FIELD SASW DATA REPORT

Spectral-Analysis-of-Surface-Waves (SASW) Testing of the Vogtle Phase 1 Test Field Vogtle Electric Generating Plant – Units 3 and 4

(1) Complete Sets of Seismic Results from All Sites, (2) Equipment Calibration Documents (3) Verification of the Forward Modeling Procedure (WinSASW) and (4) Benefits and Limitations of the SASW Method

for

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396 Plasters Ave.
Atlanta, GA 30324

by

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Geotechnical Engineering Report GR08-06
Geotechnical Engineering Center
Civil Engineering Department
The University of Texas at Austin

Table of Contents

1.0 Introduction

This report documents the measurements, analyses and results from Spectral-Analysis-of-Surface-Waves (SASW) tests that were performed at 29 sites during four different site visits on the test fill in Vogtle, GA. It includes 29 appendices as follows:

(1) Appendix A contains a map of the SASW test locations on the test fill. Also, a summary of V_S profiles for each site visit are included in this appendix.

(2) Appendices B through Z contain the "raw" data (wrapped phase plots versus frequency) for Sites A through G for each site visit, respectively. However, the data of Site G of each site visit was combined into Sites A through F of the same site visit to obtain deeper V_S profiles. During fourth site visit, an additional SASW test was performed on the natural soil at Site H. In total, there are 25 appendices (B through Z) for the SASW measurements performed on the test fill. Each appendix contains the field data sheet, "raw data" from each SASW set-up, experimental field dispersion curve determined from the raw data, theoretical match to the experimental dispersion curve and resulting shear wave velocity profile for that test location.

(3) Appendix AA contains the Calibration Documentation for Geophones and Agilent 35670A Dynamic Signal Analyzer.

(4) Appendix AB contains the verification of the forward modeling procedure (WinSASW, version 1.23) performed to evaluate the V_s profile from each field dispersion curve. This verification is the one that was developed under the QA Requirements of the Yucca Mountain Project and is currently valid on that project.

(5) Appendix AC contains a short discussion of the benefits and limitations of the SASW method.

Appendix B

SASW Measurements of First Site Visit at Vogtle, GA
Site Location: Site A

3 - Receiver SASW Data Sheet

Project : Vogtle

Data Sheet # : SA #1

Location : SA (SA #1)

Disk # : SA #1

Date/(Time) : Dec/ 9 / 2007 (: ~ :)

Personnel : Stokoe, Minjae, Yuan

Recorded by : Yuan

Checked by : Minjae

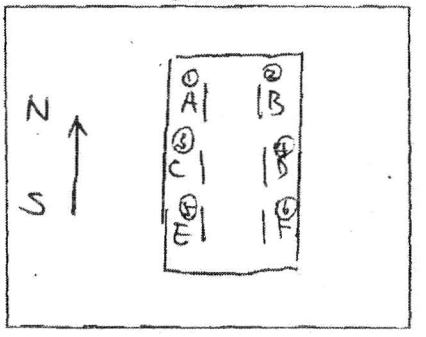
R1 I.D. : GEC 92003 Near

R2 I.D. : GEC 92002 Center

R3 I.D. : GEC 92001 Far

Analyzer : 4-ch, 35670A Same for all site

Sketch



Distance (ft)			Impact Direction		Impact Source	Record #	Freq. Range (Hz)	Notes
S - R1	R1 - R2	R2 - R3						
1	1	2	For	Rev	Small Hammer	SA1	~	
1	1	2	For	Rev	"	SA2	~	
3	3	6	For	Rev	Medium Hammer	SA3	~	
3	3	6	For	Rev	"	SA4	~	
9	9	9	For	Rev	"	SA5	~	
9	9	9	For	Rev	Big Hammer	N/A record	~	
9	9	9	For	Rev	Medium Hammer	SA6	~	
9	9	18	For	Rev	"	SA7	~	
9	9	18	For	Rev	"	SA8	~	
1	1	2	For	Rev	Small Hammer	SA9	0 - 800Hz	Hold down geophones
1	1	2	For	Rev	"	SA10	~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	

* Autosequence 3R_SASW saves F_2/1, C_2/1, F_4/3, C_4/3, Lin_1, Lin_2, Lin_4

* Autosequence 3R_SEWPSIN saves F_2/1, Var_2, F_4/3, Var_4, Lin_1, Lin_2, Lin_4

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3 - Receiver SASW Data Sheet

Page 1 of 1

Project : Vogtle

Data Sheet # : SA#7

Location : G (SA#7)

Disk # : SA#7

Date/(Time) : Dec 9, 2007 (: ~ :)

Personnel : Stokoe, Minjae, Yuan

Recorded by : Yuan

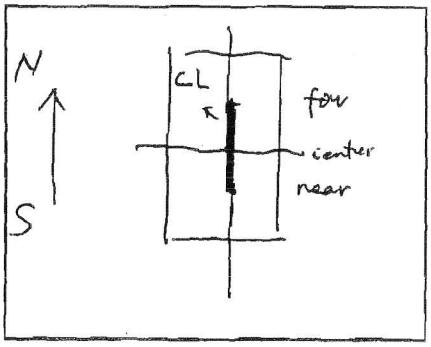
Checked by : Minjae

R1 I.D. : GEC 92003

R2 I.D. : GEC 92002

R3 I.D. : GEC 92001

Sketch



Distance (ft)			Impact Direction		Impact Source	Record #	Freq. Range (Hz)	Notes
S - R1	R1 - R2	R2 - R3						
25	25	25	For	Rev	Bulldozer	G1	0 - 100	
			For	Rev			~	
50	50		For	Rev	"	G2	0 - 100	
			For	Rev			~	
50	50		For	Rev	"	G3	0 - 100	
			For	Rev			~	
25	25	25	For	Rev	"	G4	0 - 100	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	

When I reverse direction location & Geophones not changed

* Autosequence 3R_SASW saves F_2/1, C_2/1, F_4/3, C_4/3, Lin_1, Lin_2, Lin_4

* Autosequence 3R_SEWPSIN saves F_2/1, Var_2, F_4/3, Var_4, Lin_1, Lin_2, Lin_4

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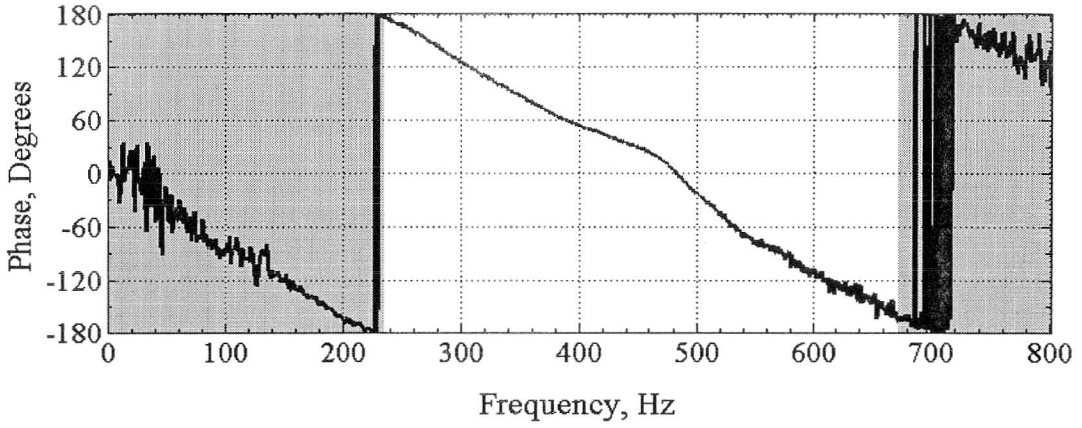

Figure B.1 Phase Plots Measured by SASW Testing with 1-ft Receiver Spacing (SA1_F_21.DAT)

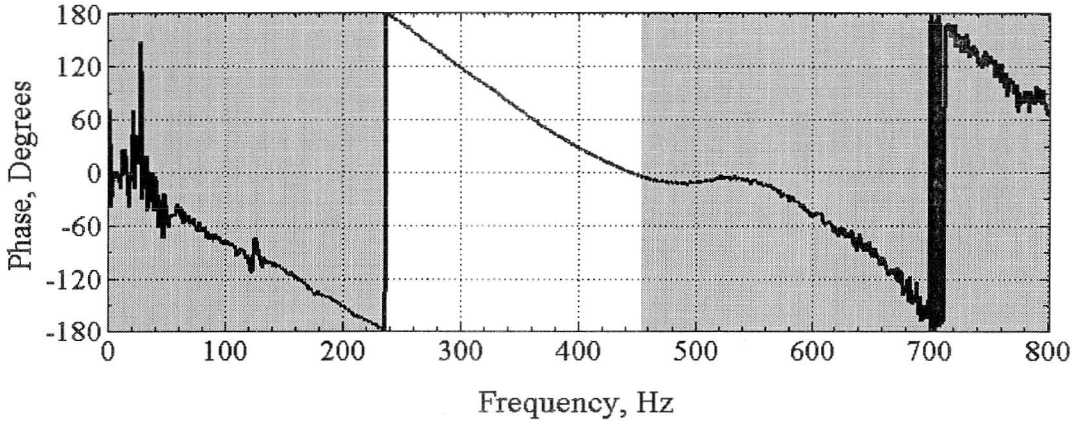

Figure B.2 Phase Plots Measured by SASW Testing with 1-ft Receiver Spacing (SA2_F_21.DAT)

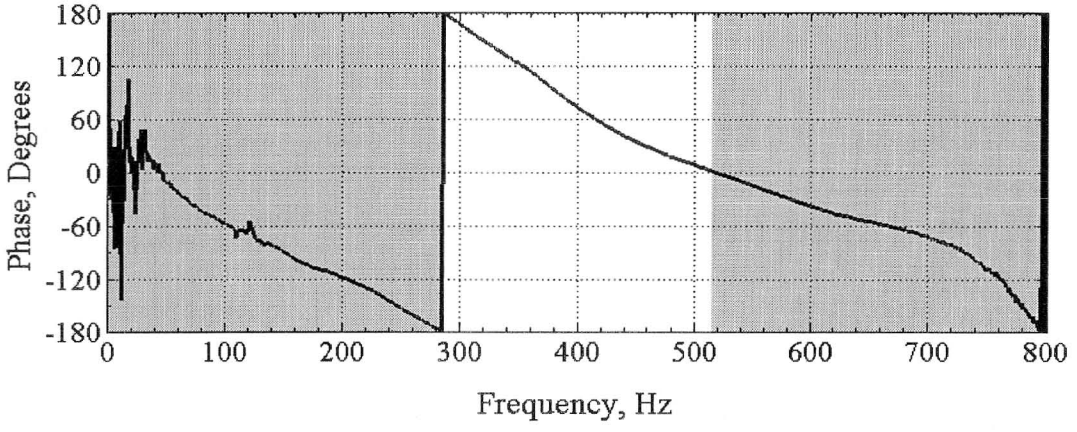

Figure B.3 Phase Plots Measured by SASW Testing with 1-ft Receiver Spacing (SA9_F_21.DAT)

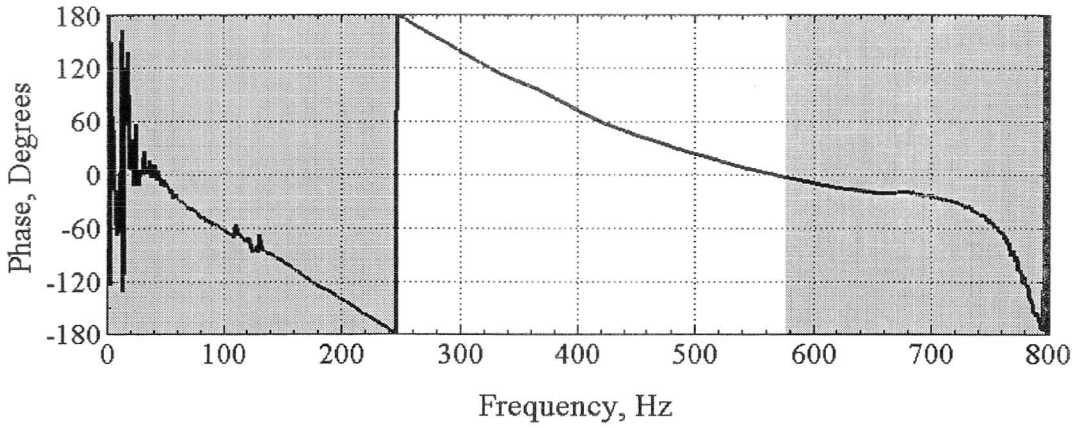

Figure B.4 Phase Plots Measured by SASW Testing with 1-ft Receiver Spacing (SA10_F_2.DAT)

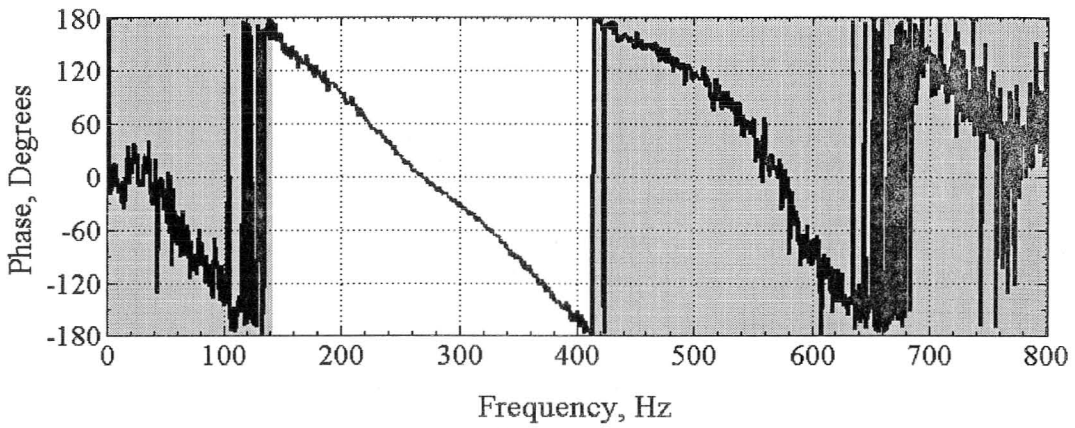

Figure B.5 Phase Plots Measured by SASW Testing with 2-ft Receiver Spacing (SA1_F_43.DAT)

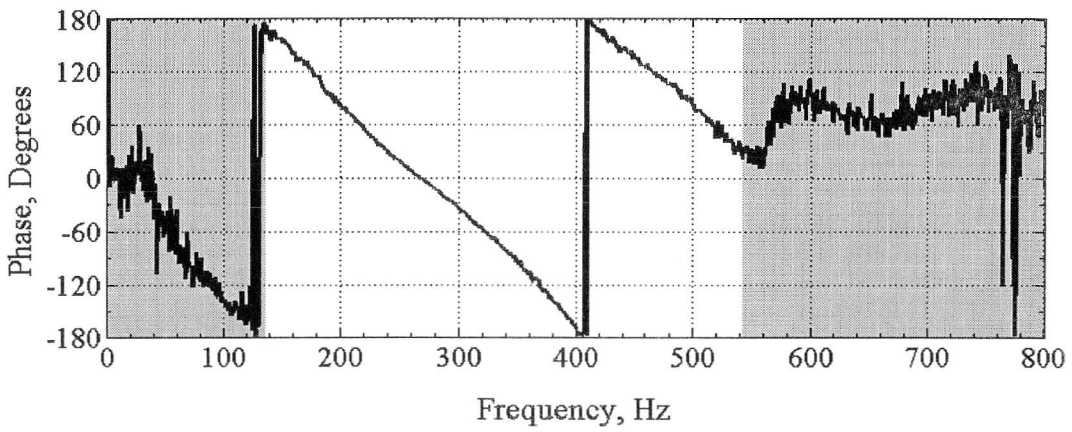

Figure B.6 Phase Plots Measured by SASW Testing with 2-ft Receiver Spacing (SA2_F_43.DAT)

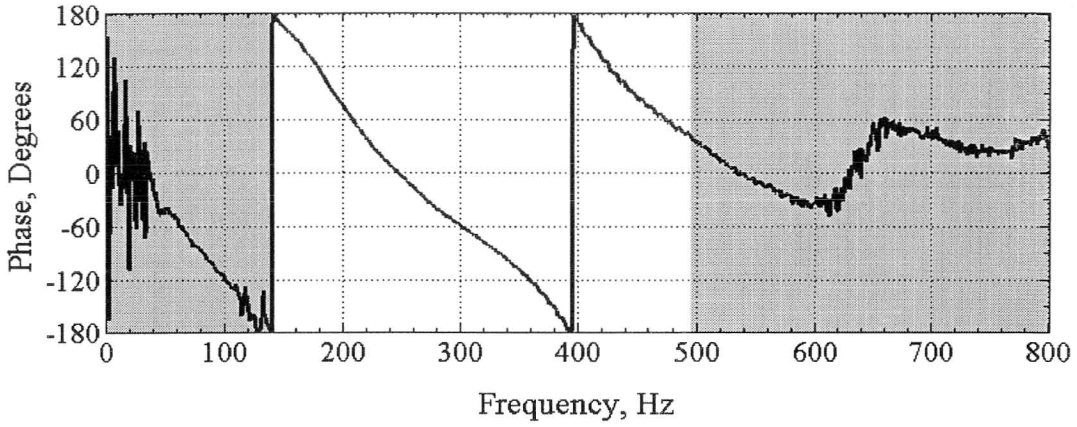

Figure B.7 Phase Plots Measured by SASW Testing with 2-ft Receiver Spacing (SA9_F_43.DAT)

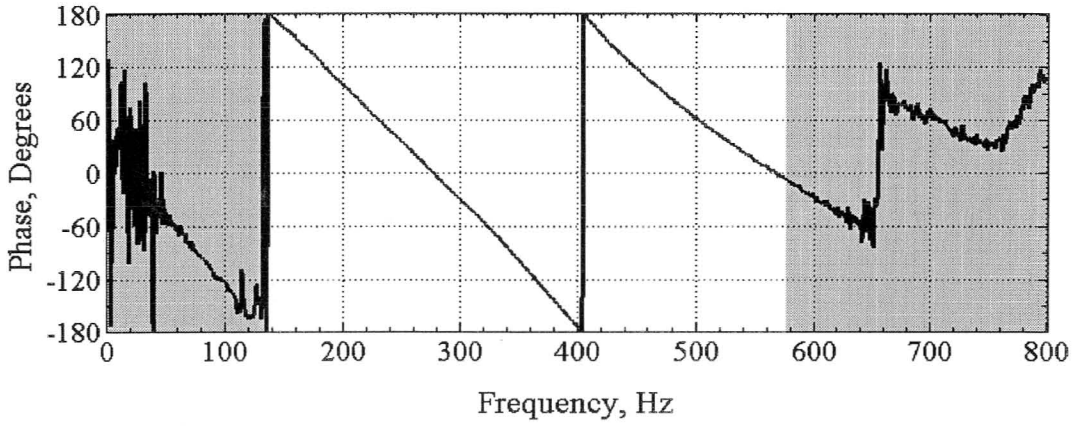

Figure B.8 Phase Plots Measured by SASW Testing with 2-ft Receiver Spacing (SA10_F_4.DAT)

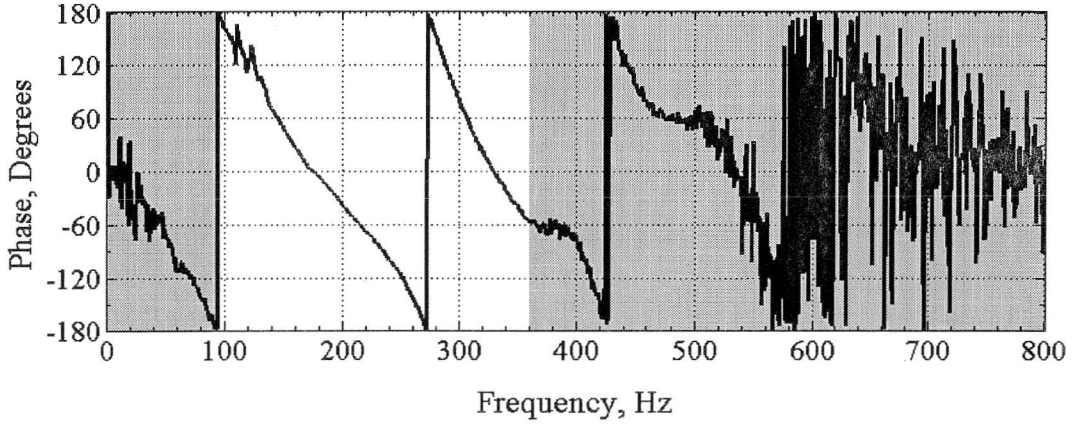

Figure B.9 Phase Plots Measured by SASW Testing with 3-ft Receiver Spacing (SA4_F_21.DAT)

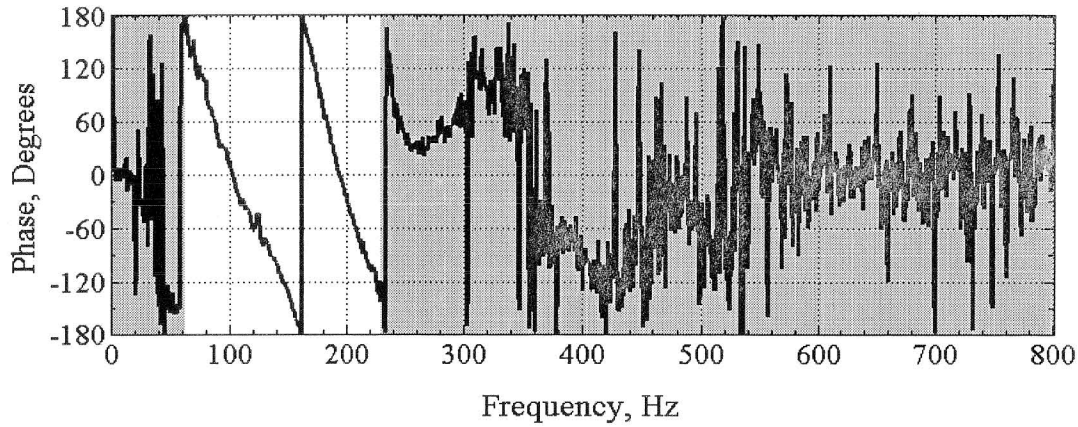

Figure B.10 Phase Plots Measured by SASW Testing with 6-ft Receiver Spacing (SA3_F_43.DAT)

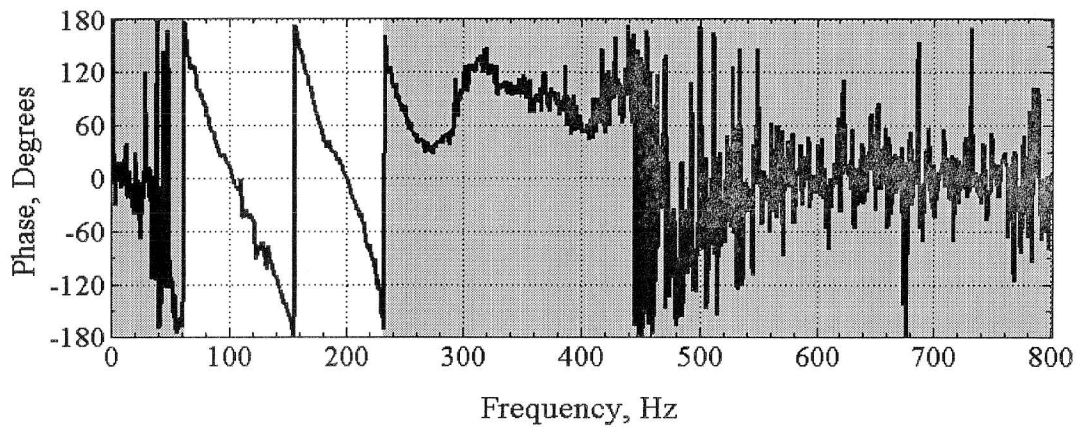

Figure B.11 Phase Plots Measured by SASW Testing with 6-ft Receiver Spacing (SA4_F_43.DAT)

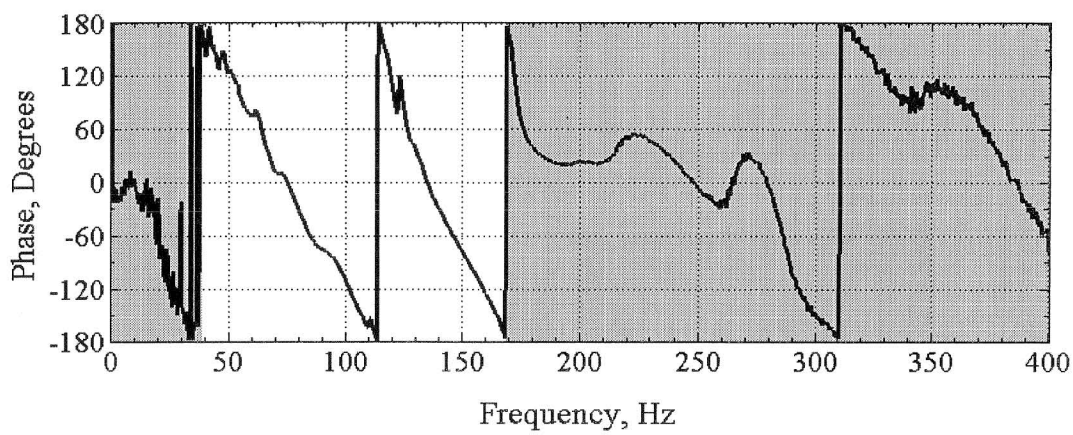

Figure B.12 Phase Plots Measured by SASW Testing with 9-ft Receiver Spacing (SA5_F_21.DAT)

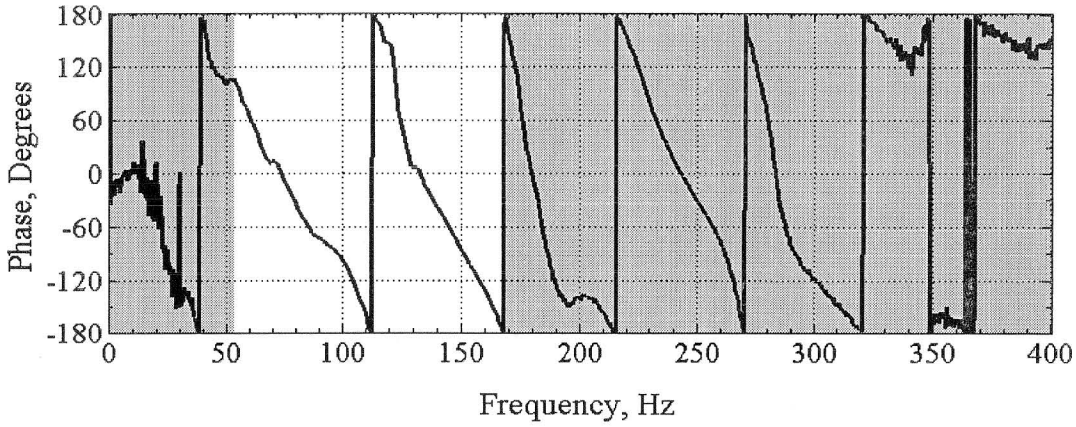

Figure B.13 Phase Plots Measured by SASW Testing with 9-ft Receiver Spacing (SA6_F_21.DAT)

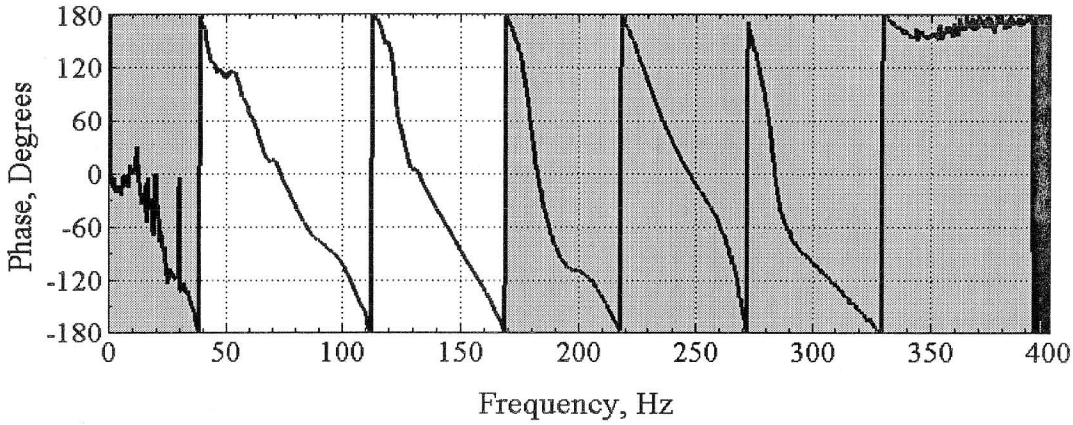

Figure B.14 Phase Plots Measured by SASW Testing with 9-ft Receiver Spacing (SA7_F_21.DAT)

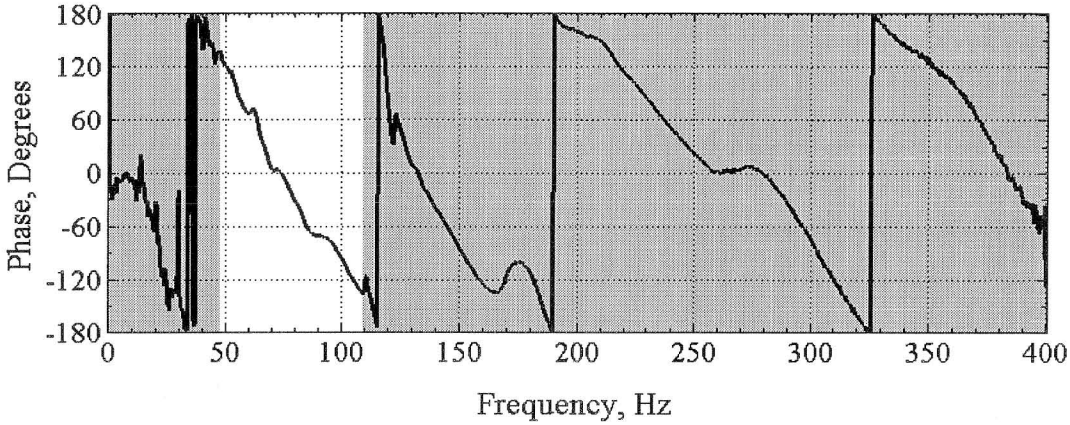

Figure B.15 Phase Plots Measured by SASW Testing with 9-ft Receiver Spacing (SA8_F_21.DAT)

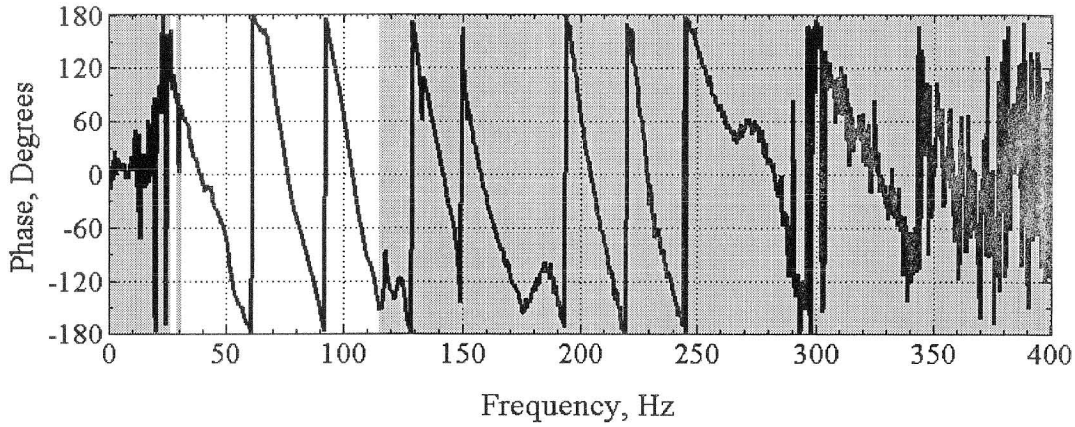

Figure B.16 Phase Plots Measured by SASW Testing with 18-ft Receiver Spacing (SA7_F_43.DAT)

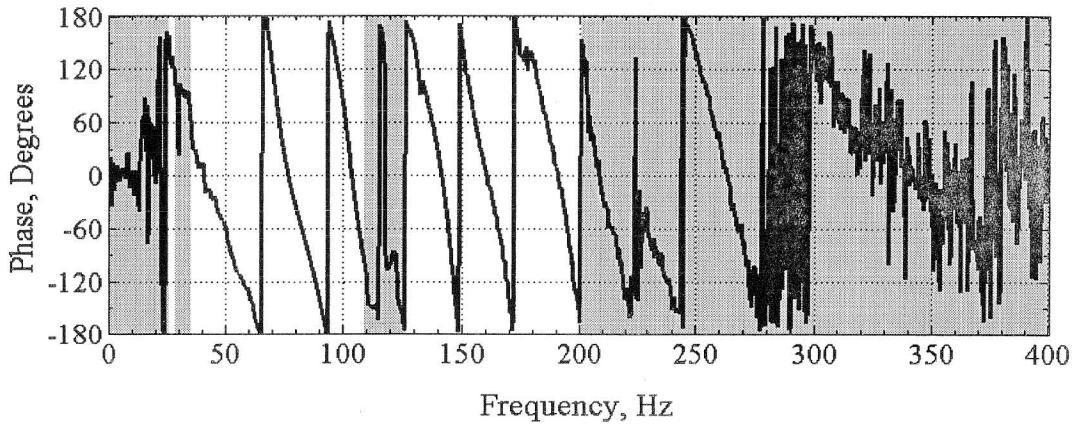

Figure B.17 Phase Plots Measured by SASW Testing with 18-ft Receiver Spacing (SA8_F_43.DAT)

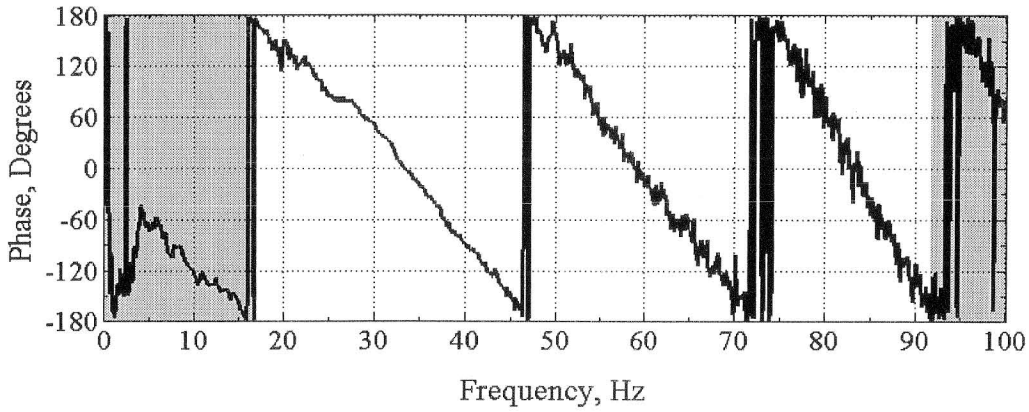

Figure B.18 Phase Plots Measured by SASW Testing with 25-ft Receiver Spacing (G1_F_21.DAT)

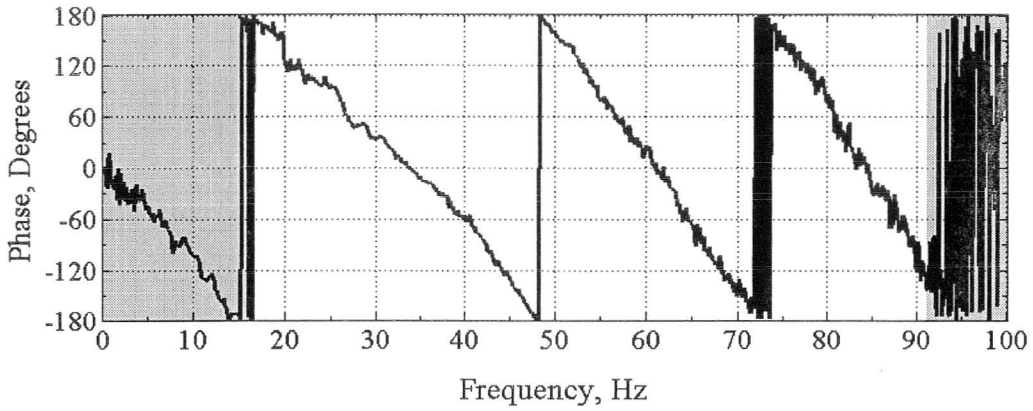

Figure B.19 Phase Plots Measured by SASW Testing with 25-ft Receiver Spacing (G1_F_43.DAT)

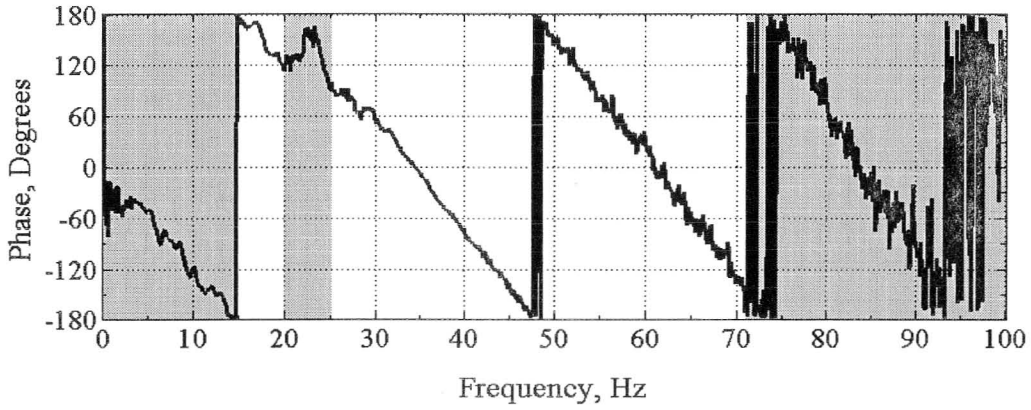

Figure B.20 Phase Plots Measured by SASW Testing with 25-ft Receiver Spacing (G4_F_21.DAT)

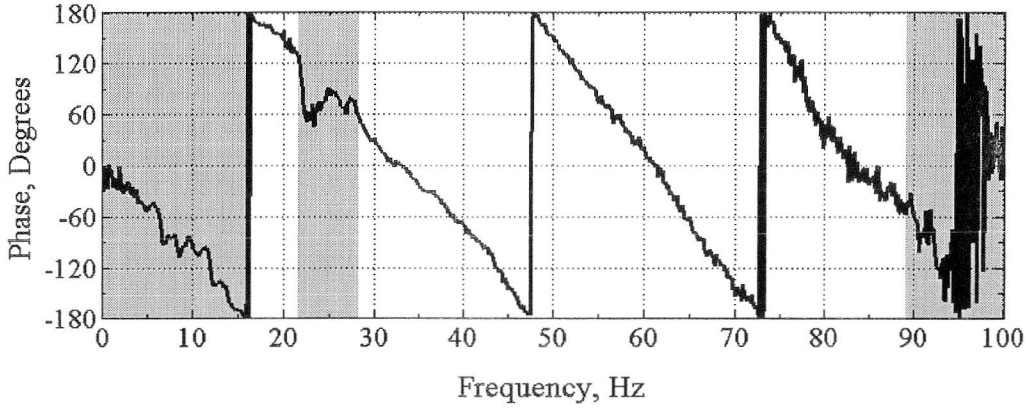

Figure B.21 Phase Plots Measured by SASW Testing with 25-ft Receiver Spacing (G4_F_43.DAT)

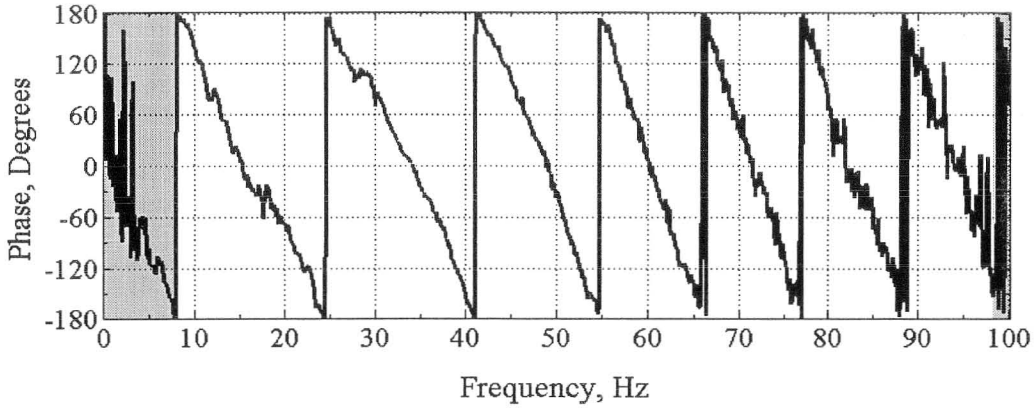

Figure B.22 Phase Plots Measured by SASW Testing with 50-ft Receiver Spacing (G2_F_21.DAT)

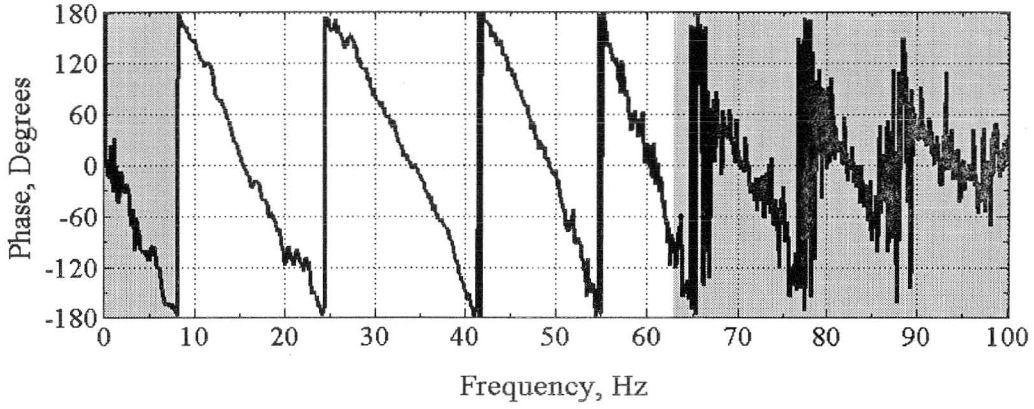

Figure B.23 Phase Plots Measured by SASW Testing with 50-ft Receiver Spacing (G3_F_21.DAT)

Table B.1 Tables of Masking Parameters Used on Data Collected during First Site Visit at Site A

Receiver Spacing (ft)	Masking Interval	Masking Start Frequency, Hz	Masking Stop Frequency, Hz	Number of Jumps	Filename
1	1	0	235	1	SA1_F_21.DAT
	2	671	800	-	
1	1	0	237	1	SA2_F_21.DAT
	2	453	800	-	
1	1	0	286	1	SA9_F_21.DAT
	2	515	800	-	
1	1	0	247	1	SA10_F_2.DAT
	2	576	800	-	
2	1	0	142	1	SA1_F_43.DAT
	2	412	800	-	
2	1	0	136	1	SA2_F_43.DAT
	2	542	800	-	
2	1	0	141	1	SA9_F_43.DAT
	2	495	800	-	
2	1	0	138	1	SA10_F_4.DAT
	2	576	800	-	
3	1	0	95	1	SA4_F_21.DAT
	2	360	800	-	
6	1	0	62	1	SA3_F_43.DAT
	2	229	800	-	
6	1	0	62	1	SA4_F_43.DAT
	2	232	800	-	
9	1	0	38.5	1	SA5_F_21.DAT
	2	168.5	400	-	
9	1	0	53.5	1	SA6_F_21.DAT
	2	167.5	400	-	
9	1	0	39	1	SA7_F_21.DAT
	2	168.5	400	-	
9	1	0	47.5	1	SA8_F_21.DAT
	2	109.5	400	-	
18	1	0	26.5	1	SA7_F_43.DAT
	2	29	31	1	
	3	115	400	-	

Performed by Jiabei Yuan Checked by Yin-Cheng Lin

Table B.2 Tables of Masking Parameters Used on Data Collected during First Site Visit at Site A (Continued)

Receiver Spacing (ft)	Masking Interval	Masking Start Frequency, Hz	Masking Stop Frequency, Hz	Number of Jumps	Filename
18	1	0	26	1	SA8_F_43.DAT
	2	28	35.5	1	
	3	108.5	126.5	4	
	4	200	400	-	
25	1	0	17	1	G1_F_21.DAT
	2	91.5	100	-	
25	1	0	16.62	1	G1_F_43.DAT
	2	90.88	100	-	
25	1	0	14.88	1	G4_F_21.DAT
	2	20	25.12	1	
	3	70.88	100	-	
25	1	0	16.38	1	G4_F_43.DAT
	2	21.62	28.12	1	
	3	88.88	100	-	
50	1	0	8.12	1	G2_F_21.DAT
	2	98	100	-	
50	1	0	8.25	1	G3_F_21.DAT
	2	62.88	100	-	

Performed by Jiabei Yuan Checked by Yin-Cheng Lin

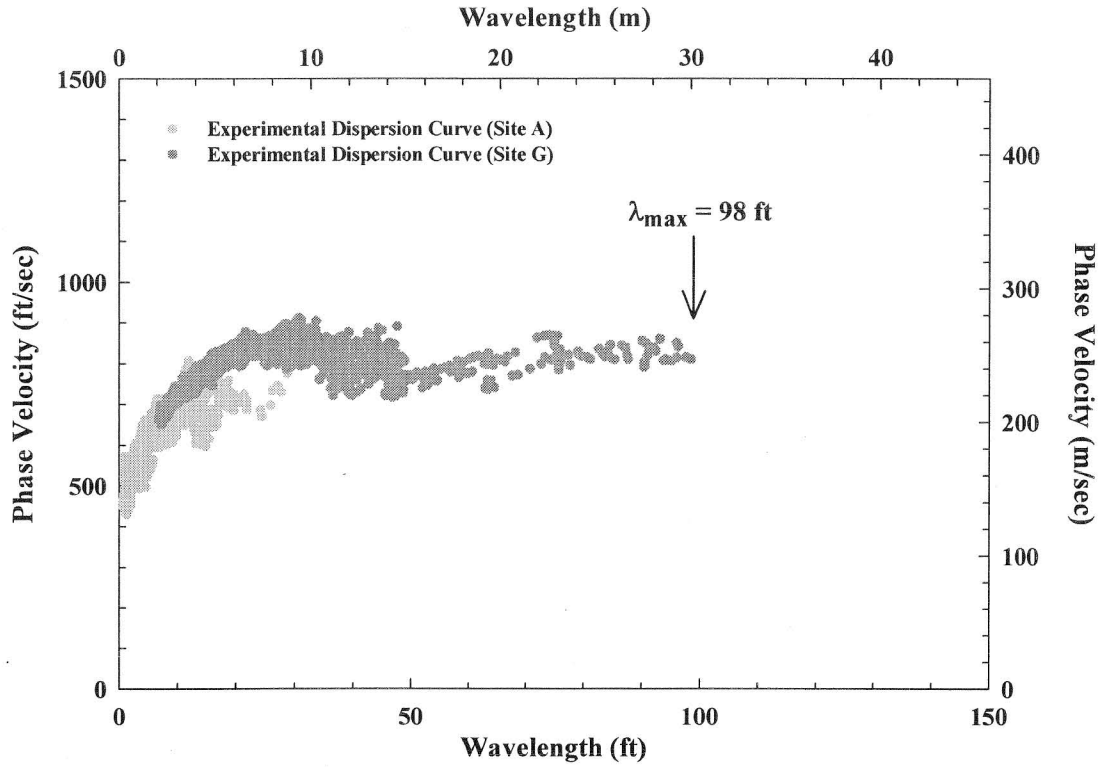

Figure B.24 Experimental Dispersion Curve Measured during First Site Visit at Site A at Vogtle, GA; Linear Wavelength Axis

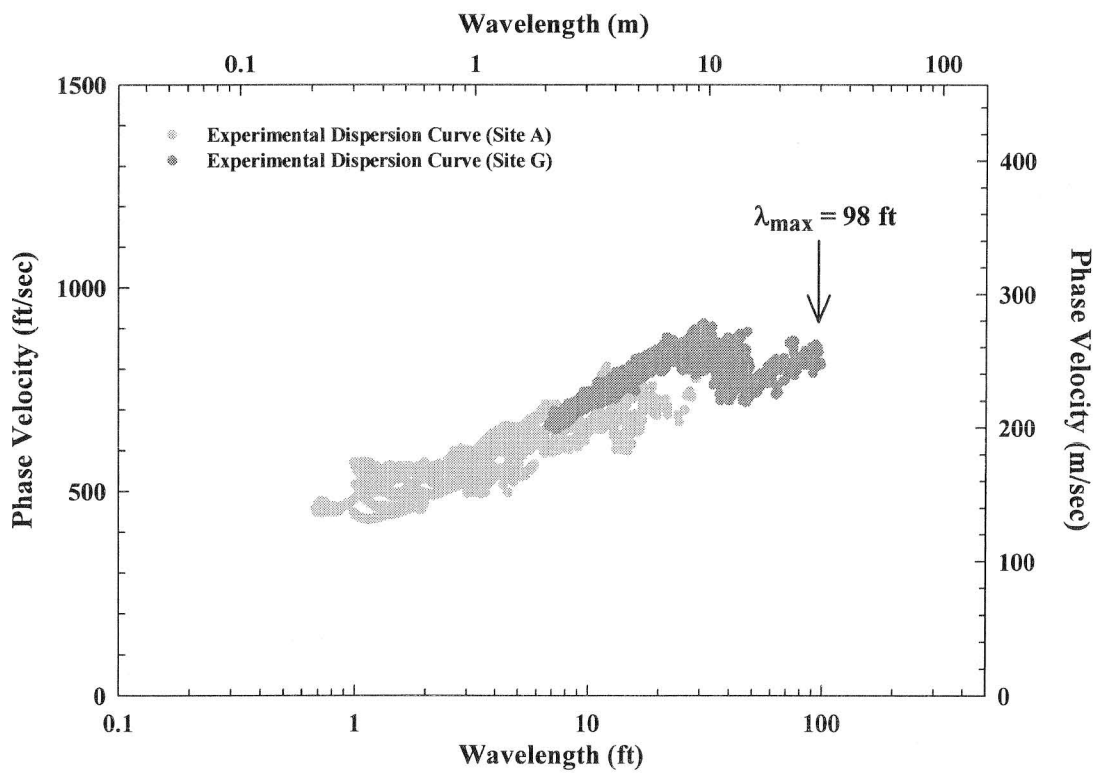

Figure B.25 Experimental Dispersion Curve Measured during First Site Visit at Site A at Vogtle, GA; Logarithmic Wavelength Axis

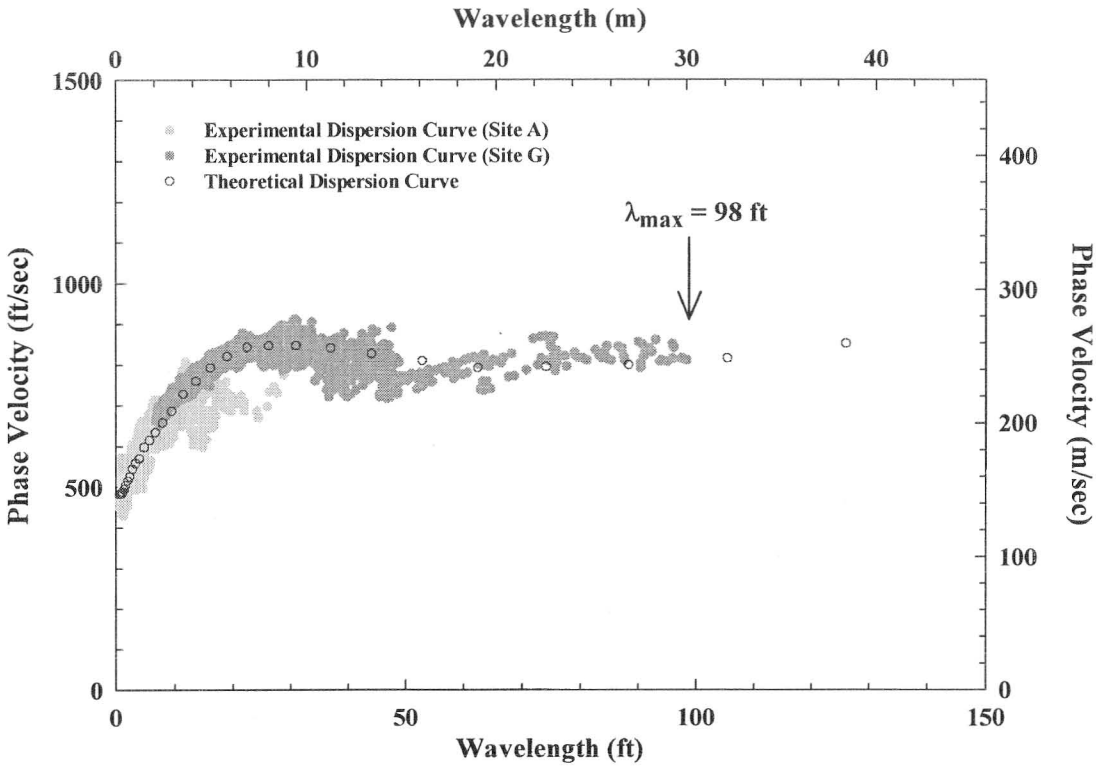

Figure B.26 Experimental and Theoretical Dispersion Curves from Site A in First Site Visit at Vogtle, GA; Linear Wavelength Axis

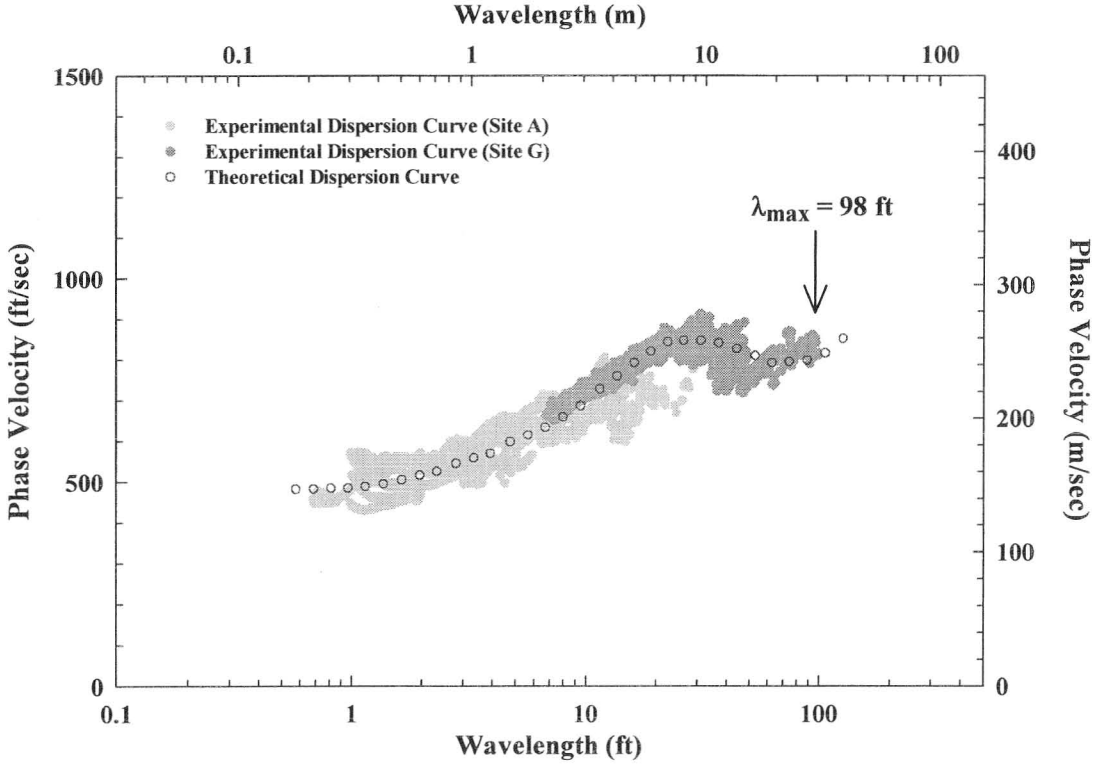

Figure B.27 Experimental and Theoretical Dispersion Curves from Site A in First Site Visit at Vogtle, GA; Logarithmic Wavelength Axis

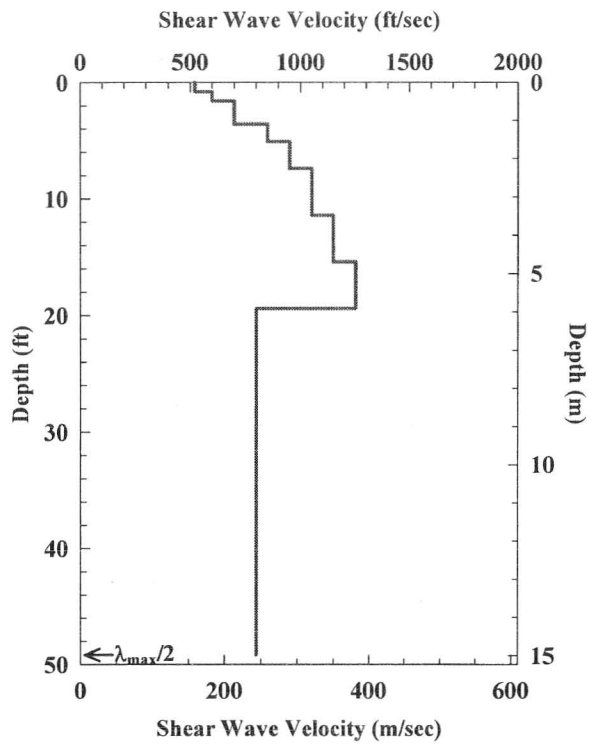

Figure B.28 Shear Wave Velocity Profile Determined at Site A during First Site Visit at Vogtle, GA

Table B.3 Profile Parameters Used to Develop Preliminary Theoretical Dispersion Curve at Site A in the First Site Visit at Vogtle, GA

Layer No.	Thickness, ft	Depth to Top of Layer, ft	S-Wave Velocity, ft/s	Assumed Poisson's Ratio	P-Wave Velocity, ft/s	Assumed Total Unit Weight, pcf
1	0.8	0.0	520	0.24	889	128
2	0.8	0.8	600	0.24	1026	128
3	2.0	1.6	700	0.24	1197	128
4	1.5	3.6	850	0.24	1453	128
5	2.3	5.1	950	0.24	1624	128
6	4.0	7.4	1050	0.24	1795	128
7	4.0	11.4	1150	0.24	1966	128
8	4.0	15.4	1250	0.24	2137	128
9	29.6	19.4	800	0.24	1368	128
10*	16.4	49.0	800	0.24	1368	128
11*#	30.0	65.4	1900	0.42	5000	135
12*#	Half Space	95.4	2200	0.38	5000	135

* Layer below maximum depth of the V_S Profile.

\# Layer below water tatble.

Performed by Yin-Cheng Lin Checked by K. H. Stokoe

Yin-Cheng Lin Kenneth H. Stokoe, II

Appendix C

SASW Measurements of First Site Visit at Vogtle, GA
Site Location: Site B

3 - Receiver SASW Data Sheet

Project : Vogtle

Data Sheet # : SA #2

Location : SB(SA #2)

Disk # : SA # 2

Date/(Time) : Dec / 9 / 2007(: ~ :)

Personnel : Stokoe, Minjae, Yuan

Recorded by : Yuan

Checked by : Minjae

R1 I.D. : GEC 92003 Near

R2 I.D. : GEC 92002 Center

R3 I.D. : GEC 92001 Far

Sketch

same as previous

Distance (ft)			Impact Direction		Impact Source	Record #	Freq. Range (Hz)	Notes
S - R1	R1 - R2	R2 - R3						
1	1	2	(For)	Rev	small hammer	SB1	~	
1	1	2	For	(Rev)	"	SB2	~	
3	3	6	For	(Rev)	"	SB3	0 ~ 800	
3	3	6	(For)	Rev	"	SB4	0 ~ 800	
9	9	18	(For)	Rev	medium hammer	SB5	0 ~ 400	
9	9	18	For	(Rev)	"	SB6	0 ~ 400	
1	1	2	(For)	Rev	small hammer	SB7	0 ~ 800	
1	1	2	For	(Rev)	"	SB8	0 ~ 800	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	
			For	Rev			~	

* Autosequence 3R_SASW saves F_2/1, C_2/1, F_4/3, C_4/3, Lin_1, Lin_2, Lin_4

* Autosequence 3R_SEWPSIN saves F_2/1, Var_2, F_4/3, Var_4, Lin_1, Lin_2, Lin_4

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