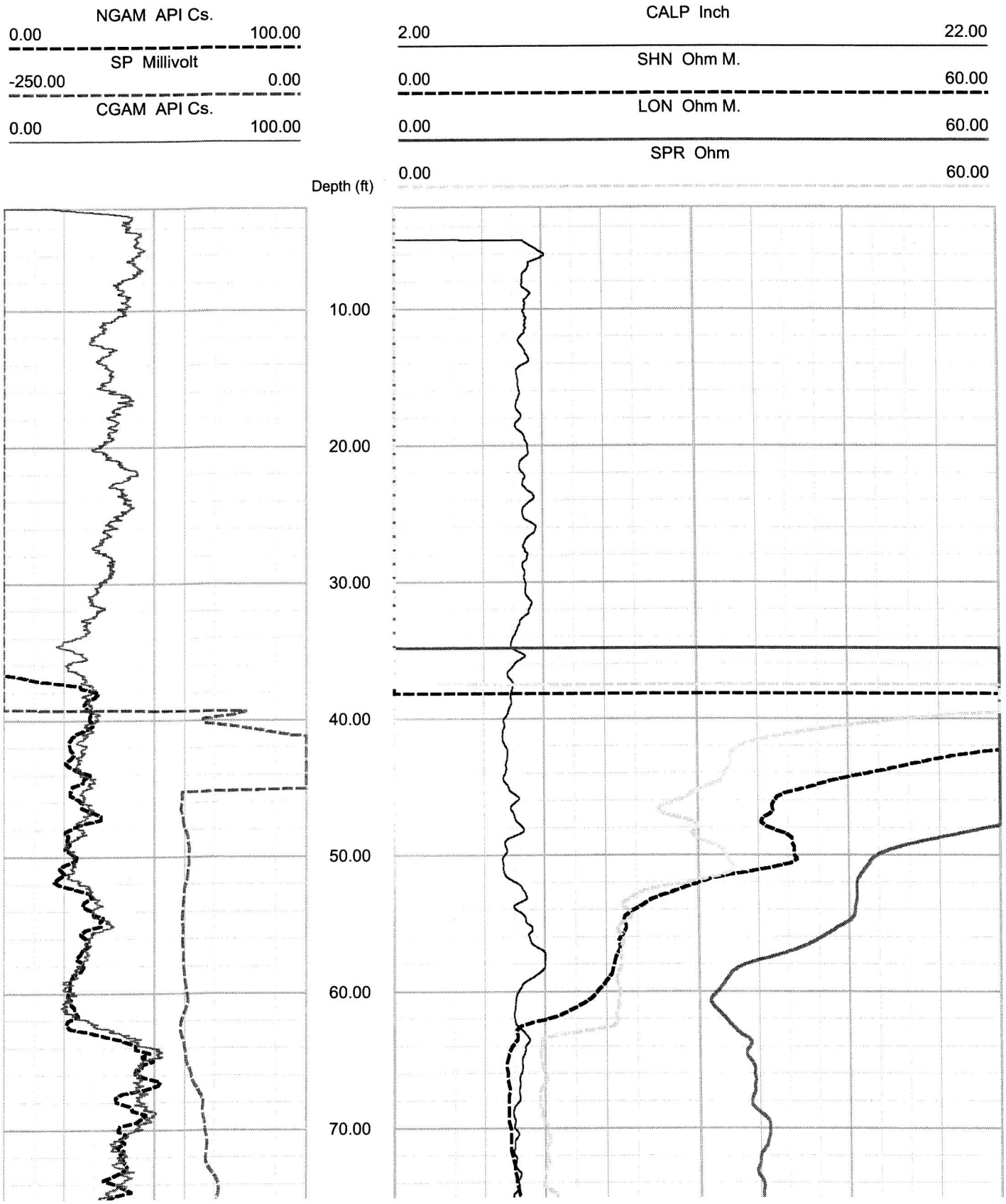
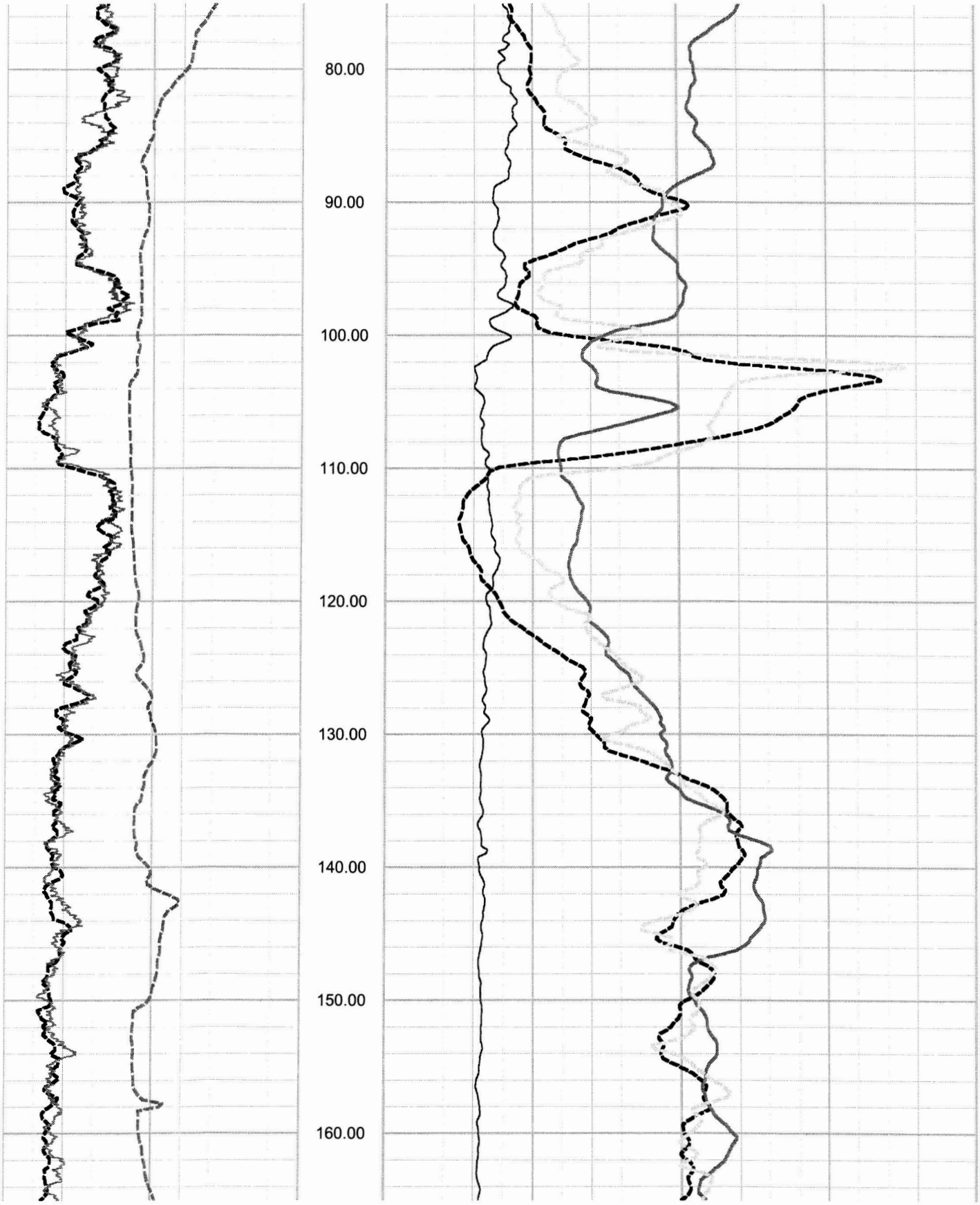
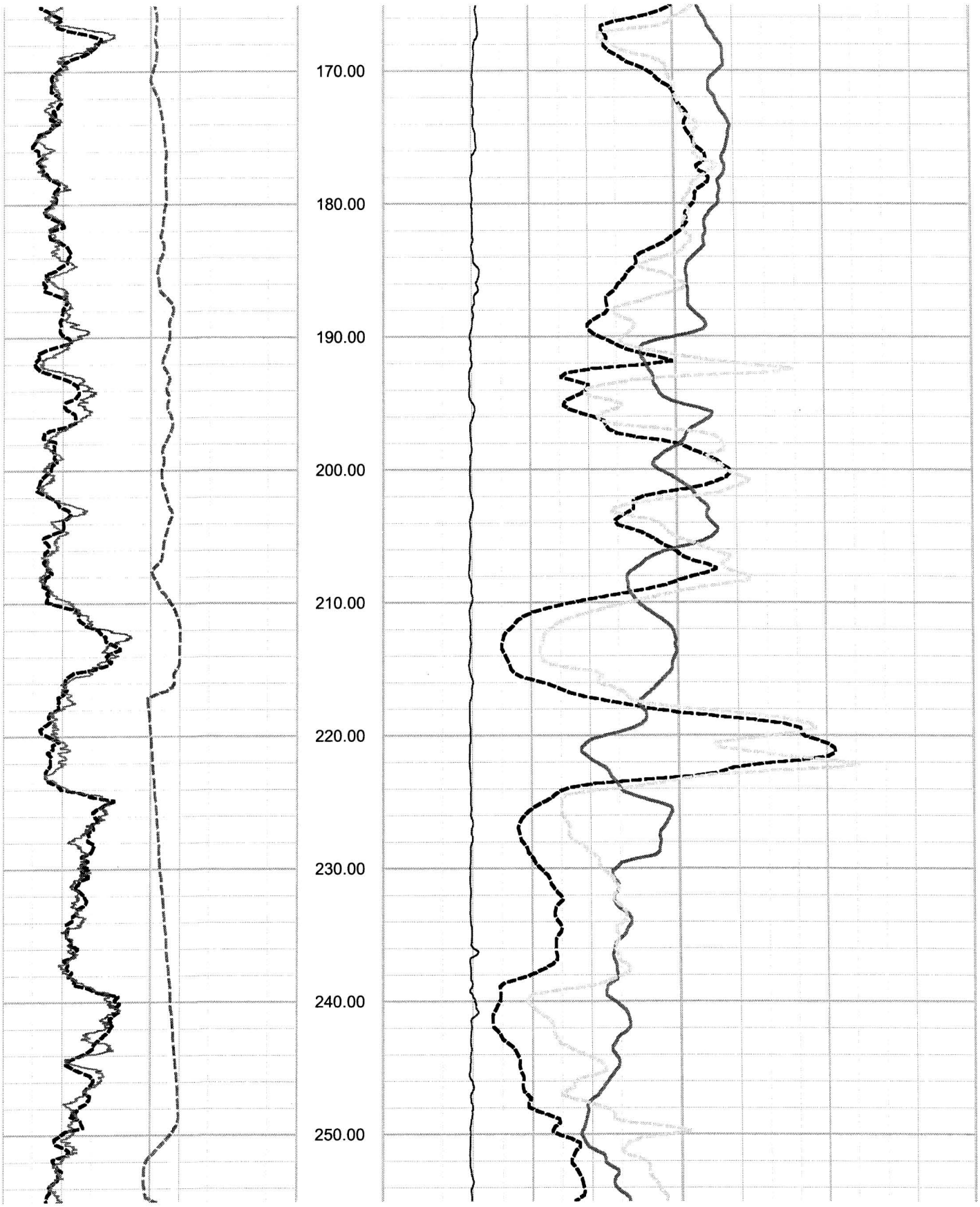


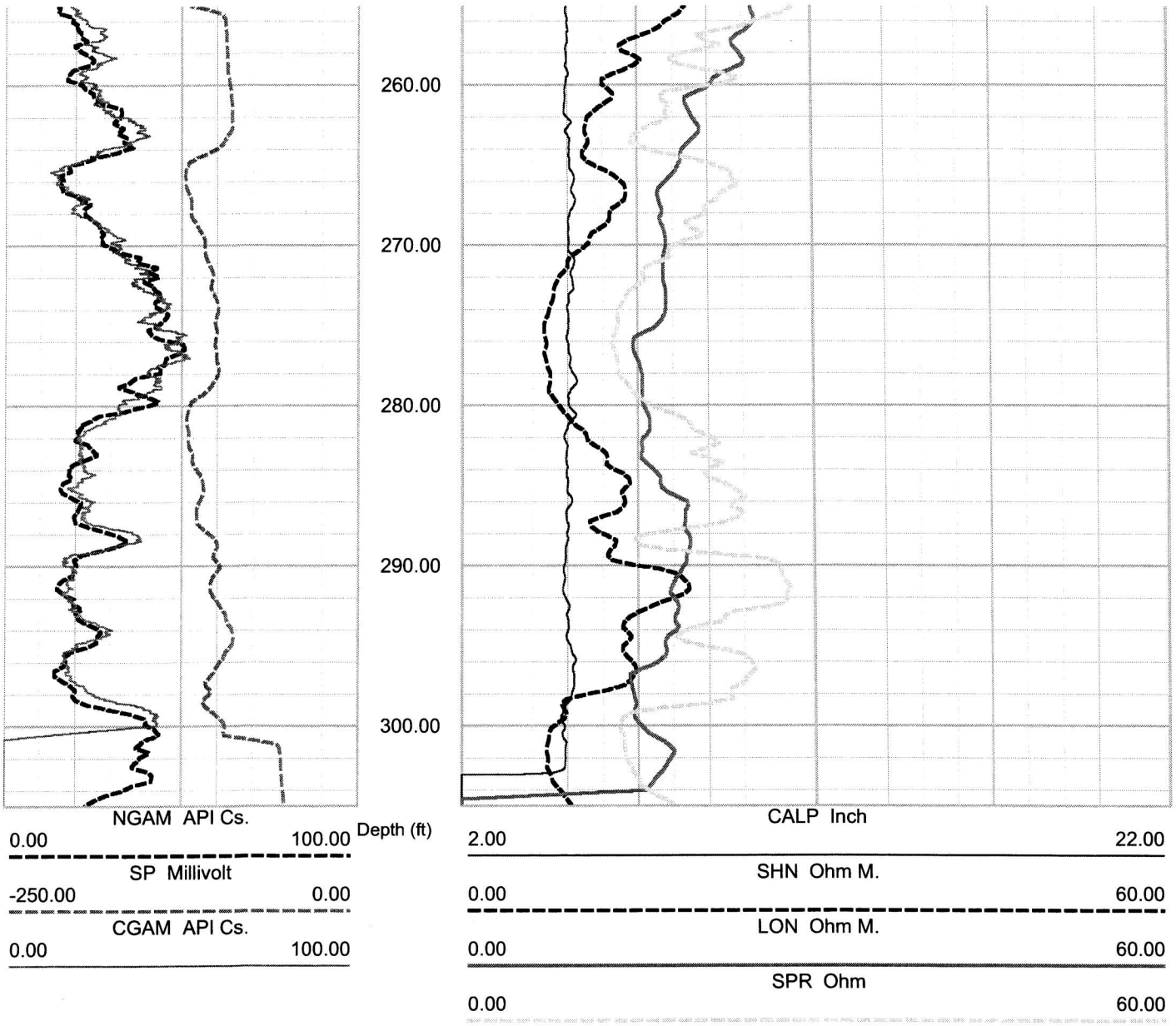
Victoria County COL Boring B-2307 ELOG, Caliper and Natural Gamma rev 1 Sheet 2 of 5



Victoria County COL Boring B-2307 ELOG, Caliper and Natural Gamma rev 1 Sheet 3 of 5



Victoria County COL Boring B-2307 ELOG, Caliper and Natural Gamma rev 1 Sheet 4 of 5



Victoria County COL Boring B-2307 ELOG, Caliper and Natural Gamma rev 1 Sheet 5 of 5

APPENDIX C

BORING GEOPHYSICAL LOGGING SYSTEMS - NIST TRACEABLE CALIBRATION PROCEDURES AND CALIBRATION RECORDS

CALIBRATION PROCEDURE FOR

GEOVision SEISMIC RECORDER/LOGGER

Reviewed 4/6/06

Objective

The timing/sampling accuracy of seismic recorders or data loggers is required for several GEOVision field procedures including Seismic Refraction, Downhole Seismic Velocity Logging, and P-S Suspension Logging. This procedure describes the method for measuring the timing accuracy of a seismic data logger, such as the OYO Model 170, OYO/Robertson Model 3403, Geometrics Strataview or Geometrics Geode. The objective of this procedure is to verify that the timing accuracy of the recorder is accurate to within 1%.

Frequency of Calibration

The calibration of each GEOVision seismic data logger is twelve (12) months. In the case of rented seismic data loggers, calibration must be performed prior to use.

Test Equipment Required

The following equipment is required. Item #2 must have current NIST traceable calibration.

1. Function generator, Krohn Hite 5400B or equivalent
2. Frequency counter, HP 5315A or equivalent
3. Test cables, from item 1 to item 2, and from item 1 to subject data logger.

Procedure

This procedure is designed to be performed using the accompanying Seismograph Calibration Data Sheet with the same revision number. All data must be entered and the procedure signed by the technician performing the test.

1. Record all identification data on the form provided.
2. Connect function generator to data logger (such as OYO Model 170) using test cable
3. Connect the function generator to the frequency counter using test cable.

4. Set up generator to produce a 100.0 Hz, 0.25 volt (amplitude is approximate, modify as necessary to yield less than full scale waveforms on logger display) peak square wave or sine wave. Verify frequency using the counter and initial space on the data sheet.

5. Initialize data logger and record a data record of at least 0.1 second using a 100 microsecond or less sample period.

6. Measure the recorded square wave frequency by measuring the duration of 9 cycles of data. This measurement can be made using the data logger display device, or by printing out a paper tape. If a paper tape can be printed, the resulting printout must be attached to this procedure. Record the data in the space provided.

7. Repeat steps 5 and 6 three more times using separate files.

Criteria

The duration for 9 cycles in any file must be 90.0 milliseconds plus or minus 0.9 milliseconds, corresponding to an average frequency for the nine cycles of 100.0 Hz plus or minus 1 Hz (obtained by dividing 9 cycles by the duration in milliseconds).

If the results are outside this range, the data logger must be marked with a GEOVision REJECT tag until it can be repaired and retested.

If results are acceptable affix label indicating the initials of the person performing the calibration, the date of calibration, and the due date for the next calibration (12 months).

Procedure Approval

Approved by:

John G. Diehl	President
Name	Title
	April 6, 2006
Signature	Date

Client Approval (if required):

Name	Title
Signature	Date

EDISON ESI℠
A SOUTHERN CALIFORNIA EDISON® Company

Metrology
7300 Fenwick Lane
Westminster, CA 92683
Phone: 866-723-2257

Calibration Report

NVLAP Accredited
Calibration

GEOVision Geophysical Services
1151 Pomona Road, Unit P
Corona, CA 92882

TEST NUMBER
527438

NVLAP®
Lab Code:105014-0

Manufacturer: Oyo
Model Number: 3403
Description: Unit, Suspension Telemetry,
Asset Number: 160023
Serial Number: 160023
PO Number: 7087-070315-01

Condition As Found: In Tolerance
Condition As Left: In Tolerance
Calibration Date: 04/13/2007
Calibration Due Date: 04/13/2008
Calibration Interval: 12 Months

Remarks:

The UUT (unit under test) was calibrated using the customer's procedure. The UUT was operated by the customer's personnel and data collection was observed by SCE personnel. The UUT was found to be in tolerance to customer supplied specifications. Frequency is accredited. Please see attached data.

Standards Utilized

I.D. No.	Mfg.	Model No.	Description	Cal. Date	Due Date
S1-03092	Hewlett Packard	5335A OPT 020, 30,40	Counter, Universal,	12/12/2006	06/12/2007
S1-03355	Hewlett Packard	3325B OPT 001, 002	Generator, Function, Synthesizer	11/08/2006	11/08/2007
S1-03686	Fluke	910	Standard, Frequency, Controlled, Gps	01/18/2007	01/18/2008

Procedure: Customer
Temperature: 23° C
Humidity: 38% RH
Test No.: 527438

Calibration Performed By:			Quality Reviewer:	
Branson, Craig A CAB	Metrologist	714-895-0714	Clarence E Stinman Jr	4/13/07
Name	Title	Phone	Name	Date

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SEISMOGRAPH CALIBRATION DATA SHEET REV 4/6/06

INSTRUMENT DATA

SYSTEM MFR:	OYO	MODEL NO.:	3403
SERIAL NO.:	160023	CALIBRATION DATE:	04/13/2007
BY:	ROBERT STELLER	DUE DATE:	04/13/2008
COUNTER MFR:	HEWLETT PACKARD	MODEL NO.:	5335A
SERIAL NO.:	2626A10854	CALIBRATION DATE:	12/12/2006
BY:	SCE #S1-03092	DUE DATE:	06/12/2007
FCTN GEN MFR:	HEWLETT PACKARD	MODEL NO.:	3325B
SERIAL NO.:	2847A14447	CALIBRATION DATE:	11/08/2006
BY:	SCE #S1-03355	DUE DATE:	11/08/2007

SYSTEM SETTINGS:

GAIN:	2
FILTER:	10 KHZ
RANGE:	100 MILLISEC
DELAY:	0
STACK: 1 (STD)	1
PULSE:	1.6
DISPLAY:	NA
SYSTEM: DATE = CORRECT DATE & TIME	04/13/2007,09:50AM

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISK AND PAPER TAPE, IF AVAILABLE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES, IF AVAILABLE, TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	401	100.0	90.0	90.0	90.0	100.0
SQUARE	402	100.0	90.0	90.0	90.0	100.0
SINE	403	100.0	90.0	90.0	90.0	100.0
SINE	404	100.0	90.0	90.0	90.0	100.0

CALIBRATED BY: ROBERT STELLER 04/13/2007 Robt Steller
NAME DATE SIGNATURE

Page 2 of 2

Seismic recorder/Logger Calibration Data Sheet Rev 1.30 4-6-06

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Metrology
7300 Fenwick Lane
Westminster, CA 92683
Phone: 866-723-2257

Calibration Report

NVLAP Accredited
Calibration

GEOVision Geophysical Services
1151 Pomona Road, Unit P
Corona, CA 92882

TEST NUMBER
527439

NVLAP
Lab Code:105014-0

Manufacturer:	Oyo	**Condition As Found:**	In Tolerance
Model Number:	3403	**Condition As Left:**	In Tolerance
Description:	Unit, Suspension Telemetry,	**Calibration Date:**	04/13/2007
Asset Number:	160024	**Calibration Due Date:**	04/13/2008
Serial Number:	160024	**Calibration Interval:**	12 Months
PO Number:	7087-070315-01		

Remarks:

The UUT (unit under test) was calibrated using the customer's procedure. The UUT was operated by the customer's personnel and data collection was observed by SCE personnel. The UUT was found to be in tolerance to customer supplied specifications. Frequency is accredited. Please see attached data.

Standards Utilized

I.D. No.	Mfg.	Model No.	Description	Cal. Date	Due Date
S1-03092	Hewlett Packard	5335A OPT 020, 30,40	Counter, Universal,	12/12/2006	06/12/2007
S1-03355	Hewlett Packard	3325B OPT 001, 002	Generator, Function, Synthesizer	11/08/2006	11/08/2007
S1-03686	Fluke	910	Standard, Frequency, Controlled, Gps	01/18/2007	01/18/2008

Procedure: Customer
Temperature: 23° C
Humidity: 38% RH
Test No.: 527439

Calibration Performed By:			Quality Reviewer:	
Branson, Craig A	Metrologist	714-895-0714		4/13/07
Name	Title	Phone	Name	Date

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Page 1 of 2

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SEISMOGRAPH CALIBRATION DATA SHEET REV 4/6/06

INSTRUMENT DATA

SYSTEM MFR:	OYO	MODEL NO.:	3403
SERIAL NO.:	160024	CALIBRATION DATE:	04/13/2007
BY:	ROBERT STELLER	DUE DATE:	04/13/2008
COUNTER MFR:	HEWLETT PACKARD	MODEL NO.:	5335A
SERIAL NO.:	2626A10854	CALIBRATION DATE:	12/12/2006
BY:	SCE #S1-03092	DUE DATE:	06/12/2007
FCTN GEN MFR:	HEWLETT PACKARD	MODEL NO.:	3325B
SERIAL NO.:	2847A14447	CALIBRATION DATE:	11/08/2006
BY:	SCE #S1-03355	DUE DATE:	11/08/2007

SYSTEM SETTINGS:

GAIN:	2
FILTER:	10 KHZ
RANGE:	100 MILLISEC
DELAY:	0
STACK: 1 (STD)	1
PULSE:	1.6
DISPLAY:	NA
SYSTEM: DATE = CORRECT DATE & TIME	04/13/2007,10:13AM

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISK AND PAPER TAPE, IF AVAILABLE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES, IF AVAILABLE, TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	501	100.0	90.0	90.0	90.0	100.0
SQUARE	502	100.0	90.0	90.0	90.0	100.0
SINE	503	100.0	90.0	90.0	90.0	100.0
SINE	504	100.0	90.0	90.0	90.0	100.0

CALIBRATED BY: ROBERT STELLER 04/13/2007 Robt Steller
NAME DATE SIGNATURE

Page 2 of 2

Seismic recorder/Logger Calibration Data Sheet Rev 1.30 4-6-06

EDISON ESI

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Metrology
7300 Fenwick Lane
Westminster, CA 92683
Phone: 866-723-2257

Calibration Report

NVLAP Accredited
Calibration

GEOVision Geophysical Services
1151 Pomona Road, Unit P
Corona, CA 92882

TEST NUMBER
527435

NVLAP
Lab Code:105014-0

Manufacturer:	Oyo Corporation	**Condition As Found:**	In Tolerance
Model Number:	3331-A	**Condition As Left:**	In Tolerance
Description:	Logger, Suspension,	**Calibration Date:**	04/13/2007
Asset Number:	19029	**Calibration Due Date:**	04/13/2008
Serial Number:	19029	**Calibration Interval:**	12 Months
PO Number:	7087-070315-01		

Remarks:

The UUT (unit under test) was calibrated using the customer's procedure. The UUT was operated by the customer's personnel and data collection was observed by SCE personnel. The UUT was found to be in tolerance to customer supplied specifications. Frequency is accredited. Please see attached data.

Standards Utilized

I.D. No.	Mfg.	Model No.	Description	Cal. Date	Due Date
S1-03092	Hewlett Packard	5335A OPT 020, 30,40	Counter, Universal,	12/12/2006	06/12/2007
S1-03355	Hewlett Packard	3325B OPT 001, 002	Generator, Function, Synthesizer	11/08/2006	11/08/2007
S1-03686	Fluke	910	Standard, Frequency, Controlled, Gps	01/18/2007	01/18/2008

Procedure: Customer
Temperature: 23° C
Humidity: 38% RH
Test No.: 527435

Calibration Performed By:			Quality Reviewer:	
Branson, Craig A CAB	Metrologist	714-895-0714	Clarence E Stinson Jr	4/13/07
Name	Title	Phone	Name	Date

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SEISMOGRAPH CALIBRATION DATA SHEET REV 4/6/06

INSTRUMENT DATA

SYSTEM MFR:	OYO	MODEL NO.:	3331A
SERIAL NO.:	19029	CALIBRATION DATE:	04/13/2007
BY:	ROBERT STELLER	DUE DATE:	04/13/2008
COUNTER MFR:	HEWLETT PACKARD	MODEL NO.:	5335A
SERIAL NO.:	2626A10854	CALIBRATION DATE:	12/12/2006
BY:	SCE #S1-03092	DUE DATE:	06/12/2007
FCTN GEN MFR:	HEWLETT PACKARD	MODEL NO.:	3325B
SERIAL NO.:	2847A14447	CALIBRATION DATE:	11/08/2006
BY:	SCE #S1-03355	DUE DATE:	11/08/2007

SYSTEM SETTINGS:

GAIN:	10
FILTER:	20 KHZ
RANGE:	100 MILLISEC
DELAY:	0
STACK: 1 (STD)	1
PULSE:	1.6
DISPLAY:	NA
SYSTEM: DATE = CORRECT DATE & TIME	04/13/2007,08:46AM

PROCEDURE:

SET FREQUENCY TO 100.0HZ SQUAREWAVE WITH AMPLITUDE APPROXIMATELY 0.25 VOLT PEAK. RECORD BOTH ON DISK AND PAPER TAPE, IF AVAILABLE. ANALYZE AND PRINT WAVEFORMS FROM ANALYSIS UTILITY. ATTACH PAPER COPIES OF PRINTOUT AND PAPER TAPES, IF AVAILABLE, TO THIS FORM. AVERAGE FREQUENCY MUST BE BETWEEN 99.0 AND 101.0 HZ.

AS FOUND 100.0 AS LEFT 100.0

WAVEFORM	FILE NO	FREQUENCY	TIME FOR 9 CYCLES Hn	TIME FOR 9 CYCLES Hr	TIME FOR 9 CYCLES V	AVERAGE FREQ.
SQUARE	101	100.0	90.0	90.0	90.0	100.0
SQUARE	102	100.0	90.0	90.0	90.0	100.0
SINE	103	100.0	90.0	90.0	90.0	100.0
SINE	104	100.0	90.0	90.0	90.0	100.0

CALIBRATED BY: ROBERT STELLER 04/13/2007 Robt Steller
NAME DATE SIGNATURE

Page 2 of 4

Seismic recorder/Logger Calibration Data Sheet Rev 1.30 4-6-06

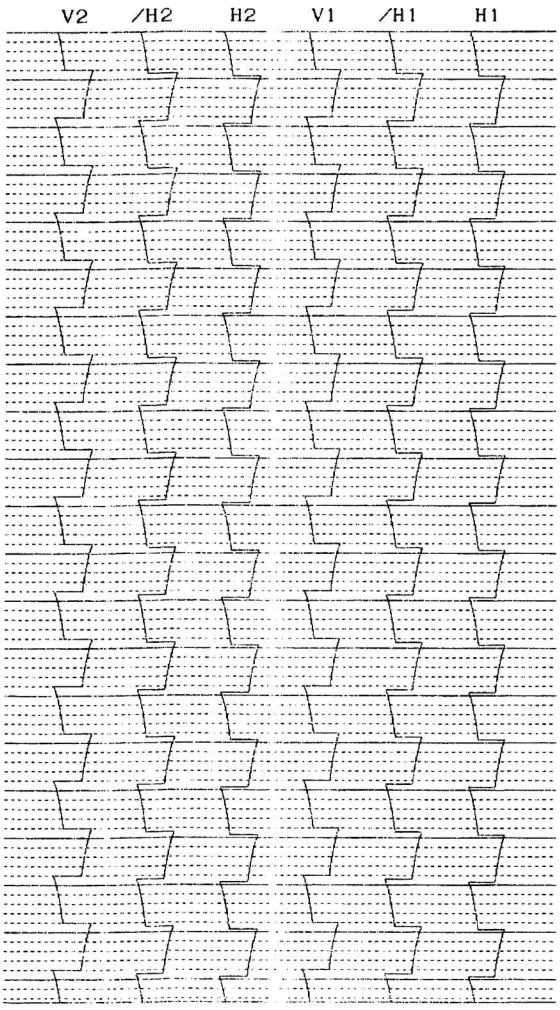
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 101
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 13/04/07 09:07:32 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



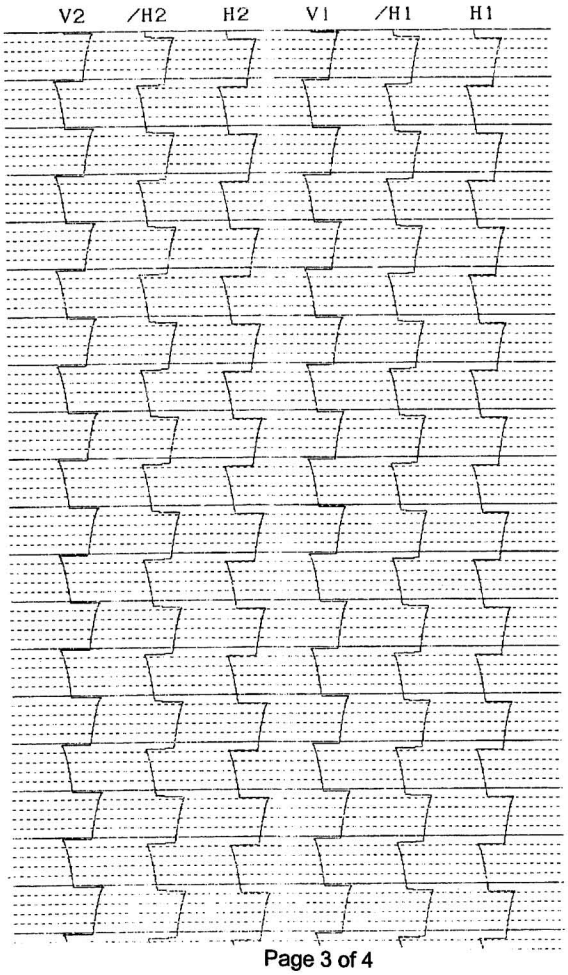
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 102
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 13/04/07 09:08:05 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



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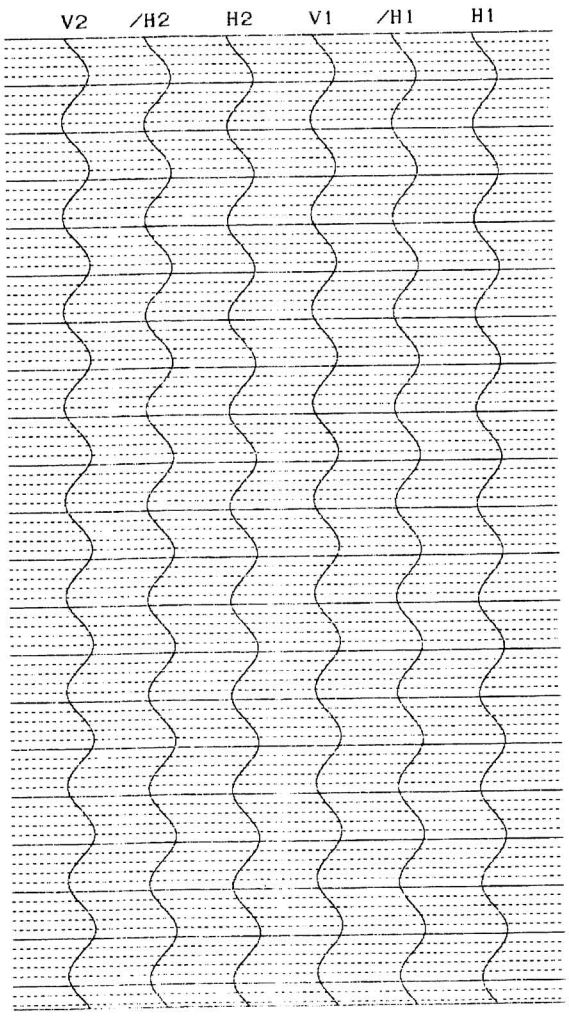
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 103
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 13/04/07 09:08:34 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



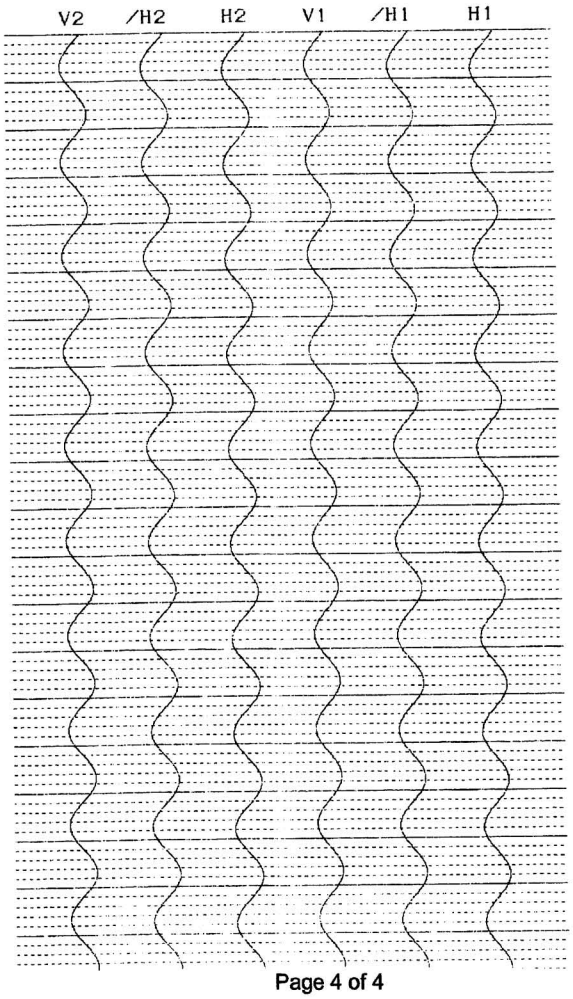
OYO S/N 19029

Suspension 170 4.25

ID_NO. : 104
HOLE NO. : 0
DEPTH : 0.0 [m]
DATE : 13/04/07 09:09:03 AM
H-SAMPLE RATE: 100 [μSEC]
V-SAMPLE RATE: 100 [μSEC]
PULSE WIDTH : 1.6 [mSEC]
DELAY TIME : 0 [mSEC]

	H1	/H1	V1	H2	/H2	V2
GAIN	X 10	X 10	X 10	X 10	X 10	X 10
LCF[Hz]	5	5	5	5	5	5
HCF[Hz]	20K	20K	20K	20K	20K	20K
STACK	1	1	1	1	1	1

TRACE SIZE : 1
H-TIME SCALE: 1.00 [mSEC/LINE]
V-TIME SCALE: 1.00 [mSEC/LINE]



Page 4 of 4

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Southern California Edison Company
7300 Fenwick Lane
Westminster, CA 92683
Ms. Jennifer E. Smith
Phone: 714-895-0133 Fax: 714-895-0781
E-mail: Jennifer.Smith@sce.com
URL: http://www.edisonmetrology.com

CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

NVLAP Code: 20/A01 ANSI/NCSL Z540-1-1994; Part 1 Compliant

DIMENSIONAL

NVLAP Code: 20/D03
Gage Blocks

Nominal Length in in	*Best Uncertainty (±) in µin* [note 1]
0.01 to < 0.05	1.9
0.05 to < 0.1	1.7
0.1 to < 1.0	1.2
1.0	1.4
2.0	1.8
3.0	2.2
4.0	2.9
5.0	5.4
6.0	5.6
7.0	5.8
8.0	6.0
10.0	6.8
12.0	7.2
16.0	8.1
20.0	9.4

2007-04-01 through 2008-03-31

Effective dates

Sally S. Bruce

For the National Institute of Standards and Technology

National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

Nominal Length in mm	*Best Uncertainty (±) in nm* [note 1]
0.5 to < 1.0	52
1.0 to < 2.5	44
2.5 to < 25.0	39
25.0	44
50.0	47
75.0	60
100.0	80

NVLAP Code: 20/D11
Spherical Diameter; Ring Gages

Range in inches	*Best Uncertainty (±) in µin* [note 1]	*Remarks*
0.040 to 0.825	10	Comparison to gage blocks
> 0.825 to 1.510	8	Comparison to gage blocks
> 1.510 to 2.510	9	Comparison to gage blocks
> 2.510 to 4.510	14	Comparison to gage blocks
> 4.510 to 6.510	21	Comparison to gage blocks
> 6.510 to 9.010	29	Comparison to gage blocks
> 9.010 to 12.010	40	Comparison to gage blocks
> 12.010 to 13.25	44	Comparison to gage blocks

ELECTROMAGNETICS - DC/LOW FREQUENCY

NVLAP Code: 20/E02
AC Current

	Best Uncertainty (±) in ppm [note 1] *Frequency in Hz*			
Range	***10***	***20***	***40***	***400 to 10 k***
10 mA	278	209	142	132
20 mA	278	209	142	132
30 mA	278	209	142	132
50 mA	300	202	124	109
100 mA	278	209	142	132

2007-04-01 through 2008-03-31

Effective dates

Sally S. Bruce

For the National Institute of Standards and Technology

National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

200 mA		278		209	142		132
300 mA		278		209	142		132
500 mA		300		203	124		109
	10	***20***	***40***	***400 to 5 k***	***10 k***		
1A	300	203	125	110	112		
	10	***20***	***40***	***400 to 10 k***			
2A	305	200	127	113			
3A	305	200	127	113			
	10	***20***	***40***	***400 to 5 k***	***10 k***		
5A	309	210	134	120	123		
	10	***20***	***40***	***400***	***1 k***	***5 k***	***10 k***
10A	318	216	140	127	127	127	128
							400 to 10 k
20A							135

NVLAP Code: 20/E05
DC Current

Range	***Best Uncertainty (±) in ppm*** [note 1]
10 nA	4.0
100 nA	3.6
1 μA	3.0
10 μA	2.3
100 μA	1.9
1 mA	1.9
10 mA	1.9
100 mA	1.9
1 A	10.4
10 A	10.4
30 A	20.6

2007-04-01 through 2008-03-31

Effective dates

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National Voluntary Laboratory Accreditation Program

CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

DC Resistance

Nominal Value in Ω	*Best Uncertainty (±) in ppm* [note 1]	*Remarks*
100 μ	6.1	Automated DC Resistance Calibration System
1 m	4.1	Automated DC Resistance Calibration System
10 m	3.1	Automated DC Resistance Calibration System
100 m	0.3	Automated DC Resistance Calibration System
1	0.2	Automated DC Resistance Calibration System
10	0.2	Automated DC Resistance Calibration System
25	0.3	Automated DC Resistance Calibration System
100	0.3	Automated DC Resistance Calibration System
1 k	0.3	Automated DC Resistance Calibration System
10 k	0.4	Automated DC Resistance Calibration System
100 k	1.2	Automated DC Resistance Calibration System
1 M	1.7	Automated DC Resistance Calibration System
10 M	2.1	Automated DC Resistance Calibration System
100 M	2.6	Automated DC Resistance Calibration System

NVLAP Code: 20/E06
DC Voltage

Range	*Best Uncertainty (±) in ppm* [notes 1,2]	*Remarks*
1.018 V	1.1	Automated DC Calibration System
10.00 V	0.4	Automated DC Calibration System
1.000 V	1.1	Automated DC Calibration System
1 mV to 100 mV	1.3 [note 6]	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
100 mV	0.7	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
1.0 V	0.4	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage

2007-04-01 through 2008-03-31

Effective dates

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CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

10.0 V	0.4	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
20.0 V	0.6	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
100.0 V	0.4	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage
1000.0 V	0.8	Ratiometric Measurement Techniques performed by voltage transfer utilizing a high precision voltage

NVLAP Code: 20/E09
LF AC Voltage

Best Uncertainty (±) in ppm *notes 1,3,4*
Frequency in Hz

Range	***10***	***20***	***40***	***100***	***1 k***	***5 kHz***	***10 k***	***15 kHz***	***20 k***	***25 kHz***
2 mV	306	893	835	873	376	599	854	889	854	825
10 mV	109	166	96	176	188	180	166	169	166	175
20 mV	79	69	65	65	65	66	66	69	66	81
30 mV	131	123	84	105	65	72	86	75	70	78
100 mV	33	37	22	33	33	32	31	32	32	34
190 mV	35	27	29	21	24	23	23	20	19	22
300 mV	47	47	23	23	27	23	19	22	26	27
1 V	120	34	18	9	12	12	12	12	11	12
1.9 V	36	22	19	10	8	8	8	8	8	9
3 V	31	34	25	17	16	15	15	15	15	17
10 V	21	33	19	11	10	10	11	11	12	11
19 V	31	23	20	11	10	10	10	10	11	11
30 V	29	34	25	16	16	17	18	18	18	20
100 V	85	36	20	16	15	15	16	14	12	15
190 V	45	24	20	19	13	13	13	15	17	16
300 V			36	29	18	22	27	24	22	23
500 V			30	25	17	18	19	19	19	21

2007-04-01 through 2008-03-31

Effective dates

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CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

700 V			27	23	18	18	18	18	18	22
1000 V			26	25	22	21	21	21	22	25

Range	*30 kHz*	*50 k*	*60 kHz*	*100 k*	*300 k*	*500 K*	*700 kHz*	*800 k*	*1M*
2 mV	730	395	529	1020	1237	2090	2308	2419	2419
10 mV	182	205	233	299	234	631	459	373	403
20 mV	94	128	167	202	301	451	371	333	373
30 mV	87	127	144	216	342	515	560	590	643
100 mV	35	42	49	76	156	201	247	271	192
190 mV	26	41	49	81	137	119	208	252	191
300 mv	29	37	42	64	120	155	172	189	152
1 V	13	18	18	11	70	90	103	95	75
1.9 V	10	15	14	14	90	95	85	81	82
3 V	19	27	24	24	90	94	96	97	112
10 V	11	11	11	12	70	95	99	104	100
19 V	11	11	12	16	84	91	89	93	104
30 V	22	31	31	31	91				
100 V	18	31	28	17					
190 V	16	18	18	21					
300 V	24	28	31	43					
500 V	24	35	37	51					
700 V	25	40	42	58					
1 kV	29								

TIME AND FREQUENCY

NVLAP Code: 20/F01
Frequency Dissemination

Range	*Best Uncertainty (±)* [note 1]	*Remarks*
10 MHz	1.2×10^{-12}	GPS Receiver

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CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

MECHANICAL

NVLAP Code: 20/M05
Flow Rate

Nominal Flow Rate	*Best Uncertainty (±) in percent* [notes 1, 5]
(0.8 to 30) L/s	0.3
(0.1 to 800) mL/s	0.4

NVLAP Code: 20/M06
Force

Nominal Force in lb	*Best Uncertainty (±)* [note 1]	*Remarks*
2 to 200	0.025 %	Dead Weight
> 200 to 300	0.086 lb	Proving Ring
> 300 to 500	0.14 lb	Proving Ring
> 500 to 1000	0.28 lb	Proving Ring
> 1000 to 2000	0.55 lb	Proving Ring
> 2000 to 5000	0.84 lb	Proving Ring
> 5000 to 10 000	1.7 lb	Proving Ring
> 10 000 to 20 000	5.5 lb	Proving Ring
> 20 000 to 35 000	5.8 lb	Proving Ring
> 35 000 to 50 000	13 lb	Proving Ring
> 50 000 to 60 000	16 lb	Proving Ring
> 60 000 to 100 000	26 lb	Proving Ring
> 100 000 to 300 000	113 lb	Proving Ring

NVLAP Code: 20/M08
Mass

Range	*Best Uncertainty (±) in mg* [notes 1,2]	*Remarks*
10 kg	2.3	Echelon I
5 kg	0.93	Echelon I
3 kg	0.65	Echelon I
2 kg	0.43	Echelon I

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Scope Revised : 2007-04-20

1 kg	0.052	Echelon I
500 g	0.043	Echelon I
300 g	0.041	Echelon I
200 g	0.034	Echelon I
100 g	0.020	Echelon I
50 g	0.013	Echelon I
30 g	0.013	Echelon I
20 g	0.0095	Echelon I
10 g	0.0073	Echelon I
5 g	0.0048	Echelon I
3 g	0.0038	Echelon I
2 g	0.0029	Echelon I
1 g	0.0030	Echelon I
500 mg	0.0017	Echelon I
300 mg	0.0013	Echelon I
200 mg	0.0010	Echelon I
100 mg	0.0009	Echelon I
50 mg	0.0007	Echelon I
30 mg	0.0007	Echelon I
20 mg	0.0005	Echelon I
10 mg	0.0005	Echelon I
5 mg	0.0006	Echelon I
3 mg	0.0006	Echelon I
2 mg	0.0005	Echelon I
1 mg	0.0005	Echelon I
30 kg	56	Echelon II
20 kg	22	Echelon II

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Scope Revised : 2007-04-20

THERMODYNAMIC

NVLAP Code: 20/T05
Pressure

Range in psi	*Best Uncertainty (±) in ppm* [note 1]	*Remarks*
0 to 50	25	Gas
> 50 to 1450	48	Gas
> 1450 to 16 000	90	Gas
> 1000 to 10 000	62	Oil
> 10 000 to 30 000	113	Oil
> 30 000 to 50 000	213	Oil

NVLAP Code: 20/T07
Resistance Thermometry

Range		*Best Uncertainty (±) in mK* [note 1]	*Remarks*
77.348 K	-195.80 °C	4.0	BP LN_2 by Comparison
234.3156 K	-38.83 °C	0.7	TPHg
273.16 K	0.01 °C	0.6	TPW
505.078 K	231.93 °C	1.6	FPSn
692.77 K	419.53 °C	2.3	FPZn

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CALIBRATION LABORATORIES

NVLAP LAB CODE 105014-0
Scope Revised : 2007-04-20

1. Represents an expanded uncertainty using a coverage factor, k = 2, at an approximate level of confidence of 95 %.
2. Approximate value. Actual value determined by the test statistics.
3. All ACV measurements performed via AC/DC transfer system.
4. Uncertainties listed are representative of the laboratory's accredited capabilities within the stated ranges. Accreditation is not limited to only those fixed values shown.
5. Dependent upon principle of operation of device being calibrated and its performance relative to standards at the time of the test.
6. The equation: uncert. = $(A + B/mVDC^2)^{0.5}$ (where A = 0.16 and B = 0.013333) is provided in order for potential customers to calculate approximate uncertainties for values down to 1 mV. Example: uncertainty at 1 mVDC would calculate to approximately ±115.47 ppm.
7. The laboratory maintains Echelon II capability for ranges 20 kg to 1 mg and separate Echelon III for all ranges.
8. Avoirdupois mass calibration services are available by comparison to equivalent metric standards. Uncertainties may be appropriately larger.

2007-04-01 through 2008-03-31

Effective dates

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GEOVision Borehole Geophysics depth wheel verification

Performed by Robert Steller on September 23, 2006

	Depth reading in #1	Depth reading out	Depth reading in #2
Depth wheel S/N 101 500 pulse/revolution Circumference = 983mm (3225.07 millifeet)	100.1 feet (30.51 m)	99.95 feet (30.46 m)	100.05 feet (30.50 m)
Depth wheel S/N 102 500 pulse/revolution Circumference = 994mm (3261.15 millifeet)	100.00 feet (30.48) m	100.05 feet (30.50 m)	100.00 feet (30.48) m
Aries winch 200 pulse/revolution Circumference = 305.9mm (1003.51 millifeet)	100.05 feet (30.50) m	100.05 feet (30.50 m)	100.00 feet (30.48) m
Depth wheel S/N 103 500 pulse/revolution Circumference = 1000mm (3.281 feet)			
Comprobe winch 500 pulse/revolution Circumference = 1000mm (3.281 feet)			

All measurements taken with a Stanley 100ft flexible stainless steel tape model number 34-130, and a Keeson 300 foot fiberglass tape, both marked in feet, inches and 1/8ths of inches. Enough cable was spooled off of the winch to allow the cable and tape measures to be laid flat on the parking lot surface side-by-side. A permanent marker was used to mark a 100.0 foot interval on the cable, and the marks were also tagged with electrical tape for visibility. The cable was then spooled back onto the winch. When the first mark was at the top of the measuring wheel, a matching permanent mark was placed, and the recording system (Robertson Micrologger) was set to 0.0 feet depth. The cable was spooled in to the second mark, and the distance was recorded. The recording system was set to 0.0 feet again, and the cable spooled out to the first mark again, and the distance was recorded. The process was repeated one more time to spool the cable back onto the winch, and the distance was recorded.

Estimated accuracy is of these measurements is +/- 0.1 foot or +/- 0.03m.

GEOVision Suspension PS probe Receiver 1–Receiver 2 (R1-R2) spacing verification

Performed by Robert Steller on September 23, 2006

	R2 center to R1 center hanging dry	R2 center to R1 center hanging submerged	R1 bottom to source center hanging submerged with 1m isolation tube S/N 280068
Receiver S/N 30086	40.2in 1.02m	40.0in 1.02m	76.0in 1.93m
Receiver S/N 20042	39.8in 1.01m	39.6in 1.01m	75.7in 1.92m
Receiver S/N 12008	40.2in 1.02m	40.0in 1.02m	76.0in 1.93m

All measurements taken with a Lufkin 3.7m flexible steel tape model number HV1034DM, marked in mm and 100th of feet. Probe suspended in 3-inch diameter clear PVC pipe, using chain clamp placed between bottom and center of Receiver 2 hard section (See Figure). Probe "bounced" to establish unrestricted hanging length before measurement. Probe allowed to relax for 5 minutes prior to each measurement. Water level set to submerge bottom of Receiver 2 hard section.. Estimated accuracy due to hysterisis in rubber section approximately +/- 0.01' or +/- 0.003m.

APPENDIX D

BORING GEOPHYSICAL LOGGING FIELD DATA LOGS

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B-11 BORING GEOPHYSICS FIELD LOG SUMMARY

SITE: EXELON-VICTORIA
CLIENT: MACTEC
AUTHOR: C. CARTER

DATE: 10/23/07
JOB: ~~7559~~ 7501
PAGE 1 OF 1

CONTACT: STEVE CRISENZO

PHONE: 361-972-0198

BOREHOLE CONSTRUCTION: CASED ____ UNCASED X
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; ____, ____ TO ____
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 2' ; NO ____
DEPTH TO BEDROCK: NA
BOREHOLE FLUID: WATER ____; FRESH WATER MUD X ; SALT WATER MUD ____;

LOGGING CREW: C. Carter

LOG TYPE	FILE NAME	DEPTH RANGE	DATE	TIMES
ELOG	B11ELOGTEST01		10/23/07	9:50am - 9:51am
ELOG	B11ELOGUP01	308.75' - 39.75'	10/23/07	11:33am - 12:01pm
SUSP	B11SUSPDOWN01	2.5m - 90.0m	10/23/07	12:54p - 2:38pm
Caliper	B11Caltest01		↓	3:30 - 3:31pm
Caliper	B11calup01	304.85' - 5.2'	↓	3:58 - 4:28pm
Caliper	B11 Caltest02		10/23/07	4:37 - 4:38pm

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B-11 ELOG FIELD LOG

SITE: EXELON VICTORIA
CLIENT: MACTEC
AUTHOR: C. CARTER

DATE: 10-23-07
JOB: ~~7350~~ 7501 cc 10/23/07
PAGE 1 OF 2

CONTACT: STEVE CRISENZO — OFFICE — PHONE: 361-972-0198
CELL — PHONE: 919-949-1707
CONTACT: — OFFICE — PHONE:
PHONE:
CONTACT: — PHONE:
PHONE:
CONTACT: — PHONE:
PHONE:
DRILLER: — PHONE:
COMPANY: — PHONE:

GENERAL SITE CONDITIONS/LOCATION:

BOREHOLE DESIGNATION: B-11 LOCATION:

COUNTY: MATAGORDA RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASED ____ UNCASED X
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; ____, ____ TO ____
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 2' ; NO ____
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA
BOREHOLE FLUID: WATER ____; FRESH WATER MUD X ; SALT WATER MUD ____;
OTHER:
DEPTH TO BOREHOLE FLUID: Ø TIME SINCE LAST CIRCULATION: 10am

LOGGING CREW: C. CARTER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: Victoria DEPARTURE TIME: 7:30 am
ARRIVED ON SITE: 8:10 am
STANDBY TIME: CAUSE:
LOGGING STARTED: 11:33 am LOGGING COMPLETED: 12:01 pm

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SITE: EXELON VICTORIA B-11 DATE: 10/23/07
CLIENT: MACTEC JOB: ~~7350~~ 7501 cc 10/23
AUTHOR: C. CARTER PAGE 2 OF 2

WINCH: COMPROBE____ SILVER X OYO____ RG____ OTHER____
MICROLOGGER 5310 X 5772___ OTHER____
ELOG PROBE 5490 x OTHER____

PROBE LENGTH	2.50M(8.20 FT)	
PLUS YOKE 10.0M (32.8 FT)	32.8	
MINUS CASING STICK-UP	-1.0	
DEPTH REF. OFFSET AT START	40.0	
DEPTH REF. OFFSET AT END	39.95	
AFTER SURVEY DEPTH ERROR	.05	LESS THAN 0.4%?

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
B11ELOGTEST01		9:50am		9:51am
B11ELOGCP01	308.75'	11:33am	39.75'	12:01am

MAINTENANCE PERFORMED ON SITE:____

EQUIPMENT PROBLEMS OR FAILURES:____

SUGGESTIONS, ADDITIONS, CHANGES:____

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B-11 CALIPER FIELD LOG

SITE: EXELON-VICTORIA
DATE: 10/23/07
CLIENT: MACTEC
JOB: 7501
AUTHOR: C. CARTER
PAGE 1 OF 2

CONTACT: STEVE CRISENZO — OFFICE PHONE: 361-972-0198
CELL PHONE: 919-949-1707
CONTACT: Allan Shaw — CELL PHONE: 301 707-2684
PHONE:
CONTACT: PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
DRILLER: PHONE:
COMPANY: PHONE:

GENERAL SITE CONDITIONS/LOCATION:

BOREHOLE DESIGNATION: B-11 LOCATION:

COUNTY: RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASED ____ UNCASED X
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; ____, ____ TO ____
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 2 ft ; NO ____
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA
BOREHOLE FLUID: WATER ____; FRESH WATER MUD X ; SALT WATER MUD ____;
OTHER:
DEPTH TO BOREHOLE FLUID: 10 ft TIME SINCE LAST CIRCULATION: 10am

LOGGING CREW: C. CARTER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: VICTORIA,TX DEPARTURE TIME: 7:30am
ARRIVED ON SITE: 8:10 am
STANDBY TIME: CAUSE:
LOGGING STARTED: 3:58pm LOGGING COMPLETED: 4:28pm

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SITE: EXELON-VICTORIA B-11 DATE: 10/23/07
CLIENT: MACTEC JOB: 7501
AUTHOR: C. CARTER PAGE 2 OF 2

WINCH: COMPROBE____ SILVER X OYO____ RG____ OTHER____
MICROLOGGER 5310 X 5772___ OTHER____
CALIPER PROBE 5368 X OTHER____

PROBE OFFSET	2.08M(6.82 FT) 12 IN MAX	
MINUS CASING STICK-UP	-1.0	
DEPTH REF. OFFSET AT START	5.82'	
DEPTH REF. OFFSET AT END	5.80'	
AFTER SURVEY DEPTH ERROR	.02	LESS THAN 0.4%?

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
B11CALTEST01		3:30pm		3:31pm
B11CALUP01	304.85'	3:58pm	5.2ft	4:28pm
B11CALTEST02		4:37pm		4:38pm

CALIBRATION PLATE S/N 201

		AS BUILT			PVC FITTING
		1.968 IN	3.937 IN	8.000 IN	4.510 IN
	FILE NAME	(50 MM)	(100 MM)	(203.2 MM)	(114.3 MM)
AS MEAS.	B11CALTEST01	2.022"	3.975"	8.046"	4.564"
AS MEAS.	B11CALTEST02	2.008"	3.99"	8.059"	4.554"
AS MEAS.					
AS MEAS.					
AS MEAS.					
AS MEAS.					

MAINTENANCE PERFORMED ON SITE:

EQUIPMENT PROBLEMS OR FAILURES:

SUGGESTIONS, ADDITIONS, CHANGES:

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P-S SUSPENSION VELOCITY FIELD LOG

SITE: EXELON VICTORIA DATE: 10/23/07
CLIENT: MACTEC JOB: 7359
AUTHOR: C. CARTER PAGE 1 OF 7

CONTACT: STEVE CRISENZO OFFICE PHONE: 361-972-0198
CELL PHONE: 919-949-1707
CONTACT: OFFICE PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
DRILLER: PHONE:
COMPANY: PHONE:

DIRECTIONS TO SITE:

GENERAL SITE CONDITIONS/LOCATION:

EA#:
BOREHOLE DESIGNATION: B-11 LOCATION:
cc. 10/23
COUNTY: ~~MATAGORDA~~ RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASED ____ UNCASED X
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; ____, ____ TO ____
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 21'; NO ____
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA
BOREHOLE FLUID: WATER ____; FRESH WATER MUD X; SALT WATER MUD ____;
OTHER:
DEPTH TO BOREHOLE FLUID: Ø TIME SINCE LAST CIRCULATION: 10 am

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SITE:_EXELON VICTORIA_____ DATE: 10/23/07
CLIENT:_MACTEC_____ JOB:_7359_____
AUTHOR:_C. CARTER_____ PAGE 2 OF 7

LOGGING CREW:_C. CARTER_____
VEHICLE(S) USED AND MILEAGE: _RENTAL_____
MOBILIZED FROM:_Victoria, TX_____ DEPARTURE TIME: 7:30 am
ARRIVED ON SITE: 8:20 am
STANDBY TIME:_____ CAUSE:_____
LOGGING STARTED: 12:54 pm LOGGING COMPLETED: 2:38 pm
STANDBY TIME:_____ CAUSE:_____
LOGGING STARTED:_____ LOGGING COMPLETED:_____
DEMOBILIZED TO:_____ ARRIVAL TIME:_____
ADDITIONAL DEMOB TIME:_____ REASON:_____

BATTERIES CHANGED BEFORE LOGGING: YES____; NO X ; STORED WITH NEW____

WINCH	COMPROBE	☐	GREY	☒	OYO	☐	RG	☐	OTH	☐	
INSTRUMENT	OYO 12004	☐	15014	☐	19029	☐	RG 160023	☒	160024	☐	
RECEIVER S/N	12008	☐	20042	☐	26066	☐	11001	☐	23053	☐	30086 ☒

MAINTENANCE PERFORMED ON SITE: Im Iso: 280068, Source: 19043, SD: 27073
WB: 470151

EQUIPMENT PROBLEMS OR FAILURES:_____

SUGGESTIONS, ADDITIONS, CHANGES:_____

COMMENTS: Top of ~~drill~~ casing 30 cm RP = 2.18
~~2.18~~ 2.13 @ 3:00 pm

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GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: EXELON VICTORIA B-11 DATE: 10/23/07
CLIENT: MACTEC JOB: ~~7359~~ 7501
AUTHOR: C. CARTER PAGE 3 OF 7

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
0.5	1.64			
1.0	3.28			
1.5	4.92			
2.0	6.56			
2.5	8.20	001		12:54
3.0	9.84	2		
3.5	11.48	3		
4.0	13.12	4		
4.5	14.76	5		
5.0	16.40	6		
5.5	18.04	7		
6.0	19.69	8		
6.5	21.33	9		
7.0	22.97	10		
7.5	24.61	11		
8.0	26.25	12		
8.5	27.89	13		
9.0	29.53	14		
9.5	31.17	15		
10.0	32.81	16		
10.5	34.45	17		
11.0	36.09	18		
11.5	37.73	19		
12.0	39.37	20		
12.5	41.01	21		
13.0	42.65	22		
13.5	44.29	23		
14.0	45.93	24		
14.5	47.57	25		
15.0	49.21	26		
15.5	50.85	27		
16.0	52.49	28		
16.5	54.13	29		
17.0	55.77	30		
17.5	57.41	31		
18.0	59.06	32		
18.5	60.70	33		
19.0	62.34	34		
19.5	63.98	35		
20.0	65.62	36		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: EXELON VICTORIA B-11 DATE: 10/23/07
CLIENT: MACTEC JOB: ~~7359~~ 7501
AUTHOR: C. CARTER PAGE 4 OF 7

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
20.5	67.26	37		
21.0	68.90	38		
21.5	70.54	39		
22.0	72.18	40		
22.5	73.82	41		
23.0	75.46	42		
23.5	77.10	43		
24.0	78.74	44		
24.5	80.38	45		
25.0	82.02	46		
25.5	83.66	47		
26.0	85.30	48		
26.5	86.94	49		
27.0	88.58	50		
27.5	90.22	51		
28.0	91.86	52		
28.5	93.50	53		
29.0	95.14	54		
29.5	96.78	55		
30.0	98.43	56		
30.5	100.07	57		
31.0	101.71	58		
31.5	103.35	59		
32.0	104.99	60		
32.5	106.63	61		
33.0	108.27	62		
33.5	109.91	63		
34.0	111.55	64		
34.5	113.19	65		
35.0	114.83	66		
35.5	116.47	67		
36.0	118.11	68		
36.5	119.75	69		
37.0	121.39	70		
37.5	123.03	71		
38.0	124.67	72		
38.5	126.31	73		
39.0	127.95	74		
39.5	129.59	75		
40.0	131.23	76		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: EXELON VICTORIA B-11 DATE: 10/23/07
CLIENT: MACTEC JOB: ~~7359~~ 7501
AUTHOR: C. CARTER PAGE 5 OF 7

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
40.5	132.87	77		
41.0	134.51	78		
41.5	136.15	79		
42.0	137.80	80		
42.5	139.44	81		
43.0	141.08	82		
43.5	142.72	83		
44.0	144.36	84		
44.5	146.00	85		
45.0	147.64	86		
45.5	149.28	87		
46.0	150.92	88		
46.5	152.56	89		
47.0	154.20	90		
47.5	155.84	91		
48.0	157.48	92		
48.5	159.12	93		
49.0	160.76	94		
49.5	162.40	95		
50.0	164.04	96		
50.5	165.68	97		
51.0	167.32	98		
51.5	168.96	99		
52.0	170.60	100		
52.5	172.24	101		
53.0	173.88	102		
53.5	175.52	103		
54.0	177.17	104		
54.5	178.81	105		
55.0	180.45	106		
55.5	182.09	107		
56.0	183.73	108		
56.5	185.37	109		
57.0	187.01	110		
57.5	188.65	111		
58.0	190.29	112		
58.5	191.93	113		
59.0	193.57	114		
59.5	195.21	115		
60.0	196.85	116		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: EXELON VICTORIA B-11 DATE: 10/23/07
CLIENT: MACTEC JOB: ~~7359~~ 7501
AUTHOR: C. CARTER PAGE 6 OF 7

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
60.5	198.49	117		
61.0	200.13	118		
61.5	201.77	119		
62.0	203.41	120		
62.5	205.05	121		
63.0	206.69	122		
63.5	208.33	123		
64.0	209.97	124		
64.5	211.61	125		
65.0	213.25	126		
65.5	214.90	127		
66.0	216.54	128		
66.5	218.18	129		
67.0	219.82	130		
67.5	221.46	131		
68.0	223.10	132		
68.5	224.74	133		
69.0	226.38	134		
69.5	228.02	135		
70.0	229.66	136		
70.5	231.30	137		
71.0	232.94	138		
71.5	234.58	139		
72.0	236.22	140		
72.5	237.86	141		
73.0	239.50	142		
73.5	241.14	143		
74.0	242.78	144		
74.5	244.42	145		
75.0	246.06	146		
75.5	247.70	147		
76.0	249.34	148		
76.5	250.98	149		
77.0	252.62	150		
77.5	254.27	151		
78.0	255.91	152		
78.5	257.55	153		
79.0	259.19	154		
79.5	260.83	155		
80.0	262.47	156		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: EXELON VICTORIA B-11 DATE: 10/23/07
CLIENT: MACTEC JOB: ~~7359~~ 7501
AUTHOR: C. CARTER PAGE 7 OF 7

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
80.5	264.11	157		
81.0	265.75	158		
81.5	267.39	159		
82.0	269.03	160		
82.5	270.67	161		
83.0	272.31	162		
83.5	273.95	163		
84.0	275.59	164		
84.5	277.23	165		
85.0	278.87	166		
85.5	280.51	167		
86.0	282.15	168		
86.5	283.79	169		
87.0	285.43	170		
87.5	287.07	171		
88.0	288.71	172		
88.5	290.35	173		
89.0	291.99	174		
89.5	293.64	175		
90.0	295.28	176	2:38pm	90.38 Lt
90.5	296.92			
91.0	298.56			
91.5	300.20			
92.0	301.84			
92.5	303.48			
93.0	305.12			
93.5	306.76			
94.0	308.40			
94.5	310.04			
95.0	311.68			
95.5	313.32			
96.0	314.96			
96.5	316.60			
97.0	318.24			
97.5	319.88			
98.0	321.52			
98.5	323.16			
99.0	324.80			
99.5	326.44			
100.0	328.08			

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B-12 BORING GEOPHYSICS FIELD LOG SUMMARY

SITE: EXELON-VICTORIA
CLIENT: MACTEC
AUTHOR: C. CARTER

DATE: 10/24/07
JOB: 7359
PAGE 1 OF 1

CONTACT: STEVE CRISENZO

PHONE: 361-972-0198

BOREHOLE CONSTRUCTION: CASED ____ UNCASED Y
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; ____, ____ TO ____
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 2 ft ; NO ____
DEPTH TO BEDROCK: NA
BOREHOLE FLUID: WATER ____; FRESH WATER MUD X ; SALT WATER MUD ____;

LOGGING CREW: C. Carter

LOG TYPE	FILE NAME	DEPTH RANGE	DATE	TIMES
ELOG	B12ELOGTEST01		10/24/07	9:31 - 9:33 am
ELOG	B12ELOGUP01	308.25' - 39.25'		11:36 - 12:03 pm
P-S velocity	B12SUSPDOWN01	2.5m - 90.0m		12:44 pm - 2:30 pm
Caliper	B12CALTEST01			3:10 - 3:12 pm
Caliper	B12CALUP01	303.95' - 4.8'		3:34 - 4:05 pm
Caliper	B12CALTEST02		10/24/07	4:13 - 4:15 pm

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B-12 ELOG FIELD LOG

SITE: EXELON VICTORIA
CLIENT: MACTEC
AUTHOR: C. CARTER

DATE: 10/24/07
JOB: 7501
PAGE 1 OF 2

CONTACT: STEVE CRISENZO — OFFICE — PHONE: 361-972-0198
CELL — PHONE: 919-949-1707
CONTACT: Allan Shaw — OFFICE — PHONE: 301 704-2684
PHONE:
CONTACT: PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
DRILLER: PHONE:
COMPANY: PHONE:

GENERAL SITE CONDITIONS/LOCATION:

BOREHOLE DESIGNATION: B-12 LOCATION:

COUNTY: Victoria RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASED ____ UNCASED X
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; ____, ____ TO ____
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 2 ft ; NO ____
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA
BOREHOLE FLUID: WATER ____; FRESH WATER MUD X ; SALT WATER MUD ____;
OTHER:
DEPTH TO BOREHOLE FLUID: Ø TIME SINCE LAST CIRCULATION: 10am

LOGGING CREW: C. CARTER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: VICTORIA, TX DEPARTURE TIME: 7:30am
ARRIVED ON SITE: 8:10am
STANDBY TIME: CAUSE:
LOGGING STARTED: 11:36am LOGGING COMPLETED: 12:03am

GEOVision Geophysical Services *1151 Pomona Road, Unit P, Corona, CA 92882* *Ph (951) 549-1234 Fx (951) 549-1236*

SITE:_EXELON VICTORIA B-12 DATE: 10/24/07
CLIENT:_MACTEC JOB:_7501
AUTHOR:_C. CARTER PAGE 2 OF 2

WINCH: COMPROBE____ SILVER X OYO____ RG____ OTHER____
MICROLOGGER 5310 X 5772___ OTHER____
ELOG PROBE 5490 X OTHER____

PROBE LENGTH	2.50M(8.20 FT)	
PLUS YOKE 10.0M (32.8 FT)	41'	
MINUS CASING STICK-UP	1.33'	
DEPTH REF. OFFSET AT START	39.67'	
DEPTH REF. OFFSET AT END	39.50	
AFTER SURVEY DEPTH ERROR	.17 ft	LESS THAN 0.4%?

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
B12ELOGTEST01		9:31 am		9:33am
B12ELOGUP01	308.25ft	11:36am	39.25 ft	12:03am

MAINTENANCE PERFORMED ON SITE:____

EQUIPMENT PROBLEMS OR FAILURES:____

SUGGESTIONS, ADDITIONS, CHANGES:____

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B-12 CALIPER FIELD LOG

SITE: EXELON-VICTORIA
DATE: 10/24/07
CLIENT: MACTEC
JOB: 7501
AUTHOR: C. CARTER
PAGE 1 OF 2

CONTACT: STEVE CRISENZO — OFFICE PHONE: 361-972-0198
CELL PHONE: 919 949-1707
CONTACT: Allan Shaw — CELL PHONE: 301-704-2684
PHONE:
CONTACT: PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
DRILLER: PHONE:
COMPANY: PHONE:

GENERAL SITE CONDITIONS/LOCATION:

BOREHOLE DESIGNATION: B-12 LOCATION:

COUNTY: Victoria RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASED ____ UNCASED X
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; ____, ____ TO ____
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 2 ft ; NO ____
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA
BOREHOLE FLUID: WATER ____; FRESH WATER MUD X ; SALT WATER MUD ____;
OTHER:
DEPTH TO BOREHOLE FLUID: 10 ft TIME SINCE LAST CIRCULATION: 10am

LOGGING CREW: C. CARTER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: VICTORIA, TX DEPARTURE TIME: 7:30am
ARRIVED ON SITE: 8:10am
STANDBY TIME: CAUSE:
LOGGING STARTED: 3:34pm LOGGING COMPLETED: 4:05pm

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SITE: EXELON-VICTORIA B-12 DATE: 10/24/07
CLIENT: MACTEC JOB: 7501
AUTHOR: C. CARTER PAGE 2 OF 2

WINCH: COMPROBE ____ SILVER X OYO ____ RG ____ OTHER ____
MICROLOGGER 5310 X 5772 ____ OTHER ____
CALIPER PROBE 5368 X OTHER ____

PROBE OFFSET	2.08M(6.82 FT) 12 IN MAX	
MINUS CASING STICK-UP	-1.33	
DEPTH REF. OFFSET AT START	5.49	
DEPTH REF. OFFSET AT END	5.25	
AFTER SURVEY DEPTH ERROR	.24	LESS THAN 0.4%?

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
B12CALTEST01		3:10pm		3:12pm
B12CALUP01	303.95ft	3:34pm	4.8ft	4:05pm
B12CALTEST02		4:13pm		4:15pm

CALIBRATION PLATE S/N 201

		AS BUILT			PVC FITTING
		1.968 IN	3.937 IN	8.000 IN	4.510 IN
	FILE NAME	(50 MM)	(100 MM)	(203.2 MM)	(114.3 MM)
AS MEAS.	B12caltest01	1.98"	3.957"	8.074"	4.548"
AS MEAS.	B12caltest02	2.00"	4.012"	8.059"	4.564"
AS MEAS.					
AS MEAS.					
AS MEAS.					
AS MEAS.					

MAINTENANCE PERFORMED ON SITE: ____

EQUIPMENT PROBLEMS OR FAILURES: ____

SUGGESTIONS, ADDITIONS, CHANGES: ____

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P-S SUSPENSION VELOCITY FIELD LOG

SITE: EXELON VICTORIA B-12 DATE: 10/24/07
CLIENT: MACTEC JOB: ~~7359~~ 7507
AUTHOR: C. CARTER PAGE 1 OF 7

CONTACT: STEVE CRISENZO OFFICE PHONE: 361-972-0198
CELL PHONE: 919-949-1707
CONTACT: OFFICE PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
DRILLER: PHONE:
COMPANY: PHONE:

DIRECTIONS TO SITE:

GENERAL SITE CONDITIONS/LOCATION:

EA#:
BOREHOLE DESIGNATION: B-12 LOCATION:
Victoria cc 10/24/07
COUNTY: ~~MATAGORDA~~ RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASED UNCASED X
DIAMETERS AND DEPTH RANGES: 4.5" 0 TO 310 ft ; , TO
BOREHOLE TOTAL DEPTH AS DRILLED: 310 ft
CONDUCTOR CASING?: YES X DEPTH TO BOTTOM OF CASING 2' ; NO
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA
BOREHOLE FLUID: WATER ; FRESH WATER MUD X ; SALT WATER MUD ;
OTHER:
DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: 10am

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SITE: EXELON VICTORIA B-12 DATE: 10/24/07
CLIENT: MACTEC JOB: 7359
AUTHOR: C. CARTER PAGE 2 OF 7

LOGGING CREW: C. CARTER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: Victoria, TX DEPARTURE TIME: 7:30 am
ARRIVED ON SITE: 8:10 am
STANDBY TIME: CAUSE:
LOGGING STARTED: 12:44 pm LOGGING COMPLETED: 2:30 pm
STANDBY TIME: CAUSE:
LOGGING STARTED: LOGGING COMPLETED:
DEMOBILIZED TO: ARRIVAL TIME:
ADDITIONAL DEMOB TIME: REASON:

BATTERIES CHANGED BEFORE LOGGING: YES ____; NO ✓; STORED WITH NEW ____

WINCH	COMPROBE ☐		GREY ☒	OYO ☐	RG ☐		OTH ☐	
INSTRUMENT	OYO 12004 ☐	15014 ☐	19029 ☐		RG 160023 ☒		160024 ☐	
RECEIVER S/N	12008 ☐	20042 ☐	26066 ☐	11001 ☐	23053 ☐		30086 ☒	

MAINTENANCE PERFORMED ON SITE: Im Iso 1 280068, Source 19043, SD 27073
WB 470151

EQUIPMENT PROBLEMS OR FAILURES:

SUGGESTIONS, ADDITIONS, CHANGES:

COMMENTS: RP = top of PVC casing = 0.41 m RP = 2.07
2.00 @ 2:49 pm

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: EXELON VICTORIA B-12 DATE: 10/24/07
CLIENT: MACTEC JOB: ~~7359~~ 7501
AUTHOR: C. CARTER PAGE 3 OF 7

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
0.5	1.64			
1.0	3.28			
1.5	4.92			
2.0	6.56			12:44
2.5	8.20	001		
3.0	9.84	2		
3.5	11.48	3		
4.0	13.12	4		
4.5	14.76	5		
5.0	16.40	6		
5.5	18.04	7		
6.0	19.69	8		
6.5	21.33	9		
7.0	22.97	10		
7.5	24.61	11		
8.0	26.25	12		
8.5	27.89	13		
9.0	29.53	14		
9.5	31.17	15		
10.0	32.81	16		
10.5	34.45	17		
11.0	36.09	18		
11.5	37.73	19		
12.0	39.37	20		
12.5	41.01	21		
13.0	42.65	22		
13.5	44.29	23		
14.0	45.93	24		
14.5	47.57	25		
15.0	49.21	26		
15.5	50.85	27		
16.0	52.49	28		
16.5	54.13	29		
17.0	55.77	30		
17.5	57.41	31		
18.0	59.06	32		
18.5	60.70	33		
19.0	62.34	34		
19.5	63.98	35		
20.0	65.62	36		