

WELL SEISMIC
REPORT

* A Mark of Schlumberger

Using the following logs:

CSI-VSP

DT, RHOB, GR, CALI

*** DATUM AT 650m ***

COMPANY: APACHE CANADA LTD.

WELL: APACHE PARAMOUNT LAC MAUNOIR C-34

FIELD: LAC MAUNOIR

COUNTRY: NORTHWEST TERRITORIES

STATE:

COUNTRY: CANADA

Date Logged: 15-Mar-2004 Date Processed: Mar-2004

Well Location: UWID: 300C346720125000

LSD: C-34

Elevations: KB: 628.00 m DF: 627.70 m GL: 622.80 m

API Number: WID: 1995 Job Number: 04009

FOLD HERE The well name, location, borehole reference data were furnished by the customer.

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretation, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule.

Field Recording:	Location: NORMAN WELL	Software Version: 11C0-305	Engineer: FRANK MACEACH
Office Recording:	ICS Center: DCS..Calgary	Baseline: GF3.8.1	Log Analyst: R PARKER

Mud and Borehole Measurements:

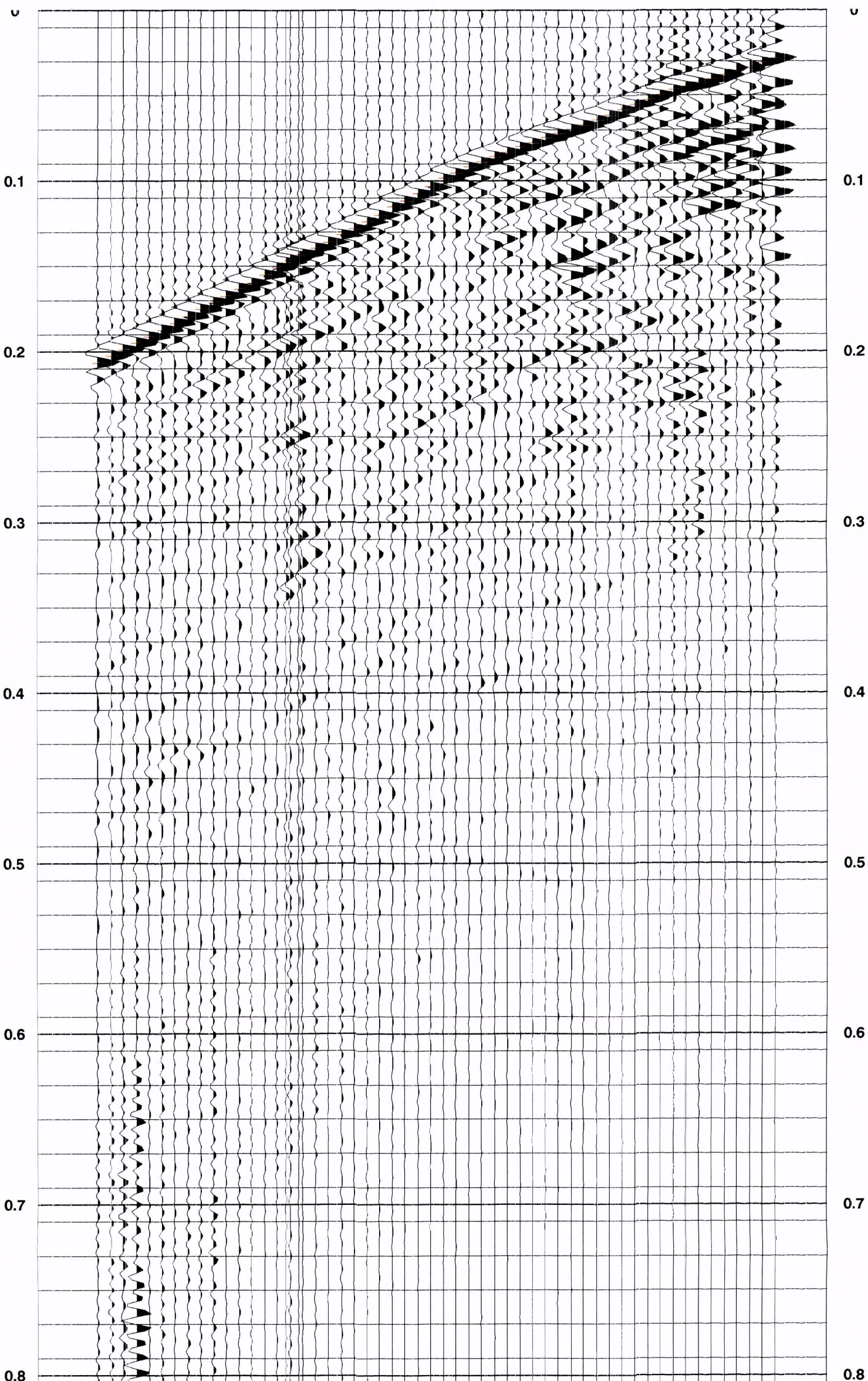
Rm @ Measured temperature: -999.250 ? @ -999.2 ?	BHT: 100.0 degC	Bitsize: 203.2 mm
Rmf @ Measured temperature: -999.250 ? @ -999.2 ?	Type Fluid in Hole	FRESH WATER
Rmc @ Measured temperature: -999.250 ? @ -999.2 ?	Mud Density: 1000.00 kg/m3	

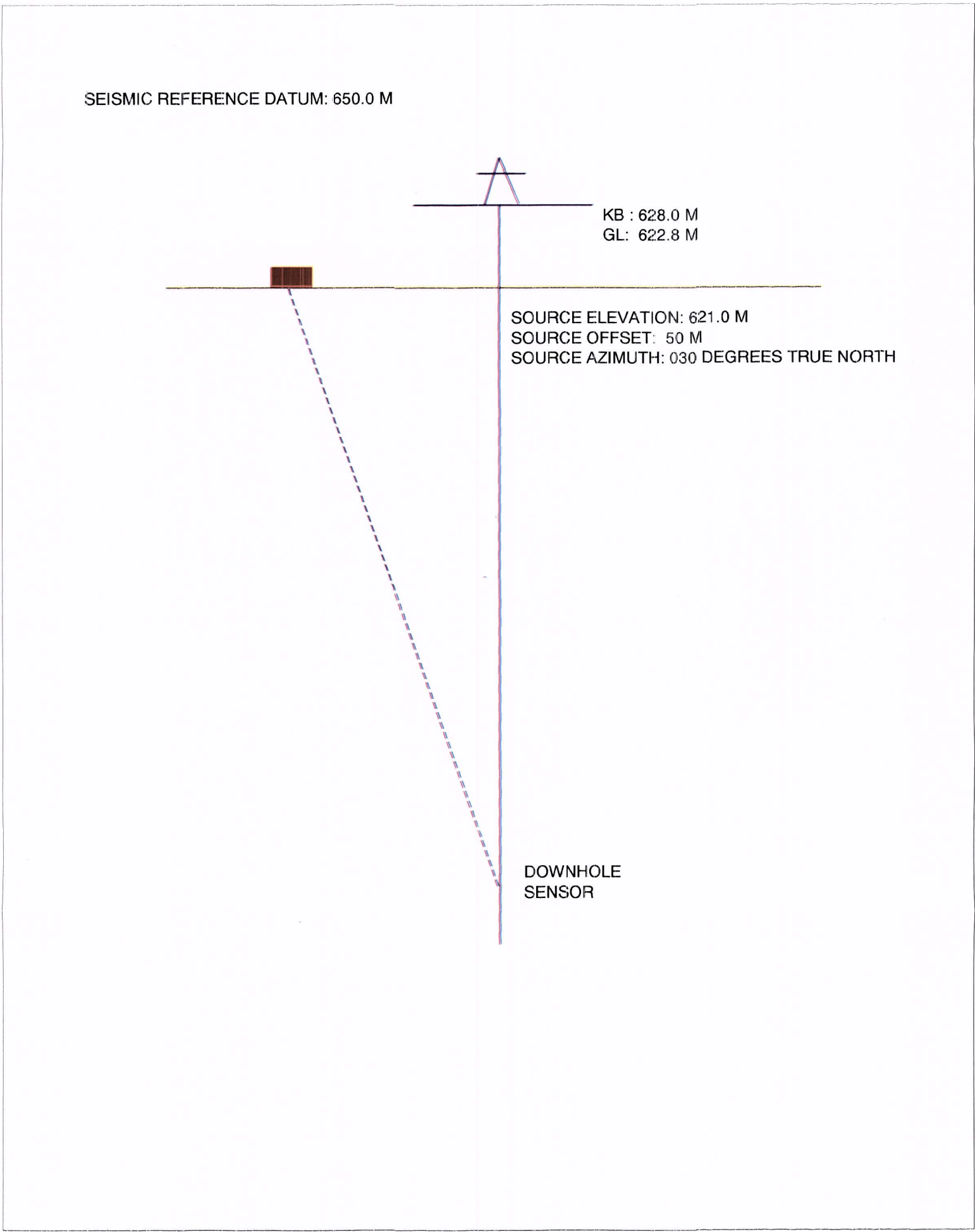
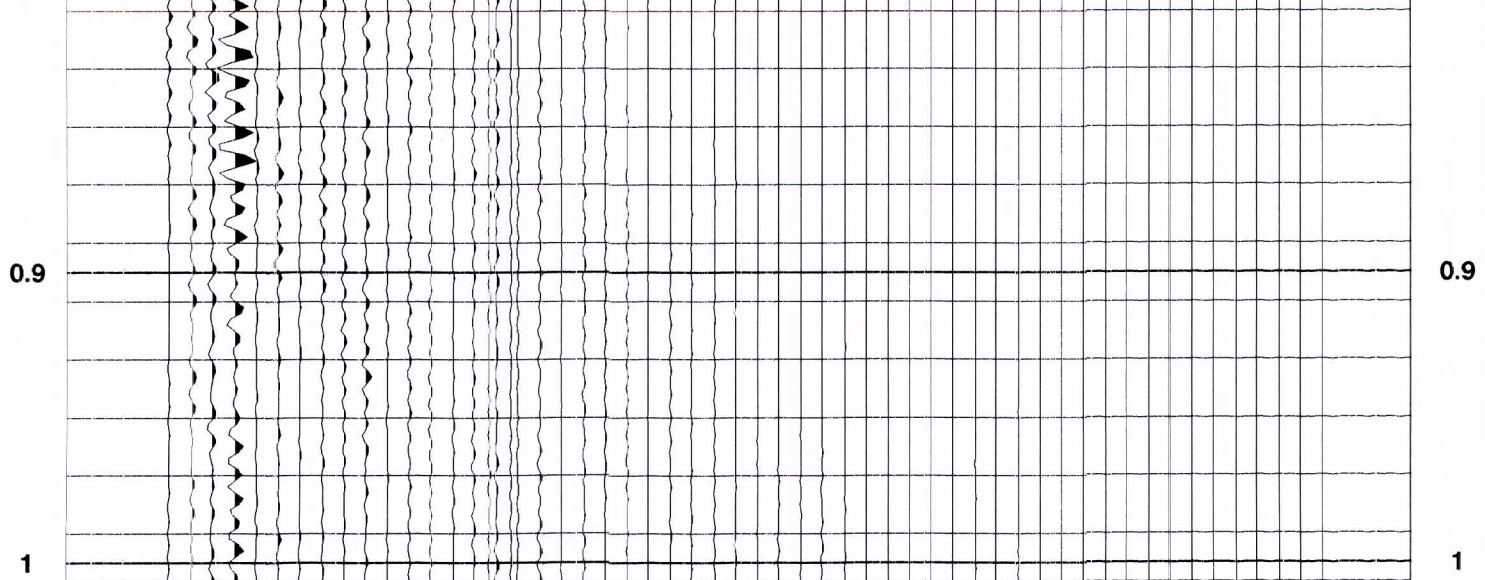
Remarks:

CORRELATED TO SOC COMPENSATED CEMENT BOND LOG DATED 15-MAR-2004
SOURCE: ONE TRACE LITTON 315 TRACK MOUNT VIBE.
SWEEP: 6 - 130 HZ, 24 SEC, LINEAR, 0.5 SEC TAPERS
SOURCE OFFSET: 50 m at 030 degrees

COMPUTING CENTRE STACKS
VERTICAL COMPONENT

MAX. AMPLITUDE	MIN. AMPLITUDE	TRANSIT TIME	LEVEL NO.	RAW DEPTH
2178.4	-2007.9	0.028	5	124
1696.3	-2023.3	0.034	7	154
1206.8	-1220.1	0.038	9	184
963.5	-696.5	0.043	11	214
804.6	-831.2	0.047	13	244
866.2	-657.1	0.062	15	274
797.4	-523.2	0.068	17	304
508.0	-345.5	0.064	19	334
360.9	-357.4	0.070	21	364
392.9	-290.0	0.075	23	394
468.6	-304.8	0.080	25	424
466.7	-267.2	0.086	27	454
507.1	-311.9	0.092	29	484
474.3	-335.9	0.099	31	514
493.3	-278.6	0.108	33	544
439.3	-288.7	0.115	35	574
396.5	-212.3	0.124	37	604
370.6	-226.6	0.132	39	634
313.3	-206.8	0.139	41	664
288.3	-160.2	0.144	43	694
363.0	-207.9	0.148	45	700
286.0	-211.5	0.155	47	724
215.8	-157.1	0.163	49	754
200.9	-146.6	0.171	51	784
204.3	-151.4	0.179	53	814
180.1	-131.8	0.187	55	844
142.2	-108.8	0.195	57	874
156.0	-90.2	0.202	59	904





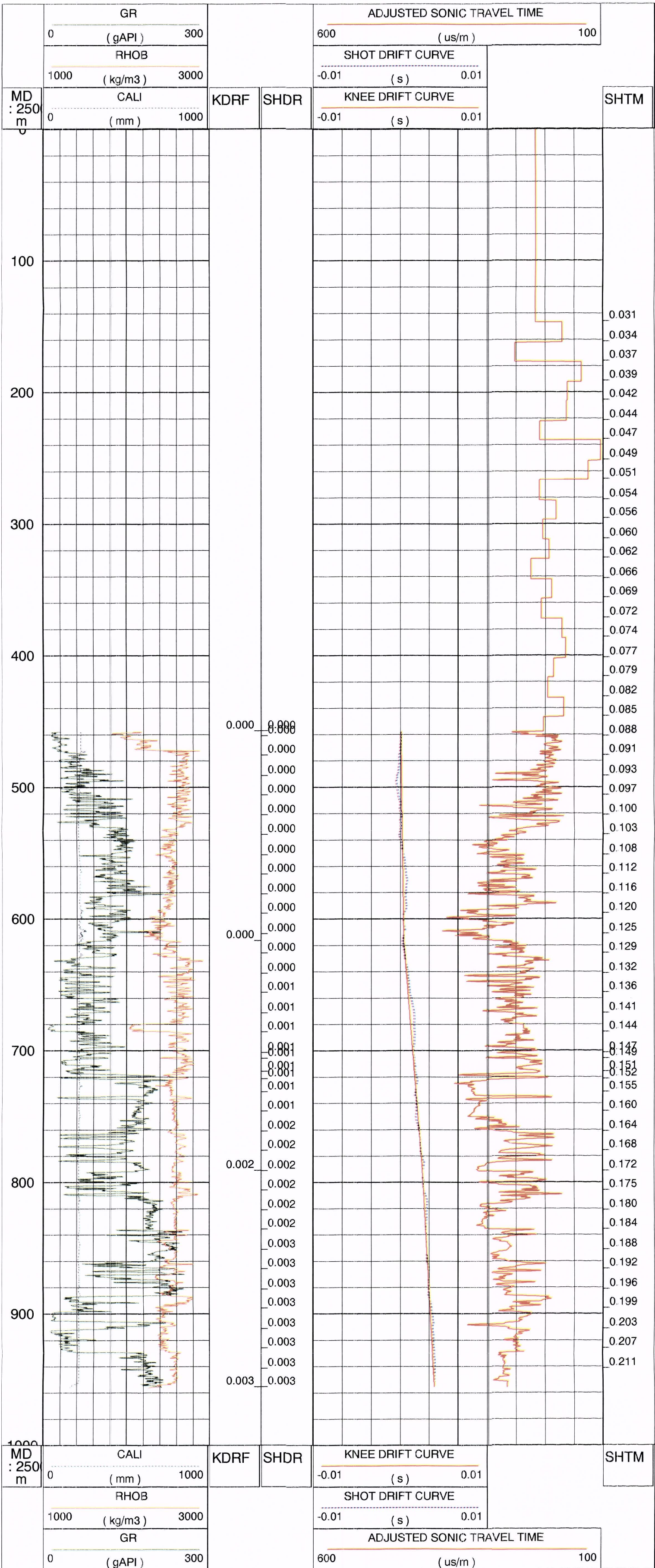
ELEVATIONS ARE POSITIVE UPWARDS
DEPTHS ARE POSITIVE DOWNWARDS
DIRECTIONS ARE RELATIVE TO TRUE NORTH
MSL : MEAN SEA LEVEL
SRD : SEISMIC REFERENCE DATUM

ELEVATION OF THE MEASURED DEPTH REFERENCE ABOVE MSL : 628.0 M
ELEVATION OF THE SRD ABOVE MSL : 650.0 M
ELEVATION OF THE MEASURED DEPTH REFERENCE ABOVE SRD : -32.0 M
ELEVATION OF GROUND ABOVE SRD : -27.2 M

VELOCITY BETWEEN SURFACE SENSOR AND SOURCE : 5000.0 M/S
VELOCITY BETWEEN SOURCE AND SRD : 5000.0 M/S

LEVEL NUMBER	VERTICAL DEPTH FROM SRD m	MEASURED DEPTH FROM KB m	OBSERVED TRAVEL TIME s	VERTICAL TRANSIT TIME s	DELTA DEPTH m	DELTA TIME s	ACOUSTIC AVERAGE VELOCITY m/s	ACOUSTIC INTERVAL VELOCITY m/s
1	0.0			0.0000				4657
2	146.5	124.5	0.0282	0.0315	15.5	0.0026	4657	5896
3	162.0	140.0	0.0306	0.0341	14.5	0.0036	4753	3985
4	176.5	154.5	0.0340	0.0377	15.5	0.0021	4679	7339
5	192.0	170.0	0.0359	0.0398	14.4	0.0023	4820	6233
6	206.4	184.4	0.0381	0.0421	15.6	0.0025	4897	6158
7	222.0	200.0	0.0405	0.0447	14.4	0.0030	4969	4814
8	236.4	214.4	0.0434	0.0477	15.5	0.0016	5112	9674
9	251.9	229.9	0.0449	0.0493	14.6	0.0018	5112	8022
10	266.5	244.5	0.0466	0.0511	15.5	0.0032	5216	4798
11	282.0	260.0	0.0498	0.0543	14.4	0.0026	5191	5547
12	296.4	274.4	0.0524	0.0569	15.5	0.0031	5207	4938
13	311.9	289.9	0.0555	0.0601	14.6	0.0028	5193	5200
14	326.5	304.5	0.0582	0.0629	15.5	0.0035	5193	4478
15	342.0	320.0	0.0617	0.0663	14.5	0.0027	5156	5330
16	356.5	334.5	0.0643	0.0690	15.5	0.0032	5163	4861
17	372.0	350.0	0.0675	0.0722	14.5	0.0025	5150	5877
18	386.5	364.5	0.0699	0.0747	15.5	0.0025	5174	6102
19	402.0	380.0	0.0724	0.0772	14.5	0.0027	5204	5430
20	416.5	394.5	0.0751	0.0799	15.5	0.0030	5212	5142
21	432.0	410.0	0.0781	0.0829	14.4	0.0024	5209	6005
22	446.4	424.4	0.0805	0.0853	15.5	0.0032	5232	4833
23	461.9	439.9	0.0836	0.0885	14.5	0.0025	5217	5879
24	476.4	454.4	0.0861	0.0910	15.5	0.0029	5235	5364
25	491.9	469.9	0.0890	0.0939	14.5	0.0031	5239	4668
26	506.4	484.4	0.0921	0.0970	15.5	0.0038	5221	4112
27	521.9	499.9	0.0958	0.1008	14.5	0.0030	5179	4786
28	536.4	514.4	0.0988	0.1038	15.5	0.0050	5168	3110
29	551.9	529.9	0.1038	0.1088	14.5	0.0040	5073	3658
30	566.4	544.4	0.1078	0.1127	15.5	0.0041	5024	3735
31	581.9	559.9	0.1119	0.1169	14.6	0.0035	4978	4155
32	596.5	574.5	0.1154	0.1204	15.5	0.0048	4954	3233
33	612.0	590.0	0.1202	0.1252	14.4	0.0038	4888	3754
34	626.4	604.4	0.1240	0.1290	15.5	0.0039	4854	4003
35	641.9	619.9	0.1279	0.1329	14.5	0.0038	4830	3821
36	656.4	634.4	0.1317	0.1367	15.6	0.0043	4802	3636
37	672.0	650.0	0.1360	0.1410	14.5	0.0034	4766	4244
38	686.5	664.5	0.1394	0.1444	15.5	0.0035	4754	4416
39	702.0	680.0	0.1429	0.1479	4.5	0.0012	4746	3850
40	706.5	684.5	0.1440	0.1491	10.0	0.0022	4739	4511
41	716.5	694.5	0.1463	0.1513	5.5	0.0016	4735	3389
42	722.0	700.0	0.1479	0.1529	10.0	0.0028	4721	3518

43	732.0	710.0	0.1507	0.1558	14.4	0.0043	4699	3355
44	746.4	724.4	0.1550	0.1601	15.5	0.0048	4663	3231
45	761.9	739.9	0.1598	0.1649	14.6	0.0033	4621	4414
46	776.5	754.5	0.1631	0.1682	15.4	0.0043	4617	3594
47	791.9	769.9	0.1674	0.1725	14.5	0.0035	4592	4158
48	806.4	784.4	0.1709	0.1759	15.5	0.0042	4583	3688
49	821.9	799.9	0.1751	0.1801	14.5	0.0042	4562	3494
50	836.4	814.4	0.1792	0.1843	15.6	0.0041	4538	3779
51	852.0	830.0	0.1833	0.1884	14.5	0.0039	4522	3753
52	866.5	844.5	0.1872	0.1923	15.5	0.0039	4506	3925
53	882.0	860.0	0.1911	0.1962	14.5	0.0036	4495	4013
54	896.5	874.5	0.1947	0.1999	15.5	0.0040	4486	3916
55	912.0	890.0	0.1987	0.2038	14.5	0.0036	4475	4048
56	926.5	904.5	0.2023	0.2074	15.5	0.0041	4467	3766
57	942.0	920.0	0.2064	0.2115			4454	



Knee and Zone Data

Raw Drift is computed at each shot level as
Shot Time - Sonic Time

From the raw drift curve, knees are selected. Knee depths define the zones for adjustment.
Selected drift values define the amount of time adjustment to the sonic log in each zone.

When the gradient versus depth of the selected drift is POSITIVE, sonic velocities are
deemed too fast. Sonic transit times are increased by a constant shift, the value of
the selected drift gradient :
Adjusted DT = DT + Shift

When the gradient is NEGATIVE, sonic velocities are deemed too low. The excess sonic transit
time over a threshold DT_Minimum is reduced by a constant reduction factor, G :
When DT < DT_Minimum Adjusted DT = DT
When DT > DT_Minimum Adjusted DT = G *(DT - DT_Minimum) + DT_Minimum

AFTER THE ADJUSTMENT OF THE SONIC LOG :

Residual is computed at each shot level as
Shot Time - Adjusted Sonic Time

It indicates how closely the adjustment has followed the shot times

KNEE NUMEER	MEASURED DEPTH FROM KB m	VERTICAL DEPTH FROM SRD m	SELECTED DRIFT AT KNEE ms	SHIFT us/m	DELTA_T MINIMUM us/m	REDUCTION FACTOR G	SELECTED DRIFT GRADIENT us/m
1	436.0	458.0	0.0002	2.2			2.2
2	595.1	617.1	0.0013	12.2			12.2
3	770.5	792.5	0.0083	8.3			8.3
4		956.0	0.0128				

MEASURED DEPTH FROM KB m	VERTICAL DEPTH FROM SRD m	VERTICAL SHOT TIME ms	ADJUSTED SONIC TIME ms	RAW DRIFT SHOT - SONIC ms	RESIDUAL SHOT - ADJUSTED SONIC ms	ADJUSTED INTERVAL VELOCITY m/s	ADJUSTED RMS VELOCITY m/s	ADJUSTED AVERAGE VELOCITY m/s
	0.0	0.0	0.0					
124.5	146.5	31.5	31.5			4657	4657	4657
140.0	162.0	34.1	34.1			5896	4764	4753
154.5	176.5	37.7	37.7			3985	4695	4679
170.0	192.0	39.8	39.8			7339	4871	4820
184.4	206.4	42.1	42.1			6233	4955	4897
200.0	222.0	44.7	44.7			6158	5031	4969
214.4	236.4	47.7	47.7			4814	5018	4959
229.9	251.9	49.3	49.3			9674	5235	5112
244.5	266.5	51.1	51.1			8022	5359	5216
260.0	282.0	54.3	54.3			4798	5327	5191
274.4	296.4	56.9	56.9			5547	5338	5207
289.9	311.9	60.1	60.1			4938	5317	5193
304.5	326.5	62.9	62.9			5200	5312	5193
320.0	342.0	66.3	66.3			4478	5272	5156
334.5	356.5	69.0	69.0			5330	5274	5163
350.0	372.0	72.2	72.2			4861	5257	5150
364.5	386.5	74.7	74.7			5877	5278	5174
380.0	402.0	77.2	77.2			6102	5307	5204
394.5	416.5	79.9	79.9			5430	5312	5212
410.0	432.0	82.9	82.9			5142	5306	5209
424.4	446.4	85.3	85.3			6005	5326	5232
439.9	461.9	88.5	88.5	0.0	0.0	4966	5309	5217
454.4	476.4	91.0	91.2	-0.2	-0.2	5343	5310	5221
469.9	491.9	93.9	94.4	-0.5	-0.5	4878	5296	5209
484.4	506.4	97.0	97.4	-0.3	-0.4	4875	5284	5199
499.9	521.9	100.8	100.9	0.0	-0.1	4453	5258	5173
514.4	536.4	103.8	104.2	-0.2	-0.4	4378	5232	5148
529.9	551.9	108.8	108.6	0.4	0.2	3514	5173	5082
544.4	566.4	112.7	112.4	0.6	0.4	3838	5134	5040
559.9	581.9	116.9	116.6	0.5	0.3	3656	5088	4990
574.5	596.5	120.4	120.4	0.3	0.0	3866	5054	4954
590.0	612.0	125.2	125.2	0.4	0.0	3257	4998	4890
604.4	626.4	129.0	129.0	0.5	0.0	3712	4964	4854
619.9	641.9	132.9	132.7	0.8	0.2	4222	4945	4837
634.4	656.4	136.7	136.5	1.0	0.2	3837	4917	4809
650.0	672.0	141.0	140.5	1.5	0.5	3913	4892	4784
664.5	686.5	144.4	144.0	1.6	0.4	4126	4874	4768
680.0	702.0	147.9	147.9	1.4	0.1	4003	4854	4748
684.5	706.5	149.1	149.0	1.6	0.1	4102	4849	4743
694.5	716.5	151.3	151.2	1.7	0.1	4485	4843	4739
700.0	722.0	152.9	152.6	1.9	0.3	3836	4835	4731
710.0	732.0	155.8	155.9	1.7	-0.1	3087	4805	4697
724.4	746.4	160.1	160.2	1.7	-0.2	3295	4770	4658
739.9	761.9	164.9	164.8	2.1	0.0	3380	4737	4623
754.5	776.5	168.2	168.2	2.2	-0.0	4315	4729	4617
769.9	791.9	172.5	172.4	2.5	0.1	3673	4706	4594
784.4	806.4	175.9	175.9	2.7	0.1	4164	4696	4585
799.9	821.9	180.1	179.9	2.9	0.2	3826	4678	4568
814.4	836.4	184.3	184.3	2.9	0.0	3339	4651	4539
830.0	852.0	188.4	188.4	3.0	0.1	3818	4635	4523
844.5	866.5	192.3	192.2	3.2	0.1	3773	4619	4508
860.0	882.0	196.2	196.3	3.2	-0.0	3803	4603	4494
874.5	896.5	199.9	199.7	3.5	0.2	4259	4598	4490
890.0	912.0	203.8	203.6	3.7	0.2	3934	4586	4479
904.5	926.5	207.4	207.2	3.8	0.2	4051	4577	4472
920.0	942.0	211.5	211.3	3.9	0.2	3754	4562	4458

[illegible]

150

200

250

300

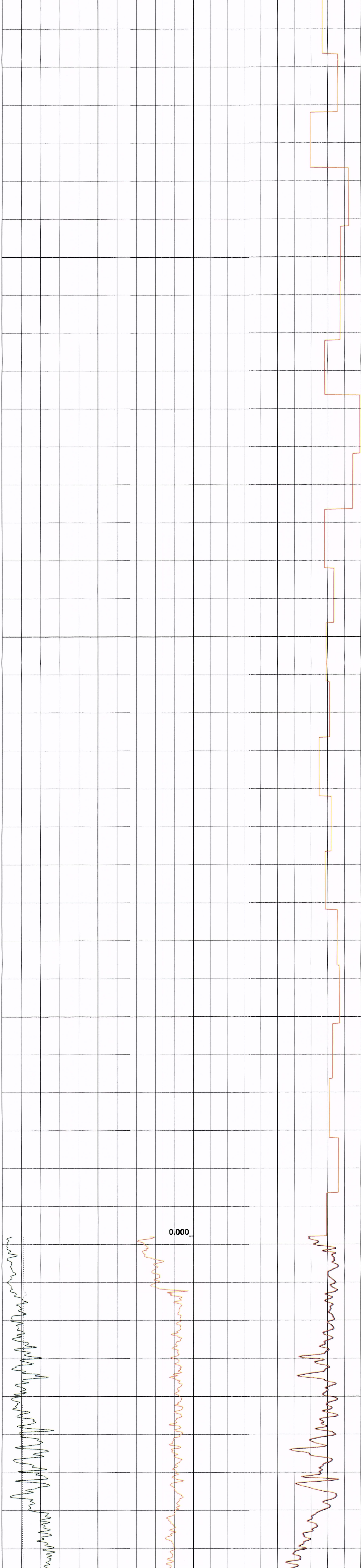
350

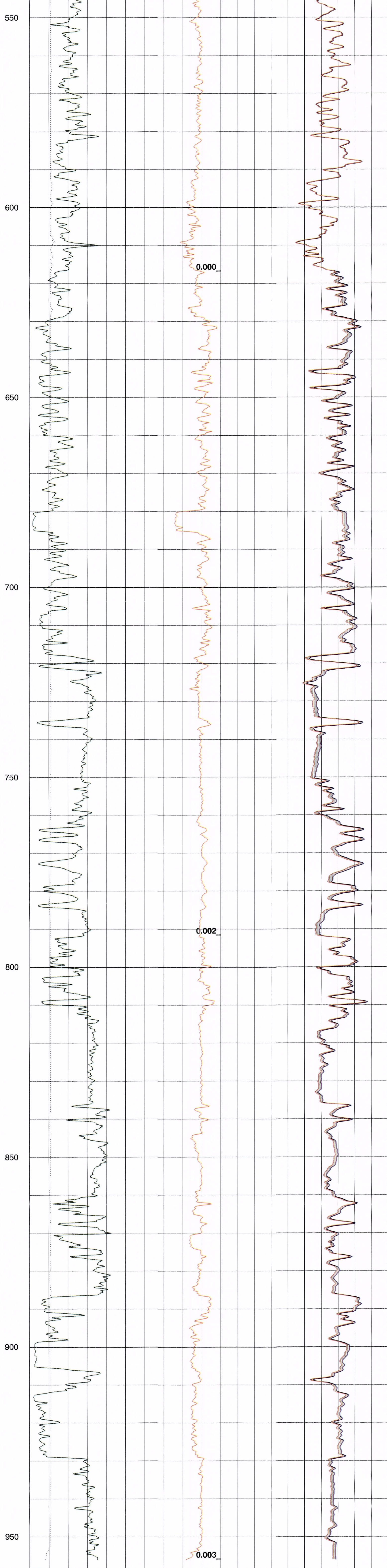
400

450

500

0.000





SONIC TRANSIT TIMES 500 to 100 MicroSec/m
REFLECTION COEFFICIENT -0.2 to 0.2
6/8-120/140 HERTZ, NORMAL POLARITY
6/8-70/90 HERTZ, NORMAL POLARITY
6/8-50/70 HERTZ, NORMAL POLARITY
6/8-120/140 HERTZ, REVERSE POLARITY
6/8-70/90 HERTZ, REVERSE POLARITY
6/8-50/70 HERTZ, REVERSE POLARITY
DEPTH FROM SRD (m)

