

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA *by Alex* DATE: 6/22/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 6 OF 8

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
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100.5	329.72	201		
101.0	331.38	202		
101.5	333.01	203		
102.0	334.65	204		
102.5	336.29	205		
103.0	337.93	206		
103.5	339.57	207		
104.0	341.21	208		
104.5	342.85	209		
105.0	344.49	210		
105.5	346.13	211		
106.0	347.77	212		
106.5	349.41	213		
107.0	351.05	214		
107.5	352.69	215		
108.0	354.33	216		
108.5	355.97	217		
109.0	357.61	218		
109.5	359.25	219		
110.0	360.89	220		
110.5	362.53	221		
111.0	364.17	222		
111.5	365.81	223		
112.0	367.45	224		
112.5	369.09	225		
113.0	370.73	226		
113.5	372.37	227		
114.0	374.02	228		
114.5	375.66	229		
115.0	377.30	230		
115.5	378.94	231		
116.0	380.58	232		
116.5	382.22	233		
117.0	383.86	234		
117.5	385.50	235		
118.0	387.14	236		
118.5	388.78	237		
119.0	390.42			HIT BOTTOM @ 118.7m => TOP OF FLOOR @ 401.5'
119.5	392.06			
120.0	393.70			



B-401 ACOUSTIC TELEVIEWER FIELD LOG

SITE: CCNPP COLA DATE: 11 / 22 / 2006
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-906-1797
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

DIRECTIONS TO SITE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-401 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED _____ UNCASED
DIAMETERS AND DEPTH RANGES: 4 1/2" 0 TO 400' ; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 400'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____ ; NO
DEPTH TO BEDROCK: 14' DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____ ; FRESH WATER MUD ; SALT WATER MUD _____ ;
OTHER: _____
DEPTH TO BOREHOLE FLUID: 0' TIME SINCE LAST CIRCULATION: 2 hrs.

GE Vision

geophysical services

SITE: CCNPP COLA 8-Ad1 DATE: 6/26/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

LOGGING CREW: R. STELLER C. CARTER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: LEXINGTON CIVIL, MD DEPARTURE TIME: 8:30
 ARRIVED ON SITE: 9:00
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 15:10 LOGGING COMPLETED: 16:59

WINCH: COMPROBE SILVER OYO _____ OTHER _____
 MICROLOGGER 5301 OTHER _____
 TELEVIEWER OPTICAL #5117 _____ ACOUSTIC #5174 5500 OTHER _____

PROBE TILT TEST 81.2° BRUNTON TILT 82° HAN4134 02°
 PROBE AZIMUTH TEST 140.9° BRUNTON AZIMUTH 141°

PROBE OFFSET	OPTICAL 1.88M(6.17FT)	ACOUSTIC 1.44M(4.72FT)	
CASING STICK-UP	-	-	1.5'
DEPTH REF. OFFSET			3.22'

3.22' ON EXT.

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>8-Ad1-Ad1-001</u>	<u>3.22</u>	<u>15:05</u>	<u>401.0</u>	<u>16:59</u>

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-401 CALIPER FIELD LOG

SITE: CCNPP COLA DATE: 6/25/2006
 CLIENT: SCHNABEL JOB: B165
 AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: <u>RUBEN TARUSELLI</u>	OFFICE PHONE: _____
	CELL PHONE: <u>703-806-1797</u>
CONTACT: _____	OFFICE PHONE: _____
	PHONE: _____
CONTACT: _____	PHONE: _____
	PHONE: _____
CONTACT: _____	PHONE: _____
	PHONE: _____
DRILLER: _____	PHONE: _____
COMPANY: _____	PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-401 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
 BOREHOLE CONSTRUCTION: CASED _____ UNCASD
 DIAMETERS AND DEPTH RANGES: 4 1/2" 0 TO 400'; _____ TO _____
 BOREHOLE TOTAL DEPTH AS DRILLED: 400'
 CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
 DEPTH TO BEDROCK: N/A DEPTH TO WATER TABLE: _____
 BOREHOLE FLUID: WATER ; FRESH WATER MUD ; SALT WATER MUD _____;
 OTHER: one 6" pipe
 DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: 4 hr

LOGGING CREW: R. STELLER, C. CARTER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: LEXINGTON PARK, VA DEPARTURE TIME: 8:30
 ARRIVED ON SITE: 9:00
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 17:17 LOGGING COMPLETED: 17:55

SITE: GCNPP COLA B-101 DATE: 6/20/2006
 CLIENT: SCHNABEL JOB: 6185
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: _____ COMPROBE _____ SILVER OYO _____ OTHER _____
 MICROLOGGER 5301 OTHER _____
 CALIPER PROBE 5368 _____ OTHER 2915

PROBE OFFSET	12 IN MAX	2.08M(6.82 FT)	24 IN MAX
CASING STICK-UP	ARMS -	<u>1.5'</u>	ARMS -
DEPTH REF. OFFSET		<u>6.32'</u>	<u>5.45'</u> ON EXIT

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>B401 CAL TEST 01</u>	<u>0</u>	<u>17:17</u>	<u>0</u>	<u>17:20</u>
<u>B401 CAL UP 01</u>	<u>397.0</u>	<u>17:28</u>	<u>0</u>	<u>17:48</u>
<u>B401 CAL TEST 02</u>	<u>0</u>	<u>17:50</u>	<u>0</u>	<u>17:55</u>

CALIBRATION PLATE S/N 201		AS BUILT		
FILE NAME	1.968 IN (50 MM)	3.937 IN (100 MM)	8.000 IN 203.2 MM	
AS MEAS. <u>B401 CAL TEST 01</u>	<u>1.97</u>	<u>3.94</u>	<u>8.00</u>	
AS MEAS. <u>B401 CAL TEST 02</u>	<u>2.01</u>	<u>3.97</u>	<u>8.04</u>	
AS MEAS.				
AS MEAS.				
AS MEAS.				
AS MEAS.				

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-401 ELOG FIELD LOG

SITE: CCNPP COLA DATE: 11/20/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
 CELL PHONE: 703-806-1787
 CONTACT: _____ OFFICE PHONE: _____
 CONTACT: _____ PHONE: _____
 CONTACT: _____ PHONE: _____
 CONTACT: _____ PHONE: _____
 DRILLER: _____ PHONE: _____
 COMPANY: _____ PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-401 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____

BOREHOLE CONSTRUCTION: CASED _____ UNCASD

DIAMETERS AND DEPTH RANGES: 4 1/2" 0 TO 400'; _____ TO _____

BOREHOLE TOTAL DEPTH AS DRILLED: 400'

CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO

DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____

BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____

OTHER: _____

DEPTH TO BOREHOLE FLUID: 0' TIME SINCE LAST CIRCULATION: 25 HR

LOGGING CREW: R. STELLER, C. CARTER

VEHICLE(S) USED AND MILEAGE: RENTAL

MOBILIZED FROM: LEWINGTONS PARK, MO. DEPARTURE TIME: 8:30

ARRIVED ON SITE: 9:00

STANDBY TIME: _____ CAUSE: _____

LOGGING STARTED: 10:34 LOGGING COMPLETED: 19:14

SITE: CCNPP COLA B-401 DATE: 6/28/2008
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: COMPROBE SILVER OYO OTHER
 MICROLOGGER 5301 OTHER
 ELOG PROBE 5490 OTHER

PROBE OFFSET	2.50M(8.20 FT)	
CASING STICK-UP	1.5	
DEPTH REF. OFFSET	6.70'	6.75' AT EXIT

Handwritten: 2nd
6/28/08

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
5401 ELOG UP G1				
5401 ELOG UP G1	399.5'	18:34	1.85'	19:14

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



P-S SUSPENSION VELOCITY FIELD LOG

SITE: CALVERT CLIFFS COLA B-404 DATE: 6/27/06
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 5

CONTACT: OFFICE PHONE:
CELL PHONE:
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-404 LOCATION:

COUNTY: RANGE: TOWNSHIP: SECTION:

BOREHOLE CONSTRUCTION: CASSED UNCASSED [checked]

DIAMETERS AND DEPTH RANGES: 4 1/2" 0 TO 200' ; TO

BOREHOLE TOTAL DEPTH AS DRILLED: 200'

CONDUCTOR CASING?: YES DEPTH TO BOTTOM OF CASING ; NO [checked]

DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE:

BOREHOLE FLUID: WATER ; FRESH WATER MUD [checked] ; SALT WATER MUD

OTHER:

DEPTH TO BOREHOLE FLUID: TIME SINCE LAST CIRCULATION: 1/2 H.R.

GEOVision

geophysical services

SITE: CALVERT CLIFFS COLA B-404 DATE: 6/27/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 5

LOGGING CREW: R. STELLER
 VEHICLE(S) USED AND MILEAGE: PENTON
 MOBILIZED FROM: LEWISTON PARK DEPARTURE TIME: 8:30
 ARRIVED ON SITE: 9:40
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 10:45 LOGGING COMPLETED: 12:07
 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 19028 RG 160023 160024
 RECEIVER S/N 12008 20042 26066 11001 23053 30060

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____

COMMENTS: DEPTH DEFERENCE BY TOTAL RECEIVER 1.64' - 1.6' = 0.04'
DEPTH BY EXIT = 0.04'

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA

B-ADA

DATE: *6/27/06*

CLIENT: SCHNABEL

JOB: 6165

AUTHOR: R. STELLER

PAGE *3* OF *5*

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
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0.5	1.64	001		
1.0	3.28	2		
1.5	4.92	3		
2.0	6.56	4		
2.5	8.20	5		
3.0	9.84	6		
3.5	11.48	7		
4.0	13.12	8		
4.5	14.76	9		
5.0	16.40	10		
5.5	18.04	11		
6.0	19.68	12		
6.5	21.33	13		
7.0	22.97	14		
7.5	24.61	15		
8.0	26.25	16		
8.5	27.89	17		
9.0	29.53	18		
9.5	31.17	19		
10.0	32.81	20		
10.5	34.45	21		
11.0	36.09	22		
11.5	37.73	23		
12.0	39.37	24		
12.5	41.01	25		
13.0	42.65	26		
13.5	44.29	27		
14.0	45.93	28		
14.5	47.57	29		
15.0	49.21	30		
15.5	50.85	31		
16.0	52.49	32		
16.5	54.13	33		
17.0	55.77	34		
17.5	57.41	35		
18.0	59.05	36		
18.5	60.70	37		
19.0	62.34	38		
19.5	63.98	39		
20.0	65.62	40		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA B-404 DATE: 6/27/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 4 OF 5

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
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20.5	67.26	41		
21.0	68.90	42		
21.5	70.54	43		
22.0	72.18	44		
22.5	73.82	45		
23.0	75.46	46		
23.5	77.10	47		
24.0	78.74	48		
24.5	80.38	49		
25.0	82.02	50		
25.5	83.66	51		
26.0	85.30	52		
26.5	86.94	53		
27.0	88.58	54		
27.5	90.22	55		
28.0	91.86	56		
28.5	93.50	57		
29.0	95.14	58		
29.5	96.78	59		
30.0	98.43	60		
30.5	100.07	61		
31.0	101.71	62		
31.5	103.35	63		
32.0	104.99	64		
32.5	106.63	65		
33.0	108.27	66		
33.5	109.91	67		
34.0	111.55	68		
34.5	113.19	69		
35.0	114.83	70		
35.5	116.47	71		
36.0	118.11	72		
36.5	119.75	73		
37.0	121.39	74		
37.5	123.03	75		
38.0	124.67	76		
38.5	126.31	77		
39.0	127.95	78		
39.5	129.59	79		
40.0	131.23	80		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA B-404 DATE: 6/22/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE: 5 OF 5

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
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40.5	132.87	81		
41.0	134.51	82		
41.5	136.15	83		
42.0	137.80	84		
42.5	138.44	85		
43.0	141.08	86		
43.5	142.72	87		
44.0	144.36	88		
44.5	146.00	89		
45.0	147.64	90		
45.5	148.28	91		
46.0	150.92	92		
46.5	152.56	93		
47.0	154.20	94		
47.5	155.84	95		
48.0	157.48	96		
48.5	159.12	97		
49.0	160.76	98		
49.5	162.40	99		
50.0	164.04	100		
50.5	165.68	101		
51.0	167.32	102		
51.5	168.96	103		
52.0	170.60	104		
52.5	172.24	105		
53.0	173.88	106		
53.5	175.52	107		
54.0	177.17	108		
54.5	178.81	109		
55.0	180.45	110		
55.5	182.09	111		
56.0	183.73	112		
56.5	185.37	113		
57.0	187.01	114		
57.5	188.65			Bottom measurement at 57.5 m.
58.0	190.29			
58.5	191.93			
59.0	193.57			
59.5	195.21			
60.0	196.85			



B-404 ACOUSTIC TELEVIEWER FIELD LOG

SITE: CCNPP COLA DATE: 6/26/2006
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-906-1797
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

DIRECTIONS TO SITE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-404 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED _____ UNCASD
DIAMETERS AND DEPTH RANGES: 4 1/2 0 TO 200 ; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 200'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____ ; NO
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____ ; FRESH WATER MUD ; SALT WATER MUD _____ ;
OTHER: _____
DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: 2 HRS

GE Vision

geophysical services

SITE: CCNPP COLA B-404 DATE: 6/24/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

LOGGING CREW: R. STELLER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: LOVELAND PARK DEPARTURE TIME: 8:30
 ARRIVED ON SITE: 7:00
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 12:50 LOGGING COMPLETED: 14:00

WINCH: COMPROBE SILVER OYO OTHER _____
 MICROLOGGER 5301 OTHER _____
 TELEVIEWER OPTICAL #5117 ACOUSTIC #5174 5150 OTHER _____

PROBE TILT TEST 0.8° BRUNTON TILT 0°
 PROBE AZIMUTH TEST 211.2° BRUNTON AZIMUTH 214° PROBE HMA @ 6.2°

PROBE OFFSET	OPTICAL 1.88M(6.17FT)	ACOUSTIC 1.44M(4.72FT)
CASING STICK-UP	-	- <u>1.6</u>
DEPTH REF. OFFSET	-	- <u>5.12'</u>

3.15' on BPT.

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>6165-01</u>	<u>5.1'</u>	<u>12:50</u>	<u>14.0'</u>	<u>14:00</u>

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-404 CALIPER FIELD LOG

SITE: CCNPP COLA DATE: 6/24/2008
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
 CELL PHONE: 703-908-1797
 CONTACT: _____ OFFICE PHONE: _____
 CONTACT: _____ PHONE: _____
 CONTACT: _____ PHONE: _____
 CONTACT: _____ PHONE: _____
 DRILLER: _____ PHONE: _____
 COMPANY: _____ PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-404 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
 BOREHOLE CONSTRUCTION: CASED _____ UNCASD
 DIAMETERS AND DEPTH RANGES: 4 1/2" 0 TO 200'; _____ TO _____
 BOREHOLE TOTAL DEPTH AS DRILLED: 200'
 CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
 DEPTH TO BEDROCK: N/A DEPTH TO WATER TABLE: _____
 BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____
 OTHER: _____
 DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: 45 HRS

LOGGING CREW: R. STELLER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: LEXINGTON, MISS DEPARTURE TIME: 8:30
 ARRIVED ON SITE: 9:00
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 14:30 LOGGING COMPLETED: 14:58

SITE: CCNPP COLA B-404 DATE: 6/24/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: COMPROBE SILVER OYO OTHER
 MICROLOGGER 5301 OTHER _____
 CALIPER PROBE 5308 OTHER 2915

PROBE OFFSET	12 IN MAX	2.08M(6.82 FT)	24 IN MAX
CASING STICK-UP	ARMS	<u>1.7'</u>	ARMS
DEPTH REF. OFFSET		<u>5.12'</u>	<u>5.10' offset</u>

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>B-404 CAL TEST 01</u>	<u>0</u>	<u>14:20</u>	<u>0</u>	<u>14:25</u>
<u>B-404 CAL UP 01</u>	<u>195</u>	<u>14:32</u>	<u>0</u>	<u>14:52</u>
<u>B-404 CAL TEST 02</u>	<u>0</u>	<u>14:55</u>	<u>0</u>	<u>14:58</u>

FILE NAME	AS BUILT		
	1.988 IN (50 MM)	3.937 IN (100 MM)	8.000 IN 203.2 MM
AS MEAS. <u>B-404 CAL TEST 01</u>	<u>1.97</u>	<u>3.93</u>	<u>8.04</u>
AS MEAS. <u>B-404 CAL TEST 02</u>	<u>1.94</u>	<u>3.97</u>	<u>7.97</u>
AS MEAS.			
AS MEAS.			
AS MEAS.			
AS MEAS.			

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-404 ELOG FIELD LOG

SITE: CCNPP COLA DATE: 6/26/2006
CLIENT: SCHNABEL JOB: 8165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-908-1787
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-404 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED _____ UNCASD
DIAMETERS AND DEPTH RANGES: 4 1/2" 0 TO 200'; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 200'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____
OTHER: _____
DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: 4-11/23

LOGGING CREW: R. STELLER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: LEXINGTON PARK DEPARTURE TIME: 8:30
ARRIVED ON SITE: 9:00
STANDBY TIME: _____ CAUSE: _____
LOGGING STARTED: 15:10 LOGGING COMPLETED: 15:28

SITE: CCNPP COLA B-404 DATE: 6/24/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: _____ COMPROBE _____ SILVER OYO _____ OTHER _____
 MICROLOGGER 5301 OTHER _____
 ELOG PROBE 5480 OTHER _____

PROBE OFFSET	2.50M(8.20 FT)
CASING STICK-UP	-1.6' + 52.8
DEPTH REF. OFFSET	30.4' 32.45' @ 64 FT.

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
BAD ELOG LIP 01	195	15:10	19.15	15:18
			15.15	
			9/2/06	

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



P-S SUSPENSION VELOCITY FIELD LOG

SITE: CALVERT CLIFFS COLA B-407 DATE: 6/16/06
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF

CONTACT: OFFICE PHONE:
CELL PHONE:
CONTACT: OFFICE PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
DRILLER: PHONE:
COMPANY: PHONE:

DIRECTIONS TO SITE:

GENERAL SITE CONDITIONS/LOCATION:

EAS:
BOREHOLE DESIGNATION: D-407 LOCATION:

COUNTY: RANGE: TOWNSHIP: SECTION:

BOREHOLE CONSTRUCTION: CASED UNCASD

DIAMETERS AND DEPTH RANGES: 4 1/4" 0 TO 200' TO 200'

BOREHOLE TOTAL DEPTH AS DRILLED: 200'

CONDUCTOR CASING?: YES DEPTH TO BOTTOM OF CASING NO

DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE:

BOREHOLE FLUID: WATER FRESH WATER MUD SALT WATER MUD

OTHER:

DEPTH TO BOREHOLE FLUID: TIME SINCE LAST CIRCULATION: 1/2 HR

GEOVision

geophysical services

SITE: CALVERT CLIFFS COLA B-45T DATE: 10/16/06
 CLIENT: SCHNABEL JOB: 6166
 AUTHOR: R. STELLER PAGE 2 OF 5

LOGGING CREW: R. STELLER
 VEHICLE(S) USED AND MILEAGE: PONTIAC
 MOBILIZED FROM: LEXINGTON AVE DEPARTURE TIME: 7:05
 ARRIVED ON SITE: 7:35
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 9:00 LOGGING COMPLETED: 10:25
 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 19028 RG 160023 160024
 RECEIVER S/N 12008 20042 26068 11001 23053 30086

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____

COMMENTS: _____

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA B-407

DATE: 6/16/06

CLIENT: SCHNABEL

JOB: B165

AUTHOR: R. STELLER

PAGE 3 OF 5

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
0.5	1.64	1		
1.0	3.28	2		
1.5	4.92	3		
2.0	6.56	4		
2.5	8.20	5		
3.0	9.84	6		
3.5	11.48	7		
4.0	13.12	8		
4.5	14.76	9		
5.0	16.40	10		
5.5	18.04	11		
6.0	19.69	12		
6.5	21.33	13		
7.0	22.97	14		
7.5	24.61	15		
8.0	26.25	16		
8.5	27.89	17		
9.0	29.53	18		
9.5	31.17	19		
10.0	32.81	20		
10.5	34.45	21		
11.0	36.09	22		
11.5	37.73	23		
12.0	39.37	24		
12.5	41.01	25		
13.0	42.65	26		
13.5	44.29	27		
14.0	45.93	28		
14.5	47.57	29		
15.0	49.21	30		
15.5	50.85	31		
16.0	52.49	32		
16.5	54.13	33		
17.0	55.77	34		
17.5	57.41	35		
18.0	59.05	36		
18.5	60.70	37		
19.0	62.34	38		
19.5	63.98	39		
20.0	65.62	40		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA 6-407 DATE: 6/16/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 4 OF 5

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	-----------------------------------

20.5	67.26	41		
21.0	68.90	42		
21.5	70.54	43		
22.0	72.18	44		
22.5	73.82	45		
23.0	75.46	46		
23.5	77.10	47		
24.0	78.74	48		
24.5	80.38	49		
25.0	82.02	50		
25.5	83.66	51		
26.0	85.30	52		
26.5	86.94	53		
27.0	88.58	54		
27.5	90.22	55		
28.0	91.86	56		
28.5	93.50	57		
29.0	95.14	58		
29.5	96.78	59		
30.0	98.43	60		
30.5	100.07	61		
31.0	101.71	62		
31.5	103.35	63		
32.0	104.99	64		
32.5	106.63	65		
33.0	108.27	66		
33.5	109.91	67		
34.0	111.55	68		
34.5	113.19	69		
35.0	114.83	70		
35.5	116.47	71		
36.0	118.11	72		
36.5	119.75	73		
37.0	121.39	74		
37.5	123.03	75		
38.0	124.67	76		
38.5	126.31	77		
39.0	127.95	78		
39.5	129.59	79		
40.0	131.23	80		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA E-407

DATE: 6/14/06

CLIENT: SCHNABEL

JOB: B165

AUTHOR: R. STELLER

PAGE 5 OF 5

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	-----------------------------------

40.5	132.87	81		
41.0	134.51	82		
41.5	136.15	83		
42.0	137.80	84		
42.5	139.44	85		
43.0	141.08	86		
43.5	142.72	87		
44.0	144.36	88		
44.5	146.00	89		
45.0	147.64	90		
45.5	149.28	91		
46.0	150.92	92		
46.5	152.56	93		
47.0	154.20	94		
47.5	155.84	95		
48.0	157.48	96		
48.5	159.12	97		
49.0	160.76	98		
49.5	162.40	99		
50.0	164.04	100		
50.5	165.68	101		
51.0	167.32	102		
51.5	168.96	103		
52.0	170.60	104		
52.5	172.24	105		
53.0	173.88	106		
53.5	175.52	107		
54.0	177.17	108		
54.5	178.81	109		
55.0	180.45	110		
55.5	182.09	111		
56.0	183.73	112		
56.5	185.37			
57.0	187.01			WVC BOTTOMS 56.2 mud 196.5'
57.5	188.65			Brown FRAMMENTAL
58.0	190.29			
58.5	191.93			
59.0	193.57			
59.5	195.21			
60.0	196.85			



B-407 CALIPER FIELD LOG

SITE: CCNPP COLA DATE: 6/16/2006
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-908-1797
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-407 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED _____ UNCASD
DIAMETERS AND DEPTH RANGES: 4 7/8" TO 2 1/2" ; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 200'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____ ; NO
DEPTH TO BEDROCK: N/A DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____ ; FRESH WATER MUD ; SALT WATER MUD _____ ;
OTHER: _____
DEPTH TO BOREHOLE FLUID: _____ TIME SINCE LAST CIRCULATION: S&P

LOGGING CREW: R. STELLER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: LEONARD'S PAD DEPARTURE TIME: 7:05
ARRIVED ON SITE: 7:35
STANDBY TIME: _____ CAUSE: _____
LOGGING STARTED: 10:58 LOGGING COMPLETED: 11:42

SITE: CCNPP COLA P2-407 DATE: 10/14/2008
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: _____ COMPROBE: _____ SILVER OYO _____ OTHER: I
 MICROLOGGER: 5301 OTHER: _____
 CALIPER PROBE: 5368 OTHER: _____

PROBE OFFSET	12 IN MAX	2.08M(8.82 FT)	24 IN MAX
CASING STICK-UP	ARMS	- <u>65</u>	ARMS - _____
DEPTH REF. OFFSET		<u>5.52</u>	

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>6407 TEST CAL 01</u>	<u>0</u>	<u>11:58</u>	<u>0</u>	<u>11:04</u>
<u>6407 CAL 01</u>	<u>193.0</u>	<u>11:10</u>	<u>0</u>	<u>11:30</u>
<u>6407 TEST CAL 02</u>	<u>0</u>	<u>11:30</u>	<u>0</u>	<u>11:42</u>

CALIBRATION PLATE S/N 201		AS BUILT		
FILE NAME	1.968 IN (50 MM)	3.937 IN (100 MM)	8.000 IN 203.2 MM	
AS MEAS. <u>6407 TEST CAL 01</u>	<u>1.96</u>	<u>3.94</u>	<u>8.00</u>	
AS MEAS. <u>6407 TEST CAL 02</u>	<u>1.98</u>	<u>3.94</u>	<u>8.00</u>	
AS MEAS.				
AS MEAS.				
AS MEAS.				
AS MEAS.				

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-407 ELOG FIELD LOG

SITE: CCNPP COLA DATE: 6/16/2008
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: <u>RUBEN TARUSELLI</u>	OFFICE PHONE:
CONTACT: _____	CELL PHONE: <u>703-906-1797</u>
CONTACT: _____	OFFICE PHONE: _____
CONTACT: _____	PHONE: _____
CONTACT: _____	PHONE: _____
CONTACT: _____	PHONE: _____
CONTACT: _____	PHONE: _____
DRILLER: _____	PHONE: _____
COMPANY: _____	PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-407 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____

BOREHOLE CONSTRUCTION: CASED _____ UNCASD

DIAMETERS AND DEPTH RANGES: 4 3/4" 0 TO 200'; _____ TO _____

BOREHOLE TOTAL DEPTH AS DRILLED: 000'

CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO

DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____

BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____; OTHER: _____

DEPTH TO BOREHOLE FLUID: _____ TIME SINCE LAST CIRCULATION: 3H

LOGGING CREW: R. STELLER

VEHICLE(S) USED AND MILEAGE: RENTAL

MOBILIZED FROM: Lakewood Park DEPARTURE TIME: 7:05

ARRIVED ON SITE: 7:55

STANDBY TIME: _____ CAUSE: _____

LOGGING STARTED: 11:50 LOGGING COMPLETED: 12:20

SITE: CCNPP COLA B-407 DATE: / /2008
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: COMPROBE SILVER OYO OTHER
 MICROLOGGER 5301 OTHER
 ELOG PROBE 5480 OTHER

PROBE OFFSET	2.50M(8.20 FT)
CASING STICK-UP	-1.50
DEPTH REF. OFFSET	99.5

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
2807.8145 r/c/s	99.0	11:55	17.6	12:16

MAINTENANCE PERFORMED ON SITE: _____

 EQUIPMENT PROBLEMS OR FAILURES: _____

 SUGGESTIONS, ADDITIONS, CHANGES: _____



geophysical services

B-407 DEVIATION
ACOUSTIC-TELEVIEWER FIELD LOG

SITE: CCNPP COLA DATE: 6/16/2008
CLIENT: SCHNABEL JOB: 8185
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUBELLI OFFICE PHONE: _____
CELL PHONE: 703-908-1797
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

DIRECTIONS TO SITE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-407 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED _____ UNCASD
DIAMETERS AND DEPTH RANGES: 4 1/4" 0 TO 200'; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 205'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____;
OTHER: _____
DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: 5-12:25

GE Vision

geophysical services

SITE: CCNPP COLA 8-407 DATE: 6/16/2008
 CLIENT: SCHNABEL JOB: 8165
 AUTHOR: R. STELLER PAGE 2 OF 2

LOGGING CREW: R. STELLER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: 10115500 PARK DEPARTURE TIME: 7:05
 ARRIVED ON SITE: 7:36
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 12:53 LOGGING COMPLETED: _____

WINCH: COMPROBE SILVER OYO OTHER MAN T
 MICROLOGGER 5301 OTHER MAN T
 TELEVIEWER OPTICAL #5117 ACOUSTIC #5174 OTHER 2VDA

PROBE TILT TEST 6.3 BRUNTON TILT 89
 PROBE AZIMUTH TEST 21.5 BRUNTON AZIMUTH 25

PROBE OFFSET	OPTICAL 1.88M(6.17FT)	ACOUSTIC 1.44M(4.72FT)
CASING STICK-UP	-	-
DEPTH REF. OFFSET	-	-

2000 e - 1.5'

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>040702/020001</u>	<u>0</u>	<u>12:53</u>	<u>13:57</u>	<u>13:57</u>

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-418 BORING GEOPHYSICS FIELD LOG SUMMARY

SITE: CCNPP COLA DATE: 6/29/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI PHONE: 703-906-1797

BOREHOLE CONSTRUCTION: CASED _____ UNCASD
 DIAMETERS AND DEPTH RANGES: 4 1/2" 0 TO 200' : _____ TO _____
 BOREHOLE TOTAL DEPTH AS DRILLED: 200'
 CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
 DEPTH TO BEDROCK: N/A
 BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____

LOGGING CREW: R. STELLER, C. CARROLL

LOG TYPE	FILE NAME	DEPTH RANGE	DATE	TIMES
RESISTIVITY	B418-114	1.6' - 187.0'	6/29/06	15:53 - 16:24
RESISTIVITY	B418-NA-1201	199.4' - 2.5'	6/29/06	16:51 - 16:59
CHLORIDE TEST	B418-CALTEST01	0	6/29/06	16:55 - 17:00
CHLORIDE TEST	B418-CALTEST01	197.0' - 197.0'	6/29/06	17:05 - 17:17
CHLORIDE TEST	B418-CALTEST02	0	6/29/06	8:05 - 8:09
CHLORIDE TEST	B418-CALTEST02	197.0' - 0	6/29/06	9:15 - 9:40
CHLORIDE TEST	B418-CALTEST03	0	6/29/06	9:41 - 9:45
LOG	B418-LOG-1201	197.0' - 200.0'	6/29/06	9:58 - 10:15



P-S SUSPENSION VELOCITY FIELD LOG

SITE: GALVERT CLIFFS COLA B-418 DATE: 10/29/06
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 6

CONTACT: OFFICE PHONE:
CELL PHONE:
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-418 LOCATION:

COUNTY: RANGE: TOWNSHIP: SECTION:

BOREHOLE CONSTRUCTION: CASED UNCASD [checked]

DIAMETERS AND DEPTH RANGES: 4 1/4" 0 TO 200' ; TO

BOREHOLE TOTAL DEPTH AS DRILLED: 200'

CONDUCTOR CASING?: YES DEPTH TO BOTTOM OF CASING ; NO [checked]

DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA

BOREHOLE FLUID: WATER ; FRESH WATER MUD [checked] ; SALT WATER MUD ;

OTHER:

DEPTH TO BOREHOLE FLUID: TIME SINCE LAST CIRCULATION: 1 HR

GEOVision

geophysical services

SITE: CALVERT CLIFFS COLA B-41B DATE: 6/29/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 6

LOGGING CREW: R. STELLER, C. ANDER
 VEHICLE(S) USED AND MILEAGE: Rental
 MOBILIZED FROM: _____ DEPARTURE TIME: 12:30
 ARRIVED ON SITE: 13:00
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 14:55 LOGGING COMPLETED: 15:24
 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 18029 RG 180023 180024
 RECEIVER S/N 12008 20042 25066 11001 23059 Scott

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____

COMMENTS: 2500 = 1.5' - 1.5' = 0.0m 0.0m IN EXIT

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA 6-415 : : DATE: 6/29/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 6

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	-----------------------------------

0.5	1.64	021		
1.0	3.28	2		
1.5	4.92	3		
2.0	6.56	4		
2.5	8.20	5		
3.0	9.84	6		
3.5	11.48	7		
4.0	13.12	8		
4.5	14.76	9		
5.0	16.40	10		
5.5	18.04	11		
6.0	19.68	12		
6.5	21.33	13		
7.0	22.97	14		
7.5	24.61	15		
8.0	26.25	16		
8.5	27.89	17		
9.0	29.53	18		
9.5	31.17	19		
10.0	32.81	20		
10.5	34.45	21		
11.0	36.09	22		
11.5	37.73	23		
12.0	39.37	24		
12.5	41.01	25		
13.0	42.65	26		
13.5	44.29	27		
14.0	45.93	28		
14.5	47.57	29		
15.0	49.21	30		
15.5	50.85	31		
16.0	52.49	32		
16.5	54.13	33		
17.0	55.77	34		
17.5	57.41	35		
18.0	59.05	36		
18.5	60.70	37		
19.0	62.34	38		
19.5	63.98	39		
20.0	65.62	40		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA B-418 DATE: 6/29/06

CLIENT: SCHNABEL JOB: 6185

AUTHOR: R. STELLER PAGE 2 OF 6

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	-----------------------------------

20.5	67.26	41		
21.0	68.90	42		
21.5	70.54	43		
22.0	72.18	44		
22.5	73.82	45		
23.0	75.46	46		
23.5	77.10	47		
24.0	78.74	48		
24.5	80.38	49		
25.0	82.02	50		
25.5	83.66	51		
26.0	85.30	52		
26.5	86.94	53		
27.0	88.58	54		
27.5	90.22	55		
28.0	91.86	56		
28.5	93.50	57		
29.0	95.14	58		
29.5	96.78	59		
30.0	98.43	60		
30.5	100.07	61		
31.0	101.71	62		
31.5	103.35	63		
32.0	104.99	64		
32.5	106.63	65		
33.0	108.27	66		
33.5	109.91	67		
34.0	111.55	68		
34.5	113.19	69		
35.0	114.83	70		
35.5	116.47	71		
36.0	118.11	72		
36.5	119.75	73		
37.0	121.39	74		
37.5	123.03	75		
38.0	124.67	76		
38.5	126.31	77		
39.0	127.95	78		
39.5	129.59	79		
40.0	131.23	80		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA B-418
 CLIENT: SCHNABEL
 AUTHOR: R. STELLER

DATE: 6/29/06
 JOB: 8165
 PAGE 5 OF 6

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	-----------------------------------

40.5	132.87	81		
41.0	134.51	82		
41.5	136.15	83		
42.0	137.80	84		
42.5	139.44	85		
43.0	141.08	86		
43.5	142.72	87		
44.0	144.36	88		
44.5	146.00	89		
45.0	147.64	90		
45.5	149.28	91		Fluid column?
46.0	150.92	92		
46.5	152.56	93		
47.0	154.20	94		
47.5	155.84	95		
48.0	157.48	96		
48.5	159.12	97		
49.0	160.76	98		
49.5	162.40	99		
50.0	164.04	100		
50.5	165.68	101		
51.0	167.32	102		
51.5	168.96	103		
52.0	170.60	104		
52.5	172.24	105		
53.0	173.88	106		
53.5	175.52	107		
54.0	177.17	108		
54.5	178.81	109		
55.0	180.45	110		
55.5	182.09	111		
56.0	183.73	112		
56.5	185.37	113		
57.0	187.01	114		Bottom in Encasement? Lit Bottom @ 57.2 m.
57.5	188.65			
58.0	190.29			
58.5	191.93			
59.0	193.57			
59.5	195.21			
60.0	196.85			

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA B-418 DATE: 6/29/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 6 OF 6

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	-----------------------------------

60.5	198.49			
61.0	200.13			T.O. @ 200'
61.5	201.77			
62.0	203.41			
62.5	205.05			
63.0	206.69			
63.5	208.33			
64.0	209.97			
64.5	211.61			
65.0	213.25			
65.5	214.89			
66.0	216.54			
66.5	218.18			
67.0	219.82			
67.5	221.46			
68.0	223.10			
68.5	224.74			
69.0	226.38			
69.5	228.02			
70.0	229.66			
70.5	231.30			
71.0	232.94			
71.5	234.58			
72.0	236.22			
72.5	237.86			
73.0	239.50			
73.5	241.14			
74.0	242.78			
74.5	244.42			
75.0	246.06			
75.5	247.70			
76.0	249.34			
76.5	250.98			
77.0	252.62			
77.5	254.27			
78.0	255.91			
78.5	257.55			
79.0	259.19			
79.5	260.83			
80.0	262.47			



B-418 ACOUSTIC TELEVIEWER FIELD LOG

SITE: CCNPP COLA DATE: 6 / 29 / 2006
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-906-1797
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

DIRECTIONS TO SITE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-418 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____

BOREHOLE CONSTRUCTION: CASED _____ UNCASD

DIAMETERS AND DEPTH RANGES: 1 1/2" Ø TO 200' ; _____ TO _____

BOREHOLE TOTAL DEPTH AS DRILLED: 200'

CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____ ; NO

DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____

BOREHOLE FLUID: WATER _____ ; FRESH WATER MUD ; SALT WATER MUD _____ ;

OTHER: _____

DEPTH TO BOREHOLE FLUID: Ø TIME SINCE LAST CIRCULATION: Ø 2:00

GEOVision

geophysical services

SITE: CCNPP COLA B-41B DATE: 6/29/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

LOGGING CREW: R. STELLER, C. CARTER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: Linton, Pa, Pa DEPARTURE TIME: 12:30
 ARRIVED ON SITE: 12:53
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 13:51 LOGGING COMPLETED: 16:49

WINCH: COMPROBE _____ SILVER OYO _____ OTHER _____
 MICROLOGGER 8301 OTHER _____
 TELEVIEWER OPTICAL #5117 _____ ACOUSTIC #5474 5500 OTHER _____

PROBE TILT TEST 29° BRUNTON TILT 23° probe hanging .15"
 PROBE AZIMUTH TEST 168.7° BRUNTON AZIMUTH 168°

PROBE OFFSET	OPTICAL 1.88M(6.17FT)	ACOUSTIC 1.44M(4.72FT)
CASING STICK-UP	-	- 1.5'
DEPTH REF. OFFSET	-	- 3.22'

2.15' on BIT

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
STICK-UP 01	199.6	15:51	3.25'	16:49

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-418 CALIPER FIELD LOG

SITE: CCNPP COLA DATE: 6/29/2006, 6/26/2006
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-906-1797
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-418 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED _____ UNCASD
DIAMETERS AND DEPTH RANGES: 4 1/4" 0 TO 200'; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 200'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____;
OTHER: _____
DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: NA

LOGGING CREW: R. STELLER, G. CARTER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: VENETA RD DEPARTURE TIME: 12:30
ARRIVED ON SITE: 13:00
STANDBY TIME: _____ CAUSE: _____
LOGGING STARTED: 6/29/06 16:55 LOGGING COMPLETED: 6/29/06 9:45

SITE: CCNPP COLA B-419 DATE: 6/29/2006 6/30/06
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: COMPROBE SILVER OYO OTHER
 MICROLOGGER: 5301 OTHER
 CALIPER PROBE: 5368 OTHER 2915

PROBE OFFSET	12 IN MAX 2.08M(6.82 FT)	24 IN MAX
CASING STICK-UP	ARMS - <u>-1.5</u>	ARMS - <u> </u>
DEPTH REF. OFFSET	<u>5.32'</u>	<u>5.32' on 24"</u>

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>B419 CAL TEST 01</u>	<u>0</u>	<u>16:55</u>	<u>0</u>	<u>17:00</u>
<u>B419 CAL UP 01</u>	<u>197.0'</u>	<u>17:05</u>	<u>197.0'</u>	<u>17:17</u>
<u>B419 CAL TEST 02</u>	<u>0</u>	<u>8:05</u>	<u>0</u>	<u>8:09</u>
<u>B419 CAL UP 02</u>	<u>197.0'</u>	<u>9:15</u>	<u>0</u>	<u>9:40</u>
<u>B419 CAL TEST 03</u>	<u>0</u>	<u>9:41</u>	<u>0</u>	<u>9:45</u>

6/29/06
6/29/06
6/30/06
6/30/06
6/30/06

CALIBRATION PLATE S/N 201

FILE NAME	AS BUILT		
	1.968 IN (50 MM)	3.937 IN (100 MM)	8.000 IN 203.2 MM
AS MEAS. <u>B419 CAL TEST 01</u>	<u>1.97</u>	<u>3.91</u>	<u>7.96</u>
AS MEAS. <u>B419 CAL TEST 02</u>	<u>1.98</u>	<u>3.94</u>	<u>7.98</u>
AS MEAS. <u>B419 CAL TEST 03</u>	<u>2.00</u>	<u>3.94</u>	<u>7.97</u>
AS MEAS.			
AS MEAS.			
AS MEAS.			

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



geophysical services

B-418 ELOG FIELD LOG

SITE: CCNPP COLA DATE: 6 / 30 / 2008
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-908-1797
CONTACT: _____ OFFICE PHONE: _____
CONTACT: _____ PHONE: _____
CONTACT: _____ PHONE: _____
CONTACT: _____ PHONE: _____
CONTACT: _____ PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-418 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____

BOREHOLE CONSTRUCTION: CASED _____ UNCASD

DIAMETERS AND DEPTH RANGES: 4 1/2 0 TO 200' ; _____ TO _____

BOREHOLE TOTAL DEPTH AS DRILLED: 200'

CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____ ; NO

DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: NA

BOREHOLE FLUID: WATER _____ ; FRESH WATER MUD ; SALT WATER MUD _____ ;
OTHER: _____

DEPTH TO BOREHOLE FLUID: 0 TIME SINCE LAST CIRCULATION: 2 HR

LOGGING CREW: R. STELLER

VEHICLE(S) USED AND MILEAGE: RENTAL

MOBILIZED FROM: LOGGING SERVICES, INC. DEPARTURE TIME: 7:00

ARRIVED ON SITE: 7:30

STANDBY TIME: _____ CAUSE: _____

LOGGING STARTED: 9:58 LOGGING COMPLETED: 10:15

SITE: CCNPP COLA B-41B DATE: 6/50/2008
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: COMPROBE SILVER OYO OTHER
 MICROLOGGER 5301 OTHER
 ELOG PROBE 5490 OTHER

PROBE OFFSET	2.50M(8.20 FT)
CASING STICK-UP	-1.5 + 3.0
DEPTH REF. OFFSET	2.5

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
B-41B COLA & PDI	197.0	9:58	20.0	10:15

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-423 BORING GEOPHYSICS FIELD LOG SUMMARY

SITE: CCNPP COLA DATE: 6/13/2008
 CLIENT: SCHNABEL JOB: 8165
 AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI PHONE: 703-908-1787

BOREHOLE CONSTRUCTION: CASED _____ UNCASD
 DIAMETERS AND DEPTH RANGES: 4 1/4" Ø TO 200' TO _____
 BOREHOLE TOTAL DEPTH AS DRILLED: 200'
 CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
 DEPTH TO BEDROCK: NA
 BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____

LOGGING CREW: R. STELLER

LOG TYPE	FILE NAME	DEPTH RANGE	DATE	TIMES
DESCRIPT	B423DELP01	193.5 - 197.0	6/13/08	16:15 - 16:20
DESCRIPT	B423DELP02	193.5 - (-1.1)	6/13/08	16:20 - 17:12
DEPTH-SWEE	001 - 113	1.0' - 185.4'	6/13/08	17:44 - 18:58
CALIB TEST	B423TESTCAL01	0	6/13/08	19:25 - 19:30
CALIB TEST	B423TESTCAL02	0	6/13/08	19:35 - 19:40
CALIB	B423CALUP01	195 - 1	6/13/08	19:47 - 20:08
CALIB TEST	B423TESTCAL03	-2.95	6/13/08	20:11 - 20:15
ELOG	B423ELOGUP01	200' - 3.3'	6/13/08	20:24 - 20:50



B-423 ^{DEVIATION} ~~ACOUSTIC~~ TELEVIEWER FIELD LOG

SITE: CCNPP COLA DATE: 6/13/2006
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-908-1797
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

DIRECTIONS TO SITE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-423 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED UNCASED
DIAMETERS AND DEPTH RANGES: 4 1/2" - 0 TO 200'; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 200'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____
OTHER: _____
DEPTH TO BOREHOLE FLUID: _____ TIME SINCE LAST CIRCULATION: 6 HR.

GE Vision

geophysical services

SITE: CCNPP COLA B-423 DATE: 6/13/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

LOGGING CREW: R. STELLER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: LESLINGTON PARK DEPARTURE TIME: 7:00
 ARRIVED ON SITE: 7:20
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 6:15 LOGGING COMPLETED: _____

WINCH: COMPROBE SILVER OYO OTHER MENIC
 MICROLOGGER 5301 OTHER MOLTE
 TELEVIEWER OPTICAL #5117 ACOUSTIC #5174 OTHER COMPROBE

PROBE TILT TEST 2.5 BRUNTON TILT 4
 PROBE AZIMUTH TEST 11.2 BRUNTON AZIMUTH _____

PROBE OFFSET	OPTICAL 1.88M(6.17FT)	ACOUSTIC 1.44M(4.72FT)
CASING STICK-UP	-	- 1.5'
DEPTH REF. OFFSET	-	- 1.5'

to PMS rev. 0

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
B423D0101	93.5	16:15	167.0	16:20
B423D0102	93.5	16:20	-3.1	17:12

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: Runout cable -3.1'



P-S SUSPENSION VELOCITY FIELD LOG

SITE: CALVERT CLIFFS COLA B-423 DATE: 6/18/05
CLIENT: SCHNABEL JOB: 8185
AUTHOR: R. STELLER PAGE 1 OF 5

CONTACT: OFFICE PHONE:
CELL PHONE:
CONTACT: OFFICE PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
CONTACT: PHONE:
PHONE:
DRILLER: PHONE:
COMPANY: PHONE:

DIRECTIONS TO SITE:

GENERAL SITE CONDITIONS/LOCATION:

EAF:
BOREHOLE DESIGNATION: B-423 LOCATION:

COUNTY: RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASIED UNCASIED
DIAMETERS AND DEPTH RANGES: 4 3/4" TO 200'
BOREHOLE TOTAL DEPTH AS DRILLED: 200'
CONDUCTOR CASING?: YES DEPTH TO BOTTOM OF CASING; NO
DEPTH TO BEDROCK: NA DEPTH TO WATER TABLE:
BOREHOLE FLUID: WATER; FRESH WATER MUD; SALT WATER MUD
OTHER:
DEPTH TO BOREHOLE FLUID: TIME SINCE LAST CIRCULATION: 3 HR

GEOVision

geophysical services

SITE: CALVERT CLIFFS COLA B-423 DATE: 6/12/06
 CLIENT: SCHNABEL JOB: 8165
 AUTHOR: R. STELLER PAGE 2 OF 5

LOGGING CREW: R. STELLER
 VEHICLE(S) USED AND MILEAGE: RENTAL
 MOBILIZED FROM: LEXINGTON PARK DEPARTURE TIME: 7:00
 ARRIVED ON SITE: 7:30
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: 12:44 LOGGING COMPLETED: 10:58
 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 18014 18028 RG 180023 180024
 RECEIVER S/N 12008 20042 26088 11001 23053 30086

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____

COMMENTS: DEPT. 2000 0.49m - .55m (LG) - 1.93m

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA

B-423

DATE:

6/13/06

CLIENT: SCHNABEL

JOB: 6165

AUTHOR: R. STELLER

PAGE

3

OF

5

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	--------------------------------------

0.5	1.64	1		
1.0	3.28	2		
1.5	4.92	3		
2.0	6.56	4		
2.5	8.20	5		
3.0	9.84	6		
3.5	11.48	7		
4.0	13.12	8		
4.5	14.76	9		
5.0	16.40	10		
5.5	18.04	11		
6.0	19.68	12		
6.5	21.33	13		
7.0	22.97	14		
7.5	24.61	15		
8.0	26.25	16		
8.5	27.89	17		
9.0	29.53	18		
9.5	31.17	19		
10.0	32.81	20		
10.5	34.45	21		
11.0	36.09	22		
11.5	37.73	23		
12.0	39.37	24		
12.5	41.01	25		
13.0	42.65	26		
13.5	44.29	27		
14.0	45.93	28		
14.5	47.57	29		
15.0	49.21	30		
15.5	50.85	31		
16.0	52.49	32		
16.5	54.13	33		
17.0	55.77	34		
17.5	57.41	35		
18.0	59.05	36		
18.5	60.70	37		
19.0	62.34	38		
19.5	63.98	39		
20.0	65.62	40		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA

B-423

DATE:

6/14/06

CLIENT: SCHNABEL

JOB: B165

AUTHOR: R. STELLER

PAGE:

4 OF *5*

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	--------------------------------------

20.5	67.26	41		
21.0	68.90	42		
21.5	70.54	43		
22.0	72.18	44		
22.5	73.82	45		
23.0	75.46	46		
23.5	77.10	47		
24.0	78.74	48		
24.5	80.38	49		
25.0	82.02	50		
25.5	83.66	51		
26.0	85.30	52		
26.5	86.94	53		
27.0	88.58	54		
27.5	90.22	55		
28.0	91.86	56		
28.5	93.50	57		
29.0	95.14	58		
29.5	96.78	59		
30.0	98.43	60		
30.5	100.07	61		
31.0	101.71	62		
31.5	103.35	63		
32.0	104.99	64		
32.5	106.63	65		
33.0	108.27	66		
33.5	109.91	67		
34.0	111.55	68		
34.5	113.19	69		
35.0	114.83	70		
35.5	116.47	71		
36.0	118.11	72		
36.5	119.75	73		
37.0	121.39	74		
37.5	123.03	75		
38.0	124.67	76		
38.5	126.31	77		
39.0	127.95	78		
39.5	129.59	79		
40.0	131.23	80		

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: CALVERT CLIFFS COLA *B-423*

DATE: *6/12/06*

CLIENT: SCHNABEL

JOB: 6165

AUTHOR: R. STELLER

PAGE *5* OF *5*

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
--------------	------------	---------------------	-------------------	-----------------------------------

40.5	132.87	81		
41.0	134.51	82		
41.5	136.15	83		
42.0	137.80	84		
42.5	139.44	85		
43.0	141.08	86		
43.5	142.72	87		
44.0	144.36	88		
44.5	146.00	89		
45.0	147.64	90		
45.5	149.28	91		
46.0	150.92	92		
46.5	152.56	93		
47.0	154.20	94		
47.5	155.84	95		
48.0	157.48	96		
48.5	159.12	97		
49.0	160.76	98		
49.5	162.40	99		
50.0	164.04	100		
50.5	165.68	101		
51.0	167.32	102		
51.5	168.96	103		
52.0	170.60	104		
52.5	172.24	105		
53.0	173.88	106		
53.5	175.52	107		
54.0	177.17	108		
54.5	178.81	109		
55.0	180.45	110		
55.5	182.09	111		
56.0	183.73	112		
56.5	185.37	113		
57.0	187.01			<i>Bottom measurement?</i>
57.5	188.65			<i>Hit bottom @ 57.7m TPE 198.1</i>
58.0	190.29			
58.5	191.93			
59.0	193.57			
59.5	195.21			
60.0	196.85			



B-423 CALIPER FIELD LOG

SITE: CCNPP COLA DATE: 12 / 15 / 2008
CLIENT: SCHNABEL JOB: 6165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE: _____
CELL PHONE: 703-908-1787
CONTACT: _____ OFFICE PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
CONTACT: _____ PHONE: _____
PHONE: _____
DRILLER: _____ PHONE: _____
COMPANY: _____ PHONE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

BOREHOLE DESIGNATION: B-423 LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
BOREHOLE CONSTRUCTION: CASED _____ UNCASD
DIAMETERS AND DEPTH RANGES: 4 1/4 0 TO 200'; _____ TO _____
BOREHOLE TOTAL DEPTH AS DRILLED: 200'
CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO
DEPTH TO BEDROCK: _____ DEPTH TO WATER TABLE: _____
BOREHOLE FLUID: WATER _____; FRESH WATER MUD ; SALT WATER MUD _____
OTHER: _____
DEPTH TO BOREHOLE FLUID: _____ TIME SINCE LAST CIRCULATION: 4 HR

LOGGING CREW: R. STELLER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: LEWISTON PARK DEPARTURE TIME: 7:00
ARRIVED ON SITE: 7:30
STANDBY TIME: _____ CAUSE: _____
LOGGING STARTED: 19:25 LOGGING COMPLETED: 20:15

SITE: CCNPP COLA B-423 DATE: 01/13/2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: COMPROBE SILVER OYO OTHER
 MICROLOGGER 5301 OTHER
 CALIPER PROBE 5368 OTHER

PROBE OFFSET	12 IN MAX 2.08M(6.82 FT)	24 IN MAX
CASING STICK-UP	ARMS - <u>1.8</u>	ARMS - _____
DEPTH REF. OFFSET	<u>5.02</u>	

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
<u>6423 TEST CAL 01</u>	<u>0</u>	<u>19:25</u>	<u>0</u>	<u>19:30</u>
<u>6423 TEST CAL 02</u>	<u>0</u>	<u>19:35</u>	<u>0</u>	<u>19:40</u>
<u>6423 CAL UP 01</u>	<u>193</u>	<u>19:47</u>	<u>0</u>	<u>20:00</u>
<u>6423 TEST CAL 03</u>	<u>-2.95</u>	<u>20:11</u>	<u>-2.95</u>	<u>20:15</u>

FILE NAME	AS BUILT		
	1.968 IN (50 MM)	3.937 IN (100 MM)	8.000 IN 203.2 MM
AS MEAS. <u>6423 TEST CAL 01</u>	<u>2.02</u>	<u>4.01</u>	<u>8.05</u>
AS MEAS. <u>6423 TEST CAL 02</u>	<u>1.97</u>	<u>3.94</u>	<u>8.00</u>
AS MEAS. <u>6423 TEST CAL 03</u>	<u>1.96</u>	<u>3.92</u>	<u>8.01</u>
AS MEAS.			
AS MEAS.			
AS MEAS.			

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____



B-423 ELOG FIELD LOG

SITE: CCNPP COLA DATE: 6/13/2006
CLIENT: SCHNABEL JOB: 8165
AUTHOR: R. STELLER PAGE 1 OF 2

CONTACT: RUBEN TARUSELLI OFFICE PHONE:
CELL PHONE: 703-908-1797
CONTACT: OFFICE PHONE:
CONTACT: PHONE:
CONTACT: PHONE:
CONTACT: PHONE:
CONTACT: PHONE:
CONTACT: PHONE:
CONTACT: PHONE:
CONTACT: PHONE:

GENERAL SITE CONDITIONS/LOCATION:

BOREHOLE DESIGNATION: B-423 LOCATION:

COUNTY: RANGE: TOWNSHIP: SECTION:
BOREHOLE CONSTRUCTION: CASED UNCASD
DIAMETERS AND DEPTH RANGES: 4 3/4" 0 TO 280' ; TO
BOREHOLE TOTAL DEPTH AS DRILLED: 280'
CONDUCTOR CASING?: YES DEPTH TO BOTTOM OF CASING ; NO
DEPTH TO BEDROCK: DEPTH TO WATER TABLE:
BOREHOLE FLUID: WATER ; FRESH WATER MUD ; SALT WATER MUD ;
OTHER:
DEPTH TO BOREHOLE FLUID: TIME SINCE LAST CIRCULATION: 5 HR

LOGGING CREW: R. STELLER
VEHICLE(S) USED AND MILEAGE: RENTAL
MOBILIZED FROM: LEWISTON PAOK DEPARTURE TIME: 7:00
ARRIVED ON SITE: 7:30
STANDBY TIME: CAUSE:
LOGGING STARTED: 20:14 LOGGING COMPLETED: 20:50

SITE: CCNPP COLA B-423 DATE: 6/13 2006
 CLIENT: SCHNABEL JOB: 6165
 AUTHOR: R. STELLER PAGE 2 OF 2

WINCH: COMPROBE SILVER OYO OTHER
 MICROLOGGER 5301 OTHER
 ELOG PROBE 5480 OTHER

PROBE OFFSET	2.50M(8.20 FT)
CASING STICK-UP	-1.8
DEPTH REF. OFFSET	6.4

LOG NAME	START DEPTH	START TIME	END DEPTH	END TIME
B423ELOG01	2.0'	2:12.4	3.3'	2:50

MAINTENANCE PERFORMED ON SITE: _____

 EQUIPMENT PROBLEMS OR FAILURES: _____

 SUGGESTIONS, ADDITIONS, CHANGES: _____

APPENDIX E

BORING GEOPHYSICAL LOGGING

FIELD MEASUREMENT PROCEDURES

PROCEDURE FOR OYO P-S SUSPENSION SEISMIC VELOCITY LOGGING

Background

This procedure describes a method for measuring shear and compressional wave velocities in soil and rock. The OYO P-S Suspension Method is applied by generating shear and compressional waves in a borehole using the OYO P-S Suspension Logger borehole tool and measuring the travel time between two receiver geophones or hydrophones located in the same tool.

Objective

The outcome of this procedure is a plot and table of P and S_H wave velocity versus depth for each borehole. Standard analysis is performed on receiver to receiver data. Data is presented in report format, with ASCII data files and digital records transmitted on diskette.

Instrumentation

1. OYO Model 170 Digital Logging Recorder or equivalent
2. OYO P-S Suspension Logger probe or equivalent, including two sets horizontal and vertical geophones, seismic source, and power supply for the source and receivers
3. Winch and winch controller, with logging cable
4. Batteries to operate P-S Logger and winch

The Suspension P-S Logger system, manufactured by OYO Corporation, or the Robertson Digital P-S Suspension Probe with the Robertson Micrologger2 are currently the only commercially available suspension logging systems. As shown in Figure 1, these systems consists of a borehole probe suspended by a cable and a recording/control electronics package on the surface.

The suspension system probe consists of a combined reversible polarity solenoid horizontal shear-wave generator (S_H) and compressional-wave generator (P), joined to

two biaxial geophones by a flexible isolation cylinder. The separation of the two geophones is one meter, allowing average wave velocity in the region between the geophones to be determined by inversion of the wave travel time between the two geophones. The total length of the probe is approximately 7 meters; the center point of the geophones is approximately 5 meters above the bottom end of the probe.

The probe receives control signals from, and sends the amplified geophone signals to, the instrumentation package on the surface via an armored 4 or 7 conductor cable. The cable is wound onto the drum of a winch and is used to support the probe. Cable travel is measured by a rotary encoder to provide probe depth data.

The entire probe is suspended by the cable and may be centered in the borehole by nylon "whiskers." Therefore, source motion is not coupled directly to the borehole walls; rather, the source motion creates a horizontally propagating pressure wave in the fluid filling the borehole and surrounding the source. This pressure wave produces a horizontal displacement of the soil forming the wall of the borehole. This displacement propagates up and down the borehole wall, in turn causing a pressure wave to be generated in the fluid surrounding the geophones as the soil displacement wave passes their location.

Environmental Conditions

The OYO P-S Suspension Logging Method can be used in either cased or uncased boreholes. For best results, the uncased borehole must be between 10 and 20 cm in diameter, or 4 to 8 inches. A cased borehole may be as small as 3 inches, if properly grouted (see below) and the grout annulus does not exceed 1 inch.

Uncased boreholes are preferred because the effects of the casing and grouting are removed. It is recommended that the borehole be drilled using the rotary mud method. This method does little damage to the borehole wall, and the drilling fluid coats and seals the borehole wall reducing fluid loss and wall collapse. The borehole fluid is required for the logging, and must be well circulated prior to logging.

If the borehole must be cased, the casing must be PVC and properly installed and grouted. Any voids in the grout will cause problems with the data. Likewise, large grout bulbs used to fill cavities will also cause problems. The grout must be set before testing. This means the grouting must take place at least 48 hours before testing.

For borehole casing, applicable preparation procedures are presented in ASTM Standard D4428/D4428M-91 Section 4.1 (see ASTM website for copy).

Calibration

Calibration of the digital recorder is required. Calibration is limited to the timing accuracy of the recorder. GEOVision's Seismograph Calibration Procedure or equivalent should be used. Calibration must be performed on an annual basis.

Measurement Procedure

The entire probe is lowered into the borehole to a specific measurement depth by the winch. A measurement sequence is then initiated by the operator from the instrumentation package control panel. No further operator intervention is then needed to complete the measurement sequence described below.

The system electronics activates the SH-wave source in one direction and records the output of the two horizontally oriented geophone axes which are situated parallel to the axis of motion of the source. The source is then activated in the opposite direction, and the horizontal output signals are again recorded, producing a SH-wave record of polarity opposite to the previous record. The source is finally actuated in the first direction again, and the responses of the vertical geophone axes to the resultant P-wave are recorded during this sampling.

The data from each geophone during each source activation is recorded as a different channel on the recording system. The seismograph has at least six channels (two simultaneous recording channels), each with at least a 12 bit 1024 sample record. Newer seismographs may have longer record lengths. The recorded data is displayed on a CRT or LCD display and possibly on paper tape output as six channels with a common time scale. Data is stored on digital media for further processing. Up to 8 sampling sequences can be stacked (averaged) to improve the signal to noise ratio of the signals.

Review of the data on the display or paper tape allows the operator to set the gains, filters, delay time, pulse length (energy), sample rate, and stacking number in order to optimize the quality of the data before recording. In the case of the Model 170, printed data is verified by the operator prior to moving the probe. In the case of the Robertson Micrologger2, storage on the hard disk should be verified from time-to-time, certainly before exiting the borehole.

Typical depth spacing for measurements is 1.0 meters, or 3.3 feet. Alternative spacing is 0.5 meter, or 1.6 feet.

Required Field Records

- 1) Field log for each borehole showing
 - a) Borehole identification
 - b) Date of test
 - c) Tester or data recorder

- d) Description of measurement
 - e) Any deviations from test plan and action taken as a result
 - f) QA Review
- 2) Paper output records are no longer required, since the Micrologger2 cannot generate them. However, data must be stored in at least 2 places prior to leaving the site
 - 3) List of record ID numbers (for data on digital media) and corresponding depth
 - 4) Diskettes, CDROM, or USB flash drives with backup copies of data on hard disk, labeled with borehole designation, record ID numbers, date, and tester name.

An example Field Log is attached to this procedure.

Analysis

Following completion of field work, the recorded digital records are processed by computer using the OYO Corporation software program PSLOG and interactively analyzed by an experienced geophysicist to produce plots and tables of P and S_H wave velocity versus depth.

The digital time series records from each depth are transferred to a personal computer for analysis. Figure 2 shows a sample of the data from a single depth. These digital records are analyzed to locate the first minima on the vertical axis records, indicating the arrival of P-wave energy. The difference in travel time between these arrivals is used to calculate the P-wave velocity for that 1-meter interval. When observable, P-wave arrivals on the horizontal axis records are used to verify the velocities determined from the vertical axis data. In addition, the soil velocity calculated from the travel time from source to first receiver is compared to the velocity derived from the travel time between receivers.

The digital records are studied to establish the presence of clear SH-wave pulses, as indicated by the presence of opposite polarity pulses on each pair of horizontal records. Ideally, the SH-wave signals from the 'normal' and 'reverse' source pulses are very nearly inverted images of each other. Digital FFT – IFFT lowpass filtering are used to remove the higher frequency P-wave signal from the SH-wave signal.

The first maxima are picked for the 'normal' signals and the first minima are picked for the 'reverse' signals. The absolute arrival time of the 'normal' and 'reverse' signals may vary by +/- 0.2 milliseconds, due to differences in actuation time of the solenoid source caused by constant mechanical bias in the source or by borehole inclination. This variation does not affect the velocity determinations, as the differential time is measured between arrivals of waves created by the same source actuation. The final velocity

OYO SUSPENSION P-S VELOCITY LOGGING SETUP

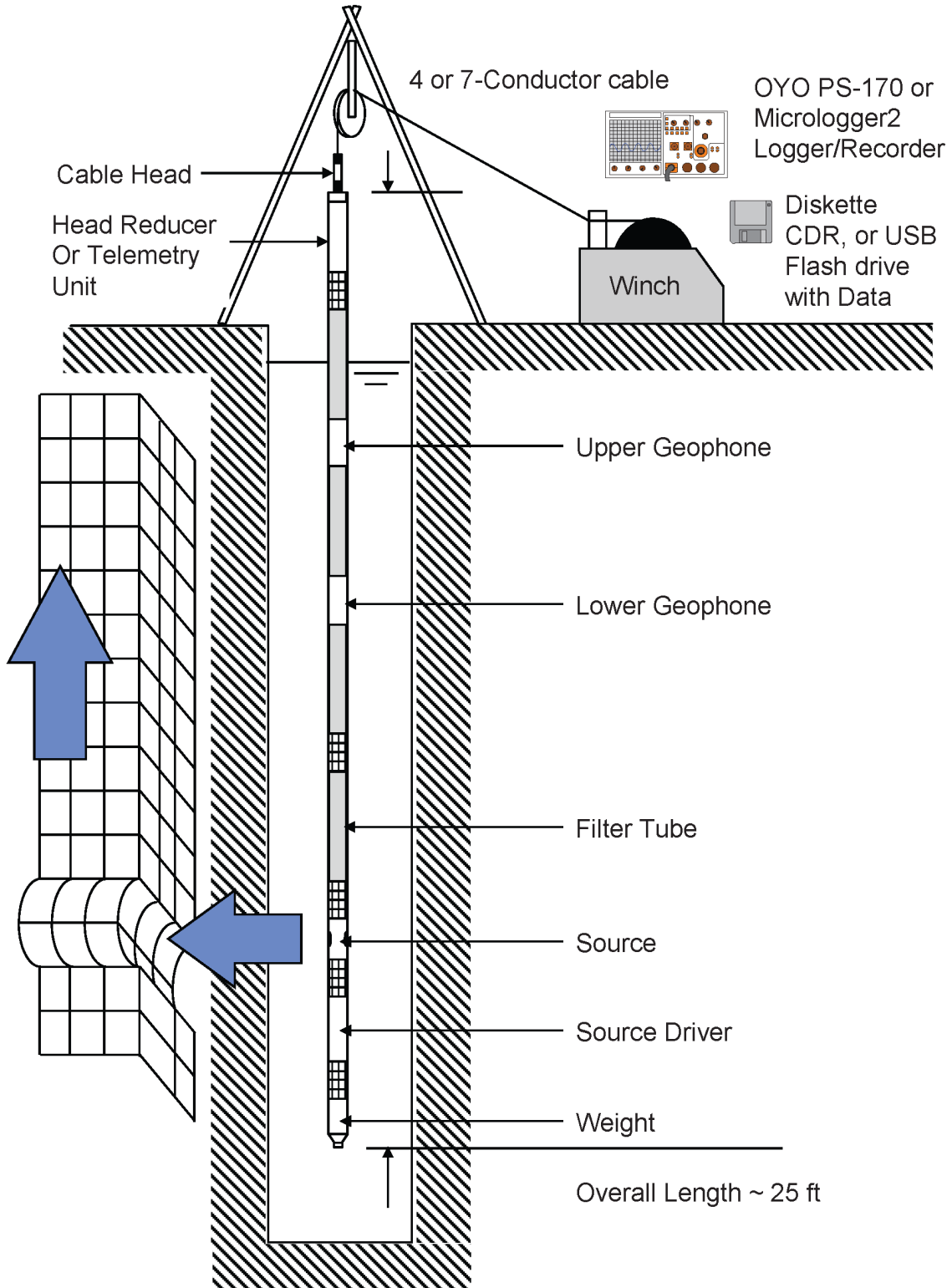


Figure 1. Suspension PS logging method setup



P-S SUSPENSION VELOCITY FIELD LOG

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE 1 OF _____

CONTACT: _____	OFFICE	PHONE: _____
		PHONE: _____
CONTACT: _____	OFFICE	PHONE: _____
		PHONE: _____
CONTACT: _____		PHONE: _____
		PHONE: _____
CONTACT: _____		PHONE: _____
		PHONE: _____
DRILLER: _____		PHONE: _____
COMPANY: _____		PHONE: _____

DIRECTIONS TO SITE: _____

GENERAL SITE CONDITIONS/LOCATION: _____

EA#: _____
 BOREHOLE DESIGNATION: _____ LOCATION: _____

COUNTY: _____ RANGE: _____ TOWNSHIP: _____ SECTION: _____
 BOREHOLE CONSTRUCTION: CASED _____ UNCASD _____
 DIAMETERS AND DEPTH RANGES: _____ 0 TO _____ ; _____, _____ TO _____
 BOREHOLE TOTAL DEPTH AS DRILLED: _____
 CONDUCTOR CASING?: YES _____ DEPTH TO BOTTOM OF CASING _____; NO _____
 DEPTH TO BEDROCK: _____ DEPTH TO WATER TABLE: _____
 BOREHOLE FLUID: WATER _____; FRESH WATER MUD _____; SALT WATER MUD _____;
 OTHER: _____
 DEPTH TO BOREHOLE FLUID: _____ TIME SINCE LAST CIRCULATION: _____



SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE 2 OF _____

LOGGING CREW: _____
 VEHICLE(S) USED AND MILEAGE: _____
 MOBILIZED FROM: _____ DEPARTURE TIME: _____
 ARRIVED ON SITE: _____
 STANDBY TIME: _____ CAUSE: _____
 LOGGING STARTED: _____ LOGGING COMPLETED: _____
 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

MAINTENANCE PERFORMED ON SITE: _____

EQUIPMENT PROBLEMS OR FAILURES: _____

SUGGESTIONS, ADDITIONS, CHANGES: _____

COMMENTS: _____

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE _____ OF _____

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			
3.0	9.84			
3.5	11.48			
4.0	13.12			
4.5	14.76			
5.0	16.40			
5.5	18.04			
6.0	19.69			
6.5	21.33			
7.0	22.97			
7.5	24.61			
8.0	26.25			
8.5	27.89			
9.0	29.53			
9.5	31.17			
10.0	32.81			
10.5	34.45			
11.0	36.09			
11.5	37.73			
12.0	39.37			
12.5	41.01			
13.0	42.65			
13.5	44.29			
14.0	45.93			
14.5	47.57			
15.0	49.21			
15.5	50.85			
16.0	52.49			
16.5	54.13			
17.0	55.77			
17.5	57.41			
18.0	59.06	GEOVISION Report 6165-01 Vol 1 of 2 CCNPP COLA Boring Geophysics rev A		11/14/2006 Page 320 of 366

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE _____ OF _____

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
18.5	60.70			
19.0	62.34			
19.5	63.98			
20.0	65.62			
20.5	67.26			
21.0	68.90			
21.5	70.54			
22.0	72.18			
22.5	73.82			
23.0	75.46			
23.5	77.10			
24.0	78.74			
24.5	80.38			
25.0	82.02			
25.5	83.66			
26.0	85.30			
26.5	86.94			
27.0	88.58			
27.5	90.22			
28.0	91.86			
28.5	93.50			
29.0	95.14			
29.5	96.78			
30.0	98.43			
30.5	100.07			
31.0	101.71			
31.5	103.35			
32.0	104.99			
32.5	106.63			
33.0	108.27			
33.5	109.91			
34.0	111.55			
34.5	113.19			
35.0	114.83			
35.5	116.47			
36.0	118.11	GEOVISION Report 6165-01 Vol 1 of 2 CCNPP COLA Boring Geophysics rev A		11/14/2006 Page 321 of 366

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE _____ OF _____

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
36.5	119.75			
37.0	121.39			
37.5	123.03			
38.0	124.67			
38.5	126.31			
39.0	127.95			
39.5	129.59			
40.0	131.23			
40.5	132.87			
41.0	134.51			
41.5	136.15			
42.0	137.80			
42.5	139.44			
43.0	141.08			
43.5	142.72			
44.0	144.36			
44.5	146.00			
45.0	147.64			
45.5	149.28			
46.0	150.92			
46.5	152.56			
47.0	154.20			
47.5	155.84			
48.0	157.48			
48.5	159.12			
49.0	160.76			
49.5	162.40			
50.0	164.04			
50.5	165.68			
51.0	167.32			
51.5	168.96			
52.0	170.60			
52.5	172.24			
53.0	173.88			
53.5	175.52			
54.0	177.17	GEOVISION Report 6165-01 Vol 1 of 2 CCNPP COLA Boring Geophysics rev A		11/14/2006 Page 322 of 366

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE _____ OF _____

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
54.5	178.81			
55.0	180.45			
55.5	182.09			
56.0	183.73			
56.5	185.37			
57.0	187.01			
57.5	188.65			
58.0	190.29			
58.5	191.93			
59.0	193.57			
59.5	195.21			
60.0	196.85			
60.5	198.49			
61.0	200.13			
61.5	201.77			
62.0	203.41			
62.5	205.05			
63.0	206.69			
63.5	208.33			
64.0	209.97			
64.5	211.61			
65.0	213.25			
65.5	214.90			
66.0	216.54			
66.5	218.18			
67.0	219.82			
67.5	221.46			
68.0	223.10			
68.5	224.74			
69.0	226.38			
69.5	228.02			
70.0	229.66			
70.5	231.30			
71.0	232.94			
71.5	234.58			
72.0	236.22			

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE _____ OF _____

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
72.5	237.86			
73.0	239.50			
73.5	241.14			
74.0	242.78			
74.5	244.42			
75.0	246.06			
75.5	247.70			
76.0	249.34			
76.5	250.98			
77.0	252.62			
77.5	254.27			
78.0	255.91			
78.5	257.55			
79.0	259.19			
79.5	260.83			
80.0	262.47			
80.5	264.11			
81.0	265.75			
81.5	267.39			
82.0	269.03			
82.5	270.67			
83.0	272.31			
83.5	273.95			
84.0	275.59			
84.5	277.23			
85.0	278.87			
85.5	280.51			
86.0	282.15			
86.5	283.79			
87.0	285.43			
87.5	287.07			
88.0	288.71			
88.5	290.35			
89.0	291.99			
89.5	293.64			
90.0	295.28	GEOVISION Report 6165-01 Vol 1 of 2 CCNPP COLA Boring Geophysics rev A		11/14/2006 Page 324 of 366

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE _____ OF _____

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
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			
100.5	329.72			
101.0	331.36			
101.5	333.01			
102.0	334.65			
102.5	336.29			
103.0	337.93			
103.5	339.57			
104.0	341.21			
104.5	342.85			
105.0	344.49			
105.5	346.13			
106.0	347.77			
106.5	349.41			
107.0	351.05			
107.5	352.69			
108.0	354.33			

GEOVISION SUSPENSION LOGGING FIELD NOTES

SITE: _____ DATE: _____
 CLIENT: _____ JOB: _____
 AUTHOR: _____ PAGE _____ OF _____

DEPTH METERS	DEPTH FEET	UNFILTERED FILE NO.	FILTERED FILE NO.	COMMENTS CASING, WATER, ROCK, ETC
108.5	355.97			
109.0	357.61			
109.5	359.25			
110.0	360.89			
110.5	362.53			
111.0	364.17			
111.5	365.81			
112.0	367.45			
112.5	369.09			
113.0	370.73			
113.5	372.38			
114.0	374.02			
114.5	375.66			
115.0	377.30			
115.5	378.94			
116.0	380.58			
116.5	382.22			
117.0	383.86			
117.5	385.50			
118.0	387.14			
118.5	388.78			
119.0	390.42			
119.5	392.06			
120.0	393.70			
120.5	395.34			
121.0	396.98			
121.5	398.62			
122.0	400.26			
122.5	401.90			
123.0	403.54			
123.5	405.18			
124.0	406.82			
124.5	408.46			
125.0	410.10			
125.5	411.75			
126.0	413.39	GEOVISION Report 6165-01 Vol 1 of 2 CCNPP COLA Boring Geophysics rev A		11/14/2006 Page 326 of 366

PROCEDURE FOR USING THE ROBERTSON GEOLOGGING HI-RESOLUTION ACOUSTIC TELEVIEWER (HiRAT)

Reviewed 2/13/06

Background

The acoustic televiewer is a device for producing a qualitative image of the wall of a borehole. Because it uses ultrasound rather than visible light it is able to work in dirty or opaque borehole fluids, although heavy drilling mud will cause excessive dispersion of the acoustic beam. The picture below shows the sonde's lower nylon section, and one of the bowspring attachments which are used to centralize the sonde in the borehole.



Pulses of ultrasound (0.5 - 1.5MHz) are generated by a piezo-electric resonator. The pulses are transmitted through the oil in which the resonator is immersed, through the wall of the acoustic housing, then propagate through the borehole fluid and are reflected from the wall of the borehole. The reflected energy is picked up by the same transducer, from which is recorded both the **amplitude** of the returned pulse and the **travel-time** which have elapsed. Blanking must be applied to prevent the transducer from registering reflections from the inside surface of the acoustic housing. The material of the housing is chosen so that its acoustic properties are similar to the oil which fills it. The housing is not designed to withstand borehole fluid pressures, but has a piston device to allow equalization between inside and outside pressure.

The **amplitude** of the returned pulse is a function of the acoustic reflectivity of the borehole wall. If the beam strikes a hard borehole wall normally to the surface the energy will be returned to the transducer and a strong return will be recorded. If the formation is softer, then less energy will be reflected. Also, if the surface of the borehole is rough, or effectively missing because of the presence of a fracture or other structure, then energy will be dispersed and a poor return will be recorded.

The **travel-time** is a simple function of the diameter of the borehole and the velocity of sound in the borehole fluid (typically 1.5Km/sec). An A/D converter monitors the output from the transducer once the blanking period has expired and a comparator is used to detect the peak amplitude during the sampling window.

The coaxially-mounted transducer has a planar radiating surface, but the vibration characteristics are such that the acoustic pulse is emitted as a 'pencil' beam. The emitted beam is deflected by a planar mirror so that it leaves the acoustic housing at right angles to the sonde axis. The mirror is rotated to scan the borehole wall. The ultrasound pulses are synchronized with rotation of the mirror so that up to 360 pulses are emitted in every revolution. Because of the time which must elapse for the two-way transit of the borehole fluid, there is an upper limit upon the number of radial samples that may be acquired from a borehole of a particular radius. In larger boreholes, therefore, it may be necessary to reduce the number of radial samples. The sonde is able to operate at 90, 180 or 360 samples per revolution.