1/5-4S (K1/T1) Well Summary

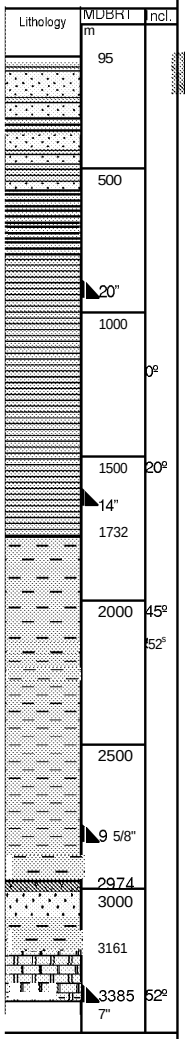
Location : 6285184 m N 477229 m E
UTM Zone 31, 3 Deg.East.

Well TD: 3090mdrkb
: 2539m tvdrkb

HESS

N.B. All depths given are Measured Depth Below Rotary Table unless stated otherwise

Casing mm	Mud	BHA	Evaluation	Hazards
30" Conductor: 30" x 1" WT, 92 - 167m Dril-Quip HD/HT90	300% excess. 1.56sg lead. 1.95sg tail.	Seawater and gel sweeps. Returns to seabed. (Weighted gel mud for anomalies in pilot hole).	Motor assy, 17 1/2" bit with 36" hole opener MWD	MWD:DIR/GR/EWR4 in 9-7/8" pilot hole).	
20" Casing 20", 131 ppf, X56 92 - 923m. Dril-Quip HD90	100% excess on lead. 1.50sg lead, 1.92sg tall. (Optional gas block slurry).	Sea water & gel sweeps. Returns to seabed.	26" motor assembly MWD	MWD: DIR. (GR/RES in 9-7/8" pilot hole).	Shallow gas anomalies- None encountered
14" Intermediate Casing: 14", 86 ppf, L80, Nom. ID 12.800" Drift 12.613" 92 - 1640m VAM TOP	TOC @ 1100m. 50% excess. 1.60sg lead. 1.92sg tail.	KCl/Glycol WBM system. 1.57sg. Returns to surface.	17 1/2" BHA Steerable motor MWD	MWD: DIR/GR/EWR4/PWD Wireline: Cancelled	Potential for kicks Potential for losses Reactive shales Steering difficulty in shales None encountered
9-5/8" Production Casing (K1): 9 5/8", 47 ppf, P110, 92 - 2873m NVAM	TOC @ 2300m. 35% excess. 1.92sg. (Optional gas block slurry).	OBM. 1.76sg. Returns to surface. Cuttings collection.	12 1/4" rotary steerable assembly used down to 2660m then rotary assembly PWD/MWD	MWD: DIR/PWD/GR/EWR4 Wireline (K1): None	Borehole stability - Minor Increasing pore pressure Potential for kicks Large right hand walk tendancy TD Selection difficult
Openhole to 3090m **MD 2593m tvdrkb**		OBM. 1.80sg. Returns to surface. Cuttings collection.	8 1/2" rotary hold assembly. PWD/MWD Coring through chalk on shows	MWD: DIR/PWD/GR/EWR4 Wireline: 2 HDIL/MAC/GR/TTRM 2B ZDEN/CNC/GR/TTRM 2C FMT/GR 2D FMT 2D	Lack of reservoir minimised problems



Stratigraphic Column, based upon original prognosis not actual depths.

Well Summary

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Mud Program

Interval #	*Mud* Type	Interval Days	BHT Deg C	Max. Dens SG	Planned Fluid Cost		Actual Fluids and Products Cost		Variance	
01	Spud Mud	2		1.050	Kr	0.00	Kr	297,400.48	Kr	297,400.48
01	Seawater	2		1.050	Kr	0.00	Kr	0.00	Kr	0.00
02	Spud Mud	1		1.050	Kr	0.00	Kr	9,390.16	Kr	9,390.16
02	Seawater	1		1.050	Kr	0.00	Kr	0.00	Kr	0.00
03	Spud Mud	5		1.050	Kr	0.00	Kr	91,474.50	Kr	91,474.50
03	Seawater	5		1.050	Kr	0.00	Kr	0.00	Kr	0.00
04	Spud Mud	7	48	1.570	Kr	0.00	Kr	13,205.56	Kr	13,205.56
04	GEM	7	48	1.570	Kr	0.00	Kr	1,809,330.75	Kr	1,809,330.75
04	Seawater	7	48	1.570	Kr	0.00	Kr	0.00	Kr	0.00
05	XP-07	11	74	1.780	Kr	0.00	Kr	5,095,273.81	Kr	5,095,273.81
05	GEM	11	74	1.780	Kr	0.00	Kr	0.00	Kr	0.00
06	XP-07	5	79	1.790	Kr	0.00	Kr	997,250.48	Kr	997,250.48
07	Seawater P&A	7	118	1.780	Kr	0.00	Kr	80,724.80	Kr	80,724.80
07	XP-07	7	118	1.780	Kr	0.00	-Kr	3,686,005.71	-Kr	3,686,005.71

Fluid Property Recap:Water-Based Fluid

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Date	Depth	Temp	SG	Fun Visc	Rheology @ 120F					Filtration					Filtrate Analysis						Sand	Retort Analysis				Rheometer Dial Reading					
						YP	Gels lbs/100 ft2			API ml/30 min	HTHP ml/30	Cake API/HTHP 32nd in	Temp		pH	Pm	Pf ml	Mf ml	mg/l	Total Hard	% by Vol	Sol % by Vol	LGS % by Vol	% by	Water% by Vol							
	mama	Deg C	SG	sec/qt	cP		10s		30m					Deg C												ppb Eq	600				6	
04/15/02	92.0		1.100	94															0	0		*0.0*	0.0		95.0	0.0					
04/15/02	0.0		1.000	0	2	-1													0	0		0.0	0.0		100.0	0.0	3	1	1		
04/16/02	937.0		1.100	105															0	0		0.0	0.0		95.0	0.0					
04/16/02	927.0		1.000	28	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1		
04/17/02	168.0		1.100	97															0	0		0.0	0.0		95.0	0.0					
04/17/02	0.0		1.000	28	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1		
04/18/02	168.0		1.100	103															0	0		0.0	0.0		95.0	0.0					
04/18/02	168.0		1.000	0	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1		
04/19/02	168.0		1.000	28	2	-1													0	0		0.0	0.0		99.0	0.0	3	1	1		
04/20/02	532.0		1.000	29	*2*	-1													0	0		0.0	0.0		99.5	0.0	3	1	1		
04/21/02	928.0		1.100	100															0	0		0.0	0.0		97.0	0.0					
04/22/02	928.0		1.000	28	2	-1													0	0		0.0	0.0		99.5	0.0	3	1	1		
04/23/02	928.0		1.600	92	52	30	6	7		2.2		1			10.20	3.40	1.14	3.05	82,000	10	0.25	15.2	1.1	2.5	76.5	2.0	134	82	63	41	7	5
04/23/02	928.0		1.000	28	2	-1													0	0		0.0	0.0		99.5	0.0	3	1	1		
04/24/02	928.0		1.600	88	51	29	6	7		2.2		1			10.10	3.60	1.10	2.94	84,000	10	0.25	15.1	0.9	2.5	76.5	2.0	131	80	62	40	7	5
04/24/02	932.0		1.600	86	50	29	6	7		2.0		1			10.20	3.50	1.10	2.85	85,000	10	0.25	15.0	0.8	2.5	76.5	2.0	129	79	60	39	7	6
04/25/02	1,019.0	15	1.600	63	23	21	6	7		2.2		1			10.40	3.45	1.15	2.90	76,000	9	0.25	15.7	1.6	2.5	76.5	2.0	67	44	31	20	6	5
04/25/02	1,180.0	33	1.600	64	31	37	5	7		2.3		1			9.70	0.90	0.80	1.38	76,000	10	0.30	16.1	2.1	0.5	78.0	6.0	99	68	52	34	7	5
04/25/02	1,345.0	35	1.600	53	34	24	5	6	6	2.6		1			9.20	1.20	0.50	0.70	75,000	200		15.6	1.8		79.0	7.5	92	58	44	29	5	4
04/26/02	1,469.0	36	1.600	57	23	20	5	8	13	2.8		1			8.90	0.10		0.25	83,000	120		16.0	2.5		78.0	6.0	66	43	33	22	5	4
04/26/02	1,646.0	36	1.600	62	25	22	6	8		2.6		1			9.10	0.15	0.05	0.25	85,000	120	0.25	16.1	2.9	2.5	75.5	10.0	72	47	36	23	6	5
04/26/02	1,646.0		1.600	60	25	22	6	8	12	2.6		1			9.10	0.10	0.05	0.25	85,000	120		18.6	8.1		75.5	6.0	72	47	36	23	6	5
04/27/02	1,326.0	33	1.600	63	23	21	6	8		2.8		1			9.00	0.20	0.05	0.15	85,000	120	0.25	16.6	3.9	2.5	75.0	10.0	67	44	33	22	6	5
04/27/02	1,646.0		1.600	61	23	21	6	8	11	2.6		1			9.00	0.20	0.05	0.25	85,000	80		18.0	6.5		76.0	8.0	67	44	33	22	6	5
04/28/02	896.0	38	1.600	64	23	22	6	7		2.8		1			9.00				85,000	120	0.25	16.6	3.9	2.5	75.0	10.0	68	45	34	23	6	5
04/28/02	1,646.0	38	1.600	70	28	22	6	8		2.4		1			9.00		0.03	0.10	85,000	120	0.25	16.6	2.7	2.5	75.0	10.0	78	50	38	24	6	5
04/28/02	1,646.0	25	1.600	62	23	22	6	7	12	2.6		1			9.00	0.25	0.05	0.20	85,000	120		15.9	2.9		78.0	8.0	68	45	35	24	6	5
04/29/02	1,646.0		1.600	63	23	20	6	8	12	2.6		1			9.00	0.10	0.03	0.10	85,000	120		15.9	2.9		78.0	10.0	66	43	32	22	6	5
04/30/02	1,646.0		1.600	60	24	23	5	8	13	2.6		1			9.00	0.10	0.01	0.20	85,000	100		15.9	2.9		78.0	8.0	71	47	35	23	5	4
05/01/02	0.0		1.600	61	24	23	5	8		2.6		1			9.00	0.10			85,000	120		16.9	5.0		77.0	0.0	71	47	34	23	5	4
05/20/02	328.0	40	1.800	90	41	19								75					0	0		30.0	3.0	54.0	16.0	0.0	101	60	46	31	11	9
05/21/02	140.0		1.000	0	1														0	0		0.0	0.0		100.0	0.0	2	1				

Fluid Property Recap:NAP-Based Fluid (API Titrations)

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Date	Depth	FL Temp	Densit	Vis	Rheology @ 120F PV	Gels lbs/100 ft2			Elect	Filtration HTHP	Cake	Temp	Whole Fluid Alk	Whole Fluid Cl	Fluid Ca	Excess Lime	Sand % by Vol	Retort Analysis Corr Sol %	LGS % by Vol	NAP % by Vol	Water % by Vol	Water Ratio	Rheometer Dial Reading 300	100	6
	m	Deg C	SG	sec/qt	cP		10s	10m	30m	Volts	mm	32nd i	Deg C	ml	mg/l		kg/m3								
05/02/02	1,649.0	30	1.700	78	30	11	8	9	9	380	*2.2*	0/2	75	0.60	30,000	9,200	2.22	0.00	25.0	1.2	53.0	20.5	72.1/27.9	71	41	30	20	6	5
05/02/02	1,700.0	39	1.800	50	29	14	8	9	9	515	4.0	0/1	75	0.75	30,000	9,200	2.77	0.00	25.5	1.1	51.0	22.0	69.9/30.1	72	43	34	21	8	6
05/03/02	1,700.0	38	1.700	57	34	11	8	11	11	675	2.8	0/1	75	0.50	22,500	17,000	1.85	0.00	26.6	3.4	52.5	20.0	72.4/27.6	79	45	35	24	8	7
05/03/02	1,870.0	50	1.800	60	35	20	11	14	14	840	2.8	0/1	75	0.70	22,500	0	2.59	0.00	26.6	2.7	52.0	20.0	72.2/27.8	90	55	42	29	11	0
05/03/02	1,953.0	57	1.800	58	34	21	11	14	14	860	2.8	0/1	75	0.70	22,500	17,000	2.59	0.00	27.1	3.8	52.0	20.0	72.2/27.8	89	55	41	29	11	9
05/04/02	2,070.0	58	1.800	56	36	23	12	16	16	870	1.8	0/1	75	1.00	31,500	15,000	3.69	0.00	27.1	4.4	52.0	19.5	72.7/27.3	95	59	45	31	12	10
05/04/02	2,200.0	59	1.800	62	38	24	15	16	16	980	1.0	0/1	75	3.20	27,000	24,000	11.82	0.00	25.9	1.8	51.5	21.5	70.5/29.5	100	62	48	34	13	11
05/04/02	2,436.0	62	1.800	60	37	26	14	16	16	910	1.6	0/1	75	0.35	25,000	16,000	1.29	0.00	27.0	3.8	52.5	19.5	72.9/27.1	100	63	49	34	14	12
05/05/02	2,535.0	62	1.800	56	40	24	14	17	17	900	1.8	0/1	75	0.35	0	16,000	1.29	0.00	27.9	3.8	52.0	20.0	72.2/27.8	104	64	49	34	14	12
05/05/02	2,584.0	56	1.800	57	38	21	14	17	17	980	1.6	0/1	75	0.35	25,000	18,000	1.29	0.00	28.5	5.0	51.0	19.5	72.3/27.7	97	59	45	31	11	10
05/05/02	2,599.0	64	1.800	56	37	23	13	17	17	920	1.8	0/1	75	0.70	27,000	16,000	2.59	0.00	26.9	2.5	52.5	19.5	72.9/27.1	97	60	47	33	13	11
05/06/02	2,660.0	59	1.800	59	39	25	14	18	18	920	1.8	0/1	75	0.35	27,000	16,000	1.29	0.00	27.4	3.0	51.5	20.0	72.0/28.0	103	64	50	35	14	13
05/06/02	2,660.0	50	1.800	60	39	24	14	17	17	910	1.5	1/0	75	0.35	27,000	18,000	1.29	0.00	27.4	3.0	51.5	20.0	72.0/28.0	102	63	50	35	14	13
05/06/02	2,660.0	48	1.800	67	37	25	14	18	18	930	1.8	0/1	75	0.35	25,000	16,000	1.29	0.00	28.5	4.9	52.5	18.0	74.5/25.5	99	62	48	33	14	12
05/07/02	2,660.0	40	1.800	70	37	25	14	18	18	920	1.8	0/1	75	0.35	25,000	18,000	1.29	0.00	28.5	4.9	52.5	18.0	74.5/25.5	99	62	47	33	14	12
05/08/02	2,675.0	52	1.800	62	36	25	14	18	18	940	1.8	0/1	75	0.70	25,000	16,000	2.59	0.00	29.0	5.9	52.0	18.0	74.3/25.7	97	61	47	32	13	0
05/08/02	2,735.0	60	1.800	60	35	25	14	15	16	950	1.5	0/1	75	3.80	23,000	16,000	14.04	0.00	28.6	2.3	52.5	18.0	74.5/25.5	95	60	46	32	12	11
05/08/02	2,820.0	69	1.800	57	34	22	14	17	17	990	1.8	0/1	75	0.25	23,500	16,000	0.92	0.00	28.1	1.1	53.5	17.5	75.4/24.6	90	56	44	30	12	11
05/09/02	2,862.0	69	1.800	56	37	22	13	18	18	1,020	1.8	0/1	75	0.35	23,500	16,000	1.29	0.00	28.1	1.1	53.5	17.5	75.4/24.6	96	59	46	33	13	11
05/09/02	2,879.0		1.800	59	37	23	13	17	17	1,000	1.8	0/1	75	0.45	25,000	16,500	1.66	0.00	28.0	1.1	53.5	17.5	75.4/24.6	97	60	47	32	13	11
05/10/02	2,879.0		1.800	60	38	22	13	17	18	1,050	1.8	0/1	75	0.40	25,000	16,250	1.48	0.01	28.0	1.1	53.5	17.5	75.4/24.6	98	60	47	32	13	11
05/11/02	2,879.0	50	1.800	63	37	23	14	19	19	1,000	2.0	0/1	75	0.20	22,000	16,000	0.74	0.00	28.6	1.3	54.5	16.0	77.3/22.7	97	60	46	31	12	10
05/11/02	2,873.0	52	1.800	64	37	22	13	17	19	1,050	1.8	0/1	75	0.25	22,500	16,000	0.92	0.10	29.1	2.5	53.5	16.5	76.4/23.6	96	59	45	30	12	11
05/12/02	2,873.0		1.800	78	38	22	14	18	19	1,020	1.8	0/1	75	0.25	22,500	16,000	0.92	0.10	29.1	2.5	53.5	16.5	76.4/23.6	98	60	45	30	12	11
05/13/02	2,879.0	45	1.800	69	37	22	13	18	18	1,000	2.0	0/1	75	0.35	22,000	16,000	1.29	0.00	28.6	1.4	54.0	16.5	76.6/23.4	96	59	46	33	12	10
05/13/02	2,850.0	52	1.800	68	35	20	13	16	18	905	2.0	0/1	75	1.50	32,000	18,000	5.54	0.10	28.7	2.4	53.0	17.0	75.7/24.3	90	55	43	29	12	10
05/14/02	2,882.0	52	1.800	67	36	21	13	16	18	902	2.0	0/1	75	1.60	33,000	20,000	5.91	0.10	28.7	3.0	53.0	17.0	75.7/24.3	93	57	43	29	12	10
05/14/02	2,955.0	52	1.800	57	36	21	12	17	18	920	2.0	0/1	75	0.25	30,000	20,000	0.92	0.00	28.8	3.1	53.0	17.0	75.7/24.3	93	57	43	29	11	10
05/14/02	3,010.0	53	1.800	68	36	21	14	17	18	966	2.0	0/1	75	1.50	30,000	20,000	5.54	0.10	28.8	3.1	53.0	17.0	75.7/24.3	93	57	44	30	12	11
05/15/02	3,034.0	50	1.800	74	38	22	15	17	18	1,030	2.0	0/1	75	1.50	30,000	20,000	5.54	0.10	28.8	3.1	53.0	17.0	75.7/24.3	98	60	46	31	13	11
05/15/02	3,063.0	52	1.800	58	39	21	13	18	19	1,031	2.0	0/1	75	5.00	33,000	24,000	18.47	0.50	28.7	2.9	53.5	16.5	76.4/23.6	99	60	44	30	11	10
05/15/02	3,091.0	50	1.800	60	36	21	14	17	18	1,040	1.8	0/1	75	1.40	33,000	22,000	5.17	0.10	28.7	2.8	54.0	16.0	77.1/22.9	93	57	44	30	12	11
05/16/02	3,090.0		1.800	73	34	20	12	15	16	1,118	2.4	0/2	75	2.80	30,000	21,200	10.35	0.10	28.8	3.1	54.5	15.5	77.9/22.1	88	54	41	28	11	10

Fluid Property Recap:NAP-Based Fluid (API Titrations)

Well : 1_5-4S (K1_T1)
Operator: Amerada Hess Norway

Date	Depth	FL Temp	Densit	Fun Vis	Rheology @ 120F					Elect Stab	Filtration			Whole Fluid Alk	Whole Fluid Cl	Whole Fluid Ca	Excess Lime	Sand % by Vol	Retort Analysis					Rheometer Dial Reading					
					PV	YP	Gels lbs/100 ft2				HTHP ml/30 min	Cake 32nd i	Temp						Corr Sol % by Vol	LGS % by Vol	NAP % by Vol	Water % by Vol	NAP Water Ratio						
	m	Deg C	SG	sec/qt	cP		10s	10m	30m	Volts			Deg C	ml	mg/l	mg/l	kg/m3							600	300	200	100	6	3
05/17/02	3,090.0		1.800	75	34	20	12	15	16	1,100	2.4	0/1	75	2.50	30,000	22,000	9.24	0.10	28.8	2.8	54.5	15.5	77.9/22.1	88	54	41	28	11	10
05/18/02	3,090.0		1.800	83	41	19	12	16	0	997	2.8	0/2	75	2.20	32,800	20,000	8.13	0.10	28.7	3.2	54.0	16.0	77.1/22.9	101	60	46	31	11	9
05/19/02	610.0		1.800	83	41	19	12	16	17	997	2.8	0/2	75	2.20	32,800	20,000	8.13	0.10	28.7	2.8	54.0	16.0	77.1/22.9	101	60	46	31	11	9

7.6 SAMPLING

7.6.1 Cuttings Samples

Cuttings samples were taken throughout the well from first returns at 928 m MDBRT. Table 7.3 outlines the sampling programme.

Table 7.3

Interval (m SS)	Sample Frequency (m)	Number of samples
928m - 2850m	10	5L tin* (partner/NPD splits onshore) 1 washed and dried
2850m - 3090m	3	5L tin* (partner/NPD splits onshore) 1 washed and dried
1700m - 3090m	50	1 x Can of Composite Geochemical,
Spud - 3090 m	BU each hole section; prior to coring; every 20m in reservoirs	1 litre bottle mud sample

Table 8.3: FMT Pressures

Pressure Interpretation Sheet

Well	1-5-4S	Permit	PL 144
Type of well	Deviated **Exploration**	Maximum Deviation	55.4 **Degrees** (a) 2903 m
Type of survey tool	FMT **10lt** Flush tank/4 lt sample chamber	Acquisition date	17/05/02
Reference Datum	MSL	Rotary Table Elevation.m	23.0
Mud Weight	1.78 sg 0.770 psi/ft		

Tool Set	MD mBDF	TVDRT mBDF	TVDSS m	Hydrostatic Press. bef. bar	Hydrostatic Press. after. bar	Fm Pr bar	DDMob mD/cP	T °C	Time \ Fm Pr G. bar/m	Fm Pr G. sg	Mud G bar/m	Mud G sg	Comments, w/ pre-test vol
1	2944.8	2507.3	2484.3	433.30	433.00			102.6	14:00	0.000	0.000	0.147	1.762	Lost seal?
2	2944.3	2507.0	2484.0	432.80	432.50	431.50		103.7	14:07	0.147	1.758	0.147	1.760	Still buildina very slowlv
3	2945.3	2507.6	2484.6	432.70	432.50	431.03	1.8	104.9	14:20	0.146	1.755	0.147	1.759	Good test?
4	2954.0	2512.6	2489.6	433.84	433.60			105.5	14:30	0.000	0.000	0.147	1.760	Tight
5	2953.4	2512.3	2489.3	433.40				105.9	14:33	0.000	0.000	0.147	1.759	Tight
6	2953.2	2512.2	2489.2	433.40	433.40			107.2	14:45	0.000	0.000	0.147	1.759	Tight
7	2973.5	2523.9	2500.9	436.30	436.00			107.6	14:57	0.000	0.000	0.147	1.762	Tight
8	2995.6	2536.7	2513.7	438.80	438.55			108.0	15:22	0.000	0.000	0.146	1.763	Tight
9	3019.0	2550.3	2527.3	441.70	441.10	427.00		108.9	15:44	0.141	1.710	0.146	1.765	Still building verv slowlv last pressure
10	3035.0	2559.7	2536.7	442.90	442.60			110.2	15:57	0.000	0.000	0.146	1.764	Tight
11	3029.5	2556.4	2533.4	441.75	441.75	435.98	13.1	111.1	16:02	0.144	1.742	0.146	1.761	Good test?
12	3025.0	2553.8	2530.8	441.10	441.10			111.1	16:10	0.000	0.000	0.146	1.761	Tight
13	3020.0	2550.3	2527.3	440.40	440.20	435.20	0.7	111.3	16:15	0.144	1.743	0.146	1.760	Good test?
14	3025.3	2554.0	2531.0	441.20	440.90	435.50	0.5	111.3	16:30	0.144	1.741	0.146	1.761	Still buildina sliahtlv after 20 mins 0.1 bar/min
15	2999.5	2538.7	2515.7	437.90	437.90			111.0	17:00	0.000	0.000	0.146	1.758	Tight
Sampling														
16	2944.4	2507.0	2484.0	432.45	432.52			109.2	17:16	0.000	0.000	0.147	1.758	Tight
17	2944.9	2507.3	2484.3	432.80	432.50	431.00	0.7	109.3	17:20	0.146	1.756	0.147	1.760	Almost stable after 10 mins
18	2945.4	2507.6	2484.6	432.90	432.70	431.10	2.5	108.7	17:35	0.146	1.756	0.147	1.760	Opened 10 lt flush tank no indication of being filled after an hour, aborted, opened 4

GEOCHEMICAL INTERPRETATION REPORT

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TITLE

Analyses of Potential Shows, Well NOCS 1/5-4S

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GEOLAB PROJECT NO.	DATE
62612	July 23rd, 2002
PROJECT MANAGER	QA RESPONSIBLE
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REPORT NO./FILE 62612	FRONT PAGE **1 of 1**

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List of Tables

1. Samples analysed

1. Summary

Analyses of cuttings, mud and FMT samples from
sections of well NOCS 1/5-4S were performed in order to assess the possibility for the presence of migrated hydrocarbons. The well samples were heavily impregnated with contaminant additives from the XP07 mud system used.

Introduction:

Geolab Nor was requested to propose an analytical program in order to investigate possible shows occurring in two intervals of 'Tyr' well NOCS 1/5-4S, this well being drilled with organic mud additives (mud XP07) causing strong masking of any free hydrocarbons. The two intervals of interest comprise an upper interval (spls 2480 - 2590 m) and a lower interval (spls 2942 - 2954 m) Shows were suspected at 2480 - 2590 m by fluorescence, including possible fault-associated hydrocarbons at 2560 m. An FMT at 2945 m was reported to have an oily film.

Besides bagged wet cuttings samples, 2 mud samples, and 2 FMT samples suspected of having natural hydrocarbons were made available. A list of the samples analysed is shown in Table 1. All depths quoted are MD.

It was suggested to firstly perform thermal extraction GC of non-cleaned samples and of the muds in order to get an overview of the degree of contamination and of any migrated hydrocarbons present. The reason for analysis of raw samples is that although cleaning methods are available for removal of organic mud additive components, even the most rigorous methods are inefficient for certain additives, and at the same time remove also any naturally occurring (migrated) hydrocarbons, i.e. compounding the problem in the cases where only traces of the latter are present. The FMT samples would also be extracted and subjected to GC analysis. It was then proposed to perform detailed characterisation of any migrated hydrocarbons detected, possibly including correlation with other oils from the area. This would be accomplished by solvent extraction, separation and GC-MS / carbon isotope analyses.

All samples were analysed by thermal extraction GC (GHM). This included the FMT samples, which were analysed by injecting the (mainly water) samples onto a pre-cleaned sand substrate which was then gently dried sufficiently for analysis. This allowed a more direct comparison between all samples.

Chromatograms from the wellsite of the mud were also supplied by the client (also included in this report). These were however at such a scale that they showed only the six major components of the drillmud additive.

Table 1 Analytical Program for SOS 1/5-4S

SampleDepth(m)	Sample Type	Headspace and Occluded Gas	C1-C4 Gas Composition & Isotope Comp.	Lithology Description	Washing	Picking for screening	Picking for screening before special treatment	Sample preparation (swc,ccp,other)	Leco TOC	Rock Eval 6	Vitrinite Reflectance	Visual Kerogen	GHM Thermal extraction GC	Picking for Extraction	Topping	Iatroscan	SOXTEC Extraction	MPLC & Deasphaltene#	EOM GC	Whole Oil GC	Sat GC	Aro GC	EOM GCMS	Sat GCMS	Aro GCMS	C isotope of fractions
Table nos.																										
1646	mud												x													
2480	SS				x	x							x													
2510	SS				x	x							x													
2540	SS				x	x							x													
2560	SS				x	x							x													
2585	mud												x													
2590	cut				x	x							x													
2942	cut				x	x							x													
2945	cut				x	x							x													
2951	cut				x	x							x													
2954	cut				x	x							x													
'PVT tank'	FMT							x					x													
'Pre flush tank'	FMT							x					x													
Nos of spls	13				9	9		2					18													

Chromatogram

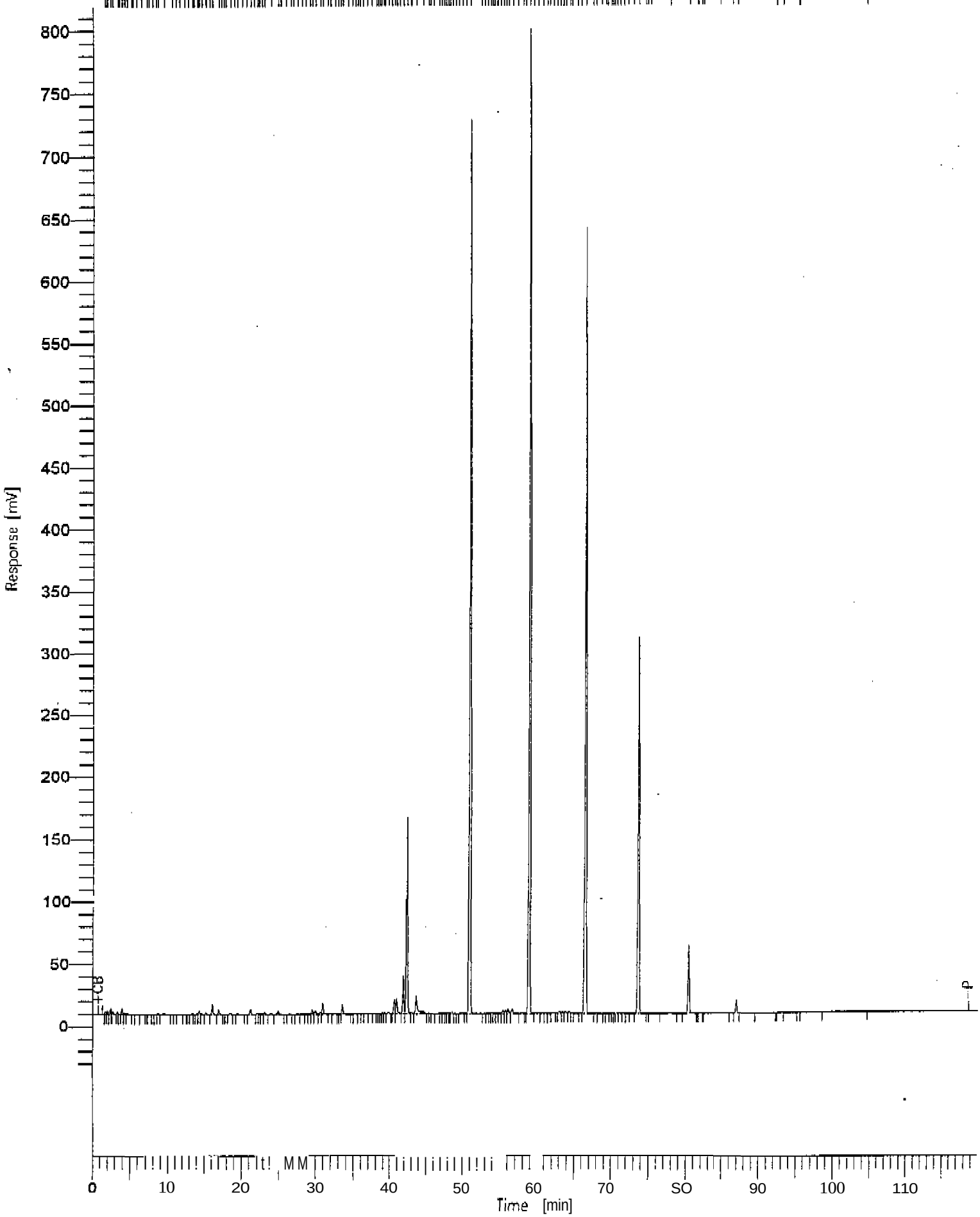
Sample Name : Elf XP07 Mud
FileName : C:\TC4\HP3\ISRB.RAW
Method : HS40.MTH
Start Time : 0.00 min
Scale Factor: 0.0

End Time : 120.00 min
Plot Offset: -33 mV

sample #:
Date : 25/01/01 16:14
Time of Injection: 25/01/01 11:10
Low Point : -33.38 mV
Plot Scale: 8S2.fi mV

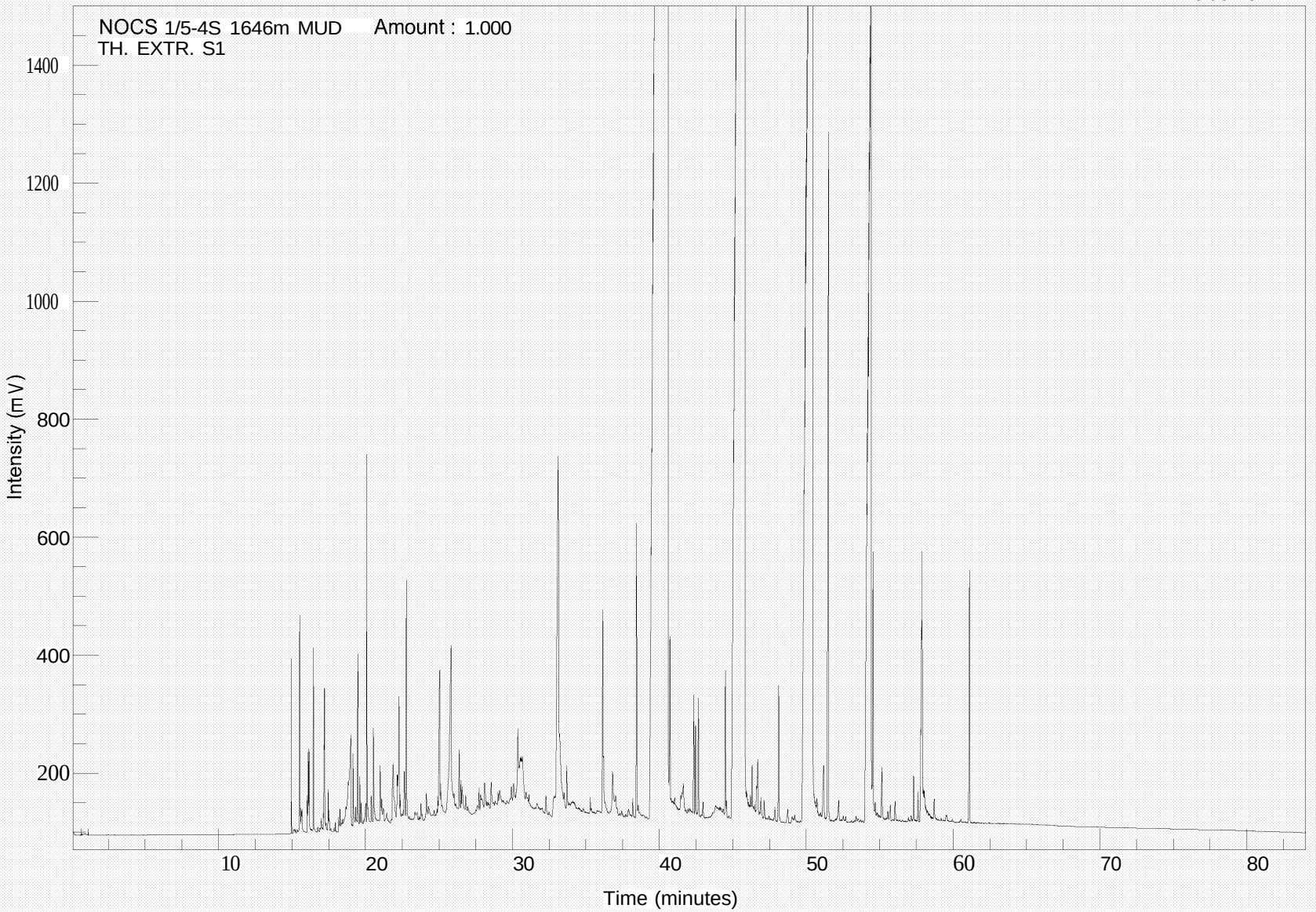
High Point : 819.24 mV

-78.00
-80.57
-81.74
-84.71
-86.36
-92.24
-15.48
-104.47



Analysis Name : [62612] 24 W76AUTOA,7,1.

Multichrom



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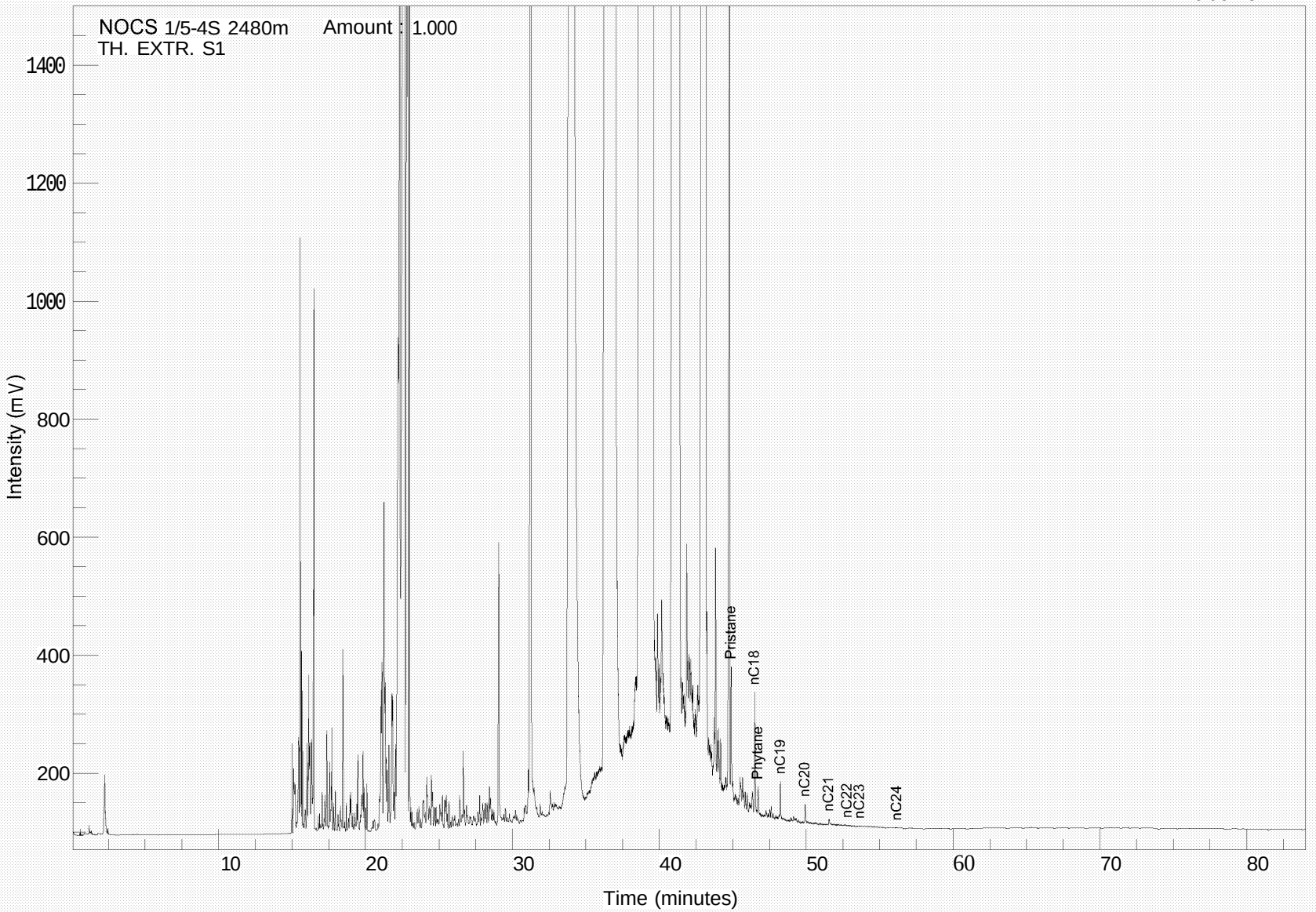
Multichrom



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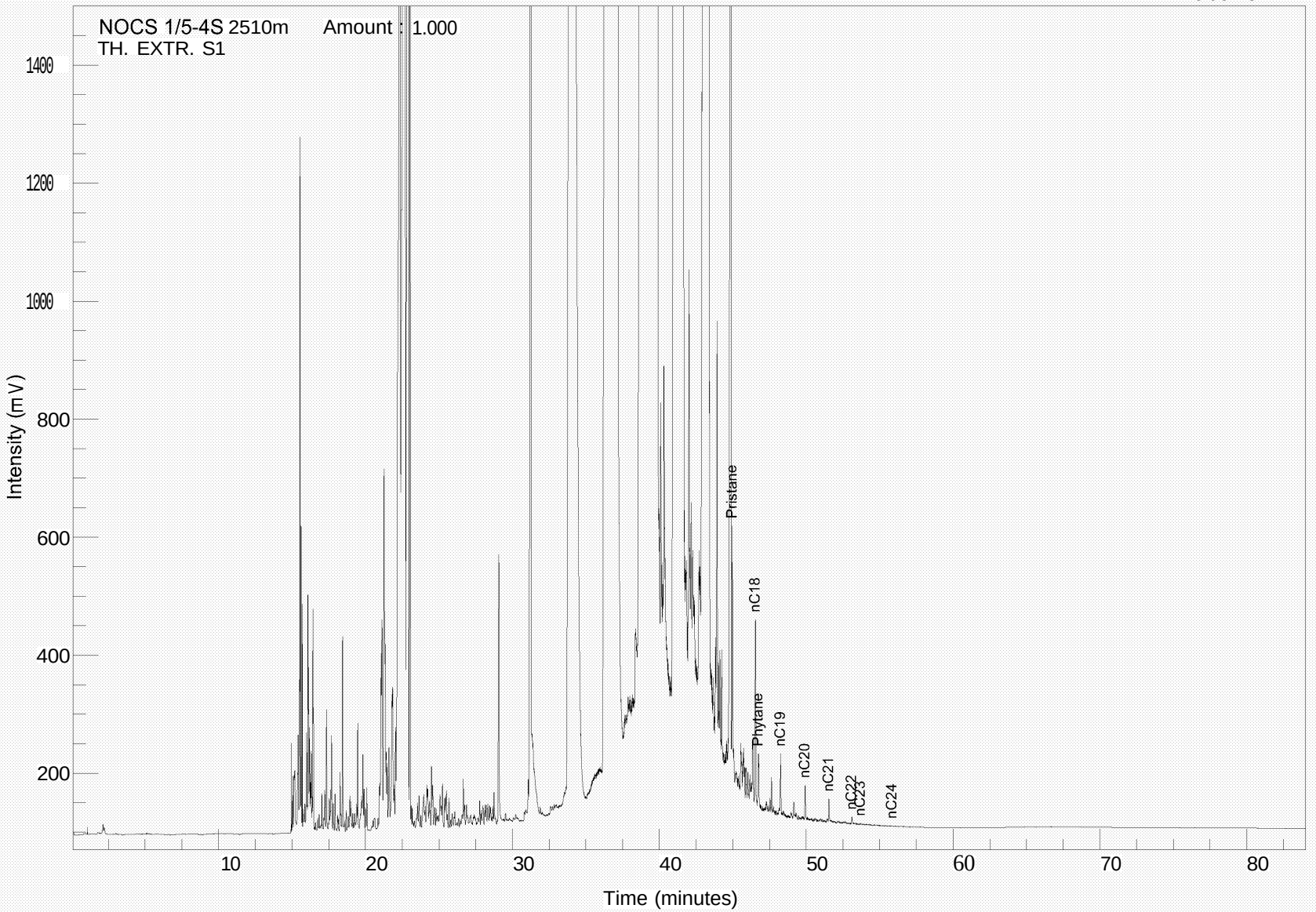

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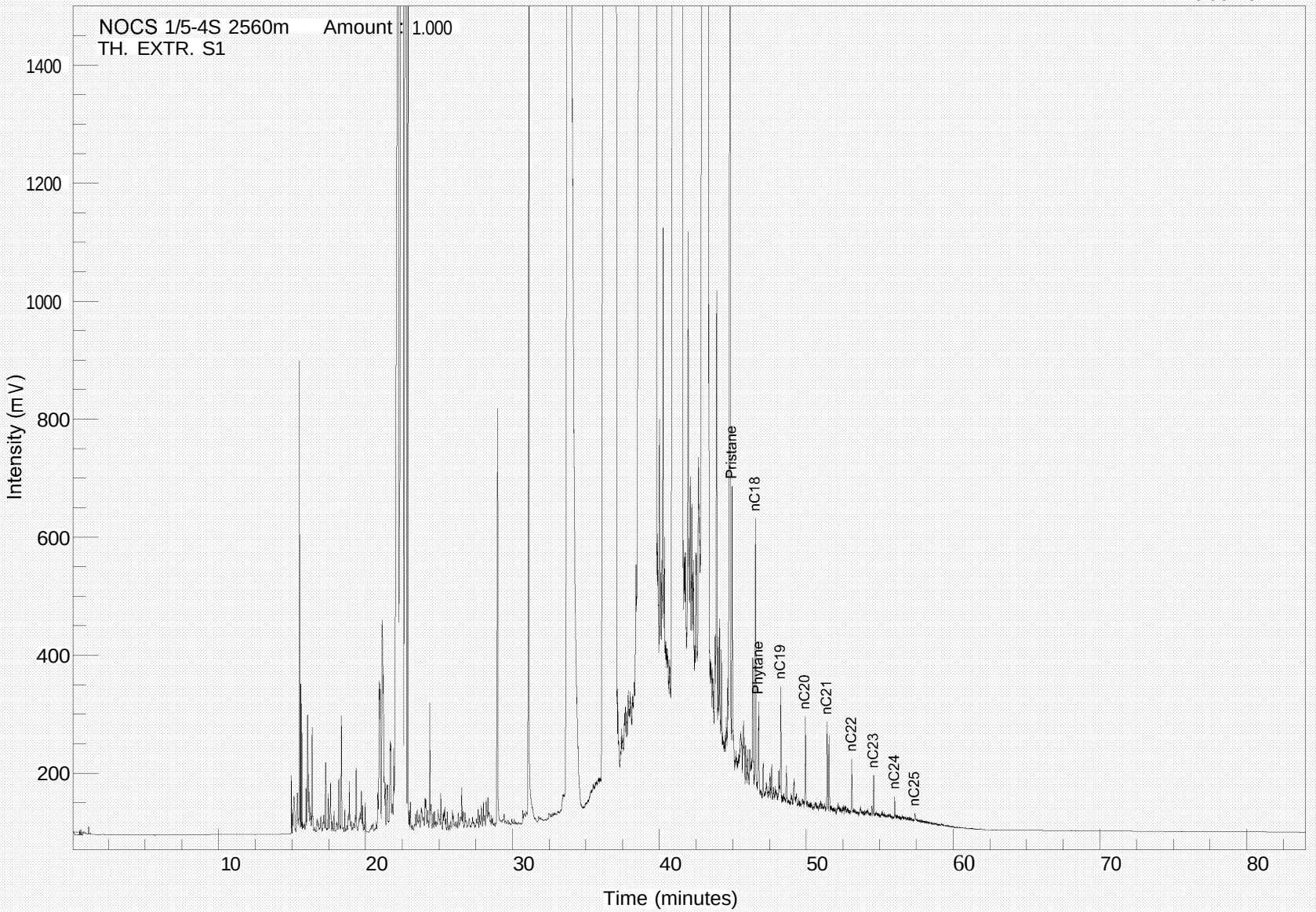

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Analysis Name : [62612] 24 W762540,1,1.

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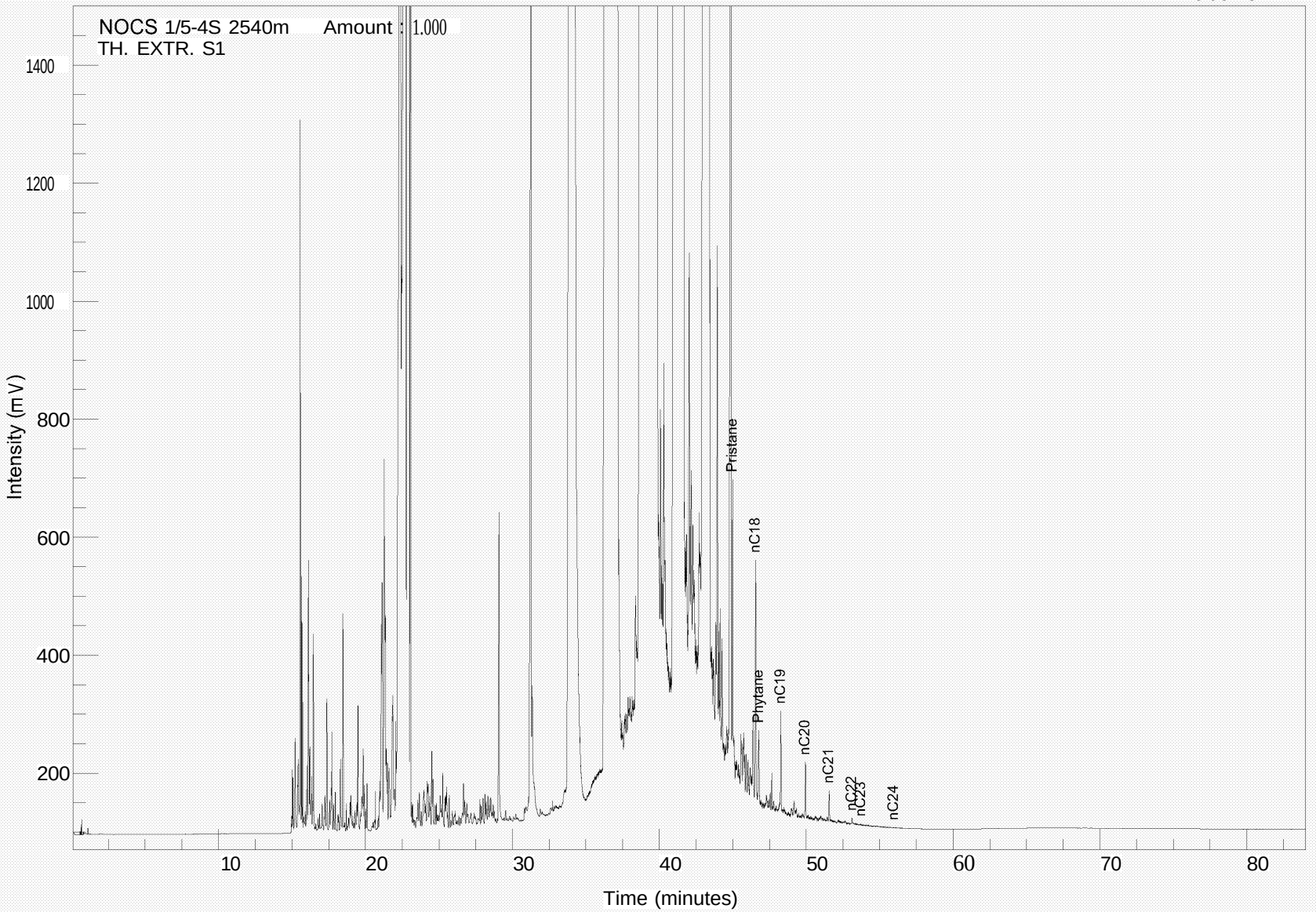

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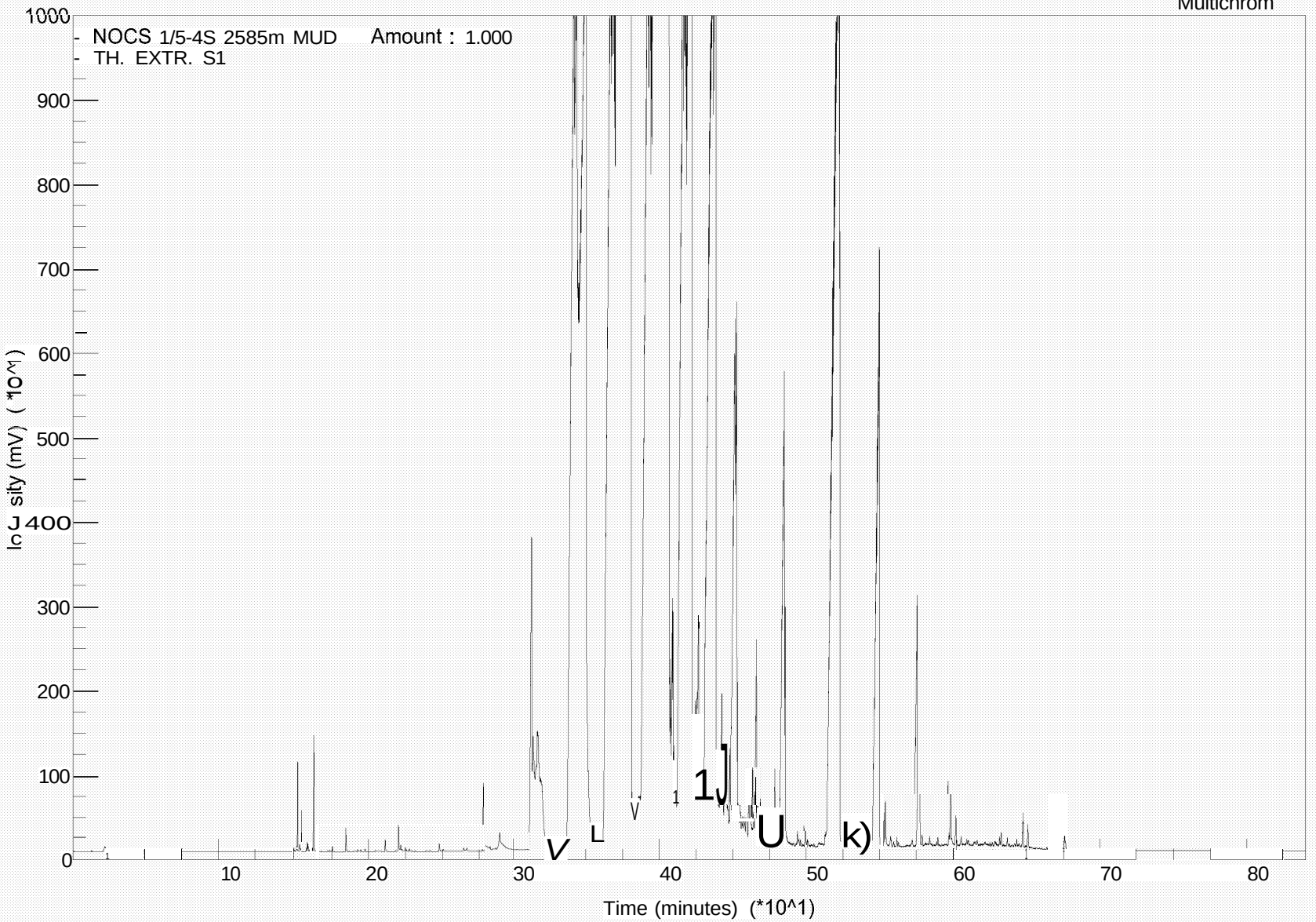

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Analysis Name : [62612] 24 W76AUTOA,2,1.

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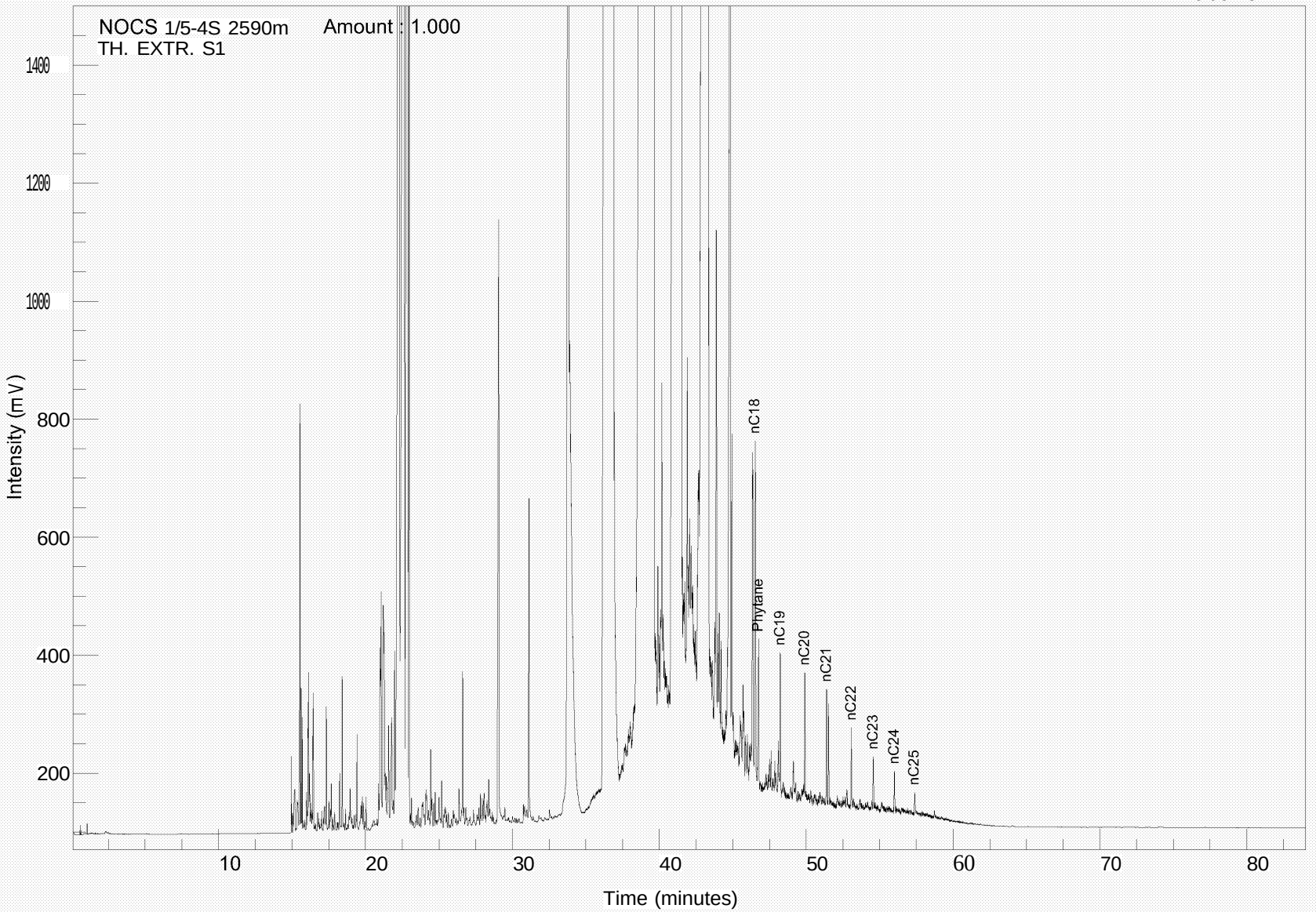

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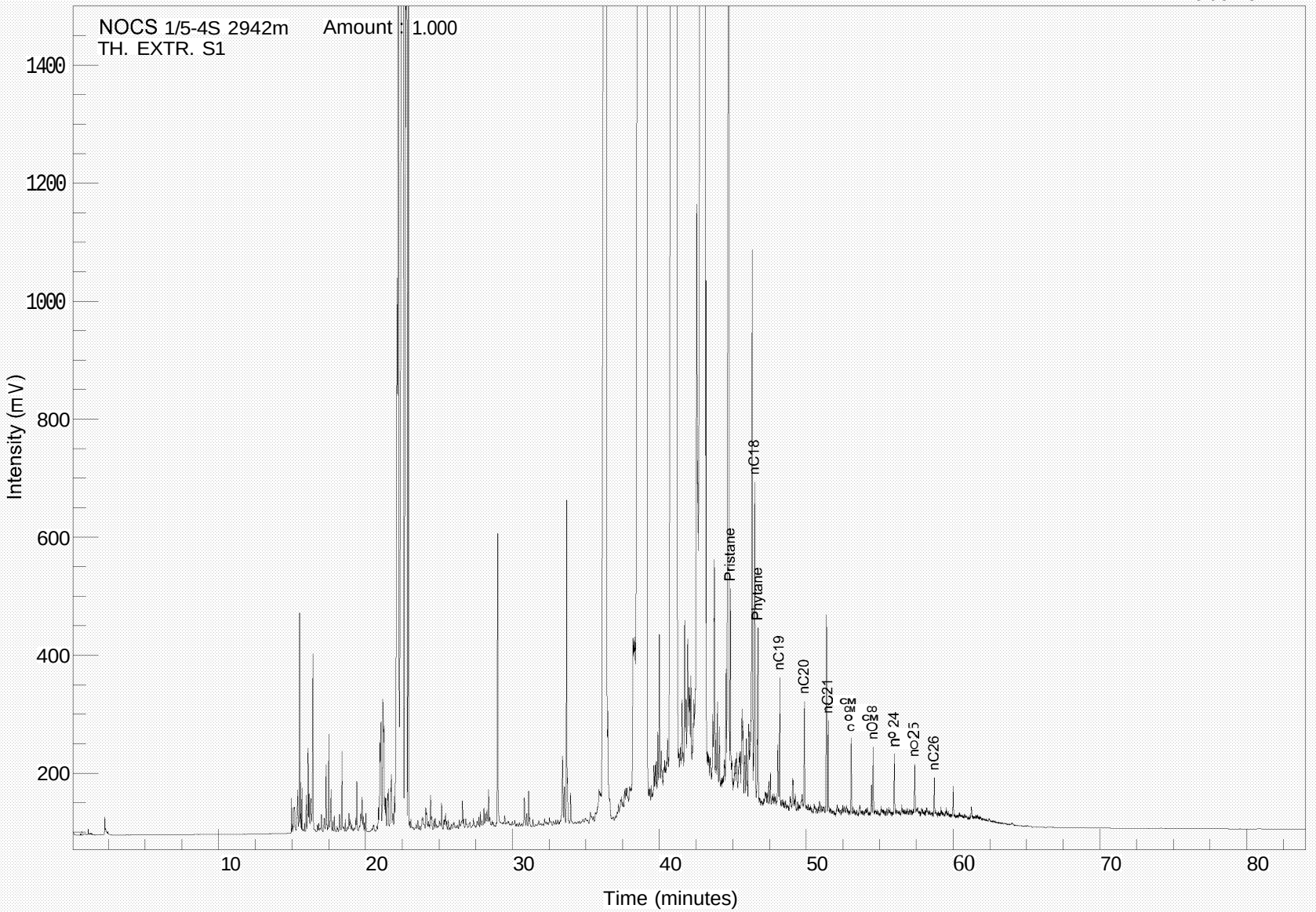

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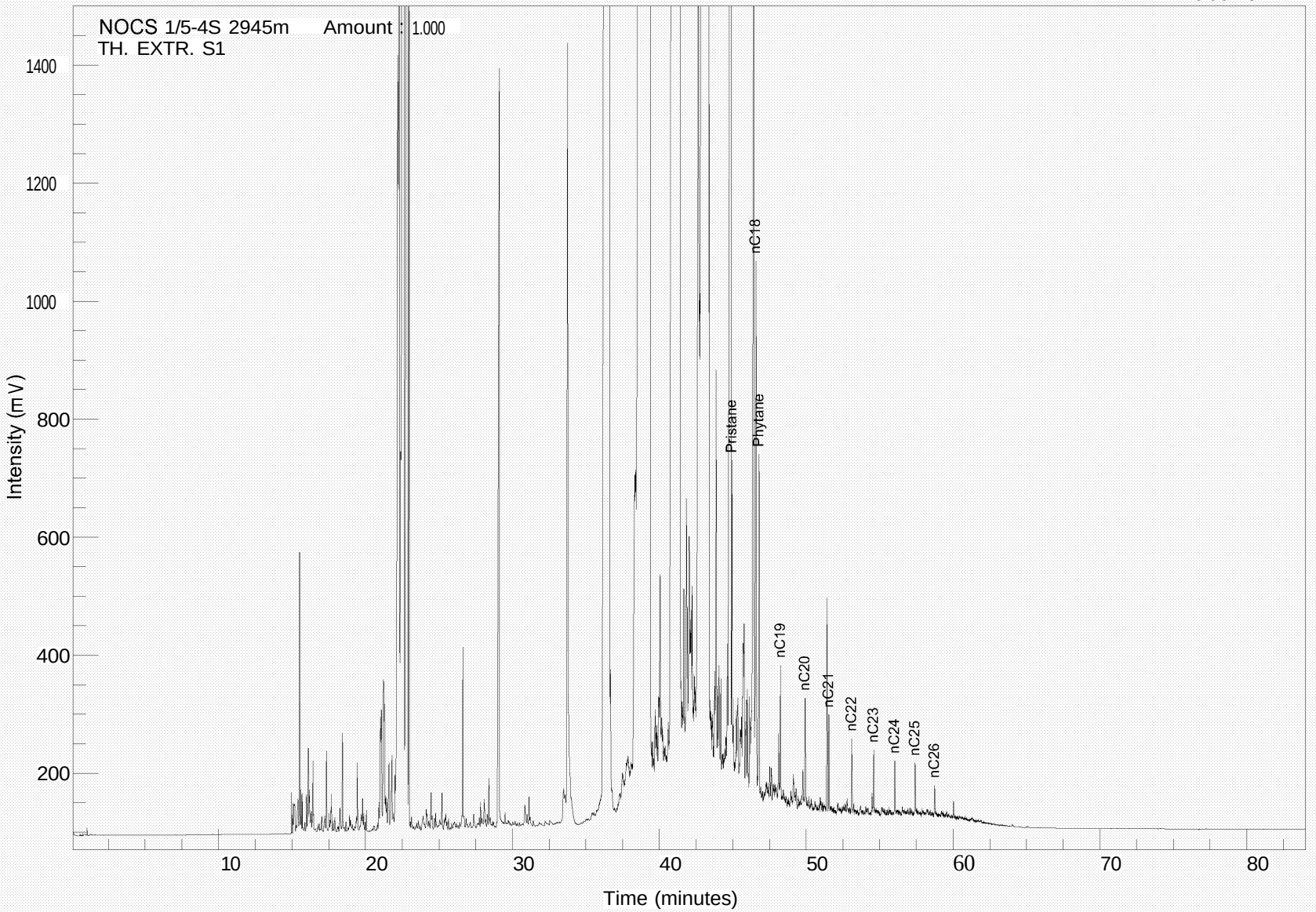

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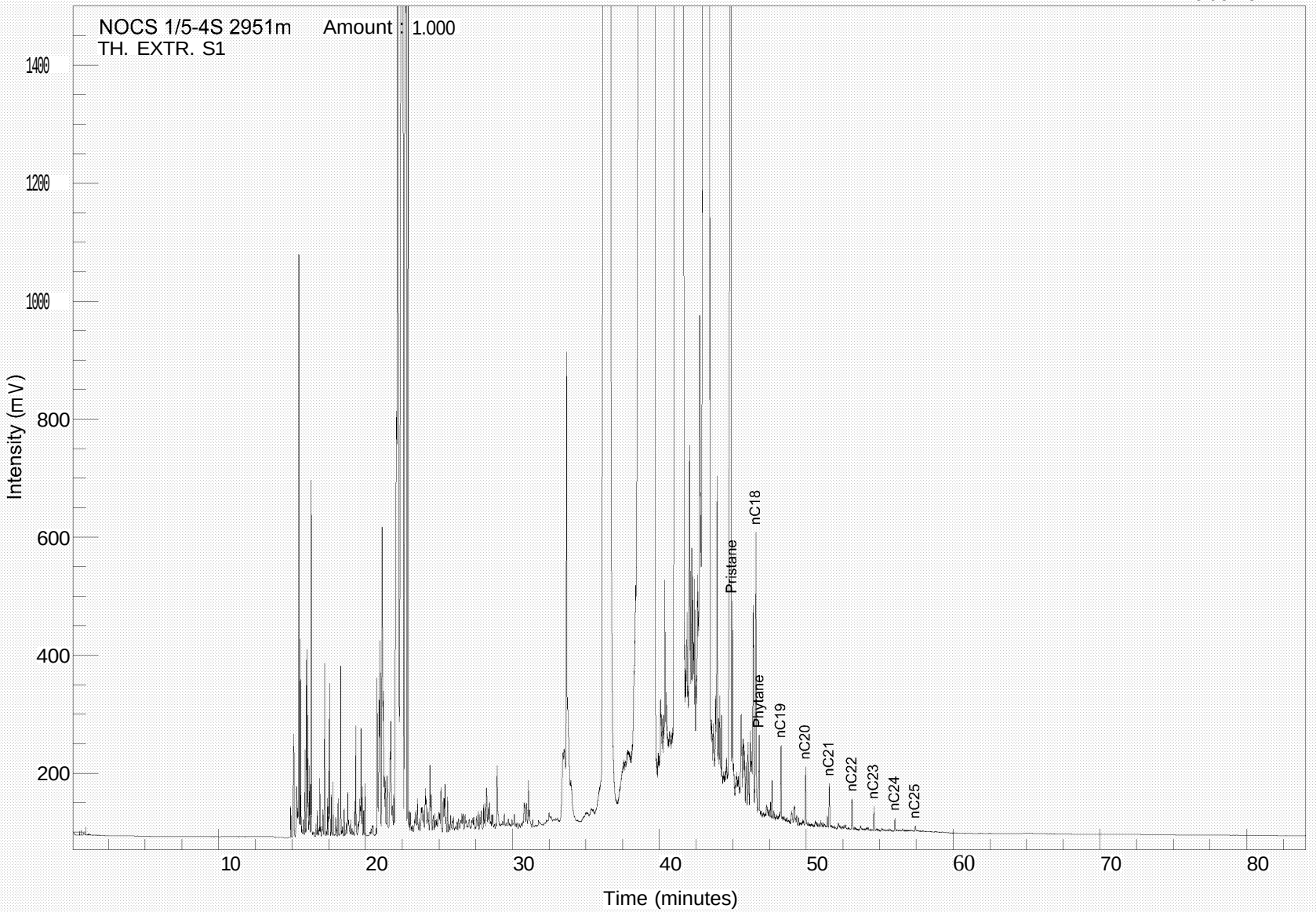

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Reported on 25-JUN-2002 at 09:43

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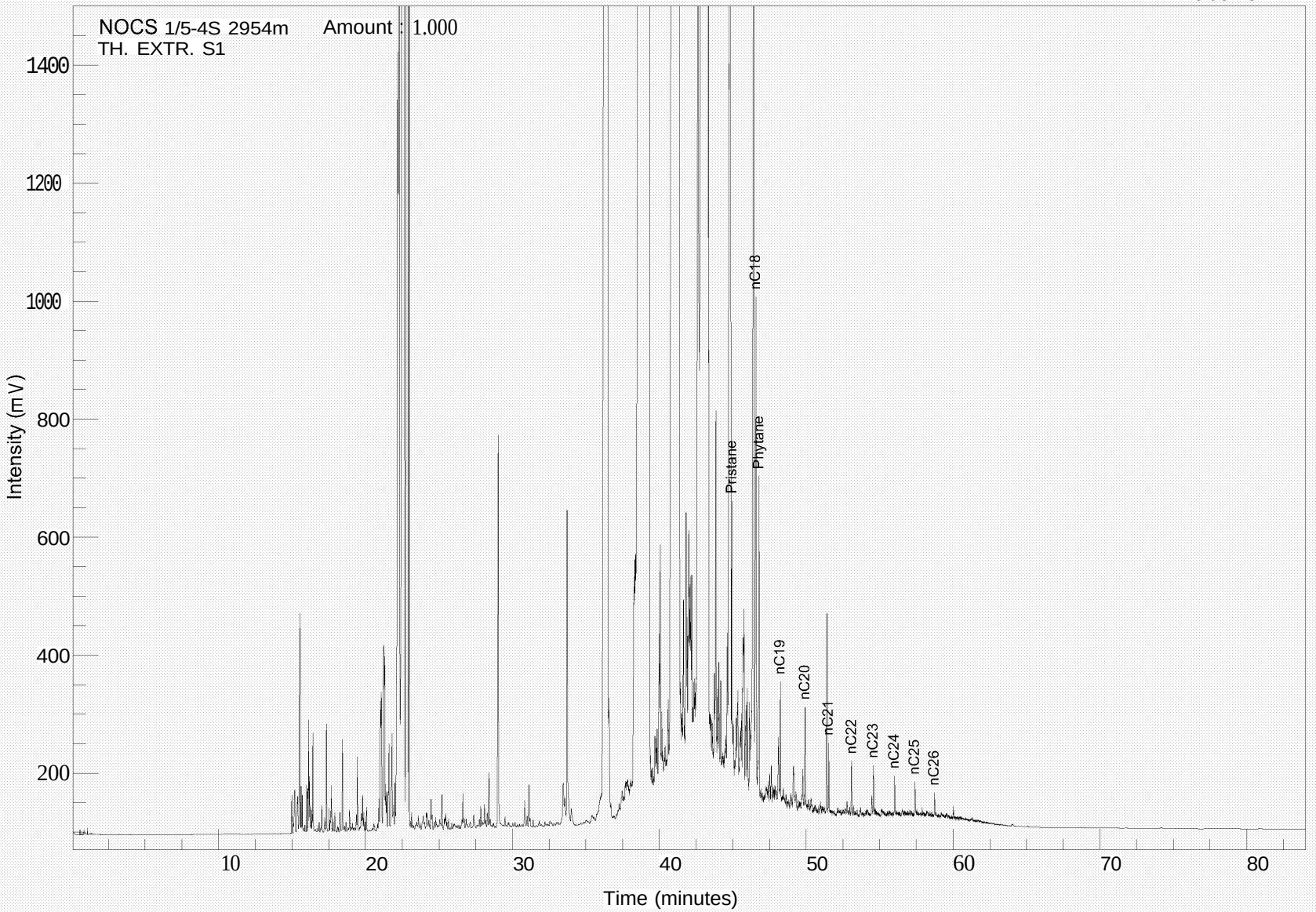

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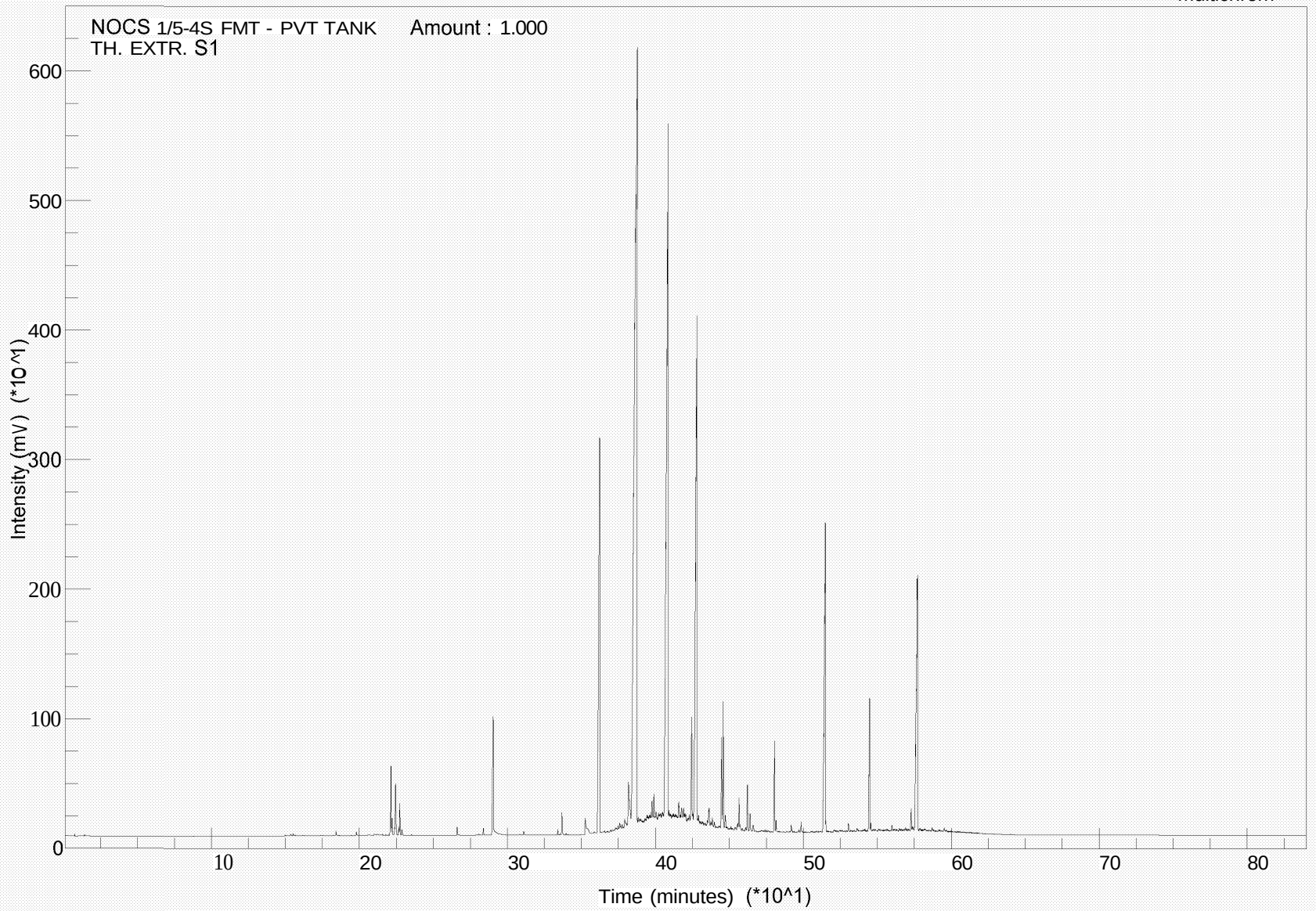

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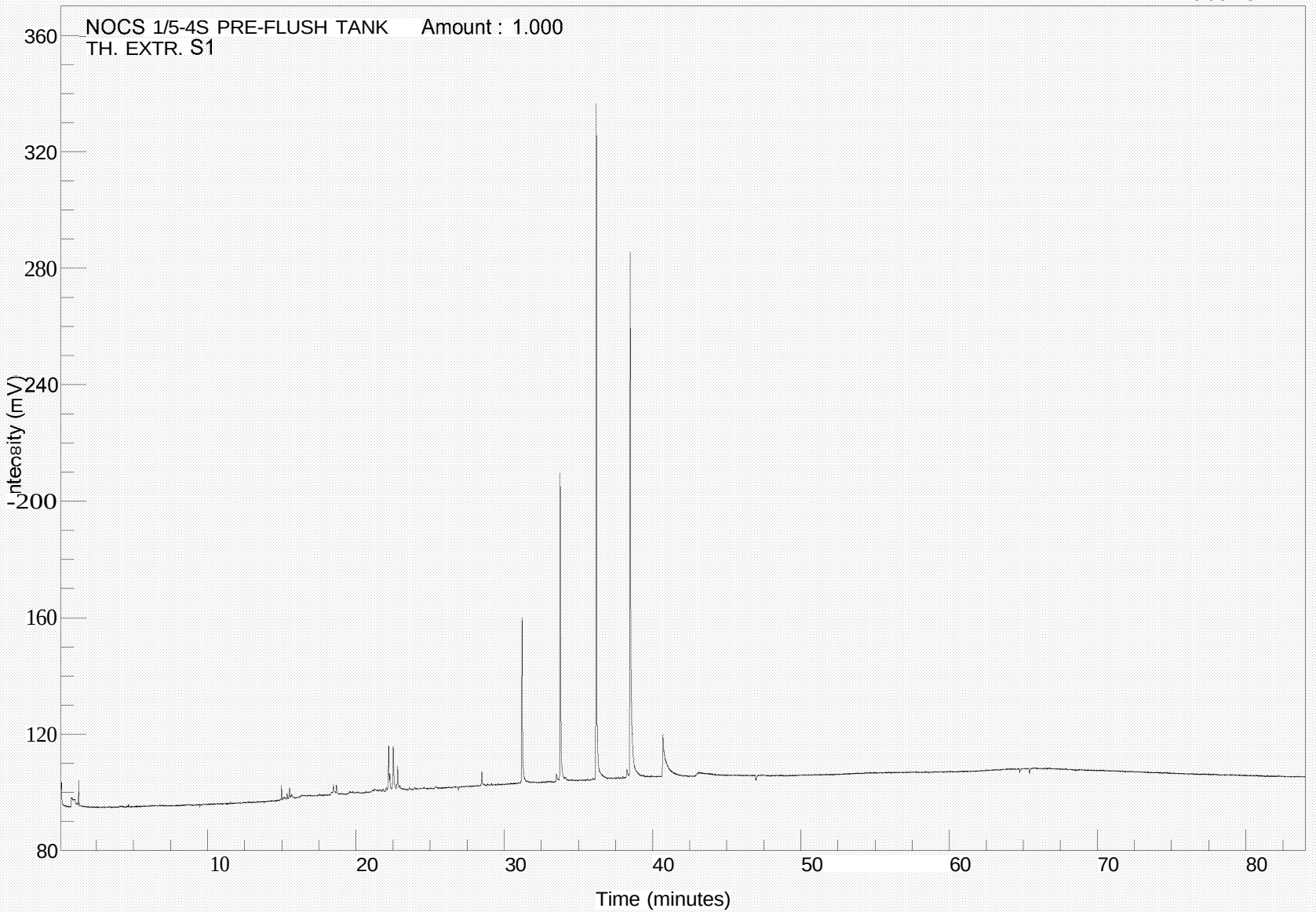

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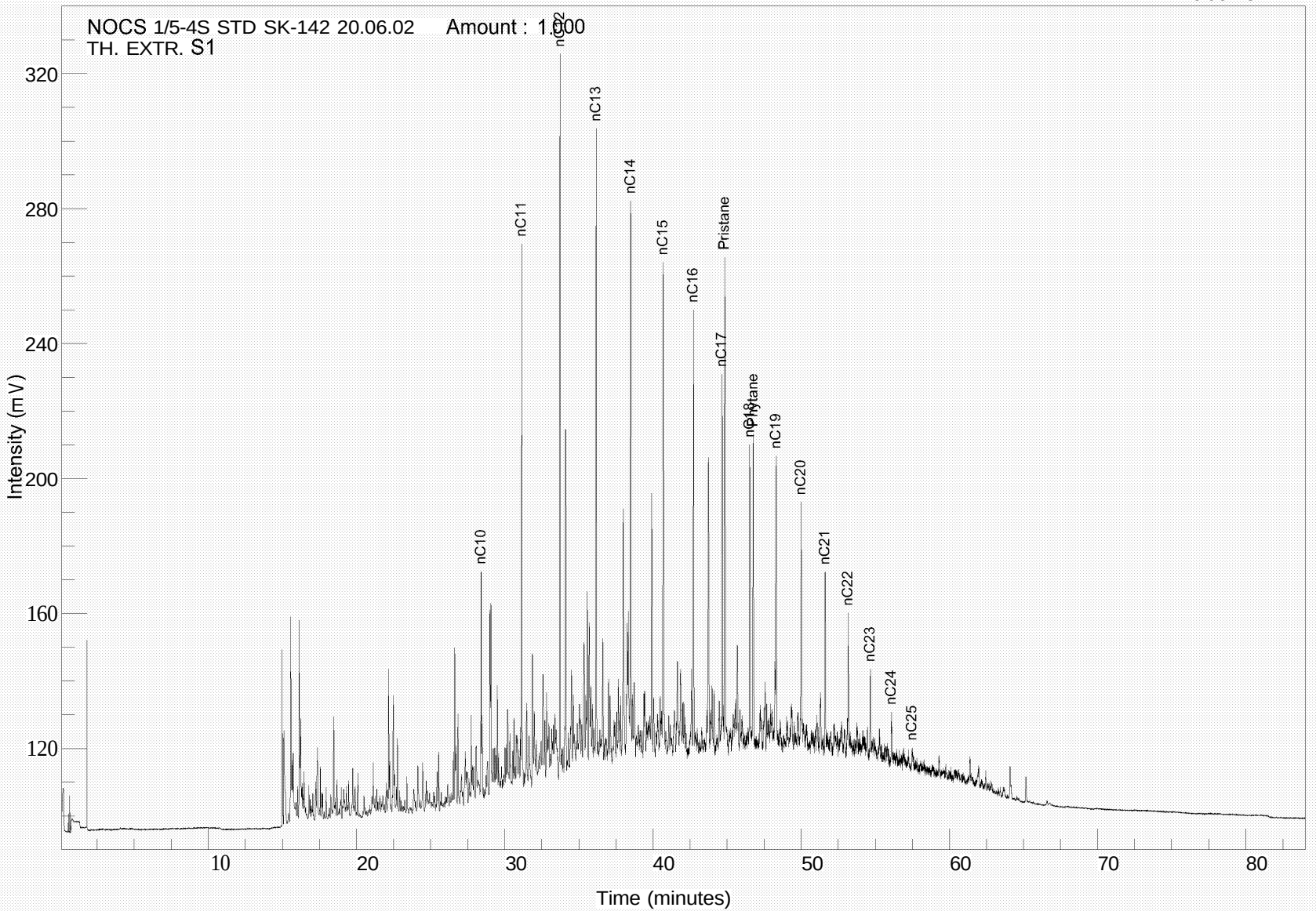

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