

ORIGINALS

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation:  $\pm 0.75$  m above G.L.

Reference Phone: Offset:  $2.12$  m

Reference Phone: Azimuth  $180$

Reference Phone: Elev.  $1.5$  m below G.L.

Reference Phone: X =  $0$  m

Reference Phone: Y =  $-2.12$  m

Reference Phone: Ref. Polarization: Az  $0$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Reference Phone: Ref. Polarization: V  $0$

Reference Phone: Ref. Polarization: R  $0$

Reference Phone: Ref. Polarization: T  $270$

Well Coord: X =  $1006.64$  Y =  $10039.59$  Z =  $+850.4$

Well Coord: X =  $1006.64$  Y =  $10039.59$  Z =  $+850.4$

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Well Coord: X =  $1006.64$  Y =  $10039.59$  Z =  $+850.4$

Date:  $23 Sept 97$

High-Cut  $1000$

Low-Cut  $4$

Sample Int.  $2 ms$

Number Samples  $2500$

Shot	File	Depth	Borehole Phone	Source	Offset	Azimuth	Elev.	X	Y	Source Polarization
1	X1WL0001	18.75	Sub new MP = $\pm 0.75m$		1.08	180		0	-1.08	270
2		18.75								90
3		18.50								270
4		18.50								90
5		18.25								270
6		18.25								90
7		18.00								270
8		18.00								90
9		17.75								270
10	X1WL0010	17.75								90

Water table  $2.928m$  sub C.E. =  $[+897.47m \text{ elev}]$

T/D =  $20.85m$

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# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: ±0.75 m above G.L.

Reference Phone: Offset: 2.12 m

Azimuth x-axis: 96

Azimuth 180

Elev. 1.15 m below G.L.

Azimuth y-axis: 0

X = 0 m

Well Coord: X = Y = Z = -2.12 m

Y = -2.12 m

Channel Borehole Phone

Ref. Polarization: Az

V=Channel 1

V 0

R=Channel 2

R 0

T=Channel 3

T 276

Date: 23 Sep 97

Number Samples 2500

High-Cut 1000

Sample Int. 12ms

Location: X-1-bwell

Low-Cut 4

Depth

Elev.

Offset

Azimuth

Elev.

X

Y

Azimuth

Vertical

Source Polarization

Shot

File

Depth

Elev.

Offset

Azimuth

Elev.

X

Y

Azimuth

Vertical

Source Polarization

Shot

File

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Elev.

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Y

Azimuth

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Source Polarization

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Source Polarization

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Source Polarization

Shot

File

Depth

Elev.

Offset

Azimuth

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: +0.75 m above G.L.

Reference Phone: Offset: 2.12 m

Azimuth x-axis: 90

Azimuth 180

Elev. 0.15 m below G.L.

Azimuth y-axis: 0

X = 0 m

Well Coord: X = 0

Y = -2.12 m

Z = 0

Channel Configuration:

Borehole Phone V=Channel 1

Ref. Polarization: V

Vert. 0

R=Channel 2

R

90

T=Channel 3

T

90

Reference Phone V=Channel 4

Az

0

R=Channel 5

R

90

T=Channel 6

T

270

Date: 23 Sep 97

Location: X1 well URSR

High-Cut 1000 Low-Cut 4 Sample Int. 2ms Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
21	X1WELL0021	16.25					0	-108	270	135
22		16.25					1	1	90	135
23		16.00					1	1	270	135
24		16.00					1	1	90	135
25		15.75					1	1	270	135
26		15.75					1	1	90	135
27		15.50					1	1	270	135
28		15.50					1	1	90	135
29		15.25					1	1	270	135
30	X1WELL0030	15.25					1	1	90	135

12:37

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# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: 0.75 m above G.L.

Reference Phone: Offset: 2.12 m

Azimuth x-axis: 90

Azimuth 180

Azimuth y-axis: 0

Elev. 15 m below G.L.

Well Coord: X=

X= 0 m

Y=

Y= -2.12 m

Z=

Channel Configuration:

Reference Phone

Vert.

V=Channel 1

V=Channel 4

V 0

R=Channel 2

R=Channel 5

R 0

T=Channel 3

T=Channel 6

T 270

Date: 23 Sept 97

Location: X1-Well URSR

Low-Cut 4 Sample Int. 2015

Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
31	X1WLC031	15.00					0	-1.08	270	135
32		15.00							90	135
33		14.75							270	135
34		14.75							90	135
35		14.50							270	135
36		14.50							90	135
37		14.25							270	135
38		14.25							90	135
39		14.00							270	135
WD	X1WLC040	14.00							90	135

12:45

reclamped at 14.50

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: 10.75 m above G.L.

Azimuth x-axis: 90

Azimuth y-axis: 0

Well Coord: X=        Y=        Z=       

Channel Borehole Phone

V=Channel 1

R=Channel 2

T=Channel 3

Reference Phone

V=Channel 4

R=Channel 5

T=Channel 6

Ref. Polarization: V        R        T       

Az 0 0 270

Vert. 0 90 90

Reference Phone: Offset: 2.12 m

Azimuth 180

Elev. 0.15 m below G.L.

X= 0 m

Y= -2.12 m

Date: 23 Sep 97

Location: X1-well GRSP

High-Cut 1000 Low-Cut 4 Sample Int. 2ms

Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
41	X1W10041	13.75					0	-1.08	270	135
42		13.75							90	135
43		13.50							270	135
44		13.50							90	135
45		13.25							270	135
46		13.25							90	135
47		13.00							270	135
48		13.00							90	135
49		12.75							270	135
50	X1W10050	12.75							90	135

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12:54

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: 0.75 m above G.L.

Azimuth x-axis: 90

Azimuth y-axis: 0

Well Coord: X=            Y=            Z=           

Channel Borehole Phone

V=Channel 1

R=Channel 2

T=Channel 3

Reference Phone

V=Channel 4

R=Channel 5

T=Channel 6

Date: 23 Sep 97 Location: X1-Well URISP

High-Cut 1000 Low-Cut 4 Sample Int. 2ms

Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
51	X1WL0051	12.50					0	-1.08	270	135
52		12.50							90	135
53		12.25							270	135
54		12.75							90	135
55		12.00							270	135
56		12.00							90	135
57		11.75							270	135
58		11.75							90	135
59		11.50							270	135
60	X1WL0060	11.50					0		90	135

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1:02

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: 0.75 m above G.L.

Azimuth x-axis: 90

Azimuth y-axis: 0

Well Coord: X= Y= Z=

Channel Borehole Phone

Configuration: V=Channel 1

R=Channel 2

T=Channel 3

Reference Phone

V=Channel 4

R=Channel 5

T=Channel 6

Ref. Polarization: V

R

T

Az

0

90

270

Vert.

0

90

270

Date: 23 Sep 97

High-Cut 1000

Low-Cut 4

Sample Int. 0.2 ms

Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
61	X1W10061	11.25					0	-1.08	270	135
62		11.25							90	135
63		11.00							270	135
64		11.00							90	135
65		10.75							270	135
66		10.75							90	135
67		10.50							270	135
68		10.50							90	135
69		10.25							270	135
70	X1W10070	10.25							90	135

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# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: 70 m above G.L.

Azimuth x-axis: 0

Azimuth y-axis: 0

Well Coord: X= 0 Y= 0 Z= 0

Channel Borehole Phone

V=Channel 1

R=Channel 2

T=Channel 3

Reference Phone

V=Channel 4

R=Channel 5

T=Channel 6

Ref. Polarization:

V 0

R 0

T 270

Vert.

0

90

270

Reference Phone: Offset: 2.12 m

Azimuth 135

Elev. 0.15 m below G.L.

X= 0 m

Y= -2.12 m

Date: 23 Sept 97

High-Cut 1000 Hz

Location: X1 well GRSP

Low-Cut 4 Hz Sample Int. 0.2 ms

Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
71	X1WLG071	10.00					0	-1.08	270	135
72		10.00							90	135
73		9.75							270	135
74		9.75							90	135
75		9.50							270	135
76		9.50							90	135
77		9.25							270	135
78		9.25							90	135
79		9.00							270	135
80	X1WLG080	9.00							90	135

1:16

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# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole  
 Casing Elevation: 0.75 m above G.L.

Reference Phone: 2.12 m

Azimuth x-axis: 90  
 Azimuth y-axis: 0  
 Well Coord: X= 0 Y= -2.12 Z= 0  
 Channel Configuration: Borehole Phone Reference Phone  
 V=Channel 1 V=Channel 4  
 R=Channel 2 R=Channel 5  
 T=Channel 3 T=Channel 6

Vert. 0  
90  
90

Date: 23 Sep 97 Location: X1-Well URSP Number Samples 2500  
 High-Cut 1000 Low-Cut 4 Sample Int. 0.2ms

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
81	X1W20081	8.75					0	-1.08	270	135
82		8.75							90	135
83		8.50							270	135
84		8.50							90	135
85		8.25							270	135
86		8.25							90	135
87		8.00							270	135
88		8.00							90	135
89		7.75							270	135
90	X1W20090	7.75							90	135

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Coordinate System Origin at Borehole

Casing Elevation:  $\pm 0.75$  m above G.L.

Azimuth x-axis: 90

Azimuth y-axis: 0

Well Coord: X = \_\_\_\_\_ Y = \_\_\_\_\_ Z = \_\_\_\_\_

Channel	Borehole Phone	Reference Phone	Ref. Polarization:	Az	Vert.
Configuration:	V=Channel <u>1</u>	V=Channel <u>4</u>	V	<u>0</u>	<u>0</u>
	R=Channel <u>2</u>	R=Channel <u>5</u>	R	<u>0</u>	<u>90</u>
	T=Channel <u>3</u>	T=Channel <u>6</u>	T	<u>270</u>	<u>90</u>

Reference Phone: \_\_\_\_\_

Off-set: 2.12 m

Azimuth 180

Elev. + 15 m below G.L.

X = 0 m

Y = -2.12 m

Date: 23 Sep 97  
High-Cut 1000 Hz  
Low-Cut 4 Hz Sample Int. 0.2ms  
Location: X1 Well U2157  
Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization			
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical	
91	X11W0091	7.5					0	-1.08	270	135	
92		7.5					1	1	90	135	
93		7.25					1	1	270	135	
94		7.25					1	1	90	135	
95		7.00					1	1	270	135	
96		7.00					1	1	90	135	
97		6.75					1	1	270	135	
98		6.75					1	1	90	135	
99		6.50					1	1	270	135	
100	X11W0090	6.50					1	1	90	135	

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: 70.75 m above G.L.

Azimuth x-axis: 90

Azimuth y-axis: 0

Well Coord: X=            Y=            Z=           

Channel Borehole Phone

V=Channel 1

R=Channel 2

T=Channel 3

Reference Phone

V=Channel 4

R=Channel 5

T=Channel 6

Ref. Polarization: V            R            T           

Az 0 0 270

Vert. 0 90 90

Reference Phone: Offset: 2.12 m

Azimuth 180

Elev. 4.15 m below G.L.

X= 0 m

Y= -2.12 m

Date: 23 Sep 97

Location: X1 well 0815P

High-Cut 1000 Low-Cut 4 Sample Int. 0.2ms

Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
101	X1WLO101	6.25					0	-1.08	270	135
102		6.25							90	135
103		6.00							270	135
104		6.00							90	135
105		5.75							270	135
106		5.75							90	135
107		5.50							270	135
108		5.50							90	135
109		5.25							270	135
110	X1WLO110	5.25						0	90	135

1:38

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole  
 Casing Elevation: 1.75 m above G.L.  
 Azimuth x-axis: 90  
 Azimuth y-axis: 0  
 Well Coord: X=        Y=        Z=         
 Channel Configuration: V=Channel 1 Reference Phone V=Channel 4  
 R=Channel 2 R=Channel 5  
 T=Channel 3 T=Channel 6

Reference Phone: Offset: 2.12 m  
 Azimuth 180  
 Elev. 15 m below G.L.  
 X= 0 Y= -2.12 m

Ref. Polarization: Az 0 Vert. 0  
 V 0  
 R 90  
 T 90

Date: 23 Sep 97 Location: X1-well URISP Number Samples 2500  
 High-Cut 1000 Low-Cut 4 Sample Int. 0.2ms

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
111	X1WL0111	5.0					0	-1.08	270	135
112		5.0							90	135
113		4.75							270	135
114		4.75							90	135
115		4.50							270	135
116		4.50							90	135
117		4.25							270	135
118		4.25							90	135
119		4.00							270	135
120	X1WL0120	4.00					0		90	135

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# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Casing Elevation: 75 m above G.L.

Azimuth x-axis: 90

Azimuth y-axis: 0

Well Coord: X=        Y=        Z=       

Channel Borehole Phone

Configuration: V=Channel 1

R=Channel 2

T=Channel 3

Reference Phone

V=Channel 4

R=Channel 5

T=Channel 6

Ref. Polarization: Az 0 Vert. 0

V 0 R 90

T 270

Date: 23 Sep 97

Location: X1 Well URISP

High-Cut 1000 Low-Cut 4 Sample Int. 0.2ms

Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
121	X1W20124	<del>3.25</del>	3.25				0	-1.08	270	135
122		3.75							90	135
123		3.50							270	135
124		3.50							90	135
125		3.25							270	135
126		3.25							90	135
127		3.00							270	135
128		3.00							90	135
129		2.75							270	135
130	X1W20130	2.75					0		90	135

1:54

# BSU GEOPHYSICS VSP OBSERVER'S LOG

Coordinate System Origin at Borehole

Reference Phone: Offset: 2.12 m

Casing Elevation: ± 0.75 m above G.L.

Azimuth x-axis: 90

Azimuth y-axis: 0

Well Coord: X= 0 Y= -2.12 Z= 0 m below G.L.

Channel Configuration: Borehole Phone V=Channel 1 Reference Phone V=Channel 4

R=Channel 2 R=Channel 5

T=Channel 3 T=Channel 6

Date: 23 Sep 97 Location: X1-Well URISP

High-Cut 1000 Low-Cut 4 Sample Int. 0.2 ms Number Samples 2500

Shot		Borehole Phone			Source			Source Polarization		
Rec.	File	Depth	Elev.	Offset	Azimuth	Elev.	X	Y	Azimuth	Vertical
131	X1WL0131	2.5					0	-1.08	270	135
132		2.5							90	135
133		2.25							270	135
134		2.25							90	135
135		2.0							270	135
136		2.0							90	135
137		1.75							270	135
138		1.75							90	135
139		1.50							270	135
140	X1WL0140	1.50							90	135

14(09) 15

2.20

Coordinate System Origin at Borehole  
Casing Elevation:  $\pm 0.75$  m above G.L.  
Azimuth x-axis:  $90$   
Azimuth y-axis:  $0$   
Well Coord: X = \_\_\_\_\_ Y = \_\_\_\_\_ Z = \_\_\_\_\_  
Channel  
Configuration:  
Borehole Phone  
V=Channel  $1$   
R=Channel  $2$   
T=Channel  $3$   
Reference Phone  
V=Channel  $4$   
R=Channel  $5$   
T=Channel  $6$   
Reference Phone:  
Offset:  $2.12$  m  
Azimuth  $180$   
Elev.  $+15$  m below G.L.  
X =  $0$  m  
Y =  $-2.12$  m  
Ref. Polarization: V \_\_\_\_\_ Az \_\_\_\_\_  
R \_\_\_\_\_  
T  $270$   
Vert.  
 $0$   
 $90$   
 $90$

Date: 23 Sep 97  
High-Cut 1000  
Location: X1 well URSP  
Low-Cut 4 Sample Int. 0.2m  
Number Samples 2500

[illegible]

502

x, y, z unknown at  
Time of Survey

## VSP Preliminary Data Sheet

Date: 9/23/97 Type of Phones 070

1. Well Name X1

2. Location of Well

X= \_\_\_\_\_ Y= \_\_\_\_\_ Z= \_\_\_\_\_

Casing Elevation: \_\_\_\_\_

3. Depth to top of water table (measured from CE) \_\_\_\_\_

sub old mp used - WATERLINE ElectriCope  
Casing elevation will be raised with well completion 11:00

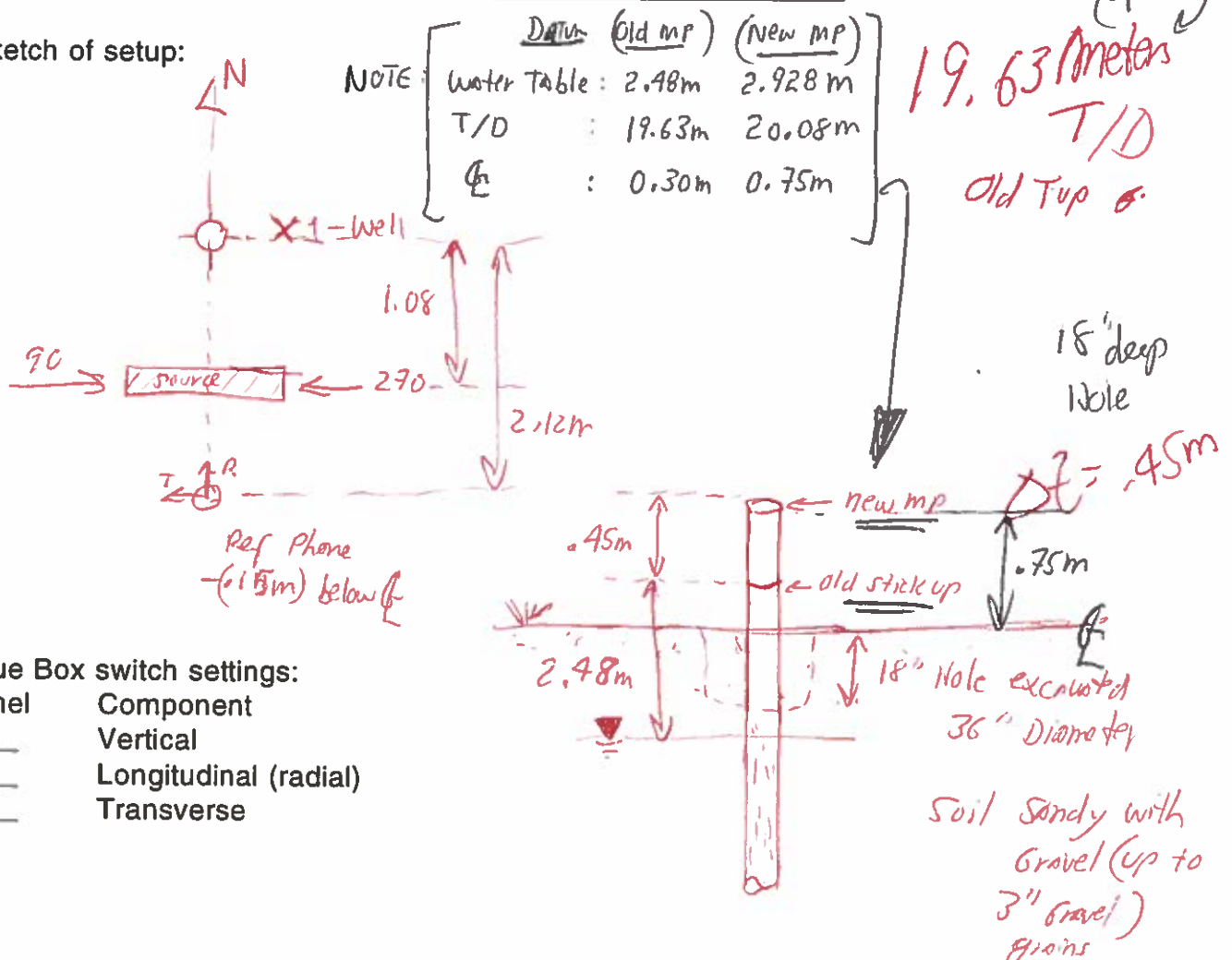
4. Casing Elevation, distance above ground level= + .75

5. Reference phone offset from borehole= 2.12m

6. Reference phone depth below ground level= .15m

7. Source Offset from borehole= 1.08m

8. Sketch of setup:



9. Blue Box switch settings:

Channel	Component
_____	Vertical
_____	Longitudinal (radial)
_____	Transverse



Figure on: [ 30 min setup / Break Down  
30 min driving to site

# VSP Check List

Project: URISP

Date: 23 sept 97

Odometer Start: 12833  
Time Out: 9:30

12442- Van  
12856 <sup>CHISS</sup> Pick Up  
Time In: 15:30

Item	Out	In	Comment
BHG-2 Borehole Geophone	✓	✓	
BHGC-1 Control Box (Blue)	✓	✓	
Cable: Spool to BHGC-1	✓	✓	
Cable: BHGC-1 to Bison	✓	✓	
Ban/Alligator Power Cables BHGC-1	✓	✓	
Break out box	✓	✓	
OYO 3-c Reference Phone (Blue)	✓	✓	
Dummy tool	✓	✓	
Snatch Block and Come-a-long	✓	✓	
Bison Seismograph	✓	✓	
Vertical Hammer Source	No	No	
Black Tape	✓	✓	
WD-40	✓	✓	
Observer's Sheets/Note Book	✓	✓	
Rope	✓	✓	
Rock Hammer	✓	✓	
Tape measure (50m)	✓	✓	
Gloves	✓	✓	
Compass and Maps	✓	✓	
Trigger Switch Toggle Box	No	No	
Gas Card & Keys	✓	✓	
Water Table Logging Probe	✓	✓	

TRIPOD