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SEISMIC PROSPECTING FOR SULPHIDE ORE AT LØKKEN WEST

FOR

ORKLA INDUSTRIER A/S

Report no. 4034.05 Oslo, 15 May 1981

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NORWAY

SEISMIC PROSPECTING FOR SULPHIDE ORE AT LØKKEN WEST

FOR

ORKLA INDUSTRIER A/S

15 May 1981

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1. INTRODUCTION

This report contains a summary of field data acquisition and presents processed seismic sections from the Løkken West area available as per May 1981.

The field work has been carried out during three different periods of time:

October/November 1979, June 1980, and October 1980.

The objective of the survey was to identify impedance contrasts by the reflection seismic method appropriate for subsequent drilling and hopefully confirmation of the existence of new sulphide ore bodies or structures related to sulphide ore occurrences.

Processing of data has been carried out by NTNF / NORSAR, Kjeller.

Part of the data acquistion during the last field period was a joint effort between A/S GEOTEAM and NTNF / NORSAR.

Preparation of lines, levelling, and coordinate determination of shot- and geophone points were done by the client.

Altogether 484 shot files have been recorded, and depth coverage obtained along a total line length of approximately 4090 metres.

2. DATA ACQUISITION

2.1 PROSPECTING AREA

The prospecting area is located at Sugustadmarka west of Orkla river, around the westerly prolongation of the axis of the Løkken Mine.

An overview map of scale 1:50000 is given in Appendix 2.1.

The seismic lines run through wooded ground sparsely covered with moraine and marsh.

The top rock along line 80 III and 80 VC is greenstone.

The remaining lines run through an area where the toprock consists of gabbro.

2.2 RECORDING OF DATA

Field Geometry

The basic field geometry has been offend in-line configuration.

Source : Explosives
Geophones : 24 (single)

Shots have been fired from both ends into the spreads.

Occasionally two recording systems have been operated simultaneously, one recording in-line configuration, the other recording on a spread sideways offset to the shots.

This recording procedure has been labelled "dual line shooting".

Shooting in one line and recording in other lines, but still approximately in-line has also been denoted dual line shooting.

Recording Instruments

Three different recording instruments of the same type, Texas Instruments DFS-V (Digital Field System-V), have been applied to obtain the data volumes reported. A general specification of the DFS-V system is given in Appendix 1.1.

For field monitoring of data, a drywrite camera of the type SIE R6AB or equivalent has been used.

Field work performance

Line 79 III was measured October / November 1979.

The recording conditions were partly unfavourable because of relatively strong wind, especially in the southern end of the line.

A total of 69 shots were recorded. Depth coverage was obtained over a length of approximately 590 metres.

Lines 80 II A and 80 II B and 80 III were recorded in June 1980 under favourable weather conditions.

Although the recording parameters were identical, raw-data from line 80 III showed less signal-to-noise ratio as compared with data from lines 80 II A and

80 II B. We believe that the decreasing data quality may be caused by moving the seismic line from gabbro into the greenstone area. Altogether 278 shots were recorded. Depth coverage 1725 metres.

Lines 80 IV and 80 V A, B and C were recorded in October 1980. The weather was calm and recording conditions excellent, however, soft snow made the field work slower than normal.

The measurement program of October 1980 consisted originally of two more lines, but these were postponed until 1981 due to the unsuitable working conditions.

Lines 80 V B and 80 V C are recorded by NTNF / NORSAR by dual line shooting.

A total of 137 shot files have been recorded, with depth coverage over a line length of approximately 1775 metres.

3. DATA PROCESSING AND RESULTS

3.1 SEISMIC LINE DEFINITION

Coordinate system

A local coordinate system is chosen for display convenience determining station locations and reference points.

This local coordinate system relates to the official system of The Geographical Survey of Norway (Axis III) in the following way:

x-direction positive approximately 15 deg east of north. x = 0 (display) corresponds to X = 571 658 Axis III.

y-direction positive approximately 15 deg north of west. y = 0 (display) corresponds to Y = 56 140 Axis III

z-direction as official. (Height above mean sea level)

A datum-level at 300 m.s.l. (metres above mean sea level) is chosen as reference for the seismic sections.

Station locations

Shots and geophone positions relates to stations in the field. Stations are established along three station profiles running south - north approximately.

The station profiles are denoted Station Profile 1 - 3 respectively.

A chart showing individual station locations within the Station Profiles 1-3 is given in Appendix 2.2

Stations within a profile are sequencially numbered. Station Profile 2 contains a secondary sequence of stations which partly overlaps with the primary station sequence.

This secondary station sequence was prepared for extension of the line northwards, and the position of the stations are shifted 78,5 metres in the y-direction for display reasons. Their true positions are consequently 78,5 metres back in the negative y-direction.

A comprehensive list of stations with coordinates and heights for each of the eight data sets is given in Appendix 1.2.

Zero-definition and axis orientation for these coordinates are given in Appendix 1.2, Page 1, below.

Note that the y-direction is chosen opposite to Orkla Industrier A/S's local system, in order to obtain a right hand system required for computer processing.

CDP-locations

The midpoint between shot- and geophone positions is the vertical projection of an ideal reflection point.

This point may be common to several combinations of shots and geophones in a regular shot and geophone configuration and thus denoted "common depth point" (CDP).

When shot and geophone spacings are irregular, as is the case for the station locations at Løkken West, the midpoints between shot and geophones define a cloud of reflection points or depth points. We may then more correctly speak in terms of "common depth area" rather than common depth point. However, we

have chosen to apply the CDP-term for this consept although it is understood that the meaning of "common" in this case relates to an area rather than a point.

The CDP-locations for a specific set of seismic data defines the seismic section and the related line in terms of depth coverage.

This report concerns 8 sets of data. CDP-locations and line definition for these 8 data sets are shown in Appendix 2.3.

A collection of CDP's within a specified area is defined and denoted CDF (common depth family).

After stack, the CDP's are represented and displayed and one single trace in the seismic section. Each such trace is related to a line coordinate on top of the seismic section.

This line coordinate is the normal projection of the CDP-area midpoint into the x-axis of the coordinate system chosen for display.

3.2 PROCESSING SEQUENCE

The seismic sections displayed in Appendix 3 contain a label where processing parameters for the various processing steps are given.

It should again be noted that the stack procedure applied is based on the areal distribution of CDP's.

3.3 SEISMIC SECTIONS

Reference numbers on top of the seismic sections are metres referring to the x-axis (positive 15 deg east from north) in the coordinate system chosen.

Numbering along the vertical axis of the seismic sections represent two-way reflection time relative to the datum plane, which is 300 m.s.l.

Seismic velocity appropriate for depth calculations has not been determined at Løkken West.

We propose to use a velocity V_P = 5900 m/s as measured for waves travelling from a depth of approximately 900 metres in the Løkken Mine up to the surface.

Line 80 III

This line covers the westernmost greenstone area. Three processing versions have been presented:

Appendix 3.1 shows a seismic section which is a "constant velocity stack" of all data pertaining to this data set.

Appendix 3.2 shows a stack of the same data as in Appendix 3.1, however, the seismic velocity used for calculating NMO - corrections is increased in specified time windows to compensate for strongly dipping reflectors ("dip-compensated stack").

Appendix 3.3 shows a dip-compensated stack where the data is reduced to maximum 12-fold according to a quality estimate of each trace within a specified reflection time interval. The traces contributing to the stack

consist of those with the most favourable signal-to-noise ratio within the given time interval ("reduced dip-compensated stack").

Line 80 V C

Shot stations for this line is located along Station Profile 1, while geophones are located along Station Profile 2 (dual line shooting). Three versions of the seismic section are presented:

Appendix 3.4 is a dip-compensated stack
Appendix 3.5 is a reduced dip-compensated stack
Appendix 3.6 is a reduced dip-compensated stack with data quality estimation in a different reflection time interval than for Appendix 3.5.

Line 79 III

Two seismic sections are presented for this line:

Appendix 3.7 shows a constant velocity stack
Appendix 3.8 shows a reduced dip-compensated stack

Line 80 II A

This line is recorded by dual line shooting in order to obtain depth coverage in the predominant gap in Station Profile 2 between stations 77 and 78.

Appendix 3.9 shows a dip-compensated stack
Appendix 3.10 shows a reduced dip-compensated stack

Line 80 II B

Appendix 3.11 shows a dip-compensated stack
Appendix 3.12 shows a reduced dip-compensated stack

Line 80 V A

This data set comprises the extension of the depth coverage to the north by adding secondary sequence of stations to Station Profile 2, see Appendix 2.2. Two seismic sections are processed and displayed.

Appendix 3.13 shows a dip-compensated stack
Appendix 3.14 shows a reduced dip-compensated stack

Line 80 V B

Line 80 V B is recorded with geophones along Station Profile 2 and shots fired along Station Profile 3. The shots used are actually the same as recorded in the data set producing line 80 IV.

Appendix 3.15 shows a dip-compensated stack
Appendix 3.16 shows a reduced dip-compensated stack

Line 80 IV

This line is the easternmost line reported. Processing as for line 80 V B:

Appendix 3.17 shows a dip-compensated stack
Appendix 3.18 shows a reduced dip-compensated stack

Lines 79 III, 80 II A, 80 II B and 80 V A. Continous display

Appendix 3.19 shows a seismic section produced by merging data from separate sections into a common continous display. All sections contributing are from reduced dip-compensated sections, Appendices 3.8, 3.10, 3.12 and 3.14.

3.4 REFLECTIONS

The seismic sections contain several interesting reflections in the time interval 0.1 - 0.4 sec, corresponding to a depth interval of approximately 300 - 1200 metres below the reference level.

The general trend in the data indicates reflections originating from contrasts dipping 30 - 40 deg from north to south, approximately.

The strong dip of reflections is convincingly demonstrated by the improvement of reflections obtained in dip-compensated sections as compared to constant velocity stacked sections.

Merging data sets together as demonstrated in Appendix 3.19 shows a consistent picture of continous reflectivity from one set of data to another.

This is in fact excluding a non-geophysical origin of reflections.

The impedance contrasts depicted in the seismic sections must be confirmed by diamond core drilling in order to decide whether they correspond to sulphide ore bodies, rock-type boundaries or other discontinuities within the rock mass.

The strongest reflections are received along line 80 II B and 80 V A at times 0.2 - 0.3 sec. This area is regarded as the primary target for drilling.

4. CONCLUSIONS AND REMARKS

The survey and data reported have demonstrated that reflection seismic sections are obtainable across the crystalline rocks of Løkken West.

A modelling of the area thus seems possible in terms of seismic discontinuities.

The geological knowledge of the area will be adequately improved by the information contained in the seismic sections supported by drilling information.

The objective of the survey, to obtain seismic information that may directly or indirectly lead to the finding of sulphide ore seems to have been fulfilled.

Oslo, 15 May 1981
for A/S G E O T E A M

Anders Dahle

Appendix 1.1

The digital recording system DFS V allows several options to be programmed by hardware soldering on a total of 47 program plugs. Comments are given for the system as it is programmed.

The system owned by A/S GEOTEAM allows 24 data channels and 6 auxiliary channels to be sampled at 1, 2 or 4 milliseconds sampling rate.

The actual DFS V consists of one Analog Module, one Controller Module and two 10 inch Tape Transports.

The system is programmed to write an extra EOF when Low Tape is detected, automatically change to the other tape deck and write First File identification. The system is then ready to continue recording without operator involvement.

The DFS V is constructed with control logic which automatically stops the recording if system faults are detected. The faults are displayed on an alphanumeric display which enables effecient trouble shooting.

The input data to the DFS V are filtered and preamplified before the channels are multiplexed and amplified.

Input line filters efficiently remove the static pick-up on the lines. Parameters for the plug in low-cut, high-cut and notch filters can be chosen as shown in the specifications.

The DFS V provides the option of fixed gain or floating point amplification. The amplifier is located between the multiplexers and the A/D converter.

The floating point amplifier with gain steps of 4:1 has a total gain of 84 dB (1:16,384). To obtain maximum dynamic

resolution the amplifier works instantanously to keep the output signal level within 19-84 per cent of the fill scale of the A/D converter.

The A/D converter has an overscale capacity of 1024 mV in addition to the full scale of 8191.5 mV to allow d-c offset from all sources to be digitized without overloading the converter. The d-c offset is calculated by use of digital low-cut filters, and the numerical value of the offset is subtracted from the value of the digitized analog voltage before recording. D-c offset problems may therefore be considered to be eliminated in the DFS V.

Data are recorded with 15 (sign + 14) bits plus a three bit gain word in SEG-C format. The actual system utilizes the phase encoded (PE) recording mode on 9-track tape. The PE mode is superior to the old NRZI since the PE mode is far less sensitive to tape skew due to different timing in recording.

The preamplifiers, one for each channel, provide a fixed gain of 24, 36 or 48 dB. The noise specifications for the instrument depends on the gain constants. With an instrument noise level of 0.10 microvolts and the maximum allowed input signal level of 20.48 mV, as specified for the 48 dB gain constant, the system dynamic range is 106 dB referred to the noise level.

Theoretical dynamic range in recording is 90 dB.
Considering the 84 dB dynamic gain of the IFP the theoretical total dynamic range is 174 dB.

Appendix 1.1

SPECIFICATIONS:

The system consists of:

- one Analog Module
- one Controller Module
- two 10 Inches Tape Transports

The system automatically changes from one tape deck to the other when Low Tape is detected.

Channels:

24 data channels and 6 auxiliary channels at 1,2 or 4 ms sampling rate

Record Length:

1 to 99 seconds in steps of 1.024 seconds, or optionally in steps of 0.512 seconds.

Recording:

9 tracks
SEG-B or SEG-C format
1600 BPI density
PE recording mode
Tape speed range 20-120 ips
2400 feet of tape on 10½ inches tape reel

Frequency Response:

Flat within 3 dB from 3 Hz to 256 Hz

Appendix 1.1

Preamplifier Gain Constants:

24, 36 or 48 dB (Presets minimum system gain)

Dynamic Gain Control:

Quaternary (4:1) floating point amplification
Range: 84 dB
Gain step accuracy: ±0.05 per cent

Maximum System Gain:

132 dB

A/D Converter:

15 bits (sign + 14)
Full scale: 8191.5 mV
Accuracy : ±0.05 per cent
Linearity : ±0.02 per cent

Digital d-c Offset Filter:

Automatically removes d-c offset produced by floating point amplifier, A/D converter and multiplexer

Input Impedance:

20,000 ohms in parallel with 35 nF

Crossfeed Isolation:

80 dB

Distortion:

0.05 per cent

Time Standard Accuracy:

0.005 per cent

Equivalent Input Noise:

From 2000 ohms source in 8-128 Hz passband:

Gain Constant 48 dB, noise 0.10 uV RMS
Gain Constant 36 dB, noise 0.17 uV RMS
Gain Constant 24 dB, noise 0.60 uV RMS

Anti-Alias Filters (High-Cut Filters):

Cut-off frequencies: 64, 128 or 256 Hz
Slope: down 70 dB at Nyquist frequency

Low-Cut Filters:

Cut-off frequencies: 3.5, 5.3, 8, 12, 18 or 27 Hz
Slope: 18 dB per octave

Notch Filter:

Center frequencies: 16 2/3, 50 or 60 Hz
Optional in/out

Appendix 1.1

DATA QUALITY CONTROL:

Read-After-Write Reproduce Modes:

Individual channel AGC
Ganged AGC
Programmed gain control (PGC)

Energy monitor display
Single trace display for graphic recorder.
Trace number selectable by switches

Data from all channels available for camera display
Overdriven channel identification

Auxiliary Circuits:

Shot point seis amplifier
Frequency reference
Time break lengthened
Auxiliary data filter for channel response duplication

In addition several items for test and calibration, Automatic display of 66 fault conditions for efficient trouble shooting.

STATION LOCATIONS*

ORKLA 80 III

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
1	1	1366.24	362.77	394.16
2	2	1359.76	357.75	391.96
3	3	1350.11	351.29	393.61
4	4	1343.68	348.99	393.67
5	5	1336.44	341.55	392.70
6	6	1328.32	332.01	390.25
7	7	1315.15	323.84	391.39
8	8	1310.68	321.92	390.26
9	9	1304.31	312.63	386.53
10	10	1298.47	304.66	385.15
11	11	1285.53	288.88	385.69
12	12	1271.58	272.30	385.08
13	13	1261.77	271.92	383.96
14	14	1246.58	271.72	384.54
15	15	1236.61	262.89	382.85
16	16	1226.37	266.24	383.25
17	17	1219.88	257.97	380.84
18	18	1211.64	254.05	379.20
19	19	1204.13	246.88	375.60
20	20	1198.53	243.68	374.48
21	20.65	1182.28	242.72	373.84
22	21	1173.53	242.20	373.50
23	22	1164.79	241.59	374.32
24	23	1152.98	239.27	373.26
25	24	1144.80	236.80	370.31
26	25	1134.17	239.88	366.74
27	26	1126.15	238.40	362.75
28	26.4	1108.27	241.42	362.74
29	26.8	1090.40	244.45	362.73
30	27	1081.46	245.96	362.72
31	28	1069.21	244.12	366.14
32	29	1060.41	237.51	366.61
33	30	1051.02	246.41	366.22
34	31	1042.48	236.97	366.16
35	32	1032.91	232.36	366.23
36	33	1020.69	231.84	364.16
37	34	1013.73	232.05	359.61
38	35	1003.11	235.82	355.31
39	35.5	991.46	234.20	353.90
40	36	979.81	232.58	352.48
41	37	973.11	232.64	354.73
42	38	957.04	236.06	354.32
43	39	950.70	246.60	355.23
44	40	935.56	248.51	355.39
45	41	936.26	265.63	354.50
46	42	929.91	274.76	352.74
47	43	922.73	285.82	350.41
48	44	911.37	285.02	348.61
49	45	905.46	290.33	344.14
50	46	895.00	300.29	340.07

* XCOORD(0) = 572000 AXIS III, POSITIVE NORTH
  YCOORD(0) = 56000 AXIS III, POSITIVE WEST

ORKLA 80 III

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
51	47	822.10	298.91	338.16
52	48	871.51	289.30	337.84
53	49	860.71	293.37	336.71
54	50	846.33	287.65	331.90
55	51	836.61	293.87	327.90
56	52	830.98	306.13	325.90
57	52.32	834.14	318.42	323.85
58	52.65	837.14	331.10	321.74
59	53	840.85	344.55	319.50
60	53.5	830.61	359.11	319.50
61	54	820.37	373.66	319.51
62	55	804.71	380.07	321.32
63	56	791.95	377.05	322.90
64	57	776.17	366.28	326.62
65	58	767.58	379.04	327.74
66	59	751.93	378.00	326.57
67	60	745.02	382.20	326.93
68	61	733.51	386.21	326.96
69	62	728.47	396.82	331.33
70	63	714.06	406.95	331.84
71	64	723.14	419.57	336.18
72	65	708.58	415.86	335.27
73	66	697.51	408.22	333.35
74	67	693.24	421.92	336.84
75	68	683.53	425.87	336.41
76	69	677.76	436.25	342.60
77	70	664.86	429.94	338.94
78	71	663.36	441.40	341.31
79	72	648.74	438.98	340.54
80	73	640.06	444.71	340.36
81	74	632.92	450.13	342.72
82	75	620.66	453.77	340.45
83	75.4	615.38	463.69	340.83
84	76	607.47	478.57	341.40
85	77	591.46	474.39	339.38
86	78	586.54	481.38	339.36
87	79	576.47	485.35	339.41
88	80	574.09	493.44	338.71
89	81	569.00	497.83	337.37
90	81.5	560.70	513.93	337.25
91	82	552.39	530.03	337.12
92	83	547.58	540.42	337.02
93	84	542.07	546.77	337.47
94	84.5	531.76	539.13	336.34
95	85	521.45	531.49	335.21
96	86	517.64	541.71	333.31
97	86.33	503.95	562.03	333.62
98	86.66	490.25	582.36	333.94
99	87	476.56	602.68	334.25
100	88	469.15	604.76	335.61

ORKLA 80 III

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
101	89	465.70	612.27	336.78
102	89.5	454.44	615.07	336.88
103	90	443.18	617.87	336.97
104	91	434.05	609.53	335.38
105	92	442.74	609.21	333.92
106	93	416.91	620.55	333.66
107	94	409.77	623.99	333.56
108	95	397.10	623.58	330.88

ORKLA 80 V C

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
1	02 1	662.07	-120.78	262.22
2	02 2	668.34	-126.44	262.89
3	02 3	681.38	-133.08	263.93
4	02 4	687.37	-134.93	264.90
5	02 5	696.41	-140.70	266.98
6	02 6	708.68	-136.87	267.36
7	02 7	726.95	-136.55	268.01
8	02 8	735.97	-139.12	270.49
9	02 9	740.44	-120.28	269.70
10	02 9.4	748.00	-115.00	270.50
11	02 10	760.25	-107.78	271.27
12	02 11	768.88	-111.23	273.14
13	02 12	775.60	-120.89	273.35
14	02 13	782.59	-124.01	274.89
15	02 14	801.80	-128.56	277.59
16	02 15	804.99	-145.95	278.74
17	02 16	814.10	-146.72	279.06
18	NY16.5	823.87	-148.32	280.45
19	02 17	833.64	-149.92	281.84
20	02 18	843.65	-150.18	282.24
21	02 19	849.38	-162.05	283.51
22	02 20	860.92	-161.96	286.07
23	02 21	870.65	-162.01	286.60
24	02 22	881.13	-164.08	287.81
25	02 23	891.60	-160.71	288.78
26	NY23.5	901.49	-163.40	289.27
27	02 24	911.37	-166.09	289.76
28	02 25	922.86	-176.37	291.45
29	02 26	928.30	-177.34	292.43
30	02 27	935.54	-179.15	293.28
31	02 28	947.22	-183.18	294.96
32	02 29	956.27	-186.96	296.08
33	02 30	957.47	-183.97	295.95
34	02 31	975.67	-192.58	297.15
35	02 33	986.41	-195.31	297.36
36	02 34	995.15	-196.46	298.37
37	02 35	1003.59	-204.83	299.64
38	02 36	1011.77	-211.29	300.16
39	02 37	1024.69	-206.61	298.49
40	02 38	1037.63	-209.60	297.29
41	NY38.5	1048.77	-210.68	293.54
42	02 39	1059.92	-211.76	289.79
43	NY 43B	1211.40	-221.20	300.20
44	02 44	1218.35	-225.07	301.28
45	NY 45	1228.90	-227.10	302.60
46	NY 46	1235.00	-228.60	303.60
47	NY 47	1248.20	-228.40	304.90
48	NY 48	1257.60	-231.80	307.60
49	NY 49	1267.30	-225.60	307.90
50	NY 50	1277.90	-233.90	308.40

ORKLA 80 V C

STAT. NO.	STAT.REF.		XCOORD.	YCOORD.	ZCOORD.
51	NY	51	1286.50	-236.10	311.00
52	NY	52	1297.70	-241.70	312.40
53	0246	53	1308.80	-235.60	313.90
54	NY	54	1322.00	-234.20	315.10
55	NY	55	1326.10	-223.60	315.70
56	NY	56	1338.00	-224.30	317.10
57	NY	57	1348.90	-219.20	317.80
58	NY	58	1363.00	-206.50	319.30
59	NY	59	1365.80	-201.20	320.10
60	NY	60	1375.60	-189.30	322.40
61	NY	61	1391.50	-185.50	323.10
62	NY	62	1411.70	-171.00	324.00
63	03	38	957.04	236.06	354.32
64	03	39	950.70	246.60	355.23
65	03	40	935.56	248.51	355.39
66	03	41	936.26	265.63	354.50
67	03	42	929.91	274.76	352.74
68	03	43	922.73	285.82	350.41
69	03	44	911.37	285.02	348.61
70	03	45	905.46	290.33	344.14
71	03	46	895.00	300.29	340.07
72	03	47	882.10	298.91	338.16
73	03	48	871.51	289.30	337.84
74	04	1	616.14	-334.02	242.50
75	04	2	626.50	-334.73	245.34
76	04	3	640.15	-335.28	248.98
77	04	4	645.43	-340.66	250.15
78	04	5	682.38	-348.51	254.44
79	04	6	693.56	-359.24	255.03
80	04	7	700.34	-363.31	256.53
81	04	8	711.47	-361.77	258.63
82	04	9	720.27	-366.90	259.04
83	04	10	737.34	-376.03	258.98
84	04	11	745.60	-376.92	263.20
85	04	12	754.82	-380.82	263.48
86	04	13	765.34	-381.63	264.79
87	04	14	774.05	-390.12	265.00
88	04	15	779.60	-401.15	265.51
89	04	16	789.55	-402.45	266.00
90	04	17	798.25	-412.45	266.99
91	04	18	811.07	-413.67	266.86
92	04	19	823.24	-413.98	268.44
93	04	20	888.75	-459.23	274.40
94	04	21	882.46	-479.27	275.98
95	04	22	891.36	-487.72	278.49
96	04	23	896.87	-489.53	279.59
97	04	24	910.59	-485.02	280.80
98	04	25	916.88	-501.46	282.58
99	04	26	930.09	-518.60	284.42
100	04	27	940.43	-521.23	286.40

ORKLA 80 V C

STAT. NO.	STAT.REF.		XCOORD.	YCOORD.	ZCOORD.
101	04	28	947.02	-526.95	288.08
102	04	29	961.22	-523.76	290.52
103	04	30	968.88	-521.69	292.93
104	04	31	976.36	-529.99	294.97
105	04	32	984.76	-533.25	296.85
106	04	33	989.79	-540.82	297.93
107	04	34	996.07	-550.03	298.35
108	04	35	1009.45	-548.73	299.22
109	04	36	1015.86	-555.58	299.84
110	04	37	1033.80	-566.10	299.79
111	04	38	1039.73	-571.57	299.47
112	04	39	1056.61	-588.21	297.88
113	04	40	1065.36	-591.78	298.36
114	04	41	1067.00	-614.41	295.27
115	04	42	1084.43	-605.40	296.31
116	04	43	1097.03	-607.59	294.97
117	04	44	1103.72	-611.51	293.37
118	04	45	1111.61	-609.35	293.07
119	04	46	1116.21	-604.63	293.13
120	04	47	1177.83	-648.41	278.02

ORKLA 79 III

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
1	STREF 63	-1.42	373.02	265.00
2	STREF 62	8.06	369.60	265.89
3	STREF 61	32.24	375.83	269.03
4	STREF 60	38.12	364.07	271.00
5	STREF 59	43.79	356.98	273.53
6	STREF 58	55.15	357.26	273.93
7	STREF 57	66.82	361.94	273.98
8	STREF 56	72.47	346.63	274.33
9	STREF 55	75.82	341.00	274.44
10	STREF 54	120.40	329.97	273.21
11	SR 53.75	130.51	335.97	274.25
12	SR 53.50	140.62	341.97	275.29
13	SR 53.25	150.72	347.97	276.32
14	STREF 53	160.83	353.97	277.36
15	STREF 52	170.28	348.54	281.18
16	STREF 51	181.74	338.70	280.38
17	STREF 50	190.57	334.97	279.33
18	SR 49.7	190.83	305.47	277.94
19	SR 49.6	190.92	295.64	277.47
20	SR 49.4	191.09	275.98	276.54
21	SR 49.2	191.27	256.31	275.61
22	STREF 49	191.44	236.65	274.68
23	STREF 48	188.64	229.40	275.79
24	STREF 47	194.15	225.07	278.10
25	STREF 46	200.79	214.87	280.39
26	STREF 45	211.46	213.49	281.62
27	STREF 44	215.81	208.63	281.69
28	STREF 43	223.82	197.40	281.35
29	STREF 42	231.11	192.95	281.66
30	STREF 41	240.05	190.72	281.50
31	STREF 40	246.26	187.46	280.70
32	STREF 39	257.21	183.00	279.63
33	STREF 38	263.21	177.99	280.10
34	SR 37.7	275.44	177.99	280.10
35	SR 37.4	287.66	172.91	280.97
36	STREF 37	303.96	166.14	282.12
37	STREF 36	307.50	163.75	282.27
38	STREF 35	316.37	160.96	283.25
39	STREF 34	326.28	158.01	283.56
40	STREF 33	331.22	153.15	282.35
41	STREF 32	341.12	147.92	281.75
42	STREF 31	383.62	183.77	286.77
43	SR 30.6	395.40	178.77	285.96
44	STREF 30	413.08	171.28	284.75
45	SR 29.5	423.98	162.88	284.17
46	STREF 29	434.88	154.48	283.59
47	STREF 28	439.08	143.03	281.07
48	SR 27.7	440.30	128.99	279.88
49	SR 27.4	441.52	114.95	278.69
50	STREF 27	443.14	96.23	277.10

ORKLA 79 III

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
51	STREF 26	451.52	95.57	278.48
52	STREF 25	461.61	97.96	279.72
53	STREF 24	470.28	98.08	280.88
54	STREF 23	479.92	101.60	280.31
55	STREF 22	483.19	99.99	280.11
56	SR 21.7	491.57	95.07	279.11
57	STREF 21	511.12	83.59	276.77
58	STREF 20	513.50	81.78	276.25
59	STREF 19	521.39	72.38	274.45
60	STREF 18	523.61	64.18	272.87
61	STREF 17	543.39	55.08	274.29
62	STREF 16	551.88	54.54	277.14
63	STREF 15	561.56	50.68	276.19
64	STREF 14	562.60	50.04	276.13
65	STREF 13	572.31	51.35	273.99
66	STREF 12	581.91	52.67	273.98
67	STREF 11	587.46	54.08	274.87
68	STREF 10	591.53	52.47	274.50
69	STREF 9	602.38	49.29	273.04
70	STREF 8	610.67	48.04	272.79
71	STREF 7	612.16	47.50	272.27
72	STREF 6	625.92	39.36	271.41
73	STREF 5	637.85	36.40	269.75
74	STREF 4	644.17	29.23	267.71
75	STREF 3	650.00	20.00	265.00
76	TOPEF 2	654.81	11.35	263.61
77	STREF 1	655.56	-1.24	263.47
78	1	662.07	-120.78	262.22
79	2	668.34	-126.44	262.89
80	3	681.38	-133.08	263.93
81	4	687.37	-134.93	264.90
82	5	696.41	-140.70	266.98
83	6	708.68	-136.87	267.36
84	7	726.95	-136.55	268.01
85	8	735.97	-139.12	270.49
86	9	740.44	-120.28	269.70
87	9.4	748.00	-115.00	270.50
88	10	760.25	-107.78	271.27
89	11	768.88	-111.23	273.14
90	12	775.60	-120.89	273.35
91	13	782.59	-124.01	274.89
92	14	801.80	-128.56	277.59
93	15	804.99	-145.95	278.74
94	16	814.10	-146.72	279.06
95	17	833.64	-149.92	281.84
96	18	843.65	-150.18	282.24
97	19	849.38	-162.05	283.51
98	20	860.92	-161.96	286.07
99	21	870.65	-162.01	286.60
100	22	881.13	-164.08	287.81

ORKLA 79 III

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
101	23	891.60	-160.71	288.78
102	24	911.37	-166.09	289.76
103	25	922.86	-176.37	291.45
104	26	928.30	-177.34	292.43
105	27	935.54	-179.15	293.28
106	28	947.22	-183.18	294.96
107	29	956.27	-186.96	296.08
108	30	957.47	-183.97	295.95
109	31	975.67	-192.58	297.15
110	32	985.05	-193.72	297.26
111	33	986.41	-195.31	297.36
112	34	995.15	-196.46	298.37
113	35	1003.59	-204.83	299.64
114	36	1011.77	-211.29	300.16
115	37	1024.69	-206.61	298.49
116	38	1037.63	-209.60	297.29
117	39	1059.92	-211.76	289.79
118	40	1070.92	-216.96	297.57
119	40.3	1084.00	-218.00	297.50
120	40.7	1102.00	-219.00	297.50
121	41	1114.72	-220.26	297.47
122	42	1128.98	-214.71	296.70
123	43	1146.40	-219.04	297.45
124	43.2	1160.00	-220.00	298.50
125	43.5	1182.00	-222.00	299.50
126	44	1218.35	-225.07	301.28
127	45	1235.03	-228.59	303.64
128	46	1308.84	-235.57	313.88

ORKLA 80 II A

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
1	STREF 63	-1.42	373.02	265.00
2	STREF 62	8.06	369.60	265.89
3	STREF 61	32.24	375.83	269.03
4	STREF 60	38.12	364.07	271.00
5	STREF 59	43.79	356.98	273.53
6	STREF 58	55.15	357.26	273.93
7	STREF 57	66.82	361.94	273.98
8	STREF 56	72.47	346.63	274.33
9	STREF 55	75.82	341.00	274.44
10	STREF 54	120.40	329.97	273.21
11	SR 53.75	130.51	335.97	274.25
12	SR 53.50	140.62	341.97	275.29
13	SR 53.25	150.72	347.97	276.32
14	STREF 53	160.83	353.97	277.36
15	STREF 52	170.28	348.54	281.18
16	STREF 51	181.74	338.70	280.38
17	STREF 50	190.57	334.97	279.33
18	SR 49.7	190.83	305.47	277.94
19	SR 49.6	190.92	295.64	277.47
20	SR 49.4	191.09	275.98	276.54
21	SR 49.2	191.27	256.31	275.61
22	STREF 49	191.44	236.65	274.68
23	STREF 48	188.64	229.40	275.79
24	STREF 47	194.15	225.07	278.10
25	STREF 46	200.79	214.87	280.39
26	STREF 45	211.46	213.49	281.62
27	STREF 44	215.81	208.63	281.69
28	STREF 43	223.82	197.40	281.35
29	STREF 42	231.11	192.95	281.66
30	STREF 41	240.05	190.72	281.50
31	STREF 40	246.26	187.46	280.70
32	STREF 39	257.21	183.00	279.63
33	STREF 38	263.21	177.99	280.10
34	SR 37.7	275.44	177.99	280.10
35	SR 37.4	287.66	172.91	280.97
36	STREF 37	303.96	166.14	282.12
37	STREF 36	307.50	163.75	282.27
38	STREF 35	316.37	160.96	283.25
39	STREF 34	326.28	158.01	283.56
40	STREF 33	331.22	153.15	282.35
41	STREF 32	341.12	147.92	281.75
42	STREF 31	383.62	183.77	286.77
43	SR 30.6	395.40	178.77	285.96
44	STREF 30	413.08	171.28	284.75
45	SR 29.5	423.98	162.88	284.17
46	STREF 29	434.88	154.48	283.59
47	STREF 28	439.08	143.03	281.07
48	SR 27.7	440.30	128.99	279.88
49	SR 27.4	441.52	114.95	278.69
50	STREF 27	443.14	96.23	277.10

ORKLA 80 II A

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
51	STREF 26	451.52	95.57	278.48
52	STREF 25	461.61	97.96	279.72
53	STREF 24	470.28	98.08	280.88
54	STREF 23	479.92	101.60	280.31
55	STREF 22	483.19	99.99	280.11
56	SR 21.7	491.57	95.07	279.11
57	STREF 21	511.12	83.59	276.77
58	STREF 20	513.50	81.78	276.25
59	STREF 19	521.39	72.38	274.45
60	STREF 18	523.61	64.18	272.87
61	STREF 17	543.39	55.08	274.29
62	STREF 16	551.88	54.54	277.14
63	STREF 15	561.56	50.68	276.19
64	STREF 14	562.60	50.04	276.13
65	STREF 13	572.31	51.35	273.99
66	STREF 12	581.91	52.67	273.98
67	STREF 11	587.46	54.08	274.87
68	STREF 10	591.53	52.47	274.50
69	STREF 9	602.38	49.29	273.04
70	STREF 8	610.67	48.04	272.79
71	STREF 7	612.16	47.50	272.27
72	STREF 6	625.92	39.36	271.41
73	STREF 5	637.85	36.40	269.75
74	STREF 4	644.17	29.23	267.71
75	STREF 3	650.00	20.00	265.00
76	STREF 2	654.81	11.35	263.61
77	STREF 1	655.56	-1.24	263.47
78	1	662.07	-120.78	262.22
79	2	668.34	-126.44	262.89
80	3	681.38	-133.08	263.93
81	4	687.37	-134.93	264.90
82	5	696.41	-140.70	266.98
83	6	708.68	-136.87	267.36
84	7	726.95	-136.55	268.01
85	8	735.97	-139.12	270.49
86	9	740.44	-120.28	269.70
87	9.4	748.00	-115.00	270.50
88	10	760.25	-107.78	271.27
89	11	768.88	-111.23	273.14
90	12	775.60	-120.89	273.35
91	13	782.59	-124.01	274.89
92	14	801.80	-128.56	277.59
93	15	804.99	-145.95	278.74
94	16	814.10	-146.72	279.06
95	17	833.64	-149.92	281.84
96	18	843.65	-150.18	282.24
97	19	849.38	-162.05	283.51
98	20	860.92	-161.96	286.07
99	21	870.65	-162.01	286.60
100	22	881.13	-164.08	287.81

ORKLA 80 II A

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
101	23	891.60	-160.71	288.78
102	24	911.37	-166.09	289.76
103	25	922.86	-176.37	291.45
104	26	928.30	-177.34	292.43
105	27	935.54	-179.15	293.28
106	28	947.22	-183.18	294.96
107	29	956.27	-186.96	296.08
108	30	957.47	-183.97	295.95
109	31	975.67	-192.58	297.15
110	32	985.05	-193.72	297.26
111	33	986.41	-195.31	297.36
112	34	995.15	-196.46	298.37
113	35	1003.59	-204.83	299.64
114	36	1011.77	-211.29	300.16
115	37	1024.69	-206.61	298.49
116	38	1037.63	-209.60	297.29
117	39	1059.92	-211.76	289.79
118	40	1070.92	-216.96	297.57
119	40.3	1084.00	-218.00	297.50
120	40.7	1102.00	-219.00	297.50
121	41	1114.72	-220.26	297.47
122	42	1128.98	-214.71	296.70
123	43	1146.40	-219.04	297.45
124	43.2	1160.00	-220.00	298.50
125	43.5	1182.00	-222.00	299.50
126	44	1218.35	-225.07	301.28
127	45	1235.03	-228.59	303.64
128	46	1308.84	-235.57	313.88

ORKLA 80 II B

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
1	STREF 63	-1.42	373.02	265.00
2	STREF 62	8.06	369.60	265.89
3	STREF 61	32.24	375.83	269.03
4	STREF 60	38.12	364.07	271.00
5	STREF 59	43.79	356.98	273.53
6	STREF 58	55.15	357.26	273.93
7	STREF 57	66.82	361.94	273.98
8	STREF 56	72.47	346.63	274.33
9	STREF 55	75.82	341.00	274.44
10	STREF 54	120.40	329.97	273.21
11	SR 53.75	130.51	335.97	274.25
12	SR 53.50	140.62	341.97	275.29
13	SR 53.25	150.72	347.97	276.32
14	STREF 53	160.83	353.97	277.36
15	STREF 52	170.28	348.54	281.18
16	STREF 51	181.74	338.70	280.38
17	STREF 50	190.57	334.97	279.33
18	SR 49.7	190.83	305.47	277.94
19	SR 49.6	190.92	295.64	277.47
20	SR 49.4	191.09	275.98	276.54
21	SR 49.2	191.27	256.31	275.61
22	STREF 49	191.44	236.65	274.68
23	STREF 48	188.64	229.40	275.79
24	STREF 47	194.15	225.07	278.10
25	STREF 46	200.79	214.87	280.39
26	STREF 45	211.46	213.49	281.62
27	STREF 44	215.81	208.63	281.69
28	STREF 43	223.82	197.40	281.35
29	STREF 42	231.11	192.95	281.66
30	STREF 41	240.05	190.72	281.50
31	STREF 40	246.26	187.46	280.70
32	STREF 39	257.21	183.00	279.63
33	STREF 38	263.21	177.99	280.10
34	SR 37.7	275.44	177.99	280.10
35	SR 37.4	287.66	172.91	280.97
36	STREF 37	303.96	166.14	282.12
37	STREF 36	307.50	163.75	282.27
38	STREF 35	316.37	160.96	283.25
39	STREF 34	326.28	158.01	283.56
40	STREF 33	331.22	153.15	282.35
41	STREF 32	341.12	147.92	281.75
42	STREF 31	383.62	183.77	286.77
43	SR 30.6	395.40	178.77	285.96
44	STREF 30	413.08	171.28	284.75
45	SR 29.5	423.98	162.88	284.17
46	STREF 29	434.88	154.48	283.59
47	STREF 28	439.08	143.03	281.07
48	SR 27.7	440.30	128.99	279.88
49	SR 27.4	441.52	114.95	278.69
50	STREF 27	443.14	96.23	277.10

ORKLA 80 II B

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
51	STREF 26	451.52	95.57	278.48
52	STREF 25	461.61	97.96	279.72
53	STREF 24	470.28	98.08	280.88
54	STREF 23	479.92	101.60	280.31
55	STREF 22	483.19	99.99	280.11
56	SR 21.7	491.57	95.07	279.11
57	STREF 21	511.12	83.59	276.77
58	STREF 20	513.50	81.78	276.25
59	STREF 19	521.39	72.38	274.45
60	STREF 18	523.61	64.18	272.87
61	STREF 17	543.39	55.08	274.29
62	STREF 16	551.88	54.54	277.14
63	STREF 15	561.56	50.68	276.19
64	STREF 14	562.60	50.04	276.13
65	STREF 13	572.31	51.35	273.99
66	STREF 12	581.91	52.67	273.98
67	STREF 11	587.46	54.08	274.87
68	STREF 10	591.53	52.47	274.50
69	STREF 9	602.38	49.29	273.04
70	STREF 8	610.67	48.04	272.79
71	STREF 7	612.16	47.50	272.27
72	STREF 6	625.92	39.36	271.41
73	STREF 5	637.85	36.40	269.75
74	STREF 4	644.17	29.23	267.71
75	STREF 3	650.00	20.00	265.00
76	STREF 2	654.81	11.35	263.61
77	STREF 1	655.56	-1.24	263.47
78	1	662.07	-120.78	262.22
79	2	668.34	-126.44	262.89
80	3	681.38	-133.08	263.93
81	4	687.37	-134.93	264.90
82	5	696.41	-140.70	266.98
83	6	708.68	-136.87	267.36
84	7	726.95	-136.55	268.01
85	8	735.97	-139.12	270.49
86	9	740.44	-120.28	269.70
87	9.4	748.00	-115.00	270.50
88	10	760.25	-107.78	271.27
89	11	768.88	-111.23	273.14
90	12	775.60	-120.89	273.35
91	13	782.59	-124.01	274.89
92	14	801.80	-128.56	277.59
93	15	804.99	-145.95	278.74
94	16	814.10	-146.72	279.06
95	17	833.64	-149.92	281.84
96	18	843.65	-150.18	282.24
97	19	849.38	-162.05	283.51
98	20	860.92	-161.96	286.07
99	21	870.65	-162.01	286.60
100	22	881.13	-164.08	287.81

ORKLA 80 II B

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
101	23	891.60	-160.71	288.78
102	24	911.37	-166.09	289.76
103	25	922.86	-176.37	291.45
104	26	928.30	-177.34	292.43
105	27	935.54	-179.15	293.28
106	28	947.22	-183.18	294.96
107	29	956.27	-186.96	296.08
108	30	957.47	-183.97	295.95
109	31	975.67	-192.58	297.15
110	32	985.05	-193.72	297.26
111	33	986.41	-195.31	297.36
112	34	995.15	-196.46	298.37
113	35	1003.59	-204.83	299.64
114	36	1011.77	-211.29	300.16
115	37	1024.69	-206.61	298.49
116	38	1037.63	-209.60	297.29
117	39	1059.92	-211.76	289.79
118	40	1070.92	-216.96	297.57
119	40.3	1084.00	-218.00	297.50
120	40.7	1102.00	-219.00	297.50
121	41	1114.72	-220.26	297.47
122	42	1128.98	-214.71	296.70
123	43	1146.40	-219.04	297.45
124	43.2	1160.00	-220.00	298.50
125	43.5	1182.00	-222.00	299.50
126	44	1218.35	-225.07	301.28
127	45	1235.03	-228.59	303.64
128	46	1308.84	-235.57	313.88

ORKLA 80 V A

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
1	02 1	662.07	-120.78	262.22
2	02 2	668.34	-126.44	262.89
3	02 3	681.38	-133.08	263.93
4	02 4	687.37	-134.93	264.90
5	02 5	696.41	-140.70	266.98
6	02 6	708.68	-136.87	267.36
7	02 7	726.95	-136.55	268.01
8	02 8	735.97	-139.12	270.49
9	02 9	740.44	-120.28	269.70
10	02 9.4	748.00	-115.00	270.50
11	02 10	760.25	-107.78	271.27
12	02 11	768.88	-111.23	273.14
13	02 12	775.60	-120.89	273.35
14	02 13	782.59	-124.01	274.89
15	02 14	801.80	-128.56	277.59
16	02 15	804.99	-145.95	278.74
17	02 16	814.10	-146.72	279.06
18	NY16.5	823.87	-148.32	280.45
19	02 17	833.64	-149.92	281.84
20	02 18	843.65	-150.18	282.24
21	02 19	849.38	-162.05	283.51
22	02 20	860.92	-161.96	286.07
23	02 21	870.65	-162.01	286.60
24	02 22	881.13	-164.08	287.81
25	02 23	891.60	-160.71	288.78
26	NY23.5	901.49	-163.40	289.27
27	02 24	911.37	-166.09	289.76
28	02 25	922.86	-176.37	291.45
29	02 26	928.30	-177.34	292.43
30	02 27	935.54	-179.15	293.28
31	02 28	947.22	-183.18	294.96
32	02 29	956.27	-186.96	296.08
33	02 30	957.47	-183.97	295.95
34	02 31	975.67	-192.58	297.15
35	02 32	985.05	-193.72	297.26
36	02 33	986.41	-195.31	297.36
37	02 34	995.15	-196.46	298.37
38	02 35	1003.59	-204.83	299.64
39	02 36	1011.77	-211.29	300.16
40	02 37	1024.69	-206.61	298.49
41	02 38	1037.63	-209.60	297.29
42	NY38.5	1048.77	-210.68	293.54
43	02 39	1059.92	-211.76	289.79
44	02 40	1070.92	-216.96	297.57
45	NY40.6	1097.50	-218.75	297.50
46	02 41	1114.72	-220.26	297.47
47	NY 42	1130.50	-215.90	295.90
48	NY42.8	1144.40	-217.58	296.62
49	NY 43	1147.90	-218.00	296.80
50	NY 43B	1211.40	-221.20	300.20

ORKLA 80 V A

STAT. NO.	STAT.REF.		XCOORD.	YCOORD.	ZCOORD.
51	02	44	1218.35	-225.07	301.28
52	NY	45	1228.90	-227.10	302.60
53	NY	46	1235.00	-228.60	303.60
54	NY	47	1248.20	-228.40	304.90
55	NY	48	1257.60	-231.80	307.60
56	NY	49	1267.30	-225.60	307.90
57	NY	50	1277.90	-233.90	308.40
58	NY	51	1286.50	-236.10	311.00
59	NY	52	1297.70	-241.70	312.40
60	0246	53	1308.80	-235.60	313.90
61	NY	54	1322.00	-234.20	315.10
62	NY	55	1326.10	-223.60	315.70
63	NY	56	1338.00	-224.30	317.10
64	NY	57	1348.90	-219.20	317.80
65	NY	58	1363.00	-206.50	319.30
66	NY	59	1365.80	-201.20	320.10
67	NY	60	1375.60	-189.30	322.40
68	NY	61	1391.50	-185.50	323.10
69	NY	62	1411.70	-171.00	324.00

ORKLA 80 V-B

STAT. NO.	STAT.REF.	XCOORD.	YCOORD.	ZCOORD.
1	02 1	662.07	-120.78	262.22
2	02 2	668.34	-126.44	262.89
3	02 3	681.38	-133.08	263.93
4	02 4	687.37	-134.93	264.90
5	02 5	696.41	-140.70	266.98
6	02 6	708.68	-136.87	267.36
7	02 7	726.95	-136.55	268.01
8	02 8	735.97	-139.12	270.49
9	02 9	740.44	-120.28	269.70
10	02 9.4	748.00	-115.00	270.50
11	02 10	760.25	-107.78	271.27
12	02 11	768.88	-111.23	273.14
13	02 12	775.60	-120.89	273.35
14	02 13	782.59	-124.01	274.89
15	02 14	801.80	-128.56	277.59
16	02 15	804.99	-145.95	278.74
17	02 16	814.10	-146.72	279.06
18	NY16.5	823.87	-148.32	280.45
19	02 17	833.64	-149.92	281.84
20	02 18	843.65	-150.18	282.24
21	02 19	849.38	-162.05	283.51
22	02 20	860.92	-161.96	286.07
23	02 21	870.65	-162.01	286.60
24	02 22	881.13	-164.08	287.81
25	02 23	891.60	-160.71	288.78
26	NY23.5	901.49	-163.40	289.27
27	02 24	911.37	-166.09	289.76
28	02 25	922.86	-176.37	291.45
29	02 26	928.30	-177.34	292.43
30	02 27	935.54	-179.15	293.28
31	02 28	947.22	-183.18	294.96
32	02 29	956.27	-186.96	296.08
33	02 30	957.47	-183.97	295.95
34	02 31	975.67	-192.58	297.15
35	02 33	986.41	-195.31	297.36
36	02 34	995.15	-196.46	298.37
37	02 35	1003.59	-204.83	299.64
38	02 36	1011.77	-211.29	300.16
39	02 37	1024.69	-206.61	298.49
40	02 38	1037.63	-209.60	297.29
41	NY38.5	1048.77	-210.68	293.54
42	02 39	1059.92	-211.76	289.79
43	NY 43B	1211.40	-221.20	300.20
44	02 44	1218.35	-225.07	301.28
45	NY 45	1228.90	-227.10	302.60
46	NY 46	1235.00	-228.60	303.60
47	NY 47	1248.20	-228.40	304.90
48	NY 48	1257.60	-231.80	307.60
49	NY 49	1267.30	-225.60	307.90
50	NY 50	1277.90	-233.90	308.40

ORKLA 80 V B

STAT. NO.	STAT.REF.		XCOORD.	YCOORD.	ZCOORD.
51	NY	51	1286.50	-236.10	311.00
52	NY	52	1297.70	-241.70	312.40
53	0246	53	1308.80	-235.60	313.90
54	NY	54	1322.00	-234.20	315.10
55	NY	55	1326.10	-223.60	315.70
56	NY	56	1338.00	-224.30	317.10
57	NY	57	1348.90	-219.20	317.80
58	NY	58	1363.00	-206.50	319.30
59	NY	59	1365.80	-201.20	320.10
60	NY	60	1375.60	-189.30	322.40
61	NY	61	1391.50	-185.50	323.10
62	NY	62	1411.70	-171.00	324.00
63	03	38	957.04	236.06	354.32
64	03	39	950.70	246.60	355.23
65	03	40	935.56	248.51	355.39
66	03	41	936.26	265.63	354.50
67	03	42	929.91	274.76	352.74
68	03	43	922.73	285.82	350.41
69	03	44	911.37	285.02	348.61
70	03	45	905.46	290.33	344.14
71	03	46	895.00	300.29	340.07
72	03	47	882.10	298.91	338.16
73	03	48	871.51	289.30	337.84
74	04	1	616.14	-334.02	242.50
75	04	2	626.50	-334.73	245.34
76	04	3	640.15	-335.28	248.98
77	04	4	645.43	-340.66	250.15
78	04	5	682.38	-348.51	254.44
79	04	6	693.56	-359.24	255.03
80	04	7	700.34	-363.31	256.53
81	04	8	711.47	-361.77	258.63
82	04	9	720.27	-366.90	259.04
83	04	10	737.34	-376.03	258.98
84	04	11	745.60	-376.92	263.20
85	04	12	754.82	-380.82	263.48
86	04	13	765.34	-381.63	264.79
87	04	14	774.05	-390.12	265.00
88	04	15	779.60	-401.15	265.51
89	04	16	789.55	-402.45	266.00
90	04	17	798.25	-412.45	266.99
91	04	18	811.07	-413.67	266.86
92	04	19	823.24	-413.98	268.44
93	04	20	888.75	-459.23	274.40
94	04	21	882.46	-479.27	275.98
95	04	22	891.36	-487.72	278.49
96	04	23	896.87	-489.53	279.59
97	04	24	910.59	-485.02	280.80
98	04	25	916.88	-501.46	282.58
99	04	26	930.09	-518.60	284.42
100	04	27	940.43	-521.23	286.40

ORKLA 80 V B

STAT. NO.	STAT.REF.		XCOORD.	YCOORD.	ZCOORD.
101	04	28	947.02	-526.95	288.08
102	04	29	961.22	-523.76	290.52
103	04	30	968.88	-521.69	292.93
104	04	31	976.36	-529.99	294.97
105	04	32	984.76	-533.25	296.85
106	04	33	989.79	-540.82	297.93
107	04	34	996.07	-550.03	298.35
108	04	35	1009.45	-548.73	299.22
109	04	36	1015.86	-555.58	299.84
110	04	37	1033.80	-566.10	299.79
111	04	38	1039.73	-571.57	299.47
112	04	39	1056.61	-588.21	297.88
113	04	40	1065.36	-591.78	298.36
114	04	41	1067.00	-614.41	295.27
115	04	42	1084.43	-605.40	296.31
116	04	43	1097.03	-607.59	294.97
117	04	44	1103.72	-611.51	293.37
118	04	45	1111.61	-609.35	293.07
119	04	46	1116.21	-604.63	293.13
120	04	47	1177.83	-648.41	278.02

ORKLA 80 IV

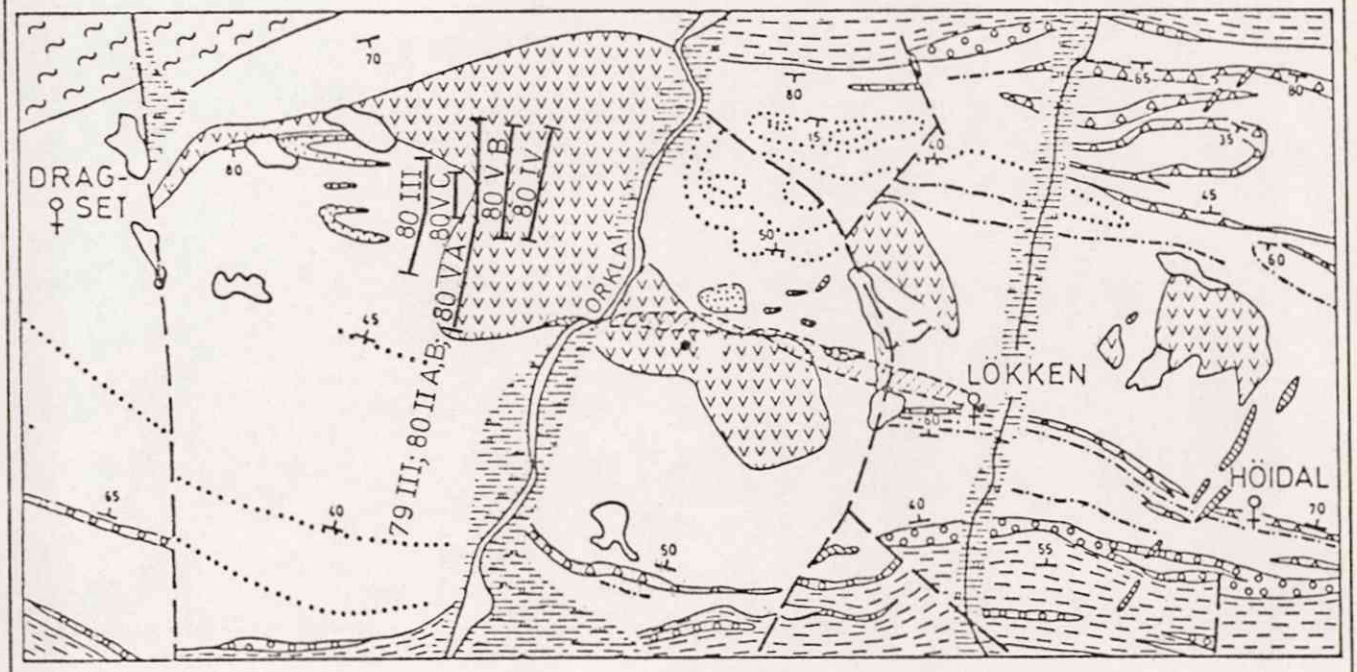
STAT. NO.	STAT.REF.		XCOORD.	YCOORD.	ZCOORD.
1	04	1	616.14	-334.02	242.50
2	04	2	626.50	-334.73	245.34
3	04	3	640.15	-335.28	248.98
4	04	4	645.43	-340.66	250.15
5	04	5	682.38	-348.51	254.44
6	04	6	693.56	-359.24	255.03
7	04	7	700.34	-363.31	256.53
8	04	8	711.47	-361.77	258.63
9	04	9	720.27	-366.90	259.04
10	04	10	737.34	-376.03	258.98
11	04	11	745.60	-376.92	263.20
12	04	12	754.82	-380.82	263.48
13	04	13	765.34	-381.63	264.79
14	04	14	774.05	-390.12	265.00
15	04	15	779.60	-401.15	265.51
16	04	16	789.55	-402.45	266.00
17	04	17	798.25	-412.45	266.99
18	04	18	811.07	-413.67	266.86
19	04	19	823.24	-413.98	268.44
20	04	20	888.75	-459.23	274.40
21	04	21	882.46	-479.27	275.98
22	04	22	891.36	-487.72	278.49
23	04	23	896.87	-489.53	279.59
24	04	24	910.59	-485.02	280.80
25	04	25	916.88	-501.46	282.58
26	04	26	930.09	-518.60	284.42
27	04	27	940.43	-521.23	286.40
28	04	28	947.02	-526.95	288.08
29	04	29	961.22	-523.76	290.52
30	04	30	968.88	-521.69	292.93
31	04	31	976.36	-529.99	294.97
32	04	32	984.76	-533.25	296.85
33	04	33	989.79	-540.82	297.93
34	04	34	996.07	-550.03	298.35
35	04	35	1009.45	-548.73	299.22
36	04	36	1015.86	-555.58	299.84
37	04	37	1033.80	-566.10	299.79
38	04	38	1039.73	-571.57	299.47
39	04	39	1056.61	-588.21	297.88
40	04	40	1065.36	-591.78	298.36
41	04	41	1067.00	-614.41	295.27
42	04	42	1084.43	-605.40	296.31
43	04	43	1097.03	-607.59	294.97
44	04	44	1103.72	-611.51	293.37
45	04	45	1111.61	-609.35	293.07
46	04	46	1116.21	-604.63	293.13
47	04	47	1177.83	-648.41	278.02

GEOTEAM

Appendix no.: 2.1

Project no.: 4034

Reflection Seismic Lines Løkken West
Approximate Location



- Metasediments (L.Hovin)
- Conglomerate
- Undifferentiated greenstones
- Volcaniclastic sediments
- Felsite
- Jasper/chert horizons
- "Vasskis" horizons
- Metagabbro
- Strongly folded metasediments
- Porphyrite
- Cover
- Faults
- Projection of Lökken deposit

N

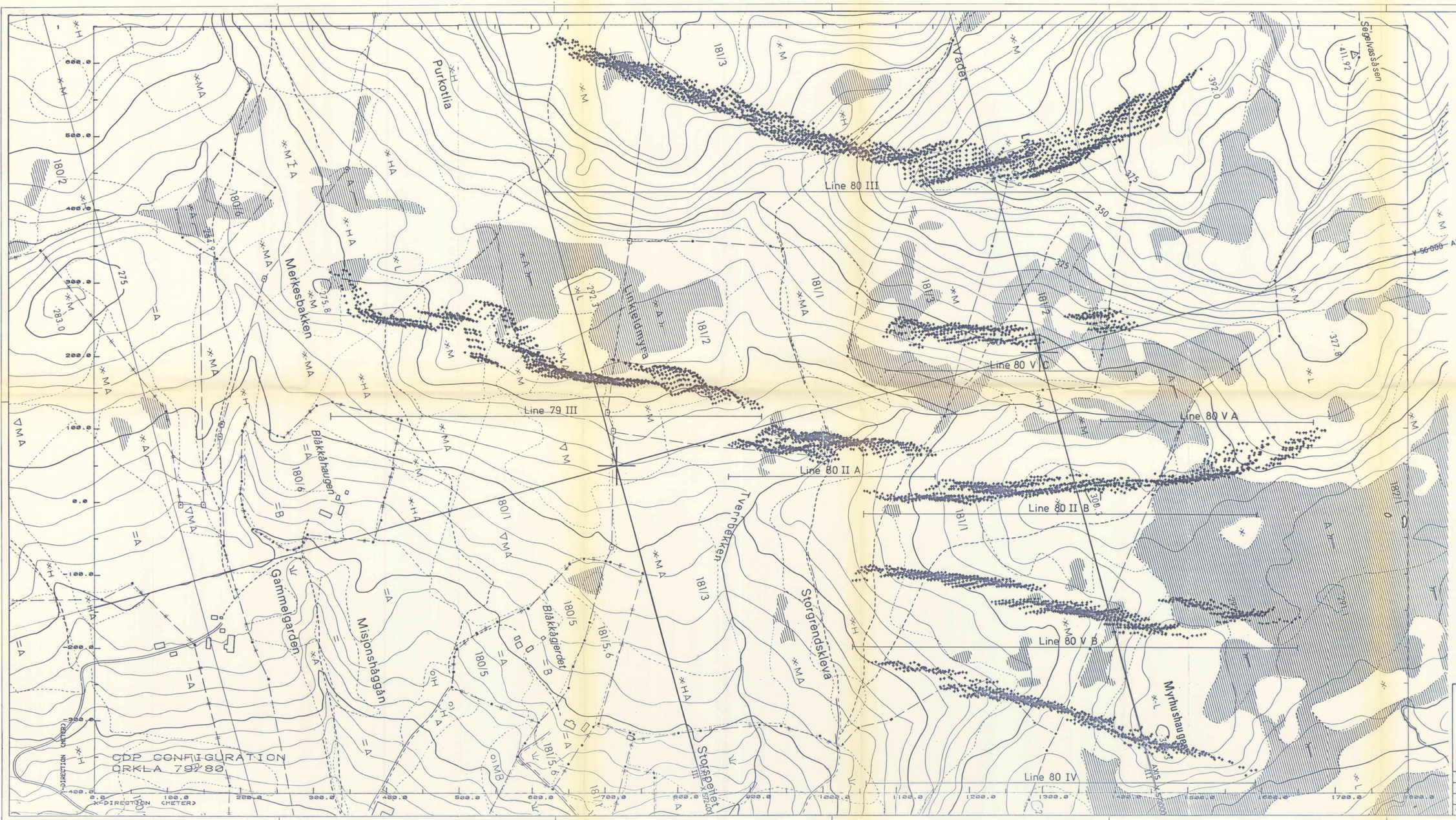
Scale

1 0 1 2 3

kilometres

79 III Seismic line

STATION CONFIGURATION
ORKLA 79/80
Station Profile 1
1 - 105
Station Profile 2
1 - 125
Station Profile 3
1 - 47
Secondary Stations
22 - 69
AXIS III
Purkotlia
Merkesbakken
Blåkåhaugen
Gammelgarden
Misjonshaggan
Blåkåsjøen
Storgrendskleva
Myrhushaugen
Lykkjåsen
Segelvasåsen
Tvergrabekken
Stasjonsveien
NORSAR
processing
LEGEND:
Shot and Geophone Station
Geophone Station only
GEOTEAM
Løkken West 79/80
Station Locations
Client
Orkla Industrier A/S
Measured 1979 / 1980
Calculated 1980 / 1981
Drawn 1981
Controlled
Map no
Scale 1:2000
Project no 4034
Appendix no 2.2



NORSAR processing

LEGEND:

+ Common depth point.

Line 80 V A Seismic line definition

GEOTEAM

Løkken West 79/80
Common Depth Point Chart

Client
Orkla Industrier A/S

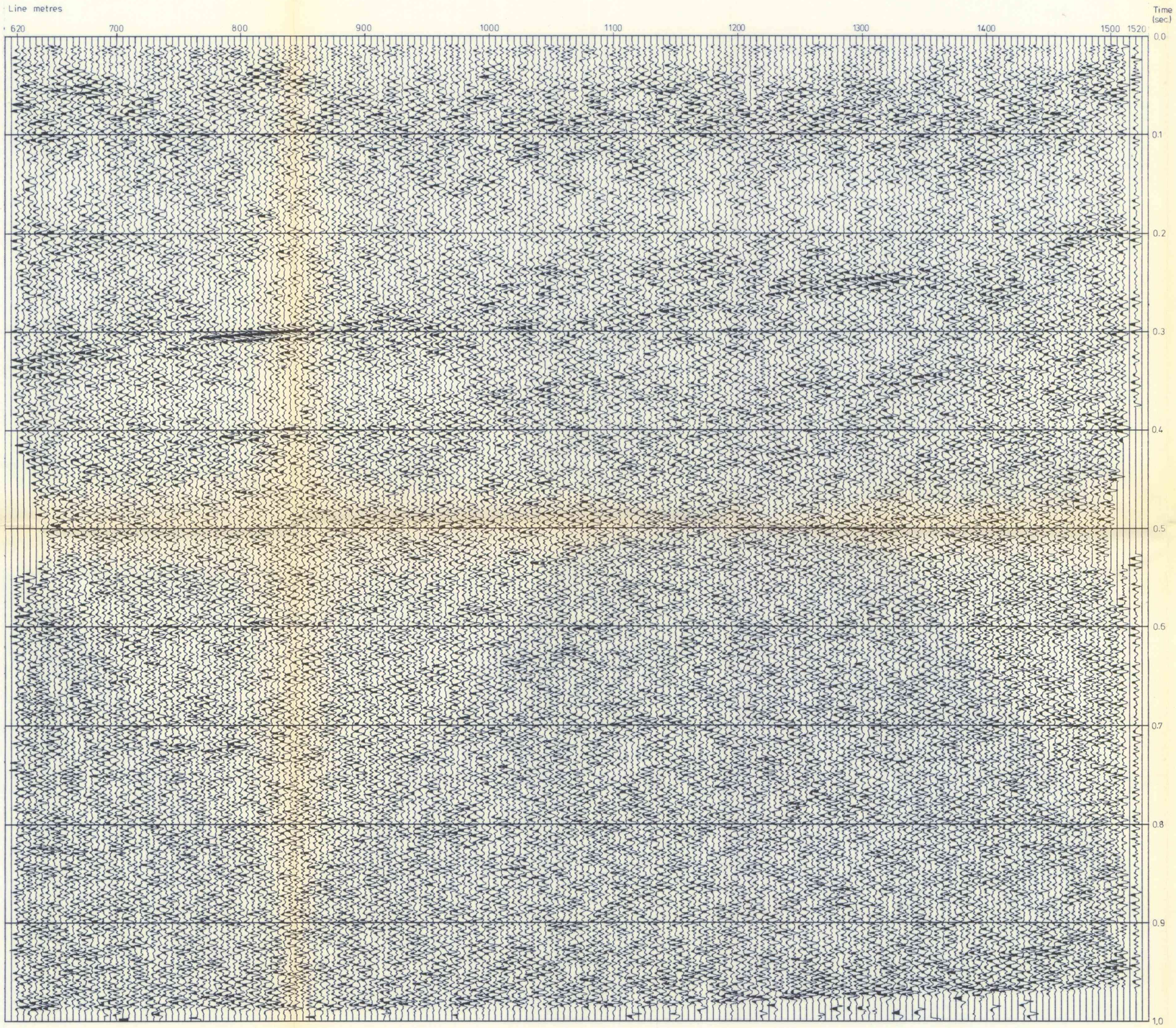
Measured	1979 / 1980
Calculated	1980 / 1981
Drawn	1981
Controlled	

Map no

Scale 1:2000

Project no 4034

Appendix no 2.3



Løkken West

Line 80 III, 620-1520m
Constant Velocity Stack

NORSAR processing

LINE

ORKLA 80 III SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: JUN 1980

DATA PROCESSING

NTNF/NORSAR DATE: SEP 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M
INSTRUMENTS:	REC. INSTR.: DFS V FILTER: H.CUT 256 HZ REC. LENGTH: 1 SEC SAMPLE RATE: 1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	V = 5000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 37 FOLD

PLAYBACK

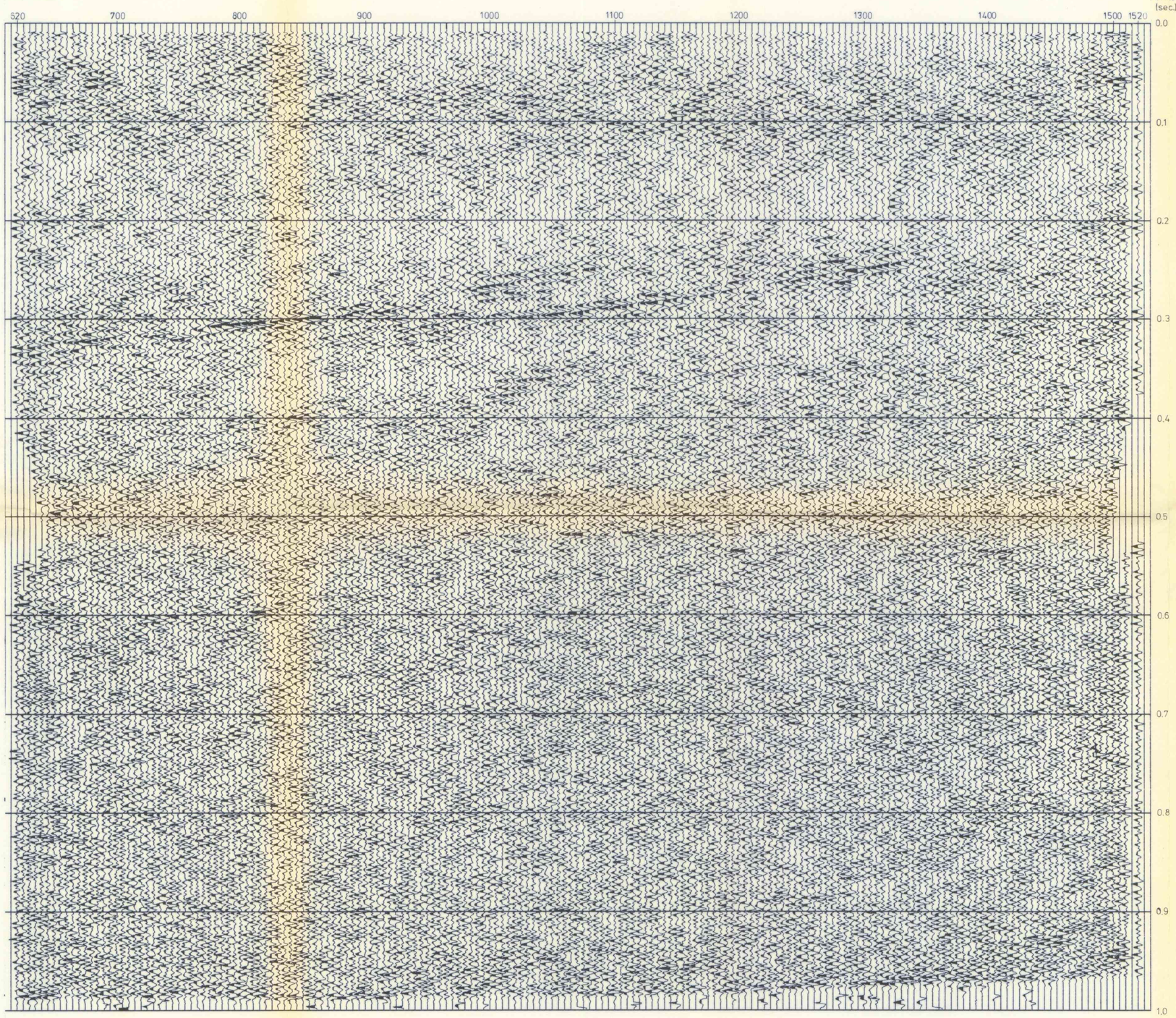
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured: June 1980	Map no.	Scale	1:2000
Calculated: September 1980		Project no.	4034
Drawn: May 1981		Appendix no.	3.1
Controlled:			



Løkken West

Line 80 III, 620-1520m

Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 III SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: JUN 1980

DATA PROCESSING

NTNF/NORSAR DATE: SEP 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M
INSTRUMENTS:	REC. INSTR.: DFS V FILTER: H.CUT 256 HZ REC. LENGTH: 1 SEC SAMPLE RATE: 1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 37 FOLD

PLAYBACK

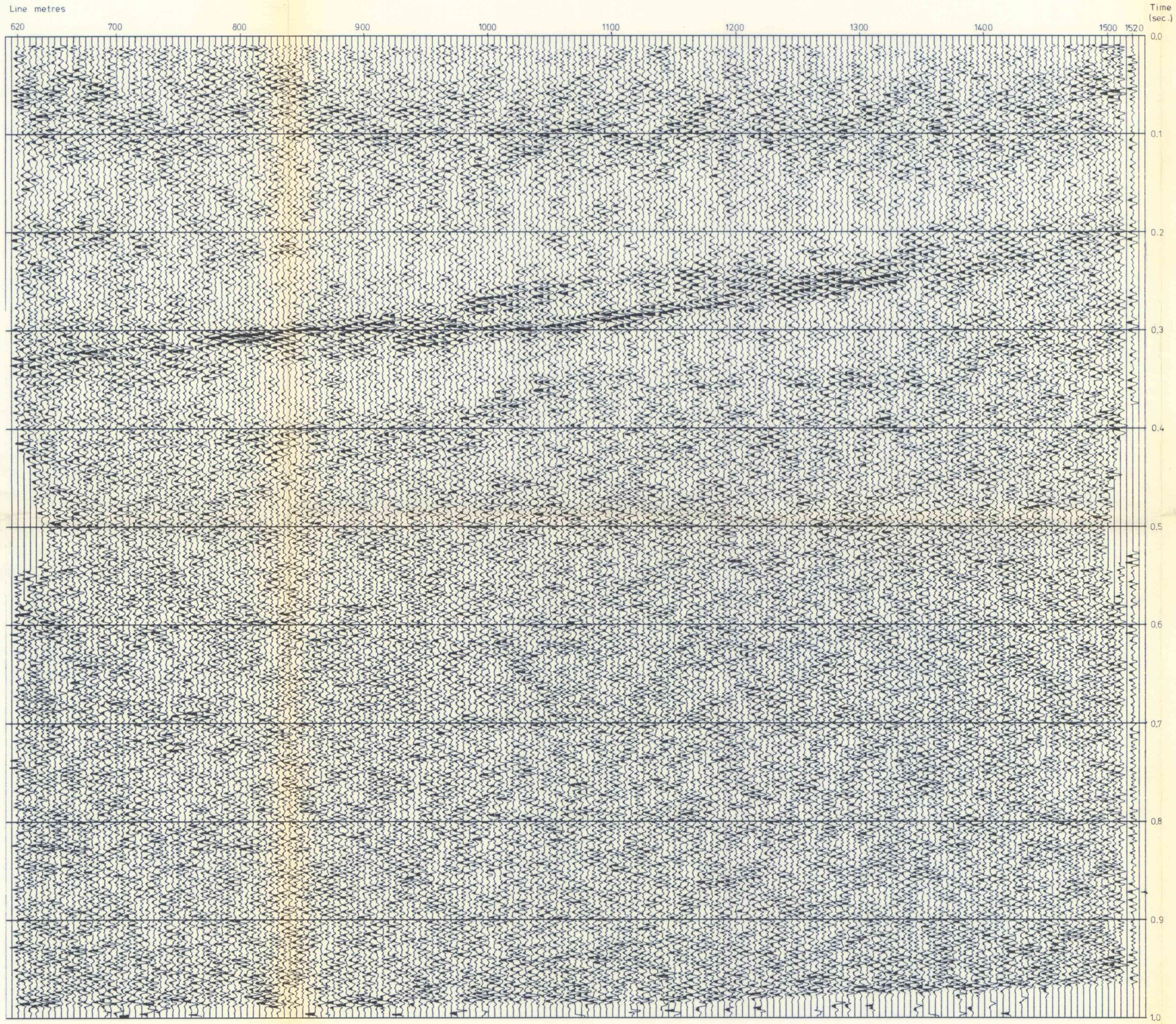
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured: June 1980	Map no.	Scale	1:2000
Calculated: September 1980		Project no.	4034
Drawn: May 1981		Appendix no.	3.2
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 III, 620-1520 m

Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 III SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: JUN 1980

DATA PROCESSING

NTNF/NORSAR DATE: SEP 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 12 FOLD, FOCUS 335 - 205, W = 30 MSEC

PLAYBACK

HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured: June 1980	Map no:	Scale	1:2000
Calculated: September 1980		Project no	4034
Drawn: May 1981		Appendix no	3.3
Controlled:			

GEOTEAM NORWAY

Løkken West

Line 80 V C, 1085-1430 m
Dip - Compensated Stack

NORSAR processing

LINE

ORKLA 80 V C SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

NTNF/NORSAR DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: DEC 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 420 M DUAL LINE SHOOTING SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (60 HZ MARKS PROD.) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 12 FOLD

PLAYBACK

HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured: October 1980	Map no.	Scale	1:2000
Calculated: December 1980		Project no.	4034
Drawn: May 1981		Appendix no.	3.4
Controlled:			

GEOTEAM NORWAY

Løkken West

Line 80 V C, 1085 - 1430 m
Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 V C SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

NTNF/NORSAR DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: DEC 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 420 M DUAL LINE SHOOTING SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (60 HZ MARKS PROD.) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 6 FOLD, FOCUS 235 - 165, W = 30 MSEC

PLAYBACK

HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client:
Orkla Industrier A/S

Measured: October 1980	Map no:	Scale	1:2000
Calculated: December 1980		Project no:	4034
Drawn: May 1981		Appendix no:	3.5
Controlled:			

GEOTEAM NORWAY

Løkken West

Line 80 V C, 1085 - 1430 m
Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 V C SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

NTNF/NORSAR DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: DEC 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 420 M DUAL LINE SHOOTING SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (60 HZ MARKS PROD.) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 6 FOLD, FOCUS 280 - 240, W = 30 MSEC

PLAYBACK

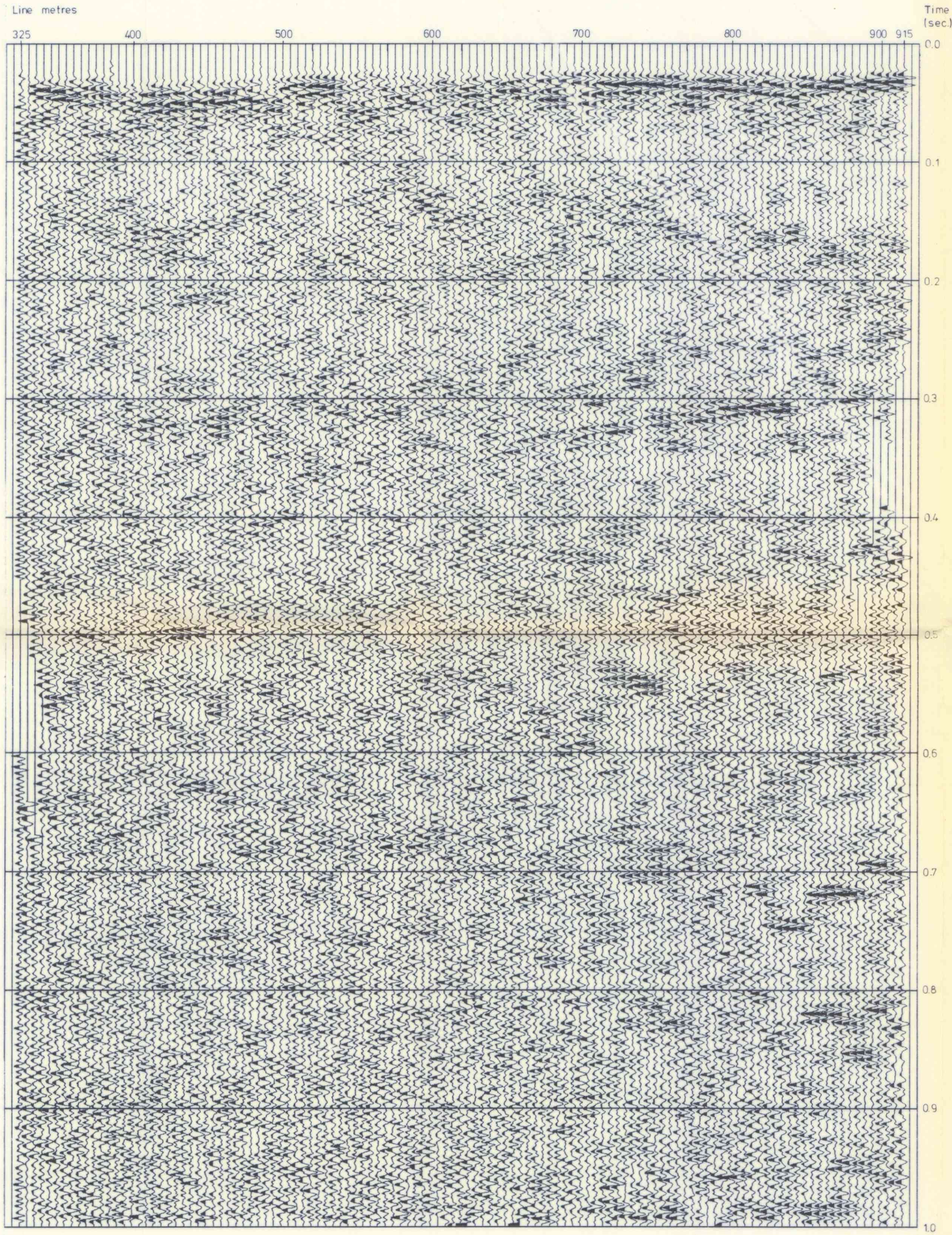
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured: October 1980	Map no.	Scale	1: 2000
Calculated: December 1980		Project no.	4034
Drawn: May 1981		Appendix no.	3.6
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 79 III, 325 - 915 m

Constant Velocity Stack

NORSAR processing

LINE

ORKLA 79 III SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: OCT - NOV 1979

DATA PROCESSING

NTNF/NORSAR DATE: AUG 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ MARKS PROD.) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	V = 5000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 44 FOLD

PLAYBACK

HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

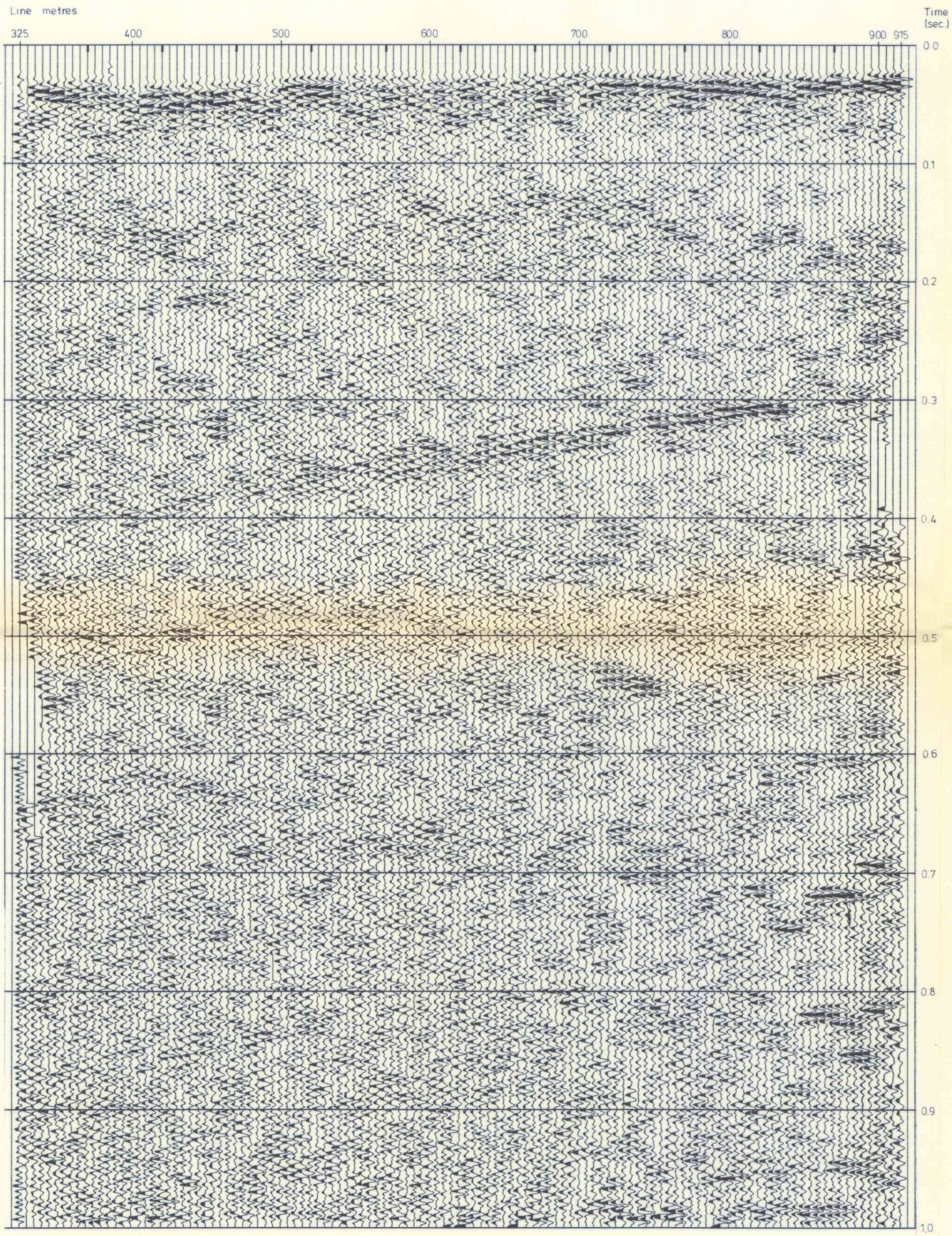
GEOTEAM

Seismic Section

Client:

Orkla Industrier A/S

Measured:	Oct.-nov 1979	Map no	Scale 1: 2000
Calculated:	August 1980		Project no 4034
Drawn:	May 1981		Appendix no 3.7
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 79 III, 325 - 915 m
Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 79 III SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: OCT - NOV 1979

DATA PROCESSING

NTNF/NORSAR DATE: AUG 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ MARKS PROD.) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	V = 5000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 12 FOLD, FOCUS 400 - 390, W = 30 MSEC

PLAYBACK

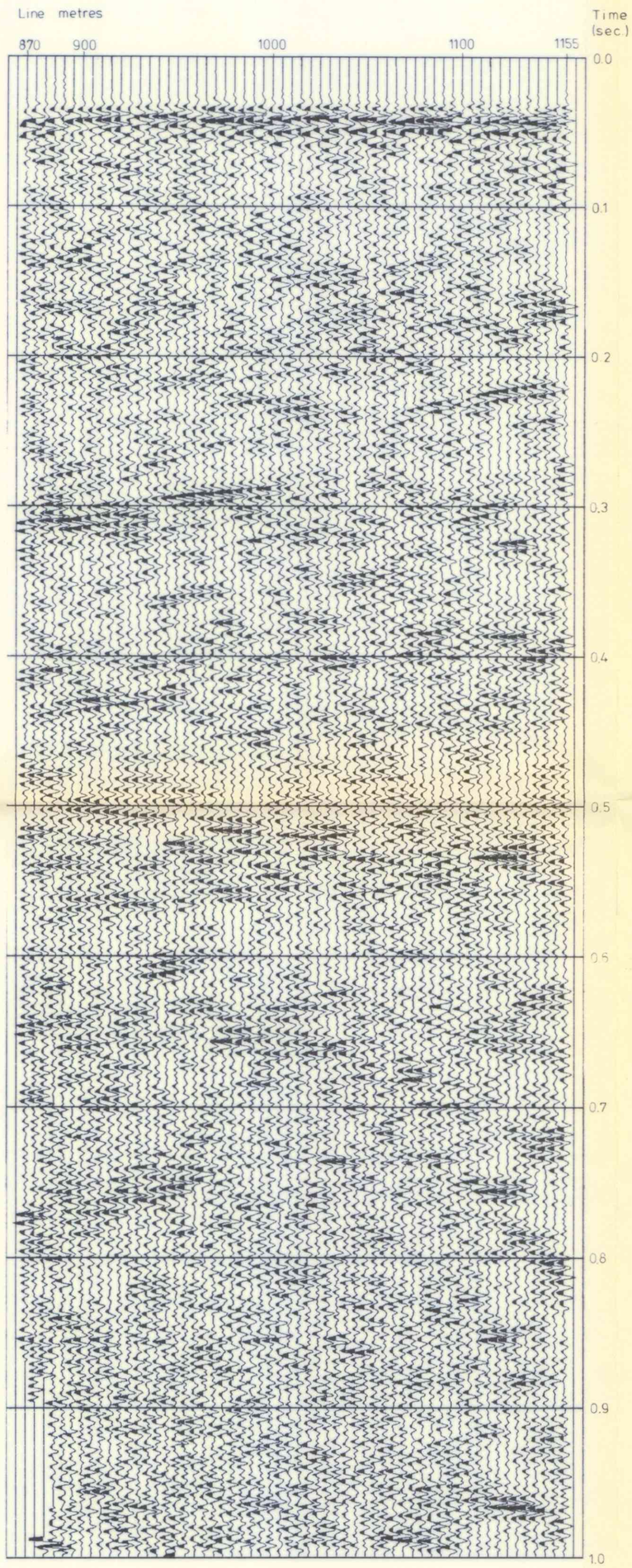
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client:
Orkla Industrier A/S

Measured:	Oct.-nov. 1979	Map no.	Scale 1:2 000
Calculated:	August 1980		Project no 4034
Drawn:	May 1981		Appendix no 3.8
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 II A, 870 - 1155 m

Dip - Compensated Stack

NORSAR processing

LINE

ORKLA 80 II A SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: JUN 1980

DATA PROCESSING

NTNF/NORSAR DATE: SEP 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M DUAL LINE SHOOTING SHOT POINT INTERVAL 10 M
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M
INSTRUMENTS:	REC. INSTR.: DFS V FILTER: H.CUT 256 HZ REC. LENGTH: 1 SEC SAMPLE RATE: 1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 48 FOLD

PLAYBACK

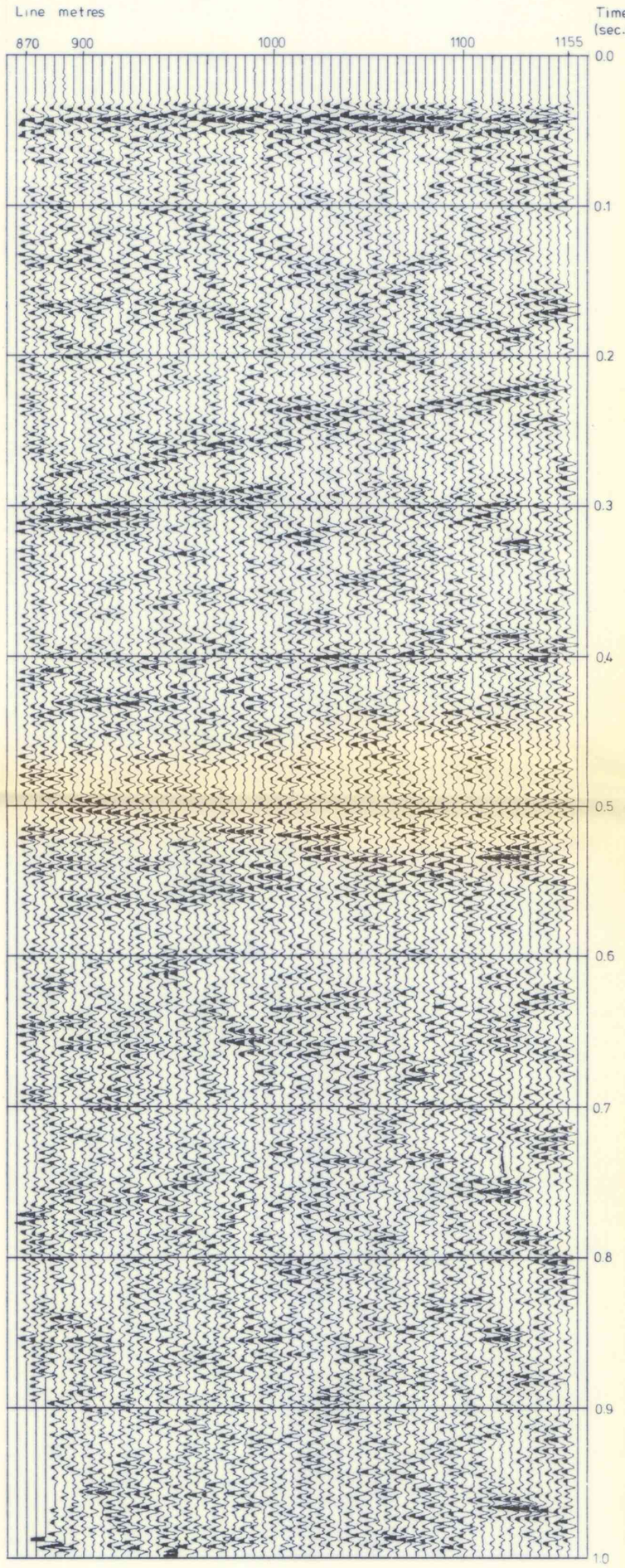
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured: June 1980	Map no:	Scale:	1:2000
Calculated: September 1980		Project no:	4034
Drawn: May 1981		Appendix no:	3.9
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 II A, 870-1155 m
Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 II A SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: JUN 1980

DATA PROCESSING

NTNF/NORSAR DATE: SEP 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M DUAL LINE SHOOTING SHOT POINT INTERVAL 10 M
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M
INSTRUMENTS:	REC. INSTR.: DFS V FILTER: H.CUT 256 HZ REC. LENGTH: 1 SEC SAMPLE RATE: 1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 12 FOLD, FOCUS 270 - 210, W = 30 MSEC

PLAYBACK

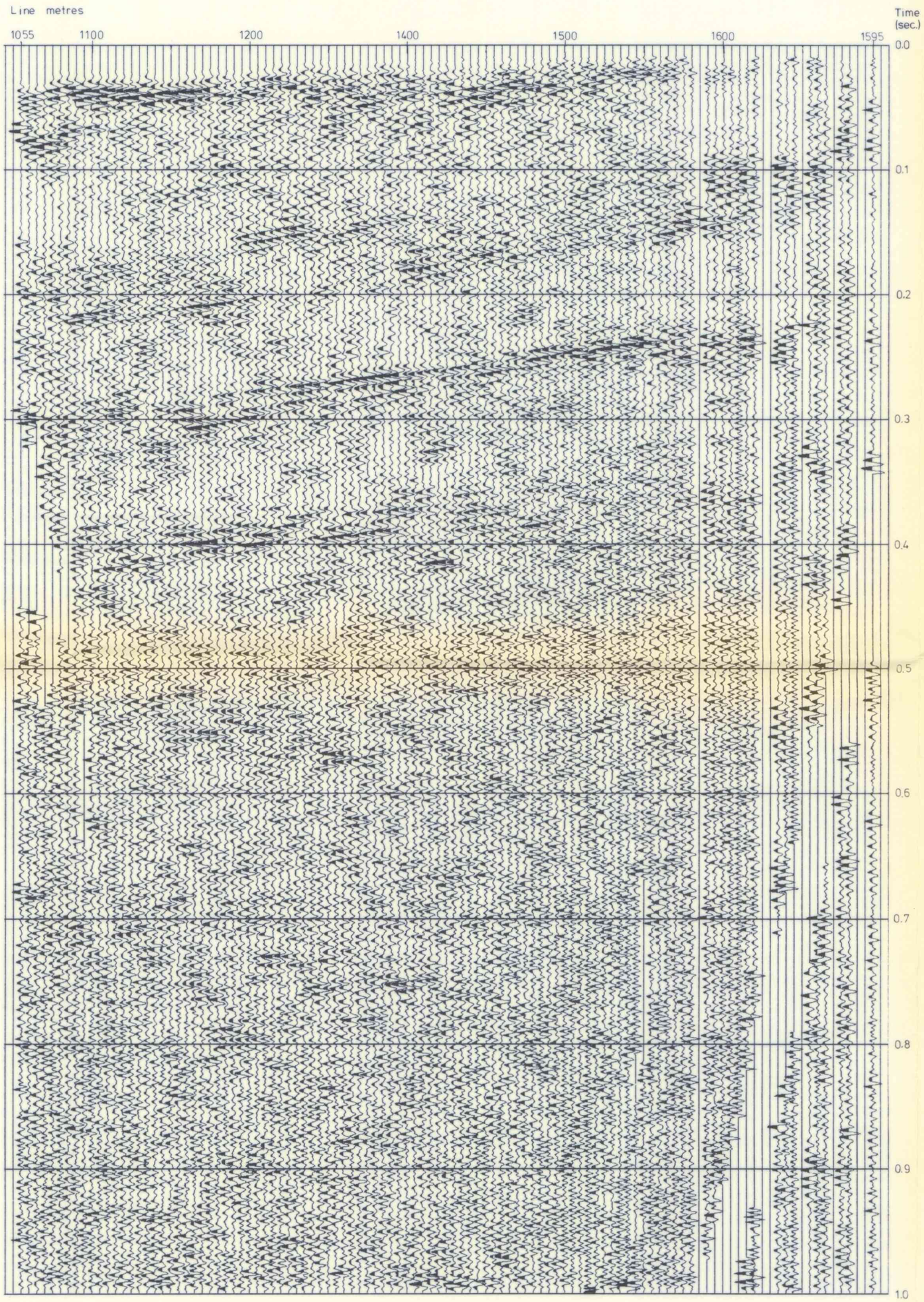
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client:
Orkla Industrier A/S

Measured: June 1980	Map no.	Scale	1:2000
Calculated: September 1980		Project no.	4034
Drawn: May 1981		Appendix no.	3.10
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 II B, 1055-1595 m

Dip - Compensated Stack

NORSAR processing

LINE

ORKLA 80 II B SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: JUN 1980

DATA PROCESSING

NTNF/NORSAR DATE: SEP 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 31 FOLD

PLAYBACK

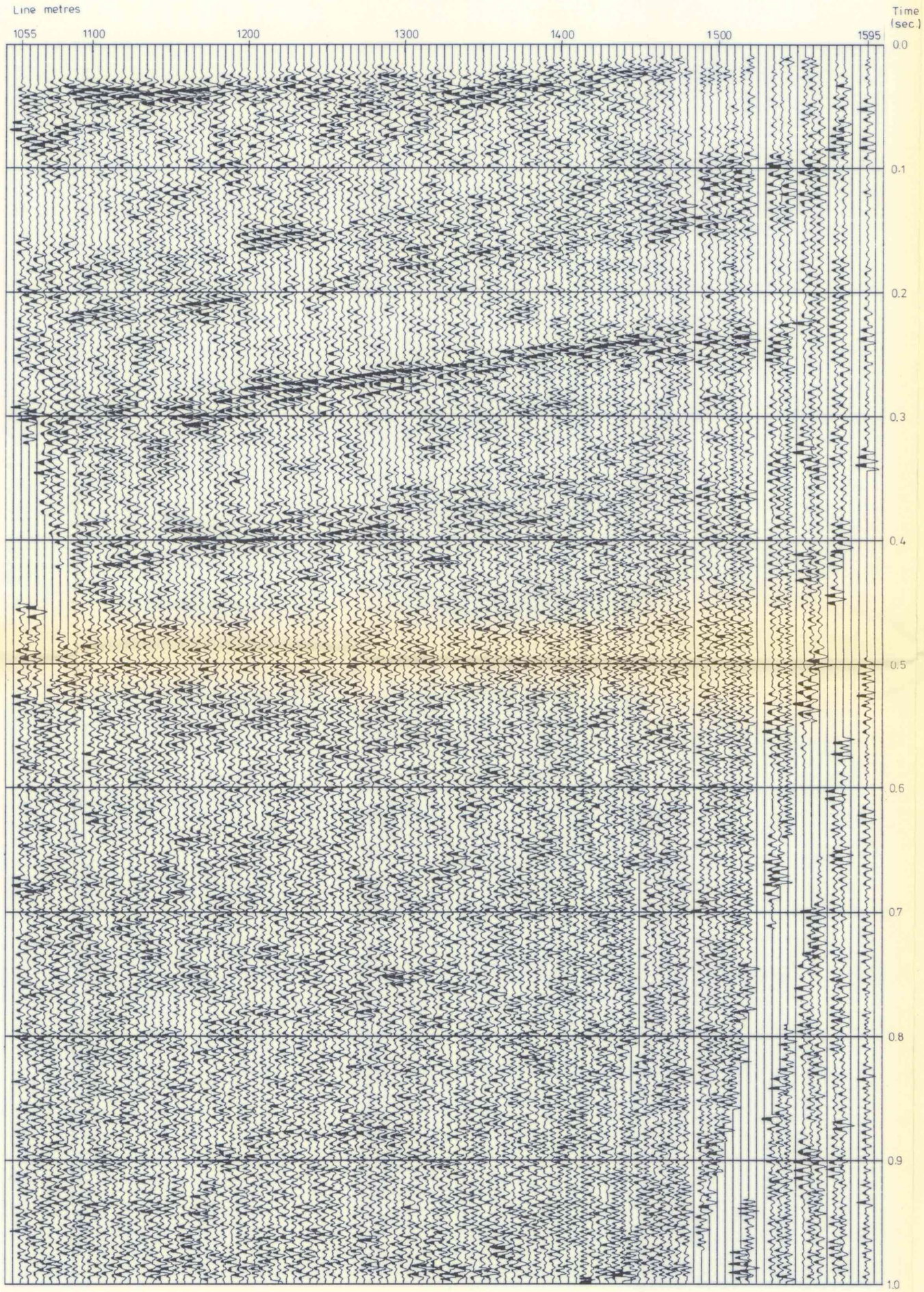
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured: June 1980	Map no:	Scale	1:2000
Calculated: September 1980		Project no:	4034
Drawn: May 1981		Appendix no:	3.11
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 II B, 1055–1595m

Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 II B SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: JUN 1980

DATA PROCESSING

NTNF/NORSAR DATE: SEP 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES	
	SP OFFSET APPROX. 120 M	
	SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7)	
	GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC
	V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 12 FOLD, FOCUS 290 - 210, W = 30 MSEC

PLAYBACK

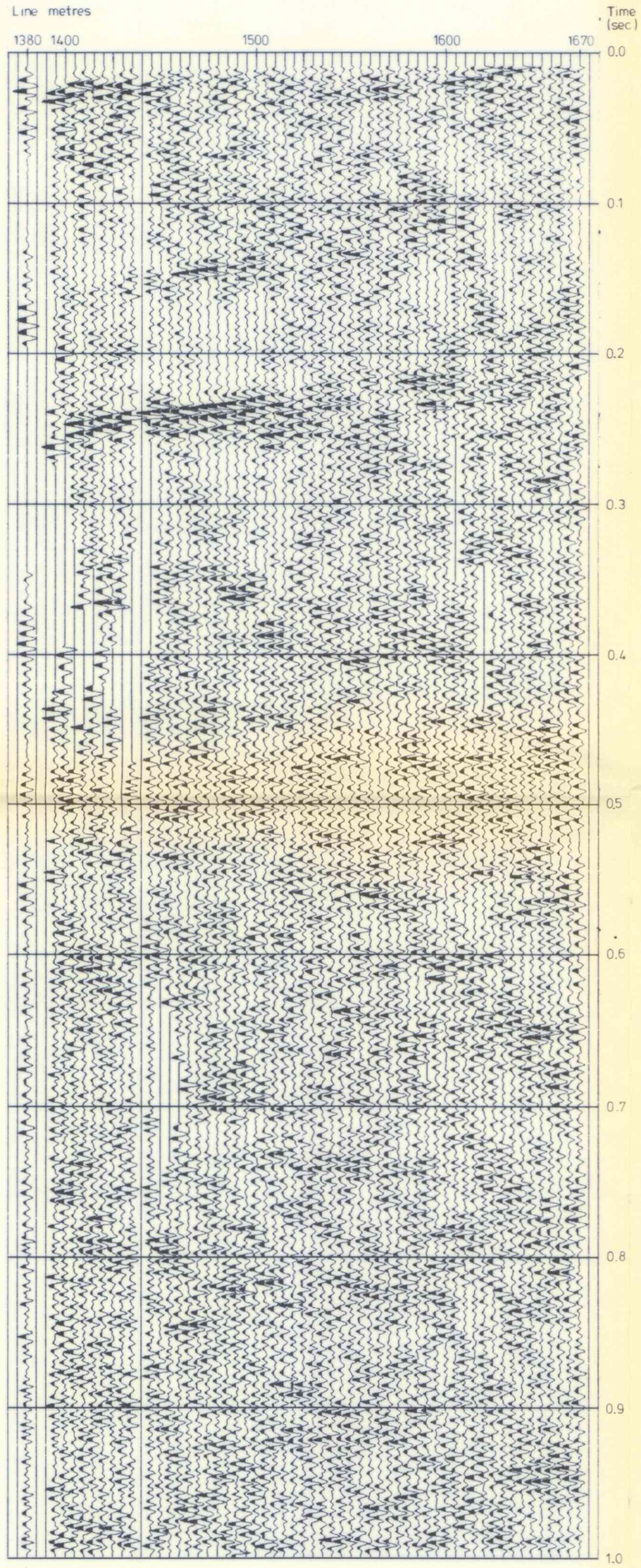
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client:
Orkla Industrier A/S

Measured: June 1980	Map no.	Scale	1:2000
Calculated: September 1980		Project no.	4034
Drawn: May 1981		Appendix no.	3.12
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 V A, 1380 - 1670 m
Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 V A SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: NOV 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 50 M SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 20 FOLD

PLAYBACK

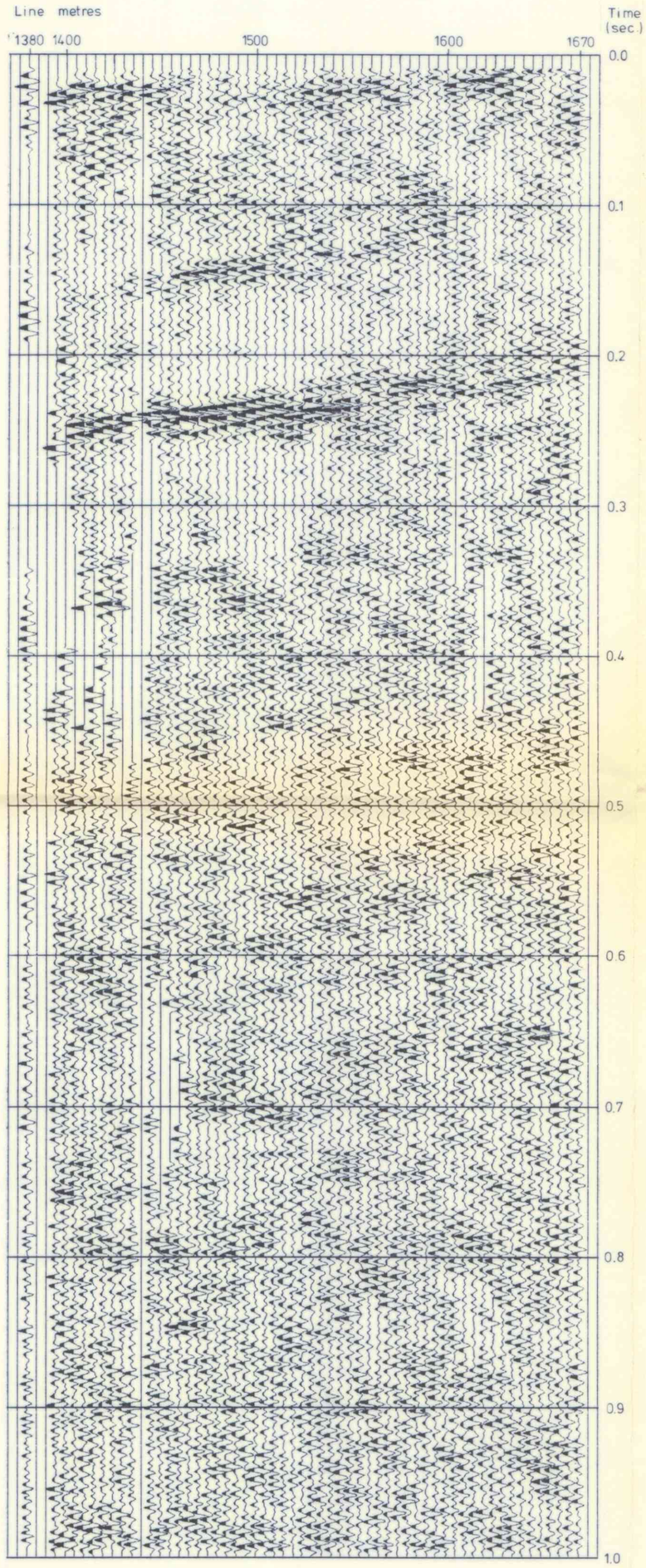
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client:
Orkla Industrier A/S

Measured:	October 1980	Map no:	Scale 1:2000
Calculated:	November 1980		Project no 4034
Drawn:	May 1981		Appendix no 3.13
Controlled:			



Løkken West

Line 80 V A, 1380 - 1670 m
Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 V A SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: NOV 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES	
	SP OFFSET APPROX. 50 M	
	SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7)	
	GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC
	V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 10 FOLD, FOCUS 240 - 190, W = 30 MSEC

PLAYBACK

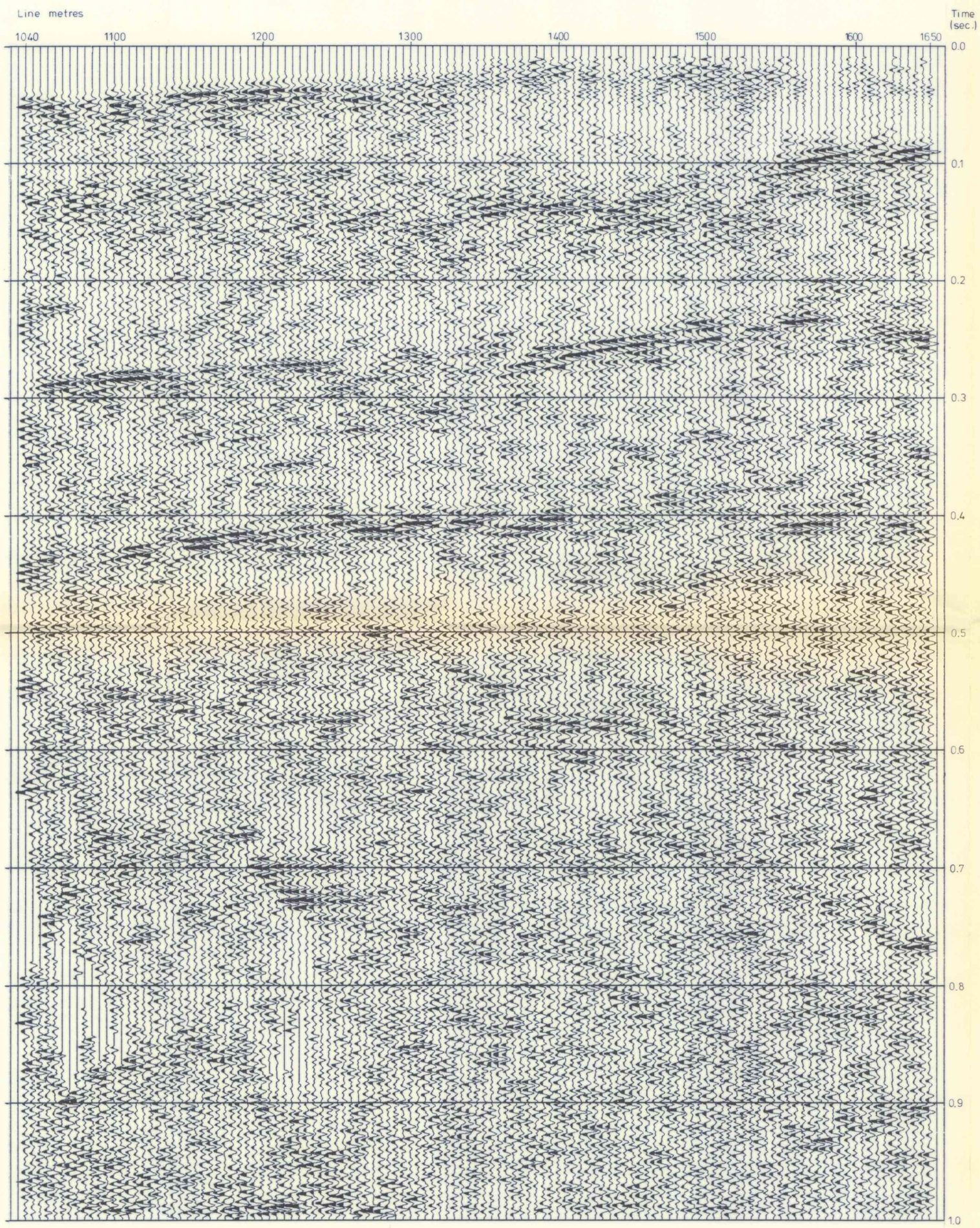
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured:	October 1980	Map no:	Scale: 1:2000
Calculated:	November 1980		Project no: 4034
Drawn:	May 1981		Appendix no: 3.14
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 V B, 1040 - 1650 m

Dip - Compensated Stack

NORSAR processing

LINE

ORKLA 80 V B SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

NTNF/NORSAR
A/S GEOTEAM
DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: DEC 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES	
	SP OFFSET APPROX. 200 M	
	DUAL LINE SHOOTING	
	SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (60 HZ MARKS PROD.)	
	GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC
	V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 16 FOLD

PLAYBACK

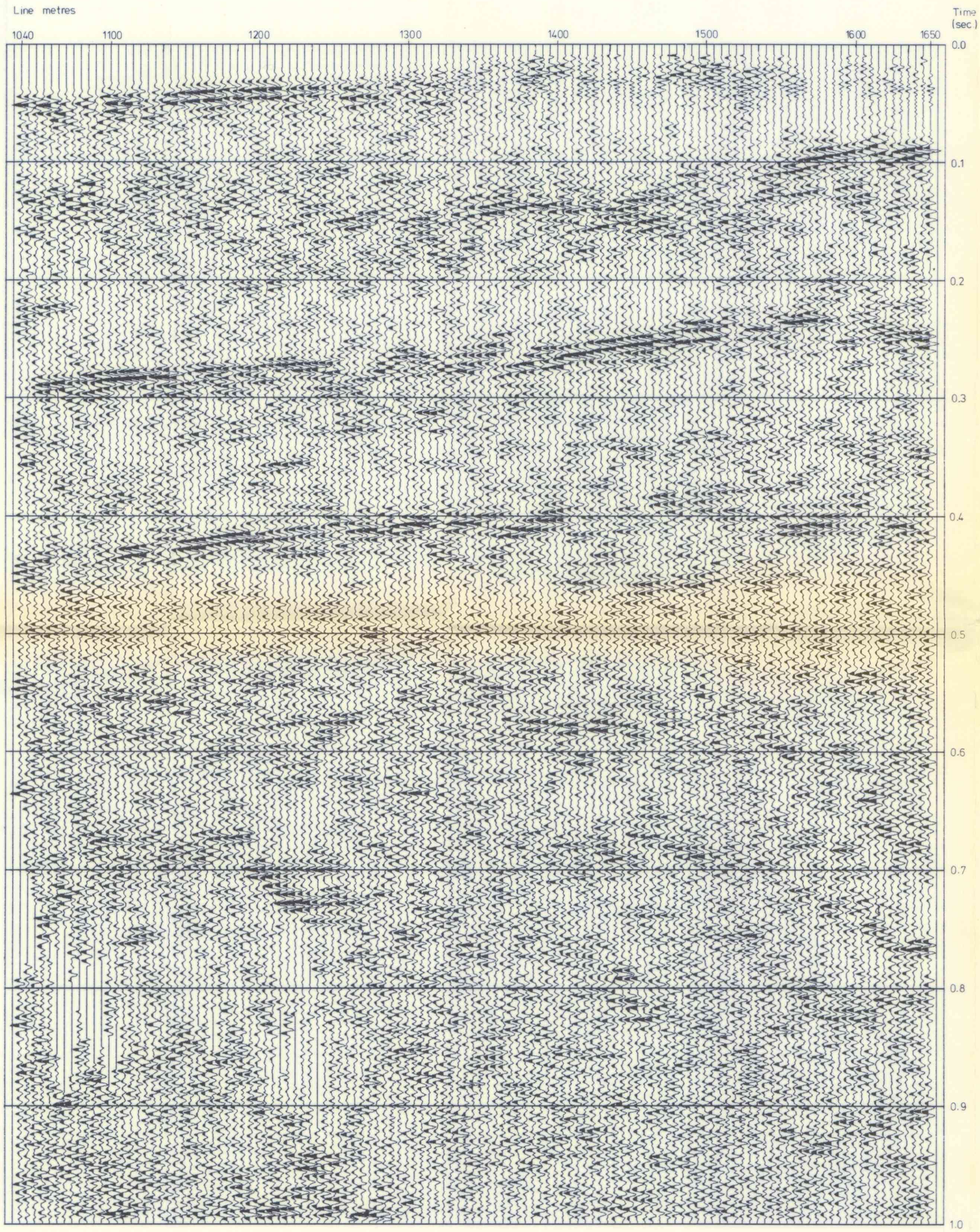
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client:
Orkla Industrier A/S

Measured:	October 1980	Map no:	Scale 1:2000
Calculated:	December 1980		Project no: 4034
Drawn:	May 1981		Appendix no: 3.15
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 V B, 1040 - 1650 m

Reduced Dip - Compensated Stack

NORSAR processing

LINE

ORKLA 80 V B SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

NTNF/NORSAR
A/S GEOTEAM
DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: DEC 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES	
	SP OFFSET APPROX. 200 M	
	DUAL LINE SHOOTING	
	SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (60 HZ MARKS PROD.)	
	GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC
	V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 12 FOLD, FOCUS 280 - 220, W = 30 MSEC

PLAYBACK

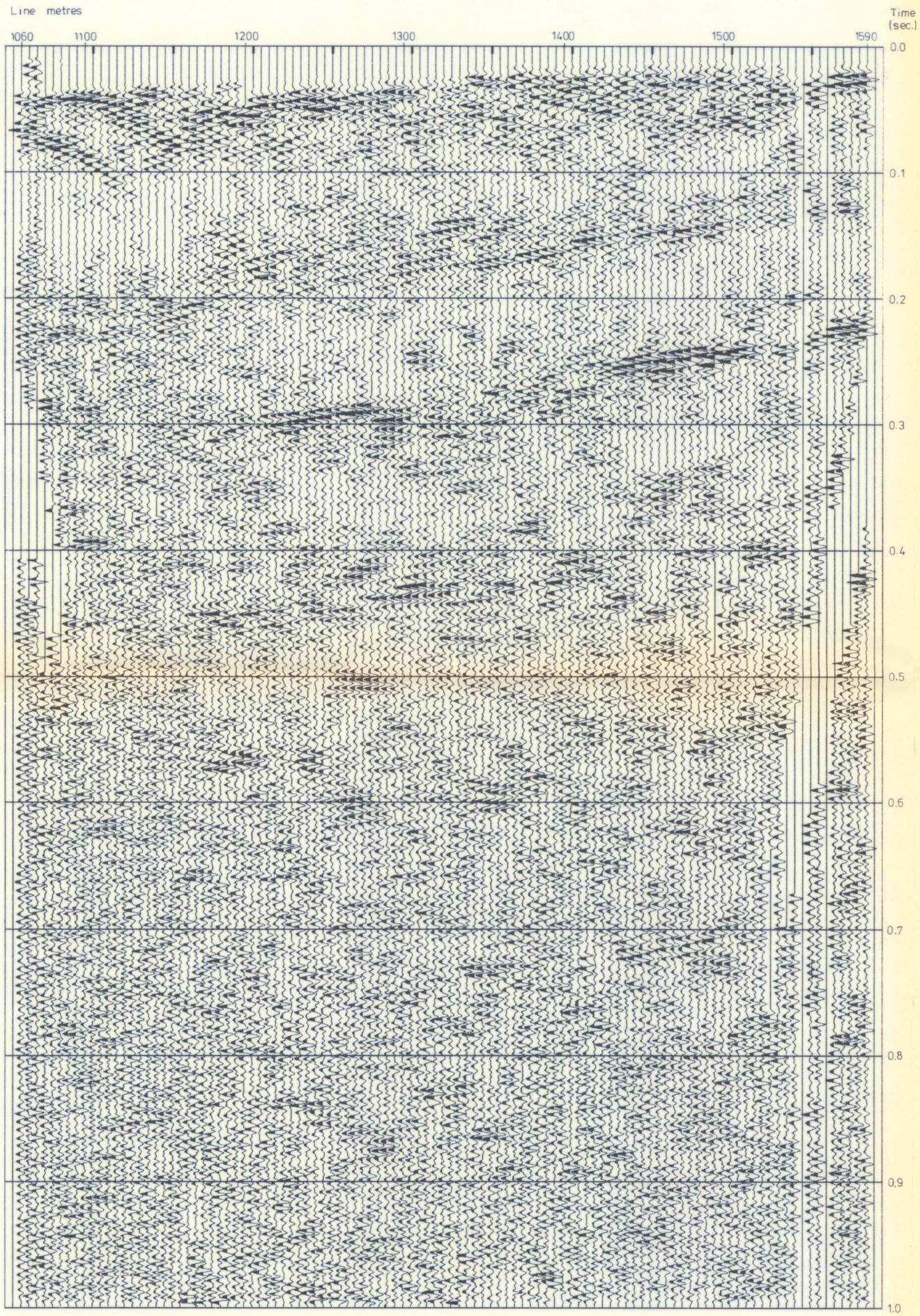
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client:
Orkla Industrier A/S

Measured:	October 1980	Map no.	Scale 1:2000
Calculated:	December 1980		Project no. 4034
Drawn:	May 1981		Appendix no. 3.16
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 IV, 1060 - 1590 m
Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 IV SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: NOV 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ L.CUT 115 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 28 FOLD

PLAYBACK

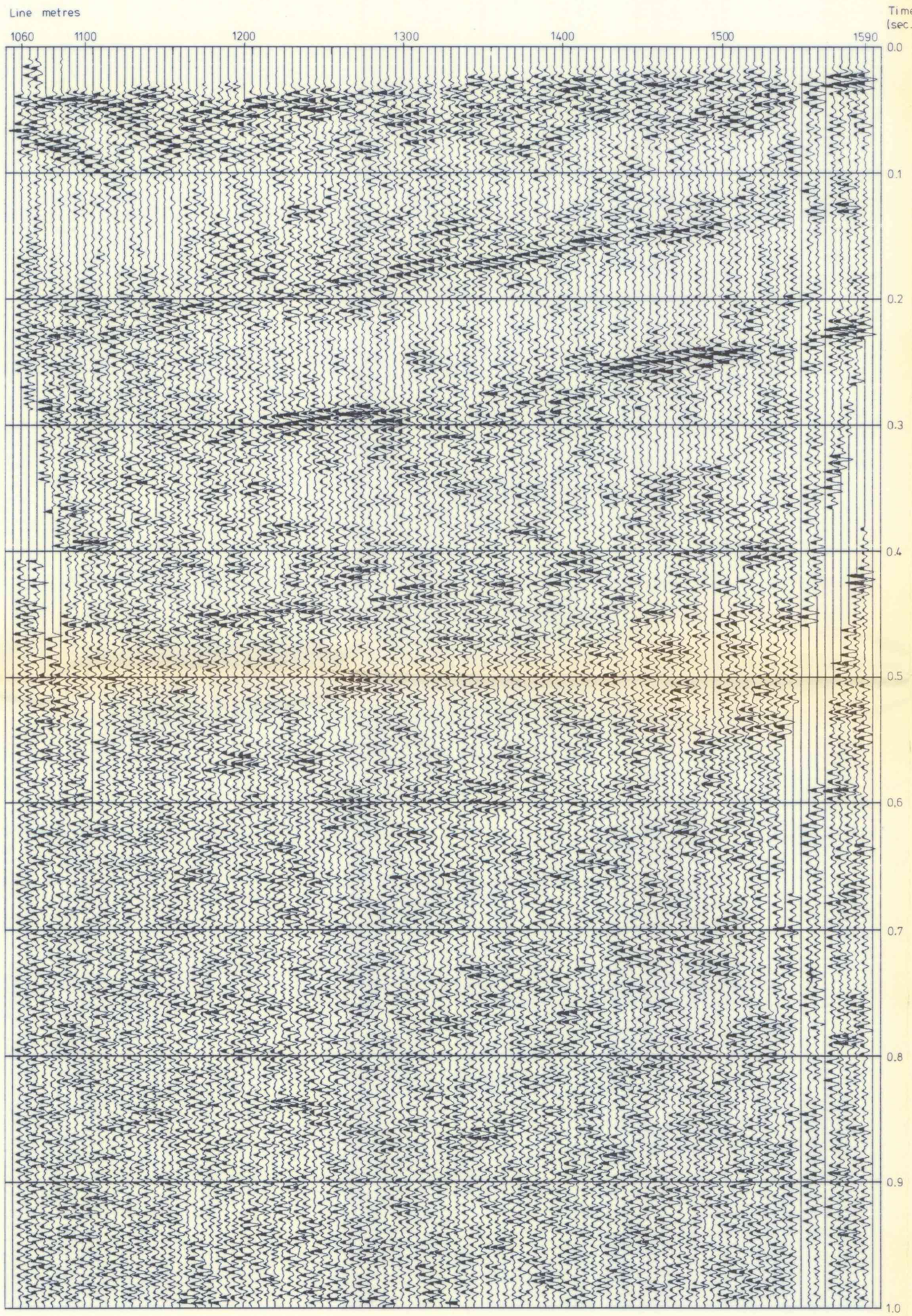
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured:	October 1980	Map no.	Scale 1:2000
Calculated:	November 1980		Project no 4034
Drawn:	May 1981		Appendix no 3.17
Controlled:			



GEOTEAM NORWAY

Løkken West

Line 80 IV, 1060 - 1590 m

Reduced Dip-Compensated Stack

NORSAR processing

LINE

ORKLA 80 IV SUGUSTADMARKA

CLIENT

ORKLA INDUSTRIER A/S

DATA AQUISITION

A/S GEOTEAM DATE: OCT 1980

DATA PROCESSING

NTNF/NORSAR DATE: NOV 1980

RECORDING PARAMETERS

SOURCE:	C4 EXPLOSIVES SP OFFSET APPROX. 120 M SHOT POINT INTERVAL 10 M	
CABLE:	24 SINGLE GEOPHONES (50 HZ SM-7) GEOPHONE SPACING 10 M	
INSTRUMENTS:	REC. INSTR.:	DFS V
	FILTER:	H.CUT 256 HZ L.CUT 115 HZ
	REC. LENGTH:	1 SEC
	SAMPLE RATE:	1 MSEC

PROCESSING PARAMETERS

DMX/EDIT:	INDIVIDUAL STATION COORD. SPECIFICATION
CDP-SORTING:	AREAL DISTR. AND LINE PROJ. CDF SELECTION
NMO:	T = 0, 50, 200 MSEC V = 5000, 5500, 8000 M/SEC
STATICS:	REF. LEVEL 300 M
BP FILTER:	BUTTERW. 120 - 250 HZ
MUTE:	V = 332 M/SEC, WINDOW = 150 MSEC
SCALE:	CONT. RMS ENV. SCALING, WINDOW = 150 MSEC
STACK:	MAX. 12 FOLD, FOCUS 235 - 110, W = 30 MSEC

PLAYBACK

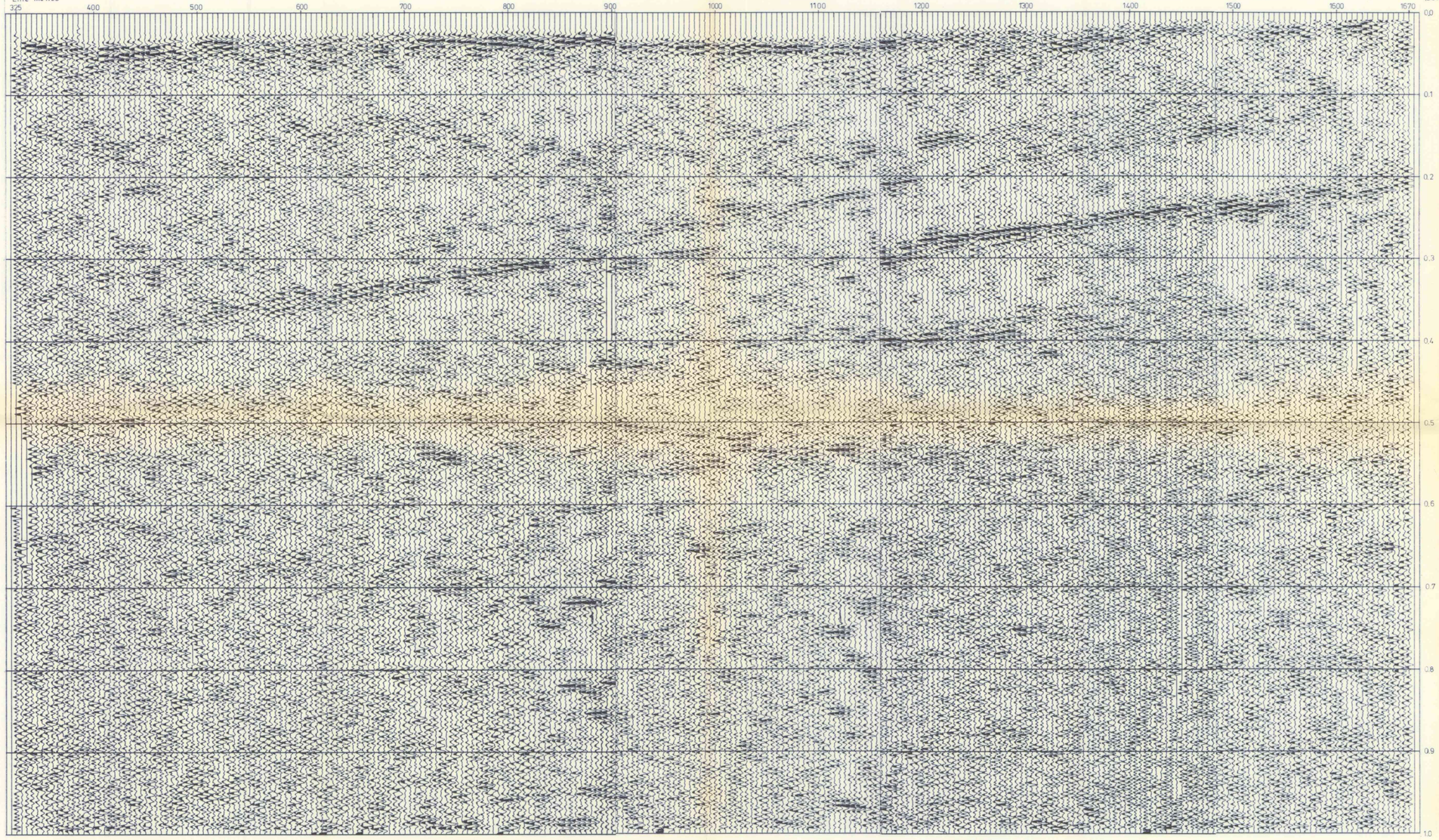
HOR. SCALE:	5 TRACES/CM
VERT. SCALE:	40 CM/SEC

GEOTEAM

Seismic Section

Client: Orkla Industrier A/S

Measured:	October 1980	Map no:	Scale: 1:2000
Calculated:	November 1980		Project no: 4034
Drawn:	May 1981		Appendix no: 3.18
Controlled:			



GEOTEAM NORWAY

NORSAR processing

Løkken West

Continous Display

Line 79 III
-"- 80 II A
-"- 80 II B
-"- 80 V A

325 - 1670 m

Reduced Dip-Compensated Stack

GEOTEAM

Seismic Section

Client
Orkla Industrier A/S

Measured	1979/1980
Calculated	1980
Drawn	1981
Controlled	

Map no

Scale	1: 2 000
Project no	4034
Appendix no	3.19