

Geochemical Report for Well NOCS 15/12-3

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REGISTRERT
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Chapter 1

INTRODUCTION

1.1 General Comments

This organic geochemical study of well NOCS 15/12-3 was carried out by Geolab Nor AS as part of a general study of wells on the border between the Norwegian and United Kingdom continental shelf. The well is located at 58°14'36.59"N and 01°52'45.67"E. The well was drilled to a total depth of 4450 m (Rotliegendes). The water depth was 86 m and Kelly Bushing (KB) elevation was 25 m. All depths are relative to KB unless otherwise specified.

A total of 190 samples was collected at Norwegian Petroleum Directorate. Six of these were chips from cores, the other 184 were cuttings samples. No fluids were analysed. All the samples were described and samples for screening analysis were selected on the basis of the lithology description plus the stratigraphical information contained in NPD Well Summary Sheets No 11. Subsequent analyses were selected on the basis of screening data and information gathered during analysis.

The report is presented chapter- and section-wise, in a chronological order of analyses carried out, beginning with lithological descriptions, screening analysis and followed by the detailed analyses. Within each section, the results are discussed in a stratigraphic context (top to bottom).

1.2 Analytical Program

The following analytical program was performed for well NOCS 15/12-3:

<u>Analysis type</u>	<u>No of samples</u>	<u>Figures</u>	<u>Tables</u>
Lithology description	190	1	1
TOC	57	1	1,2
Rock-Eval pyrolysis	57	2,3,4,5	2
Thermal extraction GC (GHM, S ₁)	20	6a-d	
Pyrolysis GC (GHM, S ₂)	20	7a-c,8	3
Soxhlet Extraction of organic matter	12	9	4a
MPLC separation	11	9	4b-e
Saturated hydrocarbon GC	11	10a-c	5
Aromatic hydrocarbon GC	11	11a-b	6a-b
Vitrinite reflectance	24	12	7
Visual kerogen microscopy	16	13	7,8
Isotope composition C ₁₅ + fraction	5	14,15	9a-b
GC - MS of saturated and aromatic HC	5	16a-c	10a-i

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)
kln	= 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
slt	= silty
Sltst	= 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

List of abbreviations used for parameters, ratios and analytical methods
(sorted alphabetically)

CPI	=	Carbon Preference Index, $0.5 \times \frac{C_{25}+C_{27}+C_{29}+C_{31}+C_{33}}{C_{24}+C_{26}+C_{28}+C_{30}+C_{32}} + \frac{C_{25}+C_{27}+C_{29}+C_{31}+C_{33}}{C_{26}+C_{28}+C_{30}+C_{32}+C_{34}}$
EOM	=	Extractable Organic Matter
FID	=	Flame Ionisation Detector
FPD	=	Flame Photometric Detector
GC	=	Gas Chromatograph
GC-MS	=	Gas Chromatograph - Mass Spectrometer
GHM	=	Geofina Hydrocarbon Meter (combined thermal extraction - pyrolysis gas chromatograph)
HC	=	Hydrocarbons
HI	=	Hydrogen Index (100 x S ₂ /TOC)
HPLC	=	High Pressure Liquid Chromatograph
MDBT(4/1)	=	Ratio of 4-/1-methyl dibenzothiophene
MNR	=	Ratio of 2-/1-methyl naphthalene
MP	=	Methyl phenanthrene
MPI1	=	Methyl phenanthrene Index, $1.5 \times (3MP+2MP) / P+9MP+1MP$
MPLC	=	Medium Pressure Liquid Chromatograph
NSO	=	Nitrogen-, Sulphur- and Oxygen-compounds
OI	=	Oxygen Index (100 x S ₃ /TOC)
P	=	Phenanthrene
PI	=	Production Index (S ₁ /(S ₁ +S ₂))
PP	=	Petroleum Potential (S ₁ +S ₂)
Ro (%)	=	Measured Vitrinite Reflectance in Percent
Rock-Eval	=	Oil show and source rock evaluation instrument
S ₁	=	Amount of Free Hydrocarbons, Rock-Eval
S ₂	=	Amount of Kerogen pyrolysate, Rock-Eval
S ₃	=	Amount of Oxidised Organic Material
SCI	=	Spore Colour Index (maturity indicator)
TCD	=	Thermal Conductivity Detector
TAI	=	Thermal Alteration Index (maturity indicator)
Tmax	=	Temperature of maximum pyrolysate yield, Rock-Eval
TOC	=	Total Organic Carbon

Experimental Procedures

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 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

Asphaltenes are removed from the EOM by precipitation in n-pentane. N-pentane is added to the EOM and 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 dissolved in dichloromethane are returned to the original flask. The solvent is removed by rotary evaporation (200 mb and 30°C).

Chromatographic Separation of Deasphaltened 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.

Vitrinite Reflectance Analysis

Samples to be analysed for vitrinite reflectance are ground to small granules (if necessary) using a pestle and mortar and are then mounted in a fast setting resin. The resin blocks are first ground flat using a coarse corundum paper to expose the rock granule surfaces and then with three finer grades of corundum paper to improve these surfaces and reduce scratches. The blocks are finally polished on a rotating Selvyt-covered lap using three grades of diamond suspension fluid. An appropriate lubricant is used when necessary.

Reflectance measurements are made under oil immersion at 546 nm using a Zeiss Universal Photo microscope II equipped with a HP 9000 series computer system. The polished blocks are mounted on the microscope stage and scanned manually in order to locate and measure particles of vitrinite. An attempt is made to obtain readings from 15-20 individual particles per sample, but this is not always possible in samples with low amounts of phytoclasts.

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.

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 μ A and a source temperature of 220°C. The instrument resolution used is 1500 (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.

Aromatic Fractions

Alkyl-substituted Benzenes

The M/Z 106 fragment ion is often used to detect the alkyl-substituted benzenes. It is especially useful for the detection of di-substituted benzenes. M/Z 134 can also be used for the detection of C₄-alkylbenzenes, but benzothiophene will also give a signal with this fragment ion.

Naphthalenes

Methyl naphthalenes are normally detected by the M/Z 142 fragment ion, while C₂-naphthalenes are detected by M/Z 156 and C₃-naphthalenes by M/Z 170.

Benzothiophenes and Dibenzothiophenes

Benzothiophene can be detected, as mentioned above, by M/Z 134. The M/Z 198 and M/Z 212 fragment ions are used for methyl-substituted dibenzothiophenes and dimethyl-substituted dibenzothiophenes respectively.

Phenanthrenes

Phenanthrene is detected using the M/Z 178 fragment ion. Anthracene will, if present, also give a signal in the M/Z 178 fragment ion. Methyl-substituted phenanthrenes give signals in the M/Z 192 fragment ion, while the M/Z 206 fragment ion shows the dimethyl-substituted phenanthrenes and the M/Z 220 fragment ion shows the C₃ substituted phenanthrenes.

Aromatic Steranes

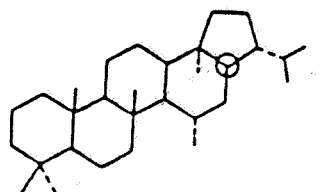
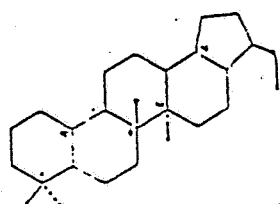
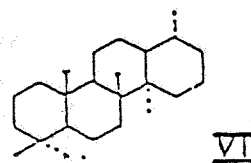
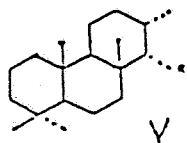
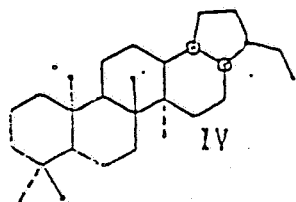
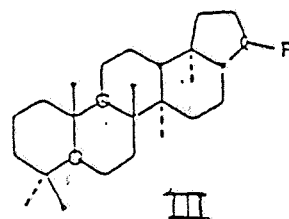
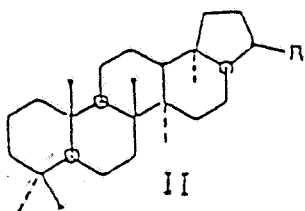
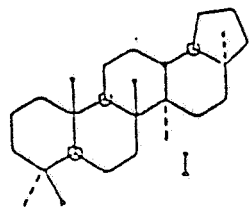
Monoaromatic steranes are detected using the M/Z 253 fragment ion, while the triaromatic steranes are detected using the M/Z 231 fragment ion.

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.	18 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 ₂ H ₅)
D.	$\beta\alpha$ norhopane	C ₂₉ H ₅₀	(III, R=C ₂ H ₅)
E.	$\alpha\beta$ hopane	C ₃₀ H ₅₂	(II, R=i-C ₃ H ₇)
F.	$\beta\alpha$ hopane	C ₃₀ H ₅₂	(III, R=i-C ₃ H ₇)
G.	22S $\alpha\beta$ homohopane	C ₃₁ H ₅₄	(II, R=i-C ₄ H ₉)
H.	22R $\alpha\beta$ homohopane	C ₃₁ H ₅₄	(II, R=i-C ₄ H ₉)
I.	$\beta\alpha$ homohopane	C ₃₁ H ₅₄	(III, R=i-C ₄ H ₉)
J.	22S $\alpha\beta$ bishomohopane	C ₃₂ H ₅₆	(II, R=i-C ₅ H ₁₁)
	22R $\alpha\beta$ bishomohopane	C ₃₂ H ₅₆	(II, R=i-C ₅ H ₁₁)
K.	22S $\alpha\beta$ trishomohopane	C ₃₃ H ₅₈	(II, R=i-C ₆ H ₁₃)
	22R $\alpha\beta$ trishomohopane	C ₃₃ H ₅₈	(II, R=i-C ₆ H ₁₃)
L.	22S $\alpha\beta$ tetrakishomohopane	C ₃₄ H ₆₀	(II, R=i-C ₇ H ₁₅)
	22R $\alpha\beta$ tetrakishomohopane	C ₃₄ H ₆₀	(II, R=i-C ₇ H ₁₅)
M.	22S $\alpha\beta$ pentakishomohopane	C ₃₅ H ₆₂	(II, R=i-C ₈ H ₁₇)
	22R $\alpha\beta$ pentakishomohopane	C ₃₅ H ₆₂	(II, R=i-C ₈ H ₁₇)
P.	Tricyclic terpene	C ₂₃ H ₄₂	(V, R=i-C ₄ H ₉)
Q.	Tricyclic terpene	C ₂₄ H ₄₄	(V, R=i-C ₅ H ₁₁)
R.	Tricyclic terpene (17R, 17S)	C ₂₅ H ₆₆	(V, R=i-C ₆ H ₁₃)
S.	Tetracyclic terpene	C ₂₄ H ₄₂	(VI)
T.	Tricyclic terpene (17R, 17S)	C ₂₆ H ₄₈	(V, R=i-C ₇ H ₁₅)
N.	Tricyclic terpene	C ₂₁ H ₃₈	(V, R=C ₂ H ₅)
O.	Tricyclic terpene	C ₂₂ H ₄₀	(V, R=C ₃ H ₇)
Y.	25,28,30-trisnorhopane/moretane	C ₂₇ H ₄₆	(VII)
X.	$\alpha\beta$ diahopane	C ₃₀ H ₅₂	(VIII)

STRUCTURES REPRESENTING TERPANES



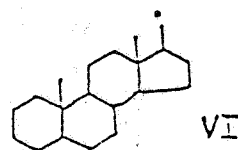
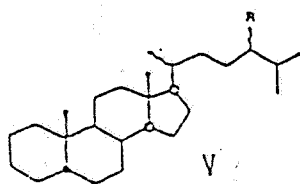
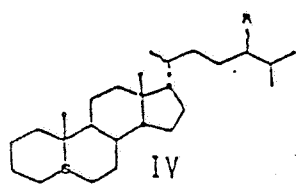
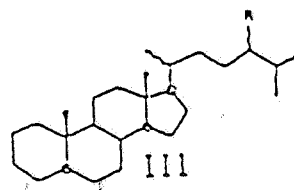
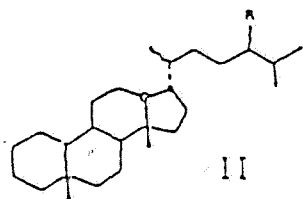
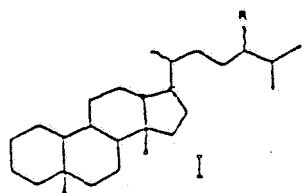
Mass Fragmentograms representing Steranes

(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	$C_{21}H_{36}$	(VI, R=C ₂ H ₅)
v.	5 α sterane	$C_{22}H_{38}$	(VI, R=C ₃ H ₇)

STRUCTURES REPRESENTING STERANES

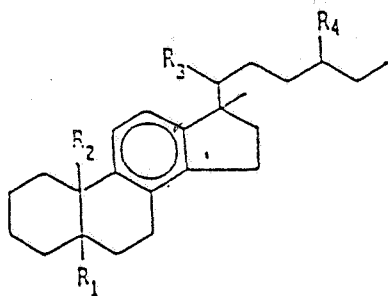
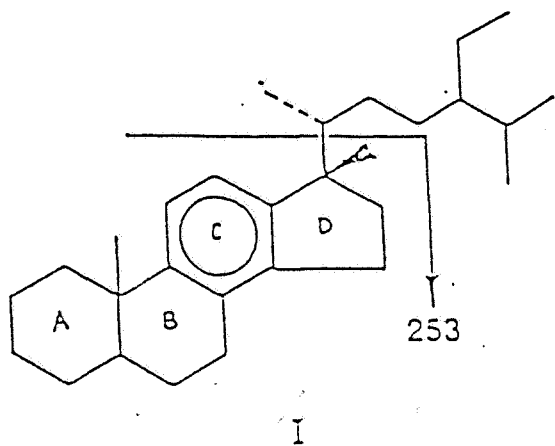


Mass Fragmentograms representing Monoaromatic Steranes (M/Z 253)

Description of C-ring monoaromatic steroid hydrocarbons

Peak	R ₁	Substituents			Abbreviation of Compound
		R ₂	R ₃	R ₄	
A1					C ₂₁ M
B1					C ₂₂ MA
C1	β(H)	CH ₃	S(CH ₃)	H	βSC ₂₇ MA
	β(H)	CH ₃	R(CH ₃)	H	βRC ₂₇ MA
D1	CH ₃	H	R(CH ₃)	H	RC ₂₇ DMA
	α(H)	CH ₃	S(CH ₃)	H	αSC ₂₇ MA
E1	β(H)	CH ₃	S(CH ₃)	CH ₃	βSC ₂₈ MA
	CH ₃	H	S(CH ₃)	CH ₃	SC ₂₈ DMA
F1	α(H)	CH ₃	R(CH ₃)	H	αRC ₂₇ MA
	α(H)	CH ₃	S(CH ₃)	CH ₃	αSC ₂₈ MA
	β(H)	CH ₃	R(CH ₃)	CH ₃	βRC ₂₈ MA
G1	CH ₃	H	R(CH ₃)	CH ₃	RC ₂₈ DMA
	β(H)	CH ₃	S(CH ₃)	C ₂ H ₅	βSC ₂₉ MA
	CH ₃	H	S(CH ₃)	C ₂ H ₅	SC ₂₉ DMA
	α(H)	CH ₃	R(CH ₃)	CH ₃	αRC ₂₈ MA
H1	β(H)	CH ₃	R(CH ₃)	C ₂ H ₅	βRC ₂₉ MA
	CH ₃	H	R(CH ₃)	C ₂ H ₅	RC ₂₉ DMA
I1	α(H)	CH ₃	R(CH ₃)	C ₂ H ₅	αRC ₂₉ MA

STRUCTURES REPRESENTING MONOAROMATIC STERANES

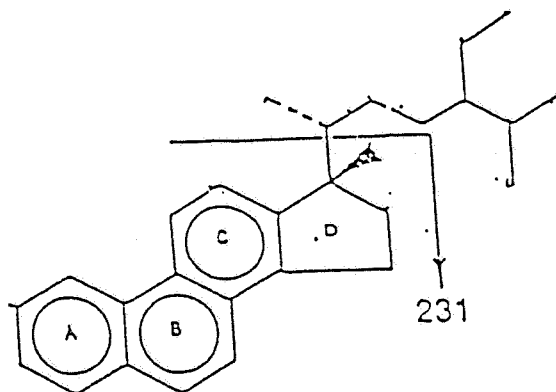


**Mass Fragmentograms representing Triaromatic Steranes
(M/Z 231)**

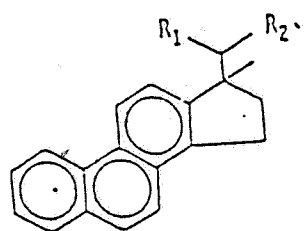
Description of ABC-ring triaromatic steroid hydrocarbons

Peak	Substituents		Abbreviation of Compound
	R ₁	R ₂	
a1	CH ₃	H	C ₂₀ TA
b1	CH ₃	CH ₃	C ₂₁ TA
c1	S(CH ₃)	C ₆ H ₁₋₃	SC ₂₆ TA
d1	R(CH ₃)	C ₆ H ₁₃	RC ₂₆ TA
	S(CH ₃)	C ₇ H ₁₅	SC ₂₇ TA
e1	S(CH ₃)	C ₈ H ₁₇	SC ₂₈ TA
f1	S(CH ₃)	C ₇ H ₁₅	RC ₂₇ TA
g1	R(CH ₃)	C ₈ H ₁₇	RC ₂₈ TA

STRUCTURES REPRESENTING TRIAROMATIC STERANES



II



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:

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

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.

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1010.00						0001
	2.39			50 Sh/Clst: lt ol gy to m gy		0001-1L
				50 S/Sst : w, pyr, fos, glauc		0001-2L
				tr Cont : ns		0001-3L
1030.00						0002
				50 Sh/Clst: lt ol gy to m gy		0002-1L
				50 S/Sst : w, pyr, fos, glauc		0002-2L
				tr Cont : ns		0002-3L
1050.00						0003
				50 Sh/Clst: lt ol gy to m gy		0003-1L
				50 S/Sst : w, pyr, fos, glauc		0003-2L
				tr Cont : ns		0003-3L
1070.00						0004
				50 Sh/Clst: lt ol gy to m gy		0004-1L
				50 S/Sst : w, pyr, fos, glauc		0004-2L
				tr Cont : ns		0004-3L
1090.00						0005
				50 Sh/Clst: lt ol gy to m gy		0005-1L
				50 S/Sst : w, pyr, fos, glauc		0005-2L
				tr Cont : ns		0005-3L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1110.00						0006
	1.63	70	Sh/Clst:	lt ol gy to m gy		0006-1L
		30	S/Sst	: w, pyr, fos, glauc		0006-2L
			tr Cont	: ns		0006-3L
1130.00						0007
		70	Sh/Clst:	lt ol gy to m gy		0007-1L
		30	S/Sst	: w, pyr, fos, glauc		0007-2L
			tr Cont	: ns		0007-3L
1170.00						0008
		100	Sh/Clst:	lt ol gy, calc, slt		0008-1L
			tr S/Sst	: lt ol gy, calc		0008-2L
1190.00						0009
		100	Sh/Clst:	lt ol gy, calc, slt		0009-1L
			tr S/Sst	: lt ol gy, calc		0009-2L
1220.00						0010
		100	Sh/Clst:	lt ol gy, calc, slt		0010-1L
			tr S/Sst	: lt ol gy, calc		0010-2L
1240.00						0011
		100	Sh/Clst:	lt ol gy to ol gy, calc, slt		0011-1L
			tr S/Sst	: lt ol gy, calc		0011-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1270.00						0012
			100	Sh/Clst: lt ol gy to ol gy to drk y brn,		0012-1L
				calc, slt		
				tr S/Sst : lt ol gy, calc		0012-2L
1290.00						0013
			100	Sh/Clst: lt ol gy to ol gy to drk y brn,		0013-1L
				calc, slt		
				tr S/Sst : lt ol gy, calc		0013-2L
1320.00						0014
	2.36		100	Sh/Clst: lt ol gy to ol gy to drk y brn,		0014-1L
				calc, slt		
				tr S/Sst : lt ol gy, calc		0014-2L
1340.00						0015
			100	Sh/Clst: lt ol gy to ol gy to drk y brn,		0015-1L
				calc, slt		
				tr S/Sst : lt ol gy, calc		0015-2L
1360.00						0016
			100	Sh/Clst: lt ol gy to ol gy to drk y brn,		0016-1L
				calc, slt		
				tr S/Sst : lt ol gy, calc		0016-2L
1380.00						0017
			100	Sh/Clst: lt ol gy to ol gy to drk y brn,		0017-1L
				calc, slt		
				tr S/Sst : lt ol gy, calc		0017-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1400.00						0018
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0018-1L
				tr S/Sst : lt ol gy, calc		0018-2L
1430.00						0019
	3.78		100	Sh/Clst: ol gy to drk y brn, calc, slt		0019-1L
1450.00						0020
			100	Sh/Clst: ol gy to drk y brn, calc, slt		0020-1L
1470.00						0021
			100	Sh/Clst: ol gy to drk y brn, calc, slt		0021-1L
1490.00						0022
			100	Sh/Clst: ol gy to drk y brn, calc, slt		0022-1L
1510.00						0023
			100	Sh/Clst: ol gy to drk y brn, calc, slt		0023-1L
1530.00						0024
			100	Sh/Clst: ol gy to drk y brn, calc, slt		0024-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1550.00						0025
	5.49	100		Sh/Clst: ol gy to drk y brn, slt		0025-1L
1570.00						0026
		100		Sh/Clst: ol gy to drk y brn, slt		0026-1L
1590.00						0027
		100		Sh/Clst: ol gy to drk y brn, slt		0027-1L
1610.00						0028
		100		Sh/Clst: ol gy to drk y brn, slt		0028-1L
1630.00						0029
		100		Sh/Clst: ol gy to drk y brn, slt		0029-1L
1650.00						0030
		100		Sh/Clst: ol gy to drk y brn, slt		0030-1L
1670.00						0031
	4.14	100		Sh/Clst: ol gy to drk y brn, slt		0031-1L
1690.00						0032
		100		Sh/Clst: ol gy to drk y brn, slt		0032-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1710.00						0033
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0033-1L
1730.00						0034
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0034-1L
1750.00						0035
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0035-1L
1770.00						0036
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0036-1L
1790.00						0037
	1.65		100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0037-1L
1810.00						0038
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0038-1L
1830.00						0039
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0039-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1850.00						0040
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0040-1L
1870.00						0041
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0041-1L
1890.00						0042
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0042-1L
1910.00						0043
		3.41	100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0043-1L
1930.00						0044
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0044-1L
1950.00						0045
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0045-1L
1970.00						0046
			100	Sh/Clst: lt ol gy to ol gy to drk y brn, calc, slt		0046-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
1990.00						0047
			100	Sh/Clst: ol gy to drk y brn, slt		0047-1L
2010.00						0048
			100	Sh/Clst: ol gy to drk y brn, slt		0048-1L
2030.00						0049
	2.91		100	Sh/Clst: ol gy to drk y brn, slt		0049-1L
2050.00						0050
			100	Sh/Clst: ol gy to drk y brn, slt		0050-1L
			tr Cont	: ns		0050-2L
2070.00						0051
			100	Sh/Clst: ol gy to drk y brn, slt		0051-1L
			tr Cont	: ns		0051-2L
2090.00						0052
			80	Cont : ns		0052-2L
			20	Sh/Clst: ol gy to drk y brn, slt		0052-1L
2110.00						0053
			90	Cont : ns		0053-2L
			10	Sh/Clst: ol gy to drk y brn, slt		0053-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2130.00						0054
			80	Cont	: ns	0054-2L
			20	Sh/Clst:	ol gy to drk y brn, slt	0054-1L
2150.00						0055
	2.93		40	Sh/Clst:	ol gy to drk y brn, slt	0055-1L
			40	Sh/Clst:	gn gy to m gy	0055-3L
			20	Cont	: ns	0055-2L
2170.00						0056
			80	Sh/Clst:	lt gn gy to m gy	0056-3L
			10	Sh/Clst:	ol gy to drk y brn, slt	0056-1L
			10	Cont	: prp, ns, dd	0056-2L
2188.00						0057
			80	Sh/Clst:	lt gn gy to m gy	0057-3L
			10	Sh/Clst:	ol gy to drk y brn, slt	0057-1L
			10	Cont	: prp, ns, dd	0057-2L
2209.00						0058
			80	Sh/Clst:	lt gn gy to m gy	0058-3L
			10	Sh/Clst:	ol gy to drk y brn, slt	0058-1L
			10	Cont	: prp, ns, dd	0058-2L
2235.00						0059
			50	Ca	: dsk y brn, dol	0059-1L
			50	Sh/Clst:	lt gn gy to m gy	0059-3L
			tr	Cont	: prp, ns, dd	0059-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2255.00						0060
				80 Sh/Clst: lt gn gy to m gy		0060-3L
				10 Ca : dsk y brn, dol		0060-1L
				10 Sh/Clst: drk y brn		0060-4L
				tr Cont : prp, ns, dd		0060-2L
2275.00						0061
				40 Sh/Clst: lt gn gy to ol gy		0061-1L
				40 Sh/Clst: gy red, calc		0061-2L
				10 Sh/Clst: m gy		0061-3L
				5 Sh/Clst: gy blk		0061-4L
				5 S/Sst : lt gy, f, cem		0061-5L
2295.00						0062
				40 Sh/Clst: lt gn gy to ol gy		0062-1L
				40 Sh/Clst: gy red, calc		0062-2L
				20 Sh/Clst: m gy		0062-3L
				tr Sh/Clst: gy blk		0062-4L
2315.00						0063
				100 Sh/Clst: m gy		0063-2L
				tr Sh/Clst: gy red, calc		0063-1L
2335.00						0064
				100 Sh/Clst: m gy		0064-1L
				tr Ca : pl y brn		0064-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2356.00						0065
	1.38	100	Sh/Clst:	m gy		0065-1L
			tr Ca	: pl y brn		0065-2L
2377.00						0066
		100	Sh/Clst:	m gy		0066-1L
			tr Ca	: pl y brn		0066-2L
2395.00						0067
		100	Sh/Clst:	m gy to drk gy		0067-1L
			tr Ca	: pl y brn		0067-2L
			tr Sh/Clst:	gy red		0067-3L
2416.00						0068
		100	Sh/Clst:	m gy to drk gy		0068-1L
			tr Ca	: pl y brn		0068-2L
			tr Sh/Clst:	gy red		0068-3L
2437.00						0069
		90	Sh/Clst:	lt gy to lt gn gy		0069-4L
		10	Sh/Clst:	m gy to drk gy		0069-1L
			tr Ca	: pl y brn		0069-2L
			tr Sh/Clst:	gy red		0069-3L
2455.00						0070
		60	Sh/Clst:	lt gy to lt gn gy		0070-4L
		20	Sh/Clst:	m gy to drk gy		0070-1L
		20	Sh/Clst:	gy red		0070-3L
			tr Ca	: pl y brn		0070-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2476.00						0071
	0.13	100	Ca	: w, chk		0071-3L
			tr Sh/Clst:	gy red		0071-1L
			tr Sh/Clst:	lt gy to lt gn gy		0071-2L
2497.00						0072
		100	Ca	: w, chk		0072-3L
			tr Sh/Clst:	gy red		0072-1L
			tr Sh/Clst:	lt gy to lt gn gy		0072-2L
2515.00						0073
	0.09	100	Ca	: w, chk		0073-3L
			tr Sh/Clst:	gy red		0073-1L
			tr Sh/Clst:	lt gy to lt gn gy		0073-2L
2536.00						0074
		100	Ca	: w, chk		0074-3L
			tr Sh/Clst:	gy red		0074-1L
			tr Sh/Clst:	lt gy to lt gn gy		0074-2L
2557.00						0075
		80	Ca	: w, chk		0075-3L
		10	Sh/Clst:	lt gy to lt gn gy		0075-2L
		5	Sh/Clst:	gy red		0075-1L
		5	Ca	: gy blk		0075-4L
2578.00						0076
		50	Cont	: ns		0076-4L
		40	Ca	: w, chk		0076-3L
		5	Sh/Clst:	gy red		0076-1L
		5	Sh/Clst:	lt gy to lt gn gy		0076-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2596.00						0077
			85	Ca : w, chk		0077-3L
			10	Sh/Clst: lt gy to lt gn gy		0077-2L
			5	Sh/Clst: gy red		0077-1L
2617.00						0078
			85	Ca : w, chk		0078-3L
			10	Sh/Clst: lt gy to lt gn gy		0078-2L
			5	Sh/Clst: gy red		0078-1L
2635.00						0079
			100	Ca : w, chk		0079-3L
			tr	Sh/Clst: gy red		0079-1L
			tr	Sh/Clst: lt gy to lt gn gy		0079-2L
2656.00						0080
			100	Ca : w, chk		0080-3L
			tr	Sh/Clst: gy red		0080-1L
			tr	Sh/Clst: lt gy to lt gn gy		0080-2L
2677.00						0081
	0.45		90	Ca : w, chk		0081-3L
			10	Sh/Clst: lt gy to lt gn gy		0081-2L
			tr	Sh/Clst: gy red		0081-1L
2695.00						0082
			90	Ca : w, chk		0082-3L
			10	Sh/Clst: lt gy to lt gn gy		0082-2L
			tr	Sh/Clst: gy red		0082-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2716.00						0083
			95	Ca : w, chk		0083-3L
			5	Sh/Clst: lt gy to lt gn gy		0083-2L
				tr Sh/Clst: gy red		0083-1L
2737.00						0084
			100	Ca : w, chk		0084-3L
				tr Sh/Clst: gy red		0084-1L
				tr Sh/Clst: lt gy to lt gn gy		0084-2L
2758.00						0085
	0.46		100	Ca : w to lt brn gy, chk		0085-3L
				tr Sh/Clst: gy red		0085-1L
				tr Sh/Clst: lt gy to lt gn gy		0085-2L
2776.00						0086
			100	Ca : w to lt brn gy, chk		0086-3L
				tr Sh/Clst: gy red		0086-1L
				tr Sh/Clst: lt gy to lt gn gy		0086-2L
2797.00						0087
	1.02		100	Ca : w to lt brn gy, chk		0087-3L
				tr Sh/Clst: gy red		0087-1L
				tr Sh/Clst: lt gy to lt gn gy		0087-2L
2818.00						0088
			90	Ca : w, chk		0088-3L
			10	Sh/Clst: lt gy to m gy		0088-2L
				tr Sh/Clst: gy red		0088-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2836.00						0089
				70 Ca : w, chk		0089-3L
				20 Sh/Clst: lt gy to m gy		0089-2L
				10 S/Sst : lt gn gy, f, cem		0089-4L
				tr Sh/Clst: gy red		0089-1L
2857.00						0090
				50 Ca : w, chk		0090-3L
				40 Sh/Clst: lt gn gy to lt gy to m gy		0090-2L
				10 S/Sst : lt gn gy, f, cem		0090-4L
				tr Sh/Clst: gy red		0090-1L
2875.00						0091
				50 Ca : w, chk		0091-3L
				40 Sh/Clst: lt gn gy to lt gy to m gy		0091-2L
				10 S/Sst : lt gn gy, f, cem		0091-4L
				tr Sh/Clst: gy red		0091-1L
2896.00						0092
				40 Ca : w, chk		0092-1L
				30 Sh/Clst: lt gn gy to lt gy to m gy		0092-2L
				20 Sh/Clst: gy red		0092-3L
				10 Sh/Clst: blk		0092-4L
2917.00						0093
				50 Ca : w to lt brn gy, chk		0093-1L
				40 Sh/Clst: lt gn gy to lt gy to m gy		0093-2L
				10 Sh/Clst: gy red		0093-3L
				tr Sh/Clst: blk		0093-4L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2935.00						0094
				50 Ca : w to lt brn gy, chk		0094-1L
				40 Sh/Clst: lt gn gy to lt gy to m gy		0094-2L
				10 Sh/Clst: gy red		0094-3L
				tr Sh/Clst: blk		0094-4L
2956.00						0095
				70 Sh/Clst: lt gn gy to lt gy to m gy		0095-2L
				20 Ca : w to lt brn gy, chk		0095-1L
				10 Sh/Clst: gy red		0095-3L
				tr Sh/Clst: blk		0095-4L
2962.00						0096
				70 Sh/Clst: lt gn gy to lt gy to m gy		0096-2L
				20 Ca : w to lt brn gy, chk		0096-1L
				10 Sh/Clst: gy red		0096-3L
				tr Sh/Clst: blk		0096-4L
2968.00						0097
				80 Sh/Clst: lt gn gy to lt gy to m gy		0097-2L
				10 Ca : w to lt brn gy, chk		0097-1L
				10 Sh/Clst: gy red		0097-3L
				tr Sh/Clst: blk		0097-4L
2971.00						0098
				80 Sh/Clst: lt gn gy to lt gy to m gy		0098-2L
				10 Ca : w to lt brn gy, chk		0098-1L
				10 Sh/Clst: gy red		0098-3L
				tr Sh/Clst: blk		0098-4L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
2977.00						0099
				50 Sh/Clst: lt gn gy to lt gy to m gy		0099-2L
				40 Ca : w to lt brn gy, chk		0099-1L
				10 Sh/Clst: gy red		0099-3L
2983.00						0100
				50 Sh/Clst: lt gn gy to lt gy to m gy		0100-2L
				40 Ca : w to lt brn gy, chk		0100-1L
				10 Sh/Clst: gy red		0100-3L
2989.00						0101
	0.36			50 Sh/Clst: lt gn gy to lt gy to m gy		0101-2L
				40 Ca : w to lt brn gy, chk		0101-1L
				10 Sh/Clst: gy red		0101-3L
2995.00						0102
				40 Ca : w to lt brn gy, chk		0102-1L
				40 Sh/Clst: lt gn gy to lt gy to m gy		0102-2L
				10 Sh/Clst: gy red		0102-3L
				10 Sh/Clst: brn blk		0102-4L
3001.00						0103
	8.43			80 Sh/Clst: brn blk		0103-4L
	cvd			10 Ca : w to lt brn gy, chk		0103-1L
	cvd			10 Sh/Clst: lt gn gy to lt gy to m gy		0103-2L
	cvd			tr Sh/Clst: gy red		0103-3L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3007.00						0104
		8.89	90	Sh/Clst: brn blk		0104-3L
	cvd		5	Ca : w to lt brn gy, chk		0104-1L
	cvd		5	Sh/Clst: lt gn gy to lt gy to m gy		0104-2L
3013.00						0105
		9.06	90	Sh/Clst: brn blk		0105-3L
	cvd		5	Ca : w to lt brn gy, chk		0105-1L
	cvd		5	Sh/Clst: lt gn gy to lt gy to m gy		0105-2L
3019.00						0106
		7.80	90	Sh/Clst: brn blk		0106-3L
	cvd		5	Ca : w to lt brn gy, chk		0106-1L
	cvd		5	Sh/Clst: lt gn gy to lt gy to m gy		0106-2L
3025.00						0107
		7.38	100	Sh/Clst: brn blk		0107-3L
	cvd		tr	Ca : w to lt brn gy, chk		0107-1L
	cvd		tr	Sh/Clst: lt gn gy to lt gy to m gy		0107-2L
3031.00						0108
		8.30	100	Sh/Clst: brn blk		0108-3L
	cvd		tr	Ca : w to lt brn gy, chk		0108-1L
	cvd		tr	Sh/Clst: lt gn gy to lt gy to m gy		0108-2L
3037.00						0109
		8.21	100	Sh/Clst: brn blk		0109-3L
	cvd		tr	Ca : w to lt brn gy, chk		0109-1L
	cvd		tr	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0109-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3043.00						0110
	cvd	8.86	100	Sh/Clst: brn blk		0110-3L
	cvd			tr Ca : w to lt brn gy, chk		0110-1L
	cvd			tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0110-2L
3049.00						0111
	cvd	9.14	100	Sh/Clst: brn blk		0111-3L
	cvd			tr Ca : w to lt brn gy, chk		0111-1L
	cvd			tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0111-2L
3055.00						0112
	cvd	8.85	100	Sh/Clst: brn blk		0112-3L
	cvd			tr Ca : w to lt brn gy, chk		0112-1L
	cvd			tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0112-2L
3061.00						0113
	cvd	9.83	100	Sh/Clst: brn blk		0113-3L
	cvd			tr Ca : w to lt brn gy, chk		0113-1L
	cvd			tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0113-2L
3070.00						0114
	cvd	9.18	100	Sh/Clst: brn blk		0114-3L
	cvd			tr Ca : w to lt brn gy, chk		0114-1L
	cvd			tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0114-2L
3076.00						0115
	cvd	7.77	100	Sh/Clst: brn blk		0115-3L
	cvd			tr Ca : w to lt brn gy, chk		0115-1L
	cvd			tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0115-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int Cvd	TOC%	%	Lithology description			
3082.00						0116
	8.12	100	Sh/Clst: brn blk			0116-1L
3088.00						0117
	9.44	100	Sh/Clst: brn blk			0117-1L
3094.00						0118
	7.97	100	Sh/Clst: brn blk			0118-1L
3100.00						0119
	8.34	100	Sh/Clst: brn blk			0119-1L
3109.00						0120
	7.86	100	Sh/Clst: brn blk			0120-1L
3115.00						0121
	10.91	100	Sh/Clst: brn blk			0121-1L
3121.00						0122
	10.71	100	Sh/Clst: brn blk			0122-1L
3127.00						0123
	8.87	100	Sh/Clst: brn blk			0123-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3133.00						0124
	cvd	7.84	80	Sh/Clst: brn blk		0124-1L
			20	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0124-2L
3139.00						0125
	cvd	7.27	90	Sh/Clst: brn blk		0125-1L
			10	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0125-2L
3145.00						0126
	cvd	6.82	100	Sh/Clst: brn blk		0126-1L
				tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0126-2L
3151.00						0127
	cvd	1.69	100	Sh/Clst: brn blk		0127-1L
				tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0127-2L
3157.00						0128
	cvd	4.10	100	Sh/Clst: brn blk		0128-1L
				tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0128-2L
3163.00						0129
	cvd		100	Sh/Clst: brn blk		0129-1L
				tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0129-2L
3169.00						0130
	cvd	5.19	100	Sh/Clst: brn blk		0130-1L
				tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0130-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3175.00						0131
	cvd	4.69	100	Sh/Clst: brn blk tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0131-1L 0131-2L
3178.00						0132
	cvd		100	Sh/Clst: brn blk tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0132-1L 0132-2L
3184.00						0133
	cvd	4.22	100	Sh/Clst: brn blk tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0133-1L 0133-2L
3193.00						0134
	cvd	4.03	100	Sh/Clst: brn blk tr Sh/Clst: lt gn gy to lt gy to m gy, gy red		0134-1L 0134-2L
3199.00						0135
			100	Sh/Clst: brn blk		0135-1L
3205.00						0136
		3.71	100	Sh/Clst: brn blk		0136-1L
3211.00						0137
		3.56	100	Sh/Clst: brn blk		0137-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3217.00						0138
			100	Sh/Clst: brn blk		0138-1L
3223.00						0139
	2.69		95	Sh/Clst: brn blk		0139-1L
			5	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0139-2L
3229.00						0140
	3.20		95	Sh/Clst: brn blk		0140-1L
			5	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0140-2L
3235.00						0141
			55	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0141-2L
			20	Sh/Clst: brn blk		0141-1L
			20	S/Sst : w, cem		0141-3L
			5	Ca : w, chk		0141-4L
3241.00						0142
			55	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0142-2L
			20	Sh/Clst: brn blk		0142-1L
			20	S/Sst : w, cem		0142-3L
			5	Ca : w, chk		0142-4L
3247.00						0143
			55	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0143-2L
			20	Sh/Clst: brn blk		0143-1L
			20	S/Sst : w, cem		0143-3L
			5	Ca : w, chk		0143-4L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3253.00						0144
			55	Sh/Clst: lt gn gy to lt gy to m gy, gy red		0144-2L
			20	Sh/Clst: brn blk		0144-1L
			20	S/Sst : w, cem		0144-3L
			5	Ca : w, chk		0144-4L
3256.00	ccp					0145
	0.25	100	Other	: w to pl y brn, evap, calc		0145-1L
3261.00	ccp					0146
	0.85	60	Sh/Clst:	drk gy, calc		0146-1L
		40	Other	: w, chk, calc		0146-2L
3263.20	ccp					0147
	0.10	100	Other	: lt gy to m gy, evap, calc, cly		0147-1L
3270.00						0148
			30	Ca : w, chk		0148-1L
			20	Ca : lt gy, drk y brn		0148-2L
			20	Sh/Clst: gy red		0148-3L
			20	Sh/Clst: drk gy		0148-4L
			10	Cont : dd		0148-5L
3375.00						0149
			70	Cont : dd		0149-2L
			30	Sh/Clst: brn blk		0149-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
3475.00						0150
	cvd		100	Sh/Clst: brn blk tr Other : evap		0150-1L 0150-2L
3575.00						0151
	cvd		100	Sh/Clst: brn blk tr Other : evap		0151-1L 0151-2L
3675.00						0152
	cvd		100	Sh/Clst: brn blk tr Other : evap		0152-1L 0152-2L
3775.00						0153
	cvd		100	Sh/Clst: brn blk tr Other : evap		0153-1L 0153-2L
3875.00						0154
	cvd		100	Sh/Clst: brn blk tr Other : evap		0154-1L 0154-2L
3980.00						0155
	cvd		100	Sh/Clst: brn blk tr Other : evap		0155-1L 0155-2L
4080.00						0156
			90	Sh/Clst: m gy to gy blk		0156-1L
			10	Other : evap		0156-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4105.00						0157
				90 Sh/Clst: m gy to gy blk		0157-1L
				10 Other : evap		0157-2L
4115.00						0158
				90 Sh/Clst: m gy to gy blk		0158-1L
				10 Other : evap		0158-2L
4125.00						0159
	cvd			90 Sh/Clst: gy blk		0159-1L
				10 Other : evap		0159-2L
4140.00						0160
	cvd			90 Sh/Clst: gy blk		0160-1L
				10 Other : evap		0160-2L
4150.00						0161
	cvd			90 Sh/Clst: gy blk		0161-1L
				10 Other : evap		0161-2L
4160.00						0162
	cvd			90 Sh/Clst: gy blk		0162-1L
				10 Other : evap		0162-2L
4170.00						0163
	cvd			90 Sh/Clst: gy blk		0163-1L
				10 Other : evap		0163-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4200.00						0164
			70	Other : evap		0164-2L
			30	Sh/Clst: drk gy		0164-1L
4210.00						0165
			70	Other : evap		0165-2L
			30	Sh/Clst: drk gy		0165-1L
4220.00						0166
			70	Other : evap		0166-2L
			30	Sh/Clst: drk gy		0166-1L
4230.00						0167
			70	Other : evap		0167-2L
			30	Sh/Clst: drk gy		0167-1L
4235.00						0168
			70	Other : evap		0168-2L
			30	Sh/Clst: drk gy		0168-1L
4250.00						0169
			70	Other : evap		0169-2L
			30	Sh/Clst: drk gy		0169-1L
4260.00						0170
			50	Sh/Clst: drk gy		0170-1L
			50	Other : evap		0170-2L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4275.00						0171
			50	Sh/Clst: drk gy		0171-1L
			50	Other : evap		0171-2L
4285.00						0172
			50	Sh/Clst: drk gy		0172-1L
			50	Other : evap		0172-2L
4295.00						0173
			50	Sh/Clst: drk gy		0173-1L
			50	Other : evap		0173-2L
4305.00						0174
			50	Sh/Clst: drk gy		0174-1L
			50	Other : evap		0174-2L
4315.00						0175
			50	Sh/Clst: drk gy		0175-1L
			50	Other : evap		0175-2L
4327.00						0176
			80	Other : evap		0176-2L
			20	Sh/Clst: drk gy		0176-1L
4336.00						0177
			80	Other : evap		0177-2L
			20	Sh/Clst: drk gy		0177-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4345.00						0178
			80	Other : evap		0178-2L
			20	Sh/Clst: drk gy		0178-1L
4357.00						0179
			80	Other : evap		0179-2L
			20	Sh/Clst: drk gy		0179-1L
4366.00						0180
			80	Other : evap		0180-2L
			20	Sh/Clst: drk gy		0180-1L
4375.00						0181
			80	Other : evap		0181-2L
			20	Sh/Clst: drk gy		0181-1L
4388.00						0182
			80	Other : evap		0182-2L
			20	Sh/Clst: drk gy		0182-1L
4403.00						0183
			80	Other : evap		0183-2L
			20	Sh/Clst: drk gy		0183-1L
4412.00						0184
			80	Other : evap		0184-2L
			20	Sh/Clst: drk gy		0184-1L

Table 1 : Lithology description for well NOCS 15/12-3

Depth unit of measure: m

Depth	Type	Grp	Frm	Age	Trb	Sample
Int	Cvd	TOC%	%	Lithology description		
4418.00						0185
			80	Other : evap		0185-2L
			20	Sh/Clst: drk gy		0185-1L
4424.00	ccp					0186
	0.23	100		Sh/Clst: lt brn gy, mic		0186-1L
4428.50	ccp					0187
	0.26	100		S/Sst : lt brn gy		0187-1L
4432.10	ccp					0188
	0.12	100		Sh/Clst: lt brn gy, mic		0188-1L
4442.00						0189
			60	Other : evap		0189-2L
			40	Sh/Clst: drk gy		0189-1L
4450.00						0190
			50	Other : evap		0190-2L
			30	Sh/Clst: drk gy		0190-1L
			20	Cont : prp		0190-3L

Table 2 : Rock-Eval table for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC ^a	HI	OI	PP	PI	Tmax	Sample
1010.00	cut	Sh/Clst: lt ol gy to m gy	9.32	3.57	1.22	2.93	2.39	149	51	12.9	0.72	428	0001-1L
1110.00	cut	Sh/Clst: lt ol gy to m gy	0.51	2.27	1.27	1.79	1.63	139	78	2.8	0.18	419	0006-1L
1320.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.38	2.89	1.45	1.99	2.36	122	61	3.3	0.12	419	0014-1L
1430.00	cut	Sh/Clst: ol gy to drk y brn	0.48	5.32	2.90	1.83	3.78	141	77	5.8	0.08	418	0019-1L
1550.00	cut	Sh/Clst: ol gy to drk y brn	0.88	6.82	3.17	2.15	5.49	124	58	7.7	0.11	419	0025-1L
1670.00	cut	Sh/Clst: ol gy to drk y brn	0.63	5.85	2.62	2.23	4.14	141	63	6.5	0.10	423	0031-1L
1790.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.44	2.31	1.28	1.80	1.65	140	78	2.8	0.16	425	0037-1L
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	4.51	3.49	1.30	2.68	3.41	102	38	8.0	0.56	422	0043-1L
2030.00	cut	Sh/Clst: ol gy to drk y brn	7.80	3.21	1.06	3.03	2.91	110	36	11.0	0.71	430	0049-1L
2150.00	cut	Sh/Clst: ol gy to drk y brn	9.51	3.34	1.32	2.53	2.93	114	45	12.9	0.74	428	0055-1L
2356.00	cut	Sh/Clst: m gy	0.26	2.21	0.73	3.03	1.38	160	53	2.5	0.11	429	0065-1L
2476.00	cut	Ca : w	0.03	0.01	0.54	0.02	0.13	8	415	-	0.75	424	0071-3L
2515.00	cut	Ca : w	0.03	0.01	0.38	0.03	0.09	11	422	-	0.75	345	0073-3L

Table 2 : Rock-Eval table for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
2677.00	cut	Ca : w	0.12	0.44	1.19	0.37	0.45	98	264	0.6	0.21	435	0081-3L
2758.00	cut	Ca : w to lt brn gy	0.28	0.75	1.66	0.45	0.46	163	361	1.0	0.27	435	0085-3L
2797.00	cut	Ca : w to lt brn gy	0.41	0.84	1.59	0.53	1.02	82	156	1.3	0.33	434	0087-3L
2989.00	cut	Sh/Clst: lt gn gy to lt gy to m gy	0.22	0.14	0.41	0.34	0.36	39	114	0.4	0.61	338	0101-2L
3001.00	cut	Sh/Clst: brn blk	5.34	53.49	0.69	77.52	8.43	635	8	58.8	0.09	428	0103-4L
3007.00	cut	Sh/Clst: brn blk	5.02	49.47	1.13	43.78	8.89	556	13	54.5	0.09	430	0104-3L
3013.00	cut	Sh/Clst: brn blk	5.48	53.01	1.23	43.10	9.06	585	14	58.5	0.09	428	0105-3L
3019.00	cut	Sh/Clst: brn blk	5.68	47.04	1.28	36.75	7.80	603	16	52.7	0.11	427	0106-3L
3025.00	cut	Sh/Clst: brn blk	4.20	36.05	1.01	35.69	7.38	488	14	40.3	0.10	430	0107-3L
3031.00	cut	Sh/Clst: brn blk	5.81	44.96	1.18	38.10	8.30	542	14	50.8	0.11	429	0108-3L
3037.00	cut	Sh/Clst: brn blk	4.94	41.13	1.45	28.37	8.21	501	18	46.1	0.11	430	0109-3L
3043.00	cut	Sh/Clst: brn blk	5.03	42.27	1.40	30.19	8.86	477	16	47.3	0.11	429	0110-3L
3049.00	cut	Sh/Clst: brn blk	6.30	48.79	1.31	37.24	9.14	534	14	55.1	0.11	428	0111-3L
3055.00	cut	Sh/Clst: brn blk	5.50	46.12	1.65	27.95	8.85	521	19	51.6	0.11	428	0112-3L
3061.00	cut	Sh/Clst: brn blk	6.02	50.66	1.72	29.45	9.83	515	17	56.7	0.11	431	0113-3L

Table 2 : Rock-Eval table for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3070.00	cut	Sh/Clst: brn blk	5.52	43.98	1.74	25.28	9.18	479	19	49.5	0.11	429	0114-3L
3076.00	cut	Sh/Clst: brn blk	4.87	39.72	1.57	25.30	7.77	511	20	44.6	0.11	430	0115-3L
3082.00	cut	Sh/Clst: brn blk	5.93	44.18	1.61	27.44	8.12	544	20	50.1	0.12	430	0116-1L
3088.00	cut	Sh/Clst: brn blk	6.23	44.48	1.54	28.88	9.44	471	16	50.7	0.12	429	0117-1L
3094.00	cut	Sh/Clst: brn blk	5.84	40.88	1.52	26.89	7.97	513	19	46.7	0.13	430	0118-1L
3100.00	cut	Sh/Clst: brn blk	5.00	38.18	1.55	24.63	8.34	458	19	43.2	0.12	432	0119-1L
3109.00	cut	Sh/Clst: brn blk	5.41	37.78	1.45	26.06	7.86	481	18	43.2	0.13	430	0120-1L
3115.00	cut	Sh/Clst: brn blk	8.13	54.01	1.60	33.76	10.91	495	15	62.1	0.13	428	0121-1L
3121.00	cut	Sh/Clst: brn blk	7.07	45.53	1.73	26.32	10.71	425	16	52.6	0.13	432	0122-1L
3127.00	cut	Sh/Clst: brn blk	6.35	38.57	1.56	24.72	8.87	435	18	44.9	0.14	432	0123-1L
3133.00	cut	Sh/Clst: brn blk	5.58	32.02	2.20	14.55	7.84	408	28	37.6	0.15	429	0124-1L
3139.00	cut	Sh/Clst: brn blk	4.46	27.56	2.10	13.12	7.27	379	29	32.0	0.14	429	0125-1L
3145.00	cut	Sh/Clst: brn blk	4.25	23.12	2.20	10.51	6.82	339	32	27.4	0.16	427	0126-1L
3151.00	cut	Sh/Clst: brn blk	0.92	3.90	1.08	3.61	1.69	231	64	4.8	0.19	430	0127-1L
3157.00	cut	Sh/Clst: brn blk	2.37	9.64	2.18	4.42	4.10	235	53	12.0	0.20	429	0128-1L

Table 2 : Rock-Eval table for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	S1	S2	S3	S2/S3	TOC	HI	OI	PP	PI	Tmax	Sample
3169.00	cut	Sh/Clst: brn blk	2.91	13.20	2.07	6.38	5.19	254	40	16.1	0.18	429	0130-1L
3175.00	cut	Sh/Clst: brn blk	3.07	12.81	2.18	5.88	4.69	273	46	15.9	0.19	428	0131-1L
3184.00	cut	Sh/Clst: brn blk	2.95	10.75	2.32	4.63	4.22	255	55	13.7	0.22	427	0133-1L
3193.00	cut	Sh/Clst: brn blk	2.37	8.30	2.41	3.44	4.03	206	60	10.7	0.22	430	0134-1L
3205.00	cut	Sh/Clst: brn blk	2.06	7.29	2.68	2.72	3.71	196	72	9.4	0.22	430	0136-1L
3211.00	cut	Sh/Clst: brn blk	2.16	7.09	2.71	2.62	3.56	199	76	9.3	0.23	427	0137-1L
3223.00	cut	Sh/Clst: brn blk	1.20	3.62	2.41	1.50	2.69	135	90	4.8	0.25	429	0139-1L
3229.00	cut	Sh/Clst: brn blk	1.52	3.89	2.71	1.44	3.20	122	85	5.4	0.28	428	0140-1L
3256.00	ccp	Other : w to pl y brn	-	-	0.63	-	0.25	-	252	-	-	-	0145-1L
3261.00	ccp	Sh/Clst: drk gy	0.12	0.19	0.63	0.30	0.85	22	74	0.3	0.39	430	0146-1L
3263.20	ccp	Other : lt gy to m gy	-	-	0.37	-	0.10	-	370	-	-	-	0147-1L
4424.00	ccp	Sh/Clst: lt brn gy	0.38	0.16	0.59	0.27	0.23	70	257	0.5	0.70	368	0186-1L
4428.50	ccp	S/Sst : lt brn gy	0.31	0.01	0.38	0.03	0.26	4	146	0.3	0.97	-	0187-1L
4432.10	ccp	Sh/Clst: lt brn gy	0.13	-	0.28	-	0.12	-	233	0.1	1.00	-	0188-1L

Table 3 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
1010.00	cut	Sh/Clst: lt ol gy to m gy	9.30	34.99	50.58	5.13	3.57	0001-1L
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	10.36	28.11	53.51	8.02	3.49	0043-1L
2030.00	cut	Sh/Clst: ol gy to drk y brn	10.65	26.11	51.57	11.66	3.21	0049-1L
2150.00	cut	Sh/Clst: ol gy to drk y brn	12.22	27.40	52.65	7.73	3.34	0055-1L
2677.00	cut	Ca : w	6.26	28.64	60.03	5.08	0.44	0081-3L
2758.00	cut	Ca : w to lt brn gy	5.70	26.52	61.92	5.85	0.75	0085-3L
2797.00	cut	Ca : w to lt brn gy	4.93	24.92	62.90	7.25	0.84	0087-3L
2989.00	cut	Sh/Clst: lt gn gy to lt gy to m gy	8.09	33.39	48.08	10.44	0.14	0101-2L
3007.00	cut	Sh/Clst: brn blk	2.51	12.39	32.04	53.06	49.47	0104-3L
3037.00	cut	Sh/Clst: brn blk	2.36	11.52	32.85	53.27	41.13	0109-3L
3061.00	cut	Sh/Clst: brn blk	2.57	12.18	31.14	54.10	50.66	0113-3L
3094.00	cut	Sh/Clst: brn blk	2.48	12.39	30.55	54.57	40.88	0118-1L
3127.00	cut	Sh/Clst: brn blk	2.88	10.52	33.29	53.31	38.57	0123-1L
3157.00	cut	Sh/Clst: brn blk	2.40	13.11	36.27	48.21	9.64	0128-1L

Table 3 : Pyrolysis GC Data (S2 peak) as Percentage of Total Area for Well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	C1	C2-C5	C6-C14	C15+	S2 from Rock-Eval	Sample
3184.00	cut	Sh/Clst: brn blk	2.55	13.54	36.91	46.99	10.75	0133-1L
3223.00	cut	Sh/Clst: brn blk	2.68	13.33	39.84	44.15	3.62	0139-1L
3261.00	ccp	Sh/Clst: drk gy	5.62	26.45	50.30	17.63	0.19	0146-1L
4424.00	ccp	Sh/Clst: lt brn gy	4.05	31.58	52.42	11.95	0.16	0186-1L
4428.50	ccp	S/Sst : lt brn gy	8.41	31.99	52.52	7.08	0.01	0187-1L
4432.10	ccp	Sh/Clst: lt brn gy	9.20	35.03	46.89	8.89	-	0188-1L

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
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	1.3	4.8	3.2	0.9	0.1	0.6	4.1	0.7	3.59	0043-1L
2030.00	com	Composite sample - see table 4 e	2.2	6.8	4.9	1.4	0.1	0.5	6.3	0.6	2.74	0191-0B
2150.00	com	Composite sample - see table 4 e	2.3	5.5	3.5	1.4	0.1	0.6	4.8	0.7	2.36	0192-0B
2797.00	cut	Ca : w to lt brn gy	1.2	0.6	-	-	-	-	-	-	0.40	0087-3L
3007.00	cut	Sh/Clst: brn blk	1.5	7.1	2.8	1.5	0.5	2.3	4.3	2.8	8.18	0104-3L
3037.00	cut	Sh/Clst: brn blk	3.2	13.1	5.3	3.3	0.7	3.7	8.7	4.4	6.47	0109-3L
3061.00	cut	Sh/Clst: brn blk	6.3	47.9	18.8	9.7	4.6	14.8	28.5	19.4	9.16	0113-3L
3094.00	cut	Sh/Clst: brn blk	5.7	43.8	17.4	9.5	1.6	15.2	27.0	16.8	7.06	0118-1L
3127.00	cut	Sh/Clst: brn blk	4.8	32.8	12.9	7.9	2.0	10.1	20.8	12.1	7.33	0123-1L
3157.00	cut	Sh/Clst: brn blk	7.9	20.7	8.9	4.3	0.8	6.7	13.2	7.5	3.12	0128-1L
3184.00	cut	Sh/Clst: brn blk	6.1	10.4	4.3	2.1	0.6	3.4	6.4	4.0	3.19	0133-1L
3229.00	com	Composite sample - see table 4 e	3.9	9.1	3.6	1.3	0.9	3.4	4.9	4.2	2.68	0193-0B

Table 4 b: Concentration of EOM and Chromatographic Fraction (wt ppm rock) for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	3682	2441	697	77	465	3139	542	0043-1L
2030.00	com	Composite sample - see table 4 e	3127	2260	616	45	205	2876	251	0191-0B
2150.00	com	Composite sample - see table 4 e	2433	1526	597	44	265	2123	309	0192-0B
2797.00	cut	Ca : w to lt brn gy	500	-	-	-	-	-	-	0087-3L
3007.00	cut	Sh/Clst: brn blk	4824	1898	1033	344	1547	2932	1891	0104-3L
3037.00	cut	Sh/Clst: brn blk	4132	1680	1060	208	1183	2740	1392	0109-3L
3061.00	cut	Sh/Clst: brn blk	7632	2987	1549	737	2358	4536	3095	0113-3L
3094.00	cut	Sh/Clst: brn blk	7752	3086	1686	286	2692	4773	2978	0118-1L
3127.00	cut	Sh/Clst: brn blk	6868	2690	1654	414	2108	4345	2523	0123-1L
3157.00	cut	Sh/Clst: brn blk	2620	1130	539	102	848	1669	950	0128-1L
3184.00	cut	Sh/Clst: brn blk	1697	697	348	92	558	1045	651	0133-1L
3229.00	com	Composite sample - see table 4 e	2331	923	329	219	859	1252	1079	0193-0B

Table 4 c: Concentration of EOM and Chromatographic Fraction (mg/g TOC(e)) for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	EOM	Sat	Aro	Asph	NSO	HC	Non-HC	Sample
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	102.57	68.02	19.43	2.16	12.96	87.45	15.12	0043-1L
2030.00	com	Composite sample - see table 4 e	114.16	82.49	22.50	1.67	7.50	104.99	9.17	0191-0B
2150.00	com	Composite sample - see table 4 e	103.12	64.68	25.31	1.87	11.25	90.00	13.12	0192-0B
2797.00	cut	Ca : w to lt brn gy	125.00	-	-	-	-	-	-	0087-3L
3007.00	cut	Sh/Clst: brn blk	58.98	23.21	12.64	4.21	18.92	35.85	23.13	0104-3L
3037.00	cut	Sh/Clst: brn blk	63.88	25.97	16.39	3.23	18.29	42.36	21.52	0109-3L
3061.00	cut	Sh/Clst: brn blk	83.32	32.61	16.91	8.05	25.75	49.53	33.79	0113-3L
3094.00	cut	Sh/Clst: brn blk	109.80	43.72	23.89	4.06	38.13	67.61	42.19	0118-1L
3127.00	cut	Sh/Clst: brn blk	93.70	36.70	22.58	5.65	28.77	59.28	34.42	0123-1L
3157.00	cut	Sh/Clst: brn blk	83.98	36.23	17.28	3.29	27.18	53.51	30.47	0128-1L
3184.00	cut	Sh/Clst: brn blk	53.20	21.85	10.93	2.91	17.51	32.78	20.42	0133-1L
3229.00	com	Composite sample - see table 4 e	87.00	34.46	12.28	8.19	32.08	46.74	40.26	0193-0B

Table 4 d: Composition of material extracted from the rock (%) for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	Sat	Aro	Asph	NSO	HC	Non-HC	Sat	HC	Sample
			EOM	EOM	EOM	EOM	EOM	EOM	EOM	Aro	
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	66.32	18.95	2.11	12.63	85.26	14.74	350.00	578.57	0043-1L
2030.00	com	Composite sample - see table 4 e	72.26	19.71	1.46	6.57	91.97	8.03	366.67	1145.45	0191-0B
2150.00	com	Composite sample - see table 4 e	62.73	24.55	1.82	10.91	87.27	12.73	255.56	685.71	0192-0B
2797.00	cut	Ca : w to lt brn gy	-	-	-	-	-	-	-	-	0087-3L
3007.00	cut	Sh/Clst: brn blk	39.36	21.43	7.14	32.07	60.78	39.22	183.66	155.00	0104-3L
3037.00	cut	Sh/Clst: brn blk	40.66	25.65	5.05	28.64	66.31	33.69	158.51	196.82	0109-3L
3061.00	cut	Sh/Clst: brn blk	39.14	20.30	9.66	30.90	59.44	40.56	192.81	146.55	0113-3L
3094.00	cut	Sh/Clst: brn blk	39.82	21.76	3.70	34.73	61.58	38.42	183.00	160.25	0118-1L
3127.00	cut	Sh/Clst: brn blk	39.17	24.09	6.03	30.70	63.27	36.73	162.58	172.22	0123-1L
3157.00	cut	Sh/Clst: brn blk	43.14	20.58	3.91	32.37	63.72	36.28	209.62	175.63	0128-1L
3184.00	cut	Sh/Clst: brn blk	41.07	20.54	5.47	32.92	61.61	38.39	200.00	160.50	0133-1L
3229.00	com	Composite sample - see table 4 e	39.61	14.11	9.41	36.87	53.72	46.28	280.62	116.08	0193-0B

Depth unit of measure: m

NOTE: Depths shown in tables 4 a to d correspond to the composite samples' lower depth.

<u>Upper depth</u>	<u>Lower depth</u>	<u>Typ</u>	<u>Sample</u>	<u>Depth</u>	<u>Typ</u>	<u>Lithology</u>	<u>Sample</u>
1990.00	2030.00	com	0191-0B is composed of:	1990.00	cut	Sh/Clst: ol gy to drk y brn, slt	0047-1L
				2010.00	cut	Sh/Clst: ol gy to drk y brn, slt	0048-1L
				2030.00	cut	Sh/Clst: ol gy to drk y brn, slt	0049-1L
2070.00	2150.00	com	0192-0B is composed of:	2070.00	cut	Sh/Clst: ol gy to drk y brn, slt	0051-1L
				2090.00	cut	Sh/Clst: ol gy to drk y brn, slt	0052-1L
				2110.00	cut	Sh/Clst: ol gy to drk y brn, slt	0053-1L
				2130.00	cut	Sh/Clst: ol gy to drk y brn, slt	0054-1L
				2150.00	cut	Sh/Clst: ol gy to drk y brn, slt	0055-1L
3217.00	3229.00	com	0193-0B is composed of:	3217.00	cut	Sh/Clst: brn blk	0138-1L
				3223.00	cut	Sh/Clst: brn blk	0139-1L
				3229.00	cut	Sh/Clst: brn blk	0140-1L

Table 5: Saturated Hydrocarbon Ratios for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	Pristane	Pristane	Pristane/nC17	Phytane	CPI1	nC17	Sample
			nC17	Phytane	Phytane/nC18	nC18		nC17+nC27	
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.48	3.11	1.47	0.32	-	1.00	0043-1L
2030.00	com	bulk	0.40	3.88	1.28	0.31	-	1.00	0191-0B
2150.00	com	bulk	0.48	3.36	1.34	0.36	-	1.00	0192-0B
3007.00	cut	Sh/Clst: brn blk	0.70	1.73	1.28	0.55	1.04	0.96	0104-3L
3037.00	cut	Sh/Clst: brn blk	0.73	1.35	1.13	0.65	1.02	0.93	0109-3L
3061.00	cut	Sh/Clst: brn blk	0.81	1.31	1.06	0.76	0.97	0.94	0113-3L
3094.00	cut	Sh/Clst: brn blk	1.12	1.02	0.81	1.39	0.97	0.94	0118-1L
3127.00	cut	Sh/Clst: brn blk	0.81	1.13	1.00	0.82	1.02	0.92	0123-1L
3157.00	cut	Sh/Clst: brn blk	0.70	1.31	1.09	0.64	1.14	0.94	0128-1L
3184.00	cut	Sh/Clst: brn blk	0.69	1.43	1.16	0.59	1.11	0.95	0133-1L
3229.00	com	bulk	0.68	1.46	1.22	0.56	1.14	0.94	0193-0B

Table 6a: Aromatic Hydrocarbon Ratios for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	MNR	DMNR	BPhR	2/1MP	MPI1	MPI2	Rc	DBT/P	4/1MDBT	(3+2) /1MDBT	Sample
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.82	1.44	0.15	-	0.64	0.75	0.78	1.02	-	-	0043-1L
2030.00	com	bulk	0.94	1.50	0.18	2.35	0.63	0.70	0.78	0.87	-	-	0191-0B
2150.00	com	bulk	0.90	1.55	0.17	2.12	0.61	0.70	0.77	0.91	-	-	0192-0B
3007.00	cut	Sh/Clst: brn blk	0.62	1.20	0.08	1.05	0.80	0.80	0.88	0.39	0.63	-	0104-3L
3037.00	cut	Sh/Clst: brn blk	0.83	1.36	0.09	1.01	0.73	0.76	0.84	0.51	0.80	-	0109-3L
3061.00	cut	Sh/Clst: brn blk	1.01	1.47	0.09	1.01	0.78	0.79	0.87	0.52	0.59	0.19	0113-3L
3094.00	cut	Sh/Clst: brn blk	1.01	1.55	0.10	1.02	0.75	0.79	0.85	0.53	0.80	0.24	0118-1L
3127.00	cut	Sh/Clst: brn blk	0.95	1.35	0.11	0.91	0.69	0.71	0.81	0.47	0.87	0.22	0123-1L
3157.00	cut	Sh/Clst: brn blk	1.02	1.79	0.13	1.22	0.77	0.88	0.86	0.39	2.19	0.48	0128-1L
3184.00	cut	Sh/Clst: brn blk	0.88	1.67	0.13	1.22	0.76	0.87	0.86	0.36	3.18	0.65	0133-1L
3229.00	com	bulk	0.71	1.62	0.10	1.22	0.75	0.86	0.85	0.33	2.55	0.69	0193-0B

Table 6b: Aromatic Hydrocarbon Ratios for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	F1	F2	Sample
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.81	0.47	0043-1L
2030.00	com	bulk	0.64	0.36	0191-0B
2150.00	com	bulk	0.62	0.35	0192-0B
3007.00	cut	Sh/Clst: brn blk	0.49	0.24	0104-3L
3037.00	cut	Sh/Clst: brn blk	0.46	0.24	0109-3L
3061.00	cut	Sh/Clst: brn blk	0.47	0.24	0113-3L
3094.00	cut	Sh/Clst: brn blk	0.46	0.24	0118-1L
3127.00	cut	Sh/Clst: brn blk	0.44	0.23	0123-1L
3157.00	cut	Sh/Clst: brn blk	0.49	0.28	0128-1L
3184.00	cut	Sh/Clst: brn blk	0.49	0.28	0133-1L
3229.00	com	bulk	0.49	0.28	0193-0B

Table 7 : Thermal Maturity Data for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
1010.00	cut	Sh/Clst: lt ol gy to m gy	-	-	-	-	3.5-4.0	428	0001-1L
1030.00	cut	Sh/Clst: lt ol gy to m gy	0.26	5	0.02	-	-	-	0002-1L
1130.00	cut	Sh/Clst: lt ol gy to m gy	0.23	20	0.04	-	-	-	0007-1L
1220.00	cut	Sh/Clst: lt ol gy	0.23	19	0.02	-	-	-	0010-1L
1320.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.24	20	0.03	-	3.5(?)	419	0014-1L
1430.00	cut	Sh/Clst: ol gy to drk y brn	0.26	20	0.04	-	3.5-4.0(??)	418	0019-1L
1550.00	cut	Sh/Clst: ol gy to drk y brn	0.26	20	0.03	-	-	419	0025-1L
1670.00	cut	Sh/Clst: ol gy to drk y brn	0.26	20	0.05	-	4.0-4.5	423	0031-1L
1790.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.33	20	0.04	-	4.0-4.5	425	0037-1L
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	0.34	20	0.04	-	4.5	422	0043-1L
2010.00	cut	Sh/Clst: ol gy to drk y brn	0.36	20	0.04	-	-	-	0048-1L
2130.00	cut	Sh/Clst: ol gy to drk y brn	0.34	20	0.05	-	-	-	0054-1L

Table 7 : Thermal Maturity Data for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
2150.00	cut	Sh/Clst: ol gy to drk y brn	-	-	-	-	5.0	428	0055-1L
2255.00	cut	Sh/Clst: lt gn gy to m gy	0.37	18	0.05	-	-	-	0060-3L
2356.00	cut	Sh/Clst: m gy	0.40	17	0.04	-	-	429	0065-1L
2455.00	cut	Sh/Clst: lt gy to lt gn gy	0.46	5	0.05	-	-	-	0070-4L
2797.00	cut	Ca : w to lt brn gy	-	-	-	-	NDP	434	0087-3L
2857.00	cut	Sh/Clst: lt gn gy to lt gy to m gy	0.42	10	0.05	-	-	-	0090-2L
2968.00	cut	Sh/Clst: lt gn gy to lt gy to m gy	0.51	14	0.03	-	-	-	0097-2L
3001.00	cut	Sh/Clst: brn blk	0.39	18	0.04	-	-	428	0103-4L
3007.00	cut	Sh/Clst: brn blk	-	-	-	-	5.5(?)	430	0104-3L
3037.00	cut	Sh/Clst: brn blk	-	-	-	-	5.5(?)	430	0109-3L
3055.00	cut	Sh/Clst: brn blk	0.47	12	0.04	-	-	428	0112-3L
3061.00	cut	Sh/Clst: brn blk	-	-	-	-	5.5-6.0(?)	431	0113-3L
3094.00	cut	Sh/Clst: brn blk	-	-	-	-	5.5	430	0118-1L
3100.00	cut	Sh/Clst: brn blk	0.43	16	0.04	-	-	432	0119-1L

Table 7 : Thermal Maturity Data for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ Lithology	Vitrinite Reflectance (%)	Number of Readings	Standard Deviation	Spore Fluorescence Colour	SCI	Tmax (°C)	Sample
3127.00	cut Sh/Clst: brn blk	-	-	-	-	6.0(?)	432	0123-1L
3151.00	cut Sh/Clst: brn blk	0.37	1	0.00	-	-	430	0127-1L
3157.00	cut Sh/Clst: brn blk	-	-	-	-	6.0-6.5(?)	429	0128-1L
3184.00	cut Sh/Clst: brn blk	-	-	-	-	6.0-6.5	427	0133-1L
3223.00	cut Sh/Clst: brn blk	-	-	-	-	6.5-7.0(??)	429	0139-1L
3270.00	cut Sh/Clst: drk gy	0.46	20	0.06	-	-	-	0148-4L
4105.00	cut Sh/Clst: m gy to gy blk	0.50	2	0.04	-	-	-	0157-1L
4260.00	cut Sh/Clst: drk gy	0.42	1	0.00	-	-	-	0170-1L
4336.00	cut Sh/Clst: drk gy	0.57	2	0.01	-	-	-	0177-1L

Table 8 : Visual Kerogen Composition Data for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	L I P T %	A m o r L t	L i p D e o c c l	S / t P i s t l	C u r e l l n	D i n o r t l	A B i t L	I N E R T %	S F u t n	M i c r o I	S i c l e t I	V I T R I n %	C o l l i n t	V i t r i n e	A m o r t V	B i t V V	Sample
1010.00	cut	Sh/Clst: lt ol gy to m gy	90	**	*	*	*	*		10	*			TR	*				0001-1L
1320.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	95	*	**	*	*	*		TR	*			5	*				0014-1L
1430.00	cut	Sh/Clst: ol gy to drk y brn	90	*	**	*	*	*		5	*			5	*				0019-1L
1670.00	cut	Sh/Clst: ol gy to drk y brn	95	*	**	*	*	*		TR	*			5	*				0031-1L
1790.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	90	*	**	*	*	*		5	*			5	*	**			0037-1L
1910.00	cut	Sh/Clst: lt ol gy to ol gy to drk y brn	85	*	**	*	*	*		5	*			10	*				0043-1L
2150.00	cut	Sh/Clst: ol gy to drk y brn	95	*	**	*	*	*		TR	*			5	*				0055-1L
2797.00	cut	Ca : w to lt brn gy	NDP		**		*			NDP	*			NDP	*				0087-3L
3007.00	cut	Sh/Clst: brn blk	90	**	*	*	**	*		10	*			TR	*				0104-3L
3037.00	cut	Sh/Clst: brn blk	85	**	*	*	**	*		15	*			TR	*				0109-3L
3061.00	cut	Sh/Clst: brn blk	85	**	*	*	**	*		15	*			TR	*				0113-3L
3094.00	cut	Sh/Clst: brn blk	80	**	*	*	**	*		20	*			TR	*				0118-1L

Table 8 : Visual Kerogen Composition Data for well NOCS 15/12-3

Depth unit of measure: m

Depth	Typ	Lithology	L	A	L	S	C	D			I	S	I	M	S	V	C	V	A	Sample			
			%	L	t	l	l	n	e	f	i	t	L	%	n	s	t	n	o		I	%	n
3127.00	cut	Sh/Clst: brn blk	85	**	*	*		**	*		15		*			TR		*		0123-1L			
3157.00	cut	Sh/Clst: brn blk	NDP	*	*	*		?			NDP		*		NDP		*		0128-1L				
3184.00	cut	Sh/Clst: brn blk	45	**	*	*	*	*			55		*	**	TR		*		0133-1L				
3223.00	cut	Sh/Clst: brn blk	90	*	**	*	*	*			10		*		TR		*		0139-1L				

Table 9a: Tabulation of carbon isotope data for EOM/EOM - fractions for well NOCS 15/12-3

Depth unit of measure: m

<u>Depth</u>	<u>Typ</u>	<u>Lithology</u>	<u>EOM</u>	<u>Saturated</u>	<u>Aromatic</u>	<u>NSO</u>	<u>Asphaltenes</u>	<u>Kerogen</u>	<u>Sample</u>
3007.00	cut	Sh/Clst	-30.97	-30.68	-30.89	-30.81	-29.93	-	0104-3
3061.00	cut	Sh/Clst	-29.27	-29.62	-29.16	-29.02	-28.72	-	0113-3
3094.00	cut	Sh/Clst	-27.75	-27.59	-28.14	-27.59	-27.83	-	0118-1
3127.00	cut	Sh/Clst	-28.62	-29.25	-28.30	-28.34	-28.01	-	0123-1
3229.00	com	Composite sample	-27.97	-28.45	-27.90	-27.75	-27.28	-	0193-0

Table 9b: Tabulation of cv values from carbon isotope data for well NOCS 15/12-3

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>Sample</u>
3007.00	cut	Sh/Clst	-30.68	-30.89	-2.61	0104-3
3061.00	cut	Sh/Clst	-29.62	-29.16	-1.45	0113-3
3094.00	cut	Sh/Clst	-27.59	-28.14	-4.32	0118-1
3127.00	cut	Sh/Clst	-29.25	-28.30	-0.47	0123-1
3229.00	com	Composite sample	-28.45	-27.90	-1.61	0193-0

Depth unit of measure: m

Depth	Lithology	Ratio1	Ratio2	Ratio3	Ratio4	Ratio5	Ratio6	Ratio7	Ratio8	Ratio9	Rat.10	Rat.11	Rat.12	Rat.13	Rat.14	Sample
3007.00	Sh/Clst	2.24	0.69	0.19	0.65	0.39	0.05	1.13	1.74	0.53	0.09	0.85	0.39	0.17	58.78	0104-3
3061.00	Sh/Clst	2.05	0.67	0.15	0.60	0.37	0.06	1.12	1.88	0.53	0.04	0.87	0.37	0.15	58.42	0113-3
3094.00	Sh/Clst	1.68	0.63	0.12	0.58	0.37	0.04	1.89	3.28	0.65	0.04	0.90	0.37	0.13	60.86	0118-1
3127.00	Sh/Clst	1.60	0.62	0.11	0.49	0.33	0.05	1.31	2.67	0.57	0.06	0.92	0.33	0.09	59.56	0123-1
3229.00	bulk	2.34	0.70	0.15	0.52	0.34	0.06	0.43	0.81	0.30	0.11	0.88	0.35	0.14	60.53	0193-0

List of Triterpane Distribution Ratios

Ratio 1: B / A

Ratio 2: $B / B+A$

Ratio 3: $B / B+E+F$

Ratio 4: C / E

Ratio 5: $C / C+E$

Ratio 6: X / E

Ratio 7: Z / E

Ratio 8: Z / C

Ratio 9: $Z / Z+E$

Ratio 10: Q / E

Ratio 11: $E / E+F$

Ratio 12: $C+D / C+D+E+F$

Ratio 13: $D+F / C+E$

Ratio 14: $J1 / J1+J2$ (%)

Table 10b: Variation in Sterane Distribution (peak height) SIR for Well NOCS 15/12-3

Depth unit of measure: m

<u>Depth</u>	<u>Lithology</u>	<u>Ratio1</u>	<u>Ratio2</u>	<u>Ratio3</u>	<u>Ratio4</u>	<u>Ratio5</u>	<u>Ratio6</u>	<u>Ratio7</u>	<u>Ratio8</u>	<u>Ratio9</u>	<u>Ratio10</u>	<u>Sample</u>
3007.00	Sh/Clst	0.51	35.21	55.60	1.82	0.64	0.43	0.31	0.39	0.54	0.97	0104-3
3061.00	Sh/Clst	0.51	39.69	60.77	1.49	0.66	0.23	0.16	0.44	0.66	1.28	0113-3
3094.00	Sh/Clst	0.53	40.31	70.50	1.54	0.75	0.29	0.21	0.54	0.68	2.00	0118-1
3127.00	Sh/Clst	0.70	45.85	73.29	1.53	0.75	0.29	0.20	0.58	0.85	2.53	0123-1
3229.00	bulk	0.70	43.81	62.67	1.38	0.66	0.42	0.30	0.46	0.78	1.49	0193-0

List of Sterane Distribution Ratios

Ratio 1: $a / a+j$

Ratio 2: $q / q+t$ (%)

Ratio 3: $2*(r+s) / (q+t + 2*(r+s))$ (%)

Ratio 4: $a+b+c+d / h+k+l+n$

Ratio 5: $r+s / r+s+q$

Ratio 6: $u+v / u+v+q+r+s+t$

Ratio 7: $u+v / u+v+i+m+n+q+r+s+t$

Ratio 8: $r+s / q+r+s+t$

Ratio 9: q / t

Ratio 10: $r+s / t$

Table 10c: Variation in Triaromatic Sterane Distribution (peak height) for Well NOCS 15/12-3

Depth unit of measure: m

<u>Depth</u>	<u>Lithology</u>	<u>Ratio1</u>	<u>Ratio2</u>	<u>Ratio3</u>	<u>Ratio4</u>	<u>Ratio5</u>	<u>Sample</u>
3007.00	Sh/Clst	0.53	0.44	0.17	0.24	0.22	0104-3
3061.00	Sh/Clst	0.54	0.47	0.18	0.23	0.23	0113-3
3094.00	Sh/Clst	0.40	0.37	0.13	0.16	0.16	0118-1
3127.00	Sh/Clst	0.35	0.29	0.13	0.15	0.19	0123-1
3229.00	bulk	0.46	0.33	0.18	0.21	0.27	0193-0

Ratio1: a1 / a1 + g1

Ratio2: b1 / b1 + g1

Ratio3: a1 + b1 / a1 + b1 + c1 + d1 + e1 + f1 + g1

Ratio4: a1 / a1 + e1 + f1 + g1

Ratio5: a1 / a1 + d1

Table 10d: Variation in Monoaromatic Sterane Distribution (peak height) for Well NOCS 15/12-3

Depth unit of measure: m

<u>Depth</u>	<u>Lithology</u>	<u>Ratio1</u>	<u>Ratio2</u>	<u>Ratio3</u>	<u>Ratio4</u>	<u>Sample</u>
3007.00	Sh/Clst	0.82	0.66	0.72	0.66	0104-3
3061.00	Sh/Clst	0.46	0.35	0.34	0.31	0113-3
3094.00	Sh/Clst	0.29	0.17	0.19	0.16	0118-1
3127.00	Sh/Clst	0.30	0.18	0.19	0.15	0123-1
3229.00	bulk	0.34	0.16	0.22	0.17	0193-0

Ratio1: A1 / A1 + E1
 Ratio2: B1 / B1 + E1

Ratio3: A1 / A1 + E1 + G1
 Ratio4: A1+B1 / A1+B1+C1+D1+E1+F1+G1+H1+I1

Table 10e: Aromatisation of Steranes (peak height) for Well NOCS 15/12-3

Depth unit of measure: m

<u>Depth</u>	<u>Lithology</u>	<u>Ratio1</u>	<u>Ratio2</u>	<u>Sample</u>
3007.00	Sh/Clst	0.05	0.99	0104-3
3061.00	Sh/Clst	0.18	0.97	0113-3
3094.00	Sh/Clst	0.23	0.96	0118-1
3127.00	Sh/Clst	0.21	0.97	0123-1
3229.00	bulk	0.25	0.97	0193-0

Ratio1:
$$\frac{C1+D1+E1+F1+G1+H1+I1}{C1+D1+E1+F1+G1+H1+I1 + c1+d1+e1+f1+g1}$$

Ratio2: $g1 / g1 + I1$

Table 10f: Raw triterpane data (peak height) m/z 191 SIR for Well NOCS 15/12-3

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				
3007.00	Sh/Clst	12157.8 2744.5 11590.5	4848.2 5621.0 8018.9	3713.5 54386.0 6565.2	4368.8 9383.6 4345.5	1387.5 23031.4 9044.2	6583.1 15477.8 5294.0	14743.8 5216.1	61626.5 11510.2	35346.6 8070.8	0104-3
3061.00	Sh/Clst	119530.4 88287.4 458103.7	57231.4 125736.5 324764.3	43108.4 1457715.0 233951.2	84575.6 223229.8 160707.3	19848.6 723902.0 322063.7	149558.6 488571.7 212629.4	306813.7 151142.4	1639888.0 415768.2	870837.0 295974.6	0113-3
3094.00	Sh/Clst	30329.2 14336.4 66510.4	14949.0 28957.7 41233.8	9292.0 335137.9 30383.5	19495.2 38655.0 18905.6	3987.2 122404.4 34707.9	31261.4 77213.3 20270.9	52652.6 20496.6	633310.8 65657.7	193256.2 42228.3	0118-1
3127.00	Sh/Clst	46279.4 20239.5 80042.7	25117.7 17093.2 52137.0	14045.7 437678.1 40986.4	23086.3 38666.9 26088.9	6591.4 202952.5 44693.3	37025.5 124518.2 24724.5	59203.0 24485.4	572446.4 108543.8	214479.9 73699.7	0123-1
3229.00	bulk	27725.4 9191.5 23123.0	16152.2 11994.6 15619.8	6468.1 146443.3 12245.5	14070.5 19260.3 7649.5	3045.5 65315.0 10384.2	12548.9 39286.6 5160.1	29347.0 11209.2	62294.1 33767.6	76656.8 22022.6	0193-0

Table 10g: Raw sterane data (peak height) m/z 217 SIR for Well NOCS 15/12-3

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					
3007.00	Sh/Clst	19388.2 10749.8 10176.0	4969.5 8581.5 7040.0	24335.1 23391.1 8812.7	15598.6 9234.3 3707.9	6841.0 4013.4 12956.9	7565.5 7331.9	9945.1 5791.9	7757.7 6227.3	13622.1	0104-3
3061.00	Sh/Clst	219162.1 267967.1 260571.8	81295.4 206281.4 223822.1	519086.1 493738.7 317490.5	331372.3 237247.1 119294.6	152997.4 109089.0 340174.4	157439.4 201519.7	243497.6 166964.5	178365.0 165537.6	359062.2	0113-3
3094.00	Sh/Clst	61275.5 46897.1 41717.5	17937.8 41306.0 36417.1	95691.7 83351.5 86922.3	57928.2 39094.2 21040.6	24222.4 17871.8 53914.9	25901.7 34144.0	40184.9 28643.7	30208.4 33147.6	59615.1	0118-1
3127.00	Sh/Clst	73192.1 85330.5 28692.6	19764.7 67533.4 43290.1	152396.6 64277.1 88186.9	99238.8 67041.9 41345.3	40138.9 26719.9 51128.9	41492.6 35834.3	57889.6 38100.4	36815.9 46192.1	62577.2	0123-1
3229.00	bulk	32146.3 32935.0 8362.3	7911.9 19793.8 13173.0	47930.6 20092.6 15087.5	30060.5 23857.0 10153.3	12891.6 9429.6 16892.3	12627.7 8617.3	17614.4 8871.6	11099.8 12806.6	17489.4	0193-0

Table 10h: Raw triaromatic sterane data (peak height) m/z 231 for Well NOCS 15/12-3

Depth unit of measure: m

Depth	Lithology	a1	b1	c1	d1	e1	f1	g1	Sample
3007.00	Sh/Clst	35942.0	25434.3	53709.5	127361.2	31314.1	47975.6	31889.7	0104-3
3061.00	Sh/Clst	74677.9	55466.3	103799.4	255097.4	70020.0	109513.7	63673.7	0113-3
3094.00	Sh/Clst	88705.5	75538.9	162079.6	465974.3	133310.7	201599.3	131345.7	0118-1
3127.00	Sh/Clst	90038.4	69290.8	148846.0	387917.4	170762.1	163486.5	167748.5	0123-1
3229.00	bulk	58508.7	34150.6	58964.0	154551.6	76748.9	68891.9	69961.7	0193-0

Depth unit of measure: m

Depth	Lithology	A1	B1	C1	D1	E1	F1	G1	H1	I1	Sample
3007.00	Sh/Clst	19377.0	8592.3	2567.0	2285.0	4337.6	468.0	3317.0	1245.9	190.1	0104-3
3061.00	Sh/Clst	35037.7	21806.3	23056.0	18135.0	40771.2	5862.5	27754.7	10884.3	2033.1	0113-3
3094.00	Sh/Clst	41398.6	20611.9	52505.1	41181.2	102902.3	13282.3	76680.9	32460.4	5820.5	0118-1
3127.00	Sh/Clst	32918.3	16589.8	41903.8	40023.9	76347.4	13351.3	65616.2	41783.4	5011.7	0123-1
3229.00	bulk	20797.7	7957.1	19844.1	15927.9	40540.6	10440.2	31186.3	19886.1	2099.5	0193-0