

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Depth of Mid. Pt. of Sample	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
No. (ft.)	(pcf)	(tsf)	N <sub>80</sub>	N <sub>60</sub>	N <sub>60</sub>	C <sub>N</sub>	(N <sub>1</sub> ) <sub>60</sub>	D <sub>r</sub>		φ	γ <sub>d</sub>	m	% <sub>w</sub>	e
<b>NOTES:</b>														
C.	This spreadsheet has been designed such that an initial "Assumed Estimated Unit Weight" is placed into Column C.													
E.	N <sub>80</sub> is the blow count per foot as determined in the field using a automatic hammer.													
F.	N <sub>60</sub> = (E <sub>AH</sub> /60) N <sub>AH</sub> , where: E <sub>AH</sub> = autohammer efficiency (80%); N <sub>AH</sub> = blowcount from the autohammer, as referenced in (1)													
	The autohammer efficiency is based on typical values of efficiencies (85 - 95) and actual testing performed on FMSM hammers. SPT Analyzer equipment from Pile Dynamics Inc. was used to conduct the testing. An autohammer is more energy efficient than a standard hammer.													
	Hammer efficiency is a means of comparing the energy transferred from the hammer to the drill string during sampling.													
G.	Correction Factor Based on 1/(square root of vertical effective stress). (Liao, S.C. and Whitman, R.V. 1985.													
	"Overburden Correction Factors for SPT in Sand", JGED, ASCE, Vol. 112, No. 3, pp. 373-377; as referenced in (2).													
	This correction factor is limited to vertical effective stresses greater than 0.25 tsf.													
I.	Relative Density based on Tokimatsu, K. and Seed, H.B. 1988. "Evaluation of Settlements in Sands Due to Earthquake Shaking", JGED, ASCE, Vol. 113, No. 8, pp. 861-878; as referenced in (2).													
J.	Classification based on field and laboratory data by FMSM.													
K, L and O	Angle of Internal Friction (phi), Unit Weight Dry and Void Ratio based on NAVFAC 7.1 "Soil Mechanics", May 1982, page 7.1-149.													
M.	Moisture content based on laboratory testing of SPT samples by FMSM.													
N.	In-situ unit weight is based on dry unit weight (L) times (1 + moisture content).													
(1)	Goble, George, GRL Newsletter, December 1995 "SPT Improvements"													
(2)	Seed and Harder, Volume 2 Memorial Symposium Proceedings, May 1990. "SPT Based Analysis of Cyclic Pore Pressure Generation and Undrained Residual Strength", pp. 361-362.													

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SB-62				Input Required										
		water =	16.6											
0.5 - 2.0	1.25	120	0.08	28	37	1.00	37	87	CH	FALSE	NA	16.0	NA	NA
2.5 - 4.0	3.25	130	0.20	54	72	1.00	72	100	SM	38	108	20.0	130	0.55
5.5 - 7.0	6.25	115	0.38	23	31	1.00	31	79	SM	34.5	102	13.0	115	0.63
7.5 - 9.0	8.25	127	0.50	79	105	1.00	105	100	SM	38	108	18.0	127	0.55
10.5 - 12.0	11.25	124	0.69	98	131	1.00	131	100	SM	38	108	15.0	124	0.55
12.5 - 14.0	13.25	123	0.81	80	107	1.00	107	100	SM	38	108	14.0	123	0.55
15.5 - 17.0	16.25	106	0.97	1	1	1.00	1	11	SM	27.5	89.5	18.0	106	0.87
17.5 - 19.0	18.25	110	1.02	4	5	0.99	5	32	SM	29.5	93	18.0	110	0.8
20.5 - 22.0	21.25	124	1.11	30	40	0.95	38	87	SM	36	105	18.0	124	0.6
22.5 - 24.0	23.25	134	1.18	43	57	0.92	53	98	SM	37	107	25.0	134	0.56
25.5 - 27.0	26.25	134	1.29	20	27	0.88	24	71	SM	34	101	33.0	134	0.65
27.5 - 29.0	28.25	135	1.36	12	16	0.86	14	53	SM	32	97	39.0	135	0.72
30.5 - 32.0	31.25	109	1.43	2	3	0.84	2	18	SM	28	90	21.0	109	0.85
32.5 - 34.0	33.25	117	1.49	4	5	0.82	4	27	SM	29	92	27.0	117	0.82
35.5 - 37.0	36.25	120	1.57	8	11	0.80	9	41	SM	30.5	95	26.0	120	0.76
37.0 - 37.5	37.25	120	1.60	50	67	0.79	53	98	CH	FALSE	NA	27.0	NA	NA

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**CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS**  
**FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required														
SB-63														
		water =	21.0											
0.5 - 2.0	1.25	121	0.08	13	17	1.00	17	60	SM	33	99	22.0	121	0.69
2.5 - 4.0	3.25	122	0.20	27	36	1.00	36	86	SM	36	105	16.0	122	0.6
5.5 - 7.0	6.25	109	0.36	2	3	1.00	3	18	SM	28	90	21.0	109	0.85
10.5 - 12.0	11.25	114	0.64	5	7	1.00	7	35	SM	30	94	21.0	114	0.78
12.5 - 14.0	13.25	112	0.76	48	64	1.00	64	100	SM	38	108	4.0	112	0.55
15.5 - 17.0	16.25	108	0.92	22	29	1.00	29	79	SM	34.5	102	6.0	108	0.73
17.5 - 19.0	18.25	106	1.03	5	7	0.99	7	35	SM	30	94	13.0	106	0.68
20.5 - 22.0	21.25	142	1.15	26	35	0.93	32	82	SM	35.5	104	37.0	142	0.61
22.5 - 24.0	23.25	121	1.20	17	23	0.91	21	67	ML	32.5	91	33.0	121	0.83
25.5 - 27.0	26.25	93	1.25	0	0	0.89	1	11	ML	27	81	15.0	93	1.05
27.5 - 29.0	28.25	106	1.29	0	0	0.88	1	11	ML	27	81	31.0	106	1.05
30.5 - 32.0	31.25	83	1.32	0	0	0.87	1	11	ML	27	81	2.0	83	1.05
32.5 - 34.0	33.25	119	1.38	0	0	0.85	1	11	ML	27	81	47.0	119	1.05
35.5 - 37.0	36.25	115	1.46	1	1	0.83	1	11	ML	27	81	42.0	115	1.05
37.5 - 39.0	38.25	115	1.51	0	0	0.81	1	11	ML	27	81	42.0	115	1.05
40.5 - 42.0	41.25	113	1.59	0	0	0.79	1	11	ML	27	81	39.0	113	1.05
42.5 - 44.0	43.25	104	1.63	0	0	0.78	1	11	ML	27	81	28.0	104	1.05
45.5 - 47.0	46.25	112	1.70	0	0	0.77	1	11	ML	27	81	38.0	112	1.05
47.5 - 49.0	48.25	115	1.76	0	0	0.75	1	11	ML	27	81	42.0	115	1.05
50.5 - 52.0	51.25	118	1.84	7	9	0.74	7	35	ML	29.5	86	37.0	118	0.95
52.5 - 54.0	53.25	120	1.90	30	40	0.73	29	79	CH	FALSE	NA	26.0	NA	NA
55.5 - 57.0	56.25	120	1.98	29	39	0.71	28	77	CH	FALSE	NA	28.0	NA	NA
57.5 - 59.0	58.25	120	2.04	28	37	0.70	26	75	CH	FALSE	NA	27.0	NA	NA

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SB-64														
		water =	20.0											
0.0 - 1.5	0.75	123	0.05	58	77	1.00	77	100	SM	38	108	14.0	123	0.55
1.5 - 3.0	2.25	120	0.14	45	60	1.00	60	100	SM	38	108	11.0	120	0.55
3.0 - 4.5	3.75	120	0.23	10	13	1.00	13	53	CH	FALSE	NA	36.0	NA	NA
4.5 - 6.0	5.25	120	0.32	13	17	1.00	17	60	CH	FALSE	NA	27.0	NA	NA
6.0 - 7.5	6.75	120	0.41	6	8	1.00	8	41	CH	FALSE	NA	28.0	NA	NA
7.5 - 9.0	8.25	120	0.50	9	12	1.00	12	52	CH	FALSE	NA	30.0	NA	NA
9.0 - 10.5	9.75	120	0.59	9	12	1.00	12	52	CH	FALSE	NA	32.0	NA	NA
10.5 - 12.0	11.25	120	0.68	17	23	1.00	23	70	CH	FALSE	NA	29.0	NA	NA
12.0 - 13.5	12.75	120	0.77	9	12	1.00	12	52	CH	FALSE	NA	31.0	NA	NA
13.5 - 15.0	14.25	120	0.86	16	21	1.00	21	68	CH	FALSE	NA	31.0	NA	NA
15.0 - 16.5	15.75	120	0.95	9	12	1.00	12	52	CH	FALSE	NA	32.0	NA	NA
16.5 - 18.0	17.25	115	1.03	18	24	0.98	24	71	ML	33	92	25.0	115	0.82
18.0 - 19.5	18.75	112	1.12	11	15	0.95	14	53	ML	31	88.5	26.0	112	0.89
19.5 - 21.0	20.25	115	1.16	12	16	0.93	15	56	ML	31.5	89.5	29.0	115	0.87
21.0 - 22.5	21.75	120	1.20	12	16	0.91	15	56	CH	FALSE	NA	23.0	NA	NA
22.5 - 24.0	23.25	120	1.24	21	28	0.90	25	74	CH	FALSE	NA	26.0	NA	NA
24.0 - 25.5	24.75	120	1.29	8	11	0.88	9	44	CH	FALSE	NA	31.0	NA	NA
25.5 - 27.0	26.25	120	1.33	14	19	0.87	16	60	CH	FALSE	NA	30.0	NA	NA
27.0 - 28.5	27.75	120	1.37	24	32	0.85	27	77	CH	FALSE	NA	27.0	NA	NA
28.5 - 30.0	29.25	120	1.41	24	32	0.84	27	75	CH	FALSE	NA	27.0	NA	NA
30.0 - 31.5	30.75	120	1.46	21	28	0.83	23	71	CH	FALSE	NA	27.0	NA	NA
31.5 - 33.0	32.25	120	1.50	26	35	0.82	28	77	CH	FALSE	NA	32.0	NA	NA
33.0 - 34.5	33.75	120	1.54	25	33	0.80	27	75	CH	FALSE	NA	28.0	NA	NA
34.5 - 36.0	35.25	120	1.59	31	41	0.79	33	82	CH	FALSE	NA	28.0	NA	NA
36.0 - 37.5	36.75	120	1.63	25	33	0.78	26	75	CH	FALSE	NA	29.0	NA	NA
37.5 - 39.0	38.25	120	1.67	44	59	0.77	45	93	CH	FALSE	NA	26.0	NA	NA
39.0 - 40.5	39.75	120	1.72	26	35	0.76	27	75	CH	FALSE	NA	26.0	NA	NA
40.5 - 42.0	41.25	120	1.76	17	23	0.75	17	60	CH	FALSE	NA	26.0	NA	NA
42.0 - 43.5	42.75	120	1.80	26	35	0.74	26	74	CH	FALSE	NA	25.0	NA	NA
43.5 - 45.0	44.25	120	1.85	28	37	0.74	28	77	CH	FALSE	NA	29.0	NA	NA
45.0 - 46.5	45.75	120	1.89	18	24	0.73	18	60	CH	FALSE	NA	30.0	NA	NA
46.5 - 48.0	47.25	120	1.93	17	23	0.72	16	60	CH	FALSE	NA	34.0	NA	NA
48.0 - 49.5	48.75	120	1.98	21	28	0.71	20	65	CH	FALSE	NA	29.0	NA	NA
49.5 - 51.0	50.25	120	2.02	15	20	0.70	14	58	CH	FALSE	NA	25.0	NA	NA
51.0 - 52.5	51.75	120	2.06	23	31	0.70	21	68	CH	FALSE	NA	24.0	NA	NA
52.5 - 54.0	53.25	120	2.11	16	21	0.69	15	56	CH	FALSE	NA	19.0	NA	NA
54.0 - 55.5	54.75	120	2.15	11	15	0.68	10	47	CH	FALSE	NA	22.0	NA	NA
55.5 - 57.0	56.25	120	2.19	19	25	0.68	17	60	CH	FALSE	NA	28.0	NA	NA
57.0 - 58.5	57.75	120	2.24		0	0.67	1	11	CH	FALSE	NA	22.0	NA	NA

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				Input Required										
				water =										
SB-65	0.5 - 2.0	127	0.08	68	91	1.00	91	100	SM	38	108	18.0	127	0.55
	2.5 - 4.0	126	0.21	44	59	1.00	59	100	SM	38	108	17.0	126	0.55
	5.5 - 7.0	127	0.40	43	57	1.00	57	100	SM	38	108	18.0	127	0.55
	7.5 - 9.0	147	0.54	31	41	1.00	41	91	SM	36.5	106	39.0	147	0.58
	10.0 - 12.0	120	0.71	ST	NA	1.00	NA	NA	SM	#N/A	#N/A	17.0	#N/A	#N/A
	12.5 - 14.0	132	0.86	92	123	1.00	123	100	SM	38	108	22.0	132	0.55
	15.5 - 17.0	120	1.04	31	41	0.98	41	89	SM	36	105	14.0	120	0.6
	17.5 - 19.0	122	1.16	25	33	0.93	31	81	SM	35.5	104	17.0	122	0.61
	20.0 - 22.0	120	1.32	ST	NA	0.87	NA	NA	SM	#N/A	#N/A	17.0	#N/A	#N/A
	22.5 - 24.0	107	1.37	1	1	0.85	1	11	SM	27.5	89.5	19.0	107	0.87
	25.5 - 27.0	109	1.44	3	4	0.83	3	24	SM	28.5	91	20.0	109	0.83
	27.5 - 29.0	105	1.49	2	3	0.82	2	18	SM	28	90	17.0	105	0.85
	30.5 - 32.0	109	1.56	0	0	0.80	1	11	SM	27.5	89.5	22.0	109	0.87
	32.0 - 34.0	120	1.61	ST	NA	0.79	NA	NA	SM	#N/A	#N/A	21.0	#N/A	#N/A
	35.5 - 37.0	124	1.71	0	0	0.77	1	11	SM	27.5	89.5	38.0	124	0.87
	37.5 - 39.0	137	1.78	0	0	0.75	1	11	SM	27.5	89.5	53.0	137	0.87
	40.5 - 42.0	163	1.93	0	0	0.72	1	11	SM	27.5	89.5	82.0	163	0.87
	42.5 - 44.0	161	2.03	0	0	0.70	1	11	SM	27.5	89.5	80.0	161	0.87
	45.0 - 47.0	120	2.11	ST	NA	0.69	NA	NA	SM	#N/A	#N/A	69.0	#N/A	#N/A
	47.5 - 49.0	159	2.22	9	12	0.67	8	41	SM	30.5	95	67.0	159	0.76
	50.5 - 52.0	128	2.32	12	16	0.66	11	47	SM	31	96	33.0	128	0.74
	52.5 - 54.0	120	2.37	29	39	0.65	25	74	CH	FALSE	NA	35.0	NA	NA
	55.5 - 57.0	120	2.46	30	40	0.64	26	74	CH	FALSE	NA	26.0	NA	NA
	57.5 - 59.0	120	2.52	31	41	0.63	26	75	CH	FALSE	NA	28.0	NA	NA









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															N <sub>80</sub>
				Input Required											
SB-67		water =	15.5												
0.0 - 1.5	0.75	119	0.04	21	28	1.00	28	77	SM	34.5	102	17.0	119	0.63	
1.5 - 3.0	2.25	123	0.14	20	27	1.00	27	75	SM	34.5	102	21.0	123	0.63	
3.0 - 4.5	3.75	140	0.24	20	27	1.00	27	75	SM	34.5	102	37.0	140	0.63	
4.5 - 6.0	5.25	120	0.33	11	15	1.00	15	56	SM	32.5	98	22.0	120	0.7	
6.0 - 7.5	6.75	134	0.43	17	23	1.00	23	70	SM	34	101	33.0	134	0.65	
7.5 - 9.0	8.25	126	0.53	16	21	1.00	21	68	SM	33.5	100	26.0	126	0.67	
9.0 - 10.5	9.75	125	0.62	6	8	1.00	8	41	SM	30.5	95	32.0	125	0.76	
10.5 - 12.0	11.25	135	0.72	46	61	1.00	61	100	ML	36	98	38.0	135	0.7	
12.0 - 13.5	12.75	129	0.82	43	57	1.00	57	100	ML	36	98	32.0	129	0.7	
13.5 - 15.0	14.25	143	0.93	23	31	1.00	31	79	SP-SM	36	110	30.0	143	0.52	
15.0 - 16.5	15.75	120	0.97	15	20	1.00	20	67	CH	FALSE	NA	17.0	NA	NA	
16.5 - 18.0	17.25	120	1.01	11	15	0.99	15	56	CH	FALSE	NA	17.0	NA	NA	
18.0 - 19.5	18.75	120	1.06	15	20	0.97	20	65	ML	32.5	91	32.0	120	0.83	
19.5 - 21.0	20.25	116	1.10	0	0	0.95	1	11	ML	27	81	43.0	116	1.05	
21.0 - 22.5	21.75	113	1.13	0	0	0.94	1	11	ML	27	81	39.0	113	1.05	
22.5 - 24.0	22.75	112	1.26	0	0	0.89	1	11	ML	27	81	38.0	112	1.05	
24.0 - 25.5	24.75	115	1.30	0	0	0.88	1	11	ML	27	81	42.0	115	1.05	
25.5 - 27.0	26.75	109	1.33	0	0	0.87	1	11	ML	27	81	35.0	109	1.05	
27.0 - 28.5	27.75	114	1.37	0	0	0.85	1	11	ML	27	81	41.0	114	1.05	
28.5 - 30.0	29.75	115	1.41	8	11	0.84	9	44	ML	30	87	32.0	115	0.93	
30.0 - 31.5	30.75	120	1.45	2	3	0.83	2	18	ML	27.5	82	46.0	120	1.03	
31.5 - 33.0	31.75	126	1.50	9	12	0.82	10	44	ML	30	87	45.0	126	0.93	
33.0 - 34.5	32.75	120	1.54	9	12	0.80	10	44	CH	FALSE	NA	NA	NA	NA	
34.5 - 36.0	33.75	120	1.59	ST	NA	0.79	NA	NA	SM	#N/A	#N/A	23.0	NA	NA	
36.0 - 37.5	34.75	120	1.59	3	4	0.78	3	24	SM	28.5	91	22.0	111	#N/A	
37.5 - 39.0	35.75	120	1.64	10	13	0.77	10	47	CH	FALSE	NA	24.0	NA	0.83	
39.0 - 40.5	36.75	123	1.68	3	4	0.76	3	24	SP-SM	29	99	24.0	123	NA	
40.5 - 42.0	37.75	120	1.73	3	4	0.75	3	24	SP-SM	29	99	21.0	120	0.69	
42.0 - 43.5	38.75	123	1.77	3	4	0.74	3	24	SP-SM	29	99	24.0	123	0.69	
43.5 - 45.0	39.75	120	1.81	16	21	0.73	16	58	CH	FALSE	NA	17.0	NA	NA	
45.0 - 46.5	40.75	120	1.86	20	27	0.73	19	65	CH	FALSE	NA	23.0	NA	NA	
46.5 - 48.0	41.75	120	1.90	23	31	0.72	22	70	CH	FALSE	NA	21.0	NA	NA	
48.0 - 49.5	42.75	120	1.94	29	39	0.71	27	77	CH	FALSE	NA	21.0	NA	NA	
49.5 - 51.0	43.75	120	1.99	29	39	0.71	27	77	CH	FALSE	NA	21.0	NA	NA	
51.0 - 52.5	44.75	120	1.99	29	39	0.71	27	77	CH	FALSE	NA	21.0	NA	NA	
52.5 - 54.0	45.75	120	1.99	29	39	0.71	27	77	CH	FALSE	NA	21.0	NA	NA	



TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>60</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required														
SB-71														
		water =	32.5											
5.0 - 6.5	5.75	120	0.35	12	16	1.00	16	60	CH	FALSE	NA	23.0	NA	NA
10.0 - 11.5	10.75	120	0.65	7	9	1.00	9	44	CH	FALSE	NA	22.0	NA	NA
15.0 - 16.5	15.75	120	0.95	8	11	1.00	11	47	CH	FALSE	NA	32.0	NA	NA
16.5 - 18.0	17.25	120	1.04	17	23	0.98	22	70	CH	FALSE	NA	26.0	NA	NA
18.0 - 19.5	18.75	120	1.13	22	29	0.94	28	77	CH	FALSE	NA	19.0	NA	NA
19.5 - 21.0	20.25	120	1.22	15	20	0.91	18	63	CH	FALSE	NA	19.0	NA	NA
21.0 - 22.5	21.75	120	1.31	12	16	0.88	14	56	CH	FALSE	NA	19.0	NA	NA
22.5 - 24.0	23.25	120	1.40	14	19	0.85	16	58	CH	FALSE	NA	23.0	NA	NA
24.0 - 25.5	24.75	120	1.49	23	31	0.82	25	74	CH	FALSE	NA	18.0	NA	NA
25.5 - 27.0	26.25	120	1.58	17	23	0.80	18	63	CH	FALSE	NA	19.0	NA	NA
27.0 - 28.5	27.75	120	1.67	40	53	0.77	41	91	CH	FALSE	NA	16.0	NA	NA
28.5 - 30.0	29.25	120	1.76	34	45	0.75	34	84	CH	FALSE	NA	13.0	NA	NA
30.0 - 32.0	31	120	1.86	ST	NA	0.73	NA	NA	CH	NA	NA	17.0	NA	NA
32.0 - 33.5	32.75	120	1.91	14	19	0.72	14	53	CH	FALSE	NA	24.0	NA	NA
33.5 - 35.0	34.25	120	1.95	10	13	0.72	10	44	CH	FALSE	NA	26.0	NA	NA
35.0 - 36.5	35.75	120	2.00	8	11	0.71	8	41	CH	FALSE	NA	19.0	NA	NA
36.5 - 38.0	37.25	120	2.04	14	19	0.70	13	53	CH	FALSE	NA	18.0	NA	NA
38.0 - 39.5	38.75	120	2.08	22	29	0.69	20	67	CH	FALSE	NA	20.0	NA	NA
39.5 - 41.5	40.5	120	2.13	ST	NA	0.68	NA	NA	CH	NA	NA	18.0	NA	NA
41.5 - 43.0	42.25	120	2.18	30	40	0.68	27	77	CH	FALSE	NA	18.0	NA	NA



TVA - Widows Creek Main Ash Pond													
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS													
FOR COARSE GRAINED SOILS													
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised
													In-situ Unit Weight (pcf)
				N <sub>60</sub>	N <sub>60</sub>	CN	(N <sub>160</sub> )	Dr		$\phi'$	$\gamma_d$	m	$\gamma_w$
				Input Required									
SB-73													
0.0 - 1.5	0.75	119	10.5	19	25	1.00	25	74	SC	34	101	18.0	119
1.5 - 3.0	2.25	119	0.04	17	23	1.00	23	70	SC	34	101	18.0	119
3.0 - 4.5	3.75	115	0.13	9	12	1.00	12	52	SC	32	97	19.0	115
4.5 - 6.0	5.25	116	0.22	11	15	1.00	15	56	SC	32.5	98	18.0	116
6.0 - 7.5	6.75	120	0.31	32	43	1.00	43	91	SC	36.5	106	13.0	120
7.5 - 9.0	8.25	126	0.40	32	43	1.00	43	91	SC	36.5	106	19.0	126
9.0 - 10.5	9.75	118	0.49	11	15	1.00	15	56	SC	32.5	98	20.0	118
10.5 - 11.0	10.75	120	0.61	100	133	1.00	133	100	Limestone	FALSE	NA	25.0	NA

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required														
SB-74														
		water =	17.5											
0.0 - 1.5	0.75	120	0.05	11	15	1.00	15	56	CH	FALSE	NA	23.0	NA	NA
1.5 - 3.0	2.25	120	0.14	12	16	1.00	16	60	CH	FALSE	NA	26.0	NA	NA
3.0 - 4.5	3.75	120	0.23	15	20	1.00	20	67	CH	FALSE	NA	28.0	NA	NA
4.5 - 6.0	5.25	120	0.32	12	16	1.00	16	60	CH	FALSE	NA	22.0	NA	NA
6.0 - 7.5	6.75	120	0.41	26	35	1.00	35	84	CH	FALSE	NA	23.0	NA	NA
7.5 - 9.0	8.25	120	0.50	33	44	1.00	44	93	CH	FALSE	NA	27.0	NA	NA
9.0 - 11.0	10	120	0.60	ST	NA	1.00	NA	NA	CH	NA	NA	27.0	NA	NA
11.0 - 12.5	11.75	120	0.71	7	9	1.00	9	44	CH	FALSE	NA	27.0	NA	NA
12.5 - 14.0	13.25	120	0.80	25	33	1.00	33	84	CH	FALSE	NA	25.0	NA	NA
14.0 - 15.5	14.75	120	0.89	19	25	1.00	25	74	CH	FALSE	NA	23.0	NA	NA
15.5 - 17.0	16.25	130	0.98	34	45	1.00	45	93	SM	36.5	106	23.0	130	0.58
17.0 - 18.5	17.75	127	1.03	13	17	0.98	17	60	SM	33	99	28.0	127	0.69
18.5 - 20.0	19.25	115	1.07	2	3	0.97	3	18	SM	28	90	28.0	115	0.85
20.0 - 21.5	20.75	115	1.11	0	0	0.95	1	11	SM	27.5	89.5	29.0	115	0.87
21.5 - 23.0	22.25	133	1.16	14	19	0.93	17	60	SM	33	99	34.0	133	0.69
23.0 - 24.5	23.75	120	1.21	13	17	0.91	16	58	CH	FALSE	NA	24.0	NA	NA
24.5 - 26.5	25.5	120	1.26	ST	NA	0.89	NA	NA	CH	NA	NA	18.0	NA	NA
26.5 - 28.0	27.25	120	1.31	9	12	0.87	11	47	CH	FALSE	NA	20.0	NA	NA
28.0 - 29.5	28.75	120	1.35	10	13	0.86	12	47	CH	FALSE	NA	26.0	NA	NA
29.5 - 31.0	30.25	120	1.39	10	13	0.85	11	47	CH	FALSE	NA	22.0	NA	NA
31.0 - 32.5	31.75	120	1.44	19	25	0.83	21	68	CH	FALSE	NA	23.0	NA	NA
32.5 - 34.0	33.25	120	1.48	29	39	0.82	32	81	CH	FALSE	NA	20.0	NA	NA
34.0 - 35.5	34.75	120	1.52	19	25	0.81	21	67	CH	FALSE	NA	21.0	NA	NA
35.5 - 37.0	36.25	120	1.57	11	15	0.80	12	47	CH	FALSE	NA	35.0	NA	NA
40.0 - 42.0	41	120	1.70	ST	NA	0.77	NA	NA	CH	NA	NA	19.0	NA	NA
45.0 - 46.5	45.75	120	1.84	16	21	0.74	16	58	CH	FALSE	NA	22.0	NA	NA
50.0 - 51.5	50.75	120	1.98	26	35	0.71	25	73	CH	FALSE	NA	24.0	NA	NA

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>1</sub> ) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
SB-75														
		water =												
0.0 - 1.5	0.75	117	50.8	6	8	1.00	8	41	SP-SM	31.5	103	14.0	117	0.62
1.5 - 3.0	2.25	120	0.04	20	27	1.00	27	75	CH	FALSE	NA	26.0	NA	NA
3.0 - 4.5	3.75	120	0.13	29	39	1.00	39	87	CH	FALSE	NA	28.0	NA	NA
4.5 - 6.0	5.25	120	0.22	14	19	1.00	19	63	CH	FALSE	NA	28.0	NA	NA
6.0 - 7.5	6.75	120	0.31	18	24	1.00	24	73	CH	FALSE	NA	28.0	NA	NA
7.5 - 9.0	8.25	120	0.40	16	21	1.00	21	68	CH	FALSE	NA	26.0	NA	NA
9.0 - 10.5	9.75	120	0.49	9	12	1.00	12	52	CH	FALSE	NA	25.0	NA	NA
10.5 - 12.0	11.25	120	0.58	9	12	1.00	12	52	CH	FALSE	NA	30.0	NA	NA
12.0 - 13.5	12.75	120	0.67	28	37	1.00	37	87	CH	FALSE	NA	21.0	NA	NA
13.5 - 15.0	14.25	120	0.76	30	40	1.00	40	89	CH	FALSE	NA	25.0	NA	NA
15.0 - 16.5	15.75	120	0.85	8	11	1.00	11	47	CH	FALSE	NA	18.0	NA	NA
16.5 - 18.0	17.25	126	0.94	100	133	0.98	131	100	SC	38	108	17.0	126	0.55
18.0 - 19.5	18.75	125	1.04	100	133	0.94	125	100	SC	38	108	16.0	125	0.55
19.5 - 21.0	20.25	119	1.13	25	33	0.90	30	79	SC	34.5	102	17.0	119	0.63
21.0 - 22.5	21.75	125	1.22	28	37	0.87	33	82	SC	35.5	104	20.0	125	0.61
22.5 - 24.0	23.25	121	1.32	23	31	0.84	26	74	SC	34	101	20.0	121	0.65
24.0 - 25.5	24.75	125	1.41	10	13	0.82	11	47	SC	31	96	30.0	125	0.74
25.5 - 27.5	26.5	120	1.50	ST	NA	0.79	NA	NA	SC	#N/A	#N/A	14.0	#N/A	#N/A
27.5 - 29.0	28.25	120	1.61	13	17	0.76	13	53	CH	FALSE	NA	18.0	NA	NA
29.0 - 30.5	29.75	120	1.71	19	25	0.75	19	63	CH	FALSE	NA	20.0	NA	NA
30.5 - 32.0	31.25	120	1.80	13	17	0.73	13	52	CH	FALSE	NA	17.0	NA	NA
32.0 - 33.5	32.75	120	1.89	23	31	0.71	22	68	CH	FALSE	NA	17.0	NA	NA
33.5 - 35.0	34.25	120	1.98	20	27	0.69	19	63	CH	FALSE	NA	16.0	NA	NA
35.0 - 37.0	36	120	2.07	ST	NA	0.68	NA	NA	CH	NA	NA	18.0	NA	NA
37.0 - 38.5	37.75	120	2.18	16	21	0.66	14	56	CH	FALSE	NA	21.0	NA	NA
38.5 - 40.0	39.25	120	2.28	15	20	0.65	13	53	CH	FALSE	NA	20.0	NA	NA
40.0 - 41.5	40.75	120	2.37	14	19	0.64	12	47	CH	FALSE	NA	20.0	NA	NA
41.5 - 43.0	42.25	120	2.46	18	24	0.63	15	58	CH	FALSE	NA	18.0	NA	NA
43.0 - 44.5	43.75	120	2.55	21	28	0.62	17	60	CH	FALSE	NA	19.0	NA	NA
44.5 - 46.0	45.25	120	2.64	14	19	0.61	11	47	CH	FALSE	NA	19.0	NA	NA
46.0 - 47.5	46.75	120	2.73	8	11	0.60	6	35	CH	FALSE	NA	20.0	NA	NA
47.5 - 49.0	48.25	120	2.82	13	17	0.59	10	47	CH	FALSE	NA	20.0	NA	NA
49.0 - 50.5	49.75	120	2.91	15	20	0.58	12	47	CH	FALSE	NA	22.0	NA	NA
50.5 - 52.0	51.25	120	3.00	11	15	0.57	8	41	CH	FALSE	NA	18.0	NA	NA
52.0 - 53.5	52.75	120	3.04	28	37	0.57	21	68	Limestone	FALSE	NA	23.0	NA	NA
53.5 - 55.0	54.25	120	3.09	68	91	0.57	51	98	Limestone	FALSE	NA	23.0	NA	NA
			3.13											

**TVA - Widows Creek Main Ash Pond**  
**CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS**  
**FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required															
SB-76		water =	37.5												
0.0	1.5	120	0.05	4	5	1.00	5	32		CH	FALSE	NA	29.0	NA	NA
1.5	3.0	120	0.14	12	16	1.00	16	60		CH	FALSE	NA	17.0	NA	NA
3.0	4.5	120	0.23	16	21	1.00	21	68		CH	FALSE	NA	17.0	NA	NA
4.5	6.0	120	0.32	11	15	1.00	15	56		CH	FALSE	NA	21.0	NA	NA
6.0	7.5	120	0.41	19	25	1.00	25	74		CL	FALSE	NA	14.0	NA	NA
7.5	9.0	120	0.50	29	39	1.00	39	87		CL	FALSE	NA	16.0	NA	NA
9.0	10.5	120	0.59	10	13	1.00	13	53		CL	FALSE	NA	19.0	NA	NA
10.5	12.0	120	0.68	18	24	1.00	24	73		CL	FALSE	NA	16.0	NA	NA
12.0	13.5	120	0.77	35	47	1.00	47	95		CL	FALSE	NA	14.0	NA	NA
13.5	15.0	120	0.86	14	19	1.00	19	63		CL	FALSE	NA	20.0	NA	NA
15.0	16.5	120	0.95	12	16	1.00	16	60		CL	FALSE	NA	16.0	NA	NA
16.5	18.0	120	1.04	22	29	0.98	29	77		CL	FALSE	NA	16.0	NA	NA
18.0	19.5	120	1.13	25	33	0.94	31	81		CL	FALSE	NA	18.0	NA	NA
19.5	21.0	120	1.22	17	23	0.91	21	67		CL	FALSE	NA	20.0	NA	NA
21.0	22.5	120	1.31	22	29	0.88	26	74		CL	FALSE	NA	19.0	NA	NA
22.5	24.0	120	1.40	21	28	0.85	24	71		CL	FALSE	NA	20.0	NA	NA
24.0	25.5	120	1.49	17	23	0.82	19	63		CL	FALSE	NA	20.0	NA	NA
25.5	27.0	120	1.59	27	36	0.79	29	77		CL	FALSE	NA	14.0	NA	NA
27.0	28.5	120	1.67	39	52	0.77	40	89		CL	FALSE	NA	16.0	NA	NA
28.5	30.0	120	1.76	42	56	0.75	42	91		CL	FALSE	NA	18.0	NA	NA
30.0	31.5	120	1.85	38	51	0.74	37	87		CL	FALSE	NA	20.0	NA	NA
31.5	33.0	120	1.94	16	21	0.72	15	58		CL	FALSE	NA	18.0	NA	NA
33.0	34.5	120	2.03	30	40	0.70	28	77		CL	FALSE	NA	20.0	NA	NA
34.5	37.0	120	2.15	11	15	0.68	10	47		CL	FALSE	NA	17.0	NA	NA
36.0	37.5	120	2.21	13	17	0.67	12	47		CL	FALSE	NA	20.0	NA	NA
37.5	39.0	0	2.16	16	21	0.68	15	56		GP	35.3	0	19.0	0	121
39.0	40.5	0	2.11	13	17	0.69	12	47		GP	34	0	14.0	0	119
40.5	42.0	120	2.15	12	16	0.68	11	47		CL	FALSE	NA	19.0	NA	NA
42.0	43.5	120	2.20	7	9	0.67	6	35		CL	FALSE	NA	50.0	NA	NA
43.5	44.5	120	2.24	3	4	0.67	3	18		CL	FALSE	NA	46.0	NA	NA
45.0	46.5	120	2.28	12	16	0.66	11	47		CL	FALSE	NA	40.0	NA	NA
46.5	48.0	120	2.33	5	7	0.66	4	27		CL	FALSE	NA	37.0	NA	NA
48.0	49.5	120	2.37	100	133	0.65	87	100		Limestone	FALSE	NA	42.0	NA	NA



TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
SB-77				Input Required										
		water =	23.0											
0.0	1.5	120	0.05	20	27	1.00	27	75	CH	FALSE	NA	21.0	NA	NA
1.5	3.0	120	0.14	25	33	1.00	33	84	CH	FALSE	NA	25.0	NA	NA
3.0	4.5	120	0.23	24	32	1.00	32	82	CH	FALSE	NA	25.0	NA	NA
4.5	6.0	120	0.32	13	17	1.00	17	60	CH	FALSE	NA	23.0	NA	NA
6.0	7.5	120	0.41	17	23	1.00	23	70	CH	FALSE	NA	26.0	NA	NA
7.5	9.0	120	0.50	18	24	1.00	24	73	CH	FALSE	NA	28.0	NA	NA
9.0	10.5	120	0.59	15	20	1.00	20	67	CH	FALSE	NA	29.0	NA	NA
10.5	12.0	120	0.68	18	24	1.00	24	73	CH	FALSE	NA	31.0	NA	NA
12.0	13.5	120	0.77	23	31	1.00	31	79	CH	FALSE	NA	26.0	NA	NA
13.5	15.0	120	0.86	28	37	1.00	37	87	CH	FALSE	NA	27.0	NA	NA
15.0	16.5	120	0.95	11	15	1.00	15	56	CH	FALSE	NA	24.0	NA	NA
16.5	18.0	120	1.04	100	133	0.98	131	100	CH	FALSE	NA	26.0	NA	NA
18.0	19.5	119	1.12	63	84	0.94	79	100	ML	36	98	21.0	119	0.7
19.5	21.0	120	1.21	60	80	0.91	73	100	CH	FALSE	NA	23.0	NA	NA
21.0	23.0	120	1.32	ST	NA	0.87	NA	NA	ML	#N/A	#N/A	23.0	#N/A	#N/A
23.0	24.5	106	1.36	6	8	0.86	7	35	ML	29.5	86	23.0	106	0.95
24.5	26.0	119	1.40	10	13	0.85	11	47	ML	30.5	88	35.0	119	0.91
26.0	27.5	120	1.44	10	13	0.83	11	47	CH	FALSE	NA	19.0	NA	NA
27.5	29.0	120	1.49	15	20	0.82	16	60	CH	FALSE	NA	20.0	NA	NA
29.0	30.5	120	1.53	14	19	0.81	15	58	CH	FALSE	NA	24.0	NA	NA
30.5	32.0	120	1.57	13	17	0.80	14	53	CH	FALSE	NA	21.0	NA	NA
32.0	33.5	120	1.62	10	13	0.79	11	47	CH	FALSE	NA	24.0	NA	NA
33.5	35.0	120	1.66	11	15	0.78	11	47	CH	FALSE	NA	18.0	NA	NA
35.0	37.0	120	1.71	8	11	0.76	8	41	CH	FALSE	NA	24.0	NA	NA
36.5	38.0	120	1.74	16	21	0.76	16	60	CH	FALSE	NA	20.0	NA	NA
38.0	40.0	120	1.80	ST	NA	0.75	NA	NA	CH	NA	NA	21.0	NA	NA
43.5	45.0	120	1.95	7	9	0.72	7	35	CH	FALSE	NA	23.0	NA	NA
48.5	50.0	120	2.09	33	44	0.69	30	79	CH	FALSE	NA	19.0	NA	NA
50.0	51.5	120	2.13	32	43	0.68	29	79	Limestone	FALSE	NA	21.0	NA	NA



TVA - Widows Creek Main Ash Pond															
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS															
FOR COARSE GRAINED SOILS															
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT		Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio	
				N Value	N <sub>60</sub>										Dr
Input Required															
		water =													
SB-79			27.5												
0.0	1.5	120	0.05	16	21	1.00	21	68	CH	FALSE	NA	17.0	NA	NA	NA
1.5	3.0	120	0.14	26	35	1.00	35	84	CH	FALSE	NA	18.0	NA	NA	NA
3.0	4.5	120	0.23	11	15	1.00	15	56	CH	FALSE	NA	16.0	NA	NA	NA
4.5	6.0	120	0.32	15	20	1.00	20	67	CH	FALSE	NA	25.0	NA	NA	NA
6.0	7.5	120	0.41	10	13	1.00	13	53	CH	FALSE	NA	21.0	NA	NA	NA
7.5	9.0	120	0.50	21	28	1.00	28	77	CH	FALSE	NA	23.0	NA	NA	NA
9.0	10.5	120	0.59	12	16	1.00	16	60	CH	FALSE	NA	17.0	NA	NA	NA
10.5	12.0	120	0.68	23	31	1.00	31	79	CH	FALSE	NA	19.0	NA	NA	NA
12.0	13.5	120	0.77	25	33	1.00	33	84	CH	FALSE	NA	18.0	NA	NA	NA
13.5	15.0	120	0.86	25	33	1.00	33	84	CH	FALSE	NA	19.0	NA	NA	NA
15.0	17.0	120	0.96	ST	NA	1.00	NA	NA	CH	NA	NA	17.0	NA	NA	NA
17.0	18.5	120	1.07	18	24	0.97	23	71	CH	FALSE	NA	19.0	NA	NA	NA
18.5	20.0	120	1.16	28	37	0.93	35	84	CH	FALSE	NA	21.0	NA	NA	NA
20.0	21.5	120	1.25	15	20	0.90	18	60	CH	FALSE	NA	19.0	NA	NA	NA
21.5	23.0	120	1.34	26	35	0.87	30	79	CH	FALSE	NA	20.0	NA	NA	NA
23.0	24.5	120	1.43	22	29	0.84	25	73	CH	FALSE	NA	21.0	NA	NA	NA
24.5	26.0	120	1.52	22	29	0.81	24	71	CH	FALSE	NA	24.0	NA	NA	NA
26.0	27.5	120	1.61	21	28	0.79	22	70	CH	FALSE	NA	29.0	NA	NA	NA
27.5	29.0	120	1.65	20	27	0.78	21	67	CH	FALSE	NA	31.0	NA	NA	NA
29.0	30.5	120	1.69	13	17	0.77	13	53	CH	FALSE	NA	32.0	NA	NA	NA
30.5	32.0	120	1.73	16	21	0.76	16	60	CH	FALSE	NA	33.0	NA	NA	NA
32.0	33.5	120	1.78	16	21	0.75	16	60	CH	FALSE	NA	41.0	NA	NA	NA
33.5	35.0	120	1.82	20	27	0.74	20	65	CH	FALSE	NA	36.0	NA	NA	NA
35.0	36.5	120	1.86	17	23	0.73	17	60	CH	FALSE	NA	37.0	NA	NA	NA
36.5	38.0	120	1.91	23	31	0.72	22	70	CH	FALSE	NA	44.0	NA	NA	NA
38.0	39.5	120	1.95	27	36	0.72	26	74	CH	FALSE	NA	41.0	NA	NA	NA
39.5	41.0	120	1.99	18	24	0.71	17	60	CH	FALSE	NA	33.0	NA	NA	NA
41.0	42.5	120	2.04	12	16	0.70	11	47	CH	FALSE	NA	37.0	NA	NA	NA
42.5	44.0	120	2.08	16	21	0.69	15	56	CH	FALSE	NA	36.0	NA	NA	NA
44.0	45.5	120	2.12	100	133	0.69	92	100	CH	FALSE	NA	NA	NA	NA	NA

**TVA - Widows Creek Main Ash Pond  
 CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS  
 FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT		Correction Factor	Corrected N-Value (N) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
				N <sub>80</sub> Value	N <sub>60</sub> Value									
Input Required														
		water =		N <sub>80</sub>	N <sub>60</sub>	C <sub>N</sub>	(N) <sub>60</sub>	Dr		φ'	γ <sub>d</sub>	m	γ <sub>w</sub>	e
SB-80														
0.0	1.5	120	22.0	6	8	1.00	8	41	CH	FALSE	NA	17.0	NA	NA
1.5	3.0	120	0.05	16	21	1.00	21	68	CH	FALSE	NA	33.0	NA	NA
3.0	4.5	120	0.14	18	24	1.00	24	73	CH	FALSE	NA	33.0	NA	NA
4.5	6.0	120	0.23	8	11	1.00	11	47	CH	FALSE	NA	35.0	NA	NA
6.0	7.5	120	0.32	13	17	1.00	17	60	CH	FALSE	NA	39.0	NA	NA
7.5	9.0	120	0.41	19	25	1.00	25	74	CH	FALSE	NA	27.0	NA	NA
9.0	10.5	120	0.50	16	21	1.00	21	68	CH	FALSE	NA	32.0	NA	NA
10.5	12.5	120	0.59	ST	NA	1.00	NA	NA	CH	NA	NA	27.0	NA	NA
12.5	14.0	120	0.69	16	21	1.00	21	68	CH	FALSE	NA	28.0	NA	NA
14.0	14.75	120	0.80	18	24	1.00	24	73	CH	FALSE	NA	21.0	NA	NA
15.5	17.0	120	0.89	9	12	1.00	12	52	CH	FALSE	NA	19.0	NA	NA
17.0	17.75	120	0.98	11	15	1.00	14	56	CH	FALSE	NA	21.0	NA	NA
18.5	20.0	120	1.07	15	20	0.97	19	63	CH	FALSE	NA	27.0	NA	NA
20.0	22.0	120	1.16	ST	NA	0.93	NA	NA	CH	FALSE	NA	27.0	NA	NA
22.0	22.75	120	1.26	2	3	0.89	2	NA	CH	NA	NA	21.0	NA	NA
23.5	23.5	124	1.31	2	3	0.87	2	18	ML	27.5	82	51.0	124	1.03
25.0	25.0	118	1.36	2	3	0.86	2	18	ML	27.5	82	44.0	118	1.03
26.5	26.5	121	1.40	2	3	0.85	2	18	ML	27.5	82	47.0	121	1.03
28.0	27.25	118	1.44	3	4	0.83	3	24	ML	28	83	42.0	118	1.01
30.0	30.0	120	1.49	ST	NA	0.82	NA	NA	ML	#N/A	#N/A	43.0	#N/A	#N/A
32.0	32.0	120	1.55	ST	NA	0.80	NA	NA	ML	#N/A	#N/A	38.0	#N/A	#N/A
33.5	33.5	112	1.59	2	3	0.79	2	18	ML	27.5	82	36.0	112	1.03
35.0	35.0	116	1.63	1	1	0.78	1	11	ML	27	81	43.0	116	1.05
37.0	37.0	120	1.68	ST	NA	0.77	NA	NA	ML	#N/A	#N/A	33.0	#N/A	#N/A
38.5	38.5	120	1.73	3	4	0.76	3	24	CH	FALSE	NA	20.0	NA	NA
40.0	40.0	120	1.78	8	11	0.75	8	41	CH	FALSE	NA	23.0	NA	NA
41.5	41.5	120	1.82	5	7	0.74	5	27	CH	FALSE	NA	25.0	NA	NA
43.0	43.0	120	1.86	6	8	0.73	6	32	CH	FALSE	NA	24.0	NA	NA
44.5	44.5	120	1.91	8	11	0.72	8	41	CH	FALSE	NA	23.0	NA	NA
46.0	46.0	120	1.95	10	13	0.72	10	44	CH	FALSE	NA	21.0	NA	NA
47.5	47.5	120	1.99	24	32	0.71	23	70	CH	FALSE	NA	17.0	NA	NA
49.5	49.5	120	2.04	ST	NA	0.70	NA	NA	CH	NA	NA	20.0	NA	NA
51.0	51.0	120	2.09	25	33	0.69	23	71	CH	FALSE	NA	23.0	NA	NA

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT		Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
				N Value	N <sub>60</sub>									
Input Required														
SB-81														
0.0	1.5	120	18.5	8	11	1.00	11	47	CH	FALSE	NA	32.0	NA	NA
1.5	3.0	120	0.14	21	28	1.00	28	77	CH	FALSE	NA	16.0	NA	NA
3.0	4.5	120	0.23	6	8	1.00	8	41	CH	FALSE	NA	17.0	NA	NA
4.5	6.0	120	0.32	8	11	1.00	11	47	CH	FALSE	NA	23.0	NA	NA
6.0	7.5	120	0.41	9	12	1.00	12	52	CH	FALSE	NA	24.0	NA	NA
7.5	9.0	120	0.50	8	11	1.00	11	47	CH	FALSE	NA	18.0	NA	NA
9.0	10.5	120	0.59	4	5	1.00	5	32	CH	FALSE	NA	21.0	NA	NA
10.5	12.0	120	0.68	3	4	1.00	4	27	CH	FALSE	NA	21.0	NA	NA
12.0	13.5	120	0.77	6	8	1.00	8	41	CH	FALSE	NA	22.0	NA	NA
13.5	15.0	120	0.86	4	5	1.00	5	32	CH	FALSE	NA	26.0	NA	NA
15.0	16.5	120	0.95	5	7	1.00	7	35	CH	FALSE	NA	25.0	NA	NA
16.5	18.0	108	1.03	7	9	0.99	9	44	ML	30	87	24.0	108	0.93
18.0	19.5	113	1.06	6	8	0.97	8	41	ML	30	87	30.0	113	0.93
19.5	21.0	111	1.10	2	3	0.95	3	18	ML	27.5	82	35.0	111	1.03
21.0	22.5	107	1.13	2	3	0.94	3	18	ML	27.5	82	31.0	107	1.03
22.5	24.0	110	1.17	2	3	0.92	3	18	ML	27.5	82	34.0	110	1.03
24.0	25.5	130	1.22	0	0	0.91	1	11	ML	27	81	60.0	130	1.05
25.5	27.5	120	1.27	ST	NA	0.89	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A
27.5	29.0	120	1.32	4	5	0.87	5	27	CL	FALSE	NA	24.0	NA	NA
29.0	30.5	120	1.36	14	19	0.86	16	60	CL	FALSE	NA	19.0	NA	NA
30.5	32.0	120	1.41	15	20	0.84	17	60	CL	FALSE	NA	23.0	NA	NA
32.0	33.5	120	1.45	19	25	0.83	21	68	CL	FALSE	NA	19.0	NA	NA
33.5	35.0	120	1.49	10	13	0.82	11	47	CL	FALSE	NA	20.0	NA	NA
35.0	36.5	120	1.54	20	27	0.81	22	68	CL	FALSE	NA	18.0	NA	NA
36.5	38.0	120	1.58	20	27	0.80	21	68	CL	FALSE	NA	28.0	NA	NA
38.0	39.5	120	1.62	17	23	0.78	18	60	CL	FALSE	NA	30.0	NA	NA
39.5	41.0	120	1.67	100	133	0.77	103	100	CL	FALSE	NA	32.0	NA	NA

**TVA - Widows Creek Main Ash Pond**  
**CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS**  
**FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required														
SB-82		water =	23.0											
0.0	1.5	115	0.04	6	8	1.00	8	41	SP-SM	31.5	103	12.0	115	0.62
1.5	3.0	120	0.13	14	19	1.00	19	63	CH	FALSE	NA	22.0	NA	NA
3.0	4.5	120	0.22	23	31	1.00	31	79	CH	FALSE	NA	30.0	NA	NA
4.5	6.0	120	0.31	10	13	1.00	13	53	CH	FALSE	NA	21.0	NA	NA
6.0	7.5	120	0.40	21	28	1.00	28	77	CH	FALSE	NA	29.0	NA	NA
7.5	9.5	120	0.51	ST	NA	1.00	NA	NA	CH	NA	NA	NA	NA	NA
9.5	11.0	120	0.61	29	39	1.00	39	87	CH	FALSE	NA	28.0	NA	NA
11.0	12.5	120	0.70	24	32	1.00	32	82	CH	FALSE	NA	25.0	NA	NA
12.5	14.0	120	0.79	38	51	1.00	51	98	CH	FALSE	NA	25.0	NA	NA
14.0	15.5	120	0.88	30	40	1.00	40	89	CH	FALSE	NA	22.0	NA	NA
15.5	17.0	120	0.97	32	43	1.00	43	91	CH	FALSE	NA	21.0	NA	NA
17.0	18.5	114	1.06	30	40	0.97	39	87	ML	34.5	95	20.0	114	0.75
18.5	20.0	129	1.16	20	27	0.93	25	73	ML	33	92	40.0	129	0.82
20.0	22.0	120	1.26	ST	NA	0.89	NA	NA	ML	#N/A	#N/A	22.0	#N/A	#N/A
22.0	23.5	128	1.37	5	7	0.85	6	32	ML	29	85	51.0	128	0.97
23.5	25.0	129	1.42	9	12	0.84	10	47	ML	30.5	88	47.0	129	0.91
25.0	26.5	117	1.46	5	7	0.83	6	32	ML	29	85	38.0	117	0.97
26.5	28.0	128	1.51	12	16	0.81	13	53	ML	31	88.5	45.0	128	0.89
28.0	29.5	131	1.56	7	9	0.80	8	41	ML	30	87	50.0	131	0.93
29.5	31.0	117	1.61	9	12	0.79	10	44	ML	30	87	34.0	117	0.93
31.0	32.5	118	1.65	13	17	0.78	14	53	ML	31	88.5	33.0	118	0.89
32.5	34.0	117	1.69	7	9	0.77	7	39	ML	29.5	86	36.0	117	0.95
34.0	35.5	126	1.73	21	28	0.76	21	68	ML	32.5	91	38.0	126	0.83
35.5	37.0	109	1.77	3	4	0.75	3	24	ML	28	83	31.0	109	1.01
37.0	38.5	113	1.81	2	3	0.74	2	18	ML	27.5	82	38.0	113	1.03
38.5	40.0	115	1.85	1	1	0.74	1	11	ML	27	81	42.0	115	1.05
40.0	42.0	120	1.90	ST	NA	0.73	NA	NA	ML	#N/A	#N/A	26.0	#N/A	#N/A
42.0	43.5	102	1.93	11	15	0.72	11	47	ML	30.5	88	16.0	102	0.91
43.5	45.0	120	1.98	14	19	0.71	13	53	CH	FALSE	NA	18.0	NA	NA
45.0	46.5	120	2.02	6	8	0.70	6	32	CH	FALSE	NA	26.0	NA	NA
46.5	48.0	120	2.06	15	20	0.70	14	53	CH	FALSE	NA	21.0	NA	NA
48.0	49.5	120	2.11	38	51	0.69	35	84	CH	FALSE	NA	19.0	NA	NA



TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
SB-84														
		water =												
0.5 - 2.0	1.25	120	22.1	25	33	1.00	33	84	CH	FALSE	NA	15.0	NA	NA
2.5 - 4.0	3.25	127	0.20	24	32	1.00	32	82	SP-SM	36.5	111.5	14.0	127	0.5
5.5 - 7.0	6.25	101	0.35	12	16	1.00	16	60	ML	32	90	12.0	101	0.85
7.5 - 9.0	8.25	127	0.48	20	27	1.00	27	75	SP-SM	36	110	15.0	127	0.52
10.0 - 12.0	11	120	0.64	ST	NA	1.00	NA	NA	SP-SM	#N/A	#N/A	19.0	#N/A	#N/A
12.5 - 14.0	13.25	119	0.78	20	27	1.00	27	75	SP-SM	36	110	8.0	119	0.52
14.5 - 16.0	15.25	130	0.91	52	69	1.00	69	100	SP-SM	39	116	12.0	130	0.44
17.5 - 19.0	18.25	130	1.10	45	60	0.95	57	100	SP-SM	39	116	12.0	130	0.44
20.0 - 22.0	21	120	1.27	ST	NA	0.89	NA	NA	SP-SM	#N/A	#N/A	16.0	#N/A	#N/A
22.5 - 24.0	23.25	138	1.35	80	107	0.86	92	100	SP-SM	39	116	19.0	138	0.44
25.5 - 27.0	26.25	135	1.46	115	153	0.83	127	100	SP-SM	39	116	16.0	135	0.44
27.5 - 29.0	28.25	137	1.54	64	85	0.81	69	100	SP-SM	39	116	18.0	137	0.44
30.5 - 32.0	31.25	120	1.62	23	31	0.79	24	73	CH	FALSE	NA	21.0	NA	NA
32.5 - 34.0	33.25	120	1.68	11	15	0.77	11	47	CH	FALSE	NA	25.0	NA	NA
35.5 - 37.0	36.25	120	1.77	19	25	0.75	19	65	CH	FALSE	NA	29.0	NA	NA
37.5 - 39.0	38.25	120	1.82	19	25	0.74	19	63	CH	FALSE	NA	32.0	NA	NA
40.0 - 42.0	41	120	1.90	ST	NA	0.72	NA	NA	CH	NA	NA	20.0	NA	NA



TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>1</sub> ) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
				Input Required										
SB-85														
5.5 - 7.0	6.25	water = 120	26.0	9	7	1.00	9	44	CH	FALSE	NA	26.0	NA	NA
7.5 - 9.0	8.25	120	0.38	21	16	1.00	21	68	CH	FALSE	NA	31.0	NA	NA
10.5 - 12.0	11.25	120	0.68	19	14	1.00	19	63	CH	FALSE	NA	27.0	NA	NA
12.5 - 14.0	13.25	120	0.80	29	22	1.00	29	79	CH	FALSE	NA	27.0	NA	NA
17.5 - 19.0	18.25	120	1.10	133	100	0.96	127	100	CH	FALSE	NA	24.0	NA	NA
20.5 - 22.0	21.25	120	1.28	23	17	0.89	20	67	CH	FALSE	NA	32.0	NA	NA
22.5 - 24.0	23.25	120	1.40	21	16	0.85	18	63	CH	FALSE	NA	35.0	NA	NA
27.0 - 27.4	27.2	120	1.51	133	100	0.81	109	100	Limestone	FALSE	NA	6.0	NA	NA







TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
SB-89														
					Input Required									
		water =	13.0											
0.5	2.0	125	0.08	36	48	1.00	48	95	SP-SM	38.5	115	9.0	125	0.45
2.0	2.8	126	0.15	100	133	1.00	133	100	SP-SM	39	116	9.0	126	0.44
5.5	7.0	120	0.38	15	20	1.00	20	67	CH	FALSE	NA	19.0	NA	NA
7.5	9.0	120	0.50	11	15	1.00	15	56	CH	FALSE	NA	24.0	NA	NA
10.0	12.0	120	0.67	ST	NA	1.00	NA	NA	CH	NA	NA	NA	NA	NA
12.5	14.0	120	0.73	29	39	1.00	39	87	CH	FALSE	NA	16.0	NA	NA
15.0	17.0	120	0.81	ST	NA	1.00	NA	NA	CH	NA	NA	23.0	NA	NA
17.5	19.0	120	0.88	9	12	1.00	12	52	CH	FALSE	NA	23.0	NA	NA
20.0	22.0	120	0.96	ST	NA	1.00	NA	NA	CH	NA	NA	27.0	NA	NA
22.5	24.0	119	1.02	47	63	0.99	62	100	ML	36	98	21.0	119	0.7
25.5	27.0	115	1.10	25	33	0.95	32	81	ML	34	94	22.0	115	0.77
27.5	29.0	116	1.15	43	57	0.93	53	99	ML	35.5	97	20.0	116	0.72
30.5	32.0	113	1.23	24	32	0.90	29	77	ML	33.5	93	22.0	113	0.8
32.5	34.0	110	1.27	15	20	0.89	18	60	ML	32	90	22.0	110	0.85
35.5	37.0	110	1.35	16	21	0.86	18	63	ML	32	90	22.0	110	0.85
37.5	39.0	111	1.39	14	19	0.85	16	58	ML	31.5	89.5	24.0	111	0.87
40.0	42.0	120	1.47	ST	NA	0.82	NA	NA	ML	#N/A	#N/A	20.0	#N/A	#N/A
42.5	44.0	120	1.54	19	25	0.81	20	67	CH	FALSE	NA	25.0	NA	NA
45.5	47.0	120	1.62	10	13	0.78	11	47	CH	FALSE	NA	24.0	NA	NA
47.5	49.0	120	1.68	17	23	0.77	18	60	CH	FALSE	NA	27.0	NA	NA
50.5	52.0	120	1.77	14	19	0.75	14	56	CH	FALSE	NA	26.0	NA	NA
52.5	54.0	120	1.83	5	7	0.74	5	27	CH	FALSE	NA	23.0	NA	NA
55.0	55.2	120	1.88	100	133	0.73	97	100	CH	FALSE	NA	26.0	NA	NA









**TVA - Widows Creek Main Ash Pond**  
**CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS**  
**FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Sample (ft.)	Assumed Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT		Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio	
				N Value	N <sub>60</sub>										
Input Required															
		water =													
		9.5													
0.0 - 1.5	0.75	130	0.05	77	103	1.00	103	100	SP-SM	39	116	120	130	0.44	
1.5 - 3.0	2.25	126	0.14	78	104	1.00	104	100	SP-SM	39	116	126	126	0.44	
3.0 - 4.5	3.75	138	0.25	90	120	1.00	120	100	SP-SM	39	116	138	138	0.44	
4.5 - 6.0	5.25	129	0.34	87	116	1.00	116	100	SP-SM	39	116	129	129	0.44	
6.0 - 7.5	6.75	132	0.44	58	77	1.00	77	100	SP-SM	39	116	132	132	0.44	
7.5 - 9.0	8.25	135	0.54	51	68	1.00	68	100	SP-SM	39	116	135	135	0.44	
9.0 - 10.5	9.75	125	0.59	19	25	1.00	25	74	SP-SM	35	109	125	125	0.54	
10.5 - 12.0	11.25	117	0.63	7	9	1.00	9	44	SP-SM	31.5	103	117	117	0.62	
12.0 - 13.5	12.75	118	0.67	6	8	1.00	8	41	SP-SM	31.5	103	118	118	0.62	
13.5 - 15.0	14.25	115	0.71	4	5	1.00	5	32	SP-SM	30	100.5	115	115	0.66	
15.0 - 16.5	15.75	116	0.75	4	5	1.00	5	32	SP-SM	30	100.5	116	116	0.66	
16.5 - 18.0	17.25	117	0.79	5	7	1.00	7	35	SP-SM	31	102	117	117	0.64	
18.0 - 19.5	18.75	117	0.84	3	4	1.00	4	27	SP-SM	29.5	99.5	117	117	0.68	
19.5 - 21.0	20.25	121	0.88	2	3	1.00	3	18	SP-SM	28.5	98	121	121	0.71	
21.0 - 22.5	21.75	118	0.92	2	3	1.00	3	18	SP-SM	28.5	98	118	118	0.71	
22.5 - 24.0	23.25	138	0.98	77	103	1.00	103	100	SP-SM	39	116	138	138	0.44	
24.0 - 25.5	24.75	126	1.02	6	8	0.99	8	41	SP-SM	31.5	103	126	126	0.62	
25.5 - 27.0	26.25	127	1.07	4	5	0.97	5	32	SP-SM	30	100.5	127	127	0.66	
27.0 - 28.5	27.75	116	1.11	2	3	0.95	3	18	SP-SM	28.5	98	116	116	0.71	
28.5 - 30.0	29.25	111	1.15	2	3	0.93	3	18	SP-SM	28.5	98	111	111	0.71	
30.0 - 32.0	31	120	1.20	ST	NA	0.91	NA	NA	SP-SM	#N/A	#N/A	#N/A	#N/A	#N/A	
32.0 - 33.5	32.75	97	1.23	0	0	0.90	1	11	SP-SM	28	97	97	97	0.72	
33.5 - 35.0	34.25	136	1.28	0	0	0.88	1	11	SP-SM	28	97	136	136	0.72	
35.0 - 36.5	35.75	122	1.33	13	17	0.87	15	58	SP-SM	33.5	106	122	122	0.57	
36.5 - 38.0	37.25	121	1.37	10	13	0.85	11	47	SP-SM	32	104	121	121	0.61	
38.0 - 39.5	38.75	118	1.42	7	9	0.84	8	41	SP-SM	31.5	103	118	118	0.62	
39.5 - 41.5	40.5	120	1.47	ST	NA	0.83	NA	NA	CH	NA	NA	NA	NA	NA	
41.5 - 43.0	42.25	120	1.52	4	5	0.81	4	27	CH	FALSE	NA	NA	NA	NA	
43.0 - 44.5	43.75	120	1.56	12	16	0.80	13	52	CH	FALSE	NA	NA	NA	NA	
44.5 - 46.0	45.25	120	1.60	18	24	0.79	19	65	CH	FALSE	NA	NA	NA	NA	
46.0 - 47.5	46.75	120	1.65	25	33	0.78	26	75	CH	FALSE	NA	NA	NA	NA	
47.5 - 49.0	48.25	120	1.69	24	32	0.77	25	73	CH	FALSE	NA	NA	NA	NA	
49.0 - 51.0	50	120	1.74	ST	NA	0.76	NA	NA	CH	NA	NA	NA	NA	NA	
51.0 - 52.5	51.75	120	1.79	17	23	0.75	17	60	CH	FALSE	NA	NA	NA	NA	
52.5 - 54.0	53.25	120	1.83	27	36	0.74	27	75	CH	FALSE	NA	NA	NA	NA	

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>1</sub> ) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
STN-94														
0.0 - 1.5	0.75	water = 120	16.0	3	4	1.00	4	27	CH	FALSE	NA	21.0	NA	NA
1.5 - 3.0	2.25	120	0.05	59	79	1.00	79	100	CH	FALSE	NA	8.0	NA	NA
3.0 - 4.5	3.75	120	0.14	34	45	1.00	45	93	CH	FALSE	NA	21.0	NA	NA
4.5 - 6.0	5.25	120	0.23	8	11	1.00	11	47	CH	FALSE	NA	22.0	NA	NA
6.0 - 7.5	6.75	120	0.32	11	15	1.00	15	56	CH	FALSE	NA	24.0	NA	NA
7.5 - 9.0	8.25	120	0.41	14	19	1.00	19	63	CH	FALSE	NA	28.0	NA	NA
9.0 - 10.5	9.75	120	0.50	5	7	1.00	7	35	CH	FALSE	NA	18.0	NA	NA
10.5 - 12.0	11.25	120	0.59	11	15	1.00	15	56	CH	FALSE	NA	22.0	NA	NA
12.0 - 13.5	12.75	120	0.68	19	25	1.00	25	74	CH	FALSE	NA	33.0	NA	NA
13.5 - 15.0	14.25	120	0.77	25	33	1.00	33	84	CH	FALSE	NA	30.0	NA	NA
15.0 - 17.0	16	120	0.86	25	NA	1.00	NA	NA	CH	FALSE	NA	NA	NA	NA
17.0 - 18.5	17.75	142	0.96	ST	NA	1.00	NA	NA	CH	NA	NA	23.0	NA	NA
18.5 - 20.0	19.25	133	1.03	23	31	0.99	30	79	SP-SM	36	110	29.0	142	0.52
20.0 - 21.5	20.75	120	1.08	10	13	0.96	13	52	SP-SM	33	105	27.0	133	0.59
21.5 - 23.0	22.25	120	1.13	14	19	0.94	18	60	CH	FALSE	NA	23.0	NA	NA
23.0 - 24.5	23.75	120	1.17	8	11	0.92	10	44	CH	FALSE	NA	27.0	NA	NA
24.5 - 26.5	25.5	120	1.21	16	21	0.91	19	65	CH	FALSE	NA	27.0	NA	NA
26.5 - 28.0	27.25	120	1.26	ST	NA	0.89	NA	NA	CH	NA	NA	25.0	NA	NA
28.0 - 29.5	28.75	120	1.31	7	9	0.87	8	41	CH	FALSE	NA	27.0	NA	NA
29.5 - 31.0	30.25	120	1.36	10	13	0.86	11	47	CH	FALSE	NA	27.0	NA	NA
31.0 - 32.5	31.75	120	1.40	15	20	0.85	17	60	CH	FALSE	NA	26.0	NA	NA
32.5 - 34.0	33.25	120	1.44	14	19	0.83	16	58	CH	FALSE	NA	27.0	NA	NA
34.0 - 35.5	34.75	120	1.49	20	27	0.82	22	68	CH	FALSE	NA	22.0	NA	NA
35.5 - 37.0	36.25	120	1.53	18	24	0.81	19	65	CH	FALSE	NA	21.0	NA	NA
37.0 - 38.5	37.75	120	1.57	24	32	0.80	26	74	CH	FALSE	NA	30.0	NA	NA
38.5 - 40.0	39.25	120	1.62	26	35	0.79	27	77	CH	FALSE	NA	36.0	NA	NA
40.0 - 41.5	40.75	120	1.66	12	16	0.78	12	52	CH	FALSE	NA	24.0	NA	NA
41.5 - 43.0	42.25	120	1.70	11	15	0.77	11	47	CH	FALSE	NA	21.0	NA	NA
43.0 - 44.5	43.75	120	1.75	20	27	0.76	20	67	CH	FALSE	NA	23.0	NA	NA
44.5 - 46.0	45.25	120	1.79	27	36	0.75	27	75	CH	FALSE	NA	20.0	NA	NA
46.0 - 47.5	46.75	120	1.83	22	29	0.74	22	68	CH	FALSE	NA	21.0	NA	NA
47.5 - 49.0	48.25	120	1.87	16	21	0.73	16	58	CH	FALSE	NA	24.0	NA	NA
49.0 - 51.0	50	120	1.92	12	16	0.72	12	47	CH	FALSE	NA	28.0	NA	NA
51.0 - 52.5	51.75	120	1.97	ST	NA	0.71	NA	NA	CH	NA	NA	25.0	NA	NA
52.5 - 54.0	53.25	117	2.02	11	15	0.70	10	47	CH	FALSE	NA	21.0	NA	NA
54.0 - 55.5	54.75	116	2.06	10	13	0.70	9	44	SC-SM	30.5	95	23.0	117	0.76
55.5 - 56.5	55.75	120	2.10	6	8	0.69	6	32	SC-SM	29.5	93	25.0	116	0.8
56.5 - 57.5	56.75	120	2.12	100	133	0.69	92	100	SC-SM	FALSE	NA	19.0	NA	NA

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>1</sub> ) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
STN-95														
0.0 - 1.5	0.75	129	15.0	12	16	1.00	16	60	SP-SM	34	107	21.0	129	0.56
1.5 - 3.0	2.25	132	0.05	24	32	1.00	32	82	SP-SM	36.5	111.5	18.0	132	0.5
3.0 - 4.5	3.75	147	0.15	25	33	1.00	33	84	SP-SM	36.5	111.5	32.0	147	0.5
4.5 - 6.0	5.25	135	0.26	10	13	1.00	13	53	SP-SM	33	105	29.0	135	0.59
6.0 - 7.5	6.75	127	0.36	23	31	1.00	31	79	ML	33.5	93	37.0	127	0.8
7.5 - 9.0	8.25	127	0.45	11	15	1.00	15	56	ML	31.5	89.5	42.0	127	0.87
9.0 - 10.5	9.75	128	0.55	17	23	1.00	23	70	ML	33	92	39.0	128	0.82
10.5 - 12.0	11.25	120	0.65	28	37	1.00	37	87	ML	34.5	95	26.0	120	0.75
12.0 - 13.5	12.75	118	0.74	31	41	1.00	41	91	ML	35	96	23.0	118	0.74
13.5 - 15.0	14.25	103	0.82	7	9	1.00	9	44	ML	30	87	18.0	103	0.93
15.0 - 16.5	15.75	106	0.90	4	5	1.00	5	32	ML	29	85	25.0	106	0.97
16.5 - 18.0	17.25	124	0.93	6	8	1.00	8	41	ML	30	87	42.0	124	0.93
18.0 - 19.5	18.75	130	0.98	67	89	0.98	88	100	ML	36	98	33.0	130	0.7
19.5 - 21.0	20.25	122	1.03	16	21	0.96	21	67	ML	32.5	91	34.0	122	0.83
21.0 - 22.5	21.75	124	1.08	13	17	0.94	16	60	ML	32	90	38.0	124	0.85
22.5 - 24.0	23.25	118	1.12	4	5	0.93	5	27	ML	28.5	84	40.0	118	0.99
24.0 - 25.5	24.75	126	1.16	0	0	0.91	1	11	ML	27	81	55.0	126	1.05
25.5 - 27.0	26.25	120	1.21	ST	NA	0.89	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A
27.0 - 28.5	28.25	124	1.26	27	27	0.87	23	71	ML	33	92	35.0	124	0.82
28.5 - 30.0	29.75	124	1.32	32	43	0.86	37	86	ML	34.5	95	31.0	124	0.75
30.0 - 31.5	31.25	120	1.36	ST	NA	0.84	NA	NA	ML	#N/A	#N/A	29.0	#N/A	#N/A
31.5 - 32.5	32.25	115	1.41	13	17	0.83	14	56	ML	31.5	89.5	29.0	115	0.87
32.5 - 34.0	33.25	116	1.46	13	17	0.82	14	56	ML	31.5	89.5	30.0	116	0.87
34.0 - 35.5	34.75	116	1.50	ST	NA	0.80	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A
35.5 - 37.0	36.25	120	1.55	3	4	0.79	3	24	ML	28	83	43.0	119	1.01
37.0 - 39.0	38.25	119	1.60	5	7	0.78	5	32	ML	29	85	45.0	123	0.97
39.0 - 40.5	39.75	123	1.64	ST	NA	0.77	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A
40.5 - 42.5	41.5	120	1.69	0	0	0.76	1	11	ML	27	81	36.0	110	1.05
42.5 - 44.0	43.25	110	1.74	0	0	0.75	1	11	ML	27	81	40.0	113	1.05
44.0 - 45.5	44.75	113	1.77	0	0	0.75	1	11	ML	#N/A	#N/A	#N/A	#N/A	#N/A
45.5 - 47.5	46.5	120	1.83	ST	NA	0.74	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A
47.5 - 49.0	48.25	126	1.88	0	0	0.73	1	11	ML	27	81	56.0	126	1.05
49.0 - 50.5	49.75	140	1.94	29	39	0.72	28	77	ML	33.5	93	51.0	140	0.8
50.5 - 52.5	51.5	120	1.99	ST	NA	0.71	NA	NA	CH	NA	NA	NA	NA	NA
52.5 - 54.0	53.25	120	2.04	20	27	0.70	19	63	CH	FALSE	NA	28.0	NA	NA
54.0 - 55.5	54.75	120	2.08	29	39	0.69	27	75	CH	FALSE	NA	29.0	NA	NA

**TVA - Widows Creek Main Ash Pond  
 CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS  
 FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT		Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio	
				N <sub>60</sub> Value	N <sub>60</sub> Value										
Input Required															
		water =													
		%		σ'		C <sub>u</sub>		D <sub>r</sub>		φ		m		γ <sub>w</sub>	
STN-96															
0.0 - 1.5	0.75	136	23.5	28	37	1.00	37	87	SP-SM	37	113	20.0	136	0.48	
1.5 - 3.0	2.25	132	0.15	19	25	1.00	25	74	SP-SM	35	109	21.0	132	0.54	
3.0 - 4.5	3.75	111	0.23	74	99	1.00	99	100	ML	36	98	13.0	111	0.7	
4.5 - 6.0	5.25	118	0.32	65	87	1.00	87	100	ML	36	98	20.0	118	0.7	
6.0 - 7.5	6.75	116	0.41	53	71	1.00	71	100	ML	36	98	18.0	116	0.7	
7.5 - 9.0	8.25	125	0.50	34	45	1.00	45	93	ML	35	96	30.0	125	0.74	
9.0 - 10.5	9.75	125	0.60	25	33	1.00	33	84	ML	34	94	33.0	125	0.77	
10.5 - 12.0	11.25	114	0.68	48	64	1.00	64	100	ML	36	98	16.0	114	0.7	
12.0 - 13.5	12.75	113	0.77	36	48	1.00	48	95	ML	35.5	97	17.0	113	0.72	
13.5 - 15.0	14.25	112	0.85	21	28	1.00	28	77	ML	33.5	93	20.0	112	0.8	
15.0 - 16.5	15.75	113	0.93	12	16	1.00	16	60	ML	32	90	25.0	113	0.85	
16.5 - 18.0	17.25	120	1.02	16	21	0.99	21	68	CH	FALSE	NA	19.0	NA	NA	
18.0 - 19.5	18.75	120	1.11	11	15	0.95	14	53	CH	FALSE	NA	NA	NA	NA	
19.5 - 21.0	20.25	120	1.20	13	17	0.91	16	58	CH	FALSE	NA	NA	NA	NA	
21.0 - 22.5	21.75	120	1.29	14	19	0.88	16	60	CH	FALSE	NA	NA	NA	NA	
22.5 - 24.0	23.25	120	1.38	20	27	0.85	23	70	CH	FALSE	NA	NA	NA	NA	
24.0 - 25.5	24.75	107	1.42	7	9	0.84	8	41	ML	30	87	23.0	107	0.93	
25.5 - 27.0	26.25	120	1.47	ST	NA	0.83	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A	
27.0 - 28.5	28.25	103	1.50	0	0	0.82	1	11	ML	27	81	27.0	103	1.05	
28.5 - 30.0	29.75	116	1.54	2	3	0.80	2	18	ML	27.5	82	42.0	116	1.03	
30.0 - 32.0	31.25	108	1.58	5	7	0.80	5	32	ML	29	85	27.0	108	0.97	
32.0 - 33.5	32.75	105	1.61	5	7	0.79	5	32	ML	29	85	23.0	105	0.97	
33.5 - 35.0	34.25	108	1.64	10	13	0.78	10	47	ML	30.5	88	23.0	108	0.91	
35.0 - 37.0	36	120	1.69	ST	NA	0.77	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A	
37.0 - 38.5	37.75	100	1.73	4	5	0.76	4	27	ML	28.5	84	19.0	100	0.99	
38.5 - 40.0	39.25	126	1.77	14	19	0.75	14	56	ML	31.5	89.5	41.0	126	0.87	
40.0 - 41.5	40.75	104	1.81	9	12	0.74	9	41	ML	30	87	20.0	104	0.93	
41.5 - 43.0	42.25	101	1.83	5	7	0.74	5	27	ML	28.5	84	20.0	101	0.99	
43.0 - 44.5	43.75	120	1.88	0	0	0.73	1	11	CL	FALSE	NA	38.0	NA	NA	
44.5 - 46.5	45.5	120	1.93	ST	NA	0.72	NA	NA	CL	NA	NA	NA	NA	NA	
46.5 - 48.0	47.25	120	1.98	14	19	0.71	13	53	CH	FALSE	NA	26.0	NA	NA	
48.0 - 49.5	48.75	120	2.02	23	31	0.70	22	68	CH	FALSE	NA	28.0	NA	NA	
49.5 - 51.0	50.25	120	2.07	25	33	0.70	23	71	CH	FALSE	NA	28.0	NA	NA	
51.0 - 52.5	51.75	120	2.11	23	31	0.69	21	68	CH	FALSE	NA	26.0	NA	NA	
52.5 - 54.5	53.5	120	2.16	ST	NA	0.68	NA	NA	CH	NA	NA	NA	NA	NA	



TVA - Widows Creek Main Ash Pond															
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS															
FOR COARSE GRAINED SOILS															
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio	
															N <sub>60</sub>
STN-98					Input Required										
		water =													
0.0	1.5	120	10.5	42	56	1.00	56	100	CL	FALSE	NA	4.0	NA	NA	
1.5	3.0	120	0.14	29	39	1.00	39	87	CL	FALSE	NA	20.0	NA	NA	
3.0	4.5	120	0.23	11	15	1.00	15	56	CL	FALSE	NA	29.0	NA	NA	
4.5	6.0	120	0.32	14	19	1.00	19	63	CL	FALSE	NA	26.0	NA	NA	
6.0	7.5	120	0.41	14	19	1.00	19	63	CL	FALSE	NA	29.0	NA	NA	
7.5	9.0	120	0.50	7	9	1.00	9	44	CL	FALSE	NA	29.0	NA	NA	
9.0	10.5	120	0.59	11	15	1.00	15	56	CL	FALSE	NA	30.0	NA	NA	
10.5	12.0	120	0.63	5	7	1.00	7	35	CL	FALSE	NA	34.0	NA	NA	
12.0	13.5	120	0.67	11	15	1.00	15	56	CL	FALSE	NA	33.0	NA	NA	
13.5	15.0	120	0.71	14	19	1.00	19	63	CL	FALSE	NA	33.0	NA	NA	
15.0	16.5	120	0.76	12	16	1.00	16	60	CL	FALSE	NA	32.0	NA	NA	
16.5	18.0	120	0.80	13	17	1.00	17	60	CL	FALSE	NA	26.0	NA	NA	
18.0	20.0	120	0.85	ST	NA	1.00	NA	NA	CL	NA	NA	30.0	NA	NA	
20.0	21.5	120	0.90	6	8	1.00	8	41	CL	FALSE	NA	27.0	NA	NA	
21.5	23.0	120	0.95	6	8	1.00	8	41	CL	FALSE	NA	28.0	NA	NA	
23.0	24.5	120	0.99	10	13	1.00	13	53	CL	FALSE	NA	38.0	NA	NA	
24.5	24.7	120	1.01	0	0	0.99	1	11	CL	FALSE	NA	16.0	NA	NA	



TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT		Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
				N Value	N <sub>60</sub>									
Input Required														
STN-100														
		water =	21.0											
0.0 - 1.5	0.75	132	0.05	32	43	1.00	43	91	SP-SM	38	114	16.0	132	0.47
1.5 - 3.0	2.25	157	0.17	90	120	1.00	120	100	SP-SM	39	116	35.0	157	0.44
3.0 - 4.5	3.75	130	0.26	100	133	1.00	133	100	SP-SM	39	116	12.0	130	0.44
4.5 - 6.0	5.25	135	0.37	46	61	1.00	61	100	SP-SM	39	116	16.0	135	0.44
6.0 - 7.5	6.75	135	0.47	92	123	1.00	123	100	SP-SM	39	116	16.0	135	0.44
7.5 - 9.0	8.25	139	0.57	69	92	1.00	92	100	SP-SM	39	116	20.0	139	0.44
9.0 - 10.5	9.75	122	0.66	23	31	1.00	31	79	ML	33.5	93	31.0	122	0.8
10.5 - 12.0	11.25	127	0.76	25	33	1.00	33	84	ML	34	94	35.0	127	0.77
12.0 - 13.5	12.75	130	0.85	97	129	1.00	129	100	SP-SM	39	116	12.0	130	0.44
13.5 - 15.0	14.25	148	0.97	84	112	1.00	112	100	SP-SM	39	116	28.0	148	0.44
15.0 - 16.5	15.75	144	1.07	19	25	0.96	24	73	SP-SM	35	109	32.0	144	0.54
16.5 - 18.0	17.25	143	1.18	22	29	0.92	27	77	SP-SM	36	110	30.0	143	0.52
18.0 - 19.5	18.75	138	1.28	12	16	0.88	14	56	SP-SM	33.5	106	30.0	138	0.57
19.5 - 21.0	20.25	122	1.38	15	20	0.85	17	60	ML	32	90	35.0	122	0.85
21.0 - 22.5	21.75	133	1.43	31	41	0.84	35	84	ML	34	94	42.0	133	0.77
22.5 - 24.0	23.25	109	1.46	8	11	0.83	9	41	ML	30	87	25.0	109	0.93
24.0 - 25.5	24.75	100	1.49	0	0	0.82	1	11	ML	27	81	23.0	100	1.05
25.5 - 27.0	26.25	116	1.53	1	1	0.81	1	11	ML	27	81	43.0	116	1.05
27.0 - 28.5	27.75	109	1.57	0	0	0.80	1	11	ML	27	81	35.0	109	1.05
28.5 - 30.0	29.25	109	1.60	0	0	0.79	1	11	ML	27	81	34.0	109	1.05
30.0 - 32.0	31	120	1.65	ST	NA	0.78	NA	NA	ML	#N/A	#N/A	21.0	#N/A	#N/A
32.0 - 33.5	32.75	152	1.73	0	0	0.76	1	11	ML	27	81	88.0	152	1.05
33.5 - 35.5	34.5	120	1.78	ST	NA	0.75	NA	NA	ML	#N/A	#N/A	107.0	#N/A	#N/A
35.5 - 37.0	36.25	161	1.87	0	0	0.73	1	11	ML	27	81	99.0	161	1.05
37.0 - 38.5	37.75	161	1.94	0	0	0.72	1	11	ML	27	81	99.0	161	1.05
38.5 - 40.0	39.25	144	2.00	0	0	0.71	1	11	ML	27	81	78.0	144	1.05
40.0 - 41.5	40.75	161	2.08	0	0	0.69	1	11	ML	27	81	99.0	161	1.05
41.5 - 43.0	42.25	165	2.15	0	0	0.68	1	11	ML	27	81	104.0	165	1.05
43.0 - 44.5	43.75	113	2.19	0	0	0.68	1	11	ML	27	81	40.0	113	1.05
44.5 - 46.5	45.5	120	2.24	ST	NA	0.67	NA	NA	ML	#N/A	#N/A	87.0	#N/A	#N/A
46.5 - 48.0	47.25	120	2.29	10	13	0.66	9	41	CH	FALSE	NA	31.0	NA	NA
48.0 - 49.5	48.75	120	2.34	9	12	0.65	8	41	CH	FALSE	NA	36.0	NA	NA
49.5 - 51.5	50.5	120	2.39	ST	NA	0.65	NA	NA	CH	NA	NA	32.0	NA	NA
51.5 - 53.0	52.25	120	2.44	12	16	0.64	10	47	CH	FALSE	NA	30.0	NA	NA
53.0 - 54.5	53.75	120	2.48	14	19	0.63	12	47	CH	FALSE	NA	28.0	NA	NA



TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required														
STN-101														
0.0 - 1.5	0.75	120	19.5	31	41	1.00	41	91	CH	FALSE	NA	10.0	NA	NA
1.5 - 3.0	2.25	120	0.14	16	21	1.00	21	68	CH	FALSE	NA	33.0	NA	NA
3.0 - 4.5	3.75	120	0.23	18	24	1.00	24	73	CH	FALSE	NA	26.0	NA	NA
4.5 - 6.0	5.25	120	0.32	7	9	1.00	9	44	CH	FALSE	NA	29.0	NA	NA
6.0 - 7.5	6.75	120	0.41	13	17	1.00	17	60	CH	FALSE	NA	27.0	NA	NA
7.5 - 9.0	8.25	120	0.50	16	21	1.00	21	68	CH	FALSE	NA	35.0	NA	NA
9.0 - 10.5	9.75	120	0.59	5	7	1.00	7	35	CH	FALSE	NA	27.0	NA	NA
10.5 - 12.0	11.25	120	0.68	14	19	1.00	19	63	CH	FALSE	NA	22.0	NA	NA
12.0 - 13.5	12.75	120	0.77	20	27	1.00	27	75	CH	FALSE	NA	22.0	NA	NA
13.5 - 15.0	14.25	120	0.86	13	17	1.00	17	60	CH	FALSE	NA	26.0	NA	NA
15.0 - 16.5	15.75	120	0.95	23	31	1.00	31	79	CH	FALSE	NA	22.0	NA	NA
16.5 - 18.0	17.25	120	1.04	8	11	0.98	11	47	CH	FALSE	NA	24.0	NA	NA
18.0 - 19.5	18.75	120	1.13	17	23	0.94	21	68	CH	FALSE	NA	25.0	NA	NA
19.5 - 21.5	20.5	120	1.18	ST	NA	0.92	NA	NA	CH	NA	NA	30.0	NA	NA
21.5 - 23.0	22.25	120	1.23	5	7	0.90	6	35	CH	FALSE	NA	26.0	NA	NA
23.0 - 24.5	23.75	120	1.27	14	19	0.89	17	60	CH	FALSE	NA	26.0	NA	NA
24.5 - 26.0	25.25	120	1.31	14	19	0.87	16	60	CH	FALSE	NA	22.0	NA	NA
26.0 - 27.5	26.75	120	1.36	15	20	0.86	17	60	CH	FALSE	NA	27.0	NA	NA
27.5 - 29.0	28.25	120	1.40	13	17	0.85	15	56	CH	FALSE	NA	27.0	NA	NA
29.0 - 31.0	30	120	1.45	ST	NA	0.83	NA	NA	CH	NA	NA	27.0	NA	NA
31.0 - 32.5	31.75	120	1.50	13	17	0.82	14	56	CH	FALSE	NA	29.0	NA	NA
32.5 - 34.0	33.25	120	1.54	20	27	0.81	22	68	CH	FALSE	NA	24.0	NA	NA
34.0 - 35.5	34.75	120	1.59	14	19	0.79	15	56	CH	FALSE	NA	23.0	NA	NA
35.5 - 37.0	36.25	120	1.63	15	20	0.78	16	58	CH	FALSE	NA	26.0	NA	NA
37.0 - 38.5	37.75	120	1.67	18	24	0.77	19	63	CH	FALSE	NA	28.0	NA	NA
38.5 - 40.0	39.25	120	1.72	11	15	0.76	11	47	CH	FALSE	NA	31.0	NA	NA
40.0 - 42.0	41	120	1.77	ST	NA	0.75	NA	NA	CH	NA	NA	29.0	NA	NA
42.0 - 43.5	42.75	120	1.82	12	16	0.74	12	47	CH	FALSE	NA	28.0	NA	NA
43.5 - 45.0	44.25	120	1.86	18	24	0.73	18	60	CH	FALSE	NA	28.0	NA	NA
45.0 - 46.5	45.75	120	1.90	15	20	0.72	15	56	CH	FALSE	NA	29.0	NA	NA
46.5 - 48.0	47.25	120	1.95	13	17	0.72	12	52	CH	FALSE	NA	30.0	NA	NA
48.0 - 49.5	48.75	120	1.99	25	33	0.71	24	71	CH	FALSE	NA	27.0	NA	NA
49.5 - 51.0	50.25	120	2.03	14	19	0.70	13	53	CH	FALSE	NA	34.0	NA	NA
51.0 - 52.5	51.75	120	2.08	16	21	0.69	15	56	CH	FALSE	NA	25.0	NA	NA
52.5 - 54.0	53.25	120	2.12	14	19	0.69	13	52	CH	FALSE	NA	27.0	NA	NA
54.0 - 55.5	54.75	120	2.16	8	11	0.68	7	39	CH	FALSE	NA	29.0	NA	NA
55.5 - 57.0	56.25	120	2.21	9	12	0.67	8	41	CL	FALSE	NA	30.0	NA	NA
57.0 - 58.5	57.75	120	2.25	27	36	0.67	24	73	CL	FALSE	NA	27.0	NA	NA
58.5 - 60.0	59.25	120	2.29	13	17	0.66	12	47	CL	FALSE	NA	27.0	NA	NA
60.0 - 61.5	60.75	120	2.33	32	43	0.65	28	77	CL	FALSE	NA	29.0	NA	NA
61.5 - 63.0	62.25	120	2.38	22	29	0.65	19	65	CL	FALSE	NA	20.0	NA	NA
63.0 - 64.5	63.75	120	2.42	91	121	0.64	78	100	CL	FALSE	NA	19.0	NA	NA









**TVA - Widows Creek Main Ash Pond  
 CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS  
 FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required														
STN-106														
		water =	12.5											
0.0	1.5	128	0.05	11	15	1.00	15	56	SP-SM	33.5	106	21.0	128	0.57
1.5	3.0	133	0.15	27	36	1.00	36	86	SP-SM	37	113	18.0	133	0.48
3.0	4.5	146	0.26	26	35	1.00	35	84	SP-SM	36.5	111.5	31.0	146	0.5
4.5	6.0	142	0.36	18	24	1.00	24	73	SP-SM	35	109	30.0	142	0.54
6.0	7.5	133	0.46	15	20	1.00	20	67	SP-SM	34.5	108	23.0	133	0.55
7.5	9.0	120	0.55	8	11	1.00	11	47	ML	30.5	88	36.0	120	0.91
9.0	10.5	118	0.64	4	5	1.00	5	32	ML	29	85	39.0	118	0.97
10.5	12.0	103	0.72	2	3	1.00	3	18	ML	27.5	82	26.0	103	1.03
12.0	13.5	114	0.76	2	3	1.00	3	18	ML	27.5	82	39.0	114	1.03
13.5	15.0	110	0.79	0	0	1.00	1	11	ML	27	81	36.0	110	1.05
15.0	16.5	122	0.84	0	0	1.00	1	11	ML	27	81	50.0	122	1.05
16.5	18.0	115	0.88	0	0	1.00	1	11	ML	27	81	42.0	115	1.05
18.0	19.5	113	0.92	0	0	1.00	1	11	ML	27	81	40.0	113	1.05
19.5	21.0	116	0.96	0	0	1.00	1	11	ML	27	81	43.0	116	1.05
21.0	22.5	112	0.99	0	0	1.00	1	11	ML	27	81	38.0	112	1.05
22.5	24.0	114	1.03	2	3	0.98	3	18	ML	27.5	82	39.0	114	1.03
24.0	26.0	120	1.08	ST	NA	0.96	NA	NA	ML	#N/A	#N/A	38.0	#N/A	#N/A
26.0	27.5	121	1.13	0	0	0.94	1	11	ML	27	81	49.0	121	1.05
27.5	29.0	115	1.17	0	0	0.92	1	11	ML	27	81	42.0	115	1.05
29.0	30.5	116	1.21	0	0	0.91	1	11	ML	27	81	43.0	116	1.05
30.5	32.0	119	1.26	0	0	0.89	1	11	ML	27	81	47.0	119	1.05
32.0	33.5	116	1.30	0	0	0.88	1	11	ML	27	81	43.0	116	1.05
33.5	35.0	120	1.34	0	0	0.86	1	11	ML	27	81	48.0	120	1.05
35.0	37.0	120	1.39	ST	NA	0.85	NA	NA	ML	#N/A	#N/A	#N/A	#N/A	#N/A
37.0	38.5	116	1.44	0	0	0.83	1	11	ML	27	81	43.0	116	1.05
38.5	40.0	117	1.48	0	0	0.82	1	11	ML	27	81	45.0	117	1.05
46.0	47.5	117	1.68	0	0	0.77	1	11	ML	27	81	45.0	117	1.05
47.5	49.0	117	1.72	0	0	0.76	1	11	ML	27	81	45.0	117	1.05
49.0	50.5	135	1.78	10	13	0.75	10	47	ML	30.5	88	53.0	135	0.91
50.5	52.5	120	1.83	ST	NA	0.74	NA	NA	CH	NA	NA	26.0	NA	NA
52.5	54.0	120	1.88	12	16	0.73	12	47	CH	FALSE	NA	26.0	NA	NA
54.0	55.5	120	1.92	8	11	0.72	8	41	CH	FALSE	NA	28.0	NA	NA

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>1</sub> ) <sub>60</sub>	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
STN-107														
		water =												
0.0 - 1.5	0.75	120	19.5	9	12	1.00	12	52	SP-SM	33	105	14.0	120	0.59
1.5 - 3.0	2.25	123	0.04	13	17	1.00	17	60	SP-SM	34	107	15.0	123	0.56
3.0 - 4.5	3.75	125	0.23	6	8	1.00	8	41	SP-SM	31.5	103	21.0	125	0.62
4.5 - 6.0	5.25	121	0.32	4	5	1.00	5	32	SP-SM	30	100.5	20.0	121	0.66
6.0 - 7.5	6.75	120	0.41	11	15	1.00	15	56	CH	FALSE	NA	21.0	NA	NA
7.5 - 9.0	8.25	120	0.50	13	17	1.00	17	60	CH	FALSE	NA	30.0	NA	NA
9.0 - 10.5	9.75	120	0.59	5	7	1.00	7	35	CH	FALSE	NA	29.0	NA	NA
10.5 - 12.0	11.25	120	0.68	8	11	1.00	11	47	CH	FALSE	NA	33.0	NA	NA
12.0 - 13.5	12.75	120	0.77	20	27	1.00	27	75	CH	FALSE	NA	32.0	NA	NA
13.5 - 15.0	14.25	120	0.86	11	15	1.00	15	56	CH	FALSE	NA	19.0	NA	NA
15.0 - 16.5	15.75	120	0.95	7	9	1.00	9	44	CH	FALSE	NA	19.0	NA	NA
16.5 - 18.0	17.25	120	1.04	12	16	0.98	16	58	CH	FALSE	NA	15.0	NA	NA
18.0 - 19.5	18.75	129	1.14	32	43	0.94	40	89	SP-SM	37	113	14.0	129	0.48
19.5 - 21.0	20.25	128	1.19	2	3	0.92	2	18	SP-SM	28.5	98	31.0	128	0.71
21.0 - 22.5	21.75	120	1.23	7	9	0.90	8	41	CH	FALSE	NA	28.0	NA	NA
22.5 - 24.0	23.25	120	1.27	11	15	0.89	13	53	CH	FALSE	NA	26.0	NA	NA
24.0 - 25.5	24.75	120	1.32	9	12	0.87	11	47	CH	FALSE	NA	31.0	NA	NA
25.5 - 27.0	26.25	120	1.36	11	15	0.86	13	52	CH	FALSE	NA	24.0	NA	NA
27.0 - 28.5	27.75	120	1.40	15	20	0.84	17	60	CH	FALSE	NA	25.0	NA	NA
28.5 - 30.0	29.25	120	1.45	21	28	0.83	23	71	CH	FALSE	NA	22.0	NA	NA
30.0 - 32.0	31	120	1.50	ST	NA	0.82	NA	NA	CH	NA	NA	24.0	NA	NA
32.0 - 33.5	32.75	120	1.55	9	12	0.80	10	44	CH	FALSE	NA	17.0	NA	NA
33.5 - 35.0	34.25	120	1.59	13	17	0.79	14	53	CH	FALSE	NA	23.0	NA	NA
35.0 - 36.5	35.75	120	1.63	17	23	0.78	18	60	CH	FALSE	NA	30.0	NA	NA
36.5 - 38.0	37.25	120	1.68	9	12	0.77	9	44	CH	FALSE	NA	23.0	NA	NA
38.0 - 39.5	38.75	120	1.72	14	19	0.76	14	56	CH	FALSE	NA	28.0	NA	NA
39.5 - 41.5	40.5	120	1.77	ST	NA	0.75	NA	NA	CH	NA	NA	22.0	NA	NA
41.5 - 43.0	42.25	120	1.82	12	16	0.74	12	47	CH	FALSE	NA	18.0	NA	NA
43.0 - 44.5	43.75	120	1.86	9	12	0.73	9	41	CH	FALSE	NA	29.0	NA	NA
44.5 - 46.0	45.25	120	1.91	7	9	0.72	7	35	CH	FALSE	NA	26.0	NA	NA
46.0 - 47.5	46.75	120	1.95	6	8	0.72	6	32	CH	FALSE	NA	34.0	NA	NA
47.5 - 49.0	48.25	120	1.99	8	11	0.71	8	41	CH	FALSE	NA	27.0	NA	NA
49.0 - 51.0	50	120	2.04	ST	NA	0.70	NA	NA	CH	NA	NA	25.0	NA	NA
51.0 - 52.5	51.75	115	2.09	10	13	0.69	9	44	SM	30.5	95	21.0	115	0.76
52.5 - 54.0	53.25	109	2.13	4	5	0.69	4	24	SM	28.5	91	20.0	109	0.83
54.0 - 54.5	54.25	120	2.15	100	133	0.68	91	100	SM	FALSE	NA	14.0	NA	NA

TVA - Widows Creek Main Ash Pond														
CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS														
FOR COARSE GRAINED SOILS														
Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised	
													In-situ Unit Weight (pcf)	Void Ratio
				Input Required										
				N <sub>60</sub>	N <sub>60</sub>	CN	(N <sub>160</sub> )	Dr		φ	γ <sub>d</sub>	m	γ <sub>w</sub>	e
STN-108														
		water =	21.0											
0.0 - 1.5	0.75	120	0.05	9	12	1.00	12	52	CH	FALSE	NA	26.0	NA	NA
1.5 - 3.0	2.25	120	0.14	17	23	1.00	23	70	CH	FALSE	NA	27.0	NA	NA
3.0 - 4.5	3.75	120	0.23	18	24	1.00	24	73	CH	FALSE	NA	19.0	NA	NA
4.5 - 6.0	5.25	120	0.32	20	27	1.00	27	75	CH	FALSE	NA	17.0	NA	NA
6.0 - 7.5	6.75	120	0.41	28	37	1.00	37	87	CH	FALSE	NA	22.0	NA	NA
7.5 - 9.0	8.25	120	0.50	13	17	1.00	17	60	CH	FALSE	NA	22.0	NA	NA
9.0 - 10.5	9.75	120	0.59	17	23	1.00	23	70	CH	FALSE	NA	25.0	NA	NA
10.5 - 12.5	11.5	120	0.69	ST	NA	1.00	NA	NA	CH	NA	NA	24.0	NA	NA
12.5 - 14.0	13.25	120	0.80	16	21	1.00	21	68	CH	FALSE	NA	26.0	NA	NA
14.0 - 15.5	14.75	120	0.89	14	19	1.00	19	63	CH	FALSE	NA	22.0	NA	NA
15.5 - 17.5	16.5	120	0.99	ST	NA	1.00	NA	NA	CH	NA	NA	19.0	NA	NA
17.5 - 19.0	18.25	120	1.10	3	4	0.96	4	24	CH	FALSE	NA	24.0	NA	NA
19.0 - 20.5	19.75	121	1.19	8	11	0.92	10	44	SM	30.5	95	27.0	121	0.76
20.5 - 22.0	21.25	94	1.21	5	7	0.91	6	35	SM	30	94		94	0.78
22.0 - 23.5	22.75	95	1.23	7	9	0.90	8	41	SM	30.5	95		95	0.76
23.5 - 25.0	24.25	114	1.27	16	21	0.89	19	63	SP	35	114		114	0.46
25.0 - 25.5	25.25	120	1.30	100	133	0.88	117	100		FALSE	NA		NA	NA



**TVA - Widows Creek Main Ash Pond**

**CORRELATION OF SPT DATA TO UNIT WEIGHTS AND SHEAR STRENGTHS**

**FOR COARSE GRAINED SOILS**

Sample Interval	Depth of Mid. Pt. of Sample (ft.)	Assumed Estimated Unit Weight (pcf)	Vertical Effective Stress (tsf)	SPT N Value	SPT N Value	Correction Factor	Corrected N-Value (N <sub>160</sub> )	Relative Density (%)	Unified Soil Classification	Internal Angle of Friction (degrees)	Unit Weight Dry (pcf)	Moisture Content (%)	Revised In-situ Unit Weight (pcf)	Void Ratio
Input Required														
STN-109														
		water =												
20.0 - 21.5	20.75	84	22.0	3	4	1.00	4	27	ML	28.5	84		84	0.99
21.5 - 23.0	22.25	82	0.87	2	3	1.00	3	18	ML	27.5	82		82	1.03
23.0 - 24.5	23.75	123	0.89	25	33	1.00	33	84	GC	38.5	123		123	0.35
24.5 - 26.0	25.25	116	0.97	9	12	1.00	12	52	GC	34.2	116		116	0.44
26.0 - 26.3	26.15	129	1.00	100	133	1.00	133	100	GC	41.6	129		129	0.29





