PRELIMINARY

GEOLOGICAL WELL PROGRAMME

CONFIDENTIAL

CONOCO NORWAY/BP/PELICAN 16/8-1

EXPLORATION WELL

SECURITY

This is a tight hole.
No information will be released to outside parties without prior permission from partner companies.

PRODUCTION LICENCE

020

LOCATION: 58° 27' 25" N
02° 26' 02" E (provisional)

SEISMIC LINE

CN 16-6, SP 80

POSITIONING ALLOWANCE: 100 m radius

RIG: Norskald

KB ELEVATION: 25m

WATER DEPTH ca. 82m

Final location, water depth and elevation are subject to onsite measurements and coordinate verification.

NEAREST WELL CONTROL

Esso	16/7-1	15 Km to SW	Phillips	16/11-1	34 km to SSE
Esso	16/9-1	20 km to ESE	Elf	16/6-1	38 km to NE

GEOLOGICAL SETTING

Prospect 16/8-1 is situated in a NE-SW trending sub-basin to the South-east of the Utsira High: the basin edge passes through the northwestern corner of block 16/8.

The basin configuration existed already during the deposition of the Zechstein when the basin was filled with more than 600 m thick salt deposits. By the end of the Triassic the thickness of the overlying

sediments was thick enough (ca. 1000m) to make the salt move and this resulted in the development of salt cushions. The resulting structures were eroded during the Early Kimmerian phase and locally an angular unconformity originated. Renewed sedimentation made the salt move again: during the Early Cretaceous at this location and later in other places, depending on the thickness and structural position of the salt and the thickness of overlying sediments. Contrary to the development in this structure, these movements were often accompanied by piercement. The salt has been in equilibrium since the Miocene.

Both the salt and the overburden thin towards the Utsira High, i.e. towards the Northwest. Generally salt flows in the direction of decreasing overburden and decreasing salt thickness and this can cause so-called travelling anticlines. These anticlines are slightly asymmetric and the structure to be drilled at this location is of this type. These features develop in wedge-shaped sedimentary sequences. By the time such anticline reaches the basin edge it can not travel any further and the basin-outward flank with the shortest curvature will break along a thrust fault.

These thrust movements started during the Early Cretaceous and by the end of the Paleocene most of the closure was established, but weak movements continued until the end of the Oligocene.

STRATIGRAPHIC OBJECTIVES

MAIN

The primary objective is formed by the basal Upper Jurassic sand. This sand was deposited in a NE-SW trending sub-basin flanking the Utsira High to the Southeast, and reaches a thickness of 325 feet in 16/9-1 and 247 feet in 16/11-1, whereas the Jurassic was found to be pierced in 16/7-1. On the Utsira High itself this sand is either absent (25/8-1, 25/11-1, 16/5-1 (?) or at the best extremely thin (5m in 16/6-1). Ca. 60 m net sand can be expected in 16/8-1.

Sand quality is generally very good in the upper part of the section but decreases downwards due to a combination of increasing cementation and shaliness. The sediments were deposited in a coastal environment.

SECONDARY

Triassic sandstones

Regional data suggest that the lower 250 m of the Triassic are predominantly shaly (Bunter shales), whereas the upper part (more than 700m thick) is developed in a predominantly sandy facies with reasonable to good poroperms. Average porosities of 20-25% were reported from well 17/10-1. At the proposed location almost 200 m of gross sandy Triassic is thought to be preserved, which could easily be in communication with the Upper Jurassic sand.

Paleocene sands

Distal ends of Paleocene turbidites reached the culmination of the Utsira High, but it is difficult to predict whether they also reached block 16/8. Regionally the presence of sand is associated with a great total thickness of the Paleocene. If this relationship also exists here, then there is a good chance that distal turbiditic sands just reached the northwestern corner of block 16/8, including the 16/8-1 location.

Four, each ca. 10 feet thick, ratty Eocene sands were penetrated in 16/7-1.

Estimated Formation Tops

TABLE 1

FORMATION	DRILLED DEPTH	SUB-SEA DEPTH	TWO WAY TIME	DEGREE OF ACCURACY /SEISMIC/
RECENT-PLEISTOCENE /SEA FLOOR/	107m	82m		
PLEISTOCENE-PLIOCENE	385m	360m		
MIOCENE	695m	670m		
OLIGOCENE	994m	969m		V_{av} m/sec V_{int} m/sec.
EOCENE	1310m	1285m		
PALEOCENE	1645m	1620m	1.650	1964 ± 100 m 2206
CHALK/U. CRETACEOUS/	1875m	1850m	1.820	2032 ± 150 m
L. CRETACEOUS	2145m	2120m	1.880	2255 ± 150 m
U. JURASSIC SHALE	2225m	2200m		1667
U. JURASSIC SAND	2270m	2245m	2.030	2212 ± 100 m
TRIASSIC	2341m	2316m		
T.D.	2438m	2413m		
* Permian Salt	2972m	2947m	2.340	2519 ± 200 m

See Appendix

Note:

Seismic picks for Paleocene and Upper Jurassic sand are considered good. They tie to 16/9-1 well, located 20 kms to the southeast, where the seismic times and corresponding geologic horizons are considerably higher than at the 16/8-1 location. The picks for top Chalk and top Lower Cretaceous are less reliable. Comparison with the surrounding wells suggests that the top of Chalk in 16/8-1 may be encountered 50 to 100 m higher than as indicated in the Table 1.

The remaining formation tops were interpolated from wells 16/7-1, 16/9-1, 16/11-1 and 16/6-1, located 15, 20, 34 and 38 kilometers away.

PRESSURE PREDICTION

Two independent methods were used for estimating the pressures that may be encountered in 16/8-1. The subsequent comparison between them led to the final pressure prognosis. The first method involved analyzing the well logs and well drilling histories of the wells situated proximally to the 16/8-1 location and in a similar geologic feature (Ling Sub-Basin). The plots of shale interval transit times and shale resistivities from 16/7-1, 16/9-1, 16/11-1 and 16/6-1 point to the mild overpressure zone beginning at around 700 $\pm$ 30 m (U. Miocene) in the entire region. The drilling history of these wells confirms the existance of the overpressure here. The mud weights used in all of the wells did not exceed 10.5 ppg until the depth of about 1550 m. (U. Cretaceous). In the subsequent logging runs various problems related to the underbalanced condition of the well bore were encountered, such as sloughing, bridging, stuck tools, etc. Increase of the mud weights to about 11.3 - 11.7 ppg allieviated the problems and the wells were drilled trouble-free until the salt was reached, when a further increase of mud weight was needed. However, it is not anticipated that 16/8-1 will reach the Permian salt (See Table 1*). No actual pressure tests were carried out in these wells.

The second method used for the estimating of possible pore pressures was the analysis of interval velocities (conversely, interval transit times, Δt) derived from the seismic lines running through and proximally to the proposed location. In order to eliminate the erroneous and unreliable reflections, the data point (stacking velocities vs. time) scatter plots were used for the selected shot points. The strongest clusters, necessarily corresponding to the more or less continuous reflections, were selected for the interval velocity determinations (Dix's program). The resulting interval transit times (Δt) were then plotted on the semilog graph vs. depth. Paul Pilkington's method of fitting separate normal pressure trend curves for the appropriate geologic ages was used for picking top of the overpressured zone and for matrix stress equation calculations of the expected mudweights (Fig.1).

Although seismically derived top of the overpressure comes out higher than in the sonic and resistivity plots, the mud weights estimated with this method are in remarkable agreement with the actual drilling data from the surrounding wells. It is interesting to note that if a single normal trend curve was drawn for the entire geologic section, the calculated mud weights would be way too high (14.5 - 15 ppg) for this area.

For the 16/8-1 well the suitable mud weight program appears to be a gradual increase from 9.0 ppg to 11.5 ppg between 480 and 700 m. Such mud weight (11.5 ppg) should be sufficient until the final T.D.

Possible minor mud weight adjustments, to improve the drilling rate, could be made after the casing program is determined.

TEMPERATURE, DRILLING HAZARDS

A temperature of about 185°F is to be expected at the T.D. of 2438 m. No particular drilling hazards are anticipated for 16/8-1 well.

CASING PROGRAMME

30"	casing set at ca. 168m
20"	casing set at ca. 534m
13.3/8"	casing set at ca. 1326m
9.5/8"	casing set at final TD, if hydrocarbons are encountered in the U. Jurassic or deeper.

LOGGING PROGRAMME

All logs should be recorded on digital tape in the event that CPI logs of specific zone are required.

Log Run No. 1 (in 17½" hole with seawater mud)

Prior to opening the hole for the running of the 20" casing, the Gamma Ray/Sonic (with velocity calibration) from T.D. to the 30" casing shoe. Continue the Gamma Ray up through casing to seabed, adjusting gamma sensitivity to get maximum contrast through casing. This log is run by request of the Norwegian Petroleum Directorate.

Log Run No. 2 (in 17½" hole with seawater mud)

Prior to running the 13.3/8" casing, the following logs will be run over the uncased interval from T.D. to the 20" casing shoe.

ISF/Sonic/Gamma Ray/SP (with velocity calibration of Sonic)

If IL (deep) resistivity exceeds 20 ohms, run a repeat section over the zones of interest on a logarithmic scale in tracks 2 and 3. If this tool is not available make two runs viz:-

(i) Gamma Ray/Sonic (with velocity calibration of Sonic)

(ii) IES/SP

Log Run No. 3 (12.1/4" hole with seawater mud)

Prior to running 9.5/8" casing (if required) the following logs will be run over the uncased interval from final T.D. to the 13.3/8" casing shoe.

a) ISF/Sonic/Gamma Ray/SP (with velocity calibration of Sonic)

If IL (deep) resistivity exceeds 20 ohms run a repeat section over the zones of interest on a logarithmic scale in tracks 2 and 3. If this tool is not available two runs will have to be made:

i) Gamma Ray/Sonic (with velocity calibration of Sonic)

ii) IES/SP

b) CNL/FDC/CAL/GR: Only record CNL over zones with porosity or special interest.

c) High Resolution Dipmeter

d) Sidewall Cores: are required for source rock study, micropalaeontology/palynology or to check type of formation fluids.

If significant hydrocarbon shows and porosities are encountered, the following additional logs will be run at intervals to be selected on site by the log specialist:

e) Dual Laterolog/SP

f) If the mudcake thickness is less than approximately 1.1/4 cm the Microlog/Microlaterolog should be run. In cases where the mudcake is thicker than 1.1/4 cm the Microlog/Proximity Tool should be run.

g) Formation Interval Tester: This tool should be available in the event it is required for further evaluation.

h) A Velocity Survey will be carried out at final T.D.

CORING

All porous reservoirs with good hydrocarbon shows (Upper Jurassic and older) will be cored (subject to hole and rig safety conditions).

All cores will be cut at intervals to be selected on site by the well-site geologist.

DRILL STEM TESTING

Open hole drill stem testing is not planned for this well. In the event of cased hole drill stem tests or FIT's being necessary, standard procedures for collecting data will be followed under the supervision of a representative of the Production Department.

FLUID SAMPLING

See Appendix B for instructions concerning quantities required of the fluids recovered. The sample distribution list is also in Appendix B.

The following points should be noted:

If liquids are produced, a sample must be taken from the top, middle and base of drill stem test string. If the liquids recovered in the test string are reverse circulated out, the volume of mud required to displace samples from the top, middle and base of the string to the surface should be circulated.

The samples should be taken after the pumps have displaced the correct volume of fluid to surface. In these curcumstances, it is best to take more samples from the bottom of the string to make sure a good sample of formation liquid is recovered.

a) If water is produced it should be stored in clean, airtight containers.. These samples will be used for salinity measurements and complete chemical analysis if required.

b) If oil is produced it should be stored in clean, airtight, lightproof drums.

c) Gas samples should be taken in a pressure cylinder that has been purged of all impurities before being sent to the rig. Glass-lined cylinders should be used because stainless steel and aluminium react with H_2S and CO_2.

BIT CUTTINGS

See Appendix B for instructions concerning data and sample acquisition and distribution to partners, government departments, consultants and storage warehouses.

Samples of bit cuttings will be caught at 6 m intervals from sea floor to 13.3/8" casing shoe. Below 13.3/8" casing shoe samples of bit cuttings will be taken at 3 m intervals to final T.D. Additional assistance to catch samples will probably be required during fast drilling in the upper part of the section. Provision should be made for mudlogging personnel to be available to handle this before the well spuds.

Sampling interval may be reduced in any part of the section, at the discretion of the wellsite geologist.

Cloth bags should be clearly marked for depth, using waterproof ink or dye. They should be drip dried, under cover, packed in sequence in wooden boxes and shipped ashore at the earliest opportunity. Cuttings destined for the Norwegian Petroleum Directorate should be packed in sealed plastic bags inside the cloth bags.

CONFIDENTIAL DATA

On completion of the well the Mudlogging Party Chief must hand over to the wellsite geologist all mudlogging data, and any confidential material which has been loaned to him for reference purposes.

SPECIAL NOTES

a) All shipments of samples and cores to shore should be clearly labelled as to contents. On arrival, they will be shipped to final destination.

b) The Continental Drilling Supervisor should see that the pipe is strapped prior to logging, coring or running DST's in order to ensure accurate depth control.

c) Since this well is being drilled from a floating rig in an area of abnormal pressure full pressure control instrumentation and engineering will be required.

d) All wireline logs, mud logs and lithology logs must be recorded with depths in metric units.

Paul Batt

Stavanger, 8th July 1976 — Paul Batt

Approved: _____ — Chief Geologist

Approved: John Stanley. — Chief Geophysicist

Approved: _____ — Exploration Manager

CONOCO NORWAY/BP/PELICAN 16/8-1

APPENDIX A

GENERAL LITHOLOGIES

Formation	Drilled Depth	Lithology	Thickness
Recent-Pleistocene	107m	Unconsolidated sand, lt.grey, fine grained, sub ang-sub rd. Shell fragments. Clay, lt-md grey, soft, sticky; tr. lignite	278m
Pleistocene-Pliocene	385m	Clay, lt-md grey, soft, sli. calc, Tr. siltstone, lt-md grey, firm, sli.calc, micaceous	310m
Miocene	695m	Clay, lt-md grey, soft, sticky, non calc. Tr.sand,v.fine grained, glauc, micaceous.	299m
Oligocene	994m	Clay, md grey to brn grey, silty, soft, sticky, v.sli.calc. Tr. silt, brn-grey, glauc,pyritic. Tr. limestone, tan.	316m
Eocene	1310m	Clay, md grey, silty, soft,micro-micaceous, Tr. sand, glauc. Silt-stone, lt-md grey, soft, non calc, Limestone stringers, lt tan.	335m
Paleocene	1645m	Upper-Volcanic ash, vitric tuff, grey, firm. Lower-clay, md-dk grey, sometimes greenish, firm. Siltstone, lt grey-green, glauc.	230m
U. Cretaceous	1875m	Chalk, cream to buff, soft to firm, cherty, tr. pyrite	270m
L. Cretaceous	2145m	Shale, dk grey, micaceous, sli-non calc. Occ. olive grey to red brown streaks, silty.	80m
U. Jurassic shale	2225m	Shale, dk grey, firm, sl. silty, calc, micaceous	45m

U. Jurassic sandstone	2270m	Sandstone, white-pale green, glauc, v.fine-coarse grained, some feldspar, friable. Tr. limestone, dense, dolomitic.	71m
Triassic	2341m	Predominantly red beds, interbedded sandstones, siltstones and shales. Sandstone, pink-red, md-coarse, some pebbles, friable. Siltstone, red-brn, sandy, argill. Shale, red,soft, slinon calc.	T.D. in Triassic at 2438m

APPENDIX B (for attachment to prognosis)

GOVERNMENT AND PARTNER WELL DATA REQUIREMENTS FOR

CONOCO NORWAY/BP/PELICAN 16/8-1

A. PARTNERS

I. BP

a. Daily Telex

Will be sent by our Stavanger office to:

J.F. Watson - Telex No. 33339 bpexp n

b. Logs

1 sepia of each Schlumberger log

1 sepia of mudlog

1 sepia of litholog

To be sent by our Stavanger office to:

J.F. Watson,
BP Petroleum Development of Norway A/S,
Boganesveien 114,
4032 Gausel.

c. Samples

One set of washed and dried samples to be sent to the above address - labelled BP.
One set of canned cutting samples taken every 100 m from 1000 m to top U. Cretaceous and every 30 m from 2000 m to T.D.

d. Contact

Mr. J.F. Watson, Tel. No. 045 - 75711
Home No. 045 - 21446

II. PELICAN

a. Daily Telex

Will be sent by our Stavanger office to:

T. Brandlie - Telex No. 11093 a esval n

b. Logs

1 print of each Schlumberger log

1 print of mudlog

1 print of litholog

To be sent by our Stavanger office to:

Mr. Tore Braadlie,
A/S Pelican & Co. K/S,
c/o Årdal og Sunndal Verk A/S,
Postboks 5177,
OSLO 3.

c. Samples

One set of washed and dry samples - labelled PELICAN

To be sent to:

Sydvaranger,
Nordråksvei 2,
1324 Lysaker.

d. Contact

Mr. Tore Braadlie - Tel. No. 02-605890
Home No. 02-533708

B. CONOCO

a. Logs

All original films, either Schlumberger or other logs, should be sent as soon as possible to the Stavanger office (exploration dept.) in order that sepias and prints may be made and distributed. One complete set of field prints should be retained on the rig when the originals are sent ashore, but must be brought ashore at the end of the well.

b. Samples

1. Rock samples.

Two sets of washed and dried samples for reference purposes.

Six sets of washed and dried samples for trade purposes,

One set of unwashed samples - labelled BF - for

2 - (650 cc) pressured oil samples

2 - (20 litre) pressured oil samples

2 - 5 gallon water samples

1 - 1/4 gallon oil sample in metal can

The latter sample to be sent, via our Stavanger office to:

Mr. J.B. Smith,
Continental Oil Company,
Exploration Research Division,
Ponca City,
Oklahoma 74601,
U.S.A.

c. Contact

Mr. B. Yonge - Tel. No. 045 - 28050
Home No. 045 - 88225

C. GOVERNMENT

a. Daily telex

Will be sent by our Stavanger office to:

D. Meier-Hansen - Telex No. 33100 noped n

b. Logs

1 sepia and 1 paper print of each Schlumberger log

1 sepia and 1 paper print of mudlog

1 sepia and 1 paper print of litholog

To be sent by our Stavanger office to:

Statens Oljedirektorat,
Att: Mr. R. Myrland,
Lagårdsveien 30,
4001 Stavanger

c. Samples

1. Cutting samples

One set of [illegible] unwashed, wet samples packed in se[illegible] plastic bags inside cloth bags - labelled OLJEDIREKTORATET -

palaeontological and palynological examinations by BP, from the 20" casing shoe to T.D. . These samples should be sent, via the Stavanger office, to:

The British Petroleum Company Ltd.,
Exploration and Production Research Division,
BP Research Centre,
Chertsey Road,
Sunbury-on-Thames,
Middlesex TW16 7LN,
England.

Att: Dr. W. Clarke (Palaeontology Branch).

Samples for source rock/maturity examinations should be taken every 100 m from 1000 m to top U. Cretaceous and every 30 m from 2000 m to T.D. and be canned according to instructions.

These samples should be sent, via the Stavanger office to:

Robertson Research Laboratories,
Tyn-Y-Coed',
Llanrhos,
Llandudno,
Gwynedd,
North Wales, LL30 1SA,

GREAT BRITAIN

Core chips (see attached core handling procedures) and SWC's (both as selected by the wellsite geologist) should be forwarded to the same addresses.

2. Fluid samples

In addition to previously specified fluid sample requirements, the following fluid samples will be required on each DST for Conoco use:

4 - 44 gallon drums of oil (2 for Conoco and partners, 2 for trade purposes)

The samples should be delivered in standard wooden boxes.

One set of washed and dried samples - labelled OLJEDIREKTO-RAT.

2. Core samples

The contractor storing our rock samples will supply Oljedirektorat with core samples, specified below.

Complete longitudinal sections of the cores, containing not less than one fourth of the cores. The cores shall be supplied in properly marked wooden boxes divided longitudinally in three-five compartments and with a hinged lid. Overall dimensiton shall be as follows:

- height 10 cm
- width 40 cm
- length 90-100 cm

d. Contact

Mr. R. Myrland - Tel. No. 045 - 32160
Home No. 045 - 42046

Core Handling and Analysis Procedures for Norwegian North Sea Areas

A) RIG PROCEDURES

1. When the core is pulled, lay it out in sequence on rig floor, or pack it into boxes which are labelled consecutively from bottom to top of core (i.e. box number 1 will be at the bottom). DO NOT WASH OR WIPE CORE AT THIS STAGE.

2. Proceed to take samples of the core as detailed below. (Do not select for optimum poroperm etc. but follow the instructions given, except for obviously tight or impervious lithologies such as shale or dense limestones/dolomites).

3. Take 15 cm samples of core at approximately 1½ m spacing, wrap them in thin plastic sheet then in aluminium foil. Place in labelled plastic core bags for shipment. Put labelled spacers into core to indicate where the samples were taken from.

4. Take 8 cm samples of the core at approximately 30 cm spacing, wrap them in thin plastic sheet then in aluminium foil. Place in labelled plastic core bags for shipment. Put numbered spacers into core to indicate where each sample came from.

5. 15 cm and 8 cm bagged samples should then be shipped so as to reach shore base as soon as possible after sampling. The Chief Geologist in Stavanger will advise about shipping addresses.

   The anticipated procedure is that the 8 cm samples will go by helicopter to Statex in Stavanger who will cut plugs for analyses of porosity, vertical and horizontal permeabilities, grain densities and water saturations. THESE MEASUREMENTS ARE USUALLY URGENTLY NEEDED FOR MANAGEMENT DECISIONS ABOUT FUTURE HANDLING OF THE WELL, AND NO TIME SHOULD BE LOST IN GETTING RESULTS.

   If hydrocarbons are confirmed the 15 cm samples may be sent to Ponca City, U.S.A. for the following measurements:-

   (a) Permeability to water, at irreducible oil saturation.
   (b) Permeability to oil, at irreducible water saturation.
   (c) Swelling (clay) properties and trends.
   (d) Compressibility data.
   (e) Capillary data.

6. At this point the remaining core may be washed down by the mud-loggers and will be briefly described by the wellsite geologist. DO NOT SMASH UP THE CORE OR DISTURB IT MORE THAN ABSOLUTELY NECESSARY.

7. Select loose shale chips at approximately 1½ m spacing, one set to be forwarded to BP together with cutting samples for Palaeontology and one set to Robertson Research to be canned according to instructions, together with cutting samples for source rock analysis.

8. The remainder of the boxed core should then be shipped ashore, either by boat or helicopter, depending on operational convenience. The Chief Geologist in Stavanger will advise about correctly addressing it so as to reach Statex in Stavanger, for slabbing etc. (see below).

9. All shipments of core material from rig to shore should be advised to the Chief Geologist in Stavanger in the daily reports.

B) STATEX PROCEDURES IN STAVANGER

1. One analysis plug in five, and also a copy of the final STATEX analysis data on all plugs will be sent to Ponca City for quality control.

2. Residues of the 8 cm core analysis samples will be returned to their correct place in the core boxes.

3. A core-gamma log, if available, may be run on a 1:200 scale.

4. The core will be slabbed longitudinally by cutting off two segments at right angles to each other. Thickness of one segment must be not less than one fourth of that of the entire core. Both segments will be photographed by STATEX.

The quarter segment will be sent to the Oljedirektorat in Stavanger. The other segment will be retained in the core store as Conoco's reference cut.

Of the remaining core, a 30 cm longitudinal slice out of every meter (taken at equally spaced intervals) will be sent to Ponca City. The volume of these slices should be ca. one fourth of that of the original core. The remaining pieces of core can be used for trade samples and any other requirements, e.g. palaeontological dating.

5. So as to complete Conoco's reference set, Ponca City will return a vertical slice of the 15 cm cores to:-

STATEX A/S,
Rektor Nærvig-Pedersensvei 29,
4001 Stavanger,
NORWAY

who will send part of every slice to Oljedirektorat.

NOTES

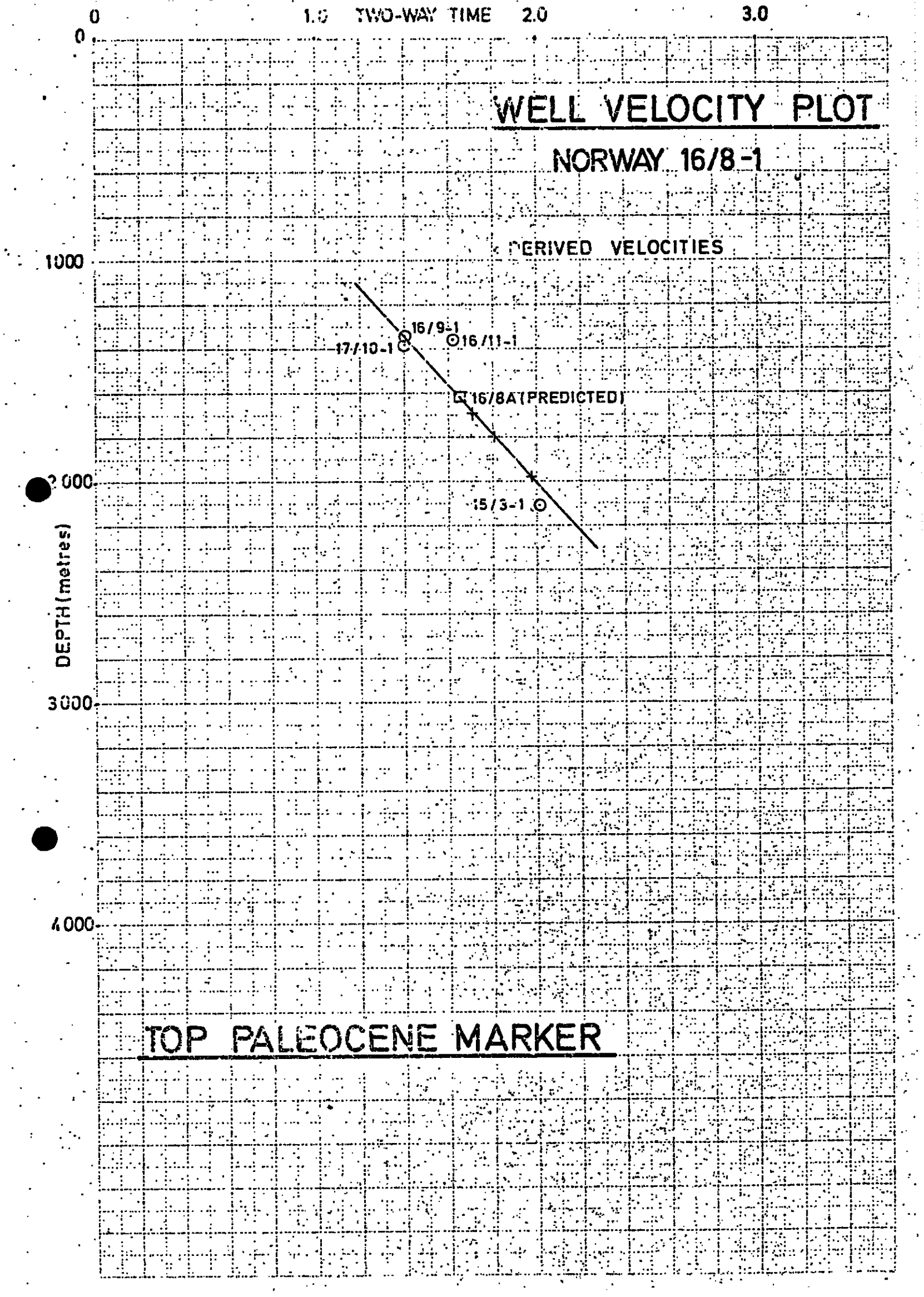
Shipment of all cuttings, cores and/or oil samples will be coordinated through Mr. C.H. Gaukel, Conoco Stavanger for clearance through Conoco's Export Services Division.

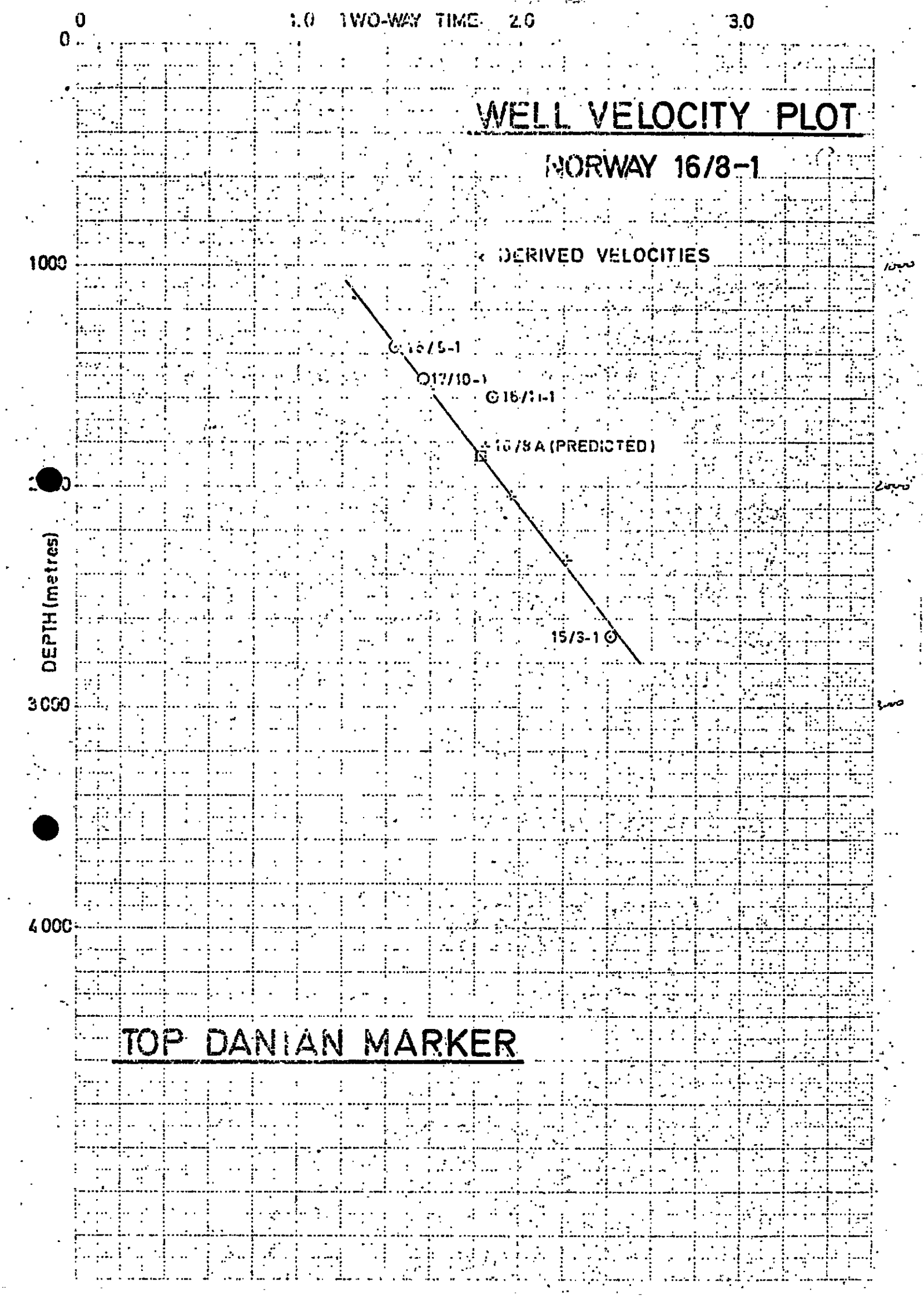
DISTRIBUTION OF ROCK SAMPLES WELL 16/[redacted]-1 (SEE APPENDIX B FOR DETAILED SAMPLING AND CORE HANDLING INSTRUCTIONS)

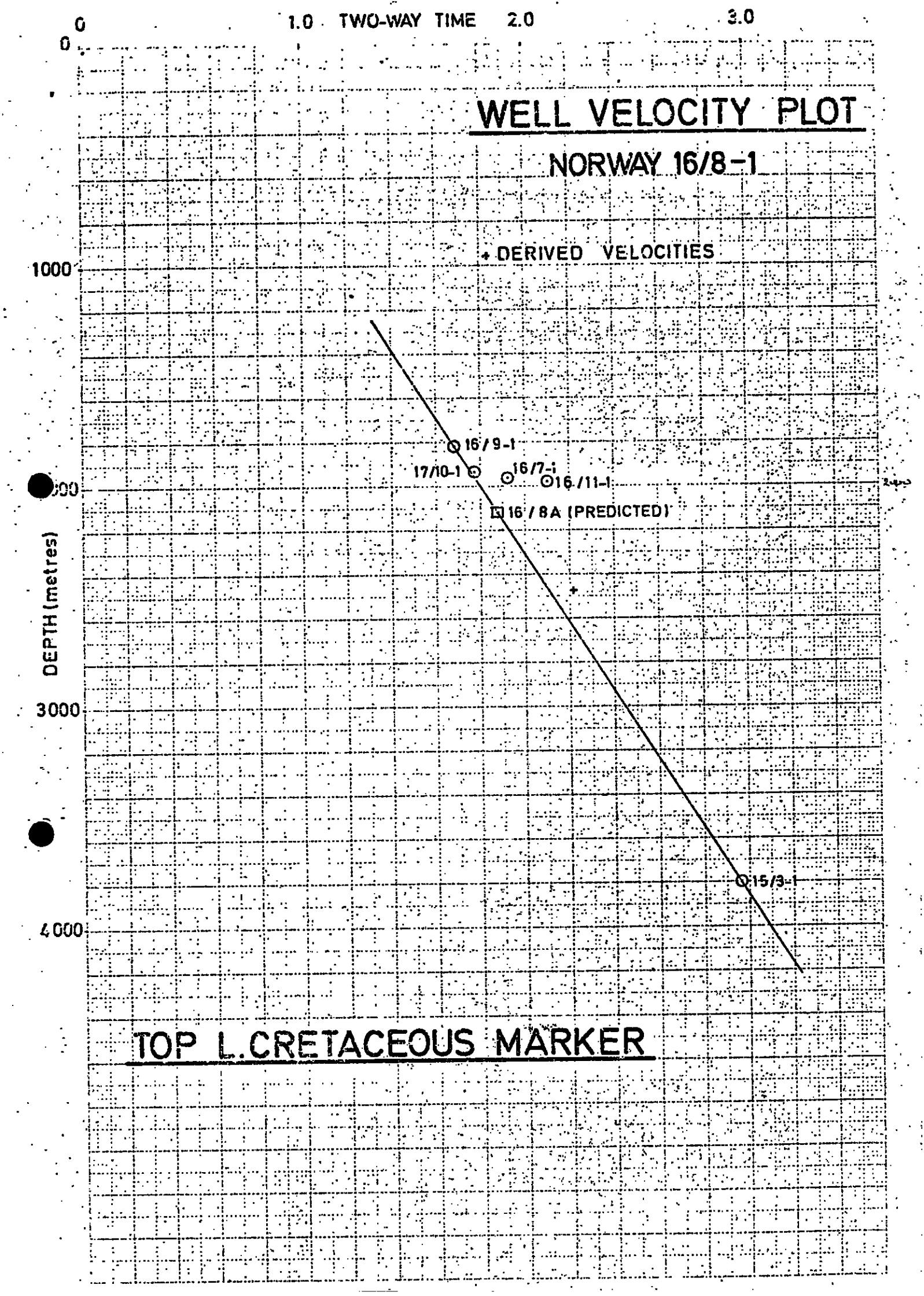
RECEIVING COMPANY	REQUIRED DURING DRILLING FROM MUD LOGGER	REQUIRED FROM STATEX	REMARKS
CUTTINGS			
Conoco Norway	5 sets washed and dried		
Petroleum Directorate	½ kg (1 bag) unwashed and sealed		
BP	1 set (unwashed) from 20" casing shoe to TD; canned cutting samples as for Rob.Res.		
Robertson Research	Canned cutting samples every 100 m from 1000 m to 1800 m every 30 m from 2000 m to T.D.		cutting samples every 6 m from sea floor to 13.3/8" shoe; every 3m from 13:3/8". Casing shoe to T.D.
Conoco Norway	)	3 sets washed and dried	
Petroleum Directorate	)2 sets unwashed	1 set washed and dried	
BP	)send to Statex for splitting	1 set washed and dried	
SIDEWALL CORES			
BP Robertson Research	split according to instructions by wellsite geologist and dispatch		
CORES			
Conoco Lab. Ponca City	sealed 15 cm samples at 1½ m spacing	longitudinal slices at ca. 1/4 of core volume (30 cm out of every meter)	remainder of 8 cm and 15 cm samples to be returned to correct place in core boxes (slices of the samples to be sent to Petr. Directorate
Conoco Norway	sealed 8 cm samples at 30 cm spacing (send immediately by helicopter to Statex)	slabbed core photographs	
Petroleum Directorate		longitudinal slices of at least 1/4 of the core volume	
BP Robertson Research	shale core chips every 1½m. Samples for source rock analysis should be canned.		

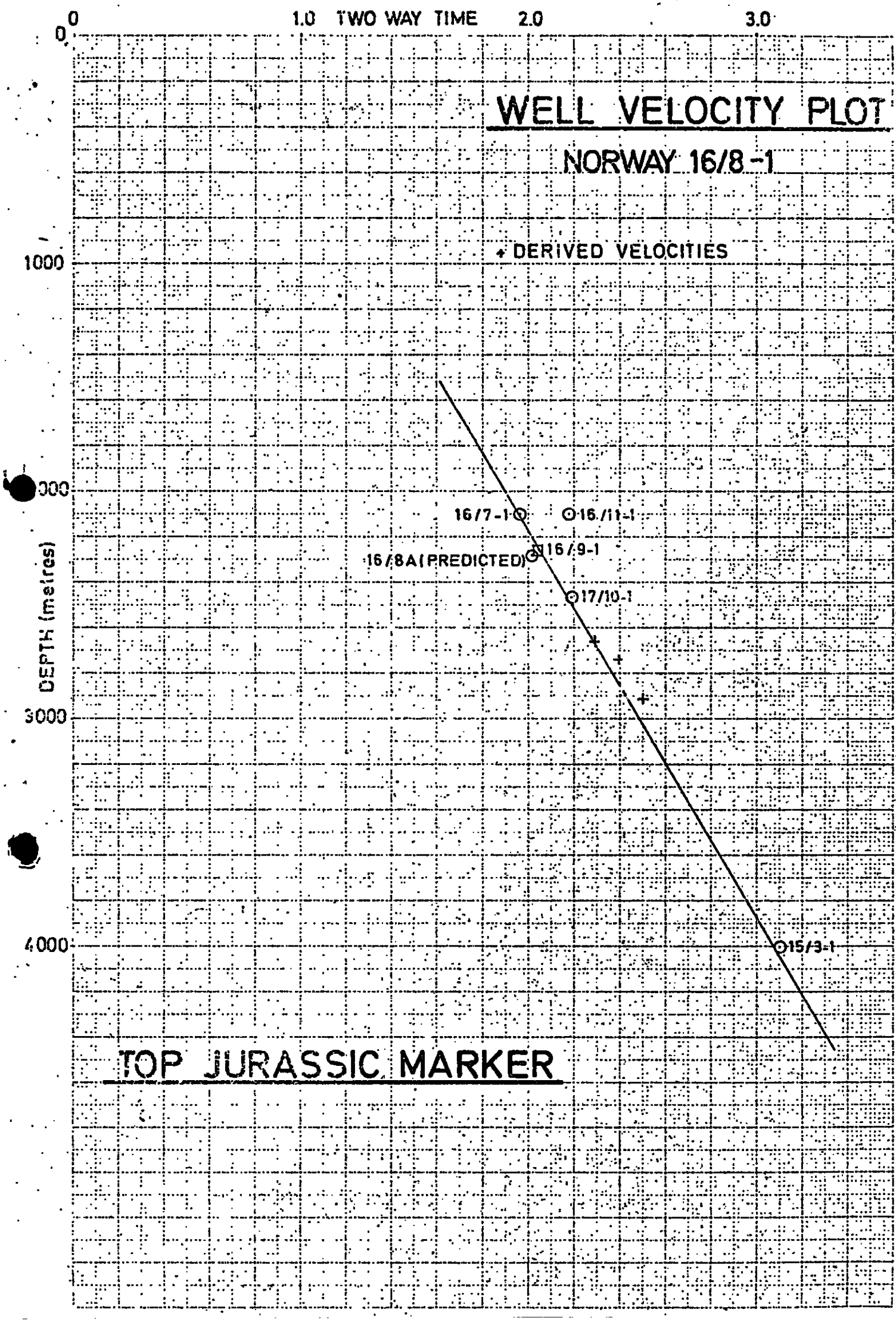
APPENDIX C

Well velocity plots


0
1.0 TWO-WAY TIME 2.0
3.0
WELL VELOCITY PLOT
NORWAY 16/8-1
DERIVED VELOCITIES
1000
16/9-1
16/11-1
17/10-1
16/8A (PREDICTED)
15/3-1
2000
DEPTH (metres)
3000
4000
TOP PALEOCENE MARKER


0
1.0 TWO-WAY TIME 2.0
3.0
WELL VELOCITY PLOT
NORWAY 16/8-1
DERIVED VELOCITIES
1000
16/5-1
17/10-1
16/11-1
16/8A (PREDICTED)
15/3-1
DEPTH (metres)
3000
4000
TOP DANIAN MARKER


0
1.0 TWO-WAY TIME 2.0
3.0
WELL VELOCITY PLOT
NORWAY 16/8-1
+ DERIVED VELOCITIES
1000
DEPTH (metres)
3000
4000
16/9-1
17/10-1
16/7-1
16/11-1
16/8A (PREDICTED)
15/3-1
TOP L.CRETACEOUS MARKER


0
1.0 TWO WAY TIME
2.0
3.0
WELL VELOCITY PLOT
NORWAY 16/8-1
+ DERIVED VELOCITIES
1000
2000
3000
4000
DEPTH (metres)
16/7-1
16/11-1
16/9-1
16/8A (PREDICTED)
17/10-1
15/3-1
TOP JURASSIC MARKER

MATRIX STRESS
CALCULATED MUDWEIGHTS (PPG):

AVG.	MAX.	AT
11.3	12.3	2200'
10.4	10.9	3500'
10.4	10.9	4200'
9.8	10.1	5500'
10.8	11.2	6500'

LEGEND

CN 16-6

sp. 57.7

sp. 81.7 AT PROPOSED LOCATION

CN 16-7

sp. 36

sp. 63

NORMAL TRENDS FOR INDIVIDUAL AGES

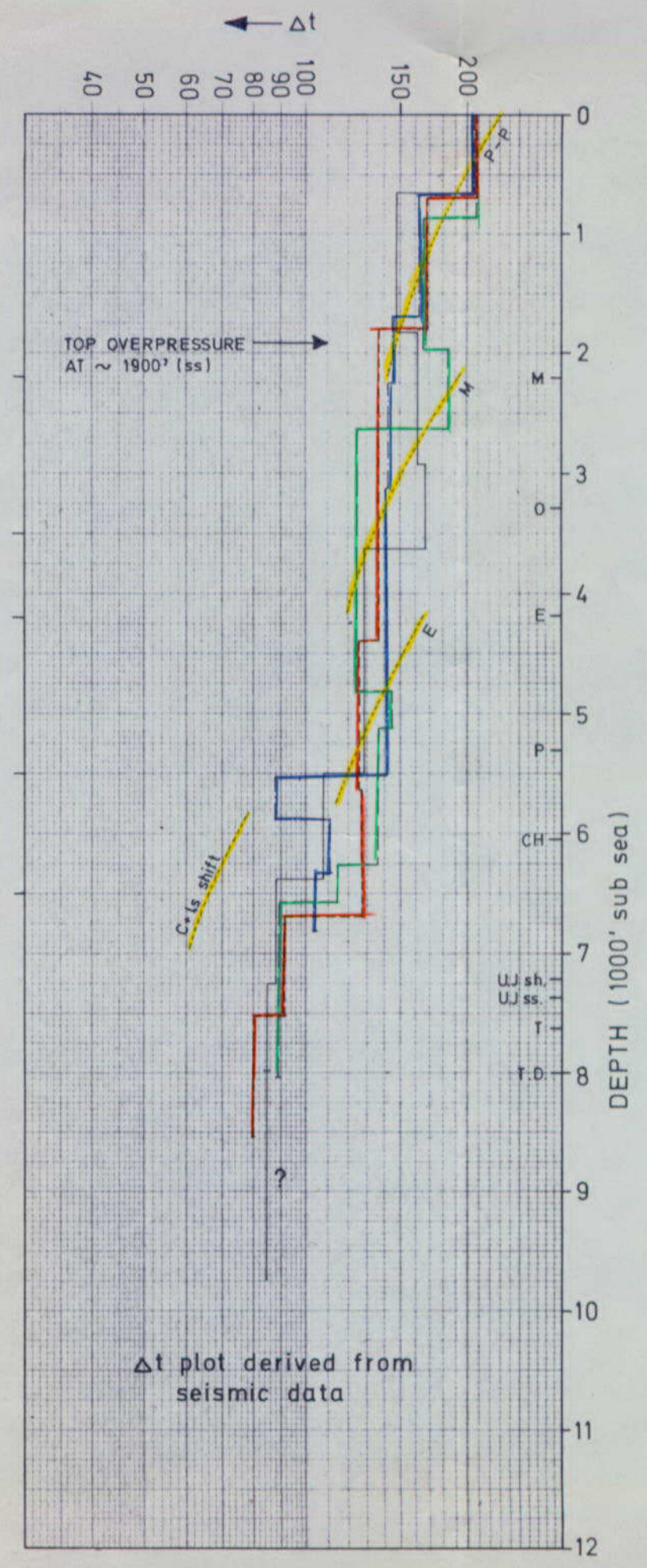
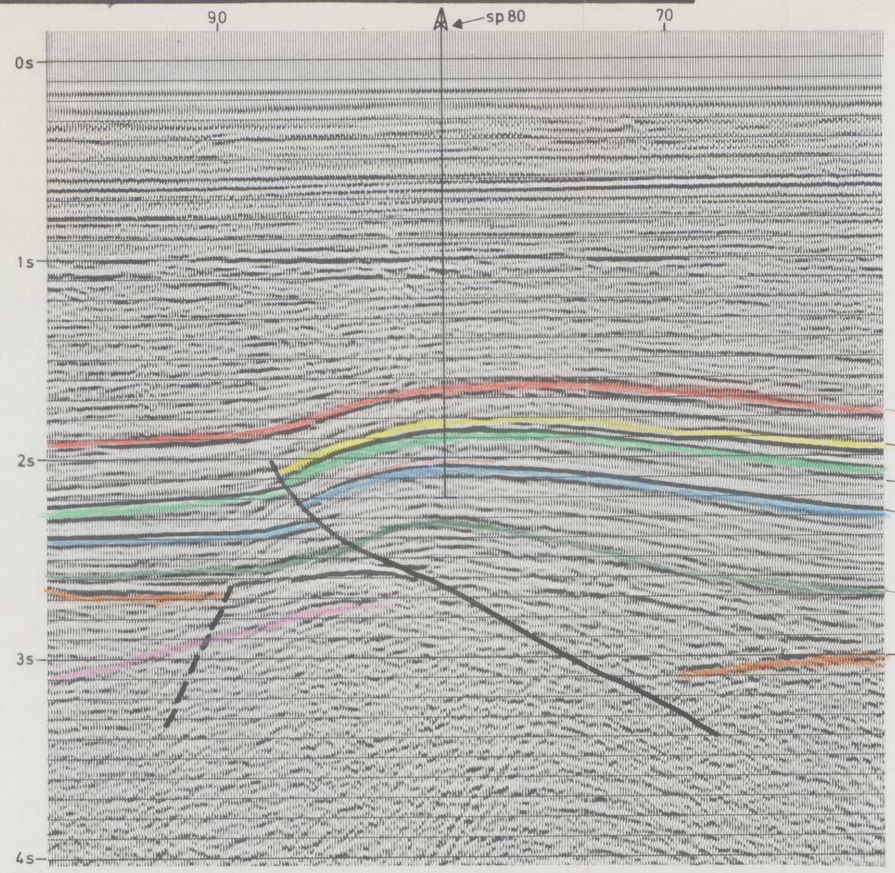


FIG.1 SEISMIC PRESSURE PREDICTION
CONOCO et. al. 16/8-1

DATA SHEET DRILLING LOCATION 16/8-1

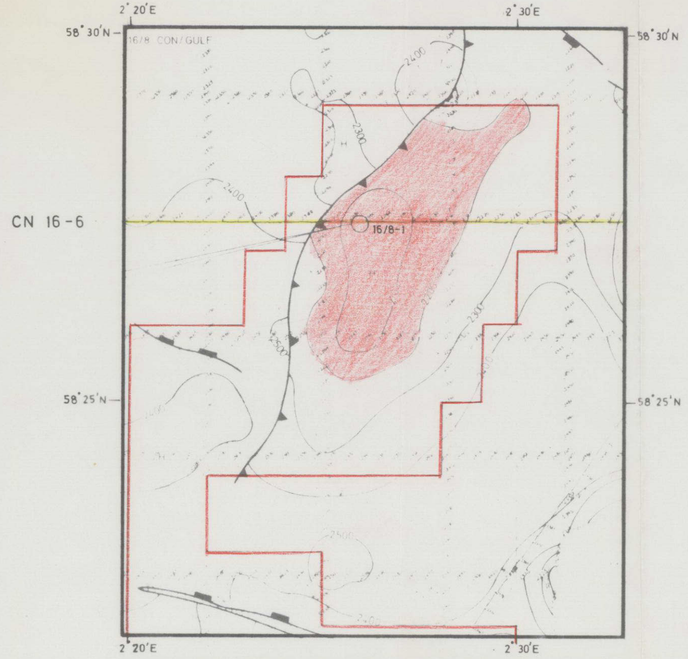


to(ms)	$\bar{v}$ (m/s)	$\bar{v}$ (ft/s)
180	1490	4887
400	1670	5477
530	1800	5904
980	1880	6166
1700	2000	6560
1860	2080	6822
1950	2130	6986
2100	2220	7281
2540	2420	7937
3040	2800	9184
3800	3200	10496
5000	3600	11808

SEISMIC LINE CN16-6

0 1 2 3 4 KMS.
2 2 1/2 MILES

horizontal scale 1:35 000
vertical scale 1 sec = 5cm



UNMIGRATED TIME CONTOUR MAP
TOP JURASSIC

0 2 4 6 kms.
scale 1:100 000

○ LOCATION

SEC.	Meters		Feet
	0	SEA LEVEL	0
	82	SEA FLOOR RECENT – PLEISTOCENE	269
	360	PLEISTOCENE – PLIOCENE	1181
			1500
	670	MIOCENE	2200
	969	OLIGOCENE	3180
	1285	EOCENE	4215
1.650	1620	PALEOCENE	5315
1.820	1850	CHALK	6070
1.880	2120	L.CRETACEOUS	6955
	2200	U.JURASSIC SH.	7220
2.030	2245	U.JURASSIC SD.	7365
	2316	TRIASSIC	7600
	2413	T.D.	8000

FORMATION TOPS, LITHOLOGY

SCALE 1:20000

COUNTRY : Norway PRODUCTION LICENSE : 020

PROVISIONAL COORDINATES: Lat. 58° 27'25"N
Long. 02° 26'02"E

WATER DEPTH : 82m

FIG. 2

NG:191

Elin 3 copies please

1761

D Saville

CONOCO

16/8-1 W 20 · 30

CONOCO NORWAY INC.
Utenlandsk aksjeselskap
P.O.Box 488,
4001 Stavanger
Telephone: (045) 28 050
Telex 33 145 conor n.

27 September 1976.

Mr. J. Watson
BP Petroleum Development of Norway A/S,
Boganesveien 114,
4032 GAUSEL

Ref: 16/8-1 Well programme.

Dear Mr. Watson,

Please find enclosed a replacement sheet for Table 1 of the geological programme for this well.

Yours sincerely,

J. Swann

Estimated Formation Tops

TABLE 1

FORMATION	DRILLED DEPTH	SUB-SEA DEPTH	TWO WAY TIME	DEGREE OF ACCURACY /SEISMIC/
RECENT-PLEISTOCENE /SEA FLOOR/	107m	82m		
PLEISTOCENE-PLIOCENE	385m	360m		
MIOCENE	695m	670m		
OLIGOCENE	994m	969m		
EOCENE	1310m	1285m		
PALEOCENE	1645m	1620m	1.650	± 100 m
CHALK/U. CRETACEOUS/	1875m	1850m	1.820	± 150 m
L. CRETACEOUS	2145m	2120m	1.880	± 150 m
U. JURASSIC SHALE	2225m	2200m		
U. JURASSIC SAND	2270m	2245m	2.030	± 100 m
TRIASSIC	2341m	2316m		
T.D.	2438m	2413m	(or 500 feet - 152.4 m - into Triassic, whichever occurs first)	
* Permian Salt	2972m	2947m	2.340	± 200 m

Note:

Seismic picks for Paleocene and Upper Jurassic sand are considered good. They tie to 16/9-1 well, located 20 kms to the southeast, where the seismic times and corresponding geologic horizons are considerably higher than at the 16/8-1 location. The picks for top Chalk and top Lower Cretaceous are less reliable. Comparison with the surrounding wells suggests that the top of Chalk in 16/8-1 may be encountered 50 to 100 m higher than as indicated in the Table 1.

Estimated Formation Tops

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Mr J. F. Walsh

16/8 { Drilling Programme
{ Geological Programme.

Mr Macfarlane
Could you please handle
1/9/76
for comments on drilling
programme 16/8.1.

Comments on drilling programme being awaited from London.

2. Comments on original version geological programme have already been communicated to Conoco, who then produced this revised version.

2.1 There appears to be some disagreement between Geological programme and drilling programme on the mud weight proposed and that suggested from pressure predictions.

2.2 Have discussed with Conoco alternative contractor and agreed upon using the local company Scanwell for any core analysis this well

2.3 Geophysicists have checked depth prognoses and are in basic agreement.

D. South.