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AMOCO PRODUCTION COMPANY  
RESEARCH CENTER

SOURCE ROCK EVALUATION

Jurassic Shale, Amoco 2/5-6 Well, Norwegian North Sea

Petroservices Group

Mary Squire Stewart

Technical Service 785655CN  
Requested by R. F. P. Hardman  
AMOCO NORWAY

*R. F. P. Hardman (10-19-78)*  
*R. F. P. Hardman 78.10.19*

- Distribution: R. F. P. Hardman - Amoco Norway  
K. A. Shepard - London  
G. M. Dow - London  
R. L. Blanton - Attn: E. A. Nelson - AIOC, Houston  
K. W. Ciriacks - AIOC, Chicago

Subject: Jurassic Shale, Amoco 2/5-6 Well, Norwegian North Sea  
(Figure 1)

#### INTRODUCTION

Source rock evaluation was requested on Jurassic samples from 3654 m to 3926 m in this well. Elemental analyses have not been used for the evaluation due to poor sample recovery.

#### CONCLUSIONS

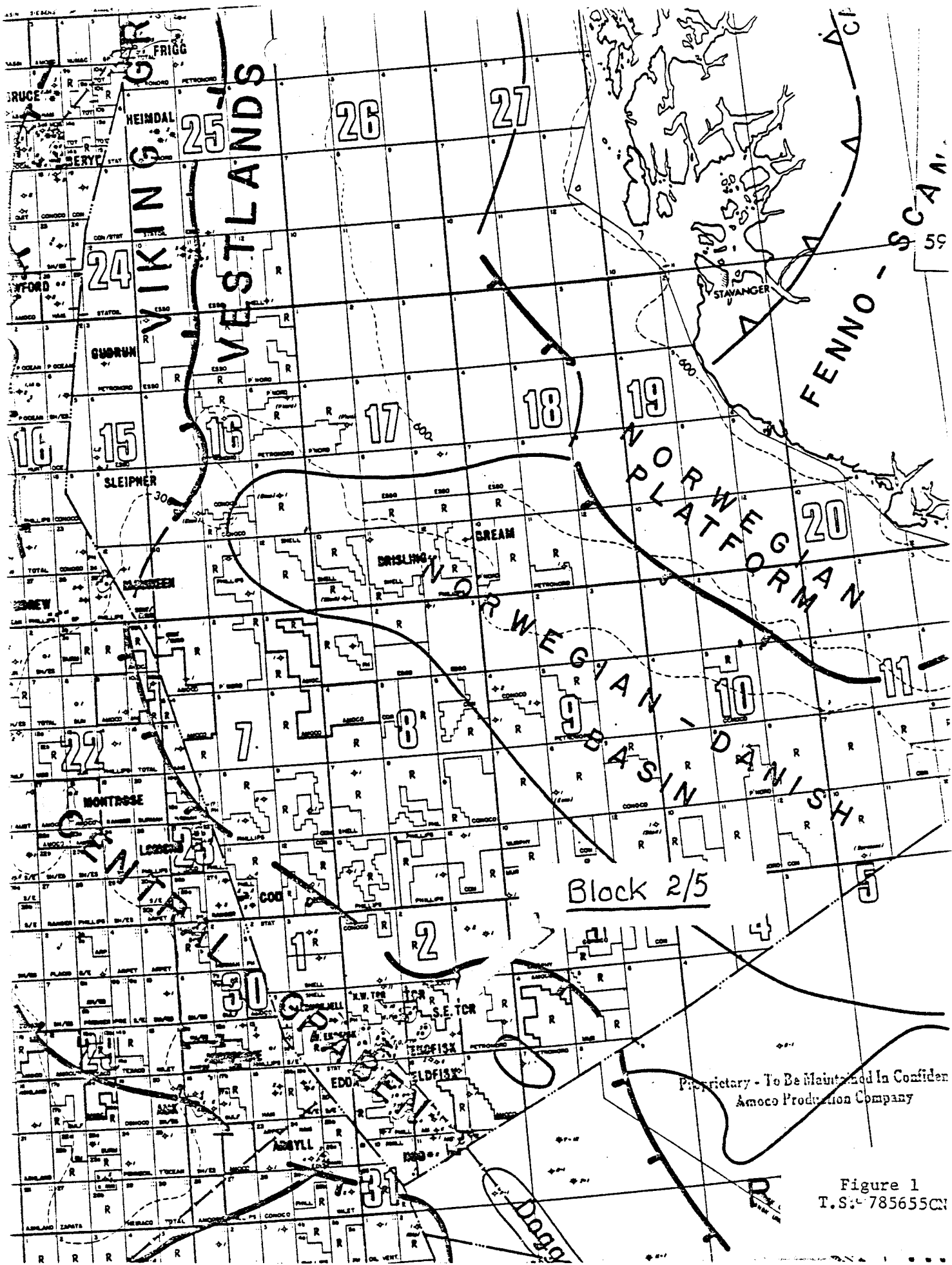
1. This Jurassic section represents a very good hydrocarbon source (total organic carbon from 1.6% - 6%, Table 2).
2. High bitumen/total organic carbon ratios (Table 2), the mature appearance of the saturated hydrocarbon chromatograms (Figures 2, 3), visual examination, and vitrinite reflectance (Figure 4) show the kerogen to be wet gas-oil generating type at peak oil generation level of diagenesis.
3. Extracts from the Jurassic shales correlate with North Sea Type J oil. Correlation is based primarily upon similarities in infrared spectra and carbon isotope ratios (Table 2). The pristane/phytane ratios (Table 2) are slightly higher than most of those for the oils (oils average a ratio of approximately 1.5 compared to 2.0 for most of these extracts). However, there are some oils with ratios of 2.0 or greater so the extract ratios are not out of line. Jurassic shales, particularly the Kimmeridgian, are widely accepted as the source for North Sea oil.

4. Two populations of kerogen are distinguishable on the vitrinite reflectance histograms for samples at 3654 m and 3704 m (Figure 4). The population with higher reflectivity probably represents reworked material. However, as the indigenous kerogen becomes more mature, the reflectance values begin to converge with those for the reworked material, making the two groups indistinguishable. Therefore, the vitrinite reflectance values for three samples at 3848-3856 m, 3894 m, and 3922-3926 m should be considered approximations.

Mary Squire Stewart

Mary Squire Stewart

MSS:mll:of/s



Proprietary - To Be Maintained In Confidence  
Amoco Production Company

Figure 1  
T.S. 785655C1

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OFFICE AINO DISTRICT EUROPE  
AUTHORIZED BY R.F.P. MANDHAN  
TECHNICAL SERVICE NUMBER 5055

SOURCE ROCK SUMMARY  
TABLE 1  
DATE 10/09/78

SAMPLE NUMBER		SMPL. TYPE	FORMATION	AGE	LITHOLOGY	DEPTH METERS		PETROLEUM GENERATION CAPABILITY	KEROGEN TYPE (OIL/GAS)	STAGE OF DIAGNOSIS	THERMAL EVOLUTION ANALYSIS	
LAB NO.	F.L.D. NO.					TOP*	BASE				GENERATED PPH	*GEN/TOT. O.C.
STATE NORWAY	COUNTY	WELL LOCATION										
WELL NAME	ASOCU NORWAY	LEASE	NO. 275-6									
N-58		CT	JUR SH	<i>Gas fm</i> <i>Gas fm</i>	3654		VERY GOOD	Wet gas-oil	Peak oil	11298	.30	
N-59		CT	JUR SH		3764		VERY GOOD	Wet gas-oil	Peak oil	5736	.16	
N-60		CT	JUR SH		3776		VERY GOOD	Wet gas-oil	Peak oil	2346	.13	
N-61		CT	JUR SH		3796	3504	VERY GOOD	Wet gas-oil	Peak oil	2550	.16	
N-62		CT	JUR SH		3848	3856	VERY GOOD	Wet gas-oil	Peak oil	6348	.20	
N-63		CT	JUR SH	3894		VERY GOOD	Wet gas-oil	Peak oil	4710	.21		
N-64		CT	JUR SH	3922	3926	VERY GOOD	Wet gas-oil	Peak oil	9834	.16		

\* Also indicates convertability

Table 1  
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AMOCO PRODUCTION COMPANY  
RESEARCH CENTER

OFFICE: AUC  
TECHNICAL SERVICE NUMBER

DISTRICT: EUROPE  
5655

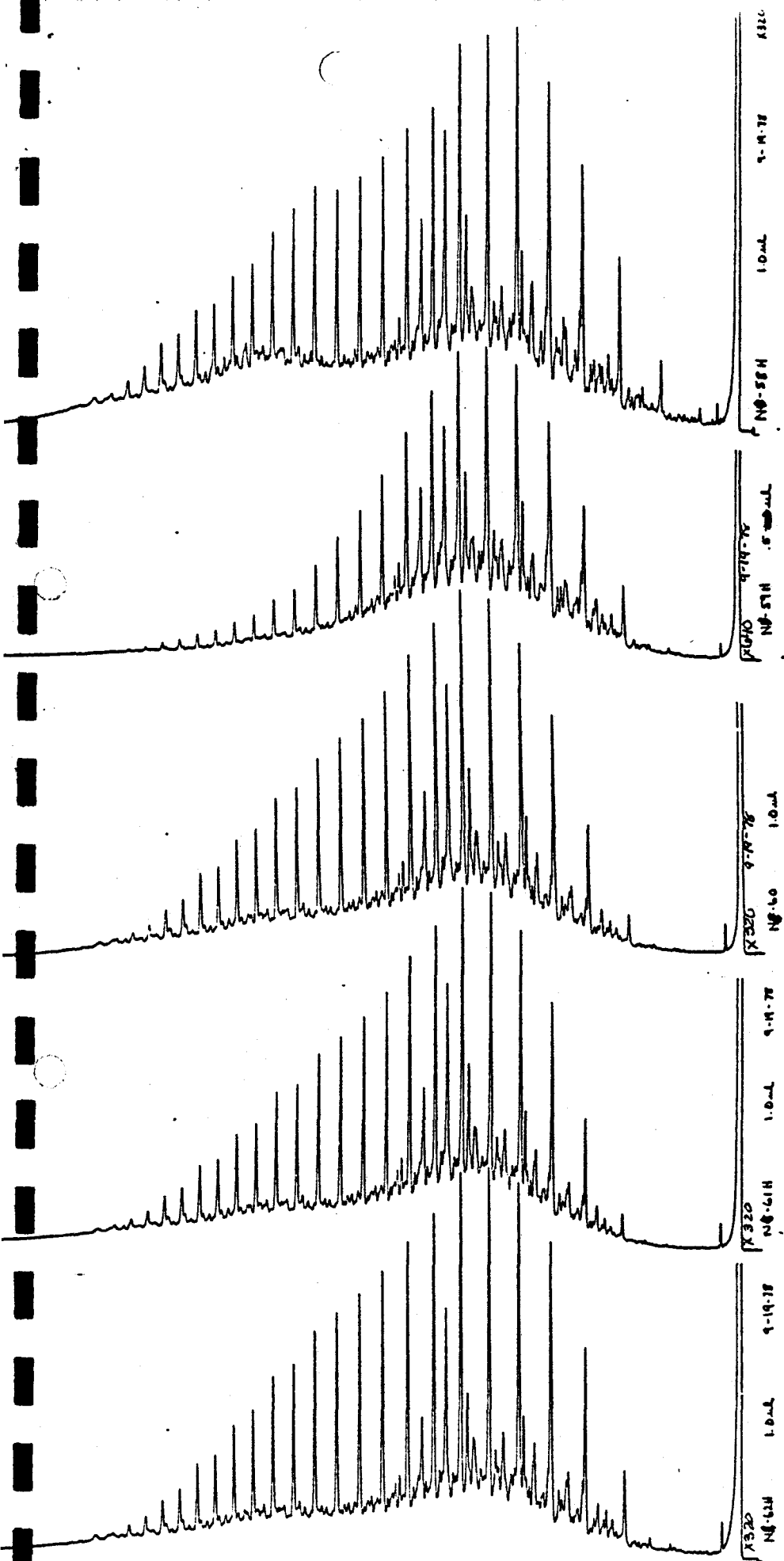
SOURCE ROCK DATA  
TABLE 2  
DATE: 10/09/78

SAMPLE NUMBER	DEPTH METERS TOP TO BOTTOM	COL. AGE	INSUL. RESID %	TOTAL ORG C WTK	BITUMEN SBL/AF PPM	SAT HC SBL/AF PPM	SAT HC/BITUMEN	BITUMEN/TOTAL ORG C	$\delta^{13}C$ Aliphatic	Optical Rotation	Pris/Phy		
STATE: NORWAY COUNTY: AMOCO NORWAY													
WELL NAME: AMOCO NORWAY WELL LOCATION: NO. 2/5-6													
N-58	3654	JUR	82	3.7	118	6572	62	3429	.52	.18	-28.3	1.18	1.6
N-59	3704	JUR	79	3.7	221	12203	149	8202	.67	.33	-28.7	1.02	1.5
N-60	3770	JUR	84	1.8	30	1697	13	706	.42	.10	-28.1	.97	1.9
N-61	3770	JUR	81	1.6	35	1953	15	614	.42	.12	-28.0	.65	1.9
N-62	3848	JUR	85	3.2	83	4633	26	1993	.43	.15	-27.4	.49	2.1
N-63	3894	JUR	84	2.2	59	3266	26	1425	.44	.15	-27.8	.86	2.0
N-64	3924	JUR	83	6.0	72	4012	32	1801	.45	.07	-27.9	1.30	1.8

SBL/AF = (PPM X .0180)

3770

Table 2  
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Amoco Production Company



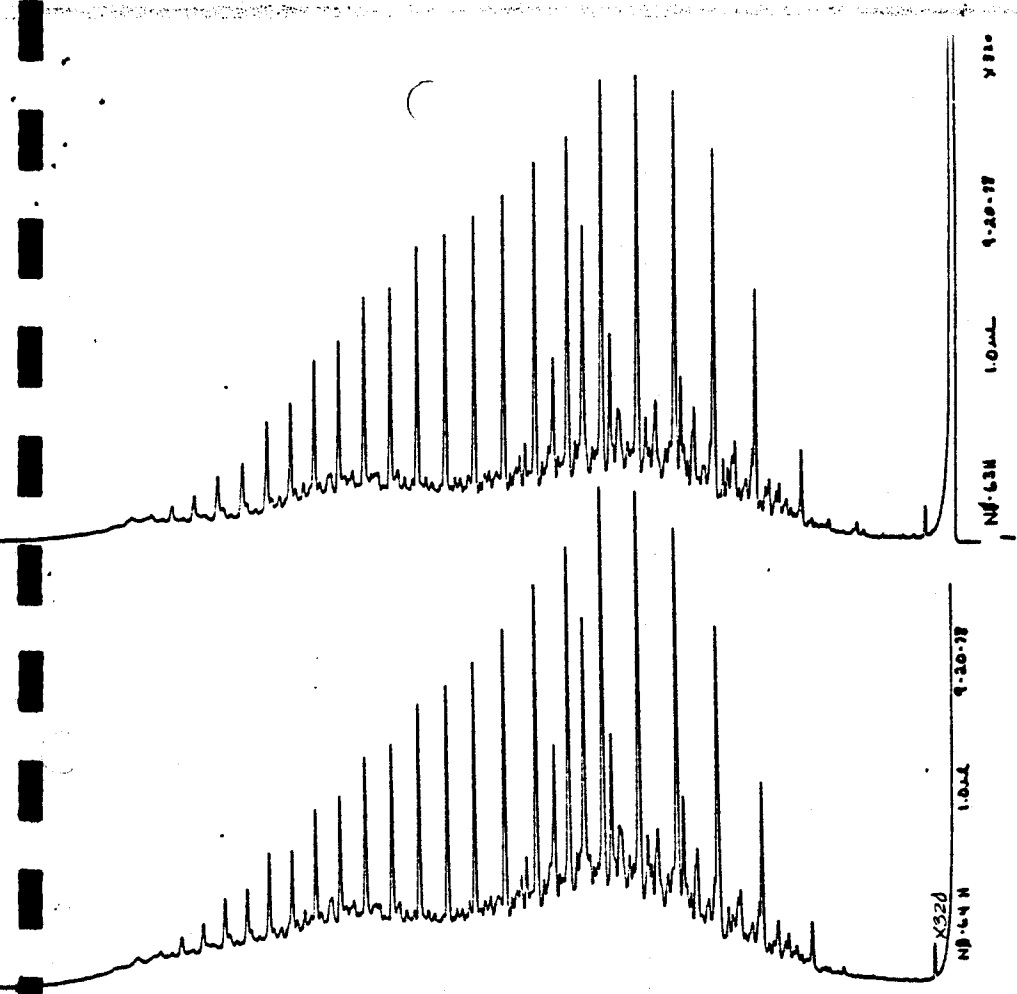
N-58  
3654m

N-59  
3704m

N-60  
3770m

N-61  
3796--3804m

N-62  
3848-3856m



N-63  
3894m

N-64  
3922-3926m

SATURATED HYDROCARBON CHROMATOGRAMS

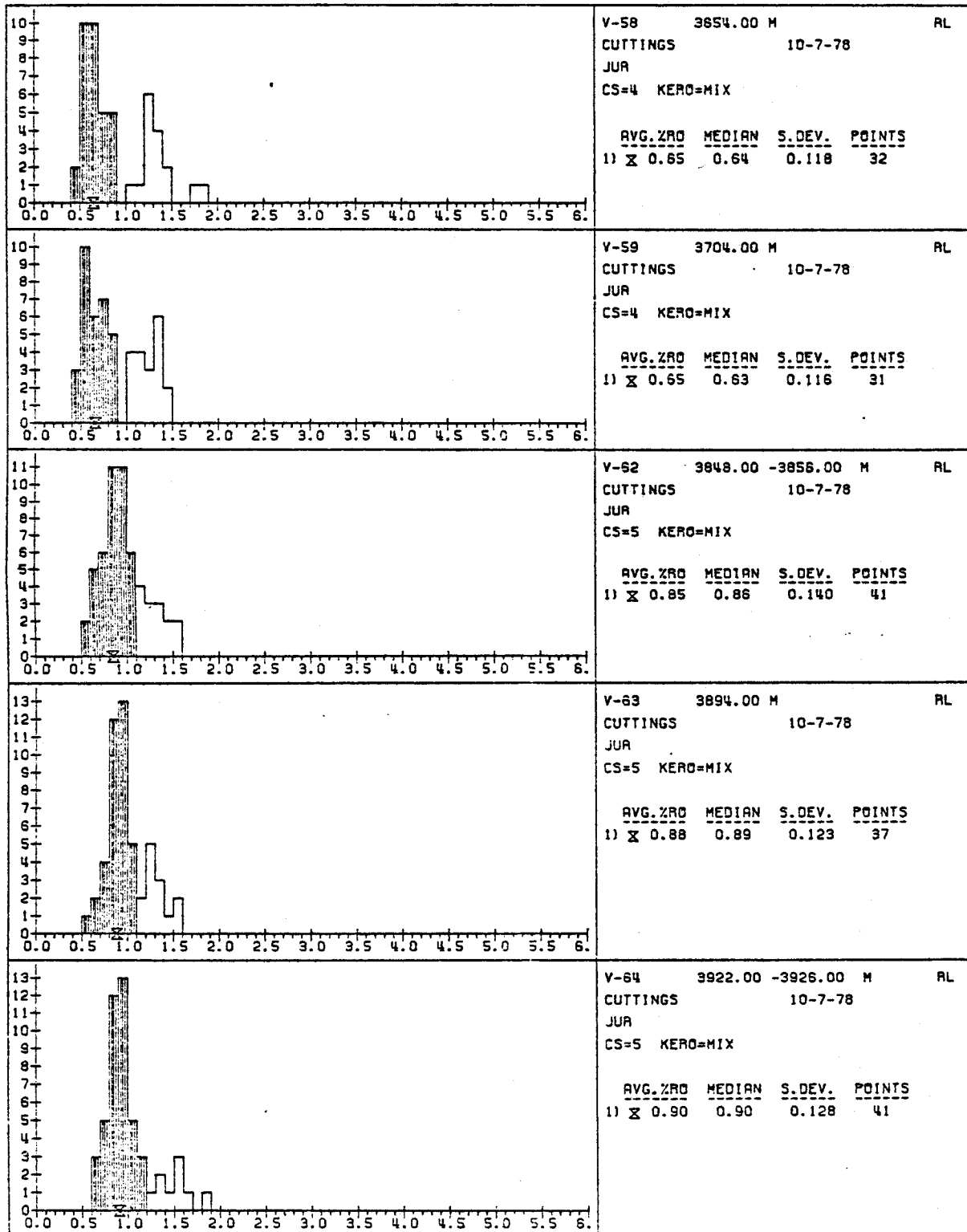


# VITRINITE REFLECTANCE ANALYSIS

AMOCO NORWAY 2/5-6 NORWAY

LOCALITY 1132A

TECH SVC NO.5655CN



*Fans. Pw*

*Fans Pw*

*Has Pw*

*Has Pw*

X-AXIS = PERCENT REFLECTANCE OF VITRINITE ( $\bar{X}$ )

Y-AXIS = FREQUENCY

AVERAGE  $\bar{X}$  FOR POP.1 = 0.78

Figure 4  
T.S. 785655CN

AMOCO PRODUCTION COMPANY  
Tulsa, Oklahoma  
October 18, 1978

*File*  
*78291*  
78291ART0073

FILE: Technical Service 785655CN

TO: R. F. P. Hardman, Amoco Norway

SUBJECT: Jurassic Shale, Amoco 2/5-6 Well, Norwegian North Sea

Cuttings from 3654 m. to 3926 m. have been analyzed and were found to be wet gas-oil sources at the peak stage of oil generation. The extracts from the shales correlate with North Sea J type oil.

*J. L. Severson*  
J. L. Severson *PzB*

MSS:ml:of/s

cc: R. L. Blanton, Attn: E. A. Nelson  
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