WCR Skull Creek West-1 (W1180)

BASIN OIL N.L.

ACN 000 628 017

Well Completion Report

SKULL CREEK WEST-1

PPL 1

Onshore Otway Basin

VICTORIA

Volume 2
Appendices and Enclosures

December 1997

Compiled By: L J Scarsbrook

APPENDIX 5

WIRELINE FORMATION TEST DATA

CROCKER
RESEARCH
UNIT 6, 1 SARICH WAY,
TECHNOLOGY PARK,
BENTLEY WA 6102 , AUSTRALIA
TEL:(619)-470-5004, 470-5006
FAX:(619)470-5003
MODEM: 470-4017
ACN:008990681
APS8EXEC.doc

FORMATION EVALUATION TOOL OPERATIONS

EXECUTIVE SUMMARY

COMPANY: CULTUS PETROLEUM N.L. WELL: Skull Creek West #1
OPERATIONS DATE: 25 February1997

Please see attached lists and plots for details of operations

The objective of the following tests was
1. To btain pressures and permeabilities within the Waarre sandstone
2. to obtain a pressure profile and a sample within the Upper Eumeralla formation

Ten tests were made which gave good permeability to tight results. The depths at which these tests were made were :

1286.5m, 1287.0m, 1288.0m & 1290.0m in the Waarre sandstone

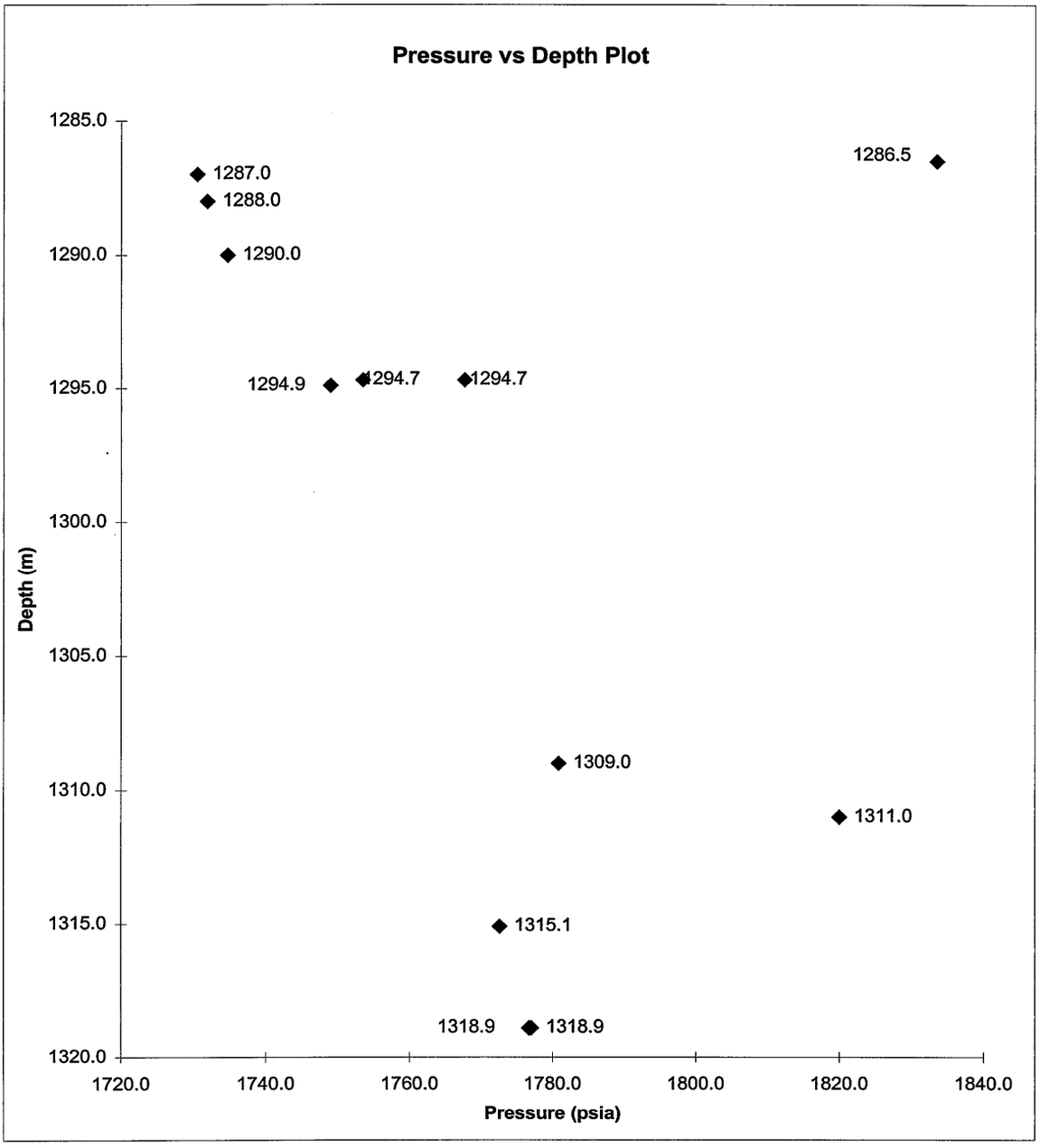
and 1294.7m, 1294.9m, 1309.0m, 1311.0m, 1315.1m & 1318.9m in the Upper Eumeralla formation.

These tests results show that the Waarre sandstone and the Upper Eumeralla formation contain varying permabilities, please see the table below.

Test	Depth	Mud P	FSIP	Mud P	Time	Date	Remarks	Perm.
	(m)	(psia)	(psia)	(psia)				(md)
1	1286.5	2087.6	1833.5	2088.4	00:43	25/2/97	Supercharged	
2	1287.0	2089.1	1730.5	2089.5	00:58	25/2/97	Good Perm	452
3	1288.0	2090.9	1731.9	2091.1	01:21	25/2/97	Good Perm	227
4	1290.0	2094.1	1734.7	2094.3	01:31	25/2/97	Good Perm	
5	1294.7	2101.6	1767.7	2102.1	01:39	25/2/97	Supercharged	
6	1294.9	2102.2	1749.0	2102.3	01:58	25/2/97	Low Perm	
7	1309.0	2124.9	1780.8	2125.5	02:14	25/2/97	Low Perm	5.4
8	1311.0	2128.5	1820.0	2128.9	02:40	25/2/97	Tight	
9	1315.1	2135.3	1772.6	2135.7	02:56	25/2/97	Fair Perm	31.9
10	1318.9	2141.7	1777.0		03:31	25/2/97	Good Perm	134

CROCKER RESEARCH

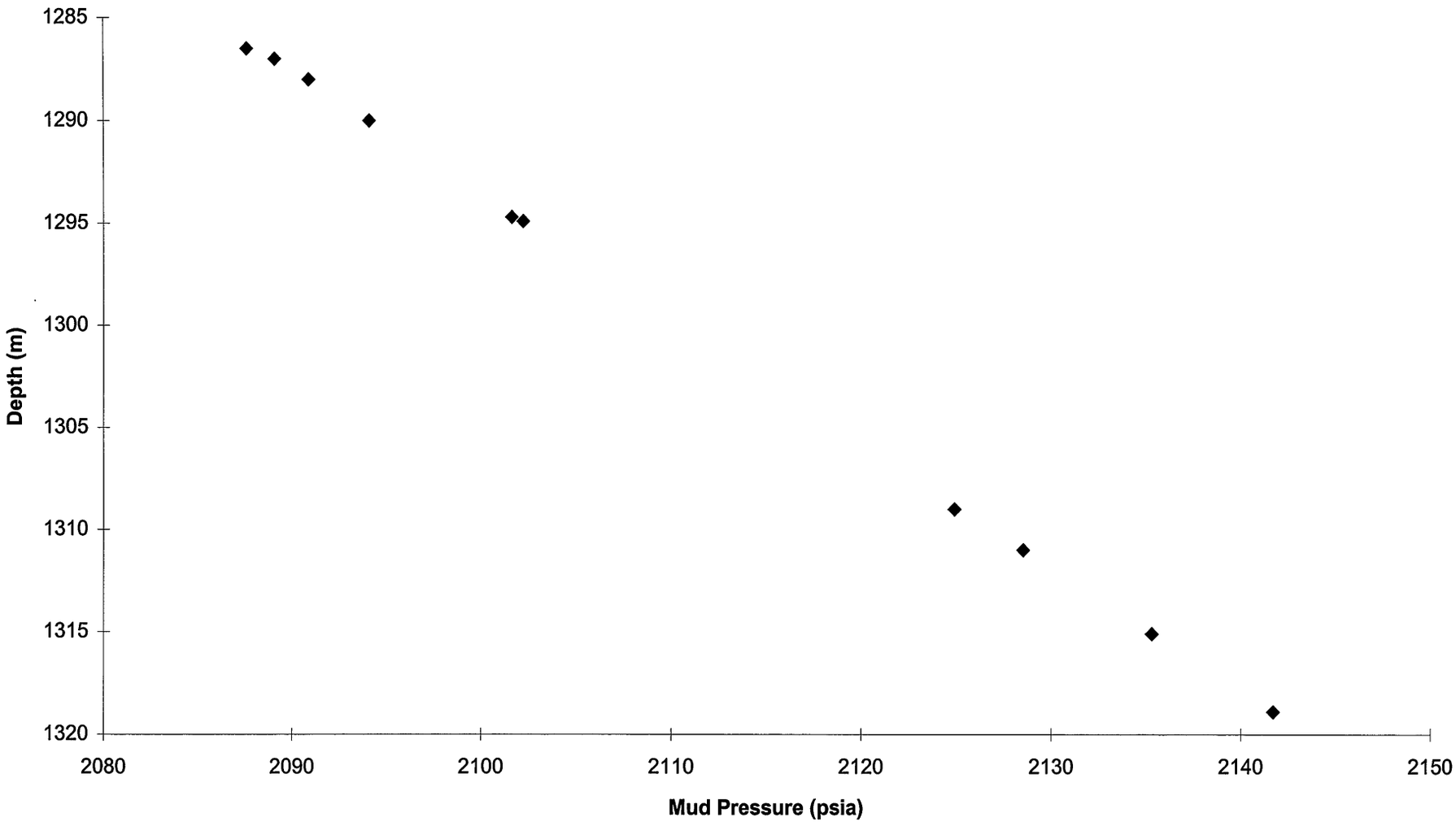
Test	FSIP	Depth
	(psia)	(m)
1	1833.5	1286.5
2	1730.5	1287.0
3	1731.9	1288.0
4	1734.7	1290.0
5	1767.7	1294.7
5	1753.5	1294.7
6	1749.0	1294.9
7	1780.8	1309.0
8	1820.0	1311.0
9	1772.6	1315.1
10	1777.0	1318.9
10	1776.7	1318.9



Skull Creek West #1
25/2/97

CROCKER RESEARCH

Mud Pressure vs Depth



Skull Creek West #1
25/2/97

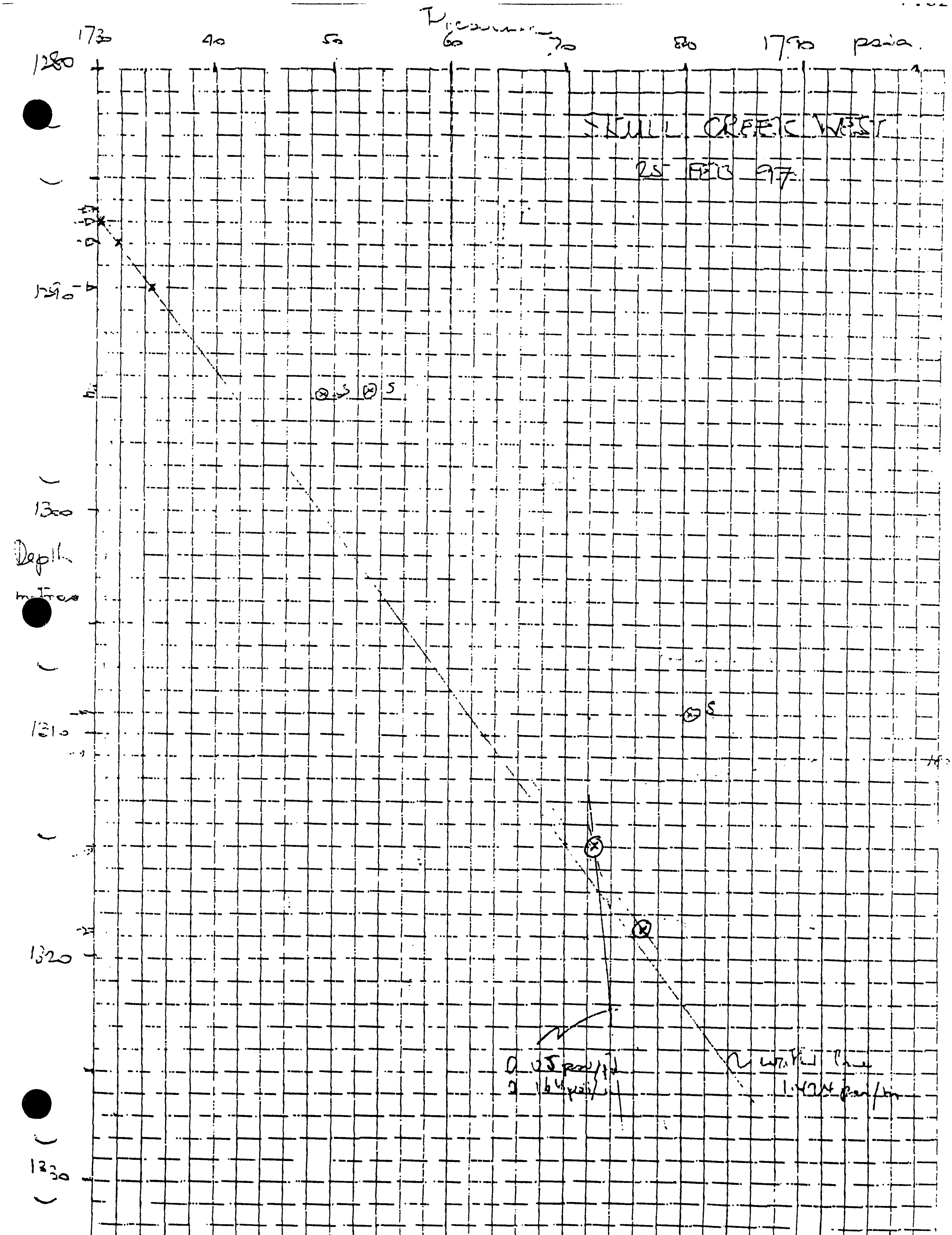
CULTUS PETROLEUM NL(

RFT - PRESSURE TEST REPORT SHEET

WELL NAME: SKULL CREEK WEST	PERMIT: PPL -1	OBSERVER: R. HARRIS	DATE: 25/2/97

TEST NO	FILE NO	DEPTH mKB	SEAT Y	SEAT N	HYDROSTATIC PRESSURE INITIAL psia	HYDROSTATIC PRESSURE FINAL psia	FORMATION PRESSURE (PSIA) QUARTZ GAUGE	FORMATION PRESSURE (PSIA) STRAIN GAUGE	PERMEABLE TIGHT	SAMPLE Y	SAMPLE N	FORMATION/REMARKS
1		1286.5	✓		2087.6	2088.4	1833.5		TIGHT		✓	SUPERCHARGED.
2.		1287.0	✓		2089.1	2089.5	1730.5		GOOD BU. 452mD		✓	DRAWDOWN = WATER. Rf = 0.43.
3.		1288.0	✓		2090.9	2091.1	1731.9		GOOD BU. 227mD		✓	"
4		1290.0	✓		2094.1	2094.3	1734.7		GOOD BU		✓	STABILISED.
5.		1294.7	✓		2101.6	2102.1	1768.7		TIGHT		✓	SUPERCHARGED.
6.		1294.9	✓		2102.2	2102.3	1749.0		V. TIGHT	md.	✓	Press still inc. Supercharged.
7.		1309.0	✓		2124.9	2125.5	1780.8		GOOD BU.	5.4	✓	Stabilised 5.4mD. / 20min filt. Ps
8		1311.0	✓		2128.5	2128.9	1820.0		V. Tight		✓	Press still building.
9.		1315.1	✓		2135.3	2135.7	1772.6	max 1430 psi	TIGHT BU. Stab.	32	✓	Stabilised BU. Drawdown 4.6 L, 3
10		1318.9	✓		2141.7		1776.7	N/A	Good BU.	134		Stab BU. 134mD. Tool fail.
												during drawdown.

c:\bruce\working\formats\97-039.doc



Pressure
1730
40
50
60
70
80
1790 psia.
1280
1290
1300
Depth metres
1310
1320
1330
SKULL CREEK WEST
25 FEB 97

Samples sent to Amdel, Adelaide.

1: small pressurised sample chamber
2: small quantity of oil (large sample chamber)
3: 1 litre recovered water (large sample chamber)
4: 12 ml mud filtrate

Samples retained at rig:

1: gas bomb (pressurised) from initial opening of tool
2: approx 8 litres recovered water
3: small quantity of oil

Samples sent special trip via Nelson Transport and should arrive Amdel Adelaide by approx 0800hr this morning (26-2-97), other modes of transport would have taken over 24 hours from here.

ATTN: Greg Oneill

RFT sample at 1530.2m

Pour Point 13.5 degrees C.

SG = 0.835 at 23 degrees C

APPENDIX 6

FIELD DST REPORTS

CULTUS PETROLEUM

WELL NAME: SKULL CREEK WEST #1 **DST : #1** **DATE: 26/02/1997**

FORMATION: **TESTER** J. SILVESTER
D. REARDON

TOTAL TOOL TO BTM OF TOP PACKER		20.48				
TOOL & DRILL COLLARS IN INTERVAL		4.05				
BOTTOM PACKER & ANCHOR		4.09				
TOTAL TOOL		**28.62**				
TOTAL TOOL TO BTM OF TOP PACKER		**20.48**				
STICK UP		**-6.53**				
DRILL PIPE	.0177	1288.68	-6.53	45 STDS + SGL	60.12	66.27
HEAVY WEIGHT DRILL PIPE	.0508	83.86	1282.15		2.20	6.15
DRILL COLLARS	.0077	121.76	1366.01	4 STDS + SGL	3.08	3.95
PUMP OUT SUB	.0076	0.41	1487.77		.01	.87
DRILL COLLAR	.0077	9.38	1488.18	1 DRILL COLLAR	.24	.80
DROP BAR SUB	.0076	0.3	1497.56		.01	.62
DRILL COLLAR	.0077	9.37	1497.86	1 DRILL COLLAR	.24	.61
CROSS OVER	.0071	0.3	1507.23		.01	.37
RECORDER CARRIER	.0078	1.53	1507.53		.04	.36
HYDRAULIC TOOL	.0078	1.61	1509.06		.04	.32
SAMPLER	.0078	1.2	1510.67		.03	.28
SQUEEZE RELIEF VALVE	.0078	1.17	1511.87		.03	.25
JARS	.0078	2.18	1513.04		.06	.22
RECORDER CARRIER	.0079	1.53	1515.22		.04	.16
RECORDER CARRIER EMP	.0077	1.83	1516.75		.04	.12
RECORDER CARRIER EMP	.0077	1.83	1518.58		.04	.08
SAFETY JOINT	.0078	1.64	1520.41		.04	.04
INFLATE PUMP		0.86	1522.05			
SCREEN		1.33	1522.91			
DEFLATE		1.02	1524.24			
PACKER		1.74	1525.26			
DEPTH		**1527**				
FLOW PORTS		0.8	1527			
RECORDER CARRIER		2.04	1527.8			
SPACING		0.61	1529.84			
STICK UP		0.6	1530.45			
DEPTH		**1531.05**	1531.05			
PACKER		1.71				
DRAGSPRING		2.38				

Australian DST Co. Pty. Ltd.
Box 619, Roma, Queensland 4455

FIELD REPORT

TEST TOOL - INFLATE

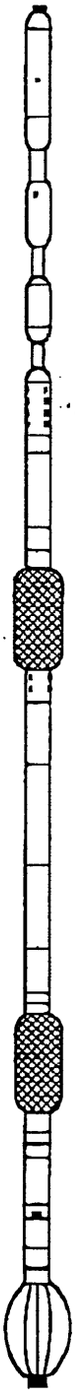
COMPANY NAME : CULTUS PETROLEUM NL
WELL NAME : SKULL CREEK WEST #1
LOCATION : ONSHORE OTWAY BASIN PPL1
TESTED INTERVAL : 1527 - 1531

TICKET # •
D.S.T.# ONE
FORMATION EUMERALLA
DATE 26-2-97

TOTAL TOOL TO BOTTOM OF TOP PACKER *	20.48
TOOL & DRILL COLLAR IN INTERVAL	4.05
BOTTOM PACKER AND ANCHOR	4.09
TOTAL TOOL	28.62
TOTAL TOOL TO BOTTOM OF TOP PACKER *	20.48
D.C. ABOVE TOOLS (5) STANDS ( ) SINGLES	140.51
D.P. ABOVE TOOLS (45) STANDS (1) SINGLES	1288.68
HW ABOVE TOOLS (3) STANDS ( ) SINGLES	83.86
OTHER ABOVE TOOL ( )	
TOTAL DRILL COLLARS, DRILL PIPE & TOOLS	1533.53
TOTAL DEPTH TO BOTTOM OF TOP PACKER	1527..
TOTAL STICK-UP ABOVE K.B.	6.53m

PIPE TALLY

DRILL COLLAR JOINT	LENGTH	DRILL PIPE JOINT	LENGTH				
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10 HWDP		10		10	
Total 1	140.51	Total 2	83.86	Total 3		Total 4	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
Total 5		Total 6		Total 7		Total 8	
1		1		1		DC 1	
2		2		2		DP 2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
						11	
Total 9		Total 10		Total 11		TOTAL	



BO SUB	.41
PO SUB	.30
CO SUB	.30
Fluid Rec.	1.53
HYDRAULIC TOOL	1.61
SAMPLER	1.20
SQUEEZEE VALVE	1.17
JARS	2.18
~~EMP #~~ REC.	1.53
REC #EMP.	1.83
EMP #	1.83
SAFETY JOINT	1.64
INFLATE PUMP	.86
SCREEN	1.33
DEFLATE	1.02
BYPASS PORT	
INFLATE PACKER	1.74
DEPTH 1527 m	
FLOW PORTS	.80
REC.#	2.04
SPACING	.61
XOS	
DRILL COLLARS	
XOS	
T. COLLAR	.60
DEPTH 1531.05 m	
INFLATE PACKER	1.71
REC #	
DRAGSPRING	2.38

COMPANY Cultus Petroleum NL STATE VIC DATE 27-2-97

Well Name Skull Creek West #1 KB Elv. 100.3 m ft. Ticket No. 2598 DST No. ONE

Well Location Onshore Otway Basin PPL 1 GR Elv. 96 m ft. Formation Eumeralla Sst

Interval 1527 - 1531 m T.D. 2000m ft. Net Pay _____ ft. Type of Test Inflate Straddle

API Gravity _____ W.S. _____ Average Porosity _____

RECORDER DATA

Mins.		#13830	# 522	# 526	# 3077
PF Rec.#	13831				
SI Range	3825 lbs.	3850	5000	5000	4250
SF Clock	24 hrs.	24	BATT	BATT	24
FS Depth	1507.8 mKB	1515.5	1518.6	1520.4	1528.8
		PSI	PSI	PSI	PSI
A. Init. Hyd.		2459	2451		2483
B. First Flow			35		
B1 Final Flow		66	35		77
C. In. Shut-In	9	1661	1621		1667
D. Init. Flow		85	95		88
E. Final Flow		132	114		132
F. Fl. Shut-in	94	1824	1833		1848
G. Final Hyd.		2449	2448		2473
Inside/Outside	ABOVE	(IN)	(IN)	(IN)	(OUT)

TIME DATA

PF Fr. 1218 to 1223 hr.

IS Fr. 1223 to 1302 hr.

SF Fr. 1302 to 1604 hr.

FS Fr. 1604 to 1904 hr.

T STARTED 0000 hr.

T. ON BOTM. 0650 hr.

T. OPEN 1218 hr.

T. PULLED 1904 hr.

T. OUT _____ hr.

TOOL DATA

Tool Wt. _____ lbs.

Wt. Set on Packer 35.000 lbs.

Wt. Pulled Loose 15.000 lbs.

Initial Str. Wt. 95.000 lbs.

Unseated Str. Wt. 95.000 lbs.

Bot. Choke 3/4" in.

Hole Size 8 1/2 in.

D. Col. I.D. 2 13/16 in.

D. Pipe I.D. 3.826 in.

D.C. Leng. 140.51 m ft.

D.P. Leng. 1288.68 m ft.

HWDP 83.86 m

RECOVERY

Total Fluid _____ ft. of _____ ft. in D.C. and _____ ft. in D.P.

_____ ft. of _____

_____ ft. of _____

_____ ft. of _____

_____ ft. of _____

GAS RECOVERY MEASURED WITH

	Time Mins.	Orifice inches	Pressure PSI	H_2O inches	Rate mcf/d
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					

MUD DATA

Mud type KCL PHPA

Weight 9.2

Vis. 50

W.L. 6.5

F.C. 1

Mud Drop _____

GENERAL DA

Amt. of fill

Btm

SURFACE CHOKE SIZE: _____

	Mins.	Inches	PSI	Inches	mcf/d
1.					
2.					
3.					
4.					
5.					
6.					
8.					
9.					
10.					

SURFACE CHOKE SIZE: _____

Mud type: ALL FRESH
Weight: 9.2
Vis.: 50
W.L.: 6.5
F.C.: 1 in.
Mud Drop: _____

GENERAL DATA

Amt. of fill: _____ ft.
Btm. H. Temp.: 140.1 °F
Hole Cond.: GOOD
Packer Size: 6 6 x 6 3/4 in.
No. of Packers: 2
Cushion Amt.: — ft.
Cushion Type: —
Reversed Out: YES
Tool Chased: NO.
Tester: T. SILVESTER - D. KEARDON
Co. Rep.: A. BRADLEY
Contractor: DD #5
Rig No.: 30.

BLOW DESCRIPTION 1st FLOW: OPENED WITH NIL AIR BLOW AND VERY WEAK AIR BLOW AFTER 5MINS

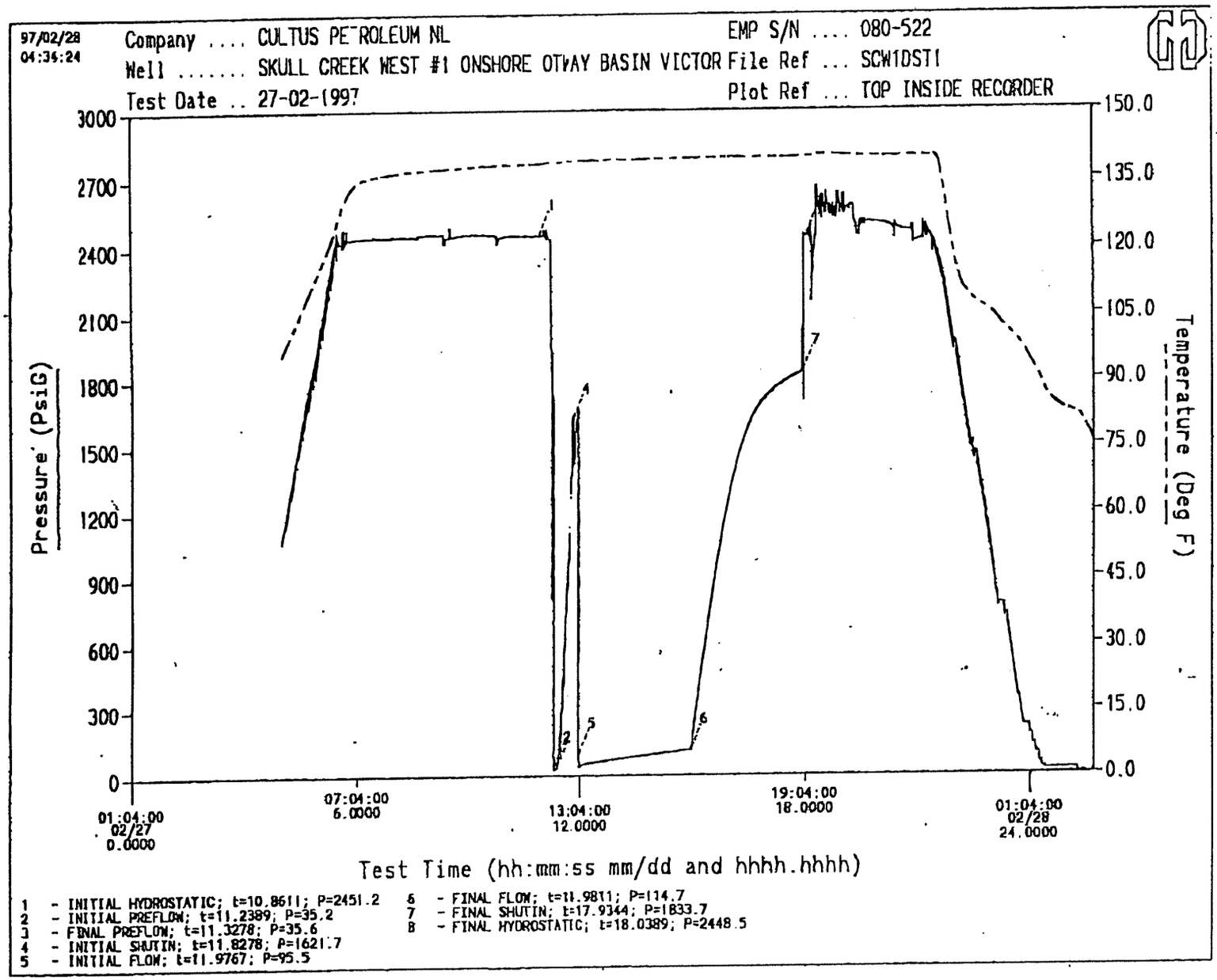
BLOW DESCRIPTION 2nd FLOW: NIL AIR BLOW INCREASING TO MODERATE AFTER 2MINS AND BOTTOM OF BUCKET AFTER 3½MINS.

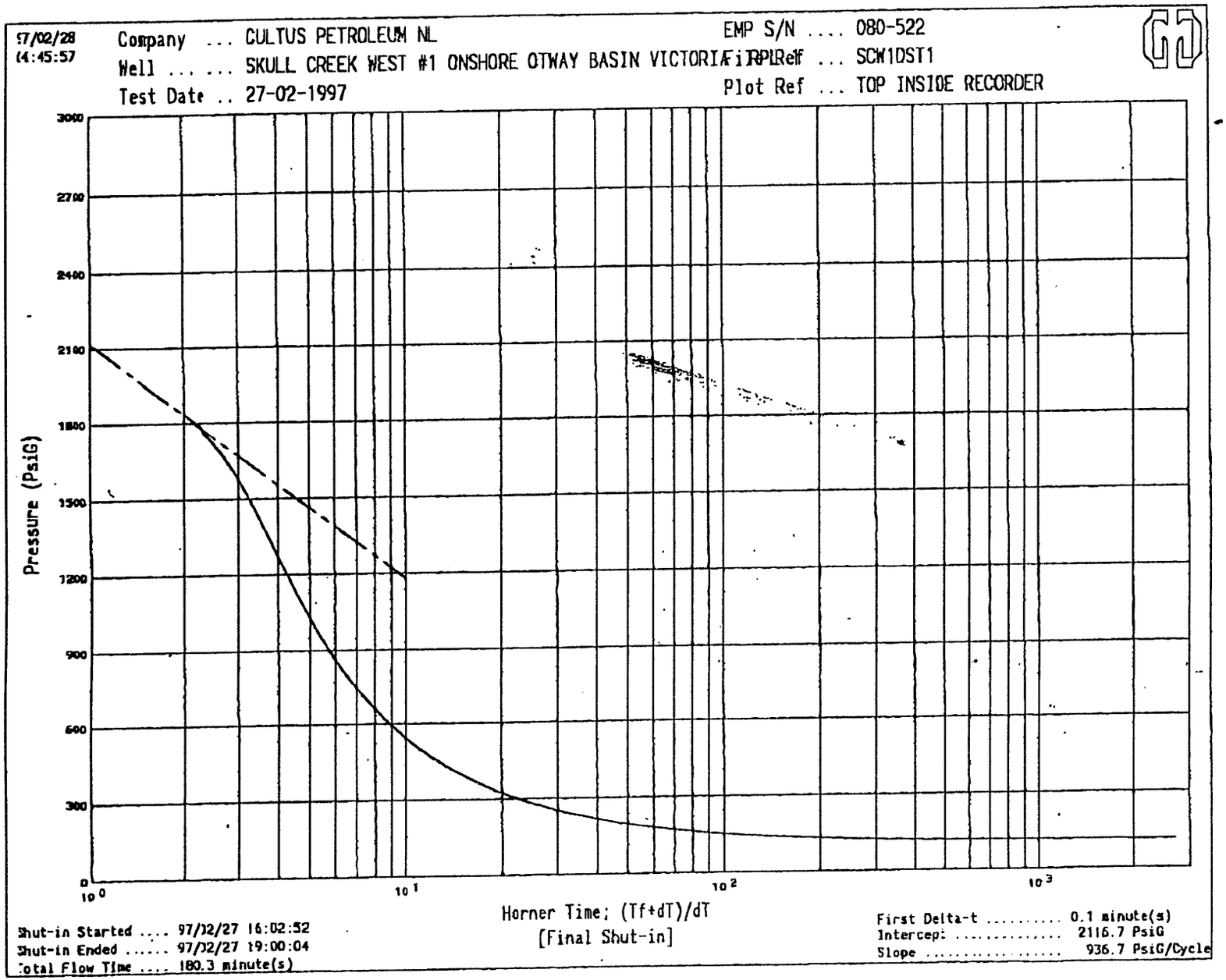
REMARKS: INCREASED TO 3¾ PSI THRU BUBBLE HOSE (16" CHOKE) BY END OF FLOW

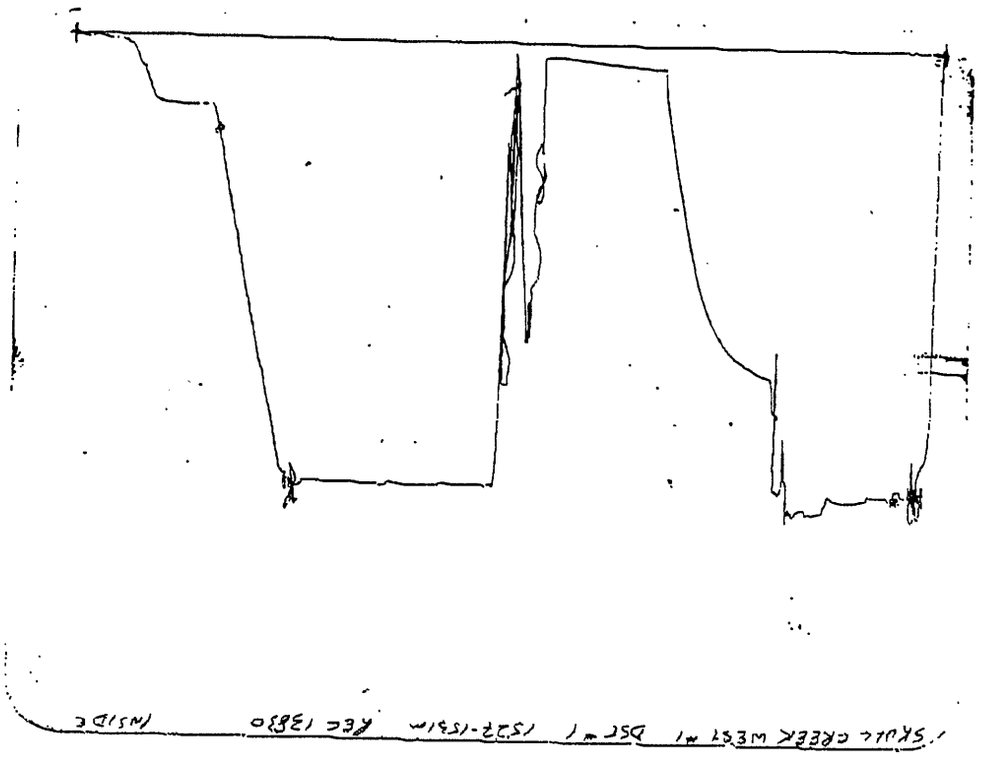
	LENGTH
TOTAL TOOL TO BOTTOM TOP PACKERS	20.48.
INTERVAL TOOL	4.05
BOTTOM PACKER & ANCHOR	4.09.
TOTAL TOOL	28.62
DRILL COLLAR ANCHOR IN INTERVAL	
DRILL COLLARS ABOVE TOOLS Stands _____ Total	140.51
DRILL PIPE ABOVE TOOLS Stands _____ Total	1288.68
H. W. PIPE ABOVE TOOLS Stands _____ Total	83.86
OTHER ABOVE TOOL Total	
TOTAL DRILL COLLARS DRILL PIPE AND TOOLS	1533.53.
TOTAL DEPTH	1527.
TOTAL DRILL PIPE ABOVE K.B.	6.53m

REMARKS: _____

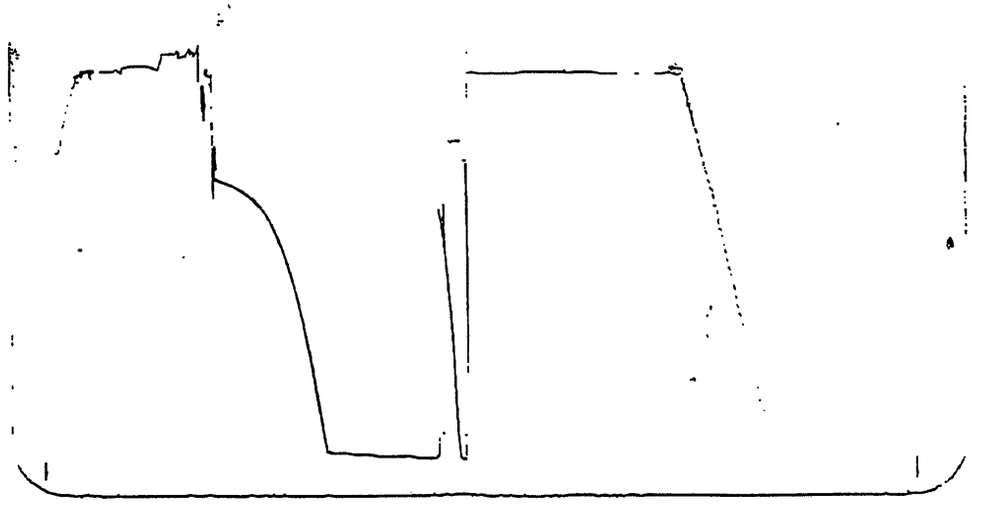
	LENGTH
BO SUB	
P.O. SUB	
C.O. SUB	
SHUT-IN TOOL	
HMV	
JARS	
SAFETY JOINT	
PACKER	
PACKER	
DEPTH	
STUBB	
ANCHOR	

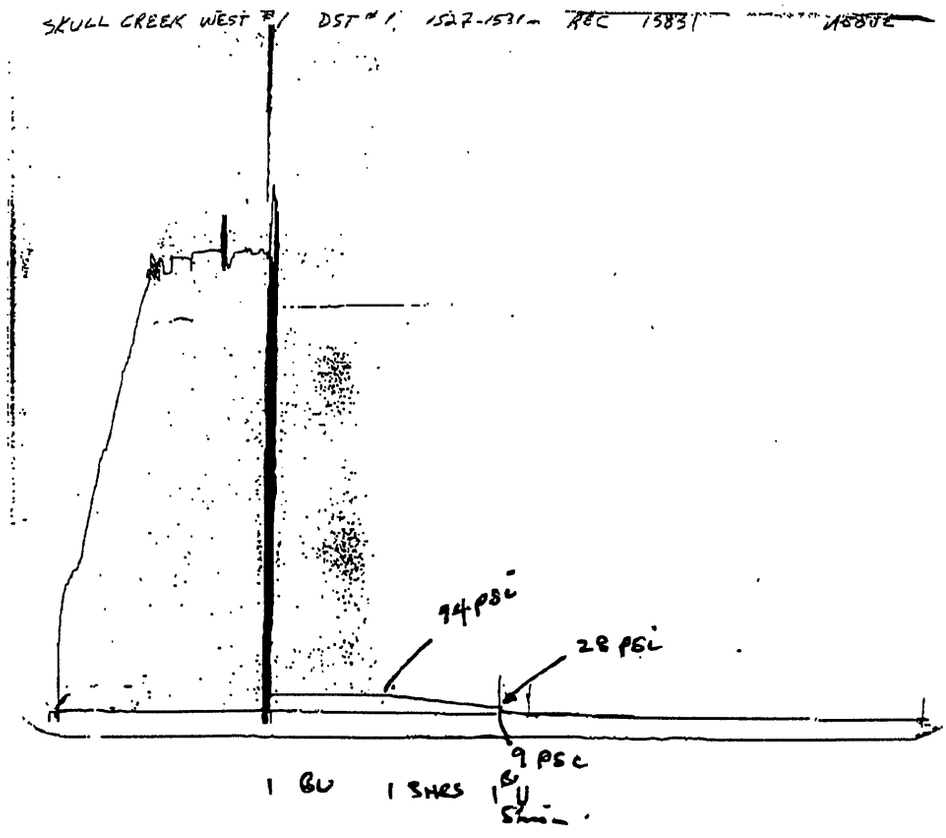






SKULL CREEK WEST #1 DST #1 1522-1531 REC 3077 OUTSIDE




SKULL CREEK WEST #1 DST #1 1527-1531m REC 1383l
94 psi
28 psi
9 psi
1 BU 1 SHRS 1 BU SI

HALLIBURTON SDL, 53-55 BANNISTER ROAD CANNINGVALE PHONE 09 4565200

SAMPLE MANIFEST FOR CULTUS SKULLCREEK WEST 1

DST # 1

CONDENSATE SAMPLE

27/08/97

DEPTH INTERVAL : 1527 - 1531 mKB
SAMPLE COLLECTED FROM: Bubble Hose

POUR PIONT : 8.7 °C

SPECIFIC GRAVITY: 0.789 @ 20 °C
API GRAVITY 47

NOTE: these valves are taken on raw sample ie., unfilterd. Appearance of sample being flocky, which gives a slightly lumpy texture.

SAMPES COLLECTED
3 X square gallon tin cans
SCH-1 DST # 1 27/2/97 SAMPLE
SCH-1 DST # 1 27/2/97 SAMPLE 4 OIL
SCH-1 DST # 1 27/2/97 SAMPLE 8 OIL

5 x square gallon plastic containers
SCH-1 DST # 1 27/2/97 SAMPLE 11 WATER/MUD
SCH-1 DST # 1 27/2/97 SAMPLES
SCH-1 DST # 1 27/2/97 SAMPLE 9
SCH-1 DST # 1 27/2/97 SAMPLE 9
SCH-1 DST # 1 27/2/97 SAMPLE 10

CULTUS PETROLEUM

WELL NAME: SKULL CREEK WEST #1 **DST: #2** **DATE 28/02/1997**

FORMATION **TESTER** J. SILVESTER
D. REARDON

TOTAL TOOL TO BTM OF TOP PACKER	20.48		
TOOL & DRILL COLLARS IN INTERVAL	4.05		
BOTTOM PACKER & ANCHOR	4.09		
TOTAL TOOL	**28.62**		
TOTAL TOOL TO BTM OF TOP PACKER	**20.48**		
STICK UP	**-3.89**		
DRILL PIPE	1070.04	-3.89	37 STDS + DBL
HEAVY WEIGHT DRILL PIPE	83.86	1066.15	
DRILL COLLARS	121.76	1150.01	4 STDS + SGL
PUMP OUT SUB	0.41	1271.77	
DRILL COLLAR	9.38	1272.18	1 DRILL COLLAR
DROP BAR SUB	0.3	1281.56	
DRILL COLLAR	9.37	1281.86	1 DRILL COLLAR
CROSS OVER	0.3	1291.23	
RECORDER CARRIER	1.53	1291.53	
HYDRAULIC TOOL	1.61	1293.06	
SAMPLER	1.2	1294.67	
SQUEEZE RELIEF VALVE	1.17	1295.87	
JARS	2.18	1297.04	
RECORDER CARRIER	1.53	1299.22	
RECORDER CARRIER EMP	1.83	1300.75	
RECORDER CARRIER EMP	1.83	1302.58	
SAFETY JOINT	1.64	1304.41	
INFLATE PUMP	0.86	1306.05	
SCREEN	1.33	1306.91	
DEFLATE	1.02	1308.24	
PACKER	1.74	1309.26	
DEPTH	**1311**		
FLOW PORTS	0.8	1311	
RECORDER CARRIER	2.04	1311.8	
SPACING	0.61	1313.84	
STICK UP	0.6	1314.45	
DEPTH	**1315.05**	1315.05	
PACKER	1.71		
DRAGSPRING	2.38		

ustralian DST Co. Pty. Ltd.
. 619, Roma, Queensland 4455

FIELD REPORT

TEST TOOL - INFLATE

COMPANY NAME : Cultus Petroleum NL
WELL NAME : Skull Creek West #1
LOCATION : Onshore Otway Basin Victoria PPL1
TESTED INTERVAL : 1311-1315.

TICKET # 2599
D.S.T.# Two
FORMATION
DATE 28-2-97

TOTAL TOOL TO BOTTOM OF TOP PACKER *	20.48
TOOL & DRILL COLLAR IN INTERVAL	4.05
BOTTOM PACKER AND ANCHOR	4.09
TOTAL TOOL	28.62
TOTAL TOOL TO BOTTOM OF TOP PACKER *	20.48
D.C. ABOVE TOOLS (5) STANDS ( ) SINGLES	140.51
D.P. ABOVE TOOLS (37) STANDS (2) SINGLES	1070.04
HW ABOVE TOOLS (3) STANDS ( ) SINGLES	83.86
OTHER ABOVE TOOL ( )	
TOTAL DRILL COLLARS, DRILL PIPE & TOOLS	1314.89
TOTAL DEPTH TO BOTTOM OF TOP PACKER	1311
TOTAL STICK-UP ABOVE K.B.	3.89

BO SUB	.41
PO SUB	.30
CO SUB	.30
Fluid Rec.	1.53
HYDRAULIC TOOL	1.61
SAMPLER	1.20
SQUEEZEE VALVE	1.17
JARS	2.18
~~EMP~~ #REC	1.53
~~REC~~ #EMP	1.83
EMP #	1.83
SAFETY JOINT	1.64
INFLATE PUMP	.86
SCREEN	1.33
DEFLATE	1.02
BYPASS PORT	
INFLATE PACKER	1.74
DEPTH 1311 m	
FLOW PORTS	.80
REC.#	2.04
SPACING	.67
XOS	
DRILL COLLARS	
XOS	
T. COLLAR	.60
DEPTH 1315.05 m	
INFLATE PACKER	1.71
REC #	
DRAGSPRING	2.38

PIPE TALLY

DRILL COLLAR JOINT	LENGTH	DRILL PIPE JOINT	LENGTH				
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
Total 1		Total 2		Total 3		Total 4	
1		1		1		1	
2		2		2		2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
Total 5		Total 6		Total 7		Total 8	
1		1		1		DC 1	
2		2		2		DP 2	
3		3		3		3	
4		4		4		4	
5		5		5		5	
6		6		6		6	
7		7		7		7	
8		8		8		8	
9		9		9		9	
10		10		10		10	
						11	
Total 9		Total 10		Total 11		TOTAL	

COMPANY Cultus Petroleum NL STATE VIC DATE 28-2-97

Well Name Skull Creek West #1 KB Elv. 100.3 m ~~ft~~. Ticket No. 2599 DST No. TWO

Well Location Onshore Otway Basin Victoria PPL1 GR Elv. 96 m ~~ft~~. Formation ____

Interval 1311 - 1315 m T.D. 2000 m ~~ft~~. Net Pay ____ ft. Type of Test INFLATE STRADDLE

API Gravity ____ W.S. ____ Average Porosity ____

RECORDER DATA

Mins. ____

		#13830	# 522	# 526	# 3077
PF Rec.#	13831				
SI Range	3825 lbs.	3850	5000	5000	4250
SF Clock	24 hrs.	24	Batt	Batt	24
FS Depth	~~ft~~ m				
		PSI	PSI	PSI	PSI
A. Init. Hyd.		2121	2124.7	2122.1	
B. First Flow			38.3	301.1	
B1 Final Flow		151	136.5	139.1	
C. In. Shut-In	103	1680	1658.2	1687.8	
D. Init. Flow		255	248.9	242.9	
E. Final Flow		604	591.9	594.6	
F. Fl. Shut-in	564	1671	1667.6	1666.1	
G. Final Hyd.		2092	2109.1	2110.6	
Inside/Outside	ABOVE	(IN)	(IN)	(IN)	(OUT)

TIME DATA

PF Fr. 1552 to 1556 hr.

IS Fr. 1556 to 1638 hr.

SF Fr. 1638 to 1840 hr.

FS Fr. 1840 to 2043 hr.

T. STARTED ____ hr.

T. ON BOTM. 0650 hr.

T. OPEN 1552 hr.

T. PULLED 2043 hr.

T. OUT ____ hr.

TOOL DATA

Tool Wt. ____ lbs.

Wt. Set on Packer 35,000 lbs.

Wt. Pulled Loose ____ lbs.

Initial Str. Wt. 88,000 lbs.

Unseated Str. Wt. 88,000 lbs.

Bot. Choke 3/4 in.

Hole Size 8 1/2 in.

D. Col. I.D. 2 13/16 in.

D. Pipe I.D. 3.826 in.

D.C. Leng. 140.51 m ~~ft~~.

D.P. Leng. 1070.04 m ~~ft~~.

HWDP 83.86

RECOVERY

Total Fluid ____ ft. of ____ ft. in D.C. and ____ ft. in D.P.

____ ft. of ____

____ ft. of ____

____ ft. of ____

____ ft. of ____

GAS RECOVERY MEASURED WITH

	Time Mins.	Orifice inches	Pressure PSI	H_2O inches	Rate mcf/d
1.	15	1/8	2		
2.	30	"	5		
3.	45	"	6		
4.	60	"	6		
5.	75	"	6		
6.	77	1/4	6		
7.	90	1/4	0		
8.	105	1/8	0		
9.	120	1/8	0		
10.					

SURFACE CHOKE SIZE: 1/8 - 1/4

MUD DATA

Mud type KCL-PHPA

Weight ____

Vis. ____

W.L. ____

F.C. ____ in.

Mud Drop ____

GENERAL DATA

Amt. of fill ____ ft.

Btm. H. Temp. 131.12 °F

Hole Cond. ____

Packer Size 6 6x6 3/4 in.

No. of Packers 2

Cushion Amt. — ft.

Cushion Type —

Reversed Out YES

Tool Chased NO

Tester J. SILVESTER + D. REARDON
Co. Rep. A. BRADLEY
Contractor O.D.E
Rig No. 30.

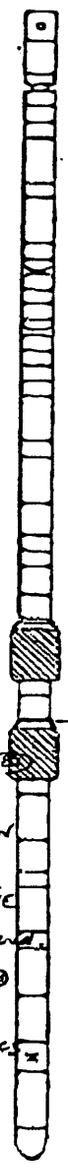
BLOW DESCRIPTION 1st FLOW: W.A.B INCREASING TO STRONG IN 30 SECS BUILDING TO 7 PSI AT END OF FLOW THRU ½" CHOKE N.G.T.S.

BLOW DESCRIPTION 2nd FLOW: W.A.B INCREASING TO MOD IN BOTTOM OF BUCKET IN 2 MINS G.T.S 77 MINS

REMARKS: AFTER R.I.H. CORRELATE WITH B.P.B. COULD NOT RUN IN WITH B.P.B. OBSTRUCTION AT APPROX 785m. POOH AND CLEAR OBSTRUCTION. THEN RIH TO CORRELATE AND TEST.

	LENGTH
TOTAL TOOL TO BOTTOM TOP PACKERS	20.48
INTERVAL TOOL	4.05
BOTTOM PACKER + ANCHOR	4.09
TOTAL TOOL	28.62
DRILL COLLAR ANCHOR IN INTERVAL	
DRILL COLLARS ABOVE TOOLS Stands ____ Total	140.51
DRILL PIPE ABOVE TOOLS Stands ____ Total	1070.04
W. PIPE ABOVE TOOLS Stands ____ Total	83.86
OTHER ABOVE TOOL Total	
TOTAL DRILL COLLARS DRILL PIPE AND TOOLS	1314.89
TOTAL DEPTH	1311.
TOTAL DRILL PIPE ABOVE K.B.	3.89 m

REMARKS: AFTER DEFLATING PACKERS TRIED TO GO DOWN TO RIG DOWN TEST HEAD & CHICSANS. STARTED TO TAKE TO MUCH WEIGHT SO STARTED TO COME UP TO PUT SINGLE IN MOUSE HOLE TO RIG DOWN. CAME UP 3-3½m AND STARTED PULLING 40-50,000 OVER. TRIED TO GO DOWN AGAIN AND COULDNT. TRIED TO COME UP AND COULDNT. TRIED JARING ON SEVERAL OCCASIONS FROM 150,000 TO 200,000 AND DIDNT MOVE SAT THE WHOLE WEIGHT OF THE DRILL STRING ON THE TOOL AND COULDNT GO DOWN. PULLED TWICE TO 250,000 AND COULDNT MOVE. IT WAS DECIDED BY THE COMPANY REP TO BACK OFF AT THE SAFETY JOINT AND RETRIEVE THE RECORDERS AND TO FISH FOR THE REST OF THE TOOLS

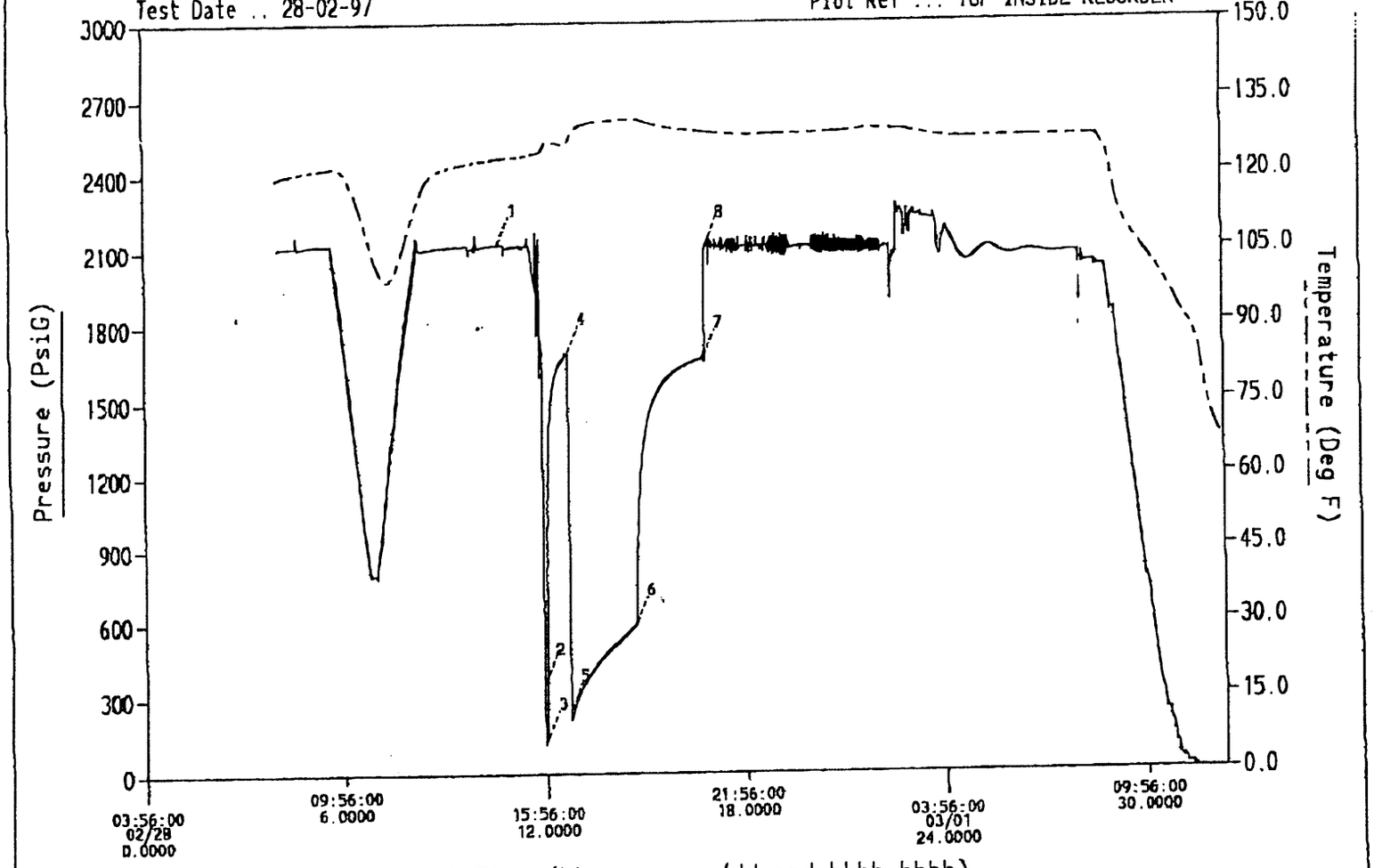


	LENGTH
BO SUB	
P.O. SUB	
C.O. SUB	
SHUT-IN TOOL	
HMV	
JARS	
SAFETY JOINT	
PACKER	
PACKER	
DEPTH	
STUBB	
ANCHOR	
BULLNOSE	
T.D.	

97/03/01
21:24:08

Company .... CULTUS PETROLEUM NL
Well ..... SKULL CREEK WEST #1 ONSHORE OTWAY BASIN VICTOR
Test Date .. 28-02-97

EMP S/N 080-522
File Ref ... SW1DST2
Plot Ref ... TOP INSIDE RECORDER

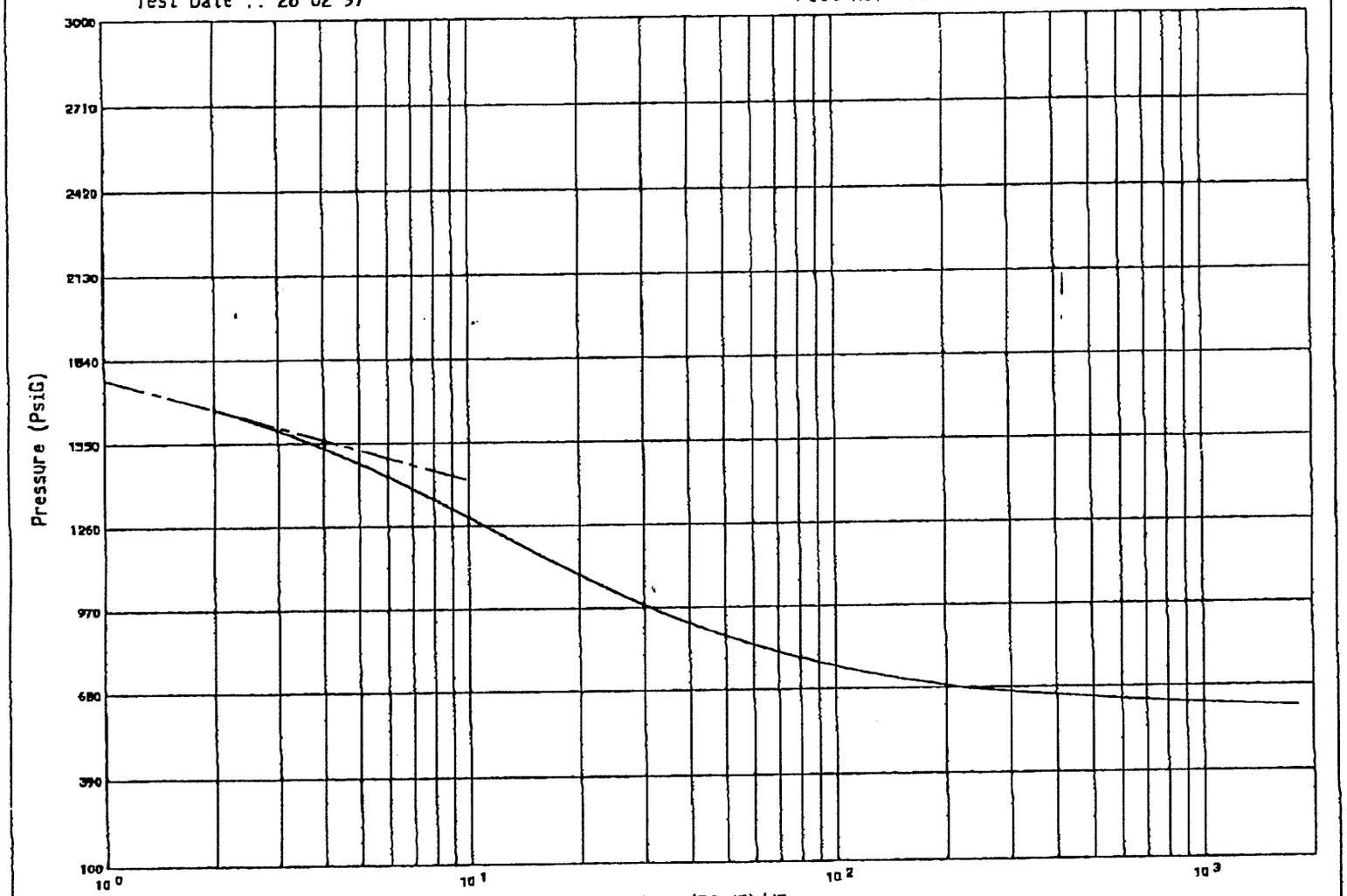


1 - INITIAL HYDROSTATIC; t=10.6344; P=2124.7
2 - INITIAL PREFLOW; t=11.9333; P=355.3
3 - FINAL PREFLOW; t=12.0089; P=136.5
4 - INITIAL SHUTIN; t=12.6933; P=1688.2
5 - INITIAL FLOW; t=12.7011; P=248.9
6 - FINAL FLOW; t=14.7167; P=591.9
7 - FINAL SHUTIN; t=16.7967; P=1667.6
8 - FINAL HYDROSTATIC; t=16.8633; P=2109.1

97/03/01
21:34:08

Company .... CULTUS PETROLEUM NL
Well ..... SKULL CREEK WEST #1 ONSHORE OTWAY BASIN VICTORIA
Test Date .. 28-02-97

EMP S/N 080-522
RPLRef ... SW1DST2
Plot Ref ... TOP INSIDE RECORDER



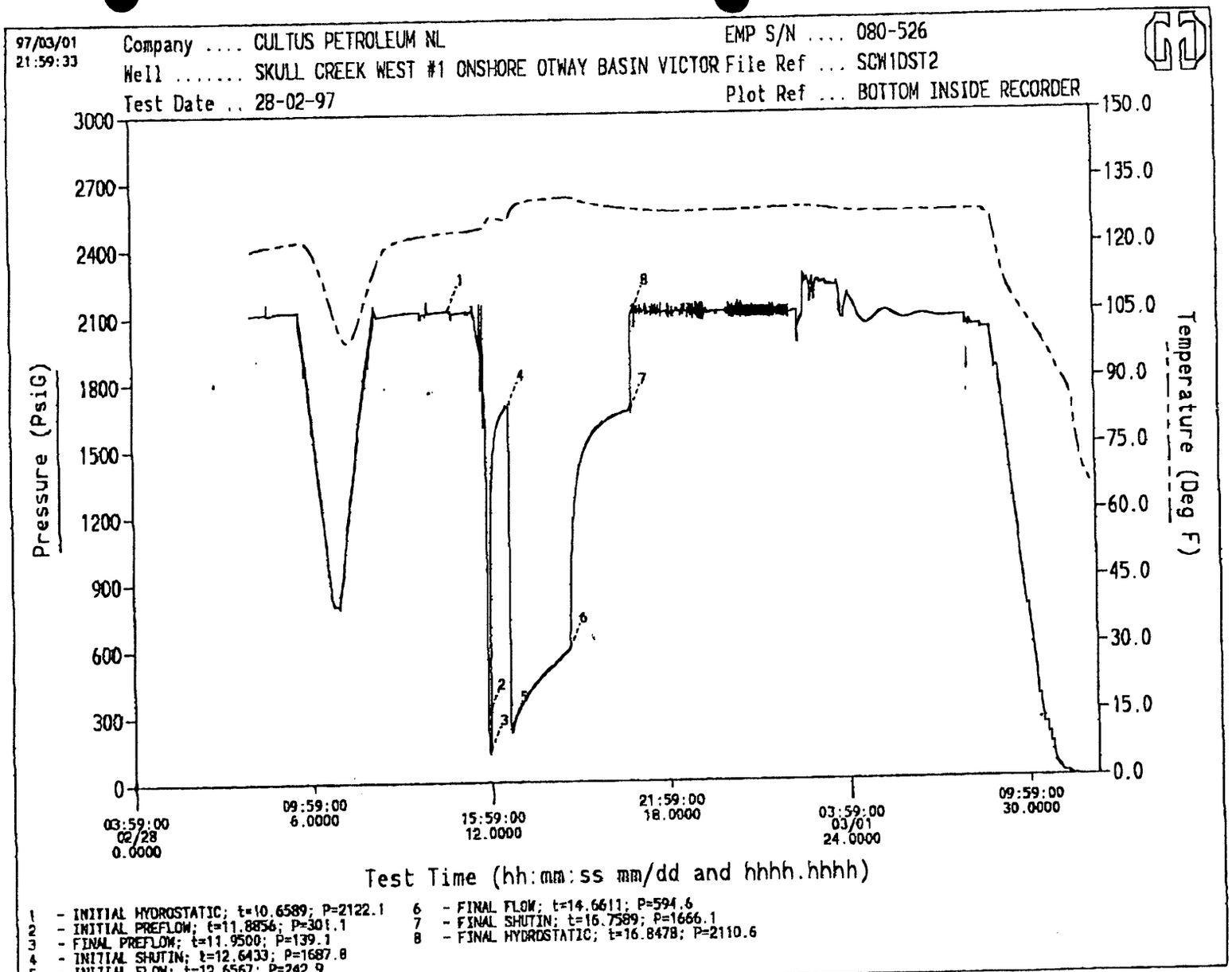
Shut-in Started 97/02/28 18:39:00
Shut-in Ended 97/02/28 20:43:48
Total Flow Time .... 120.9 minute(s)

First Delta-t ..... 0.1 minute(s)
Intercept ..... 1770.4 PsiG
Slope ..... 349.3 PsiG/Cycle

97/03/01
21:59:33

Company .... CULTUS PETROLEUM NL
Well ..... SKULL CREEK WEST #1 ONSHORE OTWAY BASIN VICTOR
Test Date .. 28-02-97

EMP S/N 080-526
File Ref ... SCW1DST2
Plot Ref ... BOTTOM INSIDE RECORDER

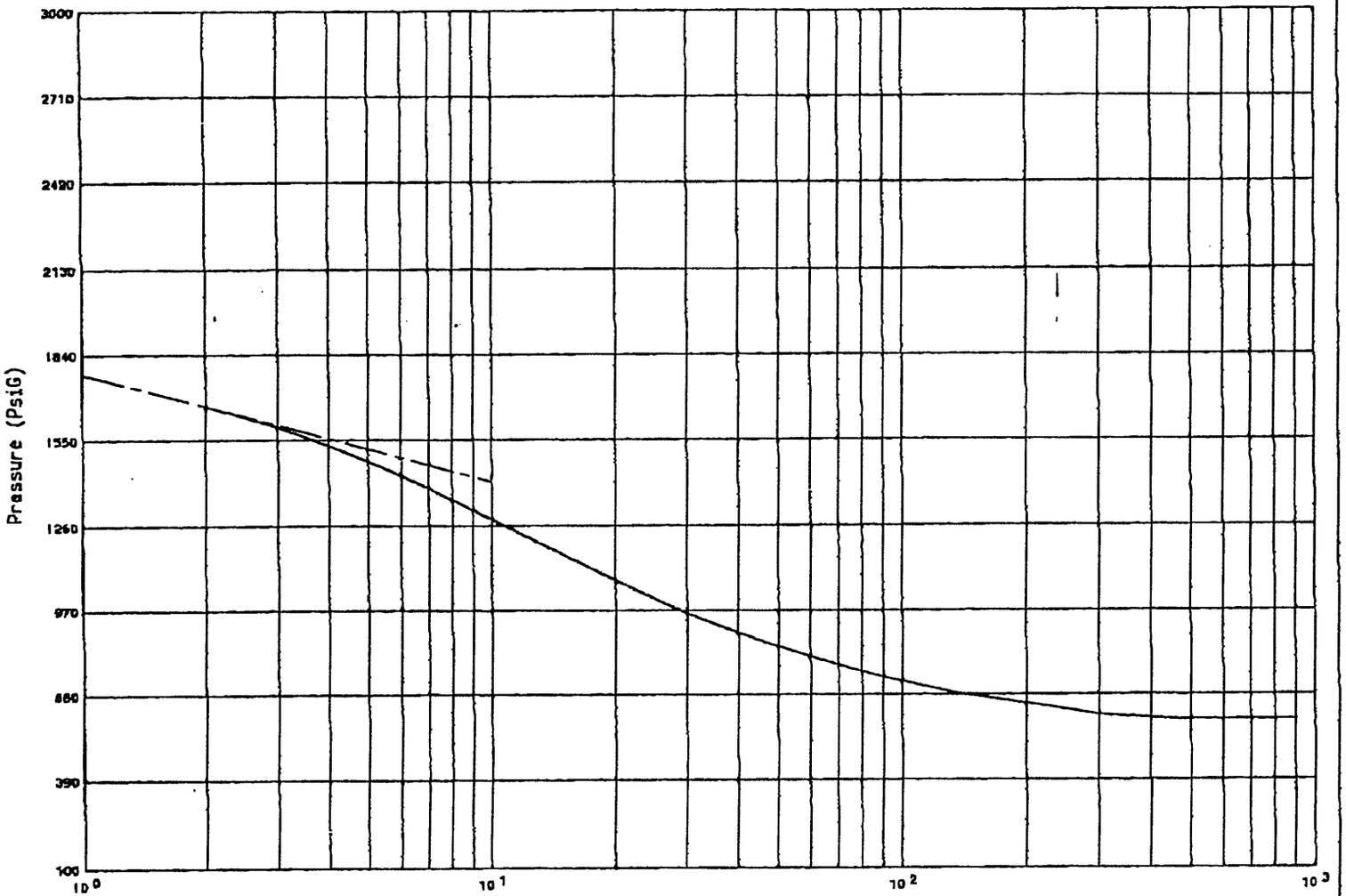


1 - INITIAL HYDROSTATIC; t=10.6589; P=2122.1
2 - INITIAL PREFLOW; t=11.8856; P=301.1
3 - FINAL PREFLOW; t=11.9500; P=139.1
4 - INITIAL SHUTIN; t=12.6433; P=1687.8
5 - INITIAL FLOW; t=12.6567; P=242.9
6 - FINAL FLOW; t=14.6611; P=594.6
7 - FINAL SHUTIN; t=16.7589; P=1666.1
8 - FINAL HYDROSTATIC; t=16.8478; P=2110.6

97/03/01
22:05:47

Company .... CULTUS PETROLEUM NL
Well ..... SKULL CREEK WEST #1 ONSHORE OTWAY BASIN VICTORIA
Test Date .. 28-02-97

EMP S/N 080-526
File Ref ... SCW1DST2
Plot Ref ... BOTTOM INSIDE RECORDER



Shut-in Started 97/02/28 18:38:40
Shut-in Ended 97/02/28 20:44:32
Total Flow Time .... 120.3 minute(s)

First Delta-t ..... 0.1 minute(s)
Intercept ..... 1773.4 PsiG
Slope ..... 364.0 PsiG/Cycle

APPENDIX 7

HYDROCARBON ANALYSIS REPORTS

amdel

PETROLEUM SERVICES GAS ANALYSIS

Method GL-01-01 ASTM D 1945-91 (modified)

Client: CULTUS PETROLEUM Report # LQ5621

Sample: SKULL CREEK WEST-1
RFT Sample
1530.2m
Flashed Stock Tank Gas

GAS	MOL %
Nitrogen	1.82
Carbon Dioxide	0.59
Methane	69.53
Ethane	10.20
Propane	10.60
I-Butane	2.70
N-Butane	2.64
I-Pentane	0.93
N-Pentane	0.48
Hexanes	0.38
Heptanes	0.12
Octanes and higher h'cs	0.01
Total	100.00

(0.00 = less than 0.01%)

The above results are calculated on an air and water free basis assuming only the measured constituents are present
The following parameters are calculated from the above composition at 15°C and 101.325 kPa (abs)

Average Molecular Weight	24.24
Lower Flammability limit	3.72
Upper Flammability limit	13.50
Ratio of upper to lower	3.63
Wobbe Index	57.33
Compressibility Factor	0.9951
Ideal Gas Density (Rel to air = 1)	0.837
Real gas Density (Rel to air = 1)	0.841
Ideal Nett Calorific Value MJ/m^3	47.73
Ideal Gross Calorific Value MJ/m^3	52.45
Real Nett Calorific Value MJ/m^3	47.97
Real Gross Calorific Value MJ/m^3	52.71
Gross calorific value of water-saturated gas MJ/m^3	51.54

This report relates specifically to the sample submitted for analysis.

Approved Signatory

Registration No: 2013
Date : 27-02-97

AMDEL PETROLEUM SERVICES
Method GL-02-03

Client: CULTUS PETROLEUM Report # LQ5621

Sample: SKULL CREEK WEST-1
RFT Sample
1530.2m

COMPOSITIONAL ANALYSIS OF RECOMBINED SEPARATOR FLUID

Component	Flashed Stock Tank Liquid Mol %	Flashed Stock Tank Gas Mol %	Recomb. Sep. Liquid Mol %
Nitrogen	-------	1.82	1.33
Carbon Dioxide	-------	0.59	0.43
Methane	-------	69.55	50.73
Ethane	0.51	10.20	7.57
Propane	1.77	10.60	8.21
I-Butane	1.43	2.70	2.35
N-Butane	1.84	2.64	2.42
I-Pentane	0.95	0.93	0.94
N-Pentane	0.59	0.48	0.51
Hexanes	2.07	0.38	0.84
Heptanes	5.57	0.12	1.59
Octanes plus	85.27	0.01	23.08
TOTAL	100.00	100.00	100.00

RATIOS

Molar ratio	0.2707	0.7293	1.0000
Mass Ratio	0.7239	0.2761	1.0000
Gas Liquid Ratio	1.00 bbl @ SC	1674.3 SCF	-------

STREAM PROPERTIES

Molecular Weight	171.3	24.2	64.0
Density obs(g/cc)	0.8002 @ 15°C	-------	-------
API-Gas Density	45.24 API @60°F	0.837 (air=1)	-------
GHV (BTU/scf)	-------	1408	-------

OCTANE PLUS PROPERTIES

Mol %	85.27	0.01	23.08
Molecular Weight	187.7	114.2	187.7
Density (g/cc)	0.8154 @ 15°C	-------	-------
API @ 60°F	41.98	-------	-------

LABORATORY FLASH SEPARATION DETAILS

Separation Temperature	22	°C
Flash Gas Volume	4.55	litres
Stabilised Liquid Volume	15	ml
Liquid Density	0.7953	g/ml

amdel

AMDEL PETROLEUM SERVICES Flash Liquid Analysis

Method GL-02-03

Client: CULTUS PETROLEUM Report # LQ5621

Sample: SKULL CREEK WEST-1
RFT Sample
1530.2m

Boiling Point Range (Deg.C)	Component	Weight%	Mol%
-88.6	Ethane	0.09	0.51
-42.1	Propane	0.46	1.77
-11.7	I-Butane	0.49	1.43
-0.5	N-Butane	0.62	1.84
27.9	I-Pentane	0.40	0.95
36.1	N-Pentane	0.25	0.59
36.1-68.9	C-6	1.04	2.07
80.0	Benzene	0.05	0.11
68.9-98.3	C-7	3.19	5.46
100.9	Methylcyclohexane	0.62	1.07
110.6	Toluene	0.04	0.08
98.3-125.6	C-8	6.35	9.53
136.1-144.4	Ethylbenz+Xylenes	0.83	1.34
125.6-150.6	C-9	7.75	10.36
150.6-173.9	C-10	9.92	11.95
173.9-196.1	C-11	7.72	8.47
196.1-215.0	C-12	6.50	6.54
215.0-235.0	C-13	6.96	6.47
235.0-252.2	C-14	5.64	4.87
252.2-270.6	C-15	5.58	4.50
270.6-287.8	C-16	3.83	2.90
287.8-302.8	C-17	3.23	2.30
302.8-317.2	C-18	3.73	2.51
317.2-330.0	C-19	2.74	1.75
330.0-344.4	C-20	1.91	1.16
344.4-357.2	C-21	1.72	0.99
357.2-369.4	C-22	1.41	0.78
369.4-380.0	C-23	1.28	0.67
380.0-391.1	C-24	1.07	0.54
391.1-401.7	C-25	1.27	0.62
401.7-412.2	C-26	1.67	0.78
412.2-422.2	C-27	2.43	1.10
>422.2	C-28+	9.19	3.99
	Total	100.00	100.00

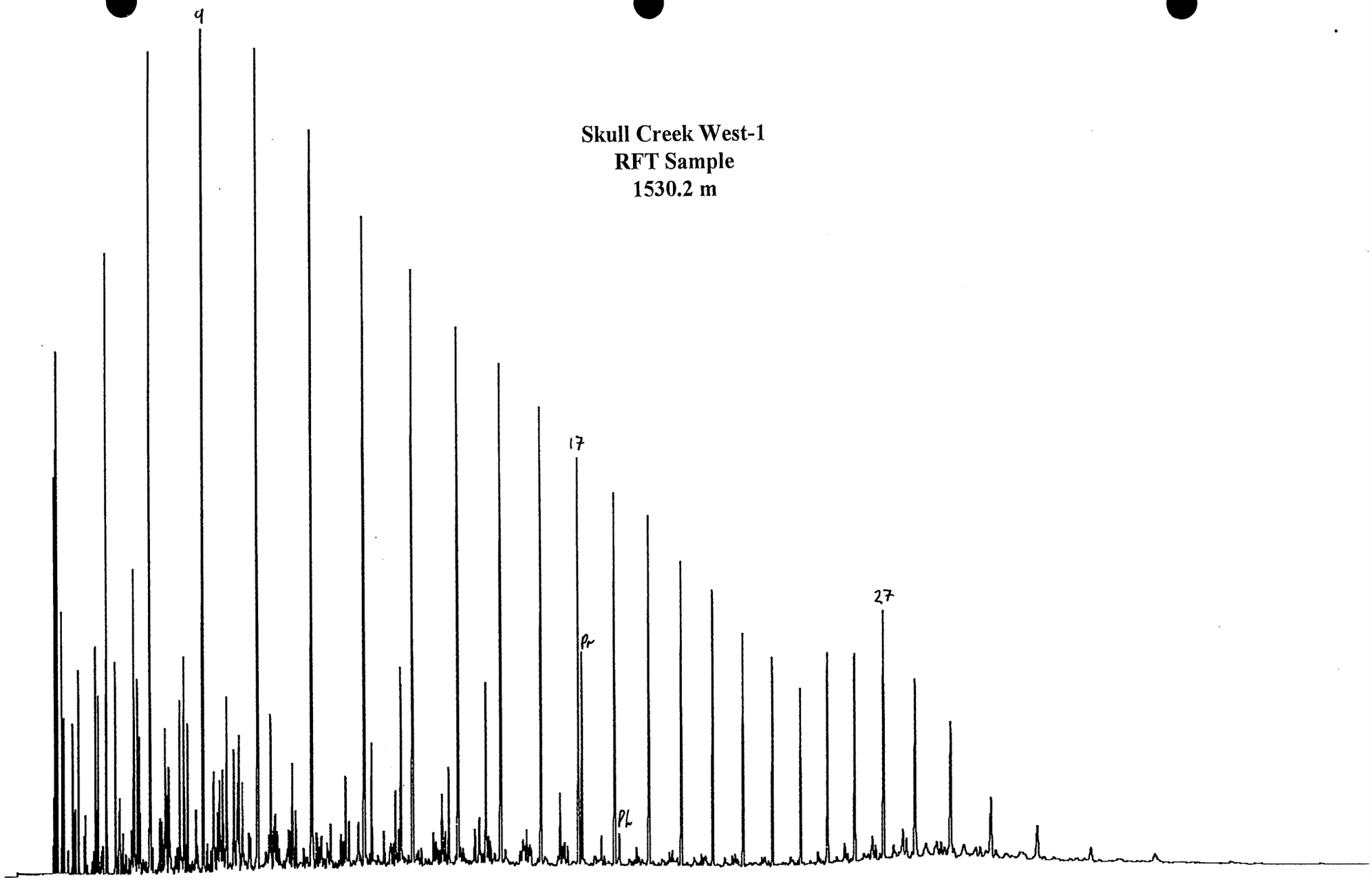
(0.00 = LESS THAN 0.01%)

The above boiling point ranges refer to the normal paraffin hydrocarbon boiling in that range. Aromatics, branched hydrocarbons, naphthenes and olefins may have higher or lower carbon numbers but are grouped and reported according to their boiling points.

Oil Parameters:

Density of Oil @ 21.8 °C	0.7953	
Specific Gravity @ 15.6 °C	0.8006	
API Gravity	45.24	
Specific Gravity of C_{8+} fraction	0.8157	(calc)
Average molecular weight of C_{8+} fraction	188	

Skull Creek West-1
RFT Sample
1530.2 m



amdel

Amdel Limited
A.C.N. 008 127 802

Petroleum Services
PO Box 338
Torrensville Plaza SA 5031

Telephone: (08) 8416 5240
Facsimile: (08) 8234 2933

31 March, 1997

Basin Oil NL
Level 4, 828 Pacific Highway
GORDON NSW 2072

Attention: Greg O'Neill

REPORT LQ5636 - Part 1

CLIENT REFERENCE: 0142

WELL NAME/RE: Skull Creek West-1

MATERIAL: DST Sample Chamber

WORK REQUIRED: Opening DST Sample Chamber and Gas Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

Brian L. Watson
Manager
Petroleum Services

1. INTRODUCTION

On 28 February 1997 a DST sample chamber was received for opening and fluids analysis.

2. RESULTS

On opening the DST sample chamber there was insufficient gas; 1750 mL of water and 1100 mL of oil recovered. Water and oil from Skull Creek West-1, DST-1 have been analysed in parts 2 and 3 of this report respectively.

amdel

RECEIVED
03 APR 1997

Amdel Limited
A.C.N. 008 127 802

Petroleum Services
PO Box 338
Torrensville Plaza SA 5031

Telephone: (08) 8416 5240
Facsimile: (08) 8234 2933

31 March, 1997

Basin Oil NL
Level 4, 828 Pacific Highway
GORDON NSW 2072

Attention: Greg O'Neill

REPORT LQ5704 - Part 1

CLIENT REFERENCE: 0143

WELL NAME/RE: Skull Creek West-1

MATERIAL: Natural Gas

WORK REQUIRED: Gas Composition

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

Brian L. Watson
Manager
Petroleum Services

amdel

PETROLEUM SERVICES GAS ANALYSIS

Method GL-01-01 ASTM D 1945-91 (modified)

Client: BASIN OIL N.L. Report # LQ5704

Sample: SKULL CREEK WEST-1, DST-2
Bubble Hose
10 kPag @ 18°C
28/02/97, 1837 h, Cyl# CCC

GAS	MOL %
Nitrogen	1.31
Carbon Dioxide	0.27
Methane	98.03
Ethane	0.36
Propane	0.01
I-Butane	0.00
N-Butane	0.00
I-Pentane	0.02
N-Pentane	0.00
Hexanes	0.00
Heptanes	0.00
Octanes and higher h'cs	0.00
Total	100.00

(0.00 = less than 0.01%)

The above results are calculated on an air and water free basis assuming only the measured constituents are present
The following parameters are calculated from the above composition at 15°C and 101.325 kPa (abs)

Average Molecular Weight	16.34
Lower Flammability limit	5.06
Upper Flammability limit	15.23
Ratio of upper to lower	3.01
Wobbe Index	49.57
Compressibility Factor	0.9981
Ideal Gas Density (Rel to air = 1)	0.564
Real gas Density (Rel to air = 1)	0.565
Ideal Nett Calorific Value MJ/m^3	33.53
Ideal Gross Calorific Value MJ/m^3	37.24
Real Nett Calorific Value MJ/m^3	33.59
Real Gross Calorific Value MJ/m^3	37.31
Gross calorific value of water-saturated gas MJ/m^3	36.58

This report relates specifically to the sample submitted for analysis.

Approved Signatory Diane Cass

Registration No: 2013
Date : 25-03-97

APPENDIX 8

WATER ANALYSIS REPORTS

Amdel Limited
A.C.N. 008 127 802

Petroleum Services
PO Box 338
Torrensville Plaza SA 5031

Telephone: (08) 8416 5240
Facsimile: (08) 8234 2933

19 March, 1997

Basin Oil NL
Level 4, 828 Pacific Highway
GORDON NSW 2072

Attention: Greg O'Neill

REPORT LQ5621

CLIENT REFERENCE: 0141

WELL NAME/RE: Skull Creek West-1

MATERIAL: RFT Tool

WORK REQUIRED: Fluids Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

Brian L. Watson
Manager
Petroleum Services

amdel
Petroleum Services

TABLE 1 - WATER ANALYSIS **JOB NUMBER: LQ5621**

WELL / ID: Skull Creek West-1
SAMPLE TYPE: RFT Sample
SAMPLE POINT: Large chamber
DATE COLLECTED: -
DATE RECEIVED: 26/02/97

FORMATION: -
INTERVAL: 1530.2m
COLLECTED BY: Client

PROPERTIES:

pH (measured) = 7.65
Resistivity (Ohm.M @ 25°C) = 0.38
Electrical Conductivity (µS/cm @ 25°C) = 26500
Specific Gravity (S.G. @ 20°C) = na
Measured Total Dissolved Solids(Evap@180°C) mg/L = na
Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH_4	na	na	Bromide	as Br	na	na
Potassium	as K	1208	30.90	Chloride	as Cl	9090	256.06
Sodium	as Na	4721	205.35	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	922	46.01	Nitrite	as NO_2	na	na
Iron	as Fe	na	na	Nitrate	as NO_3	nd	nd
Magnesium	as Mg	7.14	0.59	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO_3	854	14.00
Boron	as B	na	na	Carbonate	as CO_3	nd	nd
				Sulphite	as SO_3	na	na
				Sulphate	as SO_4	1283	26.71
Total Cations		6858.14	282.84	**Total Anions**		11227	296.77

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 2.40
b) Total Alkalinity (calc as $CaCO_3$) (mg/L) = 700
c) Total of Cations + Anions = 18085.14
(measured dissolved salts)

d) Theoretical Result of Evaporation Test = 16960
(From Electrical Conductivity)
e) 0.6 x Concentration of Bicarbonate ion* = 512.4
f) Theoretical Total Dissolved Salts d) + e) = 17472.4

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	2.40	5%	Yes
Undetected ions % =	3.51	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		< 8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
nd = not detected
is = insufficent sample

If No - what action is recommended by Amdel

amdel
Petroleum Services

TABLE 1 - WATER ANALYSIS **JOB NUMBER: LQ5621**

WELL / ID: Skull Creek West-1, Sample 1
SAMPLE TYPE: Mud filtrate
SAMPLE POINT: Suction tank
DATE COLLECTED: -
DATE RECEIVED: 26/02/97

FORMATION: -
INTERVAL: 1530.2m
COLLECTED BY: Client

PROPERTIES:

pH (measured) = 8.61
Resistivity (Ohm.M @ 25°C) = 0.80
Electrical Conductivity (µS/cm @ 25°C) = 12520
Specific Gravity (S.G. @ 20°C) = na
Measured Total Dissolved Solids(Evap@180°C) mg/L = na
Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH_4	na	na	Bromide	as Br	na	na
Potassium	as K	1793	45.86	Chloride	as Cl	3685	103.80
Sodium	as Na	1356	58.98	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	68	3.39	Nitrite	as NO_2	na	na
Iron	as Fe	na	na	Nitrate	as NO_3	is	is
Magnesium	as Mg	nd	nd	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO_3	596	9.77
Boron	as B	na	na	Carbonate	as CO_3	147	4.90
				Sulphite	as SO_3	na	na
				Sulphate	as SO_4	nd	nd
Total Cations		3217	108.23	**Total Anions**		4428	118.47

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 4.52
b) Total Alkalinity (calc as $CaCO_3$) (mg/L) = 489
c) Total of Cations + Anions = 7645
(measured dissolved salts)

d) Theoretical Result of Evaporation Test = 8012.8
(From Electrical Conductivity)
e) 0.6 x Concentration of Bicarbonate ion* = 357.6
f) Theoretical Total Dissolved Salts d) + e) = 8370.4

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	4.52	5%	Yes
Undetected ions % =	8.67	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		>8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
nd = not detected
is = insufficent sample

If No - what action is recommended by Amdel

Amdel Limited
A.C.N. 008 127 802

Petroleum Services
PO Box 338
Torrensville Plaza SA 5031

Telephone: (08) 8416 5240
Facsimile: (08) 8234 2933

13 March, 1997

Cultus Petroleum NL
Level 4, 828 Pacific Highway
GORDON NSW 2072

Attention: Andy Ion

REPORT LQ5636 - Part 2

CLIENT REFERENCE:

WELL NAME/RE: Skull Creek West-1

MATERIAL: Water/Filtrate

WORK REQUIRED: Water Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

Brian L. Watson
Manager
Petroleum Services

1. INTRODUCTION AND RESULTS

Two (2) samples were received for standard water analysis (WA-10-01). All analyses were performed according to APHA methods (19th Edition). Results are presented on the following pages.

amdel
Petroleum Services

TABLE 1 - WATER ANALYSIS

JOB NUMBER: LQ5636 - Part 2

WELL / ID: Skull Creek West-1, DST-1
SAMPLE TYPE: Mud Filtrate
SAMPLE POINT: -
DATE COLLECTED: -
DATE RECEIVED: 28/02/97

FORMATION: -
INTERVAL: 1527-1531 m
COLLECTED BY: Client

PROPERTIES:

pH (measured) = 8.66
Resistivity (Ohm.M @ 25°C) = 0.60
Electrical Conductivity (µS/cm @ 25°C) = 16800
Specific Gravity (S.G. @ 20°C) = na
Measured Total Dissolved Solids(Evap@180°C) mg/L = na
Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH_4	na	na	Bromide	as Br	na	na
Potassium	as K	1924	49.21	Chloride	as Cl	4913	138.39
Sodium	as Na	2189	95.22	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	28	1.40	Nitrite	as NO_2	na	na
Iron	as Fe	na	na	Nitrate	as NO_3	I.S.	I.S.
Magnesium	as Mg	nd	nd	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO_3	894	14.66
Boron	as B	na	na	Carbonate	as CO_3	147	4.90
				Sulphite	as SO_3	na	na
				Sulphate	as SO_4	I.S.	I.S.
Total Cations		4141	145.82	**Total Anions**		5954	157.95

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 3.99
b) Total Alkalinity (calc as $CaCO_3$) (mg/L) = 733
c) Total of Cations + Anions = 10095
(measured dissolved salts)

d) Theoretical Result of Evaporation Test = 10752
(From Electrical Conductivity)
e) 0.6 x Concentration of Bicarbonate ion* = 536.4
f) Theoretical Total Dissolved Salts d) + e) = 11288.4

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	3.99	5%	Yes
Undetected ions % =	10.57	10%	No
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		>8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
nd = not detected
is = insufficent sample

If No - what action is recommended by Amdel

amdel
Petroleum Services

TABLE 1 - WATER ANALYSIS **JOB NUMBER: LQ5636 - Part 2**

WELL / ID: Skull Creek West-1, DST-1
SAMPLE TYPE: Water
SAMPLE POINT: Sample Chamber
DATE COLLECTED: -
DATE RECEIVED: 28/02/97

FORMATION: -
INTERVAL: -
COLLECTED BY: Client

PROPERTIES:

pH (measured) = 7.51
Resistivity (Ohm.M @ 25°C) = 0.38
Electrical Conductivity (µS/cm @ 25°C) = 26100
Specific Gravity (S.G. @ 20°C) = na
Measured Total Dissolved Solids(Evap@180°C) mg/L = na
Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH_4	na	na	Bromide	as Br	na	na
Potassium	as K	989	25.29	Chloride	as Cl	9827	276.82
Sodium	as Na	4799	208.74	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	852	42.51	Nitrite	as NO_2	na	na
Iron	as Fe	na	na	Nitrate	as NO_3	nd	nd
Magnesium	as Mg	4.13	0.34	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO_3	730	11.97
Boron	as B	na	na	Carbonate	as CO_3	nd	nd
				Sulphite	as SO_3	na	na
				Sulphate	as SO_4	846	17.61
Total Cations		6644.13	276.89	**Total Anions**		11403	306.40

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 5.06
b) Total Alkalinity (calc as $CaCO_3$) (mg/L) = 598
c) Total of Cations + Anions = 18047.13
(measured dissolved salts)

d) Theoretical Result of Evaporation Test = 16704
(From Electrical Conductivity)
e) 0.6 x Concentration of Bicarbonate ion* = 438
f) Theoretical Total Dissolved Salts d) + e) = 17142

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	5.06	5%	No - Recommend further testing
Undetected ions % =	5.28	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		< 8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
nd = not detected
is = insufficent sample

If No - what action is recommended by Amdel

Amdel Limited
A.C.N. 008 127 802

Petroleum Services
PO Box 338
Torrensville Plaza SA 5031

Telephone: (08) 8416 5240
Facsimile: (08) 8234 2933

28 April, 1997

Basin Oil NL
Level 4, 828 Pacific Highway
GORDON NSW 2072

Attention: Greg O'Neill

REPORT LQ5704 - Part 2

CLIENT REFERENCE: P/O 0143

WELL NAME/RE: Skull Creek West-1

MATERIAL: Water

WORK REQUIRED: Water Analysis

Please direct technical enquiries regarding this work to the signatory below under whose supervision the work was carried out.

Brian L. Watson
Manager
Petroleum Services

1. INTRODUCTION AND RESULTS

Three (3) samples were received for standard water analysis (WA-10-01). All analyses were performed according to APHA methods (19th Edition). Results are presented on the following pages.

amdel
Petroleum Services

TABLE 1 - WATER ANALYSIS **JOB NUMBER: LQ5704 - Part 2**

WELL / ID: Skull Creek West-1, DST-2, Sample 3
SAMPLE TYPE: Water
SAMPLE POINT: -
DATE COLLECTED: -
DATE RECEIVED: 11/04/97

FORMATION: -
INTERVAL: -
COLLECTED BY: Client

PROPERTIES:

pH (measured) = 7.07
Resistivity (Ohm.M @ 25°C) = 0.40
Electrical Conductivity (µS/cm @ 25°C) = 25200
Specific Gravity (S.G. @ 20°C) = na
Measured Total Dissolved Solids(Evap@180°C) mg/L = na
Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH_4	na	na	Bromide	as Br	na	na
Potassium	as K	432	11.05	Chloride	as Cl	10136	285.52
Sodium	as Na	6561	285.38	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	194	9.68	Nitrite	as NO_2	na	na
Iron	as Fe	na	na	Nitrate	as NO_3	nd	nd
Magnesium	as Mg	65	5.35	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO_3	775	12.70
Boron	as B	na	na	Carbonate	as CO_3	nd	nd
				Sulphite	as SO_3	na	na
				Sulphate	as SO_4	143	2.98
Total Cations		7252	311.46	**Total Anions**		11054	301.20

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 1.67
b) Total Alkalinity (calc as $CaCO_3$) (mg/L) = 635
c) Total of Cations + Anions = 18306
(measured dissolved salts)

d) Theoretical Result of Evaporation Test = 16128
(From Electrical Conductivity)
e) 0.6 x Concentration of Bicarbonate ion* = 465
f) Theoretical Total Dissolved Salts d) + e) = 16593

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	1.67	5%	Yes
Undetected ions % =	10.32	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		< 8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
nd = not detected
is = insufficent sample

If No - what action is recommended by Amdel

amdel
Petroleum Services

TABLE 1 - WATER ANALYSIS **JOB NUMBER: LQ5704 - Part 2**

WELL / ID: Skull Creek West-1, DST-2, Sample 4
SAMPLE TYPE: Mud
SAMPLE POINT: -
DATE COLLECTED: -
DATE RECEIVED: 11/04/97

FORMATION: -
INTERVAL: -
COLLECTED BY: Client

PROPERTIES:

pH (measured) = 8.07
Resistivity (Ohm.M @ 25°C) = 0.78
Electrical Conductivity (µS/cm @ 25°C) = 12760
Specific Gravity (S.G. @ 20°C) = na
Measured Total Dissolved Solids(Evap@180°C) mg/L = na
Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH_4	na	na	Bromide	as Br	na	na
Potassium	as K	1245	31.84	Chloride	as Cl	3897	109.77
Sodium	as Na	2010	87.43	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	105	5.24	Nitrite	as NO_2	na	na
Iron	as Fe	na	na	Nitrate	as NO_3	nd	nd
Magnesium	as Mg	nd	nd	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO_3	2563	42.02
Boron	as B	na	na	Carbonate	as CO_3	nd	nd
				Sulphite	as SO_3	na	na
				Sulphate	as SO_4	nd	nd
Total Cations		3360	124.51	**Total Anions**		6460	151.79

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 9.87
b) Total Alkalinity (calc as $CaCO_3$) (mg/L) = 2101
c) Total of Cations + Anions = 9820
(measured dissolved salts)

d) Theoretical Result of Evaporation Test = 8166.4
(From Electrical Conductivity)
e) 0.6 x Concentration of Bicarbonate ion* = 1537.8
f) Theoretical Total Dissolved Salts d) + e) = 9704.2

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	9.87	5%	No - Recommend further testing
Undetected ions % =	1.19	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		< 8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
nd = not detected
is = insufficent sample

If No - what action is recommended by Amdel

amdel
Petroleum Services

TABLE 1 - WATER ANALYSIS **JOB NUMBER: LQ5704 - Part 2**

WELL / ID: Skull Creek West-1, DST-2, Sample 2
SAMPLE TYPE: Water
SAMPLE POINT: -
DATE COLLECTED: -
DATE RECEIVED: 11/04/97

FORMATION: -
INTERVAL: -
COLLECTED BY: Client

PROPERTIES:

pH (measured) = 7.92
Resistivity (Ohm.M @ 25°C) = 0.59
Electrical Conductivity (µS/cm @ 25°C) = 17000
Specific Gravity (S.G. @ 20°C) = na
Measured Total Dissolved Solids(Evap@180°C) mg/L = na
Measured Total Suspended Solids mg/L = na

CHEMICAL COMPOSITION

CATIONS		mg/L	meq/L	ANIONS		mg/L	meq/L
Ammonium	as NH_4	na	na	Bromide	as Br	na	na
Potassium	as K	1121	28.67	Chloride	as Cl	5156	145.24
Sodium	as Na	2705	117.66	Fluoride	as F	na	na
Barium	as Ba	na	na	Hydroxide	as OH	nd	nd
Calcium	as Ca	92	4.59	Nitrite	as NO_2	na	na
Iron	as Fe	na	na	Nitrate	as NO_3	nd	nd
Magnesium	as Mg	13.1	1.08	Sulphide	as S	na	na
Strontium	as Sr	na	na	Bicarbonate	as HCO_3	1371	22.48
Boron	as B	na	na	Carbonate	as CO_3	nd	nd
				Sulphite	as SO_3	na	na
				Sulphate	as SO_4	169	3.52
Total Cations		3931.1	152.00	**Total Anions**		6696	171.23

DERIVED PARAMETERS

a) Ion Balance (Diff*100/Sum) (%) = 5.95
b) Total Alkalinity (calc as $CaCO_3$) (mg/L) = 1124
c) Total of Cations + Anions = 10627.1
(measured dissolved salts)

d) Theoretical Result of Evaporation Test = 10880
(From Electrical Conductivity)
e) 0.6 x Concentration of Bicarbonate ion* = 822.6
f) Theoretical Total Dissolved Salts d) + e) = 11702.6

QUALITY CONTROL COMMENTS

Item	Actual Value	Acceptance Criteria	Satisfactory? (Yes/No)
Ion Balance (%) =	5.95	5%	No - Recommend further testing
Undetected ions % =	9.19	10%	Yes
(from comparison of measured vs theoretical salts derived from measured conductivity)			
Expected pH range		< 8.3	Yes
% difference between measured total dissolved solids and calc total dissolved salts (from ionic comp) =	na	5%	na

na = not applicable
nd = not detected
is = insufficent sample

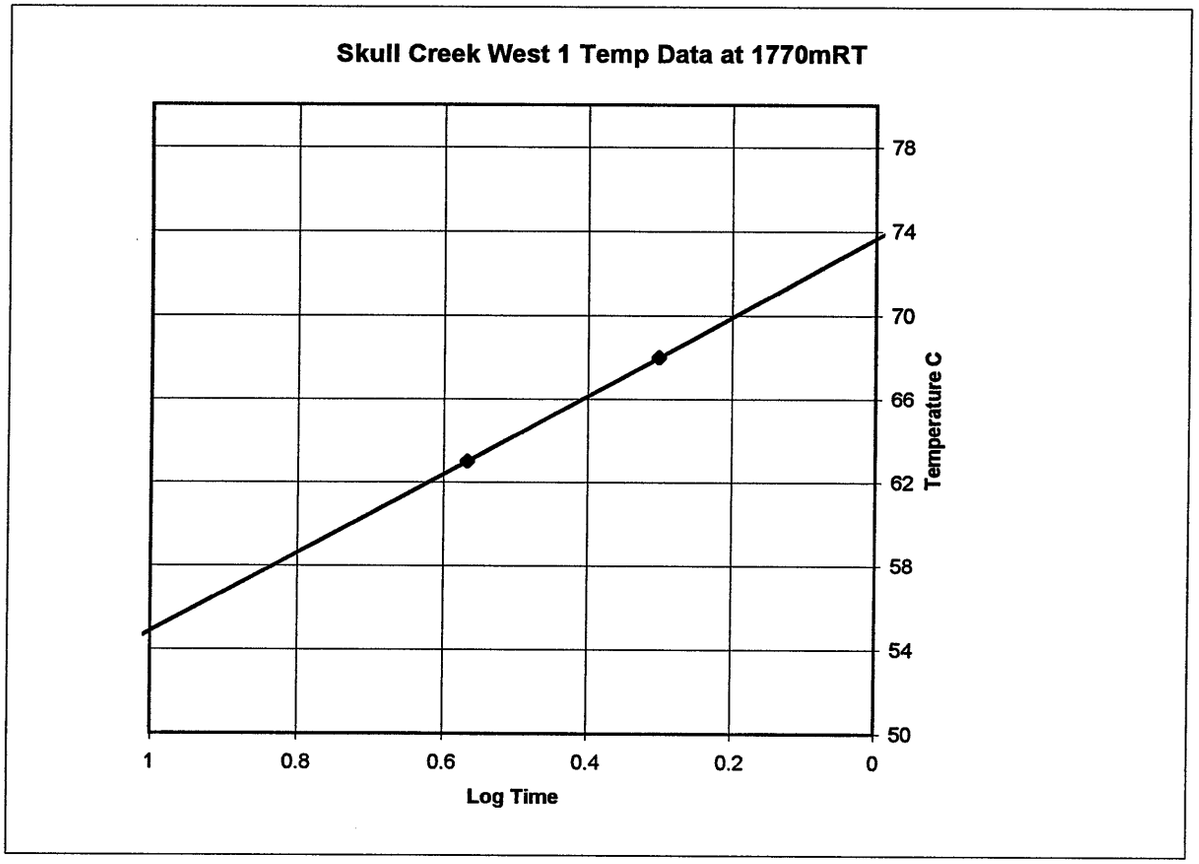
If No - what action is recommended by Amdel

APPENDIX 9

GEOTHERMAL GRADIENT DATA

Skull Creek West 1

Depth m	Log	Temp C	Hours since circ	(t+dt)/dt	Temp C	
			0		Log Time	Temp
1701	PDS	63	12	3.691667	0.567222	63
1767	RFS	68	32.3	2	0.30103	68
2000	DLS	67	7			



	Temp
Surface	15
1770	74
Gradient	0.033333
Depth	2000
Extrap BHT	81.66667

APPENDIX 10

PALYNOLOGICAL ANALYSIS

Palynological analysis of cores and cuttings from Skull Creek West–1, Port Campbell Embayment Otway Basin.

by

Alan D. Partridge

Biostrata Pty Ltd
A.C.N. 053 800 945

Biostrata Report 1997/20

26 November 1997

Palynological analysis of cores and cuttings from Skull Creek West–1, Otway Basin

by Alan D. Partridge

Contents

INTERPRETATIVE DATA

BASIC DATA

INTERPRETATIVE DATA

Summary

The palynology of eleven samples were analysed in Skull Creek West–1 over a sixty metre interval between 1270m to 1330m. The two shallowest cuttings samples between 1270m to 1285m gave Coniacian to Santonian ages and are interpreted to be from the Belfast Mudstone. The five core samples and four deeper cuttings samples between 1290.65m to 1330m gave an Early Turonian age and belong to the lower to middle parts of the Waarre Formation. Between these two ages is an erosional unconformity at the top of the Waarre Formation overlain by a probable non-depositional hiatus which accounts for the absence of the Flaxman Formation.

The palynological zones, their ages and suggested correlations to established stratigraphic units are summarised in the following Table 1. Additional interpretative data on all samples including zone identification and Confidence Ratings are recorded in Table 2, whilst basic data on sample lithologies, analytical and visual residue yields, preservation and species diversity are recorded on Table 3. Counts of the assemblages are presented on Table 4 and distribution of all identified palynomorphs in the samples are given in Table 5.

Table–1: Palynological summary for Skull Creek West–1

AGE	LITHOLOGICAL UNIT	SPORE–POLLEN ZONES (Subzones)	MICROPLANKTON ZONES (Subzones)
SANTONIAN to CONIACIAN	BELFAST MUDSTONE 1226m to 1285m	*T. apoxyexinus* 1270m *P. mawsonii* (*C. vultuosus* Subzone) 1285m	*O. porifera* to *I. cretaceum* 1270m *C. striatoconus* 1285m
EARLY TURONIAN	WAARRE FORMATION 1285m to 1327.5*m	*P. mawsonii* (*H. trinalis* Subzone) 1290.65 to 1330‡m	*P. infusorioides* (*C. edwardsii* Acme) 1290.65 to 1330‡m
EARLY CRETACEOUS	EUMERALLA FORMATION 1327.5*m to 2002m T.D.	NOT SAMPLED	NOT SAMPLED

* Log pick ‡ Based on cuttings – probably caved

Materials and Methods

The samples were received on the 7th November and sent to Laola Pty Ltd in Perth for processing. The palynological slides were returned to the author on 17th November 1997 and provisional results of the microscope analyses were submitted on the 19th November.

The palynological slides contained high visual yields with a low to moderate concentration of palynomorphs. Preservation overall was fair. Recorded spore-pollen diversity ranges from 19 to 34+ species and averages 25+ species per sample, while recorded microplankton diversity, ranges from 2 to 17+ species (Table 3). As the microplankton diversity averaged only 6+ species in the cores but 11+ in the cuttings the latter diversity is considered distorted by down-hole cavings. The palynomorph abundance data presented in Table 4 were obtained from counts made on slides prepared using a 8μm filter cloth. The counts give a good approximation of the changes in the abundance of the major species groups in the assemblages but are only considered accurate to ±5%. In the cuttings samples it was not possible to exclude caved palynomorphs from the counts and therefore the microplankton abundances from the cuttings below 1315m are undoubtedly too high.

Geological Comments

1. The short sequence sampled in Skull Creek West–1 can be readily assigned to the Mesozoic spore-pollen and microplankton zones defined by Helby *et al.* (1987) with additional resolution provided by new subzones (Figure 1; Partridge, 1997a). The time interval sampled is from the Early Turonian to mid-Santonian.

2. The succession of spore-pollen zones first established in the Otway Basin by Dettmann & Playford (1969), and subsequently modified by Helby *et al.* (1987), have been altered in one important respect. The *A. distocarinatus* Zone originally established by Dettmann & Playford (1969) with a type section in the Waarre Formation has been shown to actually belong to the younger *P. mawsonii* Zone (Partridge, 1996a). As a consequence Cenomanian age sediments thought to be present in the Waarre Formation are now demonstrated to be missing in the Otway Basin at the unconformity between the Waarre and Eumeralla Formations. In manuscripts currently in preparation it is proposed to abandon the use of the *A. distocarinatus* Zone and replace it with the *Hoegisporis uniforma* Zone for the revised "Cenomanian" concept of the zone as redefined by Helby *et al.*, (1987).

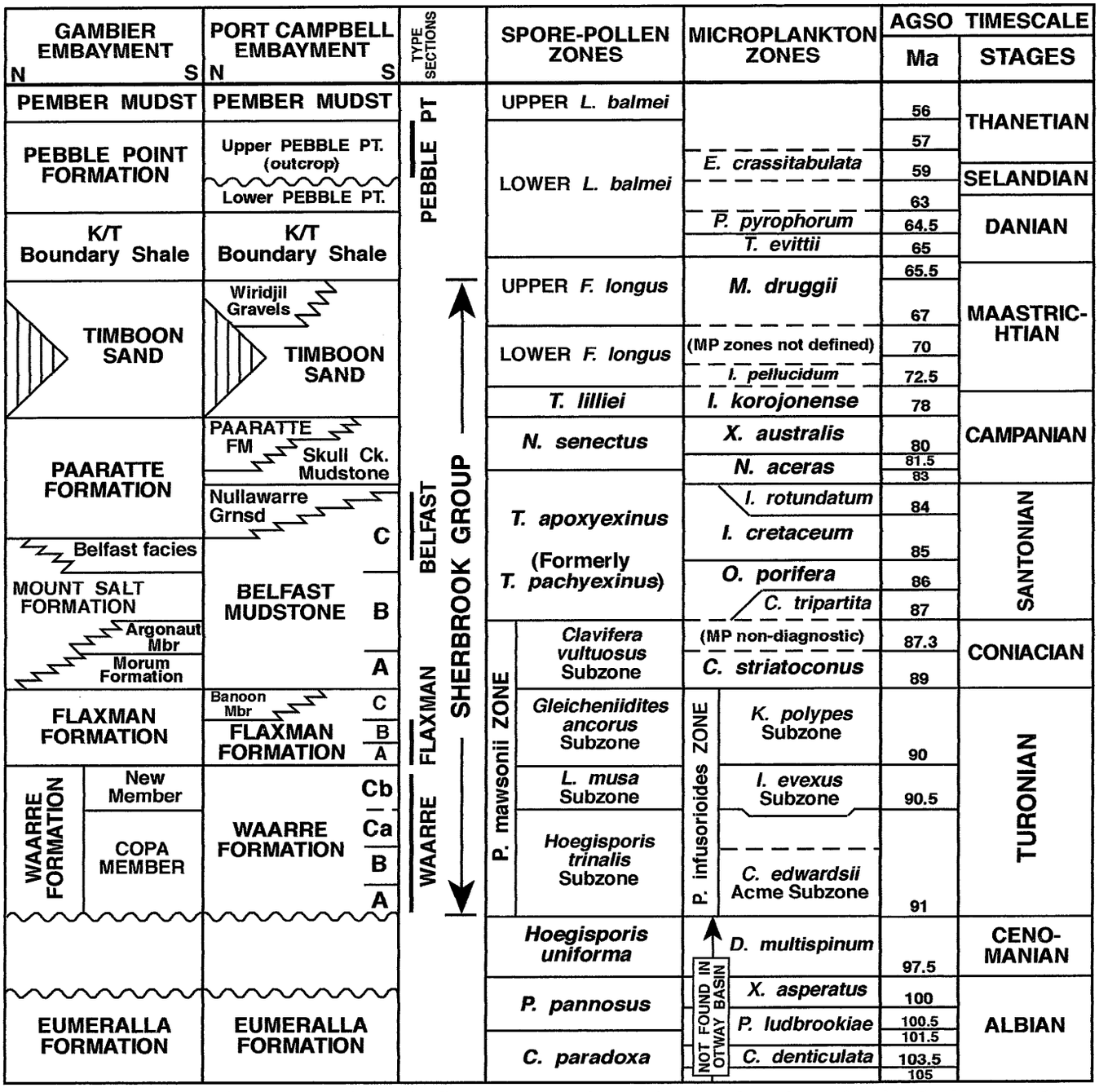


Figure 1: Revised Sherbrook Group stratigraphy and palynological timescale.

3. The samples analysed from Skull Creek West–1 confirm that the *P. mawsonii* Zone extends to the base of the Waarre Formation. As with other wells analysed in the Port Campbell Embayment there was nothing recorded in the palynological assemblages to indicate the presence of the Cenomanian age *H. uniforma* Zone.

4. All samples analysed from the Sherbrook Group in Skull Creek West–1 contain marine dinoflagellates as the principal component of their microplankton assemblages. All samples are therefore considered to be marine. The algal cyst *Amosopollis cruciformis* which has an observed environmental tolerance from marine to fresh water was not dominant in any of the samples (Table 2). The least marine is the shallowest core sample at 1290.65m which contained abundant coarse pieces of structured terrestrial organic matter.

5. Based on their palynological assemblages the two shallowest cuttings samples at 1270m and 1285m belong to the Belfast Mudstone. Both contain common to abundant microplankton comprising marine dinoflagellates and the algal cyst *Amosopollis cruciformis*. The deeper sample contains the *C. striatoconus* microplankton Zone associated with the *C. vultuosus* spore-pollen Subzone and is Coniacian in age. The shallower sample contains the *O. porifera* or perhaps the younger *I. cretaceum* microplankton Zone associated with the *T. apoxyexinus* spore-pollen Zone and is Santonian in age. All four zones are restricted to the Belfast Mudstone based on a recent reappraisal of type sections (Partridge, 1996a). Neither sample contains index species nor species abundances diagnostic of the Flaxman Formation. Considering that the deeper sample at 1285m is from the base of the shale sequence it is concluded that there is no Flaxman Formation in Skull Creek West–1.

6. The five core samples and underlying four cuttings samples between 1290.65m to 1330m all contain typical Waarre Formation assemblages. Although significantly contaminated by down-hole cavings all are broadly similar. They are assigned to the *Hoegisporis trinalis* Subzone of the *P. mawsonii* spore-pollen Zone and the *Cribroperidinium edwardsii* Acme Subzone of the *P. infusorioides* microplankton Zone and are early Turonian in age. The assemblages correlate to Units A, B and the basal part of Unit C recognised in the Waarre Formation by Buffin(1989).

7. The absence of the Flaxman Formation and upper part of Waarre Unit C in Skull Creek West–1 indicates the presence of a significant unconformity at 1285.5m. In terms of the palynological succession two spore-pollen and two microplankton subzones are missing representing about 1.5 million years (Figure 1). In part the missing section can be accounted for by a marked thinning of the Flaxman Formation and basal part of the Belfast Mudstone as has been documented between the wells Port Campbell–1 and 2 (Partridge, 1996a).

   However, there also needs to have been erosion at the top of the Waarre Formation to account for the missing *L. musa* and *I. evexus* Subzones. Evidence for this erosive unconformity in other wells consists of a facies change from cross-bedded sandstones in Unit C to distal marine microplankton assemblages at the base of the overlying Flaxman Formation. These latter assemblages have all the characteristics of a marine flooding surface. In addition, coarse quartz pebbles eroded from the Waarre Formation are mixed with the marine mudstone in a local basal member of the Flaxman Formation (= Flaxman A on Figure 1).

   Of greater uncertainty is whether any erosion has occurred at the sequence boundary unconformity believed to occur between the Flaxman Formation and Belfast Mudstone. On currently available data in the Port Campbell Embayment, in those wells where the transition from the Flaxman to Belfast has been closely analysed by palynology there are similar distal marine environments on both sides of the boundary and no obvious evidence of any subaerial erosion.

8. The age of the sand between 1285.5–1291m at the top of the Waarre Formation remains equivocal on current sampling. The sample from Core–1 at 1290.65m is believed to be out-of-place with respect to the electric logs because of its siltstone lithology (see Table 3). As this sample is located at the top of Core–1 it seems likely that none of the sand cored was successfully recovered by the core barrel. The sample at 1290.65m would therefore need to be adjusted downwards to the first shaly spike on the gamma ray log which is at 1292m. In the absence of a reliable sample from the sand, three alternative interpretations of its stratigraphic assignment are possible. Firstly, and most likely, the sand represents the basal part of Waarre Unit C. The second alternative is that all of Unit C and part of Unit B have been eroded and the sand represents one of the infrequent sands identified within Unit B. This alternative is considered unlikely because the condensed section and downlap surface known to occur within Unit B was identified at 1296.65m from the top of Core–2. The third, and

least likely alternative, is that the sand correlates with the upper part of Unit C. This last alternative is based on the identification of a probable sequence boundary between the *H. trinalis* and *L. musa* Subzones within Unit C (Figure 1). To apply the third alternative to Skull Creek West–1 would require the identification of a sequence boundary at 1291m at the base of the sand.

9. Few wells in the Port Campbell Embayment currently have the detailed and closely spaced palynological analysis needed to clearly demonstrate missing section equivalent to that found in Skull Creek West–1. One exception is Wallaby Creek–2 where the Late Santonian *I. cretaceum* Zone is recorded only four metres above the base of the Belfast Mudstone. The underlying Waarre Unit C is only seven metres thick and almost certainly eroded (Partridge, 1995b). Dunbar–1 is also somewhat similar. The Coniacian *C. striatoconus* Zone is recorded at the base of the Belfast Mudstone which is underlain by a condensed seven metre thick Flaxman Formation and a relatively normal ~38 metre thick Waarre Unit C (Partridge, 1995a). Both wells are over 6kms west of Skull Creek West–1. Closer wells such as Dunbar East–1, North Paaratte–1 & 2, Port Campbell–3 & 4, and Skull Creek–1 could not be evaluated for this report because of lack of palynological data.

   In contrast to the wells with abbreviated sequences across the top of the Waarre Formation the recent well Fenton Creek–1 contains an expanded section with good palynological sampling and documentation (Partridge, 1997b). The occurrence of the additional *L. musa* and *G. ancorus* Subzones of the *P. mawsonii* Zone indicates the presence of up to 90 metres of additional section across the top of the Waarre which is not seen in Skull Creek West–1.

10. No palynomorphs diagnostic of the Eumeralla Formation were identified in Skull Creek West-1. However, the two deepest cuttings analysed are heavily contaminated by down-hole cavings which would mask the typically low yielding assemblages from the top of the Eumeralla Formation. From an examination of the gamma and density/porosity logs picking the top of the Eumeralla Formation at the log break at 1327.5m would not significantly conflict with the recorded assemblages.

Biostratigraphy

The zone and age determinations are based on the Australia wide Mesozoic spore-pollen and microplankton zonation schemes described by Helby *et al.* (1987) with further resolution provided by the subzones recognised by Partridge (1997). Author citations for most spore-pollen species can be sourced from Helby *et al.* (1987), Dettmann (1963), Stover & Partridge (1973), whilst author citations for dinoflagellates can be found in the index of Lentin & Williams (1993). Species names followed by "ms" or "n.sp." are unpublished manuscript names.

***Tricolporites apoxyexinus* spore–pollen Zone and *Odontochitina porifera* to *Isabelidinium cretaceum* microplankton Zones.**
Sample at: 1270 metres.
Age: Santonian.

The spore-pollen assemblage is assigned to the *T. apoxyexinus* Zone on the presence of the secondary index species *Peninsulapollis gillii*, *Ilexpollenites primus* ms and *Forcipites* sp. in association with the common occurrence of *Proteacidites* spp. (~5%). The key index species for the zone *Tricolporites apoxyexinus* and *Ornamentifera sentosa* were not found, but are recorded as caved elements in deeper cuttings samples. The assemblage counts can be characterised by an abundance of angiosperm pollen (12%). This compares to <2% angiosperm pollen in the core samples from the underlying *P. mawsonii* Zone.

The microplankton assemblage contains both *Odontochitina porifera* and *Isabelidinium cretaceum* the key index species for their respective zones. Although assignment of the assemblage to the older *O. porifera* Zone is favoured the possibility that the sample belongs to the younger *I. cretaceum* Zone cannot be excluded unless shallower cuttings samples are analysed. It is noted that *Chatangiella tripartita* which has a restricted range or acme at the base of the *O. porifera* Zone was not recorded as a caved element in any of the cuttings samples. A hiatus is therefore interpreted to be present between 1270m and the *C. striatoconus* Zone identified at 1285m

The moderate diversity and abundance of marine dinoflagellates suggests an offshore marine environment of deposition at moderate water depths (~mid to outer shelf).

***Phyllocladidites mawsonii* spore–pollen Zone**
Interval: 1285-1330 metres.
Age: Coniacian–Turonian.

The ten core and cuttings samples over this interval of only 45+ metres contain the species assemblages and abundances considered typical of the *P. mawsonii* Zone in the Otway Basin. Palynological reviews of old wells and analysis of new

wells over the last three years has clearly demonstrated that the *P. mawsonii* Zone extends to the base of the Waarre Formation and that the supposed Cenomanian *A. distocarinatus* Zone has been incorrectly identified (eg. Partridge, 1996a; Partridge, 1997a & b; Figure 1). In Skull Creek West–1 the oldest occurrence of the index species *Phyllocladidites mawsonii* was recorded in the deepest core sample at 1310.2m as well as in three of the four underlying cuttings. It is very likely however that some of the specimens recorded from the cuttings are caved. The former index species *Appendicisporites distocarinatus* clearly overlaps with *P. mawsonii* as it is recorded in the shallowest core sample at 1290.65m as well as in three of the four deepest cuttings samples. Only the oldest and youngest of the four new subzones within the *P. mawsonii* Zone are found in Skull Creek West–1. The following discussion of the key index species and assemblage composition of these two subzones increases the confidence in the identification of the *P. mawsonii* Zone.

***Clavifera vultuosus* spore–pollen Subzone**
Sample at: 1285 metres.
Age: Coniacian.

The presence of the eponymous species *C. vultuosus* n.sp. associated with the LADs of *Cyatheacidites tectifera*, *Foraminisporis asymmetricum* and *Laevigatosporites musa* ms provides a confident identification of this subzone. Other key species recorded are *Clavifera triplex*, *Coptospora pileolus* ms and *Phyllocladidites mawsonii*. The assemblage is dominated by bisaccate pollen of *Podocarpidites* (21%) and spores of *Cyathidites* (21%). *Cupressacites* sp. in contrast shows a relatively low abundance of ~3% suggesting a position high within the subzone, well above the *Cupressacites* pollen spike which straddles the *G. ancorus*/*C. vultuosus* Subzone boundary (Partridge, 1997b).

***Hoegisporis trinalis* spore–pollen Subzone**
Interval: 1290.65–1330 metres.
Age: Early? Turonian.

The *H. trinalis* Subzone is defined as the interval from the LAD of *Hoegisporis uniforma* to the LAD of *H. trinalis* ms. The eponymous species is generally rare but was recorded in all core samples and three of the four cuttings over an interval of 40 metres. Other index species recorded from the cores include *Appendicisporites distocarinatus* (at 1290.65m), *Rugulatisporites admirabilis* ms (at 1290.65m and 1296.65m) and *Laevigatosporites musa* ms (at 1310.2m). The cuttings samples contain these and other index species including *Coptospora pileolus* ms (at 1320m); *Interulobites intraverrucatus* (at 1330m) and *Stoverisporites microverrucatus* (at 1315m). It is difficult with the cuttings to confidently distinguish down-hole cavings as is the case with *Clavifera triplex*. Because it is

present in the cuttings samples but not in the cores all records of *C. triplex* in this subzone could represent cavings.

The assemblages from the cores are dominated by gymnosperm pollen (ave. >56%), which mostly belong to the alete pollen of *Araucariacites* and *Dilwynites* (ave. 22%) and the bisaccate pollen of *Podocarpidites* (ave. 17%); with a secondary dominance of spores (ave. >42%); mostly comprised of *Cyathidites* (ave. 15%) and *Gleicheniidites* (ave. 7%); and only minor angiosperm pollen (~1%). The notably higher angiosperm abundance (>4%) in the cuttings suggests the counts on these samples are skewed by down-hole cavings.

The *H. trinalis* Subzone has previously been documented from Units A, B and basal part of Unit C of the Waarre Formation (Partridge, 1997a).

***Conosphaeridium striatoconus* microplankton Zone.**
Sample at: 1285 metres.
Age: Coniacian.
The presence of the eponymous species *C. striatoconus* and absence of older species *Kiokansium polypes* and *Valensiella griphus* provides a confident identification of this zone and indicates that the base of the shale section in Skull Creek West–1 is no older than Coniacian. All species of *Isabelidinium* recorded are considered to be caved. The microplankton are dominated by *Heterosphaeridium* spp. and the high abundance of 24% suggests a distal marine environment based on comparison with other wells in the Otway Basin.

***Palaeohystrichophora infusorioides* microplankton Zone and *Cribroperidinium edwardsii* Acme Subzone.**
Interval: 1290.65–1320 metres.
Age: Early? Turonian.
Four of the core samples contain low to moderate diversity microplankton assemblages which are best assigned to the *C. edwardsii* Acme Subzone recognised at the base of the *P. infusorioides* Zone in the Otway Basin (Partridge, 1997a). Although the microplankton abundances are too low to properly illustrate the abundance of *C. edwardsii*, it certainly is the most distinctive species in the samples. Other species identified and considered characteristic of both zone and subzone in the Otway Basin are *Cyclonephelium compactum, Palaeoperidinium cretaceum* and *Oligosphaeridium complex/pulcherrimum.* The four cuttings below the core samples contain mixed microplankton assemblages with obvious caved species from the Belfast Mudstone. Only the two shallower samples at 1315m and 1320m can be confidently assigned to the *C. edwardsii* Acme Subzone.

In the cores the sample at 1296.65m contains the most diverse (14+ species) and abundant (15%) microplankton assemblage and is considered to represent the most marine environment within the Waarre Formation. Although the cuttings samples contain higher diversity and more abundant microplankton assemblages they are clearly affected by down-hole cavings.

References

BUFFIN, A.J., 1989. Waarre Sandstone development within the Port Campbell Embayment. *APEA Journal 29* (1), p.299-311.

DETTMANN, M.E., 1963. Upper Mesozoic microfloras from southeastern Australia. *Proceedings Royal Society Victoria 77*, p.1–148.

DETTMANN, M.E. & PLAYFORD, G., 1969. Palynology of the Australian Cretaceous: a review. **In** *Stratigraphy and palaeontology. Essays in honour of Dorothy Hill*, K.S.W. Campbell, ed., A.N.U. Press Canberra, p.174-210.

HELBY, R., MORGAN, R. & PARTRIDGE, A.D., 1987. A palynological zonation of the Australian Mesozoic. *Memoir Association Australasian Palaeontologists 4*, p.1–94.

LENTIN, J.K. & WILLIAMS, G.L., 1993. Fossil Dinoflagellates: Index to genera and species, 1993 Edition. *AASP Contribution Series No. 28*, p.1–856.

PARTRIDGE, A.D., 1995a. Palynological analysis of Dunbar–1, Port Campbell Embayment, Otway Basin. *Biostrata Report 1995/7*, p.1–11.

PARTRIDGE, A.D., 1995b. Palynological analysis of Wallaby Creek–2, Port Campbell Embayment, Otway Basin. *Biostrata Report 1995/12*, p.1–12.

PARTRIDGE, A.D., 1996. Palynological review of the type sections of the Belfast Mudstone, Flaxman and Waarre Formations in the Port Campbell Embayment, Otway Basin. *Biostrata Report 1996/1*, p.1-25.

PARTRIDGE, A.D., 1997a. New Upper Cretaceous palynology of the Sherbrook Group, Otway Basin. In *Victorian Supplement, PESA News* April/May, p.9.

PARTRIDGE, A.D., 1997b. Palynological analysis of sidewall cores from Fenton Creek–1, Port Campbell Embayment, Otway Basin. *Biostrata Report 1997/11*, p.1–26.

STOVER, L.E. & PARTRIDGE, A.D., 1973. Tertiary and late Cretaceous spores and pollen from the Gippsland Basin, southeastern Australia. *Proceedings Royal Society Victoria 85*, p.237–286.

Table–2: Interpretative Palynological Data for Skull Creek West–1

Sample Type	Depth (m)	Spore-Pollen Zone (and Subzone)	CR	Microplankton Zone (and Subzone)	CR	MP%	Ac%	Key Species Present and Comments
Cuttings	1270	*T. apoxyexinus*	D4	*O. porifera* to *I. cretaceum*	D2	11%	1%	*Isabelidinium cretaceum* and *Odontochitina porifera* are relatively common. *Proteacidites* spp. ~5%. FADs of *Peninsulapollis gilli* and *Ilexpollenites primus* ms.
Cuttings	1285	*P. mawsonii* (*C. vultuosus* Subzone)	D1	*C. striatoconus*	D2	24%	3%	Key species *Conosphaeridium striatoconus*, *Clavifera vultuosus* ms both recorded. High microplankton abundance is indicative of a condensed distal marine environment at base of flooding surface.
Core–1	1290.65	*P. mawsonii* (*H. trinalis* Subzone)	A2	*P. infusorioides* (*C. edwardsii* Acme)	A5	<2%	NR	LADs for *Hoegisporis trinalis* and *Appendicisporites distocarinatus*. Assemblage dominated by abundant terrestrial plant material with only rare palynomorphs. Most non-marine of all samples examined.
Core–2	1296.65	*P. mawsonii* (*H. trinalis* Subzone)	A2	*P. infusorioides* (*C. edwardsii* Acme)	A3	15%	3%	LAD of *Palaeoperidinium cretaceum*. Relatively high microplankton abundance suggest this sample correlates to condensed section and downlap surface within Waarre Unit B.
Core–2	1303.55	*P. mawsonii* (*H. trinalis* Subzone)	A2	*P. infusorioides* (*C. edwardsii* Acme)	A3	5%	NR	This and underlying core samples are still marine but contain lower abundance and diversity of microplankton. Samples may belong to either Units A or B of the Waarre.
Core–2	1305.56	*P. mawsonii* (*H. trinalis* Subzone)	A2			<2%	1%	Microplankton rare but sample also contains microforaminiferal inner liners.
Core–2	1310.20	*P. mawsonii* (*H. trinalis* Subzone)	A2	*P. infusorioides* (*C. edwardsii* Acme)	A3	~5%	1%	FAD of *Phyllocladidites mawsonii* in core samples.
Cuttings	1315	*P. mawsonii* (*H. trinalis* Subzone)	D1	*P. infusorioides* (*C. edwardsii* Acme)	D5	7%	<1%	Waarre Formation assemblage mixed with palynomorphs caved from Belfast Mudstone and Paaratte Formation. MP% distorted by cavings and considered unreliable.
Cuttings	1320	*P. mawsonii* (*H. trinalis* Subzone)	D1	*P. infusorioides* (*C. edwardsii* Acme)	D3	20%	1%	Waarre index species present include *Appendicisporites distocarinatus* and *Coptospora pileolus* ms. MP% unreliable.
Cuttings	1325	*P. mawsonii*	D4			~18%	4%	Waarre index species present include *A. distocarinatus* and *Rugulatisporites admirabilis* ms. MP% unreliable.
Cuttings	1330	*P. mawsonii* (*H. trinalis* Subzone)	D4			13%	1%	FADs for *A. distocarinatus* and *H. trinalis* ms in cuttings. No palynomorphs recorded indicative of Eumeralla Formation. MP% distorted by cavings and considered unreliable.

Abbreviations:

CR = Confidence Ratings

MP% = Microplankton as percentage of total MP and SP count

Ac% = *Amosopollis cruciformis* as percentage of total SP and MP count.

FAD = First Appearance Datum

LAD = Last Appearance Datum

NR = Not Recorded

Confidence Ratings

Alpha codes: Linked to sample type		**Numeric codes:** Linked to fossil assemblage		
A	Core	**1**	**Excellent confidence:**	High diversity assemblage recorded with key zone species.
B	Sidewall core	**2**	**Good confidence:**	Moderately diverse assemblage recorded with key zone species.
C	Coal cuttings	**3**	**Fair confidence:**	Low diversity assemblage recorded with key zone species.
D	Ditch cuttings	**4**	**Poor confidence:**	Moderate to high diversity assemblage recorded without key zone species.
E	Junk basket	**5**	**Very low confidence:**	Low diversity assemblage recorded without key zone species.
F	Miscellaneous/unknown			
G	Outcrop			

Species Diversity

The use of relative diversity terms equate to the following number of species. Both spore-pollen and microplankton diversity excludes reworked or caved species in the samples.

Very low	=	1–5	species
Low	=	6–10	species
Moderate	=	11–25	species
High	=	26–74	species
Very high	=	75+	species

Table–3: Basic Sample and Palynomorph Data for Skull Creek West–1										
Sample Type	**Depth (m)**	**Lithology**	**Wt**	**Vom (cc)**	**O/Yield**	**Visual Yield**	**Palynomorph Concentration**	**Preservation**	**Number SP Species**	**Number MP Species**
Cuttings	1270	Dark grey mudstone.	12.0	1.0	0.083	High	Moderate	Poor-good	32	17
Cuttings	1285	Medium grey mudstone with minor consolidate fine sandstone.	14.0	0.3	0.021	High	Moderate	Fair-good	32	10
Core-1	1290.65	Medium grey laminated siltstone with very fine carbonaceous flecks. Single fine sandstone laminae <2μm thick.	14.8	3.8	0.256	High	Very low	Poor	19	3
Core-2	1296.65	Medium grey mudstone. No sedimentary features.	13.9	2.4	0.172	High	Moderate	Poor-fair	23	14
Core-2	1303.55	Medium grey mudstone with fine carbonaceous flecks. No obvious bedding lamination.	14.2	2.0	0.140	High	Low	Poor-fair	21	4
Core-2	1305.56	Medium grey mudstone with fine to coarse carbonaceous flecks and fragments.	15.1	2.8	0.185	High	Low	Poor	19	2
Core-2	1310.20	Medium grey siltstone and mudstone with carbonaceous flecks inter-laminated with pale grey fine sandstone.	17.3	2.4	0.138	High	Low	Poor	22	7
Cuttings	1315	Medium grey mudstone.	16.6	2.4	0.144	High	Moderate	Poor-good	34	15
Cuttings	1320	Light grey fine sandstone. Sample largely powder.	15.2	0.4	0.026	High	Low	Poor-good	31	17
Cuttings	1325	Light grey fine sandstone (90%) with medium grey mudstone (10%). Sample coarse to pebble sized.	13.7	0.5	0.036	High	Low	Poor-fair	23	12
Cuttings	1330	Light grey fine-medium sandstone (80%) with medium grey mudstone (~30%) some in large pieces and probably caved.	15.9	0.4	0.025	High	Moderate	Poor-good	27	12
		Averages	**14.8**						**25.7**	**10.3**
			Wt	=	Weight of samples in grams					
			Vol (cc)	=	Volume of aqueous suspension of kerogen residue recovered by Laola Pty Ltd					
			O/yield	=	Volume (cc) divided by Weight (grams)					

Table–4: Palynomorphs Abundance Data Skull Creek West–1											
Sample Type	Cuttings	Cuttings	Core-1	Core-2	Core-2	Core-2	Core-2	Cuttings	Cuttings	Cuttings	Cuttings
Depth (m)	1270	1285	1290.65	1296.65	1303.55	1305.56	1310.20	1315	1320	1325	1330
SPORES											
Aequitriradites spp.		0.9%									
Appendicisporites spp.			2.0%							1.0%	1.1%
Baculatisporites spp.	3.7%	2.8%	5.9%	1.9%		3.9%	1.9%	3.7%	7.8%	1.0%	3.4%
Cicatricosisporites spp.	1.9%	1.8%					1.0%		1.1%	2.0%	
Clavifera spp.		0.9%						0.9%			
Cyathidites (large) >40μm	2.8%	5.5%	3.9%	3.8%	2.7%	2.9%	3.8%	3.7%	4.4%	6.0%	10.2%
Cyathidites (small) <40μm	17.6%	15.6%	5.9%	16.3%	14.2%	12.6%	9.5%	10.3%	15.6%	10.0%	10.2%
Dictyophyllidites spp.	1.9%	4.6%	3.9%		0.9%	1.0%	5.7%	1.9%		3.0%	
Gleicheniidites spp.	15.7%	11.0%	2.0%	10.6%	3.5%	7.8%	12.4%	5.6%	11.1%	10.0%	9.1%
Herkosporites spp./Ceratosporites sp.	0.9%			1.0%	0.9%		1.9%	0.9%	1.1%	1.0%	
Laevigatosporites spp.	1.9%	3.7%	7.8%	3.8%	5.3%	1.0%	1.9%	0.9%	3.3%	3.0%	6.8%
Marratisporites scabratus							1.0%	0.9%			
Osmundacidites spp.				1.0%	0.9%	1.9%	1.0%	0.9%	2.2%		
Perotrilites sp.				1.9%							
Retitriletes spp.			2.0%	1.0%			1.9%	1.9%	3.3%		2.3%
Rugulatisporites spp.								8.4%		3.0%	
Stereisporites spp.	2.8%	1.8%	5.9%		0.9%	7.8%	2.9%		2.2%	3.0%	
Triletes undiff.	1.9%	2.8%	3.9%	5.8%	3.5%	1.0%	1.9%	4.7%	2.2%	3.0%	5.7%
Triporoletes reticulatus					0.9%						
Megaspores						1.0%					
Total Spores	**51%**	**51%**	**43%**	**47%**	**34%**	**41%**	**47%**	**45%**	**54%**	**46%**	**49%**
GYMNOSPERMS											
Araucariacites australis	1.9%	3.7%	9.8%	6.7%	21.2%	6.8%	4.8%	2.8%	5.6%	6.0%	4.5%
Corollina spp.		0.9%		1.0%					1.1%	1.0%	1.1%
Cupressacites sp.	5.6%	2.8%	2.0%	3.8%	6.2%	5.8%	4.8%		2.2%	8.0%	2.3%
Dilwynites pusillus ms	2.8%	5.5%	11.8%	7.7%	10.6%	9.7%	1.0%	6.5%	2.2%		2.3%
Dilwynites spp.	1.9%	2.8%	5.9%	4.8%		6.8%	4.8%	2.8%	4.4%	3.0%	5.7%
Hoegisporis trinalis ms				1.0%	0.9%	1.0%	1.9%				1.1%
Microcachryidites antarcticus	0.9%	0.9%	5.9%	10.6%	8.8%	2.9%	10.5%	3.7%	3.3%	3.0%	6.8%
Phyllocladidites mawsonii	0.9%	2.8%					1.9%	3.7%	1.1%		1.1%
Podocarpidites spp.	14.8%	21.1%	15.7%	14.4%	15.0%	19.4%	21.0%	16.8%	17.8%	25.0%	21.6%
Trichotomonosulcites subgranulatus	8.3%	1.8%	5.9%	1.9%	2.7%	5.8%	1.0%	3.7%	4.4%	5.0%	3.4%
Vitreisporites signatus				1.0%							
Total Gymnosperms	**37%**	**42%**	**57%**	**53%**	**65%**	**58%**	**51%**	**40%**	**42%**	**51%**	**50%**
ANGIOSPERMS undiff.											
Australopollis obscurus	0.9%	1.8%						0.9%			
Forcipites spp.	1.9%	0.9%						0.9%			
Liliacidites spp.	0.9%					1.0%	1.9%		1.1%	1.0%	
Nothofagidites senectus		1.8%						3.7%			
Proteacidites spp.	4.6%	0.9%						3.7%	1.1%	2.0%	
Tricolpites/Tricolporites spp.	2.8%	0.9%			0.9%			5.6%	1.1%		1.1%
Triporopollenites spp.	0.9%										
Total Angiosperms	**12%**	**6%**			**1%**	**1%**	**2%**	**15%**	**3%**	**3%**	**1%**
Total Spore-Pollen Count:	**108**	**109**	**51**	**104**	**113**	**103**	**105**	**107**	**90**	**100**	**88**

Table–4: Palynomorphs Abundance Data Skull Creek West–1											
Sample Type	Cuttings	Cuttings	Core-1	Core-2	Core-2	Core-2	Core-2	Cuttings	Cuttings	Cuttings	Cuttings
Depth (m)	1270	1285	1290.65	1296.65	1303.55	1305.56	1310.20	1315	1320	1325	1330
MICROPLANKTON % of MP COUNT											
Microplankton undiff.	15%	14%		26%	17%	50%	40%	50%	30%	23%	31%
Amosopollis cruciformis	8%	14%		21%		50%	20%		4%	23%	8%
Cribroperidinium edwardsii			100%	5%	17%						
Cyclophelium spp.				16%							
Heterosphaeridium spp.	38%	50%		5%			20%	38%	35%	32%	38%
Isabelidinium spp.	15%	8%							13%	14%	15%
Odontochitina spp.	8%	11%		5%	50%				9%	5%	8%
Oligosphaeridium spp.				5%				13%			
Palaeoperidinium cretaceum				16%	17%		20%		9%		
Spiniferites spp.	15%	3%								5%	
Total Microplankton Count:	**13**	**36**	**1**	**19**	**6**	**2**	**5**	**8**	**23**	**22**	**13**
Microplankton % of total SP & MP:	**11%**	**25%**	**2%**	**15%**	**5%**	**2%**	**5%**	**7%**	**20%**	**18%**	**13%**
A. cruciformis as % of total SP & MP:	1%	3%		3%		1%	1%		1%	4%	1%
Total SP and MP COUNT:	**121**	**145**	**52**	**123**	**119**	**105**	**110**	**115**	**113**	**122**	**101**
Other Palynomorphs % of TOTAL COUNT											
Microforaminiferal liners					1%	1%		1%		1%	
Fungal fruiting bodies				1%		1%					
Fungal spores	1%					3%	1%	1%		1%	
Fungal hyphae	2%		4%	1%	2%	7%	4%	2%	2%	2%	
Total Other Palynomorphs	3%		4%	2%	3%	11%	5%	3%	2%	3%	
Reworked Fossils		1%	2%		2%	1%			2%	2%	1%
TOTAL COUNT:	**125**	**147**	**55**	**125**	**125**	**119**	**116**	**119**	**117**	**129**	**102**

Table–5: Skull Creek West-1—Range Chart for selected palynomorphs

Sample Type	Cuttings	Cuttings	Core	Core	Core	Core	Core	Cuttings	Cuttings	Cuttings	Cuttings
Depth (m)	**1270**	**1285**	**1290.65**	**1296.65**	**1303.55**	**1305.56**	**1310.20**	**1315**	**1320**	**1325**	**1330**
SPORES											
Aequitriradites spinulosus		X									
Alisporites grandis						X					
Appendicisporites distocarinatus			X						X	X	X
Aratrisporites spp. **RW**					RW			RW			
Araucariacites australis	X	X	X	X	X	X	X	X	X	X	X
Australopollis obscurus	X	X						X			X
Baculatisporites spp.	X	X	X	X		X	X	X	X		X
Callialasporites dampieri	RW										
Camarozonosporites australiense		X						X			X
Camarozonosporites heskermensis								X	X		
Ceratosporites equalis	X	X		X	X			X	X	X	
Cicatricosisporites spp.		X							X	X	
Cicatricosisporites australiensis	X							X	X		
Cicatricosisporites cuniformis						X			X		
Clavatipollenites sp. (crotonoid)				X					X	X	
Clavifera triplex	X	X						X	X		X
Clavifera vultuosus ms		X									
Coptospora pileolus ms		X							X		
Corollina torosa	X	X	X	X						X	X
Crybelosporites striatus					X						
Cupressacites sp.	X	X	X	X	X	X	X	X	X	X	X
Cyatheacidites tectifera		X									
Cyathidites australis	X	X	X	X	X	X	X	X	X	X	X
Cyathidites minor	X	X	X	X	X	X	X	X	X	X	X
Dictyophyllidites spp.	X	X	X		X	X	X	X	X	X	
Dictyotosporites complex								X			
Dictyotosphorites speciosus					X						X
Didecitriletes ericianus **RW**			RW								
Dilwynites granulatus	X	X	X	X	X	X	X	X	X	X	X
Dilwynites pusillus ms	X	X	X	X	X	X	X	X		X	X
Dilwynites tuberculatus	X										X
Foraminisporis asymmetricus		X						X			
Forcipites spp.	X	X						CV			
Forcipites sabulosus		CV									
Foveogleicheniidites confossus							X				
Gleicheniidites spp.	X	X	X	X	X	X	X	X	X	X	X
Herkosporites elliottii					X			X			
Hoegisporis trinalis ms			X	X	X	X	X	X	X		X
Ilexpollenites primus ms	X										
Interulobites intraverrucatus											X
Laevigatosporites musa ms		X					X				
Laevigatosporites ovatus	X	X	X	X	X	X	X	X	X	X	X
Liliacidites spp.	X					X	X				

Table–5: Skull Creek West-1—Range Chart for selected palynomorphs											
Sample Type	Cuttings	Cuttings	Core	Core	Core	Core	Core	Cuttings	Cuttings	Cuttings	Cuttings
Depth (m)	1270	1285	1290.65	1296.65	1303.55	1305.56	1310.20	1315	1320	1325	1330
Microcachryidites antarticus	X	X	X	X	X	X	X	X	X	X	X
Nevesisporites dailyi									X		
Nothofagidites senectus		CV						CV			
Ornamentifera sentosa		CV						X			
Ornamentifera wellmanii				X	X	X	X				
Peninsulapollis gillii	X										
Peromonolites bowenii								CV			
Perotrilites jubatus				X							
Perotrilites majus								X	X		
Phyllocladidites mawsonii	X	X					X	X	X		X
Plicatipollenites sp. **RW**	RW	RW						RW	RW		RW
Podocarpidites spp.	X	X	X	X	X	X	X	X	X	X	X
Proteacidites spp.	X	X						X		CV	X
Protohaploxypinus spp. **RW**						RW					
Retimonocolpites peroreticulatus										X	
Retitriletes spp.	X		X	X			X	X	X		X
Retitriletes austroclavatidites				X							X
Retitriletes eminulus	X							X			
Retitriletes nodosa									X		
Rugulatisporites admirabilis ms			X	X						X	X
Rugulatisporites mallatus										X	
Schizocolpus marlinensis								CV			
Stereisporites antiquisporites	X	X	X	X	X	X	X	X	X	X	
Stereisporites pocockii									X		
Stereisporites virisus	X										
Stoverisporites microverrucatus								X			X
Striatoabieites multistriatus **RW**									RW	RW	
Trichotomonosulcites subgranulatus	X	X	X	X	X	X	X	X	X	X	
Tricolpites spp.	X	X			X				X		X
Tricolpites confessus								CV		CV	
Tricolporites apoxyexinus								CV			
Triporoletes reticulatus					X				X		
Triporopollenites spp.	X										
Tuberculatosporites sp. A							X				
Vitreisporites signatus	X			X							
MICROPLANKTON											
Amosopollis cruciformis	X	X		X		X	X	X	X	X	X
Apteodinium sp.								X			
Callaiosphaeridium asymmetricum	X										
Canningia rotundata	X										
Chlamydophorella nyei				X							
Conosphaeridium striatoconus		X									
Cribroperidinium cooksoniae				X					cf		
Cribroperidinium edwardsii			X	X	X		X		X		

Table–5: Skull Creek West-1—Range Chart for selected palynomorphs

Sample Type	Cuttings	Cuttings	Core	Core	Core	Core	Core	Cuttings	Cuttings	Cuttings	Cuttings
Depth (m)	**1270**	**1285**	**1290.65**	**1296.65**	**1303.55**	**1305.56**	**1310.20**	**1315**	**1320**	**1325**	**1330**
Cribroperidinium edwardsii (opercula)							X	X	X		
Cyclonephelium compactum				X	X			X	X		
Cyclonephelium distinctum											X
Dingogymnium nelsonense									CV		
Exochosphaeridium sp.			X	X							X
Florentinia deanei								X			
Fromea laevigata	X										
Heterosphaeridium spp.	X	X		X			X	X	X	X	X
Heterosphaeridium heteracanthum	X	X		X			X	X	X	X	X
Hexagonifera glabra	cf.									CV	CV
Isabelidinium spp.	X							CV	CV	CV	CV
Isabelidinium belfastense		X									
Isabelidinium cretaceum	X	X						CV	CV	CV	CV
Kiokansium polypes								X			
Lecaniella spp.							X				
Micrhystridium sp. A, Marshall 1989										X	
Nummus sp.				X				X			
Odontochitina costata	X	X		X	X	X		X	X	X	X
Odontochitina cribropoda	X	X						CV	CV	CV	
Odontochitina porifera	X							CV	CV	CV	CV
Oligosphaeridium complex			X	X							
Oligosphaeridium pulcherrimum				X				X			
Palaeoperidinium cretaceum				X	X		X		X		
Palambages spp.				X							
Schizosporis reticulatus											X
Sigmopollis carbonis		X							X		
Spiniferites spp.	X	X						X	X	X	X
Subtilisphaera sp.	X										
Trichodinium castanea											
Trithyrodinium spp.	X								X		X
Trithyrodinium vermiculata										CV	
Xenikoon australis	CV										
OTHER											
Microforaminifera liners	X				X	X		X		X	
Fungal fruiting bodies				X		X	X		X		
Fungal spores & hypae	X		X	X	X	X		X	X	X	
Botryococcus sp.											
ABBREVIATIONS											
X = Present											
RW = Reworked											
CV = Caved											
cf = Compared with											

APPENDIX 11

WELL LOCATION SURVEY DATA

018 528 653

ALAN H. SIMPSON

Licensed Surveyor, B. App. Sci. (Survey), L.S., M.I.S., Aust.

A.C.N. 062 912 510

Correspondence to:
P.O. Box 421,
Warrnambool, 3280

LAND SURVEYOR — WARRNAMBOOL

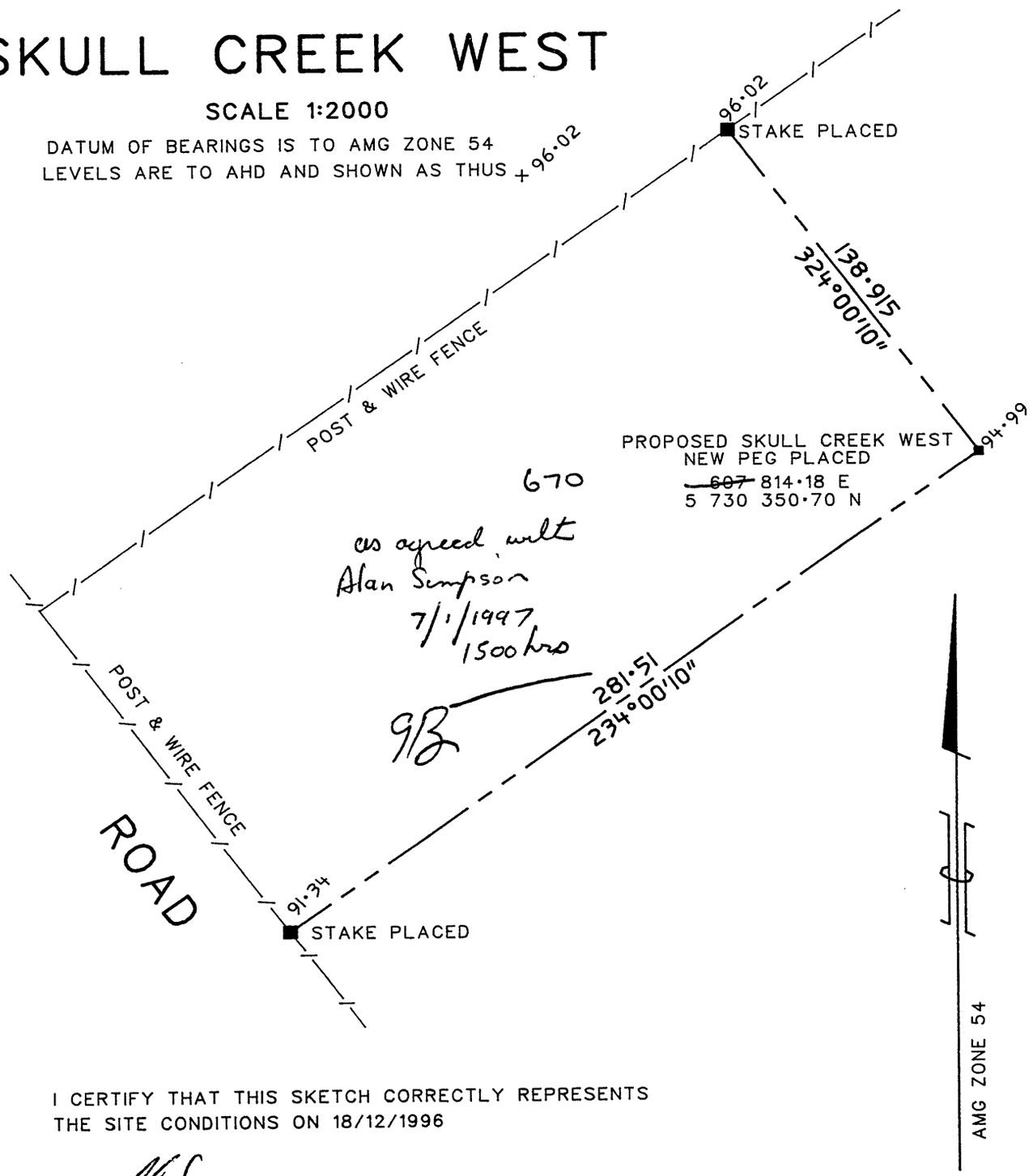
125a Kepler Street, Warrnambool.

Phone: (03) 5561 1846
A.H. (03) 5569 2404
Fax: (03) 5562 1775

SKULL CREEK WEST

SCALE 1:2000

DATUM OF BEARINGS IS TO AMG ZONE 54
LEVELS ARE TO AHD AND SHOWN AS THUS +96·02



I CERTIFY THAT THIS SKETCH CORRECTLY REPRESENTS
THE SITE CONDITIONS ON 18/12/1996

ALAN H. SIMPSON L.S.

APPENDIX 12

DRILLING REPORT

The Drilling Report will be forwarded at a later date.

ENCLOSURES

PE605032

This is an enclosure indicator page.
The enclosure PE605032 is enclosed within the container PE907607 at this location in this document.

The enclosure PE605032 has the following characteristics:

ITEM_BARCODE	= PE605032
CONTAINER_BARCODE	= PE907607
NAME	= Composite Well Log
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= COMPOSITE_LOG
DESCRIPTION	= Composite Well Log (enclosure from Well Completion Report vol.2) for Skull Creek West-1
REMARKS	=
DATE_CREATED	= 2/03/97
DATE_RECEIVED	= 30/04/98
W_NO	= W1180
WELL_NAME	= SKULL CREEK WEST-1
CONTRACTOR	= BASIN OIL NL
CLIENT_OP_CO	= BASIN OIL NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE605033

This is an enclosure indicator page.
The enclosure PE605033 is enclosed within the container PE907607 at this location in this document.

The enclosure PE605033 has the following characteristics:

ITEM_BARCODE	= PE605033
CONTAINER_BARCODE	= PE907607
NAME	= Mud Log
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= MUD_LOG
DESCRIPTION	= Mud Log (enclosure from Well Completion Report vol.2) for Skull Creek West-1
REMARKS	=
DATE_CREATED	= 23/02/97
DATE_RECEIVED	= 30/04/98
W_NO	= W1180
WELL_NAME	= SKULL CREEK WEST-1
CONTRACTOR	= HALLIBURTON
CLIENT_OP_CO	= BASIN OIL NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE605034

This is an enclosure indicator page.
The enclosure PE605034 is enclosed within the container PE907607 at this location in this document.

The enclosure PE605034 has the following characteristics:

ITEM_BARCODE	= PE605034
CONTAINER_BARCODE	= PE907607
NAME	= Electric Log Analysis
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Electric Log Analysis (enclosure from Well Completion Report vol.2) for Skull Creek West-1
REMARKS	=
DATE_CREATED	= 22/01/98
DATE_RECEIVED	= 30/04/98
W_NO	= W1180
WELL_NAME	= SKULL CREEK WEST-1
CONTRACTOR	= BASIN OIL NL
CLIENT_OP_CO	= BASIN OIL NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE907608

This is an enclosure indicator page.
The enclosure PE907608 is enclosed within the container PE907607 at this location in this document.

The enclosure PE907608 has the following characteristics:

ITEM_BARCODE	= PE907608
CONTAINER_BARCODE	= PE907607
NAME	= Velocity Survey
BASIN	= OTWAY
PERMIT	= PPL/1
TYPE	= WELL
SUBTYPE	= VELOCITY_RPT
DESCRIPTION	= Velocity Survey Report, for Cultus Petroleum NL, recorded by Velocity Data Pty Ltd, processed by Velseis Pty Ltd, (enclosure from Well Completion Report vol.2) for Skull Creek West-1
REMARKS	=
DATE_CREATED	= 2/04/97
DATE_RECEIVED	=
W_NO	= W1180
WELL_NAME	= SKULL CREEK WEST-1
CONTRACTOR	= VELSEIS PTY LTD
CLIENT_OP_CO	= CULTUS PETROLEUM PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

Enclosure from WCR vol. 2

Velocity Survey

Skull Creek West-1

(W1180)

Velocity Data

VELOCITY SURVEY

SKULL CREEK WEST NO. 1

PPL-1

VICTORIA

for

CULTUS PETROLEUM NL

recorded by

VELOCITY DATA PTY. LTD.

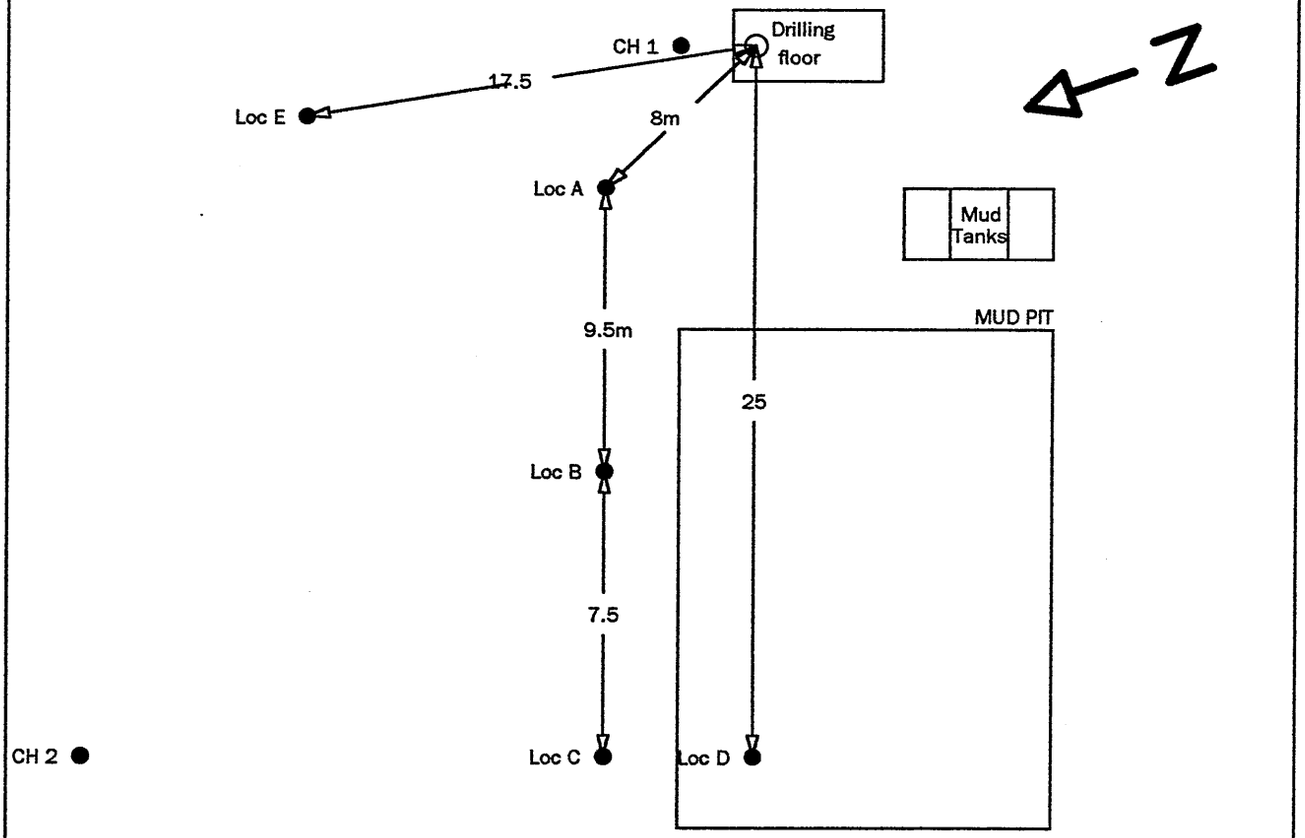
Processed by

VELSEIS PTY. LTD.

Integrated Seismic Technologies

Brisbane, Australia
2 April, 1997

CONTENTS



SKULL CREEK WEST #1

SHOT POINT LOCATION SKETCH

CULTUS PETROLEUM NL

Figure 1

SUMMARY

Velocity Data Pty Ltd conducted a velocity survey for Cultus Petroleum NL in the Skull Creek West No. 1 well, PPL 1, Victoria, Australia. The date of the survey was the 26th February 1997.

The results of the survey, which are considered to be reliable, have been used to calibrate the sonic log.

Explosives were used as an energy source with shots being fired in the mud pit in the majority of instances.

GENERAL INFORMATION

Name of Well	: Skull Creek West No. 1
Location	: PPL 1
Coordinates	: Latitude 38 33' 13.5"S : Longitude 142 57' 37.5"E
Date of Survey	: 26th February, 1997
Wireline Logging	: BPB Wireline Services
Weather	: Fine
Operational Base	: Brisbane
Operator	: D. Blick
Shooter	: G. Clifford
Client Representative	: Mr. D. Horner

EQUIPMENT

Downhole Tool

Veldata Camlock 100 (90 mm)

Sensors:

6 HSI 4.5 Hz 215 ohm, high temperature (300 degrees F) detectors connected in series parallel. Frequency response 8-300 Hz within 3 dB.

Preamplifier:

48 dB fixed gain.
Frequency response 5-200 Hz within 3 dB.

Reference Geophone

Mark Products L1 4.5 Hz

Recording Instrument

(1) System VDL 16

Windows based high resolution seismic acquisition instruments

Computer :	386 Portable computer
Resolution :	A/D conversion 16 bits
Dynamic Range :	96dB
Total Gain :	136dB
Data channels :	8
Display :	A4 Bubble Jet Printer 300 D.P.I.

RECORDING

Energy Source	: Explosive, Powergel
Shot Location	: Mud pit
Charge Size	: 0.2-2
Average Shot Depth	: 2.0 metre
Mud Pit Shot Offset	: 25.0 metres
Recording Geometry	: Figure 1

Shots were recorded on $3^1/_2$" floppy disc. Printouts of the shots used are included with this report.

The sample rate was 0.5 ms across the entire survey.

The scale of the graphic display varies with signal strength and is noted on each playout.
The times were picked from a sample by sample screen plot a full set of these trace displays can be seen at the rear of the report.

PROCESSING

Elevation Data

Elevation of RT	: 100.3m above sea level
Elevation of Ground	: 96.0m above sea level
Elevation of Seismic Datum	: 0.0m above sea level
Depth Surveyed	: 1990.0m below RT
Total Depth	: 2000m
Depth of Casing	: 722m below RT
Sonic Log Interval	: 1.2m to 1987.9m below RT

PROCESSING

Recorded Data

Number of Shots Processed : 31

Number of Levels Recorded : 20

Data Quality : Good

Noise Level : Low

Correction for Instrument Delay and Shot Offset

The 'corrected' times shown on the calculation sheet have been obtained by:

(1) Subtraction of the instrument delay (2.5 msec) from the recorded arrival times.
(2) Geometric correction for non-verticality of ray paths resulting from shot offset.
(3) Shot static correction to correct for the depth of shot below ground level at the well head using a correction velocity of 1500 metres/sec.
(4) Additional 1.0 msec uphole time added to all shots external to the mud.
(5) 3.0 msec bulk shift applied to all shots discharged within the mud pit to tie them to shots external to the pit.
(6) re-addition of the instrument delay (2.5 msec).

Correction to Datum

The datum chosen was 0.0 metres ASL that is 100.3 metres below RT. This level was shot seven times during the survey, all of which have been used to calculate the effective datum correction time of 57.3 msec.

This value includes the 2.5 msec instrument delay which must be subtracted to obtain the raw time.

PROCESSING

Calibration of Sonic Log - Method

Sonic times were adjusted to checkshot times using a polynomial derived least squares fit correction of the sonic transient times. The sonic log that lay within the casing was deleted from the calibration.

Differences between the check shot and sonic times arise as the sonic tool measures the local velocity characteristics of the formation with a high frequency signal, whereas the downhole geophone records the bulk velocity character using a signal of significantly lower frequency.

Calibration of Sonic Log - Results

The discrepancies between shot and sonic interval velocities were generally small. The largest of these occurred over the interval 1765.0 to 1888.0m which yielded an interval sonic drift of 30.89 μsec/m.

In aggregate, the shot and sonic interval times differed by 6.2 msec over the logged portion of the well.

PROCESSING

Trace Playouts (Figure 3)

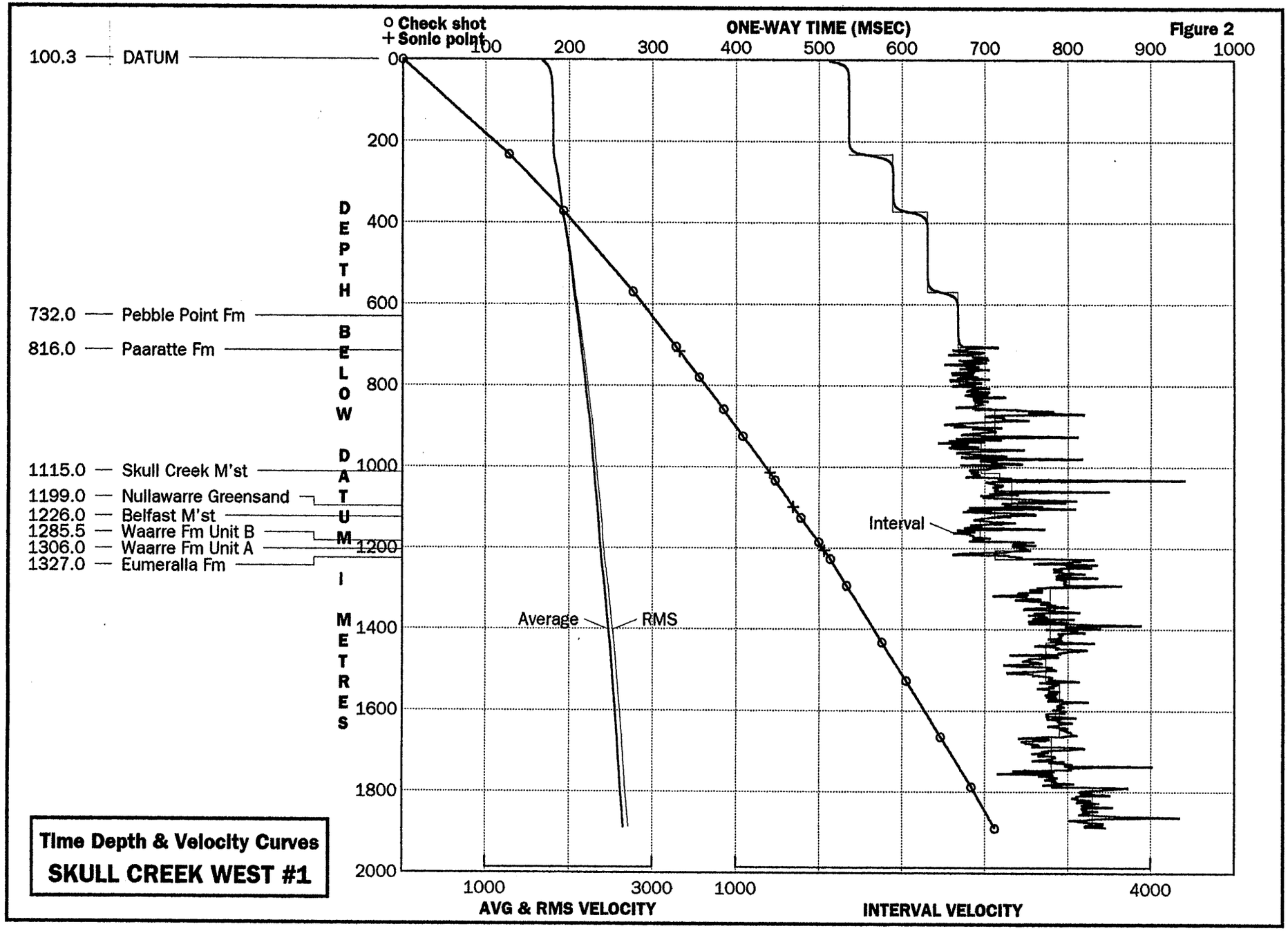
Figure 3A is a plot of all raw data traces used.

Figure 3B is a plot to scale in depth and time of selected traces.

Figure 3C is a plot of selected surface traces. .

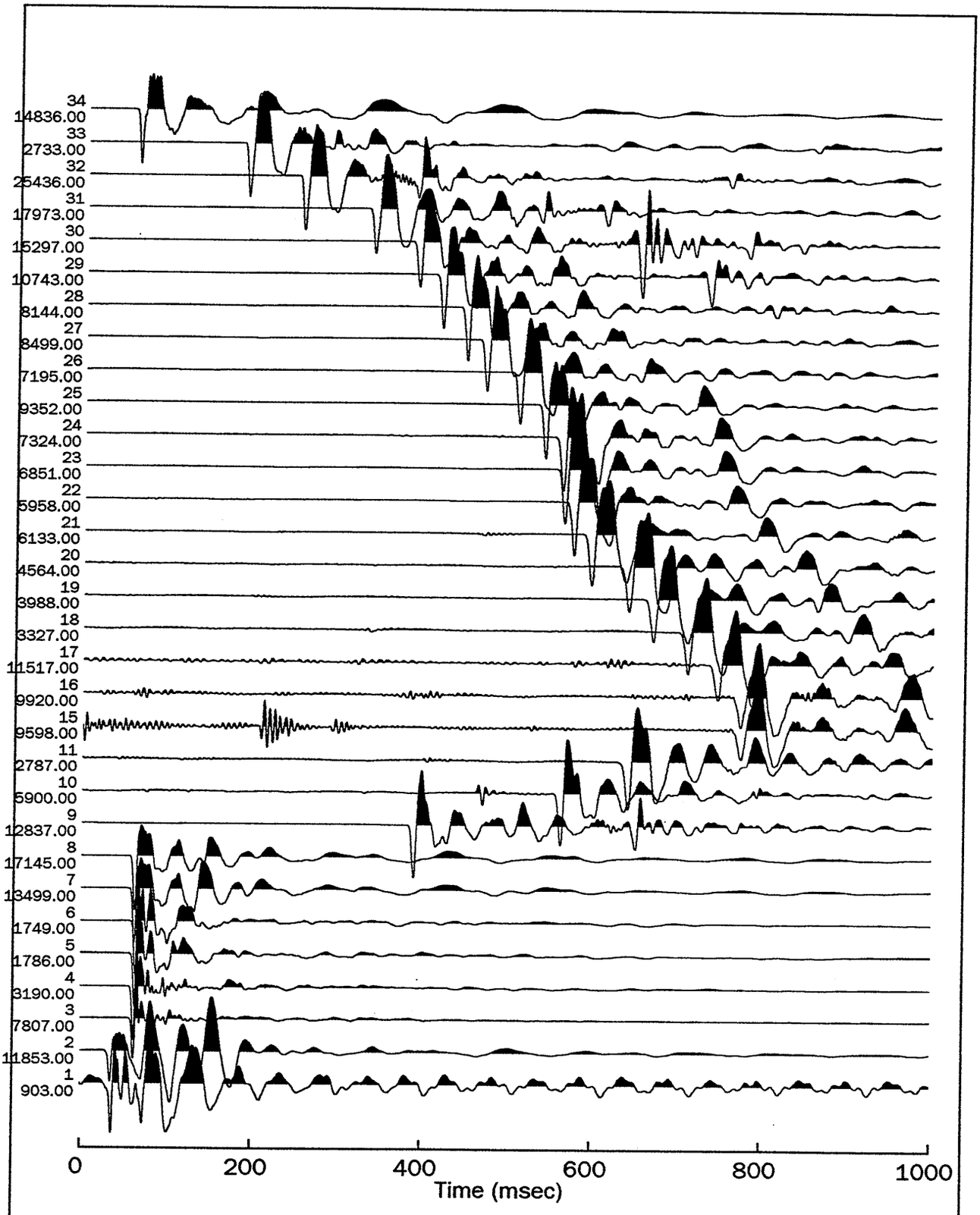
Fiona Duncan
Geophysicist.

Figure 2



Time Depth & Velocity Curves

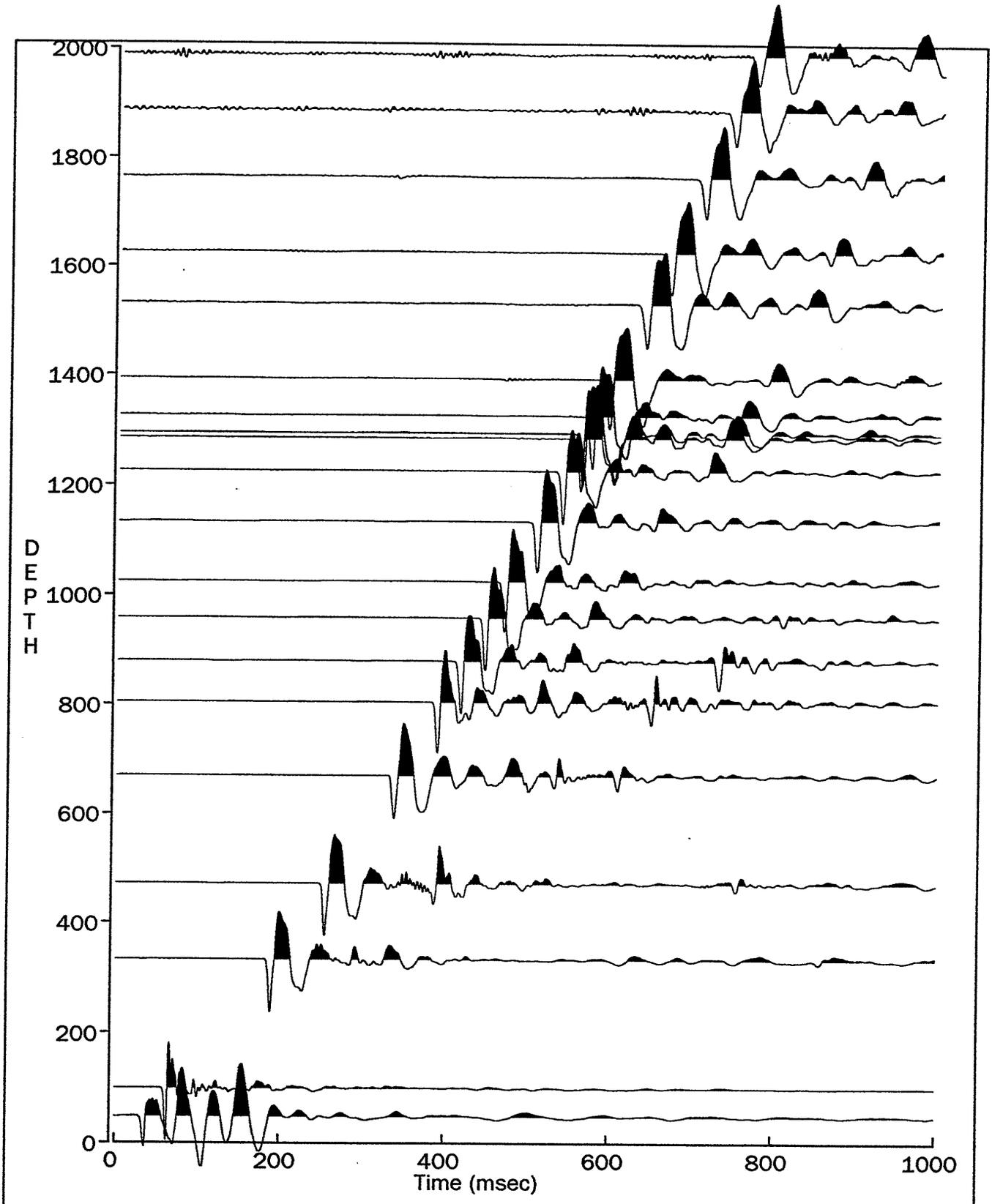
SKULL CREEK WEST #1



SKULL CREEK WEST #1

VELOCITY SURVEY TRACE DISPLAY

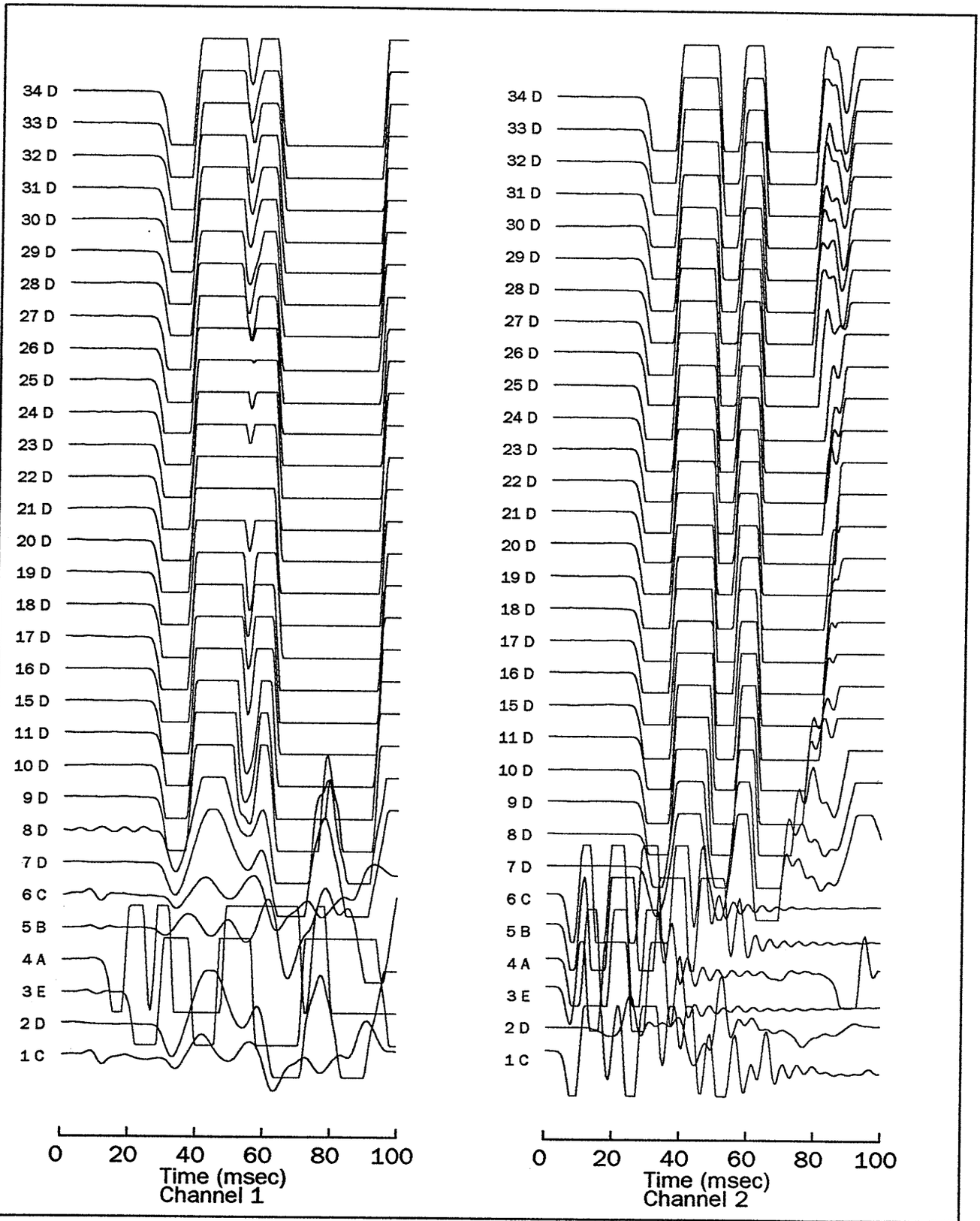
Figure 3a



SKULL CREEK WEST #1

VELOCITY SURVEY TRACE DISPLAY

Figure 3b



SKULL CREEK WEST #1

VELOCITY SURVEY TRACE DISPLAY
AUXILIARY CHANNELS

Figure 3c

TABLE 1 **Time depth curve values** **Page 1**

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
2.5	1.5	1681	1681	1681	102.5	56.9	1803	1803	1815
5.0	2.9	1699	1699	1717	105.0	58.2	1803	1803	1815
7.5	4.4	1713	1714	1744	107.5	59.6	1803	1803	1815
10.0	5.8	1726	1726	1764	110.0	61.0	1803	1804	1815
12.5	7.2	1736	1736	1778	112.5	62.4	1804	1804	1815
15.0	8.6	1744	1745	1788	115.0	63.8	1804	1804	1815
17.5	10.0	1752	1752	1796	117.5	65.1	1804	1804	1815
20.0	11.4	1758	1758	1801	120.0	66.5	1804	1805	1815
22.5	12.8	1763	1763	1805	122.5	67.9	1805	1805	1815
25.0	14.1	1767	1768	1808	125.0	69.3	1805	1805	1815
27.5	15.5	1771	1771	1810	127.5	70.6	1805	1805	1815
30.0	16.9	1774	1775	1811	130.0	72.0	1805	1805	1815
32.5	18.3	1777	1778	1812	132.5	73.4	1805	1805	1815
35.0	19.7	1780	1780	1813	135.0	74.8	1805	1806	1815
37.5	21.0	1782	1782	1814	137.5	76.1	1806	1806	1815
40.0	22.4	1784	1784	1814	140.0	77.5	1806	1806	1815
42.5	23.8	1786	1786	1814	142.5	78.9	1806	1806	1815
45.0	25.2	1787	1788	1814	145.0	80.3	1806	1806	1815
47.5	26.6	1789	1789	1814	147.5	81.7	1806	1806	1815
50.0	27.9	1790	1790	1815	150.0	83.0	1806	1807	1815
52.5	29.3	1791	1791	1815	152.5	84.4	1807	1807	1815
55.0	30.7	1792	1792	1815	155.0	85.8	1807	1807	1815
57.5	32.1	1793	1793	1815	157.5	87.2	1807	1807	1815
60.0	33.4	1794	1794	1815	160.0	88.5	1807	1807	1815
62.5	34.8	1795	1795	1815	162.5	89.9	1807	1807	1815
65.0	36.2	1796	1796	1815	165.0	91.3	1807	1807	1815
67.5	37.6	1796	1797	1815	167.5	92.7	1807	1807	1815
70.0	39.0	1797	1797	1815	170.0	94.1	1807	1808	1815
72.5	40.3	1798	1798	1815	172.5	95.4	1808	1808	1815
75.0	41.7	1798	1798	1815	175.0	96.8	1808	1808	1815
77.5	43.1	1799	1799	1815	177.5	98.2	1808	1808	1815
80.0	44.5	1799	1799	1815	180.0	99.6	1808	1808	1815
82.5	45.8	1800	1800	1815	182.5	100.9	1808	1808	1815
85.0	47.2	1800	1800	1815	185.0	102.3	1808	1808	1815
87.5	48.6	1800	1801	1815	187.5	103.7	1808	1808	1815
90.0	50.0	1801	1801	1815	190.0	105.1	1808	1808	1815
92.5	51.4	1801	1801	1815	192.5	106.5	1808	1808	1815
95.0	52.7	1802	1802	1815	195.0	107.8	1808	1809	1816
97.5	54.1	1802	1802	1815	197.5	109.2	1808	1809	1816
100.0	55.5	1802	1802	1815	200.0	110.6	1809	1809	1816

TABLE 1 Time depth curve values

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
202.5	112.0	1809	1809	1817	302.5	161.3	1876	1880	2136
205.0	113.3	1809	1809	1818	305.0	162.5	1877	1882	2136
207.5	114.7	1809	1809	1819	307.5	163.6	1879	1884	2136
210.0	116.1	1809	1809	1820	310.0	164.8	1881	1886	2136
212.5	117.5	1809	1809	1822	312.5	166.0	1883	1887	2136
215.0	118.8	1809	1809	1825	315.0	167.1	1885	1889	2136
217.5	120.2	1810	1810	1830	317.5	168.3	1886	1891	2136
220.0	121.6	1810	1810	1836	320.0	169.5	1888	1893	2136
222.5	122.9	1810	1810	1845	322.5	170.6	1890	1895	2136
225.0	124.3	1811	1811	1857	325.0	171.8	1892	1896	2136
227.5	125.6	1811	1812	1874	327.5	173.0	1893	1898	2136
230.0	126.9	1812	1813	1899	330.0	174.2	1895	1900	2136
232.5	128.2	1814	1814	1935	332.5	175.3	1896	1902	2137
235.0	129.5	1815	1816	1983	335.0	176.5	1898	1903	2137
237.5	130.7	1817	1818	2025	337.5	177.7	1900	1905	2137
240.0	131.9	1819	1820	2055	340.0	178.8	1901	1906	2137
242.5	133.1	1822	1822	2078	342.5	180.0	1903	1908	2138
245.0	134.3	1824	1825	2094	345.0	181.2	1904	1910	2139
247.5	135.5	1827	1828	2106	347.5	182.3	1906	1911	2140
250.0	136.7	1829	1830	2115	350.0	183.5	1907	1913	2141
252.5	137.9	1832	1833	2121	352.5	184.7	1909	1914	2143
255.0	139.0	1834	1836	2125	355.0	185.8	1910	1916	2146
257.5	140.2	1837	1838	2128	357.5	187.0	1912	1917	2150
260.0	141.4	1839	1841	2130	360.0	188.2	1913	1919	2156
262.5	142.6	1841	1844	2132	362.5	189.3	1915	1921	2164
265.0	143.7	1844	1846	2133	365.0	190.5	1916	1922	2175
267.5	144.9	1846	1849	2134	367.5	191.6	1918	1924	2191
270.0	146.1	1848	1851	2135	370.0	192.7	1920	1926	2214
272.5	147.2	1851	1853	2135	372.5	193.9	1922	1928	2246
275.0	148.4	1853	1856	2135	375.0	194.9	1924	1930	2283
277.5	149.6	1855	1858	2136	377.5	196.0	1926	1932	2311
280.0	150.8	1857	1861	2136	380.0	197.1	1928	1935	2332
282.5	151.9	1860	1863	2136	382.5	198.2	1930	1937	2346
285.0	153.1	1862	1865	2136	385.0	199.2	1932	1940	2357
287.5	154.3	1864	1867	2136	387.5	200.3	1935	1942	2365
290.0	155.4	1866	1869	2136	390.0	201.3	1937	1944	2370
292.5	156.6	1868	1872	2136	392.5	202.4	1939	1947	2374
295.0	157.8	1870	1874	2136	395.0	203.4	1942	1949	2377
297.5	158.9	1872	1876	2136	397.5	204.5	1944	1952	2379
300.0	160.1	1874	1878	2136	400.0	205.5	1946	1954	2380

TABLE 1 Time depth curve values

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
402.5	206.6	1948	1957	2381	502.5	248.5	2022	2035	2384
405.0	207.6	1950	1959	2382	505.0	249.6	2023	2037	2384
407.5	208.7	1953	1961	2383	507.5	250.6	2025	2038	2384
410.0	209.7	1955	1964	2383	510.0	251.7	2026	2040	2384
412.5	210.8	1957	1966	2383	512.5	252.7	2028	2041	2384
415.0	211.8	1959	1968	2384	515.0	253.8	2029	2043	2384
417.5	212.9	1961	1971	2384	517.5	254.8	2031	2044	2384
420.0	213.9	1963	1973	2384	520.0	255.9	2032	2046	2384
422.5	215.0	1965	1975	2384	522.5	256.9	2034	2047	2384
425.0	216.0	1967	1977	2384	525.0	258.0	2035	2049	2384
427.5	217.1	1969	1979	2384	527.5	259.0	2036	2050	2384
430.0	218.1	1971	1982	2384	530.0	260.1	2038	2052	2384
432.5	219.2	1973	1984	2384	532.5	261.1	2039	2053	2385
435.0	220.2	1975	1986	2384	535.0	262.2	2041	2055	2385
437.5	221.3	1977	1988	2384	537.5	263.2	2042	2056	2385
440.0	222.3	1979	1990	2384	540.0	264.3	2043	2058	2386
442.5	223.4	1981	1992	2384	542.5	265.3	2045	2059	2386
445.0	224.4	1983	1994	2384	545.0	266.4	2046	2060	2387
447.5	225.5	1985	1996	2384	547.5	267.4	2047	2062	2388
450.0	226.5	1987	1998	2384	550.0	268.5	2049	2063	2390
452.5	227.6	1988	2000	2384	552.5	269.5	2050	2065	2393
455.0	228.6	1990	2002	2384	555.0	270.5	2051	2066	2396
457.5	229.7	1992	2004	2384	557.5	271.6	2053	2067	2401
460.0	230.7	1994	2006	2384	560.0	272.6	2054	2069	2408
462.5	231.8	1996	2008	2384	562.5	273.7	2055	2070	2417
465.0	232.8	1997	2009	2384	565.0	274.7	2057	2072	2431
467.5	233.9	1999	2011	2384	567.5	275.7	2058	2073	2450
470.0	234.9	2001	2013	2384	570.0	276.7	2060	2075	2477
472.5	236.0	2002	2015	2384	572.5	277.7	2061	2076	2510
475.0	237.0	2004	2017	2384	575.0	278.7	2063	2078	2537
477.5	238.1	2006	2018	2384	577.5	279.7	2065	2080	2556
480.0	239.1	2007	2020	2384	580.0	280.7	2067	2082	2570
482.5	240.2	2009	2022	2384	582.5	281.6	2068	2084	2580
485.0	241.2	2011	2024	2384	585.0	282.6	2070	2086	2587
487.5	242.3	2012	2025	2384	587.5	283.6	2072	2088	2592
490.0	243.3	2014	2027	2384	590.0	284.5	2074	2090	2596
492.5	244.4	2016	2029	2384	592.5	285.5	2075	2092	2598
495.0	245.4	2017	2030	2384	595.0	286.4	2077	2094	2600
497.5	246.4	2019	2032	2384	597.5	287.4	2079	2095	2602
500.0	247.5	2020	2034	2384	600.0	288.4	2081	2097	2603

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
602.5	289.3	2082	2099	2603	702.5	327.7	2144	2165	2638
605.0	290.3	2084	2101	2604	705.0	328.5	2146	2167	2894
607.5	291.2	2086	2103	2604	707.5	329.5	2147	2169	2695
610.0	292.2	2088	2105	2604	710.0	330.4	2149	2170	2660
612.5	293.2	2089	2107	2604	712.5	331.4	2150	2172	2569
615.0	294.1	2091	2108	2605	715.0	332.3	2151	2173	2615
617.5	295.1	2093	2110	2605	717.5	333.2	2153	2175	2793
620.0	296.0	2094	2112	2605	720.0	334.1	2155	2177	2768
622.5	297.0	2096	2114	2605	722.5	335.1	2156	2178	2538
625.0	298.0	2098	2116	2605	725.0	336.0	2158	2180	2713
627.5	298.9	2099	2117	2605	727.5	337.0	2159	2181	2711
630.0	299.9	2101	2119	2605	730.0	337.8	2161	2183	2818
632.5	300.8	2102	2121	2605	732.5	338.8	2162	2185	2729
635.0	301.8	2104	2122	2605	735.0	339.6	2164	2187	2824
637.5	302.8	2106	2124	2605	737.5	340.6	2165	2188	2615
640.0	303.7	2107	2126	2605	740.0	341.5	2167	2189	2653
642.5	304.7	2109	2128	2605	742.5	342.4	2168	2191	2809
645.0	305.6	2110	2129	2605	745.0	343.4	2170	2193	2715
647.5	306.6	2112	2131	2605	747.5	344.4	2171	2194	2509
650.0	307.6	2113	2133	2605	750.0	345.3	2172	2195	2654
652.5	308.5	2115	2134	2605	752.5	346.2	2174	2197	2753
655.0	309.5	2116	2136	2605	755.0	347.1	2175	2198	2706
657.5	310.4	2118	2137	2605	757.5	348.1	2176	2200	2621
660.0	311.4	2119	2139	2605	760.0	349.0	2178	2201	2830
662.5	312.4	2121	2141	2605	762.5	349.9	2179	2203	2677
665.0	313.3	2122	2142	2605	765.0	350.8	2181	2204	2722
667.5	314.3	2124	2144	2605	767.5	351.8	2182	2205	2559
670.0	315.2	2125	2145	2605	770.0	352.7	2183	2207	2709
672.5	316.2	2127	2147	2606	772.5	353.7	2184	2208	2564
675.0	317.2	2128	2148	2606	775.0	354.6	2185	2209	2682
677.5	318.1	2130	2150	2606	777.5	355.5	2187	2211	2747
680.0	319.1	2131	2151	2607	780.0	356.5	2188	2212	2601
682.5	320.0	2133	2153	2607	782.5	357.4	2190	2214	2830
685.0	321.0	2134	2154	2608	785.0	358.4	2191	2215	2546
687.5	321.9	2135	2156	2609	787.5	359.3	2192	2216	2553
690.0	322.9	2137	2157	2611	790.0	360.3	2193	2217	2686
692.5	323.9	2138	2159	2613	792.5	361.2	2194	2219	2776
695.0	324.8	2140	2160	2617	795.0	362.1	2195	2220	2613
697.5	325.8	2141	2162	2622	797.5	363.0	2197	2221	2731
700.0	326.7	2142	2163	2629	800.0	364.0	2198	2222	2568

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
802.5	364.9	2199	2224	2713	902.5	400.4	2254	2284	2920
805.0	365.8	2201	2225	2832	905.0	401.3	2255	2285	2713
807.5	366.7	2202	2227	2707	907.5	402.2	2256	2286	2803
810.0	367.7	2203	2228	2696	910.0	403.1	2258	2287	2865
812.5	368.6	2204	2229	2671	912.5	403.9	2259	2289	2882
815.0	369.5	2206	2231	2833	915.0	404.8	2260	2290	2767
817.5	370.4	2207	2232	2700	917.5	405.8	2261	2291	2694
820.0	371.3	2208	2234	2820	920.0	406.7	2262	2292	2631
822.5	372.2	2210	2235	2658	922.5	407.6	2263	2293	2803
825.0	373.2	2211	2236	2696	925.0	408.3	2265	2296	3471
827.5	374.0	2212	2238	2949	927.5	409.2	2267	2297	2838
830.0	374.9	2214	2239	2751	930.0	410.2	2267	2298	2592
832.5	375.8	2215	2241	2717	932.5	411.0	2269	2299	2919
835.0	376.8	2216	2242	2723	935.0	412.0	2269	2300	2543
837.5	377.6	2218	2244	2819	937.5	412.9	2270	2301	2794
840.0	378.6	2219	2245	2734	940.0	413.9	2271	2301	2464
842.5	379.5	2220	2246	2780	942.5	414.9	2272	2302	2678
845.0	380.4	2222	2248	2789	945.0	415.8	2272	2303	2559
847.5	381.3	2223	2249	2749	947.5	416.8	2273	2304	2615
850.0	382.2	2224	2250	2718	950.0	417.7	2274	2305	2752
852.5	383.2	2225	2251	2593	952.5	418.7	2275	2305	2542
855.0	384.0	2226	2253	2833	955.0	419.6	2276	2306	2617
857.5	384.9	2228	2254	2850	957.5	420.5	2277	2308	3083
860.0	385.7	2230	2256	3079	960.0	421.3	2279	2309	2876
862.5	386.5	2232	2259	3293	962.5	422.3	2279	2310	2654
865.0	387.3	2233	2261	3119	965.0	423.2	2280	2311	2596
867.5	388.0	2236	2263	3348	967.5	424.2	2281	2312	2675
870.0	388.7	2238	2266	3515	970.0	425.1	2282	2313	2779
872.5	389.6	2239	2268	2833	972.5	425.9	2283	2314	2958
875.0	390.5	2241	2269	2803	975.0	426.9	2284	2315	2632
877.5	391.4	2242	2271	2937	977.5	427.8	2285	2316	2659
880.0	392.2	2244	2273	2931	980.0	428.5	2287	2318	3504
882.5	393.1	2245	2274	2947	982.5	429.4	2288	2319	2770
885.0	393.9	2247	2276	3118	985.0	430.3	2289	2320	2775
887.5	394.7	2248	2278	2856	987.5	431.2	2290	2321	2868
890.0	395.7	2249	2279	2719	990.0	432.1	2291	2323	2894
892.5	396.6	2250	2280	2607	992.5	432.9	2293	2324	3070
895.0	397.6	2251	2280	2506	995.0	433.8	2294	2325	2628
897.5	398.6	2252	2281	2657	997.5	434.7	2295	2326	2843
900.0	399.5	2253	2282	2579	1000.0	435.5	2296	2328	2951

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1002.5	436.4	2297	2329	2860	1102.5	470.4	2344	2380	3454
1005.0	437.3	2298	2330	2815	1105.0	471.3	2345	2381	2679
1007.5	438.2	2299	2331	2690	1107.5	472.2	2346	2382	2850
1010.0	439.2	2300	2332	2700	1110.0	473.1	2346	2382	2648
1012.5	440.1	2301	2333	2752	1112.5	474.0	2347	2383	2816
1015.0	441.0	2302	2333	2702	1115.0	474.8	2348	2385	3157
1017.5	441.9	2303	2334	2740	1117.5	475.6	2350	2386	3171
1020.0	442.8	2303	2335	2765	1120.0	476.4	2351	2387	2898
1022.5	443.7	2304	2336	2707	1122.5	477.3	2352	2388	2985
1025.0	444.7	2305	2337	2664	1125.0	478.2	2353	2389	2825
1027.5	445.5	2306	2338	2992	1127.5	479.1	2354	2390	2767
1030.0	446.4	2307	2339	2901	1130.0	480.0	2354	2391	2722
1032.5	447.0	2310	2343	4244	1132.5	480.9	2355	2391	2809
1035.0	447.8	2311	2344	2983	1135.0	481.7	2356	2392	2847
1037.5	448.7	2312	2345	2812	1137.5	482.6	2357	2394	3021
1040.0	449.6	2313	2346	2845	1140.0	483.4	2358	2395	2920
1042.5	450.4	2314	2348	2878	1142.5	484.4	2359	2395	2700
1045.0	451.3	2316	2349	2933	1145.0	485.3	2360	2396	2779
1047.5	452.1	2317	2350	2920	1147.5	486.2	2360	2397	2694
1050.0	453.0	2318	2351	2862	1150.0	487.1	2361	2397	2656
1052.5	453.9	2319	2352	2897	1152.5	487.9	2362	2399	3234
1055.0	454.7	2320	2353	2894	1155.0	488.9	2363	2399	2606
1057.5	455.6	2321	2355	2873	1157.5	489.8	2363	2400	2669
1060.0	456.3	2323	2357	3697	1160.0	490.7	2364	2400	2728
1062.5	457.1	2324	2359	3137	1162.5	491.7	2364	2401	2576
1065.0	458.0	2325	2360	2838	1165.0	492.6	2365	2401	2696
1067.5	458.8	2327	2361	3042	1167.5	493.5	2366	2402	2694
1070.0	459.7	2328	2362	2774	1170.0	494.5	2366	2402	2720
1072.5	460.6	2329	2363	2835	1172.5	495.4	2367	2403	2718
1075.0	461.5	2330	2364	2791	1175.0	496.3	2368	2404	2839
1077.5	462.3	2331	2365	2955	1177.5	497.2	2368	2405	2714
1080.0	463.1	2332	2367	3184	1180.0	498.1	2369	2405	2793
1082.5	463.8	2334	2369	3461	1182.5	499.0	2370	2406	2692
1085.0	464.6	2335	2370	3046	1185.0	499.8	2371	2407	3155
1087.5	465.4	2337	2372	3384	1187.5	500.6	2372	2408	3027
1090.0	466.2	2338	2373	2928	1190.0	501.5	2373	2409	3006
1092.5	467.1	2339	2374	2988	1192.5	502.2	2374	2411	3168
1095.0	467.9	2340	2376	2948	1195.0	503.1	2375	2412	3003
1097.5	468.7	2342	2377	3219	1197.5	503.9	2376	2413	3046
1100.0	469.6	2342	2378	2692	1200.0	504.7	2378	2414	3098

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1202.5	505.5	2379	2416	3053	1302.5	536.1	2430	2473	3128
1205.0	506.3	2380	2417	3131	1305.0	536.9	2431	2474	3216
1207.5	507.2	2381	2418	2983	1307.5	537.6	2432	2476	3212
1210.0	508.0	2382	2419	2950	1310.0	538.5	2433	2477	3048
1212.5	509.0	2382	2419	2632	1312.5	539.3	2434	2478	3041
1215.0	509.9	2383	2420	2572	1315.0	540.1	2435	2479	3113
1217.5	510.8	2384	2421	2971	1317.5	541.0	2435	2479	2863
1220.0	511.6	2385	2422	2982	1320.0	541.8	2436	2480	3106
1222.5	512.4	2386	2423	3071	1322.5	542.6	2437	2481	3105
1225.0	513.2	2387	2424	3032	1325.0	543.4	2439	2483	3206
1227.5	513.9	2388	2426	3588	1327.5	544.2	2439	2483	3024
1230.0	514.7	2390	2428	3437	1330.0	545.0	2440	2485	3125
1232.5	515.4	2391	2429	3493	1332.5	545.7	2442	2486	3251
1235.0	516.1	2393	2431	3378	1335.0	546.5	2443	2487	3274
1237.5	516.9	2394	2432	3159	1337.5	547.3	2444	2488	3205
1240.0	517.6	2396	2434	3611	1340.0	548.0	2445	2490	3312
1242.5	518.3	2397	2436	3390	1342.5	548.8	2446	2491	3254
1245.0	519.1	2399	2438	3462	1345.0	549.5	2447	2492	3404
1247.5	519.8	2400	2440	3572	1347.5	550.4	2448	2493	3117
1250.0	520.5	2401	2441	3298	1350.0	551.2	2449	2494	3085
1252.5	521.3	2403	2443	3359	1352.5	551.9	2451	2495	3306
1255.0	522.0	2404	2444	3338	1355.0	552.7	2452	2497	3264
1257.5	522.8	2405	2446	3301	1357.5	553.4	2453	2498	3485
1260.0	523.5	2407	2447	3373	1360.0	554.2	2454	2499	3164
1262.5	524.2	2408	2449	3523	1362.5	555.0	2455	2500	3232
1265.0	525.0	2410	2450	3335	1365.0	555.8	2456	2502	3122
1267.5	525.7	2411	2452	3321	1367.5	556.5	2457	2503	3211
1270.0	526.5	2412	2453	3319	1370.0	557.3	2458	2504	3254
1272.5	527.2	2414	2455	3614	1372.5	558.1	2459	2505	3152
1275.0	527.9	2415	2457	3319	1375.0	558.8	2460	2506	3446
1277.5	528.7	2416	2458	3376	1377.5	559.6	2461	2507	3154
1280.0	529.4	2418	2460	3388	1380.0	560.4	2462	2508	3121
1282.5	530.1	2419	2461	3385	1382.5	561.2	2464	2510	3403
1285.0	530.9	2420	2463	3375	1385.0	562.0	2465	2511	3125
1287.5	531.6	2422	2464	3378	1387.5	562.7	2466	2512	3559
1290.0	532.4	2423	2466	3407	1390.0	563.3	2468	2514	3929
1292.5	533.0	2425	2468	3786	1392.5	564.0	2469	2516	3387
1295.0	533.7	2426	2470	3543	1395.0	564.8	2470	2517	3499
1297.5	534.5	2427	2471	3181	1397.5	565.4	2472	2519	3637
1300.0	535.3	2429	2472	3215	1400.0	566.2	2473	2520	3248

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1402.5	566.9	2474	2521	3471	1502.5	597.4	2515	2566	3178
1405.0	567.7	2475	2523	3425	1505.0	598.3	2515	2566	2962
1407.5	568.4	2476	2524	3524	1507.5	599.1	2516	2567	2965
1410.0	569.1	2478	2525	3330	1510.0	599.9	2517	2568	3149
1412.5	569.9	2479	2527	3366	1512.5	600.7	2518	2568	3147
1415.0	570.6	2480	2528	3339	1515.0	601.5	2519	2569	3241
1417.5	571.4	2481	2529	3354	1517.5	602.3	2520	2570	3288
1420.0	572.1	2482	2531	3345	1520.0	603.0	2521	2572	3278
1422.5	572.9	2483	2532	3261	1522.5	603.8	2522	2572	3264
1425.0	573.6	2484	2533	3337	1525.0	604.5	2523	2574	3325
1427.5	574.4	2485	2534	3361	1527.5	605.3	2524	2575	3480
1430.0	575.1	2486	2535	3277	1530.0	606.0	2525	2576	3200
1432.5	575.8	2488	2537	3591	1532.5	606.8	2526	2577	3271
1435.0	576.6	2489	2538	3330	1535.0	607.5	2527	2578	3332
1437.5	577.3	2490	2539	3309	1537.5	608.3	2528	2579	3301
1440.0	578.1	2491	2540	3165	1540.0	609.1	2528	2580	3265
1442.5	578.9	2492	2541	3295	1542.5	609.8	2529	2581	3299
1445.0	579.6	2493	2542	3335	1545.0	610.6	2530	2582	3182
1447.5	580.4	2494	2544	3314	1547.5	611.4	2531	2583	3264
1450.0	581.1	2495	2545	3540	1550.0	612.1	2532	2584	3268
1452.5	581.8	2497	2546	3480	1552.5	612.9	2533	2585	3338
1455.0	582.5	2498	2548	3380	1555.0	613.7	2534	2586	3265
1457.5	583.3	2499	2549	3328	1557.5	614.4	2535	2587	3324
1460.0	584.0	2500	2550	3345	1560.0	615.2	2536	2588	3240
1462.5	584.9	2501	2551	2986	1562.5	615.9	2537	2589	3310
1465.0	585.6	2502	2552	3292	1565.0	616.7	2538	2590	3248
1467.5	586.4	2503	2553	3332	1567.5	617.5	2539	2591	3318
1470.0	587.2	2504	2554	3209	1570.0	618.2	2540	2591	3264
1472.5	588.0	2504	2555	3119	1572.5	619.0	2541	2593	3367
1475.0	588.8	2505	2556	3130	1575.0	619.7	2541	2593	3258
1477.5	589.6	2506	2556	3075	1577.5	620.4	2543	2595	3545
1480.0	590.4	2507	2557	3169	1580.0	621.2	2544	2596	3396
1482.5	591.1	2508	2558	3212	1582.5	621.9	2545	2597	3347
1485.0	591.9	2509	2559	3127	1585.0	622.7	2545	2598	3349
1487.5	592.8	2509	2560	2941	1587.5	623.4	2546	2599	3322
1490.0	593.6	2510	2560	3056	1590.0	624.2	2547	2600	3374
1492.5	594.4	2511	2561	3286	1592.5	624.9	2548	2601	3329
1495.0	595.1	2512	2563	3246	1595.0	625.7	2549	2602	3349
1497.5	595.9	2513	2564	3293	1597.5	626.4	2550	2603	3292
1500.0	596.7	2514	2565	3316	1600.0	627.2	2551	2604	3389

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval	Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1602.5	627.9	2552	2605	3342	1702.5	658.2	2587	2641	3259
1605.0	628.7	2553	2606	3380	1705.0	659.0	2587	2642	3147
1607.5	629.4	2554	2607	3246	1707.5	659.8	2588	2643	3234
1610.0	630.2	2555	2608	3253	1710.0	660.6	2589	2643	3187
1612.5	631.0	2556	2609	3245	1712.5	661.3	2590	2644	3303
1615.0	631.7	2557	2610	3389	1715.0	662.1	2590	2645	3311
1617.5	632.4	2558	2611	3459	1717.5	662.8	2591	2646	3291
1620.0	633.2	2558	2612	3253	1720.0	663.6	2592	2647	3246
1622.5	633.9	2559	2613	3328	1722.5	664.4	2593	2647	3148
1625.0	634.7	2560	2614	3327	1725.0	665.1	2593	2648	3374
1627.5	635.4	2561	2615	3362	1727.5	665.9	2594	2649	3268
1630.0	636.2	2562	2616	3431	1730.0	666.6	2595	2650	3388
1632.5	636.9	2563	2617	3336	1732.5	667.4	2596	2651	3434
1635.0	637.7	2564	2618	3335	1735.0	668.1	2597	2652	3380
1637.5	638.4	2565	2619	3259	1737.5	668.7	2598	2653	4010
1640.0	639.2	2566	2620	3336	1740.0	669.4	2599	2654	3483
1642.5	639.9	2567	2621	3401	1742.5	670.2	2600	2655	3408
1645.0	640.7	2568	2622	3349	1745.0	670.9	2601	2656	3426
1647.5	641.4	2569	2623	3386	1747.5	671.7	2601	2657	3008
1650.0	642.1	2570	2624	3395	1750.0	672.5	2602	2658	3302
1652.5	642.9	2571	2625	3416	1752.5	673.3	2603	2658	3275
1655.0	643.6	2571	2626	3428	1755.0	674.1	2603	2659	2897
1657.5	644.3	2572	2627	3427	1757.5	674.9	2604	2660	3291
1660.0	645.0	2573	2628	3466	1760.0	675.7	2605	2660	3193
1662.5	645.8	2574	2629	3372	1762.5	676.4	2606	2661	3273
1665.0	646.6	2575	2629	3176	1765.0	677.2	2606	2662	3323
1667.5	647.4	2576	2630	3047	1767.5	677.9	2607	2663	3288
1670.0	648.2	2577	2631	3267	1770.0	678.7	2608	2663	3237
1672.5	648.9	2577	2632	3238	1772.5	679.5	2609	2664	3310
1675.0	649.7	2578	2632	3067	1775.0	680.2	2609	2665	3295
1677.5	650.6	2579	2633	3094	1777.5	681.0	2610	2666	3320
1680.0	651.4	2579	2634	3100	1780.0	681.7	2611	2667	3443
1682.5	652.1	2580	2634	3185	1782.5	682.5	2612	2667	3223
1685.0	652.9	2581	2635	3195	1785.0	683.2	2613	2668	3357
1687.5	653.7	2581	2636	3145	1787.5	684.0	2613	2669	3288
1690.0	654.4	2582	2637	3453	1790.0	684.6	2615	2670	3834
1692.5	655.2	2583	2638	3522	1792.5	685.3	2616	2672	3730
1695.0	655.9	2584	2639	3420	1795.0	686.0	2617	2673	3640
1697.5	656.7	2585	2640	3264	1797.5	686.7	2618	2674	3534
1700.0	657.4	2586	2640	3213	1800.0	687.4	2618	2675	3487

Well : SKULL CREEK WEST #1 Client : CULTUS PETROLEUM NL
Survey units : METRES Datum : 0.0
Calibrated sonic velocities used from 705.0 to 1887.5

Datum depth	One-way time(ms)	VELOCITIES Average	RMS	Interval
1802.5	688.1	2619	2676	3571
1805.0	688.8	2620	2677	3496
1807.5	689.5	2621	2678	3705
1810.0	690.2	2622	2679	3465
1812.5	690.9	2623	2680	3475
1815.0	691.7	2624	2681	3434
1817.5	692.4	2625	2682	3473
1820.0	693.1	2626	2683	3568
1822.5	693.8	2627	2684	3514
1825.0	694.5	2628	2685	3469
1827.5	695.2	2629	2686	3625
1830.0	695.9	2630	2687	3567
1832.5	696.6	2631	2688	3502
1835.0	697.3	2631	2689	3524
1837.5	698.0	2632	2690	3723
1840.0	698.7	2633	2691	3502
1842.5	699.4	2634	2692	3508
1845.0	700.2	2635	2693	3521
1847.5	700.8	2636	2694	3616
1850.0	701.6	2637	2695	3510
1852.5	702.3	2638	2696	3556
1855.0	703.0	2639	2697	3485
1857.5	703.7	2640	2698	3629
1860.0	704.3	2641	2699	3772
1862.5	704.9	2642	2701	4208
1865.0	705.6	2643	2702	3644
1867.5	706.3	2644	2703	3542
1870.0	707.0	2645	2704	3413
1872.5	707.8	2646	2705	3491
1875.0	708.5	2647	2705	3556
1877.5	709.1	2648	2707	3657
1880.0	709.8	2649	2708	3655
1882.5	710.5	2649	2709	3535
1885.0	711.2	2650	2710	3524
1887.5	711.9	2651	2711	3675

COMPANY : CULTUS PETROLEUM NL
WELL : SKULL CREEK WEST #1

Latitude : 38 33 13.50 S Longitude : 142 57 37.50 E Survey date : 10-Jan-80
Elevations : Datum : 0 Ground : 96 Kelly : 100.3

Survey units : METRES
Times : MILLISECONDS

Shot data : Location / Elevation / Offset

Location	Elevation	Offset
A	96.0	8.0
B	96.0	17.5
C	96.0	25.0
E	96.0	17.5
D	95.0	25.0

Rig identification : O.D & E RIG 30
Energy source : POWERGEL
Logger : B.P.B.
Elevation velocity for shot statics : 1500
Instrument delay : 2.5 msec

SHOT CALCULATIONS :

Shot no.	Geophone depth Kelly	Datum	Shot Locn	Shot Depth	TIMES Record	Corr.	Avg.	Datum	Check shot interval distance	time	Velocities Average	RMS	Interval
1	48.0	-52.3	C	0.5	31.0	28.2 n/u							
2	48.0	-52.3	D	1.0	29.0	28.9 n/u							
DATUM													
3	100.3	0.0	E	0.5	56.5	56.6							
4	100.3	0.0	A	0.5	56.5	57.3							
5	100.3	0.0	B	0.5	57.5	57.6							
6	100.3	0.0	C	0.5	58.5	57.7							
7	100.3	0.0	D	1.0	55.5	57.4							
8	100.3	0.0	D	1.0	55.5	57.4							
34	100.3	0.0	D	2.0	55.0	56.9	57.3	0.0					
									232.7	128.3			1813.7
33	333.0	232.7	D	2.0	182.5	185.6	185.6	128.3			1813.7	1813.7	
									139.0	65.2			2131.9
32	472.0	371.7	D	2.0	247.5	250.8	250.8	193.5			1920.9	1926.8	
									198.0	83.1			2382.7
31	670.0	569.7	D	2.0	330.5	333.9	333.9	276.6			2059.7	2074.3	
9	805.0	704.7	D	1.0	382.0	385.5							

SHOT CALCULATIONS : (cont)

Shot no.	Geophone depth Kelly	Geophone depth Datum	Shot Locn	Shot Depth	TIMES Record	TIMES Corr.	TIMES Avg.	TIMES Datum	Check shot distance	Check shot time	Velocities Average	Velocities RMS	Velocities Interval
									135.0	51.9			2601.2
30	805.0	704.7	D	2.0	382.5	386.0	385.8	328.5			2145.2	2166.1	
									75.0	27.7			2707.6
29	880.0	779.7	D	2.0	410.0	413.5	413.5	356.2			2188.9	2213.0	
									79.0	29.0			2724.1
28	959.0	858.7	D	2.0	439.0	442.5	442.5	385.2			2229.2	2255.5	
									66.0	23.0			2869.6
27	1025.0	924.7	D	2.0	462.0	465.5	465.5	408.2			2265.3	2294.5	
									109.0	39.0			2794.9
26	1134.0	1033.7	D	2.0	501.0	504.5	504.5	447.2			2311.5	2342.4	
Belfast M'st													
									92.0	31.1			2958.2
25	1226.0	1125.7	D	2.0	532.0	535.6	535.6	478.3			2353.5	2387.2	
Waarre Fm Unit B													
10	1285.5	1185.2	D	1.0	554.0	557.6			59.5	21.5			2767.4
24	1285.5	1185.2	D	2.0	553.0	556.6	557.1	499.8			2371.3	2404.8	
23	1295.0	1194.7	D	2.0	554.5	558.1 n/u							
Eumeralla Fm													
									41.5	14.0			2964.3
22	1327.0	1226.7	D	2.0	567.5	571.1	571.1	513.8			2387.5	2421.8	
									66.5	19.5			3410.3
21	1393.5	1293.2	D	2.0	587.0	590.6	590.6	533.3			2424.9	2464.9	
11	1532.5	1432.2	D	1.0	630.0	633.6			139.0	42.5			3270.6
20	1532.5	1432.2	D	2.0	629.0	632.6	633.1	575.8			2487.3	2533.2	
									94.0	29.0			3241.4
19	1626.5	1526.2	D	2.0	658.5	662.1	662.1	604.8			2523.5	2571.6	
									138.5	41.5			3337.3
18	1765.0	1664.7	D	2.0	700.0	703.6	703.6	646.3			2575.7	2627.5	

SHOT CALCULATIONS : (cont)

Shot no.	Geophone depth Kelly	Datum	Shot Locn	Shot Depth	TIMES Record	Corr.	Avg.	Datum	Check shot interval distance	time	Velocities Average	RMS	Interval
									123.0	37.5			3280.0
17	1888.0	1787.7	D	2.0	737.5	741.1	741.1	683.8			2614.4	2667.4	
15	1990.0	1889.7	D	2.0	766.5	770.1			102.0	28.5			3578.9
16	1990.0	1889.7	D	2.0	765.5	769.1	769.6	712.3			2653.0	2709.8	

COMPANY : CULTUS PETROLEUM NL
WELL : SKULL CREEK WEST #1

Latitude : 38 33 13.50 S Longitude : 142 57 37.50 E Survey date : 10-Jan-80 Survey units : METRES
Elevations : Datum : 0 Ground : 96 Kelly : 100.3 Times : MILLISECONDS

SONIC DRIFT :

Geophone depth Kelly — Datum		Check shot times Average - Below Datum		Check shot interval Distance – Time		Sonic Int. time	Interval sonic drift usec/m – msec		Cumulative drift msec
DATUM									
100.3	0.0	57.3	0.0						
				232.7	128.3				
333.0	232.7	185.6	128.3						
				139.0	65.2				
472.0	371.7	250.8	193.5						
				198.0	83.1				
670.0	569.7	333.9	276.6						
				135.0	51.9				
805.0	704.7	385.8	328.5						
				75.0	27.7	29.5	-24.00	-1.8	-1.8
880.0	779.7	413.5	356.2						
				79.0	29.0	28.8	2.53	0.2	-1.6
959.0	858.7	442.5	385.2						
				66.0	23.0	23.8	-12.12	-0.8	-2.4
1025.0	924.7	465.5	408.2						
				109.0	39.0	39.4	-3.67	-0.4	-2.8
1134.0	1033.7	504.5	447.2						
				92.0	31.1	31.1	0.00	0.0	-2.8
Belfast M'st									
1226.0	1125.7	535.6	478.3						
				59.5	21.5	20.9	10.08	0.6	-2.2
Waarre Fm Unit B									
1285.5	1185.2	557.1	499.8						

SONIC DRIFT : (cont)

Geophone depth Kelly	Datum	Check shot times Average	Below Datum	Check shot interval Distance	Time	Sonic Int. time	Interval sonic drift usec/m	msec	Cumulative drift msec
Waarre Fm Unit B									
1285.5	1185.2	557.1	499.8						
				41.5	14.0	13.8	4.82	0.2	-2.0
Eumeralla Fm									
1327.0	1226.7	571.1	513.8						
				66.5	19.5	20.5	-15.04	-1.0	-3.0
1393.5	1293.2	590.6	533.3						
				139.0	42.5	41.8	5.04	0.7	-2.3
1532.5	1432.2	633.1	575.8						
				94.0	29.0	28.1	9.57	0.9	-1.4
1626.5	1526.2	662.1	604.8						
				138.5	41.5	39.5	14.44	2.0	0.6
1765.0	1664.7	703.6	646.3						
				123.0	37.5	33.7	30.89	3.8	4.4
1888.0	1787.7	741.1	683.8						
				102.0	28.5	26.7	17.65	1.8	6.2
1990.0	1889.7	769.6	712.3						

COMPANY : CULTUS PETROLEUM NL
WELL : SKULL CREEK WEST #1

Latitude : 38 33 13.50 S Longitude : 142 57 37.50 E Survey date : 10-Jan-80 Survey units : METRES
Elevations : Datum : 0 Ground : 96 Kelly : 100.3 Times : MILLISECONDS

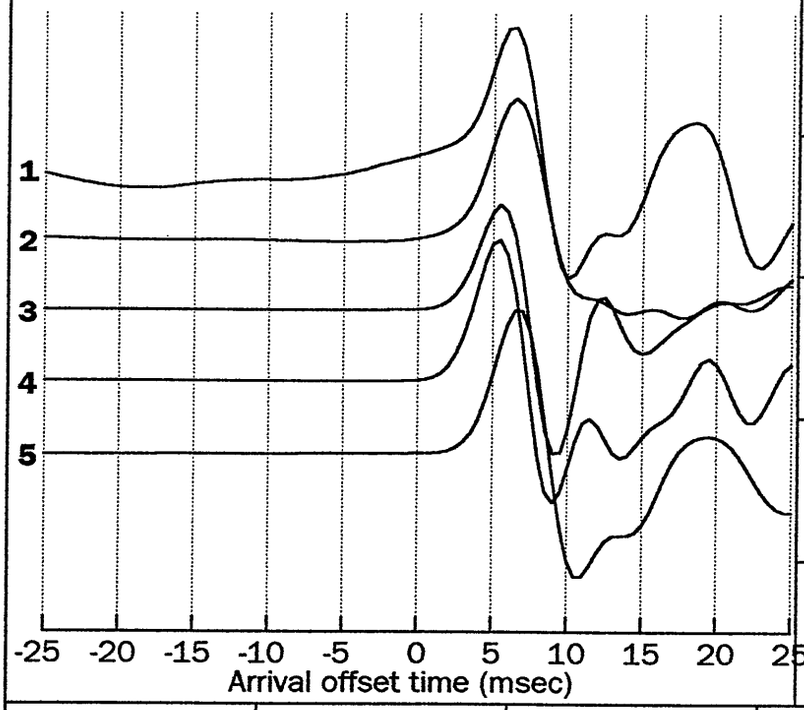
SONIC CALIBRATION :

Geophone depth Kelly	Datum	Interval Distance	Original sonic times Interval	Cumulative	Adjusted sonic times Interval	Calibrated	Velocities Average	RMS	Interval
DATUM									
100.3	0.0								
		232.7							1813.7
333.0	232.7						1813.7	1813.7	
		139.0							2131.9
472.0	371.7						1920.9	1926.8	
		198.0							2382.7
670.0	569.7						2059.7	2074.3	
		135.0							2601.2
805.0	704.7						2145.2	2166.1	
		11.0	4.4		4.1				2662.5
Paaratte Fm									
816.0	715.7			4.4		332.6	2151.6	2173.0	
		64.0	25.1		23.6				2715.5
880.0	779.7			29.5		356.2	2188.9	2213.0	
		79.0	28.8		29.0				2724.1
959.0	858.7			58.3		385.2	2229.2	2255.5	
		66.0	23.8		23.0				2869.6
1025.0	924.7			82.1		408.2	2265.3	2294.5	
		90.0	32.8		32.5				2772.0
Skull Creek M'st									
1115.0	1014.7			114.9		440.7	2302.6	2333.0	
		19.0	6.6		6.5				2908.3
1134.0	1033.7			121.5		447.2	2311.5	2342.4	

SONIC CALIBRATION : (cont)

Geophone depth Kelly — Datum	Interval Distance	Original sonic times Interval – Cumulative	Adjusted sonic times Interval – Calibrated	Velocities Average	Velocities RMS	Velocities Interval
1134.0 1033.7				2311.5	2342.4	
	65.0	21.7	21.7			2995.4
Nullawarre Greensand						
1199.0 1098.7		143.2	468.9	2343.1	2376.6	
	27.0	9.4	9.4			2872.3
Belfast M'st						
1226.0 1125.7		152.6	478.3	2353.5	2387.3	
	59.5	20.9	21.5			2767.4
Waarre Fm Unit B						
1285.5 1185.2		173.5	499.8	2371.3	2404.9	
	20.5	6.6	6.7			3061.7
Waarre Fm Unit A						
1306.0 1205.7		180.1	506.5	2380.5	2414.8	
	21.0	7.2	7.3			2875.0
Eumeralla Fm						
1327.0 1226.7		187.3	513.8	2387.5	2421.9	
	66.5	20.5	19.5			3410.3
1393.5 1293.2		207.8	533.3	2424.9	2465.0	
	139.0	41.8	42.5			3270.6
1532.5 1432.2		249.6	575.8	2487.3	2533.3	
	94.0	28.1	29.0			3241.4
1626.5 1526.2		277.7	604.8	2523.5	2571.7	
	138.5	39.5	41.5			3337.3
1765.0 1664.7		317.2	646.3	2575.7	2627.6	
	123.0	33.7	37.5			3280.0
1888.0 1787.7		350.9	683.8	2614.4	2667.5	
	102.0	26.7	28.5			3578.9
1990.0 1889.7		377.6	712.3	2653.0	2709.8	

First arrivals plot : SKULL CREEK WEST #1



Shot 1 Location : C
Charge depth 0.5 Size 0.2
Phone depth : 48.0
Arrival time : 31.0 msec

Shot 2 Location : D
Charge depth 1.0 Size 0.2
Phone depth : 48.0
Arrival time : 29.0 msec

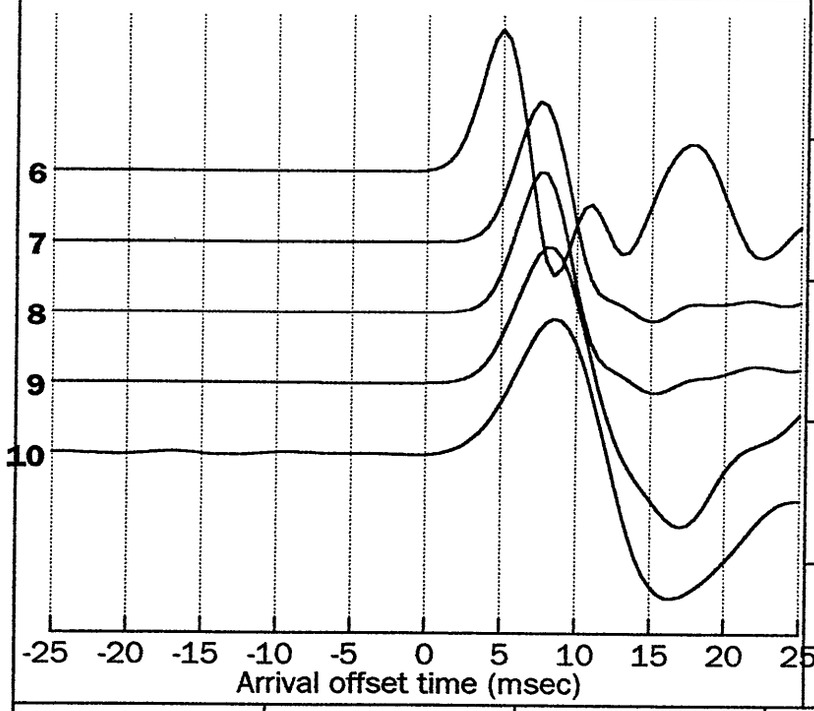
Shot 3 Location : E
Charge depth 0.5 Size 0.2
Phone depth : 100.3
Arrival time : 56.5 msec

Shot 4 Location : A
Charge depth 0.5 Size 0.2
Phone depth : 100.3
Arrival time : 56.5 msec

Shot 5 Location : B
Charge depth 0.5 Size 0.2
Phone depth : 100.3
Arrival time : 57.5 msec

SHOT 1		SHOT 2		SHOT 3		SHOT 4		SHOT 5	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
20.0	65.00	18.0	41.00	46.0	7.00	46.0	-4.00	46.0	12.00
20.5	65.00	18.5	46.00	46.5	7.00	46.5	-1.00	46.5	11.00
21.0	65.00	19.0	53.00	47.0	7.00	47.0	-1.00	47.0	13.00
21.5	67.00	19.5	61.00	47.5	7.00	47.5	-1.00	47.5	11.00
22.0	67.00	20.0	70.00	48.0	6.00	48.0	-1.00	48.0	11.00
22.5	66.00	20.5	79.00	48.5	7.00	48.5	0.00	48.5	11.00
23.0	65.00	21.0	87.00	49.0	6.00	49.0	0.00	49.0	9.00
23.5	60.00	21.5	97.00	49.5	6.00	49.5	0.00	49.5	10.00
24.0	56.00	22.0	103.00	50.0	6.00	50.0	0.00	50.0	10.00
24.5	50.00	22.5	110.00	50.5	6.00	50.5	0.00	50.5	10.00
25.0	44.00	23.0	115.00	51.0	7.00	51.0	0.00	51.0	9.00
25.5	38.00	23.5	120.00	51.5	6.00	51.5	1.00	51.5	9.00
26.0	32.00	24.0	121.00	52.0	6.00	52.0	0.00	52.0	9.00
26.5	23.00	24.5	120.00	52.5	6.00	52.5	0.00	52.5	9.00
27.0	13.00	25.0	117.00	53.0	6.00	53.0	0.00	53.0	8.00
27.5	2.00	25.5	112.00	53.5	6.00	53.5	0.00	53.5	8.00
28.0	-12.00	26.0	106.00	54.0	5.00	54.0	-1.00	54.0	7.00
28.5	-25.00	26.5	97.00	54.5	5.00	54.5	-1.00	54.5	7.00
29.0	-36.00	27.0	86.00	55.0	3.00	55.0	-2.00	55.0	6.00
29.5	-48.00	27.5	72.00	55.5	1.00	55.5	-4.00	55.5	6.00
30.0	-60.00	28.0	49.00	56.0	-3.00	56.0	-7.00	56.0	5.00
30.5	-69.00	28.5	17.00	**56.5**	**-12.00**	**56.5**	**-13.00**	56.5	3.00
31.0	**-82.00**	**29.0**	**-35.00**	57.0	-27.00	57.0	-25.00	57.0	1.00
31.5	-95.00	29.5	-104.00	57.5	-60.00	57.5	-50.00	**57.5**	**-2.00**
32.0	-109.00	30.0	-197.00	58.0	-124.00	58.0	-96.00	58.0	-6.00
32.5	-123.00	30.5	-318.00	58.5	-246.00	58.5	-183.00	58.5	-13.00
33.0	-140.00	31.0	-480.00	59.0	-468.00	59.0	-338.00	59.0	-30.00
33.5	-162.00	31.5	-719.00	59.5	-851.00	59.5	-593.00	59.5	-66.00
34.0	-195.00	32.0	-1087.00	60.0	-1451.00	60.0	-973.00	60.0	-135.00
34.5	-250.00	32.5	-1650.00	60.5	-2299.00	60.5	-1482.00	60.5	-247.00
35.0	-335.00	33.0	-2453.00	61.0	-3358.00	61.0	-2078.00	61.0	-422.00
35.5	-454.00	33.5	-3492.00	61.5	-4487.00	61.5	-2663.00	61.5	-666.00
36.0	-596.00	34.0	-4668.00	62.0	-5412.00	62.0	-3088.00	62.0	-973.00
36.5	-734.00	34.5	-5770.00	62.5	-5837.00	62.5	-3190.00	62.5	-1307.00
37.0	-828.00	35.0	-6590.00	63.0	-5473.00	63.0	-2845.00	63.0	-1606.00
37.5	-836.00	35.5	-6909.00	63.5	-4116.00	63.5	-2026.00	63.5	-1786.00
38.0	-732.00	36.0	-6581.00	64.0	-1775.00	64.0	-839.00	64.0	-1772.00
38.5	-515.00	36.5	-5588.00	64.5	1193.00	64.5	487.00	64.5	-1516.00
39.0	-219.00	37.0	-4045.00	65.0	4213.00	65.0	1665.00	65.0	-1030.00
39.5	103.00	37.5	-2199.00	65.5	6563.00	65.5	2444.00	65.5	-382.00
40.0	382.00	38.0	-403.00	66.0	7807.00	66.0	2691.00	66.0	311.00
40.5	571.00	38.5	1065.00	66.5	7750.00	66.5	2452.00	66.5	921.00
41.0	646.00	39.0	2058.00	67.0	6511.00	67.0	1909.00	67.0	1346.00
41.5	621.00	39.5	2588.00	67.5	4502.00	67.5	1326.00	67.5	1543.00
42.0	543.00	40.0	2789.00	68.0	2257.00	68.0	925.00	68.0	1538.00

First arrivals plot : SKULL CREEK WEST #1



Shot 6 Location : C
Charge depth 0.5 Size 0.2
Phone depth : 100.3
Arrival time : 58.5 msec

Shot 7 Location : D
Charge depth 1.0 Size 0.2
Phone depth : 100.3
Arrival time : 55.5 msec

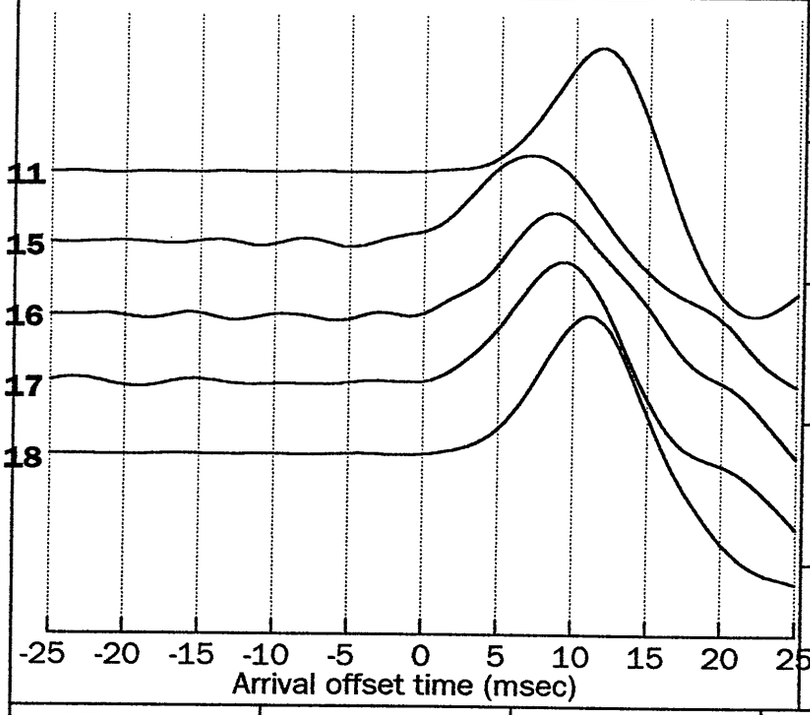
Shot 8 Location : D
Charge depth 1.0 Size 0.2
Phone depth : 100.3
Arrival time : 55.5 msec

Shot 9 Location : D
Charge depth 1.0 Size 0.5
Phone depth : 805.0
Arrival time : 382.0 msec

Shot 10 Location : D
Charge depth 1.0 Size 1.0
Phone depth : 1285.5
Arrival time : 554.0 msec

SHOT 6		SHOT 7		SHOT 8		SHOT 9		SHOT 10	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
48.0	2.00	44.0	0.00	44.0	-25.00	371.0	-30.00	543.0	-38.00
48.5	1.00	44.5	0.00	44.5	-26.00	371.5	-30.00	543.5	-56.00
49.0	1.00	45.0	2.00	45.0	-26.00	372.0	-30.00	544.0	-70.00
49.5	0.00	45.5	0.00	45.5	-27.00	372.5	-30.00	544.5	-79.00
50.0	1.00	46.0	0.00	46.0	-27.00	373.0	-30.00	545.0	-80.00
50.5	0.00	46.5	-1.00	46.5	-29.00	373.5	-29.00	545.5	-77.00
51.0	0.00	47.0	-1.00	47.0	-28.00	374.0	-29.00	546.0	-67.00
51.5	-1.00	47.5	-1.00	47.5	-26.00	374.5	-28.00	546.5	-53.00
52.0	0.00	48.0	-2.00	48.0	-26.00	375.0	-28.00	547.0	-38.00
52.5	1.00	48.5	-2.00	48.5	-25.00	375.5	-26.00	547.5	-26.00
53.0	1.00	49.0	-1.00	49.0	-24.00	376.0	-24.00	548.0	-17.00
53.5	0.00	49.5	-2.00	49.5	-23.00	376.5	-23.00	548.5	-12.00
54.0	0.00	50.0	-3.00	50.0	-22.00	377.0	-23.00	549.0	-15.00
54.5	0.00	50.5	-2.00	50.5	-21.00	377.5	-22.00	549.5	-18.00
55.0	1.00	51.0	-2.00	51.0	-21.00	378.0	-21.00	550.0	-23.00
55.5	1.00	51.5	-2.00	51.5	-20.00	378.5	-23.00	550.5	-25.00
56.0	0.00	52.0	-1.00	52.0	-19.00	379.0	-25.00	551.0	-22.00
56.5	-1.00	52.5	-2.00	52.5	-17.00	379.5	-25.00	551.5	-15.00
57.0	1.00	53.0	-3.00	53.0	-18.00	380.0	-26.00	552.0	-3.00
57.5	-1.00	53.5	-2.00	53.5	-18.00	380.5	-25.00	552.5	9.00
58.0	-1.00	54.0	-3.00	54.0	-20.00	381.0	-25.00	553.0	19.00
58.5	**-5.00**	54.5	-5.00	54.5	-22.00	381.5	-25.00	553.5	23.00
59.0	-14.00	55.0	-7.00	55.0	-25.00	**382.0**	**-31.00**	**554.0**	**15.00**
59.5	-33.00	**55.5**	**-13.00**	**55.5**	**-31.00**	382.5	-42.00	554.5	-10.00
60.0	-68.00	56.0	-24.00	56.0	-43.00	383.0	-67.00	555.0	-56.00
60.5	-134.00	56.5	-48.00	56.5	-70.00	383.5	-119.00	555.5	-133.00
61.0	-249.00	57.0	-97.00	57.0	-126.00	384.0	-222.00	556.0	-245.00
61.5	-432.00	57.5	-197.00	57.5	-240.00	384.5	-404.00	556.5	-402.00
62.0	-691.00	58.0	-397.00	58.0	-469.00	385.0	-706.00	557.0	-613.00
62.5	-1013.00	58.5	-776.00	58.5	-907.00	385.5	-1185.00	557.5	-886.00
63.0	-1351.00	59.0	-1445.00	59.0	-1689.00	386.0	-1891.00	558.0	-1234.00
63.5	-1628.00	59.5	-2523.00	59.5	-2974.00	386.5	-2874.00	558.5	-1660.00
64.0	-1749.00	60.0	-4105.00	60.0	-4878.00	387.0	-4149.00	559.0	-2166.00
64.5	-1637.00	60.5	-6124.00	60.5	-7337.00	387.5	-5656.00	559.5	-2743.00
65.0	-1264.00	61.0	-8429.00	61.0	-10233.00	388.0	-7315.00	560.0	-3370.00
65.5	-674.00	61.5	-10725.00	61.5	-13222.00	388.5	-9017.00	560.5	-4014.00
66.0	18.00	62.0	-12579.00	62.0	-15733.00	389.0	-10577.00	561.0	-4621.00
66.5	658.00	62.5	-13499.00	62.5	-17145.00	389.5	-11790.00	561.5	-5132.00
67.0	1104.00	63.0	-13137.00	63.0	-16995.00	390.0	-12446.00	562.0	-5495.00
67.5	1278.00	63.5	-11418.00	63.5	-15132.00	390.5	-12380.00	562.5	-5659.00
68.0	1188.00	64.0	-8615.00	64.0	-11804.00	391.0	-11523.00	563.0	-5584.00
68.5	928.00	64.5	-5202.00	64.5	-7638.00	391.5	-9921.00	563.5	-5246.00
69.0	636.00	65.0	-1663.00	65.0	-3270.00	392.0	-7715.00	564.0	-4638.00
69.5	438.00	65.5	1342.00	65.5	672.00	392.5	-5110.00	564.5	-3768.00
70.0	397.00	66.0	3470.00	66.0	3614.00	393.0	-2270.00	565.0	-2688.00

First arrivals plot : SKULL CREEK WEST #1



Shot 11 Location : D
Charge depth 1.0 Size 1.0
Phone depth : 1532.5
Arrival time : 630.0 msec

Shot 15 Location : D
Charge depth 2.0 Size 1.5
Phone depth : 1990.0
Arrival time : 766.5 msec

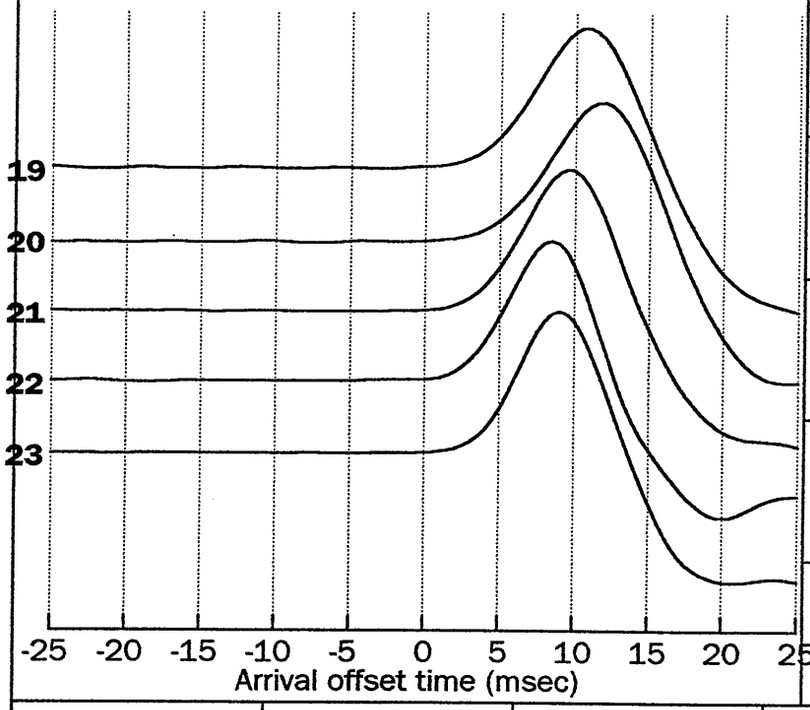
Shot 16 Location : D
Charge depth 2.0 Size 1.5
Phone depth : 1990.0
Arrival time : 765.5 msec

Shot 17 Location : D
Charge depth 2.0 Size 1.5
Phone depth : 1888.0
Arrival time : 737.5 msec

Shot 18 Location : D
Charge depth 2.0 Size 1.5
Phone depth : 1765.0
Arrival time : 700.0 msec

SHOT 11		SHOT 15		SHOT 16		SHOT 17		SHOT 18	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
619.0	-9.00	756.0	129.00	754.0	120.00	726.0	-23.00	689.0	-35.00
619.5	-8.00	756.5	105.00	754.5	45.00	726.5	-39.00	689.5	-35.00
620.0	-8.00	757.0	24.00	755.0	-5.00	727.0	-57.00	690.0	-36.00
620.5	-9.00	757.5	-88.00	755.5	-27.00	727.5	-66.00	690.5	-33.00
621.0	-12.00	758.0	-205.00	756.0	-22.00	728.0	-63.00	691.0	-31.00
621.5	-15.00	758.5	-292.00	756.5	9.00	728.5	-51.00	691.5	-29.00
622.0	-16.00	759.0	-326.00	757.0	59.00	729.0	-34.00	692.0	-28.00
622.5	-18.00	759.5	-295.00	757.5	126.00	729.5	-22.00	692.5	-27.00
623.0	-18.00	760.0	-206.00	758.0	203.00	730.0	-20.00	693.0	-28.00
623.5	-17.00	760.5	-82.00	758.5	277.00	730.5	-35.00	693.5	-32.00
624.0	-14.00	761.0	46.00	759.0	324.00	731.0	-65.00	694.0	-36.00
624.5	-12.00	761.5	145.00	759.5	323.00	731.5	-107.00	694.5	-42.00
625.0	-10.00	762.0	188.00	760.0	268.00	732.0	-153.00	695.0	-48.00
625.5	-9.00	762.5	172.00	760.5	166.00	732.5	-198.00	695.5	-52.00
626.0	-8.00	763.0	93.00	761.0	47.00	733.0	-237.00	696.0	-51.00
626.5	-9.00	763.5	-28.00	761.5	-54.00	733.5	-260.00	696.5	-49.00
627.0	-9.00	764.0	-168.00	762.0	-106.00	734.0	-267.00	697.0	-42.00
627.5	-10.00	764.5	-301.00	762.5	-94.00	734.5	-258.00	697.5	-30.00
628.0	-10.00	765.0	-413.00	763.0	-30.00	735.0	-233.00	698.0	-29.00
628.5	-13.00	765.5	-499.00	763.5	46.00	735.5	-202.00	698.5	-26.00
629.0	-17.00	766.0	-568.00	764.0	88.00	736.0	-179.00	699.0	-27.00
629.5	-23.00	**766.5**	**-639.00**	764.5	56.00	736.5	-179.00	699.5	-34.00
630.0	**-33.00**	767.0	-741.00	765.0	-64.00	737.0	-223.00	**700.0**	**-43.00**
630.5	-43.00	767.5	-895.00	**765.5**	**-259.00**	**737.5**	**-319.00**	700.5	-58.00
631.0	-54.00	768.0	-1121.00	766.0	-494.00	738.0	-480.00	701.0	-75.00
631.5	-65.00	768.5	-1429.00	766.5	-734.00	738.5	-702.00	701.5	-97.00
632.0	-75.00	769.0	-1811.00	767.0	-957.00	739.0	-977.00	702.0	-120.00
632.5	-86.00	769.5	-2256.00	767.5	-1160.00	739.5	-1296.00	702.5	-152.00
633.0	-102.00	770.0	-2741.00	768.0	-1366.00	740.0	-1654.00	703.0	-192.00
633.5	-128.00	770.5	-3242.00	768.5	-1609.00	740.5	-2048.00	703.5	-245.00
634.0	-168.00	771.0	-3730.00	769.0	-1921.00	741.0	-2481.00	704.0	-317.00
634.5	-229.00	771.5	-4178.00	769.5	-2322.00	741.5	-2966.00	704.5	-407.00
635.0	-310.00	772.0	-4563.00	770.0	-2806.00	742.0	-3511.00	705.0	-519.00
635.5	-414.00	772.5	-4869.00	770.5	-3347.00	742.5	-4112.00	705.5	-655.00
636.0	-539.00	773.0	-5088.00	771.0	-3904.00	743.0	-4747.00	706.0	-815.00
636.5	-684.00	773.5	-5224.00	771.5	-4434.00	743.5	-5391.00	706.5	-1000.00
637.0	-846.00	774.0	-5279.00	772.0	-4895.00	744.0	-6013.00	707.0	-1204.00
637.5	-1025.00	774.5	-5255.00	772.5	-5259.00	744.5	-6582.00	707.5	-1426.00
638.0	-1218.00	775.0	-5154.00	773.0	-5504.00	745.0	-7063.00	708.0	-1655.00
638.5	-1424.00	775.5	-4970.00	773.5	-5613.00	745.5	-7420.00	708.5	-1884.00
639.0	-1640.00	776.0	-4703.00	774.0	-5577.00	746.0	-7623.00	709.0	-2105.00
639.5	-1854.00	776.5	-4344.00	774.5	-5396.00	746.5	-7651.00	709.5	-2301.00
640.0	-2060.00	777.0	-3895.00	775.0	-5091.00	747.0	-7495.00	710.0	-2459.00
640.5	-2241.00	777.5	-3367.00	775.5	-4688.00	747.5	-7151.00	710.5	-2566.00
641.0	-2380.00	778.0	-2784.00	776.0	-4223.00	748.0	-6624.00	711.0	-2609.00

First arrivals plot : SKULL CREEK WEST #1



Shot 19 Location : D
Charge depth 2.0 Size 1.5
Phone depth : 1626.5
Arrival time : 658.5 msec

Shot 20 Location : D
Charge depth 2.0 Size 1.5
Phone depth : 1532.5
Arrival time : 629.0 msec

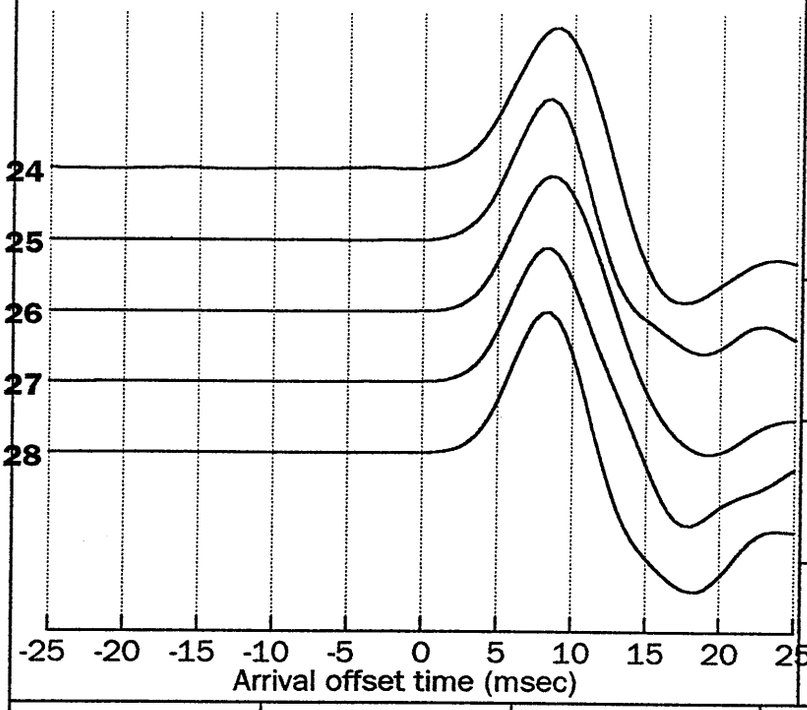
Shot 21 Location : D
Charge depth 2.0 Size 1.5
Phone depth : 1393.5
Arrival time : 587.0 msec

Shot 22 Location : D
Charge depth 2.0 Size 1.0
Phone depth : 1327.0
Arrival time : 567.5 msec

Shot 23 Location : D
Charge depth 2.0 Size 1.0
Phone depth : 1295.0
Arrival time : 554.5 msec

SHOT 19		SHOT 20		SHOT 21		SHOT 22		SHOT 23	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
648.0	-19.00	618.0	19.00	576.0	-9.00	556.0	-24.00	544.0	22.00
648.5	-13.00	618.5	17.00	576.5	-10.00	556.5	-26.00	544.5	21.00
649.0	-5.00	619.0	23.00	577.0	-6.00	557.0	-27.00	545.0	21.00
649.5	-1.00	619.5	32.00	577.5	-2.00	557.5	-29.00	545.5	18.00
650.0	2.00	620.0	45.00	578.0	3.00	558.0	-31.00	546.0	17.00
650.5	3.00	620.5	59.00	578.5	4.00	558.5	-31.00	546.5	14.00
651.0	-1.00	621.0	69.00	579.0	8.00	559.0	-31.00	547.0	14.00
651.5	-7.00	621.5	76.00	579.5	8.00	559.5	-30.00	547.5	14.00
652.0	-15.00	622.0	75.00	580.0	11.00	560.0	-26.00	548.0	15.00
652.5	-21.00	622.5	68.00	580.5	9.00	560.5	-24.00	548.5	17.00
653.0	-24.00	623.0	56.00	581.0	12.00	561.0	-25.00	549.0	17.00
653.5	-23.00	623.5	42.00	581.5	14.00	561.5	-27.00	549.5	18.00
654.0	-19.00	624.0	31.00	582.0	14.00	562.0	-33.00	550.0	18.00
654.5	-12.00	624.5	24.00	582.5	14.00	562.5	-42.00	550.5	17.00
655.0	-6.00	625.0	22.00	583.0	11.00	563.0	-56.00	551.0	16.00
655.5	-2.00	625.5	26.00	583.5	9.00	563.5	-70.00	551.5	14.00
656.0	0.00	626.0	34.00	584.0	5.00	564.0	-82.00	552.0	10.00
656.5	-4.00	626.5	39.00	584.5	-2.00	564.5	-89.00	552.5	7.00
657.0	-9.00	627.0	43.00	585.0	-6.00	565.0	-92.00	553.0	4.00
657.5	-17.00	627.5	43.00	585.5	-12.00	565.5	-89.00	553.5	3.00
658.0	-32.00	628.0	37.00	586.0	-18.00	566.0	-85.00	554.0	-2.00
658.5	**-39.00**	628.5	26.00	586.5	-25.00	566.5	-82.00	**554.5**	**-10.00**
659.0	-48.00	**629.0**	**12.00**	**587.0**	**-38.00**	567.0	-92.00	555.0	-23.00
659.5	-58.00	629.5	-1.00	587.5	-60.00	**567.5**	**-121.00**	555.5	-46.00
660.0	-69.00	630.0	-14.00	588.0	-99.00	568.0	-181.00	556.0	-82.00
660.5	-91.00	630.5	-32.00	588.5	-160.00	568.5	-279.00	556.5	-138.00
661.0	-124.00	631.0	-55.00	589.0	-249.00	569.0	-427.00	557.0	-225.00
661.5	-170.00	631.5	-87.00	589.5	-378.00	569.5	-631.00	557.5	-352.00
662.0	-234.00	632.0	-138.00	590.0	-550.00	570.0	-901.00	558.0	-534.00
662.5	-317.00	632.5	-207.00	590.5	-775.00	570.5	-1242.00	558.5	-790.00
663.0	-423.00	633.0	-299.00	591.0	-1054.00	571.0	-1660.00	559.0	-1136.00
663.5	-557.00	633.5	-414.00	591.5	-1397.00	571.5	-2153.00	559.5	-1584.00
664.0	-718.00	634.0	-557.00	592.0	-1803.00	572.0	-2714.00	560.0	-2142.00
664.5	-908.00	634.5	-724.00	592.5	-2270.00	572.5	-3326.00	560.5	-2806.00
665.0	-1126.00	635.0	-921.00	593.0	-2792.00	573.0	-3964.00	561.0	-3554.00
665.5	-1371.00	635.5	-1146.00	593.5	-3355.00	573.5	-4586.00	561.5	-4350.00
666.0	-1636.00	636.0	-1402.00	594.0	-3937.00	574.0	-5137.00	562.0	-5120.00
666.5	-1915.00	636.5	-1687.00	594.5	-4502.00	574.5	-5577.00	562.5	-5809.00
667.0	-2197.00	637.0	-1997.00	595.0	-5008.00	575.0	-5863.00	563.0	-6363.00
667.5	-2472.00	637.5	-2327.00	595.5	-5419.00	575.5	-5958.00	563.5	-6724.00
668.0	-2721.00	638.0	-2661.00	596.0	-5702.00	576.0	-5840.00	564.0	-6851.00
668.5	-2930.00	638.5	-2986.00	596.5	-5827.00	576.5	-5499.00	564.5	-6723.00
669.0	-3083.00	639.0	-3281.00	597.0	-5775.00	577.0	-4950.00	565.0	-6352.00
669.5	-3167.00	639.5	-3529.00	597.5	-5541.00	577.5	-4213.00	565.5	-5770.00
670.0	-3171.00	640.0	-3712.00	598.0	-5133.00	578.0	-3335.00	566.0	-5018.00

First arrivals plot : SKULL CREEK WEST #1



Shot 24 Location : D
Charge depth 2.0 Size 1.0
Phone depth : 1285.5
Arrival time : 553.0 msec

Shot 25 Location : D
Charge depth 2.0 Size 1.0
Phone depth : 1226.0
Arrival time : 532.0 msec

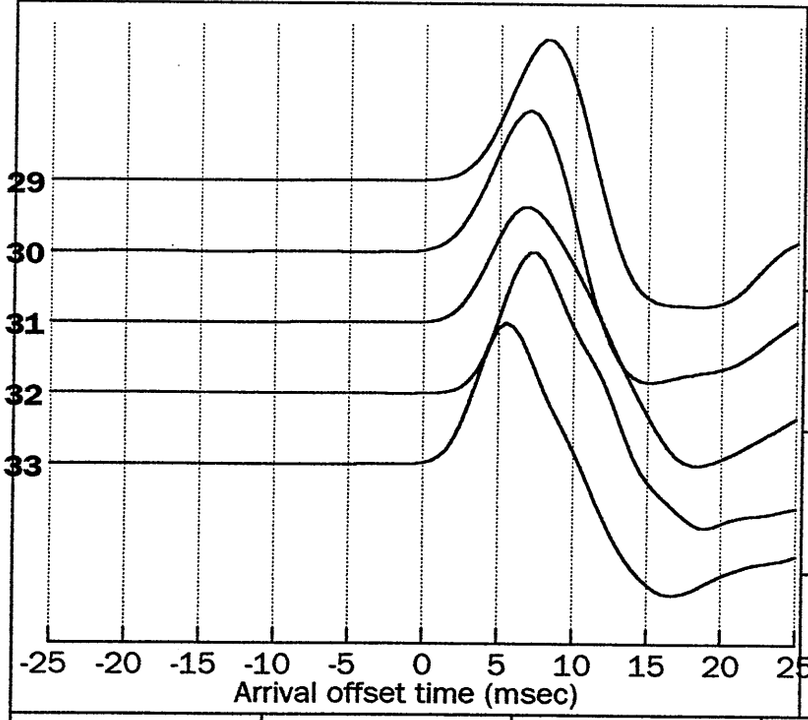
Shot 26 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 1134.0
Arrival time : 501.0 msec

Shot 27 Location : D
Charge depth 2.0 Size 1.0
Phone depth : 1025.0
Arrival time : 462.0 msec

Shot 28 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 959.0
Arrival time : 439.0 msec

SHOT 24		SHOT 25		SHOT 26		SHOT 27		SHOT 28	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
542.0	-8.00	521.0	-9.00	490.0	-6.00	451.0	-42.00	428.0	-13.00
542.5	-12.00	521.5	-10.00	490.5	-8.00	451.5	-46.00	428.5	-14.00
543.0	-16.00	522.0	-9.00	491.0	-10.00	452.0	-48.00	429.0	-16.00
543.5	-16.00	522.5	-9.00	491.5	-10.00	452.5	-49.00	429.5	-17.00
544.0	-17.00	523.0	-8.00	492.0	-12.00	453.0	-48.00	430.0	-19.00
544.5	-18.00	523.5	-9.00	492.5	-11.00	453.5	-47.00	430.5	-19.00
545.0	-17.00	524.0	-9.00	493.0	-11.00	454.0	-44.00	431.0	-20.00
545.5	-19.00	524.5	-10.00	493.5	-11.00	454.5	-42.00	431.5	-21.00
546.0	-19.00	525.0	-10.00	494.0	-11.00	455.0	-40.00	432.0	-22.00
546.5	-25.00	525.5	-9.00	494.5	-12.00	455.5	-40.00	432.5	-22.00
547.0	-32.00	526.0	-8.00	495.0	-13.00	456.0	-41.00	433.0	-21.00
547.5	-41.00	526.5	-6.00	495.5	-14.00	456.5	-43.00	433.5	-21.00
548.0	-52.00	527.0	-5.00	496.0	-15.00	457.0	-46.00	434.0	-21.00
548.5	-61.00	527.5	-4.00	496.5	-16.00	457.5	-47.00	434.5	-19.00
549.0	-67.00	528.0	-5.00	497.0	-16.00	458.0	-49.00	435.0	-18.00
549.5	-68.00	528.5	-5.00	497.5	-16.00	458.5	-49.00	435.5	-15.00
550.0	-63.00	529.0	-7.00	498.0	-17.00	459.0	-48.00	436.0	-15.00
550.5	-53.00	529.5	-8.00	498.5	-16.00	459.5	-45.00	436.5	-15.00
551.0	-42.00	530.0	-9.00	499.0	-17.00	460.0	-41.00	437.0	-13.00
551.5	-31.00	530.5	-9.00	499.5	-20.00	460.5	-41.00	437.5	-14.00
552.0	-27.00	531.0	-10.00	500.0	-22.00	461.0	-40.00	438.0	-15.00
552.5	-33.00	531.5	-17.00	500.5	-25.00	461.5	-45.00	438.5	-19.00
553.0	**-54.00**	**532.0**	**-31.00**	**501.0**	**-33.00**	**462.0**	**-53.00**	**439.0**	**-26.00**
553.5	-93.00	532.5	-61.00	501.5	-45.00	462.5	-72.00	439.5	-41.00
554.0	-155.00	533.0	-115.00	502.0	-73.00	463.0	-104.00	440.0	-72.00
554.5	-246.00	533.5	-206.00	502.5	-120.00	463.5	-161.00	440.5	-126.00
555.0	-380.00	534.0	-346.00	503.0	-207.00	464.0	-259.00	441.0	-222.00
555.5	-568.00	534.5	-557.00	503.5	-347.00	464.5	-422.00	441.5	-382.00
556.0	-828.00	535.0	-863.00	504.0	-564.00	465.0	-674.00	442.0	-630.00
556.5	-1178.00	535.5	-1292.00	504.5	-883.00	465.5	-1049.00	442.5	-997.00
557.0	-1627.00	536.0	-1866.00	505.0	-1319.00	466.0	-1572.00	443.0	-1506.00
557.5	-2182.00	536.5	-2606.00	505.5	-1884.00	466.5	-2258.00	443.5	-2181.00
558.0	-2840.00	537.0	-3514.00	506.0	-2573.00	467.0	-3109.00	444.0	-3014.00
558.5	-3583.00	537.5	-4565.00	506.5	-3361.00	467.5	-4088.00	444.5	-3991.00
559.0	-4375.00	538.0	-5683.00	507.0	-4203.00	468.0	-5124.00	445.0	-5031.00
559.5	-5160.00	538.5	-6807.00	507.5	-5026.00	468.5	-6126.00	445.5	-6054.00
560.0	-5892.00	539.0	-7847.00	508.0	-5759.00	469.0	-7014.00	446.0	-6976.00
560.5	-6526.00	539.5	-8689.00	508.5	-6346.00	469.5	-7689.00	446.5	-7695.00
561.0	-7005.00	540.0	-9223.00	509.0	-6737.00	470.0	-8068.00	447.0	-8110.00
561.5	-7284.00	540.5	-9352.00	509.5	-6893.00	470.5	-8091.00	447.5	-8144.00
562.0	-7324.00	541.0	-9022.00	510.0	-6802.00	471.0	-7749.00	448.0	-7762.00
562.5	-7105.00	541.5	-8229.00	510.5	-6471.00	471.5	-7075.00	448.5	-6969.00
563.0	-6620.00	542.0	-7021.00	511.0	-5924.00	472.0	-6141.00	449.0	-5817.00
563.5	-5884.00	542.5	-5493.00	511.5	-5192.00	472.5	-5037.00	449.5	-4380.00
564.0	-4922.00	543.0	-3738.00	512.0	-4301.00	473.0	-3836.00	450.0	-2747.00

First arrivals plot : SKULL CREEK WEST #1



Shot 29 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 880.0
Arrival time : 410.0 msec

Shot 30 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 805.0
Arrival time : 382.5 msec

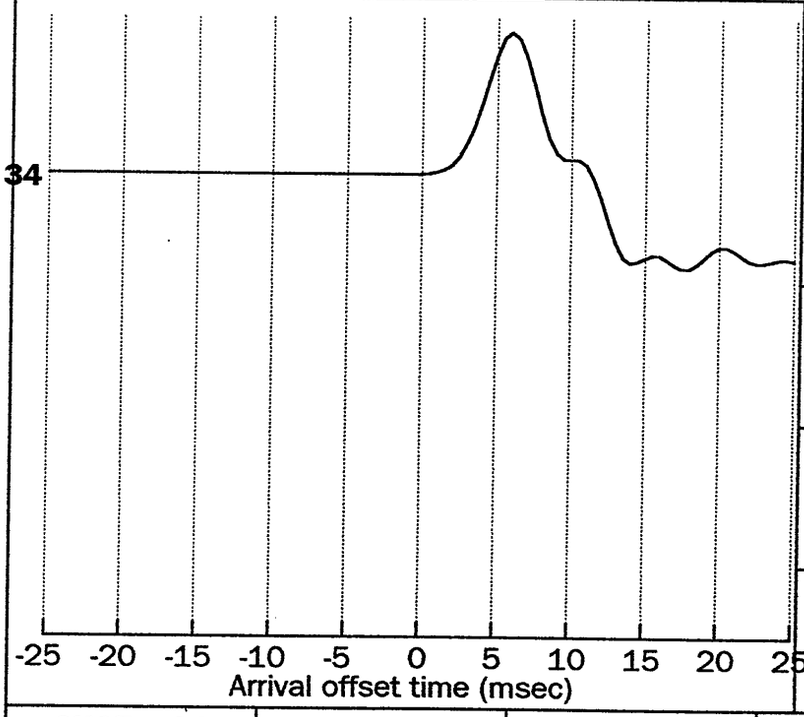
Shot 31 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 670.0
Arrival time : 330.5 msec

Shot 32 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 472.0
Arrival time : 247.5 msec

Shot 33 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 333.0
Arrival time : 182.5 msec

SHOT 29		SHOT 30		SHOT 31		SHOT 32		SHOT 33	
Time	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**	**Time**	**Ampl**
399.0	-8.00	372.0	28.00	320.0	15.00	236.0	27.00	172.0	-1.00
399.5	-10.00	372.5	24.00	320.5	14.00	236.5	30.00	172.5	-1.00
400.0	-13.00	373.0	20.00	321.0	12.00	237.0	31.00	173.0	-1.00
400.5	-14.00	373.5	16.00	321.5	10.00	237.5	28.00	173.5	-1.00
401.0	-14.00	374.0	16.00	322.0	7.00	238.0	26.00	174.0	-1.00
401.5	-16.00	374.5	17.00	322.5	6.00	238.5	22.00	174.5	-2.00
402.0	-15.00	375.0	20.00	323.0	4.00	239.0	18.00	175.0	-2.00
402.5	-17.00	375.5	22.00	323.5	4.00	239.5	17.00	175.5	-3.00
403.0	-17.00	376.0	27.00	324.0	3.00	240.0	19.00	176.0	-2.00
403.5	-17.00	376.5	31.00	324.5	4.00	240.5	23.00	176.5	-2.00
404.0	-19.00	377.0	34.00	325.0	3.00	241.0	25.00	177.0	-2.00
404.5	-20.00	377.5	37.00	325.5	1.00	241.5	29.00	177.5	-2.00
405.0	-21.00	378.0	39.00	326.0	-1.00	242.0	29.00	178.0	-3.00
405.5	-23.00	378.5	40.00	326.5	0.00	242.5	28.00	178.5	-4.00
406.0	-24.00	379.0	40.00	327.0	1.00	243.0	28.00	179.0	-4.00
406.5	-26.00	379.5	40.00	327.5	6.00	243.5	30.00	179.5	-5.00
407.0	-28.00	380.0	38.00	328.0	6.00	244.0	31.00	180.0	-5.00
407.5	-29.00	380.5	34.00	328.5	6.00	244.5	34.00	180.5	-5.00
408.0	-29.00	381.0	32.00	329.0	6.00	245.0	36.00	181.0	-4.00
408.5	-32.00	381.5	22.00	329.5	1.00	245.5	38.00	181.5	-5.00
409.0	-35.00	382.0	-4.00	330.0	-8.00	246.0	36.00	182.0	-8.00
409.5	-41.00	**382.5**	**-47.00**	**330.5**	**-28.00**	246.5	29.00	**182.5**	**-17.00**
410.0	**-54.00**	383.0	-133.00	331.0	-72.00	247.0	16.00	183.0	-35.00
410.5	-79.00	383.5	-283.00	331.5	-170.00	**247.5**	**-11.00**	183.5	-73.00
411.0	-131.00	384.0	-532.00	332.0	-362.00	248.0	-82.00	184.0	-149.00
411.5	-226.00	384.5	-920.00	332.5	-714.00	248.5	-241.00	184.5	-281.00
412.0	-389.00	385.0	-1490.00	333.0	-1300.00	249.0	-576.00	185.0	-486.00
412.5	-650.00	385.5	-2278.00	333.5	-2198.00	249.5	-1215.00	185.5	-779.00
413.0	-1047.00	386.0	-3308.00	334.0	-3465.00	250.0	-2322.00	186.0	-1150.00
413.5	-1613.00	386.5	-4577.00	334.5	-5085.00	250.5	-4066.00	186.5	-1576.00
414.0	-2375.00	387.0	-6003.00	335.0	-6951.00	251.0	-6491.00	187.0	-2005.00
414.5	-3343.00	387.5	-7544.00	335.5	-8968.00	251.5	-9614.00	187.5	-2380.00
415.0	-4503.00	388.0	-9103.00	336.0	-10948.00	252.0	-13339.00	188.0	-2635.00
415.5	-5771.00	388.5	-10550.00	336.5	-12687.00	252.5	-17309.00	188.5	-2733.00
416.0	-7091.00	389.0	-11743.00	337.0	-13973.00	253.0	-21007.00	189.0	-2661.00
416.5	-8371.00	389.5	-12534.00	337.5	-14669.00	253.5	-23871.00	189.5	-2443.00
417.0	-9489.00	390.0	-12802.00	338.0	-14739.00	254.0	-25431.00	190.0	-2127.00
417.5	-10318.00	390.5	-12471.00	338.5	-14235.00	254.5	-25436.00	190.5	-1773.00
418.0	-10743.00	391.0	-11522.00	339.0	-13279.00	255.0	-23959.00	191.0	-1424.00
418.5	-10679.00	391.5	-10005.00	339.5	-12007.00	255.5	-21358.00	191.5	-1107.00
419.0	-10089.00	392.0	-8011.00	340.0	-10551.00	256.0	-18174.00	192.0	-819.00
419.5	-8981.00	392.5	-5657.00	340.5	-8991.00	256.5	-14943.00	192.5	-546.00
420.0	-7419.00	393.0	-3020.00	341.0	-7351.00	257.0	-12034.00	193.0	-260.00
420.5	-5499.00	393.5	-286.00	341.5	-5628.00	257.5	-9564.00	193.5	46.00
421.0	-3300.00	394.0	2352.00	342.0	-3781.00	258.0	-7353.00	194.0	375.00

First arrivals plot : SKULL CREEK WEST #1



Shot 34 Location : D
Charge depth 2.0 Size 0.5
Phone depth : 100.3
Arrival time : 55.0 msec

SHOT	34
Time	**Ampl**
44.0	23.00
44.5	22.00
45.0	22.00
45.5	22.00
46.0	21.00
46.5	21.00
47.0	21.00
47.5	22.00
48.0	22.00
48.5	22.00
49.0	21.00
49.5	22.00
50.0	21.00
50.5	21.00
51.0	17.00
51.5	16.00
52.0	16.00
52.5	15.00
53.0	13.00
53.5	10.00
54.0	3.00
54.5	-11.00
55.0	**-43.00**
55.5	-106.00
56.0	-235.00
56.5	-497.00
57.0	-992.00
57.5	-1862.00
58.0	-3235.00
58.5	-5154.00
59.0	-7492.00
59.5	-10054.00
60.0	-12463.00
60.5	-14209.00
61.0	-14836.00
61.5	-14110.00
62.0	-12132.00
62.5	-9354.00
63.0	-6423.00
63.5	-3928.00
64.0	-2291.00
64.5	-1648.00
65.0	-1624.00
65.5	-1639.00
66.0	-1108.00