Table 2.5-44 WBNP - Bearing Capacity - Category I Soil-Supported Structures
Adopted Soil Properties For Bearing Capacity Determination

	Unit Weight (PCF)			Strength Tests					
				Q		R		R or S	
Material	Moist	Sat.	Sub	φ (DEG)	C (PSF)	φ (DEG)	C (PSF)	φ (DEG)	C (PSF)
Granular fill	133	142	80	39	1400	38[a]	0[a]	38	700
In-situ gravel (N450)	125	143	72	39[a]	0[a]	39[a]	0[a]	39	0
In-situ gravel (N = 16, 17)	120[a]	130[a]	68[a]	30[a]	0[a]	30[a]	0[a]	30[a]	0[a]
Weathered shale	-	127	64	0	1600	18	300	27	0

[a] Properties assumed.

Table 2.5-45 Watts Bar Nuclear Plant
ERCW Liquefaction
Trench A
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I	II	III
Symbol	SM-SC	SC	CL
Mechanical and Hydrometer Analysis			
Gravel, percent	0	0	0
Sand, percent	70	51	40
Silt, percent	15	24	29
Clay, percent	15	25	31
Atterberg Limits			
Liquid limit, percent	24	28	34
Plastic limit, percent	19	17	19
Plasticity index, percent	5	11	15
Shrinkage limit, percent	--	--	--
Standard Proctor Compaction			
Optimum moisture, percent	13.1	14.1	15.9
Maximum density, pcf	116.6	114.4	110.8
Penetration resistance, psi	910	840	760
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit Weight			
Triaxial R: φ, degrees	15.0	14.8	18.0
c, tsf	0.29	0.11	0.03
Shear Strength at 3% Dry of Optimum Moisture and at 100% of Maximum Unit Weight			
Triaxial R: φ, degrees	--	15.7	16.8
c, tsf	--	0.19	0.10
Percent of class in area	8	61	31
Natural moisture content, percent	18.5	19.4	20.7

Table 2.5-45a Watts Bar Nuclear Plant ERCW Liquefaction, Trench A Supplemental Borrow Summary of Laboratory Test Data Borrow Soil Classes

Group	1	2	3
Symbol	ML	SM	ML
Mechanical and Hydrometer Analysis			
Gravel, percent	0	0	0
Sand, percent	16	54	43
Silt, percent	44	31	15
Clay, percent	40	15	22
Atterberg Limits			
Liquid limit, percent	47	26	34
Plastic limit, percent	29	25	26
Plasticity index, percent	18	1	8
Shrinkage limit, percent	--	--	—
Standard Protoctor Compaction			
Optimum moisture, percent	21.4	17.3	18.8
Maximum density, pcf	99.7	108.4	105.3
Penetration resistance, psi	1180	860	800
Shear Strength at 3% Dry of Optimum Moisture			
and at 100% of Maximum Unit Weight*			
Triaxial R: φ, degrees	13.0	11.6	12.9
c, tsf	0.43	0.46	0.69
Percent of class in area	--	--	--
Natural moisture content, percent	--	--	--

* Group 2 tested at 95 percent of maximum unit weight.

Table 2.5-46 Watts Bar Nuclear Plant
ERCW Liquefaction
Trench B
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I	II	III
Symbol	SM	SM-SC	CL
Mechanical and Hydrometer Analysis			
Gravel, percent	0	0	0
Sand, percent	66	55	43
Silt, percent	22	24	28
Clay, percent	12	21	29
Atterberg Limits			
Liquid limit, percent	NP	28	30
Plastic limit, percent	NP	22	19
Plasticity index, percent	NP	6	11
Shrinkage limit, percent	--	--	--
Standard Proctor Compaction			
Optimum moisture, percent	15.3	15.6	15.8
Maximum density, pcf	110.7	110.3	109.8
Penetration resistance, psi	770	1025	1425
Shear Strength at 3% Dry of Optimum Moisture			
and at 95% of Maximum Unit Weight	7.6	5.5	10.4
Triaxial R: φ, degrees	1.67	1.05	0.32
c, tsf			
Percent of class in area	26	22	52
Natural moisture content, percent	25.0	28.4	22.2

Table 2.5-47 Watts Bar Nuclear Plant
ERCW Liquefaction
Borrow Area 9
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I	II
Symbol	CL	CL-ML
Mechanical and Hydrometer Analysis		
Gravel, percent	0	0
Sand, percent	24	32
Silt, percent	40	27
Clay, percent	36	41
Atterberg Limits		
Liquid limit, percent	31	40
Plastic limit, percent	15	25
Plasticity index, percent	16	15
Shrinkage limit, percent	--	--
Standard Proctor Compaction		
Optimum moisture, percent	16.4	19.6
Maximum density, pcf	110.3	104.0
Penetration resistance, psi	350	680
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit Weight		
Triaxial R: φ, degrees	12.3	8.0
c, tsf	0.11	0.57
Shear Strength at 3% Dry of Optimum Moisture and at 100% of Maximum Unit Weight		
Triaxial R: φ, degrees	11.6	--
c, tsf	0.28	--
Percent of class in area	50	50
Natural moisture content, percent	18.1	21.7

Table 2.5-48 Watts Bar Nuclear Plant
ERCW Liquefaction
Borrow Area 10
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I	II
Symbol	CL	CL-ML
Mechanical and Hydrometer Analysis		
Gravel, percent	0	0
Sand, percent	33	19
Silt, percent	31	33
Clay, percent	36	48
Atterberg Limits		
Liquid limit, percent	39	45
Plastic limit, percent	23	26
Plasticity index, percent	16	19
Shrinkage limit, percent	--	--
Standard Proctor Compaction		
Optimum moisture, percent	20.6	25.4
Maximum density, pcf	103.0	93.3
Penetration resistance, psi	620	860
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit Weight*		
Triaxial R: φ, degrees	11.9	15.2
c, tsf	0.21	0.09
Shear Strength at 3% Dry of Optimum Moisture and at 100% of Maximum Unit Weight		
Triaxial R: φ, degrees	--	15.0
c, tsf	--	0.12
Percent of class in area	86	14
Natural moisture content, percent	23.9	27.6

*At a density of 90 pcf on class II.

Table 2.5-49 Watts Bar Nuclear Plant
ERCW Liquefaction
Borrow Area 11
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I
Symbol	ML
Mechanical and Hydrometer Analysis	
Gravel, percent	0
Sand, percent	21
Silt, percent	35
Clay, percent	44
Atterberg Limits	
Liquid limit, percent	44
Plastic limit, percent	29
Plasticity index, percent	15
Shrinkage limit, percent	--
Standard Proctor Compaction	
Optimum moisture, percent	22.2
Maximum density, pcf	99.8
Penetration resistance, psi	850
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit Weight*	
Triaxial R: φ, degrees	13.2
c, tsf	0.21
Percent of class in area	100
Natural moisture content, percent	26.9

Table 2.5-50 Watts Bar Nuclear Plant
ERCW Liquefaction
Borrow Area 12
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I	II	III
Symbol	SM	CL-ML	CL-ML
Mechanical and Hydrometer Analysis			
Gravel, percent	0	0	0
Sand, percent	50	22	22
Silt, percent	26	39	40
Clay, percent	24	39	38
Atterberg Limits			
Liquid limit, percent	32	40	42
Plastic limit, percent	25	25	26
Plasticity index, percent	7	15	16
Shrinkage limit, percent	--	--	--
Standard Proctor Compaction			
Optimum moisture, percent	16.8	17.8	19.2
Maximum density, pcf	108.8	106.5	103.7
Penetration resistance, psi	1165	1150	1140
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit Weight			
Triaxial R: φ, degrees	9.5	12.0	16.4
c, tsf	0.57	0.29	0.04
Shear Strenght at 3% Dry of Optimum Moisture and at 100% of Maximum Unit Weight			
Triaxial R: φ, degrees	--	--	12.5
c, tsf	--	--	0.39
Percent of class in area	12	55	33
Natural moisture content, percent	21.6	24.9	25.2

Table 2.5-51 Watts Bar Nuclear Plant
ERCW Liquefaction
Borrow Area 13
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I	II	III
Symbol	ML	ML	MH
Mechanical and Hydrometer Analysis			
Gravel, percent	0	0	0
Sand, percent	24	23	12
Silt, percent	42	39	41
Clay, percent	34	38	47
Atterberg Limits			
Liquid limit, percent	37	41	52
Plastic limit, percent	26	27	35
Plasticity index, percent	11	14	17
Shrinkage limit, percent	--	--	--
Standard Proctor Compaction			
Optimum moisture, percent	19.2	20.0	23.3
Maximum density, pcf	106.6	105.1	98.8
Penetration resistance, psi	650	800	740
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit Weight			
Triaxial R: o, degrees	15.6	14.5	18.3
c, tsf	0.15	0.14	0.02
Shear Strenght at 3% Dry of Optimum Moisture and at 100% of Maximum Unit Weight			
Triaxial R: φ, degrees	11.7	14.5	14.7
c, tsf	0.66	0.51	0.44
Percent of class in area	45	50	5
Natural moisture content, percent	19.6	22.7	27.6

Table 2.5-52 Watts Bar Nuclear Plant
ERCW Liquefaction
Borrow Area 2c
Summary of Laboratory Test Data
Borrow Soil Classes

Class	I	II	III	IV	V	VI
Symbol	ML	SM-SC	CL	CL	CL-ML	MH
Mechanical and Hydrometer Analysis						
Gravel, percent	0	0	0	0	0	0
Sand, percent	48	65	48	30	23	5
Silt, percent	40	16	23	34	39	40
Clay, percent	12	19	29	36	38	55
Atterberg Limits						
Liquid limit, percent	NP	25	36	41	44	62
Plastic limit, percent	NP	19	22	24	27	35
Plasticity index, percent	NP	6	14	17	17	27
Shrinkage limit, percent	--	--	--	--	--	--
Standard Proctor Compaction						
Optimum moisture, percent	12.1	13.9	16.6	18.1	19.5	26.8
Maximum density, pcf	117.7	114.0	109.0	106.2	103.5	90.8
Penetration resistance, psi	1000	1125	1050	760	840	950
Shear Strength at 3% Dry of Optimum Moisture and at 95% of Maximum Unit Weight*						
Triaxial R: φ, degrees	17.5	**	13.4	9.0	18.1	19.0
c, tsf	0.63	**	0.11	0.33	0.00	0.00
Shear Strenght at 3% Dry of Optimum Moisture and at 100% of Maximum Unit Weight***						
Triaxial R: φ, degrees	--	--	13.0	--	15.3	17.4
c, tsf	--	--	0.58	--	0.22	0.24
Percent of class in area	1	1	3	31	63	1
Natural moisture content, percent	21.7	20.5	26.4	22.9	23.6	31.6

* Class VI tested at 90.0 pcf

** Class II is less than 1% of total borrow and no shear tests were conducted on this class.

*** Class VI tested at 105% of maximum unit weight.

Table 2.5-53 Watts Bar Nuclear Plant
ERCW Liquefaction
Borrow Area 2c Extension
Summary of Laboratory Test Data
Borrow Soil Groups

Group	1	2	3	4	5	6	7	8	9
Symbol	CL	CL	CL	CL	CL-ML	MH	CL	CL-ML	SM
Mechanical and Hydrometer Analysis									
Gravel, percent	0	0	0	0	0	0	0	0	1
Sand, percent	23	30	24	20	23	15	36	42	55
Silt, percent	48	42	43	40	36	27	36	33	30
Clay, percent	29	28	33	40	41	58	28	25	14
Atterberg Limits									
Liquid limit, percent	34	34	40	41	47	58	37	35	32
Plastic limit, percent	21	22	24	24	28	32	23	23	20
Plasticity index, percent	13	12	16	17	19	26	14	12	1
Shrinkage limit, percent	--	--	--	--	--	--	--	--	--
Standard Proctor Compaction									
Optimum moisture, percent*	16.6	17.3	18.8	20.2	21.7	28.1	16.6	16.6	14.8
Maximum density, pcf	109.0	107.7	104.8	102.3	99.6	88.0	109.0	109.0	112.8
Penetration resistance, psi	--	--	--	--	--	--	--	--	--
Percent of group in area	3	24	11	13	11	3	33	3	1
Natural moisture content, percent	21.5	16.4	21.5	21.8	26.5	27.2	14.0	16.6	10.1

*Standard proctor compaction results are based on borrow area 2C family of curves.

Note: Shear strength tests were not conducted on the extension of borrow area 2C.

Table 2.5-54 Summary of Laboratory Test Data

	Maximum Fines Gradation		Average Fines Gradation		Minimum Fines Gradation	
Minimum density, pcf	107.1		103.1		108.7	
Maximum density, pcf	143.1		139.5		143.9	
	Ø	**C (tsf)**	**Ø**	**C (tsf)**	**Ø**	**C (tsf)**
Triaxial Shear (Q)						
At 80% R_d	38.7	0.73	38.3	1.46	40.5	1.91
At 70% R_d	38.5	0.50	42.5	0.80	42.0	1.64
Triaxial Shear (R)						
At 80% R_d	39.3	1.93	41.8	0.99	43.7	0.34
Direct Shear (S)						
At 80% R_d	39.4	0.30	42.0	0.52	44.2	0.63
At 70% R_d	36.0	0.35	44.0	0.24	42.5	0.52

R_d = Relative density

Table 2.5-55 Granular Material Design Values
Section 1032 Material

Relative Density	Unit Weight		Shear Strength Values			
	Ym	Ysat	Q		R&S*	
	(pcf)	(pcf)	0	C	0	C
				(tsf)		(tsf)
80%	135	143	39*	1.0	40*	0.5
70%	133	142	39*	0.7	38*	0.35

* For an analysis where pore pressure buildup has to be considered, estimated pore pressure should be incremented (suggest 10% increments)to a reasonable maximum level to check the effect of pore pressure buildup.

Ym = Moist unit weight

Ysat = Saturated unit weight

Q = Unconsolidated - undrained triaxial shear test

R = Consolidated - undrained triaxial shear test (effective)

S = Direct shear test

Table 2.5-56 Watts Bar Nuclear Plant
Relative Density Test Results on Engineered
Granular Fill Beneath the Diesel Generator Building

Sample	Max. Dry Density (pcf)	Min. Dry Density (pcf)	Field Density (pcf)	Relative Density (pcf)
158	144.6	100.4	132.0	78
159	144.6	100.4	133.0	80
160	144.6	100.4	135.0	84
162	144.6	100.4	137.75	82
163	144.6	100.4	136.5	87
164	144.6	100.4	131.25	77
167	144.6	100.4	135.50	85
168	144.6	100.4	138.00	89
169	144.6	100.4	135.75	85
170	144.6	100.4	131.50	77
171	144.6	100.4	136.75	87
172	144.6	100.4	133.25	81
178	144.6	100.4	130.25	75
179	144.6	100.4	131.5	77
180	144.6	100.4	131.0	76
184	144.6	100.4	130.75	78
185	144.6	100.4	137.5	88
186	144.6	100.4	130.5	76
190	144.6	100.4	138.5	90
191	144.6	100.4	136.25	86
192	144.6	100.4	134.75	83
194	144.6	100.4	128.75	72
195	144.6	100.4	132.0	78
196	144.6	100.4	131.5	77
199	144.6	100.4	129.5	76
200	144.6	100.4	137.25	88
201	144.6	100.4	130.75	77
204	144.6	100.4	125.75	66
205	144.6	100.4	127.75	70

Table 2.5-56 Watts Bar Nuclear Plant
Relative Density Test Results on Engineered
Granular Fill Beneath the Diesel Generator Building

206	144.6	100.4	127.75	70
210	144.6	100.4	128.25	71
211	144.6	100.4	137.0	87
212	138.8	109.9	133.5	83
213	138.8	109.9	137.0	96
214	138.8	109.9	136.5	93
217	138.8	109.9	133.75	86.5
218	138.8	109.9	136.5	94.5

Table 2.5-57 Watts Bar Nuclear Plant
Sieve Analysis of 1032 Gravel
Tennessee Valley Authority
(Sheet 1 of 5)

SCREEN SIZE				1-1/4 in	1 in	3/4 in	3/8 in	#4	#10	#16	#40	#100	#200
				PERCENT PASSING									
SPECIFICATION LIMITS 1032.02				100	95-100	70-100	50-85	36-65	20-45	NA	8-25	NA	0-10
DATE	TIME	SAMPLE SOURCE	SAMPLE WT(LBS)										
3-21-75	12:10 PM	TVA Stockpile	16.7	100.0	100.0	91.1	66.6	44.5	26.2	NA	10.4	NA	4.1
3-25-75	1:00 PM	TVA Stockpile	15.0	100.0	100.0	91.1	76.7	54.2	32.1	NA	10.2	NA	3.9
3-26-75	11:15 AM	TVA Stockpile	16.7	100.0	97.2	87.2	62.4	43.7	26.8	NA	5.7	NA	
3-27-75	2:30 PM	TVA Stockpile	16.7	100.0	93.6	85.8	65.3	47.1	24.4	NA	11.2	NA	4.8
3-28-75	9:15 AM	TVA Stockpile	16.6	100.0	100.0	93.0	79.3	58.2	38.0	NA	14.4	NA	4.4
3-31-75	9:40 AM	TVA Stockpile	16.7	100.0	100.0	92.9	66.6	42.2	23.9	NA	9.5	NA	4.2
4-1-75	10:30 AM	TVA Stockpile	15.0	100.0	96.2	93.7	78.4	56.9	34.1	NA	13.4	NA	5.1
4-2-75	12:00 PM	TVA Stockpile	16.4	100.0	100.0	91.6	64.6	42.6	24.5	NA	9.0	NA	3.9
4-3-75	10:45 AM	TVA Stockpile	16.3	100.0	98.1	90.1	74.3	55.8	31.6	NA	5.3	NA	1.6
4-4-75	9:30 AM	TVA Stockpile	17.0	100.0	97.8	92.1	77.2	59.6	38.7	NA	13.5	NA	4.2
4-7-75	12:30 PM	TVA Stockpile	16.7	100.0	98.7	95.6	77.2	57.6	34.3	NA	10.3	NA	4.4
4-8-75	12:15 PM	TVA Stockpile	16.7	100.0	95.7	88.3	61.9	39.9	25.1	NA	10.1	NA	3.4
4-9-75	12:10 PM	TVA Stockpile	16.7	100.0	100.0	95.8	77.5	53.2	32.1	NA	11.7	NA	3.4
4-10-75	1:00 PM	TVA Stockpile	16.7	100.0	100.0	87.2	49.9	32.2	20.0	NA	8.9	NA	3.9
4-11-75	10:00 AM	TVA Stockpile	20.0	100.0	98.6	90.5	63.6	44.0	26.5	NA	8.8	NA	3.0
4-14-75	10:00 AM	TVA Stockpile	20.0	100.0	98.5	91.6	64.0	40.8	33.5	NA	8.6	NA	4.8
4-15-75	10:15 AM	TVA Stockpile	20.0	100.0	100.0	91.2	67.7	41.3	23.4	NA	8.1	NA	2.7
4-16-75	12:05 AM	TVA Stockpile	16.7	100.0	100.0	88.9	63.9	43.1	26.4	NA	9.7	NA	3.8

Table 2.5-57 Watts Bar Nuclear Plant
Sieve Analysis of 1032 Gravel
Tennessee Valley Authority
(Sheet 2 of 5)

SCREEN SIZE				1-1/4 in	1 in	3/4 in	3/8 in	#4	#10	#16	#40	#100	#200
				PERCENT PASSING									
SPECIFICATION LIMITS 1032.02				100	95-100	70-100	50-85	36-65	20-45	NA	8-25	NA	0-10
DATE	TIME	SAMPLE SOURCE	SAMPLE WT(LBS)										
4-17-75	2:00 PM	TVA Stockpile	16.5	100.0	100.0	91.7	64.6	42.8	24.5	NA	9.2	NA	4.0
4-18-75	1:35 PM	TVA Stockpile	16.8	100.0	99.0	94.2	73.7	54.4	33.9	NA	11.5	NA	4.8
4-21-75	3:30 PM	TVA Stockpile	16.7	100.0	100.0	91.3	54.5	33.4	19.8	NA	8.5	NA	3.6
4-22-75	3:30 PM	TVA Stockpile	16.6	100.0	100.0	87.6	55.0	34.1	19.3	NA	7.9	NA	3.4
4-23-75	12:05	TVA Stockpile Diesel	20.0	100.0	99.0	92.9	64.5	25.7	19.3	NA	10.1	NA	2.1
4-24-75	10:00 AM	Generator Fds	20.0	100.0	100.0	95.7	81.2	59.1	32.9	NA	9.5	NA	4.2
4-25-75	10:50 AM	TVA Stockpile	16.7	100.0	97.1	86.3	56.9	37.8	24.1	NA	9.1	NA	3.8
4-28-75	9:30 AM	TVA Stockpile	16.8	100.0	100.0	95.7	81.0	60.1	38.8	NA	14.5	NA	4.6
4-29-75	12:30 PM	TVA Stockpile	16.7	100.0	100.0	90.2	72.6	54.7	35.3	NA	12.8	NA	3.9
4-30-75	1:00 PM	TVA Stockpile	16.9	100.0	100.0	95.3	72.2	49.8	30.3	NA	11.1	NA	3.5
5-1-75	10:00 AM	TVA Stockpile	15.0	100.0	100.0	94.2	73.9	48.3	31.1	NA	16.3	NA	8.9
5-2-75	10:00 AM	TVA Stockpile	16.7	100.0	100.0	94.7	77.9	56.3	35.9	NA	13.9	NA	4.5
5-5-75	1:00 PM	TVA Stockpile	16.8	100.0	100.0	94.1	81.0	63.4	42.8	NA	17.2	NA	5.6
5-6-75	9:00 AM	TVA Stockpile	17.0	100.0	100.0	97.5	78.5	57.0	35.7	NA	11.6	NA	3.8
5-7-75	8:30 AM	TVA Stockpile	16.9	100.0	98.9	91.6	64.4	44.3	27.1	NA	10.3	NA	3.6
5-8-75	12:45 PM	TVA Stockpile	16.8	100.0	100.0	92.2	74.8	53.9	34.3	NA	12.3	NA	3.9
5-9-75	1:01 PM	TVA Stockpile	16.8	100.0	100.0	98.2	74.5	51.5	31.7	NA	11.9	NA	3.7

Table 2.5-57 Watts Bar Nuclear Plant
Sieve Analysis of 1032 Gravel
Tennessee Valley Authority
(Sheet 3 of 5)

SCREEN SIZE				1-1/4 in	1 in	3/4 in	3/8 in	#4	#10	#16	#40	#100	#200
				PERCENT PASSING									
SPECIFICATION LIMITS 1032.02				100	95-100	70-100	50-85	36-65	20-45	NA	8-25	NA	0-10
DATE	TIME	SAMPLE SOURCE	SAMPLE WT(LBS)										
5-12-75	10:00 AM	TVA Stockpile	16.7	100.0	100.0	95.7	77.4	53.2	32.2	NA	11.7	NA	3.4
5-13-75	1:00 PM	TVA Stockpile	16.7	100.0	98.1	91.9	75.4	55.5	35.9	NA	12.5	NA	4.0
5-14-75	9:45 AM	TVA Stockpile	16.9	100.0	100.0	89.3	65.7	43.1	28.1	NA	10.1	NA	4.3
5-15-75	9:45 AM	TVA Stockpile	17.0	100.0	100.0	93.2	73.4	52.4	32.8	NA	13.0	NA	4.5
5-16-75	10:30 AM	TVA Stockpile	16.6	100.0	100.0	91.4	71.3	49.4	29.3	NA	10.1	NA	4.3
5-19-75	9:45 AM	TVA Stockpile	16.7	100.0	100.0	97.7	76.1	54.9	34.1	NA	10.2	NA	3.5
5-20-75	1:30 PM	TVA Stockpile	16.1	100.0	100.0	86.9	52.2	30.0	15.0	NA	6.6	NA	8.3
5-21-75	9:30 AM	TVA Stockpile	16.8	100.0	100.0	95.6	80.9	60.0	38.4	NA	14.5	NA	4.6
5-22-75	10:00 AM	TVA Stockpile	16.7	100.0	100.0	87.3	49.9	32.2	19.9	NA	8.9	NA	3.9
5-23-75	9:30 AM	TVA Stockpile	16.6	100.0	100.0	91.7	71.4	49.4	29.1	NA	10.2	NA	4.3
5-27-75	9:30 AM	TVA Stockpile	16.7	100.0	100.0	87.2	49.8	32.3	20.0	NA	8.9	NA	3.8
5-28-75	9:30 AM	TVA Stockpile	16.8	100.0	100.0	96.3	72.6	54.8	35.3	NA	12.8	NA	3.8
5-29-75	9:30 AM	TVA Stockpile	16.7	100.0	98.6	86.4	64.4	43.3	24.3	NA	8.6	NA	3.5
5-30-75	9:30 AM	TVA Stockpile	16.3	100.0	97.3	95.4	73.4	56.0	36.8	NA	13.7	NA	4.5
6-2-75	9:15 PM	TVA Stockpile	16.7	100.0	100.0	87.2	49.8	32.2	20.0	NA	8.9	NA	3.8
6-3-75	1:00 PM	TVA Stockpile	15.4	100.0	100.0	81.3	54.0	30.2	20.2	NA	14.5	NA	4.8
6-4-75	10:30 AM	TVA Stockpile	16.6	100.0	100.0	91.7	66.9	43.7	24.5	NA	9.5	NA	3.2
6-5-75	5:00 PM	TVA Stockpile	16.8	100.0	98.1	91.2	73.3	53.1	29.8	NA	11.2	NA	4.5

Table 2.5-57 Watts Bar Nuclear Plant
Sieve Analysis of 1032 Gravel
Tennessee Valley Authority
(Sheet 4 of 5)

SCREEN SIZE				1-1/4 in	1 in	3/4 in	3/8 in	#4	#10	#16	#40	#100	#200
				PERCENT PASSING									
SPECIFICATION LIMITS 1032.02				100	95-100	70-100	50-85	36-65	20-45	NA	8-25	NA	0-10
DATE	TIME	SAMPLE SOURCE	SAMPLE WT(LBS)										
6-6-75	9:30 AM	TVA Stockpile	15.3	100.0	97.3	95.2	73.3	55.9	36.5	NA	13.5	NA	3.7
6-9-75	10:00 AM	TVA Stockpile	16.6	100.0	100.0	95.6	77.7	58.0	33.8	NA	10.5	NA	3.5
6-10-75	10:00 AM	TVA Stockpile	16.5	100.0	100.0	91.5	71.1	49.1	29.0	NA	9.0	NA	2.8
6-12-75	7:30 AM	TVA Stockpile	16.6	100.0	99.5	95.8	77.5	57.6	34.4	NA	10.3	NA	3.5
6-13-75	9:30 AM	TVA Stockpile	16.6	100.0	100.0	97.7	82.2	63.5	41.3	NA	16.7	NA	5.9
6-16-75	9:30 AM	TVA Stockpile	16.6	100.0	99.6	95.7	77.5	57.9	34.4	NA	10.3	NA	3.4
6-17-75	12:30 PM	TVA Stockpile	16.7	100.0	97.2	91.9	77.4	57.4	35.6	NA	12.0	NA	2.5
6-18-75	9:30 AM	TVA Stockpile	16.7	100.0	100.0	93.8	76.8	56.5	35.1	NA	11.6	NA	2.8
6-19-75	9:30 AM	TVA Stockpile	16.7	100.0	100.0	*	67.1	48.6	29.8	NA	9.6	NA	3.4
6-20-75	1:00 PM	TVA Stockpile	15.1	100.0	100.0	99.9	75.6	51.5	26.9	NA	7.1	NA	1.5
6-23-75	9:30 AM	TVA Stockpile	16.6	100.0	97.8	90.4	69.8	46.9	27.3	NA	11.3	NA	4.2
6-24-75	9:30 AM	TVA Stockpile	16.7	100.0	99.8	93.3	64.1	38.0	22.4	NA	8.3	NA	3.2
6-25-75	9:30 AM	TVA Stockpile	15.6	100.0	100.0	95.2	77.0	58.2	33.6	NA	8.7	NA	1.6
6-26-75	9:30 PM	TVA Stockpile	16.7	100.0	99.6	95.5	77.9	57.8	34.6	NA	11.0	NA	4.2
6-27-75	10:00 AM	TVA Stockpile	15.8	100.0	100.0	92.0	56.1	37.1	22.9	NA	9.4	NA	3.3
6-30-75	9:30 AM	TVA Stockpile	16.7	100.0	100.0	89.4	67.4	48.6	29.9	NA	9.8	NA	3.1
7-1-75	12:30 PM	TVA Stockpile	16.2	100.0	99.2	90.1	75.6	57.8	31.2	NA	4.8	NA	1.7
7-2-75	10:30 AM	TVA Stockpile	16.5	100.0	100.0	91.8	64.7	42.7	24.5	NA	9.0	NA	4.0

Table 2.5-57 Watts Bar Nuclear Plant
Sieve Analysis of 1032 Gravel
Tennessee Valley Authority
(Sheet 5 of 5)

SCREEN SIZE				1-1/4 in	1 in	3/4 in	3/8 in	#4	#10	#16	#40	#100	#200
				PERCENT PASSING									
SPECIFICATION LIMITS 1032.02				100	95-100	70-100	50-85	36-65	20-45	NA	8-25	NA	0-10
DATE	TIME	SAMPLE SOURCE	SAMPLE WT(LBS)										
7-3-75	9:30 AM	TVA Stockpile	16.5	100.0	97.4	94.7	73.1	52.5	30.7	NA	8.3	NA	2.5
7-9-75	5:30 PM	TVA Stockpile	16.7	100.0	100.0	93.2	68.3	96.7	27.5	NA	8.7	NA	3.1
7-10-75	10:00 AM	TVA Stockpile	16.8	100.0	97.7	89.7	73.3	53.7	34.3	NA	12.9	NA	3.6
7-11-75	9:30 AM	TVA Stockpile	15.7	100.0	100.0	89.2	61.7	41.9	23.9	NA	7.0	NA	2.6
7-14-75	9:30 AM	TVA Stockpile	15.8	100.0	100.0	91.8	56.4	37.6	22.7	NA	9.5	NA	3.5
7-15-75	2:00 PM	TVA Stockpile	16.7	100.0	100.0	97.6	75.9	54.8	34.2	NA	10.2	NA	3.4
7-16-75	1:00 PM	TVA Stockpile	15.8	100.0	100.0	96.5	79.6	58.4	34.0	NA	9.9	NA	0.0
7-17-75	2:00 PM	TVA Stockpile	16.4	100.0	100.0	98.0	77.0	57.7	35.0	NA	9.2	NA	1.6
7-18-75	2:00 PM	TVA Stockpile	15.2	100.0	100.0	99.4	76.0	51.4	27.2	NA	7.5	NA	0.0
7-21-75	1:00 PM	TVA Stockpile	16.8	100.0	100.0	96.1	75.5	52.8	31.3	NA	10.1	NA	3.2
7-22-75	1:30 PM	TVA Stockpile	16.5	100.0	100.0	97.5	77.0	51.9	28.7	NA	9.7	NA	4.0
7-23-75		TVA Stockpile	16.8	100.0	100.0	95.6	80.4	64.8	43.3	NA	16.6	NA	6.5
7-24-75	10:30 PM	TVA Stockpile	16.7	100.0	100.0	97.5	64.9	40.2	21.7	NA	6.8	NA	1.2
7-25-75		TVA Stockpile	16.8	100.0	100.0	92.2	74.8	53.9	34.3	NA	12.3	NA	3.9
7-28-75	9:30 AM	TVA Stockpile	16.9	100.0	100.0	95.3	63.4	46.5	28.6	NA	8.6	NA	2.4
7-29-75	7:10 AM	TVA Stockpile	16.2	100.0	99.1	90.2	75.3	57.8	31.1	NA	4.9	NA	1.1
7-30-75	10:30 AM	TVA Stockpile	16.8	100.0	100.0	85.6	68.8	43.2	26.1	NA	8.9	NA	3.6

*Omitted by mistake

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 1 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
MAR	1	698.6	712.9	713.5	711.2	703.4	713.2	716.3	--	680.61
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	698.9	713.0	713.6	711.4	703.0	713.0	716.1	0.00	681.83
	5	--	--	--	--	--	--	--	--	--
	6	--	--	--	--	--	--	--	1.20	--
	7	--	--	--	--	--	--	--	--	--
	8	698.6	713.0	713.2	711.4	703.6	713.2	716.3	0.00	681.99
	9	--	--	--	--	--	--	--	0.00	--
	10	699.0	713.3	714.0	711.5	703.2	713.3	717.3	0.00	682.04
	11	--	--	--	--	--	--	--	--	--
	12	--	--	--	--	--	--	--	--	--
	13	--	--	--	--	--	--	--	0.93	--
	14	--	--	--	--	--	--	--	--	--
	15	698.8	713.3	714.0	711.5	702.9	712.7	717.1	--	681.87
	16	--	--	--	--	--	--	--	0.25	--
	17	--	--	--	--	--	--	--	0.30	--
	18	699.1	713.4	714.1	711.6	703.4	713.3	717.1	0.20	681.95
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	0.00	--
	21	--	--	--	--	--	--	--	--	--
	22	699.3	713.2	713.6	711.6	703.1	713.1	716.9	0.47	680.90
	23	--	--	--	--	--	--	--	0.00	--
	24	699.4	713.3	713.5	711.4	703.0	713.1	*	0.00	679.45
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--
	29	698.9	712.9	712.9	710.8	702.7	712.3	*	0.00	681.38

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 2 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	30	--	--	--	--	--	--	--	0.00	--
	31	--	--	--	--	--	--	--	0.41	--
*Destroyed										
APR	1	698.9	712.7	712.8	710.6	702.7	709.9[1]	*	0.00	680.74
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	--	--	--	--	--	--	--	0.00	--
	5	698.7	712.7	712.3	709.9	702.6	707.3	--	0.21	679.45
	6	--	--	--	--	--	--	--	0.00	--
	7	--	--	--	--	--	--	--	0.00	--
	8	698.5	712.6	712.1	709.0	702.6	707.3	--	0.54	680.31
	9	--	--	--	--	--	--	--	0.00	--
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.00	--
	12	698.4	712.5	712.1	707.7	702.8	707.4	--	0.00	680.41
	13	--	--	--	--	--	--	--	0.00	--
	14	--	--	--	--	--	--	--	0.00	--
	15	698.4	712.3	711.4	707.3	702.7	707.2	707.7**	0.00	680.04
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.49	--
	18	--	--	--	--	--	--	--	0.00	--
	19	698.5	712.7	713.1	709.0	702.8	707.3	716.5	0.00	680.5
	20	--	--	--	--	--	--	--	0.00	--
	21	698.6	712.1	710.7	706.8	702.6	707.1	716.4	0.00	680.54
	22	--	--	--	--	--	--	--	0.00	--
	23	--	--	--	--	--	--	--	0.00	--
	24	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 3 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	25	--	--	--	--	--	--	--	0.66	--
	26	698.6	711.9	710.1	706.3	702.7	707.0	716.8	0.18	680.96
	27	--	--	--	--	--	--	--	0.11	--
	28	698.5	711.9	710.0	706.2	702.6	707.1	716.9	0.00	681.32
	29	--	--	--	--	--	--	--	0.00	--
	30	--	--	--	--	--	--	--	0.00	--
* Destroyed										
** Repaired										
[1] Dropping due to nearby excavation for CML										
MAY	1	--	--	--	--	--	--	--	0.02	--
	2	--	--	--	--	--	--	--	0.00	--
	3	698.2	711.9	709.8	705.9	702.6	707.2	716.9	0.00	682.18
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.00	--
	6	--	--	--	--	--	--	--	0.00	--
	7	698.8	711.7	709.5	705.7	702.5	707.2	716.8	0.41	682.35
	8	--	--	--	--	--	--	--	0.00	--
	9	--	--	--	--	--	--	--	0.00	--
	10	698.7	711.8	710.7	705.6	702.5	707.3	716.8	0.00	682.57
	11	--	--	--	--	--	--	--	0.00	--
	12	698.7	711.9	711.0	705.6	702.5	707.2	716.7	0.00	682.40
	13	--	--	--	--	--	--	--	0.00	--
	14	--	--	--	--	--	--	--	0.00	--
	15	--	--	--	--	--	--	--	0.00	--
	16	--	--	--	--	--	--	--	0.00	--
	17	698.6	712.0	711.0	705.8	702.5	707.2	716.8	0.00	682.17
	18	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 4 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	19	--	--	--	--	--	--	--	0.00	--
	20	698.5	712.1	710.9	705.9	702.5	707.2	716.8	0.00	682.16
	21	--	--	--	--	--	--	--	0.00	--
	22	--	--	--	--	--	--	--	1.78	--
	23	--	--	--	--	--	--	--	0.00	--
	24	698.9	712.3	711.7	705.9	702.5	707.4	716.9	0.00	682.13
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.38	--
	27	699.0	712.5	711.9	706.1	702.5	707.3	716.9	0.00	682.60
	28	--	--	--	--	--	--	--	0.70	--
	29	--	--	--	--	--	--	--	0.00	--
	30	--	--	--	--	--	--	--	0.00	--
	31	--	--	--	--	--	--	--	0.00	--
JUNE	1	699.4	712.6	712.1	706.2	702.5	707.4	716.9	0.00	682.77
	2	--	--	--	--	--	--	--	0.00	--
	3	699.3	712.6	712.0	706.4	702.5	707.5	716.9	0.00	682.35
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.00	--
	6	--	--	--	--	--	--	--	0.00	--
	7	699.1	712.6	712.2	706.5	702.4	707.4	716.9	0.00	682.31
	8	--	--	--	--	--	--	--	0.00	--
	9	699.0	712.6	712.3	706.5	702.5	707.4	716.8	0.00	682.11
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.00	--
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.00	--
	14	698.9	712.5	713.0	706.7	702.5	707.3	716.7	0.00	682.41
	15	--	--	--	--	--	--	--	0.00	--
	16	699.3	712.6	713.0	706.6	702.5	707.3	716.7	0.00	682.45

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 5 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	17	--	--	--	--	--	--	--	0.00	--
	18	--	--	--	--	--	--	--	0.00	--
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	0.00	--
	21	699.7	712.6	712.9	706.6	702.5	707.3	716.6	0.00	683.01
	22	--	--	--	--	--	--	--	0.00	--
	23	699.7	712.4	712.5	706.8	702.4	707.3	716.5	0.00	682.57
	24	--	--	--	--	--	--	--	0.02	--
	25	--	--	--	--	--	--	--	0.01	--
	26	--	--	--	--	--	--	--	1.83	--
	27	--	--	--	--	--	--	--	0.16	--
	28	700.0	712.6	712.8	706.8	702.5	707.4	716.6	0.00	682.87
	29	--	--	--	--	--	--	--	0.00	--
	30	700.0	712.5	712.7	706.8	702.4	707.4	717.1	0.00	682.64
JULY	1	--	--	--	--	--	--	--	0.00	--
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.00	--
	6	700.0	712.6	712.8	706.7	702.4	707.3	717.0	0.00	682.77
	7	--	--	--	--	--	--	--	0.00	--
	8	700.1	712.6	712.7	706.9	702.5	707.3	716.9	0.03	681.93
	9	--	--	--	--	--	--	--	0.22	--
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.00	--
	12	700.0	712.6	712.8	706.9	702.4	707.4	716.9	0.00	683.50
	13	--	--	--	--	--	--	--	0.00	--
	14	700.1	712.5	712.8	706.8	702.4	707.4	716.9	0.00	682.7
	15	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 6 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	--	--	--	--	--	--	--	0.00	--
	19	700.0	712.5	712.8	706.8	702.3	707.3	717.0	0.00	682.26
	20	--	--	--	--	--	--	--	0.00	--
	21	--	--	--	--	--	--	--	0.42	--
	22	700.1	712.5	712.7	706.8	702.3	706.7	716.8	0.02	683.46
	23	--	--	--	--	--	--	--	0.01	--
	24	--	--	--	--	--	--	--	0.00	--
	25	--	--	--	--	--	--	--	0.00	--
	26	700.0	712.3	712.7	706.7	702.4	706.4	716.2	0.00	682.57
	27	--	--	--	--	--	--	--	0.29	--
	28	--	--	--	--	--	--	--	0.03	--
	29	700.0	712.7	712.7	706.9	702.3	706.4	716.7	0.00	682.05
	30	--	--	--	--	--	--	--	0.12	--
	31	--	--	--	--	--	--	--	0.97	--
AUG	1	--	--	--	--	--	--	--	0.00	--
	2	700.2	712.7	712.7	706.8	702.5	706.5	716.8	0.00	683.99
	3	--	--	--	--	--	--	--	0.00	--
	4	700.1	712.7	712.7	706.7	702.4	706.4	716.8	0.00	683.70
	5	--	--	--	--	--	--	--	0.00	--
	6	--	--	--	--	--	--	--	0.00	--
	7	--	--	--	--	--	--	--	0.21	--
	8	--	--	--	--	--	--	--	0.50	--
	9	700.2	712.7	712.7	706.7	702.4	707.4	716.7	0.63	682.83
	10	--	--	--	--	--	--	--	0.35	--
	11	700.1	712.7	712.6	706.7	702.5	708.0	716.7	0.13	682.90
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 7 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	14	--	--	--	--	--	--	--	0.00	--
	15	--	--	--	--	--	--	--	0.00	--
	16	699.9	711.9	712.5	706.7	702.4	708.9	716.9	0.33	681.23
	17	--	--	--	--	--	--	--	1.26	--
	18	700.2	712.8	712.7	706.7	702.5	707.1	717.0	0.02	682.40
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	0.00	--
	21	--	--	--	--	--	--	--	0.00	--
	22	--	--	--	--	--	--	--	0.00	--
	23	699.9	712.6	712.7	706.7	702.5	709.7*	717.0	0.52	682.63
	24	--	--	--	--	--	--	--	0.00	--
	25	700.0	712.7	712.7	706.7	702.5	710.0	716.9	0.00	682.68
	26	--	--	--	--	--	--	--	0.10	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--
	29	--	--	--	--	--	--	--	0.00	--
	30	699.9	712.6	712.5	706.7	702.4	709.6	716.8	0.17	682.40
	31	--	--	--	--	--	--	--	0.53	--
SEPT	1	699.9	712.5	712.6	706.7	702.5	709.8	716.8	0.03	682.50
	2	--	--	--	--	--	--	--	0.25	--
	3	--	--	--	--	--	--	--	0.02	--
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.00	--
	6	699.9	712.5	712.3	706.5	702.4	710.4	717.0	0.00	681.8
	7	--	--	--	--	--	--	--	0.00	--
	8	699.8	712.5	712.5	706.6	702.5	710.5	717.2	0.00	681.19

* Changed 2.6 since 18th.

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 8 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	9	--	--	--	--	--	--	--	0.00	--
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.22	--
	12	--	--	--	--	--	--	--	0.00	--
	13	699.6	712.3	712.3	706.6	702.5	710.5	717.1	0.08	680.86
	14	--	--	--	--	--	--	--	0.11	--
	15	699.7	712.5	712.4	706.6	702.5	710.6	717.1	0.00	682.10
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	--	--	--	--	--	--	--	0.00	--
	19	--	--	--	--	--	--	--	0.00	--
	20	699.8	712.3	712.3	708.3	702.4	710.4	717.0	0.00	681.70
	21	--	--	--	--	--	--	--	0.00	--
	22	699.2	712.3	713.1	708.7	702.5	710.3	716.9	0.00	682.04
	23	--	--	--	--	--	--	--	0.00	--
	24	--	--	--	--	--	--	--	0.00	--
	25	--	--	--	--	--	--	--	0.44	--
	26	--	--	--	--	--	--	--	0.09	--
	27	698.9	712.4	713.3	709.4	702.4	710.5	716.9	0.00	681.55
	28	--	--	--	--	--	--	--	0.00	--
	29	698.9	712.4	713.2	709.6	702.4	710.5	716.9	0.00	682.33
	30	--	--	--	--	--	--	--	0.00	--
* Changed 2.6 since 18th.										
OCT	1	--	--	--	--	--	--	--	0.00	--
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	698.4	712.5	713.6	709.9	702.4	710.3	716.9	0.00	682.14

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 9 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	5	--	--	--	--	--	--	--	0.00	--
	6	698.8	712.3	713.0	710.2	702.4	710.2	716.9	0.00	681.92
	7	--	--	--	--	--	--	--	1.38	--
	8	--	--	--	--	--	--	--	0.04	--
	9	--	--	--	--	--	--	--	0.00	--
	10	--	--	--	--	--	--	--	0.77	--
	11	--	--	--	--	--	--	--	0.00	--
	12	699.4	712.6	713.9	710.5	702.6	711.1	717.3	0.69	681.34
	13	--	--	--	--	--	--	--	0.35	--
	14	--	--	--	--	--	--	--	0.00	--
	15	--	--	--	--	--	--	--	0.00	--
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	699.7	713.2	714.4	710.7	702.6	711.3	717.1	0.00	680.74
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	0.00	--
	21	--	--	--	--	--	--	--	0.00	--
	22	--	--	--	--	--	--	--	0.00	--
	23	--	--	--	--	--	--	--	0.00	--
	24	--	--	--	--	--	--	--	0.00	--
	25	698.8	713.2	714.3	710.9	702.5	711.0	717.1	0.00	681.43
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--
	29	--	--	--	--	--	--	--	0.00	--
	30	--	--	--	--	--	--	--	0.00	--
	31	--	--	--	--	--	--	--	0.00	--
NOV	1	698.2	712.8	713.3	710.7	702.5	711.0	711.1	0.00	679.77
	2	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 10 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	3	--	--	--	--	--	--	--	2.32	--
	4	--	--	--	--	--	--	--	0.05	--
	5	--	--	--	--	--	--	--	0.00	--
	6	--	--	--	--	--	--	--	0.00	--
	7	--	--	--	--	--	--	--	0.00	--
	8	698.1	712.6	712.8	710.2	702.7	711.6	717.2	0.00	680.29
	9	--	--	--	--	--	--	--	0.00	--
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.00	--
	12	--	--	--	--	--	--	--	0.60	--
	13	--	--	--	--	--	--	--	0.00	--
	14	--	--	--	--	--	--	--	0.00	--
	15	697.8	712.5	712.5	709.9	702.7	711.6	717.1	0.00	680.60
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	1.48	--
	18	--	--	--	--	--	--	--	0.41	--
	19	--	--	--	--	--	--	--	0.08	--
	20	--	--	--	--	--	--	--	0.00	--
	21	--	--	--	--	--	--	--	0.78	--
	22	698.7	712.8	712.9	710.1	702.7	712.3	717.5	0.16	680.00
	23	--	--	--	--	--	--	--	0.00	--
	24	--	--	--	--	--	--	--	0.00	--
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.19	--
	28	--	--	--	--	--	--	--	1.53	
	29	699.5	712.8	712.7	710.0	703.8	712.8	717.7	0.00	680.32
	30	--	--	--	--	--	--	--	1.03	--
DEC	1	--	--	--	--	--	--	--	2.79	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 11 of 20)

Date 1982	P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
2	--	--	--	--	--	--	--	0.00	--
3	--	--	--	--	--	--	--	0.00	--
4	--	--	--	--	--	--	--	0.08	--
5	--	--	--	--	--	--	--	0.69	--
6	700.2	713.1	713.5	710.4	703.5	713.4	718.2	0.00	682.32
7	--	--	--	--	--	--	--	0.00	--
8	--	--	--	--	--	--	--	0.00	--
9	--	--	--	--	--	--	--	0.00	--
10	--	--	--	--	--	--	--	0.00	--
11	--	--	--	--	--	--	--	0.88	--
12	--	--	--	--	--	--	--	0.15	--
13	699.9	713.2	714.1	710.8	703.4	713.2	718.2	0.00	681.1
14	--	--	--	--	--	--	--	0.00	--
15	--	--	--	--	--	--	--	1.59	--
16	--	--	--	--	--	--	--	0.00	--
17	--	--	--	--	--	--	--	0.00	--
18	--	--	--	--	--	--	--	0.00	--
19	--	--	--	--	--	--	--	0.08	--
20	700.3	713.6	714.4	711.4	703.0	713.4	718.5	0.00	683.0
21	--	--	--	--	--	--	--	0.00	--
22	--	--	--	--	--	--	--	0.03	--
23	--	--	--	--	--	--	--	0.05	--
24	--	--	--	--	--	--	--	0.04	--
25	--	--	--	--	--	--	--	0.16	--
26	--	--	--	--	--	--	--	0.60	--
27	700.1	713.8	714.5	711.2	702.7	712.5	717.8	0.00	681.31
28	--	--	--	--	--	--	--	0.72	--
29	--	--	--	--	--	--	--	0.00	--
30	--	--	--	--	--	--	--	0.11	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 12 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	31	--	--	--	--	--	--	--	0.00	--
JAN	1	--	--	--	--	--	--	--	0.00	--
	2	--	--	--	--	--	--	--	1.13	--
	3	700.0	713.6	714.6	711.7	703.0	713.1	718.2	0.00	681.02
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.00	--
	6	--	--	--	--	--	--	--	0.00	--
	7	--	--	--	--	--	--	--	0.00	--
	8	--	--	--	--	--	--	--	0.00	--
	9	--	--	--	--	--	--	--	0.26	--
	10	699.8	713.4	714.3	711.5	702.8	712.8	718.5	0.10	679.00
	11	--	--	--	--	--	--	--	0.04	--
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.00	--
	14	--	--	--	--	--	--	--	0.00	--
	15	--	--	--	--	--	--	--	0.00	--
	16	--	--	--	--	--	--	--	0.00	--
	17	699.5	713.2	713.9	711.0	702.7	712.5	718.3	0.00	680.30
	18	--	--	--	--	--	--	--	0.00	--
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	0.26	--
	21	--	--	--	--	--	--	--	0.33	--
	22	--	--	--	--	--	--	--	0.00	--
	23	--	--	--	--	--	--	--	0.00	--
	24	699.3	713.3	713.9	711.1	702.9	712.6	718.3	0.00	680.10
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 13 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	29	--	--	--	--	--	--	--	0.08	--
	30	--	--	--	--	--	--	--	0.06	--
	31	699.0	713.3	713.8	711.0	702.7	712.4	718.6	0.00	678.42
FEB	1	--	--	--	--	--	--	--	1.87	--
	2	--	--	--	--	--	--	--	0.08	--
	3	--	--	--	--	--	--	--	0.00	--
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.11	--
	6	--	--	--	--	--	--	--	0.35	--
	7	699.3	713.3	713.9	711.2	702.7	713.4	718.8	0.00	680.64
	8	--	--	--	--	--	--	--	0.00	--
	9	--	--	--	--	--	--	--	0.03	--
	10	--	--	--	--	--	--	--	1.34	--
	11	--	--	--	--	--	--	--	0.16	--
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.00	--
	14	700.0	713.5	713.7	711.0	703.2	713.7	718.7	0.00	681.00
	15	--	--	--	--	--	--	--	0.00	--
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	--	--	--	--	--	--	--	0.00	--
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	0.00	--
	21	699.5	713.3	713.2	710.7	702.7	712.7	718.3	0.48	680.11
	22	--	--	--	--	--	--	--	0.00	--
	23	--	--	--	--	--	--	--	0.00	--
	24	--	--	--	--	--	--	--	0.00	--
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 14 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	27	--	--	--	--	--	--	--	0.00	--
	28	699.4	713.1	712.9	710.4	702.7	712.7	719.0	0.00	677.46
MAR	1	--	--	--	--	--	--	--	0.00	--
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.63	--
	6	--	--	--	--	--	--	--	0.41	--
	7	699.0	713.4	713.9	710.8	703.2	712.8	718.8	0.00	678.77
	8	--	--	--	--	--	--	--	0.00	--
	9	--	--	--	--	--	--	--	0.00	--
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.03	--
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.00	--
	14	698.9	713.5	714.5	710.6	702.8	712.6	718.9	0.00	679.64
	15	--	--	--	--	--	--	--	0.00	--
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	--	--	--	--	--	--	--	0.00	--
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	1.31	--
	21	698.5	713.5	713.9	711.0	702.9	712.5	718.6	0.00	678.32
	22	--	--	--	--	--	--	--	0.00	--
	23	--	--	--	--	--	--	--	0.00	--
	24	--	--	--	--	--	--	--	0.27	--
	25	--	--	--	--	--	--	--	0.02	--
	26	--	--	--	--	--	--	--	0.43	--
	27	--	--	--	--	--	--	--	0.53	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 15 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	28	698.3	713.2	713.9	710.7	702.9	712.1	718.4	0.00	676.98
	29	--	--	--	--	--	--	--	0.37	--
	30	--	--	--	--	--	--	--	0.06	--
	31	--	--	--	--	--	--	--	0.45	--
APR	1	--	--	--	--	--	--	--	0.13	--
	2	--	--	--	--	--	--	--	0.61	--
	3	--	--	--	--	--	--	--	0.00	--
	4	698.2	713.0	713.7	710.9	702.9	712.8	718.6	0.00	677.21
	5	--	--	--	--	--	--	--	3.71	--
	6	--	--	--	--	--	--	--	0.03	--
	7	--	--	--	--	--	--	--	0.00	--
	8	--	--	--	--	--	--	--	0.50	--
	9	--	--	--	--	--	--	--	1.02	--
	10	--	--	--	--	--	--	--	0.00	--
	11	700.0	713.5	714.3	711.2	703.5	714.3	719.0	0.04	684.35
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.12	--
	14	--	--	--	--	--	--	--	0.98	--
	15	--	--	--	--	--	--	--	0.00	00
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	700.2	714.0	715.4	711.6	702.8	713.1	719.2	0.13	683.78
	19	--	--	--	--	--	--	--	0.00	--
	20	--	--	--	--	--	--	--	0.00	--
	21	--	--	--	--	--	--	--	0.00	--
	22	--	--	--	--	--	--	--	0.00	--
	23	--	--	--	--	--	--	--	0.90	--
	24	--	--	--	--	--	--	--	0.53	--
	25	699.9	714.3	715.7	712.1	703.0	713.0	719.1	0.00	683.84

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 16 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--
	29	--	--	--	--	--	--	--	0.00	--
	30	--	--	--	--	--	--	--	0.00	--
MAY	1	--	--	--	--	--	--	--	0.00	--
	2	700.1	714.1	715.2	712.1	702.7	712.5	719.1	0.00	683.44
	3	--	--	--	--	--	--	--	0.75	--
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.00	--
	6	--	--	--	--	--	--	--	0.00	--
	7	--	--	--	--	--	--	--	0.00	--
	8	--	--	--	--	--	--	--	0.62	--
	9	699.9	713.8	714.8	711.8	702.6	712.2	718.9	0.00	684.15
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.00	--
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.00	--
	14	--	--	--	--	--	--	--	0.00	--
	15	--	--	--	--	--	--	--	0.29	--
	16	699.8	713.8	714.9	711.7	702.6	712.1	718.9	0.16	683.74
	17	--	--	--	--	--	--	--	0.00	--
	18	--	--	--	--	--	--	--	0.00	--
	19	--	--	--	--	--	--	--	1.47	--
	20	--	--	--	--	--	--	--	0.77	--
	21	--	--	--	--	--	--	--	0.53	--
	22	--	--	--	--	--	--	--	0.78	--
	23	700.3	714.0	714.6	711.5	703.7	713.5	719.0	0.58	687.77
	24	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 17 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--
	29	--	--	--	--	--	--	--	0.22	--
	30	--	--	--	--	--	--	--	0.00	--
	31	700.2	713.6	714.5	711.2	702.7	712.5	719.1	0.00	683.62
JUNE	1	--	--	--	--	--	--	--	0.00	--
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	--	--	--	--	--	--	--	0.34	--
	5	--	--	--	--	--	--	--	0.00	--
	6	700.2	713.3	714.5	711.2	702.6	712.1	718.9	0.50	684.83
	7	--	--	--	--	--	--	--	0.00	--
	8	--	--	--	--	--	--	--	0.00	--
	9	--	--	--	--	--	--	--	0.00	--
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.00	--
	12	--	--	--	--	--	--	--	0.00	--
	13	700.1	713.2	713.6	710.4	702.5	711.8	718.7	0.00	684.28
	14	--	--	--	--	--	--	--	0.00	--
	15	--	--	--	--	--	--	--	0.00	--
	16	--	--	--	--	--	--	--	0.07	--
	17	--	--	--	--	--	--	--	0.75	--
	18	--	--	--	--	--	--	--	2.08	--
	19	--	--	--	--	--	--	--	1.42	--
	20	699.8	713.1	713.9	711.0	702.5	711.4	718.8	0.00	684.09
	21	--	--	--	--	--	--	--	0.00	--
	22	--	--	--	--	--	--	--	0.20	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 18 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	23	--	--	--	--	--	--	--	0.18	--
	24	--	--	--	--	--	--	--	0.00	--
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.00	--
	27	698.9	712.6	712.9	710.4	702.5	711.7	718.6	0.19	683.94
	28	--	--	--	--	--	--	--	0.00	--
	29	--	--	--	--	--	--	--	0.00	--
	30	--	--	--	--	--	--	--	0.16	--
JULY	1	--	--	--	--	--	--	--	0.00	--
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	--	--	--	--	--	--	--	0.05	--
	5	698.6	712.3	712.4	710.1	702.5	711.5	718.5	0.14	683.89
	6	--	--	--	--	--	--	--	0.00	--
	7	--	--	--	--	--	--	--	0.00	--
	8	--	--	--	--	--	--	--	0.00	--
	9	--	--	--	--	--	--	--	0.00	--
	10	--	--	--	--	--	--	--	0.00	--
	11	698.3	712.0	712.0	709.8	702.5	711.1	718.2	0.00	683.47
	12	--	--	--	--	--	--	--	0.00	--
	13	--	--	--	--	--	--	--	0.00	--
	14	--	--	--	--	--	--	--	0.00	--
	15	--	--	--	--	--	--	--	0.00	--
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	698.2	711.9	711.6	709.7	702.5	710.4	718.0	0.00	682.78
	19	--	--	--	--	--	--	--	--	--
	20	--	--	--	--	--	--	--	--	--
	21	--	--	--	--	--	--	--	--	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 19 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	22	--	--	--	--	--	--	--	--	--
	23	--	--	--	--	--	--	--	--	--
	24								0.04	--
	25	696.2	711.7	711.5	709.4	702.5	711.5	718.1	--	683.35
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--
	29	--	--	--	--	--	--	--	0.00	--
	30	--	--	--	--	--	--	--	0.00	--
	31	--	--	--	--	--	--	--	0.16	--
AUG	1	697.0	711.3	711.7	709.6	702.5	710.9	718.3	0.01	683.17
	2	--	--	--	--	--	--	--	0.00	--
	3	--	--	--	--	--	--	--	0.00	--
	4	--	--	--	--	--	--	--	0.00	--
	5	--	--	--	--	--	--	--	0.00	--
	6	--	--	--	--	--	--	--	0.00	--
	7	--	--	--	--	--	--	--	0.00	--
	8	695.0	711.3	711.0	709.2	702.5	710.5	717.8	0.00	682.95
	9	--	--	--	--	--	--	--	0.01	--
	10	--	--	--	--	--	--	--	0.00	--
	11	--	--	--	--	--	--	--	0.79	--
	12	--	--	--	--	--	--	--	0.01	--
	13	--	--	--	--	--	--	--	0.00	--
	14	--	--	--	--	--	--	--	0.00	--
	15	695.2	711.3	711.5	708.9	702.4	710.5	719.6	0.00	682.86
	16	--	--	--	--	--	--	--	0.00	--
	17	--	--	--	--	--	--	--	0.00	--
	18	--	--	--	--	--	--	--	0.00	--
	19	--	--	--	--	--	--	--	0.00	--

Table 2.5-58 Watts Bar Nuclear Plant
ERCW – Piezometers
Water Level Readings
(Sheet 20 of 20)

Date 1982		P-1	P-2	P-3	P-4	P-6	P-7	P-8	Rainfall in.	Lake Level
	20	--	--	--	--	--	--	--	0.00	--
	21	--	--	--	--	--	--	--	0.00	--
	22	693.8	711.4	710.7	708.9	702.4	710.2	717.5	0.00	682.73
	23	--	--	--	--	--	--	--	0.00	--
	24	--	--	--	--	--	--	--	0.00	--
	25	--	--	--	--	--	--	--	0.00	--
	26	--	--	--	--	--	--	--	0.00	--
	27	--	--	--	--	--	--	--	0.00	--
	28	--	--	--	--	--	--	--	0.00	--
	29	693.7	711.4	710.6	708.8	702.4	709.4	717.4	0.00	683.10
	30	--	--	--	--	--	--	--	0.00	--
	31	--	--	--	--	--	--	--	0.00	--

Table 2.5-59 ERCW Route Liquefaction Evaluation
Maximum and Average Element Stresses and Peak Acceleration
at the Top of Each Layer
(Sheet 1 of 2)

Layer	Depth (Feet)	Top of Ground				Top of Rock
		0.25g 5Hz	0.18g 5 Hz	0.225g 5 Hz	0.25g 25 Hz	0.18g 25 Hz
Max Element Stresses (psf)						
1	1.5	44	32	39	50	80
2	4.5	132	95	118	149	239
3	7.5	220	159	196	244	395
4	10.5	308	221	275	339	549
5	13.5	396	283	351	433	692
6	16.6	484**	344	429	520	814
7	19.5	566**	407	502	600	942
8	22.5	645	466	574	671	1044
9	25.5	720	522	643	734	1130
10	28.5	790	575	709	793	1198
Average Element Stresses* (psf)						
1	1.5	29	21	25	33	52
2	4.5	86	62	77	97	155
3	7.5	143	103	127	159	257
4	10.5	200	144	179	220	357
5	13.5	257	184	228	281	449
6	16.5	315	224	279	338	536
7	19.5	368	265	326	390	612
8	22.5	419	303	373	436	679
9	25.5	468	339	418	477	735
10	28.5	514	374	461	515	779
Top of Layer Accelerations (g)						
1	0	.24	.17	.22	.28	.44
2	3	.24	.17	.22	.28	.44
3	6	.24	.17	.22	.27	.44
4	9	.24	.17	.21	.26	.43
5	12	.24	.17	.21	.25	.41
6	15	.23	.17	.21	.25	.39

Table 2.5-59 ERCW Route Liquefaction Evaluation
Maximum and Average Element Stresses and Peak Acceleration
at the Top of Each Layer
(Sheet 2 of 2)

Layer	Depth (Feet)	Top of Ground				Top of Rock
		0.25g 5Hz	0.18g 5 Hz	0.225g 5 Hz	0.25g 25 Hz	0.18g 25 Hz
7	18	.23	.16	.20	.24	.36
8	21	.22	.16	.20	.22	.32
9	24	.21	.15	.19	.22	.27
10	27	.20	.15	.18	.22	.22
11	30	.20	.14	.18	.23	.20

* Average element stress - 0.65* max element stress

** Assume 500 psf at 17.5 feet

Table 2.5-60 Factors of Safety with Depth When the Water Table is not Considered

Layer	Depth (Feet)	$\bar{\sigma}_v$ (psf)	$\bar{\sigma}_h$ (psf)	τ/σ_3	τ_f	τ_{avg}	FS = τ_f/t_{avg}
For Sample 3 - Reconstituted							
1	1.5	180	90	0.34	31	29	1.07
2	4.5	540	270	0.34	92	86	1.07
3	7.5	900	450	0.34	153	143	1.07
4	10.5	1260	630	0.34	214	200	1.07
5	13.5	1620	810	0.34	275	257	1.07
6	16.5	1980	990	0.34	337	315	1.07
7	19.5	2340	1170	0.34	398	368	1.08
8	22.5	2700	1350	0.34	459	419	1.10
9	25.5	3060	1530	0.34	520	468	1.11
10	28.5	3420	1710	0.34	581	514	1.13
For Sample 2 - In situ							
1	1.5	180	90	0.60	54	29	1.86
2	4.5	540	270	0.60	162	86	1.88
3	7.5	900	450	0.60	270	143	1.89
4	10.5	1260	630	0.60	378	200	1.89
5	13.5	1620	810	0.60	486	257	1.89
6	16.5	1980	990	0.60	594	315	1.89
7	19.5	2340	1170	0.60	702	368	1.91
8	22.5	2700	1350	0.60	810	419	1.93
9	25.5	3060	1530	0.60	918	468	1.96
10	28.5	3420	1710	0.60	1026	514	2.00

Notation:

$\bar{\sigma}_v$ = effective vertical stress

$\bar{\sigma}_h$ = effective horizontal stress

τ/σ_3 = cyclic stress ration

τ_f = cyclic shear stress corresponding to 5% strain

τ_{avg} = average on effective shear stress

FS = Factor of Safety against 5% cyclic strain potential

Table 2.5-61 Factors of Safety with Depth Assuming the Water Table is 16.5 feet Below Ground Surface

Layer	Depth (Feet)	$\overline{\sigma}$ v (psf)	$\overline{\sigma}$ h (psf)	τ/o 3	τ_f	τ_{avg}	FS= $\tau_{f/t\ avg}$
For Sample 3 - Reconstituted							
1	1.5	180	90	0.34	31	29	1.07
2	4.5	540	270	0.34	92	86	1.07
3	7.5	900	450	0.34	153	143	1.07
4	10.5	1260	630	0.34	214	200	1.07
5	13.5	1620	810	0.34	275	257	1.07
6	16.5	1980	990	0.34	337	315	1.07
7	19.5	2160	1080	0.34	367	368	1.00
8	22.5	2340	1170	0.34	398	419	.95
9	25.5	2520	1260	0.34	428	468	.91
10	28.5	2700	1350	0.34	459	514	.89
For Sample 2 - In situ							
1	1.5	180	90	0.60	54	29	1.86
2	4.5	540	270	0.60	162	86	1.88
3	7.5	900	450	0.60	270	143	1.89
4	10.5	1260	630	0.60	378	200	1.89
5	13.5	1620	810	0.60	486	257	1.89
6	16.5	1980	990	0.60	594	315	1.89
7	19.5	2160	1080	0.60	648	368	1.76
8	22.5	2340	1170	0.60	702	419	1.68
9	25.5	2520	1260	0.60	756	468	1.62
10	28.5	2700	1350	0.60	810	514	1.58

Notation:

$\overline{\sigma}_v$ = effective vertical stress

$\overline{\sigma}_h$ = effective horizontal stress

τ / σ_3 = cyclic stress ration

τ_f = cyclic shear stress corresponding to 5% strain

τ_{avg} = average on effective shear stress

FS = Factor of Safety against 5% cyclic strain potential

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 1 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-49	700.9	13	SM-SC	28.3	6.5	25.1	0.074	49.0	
SS-49A	700.7	5	SM	NP	NP	26.5	0.110	31.0	
	700.7	5	SM	23.0	1.0	29.0	0.990	42.0	same sample
	698.7	6	SM	23.0	1.0	29.9	0.990	41.0	
	696.7	5	SM	NP	NP	31.8	0.120	29.0	
	696.7	5	SM	29.0	4.0	32.4	0.080	47.0	same sample
	692.7	5	SM	23.0	1.0	28.7	0.080	47.0	
	690.7	6	SM	NP	NP	30.0	0.120	31.0	
	688.7	17	SM	NP	NP	31.2	0.120	38.0	
	688.7	17	SM	NP	NP	21.2	0.650	19.4	same sample
SS-131	699.9	4	SM	30.8	6.9	28.1	0.080	48.0	
	697.9	5	SM	25.9	3.3	30.1	0.080	45.0	
	695.9	5	SM	25.9	3.3	29.7	0.080	45.0	
	693.9	7	SM	NP	NP	26.2	0.085	45.0	
	691.9	7	SM	NP	NP	24.0	0.085	45.0	
SS-50A	702.2	14	SM	NP	NP	25.5	0.010	35.0	
	700.2	11	SM	27.0	2.0	28.8	0.100	37.0	
	700.2	11	SM	NP	NP	26.9	0.173	22.0	same sample

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 2 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
	698.2	13	SM	26.0	2.0	27.4	0.100	38.0	same sample
	698.2	13	SM	NP	NP	28.8	0.120	29.0	
	696.2	9	SM	NP	NP	33.5	0.130	26.0	same sample
	696.2	9	SM	NP	NP	33.5	0.120	26.0	
	694.2	5	SM	NP	NP	38.4	0.090	39.0	
SS-50	701.8	10	SM	34.1	7.6	22.4	0.084	47.0	
	697.8	5	SM	NP	NP	28.2	0.098	43.0	
	695.8	8	SM	NP	NP	29.1	0.093	43.0	
	693.8	2	SM	NP	NP	31.5	0.087	47.0	
	691.8	10	G-SM	NP	NP	23.7	0.190	33.9	
SS-133	704.0	19	G-SM	NP	NP	17.3	0.250	29.0	
SS-134	710.5	3	SM	NP	NP	29.3	0.148	26.0	
	708.5	8	SM	NP	NP	27.5	0.141	31.0	
SS-134A	709.5	4	SM	23.0	1.0	30.0	0.105	35.0	same sample
	709.5	4	SM	NP	NP	29.1	0.110	30.0	
	707.5	9	SM	24.0	2.0	27.9	0.100	27.0	same sample
	707.5	9	SM	24.0	1.0	28.9	0.090	43.0	
SS-135	712.0	11	SM	34.1	8.7	23.6	-	-	
	710.9	12	SM	30.0	4.4	20.1	-	-	
	708.9	8	SM	NP	NP	-	-	-	

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 3 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
	706.9	8	SM	NP	NP	-	-	-	
	704.9	8	SM	NP	NP	25.3	-	-	
SS-135A	714.5	13	SM	31.0	3.0	24.3	0.078	48.0	
	712.5	7	SM	NP	NP	22.8	0.105	33.0	
	710.5	7	SM	NP	NP	24.3	0.120	29.0	
	708.5	5	SM	NP	NP	34.2	0.120	29.0	
	706.5	8	SM	22.0	1.0	27.0	0.120	33.0	
	704.5	7	SM	NP	NP	30.9	0.100	35.0	
SS-65B	713.2	9	SM	29.0	2.0	25.7	0.085	43.0	
	711.2	6	SM	25.0	1.0	27.5	0.090	41.0	
	709.2	3	SM	25.0	1.0	33.1	0.100	38.0	same sample
	709.2	3	SM	NP	NP	32.9	0.110	31.0	
	707.2	5	SM	25.0	1.0	32.5	0.100	34.0	
	705.2	7	SM	26.0	2.0	27.1	0.075	50.0	same sample
	705.2	7	SM	25.0	1.0	30.8	0.100	35.0	
SS-65	712.0	12	SM	33.1	6.6	21.5	0.077	48.0	
	710.0	10	SM	NP	NP	15.7	0.132	32.5	
	708.0	7	SM	30.1	5.1	23.7	0.091	43.0	
	706.0	5	SM	28.9	3.5	28.2	0.140	34.0	
	704.0	8	-	-	-	-	-	-	no sample

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 4 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-136	710.9	5	SM	NP	NP	26.3	0.100	40.0	
	708.9	8	SM	NP	NP	28.5	0.122	35.0	
	706.9	12	SM	NP	NP	21.9	0.145	33.0	
SS-137	712.9	9	SM	25.9	1.8	20.7	-	-	
SS-138	713.2	6	SM	28.1	2.5	23.4	0.079	49.0	
	711.2	7	SM	28.1	2.5	24.5	0.79	49.0	
	705.2	13	SM	26.4	2.3	15.0	-	-	
SS-138A	713.2	8	SM	29.0	3.0	25.1	0.073	50.0	
	711.2	8	SM	NP	NP	22.1	0.100	36.0	
	709.2	12	SM	29.0	1.0	27.1	0.073	49.0	
	707.2	4	SM	28.0	2.0	35.6	0.090	41.0	
	705.2	9	SM	22.0	1.0	27.8	0.140	31.0	
	705.2	9	SM	NP	NP	29.1	0.180	21.0	same sample
SS-138B	710.6	8	SM	27.0	3.0	24.7	0.090	42.0	
	708.6	9	SM	34.0	5.0	36.2	0.080	46.0	
	706.6	8	SM-SC	27.0	5.0	30.0	0.105	35.0	
	704.6	7	SM-SC	26.0	5.0	32.5	0.110	35.0	
SS-138C	710.6	8	SM-SC	27.0	4.0	27.5	0.095	38.0	

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 5 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-139	711.5	8	SM	NP	NP	15.5	0.110	35.0	
	709.5	9	SM	NP	NP	18.2	0.110	35.0	
	705.5	14	SM	NP	NP	22.1	0.375	13.0	
SS-140	706.7	4	SM	NP	NP	38.7	0.110	36.0	
SS-87	707.6	12	SM	31.6	6.2	27.5	0.078	48.0	
SS-141	704.6	17	G-SM	NP	NP	7.8	0.79	19.0	
SS-143	695.1	7	-	-	-	-	-	-	no sample
	693.1	9	G-SP-SM	NP	NP	13.5	1.80	12.0	
SS-143A	701.0	3	SM-SC	21.0	5.0	21.2	0.093	45.0	
	697.0	8	SM	37.0	11.0	43.1	0.130	41.0	
SS-143B	696.3	21	SM	37.0	7.0	27.7	0.300	34.0	
SS-146	702.4	13	G-SM	21.6	1.9	14.6	0.200	25.0	
SS-147	701.7	18	G-SM	NP	NP	17.1	0.460	14.0	
SS-153	707.7	15	G-SW-SM	NP	NP	10.8	2.500	10.0	
SS-158	711.5	2	SM	22.9	2.5	32.2	0.088	44.0	
SS-159	712.0	20	G-SM	NP	NP	13.7	0.430	21.0	

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 6 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-160	720.9	15	SM	NP	NP	22.5	0.134	39.0	
	718.9	7	SM	24.2	1.7	23.8	0.173	34.0	
	716.9	12	SM	27.0	3.0	25.8	0.153	33.0	
	714.9	5	SM-SC	32.1	8.5	30.2	0.105	46.0	
	710.9	5	GM	26.2	2.2	24.3	0.210	37.0	
SS-161A	720.9	10	SM	26.0	2.0	23.8	0.120	32.0	
	718.9	13	SM	NP	NP	17.8	0.230	17.0	same sample
	718.9	13	SM	NP	NP	17.0	0.180	20.0	
SS-161	718.4	9	SM	NP	NP	18.4	0.230	24.0	
	716.4	10	SM	NP	NP	21.5	0.220	24.0	
	708.4	19	G-SM	NP	NP	12.7	0.220	32.0	
SS-162	717.8	20	SM	28.3	1.6	27.7	0.090	47.0	
	715.8	19	SM	27.6	3.0	30.2	0.122	39.0	
	713.8	5	SM	NP	NP	34.3	0.155	36.0	
	711.8	11	G-SW-SM	NP	NP	20.4	2.000	11.0	
SS-163	721.0	5	SM-SC	30.4	7.1	28.4	0.084	47.0	
	719.0	6	SM-SC	30.4	7.1	26.9	0.084	47.0	
	717.0	3	SM	27.2	3.3	31.1	0.097	45.0	
	715.0	4	SM	29.7	4.7	33.5	0.090	43.0	
	713.0	17	G-SM	28.7	3.8	27.8	0.190	26.0	

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 7 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-163A	721.5	7	SM	31.0	7.0	28.9	0.080	48.0	
	719.5	11	SP-SM	NP	NP	28.2	0.220	8.0	
	717.5	4	SM	30.0	3.0	36.3	0.080	45.0	
	715.5	5	SM	31.0	5.0	34.3	0.098	43.0	
SS-80	721.2	3	SM	41.6	14.6	29.1	0.120	44.0	
	715.2	7	SM	24.5	0.7	25.4	0.061	29.0	
SS-164	719.0	9	SM-SC	31.5	8.6	27.4	0.240	33.0	
	717.0	15	G-SP-SM	NP	NP	16.2	0.750	12.0	
	715.0	20	G-SP-SM	NP	NP	20.9	0.340	10.0	
	713.0	11	SM	31.1	5.7	26.6	0.174	33.0	
SS-165	716.7	3	SM-SC	30.7	8.1	23.3	-	-	
	714.7	2	SM-SC	30.7	8.1	34.4	-	-	
SS-84	713.4	2	SM	24.8	2.2	30.1	0.110	41.0	
SS-130	715.7	10	SM	NP	NP	17.8	0.240	22.0	
	713.7	9	SM	NP	NP	15.5	0.290	15.0	
SS-128	712.7	2	SM	NP	NP	23.7	0.280	16.0	
SS-127	712.2	0	SM-SC	23.3	4.4	36.1	0.079	48.0	
SS-125	714.4	2	SM	NP	NP	29.0	0.130	8.0	
	708.4	16	G-SP-SM	NP	NP	21.7	0.660	8.0	
	706.4	17	G-SP-SM	NP	NP	12.8	3.00	10.0	

Table 2.5-62 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 8 of 8)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-25	715.6	2	SM	NP	NP	29.2	0.076	48.0	
SS-28	713.4	10	SM	NP	NP	31.0	0.18	27.5	
SS-170	719.2	4	G-SM-SC	34.8	11.5	29.1	0.125	42.0	
	717.2	17	G-SM-SC	34.8	11.5	23.6	0.125	42.0	
	715.2	18	G-SM-SC	NP	NP	19.2	0.450	11.0	

Table 2.5-63 SUMMARY OF SPT SAMPLES OF SILTS (ML) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 1 of 3)

Boring No.	Ellev. (ft)	SPT Blow Counts	Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-49	698.9	14	ML	28.8	5.3	26.1	0.070	53.0	
	696.9	12	ML	28.8	5.3	26.8	0.064	53.0	
SS-49A	694.7	6	ML	22.0	1.0	28.3	0.070	53.0	same sample
	694.7	6	ML	22.0	3.0	28.0	0.070	54.0	
	692.7	5	ML	NP	NP	27.8	0.070	56.0	
SS-50A	694.2	5	ML	29.0	3.0	34.8	0.070	55.0	
SS-50	703.8	10	ML	37.5	11.3	22.1	0.050	54.0	
SS-132	702.1	13	ML	43.1	15.2	25.7	-	-	
	700.1	15	ML	45.8	17.5	23.4	-	-	
SS-135	714.9	12	ML	42.2	13.8	26.3	0.074	69.0	
SS-135A	706.5	8	ML	27.0	2.0	32.1	0.073	51.0	same sample
	706.5	8	ML	29.0	7.0	-	-	-	
	704.5	7	ML	25.0	2.0	32.1	0.073	50.0	
SS-65B	715.2	14	ML	35.0	6.0	26.7	0.060	60.0	
SS-65	714.0	16	ML	46.1	15.6	29.2	0.030	72.0	
SS-136	712.9	9	ML	32.8	5.7	25.0	0.070	53.0	
SS-137	714.9	11	ML	35.6	9.6	24.2	0.058	62.0	
	710.9	7	ML	31.7	5.6	25.0	0.070	52.0	
	708.9	8	ML	31.7	5.6	25.3	0.070	52.0	
SS-138	709.2	7	ML	32.7	5.9	28.4	0.070	53.0	
	707.2	5	ML-CL	27.0	5.1	29.6	0.067	52.0	

Table 2.5-63 SUMMARY OF SPT SAMPLES OF SILTS (ML) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 2 of 3)

SS-139	707.5	7	ML	31.0	3.9	32.8	0.056	63.0
SS-140	710.7	12	ML	34.1	6.2	25.0	0.061	54.0
	708.7	3	ML	-	-	17.4	0.073	50.0
SS-87	711.6	13	ML	37.4	12.9	43.9	0.038	62.0
SS-143C	696.6	3	CL-ML	32.0	10.0	46.5	<0.074	72.0
SS-101	712.5	3	ML	24.7	2.0	31.9	0.072	53.0
SS-159	718.0	6	CL-ML	26.8	4.2	29.4	0.064	59.0
SS-161A	714.9	5	ML	38.0	12.0	35.7	0.055	58.0
SS-161	714.4	3	CL-ML	36.8	13.2	35.8	-	-
	712.4	5	ML	25.7	2.3	30.9	0.076	51.0
SS-80	719.2	5	ML	24.6	2.4	28.1	0.075	51.0
SS-164	721.0	6	CL-ML	36.0	12.1	28.2	0.059	53.0
SS-165	720.7	5	ML	37.4	11.5	31.9	0.060	58.0
	718.7	6	CL-ML	39.0	14.2	31.2	0.015	63.0
SS-166	720.5	13	ML	48.8	19.8	13.0	0.011	87.0
	718.5	11	ML	48.8	19.8	11.0	0.011	87.0
	716.5	6	CL-ML	31.4	9.1	28.4	0.056	63.0
SS-84	711.4	3	ML	24.5	1.3	31.4	0.070	52.0
SS-130	717.7	7	ML	35.7	11.3	20.8	-	-
SS-26	718.0	3	ML	24.4	0.6	29.7	0.051	61.0
	716.0	4	ML	NP	NP	31.0	0.074	51.0
SS-27	713.1	3	ML	23.1	2.9	24.5	0.072	51.0
SS-169	119.1	8	CL-ML	43.0	17.0	31.8	0.021	78.0

Table 2.5-63 SUMMARY OF SPT SAMPLES OF SILTS (ML) BELOW ERCW PIPELINES HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

(Sheet 3 of 3)

117.1	6	ML	41.4	13.7	34.3	0.043	68.0
115.1	6	ML	41.4	13.7	32.3	0.043	68.0
113.1	5	ML	40.8	13.7	33.1	0.043	65.0

Table 2.5-64 SUMMARY OF SPT SAMPLES OF SILTY SANDS (SM) BELOW ELECTRICAL CONDUITS HAVING FACTOR OF SAFETY LESS THAN UNITY FOR 0.4 G PEAK GROUND SURFACE ACCELERATION

Boring No.	Ellev. (ft)	Blow Counts	SPT Soil Type	Liquid Limit	Plasticity Index	Water Content (%)	D 50 (mm)	Fines Content (%)	Remarks
SS-171	708.2	6	SM	NP	NP	26.7	0.20	13.0	
	706.2	9	SP-SM	NP	NP	26.5	0.26	7.0	
	704.2	9	SP-SM	NP	NP	24.1	0.27	9.0	
	702.2	12	SP-SM	NP	NP	30.9	0.27	8.0	
SS-53	708.0	18	SM	27.1	3.1	19.6	0.15	40.0	
SS-173	709.0	20	SM-SC	37.0	12.0	20.6	0.086	47.0	
SS-63	713.1	17	SM	36.0	10.0	21.6	0.078	48.0	
	711.1	10	SM	36.0	10.0	20.7	0.078	48.0	
	709.1	10	SM	36.0	10.0	27.0	0.078	48.0	
SS-57	715.0	14	SP-SM	NP	NP	6.4	0.75	9.0	

Table 2.5-65 Strain Criteria for Determining Potential Settlement Of Soils Subject to Earthquake With Peak Top-Of-Ground Acceleration of 0.40g At Watts Bar Nuclear Plant

MATERIAL CLASSIFICATION	PERCENT VERTICAL STRAIN (%Ev)	
	BELOW WATER TABLE	ABOVE/BELOW WATER TABLE
SP (<12% fines)	6[1]	3[2]
SM or ML (clean)	3[1]	1.5[2]
SC	1[1]	0.5[2]
CL or ML-CL	0.75[1]	0.5[3]

Notes:

1) If potentially liquefiable

2) If loose N≤15 but not potentially liquefiable

3) If soft N≤5 but not potentially liquefiable

4) Classification of SP-SM will be treated as SP for criteria

5) Classification of G-SM or SM-SC will be treated as SM for criteria

Table 2.5-66
Soil Bearing Capacities and Factors of Safety for Soil-Supported Category I Structures

Structures	Sustained Loads			Dynamic Loads	
	Ultimate Soil Bearing Capacity (KSF)	Actual Soil Bearing Maximum (KSF)	Factor of Safety	Actual Soil Bearing Maximum (KSF)	Factor of Safety
Diesel Generator Building	20.0	3.5	5.7	5.5	3.6
Refueling Water Storage Tanks I and II	20.0	2.3	8.7	8.6	2.3
ERCW Standpipe Structure I	20.0	1.7	11.8	4.5	4.4
ERCW Standpipe Structure II	20.0	1.9	10.5	4.7	4.3
Discharge Overflow Structure	20.0	1.9	10.5	5.3	3.8
Refueling Water Storage Pipe Tunnels A and B	20.0	2.5	8.0	3.3	6.1
Waste Packaging Area	20.0	1.4	14.0+	6.7	3.0+

Added by Amendment 50

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SETTLEMENT MONITORING PROGRAM
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SHEET 1

	SETTLEMENT POINTS									
	SS-1 (SE)		SS-2 (SW)		SS-3 (NE)		SS-4 (NW)			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
10-31-75			742.015	–			742.033	–	FRH 12-30-81	BTB 1-22-82
11-24-75	742.047	–	742.017	.002	742.044	–	742.038	.005	↓	↓
12-16-75	742.046	-.001	742.018	.003	742.044	.000	742.038	.005		
1-14-76	742.045	-.002	742.017	.002	742.041	-.003	742.036	.003		
2-11-76	742.043	-.004	742.015	.000	742.038	-.006	742.034	.001		
3-12-76	742.035	-.012	742.006	-.009	742.031	-.013	Not Run			
4-15-76	742.037	-.010	742.007	-.008	742.032	-.012	"			
5-11-76	742.041	-.006	742.011	-.004	742.037	-.007	"			
6-11-76	742.035	-.012	742.005	-.010	742.030	-.014	742.021	-.012		
7-14-76	742.032	-.015	742.004	-.011	742.028	-.016	742.023	-.010		
8-10-76	742.040	-.007	742.010	-.005	742.034	-.010	742.030	-.003		
9-14-76	742.035	-.012	742.006	-.009	742.031	-.013	742.025	-.008		
10-13-76	742.038	-.009	742.008	-.007	742.026	-.018	742.031	-.002		
11-9-76	Poor Closure		Not Used							
12-9-76	742.027	-.020	741.996	-.019	742.026	-.018	742.018	-.015		
1-12-77	742.032	-.015	742.001	-.014	742.033	-.011	742.024	-.009		
2-10-77	742.033	-.014	742.004	-.011	742.032	-.012	742.026	-.007		
3-15-77	742.032	-.015	742.002	-.013	742.028	-.016	742.023	-.010		
4-11-77	742.030	-.017	742.000	-.015	742.026	-.018	742.021	-.012		
5-10-77	742.029	-.019	741.997	-.018	742.023	-.021	742.017	-.016		
6-6-77	742.027	-.020	741.997	-.018	742.022	-.022	742.017	-.016		
7-6-77	742.032	-.015	742.000	-.015	742.025	-.019	742.021	-.012		
8-3-77	742.021	-.026	741.989	-.026	742.015	-.029	742.011	-.022		
9-12-77	742.024	-.023	741.992	-.023	742.023	-.021	742.018	-.015		

(-) = initial reading + = up - = down

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SETTLEMENT MONITORING PROGRAM
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TABLE 2.5-67
SHEET 2

Added by Amendment 50

	SETTLEMENT POINTS									
	SS-1 SE		SS-2 SW		SS-3 NE		SS-4 NW			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
10-11-77	742.024	-.023	741.991	-.024	742.023	-.021	742.017	-.016	FRH 12-31-81	BTB 1-25-82
11-7-77	742.021	-.026	741.990	-.025	742.021	-.023	742.017	-.016	↓	↓
12-15-77	742.026	-.021	741.995	-.020	742.027	-.017	742.022	-.011		
1-9-78	742.021	-.026	741.990	-.025	742.020	-.024	742.017	-.016		
2-2-78	742.022	-.025	741.992	-.023	742.023	-.021	742.020	-.013		
3-3-78	742.017	-.030	741.985	-.030	742.018	-.026	742.011	-.022		
4-3-78	742.015	-.032	741.984	-.031	742.016	-.028	742.008	-.025		
5-4-78	742.015	-.032	741.984	-.031	742.015	-.029	742.010	-.023		
6-5-78	742.013	-.034	741.982	-.033	742.013	-.031	742.008	-.025		
7-10-78	742.012	-.035	741.982	-.033	742.011	-.033	742.009	-.024		
8-4-78	742.010	-.037	741.979	-.036	742.010	-.034	742.006	-.027		
9-29-78	742.013	-.034	741.983	-.032	742.013	-.031	742.010	-.023		
1-21-79	742.019	-.028	741.989	-.026	742.020	-.024	742.015	-.018		
4-11-79	742.009	-.038	741.977	-.038	742.010	-.034	742.004	-.029		
7-26-79	742.006	-.041	741.976	-.039	742.010	-.034	742.003	-.030		
10-23-79	742.009	-.038	741.977	-.038	742.012	-.032	742.005	-.028		
1-20-80	742.003	-.044	741.972	-.043	742.004	-.040	742.000	-.033		
4-29-80	742.003	-.044	741.971	-.044	742.004	-.040	741.998	-.035		
10-9-80	742.009	-.038	741.976	-.039	742.011	-.033	742.005	-.028		
4-10-81	741.998	-.049	741.966	-.049	741.999	-.045	741.993	-.040		
4-10-81	* 743.744	-	* 743.454	-	* 744.010	-	* 744.044	-		
10-7-81	743.757	+.013	743.467	+.013	744.023	+.013	744.058	+.014		
12-22-81	743.752	+.009	Not Run	-	744.019	+.009	744.056	+.012		BTB 1-26-82
1-20-82	743.744	0.0	NR	-	744.013	+.003	744.048	+.004	JAD 2-11-82	LTT 2-17-82

* Monument moved from inside to outside of building. Initial elev. reset.

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SETTLEMENT MONITORING PROGRAM
DIESEL GENERATOR BUILDING
TABLE 2.5-67
SHEET 3

Added by Amendment 50

	SETTLEMENT POINTS									
	SS-1 SE		SS-2 SW		SS-3 NE		SS-4 NW			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
1-29-82	743.752	±.008	743.963	±.009	744.020	±.010	744.055	±.011	JAD 2-17-82	LTT 2-17-82
AVG *	743.749	±.005	—	—	744.017	±.007	744.053	±.009	JAD 2-22-82	LTT 2-22-82

* 1 SET THREE READINGS

WATTS BAR NUCLEAR PLANT
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SETTLEMENT MONITORING PROGRAM
WASTE MANAGEMENT BUILDING
TABLE 2.5-68
SHEET 1

Added by Amendment 50

	SETTLEMENT POINTS									
	SS-45		SS-46		SS-47		SS-48			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
3-15-77	728.982	i	728.981	i	728.996	i	728.975	i	JAD 12/30/81	[illegible] 1-27-82
4-11-77	728.980	-.002	728.977	-.004	728.992	-.004	728.970	-.005	↓	↓
5-10-77	728.976	-.006	728.973	-.008	728.988	-.008	728.966	-.009		
6-6-77	728.980	-.002	728.976	-.005	728.991	-.005	728.970	-.005		
7-6-77	728.982	0	728.976	-.005	728.991	-.005	728.972	-.003		
8-3-77	728.962	-.020	728.957	-.024	728.973	-.023	728.953	-.022		
8-12-77	728.974	-.008	728.970	-.011	728.985	-.011	728.965	-.010		
10-11-77	728.976	-.006	Not Run	—	728.959	-.007	728.968	-.007		
11-7-77	Not Run	-	728.961	-.020	728.978	-.018	728.956	-.019		
12-15-77	N.R.	-	728.976	-.005	728.993	-.003	728.970	-.005		
1-9-78	N.R.	-	728.974	-.007	728.990	-.006	728.968	-.007		
2-2-78	728.973	-.009	NR	-	728.979	-.017	728.995	-.020		
3-3-78	728.971	-.011	728.969	-.012	728.985	-.011	728.965	-.012		
4-3-78	728.968	-.014	728.965	-.016	728.981	-.015	728.959	-.016		
5-4-78	728.974	-.008	728.971	-.010	728.986	-.010	728.963	-.012		
6-5-78	728.963	-.019	728.960	-.021	728.977	-.019	728.955	-.020		
7-10-78	728.961	-.021	728.957	-.024	728.975	-.021	728.955	-.020		
8-4-78	728.955	-.027	728.951	-.030	728.968	-.028	728.952	-.023		
9-29-78	728.968	-.014	NR	-	728.983	-.013	728.962	-.013		
1-21-79	728.969	-.013	NR	-	728.972	-.004	728.963	-.007		
4-11-79	728.950	-.032	728.951	-.030	728.973	-.023	728.949	-.026		
7-25-79	728.959	-.023	728.961	-.020	728.980	-.016	728.958	-.017		
10-22-79	Not Run	-	728.955	-.026	728.976	-.020	728.953	-.022		
1-19-80	728.945	-.037	728.946	-.035	728.968	-.028	Not Run	—		
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]				

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM
WASTE MANAGEMENT BUILDING
TABLE 2.5-68
SHEET 2

Added by Amendment 50

	SETTLEMENT POINTS									
	SS-45		SS-46		SS-47		SS-48			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
4-23-80	728.939	-.043	728.940	-.041	728.962	-.034	Not Run	-	JAD 1-25-82	ATB 1-27-82
10-9-80	728.955	-.027	728.953	-.028	728.974	-.022	Not Run	-		↓
4-10-81	Not Run	-	728.947	-.034	728.970	-.026	NR	-		
10-7-81	NR	-	728.957	-.024	728.981	-.015	NR	-		
12-22-81	728.943	-.039	728.947	-.034	728.973	-.023	NR	-		ATB 1-27-82
1-18-82	728.940	-.042	728.946	-.035	728.970	-.026	NR	-	JAD 2-11-82	ATB 2-17-82
1-27-82	728.942	-.040	728.947	-.034	728.972	-.024	728.946	-.029	JAD 2-11-82	ATB 2-17-82
2-11-82	—	-					728.944	-.031	JMH 2-25-82	ATB 2-25-82
AVG	*728.942	-.040	*728.947	-.034	*728.972	-.024	**728.945	-.030	JMH 2-25-82	ATB 2-25-82

* Last Three Readings ** Last Two Readings

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM
INTAKE PUMPING STATION
TABLE 2.5-69
SHEET 1

Added by Amendment 50

	SETTLEMENT POINTS									
	SS-1		SS-2		SS-3		SS-4			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
									JAD 1-12-82	BTB 1-27-82
10-17-74	652.031	i	652.009	i					↓	↓
11-25-74	Inaccessible	—	652.008	-.001						
12-19-74	652.039	+.008	Not Read	—	652.051	i				
1-23-75	652.037	+.006	NR	—	652.049	-.002				
2-24-75	652.036	+.005	NR	—	652.046	-.005				
3-21-75	No Data	—	NR	—	652.033	-.018				
5-9-75	652.049	+.018	652.021	+.012	652.062	+.011				
6-4-75	652.037	+.006	652.011	+.002	652.050	-.001				
7-2-75	Not Read	—	NR		Not Read	-				
7-21-75	NR	—	NR		NR	-				
8-22-75	NR	—	NR		NR	-				
9-10-75	NR	—	NR		NR	-				
10-31-75	652.036	+.005	652.006	-.003	652.049	-.002				
11-24-75	652.038	+.007	652.008	-.001	652.050	-.001				
12-16-75	652.040	+.009	652.007	-.002	652.053	+.002				
1-14-76	652.040	+.009	652.009	0.0	652.051	0.0				
2-11-76	652.041	+.010	652.008	-.001	652.052	+.001				
3-13-76	652.046	+.015	652.016	+.007	652.057	+.006				
4-15-76	652.050	+.019	652.017	+.008	652.059	+.008				
5-11-76	652.067	+.036	652.014	+.005	652.047	+.004				
6-11-76	652.042	+.011	652.010	+.001	652.054	+.003				
7-14-76	652.038	+.007	652.007	-.002	652.052	+.001				
8-10-76	652.036	+.005	652.001	-.008	652.052	+.001				
9-14-76	652.030	+.001	652.000	-.009	652.048	-.003				

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SETTLEMENT MONITORING PROGRAM

WATTS BAR NUCLEAR PLANT

INTAKE PUMPING STATION

Added by Amendment 50

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM
INTAKE PUMPING STATION
TABLE 2.5-69
SHEET 2

	SETTLEMENT POINTS																					
	SS-1		SS-1A		SS-2		SS-3		SS-3A		SS-4											
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
10-13-76	652.034	+.003			652.004	-.005	652.048	-.003													JAD 1-20-82	[illegible] 1-20-82
11-9-76	Poor Closure Not Used	-			Poor Closure Not Used	-	Poor Closure Not Used	-													↓	↓
12-9-76	Not Run	-			Not Run	-	Not Run	-														
1-12-77	NR	-			NR	-	NR	-														
2-10-77	NR	-			NR	-	NR	-														
3-15-77	652.036	+.005	741.128	i	652.022	+.013	652.052	+.001			727.829	i										
4-11-77	652.029	-.002	Not Run	-	651.997	-.012	652.049	-.002			727.826	-.003										
5-10-77	652.022	-.009	741.121	-.007	651.991	-.018	652.046	-.005			727.827	-.002										
6-6-77	652.027	-.004	741.131	+.003	651.999	-.010	652.052	+.001			727.833	+.004										
7-6-77	NR	-	NR	-	NR	-	NR	-			727.833	+.004										
8-3-77	NR	-	741.128	0.0	NR	-	NR	-	741.418	i	727.828	-.001										
9-12-77	NR	-	741.114	-.014	NR	-	NR	-	741.402	-.016	727.816	-.013										
10-11-77	NR	-	741.117	-.011	NR	-	NR	-	741.404	-.014	727.815	-.014										
11-7-77	NR	-	741.109	-.019	NR	-	NR	-	741.396	-.022	727.816	-.013										
12-15-77	Permanently Inaccessible		741.124	-.004	Permanently Inaccessible		Permanently Inaccessible		741.412	-.006	727.826	-.003										
1-9-78			741.109	-.019					741.397	-.021	727.811	-.018										
2-2-78			741.105	-.023					741.391	-.027	NR	-										
3-3-78			741.111	-.017					741.396	-.022	727.815	-.014										
4-3-78			741.120	-.008					741.405	-.013	727.821	-.008										
5-4-78			741.125	-.003					741.412	-.006	727.828	-.00[illegible]										
6-5-78			741.118	-.010					741.407	-.011	727.822	-.[illegible]										
7-10-78			741.135	+.007					741.421	+.003	727.841	+.012										
8-4-78			741.129	+.001					741.416	-.002	727.830	+.001										
9-29-78			741.119	-.009					741.410	-.008	727.82[illegible]	-.003										

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SETTLEMENT MONITORING PROGRAM

WATTS BAR NUCLEAR PLANT

INTAKE PUMPING STATION

Added by Amendment 50

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM
INTAKE PUMPING STATION
TABLE 2.5-69
SHEET 3

	SETTLEMENT POINTS																					
	SS-1		SS-1A		SS-2		SS-3		SS-3A		SS-4											
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
2-7-79			741.102	-.026					741.386	-.032	727.810	-.019									JAD 1-20-82	STT 1-26-82
4-7-79			741.109	-.019					741.378	-.020	727.820	-.009									↓	↓
7-19-79			741.123	-.005					741.414	-.004	727.834	+.005									↓	
10-17-79			741.115	-.013					741.404	-.014	727.824	-.005										
1-21-80			741.107	-.021					741.397	-.021	727.815	-.014										
4-23-80			741.118	-.010					741.407	-.011	727.827	-.002										
12-18-81			Not Rvn	-					Not Rvn	-	727.807	-.022										STT 1-26-82
1-7-82			NR	-	NR	-	NR	-	NR	-	727.820	-.009									JAD 2-11-82	STT 2-12-82
1-21-82			NR	-	NR	-	NR	-	NR	-	727.814	-.015										STT 2-12-82
AVG *			-	-	-	-	-	-	-	-	727.814	-.015									JAD 2-22-82	STT 2-22-82

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SETTLEMENT MONITORING PROGRAM

WATTS BAR NUCLEAR PLANT

POWERHOUSE

Added by Amendment 50

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM
POWERHOUSE
TABLE 2.5-70
SHEET 1

	SETTLEMENT POINTS																					
	SS-1		SS-1A		SS-1B		SS-2		SS-2A		SS-3		SS-4		SS-5		SS-6		SS-7			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
10-16-73																					JAD 12-31-81	5TS 1-26-82
11-19-73																					↓	↓
12-17-73	656.536	i																				
1-16-74	NOT READ	-																				
2-20-74	656.534	-.002					672.176	i														
3-18-74	INACC. *						672.173	-.003														
4-15-74							672.175	-.001			690.079	i										
5-13-74							672.171	-.005			690.076	-.003										
6-11-74							675.693 RS*	-			690.081	+.002										
7-15-74							675.695	+.002			690.085	+.006										
8-13-74							675.688	-.005			690.077	-.002										
9-16-74							675.691	-.002			694.125 **	-.001										
10-17-74							675.693	0			694.120	-.006										
11-18-74							675.682	-.011			694.118	-.008										
12-18-74							675.691	-.002	692.017	i	694.120	-.006										
1-20-75							675.690	-.003	692.012	-.005	694.118	-.008					696.641	i				
2-19-75							675.686	-.007	692.014	-.003	694.119	-.007			696.632	i	696.649	+.008	696.616	i		
3-17-75			676.014	i			675.682	-.004	692.014	-.003	694.122	-.004			696.626	-.006	696.641	0	696.609	-.007		
5-6-75			676.020	+.006			675.694	+.011	692.015	-.002	694.122	-.004			696.625	-.007	696.640	-.001	696.605	-.011		
6-2-75			676.015	+.001			675.688	-.005	692.015	-.002	694.122	-.004			705.292 *0	0	705.318 *1	0	705.324 *2	-.001		
7-7-75			676.012	-.002			675.681	-.012	692.005	-.012	694.119	-.007			705.281	-.011	705.306	-.012	705.313	-.012		
7-21-75			676.020	+.006			675.691	-.002	692.019	+.002	694.127	+.011			NOT RUN	-	705.325	+.007	705.331	+.006		
8-18-75			676.012	-.002			675.681	-.012	692.015	-.002	694.114	-.012			705.281	-.011	705.308	-.010	705.313	-.012		
9-10-75			676.018	+.004			675.688	-.005	692.016	-.001	694.124	-.002			N R	-	NOT RUN	-	NOT RUN	-		

*RS Point Reset to new location
i Initial reading

** Reset to 694.126 on 8/23/74

*0 Reset to 705.292 on 5-6-75

*1 Reset to 705.318 on 5/6/75

*2 Reset to 705.325 on 5/6/75

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SETTLEMENT MONITORING PROGRAM

WATTS BAR NUCLEAR PLANT

POWERHOUSE

Added by Amendment 50

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM POWERHOUSE TABLE 2.5-70 SHEET 2

	SETTLEMENT POINTS																					
	SS-1		SS-1A		SS-1B		SS-2		SS-2A		SS-3		SS-4		SS-5		SS-6		SS-7			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
10-31-75			676.012	-.002	692.008	i	675.685	-.008	692.009	-.008	694.116	-.010			Not Run	-	Not Run	-	Not Run	-	JAD 12-31-81	JFW 1-26-82
11-24-75			676.021	+.007	692.017	+.009	675.695	+.002	692.021	+.004	694.125	-.001			NR	-	NR	-	NR	-	↓	↓
12-16-75			676.003	-.011	691.999	-.009	675.675	-.018	692.000	-.017	694.107	-.019			705.290	-.002	705.318	0	705.326	+.001		
1-14-76			676.016	+.002	692.012	+.004	675.688	-.005	692.014	-.003	694.120	-.006	729.033	i	705.284	-.008	705.308	-.010	705.318	-.007		
2-11-76			676.018	+.004	692.016	+.008	675.688	-.005	692.014	-.003	694.124	-.002	729.040	+.007	705.290	-.002	705.317	-.001	705.326	+.001		
3-18-76			676.022	+.008	692.020	+.012	675.693	0	692.019	+.002	694.126	0	729.027	-.006	705.279	-.013	705.307	-.011	705.315	-.010		
4-15-76			676.016	+.002	692.014	+.006	675.684	-.009	692.011	-.006	694.120	-.006	729.036	+.003	705.301	+.009	705.325	+.007	705.331	+.006		
5-11-76			676.019	+.005	692.020	+.012	675.680	-.004	692.017	0	694.126	0	729.037	+.004	705.307	+.015	705.330	+.012	705.335	+.010		
6-11-76			676.014	0	692.010	+.002	675.685	-.013	692.004	-.013	694.115	-.011	729.028	-.005	705.294	+.002	705.317	-.001	705.322	-.003		
7-14-76			676.012	-.002	692.016	+.008	675.677	-.016	692.009	-.008	694.121	-.005	729.031	-.002	705.311	+.019	705.332	+.014	705.336	+.011		
8-10-76			676.023	+.009	692.023	+.015	675.688	-.005	692.015	-.002	694.129	+.003	729.037	+.004	705.308	+.016	705.329	+.011	705.334	+.009		
9-14-76			676.006	-.008	692.003	-.005	675.670	-.023	691.996	-.021	694.110	-.016	729.027	-.006	705.280	-.012	705.311	-.007	705.314	-.011		
10-13-76			676.014	0	692.010	+.002	675.677	-.016	692.004	-.013	694.117	-.009	729.030	-.003	705.294	+.002	705.320	+.002	705.327	+.002		
11-9-76			Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-		
12-9-76			675.994	-.020	691.992	-.016	675.658	-.035	691.984	-.033	694.099	-.027	729.020	-.013	705.264	-.028	705.295	-.023	705.300	-.025		
1-12-77			676.002	-.012	692.000	-.008	675.664	-.029	691.993	-.024	694.109	-.017	729.017	-.016	Not Run	-	Not Run	-	Not Run	-		
2-10-77			676.009	-.005	692.011	+.003	675.673	-.020	692.002	-.015	694.119	-.007	729.026	-.007	NR	-	NR	-	NR	-		
3-15-77			676.012	-.002	692.016	+.008	675.673	-.020	692.006	-.011	694.123	-.003	Not Run	-	705.283	-.009	705.313	-.005	705.318	-.007		
4-11-77			676.010	-.004	Not Run	-	675.673	-.020	692.001	-.016	694.115	-.011	NR	-	705.282	-.010	705.311	-.007	705.315	-.010		
5-10-77			676.005	-.009	691.996	-.012	675.666	-.027	691.986	-.031	694.102	-.024	729.018	-.015	705.273	-.019	705.303	-.015	705.306	-.019		
6-6-77			676.026	+.012	692.018	+.010	675.685	-.008	692.010	-.007	694.123	-.003	729.026	-.007	705.287	-.005	705.312	-.006	705.316	-.009		
7-6-77			676.018	+.004	692.017	+.009	675.677	-.016	692.007	-.010	694.118	-.008	729.035	+.002	705.287	-.005	705.316	-.002	705.317	-.008		
8-3-77			675.989	-.025	691.993	-.015	675.648	-.045	691.182	-.035	694.098	-.028	729.011	-.022	705.264	-.028	705.292	-.026	705.294	-.031		
9-12-77			676.009	-.005	692.006	-.002	675.669	-.024	691.995	-.022	694.111	-.015	729.024	-.009	705.279	-.013	705.304	-.014	705.308	-.017		

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SETTLEMENT MONITORING PROGRAM

Watts Bar Nuclear Plant

Powerhouse

Added by Amendment 50

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM
POWERHOUSE
TABLE 2.5-70
SHEET 3

	SETTLEMENT POINTS																					
	SS-1		SS-1A		SS-1B		SS-2		SS-2A		SS-3		SS-4		SS-5		SS-6		SS-7			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
10-11-77			676.018	+.004	692.015	+.007	675.677	-.016	692.002	-.015	694.124	-.002	729.026	-.007	705.282	-.010	705.312	-.006	705.314	-.011	JAD 12/21/81	BTB 1-26-82
11-7-77			675.995	-.019	691.997	-.011	675.656	-.037	691.986	-.031	694.104	-.022	729.010	-.023	705.268	-.026	705.296	-.022	705.299	-.026	↓	↓
12-15-77			676.019	-.005	692.014	+.006	675.680	-.013	692.005	-.012	694.124	-.002	729.022	-.011	705.281	-.011	705.311	-.007	705.311	-.014		
1-9-78			676.010	-.004	692.010	+.002	675.669	-.024	691.998	-.019	694.120	-.006	729.022	-.011	NOT RUN	-	NOT RUN	-	NOT RUN	-		
2-2-78			676.016	+.002	692.016	-.008	675.676	-.017	692.008	-.009	694.126	0	729.027	-.006	NR	-	NR	-	NR	-		
3-3-78			676.006	-.008	692.004	-.004	675.667	-.026	691.994	-.023	694.113	-.013	729.017	-.016	705.280	-.012	705.310	-.008	705.310	-.015		
4-3-78			NOT RUN	-	692.004	-.004	675.664	-.029	691.991	-.026	694.112	-.014	729.017	-.016	705.274	-.018	705.304	-.014	705.304	-.021		
5-4-78			N.R.	-	NOT RUN	-	675.670	-.023	691.998	-.019	694.117	-.009	729.017	-.011	NR	-	NR	-	NR	-		
6-5-78			PERMANENTLY INACCESSIBLE		NR	-	675.672	-.021	692.000	-.017	694.116	-.010	729.014	-.019	705.271	-.021	705.300	-.018	705.301	-.024		
7-10-78					692.006	-.002	675.662	-.031	691.992	-.025	694.110	-.016	729.015	-.018	705.271	-.021	NR	-				
8-4-78					691.996	-.012	NOT RUN	-	691.984	-.033	694.101	-.025	729.010	-.023								
9-29-78					692.011	+.002	NOT RUN	-	691.999	-.018	694.115	-.011	729.020	-.013								
1-19-79					692.012	+.004	NOT RUN	-	NR		694.122	-.004										
4-11-79					692.004	-.004	675.659	-.034	NR		694.103	-.018										
7-20-79					692.013	+.005	NR	-	NR		NR	-										
10-18-79					692.012	+.004	675.673	-.020	NR		694.117	-.009										
1-10-80					691.999	-.009	675.656	-.037	NR		694.105	-.021										
4-29-80					691.994	-.014	675.655	-.038	NR		694.098	-.028										
10-4-80																						
4-8-81																						
10-6-81																						
12-18-81					691.981	-.027	675.643	-.050	NOT RUN	-	694.091	-.035	NOT RUN	-	NOT RUN	-	NOT RUN	-	NOT RUN	-	JAD 1-25-82	BTB 1-26-81
1-8-82					692.007	-.001	675.663	-.030	NR	-	694.113	-.013	NR	-	NR	-	NIR	-	NIR	-	JAD 2-11-82	BTB 2-12-82
1-22-82					692.001	-.007	675.660	-.033	NR	-	694.110	-.016	728.993	-.040	705.266	-.026	705.296	-.022	705.297	-.028	JAD 2-17-82	BTB 2-17-82

Added by Amendment 50

SETTLEMENT MONITORING PROGRAM

WATTS BAR NUCLEAR PLANT

POWERHOUSE

	SETTLEMENT POINTS																					
	SS-1		SS-1A		SS-1B		SS-2		SS-2A		SS-3		SS-4		SS-5		SS-6		SS-7			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
2-12-82													728.995	-.038	705.263	-.029	705.293	-.025	705.294	-.031	JMH 2-25-82	2-25-82
AVG.					*691.996	-.012	*675.655	-.038	-	-	*694.105	-.021	**728.994	-.039	**705.265	-.027	**705.295	-.023	**705.296	-.029	JMH 2-25-82	2-25-82

* LAST THREE READING ** LAST TWO READING

SETTLEMENT MONITORING PROGRAM

WATTS BAR NUCLEAR PLANT

POWERHOUSE

Added by Amendment 50

	SETTLEMENT POINTS																					
	SS-8		SS-9		SS-10		SS-11		SS-12		SS-13		SS-14		SS-15		SS-16		SS-17			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
3-18-74					690.032	i															JAD 1-4-82	978 1-26-82
4-15-74					690.033	+.001													690.091	i	↓	↓
5-13-74					690.031	-.001													690.088	-.003		
6-11-74					690.035	+.003													690.086	-.005		
7-15-74					690.035	+.003													690.090	-.001		
8-13-74					690.027	-.005													690.081	-.010		
8-23-74					694.217	RS -													694.098	RS		
9-16-74					694.220	+.003					696.590	i			696.605	i			694.091	-.007		
10-17-74					694.212	-.005					696.585	-.005	696.593	i	696.605	0			694.090	-.003		
11-18-74					694.212	-.005					696.585	-.005	696.593	0	696.604	-.001			694.095	-.003		
12-18-74					694.214	-.003					704.807*	+.001	704.792**	0	704.767***	0			694.095	-.003		
1-20-75					694.213	-.004					704.803	-.003	704.793	+.001	704.766	-.001			694.097	-.001		
2-19-75					694.211	-.006					704.805	-.001	704.796	+.004	704.770	+.003			694.097	-.001		
3-17-75					694.210	-.007					704.802	-.004	704.792	0	704.766	-.001			694.097	-.001		
5-6-75					694.208	-.009					704.801	-.005	704.790	-.002	704.763	-.004			694.100	+.002		
6-2-75					694.207	-.010					704.793	-.013	704.786	-.006	704.760	-.007			694.097	-.001		
7-7-75					694.193	-.024					704.790	-.016	704.783	-.009	704.759	-.008			694.093	-.005		
7-21-75					694.208	-.009					704.802	-.004	704.794	+.002	704.772	+.005			694.101	+.003		
8-18-75					694.203	-.014					704.787	-.019	704.778	-.014	704.756	-.011			694.089	-.010		
9-10-75					694.202	-.015					704.799	-.007	704.788	-.004	704.766	-.001			694.096	-.002		
10-31-75					694.198	-.019					704.788	-.018	704.778	-.014	704.755	-.012			694.091	-.007		
11-24-75					694.212	-.005					704.804	-.002	704.796	+.004	704.771	+.004			694.103	+.005		
12-17-75					694.190	-.027					704.791	-.015	704.783	-.009	704.758	-.009			694.084	-.012		
1-14-76					694.206	-.011					704.797	-.009	704.788	-.004	704.764	-.003	728.980	i	694.099	+.001		

RS - POINT RESET

* POINT RESET TO 704.806 ON 11-18-74

** POINT RESET TO 704.792 ON 11-18-74

*** POINT RESET TO 704.767 ON 11-18-74

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SETTLEMENT MONITORING PROGRAM

WATTS BAR NUCLEAR PLANT

POWERHOUSE

Added by Amendment 50

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SETTLEMENT MONITORING PROGRAM
POWERHOUSE
TABLE 2.5-70
SHEET 6

	SETTLEMENT POINTS																					
	SS-8		SS-9		SS-10		SS-11		SS-12		SS-13		SS-14		SS-15		SS-16		SS-17			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
2-11-76			728.953	i	694.207	-.010	729.033	i			704.804	-.002	704.795	+.003	704.771	+.004	728.991	+.011	694.101	+.003	JAD 1-4-82	BTD 1-26-82
3-18-76			728.942	-.011	694.205	-.012	729.023	-.010			704.797	-.009	704.790	-.002	704.764	-.003	728.987	+.007	694.105	+.007	↓	↓
4-15-76			728.946	-.007	694.201	-.016	729.027	-.006			704.795	-.011	704.787	-.005	704.763	-.004	728.990	+.010	694.096	-.002		
5-11-76			728.946	-.007	694.205	-.012	729.028	-.005			704.795	-.011	704.785	-.007	704.763	-.004	728.986	+.006	694.101	+.003		
6-11-76			728.934	-.019	694.192	-.025	729.016	-.017			Not Run	—	Not Run	—	Not Run	—	728.986	+.006	694.089	-.009		
7-14-76	729.034	i	728.936	-.017	694.195	-.022	729.019	-.014	728.995	i	704.787	-.019	704.779	-.013	704.757	-.010	728.987	+.007	694.094	-.004		
8-10-76	729.039	+.005	728.940	-.013	694.200	-.017	729.023	-.010	729.002	+.007	704.785	-.021	704.778	-.014	704.755	-.012	728.983	+.003	694.102	+.004		
9-14-76	729.033	-.001	728.934	-.019	694.183	-.034	729.020	-.013	728.997	+.002	704.786	-.020	704.779	-.013	704.754	-.013	728.[illegible]	+.008	694.088	-.010		
10-13-76	729.039	+.005	728.942	-.011	694.191	-.026	729.026	-.007	729.001	+.006	704.787	-.019	704.779	-.013	704.758	-.009	[illegible].952	+.002	694.095	-.003		
11-9-76	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—		
12-9-76	729.026	-.008	728.932	-.021	694.174	-.043	729.013	-.020	728.987	-.008	704.766	-.040	704.762	-.030	704.737	-.030	728.979	-.001	694.074	-.024		
1-12-77	729.029	-.005	728.937	-.016	694.184	-.033	Not Run	—	728.991	-.004	704.770	-.036	704.767	-.025	704.741	-.026	Not Run	—	694.082	-.016		
2-10-77	729.030	-.004	728.951	-.002	694.193	-.024	729.027	-.006	728.991	-.004	704.785	-.021	704.780	-.012	704.761	-.006	NR	—	694.093	-.005		
3-15-77	729.032	-.002	Not Run	—	694.195	-.022	729.018	-.015	728.991	-.004	704.787	-.019	704.784	-.008	704.758	-.009	728.978	-.002	694.086	-.002		
4-11-77	729.027	-.007	728.933	-.020	694.189	-.028	729.015	-.018	728.988	-.007	704.780	-.026	704.776	-.016	704.752	-.015	Not Run	—	694.090	-.008		
5-10-77	729.023	-.011	728.926	-.027	694.174	-.043	729.013	-.020	728.984	-.011	704.772	-.034	704.771	-.021	704.743	-.024	728.977	-.003	694.082	-.016		
6-6-77	729.027	-.007	728.932	-.021	694.136	-.021	729.011	-.022	728.989	-.006	704.780	-.026	704.779	-.013	704.753	-.014	728.975	-.005	694.087	-.001		
7-6-77	729.035	+.001	728.937	-.016	694.190	-.027	729.015	-.018	728.997	+.002	704.783	-.023	704.780	-.012	704.754	-.013	728.975	-.005	694.084	-.004		
8-3-77	729.016	-.018	728.915	-.038	694.165	-.052	729.000	-.033	728.976	-.019	704.756	-.050	704.755	-.037	704.726	-.041	728.980	.000	694.070	-.028		
9-12-77	Not Run	-	728.929	-.024	694.178	-.039	729.007	-.026	728.988	-.007	704.770	-.036	704.763	-.023	704.743	-.024	728.974	-.006	694.081	-.017		
10-11-77	NR	—	728.936	-.017	694.188	-.029	729.013	-.020	728.984	-.011	Not Run	—	Not Run	—	704.752	-.015	728.968	-.012	694.095	-.003		
11-7-77	729.015	-.019	728.920	-.033	694.172	-.045	729.012	-.021	728.975	-.020	NR	—	NR	—	NR	—	728.971	-.009	694.078	-.020		
12-15-77	Not Run Inaccessible	—	728.936	-.017	694.194	-.023	729.018	-.015	Not Run Inacc.	—	NR Inacces.	—	NR	—	NR	—	728.971	-.009	694.086	-.002		
1-9-78	729.025	-.009	728.934	-.019	694.187	-.030	729.012	-.021	728.985	-.010	NR	—	NR	—	NR	—	Not Run		694.092	-.006		

SETTLEMENT MONITORING PROGRAM

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POWERHOUSE

Added by Amendment 50

	SETTLEMENT POINTS																					
	CS-8		SS-9		SS-10		SS-11		SS-12		SS-13		SS-14		SS-15		SS-16		SS-17			
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
2-2-78	729.033	-.001	728.940	-.013	694.193	-.024	729.016	-.017	Not Run	-	Not Run	-	Not Run	-			728.965	-.015	694.098	.000	JAD 1/19/82	LTB 1-26-82
3-3-78	Not Run	-	728.928	-.025	694.183	-.034	729.007	-.026	728.982	-.013	704.771	-.035	704.768	-.024			728.963	-.017	694.086	-.012		
4-3-78	729.022	-.012	728.925	-.028	694.178	-.039	729.003	-.030	728.980	-.015	NR	-	NR	-			Not Run	-	694.084	-.014		
5-4-78	729.025	-.009	728.933	-.020	694.196	-.031	729.007	-.026	728.984	-.011	NR	-	NR	-			NR	-	694.090	-.008		
6-5-78	729.013	-.015	728.922	-.031	694.186	-.031	729.003	-.030	728.978	-.017	NR	-							694.089	-.009		
7-10-78	729.019	-.015	728.921	-.032	694.174	-.043	729.002	-.031	728.980	-.015									694.082	-.016		
8-4-78	729.015	-.019	728.913	-.040	694.168	-.049	728.995	-.038	728.976	-.019									694.073	-.025		
9-29-78			728.929	-.024	694.183	-.034	729.008	-.025											Not Run	-		
1-19-79			728.934	-.019	694.184	-.033	729.016	-.017											NR	-		
4-9-79			728.916	-.037	694.175	-.042	729.000	-.033									728.960	-.014	694.083	-.015		
7-24-79	NR	-	728.926	-.027	694.182	-.035	728.999	-.034	NR	-	NR	-	NR	-	NR	-	NR	-	694.090	-.008		
10-22-79	NR	-	728.920	-.033	694.178	-.039	NR	-	NR	-	NR	-	NR	-	NR	-	NR	-	694.090	-.008		
1-19-80	NR	-	728.913	-.040	694.168	-.049	728.991	-.042	NR	-	NR	-	NR	-	NR	-	NR	-	694.076	-.022		
4-29-80	NR	-	728.909	-.044	694.161	-.056	728.993	-.040	"	-	"	-	"	-	"	-	"	-	Not Run	-		
12-22-81	729.010	-.024	728.917	-.036	694.157	-.060	729.000	-.033	"	-	"	-	"	-	"	-	"	-	694.063	-.035		
1-18-82	729.006	-.028	728.914	-.039	694.181	-.036	728.995	-.038	"	-	"	-	"	-	"	-	"	-	694.085	-.013	JAD 2-11-82	LTB 2-17-82
1-27-82	729.009	-.025	728.917	-.036	694.175	-.042	729.000	-.033	NR	-	704.761	-.045	704.759	-.033	704.733	-.034	728.950	-.030	694.083	-.015	JAD 2-11-82	LTB 2-17-82
2-11-82	729.010	-.024	N.R	-	694.170	-.047	N.R.	-	NR	-	704.759	-.047	704.758	-.034	704.731	-.036	728.948	-.032	NR	-	JMH 2-25-82	LTB 2-25-82
AVG.	*** 729.009	-.025	* 728.916	-.037	*** 694.171	-.046	* 728.[illegible]	[illegible]	NR	-	** 709.760	-.046	** 704.759	-.033	** 704.732	-.035	** 728.949	-.031	* 694.077	-.021	JMH 2-15-82	LTB 2-25-82

* LAST THREE READINGS ** LAST TWO READINGS *** LAST FOUR READINGS

WATTS BAR NUCLEAR PLANT
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POWERHOUSE
TABLE 2.5-70
SHEET 8

Added by Amendment 50

	SETTLEMENT POINTS									
	SS-18		SS-19		SS-20					
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
10-16-73	689.531	i			689.502	i			JAD 1-4-82	JTB 1-26-92
11-19-73	689.542	+.011	689.505	i	689.505	+.003			↓	↓
12-17-73	689.538	+.007	689.512	+.007	INAC.	-				
1-6-74	689.538	+.007	689.500	-.005	INAC.	-				
2-20-74	689.541	+.010	689.502	-.003	INAC.	-				
3-18-74	689.540	+.009	689.501	-.004	689.509	+.007				
4-15-74	689.538	+.007	689.501	-.004	689.508	+.006				
5-13-74	689.540	+.009	689.504	-.001	689.511	+.009				
6-11-74	689.535	+.004	689.504	-.001	689.510	+.008				
6-11-74	694.039	RS	694.046	RS	693.972	RS				
7-15-74	694.033	-.006	694.043	-.003	693.971	-.001				
8-13-74	694.037	-.002	694.042	-.004	693.972	0.0				
9-16-74	694.032	-.007	694.039	-.007	693.973	+.001				
10-17-74	READING ERROR	-	694.037	-.009	693.972	0.0				
11-18-74	694.027	-.012	694.020	-.026	693.959	-.013				
12-18-74	694.043	+.004	694.036	-.010	693.976	+.004				
1-20-75	694.042	+.003	694.033	-.013	693.971	-.001				
2-19-75	694.043	+.004	694.037	-.009	693.975	+.003				
3-17-75	694.042	+.003	694.033	-.013	693.972	0.0				
5-6-75	694.031	-.008	694.032	-.014	693.964	-.008				
6-2-75	694.037	-.002	694.041	-.005	693.971	-.001				
7-7-75	694.033	-.006	694.037	-.009	693.966	-.006				
7-21-75	694.039	0.0	694.043	-.003	693.975	+.003				
8-18-75	694.021	-.018	694.027	-.019	693.957	-.015				

RS POINT RESET INAC - INACCESSIBLE

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TABLE 2.5-70
SHEET 9

Added by Amendment 50

	SETTLEMENT POINTS									
	SS-18		SS-19		SS-20					
DATE	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	ELEV	DIFF	BY	CHKD
9-10-75	694.035	-.004	694.036	-.010	693.972	0.0			JAB 1-4-82	BTB 1-26-82
10-31-75	694.039	0.0	694.035	-.011	693.972	0.0				↓
11-24-75	694.046	+.007	694.037	-.009	693.976	+.004				
12-17-75	694.052	+.013	694.043	-.003	693.983	+.011				
1-14-76	694.053	+.014	694.043	-.003	693.984	+.012				
2-11-76	694.052	+.013	694.043	-.003	693.982	+.010				
3-18-76	694.041	+.002	694.036	-.010	693.972	0.0				
4-15-76	694.047	+.008	694.045	-.001	693.978	+.006				
5-11-76	694.052	+.013	694.049	+.003	693.983	+.011				
6-11-76	694.022	-.017	694.026	-.020	693.957	-.015				
7-14-76	694.038	-.001	694.043	-.003	693.973	+.001				
8-10-76	694.033	-.006	694.038	-.008	693.970	-.002				
9-14-76	694.024	-.015	694.027	-.019	693.959	-.013				
10-13-76	694.042	+.003	694.042	-.004	693.978	+.006				
11-9-76	Poor Closure Not Used	—	Poor Closure Not Used	—	Poor Closure Not Used	—				
12-9-76	694.037	-.002	694.033	-.013	693.971	-.001				
1-12-77	694.043	+.004	694.038	-.008	693.975	+.003				
2-10-77	694.051	+.012	694.049	+.003	693.985	+.013				
3-15-77	694.046	+.007	694.046	0.0	693.980	+.008				
4-11-77	694.033	-.006	694.032	-.014	693.965	-.007				
5-10-77	694.034	-.005	694.035	-.011	693.968	-.004				
6-6-77	694.045	+.006	694.048	+.002	693.979	+.007				
7-6-77	694.034	-.005	694.042	-.004	693.972	0.0				
8-3-77	693.999	-.040	694.006	-.040	693.935	-.037				

Added by Amendment 50

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TABLE 2.5-70
SHEET 12

	SETTLEMENT POINTS					
	SS-21		SS-22		SS-23	
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF
6-11-76	709.976	-.030	709.994	-.005	709.867	+.027
7-14-76	709.993	-.013	710.012	+.013	709.868	+.028
8-10-76	709.990	-.016	710.010	+.011	709.862	+.022
9-14-76	709.978	-.028	709.996	-.003	709.868	+.028
10-13-76	709.996	-.010	710.011	+.012	709.870	+.030
11-9-76	Poor Closure Not Used	-	Poor Closure Not Used	-	Poor Closure Not Used	-
12-9-76	709.986	-.020	710.003	+.004	Not Run	-
1-12-77	710.000	-.006	710.014	+.015	709.871	+.031
2-10-77	710.005	-.001	710.018	+.019	709.885	+.045
3-15-77	709.999	-.007	710.016	+.017	709.868	+.028
4-11-77	709.990	-.016	710.007	+.008	709.873	+.033
5-10-77	709.986	-.020	710.004	+.005	709.869	+.029
6-6-77	710.000	-.006	710.019	+.020	709.867	+.027
7-6-77	709.992	-.014	710.010	+.011	709.860	+.020
8-3-77	709.953	-.053	709.976	-.023	709.867	+.027
9-12-77	709.984	-.022	710.003	+.004	709.859	+.019
10-11-77	710.002	-.004	710.019	+.020	709.864	+.024
11-7-77	709.987	-.019	710.004	+.005	709.869	+.029
12-15-77	709.987	-.019	710.008	+.009	709.866	+.026
1-9-78	710.002	-.004	710.020	+.021	709.872	+.032
2-2-78	709.998	-.008	710.021	+.022	709.871	+.031
3-3-78	709.989	-.017	710.006	+.007	709.865	+.025
4-3-78	709.978	-.028	710.000	+.001	709.864	+.024
5-4-78	709.989	-.017	710.011	+.012	709.863	+.023

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TABLE 2.5-70
SHEET 13

Added by Amendment 50

	SETTLEMENT POINTS					
	SS-21		SS-22		SS-23	
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF
6-5-78	709.978	-.028	710.002	+.003	709.858	+.018
7-10-78	709.978	-.028	709.997	-.002	709.854	+.014
8-4-78	709.987	-.019	710.006	+.007	709.854	+.014
9-29-78	709.989	-.017	710.011	+.012	709.857	+.017
1-5-79	709.996	-.010	710.012	+.013	709.858	+.018
4-9-79	709.979	-.027	710.000	+.001	709.868	+.028
7-20-79	709.978	-.028	710.002	+.003	709.851	+.011
10-19-79	709.981	-.025	710.007	+.008	709.855	+.015
1-18-80	709.983	-.023	710.005	+.006	709.854	+.014
4-28-80	709.978	-.028	709.999	0.0	709.861	+.021
12-18-81	709.978	-.028	709.997	-.002	709.855	+.015
1-7-82	709.986	-.020	710.009	+.010	709.862	+.022
1-22-82	709.979	-.027	710.003	+.004	709.864	+.024
AVG *	709.981	-.025	710.003	+.004	709.860	+.020

* LAST THREE READINGS

WATTS BAR NUCLEAR PLANT
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SETTLEMENT MONITORING PROGRAM
POWERHOUSE
TABLE 2.5-70
SHEET 11

Added by Amendment 50

	SETTLEMENT POINTS					
	SS-21		SS-22		SS-23	
DATE	ELEV	DIFF	ELEV	DIFF	ELEV.	DIFF
6-11-74						
7-15-74						
8-13-74						
9-16-74					709.840	i
10-17-74	710.006	i			709.869	+.029
11-18-74	NOT RUN	–			709.870	+.030
12-18-74	710.004	-.002			709.874	+.034
1-20-75	709.997	-.009			709.871	+.031
2-19-75	710.000	-.006			709.869	+.029
3-17-75	709.996	-.010			709.869	+.029
5-6-75	709.991	-.015			709.863	+.023
6-2-75	709.989	-.017			709.861	+.021
7-7-75	709.992	-.014			709.861	+.021
7-21-75	709.995	-.011			709.859	+.019
8-18-75	709.984	-.022	709.999	i	709.858	+.018
9-10-75	709.996	-.010	710.008	+.009	709.861	+.021
10-31-75	NOT RUN	–	710.008	+.009	709.870	+.030
11-24-75	709.997	-.009	710.008	+.009	709.871	+.031
12-16-75	710.005	-.001	710.017	+.018	709.881	+.041
1-14-76	710.002	-.004	710.014	+.015	709.869	+.029
2-11-76	710.004	-.002	710.017	+.018	709.875	+.035
3-18-76	709.995	-.011	710.010	+.011	709.871	+.031
4-15-76	709.998	-.008	710.014	+.015	709.872	+.032
5-11-76	710.003	-.003	710.018	+.019	709.874	+.034

TABLE 2.5-71

DIFFERENTIAL SETTLEMENT BETWEEN ROCK SUPPORTED STRUCTURES

	Settlement Station	Initial Reading Date	Initial Reading Elevation (Feet)	Maximum Differential Settlement Date	Maximum Differential Settlement Elevation (Feet)	Maximum Differential Settlement S (Feet)	Maximum Differential Settlement ΔS (Feet)	Most Recent Differential Settlement Date	Most Recent Differential Settlement Elevation (Feet)	Most Recent Differential Settlement S (Feet)	Most Recent Differential Settlement ΔS (Feet)
Auxiliary Control Building and Turbine Building Settlement Stations (The turbine building is noncategory I.)	SS20	10-17-74	693.972	04-25-80	693.975	+0.003	0.031	01-22-82	693.968(1)	-0.004	0.021
	SS21	10-17-74	710.006	04-25-80	709.978	-0.028		01-22-82	709.981(1)	-0.025	
	SS19	08-18-75	694.027	08-04-78	694.042	+0.015	0.008	01-22-82	694.032(1)	+0.005	0.001
	SS22	08-18-75	709.999	08-04-78	710.006	+0.007		01-22-82	710.003(1)	+0.004	
	SS18	09-16-74	694.032	06-11-76	694.022	-0.010	0.037*	01-22-82	694.031(1)	-0.001	0.021
	SS23	09-16-74	709.840	06-11-76	709.867	+0.027		01-22-82	709.860(1)	+0.020	
Reactor Building Unit 1 and Auxiliary Building Settlement Stations	SS15	01-14-76	704.764	08-03-77	704.726	-0.038	0.038	02-12-82	704.732(2)	-0.032	0.001
	SS16	01-14-76	728.980	08-03-77	728.980	0.000		02-12-82	728.949(2)	-0.031	
	SS12	07-14-76	728.995	01-12-77	728.991	-0.004	0.013	03-03-78	728.982(3)	-0.013	0.003
	SS13	07-14-76	704.787	01-12-77	704.770	-0.017		03-03-78	704.771(3)	-0.016	
Reactor Building Unit 2 and Auxiliary Building Settlement Stations	SS4	01-14-76	729.033	07-14-76	729.031	-0.002	0.029	02-12-82	728.994(2)	-0.039	0.020
	SS5	01-14-76	705.284	07-14-76	705.311	+0.027		02-12-82	705.265(2)	-0.019	
	SS7	07-14-76	705.336	12-09-76	705.300	-0.036	0.028	02-12-82	705.296(2)	-0.040	0.015
	SS8	07-14-76	729.034	12-09-76	729.026	-0.008		02-12-82	729.009(4)	-0.025	

*This is the second highest differential settlement for SS18 and SS23, the highest is peculiarly high in August of 1977.

S=Settlement ΔS=Differential Settlement

(1) Average of three readings from December 22, 1981, January 18, 1982, and January 27, 1982.
(2) Average of two readings from January 27, 1982 and February 12, 1982, difficult conditions.
(3) Single reading of March 3, 1978.
(4) Average of four readings from December 22, 1981, January 18, 1982, January 27, 1982, and February 12, 1982.

Added by Amendment 50

B61187.10

TABLE 2.5-72

SETTLEMENT MONITORING PROGRAM OF CATEGORY I STRUCTURES

Structure	Foundation Material	Design Total Settlement	Design Differential Settlement	Maximum Measured Total Settlement (inches)	Date	Updated Measured Total Settlement (inches)	Date	Settlement Station
Unit 1 R.B.	Rock	1 to 2 inches	1 inch	0.60	8-03-77	0.55(1)	2-12-82	SS-13
Unit 2 R.B.	Rock	1 to 2 inches	1 inch	0.37	8-03-77	0.35(1)	2-12-82	SS-7
Aux. & Control Building	Rock	1 to 2 inches	1 inch	0.67	4-29-80	0.55(2)	2-12-82	SS-10
Intake Pumping Station	Rock	1 to 2 inches	1 inch	0.38	2-2-79	0.13(3)	4-23-80	SS-3A
Diesel Generator Building	Compacted Granular Backfill on In Situ Gravel on Rock	NEGLIGIBLE	NEGLIGIBLE	0.59	4-10-81	0.53(4&5)	1-29-82	SS-1
Waste Packaging Area	Compacted Granular Backfill on Rock	NEGLIGIBLE	NEGLIGIBLE	0.52	4-28-80	0.48(4)	1-27-82	SS-45

(1) Average of two readings from January 27, 1982, and February 12, 1982; difficult conditions.

(2) Average of four readings from December 22, 1981; January 18, 1982; January 27, 1982; and February 12, 1982.

(3) Single reading on April 23, 1980.

(4) Average of three readings from December 22, 1981; January 18, 1982; and January 27, 1982.

(5) Corrected to reset value on April 10, 1981.

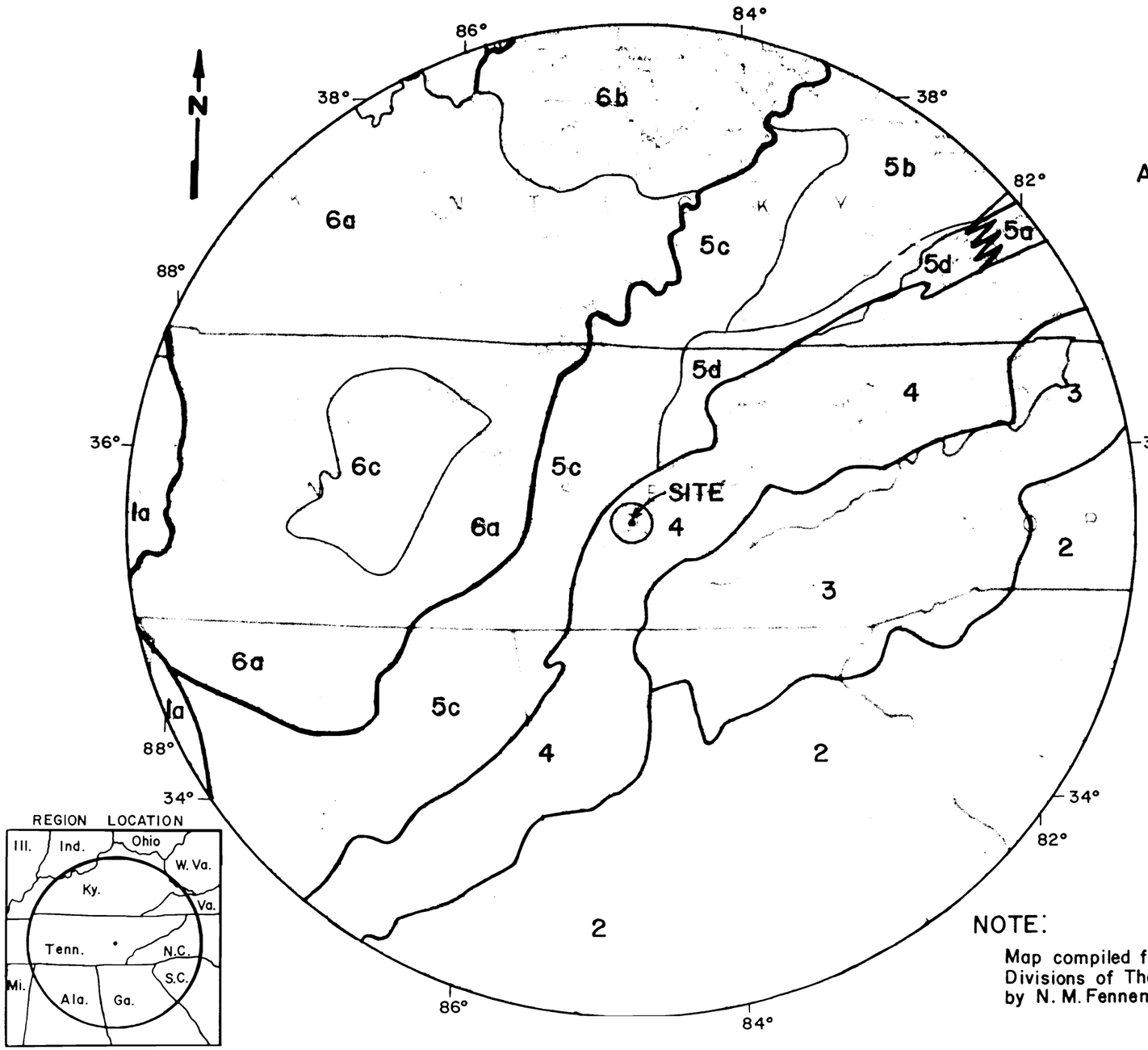
Added by Amendment 50

TABLE 2.5-73

Summary of Ground-Water Level Estimates

ERCW Piezometer	25-Year Ground-Water Estimate	Previous Estimate
P1	702.9	701
P2	717.6	716
P3	716.8	715
P4	714.4	713
P5	712.5	705
P6	710.2	709
P7	718.4	717
P8	723.4	722

Revised by Amendment 50



EXPLANATION

ATLANTIC PLAIN DIVISION
- 1 - COASTAL PLAIN
  - (1a) East Gulf Coastal Plain

APPALACHIAN HIGHLANDS DIVISION
- 2 - PIEDMONT PROVINCE
- 3 - BLUE RIDGE PROVINCE
- 4 - VALLEY AND RIDGE PROVINCE
- 5 - APPALACHIAN PLATEAUS PROVINCE
  - (5a) Allegeny Mountain Section
  - (5b) Kanawha Section
  - (5c) Cumberland Plateau Section
  - (5d) Cumberland Mountain Section

INTERIOR PLAINS DIVISION
- 6 - INTERIOR LOW PLATEAUS PROVINCE
  - (6a) Highland Rim Section
  - (6b) Lexington Plain
  - (6c) Nashville Basin

SCALE:

25 0 25 50 Miles

NOTE:

Map compiled from "Physical Divisions of The United States" by N. M. Fenneman, Edition of 1946 Reprinted 1949

WATTS BAR NUCLEAR PLANT
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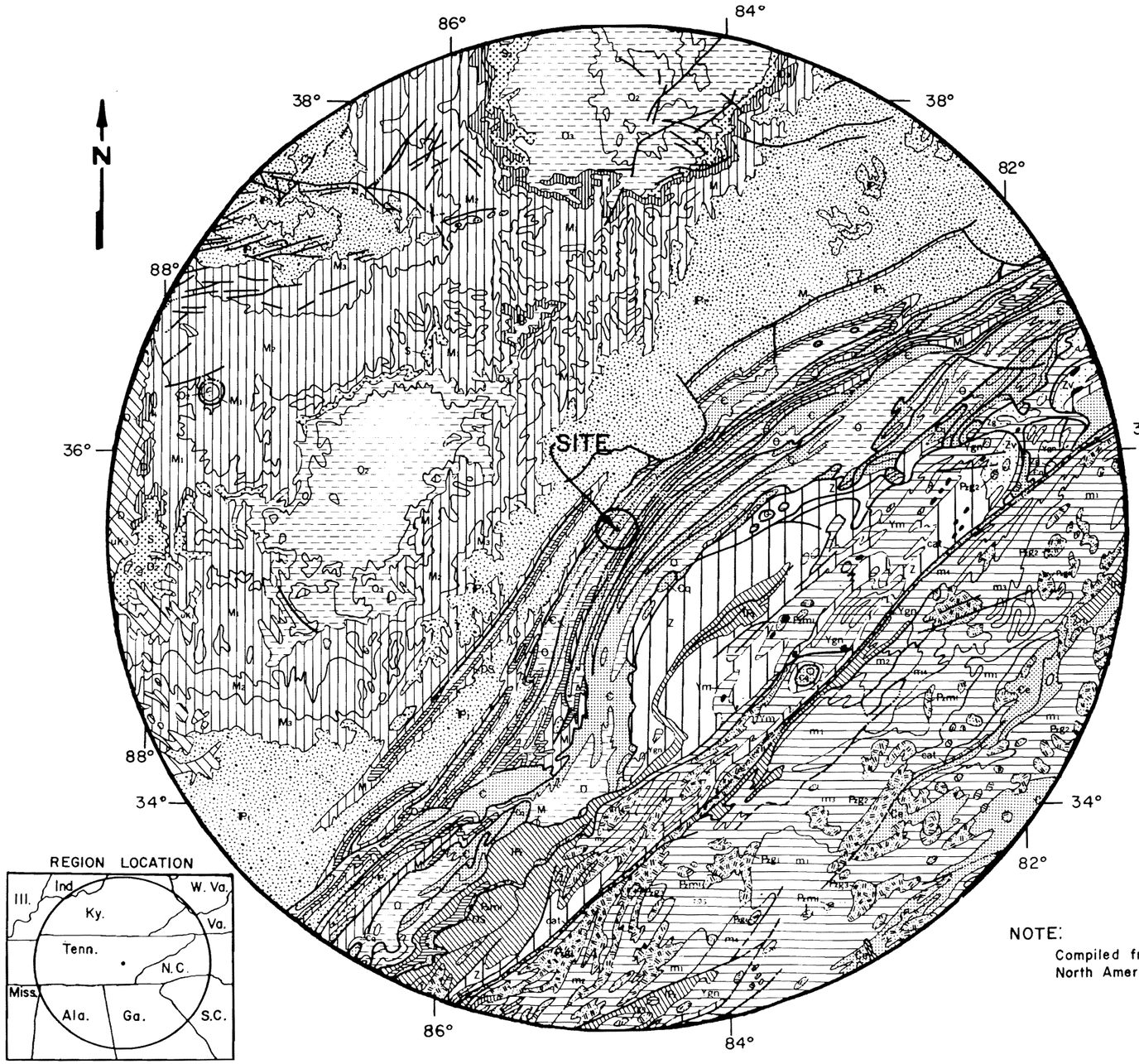
REGIONAL PHYSIOGRAPHIC MAP

Figure 2.5-1

Figure 2.5-1 Regional Physiographic Map



EXPLANATION

- TERTIARY— Te_3
- CRETACEOUS— uK_1, uK_2, uK_3, uK_4
- PENNSYLVANIAN— P_1, P_2, P_3
- MISSISSIPPIAN— M_1, M_2, M_3
- DEVONIAN — D, D_2, D_3
- SILURIAN— S, S_2
- DEVONIAN AND SILURIAN IN VALLEY AND RIDGE — DS
- ORDOVICIAN— O, O_2, O_3
- CAMBRIAN— $\epsilon, \epsilon e, \epsilon q$
- LOWER PALEOZOIC SEDIMENTS AND METASEDIMENTS (undifferentiated)— lPz
- PALEOZOIC GRANITE AND MAFIC INTRUSIVE ROCKS AND CATACLASTIC ROCKS — Pzm_1, Pzg_1, Pzg_2, Pzg_3, cat
- PALEOZOIC ULTRAMAFIC BODIES
- PRECAMBRIAN SEDIMENTARY AND METASEDIMENTARY ROCKS— z
- PRECAMBRIAN AND LOWER PALEOZOIC METAMORPHIC ROCKS — $m_1, m_2, m_3, m_4, Ym, Ygn$
- PRECAMBRIAN VOLCANIC AND GRANITE ROCKS— Zv, Zg
- GEOLOGIC CONTACT
- GEOLOGIC FAULT

SCALE:

25 0 25 50 75 Miles

NOTE:

Compiled from "Geologic Map of North America" USGS 1974.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
REGIONAL GEOLOGIC MAP Figure 2.5-2

Figure 2.5-2 Regional Geologic Map

Figure 2.5-3 Subregional Geologic Setting (Actual Figure Located in Oversized Figures File)

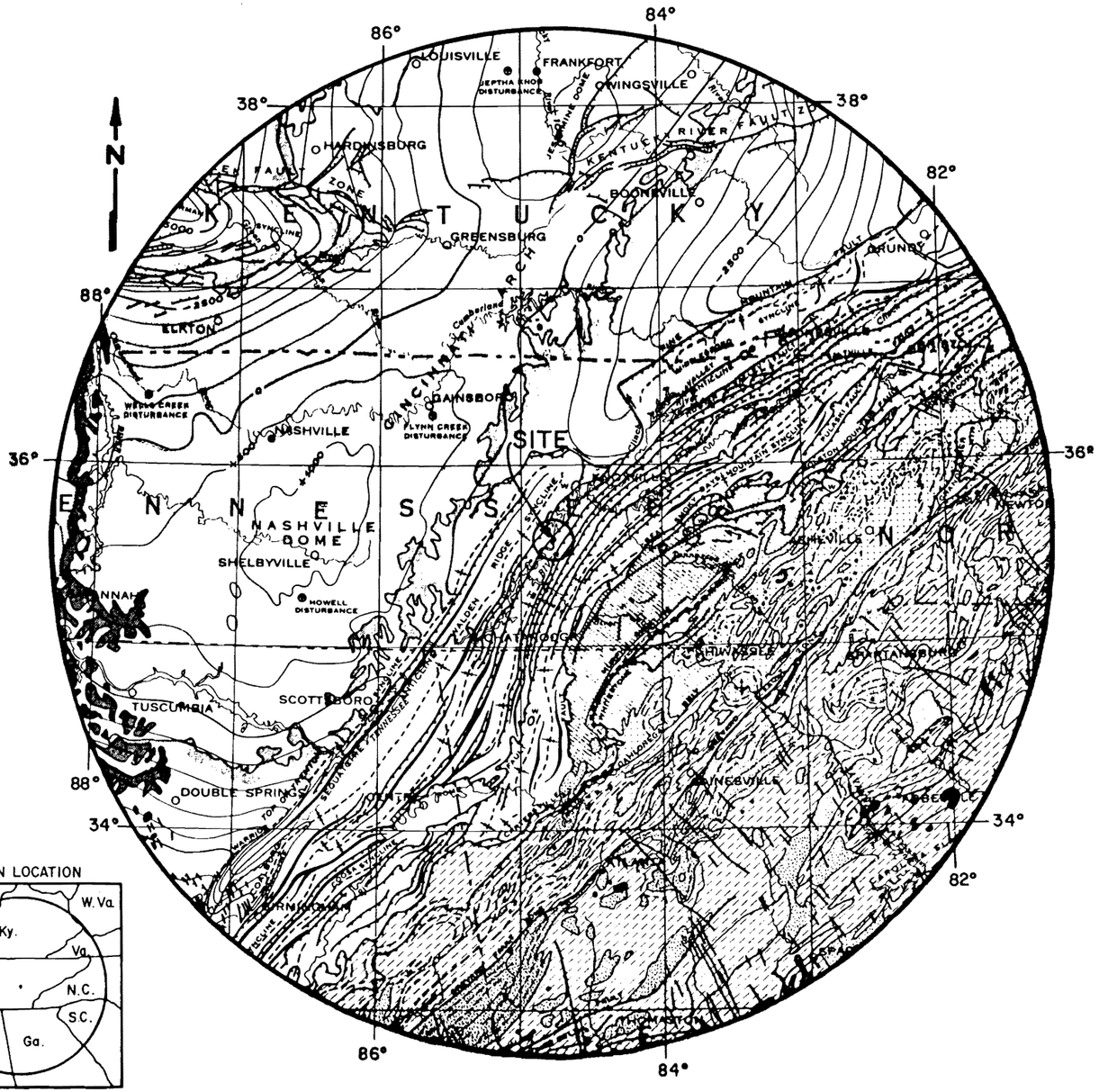


Figure 2.5-4 Regional Tectonic Map

EXPLANATION

METAMORPHIC ROCKS

- Paleozoic metamorphic rocks
- Precambrian metamorphic rocks

INTRUSIVE IGNEOUS ROCKS

- Mesozoic dikes, sills and stocks
- Small dikes and other intrusive bodies
- Ultramafic bodies
- Paleozoic felsic intrusive bodies
- Paleozoic mafic intrusive bodies

SEDIMENTARY ROCKS

- Precambrian sedimentary and volcanic rocks

GEOLOGIC BOUNDARIES

- Base of Cretaceous sedimentary rocks
- Base of Pennsylvanian sedimentary rocks

STRUCTURAL FEATURES

- Window
- Thrust fault
- Normal fault
- Lateral fault
- Buried fault
- Unclassified faults
- En echelon fault system
- Enlongate, closely compressed anticline
- Anticlinal axis
- Dome
- Synclinal axis
- Structure contours on top of Trenton Limestone (on top of Oriskany Sandstone in West Virginia)
- Intensely disturbed, localized uplift
- Trend lines in metamorphic rocks

NOTE:

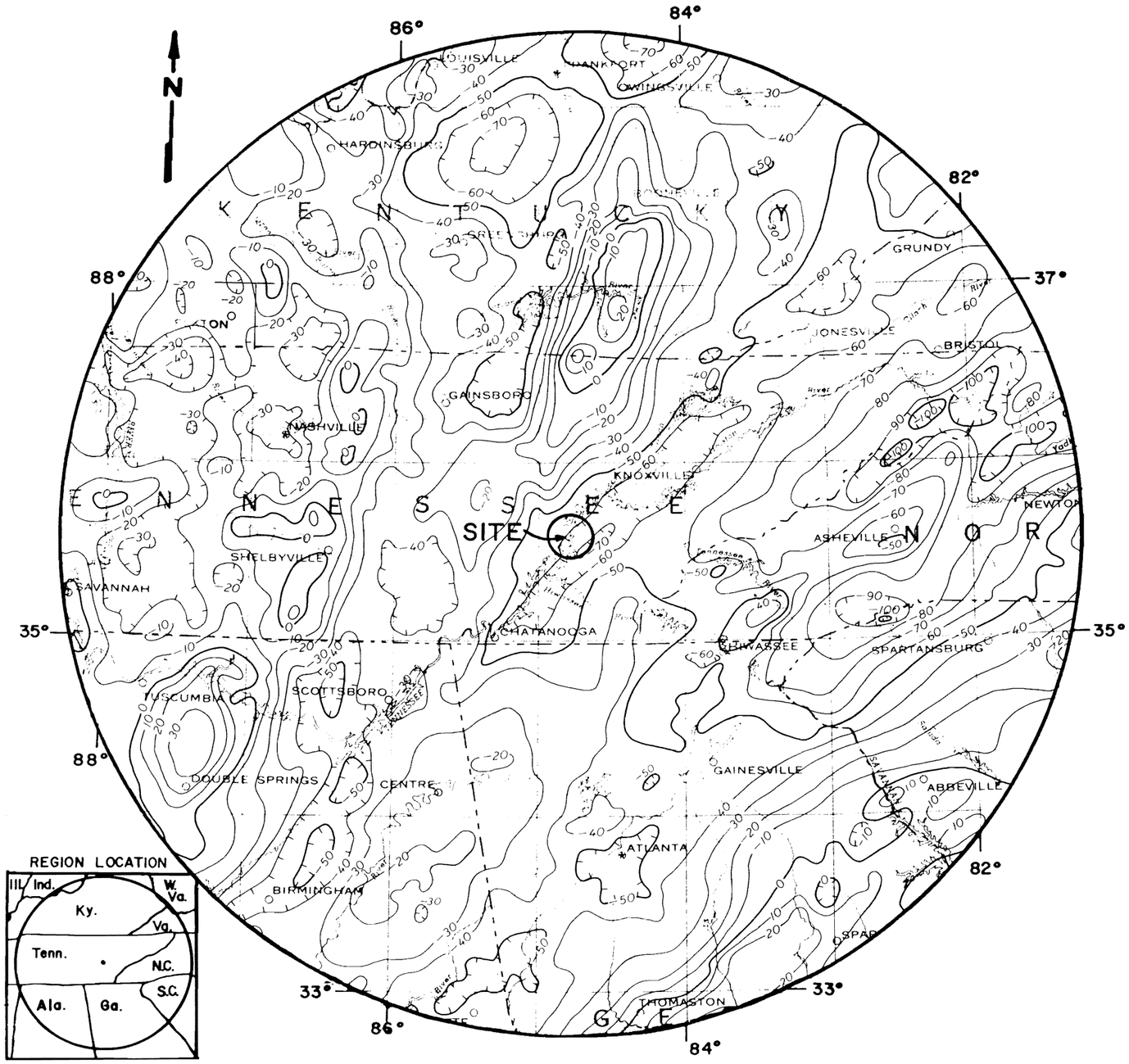
Compiled from "Tectonic Map of The United States"— USGS & AAPG, 1961.

SCALE: 25 0 25 50 Miles

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

REGIONAL TECTONIC MAP

Figure 2.5-4



By the
AMERICAN GEOPHYSICAL UNION
Special Committee for the Geophysical
and Geological Study of the Continents
G. P. Woollard, Chairman
and the
U.S. GEOLOGICAL SURVEY
H. R. Joesting, Coordinator

SCALE:
40 0 40 80 Miles

APPROXIMATELY 1 INCH TO 40 MILES
CONTOUR INTERVAL 10 MILLIGALS
REDUCTION DENSITY 2.67 G PER CM^3

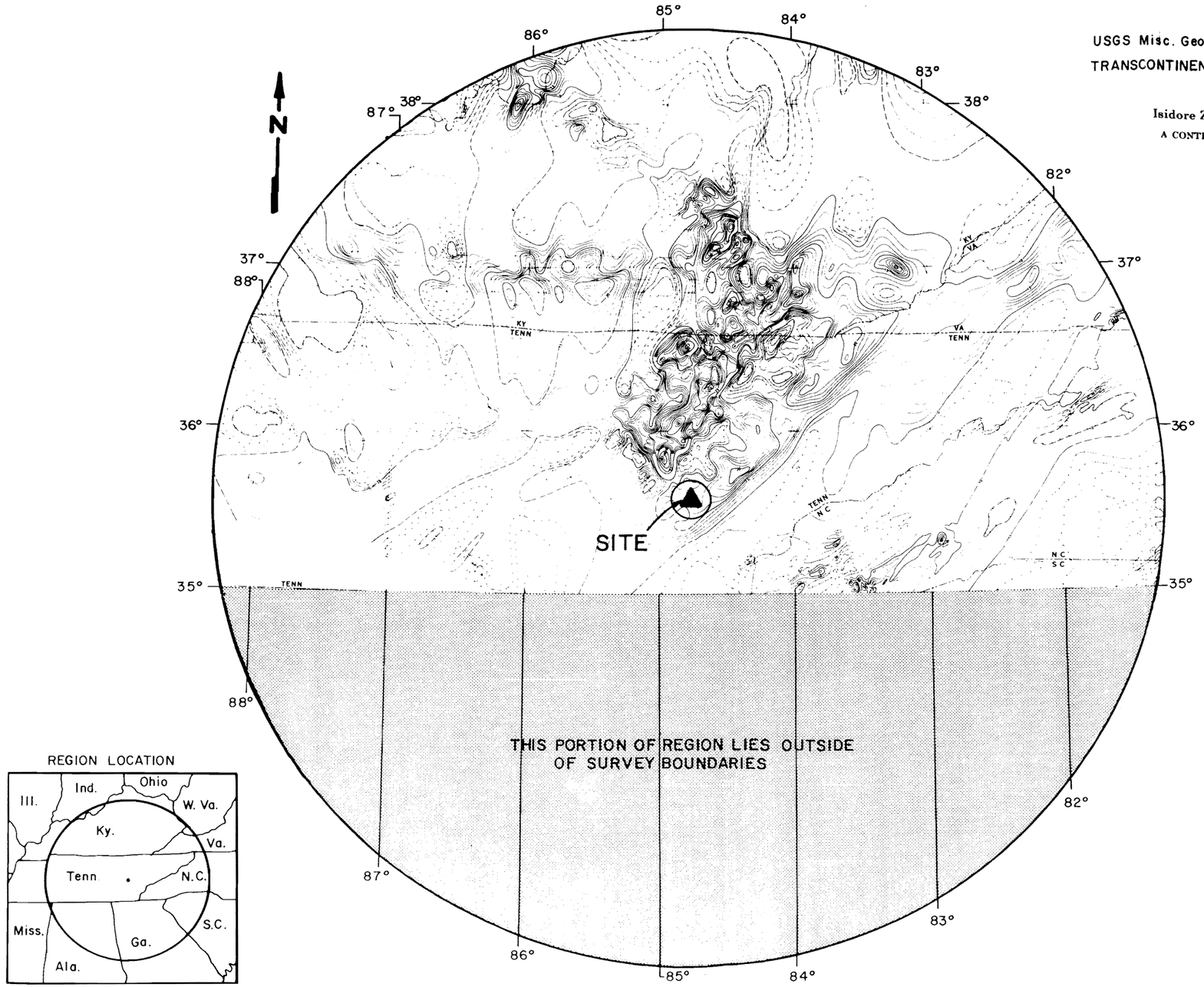
Datum is 980.1188 gals. gravity pier at Commerce Bldg., Washington, D. C.

All gravity meters used in obtaining data for this map were calibrated against Mexico City—Point Barrow pendulum traverse

1964

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
REGIONAL BOUGUER GRAVITY ANOMALY MAP Figure 2.5-5

Figure 2.5-5 Regional Bouguer Gravity Anomaly Map



COMPILED FROM

USGS Misc. Geologic Investigations Map I-535-A

TRANSCONTINENTAL GEOPHYSICAL SURVEY (35°—39°N)

By

Isidore Zietz, H. P. Stockard, and John R. Kirby

A CONTRIBUTION TO THE UPPER MANTLE PROJECT

EXPLANATION

10

Magnetic contours

In hundreds of gammas. Dashed where incomplete, contour interval 100 gammas, datum arbitrary. Main magnetic field of the earth, supplied by the U.S. Coast and Geodetic Survey and based on Epoch 1955, has been removed from all aeromagnetic data

0

Magnetic contours showing area of lower magnetic intensity

Flight path

Showing location of individual flight lines and exception to standard elevation

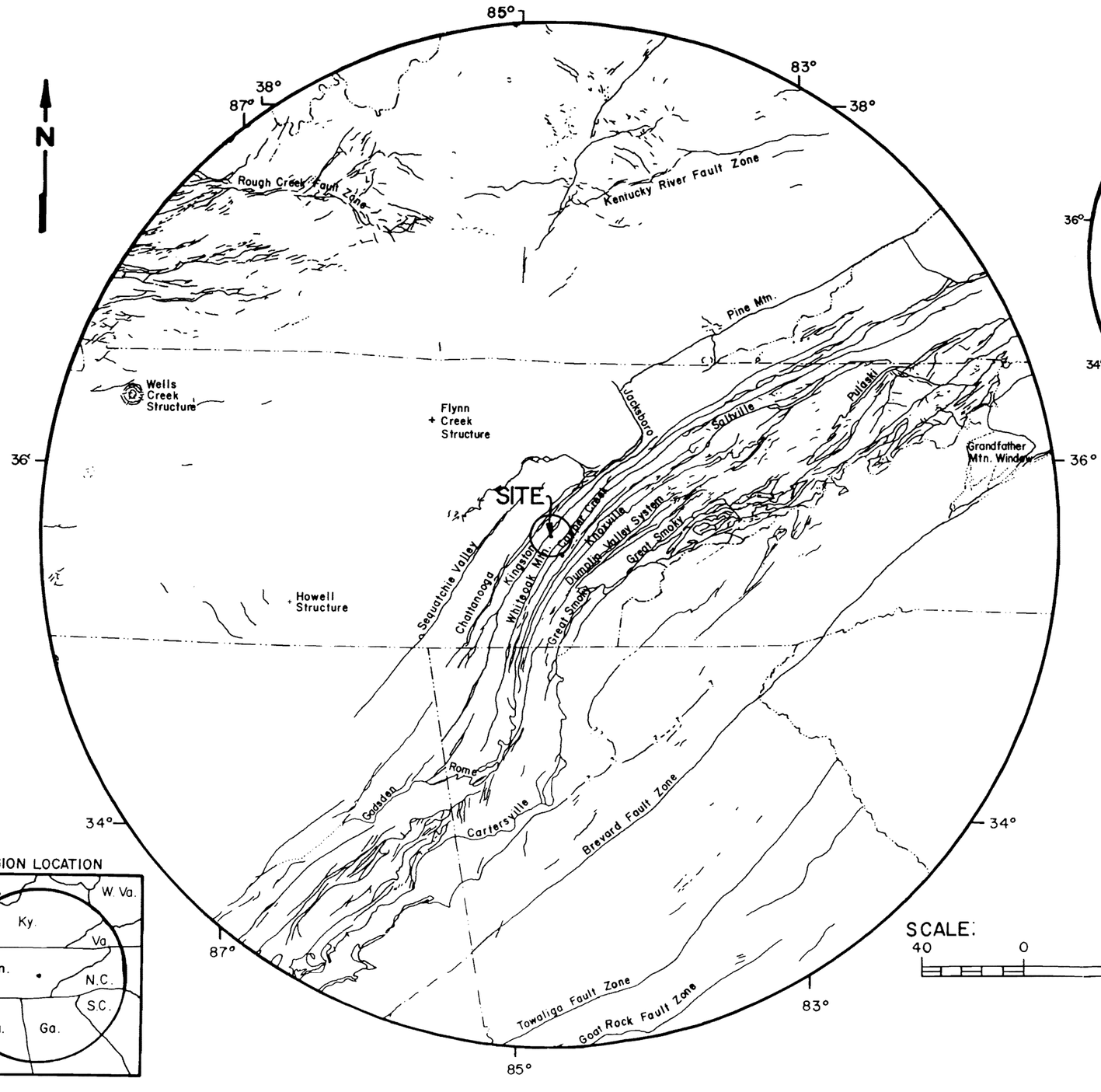
REGION LOCATION

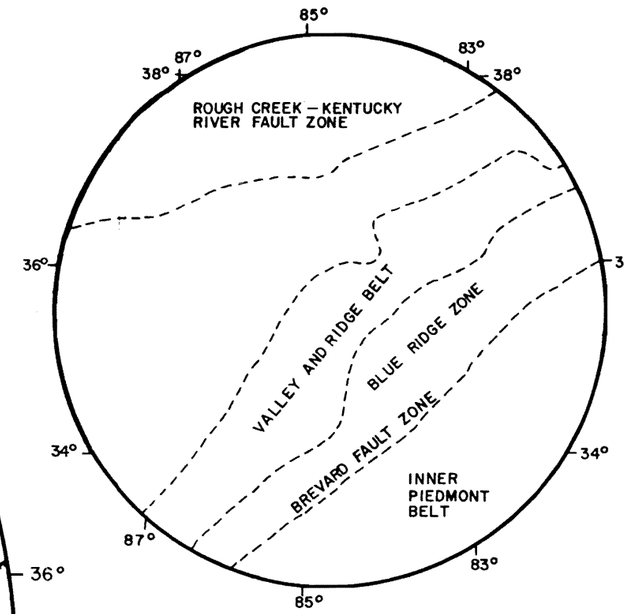
SCALE:

25 0 25 50 Miles

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
REGIONAL MAGNETIC MAP Figure 2.5-6

Figure 2.5-6 Regional Magnetic Map





BOUNDARIES OF MAJOR FAULT BELTS

LEGEND:

- Surface fault
- Inferred fault, queried where doubtful
- + Faulted complex, astrobleme or cryptovolcanic structure
- State boundaries

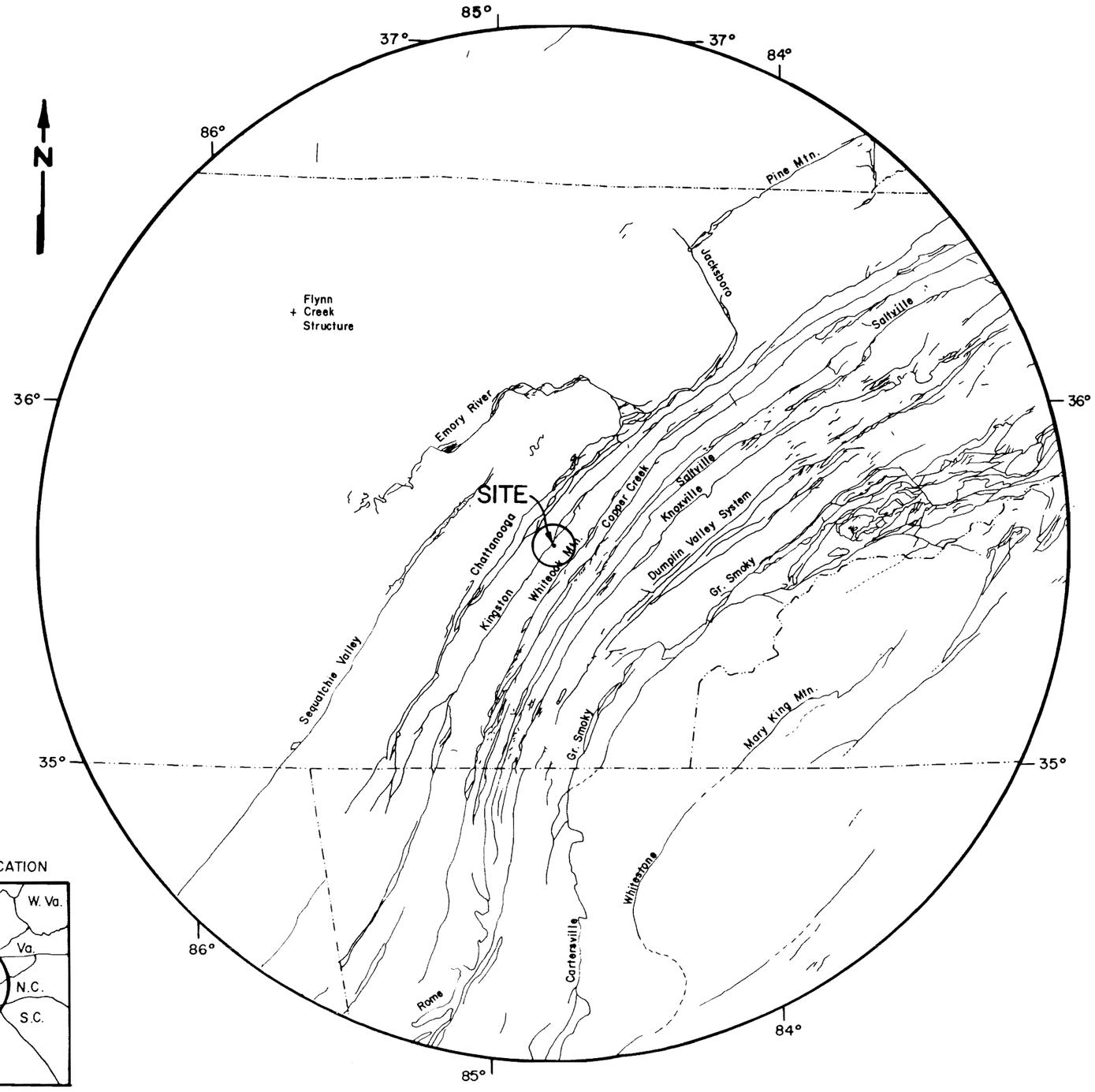
NOTE:

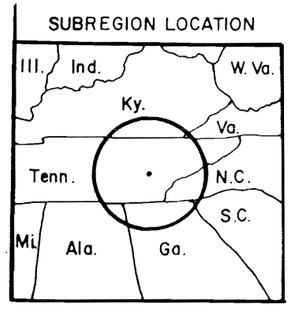
Specific data and published sources for indicated faults and fault systems are available in TVA - Geologic Services Branch files.

SCALE: 40 0 40 MILES

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
REGIONAL FAULT MAP Figure 2.5-7

Figure 2.5-7 Regional Fault Map





LEGEND:

- Surface fault
- ? Inferred fault, queried where doubtful
- \+ Faulted complex, astrobleme or cryptovolcanic structure
- State boundaries

NOTE:

Specific data and published sources for indicated faults and fault systems are available in TVA - Geologic Services Branch files.

SCALE:
20 0 20 MILES

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
SUBREGIONAL FAULT MAP
Figure 2.5-8

Figure 2.5-8 Subregional Fault Map

DESCRIPTION OF MAP UNITS

QUATERNARY	Qal	ALLUVIUM--SOIL, SHALY TO SANDY; CONTAINS ABUNDANT PEBBLES AND COBBLES OF VARIOUS LITHOLOGIES AND TEXTURES, GENERALLY WATERWORN. MAPPED ONLY IN FLOOD PLAIN OF THE TENNESSEE RIVER.
	Qt	TERRACE DEPOSITS--SOIL, SHALY TO SANDY; WITH ROUNDED PEBBLES AND COBBLES; GENERALLY STRATIFIED. REPRESENTS AT LEAST TWO EARLIER FLOOD PLAIN LEVELS OF THE TENNESSEE RIVER.
SILURIAN	Sr	ROCKWOOD FORMATION--SHALE, YELLOWISH-BROWN TO REDDISH; WITH NUMEROUS THIN LAYERS OF YELLOWISH-BROWN TO GRAY SILTSTONE, AND A FEW THIN BEDS OF FINE-GRAINED GRAY SANDSTONE. THICKNESS ABOUT 200 FEET.
ORDOVICIAN	Och	CHICKAMAUGA LIMESTONE--LIMESTONE, LIGHT- TO MEDIUM-GRAY, SLABBY TO MEDIUM-BEDDED; SHALY LIMESTONE ABUNDANT. ESTIMATED THICKNESS 1800 FEET.
CAMBRIAN AND ORDOVICIAN	Ock	KNOX GROUP--DOLOMITE, LIGHT- TO DARK-GRAY, FINE- TO COARSE-GRAINED; AND LIMESTONE, MEDIUM-GRAY TO BLUISH-GRAY, GENERALLY FINE-GRAINED. THIN- TO THICK-BEDDED. WEATHERS TO CHERTY RUBBLE. THICKNESS ABOUT 2600 FEET.
CAMBRIAN	Cc	CONASAUGA GROUP--SHALE, CALCAREOUS IN UPPER PART, BECOMING ARENACEOUS AND SILTY TOWARD BASE; ZONES OF SHALY GRAY LIMESTONE, AS MUCH AS 100 FEET THICK, SCATTERED THROUGHOUT BUT CONCENTRATED IN UPPER HALF. ESTIMATED THICKNESS AS MUCH AS 2000 FEET.
	Cr	ROME FORMATION--SHALE, SILTSTONE, AND SANDSTONE WITH LOCAL BEDS OF GRAY LIMESTONE NEAR BASE. SHALE VARIEGATED, REDDISH AND GREENISH, MICACEOUS, AND ARENACEOUS. NUMEROUS THIN SILTSTONE LAYERS. SANDSTONE BEDS GENERALLY FINE-GRAINED, THIN- TO MEDIUM-BEDDED. BASE NOT EXPOSED; ESTIMATED THICKNESS 1000 FEET.

GEOLOGIC SYMBOLS

- CONTACT, APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED
- FAULT, APPROXIMATELY LOCATED, DOTTED WHERE CONCEALED. ▬ ON HANGING WALL OF THRUST FAULT
- STRIKE AND DIP OF BEDS
- APPROXIMATE STRIKE AND DIP OF CRUMPLED BEDS
- SYNCLINE, SHOWING STRIKE OF AXIAL PLANE
- MINOR ANTICLINE, SHOWING STRIKE OF AXIAL PLANE

NOTES:

(1) MAP CONSISTS OF TWO SLIGHTLY OVERLAPPING NORTH AND SOUTH SEGMENTS THAT MATCH ALONG THE INDICATED LINE. CROSS SECTION A-A' EXTENDS ACROSS BOTH SEGMENTS AND IS SHOWN IN PROFILE AS GEOLOGIC SECTION THROUGH PLANT AREA (FIG. 2.5-11).

(2) GEOLOGIC MAP BY TVA. BASED ON FIELD DATA, ON DATA FROM THE SPRING CITY (GM 118-NE) AND TEN MILE (GM 124-NW) GEOLOGIC QUADRANGLE MAPS PUBLISHED BY THE TENNESSEE DIVISION OF GEOLOGY (1964), AND ON THE GEOLOGIC MAP OF EAST TENNESSEE (ROGERS, 1953).

(3) DESCRIPTION OF MAP UNITS AND GEOLOGIC SYMBOLS REPRESENT A COMPOSITE LEGEND FOR BOTH NORTH AND SOUTH SEGMENTS.

SCALE:

1/2 0 1 Mile

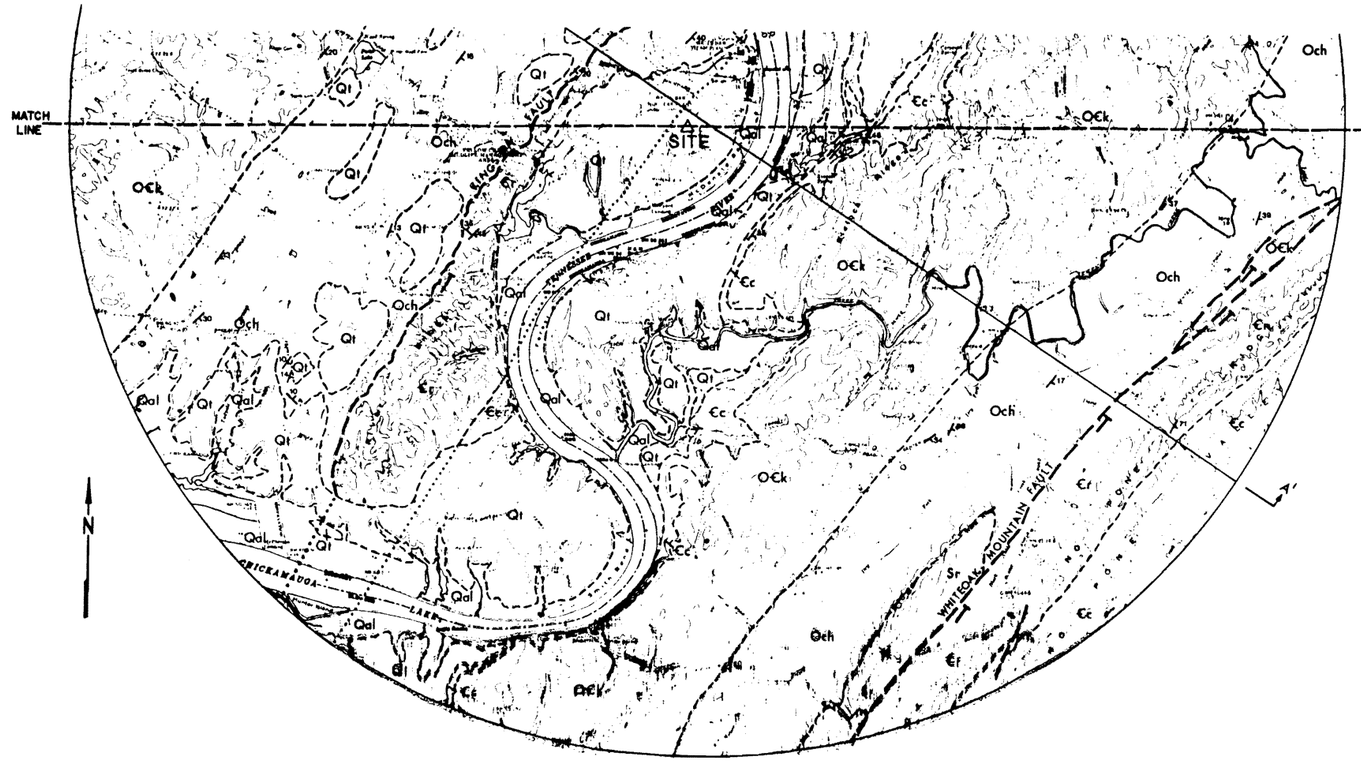
CONTOUR INTERVAL 20 FEET

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GEOLOGIC MAP OF PLANT AREA
(NORTH SEGMENT)

Figure 2.5-9

Figure 2.5-9 Geologic Map Of Plant Area (North Segment)



DESCRIPTION OF MAP UNITS

QUATERNARY	Qal	ALLUVIUM--SOIL, SHALY TO SANDY; CONTAINS ABUNDANT PEBBLES AND COBBLES OF VARIOUS LITHOLOGIES AND TEXTURES, GENERALLY WATERWORN. MAPPED ONLY IN FLOOD PLAIN OF THE TENNESSEE RIVER.
	Qt	TERRACE DEPOSITS--SOIL, SHALY TO SANDY; WITH ROUNDED PEBBLES AND COBBLES; GENERALLY STRATIFIED. REPRESENTS AT LEAST TWO EARLIER FLOOD PLAIN LEVELS OF THE TENNESSEE RIVER.
SILURIAN	Sr	ROCKWOOD FORMATION--SHALE, YELLOWISH-BROWN TO REDDISH; WITH NUMEROUS THIN LAYERS OF YELLOWISH-BROWN TO GRAY SILTSTONE, AND A FEW THIN BEDS OF FINE-GRAINED GRAY SANDSTONE. THICKNESS ABOUT 200 FEET.
ORDOVICIAN	Och	CHICKAMAUGA LIMESTONE--LIMESTONE, LIGHT- TO MEDIUM-GRAY, SLABBY TO MEDIUM-BEDDED; SHALY LIMESTONE ABUNDANT. ESTIMATED THICKNESS 1800 FEET.
CAMBRIAN AND ORDOVICIAN	Ock	KNOX GROUP--DOLOMITE, LIGHT- TO DARK-GRAY, FINE- TO COARSE-GRAINED; AND LIMESTONE, MEDIUM-GRAY TO BLUISH-GRAY, GENERALLY FINE-GRAINED. THIN- TO THICK-BEDDED. WEATHERS TO CHERTY RUBBLE. THICKNESS ABOUT 2600 FEET.
CAMBRIAN	Cc	CONASAUGA GROUP--SHALE, CALCAREOUS IN UPPER PART, BECOMING ARENACEOUS AND SILTY TOWARD BASE; ZONES OF SHALY GRAY LIMESTONE, AS MUCH AS 100 FEET THICK, SCATTERED THROUGHOUT BUT CONCENTRATED IN UPPER HALF. ESTIMATED THICKNESS AS MUCH AS 2000 FEET.
	Cr	ROME FORMATION--SHALE, SILTSTONE, AND SANDSTONE WITH LOCAL BEDS OF GRAY LIMESTONE NEAR BASE. SHALE VARIEGATED, REDDISH AND GREENISH, MICACEOUS, AND ARENACEOUS. NUMEROUS THIN SILTSTONE LAYERS. SANDSTONE BEDS GENERALLY FINE-GRAINED, THIN- TO MEDIUM-BEDDED. BASE NOT EXPOSED; ESTIMATED THICKNESS 1000 FEET.

GEOLOGIC SYMBOLS

- Contact, approximately located, dotted where concealed
- Fault, approximately located, dotted where concealed. ——¢ on hanging wall of thrust fault
- Strike and dip of beds
- Approximate strike and dip of crumpled beds
- Syncline, showing strike of axial plane
- Minor anticline, showing strike of axial plane

NOTES:

(1) Map consists of two slightly overlapping North and South segments that match along the indicated line. Cross section A-A' extends across both segments and is shown in profile as Geologic Section Through Plant Area (Fig. 2.5-11).

(2) Geologic map by TVA. Based on field data, on data from the Spring City (GA 118-NE) and Ten Mile (GA 135-NW) Geologic Quadrangle maps published by the Tennessee Division of Geology (1968), and on the Geologic Map of East Tennessee (Hardeman, 1966).

(3) Description of Map Units and Geologic Symbols represent a composite legend for both North and South segments.

SCALE:

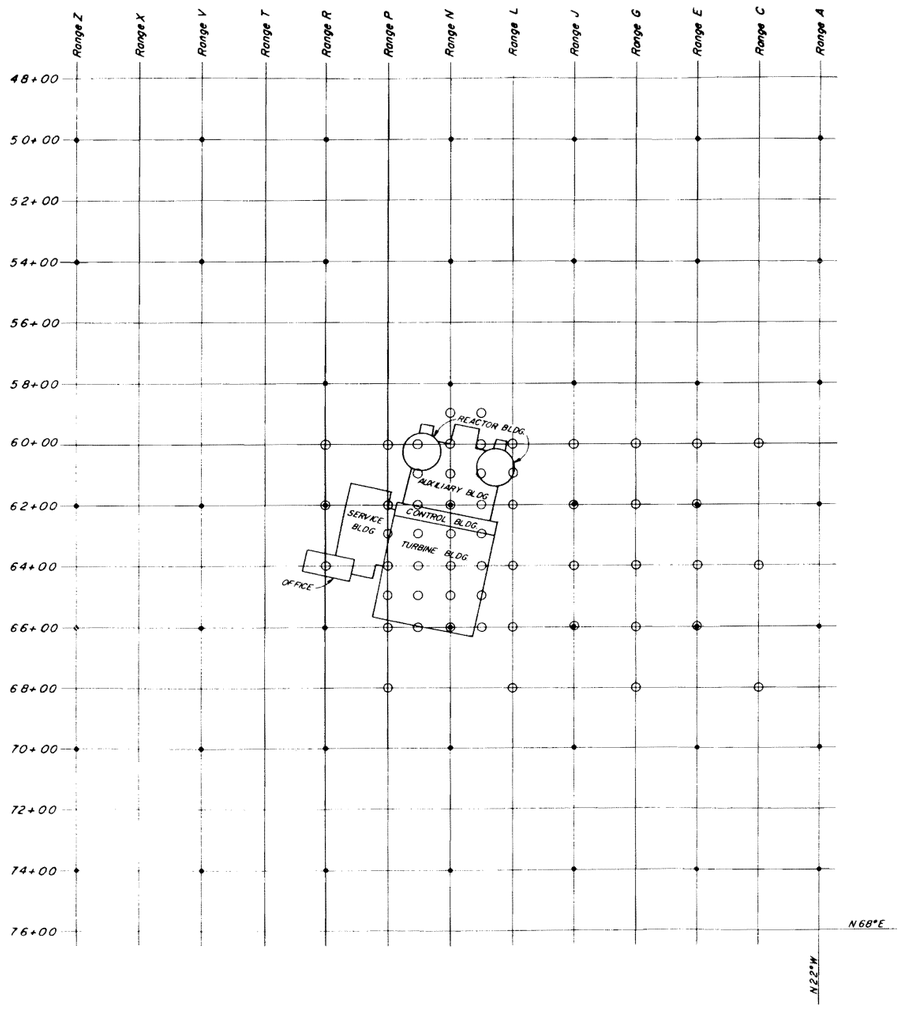
1/2 0 1 MILE

CONTOUR INTERVAL 80 FEET

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GEOLOGIC MAP OF PLANT AREA (SOUTH SEGMENT) Figure 2.5-10

Figure 2.5-10 Geologic Map of Plant Area (South Segment)

Figure 2.5-11 Geologic Section Through Plant Area (Actual Figure Located in Oversized Figures File)



LEGEND:

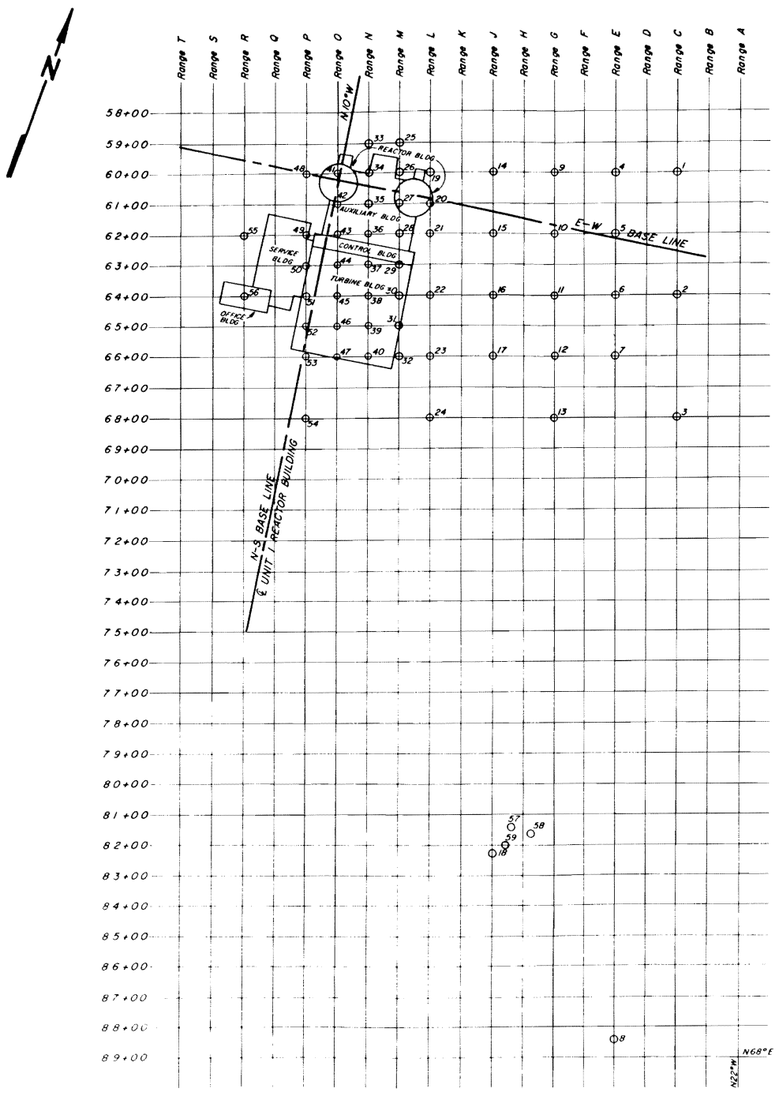
- Seismic refraction station
- NX wireline core drill hole station
- Seismic refraction and NX wireline core drill hole station

SCALE:

200 0 200 400 FEET

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
CORE DRILL HOLE AND SEISMIC REFRACTION LOCATIONS Figure 2.5-12

Figure 2.5-12 Core Drill Hole and Seismic Refraction Locations



Hole Number	Station Number	Surface Elevation	Top of Rock Elevation	Bottom of Hole Elevation	Average Ground Water Elevation August-December 1970
1	C-60+00	739.1	697.1	634.2	
2	C-64+00	736.7	696.7	636.7	719.5
3	C-68+00	736.2	698.2	635.2	718.4
4	E-60+00	734.6	700.1	634.2	720.0
5	E-62+00	736.1	693.0	636.4	
6	E-64+00	735.9	689.5	634.2	724.1
7	E-66+00	735.3	696.3	635.0	
8	E-88+40	699.4	650.1	598.1	
9	G-60+00	734.5	702.8	634.3	721.5
10	G-62+00	734.9	694.1	661.2	
11	G-64+00	734.2	698.2	634.2	720.9
12	G-66+00	736.2	694.0	636.2	720.3
13	G-68+00	739.8	701.2	639.3	
14	J-60+00	733.4	697.4	633.4	721.6
15	J-62+00	732.0	696.0	657.4	721.3
16	J-64+00	735.7	700.2	654.6	721.2
17	J-66+00	738.6	692.8	638.1	720.6
18	J-82+25	700.1	662.3	612.2	
19	L-60+00	733.2	699.6	656.0	721.6
20	L-61+00	729.7	698.1	548.4	
21	L-62+00	733.1	690.9	647.1	721.1
22	L-64+00	736.6	694.4	636.6	721.2
23	L-66+00	741.9	699.9	651.9	719.6
24	L-68+00	738.0	700.8	638.0	719.3
25	M-59+00	732.2	698.4	634.1	
26	M-60+00	729.1	701.1	634.6	
27	M-61+00	732.9	699.2	634.6	
28	M-62+00	733.4	695.0	634.8	
29	M-63+00	734.7	691.4	639.5	
30	M-64+00	737.5	699.9	679.7	
31	M-65+00	741.2	699.9	678.9	
32	M-66+00	742.3	699.5	678.1	
33	N-59+00	728.4	697.4	634.8	
34	N-60+00	730.6	698.3	634.4	723.0
35	N-61+00	732.5	698.2	635.4	
36	N-62+00	733.9	688.9	658.5	721.2
37	N-63+00	735.7	693.7	634.7	
38	N-64+00	738.2	695.9	641.5	721.2
39	N-65+00	742.1	699.8	548.8	
40	N-66+00	742.3	700.3	656.8	719.6
41	O-60+00	732.8	696.7	646.7	
42	O-61+00	732.5	696.1	635.0	
43	O-62+00	735.9	691.0	625.3	
44	O-63+00	736.7	700.3	635.0	
45	O-64+00	741.2	697.8	677.8	
46	O-65+00	743.6	697.8	677.3	
47	O-66+00	743.9	699.4	678.9	
48	P-60+00	732.8	696.6	634.7	
49	P-62+00	736.1	697.8	634.9	
50	P-63+00	741.2	696.2	635.0	
51	P-64+00	744.5	700.0	646.5	
52	P-65+00	745.2	705.2	634.6	714.5
53	P-66+00	743.5	700.9	688.9	
54	P-68+00	737.4	705.2	647.4	
55	R-62+00	742.7	702.7	680.7	716.9
56	R-64+00	742.4	698.9	679.5	714.5
57	19+89S 9+80E	702.2	669.2	617.7	
58	19+91S 10+38E	699.4	665.1	615.0	
59	20+45S 9+66E	699.4	662.0	610.9	

LEGEND:

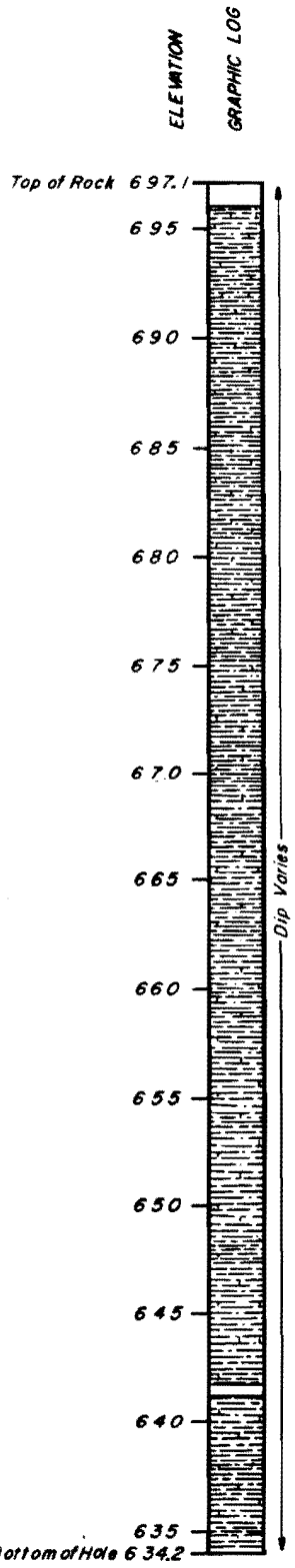
○ *Nx wireline core drill hole station*

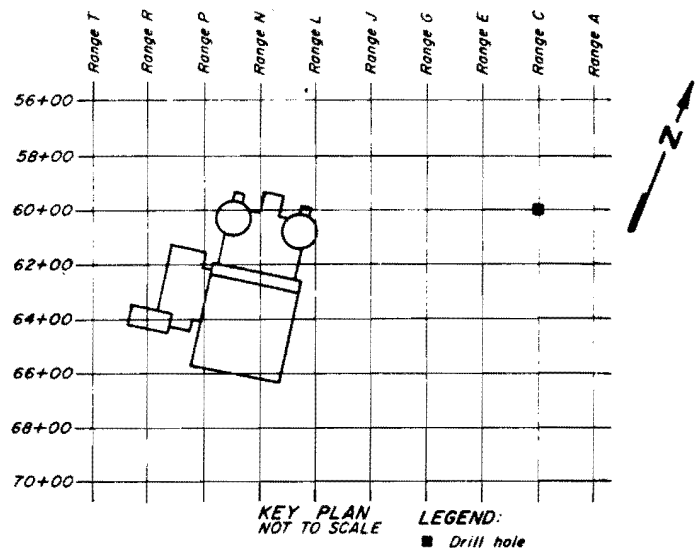
SCALE:

200 0 200 400 Feet

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
CORE DRILL LAYOUT AND SUMMARY
Figure 2.5-13

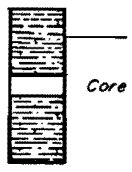
Figure 2.5-13 Core Drill Layout and Summary





LEGEND

GRAPHIC LOG



NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

GENERAL ROCK DESCRIPTION

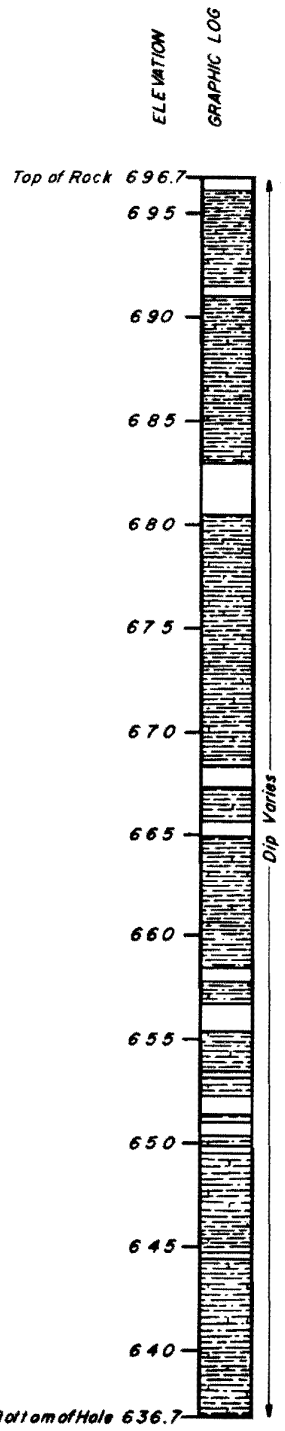
THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

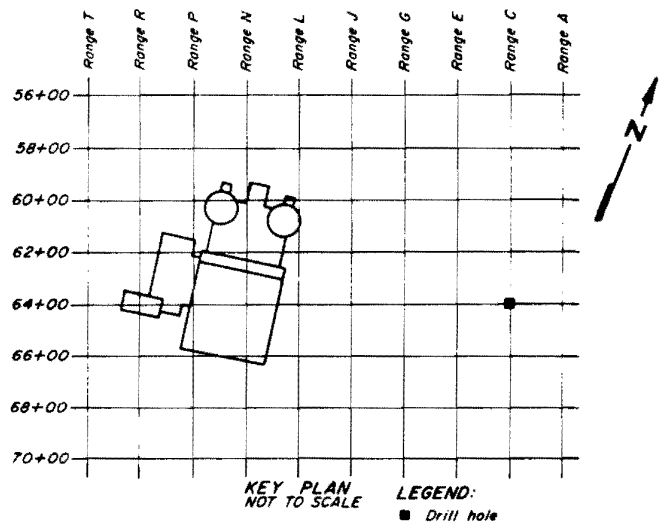
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 1
STA. C-60+00

Figure 2.5-14

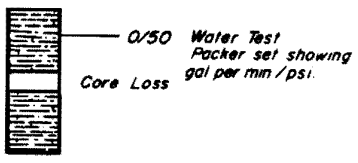
Figure 2.5-14 Graphic Log Hole 1 Sta. C-60+00





LEGEND:

GRAPHIC LOG



NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

GENERAL ROCK DESCRIPTION

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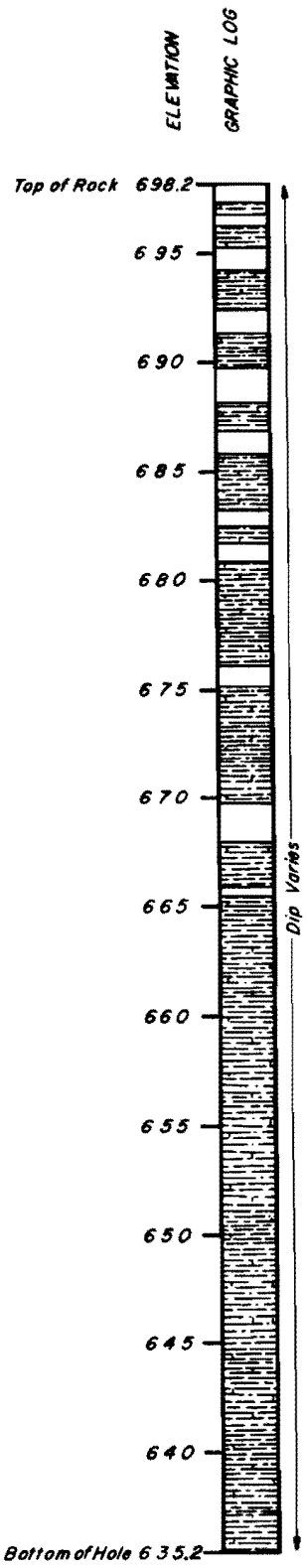
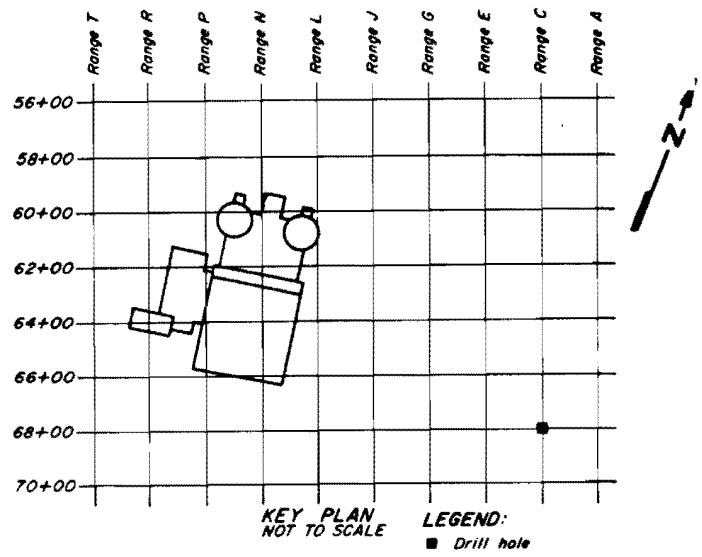
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 2
STA. C-64+00

Figure 2.5-15

Figure 2.5-15 Graphic Log Hole 2 Sta. C-64+00



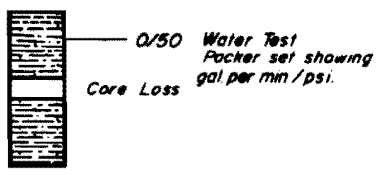


NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

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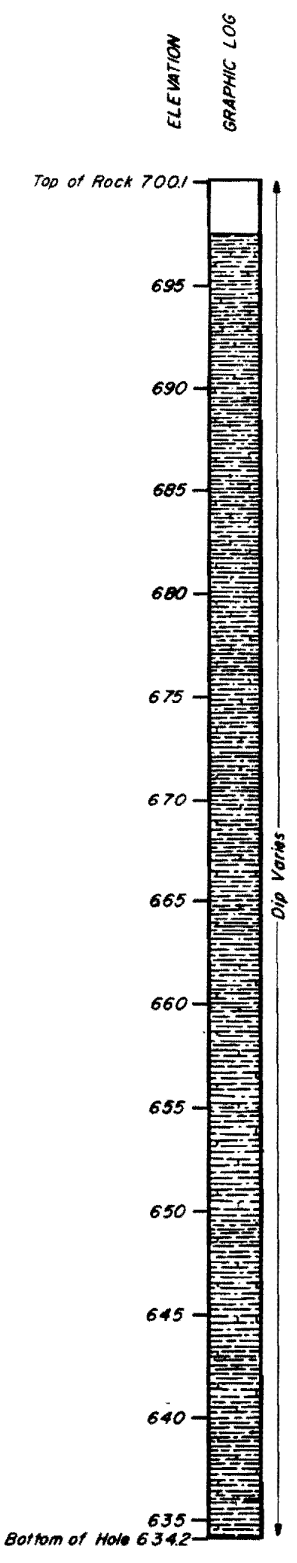
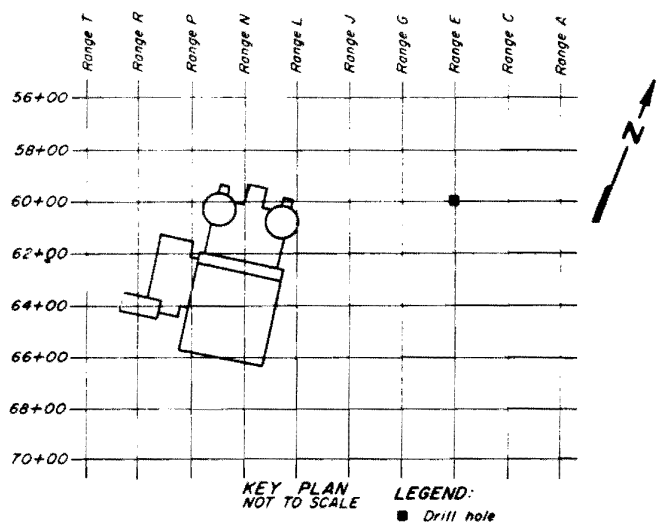
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 3 STA. C-68+00 Figure 2.5-16

Figure 2.5-16 Graphic Log Hole 3 Sta. C-68+00



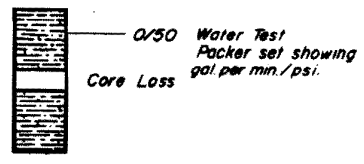


NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

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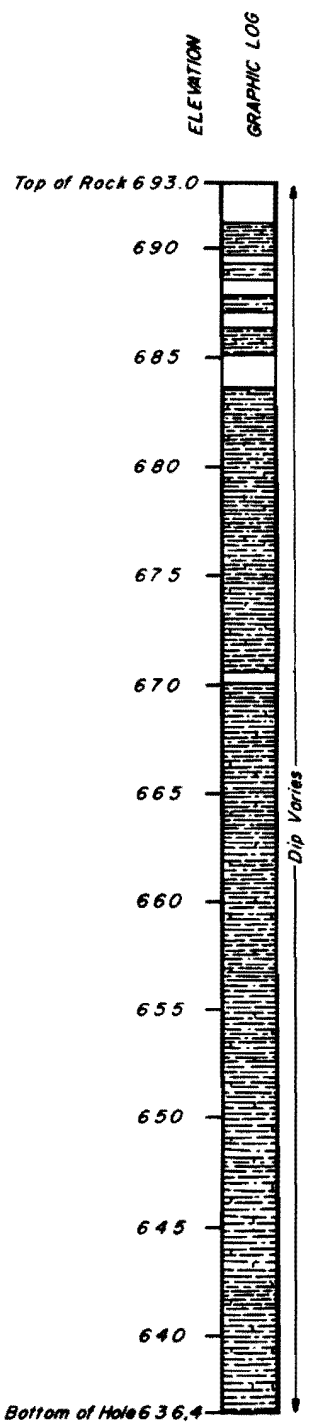
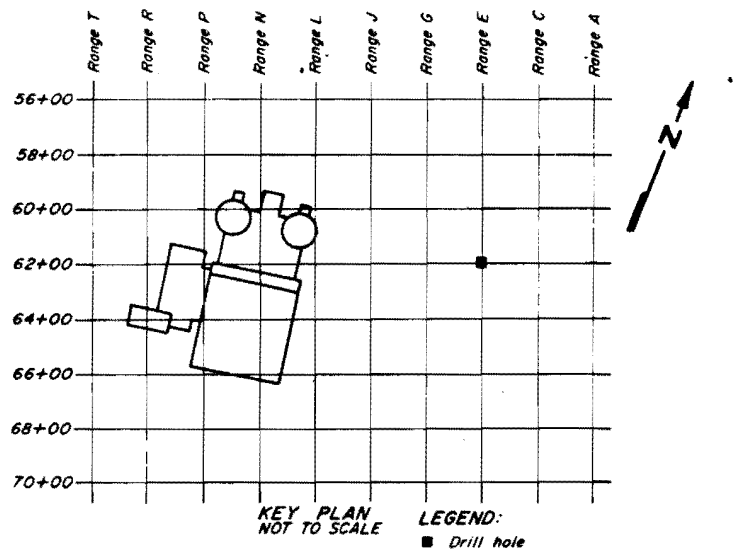
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 4 STA. E-60+00 Figure 2.5-17

Figure 2.5-17 Graphic Log Hole 4 Sta. E-60+00



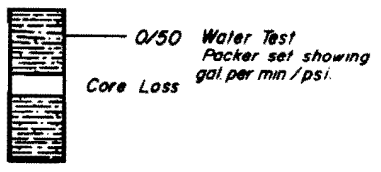


NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

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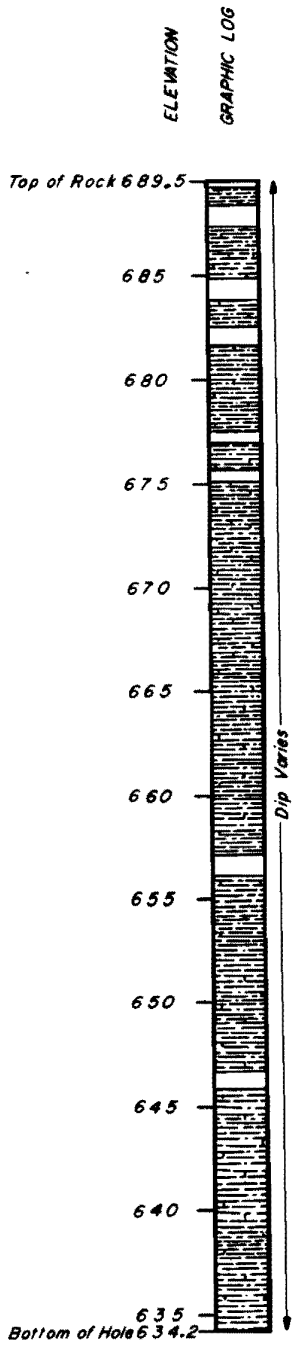
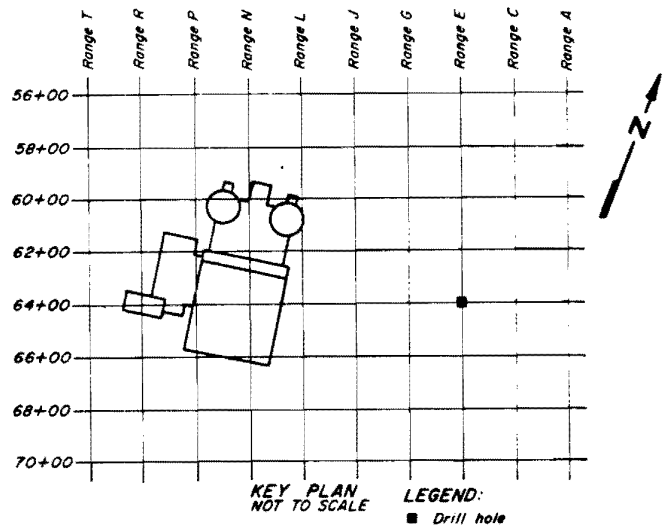
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 5
STA. E-62+00

Figure 2.5-18

Figure 2.5-18 Graphic Log Hole 5 Sta. E-62+00



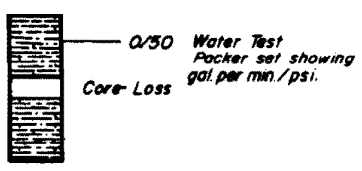


NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

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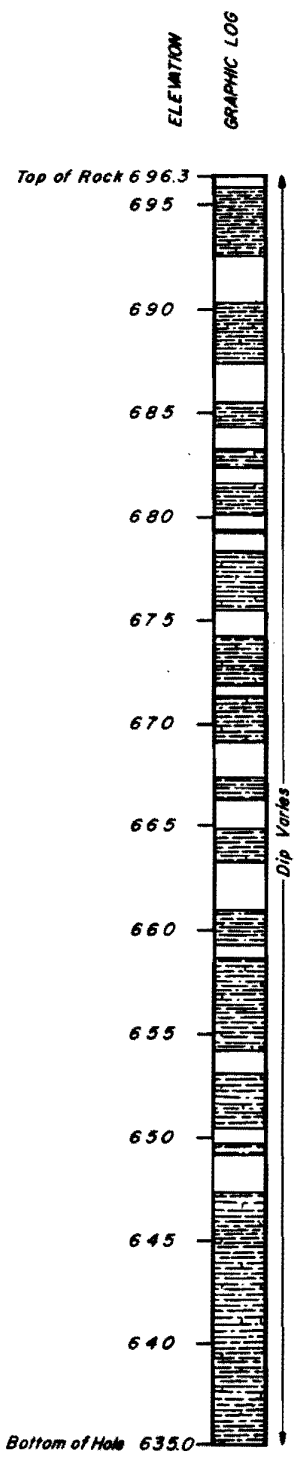
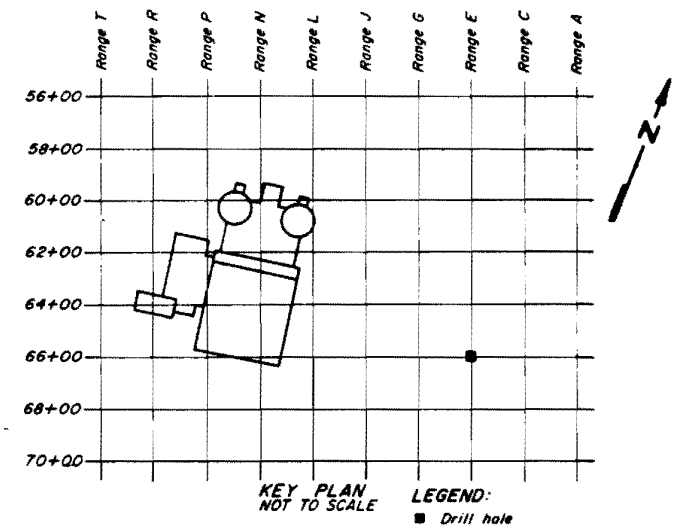
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 6 STA. E-64+00 Figure 2.5-19

Figure 2.5-19 Graphic Log Hole 6 Sta. E-64+00



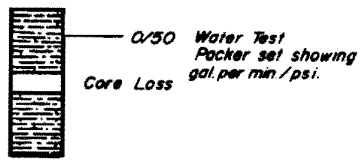


NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

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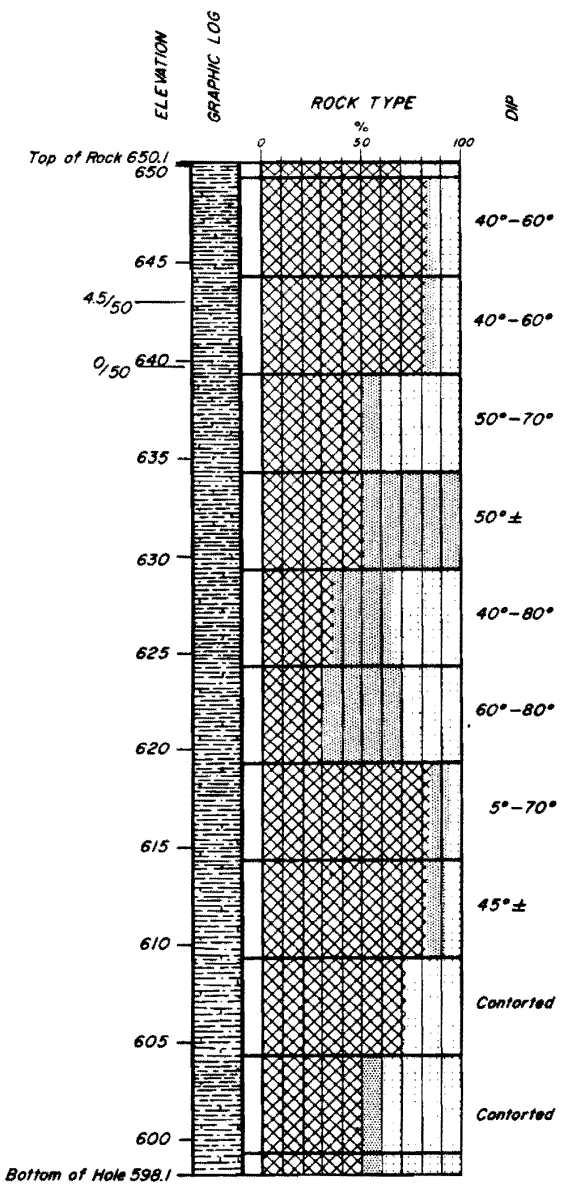
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 7 STA. E-66+00 Figure 2.5-20

Figure 2.5-20 Graphic Log Hole 7 Sta. E-66+00

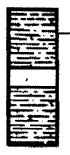


NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.
3. FOR CORE DRILL HOLE LOCATION SEE DRAWING 85 GE 1 822K1825.

LEGEND:

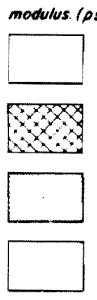
GRAPHIC LOG



GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



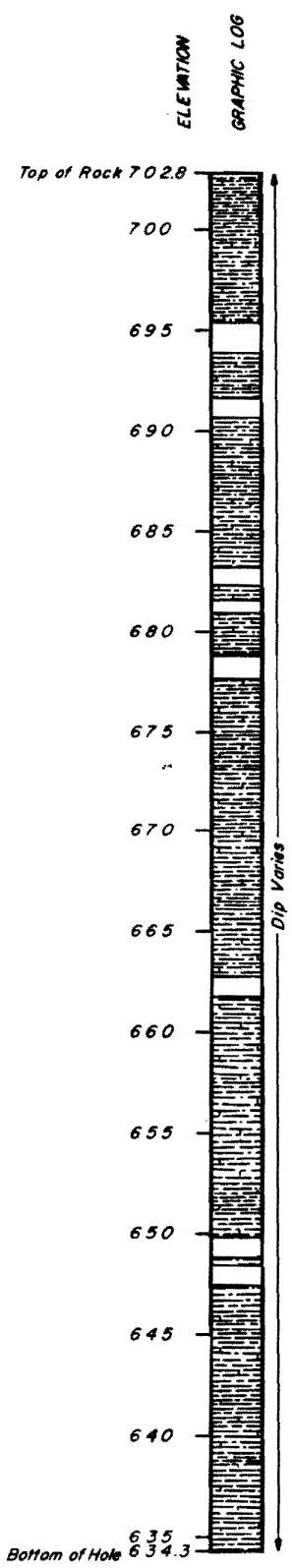
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

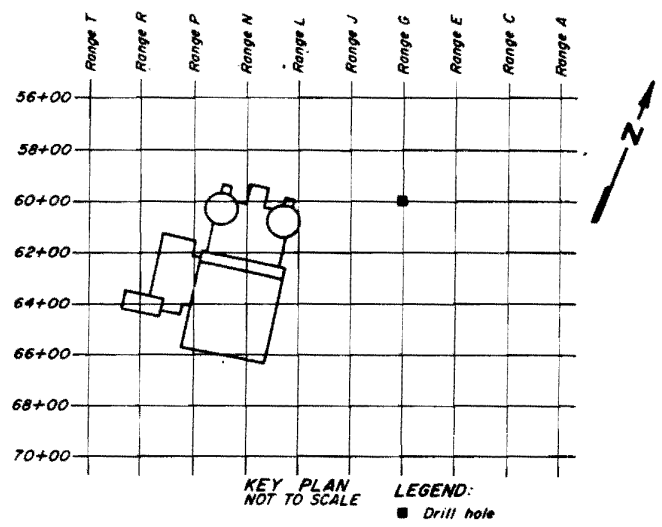
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 8
STA. E-88+40

Figure 2.5-21

Figure 2.5-21 Graphic Log Hole 8 Sta. E-88+40



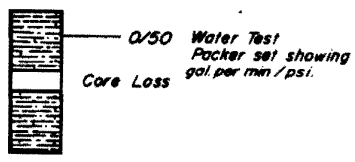


NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

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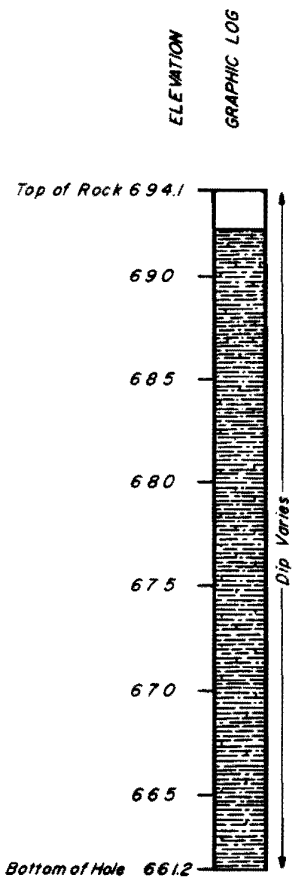
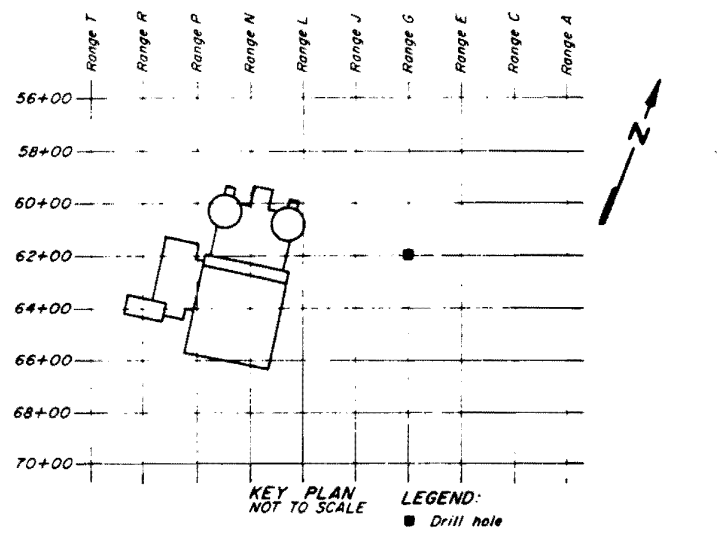
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 9 STA. G-60+00 Figure 2.5-22

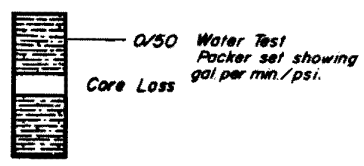
Figure 2.5-22 Graphic Log Hole 9 Sta. G-60+00





LEGEND:

GRAPHIC LOG



NOTE:

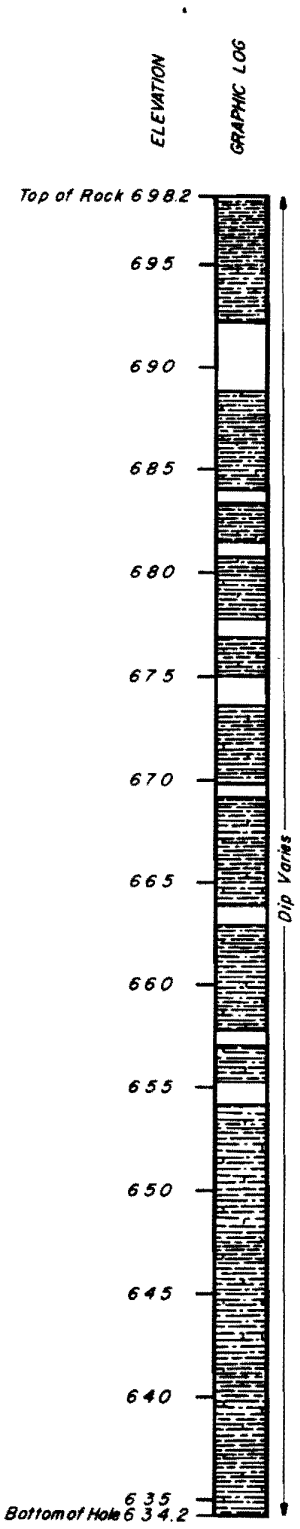
THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

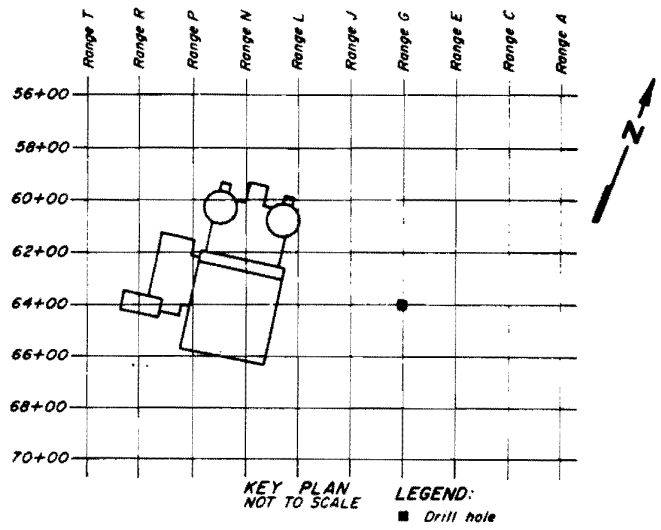
GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 10 STA. G-62+00 Figure 2.5-23

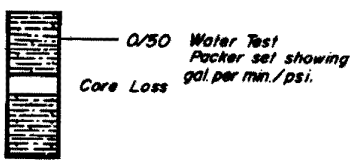
Figure 2.5-23 Graphic Log Hole 10 Sta. G-62+00





LEGEND:

GRAPHIC LOG



NOTE:

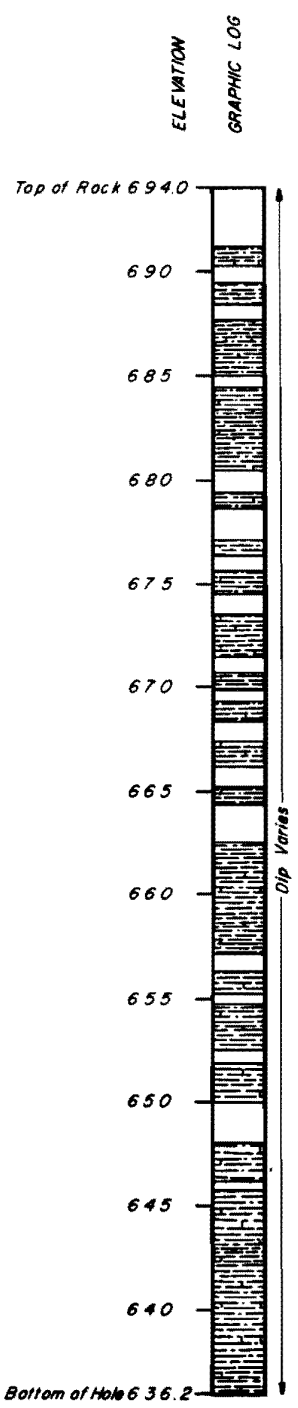
THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

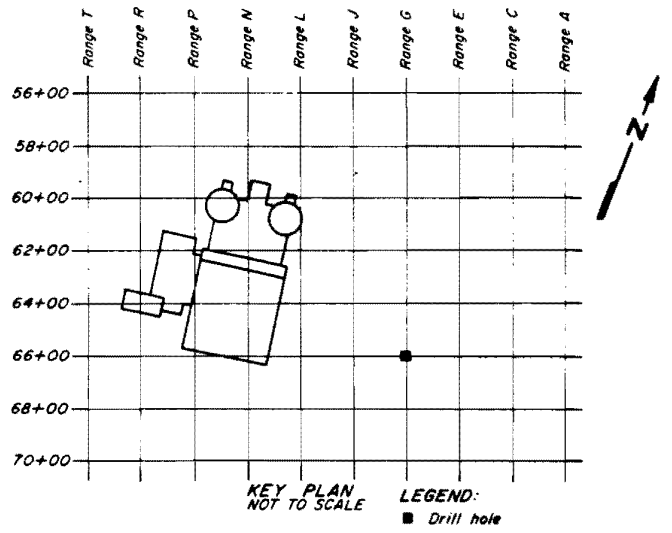
GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 11 STA. G-64+00 Fig. 2.5-24

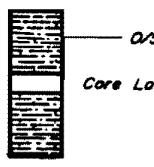
Figure 2.5-24 Graphic Log Hole 11 Sta. G-64+00





LEGEND:

GRAPHIC LOG



NOTE:

THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

GENERAL ROCK DESCRIPTION

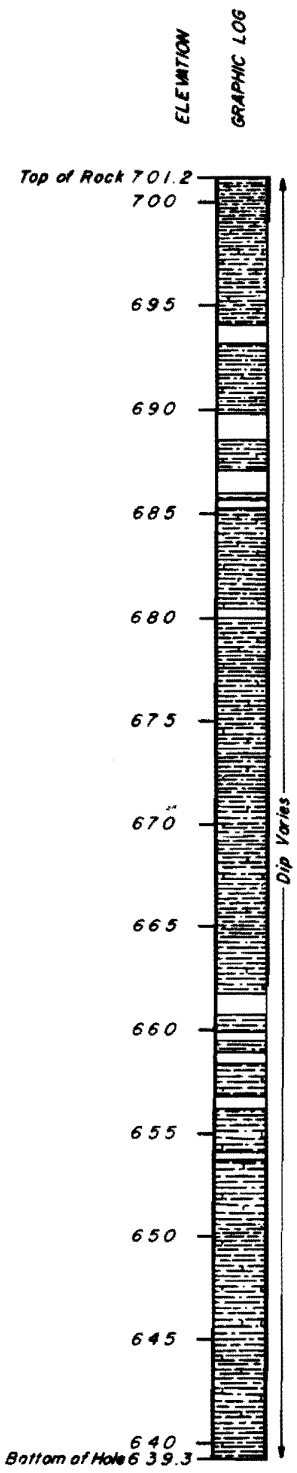
THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

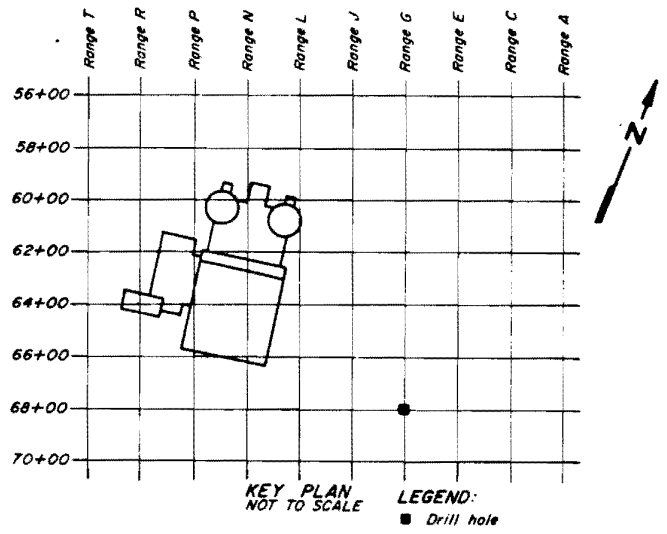
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 12
STA. G-66+00

Figure 2.5-25

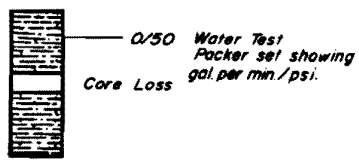
Figure 2.5-25 Graphic Log Hole 12 Sta. G-66+00





LEGEND:

GRAPHIC LOG



NOTE:

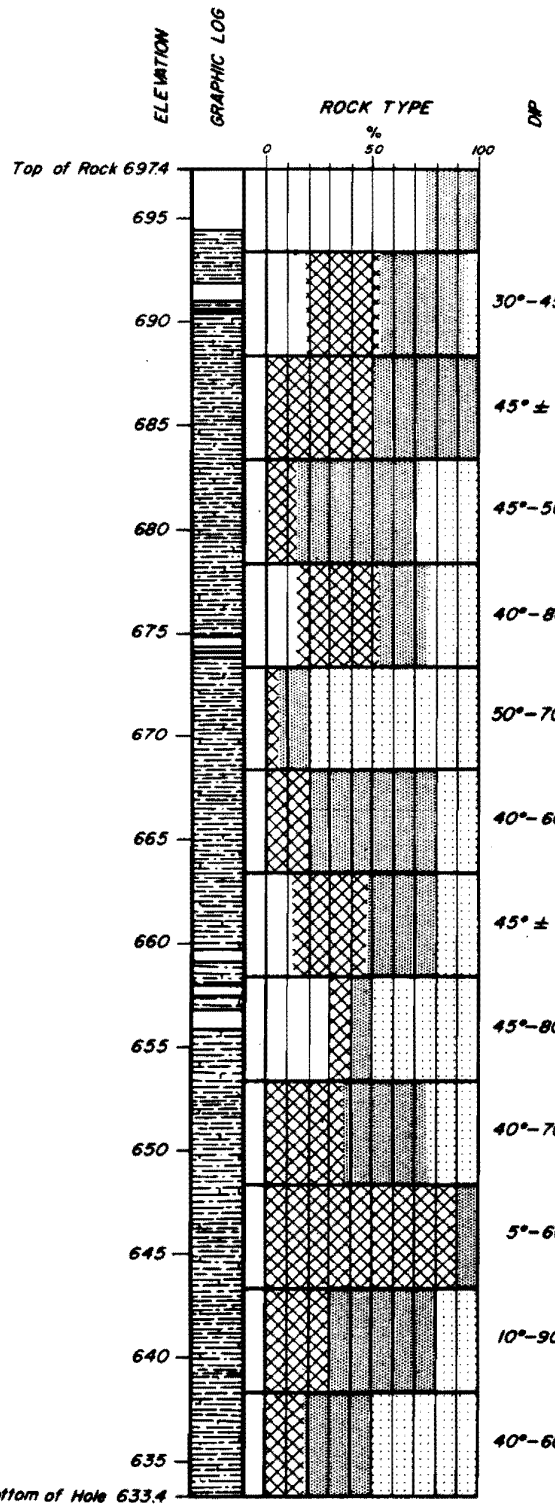
THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

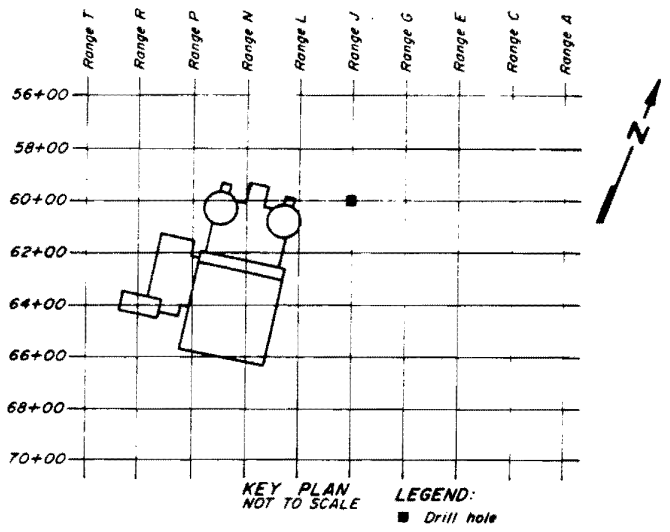
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 13 STA. G-68+00 Figure 2.5-26

Figure 2.5-26 Graphic Log Hole 13 Sta. G-68+00



NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.



LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

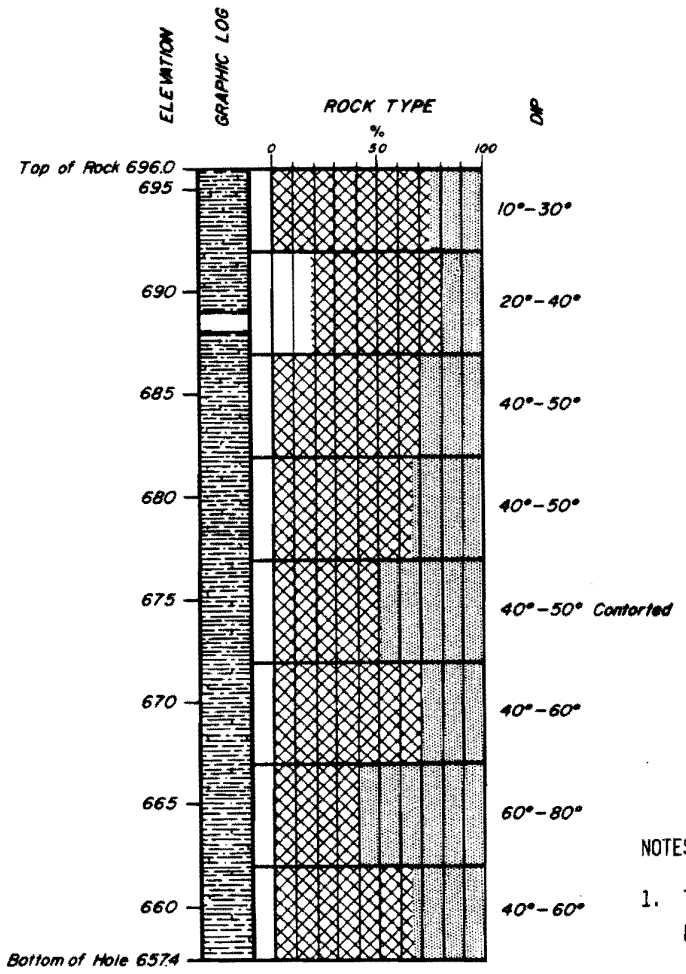
ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

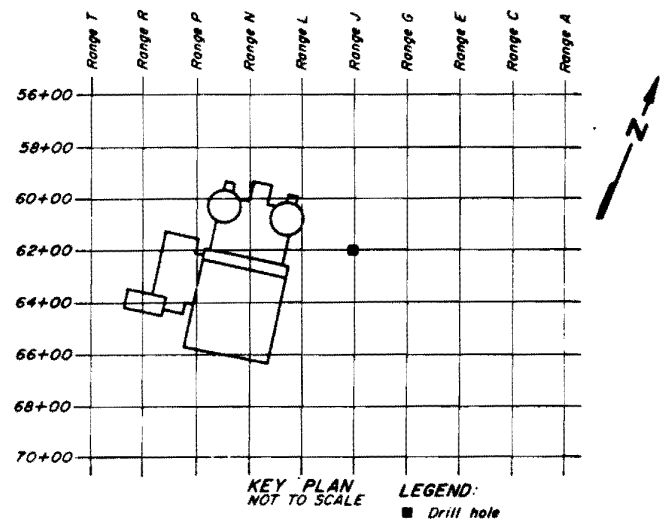
- Type C - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 14 STA. J-60+00 Figure 2.5-27

Figure 2.5-27 Graphic Log Hole 14 Sta. J-60+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

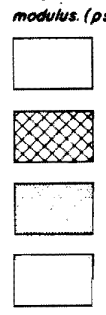
0/50 Water Test Packer set showing gal per min / psi

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

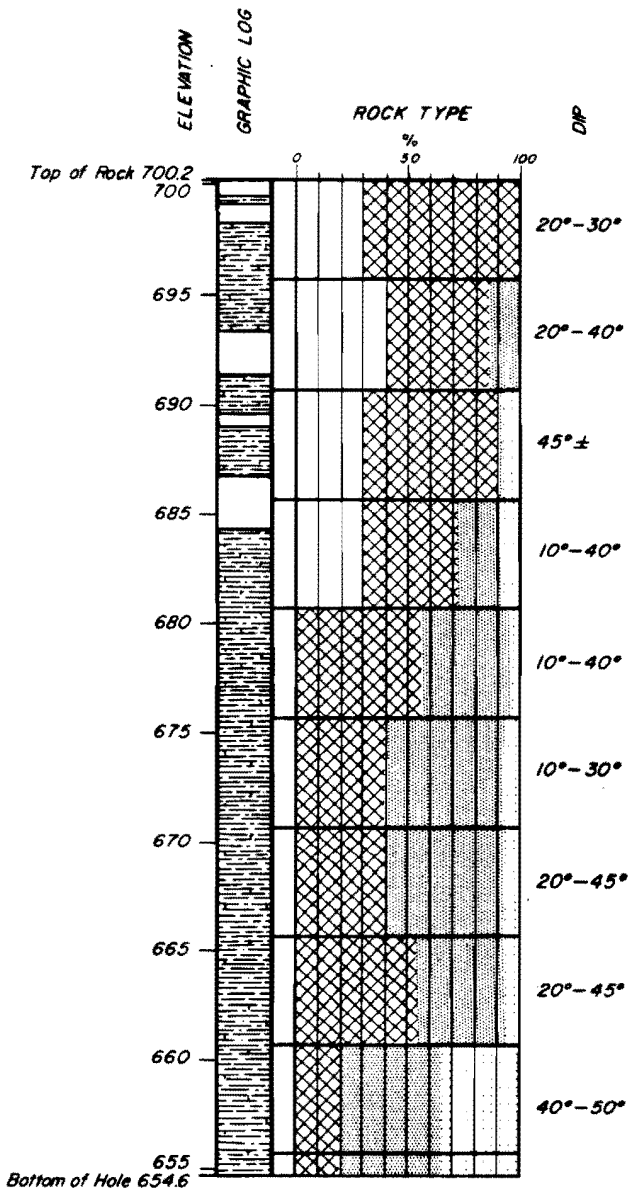
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

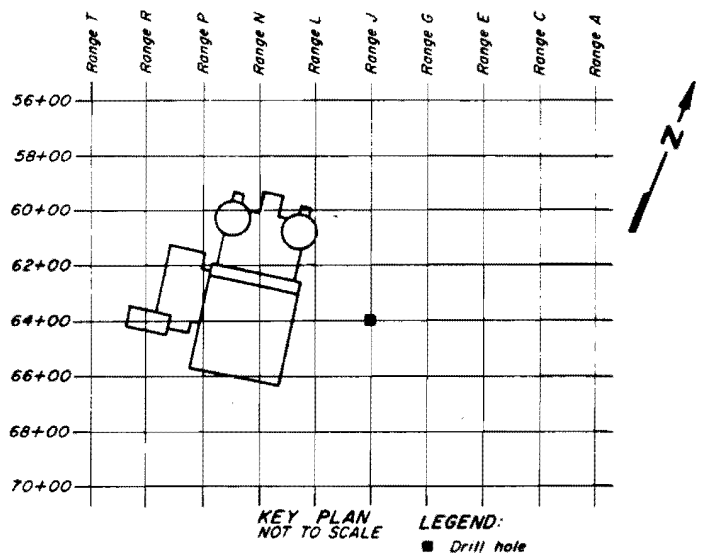
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 15
STA. J-62+00

Figure 2.5-28

Figure 2.5-28 Graphic Log Hole 15 Sta. J-62+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

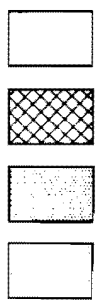
0/50 Water Test Packer set showing gal per min / psi.

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

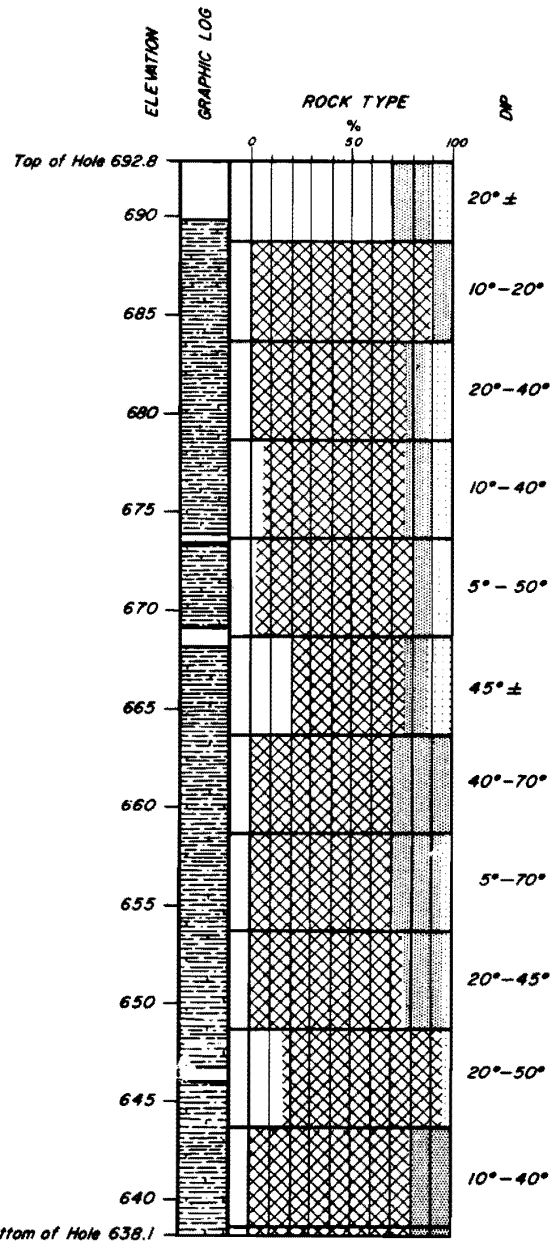
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

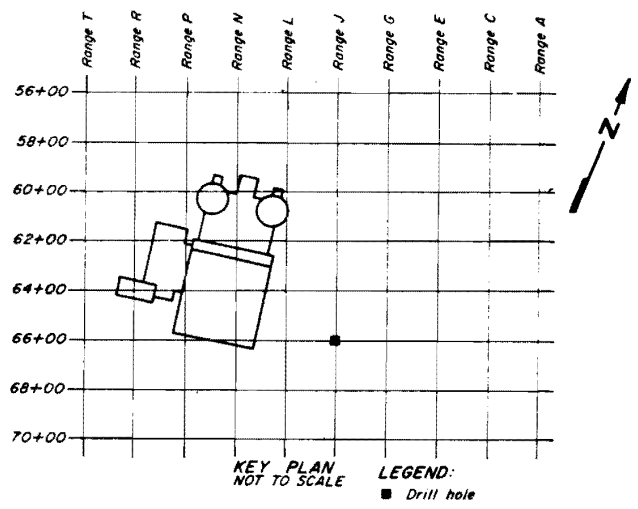
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 16
STA. J-64+00

Figure 2.5-29

Figure 2.5-29 Graphic Log Hole 16 Sta. J-64+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.

2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

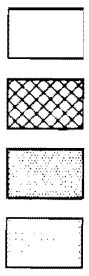
0/50 Water Test Packer set showing gal per min / psi.

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

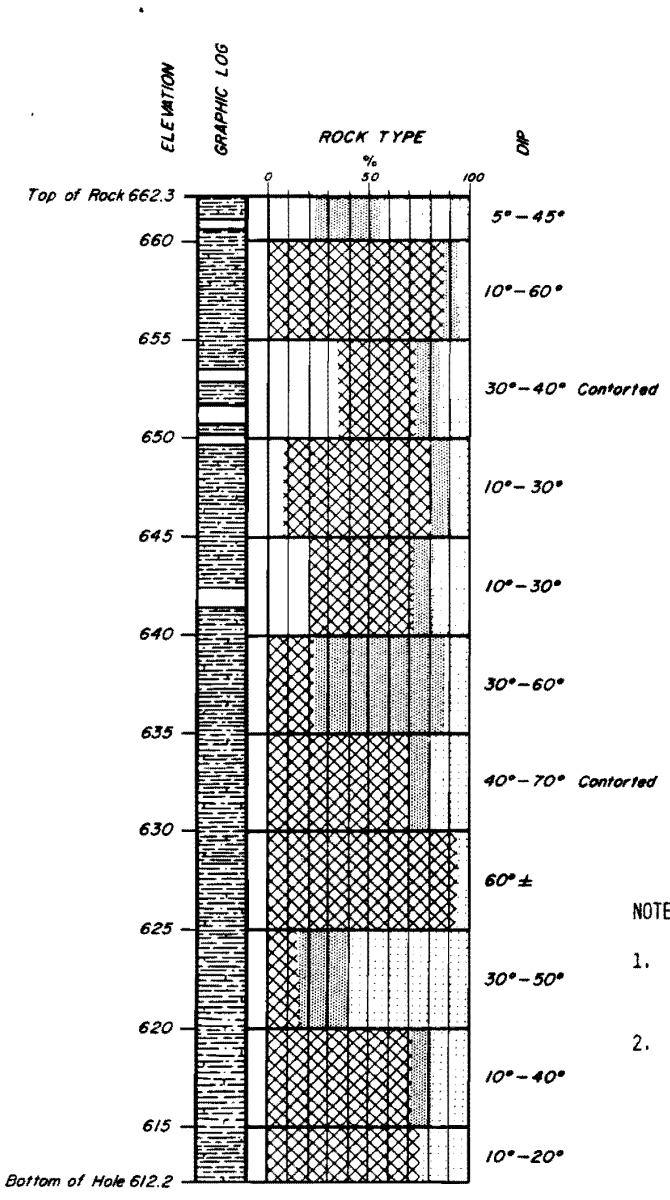
Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 17 STA. J-66+00 Figure 2.5-30

Figure 2.5-30 Graphic Log Hole 17 Sta. J-66+00



NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.
3. FOR CORE DRILL HOLE LOCATION SEE DRAWING 85 GE 1 822K1825.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi.

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss

Type 1 - Soft shale. 1 to 10

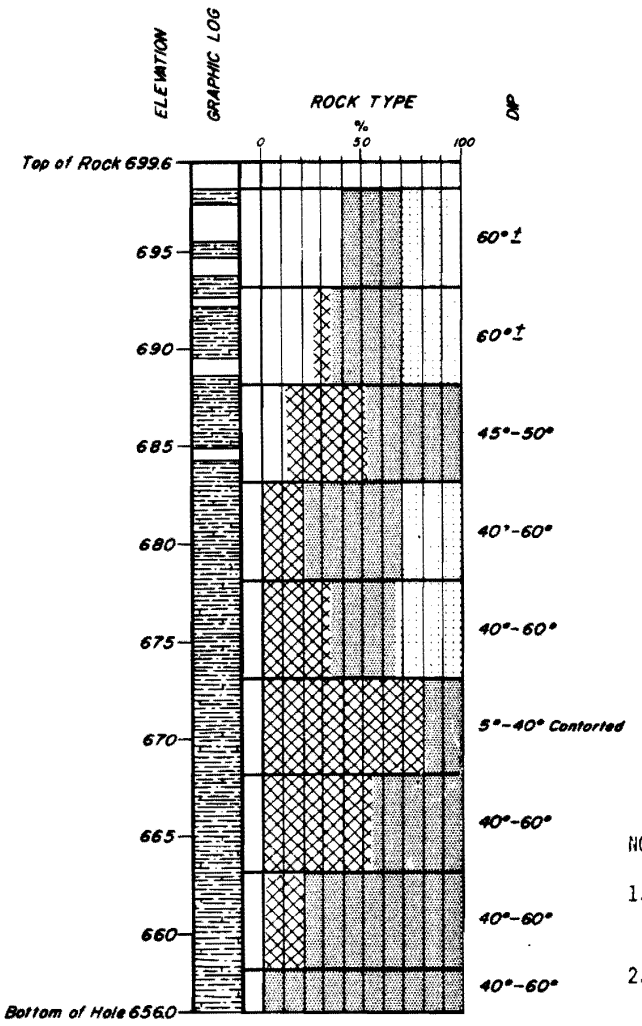
Type 2 - Hard shale. 5 to 60

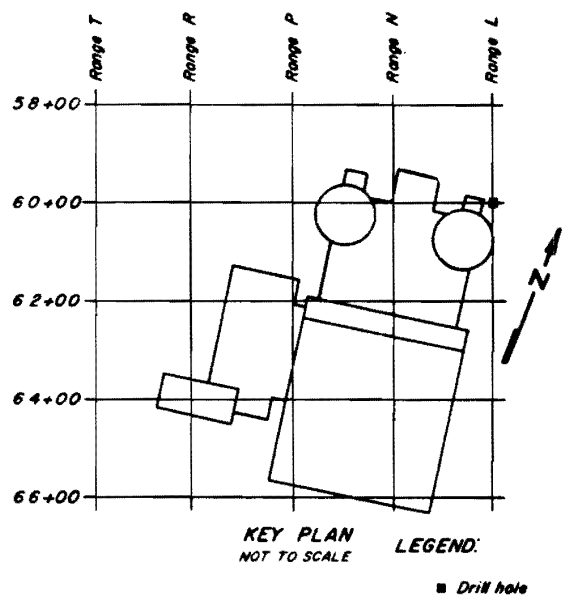
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 18 STA. J-82+25 Figure 2.5-31

Figure 2.5-31 Graphic Log Hole 18 Sta. J-82+25





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 699.6 AND 661.2. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi.

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

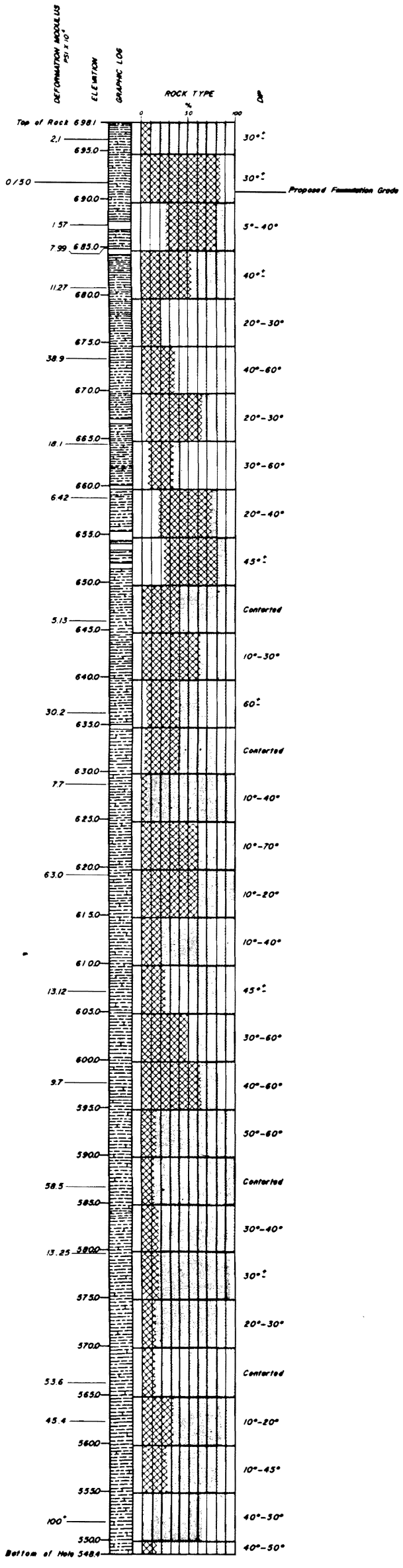
Type 2 - Hard shale. 5 to 60

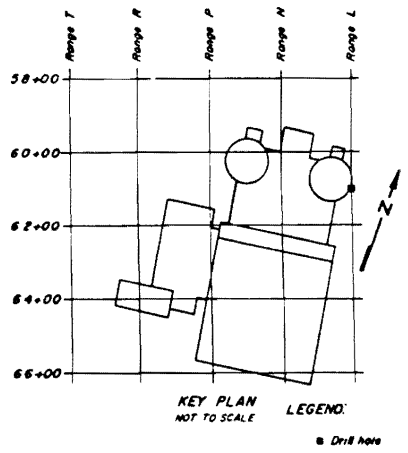
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 19 STA. L-60+00 Figure 2.5-32

Figure 2.5-32 Graphic Log Hole 19 Sta. L-60+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 698.1 AND 619.7. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus (psi x 10^4)

Type 0 - Core loss

Type 1 - Soft shale 1 to 10

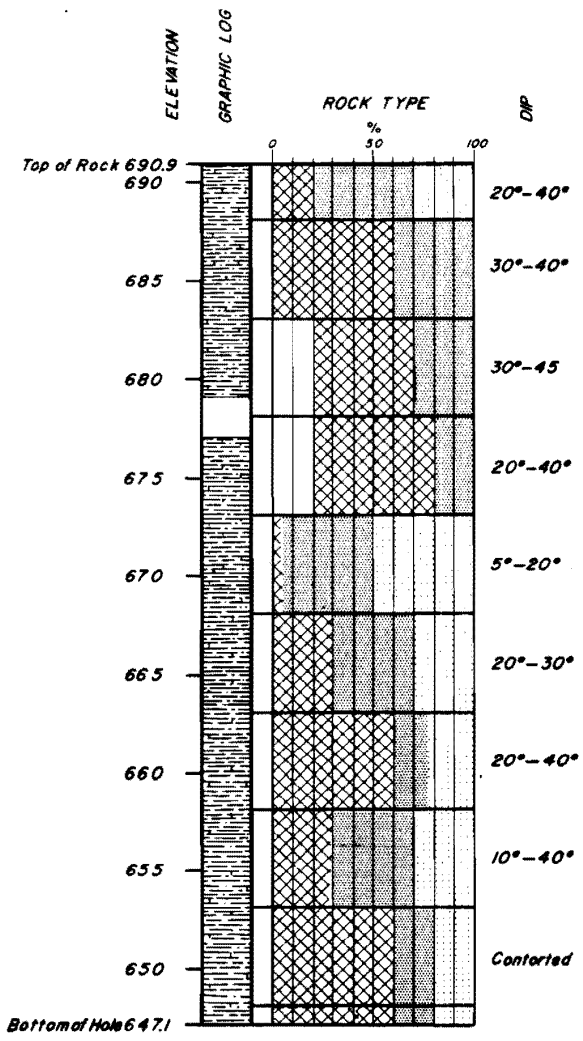
Type 2 - Hard shale 5 to 60

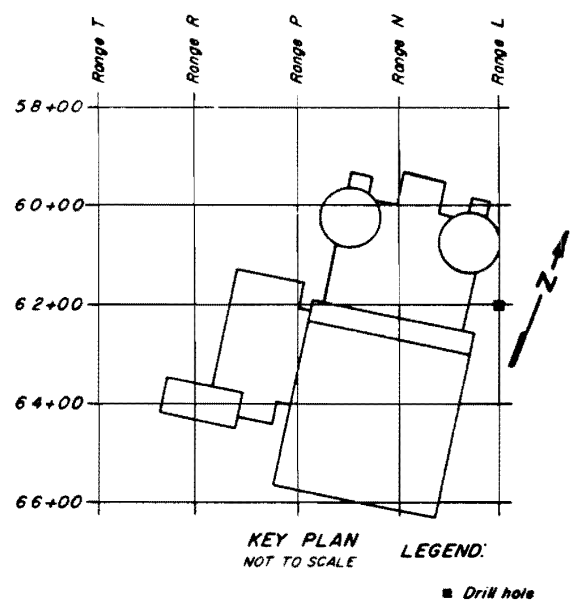
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 20 STA. L-61+00 Figure 2.5-33

Figure 2.5-33 Graphic Log Hole 20 Sta. L-6l+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 690.9 AND 651.1. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 *Water Test Packer set showing gal per min / psi*

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

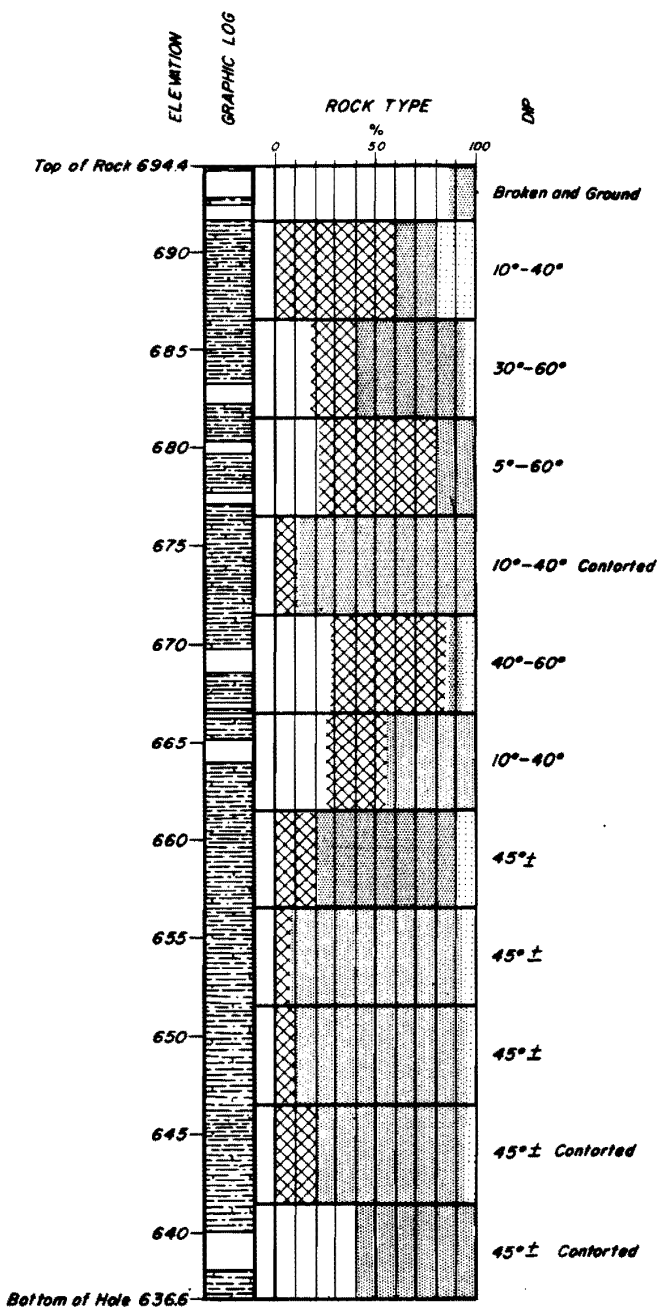
Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

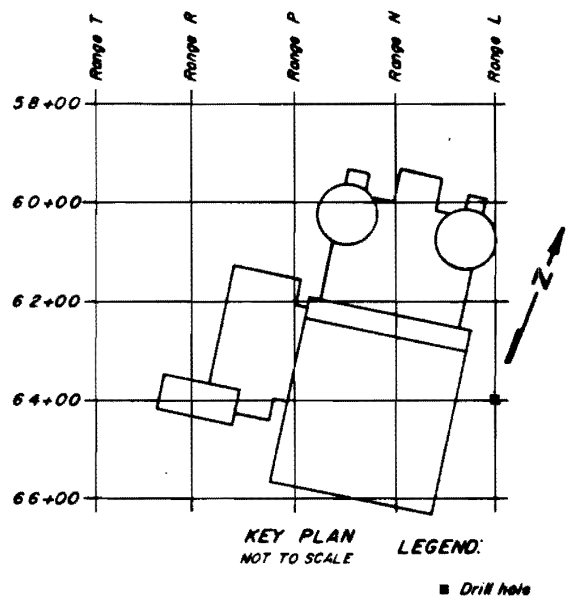
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 21 STA. L-62+00 Figure 2.5-34

Figure 2.5-34 Graphic Log Hole 21 Sta. L-62+00



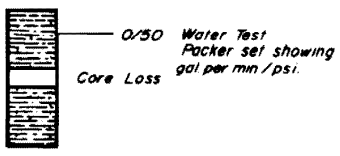
NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.



LEGEND:

GRAPHIC LOG

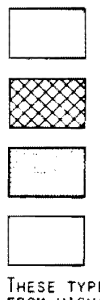


GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss

Type 1 - Soft shale. 1 to 10

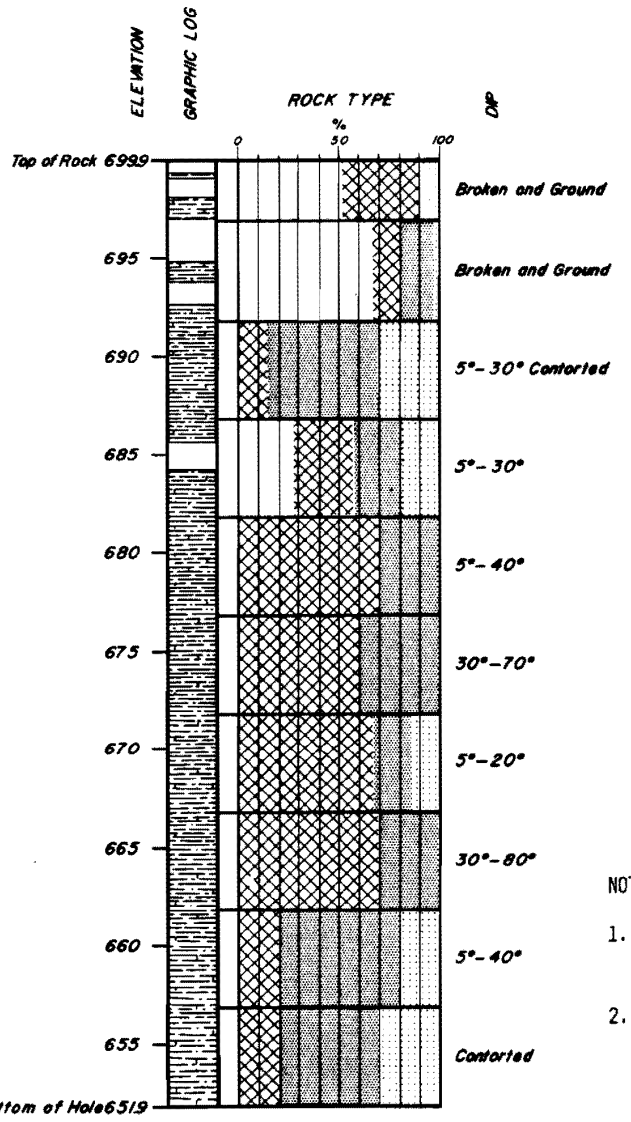
Type 2 - Hard shale. 5 to 60

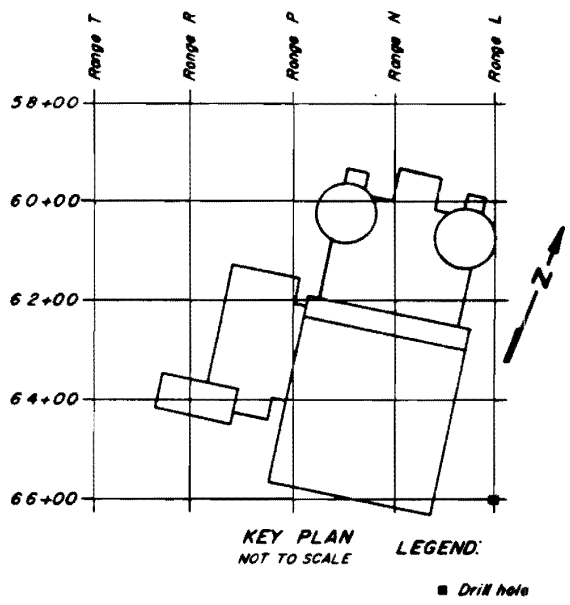
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 22 STA. L-64+00 Figure 2.5-35

Figure 2.5-35 Graphic Log Hole 22 Sta. L-64+00



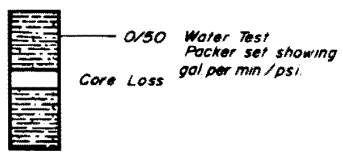


NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

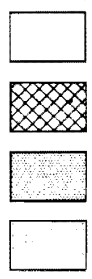


GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

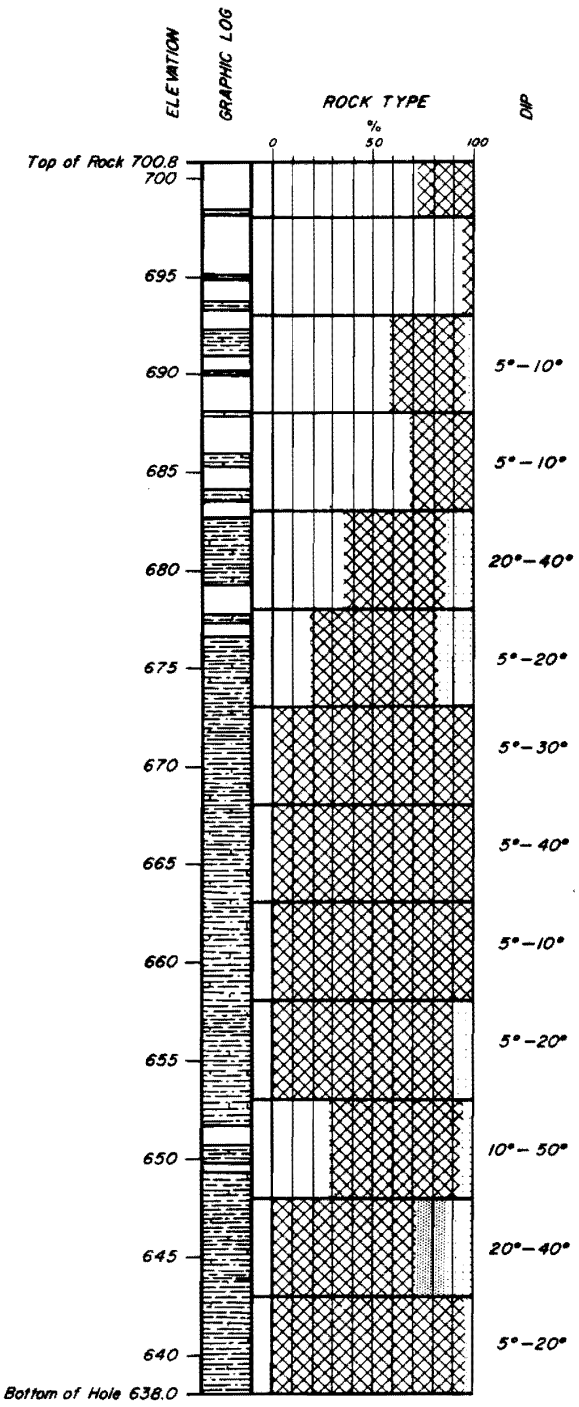
Type 2 - Hard shale. 5 to 60

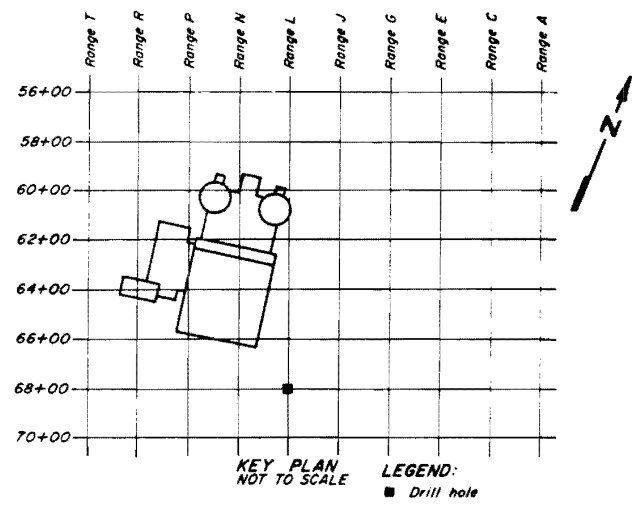
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 23 STA. L-66+00 Figure 2.5-36

Figure 2.5-36 Graphic Log Hole 23 Sta. L-66+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min / psi.

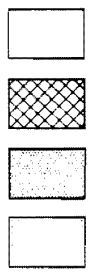
Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

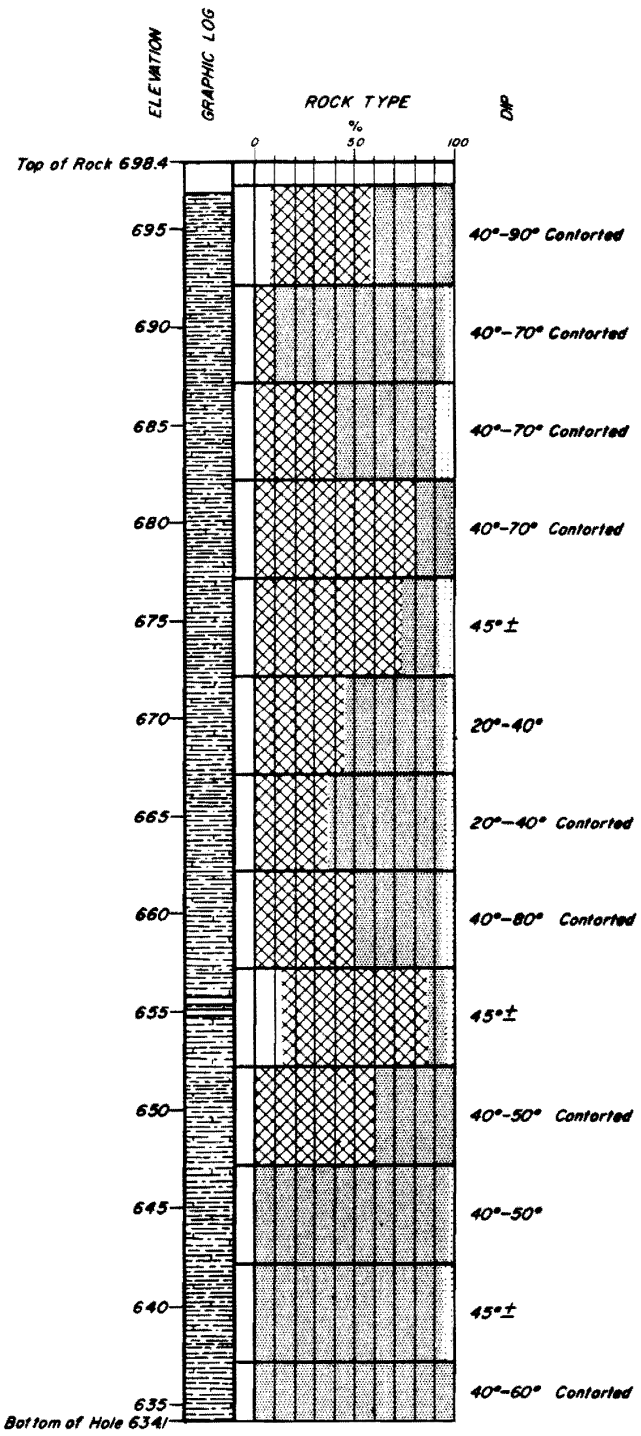
Type 2 - Hard shale. 5 to 60

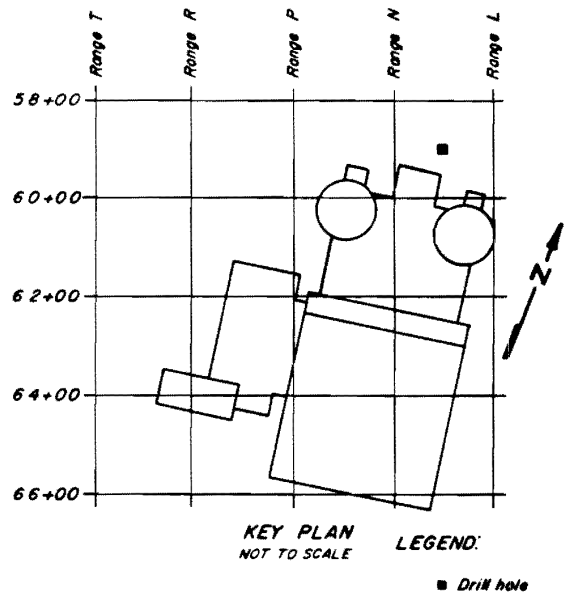
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 24 STA. L-68+00 Figure 2.5-37

Figure 2.5-37 Graphic Log Hold 24 Sta. L-68+00



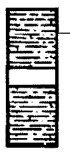


NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 698.4 AND 651.2. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG



0/50 *Water Test Packer set showing gal per min / psi.*

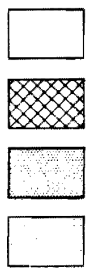
Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

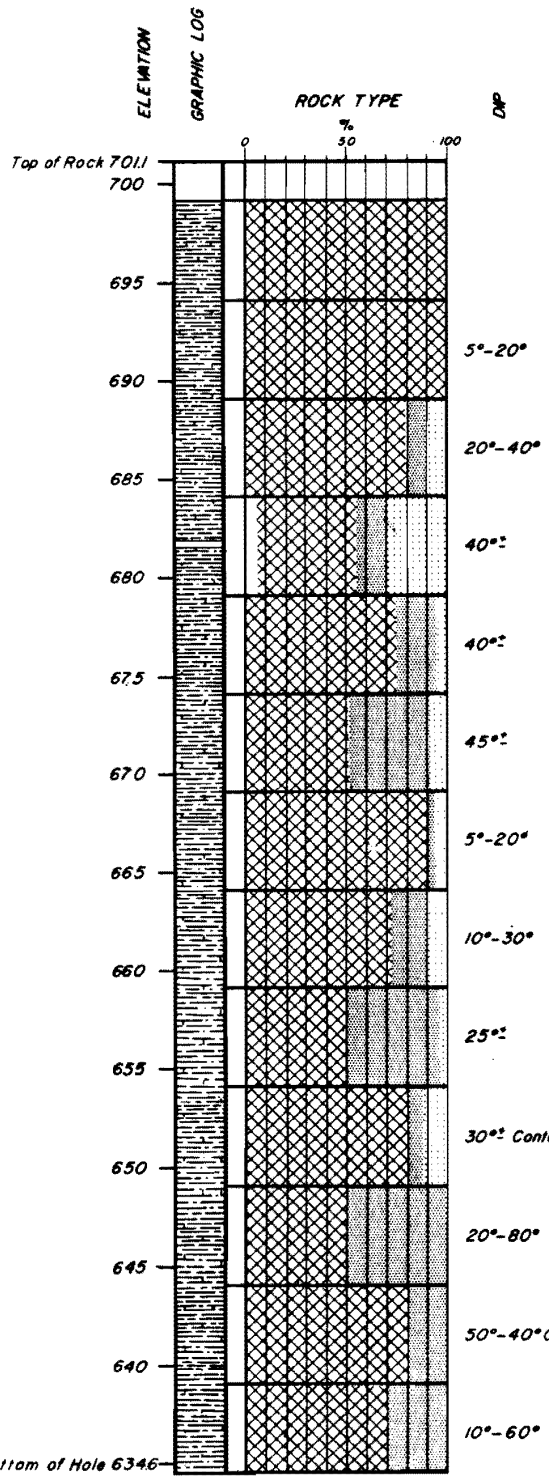
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

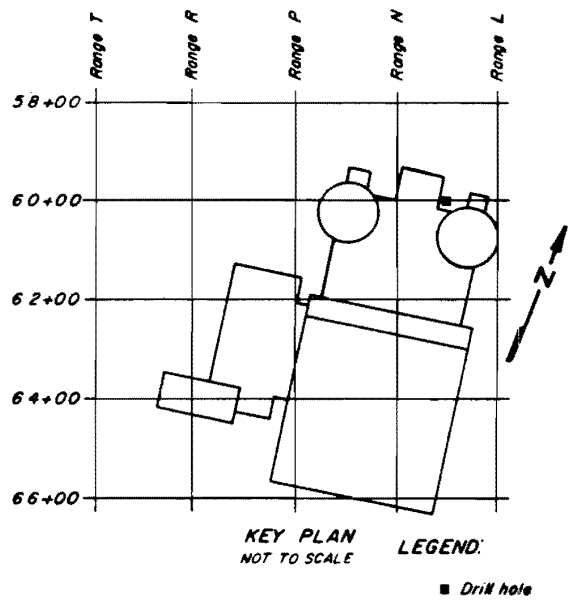
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 25
STA. M-59+00

Figure 2.5-38

Figure 2.5-38 Graphic Log Hole M-59+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 701.1 AND 639.1. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 *Water Test Packer set showing gal per min/psi*

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss

Type 1 - Soft shale. 1 to 10

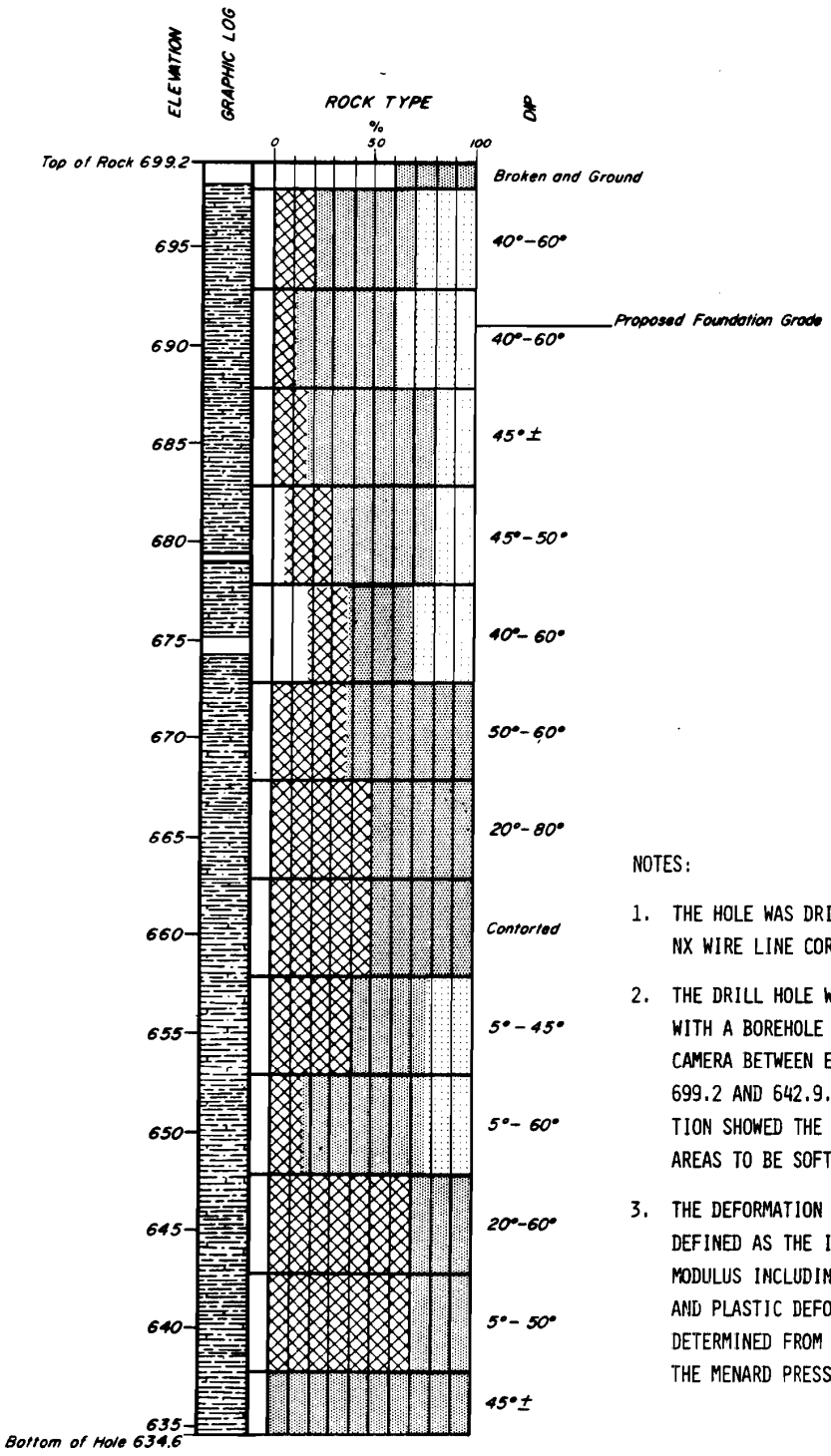
Type 2 - Hard shale. 5 to 60

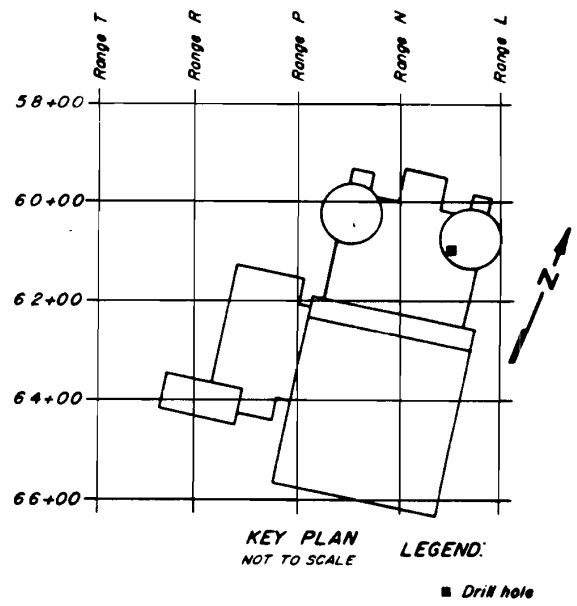
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 26 STA. M-60+00 Figure 2.5-39

Figure 2.5-39 Graphic Log Hole 26M-60+00



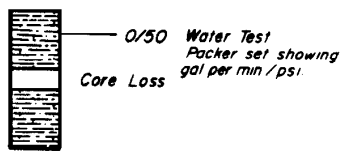


NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 699.2 AND 642.9. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

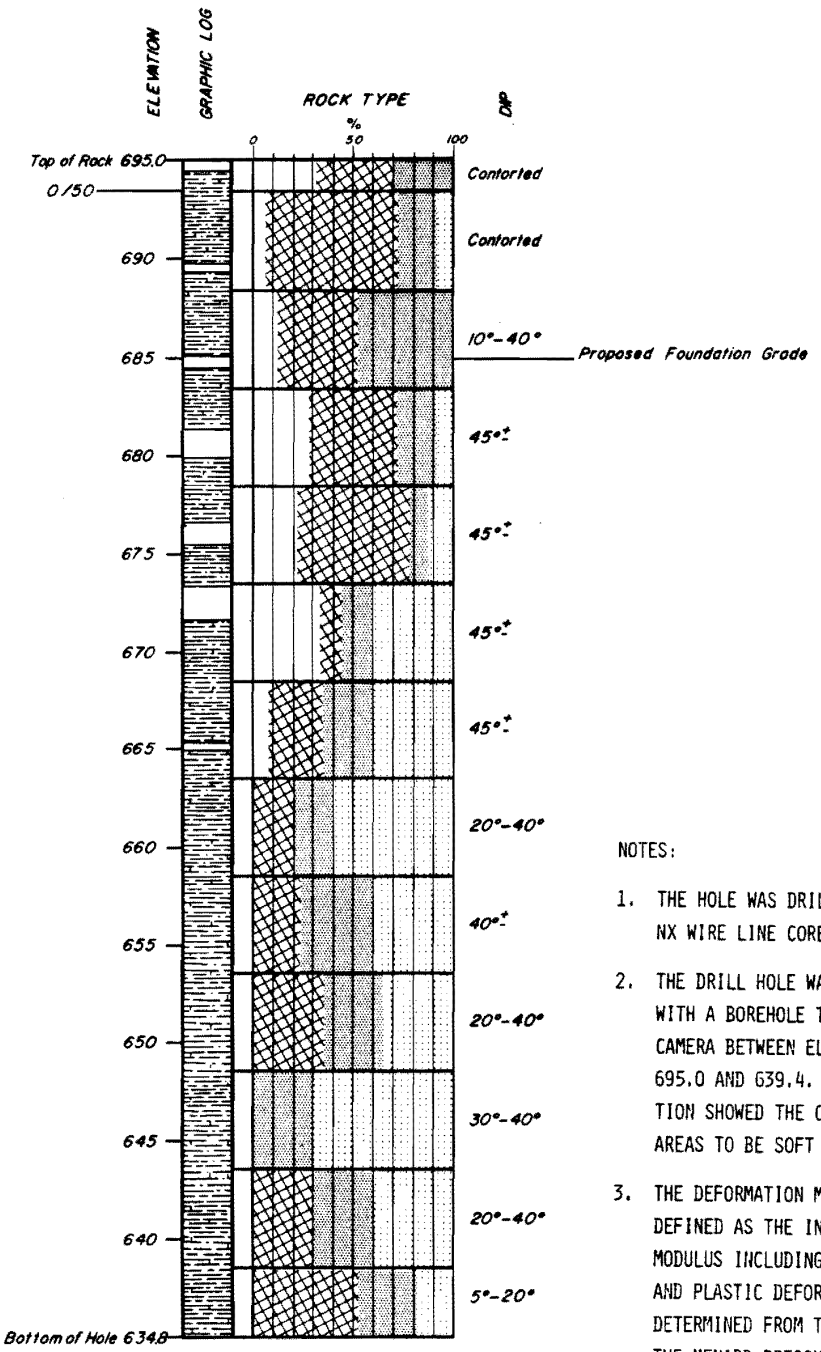
ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

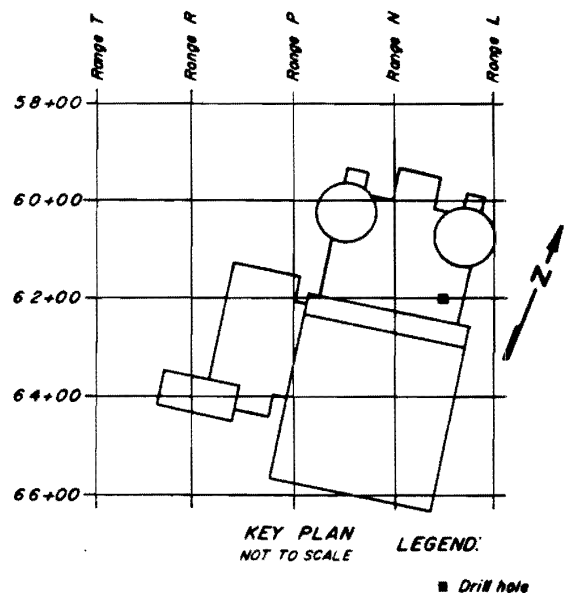
- *Type 0 - Core loss.*
- *Type 1 - Soft shale. 1 to 10*
- *Type 2 - Hard shale. 5 to 60*
- *Type 3 - Limestone. 100+*

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 27 STA. M-61+00 Figure 2.5-40

Figure 2.5-40 Graphic Log Hole 27 Sta. M-6l+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 695.0 AND 639.4. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi.

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

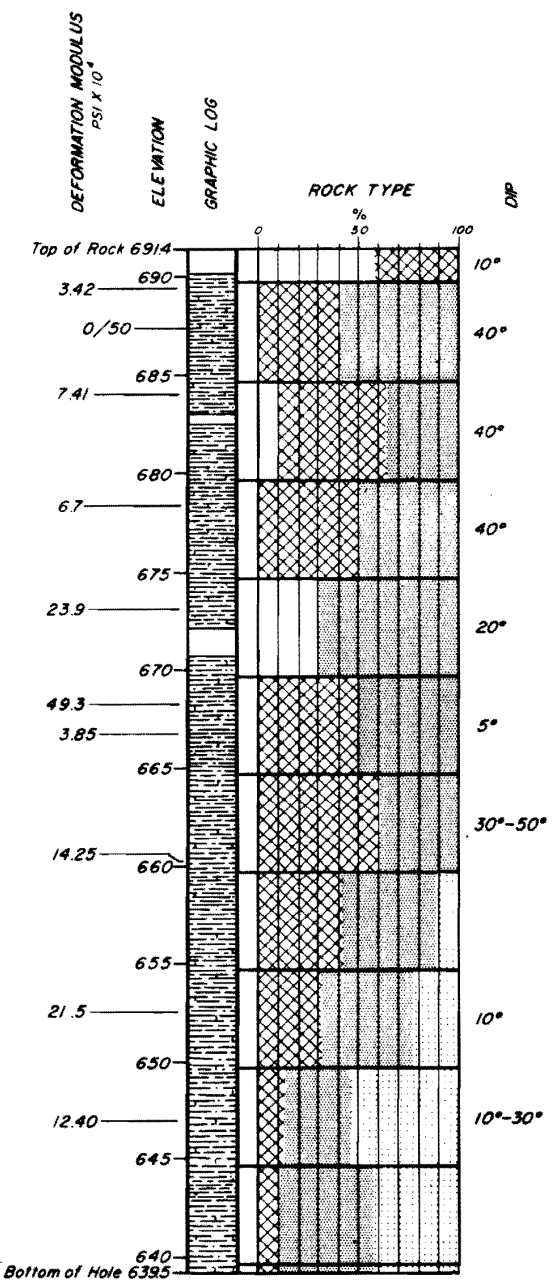
Type 2 - Hard shale. 5 to 60

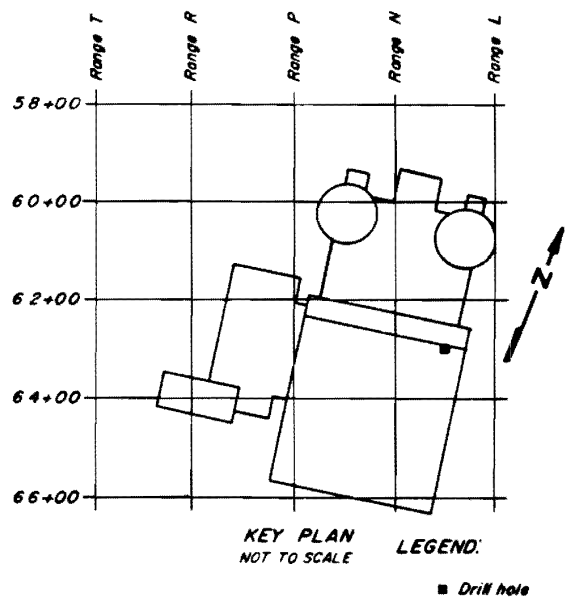
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 28 STA. M-62+00 Figure 2.5-41

Figure 2.5-41 Graphic Log Hole 28 Sta.M-62+00



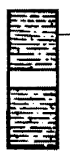


NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 691.4 AND 646.7. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG



0/50 *Water Test Packer set showing gal per min / psi.*

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10⁴)

Type 0 - Core loss

Type 1 - Soft shale. 1 to 10

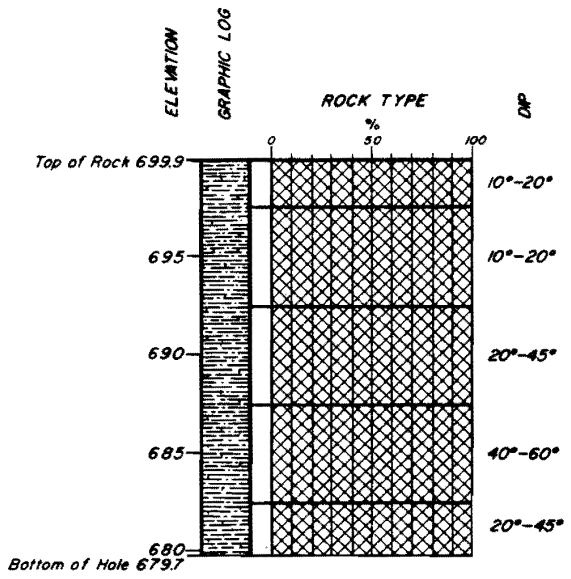
Type 2 - Hard shale. 5 to 60

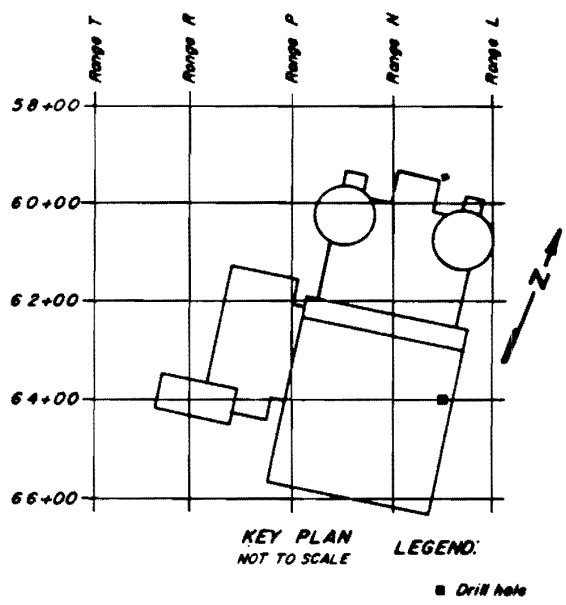
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 29 STA. M-63+00 Figure 2.5-42

Figure 2.5-42 Graphic Log Hole 29 Sta. M-63+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi.

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

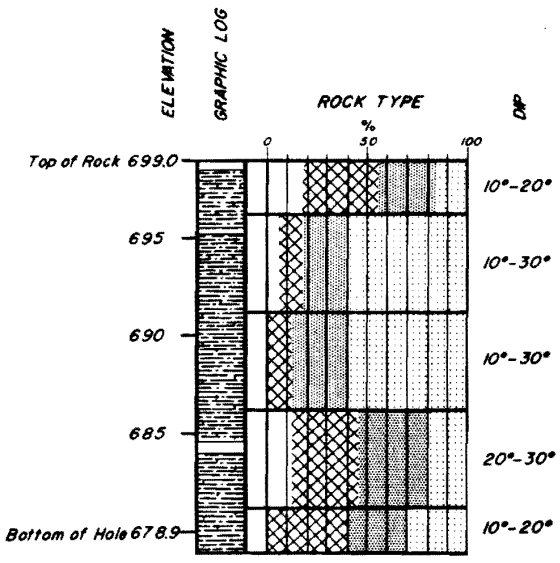
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

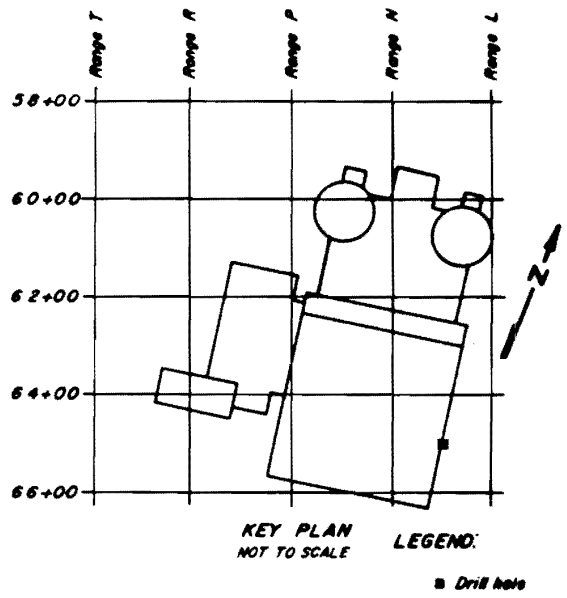
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 30
STA. M-64+00

Figure 2.5-43

Figure 2.5-43 Graphic Log Hole 30 Sta. M-64+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 *Water Test Packer set showing gal per min./psi.*

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

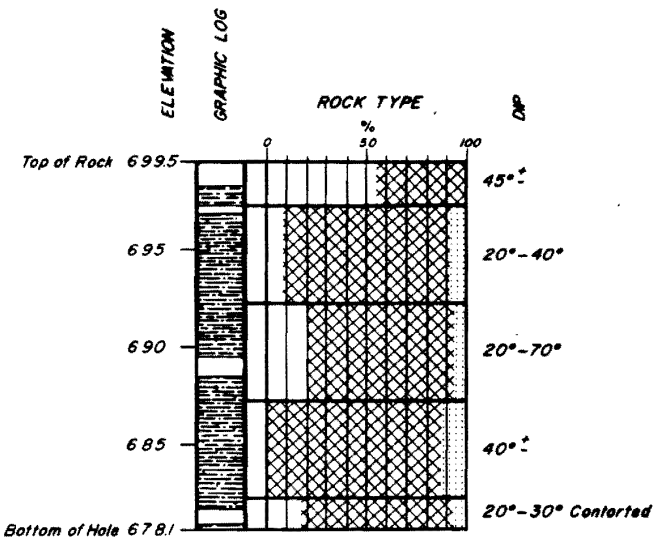
Type 2 - Hard shale. 5 to 60

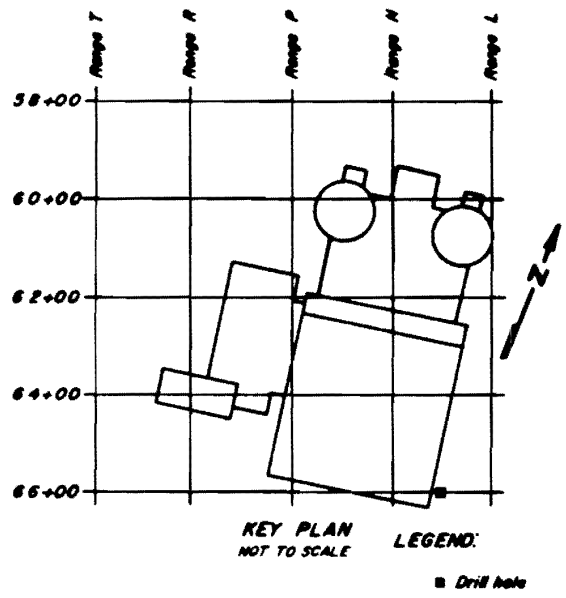
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 31 STA. M-65+00 Figure 2.5-44

Figure 2.5-44 Graphic Log Hole 31 Sta. M-65+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi.

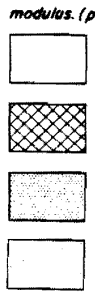
Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

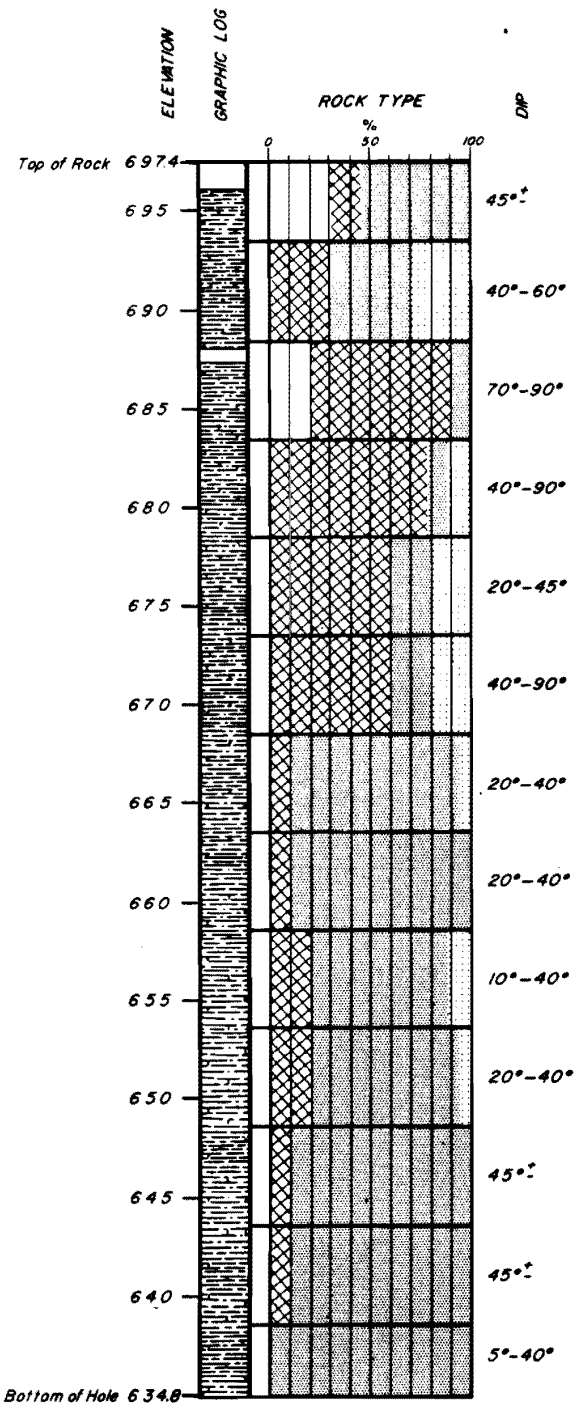
Type 2 - Hard shale. 5 to 60

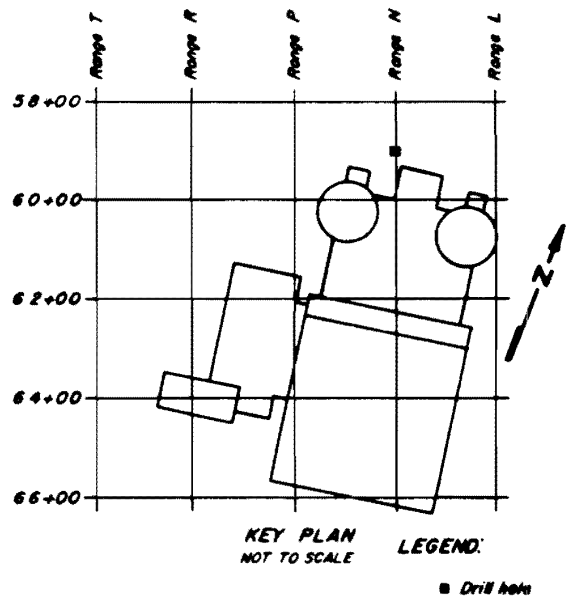
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 32 STA. M-66+00 Figure 2.5-45

Figure 2.5-45 Graphic Log Hole 32 Sta. M-66+00



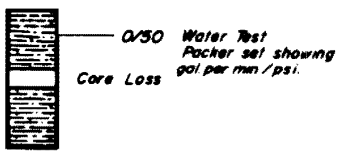


NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 697.1 AND 644.4. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

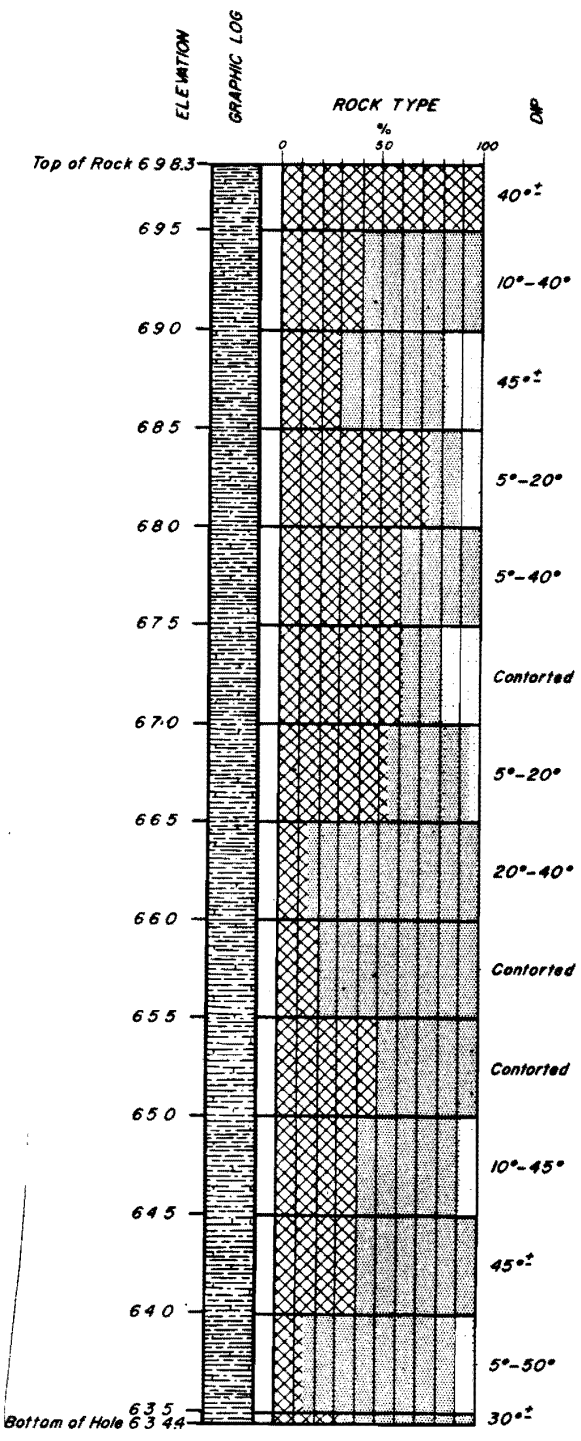
ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

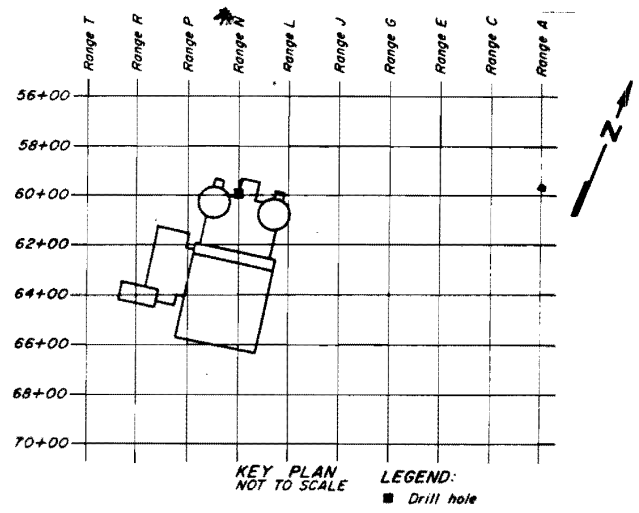
- *Type 0 - Core loss.*
- *Type 1 - Soft shale. 1 to 10*
- *Type 2 - Hard shale. 5 to 60*
- *Type 3 - Limestone. 100+*

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 33 STA. N-59+00 Figure 2.5-46

Figure 2.5-46 Graphic Log Hole 33 Sta. N-59+00



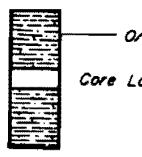


NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 698.3 AND 639.6. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

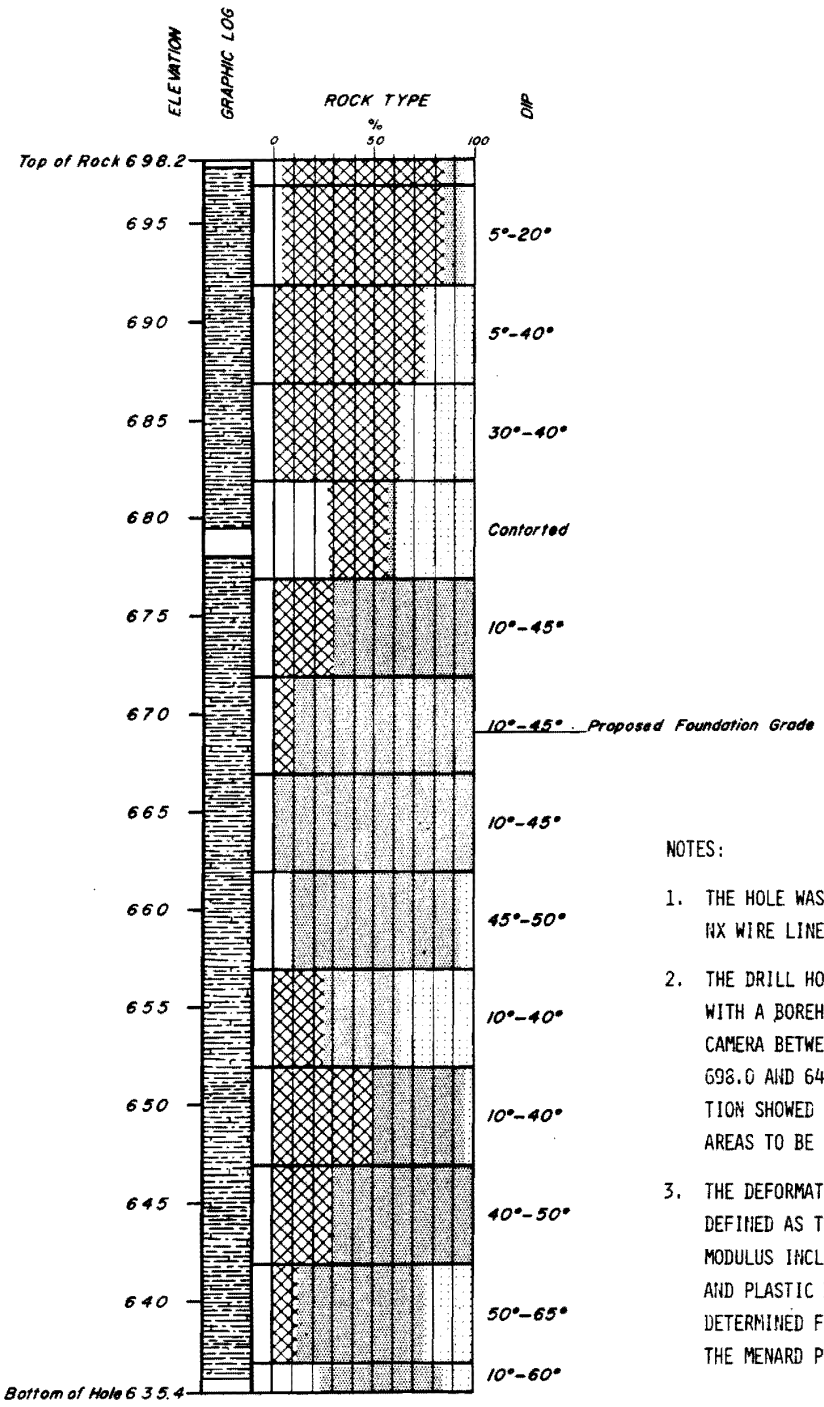
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 34
STA. N-60+00

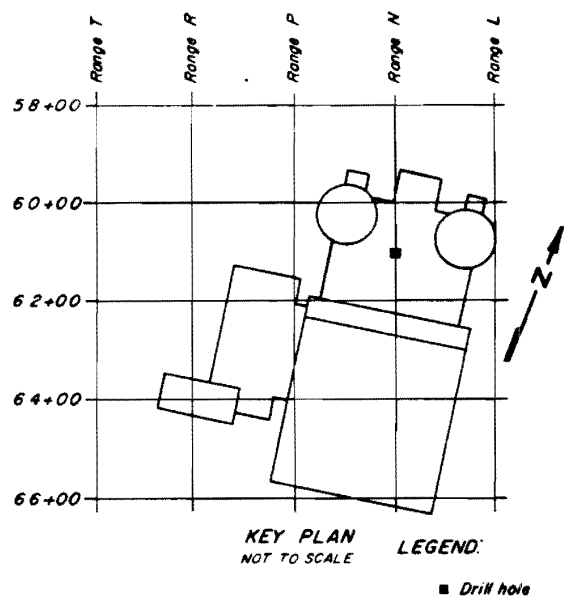
Figure 2.5-47

Figure 2.5-47 Graphic Log Hole 34 Sta. N-60+00



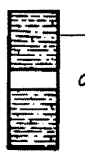
NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 698.0 AND 647.5. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.



LEGEND:

GRAPHIC LOG



0/50 Water Test Packer set showing gal per min/psi.

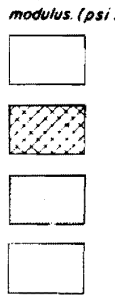
Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss

Type 1 - Soft shale. 1 to 10

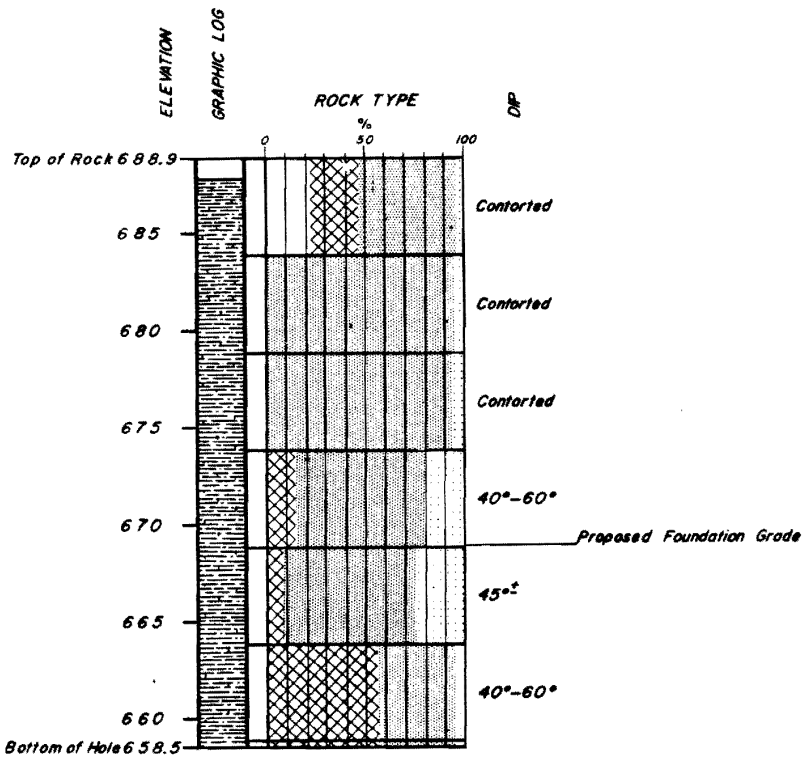
Type 2 - Hard shale. 5 to 60

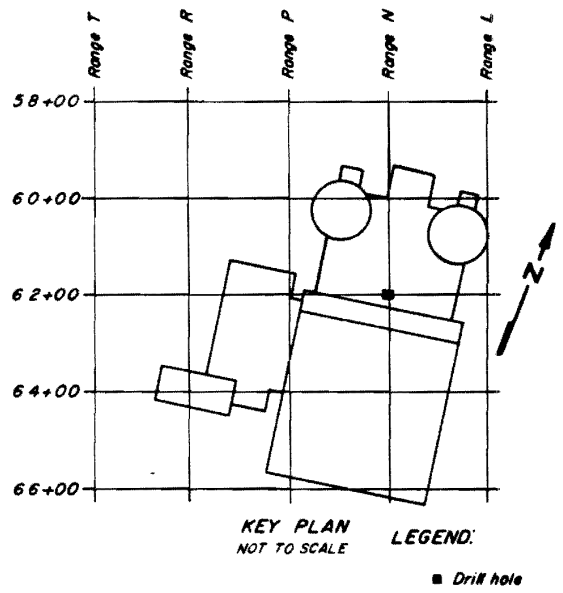
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 35 STA. N-61+00 Figure 2.5-48

Figure 2.5-48 Graphic Log Hole 35 Sta. N-6l+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 688.9 AND 663.9. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

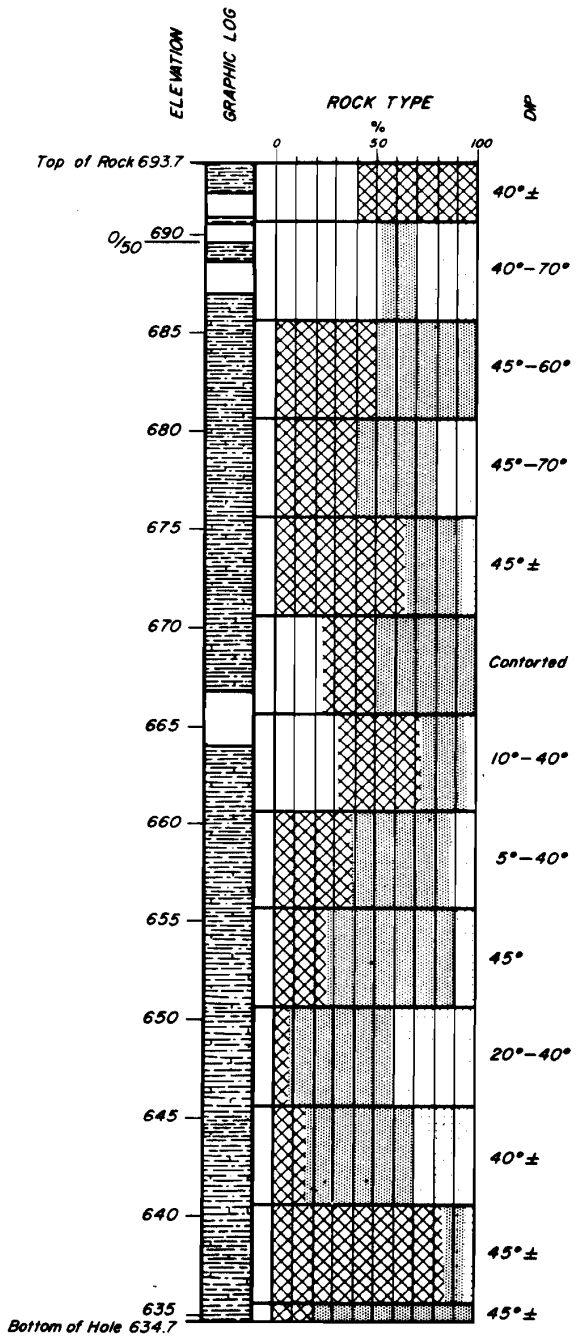
ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

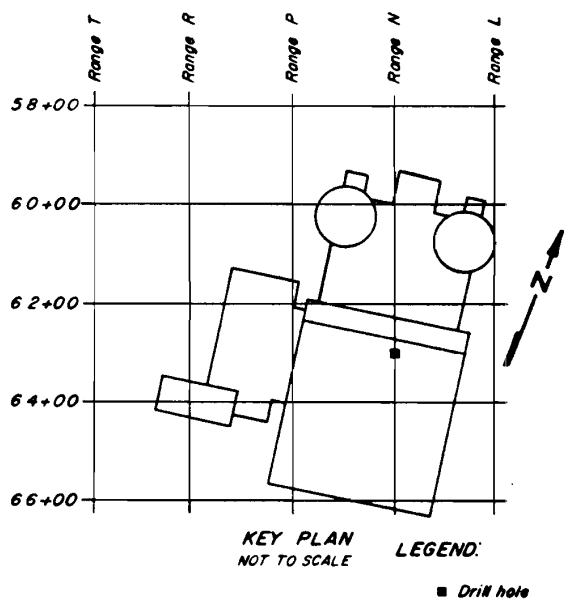
- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 36 STA. N-62+00 Figure 2.5-49

Figure 2.5-49 Graphic Log Hole 36 Sta. N-62+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 693.7 AND 657.7. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min./psi

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^6)

- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

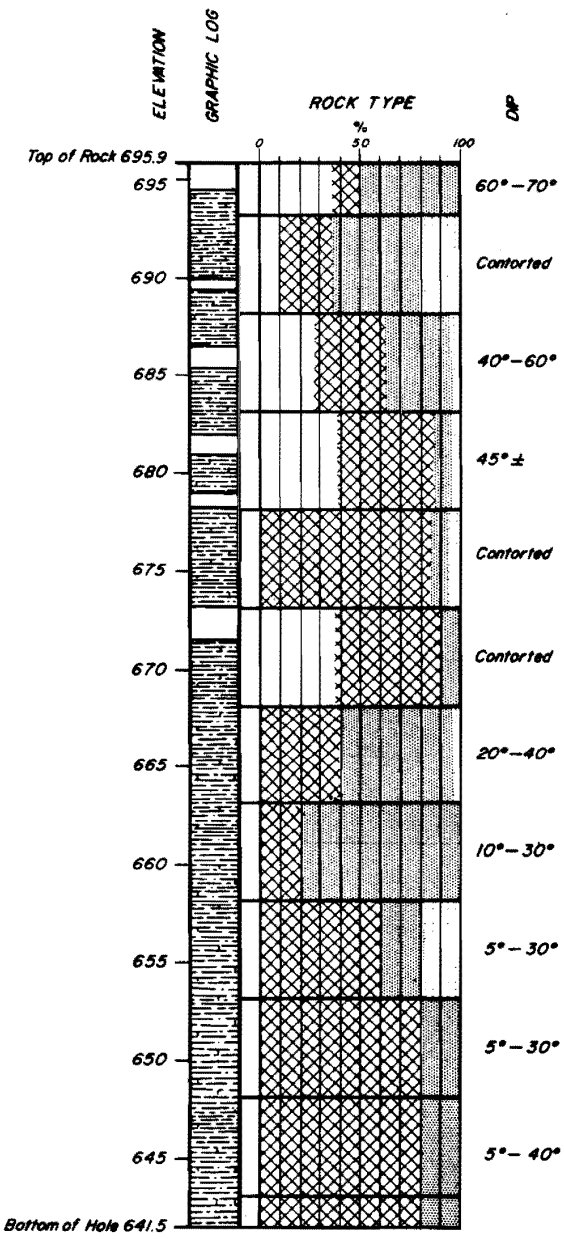
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

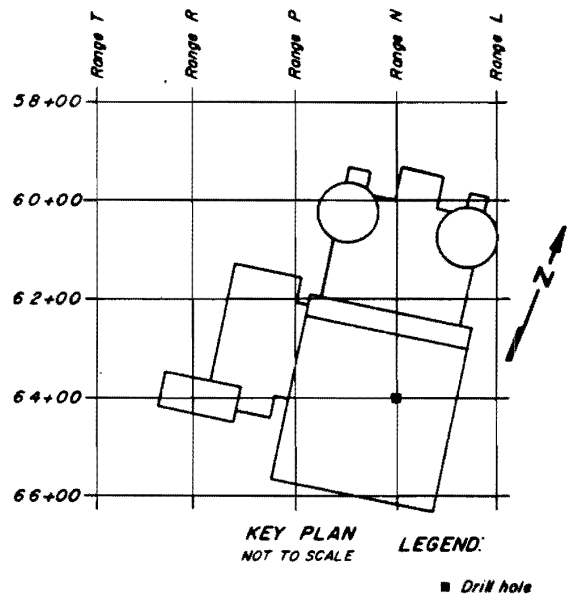
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 37
STA. N-63+00

Figure 2.5-50

Figure 2.5-50 Graphic Log Hole 37 Sta. N-63+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

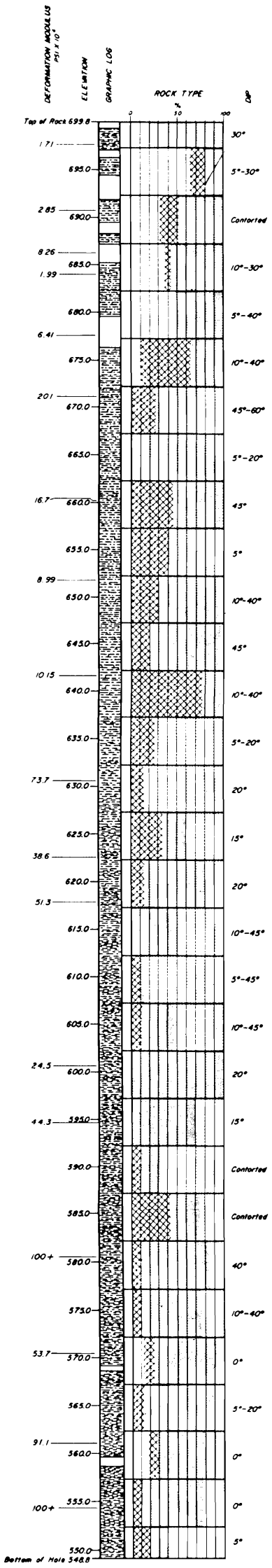
ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

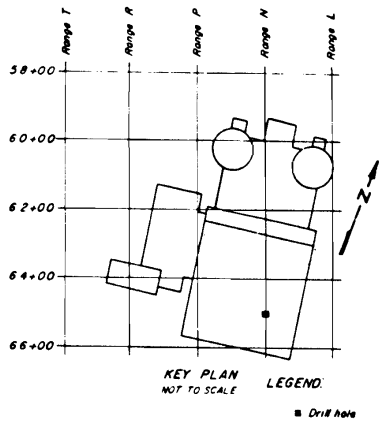
- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 38 STA. N-64+00 Figure 2.5-51

Figure 2.5-51 Graphic Log Hole 38 Sta. N-64+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEM ELEVATIONS 699.8 AND 641.0. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND

GRAPHIC LOG

Core Loss

0/50 Water Test Packer set showing gal per min/psi

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus ($psi \times 10^4$)

Type 0 - Core loss

Type 1 - Soft shale. 1 to 10

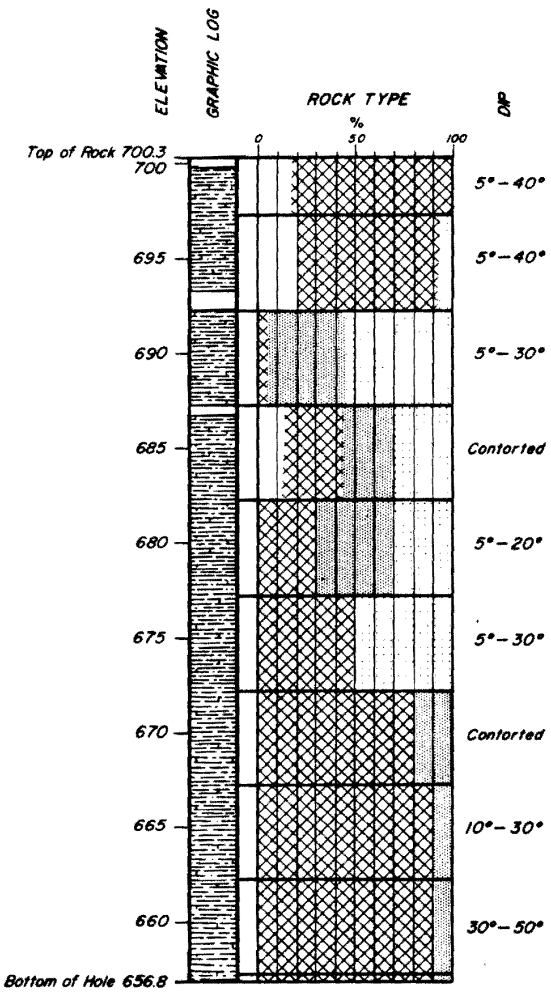
Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

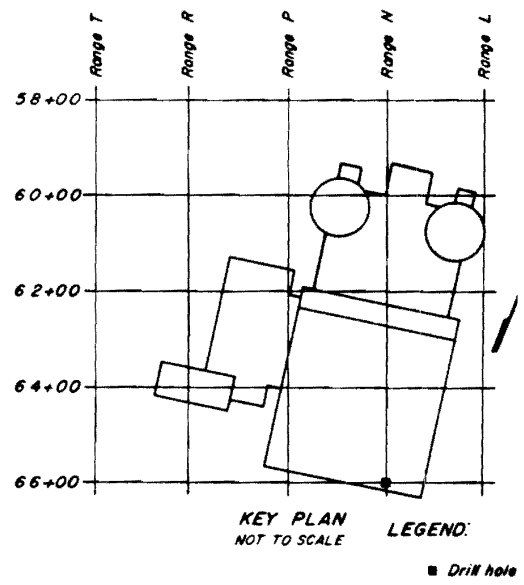
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 39 STA. N-65+00 Figure 2.5-52

Figure 2.5-52 Graphic Log Hole 39 Sta. N-65+00



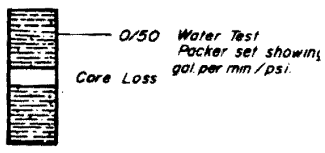
NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.



LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

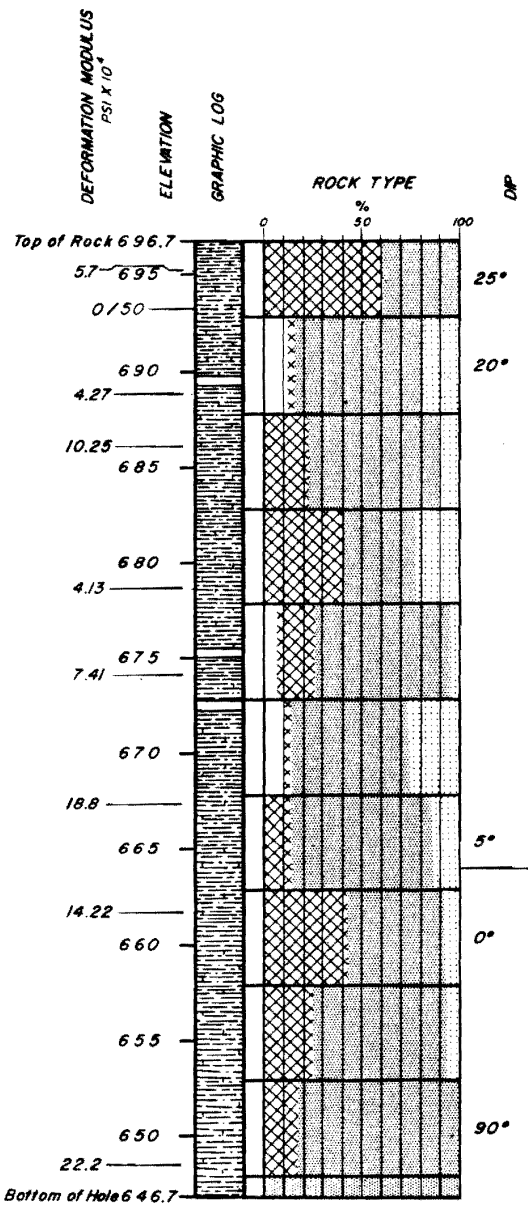
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

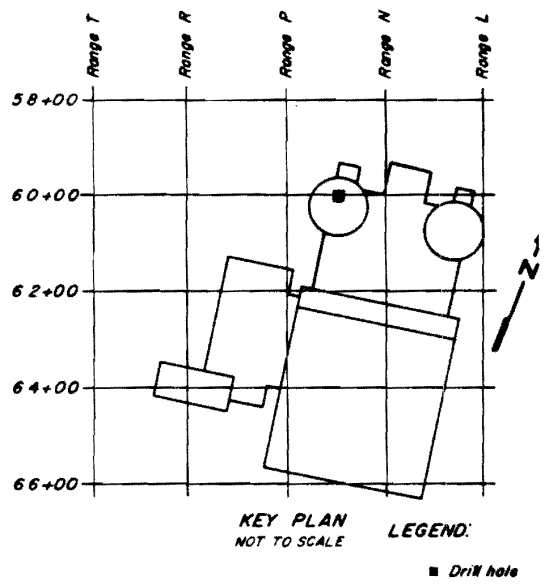
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 40
STA. N-66+00

Figure 2.5-53

Figure 2.5-53 Graphic Log Hole 40 Sta. N-66+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 696.8 AND 650.6. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min /psi.

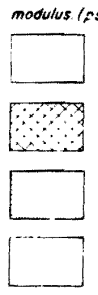
Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONE.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus (psi x 10^4)



Type 0 - Core loss

Type 1 - Soft shale. 1 to 10

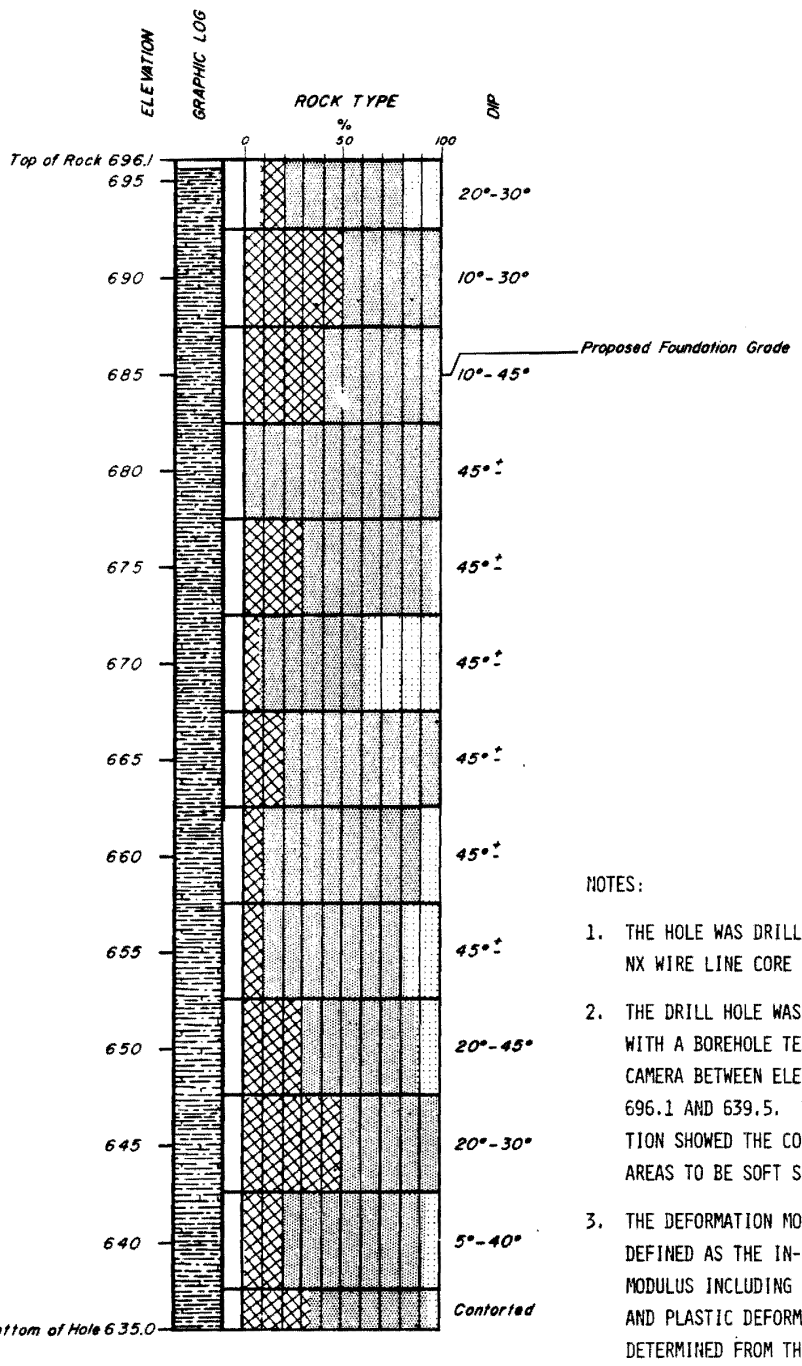
Type 2 - Hard shale. 5 to 60

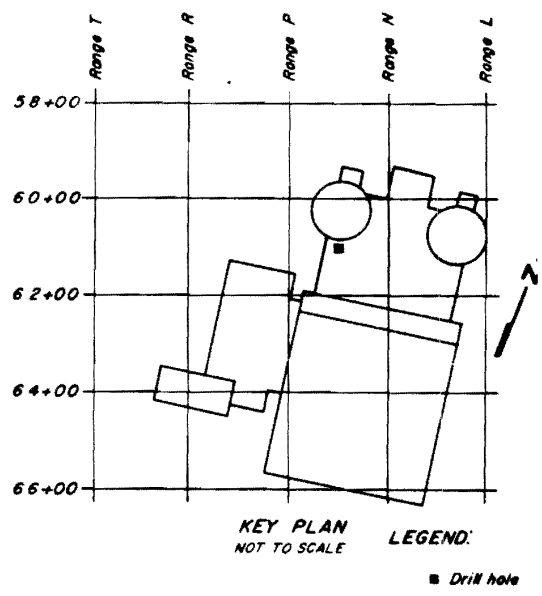
Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 41 STA. 0-60+00 Figure 2.5-54

Figure 2.5-54 Graphic Log Hole 41 Sta. 0-60+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 696.1 AND 639.5. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- Type 0 - Core loss
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

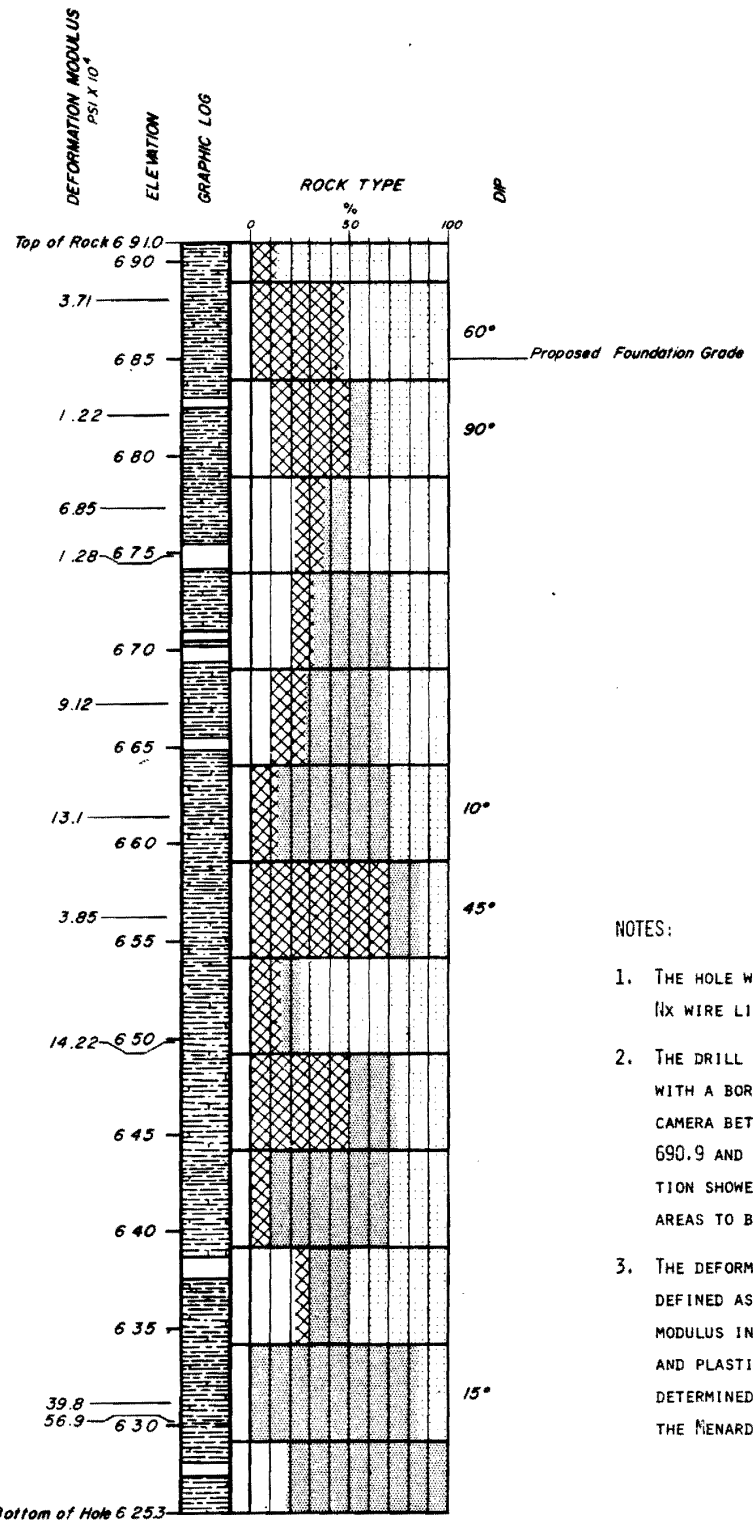
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

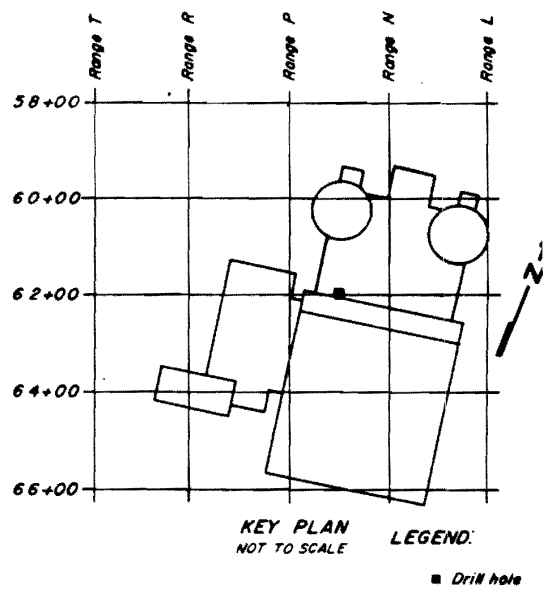
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 42
STA. 0-61+00

Figure 2.5-55

Figure 2.5-55 Graphic Log Hole 42 Sta. 0-61+00





NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 690.9 AND 645.2. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min./psi

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10⁴)

- Type 0 - Core loss
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

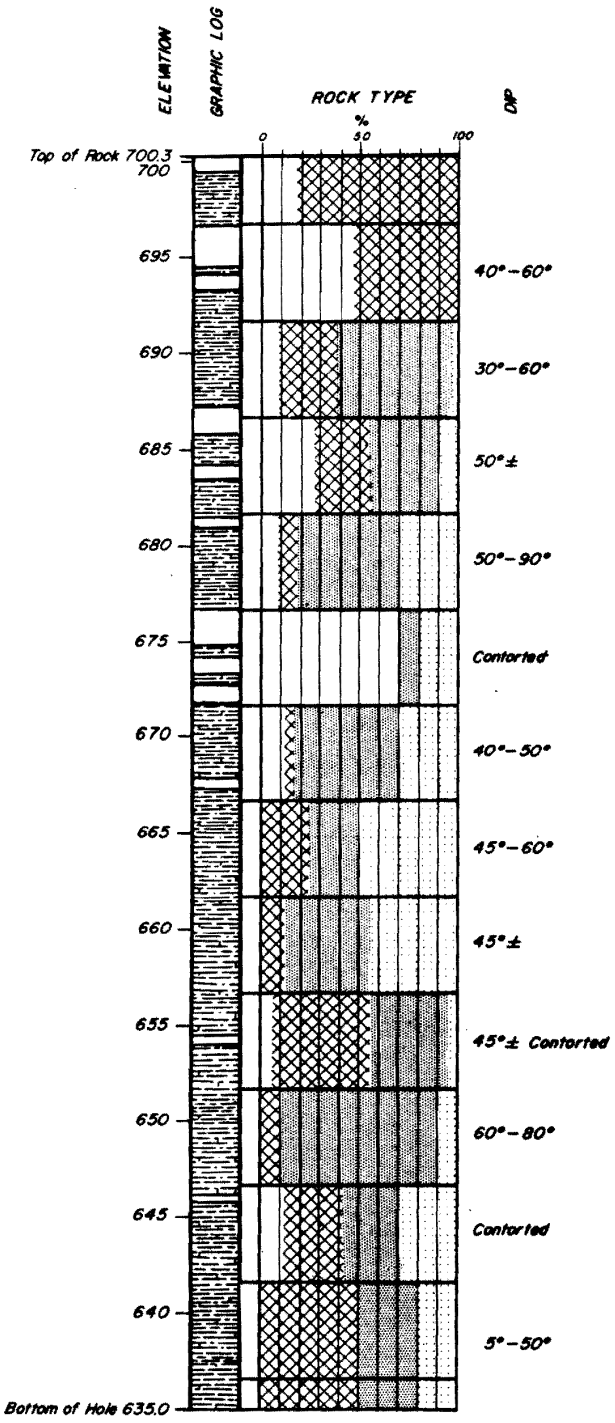
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

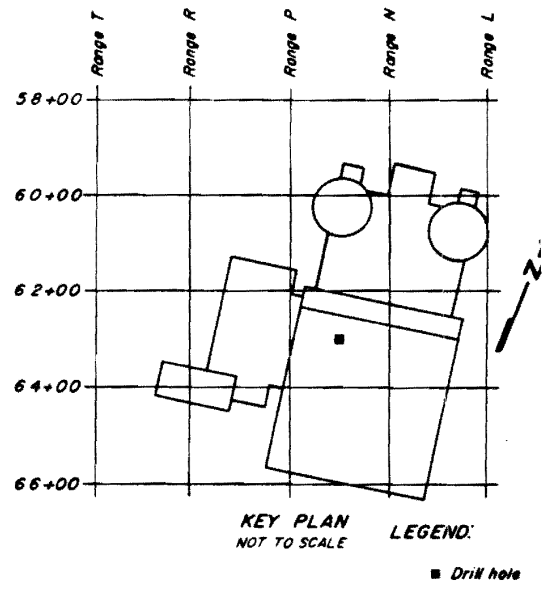
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 43
STA. O-62+00

Figure 2.5-56

Figure 2.5-56 Graphic Log Hole 43 Sta. 0-62+00





NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 699.9 AND 663.7. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

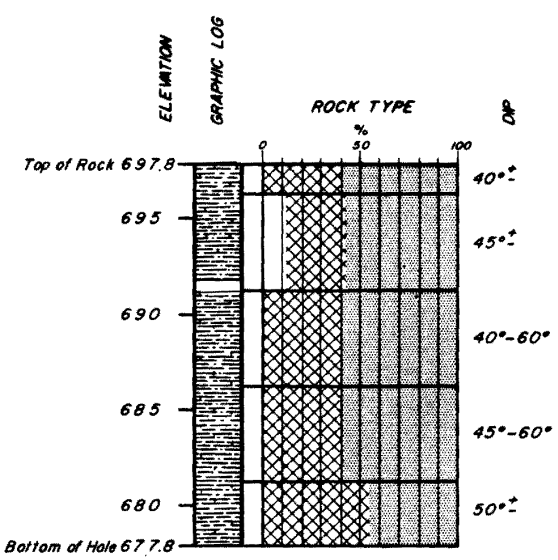
ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

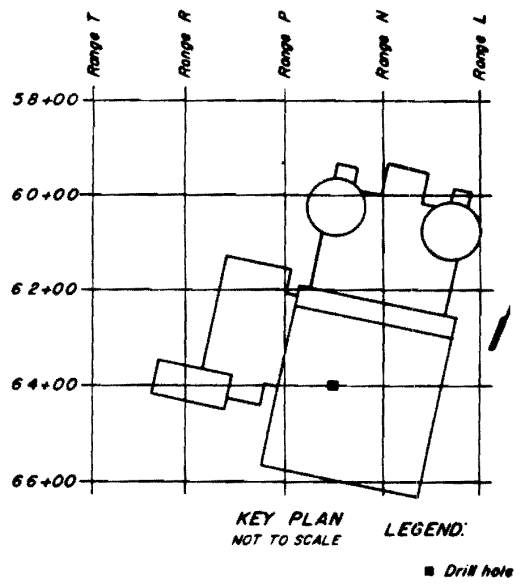
- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG HOLE 44 STA. 0-63+00 Figure 2.5-57

Figure 2.5-57 Graphic Log Hole 44 Sta. 0-63+00





NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

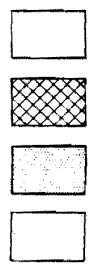
LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



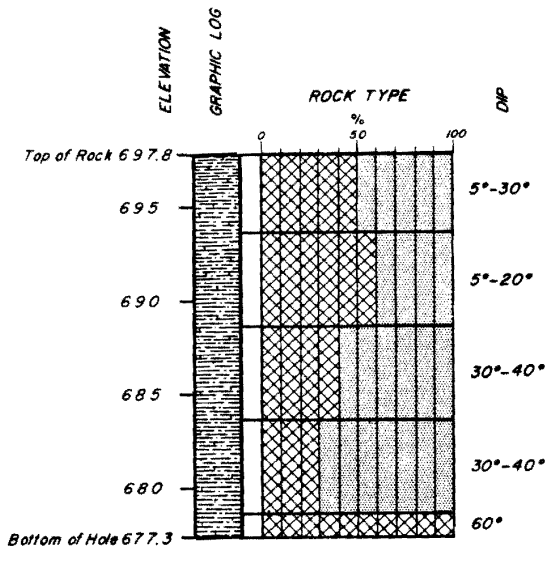
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

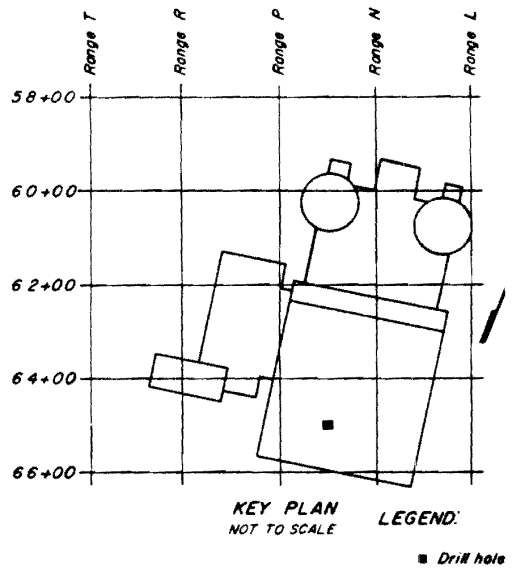
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 45
STA. 0-64+00

Figure 2.5-58

Figure 2.5-58 Graphic Log Hole 45 Sta. 0-64+00



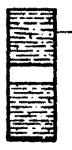


NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

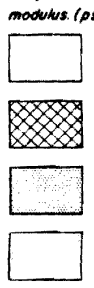
GRAPHIC LOG



GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

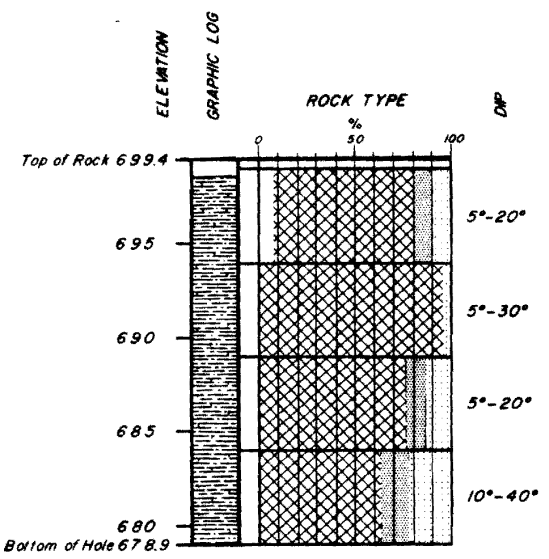
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

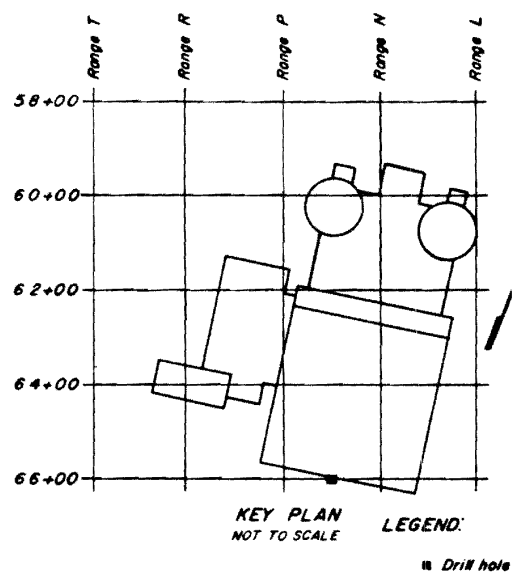
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 46
STA. 0-65+00

Figure 2.5-59

Figure 2.5-59 Graphic Log Hole 46 Sta. 0-65+00





NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.

2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- *Type 0 - Core loss.*
- *Type 1 - Soft shale. 1 to 10*
- *Type 2 - Hard shale. 5 to 60*
- *Type 3 - Limestone. 100+*

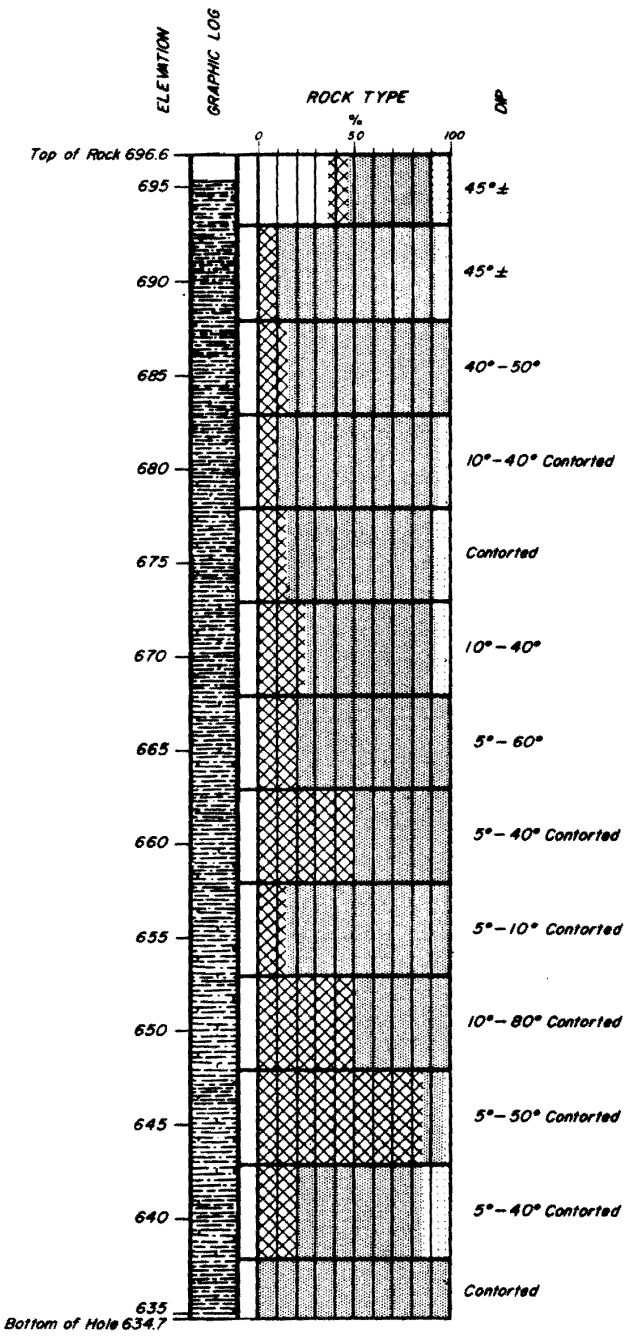
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 47
STA. 0-66+00

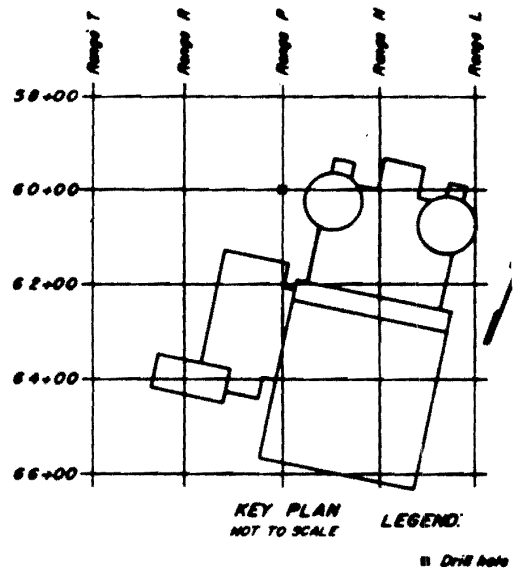
Figure 2.5-60

Figure 2.5-60 Graphic Log Hole 47 Sta. 0-66+00



NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 696.4 AND 647.1. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.



LEGEND

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- *Type 0 - Core loss.*
- *Type 1 - Soft shale. 1 to 10*
- *Type 2 - Hard shale. 5 to 60*
- *Type 3 - Limestone. 100+*

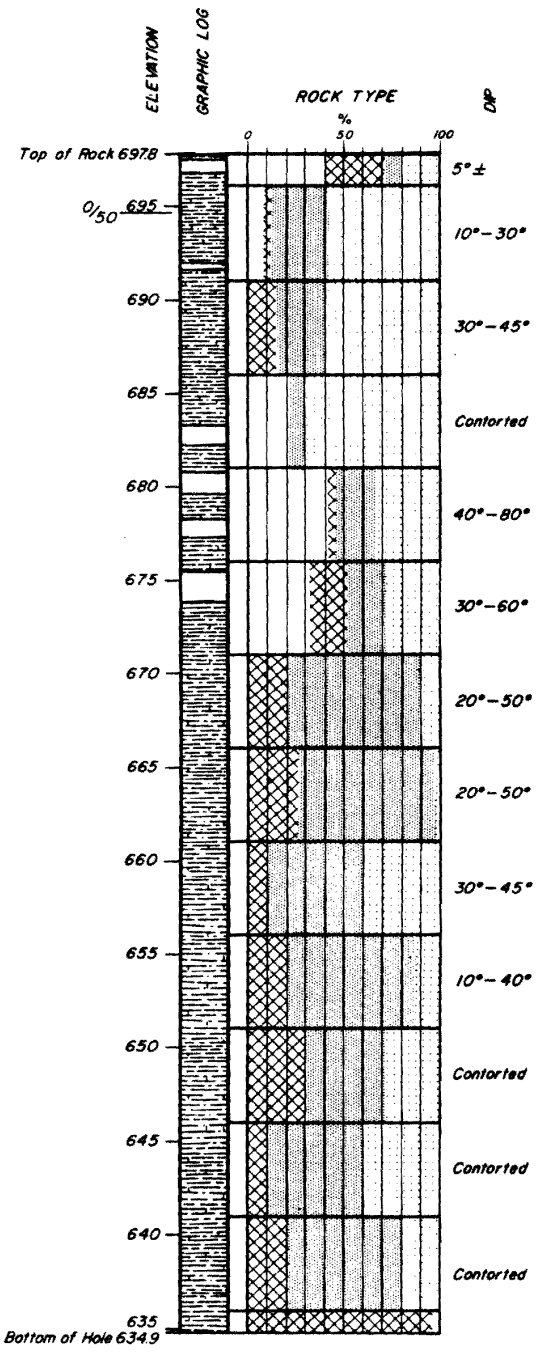
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

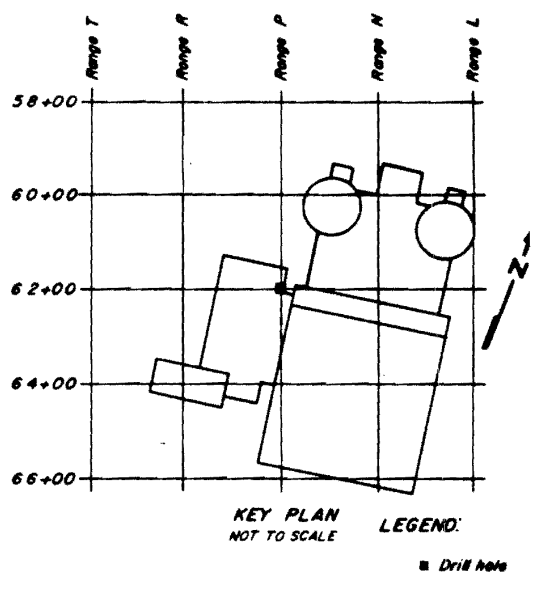
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 48
STA. P-60+00

Figure 2.5-61

Figure 2.5-61 Graphic Log Hole 48 Sta. P-60+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 697.4 AND 642.1. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 *Water Test Packer set showing gal per min / psi.*

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

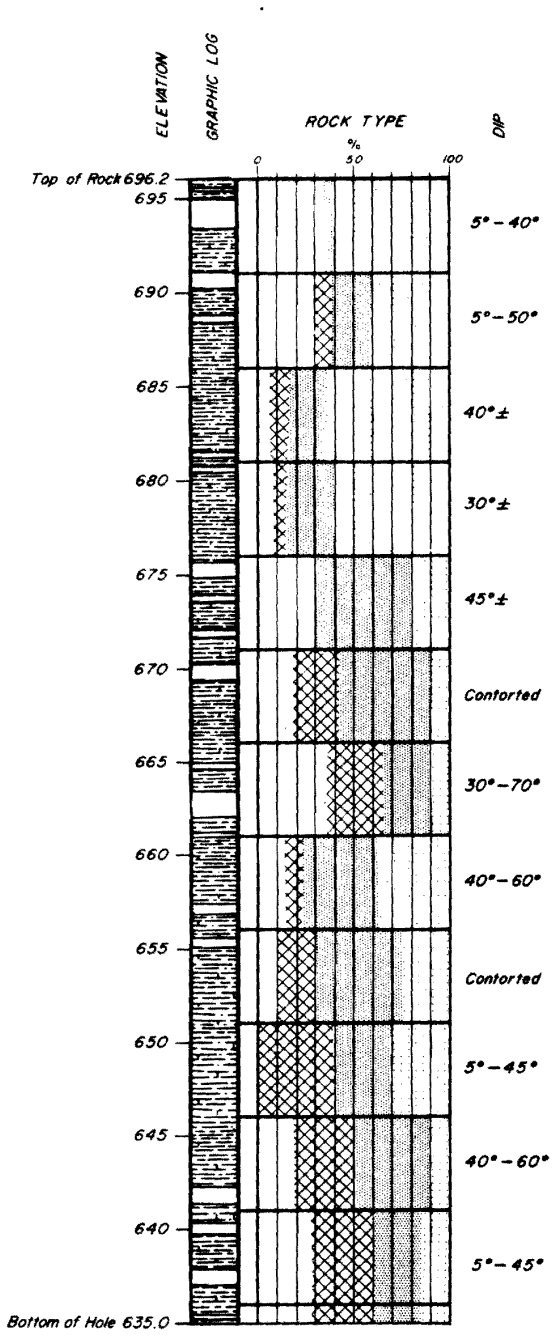
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

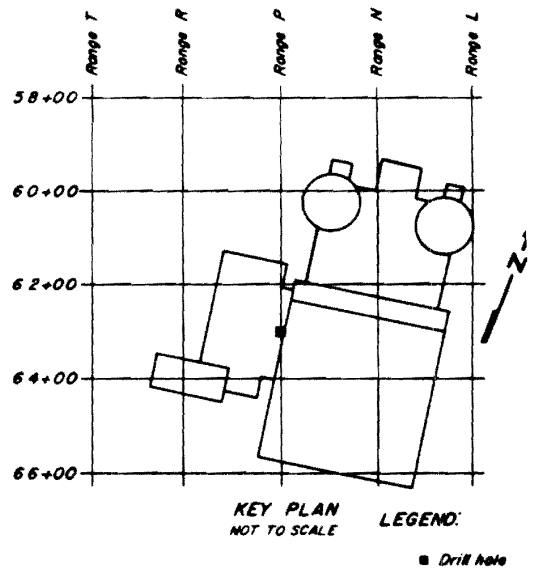
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 49
STA. P-62+00

Figure 2.5-62

Figure 2.5-62 Graphic Log Hole 49 Sta. P-62+00 (Sheet 1 of 4)





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 696.8 AND 652.5. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE.
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min / psi.

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

Type 0 - Core loss.

Type 1 - Soft shale. 1 to 10

Type 2 - Hard shale. 5 to 60

Type 3 - Limestone. 100+

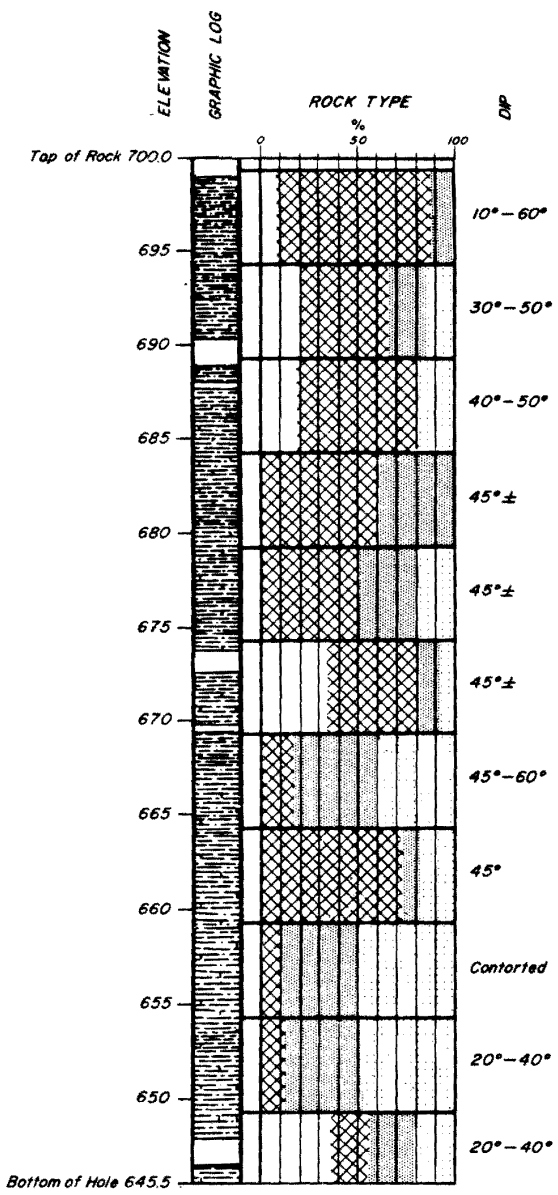
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 50
STA. P-63+00

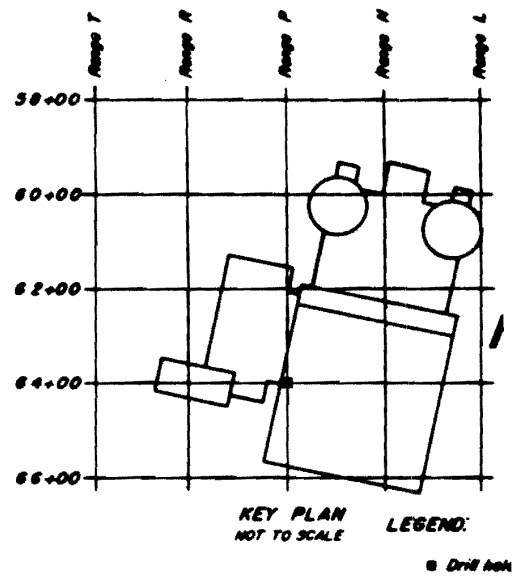
Figure 2.5-63

Figure 2.5-63 Graphic Log Hole 50 Sta. P-63+00



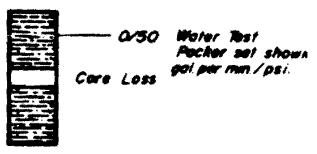
NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.



LEGEND:

GRAPHIC LOG



GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- *Type 0 - Core loss*
- *Type 1 - Soft shale 1 to 10*
- *Type 2 - Hard shale 5 to 60*
- *Type 3 - Limestone 100+*

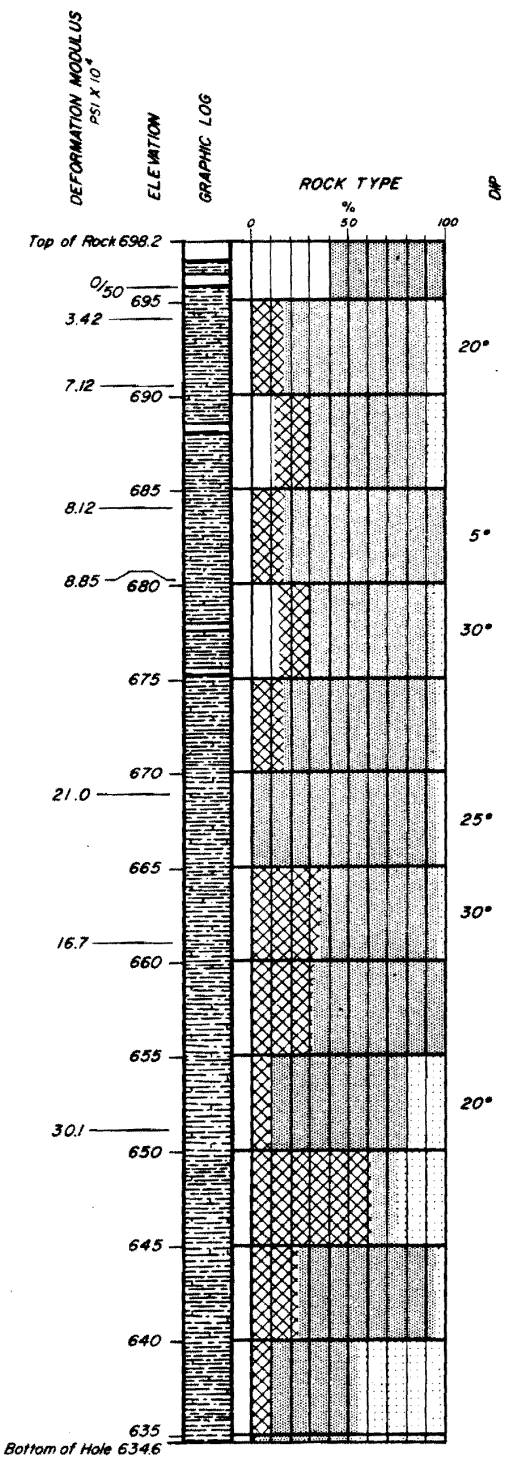
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

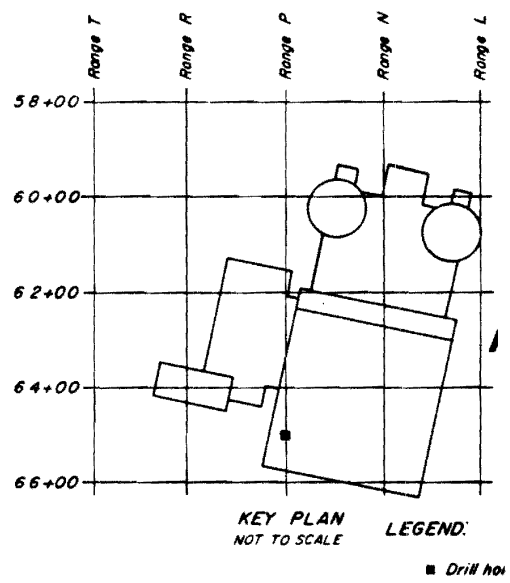
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 51
STA. P-64+00

Figure 2.5-64

Figure 2.5-64 Graphic Log Hole 51 Sta. P-64+00





NOTES:

1. THE HOLE WAS DRILLED WITH AN NX WIRE LINE CORE DRILL.
2. THE DRILL HOLE WAS INSPECTED WITH A BOREHOLE TELEVISION CAMERA BETWEEN ELEVATIONS 698.2 AND 649.2. THE INSPECTION SHOWED THE CORE LOSS AREAS TO BE SOFT SHALE,
3. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

0/50 *Water Test Packer set show gal per min / psi.*

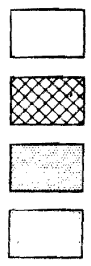
Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10⁴)



Type 0 - Core loss.

Type 1 - Soft shale 1 to 10

Type 2 - Hard shale 5 to 60

Type 3 - Limestone. 100+

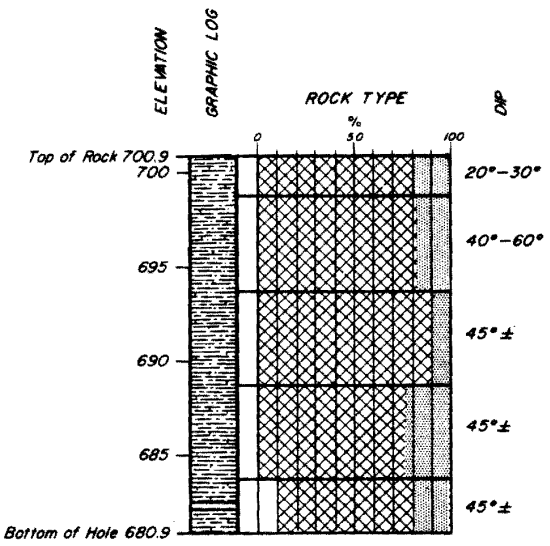
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATION WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

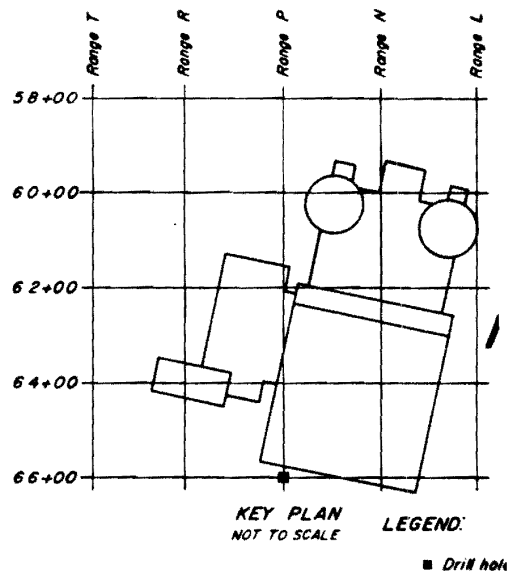
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG
HOLE 52
STA. P-65+00

Figure 2.5-65

Figure 2.5-65 Graphic Log Hole 52 Sta. P-65+00



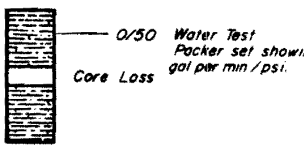


NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

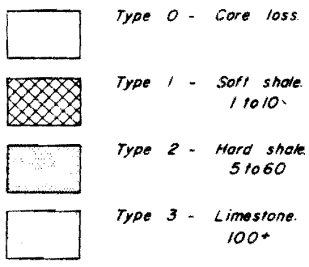


GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



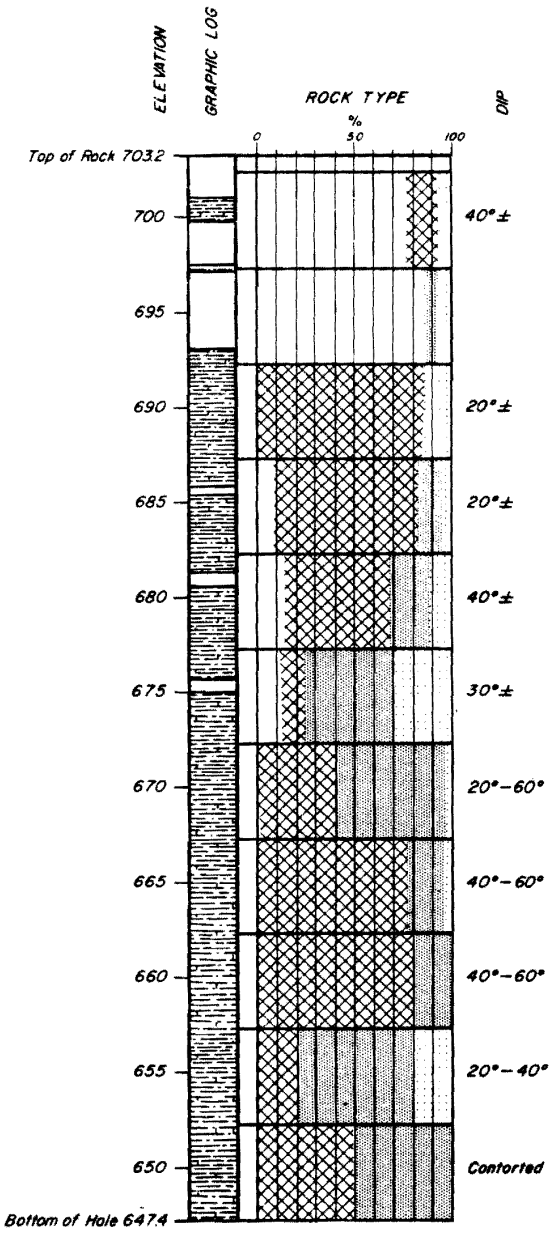
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATION WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

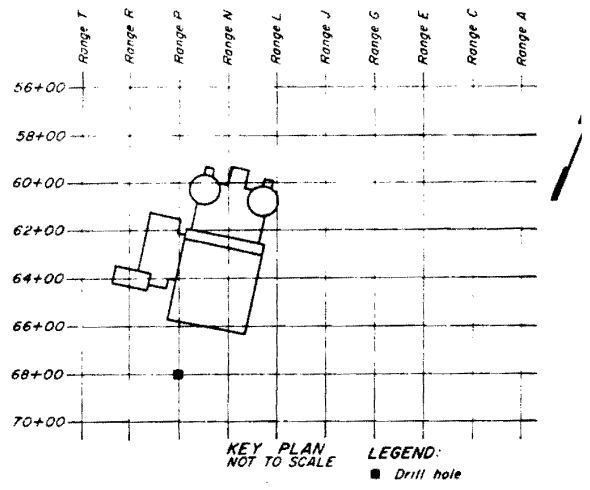
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 53
STA. P-66+00

Figure 2.5-66

Figure 2.5-66 Graphic Log Hole 53 Sta. P-66+00



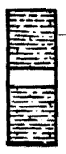


NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

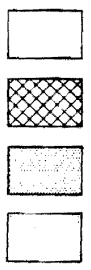


GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)



Type 0 - Core loss.

Type 1 - Soft shale 1 to 10

Type 2 - Hard shale 5 to 60

Type 3 - Limestone. 100+

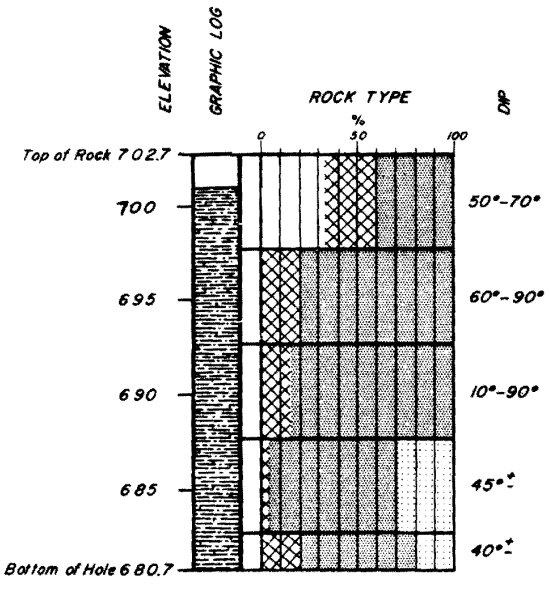
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

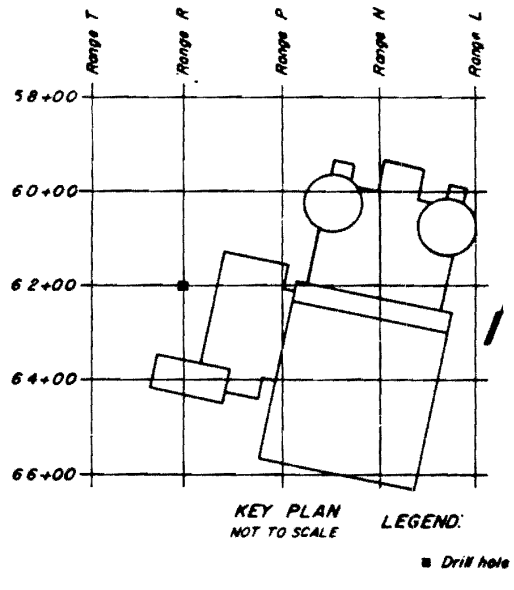
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 54
STA. P-68+00

Figure 2.5-67

Figure 2.5-67 Graphic Log Hole 54 Sta. P-68+00



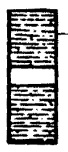


NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG



0/50 *Water Test Packer set shown gal per min / psi.*

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- *Type 0 - Core loss.*
- *Type 1 - Soft shale. 1 to 10*
- *Type 2 - Hard shale. 5 to 60*
- *Type 3 - Limestone. 100+*

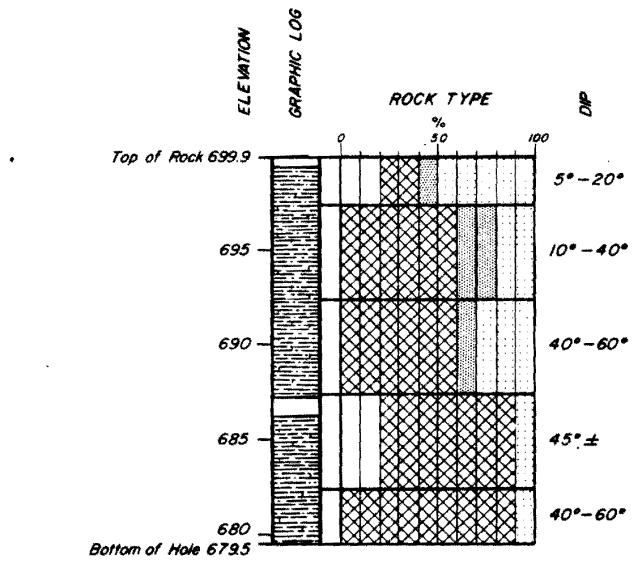
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

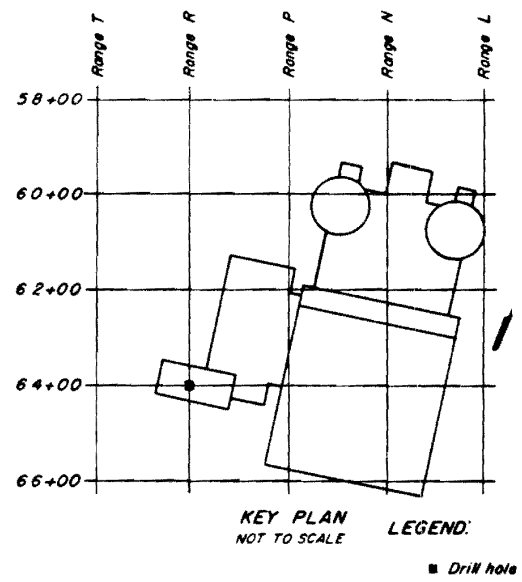
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 55
STA. R-62+00

Figure 2.5-68

Figure 2.5-68 Graphic Log Hole 55 Sta. R-62+00





NOTES:

1. THE HOLE WAS DRILLED WITH A NX WIRE LINE CORE DRILL.
2. THE DEFORMATION MODULUS IS DEFINED AS THE IN-SITU SECANT MODULUS INCLUDING BOTH ELASTIC AND PLASTIC DEFORMATION AS DETERMINED FROM THE RESULTS OF THE MENARD PRESSUREMETER TESTS.

LEGEND:

GRAPHIC LOG

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALES INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus. (psi x 10^4)

- Type 0 - Core loss.
- Type 1 - Soft shale. 1 to 10
- Type 2 - Hard shale. 5 to 60
- Type 3 - Limestone. 100+

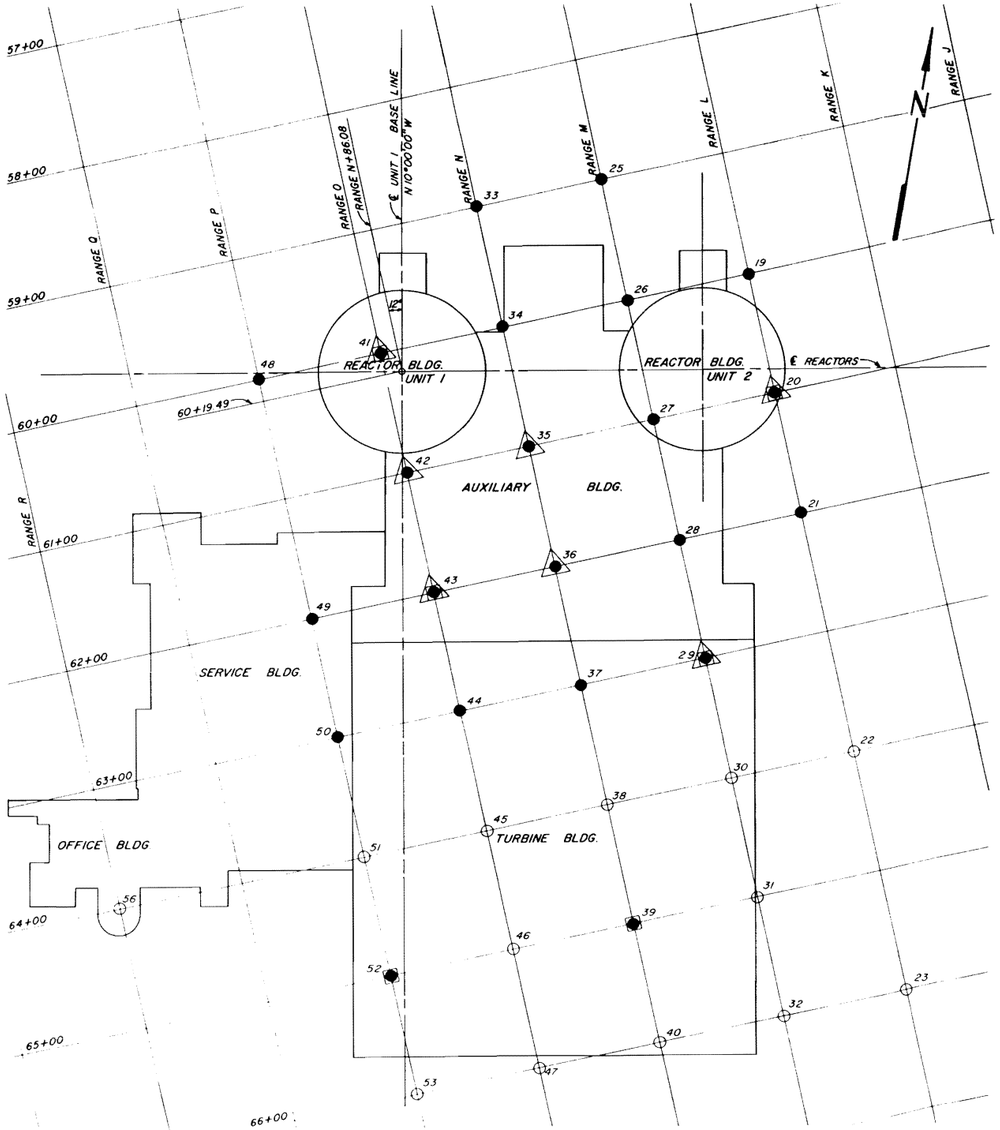
THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORE. GENERALLY, DETERMINATIONS WERE MADE FOR EACH FIVE FOOT LENGTH OF CORE IN THE BOX.

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

GRAPHIC LOG
HOLE 56
STA. R-64+00

Figure 2.5-69

Figure 2.5-69 Graphic Log Hole 56 Sta. R-64+00



PLAN

SUMMARY

Hole Number	Station Number	Surface Elevation	Top of Rock Elevation	Bottom of Hole Elevation	Average Ground Water Elevation August-December 1970
19	L-60+00	733.2	699.6	656.0	721.6
20	L-61+00	729.7	698.1	548.4	
21	L-62+00	733.1	690.9	647.1	721.6
22	L-64+00	736.6	694.4	636.6	721.2
23	L-66+00	741.9	699.9	651.9	719.6
25	M-59+00	732.2	698.4	634.1	
26	M-60+00	729.1	701.1	634.6	
27	M-61+00	732.9	699.2	634.6	
28	M-62+00	733.4	695.0	634.8	
29	M-63+00	734.7	691.4	639.5	
30	M-64+00	737.5	699.9	679.7	
31	M-65+00	741.2	699.0	678.9	
32	M-66+00	742.3	699.5	678.1	
33	N-59+00	728.4	697.4	634.8	723.0
34	N-60+00	730.6	698.3	634.4	
35	N-61+00	732.5	698.2	635.4	
36	N-62+00	733.9	688.9	658.5	721.2
37	N-63+00	735.7	693.7	634.7	
38	N-64+00	738.2	695.9	641.5	719.6
39	N-65+00	742.1	699.8	548.8	
40	N-66+00	742.3	700.3	656.8	719.6
41	O-60+00	732.8	696.7	646.7	
42	O-61+00	732.5	696.1	635.0	
43	O-62+00	733.9	691.0	625.3	
44	O-63+00	736.7	700.3	635.0	
45	O-64+00	741.2	697.8	677.8	
46	O-65+00	743.6	697.8	677.3	
47	O-66+00	743.9	699.4	678.9	
48	P-60+00	732.8	696.6	634.7	
49	P-62+00	736.1	697.8	634.9	
50	P-63+00	741.2	696.2	635.0	
51	P-64+00	744.3	700.0	645.5	719.8
52	P-65+00	745.2	698.2	634.6	
53	P-66+00	743.8	700.9	680.9	
56	R-64+00	742.4	699.9	679.5	

LEGEND:

- ○ Nx WIRELINE CORE DRILL HOLE.
- ● DRILL HOLE SURVEYED WITH BORE HOLE TELEVISION.
- ▣ DRILL HOLE SURVEYED WITH MENARD PRESSUREMETER.
- △ DRILL HOLE SURVEYED WITH CONTINUOUS VELOCITY LOGGER.

SCALE:

50 0 50 100 Feet

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SPECIAL STUDIES
LAYOUT AND SUMMARY

Figure 2.5-70

Figure 2.5-70 Special Studies Layout And Summary

Figure 2.5-71 (Please see Figures DVD for Actual Figure)

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

L-61+00 0.0 0.0 729.70 181.60 5 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
32.0	8625.	4804.	*	87.	165.	223.	34.	175.5	0.275	2.763
32.5	8766.	4828.	*	87.	170.	222.	33.	172.4	0.282	2.713
33.0	8937.	4841.	*	85.	176.	219.	32.	168.0	0.292	2.642
33.5	9173.	4907.	*	86.	185.	223.	31.	164.9	0.300	2.592
34.0	9183.	4809.	*	80.	185.	209.	31.	159.9	0.311	2.511
34.5	8940.	4589.	*	71.	174.	187.	33.	155.5	0.321	2.441
35.0	9055.	4675.	*	74.	179.	195.	32.	156.7	0.318	2.461
35.5	8905.	4788.	*	82.	175.	213.	32.	166.1	0.297	2.612
36.0	8711.	4915.	*	93.	169.	237.	33.	179.2	0.266	2.823
36.5	8329.	4758.	*	89.	155.	225.	36.	183.0	0.258	2.884
37.0	8421.	4859.	*	95.	158.	237.	35.	186.1	0.251	2.934
37.5	8373.	4877.	*	97.	157.	241.	36.	189.2	0.243	2.984
38.0	8883.	5145.	*	107.	176.	267.	32.	187.3	0.248	2.954
38.5	8994.	5053.	*	98.	180.	249.	32.	178.0	0.269	2.803
39.0	9040.	4908.	*	88.	180.	226.	32.	168.6	0.291	2.652
39.5	9101.	4893.	*	86.	182.	222.	31.	166.1	0.297	2.612
40.0	9279.	4976.	*	88.	190.	230.	30.	165.5	0.298	2.602
40.5	9386.	5121.	*	96.	195.	248.	30.	169.9	0.288	2.672
41.0	9535.	5202.	*	99.	201.	255.	29.	169.9	0.288	2.672
41.5	9719.	5315.	*	104.	209.	267.	28.	170.5	0.287	2.682
42.0	10233.	5597.	*	115.	232.	296.	26.	170.5	0.287	2.682
42.5	10364.	5681.	*	119.	238.	306.	25.	171.1	0.285	2.692
43.0	10614.	5805.	*	124.	249.	319.	24.	170.5	0.287	2.682
43.5	10887.	5883.	*	125.	261.	323.	23.	167.4	0.294	2.632
44.0	11048.	5999.	*	131.	269.	338.	22.	168.6	0.291	2.652
44.5	11232.	6099.	*	135.	278.	349.	22.	168.6	0.291	2.652
45.0	11187.	6045.	*	132.	276.	341.	22.	167.4	0.294	2.632
45.5	11130.	6028.	*	132.	273.	340.	22.	168.0	0.292	2.642
46.0	10942.	5942.	*	128.	264.	332.	23.	168.6	0.291	2.652
46.5	10518.	5697.	*	118.	244.	304.	24.	168.0	0.292	2.642

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 32.0 - 46.5
Figure 2.5-72

Figure 2.5-72 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 32.0 - 46.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

L-61+00 0.0 0.0 729.70 181.60 5 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
47.0	10569.	5739.	*	120.	247.	309.	24.	168.6	0.291	2.652
47.5	10417.	5670.	*	117.	240.	303.	25.	169.2	0.290	2.662
48.0	10875.	5919.	*	128.	261.	330.	23.	169.2	0.290	2.662
48.5	10750.	5851.	*	125.	255.	322.	23.	169.2	0.290	2.662
49.0	10869.	5916.	*	128.	261.	330.	23.	169.2	0.290	2.662
49.5	11396.	6217.	*	142.	287.	365.	21.	169.9	0.288	2.672
50.0	11199.	6096.	*	136.	277.	350.	22.	169.2	0.290	2.662
50.5	10650.	5783.	*	122.	250.	314.	24.	168.6	0.291	2.652
51.0	10512.	5722.	*	120.	244.	308.	24.	169.2	0.290	2.662
51.5	10809.	5898.	*	127.	258.	328.	23.	169.9	0.288	2.672
52.0	11010.	6007.	*	132.	268.	341.	22.	169.9	0.288	2.672
52.5	11482.	6280.	*	145.	291.	373.	21.	170.5	0.287	2.682
53.0	12214.	6711.	*	167.	330.	428.	19.	171.7	0.284	2.702
53.5	12890.	7099.	*	187.	368.	481.	17.	172.4	0.282	2.713
54.0	13944.	7697.	*	221.	431.	566.	15.	173.0	0.281	2.723
54.5	13903.	7675.	*	220.	428.	563.	15.	173.0	0.281	2.723
55.0	13913.	7698.	*	222.	429.	568.	15.	173.6	0.279	2.733
55.5	13923.	7721.	*	224.	430.	573.	15.	174.2	0.278	2.743
56.0	13246.	7329.	*	201.	389.	515.	16.	173.6	0.279	2.733
56.5	12872.	7090.	*	187.	367.	479.	17.	172.4	0.282	2.713
57.0	12368.	6812.	*	173.	339.	442.	18.	172.4	0.282	2.713
57.5	11087.	6532.	*	158.	313.	406.	20.	171.7	0.284	2.702
58.0	11389.	6243.	*	144.	287.	370.	21.	171.1	0.285	2.692
58.5	11039.	6035.	*	134.	269.	345.	22.	170.5	0.287	2.682
59.0	10992.	5997.	*	132.	267.	339.	23.	169.9	0.288	2.672
59.5	10473.	5714.	*	120.	242.	308.	25.	169.9	0.288	2.672
60.0	10417.	5656.	*	116.	240.	300.	25.	168.6	0.291	2.652
60.5	10361.	5612.	*	114.	237.	295.	25.	168.0	0.292	2.642
61.0	10708.	5772.	*	120.	253.	310.	24.	166.7	0.295	2.622
61.5	10985.	5906.	*	125.	266.	324.	23.	166.1	0.297	2.612

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 47.0 - 61.5
Figure 2.5-73

Figure 2.5-73 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 47.0 - 61.5

B I R D W E L L 3-D E L A S T I C P R O P E R T I E S T A B U L A T I O N

TENNESSEE VALLEY AUTHORITY

L-61+00 0.0 0.0 729.70 181.60 5 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
62.0	10948.	5886.	*	124.	264.	322.	23.	166.1	0.297	2.612
62.5	11780.	6349.	*	145.	306.	376.	20.	166.7	0.295	2.622
63.0	11910.	6419.	*	148.	313.	384.	20.	166.7	0.295	2.622
63.5	11578.	6271.	*	143.	296.	368.	21.	168.0	0.292	2.642
64.0	10930.	5920.	*	127.	264.	328.	23.	168.0	0.292	2.642
64.5	11402.	6191.	*	139.	287.	360.	21.	168.6	0.291	2.652
65.0	11225.	6095.	*	135.	278.	349.	22.	168.6	0.291	2.652
65.5	11130.	6058.	*	134.	274.	346.	22.	169.2	0.290	2.662
66.0	11303.	6167.	*	139.	282.	359.	21.	169.9	0.288	2.672
66.5	11633.	6347.	*	148.	299.	380.	20.	169.9	0.288	2.672
67.0	11801.	6454.	*	153.	308.	394.	20.	170.5	0.287	2.682
67.5	12259.	6705.	*	165.	332.	425.	19.	170.5	0.287	2.682
68.0	12145.	6627.	*	161.	326.	415.	19.	169.9	0.288	2.672
68.5	13036.	7112.	*	185.	375.	477.	17.	169.9	0.288	2.672
69.0	12958.	7053.	*	182.	371.	468.	17.	169.2	0.290	2.662
69.5	12503.	6789.	*	168.	345.	433.	18.	168.6	0.291	2.652
70.0	11996.	6514.	*	154.	318.	398.	19.	168.6	0.291	2.652
70.5	11612.	6290.	*	143.	297.	371.	20.	168.0	0.292	2.642
71.0	11029.	5974.	*	129.	268.	334.	22.	168.0	0.292	2.642
71.5	11041.	5966.	*	128.	269.	333.	22.	167.4	0.294	2.632
72.0	11098.	5982.	*	129.	271.	333.	22.	166.7	0.295	2.622
72.5	11091.	5963.	*	127.	271.	330.	22.	166.1	0.297	2.612
73.0	10985.	5891.	*	124.	266.	322.	23.	165.5	0.298	2.602
73.5	10992.	5895.	*	124.	266.	322.	23.	165.5	0.298	2.602
74.0	10609.	5646.	*	112.	247.	293.	24.	163.6	0.302	2.572
74.5	10204.	5387.	*	101.	228.	265.	26.	161.7	0.307	2.541
75.0	10175.	5314.	*	97.	226.	255.	26.	159.2	0.313	2.501
75.5	9717.	5116.	*	91.	207.	238.	28.	161.1	0.308	2.531
76.0	9916.	5291.	*	99.	216.	258.	27.	164.2	0.301	2.582
76.5	9966.	5385.	*	105.	219.	271.	27.	167.4	0.294	2.632

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 62.0 - 76.5
Figure 2.5-74

Figure 2.5-74 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 62.0 - 76.5

BIROWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

L-61+00 0.0 0.0 729.70 181.60 5 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
77.0	9843.	5305.	*	101.	214.	262.	27.	166.7	0.295	2.622
77.5	9661.	5207.	*	98.	206.	253.	28.	166.7	0.295	2.622
78.0	9512.	5165.	*	97.	200.	250.	29.	168.6	0.291	2.652
78.5	9338.	5131.	*	98.	193.	250.	30.	171.7	0.284	2.702
79.0	8831.	4886.	*	89.	173.	229.	33.	173.6	0.279	2.733
79.5	8681.	4714.	*	81.	166.	209.	34.	168.6	0.291	2.652
80.0	8785.	4782.	*	83.	170.	215.	33.	169.2	0.290	2.662
80.5	9797.	5358.	*	106.	212.	272.	28.	170.5	0.287	2.682
81.0	10295.	5630.	*	117.	234.	300.	25.	170.5	0.287	2.682
81.5	10642.	5722.	*	117.	249.	304.	24.	166.1	0.297	2.612
82.0	10857.	5716.	*	114.	258.	297.	23.	161.1	0.308	2.531
82.5	10875.	5787.	*	118.	260.	308.	23.	163.6	0.302	2.572
83.0	10744.	5747.	*	117.	254.	305.	24.	164.9	0.300	2.592
83.5	10737.	5802.	*	122.	254.	314.	24.	167.4	0.294	2.632
84.0	10494.	5766.	*	123.	244.	316.	24.	171.7	0.284	2.702
84.5	11085.	6091.	*	137.	272.	353.	22.	171.7	0.284	2.702
85.0	10803.	5922.	*	129.	258.	333.	23.	171.1	0.285	2.692
85.5	10761.	5913.	*	130.	256.	333.	23.	171.7	0.284	2.702
86.0	10918.	6013.	*	134.	264.	345.	23.	172.4	0.282	2.713
86.5	10949.	6002.	*	133.	265.	342.	23.	171.1	0.285	2.692
87.0	10575.	5700.	*	117.	246.	303.	24.	166.7	0.295	2.622
87.5	10226.	5512.	*	109.	230.	283.	26.	166.7	0.295	2.622
88.0	10109.	5449.	*	107.	225.	277.	26.	166.7	0.295	2.622
88.5	10104.	5446.	*	107.	225.	276.	26.	166.7	0.295	2.622
89.0	10173.	5456.	*	106.	228.	276.	26.	165.5	0.298	2.602
89.5	10168.	5453.	*	106.	228.	276.	26.	165.5	0.298	2.602
90.0	10173.	5456.	*	106.	228.	276.	26.	165.5	0.298	2.602
90.5	10178.	5472.	*	107.	228.	278.	26.	166.1	0.297	2.612
91.0	10726.	5767.	*	119.	253.	309.	24.	166.1	0.297	2.612
91.5	11455.	6159.	*	136.	289.	352.	21.	166.1	0.297	2.612

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 77.0 - 91.5
Figure 2.5-75

Figure 2.5-75 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 77.0 - 91.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
L-61+00 0.0 0.0 729.70 181.60 5 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
92.0	11702.	6291.	*	142.	302.	368.	20.	166.1	0.297	2.612
92.5	11836.	6363.	*	145.	309.	376.	20.	166.1	0.297	2.612
93.0	11959.	6429.	*	148.	315.	384.	19.	166.1	0.297	2.612
93.5	11455.	6159.	*	136.	289.	352.	21.	166.1	0.297	2.612
94.0	11951.	6425.	*	148.	315.	384.	19.	166.1	0.297	2.612
94.5	11709.	6279.	*	141.	302.	365.	20.	165.5	0.298	2.602
95.0	11375.	6100.	*	133.	285.	345.	21.	165.5	0.298	2.602
95.5	11475.	6170.	*	136.	290.	354.	21.	166.1	0.297	2.612
96.0	11687.	6268.	*	140.	301.	364.	20.	165.5	0.298	2.602
96.5	11680.	6264.	*	140.	300.	364.	20.	165.5	0.298	2.602
97.0	11758.	6305.	*	142.	304.	368.	20.	165.5	0.298	2.602
97.5	11605.	6239.	*	139.	297.	362.	21.	166.1	0.297	2.612
98.0	11523.	6210.	*	139.	293.	359.	21.	166.7	0.295	2.622
98.5	11944.	6421.	*	148.	314.	383.	20.	166.1	0.297	2.612
99.0	11523.	6226.	*	140.	293.	362.	21.	167.4	0.294	2.632
99.5	11322.	6133.	*	136.	283.	352.	21.	168.0	0.292	2.642
100.0	10912.	5925.	*	128.	263.	330.	23.	168.6	0.291	2.652
100.5	10756.	5840.	*	124.	255.	320.	23.	168.6	0.291	2.652
101.0	10115.	5492.	*	110.	226.	283.	26.	168.6	0.291	2.652
101.5	9895.	5373.	*	105.	216.	271.	27.	168.6	0.291	2.652
102.0	10254.	5554.	*	112.	232.	289.	26.	168.0	0.292	2.642
102.5	10797.	5834.	*	123.	257.	318.	23.	167.4	0.294	2.632
103.0	11186.	6029.	*	131.	276.	339.	22.	166.7	0.295	2.622
103.5	11098.	5981.	*	129.	271.	333.	22.	166.7	0.295	2.622
104.0	10942.	5898.	*	125.	264.	324.	23.	166.7	0.295	2.622
104.5	11054.	5958.	*	128.	269.	331.	22.	166.7	0.295	2.622
105.0	10351.	5593.	*	113.	236.	292.	25.	167.4	0.294	2.632
105.5	10100.	5457.	*	108.	225.	278.	26.	167.4	0.294	2.632
106.0	9925.	5376.	*	105.	217.	271.	27.	168.0	0.292	2.642
106.5	9895.	5359.	*	104.	216.	269.	27.	168.0	0.292	2.642

WATTS BAR NUCLEAR PLANT
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3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 92.0 - 106.5
Figure 2.5-76

Figure 2.5-76 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 92.0 - 106.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

L-61+00 0.0 0.0 729.70 181.60 5 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS	MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
107.0	10616.	5736. *	119.	248.	307.	24.	167.4	0.294	2.632
107.5	10815.	5844. *	123.	258.	319.	23.	167.4	0.294	2.632
108.0	10803.	5823. *	122.	257.	316.	23.	166.7	0.295	2.622
108.5	10587.	5706. *	117.	247.	303.	24.	166.7	0.295	2.622
109.0	10335.	5557. *	111.	235.	287.	25.	166.1	0.297	2.612
109.5	9951.	5350. *	103.	218.	266.	27.	166.1	0.297	2.612
110.0	9557.	5138. *	95.	201.	245.	29.	166.1	0.297	2.612
110.5	9391.	5049. *	91.	194.	237.	30.	166.1	0.297	2.612
111.0	9391.	5036. *	91.	194.	235.	30.	165.5	0.298	2.602
111.5	9432.	5058. *	91.	196.	237.	30.	165.5	0.298	2.602
112.0	9473.	5080. *	92.	198.	239.	29.	165.5	0.298	2.602
112.5	9642.	5171. *	95.	205.	248.	28.	165.5	0.298	2.602
113.0	9642.	5171. *	95.	205.	248.	28.	165.5	0.298	2.602
113.5	9685.	5194. *	96.	206.	250.	28.	165.5	0.298	2.602
114.0	9906.	5326. *	102.	216.	264.	27.	166.1	0.297	2.612
114.5	9906.	5339. *	103.	216.	266.	27.	166.7	0.295	2.622
115.0	9951.	5363. *	103.	218.	268.	27.	166.7	0.295	2.622
115.5	10090.	5438. *	106.	224.	276.	26.	166.7	0.295	2.622
116.0	10685.	5774. *	120.	252.	311.	24.	167.4	0.294	2.632
116.5	11238.	6072. *	133.	278.	344.	22.	167.4	0.294	2.632
117.0	11414.	6183. *	139.	287.	358.	21.	168.0	0.292	2.642
117.5	12460.	6749. *	165.	342.	427.	18.	168.0	0.292	2.642
118.0	12046.	6541. *	156.	320.	402.	19.	168.6	0.291	2.652
118.5	12826.	6964. *	176.	363.	455.	17.	168.6	0.291	2.652
119.0	12979.	7064. *	182.	372.	470.	17.	169.2	0.290	2.662
119.5	13057.	7107. *	184.	377.	476.	17.	169.2	0.290	2.662
120.0	13057.	7107. *	184.	377.	476.	17.	169.2	0.290	2.662
120.5	12751.	6940. *	176.	359.	454.	17.	169.2	0.290	2.662
121.0	12389.	6743. *	166.	339.	428.	18.	169.2	0.290	2.662
121.5	11914.	6469. *	152.	313.	393.	20.	168.6	0.291	2.652

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3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 107.0 - 121.5
Figure 2.5-77

Figure 2.5-77 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 107.0 - 121.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

L-61+00 0.0 0.0 729.70 181.60 5 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
122.0	11556.	6260.	*	142.	295.	367.	21.	168.0	0.292	2.642
122.5	11142.	6035.	*	132.	274.	341.	22.	168.0	0.292	2.642
123.0	10379.	5594.	*	113.	237.	292.	25.	166.7	0.295	2.622
123.5	9856.	5299.	*	101.	214.	261.	27.	166.1	0.297	2.612
124.0	10423.	5604.	*	113.	239.	292.	25.	166.1	0.297	2.612
124.5	10645.	5708.	*	116.	249.	302.	24.	165.5	0.298	2.602
125.0	10750.	5765.	*	119.	254.	308.	24.	165.5	0.298	2.602
125.5	10839.	5798.	*	120.	258.	311.	23.	164.9	0.300	2.592
126.0	10833.	5795.	*	119.	258.	310.	23.	164.9	0.300	2.592
126.5	10833.	5795.	*	119.	258.	310.	23.	164.9	0.300	2.592
127.0	10627.	5685.	*	115.	248.	299.	24.	164.9	0.300	2.592
127.5	10627.	5685.	*	115.	248.	299.	24.	164.9	0.300	2.592
128.0	10627.	5714.	*	117.	249.	303.	24.	166.1	0.297	2.612
128.5	10674.	5753.	*	119.	251.	308.	24.	166.7	0.295	2.622
129.0	10942.	5912.	*	126.	264.	327.	23.	167.4	0.294	2.632
129.5	11401.	6160.	*	137.	287.	355.	21.	167.4	0.294	2.632
130.0	11645.	6292.	*	143.	299.	370.	20.	167.4	0.294	2.632
130.5	11778.	6364.	*	146.	306.	378.	20.	167.4	0.294	2.632
131.0	11522.	6210.	*	139.	293.	359.	21.	166.7	0.295	2.622
131.5	11401.	6130.	*	135.	286.	349.	21.	166.1	0.297	2.612
132.0	11225.	6020.	*	129.	277.	336.	22.	165.5	0.298	2.602
132.5	10936.	5865.	*	123.	263.	319.	23.	165.5	0.298	2.602
133.0	10827.	5806.	*	120.	258.	312.	23.	165.5	0.298	2.602
133.5	10668.	5706.	*	116.	250.	301.	24.	164.9	0.300	2.592
134.0	10616.	5679.	*	115.	248.	298.	24.	164.9	0.300	2.592
134.5	10622.	5682.	*	115.	248.	298.	24.	164.9	0.300	2.592
135.0	10774.	5778.	*	119.	255.	309.	23.	165.5	0.298	2.602
135.5	10762.	5771.	*	119.	255.	309.	23.	165.5	0.298	2.602
136.0	10768.	5775.	*	119.	255.	309.	23.	165.5	0.298	2.602
136.5	10833.	5810.	*	120.	258.	313.	23.	165.5	0.298	2.602

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3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 122.0 - 136.5
Figure 2.5-78

Figure 2.5-78 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 122.0 - 136.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
L-61+00 0.0 0.0 729.70 181.60 5 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS	MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
137.0	10948.	5871. *	123.	264.	320.	23.	165.5	0.298	2.602
137.5	11225.	6035. *	130.	277.	338.	22.	166.1	0.297	2.612
138.0	11328.	6075. *	132.	282.	342.	21.	165.5	0.298	2.602
138.5	11335.	6079. *	132.	283.	342.	21.	165.5	0.298	2.602
139.0	11116.	5977. *	128.	272.	332.	22.	166.1	0.297	2.612
139.5	11116.	5977. *	128.	272.	332.	22.	166.1	0.297	2.612
140.0	11110.	5973. *	128.	272.	332.	22.	166.1	0.297	2.612
140.5	10882.	5865. *	124.	261.	321.	23.	166.7	0.295	2.622
141.0	10726.	5767. *	119.	253.	309.	24.	166.1	0.297	2.612
141.5	10780.	5810. *	121.	256.	315.	23.	166.7	0.295	2.622
142.0	10888.	5868. *	124.	261.	321.	23.	166.7	0.295	2.622
142.5	10888.	5868. *	124.	261.	321.	23.	166.7	0.295	2.622
143.0	10888.	5868. *	124.	261.	321.	23.	166.7	0.295	2.622
143.5	10570.	5683. *	116.	246.	300.	24.	166.1	0.297	2.612
144.0	10468.	5642. *	114.	241.	297.	25.	166.7	0.295	2.622
144.5	10674.	5739. *	118.	251.	306.	24.	166.1	0.297	2.612
145.0	10780.	5781. *	119.	256.	310.	23.	165.5	0.298	2.602
145.5	10774.	5778. *	119.	255.	309.	23.	165.5	0.298	2.602
146.0	11110.	5958. *	127.	272.	329.	22.	165.5	0.298	2.602
146.5	11110.	5943. *	126.	272.	326.	22.	164.9	0.300	2.592
147.0	10780.	5781. *	119.	256.	310.	23.	165.5	0.298	2.602
147.5	10519.	5641. *	114.	244.	295.	24.	165.5	0.298	2.602
148.0	10314.	5531. *	109.	234.	284.	25.	165.5	0.298	2.602
148.5	10780.	5795. *	120.	256.	312.	23.	166.1	0.297	2.612
149.0	10468.	5628. *	114.	241.	294.	25.	166.1	0.297	2.612
149.5	10319.	5548. *	110.	235.	286.	25.	166.1	0.297	2.612
150.0	10674.	5739. *	118.	251.	306.	24.	166.1	0.297	2.612
150.5	10468.	5628. *	114.	241.	294.	25.	166.1	0.297	2.612
151.0	10674.	5739. *	118.	251.	306.	24.	166.1	0.297	2.612
151.5	10780.	5795. *	120.	256.	312.	23.	166.1	0.297	2.612

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3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 137.0 - 151.5
Figure 2.5-79

Figure 2.5-79 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 137.0 - 151.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

L-61+00 0.0 0.0 729.70 181.60 5 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

				MODULI IN 10 TO 4TH LBS/SQ. INCH						
DEPTH	VP	VS		SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
152.0	10888.	5839.	*	122.	261.	316.	23.	165.5	0.298	2.602
152.5	11110.	5958.	*	127.	272.	329.	22.	165.5	0.298	2.602
153.0	10833.	5810.	*	120.	258.	313.	23.	165.5	0.298	2.602
153.5	10418.	5587.	*	111.	239.	289.	25.	165.5	0.298	2.602
154.0	10319.	5534.	*	109.	234.	284.	25.	165.5	0.298	2.602
154.5	10270.	5508.	*	108.	232.	281.	26.	165.5	0.298	2.602
155.0	10726.	5752.	*	118.	253.	307.	24.	165.5	0.298	2.602
155.5	10524.	5644.	*	114.	244.	295.	24.	165.5	0.298	2.602
156.0	10894.	5842.	*	122.	261.	316.	23.	165.5	0.298	2.602
156.5	11231.	6038.	*	131.	278.	339.	22.	166.1	0.297	2.612
157.0	11529.	6198.	*	138.	293.	357.	21.	166.1	0.297	2.612
157.5	11529.	6214.	*	139.	293.	360.	21.	166.7	0.295	2.622
158.0	11231.	6053.	*	132.	278.	341.	22.	166.7	0.295	2.622
158.5	11468.	6181.	*	137.	290.	356.	21.	166.7	0.295	2.622
159.0	11408.	6149.	*	136.	287.	352.	21.	166.7	0.295	2.622
159.5	10839.	5857.	*	124.	259.	320.	23.	167.4	0.294	2.632
160.0	11590.	6278.	*	143.	296.	369.	21.	168.0	0.292	2.642
160.5	12173.	6594.	*	158.	327.	407.	19.	168.0	0.292	2.642
161.0	12303.	6680.	*	162.	334.	419.	18.	168.6	0.291	2.652
161.5	12234.	6659.	*	162.	331.	417.	19.	169.2	0.290	2.662
162.0	11900.	6477.	*	153.	313.	395.	20.	169.2	0.290	2.662
162.5	11645.	6338.	*	147.	299.	378.	20.	169.2	0.290	2.662
163.0	11348.	6177.	*	139.	284.	359.	21.	169.2	0.290	2.662
163.5	11060.	6020.	*	132.	270.	341.	22.	169.2	0.290	2.662
164.0	10948.	5959.	*	130.	265.	334.	23.	169.2	0.290	2.662
164.5	11060.	6020.	*	132.	270.	341.	22.	169.2	0.290	2.662
165.0	11231.	6098.	*	135.	278.	349.	22.	168.6	0.291	2.652
165.5	11414.	6183.	*	139.	287.	358.	21.	168.0	0.292	2.642
166.0	11414.	6183.	*	139.	287.	358.	21.	168.0	0.292	2.642
166.5	11597.	6282.	*	143.	297.	370.	21.	168.0	0.292	2.642

WATTS BAR NUCLEAR PLANT
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3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 152.0 - 166.5
Figure 2.5-80

Figure 2.5-80 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 152.0 - 166.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
L-61+00 0.0 0.0 729.70 181.60 5 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS	MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
167.0	11414.	6168. *	137.	287.	355.	21.	167.4	0.294	2.632
167.5	11123.	6010. *	130.	273.	337.	22.	167.4	0.294	2.632
168.0	10633.	5745. *	119.	249.	308.	24.	167.4	0.294	2.632
168.5	10281.	5541. *	110.	233.	286.	25.	166.7	0.295	2.622
169.0	9951.	5363. *	103.	218.	268.	27.	166.7	0.295	2.622
169.5	10184.	5476. *	107.	228.	279.	26.	166.1	0.297	2.612
170.0	10429.	5607. *	113.	240.	292.	25.	166.1	0.297	2.612
170.5	10479.	5634. *	114.	242.	295.	25.	166.1	0.297	2.612
171.0	10429.	5593. *	112.	239.	290.	25.	165.5	0.298	2.602
171.5	10680.	5727. *	117.	251.	304.	24.	165.5	0.298	2.602
172.0	10474.	5617. *	113.	241.	292.	25.	165.5	0.298	2.602
172.5	10732.	5755. *	118.	254.	307.	24.	165.5	0.298	2.602
173.0	11116.	5977. *	128.	272.	332.	22.	166.1	0.297	2.612
173.5	11468.	6181. *	137.	290.	356.	21.	166.7	0.295	2.622
174.0	11842.	6383. *	147.	309.	380.	20.	166.7	0.295	2.622
174.5	12098.	6537. *	154.	323.	399.	19.	167.4	0.294	2.632
175.0	12303.	6664. *	161.	334.	416.	18.	168.0	0.292	2.642
175.5	12098.	6569. *	157.	323.	405.	19.	168.6	0.291	2.652
176.0	11515.	6252. *	142.	293.	367.	21.	168.6	0.291	2.652
176.5	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
177.0	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
177.5	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
178.0	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
178.5	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
179.0	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
179.5	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
180.0	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
180.5	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
181.0	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0
181.5	0.	0. *	0.	0.	0.	0.	0.0	0.0	0.0

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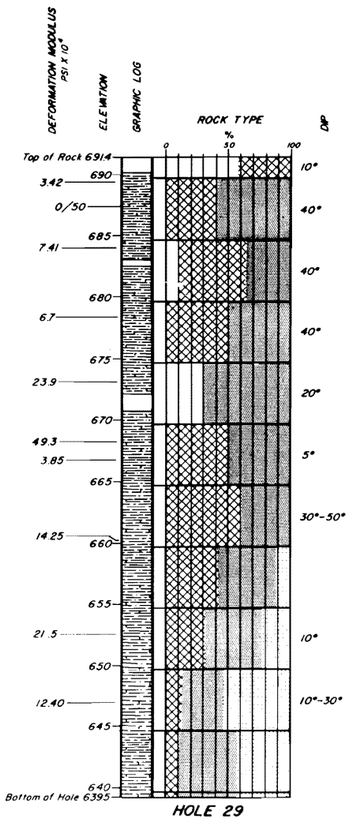
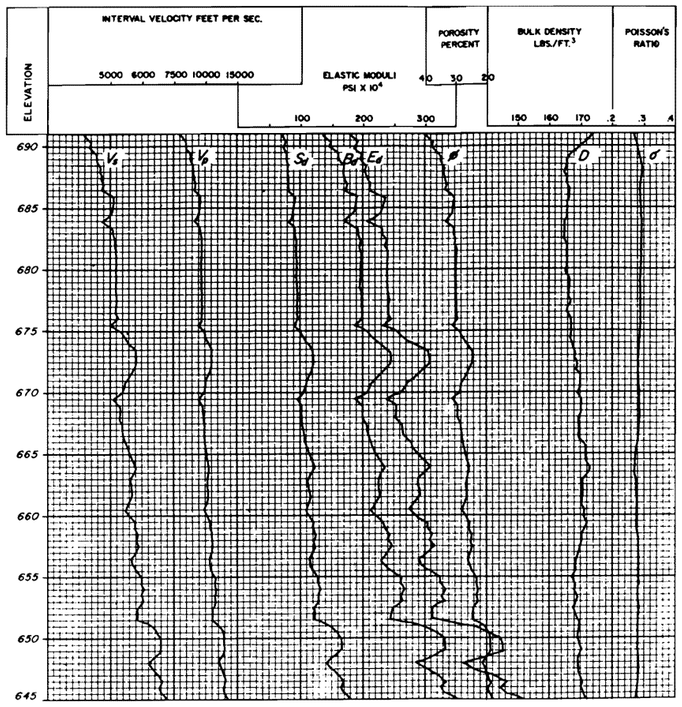
3-D ELASTIC PROPERTIES TABULATION
STA. L-61+00
DEPTH 167.0 - 176.0
Figure 2.5-81

Figure 2.5-81 3-D Elastic Properties Tabulation Sta. L-61+00 Depth 167.0 - 176.0



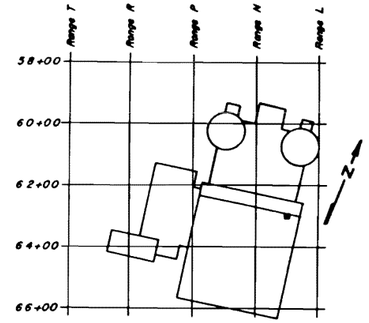


LEGEND:

V_s = Shear Velocity.
V_p = Compressional Velocity.
S_d = Dynamic Shear Modulus.
B_d = Dynamic Bulk Modulus.
E_d = Dynamic Young's Modulus.
ϕ = Porosity.
D = Density.
σ = Poisson's Ratio.

NOTES:

1. The hole was drilled with an NX wire line core drill.
2. The drill hole was inspected with a borehole television camera between elevations 691.4 and 646.7. The inspection showed the core loss areas to be soft shale.
3. The deformation modulus is defined as the in-situ secant modulus including both elastic and plastic deformation as determined from the results of the Menard pressuremeter tests.
4. The borehole survey for the dynamic elastic moduli was made by the Birdwell Division of Seismograph Service Corporation.



LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi.

Core Loss

General Rock Description

The foundation rock is composed of the Conasauga Formation. This formation consists of contorted gray-green shales interbedded with lenses of limestones.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus (psi x 10^4)

Type 0 - Core loss

Type 1 - Soft shale 1 to 10

Type 2 - Hard shale 5 to 60

Type 3 - Limestone 100+

These types were identified from visual inspection of the core. Generally, determinations were made for each five foot length of core in the box.

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GRAPHIC LOG AND
ELASTIC MODULI
STA. M-63+00

Figure 2.5-82

Figure 2.5-82 Graphic Log and Elastic Moduli Sta. M-63+00

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

M-63400 0.0 0.0 734.70 95.20 I 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
44.0	7813.	4333.	*	71.	135.	180.	40.	174.2	0.278	2.743
44.5	8160.	4484.	*	74.	147.	191.	37.	171.7	0.284	2.702
45.0	8099.	4419.	*	72.	145.	184.	38.	169.9	0.288	2.672
45.5	8492.	4589.	*	76.	159.	197.	35.	167.4	0.294	2.632
46.0	8527.	4585.	*	75.	160.	195.	35.	166.1	0.297	2.612
46.5	8703.	4679.	*	78.	167.	203.	34.	166.1	0.297	2.612
47.0	8696.	4664.	*	78.	166.	202.	34.	165.5	0.298	2.602
47.5	8770.	4715.	*	80.	169.	207.	33.	166.1	0.297	2.612
48.0	8845.	4755.	*	81.	172.	210.	33.	166.1	0.297	2.612
48.5	8766.	4725.	*	80.	169.	208.	33.	166.7	0.295	2.622
49.0	9319.	5023.	*	91.	191.	235.	30.	166.7	0.295	2.622
49.5	9314.	5008.	*	90.	191.	233.	30.	166.1	0.297	2.612
50.0	9273.	4985.	*	89.	189.	231.	30.	166.1	0.297	2.612
50.5	9150.	4919.	*	87.	184.	225.	31.	166.1	0.297	2.612
51.0	8763.	4699.	*	79.	169.	205.	33.	165.5	0.298	2.602
51.5	9277.	4975.	*	88.	189.	229.	30.	165.5	0.298	2.602
52.0	9314.	4995.	*	89.	191.	231.	30.	165.5	0.298	2.602
52.5	9442.	5063.	*	92.	196.	238.	29.	165.5	0.298	2.602
53.0	9356.	5030.	*	91.	193.	235.	30.	166.1	0.297	2.612
53.5	9442.	5076.	*	92.	196.	239.	29.	166.1	0.297	2.612
54.0	9450.	5081.	*	93.	197.	240.	29.	166.1	0.297	2.612
54.5	9408.	5058.	*	92.	195.	238.	30.	166.1	0.297	2.612
55.0	9403.	5055.	*	92.	195.	238.	30.	166.1	0.297	2.612
55.5	9399.	5066.	*	92.	195.	239.	30.	166.7	0.295	2.622
56.0	9395.	5064.	*	92.	194.	239.	30.	166.7	0.295	2.622
56.5	9399.	5066.	*	92.	195.	239.	30.	166.7	0.295	2.622
57.0	9446.	5091.	*	93.	197.	242.	29.	166.7	0.295	2.622
57.5	9446.	5104.	*	94.	197.	243.	29.	167.4	0.294	2.632
58.0	9437.	5087.	*	93.	196.	241.	29.	166.7	0.295	2.622
58.5	9446.	5091.	*	93.	197.	242.	29.	166.7	0.295	2.622

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. M-63+00
DEPTH 44.0 - 58.5
Figure 2.5-83

Figure 2.5-83 3-D Elastic Properties Tabulation Sta. M-63+00 Depth 44.0 - 58.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

M-63+00 0.0 0.0 734.70 95.20 1 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

				MODULI IN 10 TO 4TH LBS/SQ. INCH						
DEPTH	VP	VS		SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
59.0	9494.	5130.	*	95.	199.	246.	29.	167.4	0.294	2.632
59.5	9150.	4944.	*	88.	185.	228.	31.	167.4	0.294	2.632
60.0	9702.	5242.	*	99.	208.	257.	28.	167.4	0.294	2.632
60.5	9887.	5342.	*	103.	216.	267.	27.	167.4	0.294	2.632
61.0	10143.	5494.	*	109.	227.	283.	26.	168.0	0.292	2.642
61.5	10508.	5706.	*	118.	244.	306.	24.	168.6	0.291	2.652
62.0	10550.	5728.	*	119.	246.	308.	24.	168.6	0.291	2.652
62.5	10539.	5736.	*	120.	245.	310.	24.	169.2	0.290	2.662
63.0	10381.	5650.	*	117.	238.	301.	25.	169.2	0.290	2.662
63.5	10089.	5518.	*	112.	229.	288.	26.	170.5	0.287	2.682
64.0	9850.	5387.	*	107.	214.	275.	27.	170.5	0.287	2.682
64.5	9752.	5334.	*	105.	210.	269.	28.	170.5	0.287	2.682
65.0	9666.	5274.	*	102.	206.	263.	28.	169.9	0.288	2.672
65.5	9162.	5011.	*	92.	186.	238.	31.	170.5	0.287	2.682
66.0	9494.	5192.	*	99.	199.	255.	29.	170.5	0.287	2.682
66.5	9480.	5185.	*	99.	199.	254.	29.	170.5	0.287	2.682
67.0	9480.	5173.	*	98.	199.	253.	29.	169.9	0.288	2.672
67.5	9635.	5257.	*	101.	205.	261.	28.	169.9	0.288	2.672
68.0	9649.	5265.	*	102.	206.	262.	28.	169.9	0.288	2.672
68.5	9703.	5294.	*	103.	208.	265.	28.	169.9	0.288	2.672
69.0	9822.	5397.	*	108.	214.	277.	27.	171.7	0.284	2.702
69.5	9892.	5435.	*	109.	217.	281.	27.	171.7	0.284	2.702
70.0	10007.	5511.	*	113.	222.	290.	27.	172.4	0.282	2.713
70.5	10159.	5608.	*	117.	229.	301.	26.	173.0	0.281	2.723
71.0	10326.	5713.	*	122.	236.	313.	25.	173.6	0.279	2.733
71.5	10159.	5608.	*	117.	229.	301.	26.	173.0	0.281	2.723
72.0	10079.	5525.	*	113.	225.	290.	26.	171.1	0.285	2.692
72.5	10084.	5528.	*	113.	225.	290.	26.	171.1	0.285	2.692
73.0	10138.	5558.	*	114.	227.	293.	26.	171.1	0.285	2.692
73.5	10128.	5552.	*	114.	227.	292.	26.	171.1	0.285	2.692

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. M-63+00
DEPTH 59.0 - 73.5
Figure 2.5-84

Figure 2.5-84 3-D Elastic Properties Tabulation Sta. M-63+00 Depth 59.0 - 73.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

M-63+00 0.0 0.0 734.70 95.20 1 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
74.0	9977.	5469.	*	110.	220.	284.	27.	171.1	0.285	2.692
74.5	9789.	5379.	*	107.	212.	275.	28.	171.7	0.284	2.702
75.0	9982.	5485.	*	111.	221.	286.	27.	171.7	0.284	2.702
75.5	10278.	5661.	*	119.	234.	306.	25.	172.4	0.282	2.713
76.0	10329.	5676.	*	119.	236.	306.	25.	171.7	0.284	2.702
76.5	10491.	5751.	*	122.	243.	314.	24.	171.1	0.285	2.692
77.0	10433.	5719.	*	121.	241.	310.	25.	171.1	0.285	2.692
77.5	10575.	5784.	*	123.	247.	317.	24.	170.5	0.287	2.682
78.0	10416.	5683.	*	118.	240.	305.	25.	169.9	0.288	2.672
78.5	10212.	5558.	*	113.	230.	291.	26.	169.2	0.290	2.662
79.0	10273.	5592.	*	114.	233.	294.	25.	169.2	0.290	2.662
79.5	10474.	5701.	*	119.	242.	306.	25.	169.2	0.290	2.662
80.0	10896.	5902.	*	126.	262.	326.	23.	168.0	0.292	2.642
80.5	10890.	5913.	*	127.	262.	328.	23.	168.6	0.291	2.652
81.0	11005.	5975.	*	130.	267.	335.	23.	168.6	0.291	2.652
81.5	10896.	5931.	*	128.	262.	331.	23.	169.2	0.290	2.662
82.0	10959.	5965.	*	130.	265.	335.	23.	169.2	0.290	2.662
82.5	10624.	5768.	*	121.	249.	312.	24.	168.6	0.291	2.652
83.0	10570.	5753.	*	121.	247.	312.	24.	169.2	0.290	2.662
83.5	10516.	5738.	*	121.	244.	311.	24.	169.9	0.288	2.672
84.0	11625.	6343.	*	147.	299.	380.	20.	169.9	0.288	2.672
84.5	12027.	6562.	*	158.	320.	406.	19.	169.9	0.288	2.672
85.0	12311.	6717.	*	165.	335.	426.	18.	169.9	0.288	2.672
85.5	12319.	6737.	*	167.	336.	430.	18.	170.5	0.287	2.682
86.0	12319.	6737.	*	167.	336.	430.	18.	170.5	0.287	2.682
86.5	11958.	6525.	*	156.	316.	402.	19.	169.9	0.288	2.672
87.0	11365.	6201.	*	141.	285.	363.	21.	169.9	0.288	2.672
87.5	11625.	6343.	*	147.	299.	380.	20.	169.9	0.288	2.672
88.0	12097.	6616.	*	161.	324.	414.	19.	170.5	0.287	2.682
88.5	12376.	6785.	*	170.	339.	437.	18.	171.1	0.285	2.692

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. M-63+00
DEPTH 74.0 - 88.5
Figure 2.5-85

Figure 2.5-85 3-D Elastic Properties Tabulation Sta. M-63+00 Depth 74.0 - 88.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

M-63+00 0.0 0.0 734.70 95.20 1 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

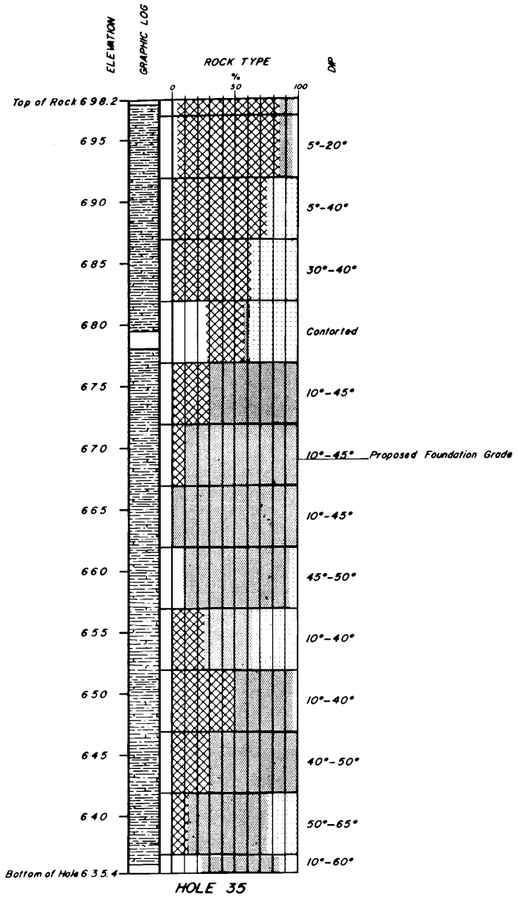
MODULI IN 10 TO 4TH LBS/SQ. INCH

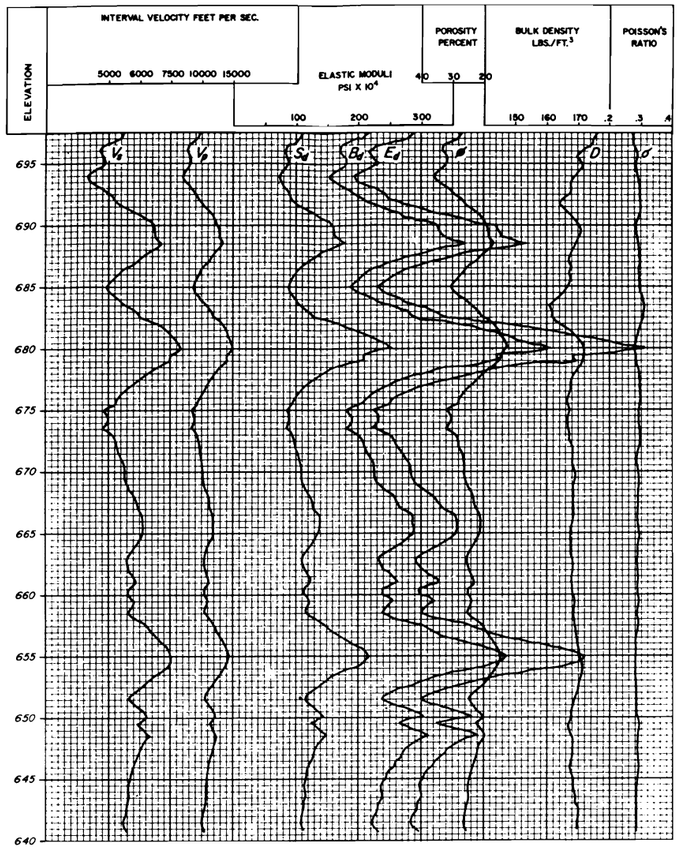
DEPTH	VP	VS		SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
89.0	12160.	6666.	*	164.	327.	422.	19.	171.1	0.285	2.692
89.5	12303.	6760.	*	169.	335.	435.	18.	171.7	0.284	2.702
90.0	12763.	7029.	*	184.	361.	471.	17.	172.4	0.282	2.713
90.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
91.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
91.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
92.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
92.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
93.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
93.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. M-63+00
DEPTH 89.0 - 90.0
Figure 2.5-86

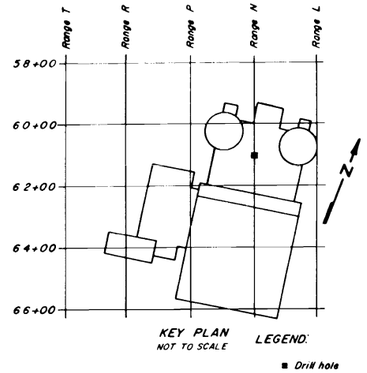
Figure 2.5-86 3-D Elastic Properties Tabulation Sta. M-63+00 Depth 89.0 - 90.0





LEGEND:

Vs = Shear Velocity.
Vp = Compressional Velocity.
Sd = Dynamic Shear Modulus.
Bd = Dynamic Bulk Modulus.
Ed = Dynamic Young's Modulus.
ø = Porosity.
D = Density.
σ = Poisson's Ratio.



NOTES:

1. The hole was drilled with an NX wire line core drill.
2. The drill hole was inspected with a borehole television camera between elevations 698.0 and 647.5. The inspection showed the core loss areas to be soft shale.
3. The deformation modulus is defined as the in-situ secant modulus including both elastic and plastic deformation as determined from the results of the Menard pressuremeter tests.
4. The borehole survey for the dynamic elastic moduli was made by the Birdwell Division of Seismograph Service Corporation.

LEGEND

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi

Core Loss

General Rock Description

The foundation rock is composed of the Conasauga Formation. This formation consists of contorted gray-green shales interbedded with lenses of limestones.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus (psi x 10^4)

Type 0 - Core loss

Type 1 - Soft shale 1 to 10

Type 2 - Hard shale 5 to 60

Type 3 - Limestone 100+

These types were identified from visual inspection of the core. Generally, determinations were made for each five foot length of core in the box.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG AND ELASTIC MODULI STA. N-61+00 Figure 2.5-87

Figure 2.5-87 Graphic Log and Elastic Moduli Sta. N-61+00

B I R D W E L L 3-D E L A S T I C P R O P E R T I E S T A B U L A T I O N

TENNESSEE VALLEY AUTHORITY

N-61+10 0.0 0.0 732.50 97.10 2 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

				MODULI IN 10 TO 4TH LBS/SQ. INCH						
DEPTH	VP	VS		SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
35.0	9789.	5465.	*	113.	213.	289.	27.	176.1	0.274	2.773
35.5	9595.	5333.	*	107.	204.	274.	28.	174.9	0.277	2.753
36.0	8766.	4861.	*	89.	170.	227.	33.	174.2	0.278	2.743
36.5	8675.	4755.	*	83.	166.	215.	34.	171.1	0.285	2.692
37.0	8929.	4860.	*	86.	176.	222.	32.	169.2	0.290	2.662
37.5	8975.	4932.	*	90.	178.	231.	32.	171.7	0.284	2.702
38.0	8584.	4695.	*	81.	163.	209.	34.	170.5	0.287	2.682
38.5	8226.	4477.	*	73.	149.	189.	37.	169.2	0.290	2.662
39.0	8462.	4572.	*	75.	158.	195.	35.	167.4	0.294	2.632
39.5	8968.	4845.	*	85.	177.	219.	32.	167.4	0.294	2.632
40.0	9383.	5070.	*	93.	194.	240.	30.	167.4	0.294	2.632
40.5	9697.	5174.	*	95.	207.	247.	28.	164.2	0.301	2.582
41.0	10246.	5481.	*	107.	231.	278.	26.	164.9	0.300	2.592
41.5	10851.	5849.	*	123.	259.	319.	23.	166.7	0.295	2.622
42.0	11712.	6375.	*	148.	303.	383.	20.	169.2	0.290	2.662
42.5	12183.	6663.	*	163.	328.	420.	19.	170.5	0.287	2.682
43.0	12183.	6679.	*	165.	328.	423.	19.	171.1	0.285	2.692
43.5	12247.	6698.	*	165.	332.	425.	19.	170.5	0.287	2.682
44.0	12956.	7052.	*	182.	371.	468.	17.	169.2	0.290	2.662
44.5	12018.	6526.	*	155.	319.	400.	19.	168.6	0.291	2.652
45.0	11328.	6121.	*	135.	283.	350.	21.	167.4	0.294	2.632
45.5	10846.	5846.	*	123.	259.	318.	23.	166.7	0.295	2.622
46.0	10032.	5434.	*	107.	222.	277.	27.	168.0	0.292	2.642
46.5	9708.	5233.	*	98.	208.	255.	28.	166.7	0.295	2.622
47.0	9383.	5070.	*	93.	194.	240.	30.	167.4	0.294	2.632
47.5	9142.	4927.	*	87.	184.	226.	31.	166.7	0.295	2.622
48.0	9490.	5076.	*	92.	198.	238.	29.	164.9	0.300	2.592
48.5	10017.	5317.	*	99.	220.	259.	27.	163.0	0.304	2.562
49.0	10530.	5529.	*	106.	243.	277.	25.	160.5	0.310	2.521
49.5	11232.	5930.	*	123.	277.	321.	22.	161.7	0.307	2.541

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. N-61+00
DEPTH 35.0 - 49.5
Figure 2.5-88

Figure 2.5-88 3-D Elastic Properties Tabulation Sta. N-61+00 Depth 35.0 - 49.5

BIROWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

N-6140 0.0 0.0 732.50 97.10 2 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS	MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
50.0	11517.	6080. *	129.	291.	337.	21.	161.7	0.307	2.541
50.5	12912.	6889. *	168.	366.	437.	17.	164.2	0.301	2.582
51.0	13505.	7297. *	192.	402.	497.	16.	167.4	0.294	2.632
51.5	14134.	7712. *	218.	441.	561.	14.	169.9	0.288	2.672
52.0	14526.	7982. *	236.	467.	606.	14.	171.7	0.284	2.702
52.5	15145.	8341. *	259.	508.	663.	13.	172.4	0.282	2.713
53.0	13772.	7567. *	212.	420.	545.	15.	171.7	0.284	2.702
53.5	13874.	7605. *	214.	426.	549.	15.	171.1	0.285	2.692
54.0	12450.	6793. *	169.	343.	436.	18.	169.9	0.288	2.672
54.5	11815.	6416. *	150.	308.	387.	20.	168.6	0.291	2.652
55.0	11135.	6031. *	132.	274.	341.	22.	168.0	0.292	2.642
55.5	10516.	5682. *	117.	244.	302.	24.	167.4	0.294	2.632
56.0	10097.	5456. *	107.	225.	278.	26.	167.4	0.294	2.632
56.5	9710.	5234. *	99.	208.	255.	28.	166.7	0.295	2.622
57.0	9580.	5164. *	96.	202.	248.	29.	166.7	0.295	2.622
57.5	9007.	4867. *	86.	179.	221.	32.	167.4	0.294	2.632
58.0	9248.	4984. *	89.	188.	231.	30.	166.7	0.295	2.622
58.5	9239.	4980. *	89.	188.	231.	31.	166.7	0.295	2.622
59.0	8999.	4850. *	85.	178.	219.	32.	166.7	0.295	2.622
59.5	9493.	5129. *	95.	199.	246.	29.	167.4	0.294	2.632
60.0	9670.	5225. *	99.	206.	255.	28.	167.4	0.294	2.632
60.5	9715.	5262. *	100.	208.	259.	28.	168.0	0.292	2.642
61.0	9806.	5325. *	103.	212.	266.	28.	168.6	0.291	2.652
61.5	9995.	5427. *	107.	221.	277.	27.	168.6	0.291	2.652
62.0	10087.	5477. *	109.	225.	282.	26.	168.6	0.291	2.652
62.5	10087.	5490. *	110.	225.	284.	26.	169.2	0.290	2.662
63.0	10087.	5490. *	110.	225.	284.	26.	169.2	0.290	2.662
63.5	10236.	5558. *	112.	231.	290.	26.	168.6	0.291	2.652
64.0	10441.	5669. *	117.	241.	302.	25.	168.6	0.291	2.652
64.5	10759.	5842. *	124.	256.	321.	23.	168.6	0.291	2.652

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. N-61+00
DEPTH 50.0 - 64.5
Figure 2.5-89

Figure 2.5-89 3-D Elastic Properties Tabulation Sta. N-61+00 Depth 50.0 - 64.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

N-61+00 0.0 0.0 732.50 97.10 2 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
65.0	10877.	5906.	*	127.	261.	328.	23.	168.6	0.291	2.652
65.5	10992.	5969.	*	130.	267.	335.	23.	168.6	0.291	2.652
66.0	11351.	6164.	*	138.	284.	357.	21.	168.6	0.291	2.652
66.5	11351.	6164.	*	138.	284.	357.	21.	168.6	0.291	2.652
67.0	11414.	6182.	*	138.	287.	358.	21.	168.0	0.292	2.642
67.5	11414.	6182.	*	138.	287.	358.	21.	168.0	0.292	2.642
68.0	11175.	6053.	*	133.	276.	343.	22.	168.0	0.292	2.642
68.5	10884.	5895.	*	126.	261.	326.	23.	168.0	0.292	2.642
69.0	10553.	5716.	*	118.	246.	306.	24.	168.0	0.292	2.642
69.5	10241.	5561.	*	112.	232.	290.	26.	168.6	0.291	2.652
70.0	10292.	5588.	*	114.	234.	293.	25.	168.6	0.291	2.652
70.5	10395.	5644.	*	116.	238.	299.	25.	168.6	0.291	2.652
71.0	10716.	5818.	*	123.	253.	318.	24.	168.6	0.291	2.652
71.5	10941.	5941.	*	128.	264.	331.	23.	168.6	0.291	2.652
72.0	10343.	5616.	*	115.	236.	296.	25.	168.6	0.291	2.652
72.5	10343.	5616.	*	115.	236.	296.	25.	168.6	0.291	2.652
73.0	10765.	5859.	*	125.	256.	323.	23.	169.2	0.290	2.662
73.5	10494.	5712.	*	119.	243.	307.	24.	169.2	0.290	2.662
74.0	10337.	5627.	*	116.	236.	298.	25.	169.2	0.290	2.662
74.5	10765.	5859.	*	125.	256.	323.	23.	169.2	0.290	2.662
75.0	11669.	6351.	*	147.	301.	380.	20.	169.2	0.290	2.662
75.5	12005.	6534.	*	156.	318.	402.	19.	169.2	0.290	2.662
76.0	12425.	6779.	*	168.	341.	434.	18.	169.9	0.288	2.672
76.5	13119.	7158.	*	188.	380.	484.	16.	169.9	0.288	2.672
77.0	13722.	7504.	*	207.	416.	533.	15.	170.5	0.287	2.682
77.5	14102.	7712.	*	219.	440.	563.	14.	170.5	0.287	2.682
78.0	13966.	7656.	*	216.	431.	556.	15.	171.1	0.285	2.692
78.5	13428.	7378.	*	202.	399.	518.	16.	171.7	0.284	2.702
79.0	12376.	6785.	*	170.	339.	437.	18.	171.1	0.285	2.692
79.5	11867.	6490.	*	155.	311.	399.	20.	170.5	0.287	2.682

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. N-61+00
DEPTH 65.0 - 79.5
Figure 2.5-90

Figure 2.5-90 3-D Elastic Properties Tabulation Sta. N-61+00 Depth 65.0 - 79.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

N-61+00 0.0 0.0 732.50 97.10 2 1 1

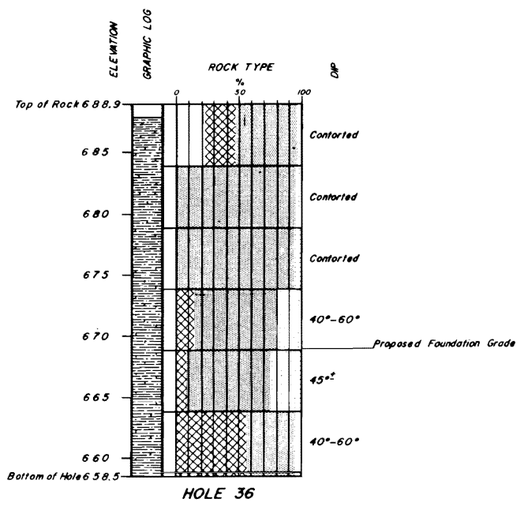
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
80.0	11301.	6181.	*	140.	282.	362.	21.	170.5	0.287	2.682
80.5	10658.	5815.	*	124.	251.	319.	24.	169.9	0.288	2.672
81.0	10340.	5628.	*	116.	236.	298.	25.	169.2	0.290	2.662
81.5	10745.	5834.	*	124.	255.	320.	24.	168.6	0.291	2.652
82.0	11418.	6185.	*	139.	288.	358.	21.	168.0	0.292	2.642
82.5	11814.	6399.	*	148.	308.	384.	20.	168.0	0.292	2.642
83.0	10920.	5900.	*	126.	263.	325.	23.	167.4	0.294	2.632
83.5	11461.	6193.	*	138.	290.	358.	21.	167.4	0.294	2.632
84.0	11966.	6481.	*	152.	316.	393.	19.	168.0	0.292	2.642
84.5	11483.	6235.	*	141.	291.	365.	21.	168.6	0.291	2.652
85.0	11182.	6072.	*	134.	276.	346.	22.	168.6	0.291	2.652
85.5	11063.	6007.	*	131.	270.	339.	22.	168.6	0.291	2.652
86.0	10890.	5898.	*	126.	262.	326.	23.	168.0	0.292	2.642
86.5	10777.	5837.	*	123.	256.	319.	23.	168.0	0.292	2.642
87.0	10564.	5722.	*	119.	246.	307.	24.	168.0	0.292	2.642
87.5	10505.	5704.	*	118.	244.	306.	24.	168.6	0.291	2.652
88.0	10348.	5619.	*	115.	236.	296.	25.	168.6	0.291	2.652
88.5	10343.	5630.	*	116.	236.	298.	25.	169.2	0.290	2.662
89.0	10395.	5658.	*	117.	239.	301.	25.	169.2	0.290	2.662
89.5	10262.	5586.	*	114.	233.	294.	25.	169.2	0.290	2.662
90.0	10217.	5588.	*	115.	231.	295.	26.	170.5	0.287	2.682
90.5	10092.	5519.	*	112.	225.	288.	26.	170.5	0.287	2.682
91.0	10038.	5477.	*	110.	223.	283.	26.	169.9	0.288	2.672
91.5	10082.	5501.	*	111.	225.	286.	26.	169.9	0.288	2.672
92.0	10302.	5634.	*	117.	235.	300.	25.	170.5	0.287	2.682
92.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
93.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
93.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
94.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
94.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0

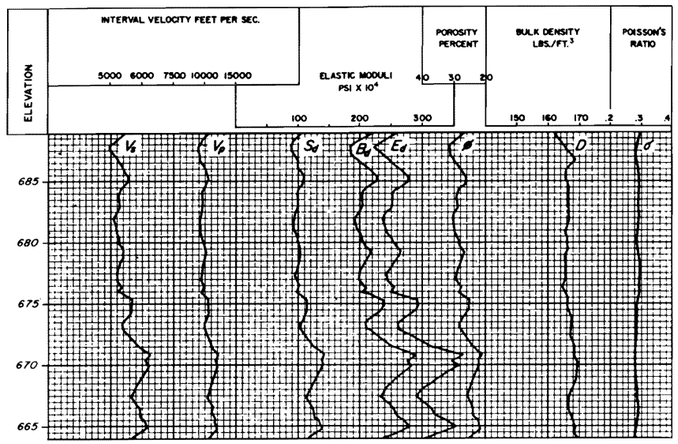
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. N-61+00
DEPTH 80.0 - 92.0
Figure 2.5-91

Figure 2.5-91 3-D Elastic Properties Tabulation Sta. N-61+00 Depth 80.0 - 92.0

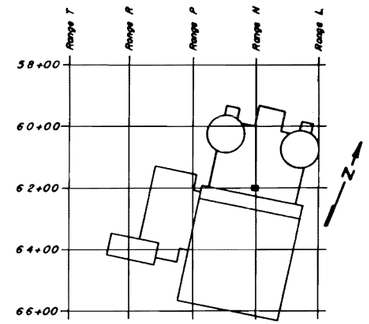


HOLE 36



LEGEND:

Vs = Shear Velocity.
Vp = Compressional Velocity.
Sd = Dynamic Shear Modulus.
Bd = Dynamic Bulk Modulus.
Ed = Dynamic Young's Modulus.
ϕ = Porosity.
D = Density.
σ = Poisson's Ratio.



KEY PLAN
NOT TO SCALE

LEGEND:

■ Drill hole

NOTES:

1. The hole was drilled with an NX wire line core drill.
2. The drill hole was inspected with a borehole television camera between elevations 688.9 and 663.9. The inspection showed the core loss areas to be soft shale.
3. The deformation modulus is defined as the in-situ secant modulus including both elastic and plastic deformation as determined from the results of the Menard pressuremeter tests.
4. The borehole survey for the dynamic elastic moduli was made by the Birdwell Division of Seismograph Service Corporation.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi

Core Loss

General Rock Description

The foundation rock is composed of the Conasauga Formation. This formation consists of contorted gray-green shales interbedded with lenses of limestones.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus (psi x 10^4)

- Type 0 - Core loss
- Type 1 - Soft shale 1 to 10
- Type 2 - Hard shale 5 to 60
- Type 3 - Limestone 100+

These types were identified from visual inspection of the core. Generally, determinations were made for each five foot length of core in the box.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG AND ELASTIC MODULI STA. N-62+00 Figure 2.5-92

Figure 2.5-92 Graphic Log and Elastic Modula Sta. N-62+00

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

N-62+00 0.0 0.0 733.90 75.40 1 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
45.0	10118.	5370.	*	101.	225.	264.	26.	163.0	0.304	2.562
45.5	9536.	5088.	*	92.	200.	239.	29.	164.2	0.301	2.582
46.0	9146.	4905.	*	86.	184.	223.	31.	165.5	0.298	2.602
46.5	9115.	4925.	*	88.	183.	227.	31.	167.4	0.294	2.632
47.0	9303.	5076.	*	94.	191.	243.	30.	169.9	0.288	2.672
47.5	9517.	5168.	*	97.	200.	251.	29.	168.6	0.291	2.652
48.0	9885.	5315.	*	101.	215.	262.	27.	166.1	0.297	2.612
48.5	10190.	5478.	*	108.	229.	279.	26.	166.1	0.297	2.612
49.0	10135.	5463.	*	107.	226.	278.	26.	166.7	0.295	2.622
49.5	9715.	5249.	*	99.	208.	257.	28.	167.4	0.294	2.632
50.0	9539.	5154.	*	96.	201.	248.	29.	167.4	0.294	2.632
50.5	9587.	5180.	*	97.	203.	251.	29.	167.4	0.294	2.632
51.0	9591.	5183.	*	97.	203.	251.	29.	167.4	0.294	2.632
51.5	9415.	5087.	*	93.	195.	242.	30.	167.4	0.294	2.632
52.0	9319.	5035.	*	92.	191.	237.	30.	167.4	0.294	2.632
52.5	9389.	5061.	*	92.	194.	239.	30.	166.7	0.295	2.622
53.0	9483.	5098.	*	93.	198.	242.	29.	166.1	0.297	2.612
53.5	9596.	5172.	*	96.	203.	249.	29.	166.7	0.295	2.622
54.0	9689.	5222.	*	98.	207.	254.	28.	166.7	0.295	2.622
54.5	9939.	5357.	*	103.	218.	267.	27.	166.7	0.295	2.622
55.0	9925.	5336.	*	102.	217.	265.	27.	166.1	0.297	2.612
55.5	9741.	5237.	*	98.	209.	255.	28.	166.1	0.297	2.612
56.0	9622.	5173.	*	96.	204.	249.	29.	166.1	0.297	2.612
56.5	9500.	5108.	*	93.	199.	242.	29.	166.1	0.297	2.612
57.0	9530.	5124.	*	94.	200.	244.	29.	166.1	0.297	2.612
57.5	9801.	5256.	*	99.	211.	256.	28.	165.5	0.298	2.602
58.0	9626.	5175.	*	96.	204.	249.	28.	166.1	0.297	2.612
58.5	10374.	5591.	*	112.	237.	291.	25.	166.7	0.295	2.622
59.0	10425.	5619.	*	114.	240.	294.	25.	166.7	0.295	2.622
59.5	10289.	5559.	*	112.	233.	289.	25.	167.4	0.294	2.632

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. N-62+00
DEPTH 45.0 - 59.5
Figure 2.5-93

Figure 2.5-93 3-D Elastic Properties Tabulation Sta. N-62+00 Depth 45.0 - 59.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

N-62+00 0.0 0.0 733.90 75.40 1 1 1

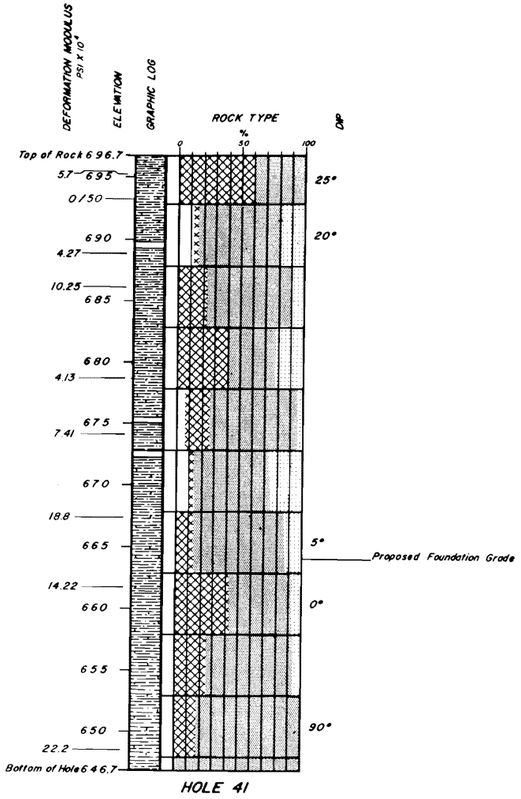
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

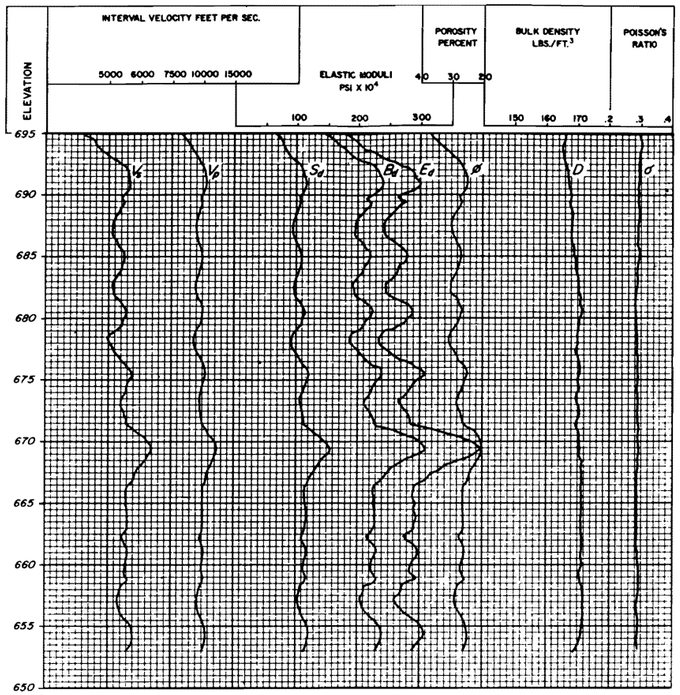
				MODULI IN 10 TO 4TH LBS/SQ. INCH						
DEPTH	VP	VS		SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
60.0	10011.	5423.	*	107.	221.	275.	27.	168.0	0.292	2.642
60.5	9724.	5267.	*	101.	209.	260.	28.	168.0	0.292	2.642
61.0	9760.	5287.	*	101.	210.	262.	28.	168.0	0.292	2.642
61.5	10130.	5487.	*	109.	226.	282.	26.	168.0	0.292	2.642
62.0	10442.	5670.	*	117.	241.	302.	25.	168.6	0.291	2.652
62.5	10713.	5831.	*	124.	253.	320.	24.	169.2	0.290	2.662
63.0	11449.	6231.	*	142.	289.	366.	21.	169.2	0.290	2.662
63.5	11153.	6085.	*	136.	275.	350.	22.	169.9	0.288	2.672
64.0	11332.	6183.	*	140.	284.	361.	21.	169.9	0.288	2.672
64.5	11018.	6011.	*	132.	268.	341.	22.	169.9	0.288	2.672
65.0	10848.	5905.	*	127.	260.	328.	23.	169.2	0.290	2.662
65.5	10576.	5743.	*	120.	247.	310.	24.	168.6	0.291	2.652
66.0	10380.	5622.	*	115.	238.	296.	25.	168.0	0.292	2.642
66.5	10278.	5554.	*	111.	233.	288.	25.	167.4	0.294	2.632
67.0	10477.	5661.	*	116.	242.	299.	25.	167.4	0.294	2.632
67.5	10750.	5808.	*	122.	255.	315.	24.	167.4	0.294	2.632
68.0	10811.	5856.	*	124.	258.	321.	23.	168.0	0.292	2.642
68.5	11147.	6052.	*	133.	274.	344.	22.	168.6	0.291	2.652
69.0	11319.	6161.	*	139.	283.	357.	21.	169.2	0.290	2.662
69.5	10805.	5881.	*	126.	258.	326.	23.	169.2	0.290	2.662
70.0	10184.	5557.	*	113.	229.	291.	26.	169.9	0.288	2.672
70.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
71.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
71.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
72.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
72.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
73.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
73.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
74.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
74.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. N-62+00
DEPTH 60.0 - 70.0
Figure 2.5-94

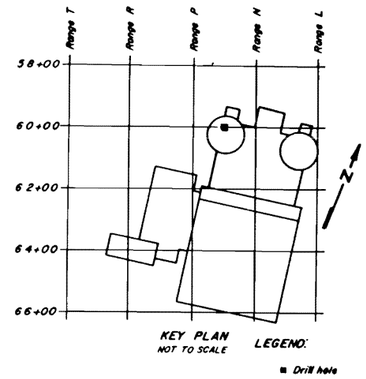
Figure 2.5-94 3-D Elastic Properties Tabulation Sta. N-62+00 Depth 60.0 - 70.0





LEGEND:

Vs = Shear Velocity.
Vp = Compressional Velocity.
Sd = Dynamic Shear Modulus.
Bd = Dynamic Bulk Modulus.
Ed = Dynamic Young's Modulus.
ø = Porosity.
D = Density.
σ = Poisson's Ratio.



NOTES:

1. The hole was drilled with an NX wire line core drill.
2. The drill hole was inspected with a borehole television camera between elevations 696.8 and 650.8. The inspection showed the core loss areas to be soft shale.
3. The deformation modulus is defined as the in-situ secant modulus including both elastic and plastic deformation as determined from the results of the Menard pressuremeter tests.
4. The borehole survey for the dynamic elastic moduli was made by the Birdwell Division of Seismograph Service Corporation.

LEGEND:

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi.
Core Loss

General Rock Description

The foundation rock is composed of the Conasauga Formation. This formation consists of contorted gray-green shales interbedded with lenses of limestones.

ROCK TYPE
Given graphically in % and showing ranges of test values for deformation modulus (psi x 10⁴)

Type 0 - Core loss
Type 1 - Soft shale 1 to 10
Type 2 - Hard shale 5 to 60
Type 3 - Limestone 100+

These types were identified from visual inspection of the core. Generally, determinations were made for each five foot length of core in the box.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG AND ELASTIC MODULI STA. 0-60+00
Figure 2.5-95

Figure 2.5-95 Graphic Log and Elastic Moduli Sta. 0-60+00

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
0-60+00 0.0 0.0 732.80 86.10 5 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
38.0	8262.	4442.	*	71.	150.	183.	37.	166.1	0.297	2.612
38.5	8638.	4632.	*	77.	164.	199.	34.	165.5	0.298	2.602
39.0	8855.	4737.	*	80.	172.	207.	33.	164.9	0.300	2.592
39.5	9260.	4953.	*	87.	189.	227.	30.	164.9	0.300	2.592
40.0	9613.	5155.	*	95.	203.	246.	29.	165.5	0.298	2.602
40.5	10186.	5476.	*	107.	229.	279.	26.	166.1	0.297	2.612
41.0	10382.	5596.	*	113.	238.	292.	25.	166.7	0.295	2.622
41.5	10424.	5618.	*	114.	239.	294.	25.	166.7	0.295	2.622
42.0	10488.	5667.	*	116.	243.	300.	25.	167.4	0.294	2.632
42.5	10340.	5587.	*	113.	236.	292.	25.	167.4	0.294	2.632
43.0	9839.	5329.	*	103.	214.	266.	27.	168.0	0.292	2.642
43.5	10081.	5447.	*	107.	224.	277.	26.	167.4	0.294	2.632
44.0	9792.	5304.	*	102.	212.	263.	28.	168.0	0.292	2.642
44.5	9568.	5182.	*	97.	202.	252.	29.	168.0	0.292	2.642
45.0	9388.	5085.	*	94.	194.	242.	30.	168.0	0.292	2.642
45.5	9383.	5083.	*	94.	194.	242.	30.	168.0	0.292	2.642
46.0	9383.	5083.	*	94.	194.	242.	30.	168.0	0.292	2.642
46.5	9603.	5202.	*	98.	203.	253.	29.	168.0	0.292	2.642
47.0	9740.	5289.	*	102.	209.	263.	28.	168.6	0.291	2.652
47.5	10021.	5441.	*	108.	222.	278.	27.	168.6	0.291	2.652
48.0	10016.	5452.	*	109.	222.	280.	27.	169.2	0.290	2.662
48.5	9824.	5347.	*	104.	213.	269.	27.	169.2	0.290	2.662
49.0	9731.	5297.	*	102.	209.	264.	28.	169.2	0.290	2.662
49.5	9550.	5210.	*	99.	202.	256.	29.	169.9	0.288	2.672
50.0	9294.	5071.	*	94.	191.	243.	30.	169.9	0.288	2.672
50.5	9336.	5094.	*	95.	193.	245.	30.	169.9	0.288	2.672
51.0	9379.	5129.	*	97.	194.	249.	30.	170.5	0.287	2.682
51.5	9736.	5325.	*	104.	210.	268.	28.	170.5	0.287	2.682
52.0	10071.	5521.	*	112.	224.	289.	26.	171.1	0.285	2.692
52.5	10076.	5524.	*	113.	225.	289.	26.	171.1	0.285	2.692

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-60+00
DEPTH 38.0 - 52.5
Figure 2.5-96

Figure 2.5-96 3-D Elastic Properties Tabulation Sta. 0-60+00 Depth 38.0 - 52.5

BIROWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
0-60+00 0.0 0.0 732.80 86.10 5 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
53.0	9881.	5404.	*	107.	216.	276.	27.	170.5	0.287	2.682
53.5	9736.	5325.	*	104.	210.	268.	28.	170.5	0.287	2.682
54.0	9252.	5048.	*	93.	189.	241.	30.	169.9	0.288	2.672
54.5	9128.	4980.	*	91.	184.	234.	31.	169.9	0.288	2.672
55.0	9132.	4982.	*	91.	184.	234.	31.	169.9	0.288	2.672
55.5	9440.	5138.	*	96.	197.	249.	29.	169.2	0.290	2.662
56.0	9663.	5272.	*	102.	206.	262.	28.	169.9	0.288	2.672
56.5	9924.	5428.	*	108.	218.	279.	27.	170.5	0.287	2.682
57.0	10376.	5675.	*	118.	238.	305.	25.	170.5	0.287	2.682
57.5	10429.	5704.	*	120.	240.	308.	25.	170.5	0.287	2.682
58.0	10191.	5561.	*	113.	230.	292.	26.	169.9	0.288	2.672
58.5	10047.	5495.	*	111.	223.	286.	26.	170.5	0.287	2.682
59.0	9983.	5434.	*	108.	220.	278.	27.	169.2	0.290	2.662
59.5	9745.	5304.	*	103.	210.	265.	28.	169.2	0.290	2.662
60.0	9787.	5340.	*	104.	212.	269.	28.	169.9	0.288	2.672
60.5	9929.	5417.	*	108.	218.	277.	27.	169.9	0.288	2.672
61.0	10076.	5497.	*	111.	224.	285.	26.	169.9	0.288	2.672
61.5	10126.	5511.	*	111.	226.	286.	26.	169.2	0.290	2.662
62.0	10707.	5842.	*	125.	253.	322.	24.	169.9	0.288	2.672
62.5	11415.	6228.	*	142.	288.	366.	21.	169.9	0.288	2.672
63.0	11734.	6417.	*	151.	304.	390.	20.	170.5	0.287	2.682
63.5	11869.	6491.	*	155.	311.	399.	20.	170.5	0.287	2.682
64.0	11601.	6345.	*	148.	298.	381.	20.	170.5	0.287	2.682
64.5	11160.	6118.	*	138.	276.	355.	22.	171.1	0.285	2.692
65.0	10808.	5925.	*	130.	258.	333.	23.	171.1	0.285	2.692
65.5	10585.	5803.	*	124.	248.	319.	24.	171.1	0.285	2.692
66.0	10424.	5714.	*	121.	240.	310.	25.	171.1	0.285	2.692
66.5	10110.	5542.	*	113.	226.	291.	26.	171.1	0.285	2.692
67.0	10061.	5515.	*	112.	224.	289.	26.	171.1	0.285	2.692
67.5	10066.	5518.	*	112.	224.	289.	26.	171.1	0.285	2.692

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-60+00
DEPTH 53.0 - 67.5
Figure 2.5-97

Figure 2.5-97 3-D Elastic Properties Tabulation Sta. 0-60+00 Depth 53.0 -67.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

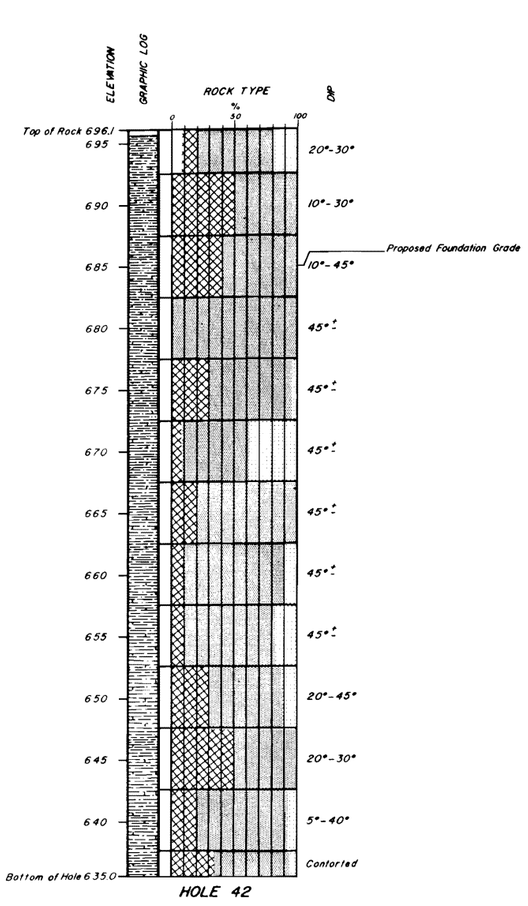
TENNESSEE VALLEY AUTHORITY
0-60+00 0.0 0.0 732.80 86.10 5 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

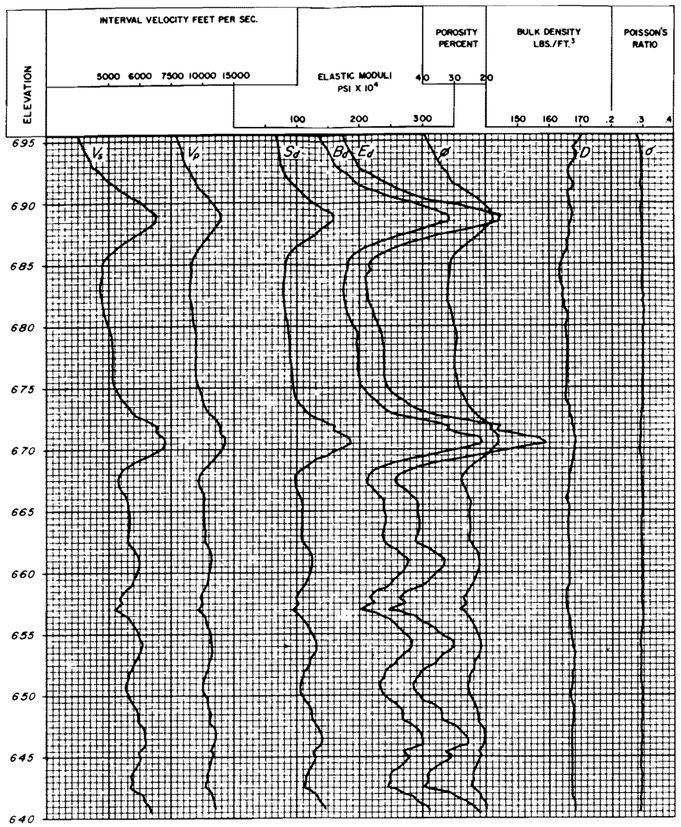
DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
68.0	10115.	5545.	*	113.	226.	292.	26.	171.1	0.285	2.692
68.5	10115.	5545.	*	113.	226.	292.	26.	171.1	0.285	2.692
69.0	10160.	5570.	*	115.	228.	294.	26.	171.1	0.285	2.692
69.5	10110.	5542.	*	113.	226.	291.	26.	171.1	0.285	2.692
70.0	10120.	5548.	*	114.	227.	292.	26.	171.1	0.285	2.692
70.5	9829.	5388.	*	107.	214.	275.	27.	171.1	0.285	2.692
71.0	9963.	5462.	*	110.	220.	283.	27.	171.1	0.285	2.692
71.5	10160.	5570.	*	115.	228.	294.	26.	171.1	0.285	2.692
72.0	10211.	5598.	*	116.	231.	297.	26.	171.1	0.285	2.692
72.5	10071.	5521.	*	112.	224.	289.	26.	171.1	0.285	2.692
73.0	9973.	5467.	*	110.	220.	284.	27.	171.1	0.285	2.692
73.5	10055.	5499.	*	111.	224.	286.	26.	170.5	0.287	2.682
74.0	10257.	5609.	*	116.	233.	298.	25.	170.5	0.287	2.682
74.5	9815.	5380.	*	107.	213.	275.	27.	171.1	0.285	2.692
75.0	9722.	5329.	*	105.	209.	269.	28.	171.1	0.285	2.692
75.5	9585.	5255.	*	102.	203.	262.	29.	171.1	0.285	2.692
76.0	9585.	5255.	*	102.	203.	262.	29.	171.1	0.285	2.692
76.5	9722.	5329.	*	105.	209.	269.	28.	171.1	0.285	2.692
77.0	9910.	5432.	*	109.	217.	280.	27.	171.1	0.285	2.692
77.5	10206.	5595.	*	116.	230.	297.	26.	171.1	0.285	2.692
78.0	10360.	5679.	*	119.	237.	306.	25.	171.1	0.285	2.692
78.5	10407.	5705.	*	120.	240.	309.	25.	171.1	0.285	2.692
79.0	10413.	5695.	*	119.	240.	307.	25.	170.5	0.287	2.682
79.5	10308.	5624.	*	116.	235.	299.	25.	169.9	0.288	2.672
80.0	10155.	5514.	*	111.	228.	286.	26.	168.6	0.291	2.652
80.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
81.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
81.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
82.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
82.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-60+00
DEPTH 68.0 - 80.0
Figure 2.5-98

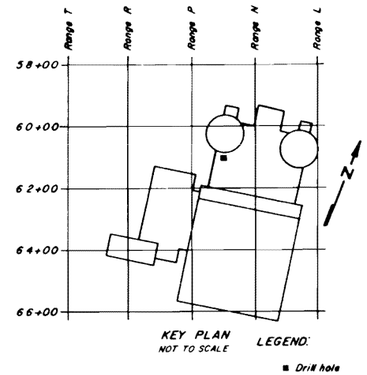
Figure 2.5-98 3-D Elastic Properties Tabulation Sta. 0-60+00 Depth 68.0 - 80.0





LEGEND:

Vs = Shear Velocity.
Vp = Compressional Velocity.
Sd = Dynamic Shear Modulus.
Bd = Dynamic Bulk Modulus.
Ed = Dynamic Young's Modulus.
ø = Porosity.
D = Density.
σ = Poisson's Ratio.



NOTES:

1. The hole was drilled with an NX wire line core drill.
2. The drill hole was inspected with a borehole television camera between elevations 696.1 and 639.5. The inspection showed the core loss area to be soft shale.
3. The deformation modulus is defined as the in-situ secant modulus including both elastic and plastic deformation as determined from the results of the Menard pressuremeter tests.
4. The borehole survey for the dynamic elastic moduli was made by the Birdwell Division of Seismograph Service Corporation.

LEGEND

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min /psi

Core Loss

GENERAL ROCK DESCRIPTION

The foundation rock is composed of the Chickamauga formation. The formation consists of interbedded gray-green shales interbedded with lenses of limestones.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus (psi x 10^4)

Type 0 - Core loss

Type 1 - Soft shale 1 to 10

Type 2 - Hard shale 5 to 60

Type 3 - Limestone 100+

These rock were identified from visual inspection of the cores. Dynamic determinations were made for each rock type length of core in the bore.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG AND ELASTIC MODULI STA. 0-61+00
Figure 2.5-99

Figure 2.5-99 Graphic Log and Elastic Moduli Sta. 0-61+00

BIROWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
0-61400 0.0 0.0 732.50 97.50 4 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
37.0	7834.	4285.	*	68.	136.	174.	40.	170.5	0.287	2.682
37.5	7988.	4338.	*	68.	141.	177.	39.	168.6	0.291	2.652
38.0	8140.	4398.	*	70.	146.	181.	38.	167.4	0.294	2.632
38.5	8234.	4471.	*	73.	150.	188.	37.	168.6	0.291	2.652
39.0	8407.	4543.	*	75.	156.	193.	36.	167.4	0.294	2.632
39.5	8539.	4591.	*	76.	161.	196.	35.	166.1	0.297	2.612
40.0	8902.	4786.	*	82.	175.	213.	33.	166.1	0.297	2.612
40.5	9126.	4919.	*	87.	184.	225.	31.	166.7	0.295	2.622
41.0	9455.	5121.	*	95.	197.	246.	29.	168.0	0.292	2.642
41.5	10067.	5398.	*	104.	223.	270.	26.	165.5	0.298	2.602
42.0	10632.	5716.	*	117.	249.	304.	24.	166.1	0.297	2.612
42.5	11380.	6134.	*	135.	285.	351.	21.	166.7	0.295	2.622
43.0	11960.	6446.	*	149.	315.	387.	19.	166.7	0.295	2.622
43.5	12467.	6736.	*	164.	343.	424.	18.	167.4	0.294	2.632
44.0	12467.	6720.	*	162.	343.	421.	18.	166.7	0.295	2.622
44.5	11824.	6357.	*	145.	308.	376.	20.	166.1	0.297	2.612
45.0	11131.	5984.	*	128.	273.	333.	22.	166.1	0.297	2.612
45.5	10408.	5582.	*	111.	238.	289.	25.	165.5	0.298	2.602
46.0	9871.	5293.	*	100.	214.	260.	27.	165.5	0.298	2.602
46.5	9385.	5020.	*	90.	194.	233.	30.	164.9	0.300	2.592
47.0	9174.	4895.	*	85.	185.	221.	31.	164.2	0.301	2.582
47.5	9054.	4818.	*	82.	180.	213.	32.	163.6	0.302	2.572
48.0	9058.	4820.	*	82.	180.	214.	32.	163.6	0.302	2.572
48.5	8983.	4780.	*	81.	177.	210.	32.	163.6	0.302	2.572
49.0	8983.	4780.	*	81.	177.	210.	32.	163.6	0.302	2.572
49.5	8983.	4793.	*	81.	177.	212.	32.	164.2	0.301	2.582
50.0	8983.	4793.	*	81.	177.	212.	32.	164.2	0.301	2.582
50.5	9026.	4828.	*	83.	179.	215.	32.	164.9	0.300	2.592
51.0	9066.	4849.	*	84.	181.	217.	32.	164.9	0.300	2.592
51.5	9142.	4902.	*	86.	184.	223.	31.	165.5	0.298	2.602

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-61+00
DEPTH 37.0 - 51.5
Figure 2.5-100

Figure 2.5-100 3-D Elastic Properties Tabulation Sta. 0-61+00 Depth 37.0 - 51.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
0-61+00 0.0 0.0 732.50 97.50 4 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
52.0	9223.	4946.	*	87.	187.	227.	31.	165.5	0.298	2.602
52.5	9305.	4990.	*	89.	191.	231.	30.	165.5	0.298	2.602
53.0	9432.	5058.	*	91.	196.	237.	30.	165.5	0.298	2.602
53.5	9428.	5056.	*	91.	196.	237.	30.	165.5	0.298	2.602
54.0	9471.	5079.	*	92.	197.	239.	29.	165.5	0.298	2.602
54.5	9471.	5079.	*	92.	197.	239.	29.	165.5	0.298	2.602
55.0	9471.	5079.	*	92.	197.	239.	29.	165.5	0.298	2.602
55.5	9466.	5077.	*	92.	197.	239.	29.	165.5	0.298	2.602
56.0	9510.	5100.	*	93.	199.	241.	29.	165.5	0.298	2.602
56.5	9514.	5102.	*	93.	199.	241.	29.	165.5	0.298	2.602
57.0	9514.	5102.	*	93.	199.	241.	29.	165.5	0.298	2.602
57.5	9642.	5171.	*	95.	205.	248.	28.	165.5	0.298	2.602
58.0	9871.	5293.	*	100.	214.	260.	27.	165.5	0.298	2.602
58.5	10062.	5396.	*	104.	223.	270.	26.	165.5	0.298	2.602
59.0	10316.	5546.	*	110.	234.	286.	25.	166.1	0.297	2.612
59.5	10632.	5716.	*	117.	249.	304.	24.	166.1	0.297	2.612
60.0	11442.	6167.	*	137.	289.	354.	21.	166.7	0.295	2.622
60.5	12459.	6732.	*	164.	342.	423.	18.	167.4	0.294	2.632
61.0	12385.	6692.	*	162.	338.	418.	18.	167.4	0.294	2.632
61.5	13333.	7222.	*	189.	392.	489.	16.	168.0	0.292	2.642
62.0	13428.	7273.	*	192.	398.	496.	16.	168.0	0.292	2.642
62.5	12772.	6918.	*	173.	360.	448.	17.	168.0	0.292	2.642
63.0	11832.	6393.	*	148.	309.	382.	20.	167.4	0.294	2.632
63.5	10904.	5892.	*	125.	262.	324.	23.	167.4	0.294	2.632
64.0	10260.	5530.	*	110.	232.	285.	26.	166.7	0.295	2.622
64.5	9829.	5284.	*	100.	213.	259.	27.	166.1	0.297	2.612
65.0	9783.	5259.	*	99.	211.	257.	28.	166.1	0.297	2.612
65.5	9875.	5309.	*	101.	215.	262.	27.	166.1	0.297	2.612
66.0	10110.	5436.	*	106.	225.	275.	26.	166.1	0.297	2.612
66.5	10414.	5585.	*	111.	239.	289.	25.	165.5	0.298	2.602

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-61+00
DEPTH 52.0 - 66.5
Figure 2.5-101

Figure 2.5-101 3-D Elastic Properties Tabulation Sta. 0-61+00 Depth 52.0 - 66.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY
0-61+00 0.0 0.0 732.50 97.50 4 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
67.0	10362.	5571.	*	111.	236.	288.	25.	166.1	0.297	2.612
67.5	10414.	5599.	*	112.	239.	291.	25.	166.1	0.297	2.612
68.0	10466.	5627.	*	113.	241.	294.	25.	166.1	0.297	2.612
68.5	10466.	5627.	*	113.	241.	294.	25.	166.1	0.297	2.612
69.0	10414.	5599.	*	112.	239.	291.	25.	166.1	0.297	2.612
69.5	10357.	5568.	*	111.	236.	288.	25.	166.1	0.297	2.612
70.0	10408.	5596.	*	112.	239.	291.	25.	166.1	0.297	2.612
70.5	10785.	5799.	*	120.	256.	312.	23.	166.1	0.297	2.612
71.0	11013.	5921.	*	126.	267.	326.	23.	166.1	0.297	2.612
71.5	11197.	6020.	*	130.	276.	337.	22.	166.1	0.297	2.612
72.0	11137.	5988.	*	128.	273.	333.	22.	166.1	0.297	2.612
72.5	10961.	5893.	*	124.	265.	323.	23.	166.1	0.297	2.612
73.0	10785.	5799.	*	120.	256.	312.	23.	166.1	0.297	2.612
73.5	10572.	5684.	*	116.	246.	300.	24.	166.1	0.297	2.612
74.0	10160.	5448.	*	106.	227.	275.	26.	165.5	0.298	2.602
74.5	9918.	5319.	*	101.	216.	262.	27.	165.5	0.298	2.602
75.0	10116.	5425.	*	105.	225.	273.	26.	165.5	0.298	2.602
75.5	9558.	5126.	*	94.	201.	243.	29.	165.5	0.298	2.602
76.0	10367.	5574.	*	111.	237.	289.	25.	166.1	0.297	2.612
76.5	10632.	5716.	*	117.	249.	304.	24.	166.1	0.297	2.612
77.0	10853.	5850.	*	123.	260.	319.	23.	166.7	0.295	2.622
77.5	11084.	5974.	*	128.	271.	333.	22.	166.7	0.295	2.622
78.0	11332.	6123.	*	135.	283.	350.	21.	167.4	0.294	2.632
78.5	11338.	6126.	*	135.	283.	351.	21.	167.4	0.294	2.632
79.0	11156.	6043.	*	132.	275.	342.	22.	168.0	0.292	2.642
79.5	10865.	5885.	*	126.	260.	324.	23.	168.0	0.292	2.642
80.0	10753.	5825.	*	123.	255.	318.	23.	168.0	0.292	2.642
80.5	10430.	5636.	*	115.	240.	297.	25.	167.4	0.294	2.632
81.0	10378.	5608.	*	114.	237.	294.	25.	167.4	0.294	2.632
81.5	10225.	5525.	*	110.	231.	285.	26.	167.4	0.294	2.632

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-61+00
DEPTH 67.0 - 81.5
Figure 2.5-102

Figure 2.5-102 3-D Elastic Properties Tabulation Sta. 0-61+00 Depth 67.0 - 81.5

BIROWELL 3-D ELASTIC PROPERTIES TABULATION

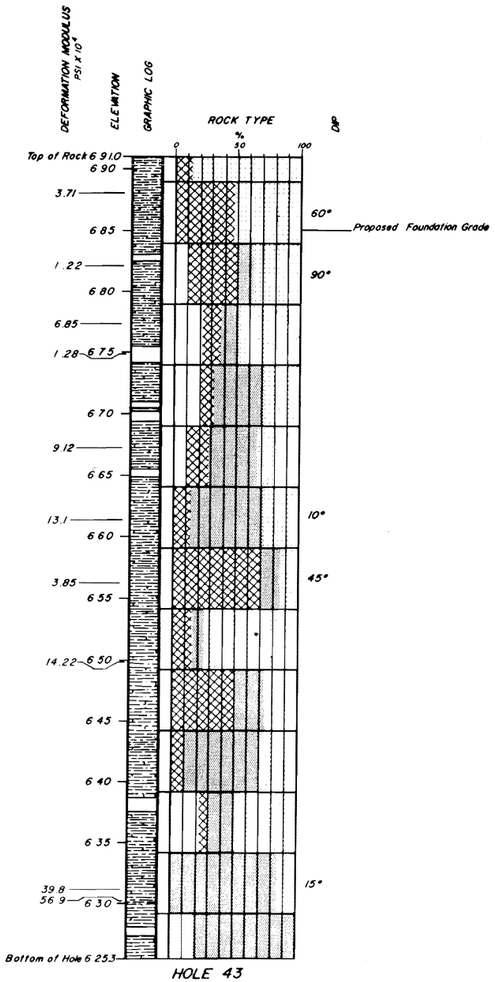
TENNESSEE VALLEY AUTHORITY
O-61+00 0.0 0.0 732.50 97.50 4 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

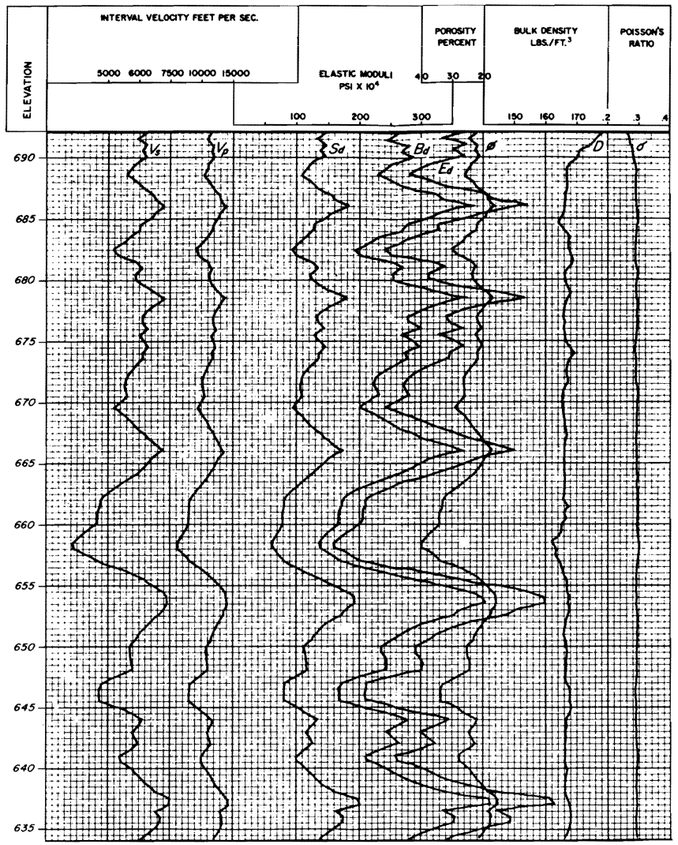
DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
82.0	10281.	5541.	*	110.	233.	286.	25.	166.7	0.295	2.622
82.5	10436.	5625.	*	114.	240.	295.	25.	166.7	0.295	2.622
83.0	10638.	5734.	*	118.	249.	306.	24.	166.7	0.295	2.622
83.5	10968.	5926.	*	127.	265.	328.	23.	167.4	0.294	2.632
84.0	11026.	5957.	*	128.	268.	332.	22.	167.4	0.294	2.632
84.5	11032.	5961.	*	128.	268.	332.	22.	167.4	0.294	2.632
85.0	11456.	6190.	*	138.	289.	358.	21.	167.4	0.294	2.632
85.5	11576.	6255.	*	141.	295.	365.	21.	167.4	0.294	2.632
86.0	11699.	6321.	*	144.	302.	373.	20.	167.4	0.294	2.632
86.5	11699.	6321.	*	144.	302.	373.	20.	167.4	0.294	2.632
87.0	11072.	5982.	*	129.	270.	334.	22.	167.4	0.294	2.632
87.5	11312.	6112.	*	135.	282.	349.	21.	167.4	0.294	2.632
88.0	11072.	5982.	*	129.	270.	334.	22.	167.4	0.294	2.632
88.5	10785.	5828.	*	123.	256.	317.	23.	167.4	0.294	2.632
89.0	10620.	5738.	*	119.	249.	308.	24.	167.4	0.294	2.632
89.5	10669.	5765.	*	120.	251.	310.	24.	167.4	0.294	2.632
90.0	10508.	5678.	*	116.	243.	301.	24.	167.4	0.294	2.632
90.5	11305.	6108.	*	135.	282.	349.	22.	167.4	0.294	2.632
91.0	11492.	6225.	*	140.	291.	363.	21.	168.0	0.292	2.642
91.5	11824.	6405.	*	149.	308.	384.	20.	168.0	0.292	2.642
92.0	11960.	6494.	*	153.	316.	396.	19.	168.6	0.291	2.652
92.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
93.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
93.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
94.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
94.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
95.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
95.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
96.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
96.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. O-61+00
DEPTH 82.0 - 92.0
Figure 2.5-103

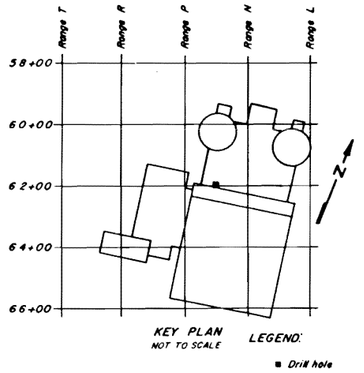
Figure 2.5-103 3-D Elastic Properties Tabulation Sta. 0-61+00 Depth 82.0 - 92.0





LEGEND:

V_S = Shear Velocity.
V_P = Compressional Velocity.
S_d = Dynamic Shear Modulus.
B_d = Dynamic Bulk Modulus.
E_d = Dynamic Young's Modulus.
ϕ = Porosity.
D = Density.
σ = Poisson's Ratio.



NOTES:

1. The hole was drilled with an NX wire line core drill.
2. The drill hole was inspected with a borehole television camera between elevations 690.9 and 645.2. The inspection showed the core loss areas to be soft shale.
3. The deformation modulus is defined as the in-situ secant modulus including both elastic and plastic deformation as determined from the results of the Menard pressuremeter tests.
4. The borehole survey for the dynamic elastic moduli was made by the Birdwell Division of Seismograph Service Corporation.

LEGEND

GRAPHIC LOG

0/50 Water Test Packer set showing gal per min/psi

Core Loss

GENERAL ROCK DESCRIPTION

THE FOUNDATION ROCK IS COMPOSED OF THE CHICKAMAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED LIMESTONE SHALE INTERBEDDED WITH LENSES OF LIMESTONES.

ROCK TYPE

Given graphically in % and showing ranges of test values for deformation modulus (psi x 10^4)

Type 0 - Core loss

Type 1 - Soft shale 1 to 10

Type 2 - Hard shale 5 to 60

Type 3 - Limestone 100+

THESE TYPES WERE IDENTIFIED FROM VISUAL INSPECTION OF THE CORES. GENERALLY ALTERNATIONS WERE MADE FOR EACH FOOT OF LENGTH OF THE HOLE.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
GRAPHIC LOG AND ELASTIC MODULI STA. O-62+00
Figure 2.5-104

Figure 2.5-104 Graphic Log And Elastic Moduli Sta. 0-62+00

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

0-62+00 0.0 0.0 733.90 108.60 3 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
43.0	11024.	6208.	*	148.	270.	376.	22.	178.6	0.268	2.813
43.5	10458.	5851.	*	130.	243.	332.	25.	176.7	0.272	2.783
44.0	11230.	6241.	*	147.	280.	375.	22.	174.9	0.277	2.753
44.5	11074.	6085.	*	137.	271.	352.	22.	171.7	0.284	2.702
45.0	11436.	6269.	*	145.	289.	373.	21.	171.1	0.285	2.692
45.5	10716.	5819.	*	123.	253.	318.	24.	168.6	0.291	2.652
46.0	10436.	5639.	*	115.	240.	297.	25.	167.4	0.294	2.632
46.5	10159.	5489.	*	109.	228.	281.	26.	167.4	0.294	2.632
47.0	10786.	5828.	*	123.	256.	317.	23.	167.4	0.294	2.632
47.5	11154.	6027.	*	131.	274.	339.	22.	167.4	0.294	2.632
48.0	12151.	6549.	*	154.	325.	400.	19.	166.7	0.295	2.622
48.5	12368.	6666.	*	160.	337.	414.	18.	166.7	0.295	2.622
49.0	13252.	7143.	*	184.	387.	475.	16.	166.7	0.295	2.622
49.5	12360.	6645.	*	158.	336.	410.	18.	166.1	0.297	2.612
50.0	11933.	6399.	*	146.	313.	380.	20.	165.5	0.298	2.602
50.5	11199.	5975.	*	126.	276.	329.	22.	164.2	0.301	2.582
51.0	11076.	5955.	*	127.	270.	330.	22.	166.1	0.297	2.612
51.5	10317.	5588.	*	113.	235.	293.	25.	168.0	0.292	2.642
52.0	9906.	5366.	*	104.	216.	270.	27.	168.0	0.292	2.642
52.5	9356.	5068.	*	93.	193.	241.	30.	168.0	0.292	2.642
53.0	9539.	5180.	*	98.	201.	252.	29.	168.6	0.291	2.652
53.5	10701.	5825.	*	124.	253.	319.	24.	169.2	0.290	2.662
54.0	11112.	6034.	*	132.	273.	342.	22.	168.6	0.291	2.652
54.5	10762.	5801.	*	121.	255.	314.	23.	166.7	0.295	2.622
55.0	10774.	5807.	*	121.	256.	314.	23.	166.7	0.295	2.622
55.5	11300.	6106.	*	135.	282.	348.	22.	167.4	0.294	2.632
56.0	12154.	6599.	*	158.	326.	409.	19.	168.6	0.291	2.652
56.5	13075.	7082.	*	182.	377.	470.	17.	168.0	0.292	2.642
57.0	12360.	6662.	*	160.	337.	414.	18.	166.7	0.295	2.622
57.5	11737.	6310.	*	143.	303.	370.	20.	166.1	0.297	2.612

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-62+00
DEPTH 43.0 - 57.5
Figure 2.5-105

Figure 2.5-105 3-D Elastic Properties Tabulation Sta. 0-62+00 Depth 43.0 - 57.5

BIRDWELL 3-D ELASTIC PROPERTIES TABULATION

TENNESSEE VALLEY AUTHORITY

0-62+00 0.0 0.0 733.90 108.60 3 1 1

WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

				MODULI IN 10 TO 4TH LBS/SQ. INCH						
DEPTH	VP	VS		SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
58.0	11244.	6045.	*	131.	278.	340.	22.	166.1	0.297	2.612
58.5	11321.	6102.	*	134.	282.	347.	21.	166.7	0.295	2.622
59.0	11697.	6289.	*	142.	301.	368.	20.	166.1	0.297	2.612
59.5	10999.	5928.	*	126.	267.	327.	23.	166.7	0.295	2.622
60.0	11422.	6156.	*	136.	288.	353.	21.	166.7	0.295	2.622
60.5	11599.	6283.	*	143.	297.	370.	21.	168.0	0.292	2.642
61.0	11138.	6077.	*	135.	274.	349.	22.	169.9	0.288	2.672
61.5	11230.	6083.	*	134.	278.	347.	22.	168.0	0.292	2.642
62.0	10820.	5847.	*	123.	258.	319.	23.	167.4	0.294	2.632
62.5	10398.	5618.	*	114.	238.	295.	25.	167.4	0.294	2.632
63.0	10123.	5483.	*	109.	226.	282.	26.	168.0	0.292	2.642
63.5	10036.	5423.	*	106.	222.	275.	26.	167.4	0.294	2.632
64.0	10154.	5459.	*	107.	227.	277.	26.	166.1	0.297	2.612
64.5	10258.	5515.	*	109.	232.	283.	26.	166.1	0.297	2.612
65.0	9852.	5297.	*	101.	214.	261.	27.	166.1	0.297	2.612
65.5	9482.	5098.	*	93.	198.	241.	29.	166.1	0.297	2.612
66.0	10056.	5407.	*	105.	223.	272.	26.	166.1	0.297	2.612
66.5	10468.	5642.	*	115.	241.	297.	25.	166.7	0.295	2.622
67.0	10803.	5822.	*	122.	257.	316.	23.	166.7	0.295	2.622
67.5	11355.	6136.	*	136.	284.	352.	21.	167.4	0.294	2.632
68.0	11687.	6315.	*	144.	301.	373.	20.	167.4	0.294	2.632
68.5	12413.	6690.	*	161.	340.	417.	18.	166.7	0.295	2.622
69.0	12967.	6989.	*	176.	371.	455.	17.	166.7	0.295	2.622
69.5	12105.	6524.	*	153.	323.	397.	19.	166.7	0.295	2.622
70.0	11756.	6336.	*	144.	305.	374.	20.	166.7	0.295	2.622
70.5	11285.	6082.	*	133.	281.	345.	22.	166.7	0.295	2.622
71.0	10861.	5854.	*	123.	260.	319.	23.	166.7	0.295	2.622
71.5	10195.	5495.	*	109.	229.	281.	26.	166.7	0.295	2.622
72.0	9610.	5180.	*	96.	204.	250.	29.	166.7	0.295	2.622
72.5	9125.	4918.	*	87.	183.	225.	31.	166.7	0.295	2.622

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-62+00
DEPTH 58.0 - 72.5

Figure 2.5-106

Figure 2.5-106 3-D Elastic Properties Tabulation Sta. 0-62+00 Depth 58.0 - 72.5

B I R D W E L L 3-D E L A S T I C P R O P E R T I E S T A B U L A T I O N

TENNESSEE VALLEY AUTHORITY
0-62+00 0.0 0.0 733.90. 108.60 3 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
73.0	8832.	4748.	*	81.	172.	210.	33.	166.1	0.297	2.612
73.5	8796.	4753.	*	82.	171.	211.	33.	167.4	0.294	2.632
74.0	8697.	4688.	*	79.	167.	205.	34.	166.7	0.295	2.622
74.5	8697.	4688.	*	79.	167.	205.	34.	166.7	0.295	2.622
75.0	8693.	4662.	*	78.	166.	201.	34.	165.5	0.298	2.602
75.5	8393.	4501.	*	72.	155.	188.	36.	165.5	0.298	2.602
76.0	8051.	4307.	*	66.	143.	171.	38.	164.9	0.300	2.592
76.5	7859.	4160.	*	61.	136.	158.	40.	162.4	0.305	2.551
77.0	7876.	4191.	*	62.	136.	161.	40.	163.6	0.302	2.572
77.5	8406.	4473.	*	71.	155.	184.	36.	163.6	0.302	2.572
78.0	8733.	4671.	*	78.	168.	202.	34.	164.9	0.300	2.592
78.5	9549.	5121.	*	94.	201.	243.	29.	165.5	0.298	2.602
79.0	10513.	5652.	*	114.	243.	297.	24.	166.1	0.297	2.612
79.5	11443.	6183.	*	138.	289.	357.	21.	167.4	0.294	2.632
80.0	12116.	6546.	*	155.	324.	400.	19.	167.4	0.294	2.632
80.5	13039.	7045.	*	179.	375.	464.	17.	167.4	0.294	2.632
81.0	13430.	7275.	*	192.	398.	496.	16.	168.0	0.292	2.642
81.5	13554.	7323.	*	194.	405.	501.	15.	167.4	0.294	2.632
82.0	12923.	7000.	*	178.	368.	459.	17.	168.0	0.292	2.642
82.5	12678.	6850.	*	169.	354.	438.	17.	167.4	0.294	2.632
83.0	11938.	6434.	*	149.	314.	386.	20.	166.7	0.295	2.622
83.5	11414.	6152.	*	136.	287.	353.	21.	166.7	0.295	2.622
84.0	11054.	5943.	*	127.	269.	328.	22.	166.1	0.297	2.612
84.5	10814.	5829.	*	122.	258.	317.	23.	166.7	0.295	2.622
85.0	10349.	5592.	*	113.	236.	292.	25.	167.4	0.294	2.632
85.5	10359.	5597.	*	113.	237.	293.	25.	167.4	0.294	2.632
86.0	10485.	5665.	*	116.	242.	300.	25.	167.4	0.294	2.632
86.5	10552.	5701.	*	117.	245.	304.	24.	167.4	0.294	2.632
87.0	10530.	5689.	*	117.	244.	302.	24.	167.4	0.294	2.632
87.5	9689.	5235.	*	99.	207.	256.	28.	167.4	0.294	2.632

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-62+00
DEPTH 73.0 - 87.5
Figure 2.5-107

Figure 2.5-107 3-D Elastic Properties Tabulation Sta. 0-62+00 Depth 73.0 - 87.5

B I R D W E L L 3-D E L A S T I C P R O P E R T I E S T A B U L A T I O N

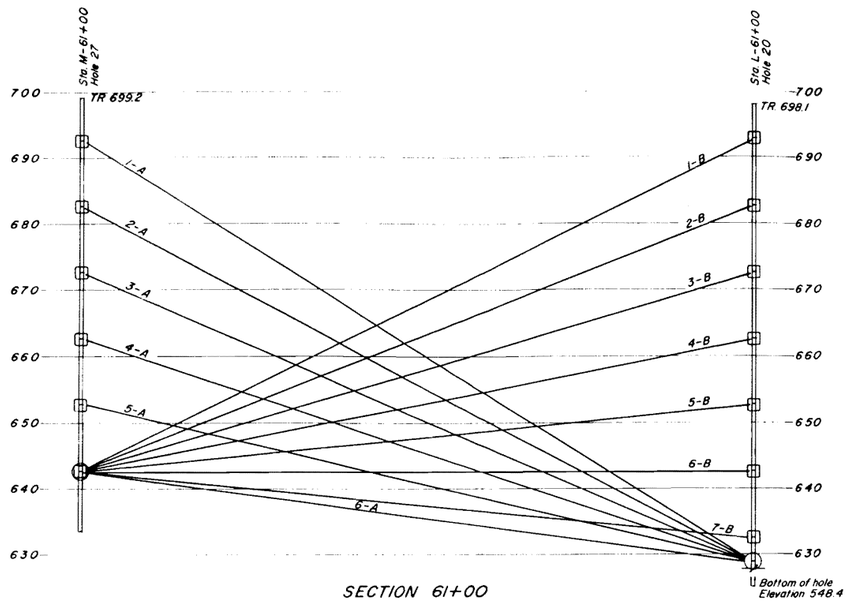
TENNESSEE VALLEY AUTHORITY
0-62+00 0.0 0.0 733.90 108.60 3 1 1
WATTS BAR NUCLEAR PLANT, RHEA COUNTY, TENNESSEE

DEPTH	VP	VS		MODULI IN 10 TO 4TH LBS/SQ. INCH SHEAR	BULK	YOUNGS	POROS.	DENSITY	POISSON	RHO
88.0	8809.	4760.	*	82.	171.	212.	33.	167.4	0.294	2.632
88.5	8690.	4707.	*	80.	167.	208.	34.	168.0	0.292	2.642
89.0	8683.	4703.	*	80.	166.	207.	34.	168.0	0.292	2.642
89.5	8711.	4719.	*	81.	167.	209.	34.	168.0	0.292	2.642
90.0	9600.	5213.	*	99.	203.	255.	29.	168.6	0.291	2.652
90.5	10408.	5638.	*	115.	239.	298.	25.	168.0	0.292	2.642
91.0	11285.	6097.	*	134.	281.	347.	22.	167.4	0.294	2.632
91.5	10968.	5927.	*	127.	265.	328.	23.	167.4	0.294	2.632
92.0	10518.	5669.	*	116.	244.	299.	24.	166.7	0.295	2.622
92.5	10693.	5763.	*	119.	252.	309.	24.	166.7	0.295	2.622
93.0	10968.	5912.	*	126.	265.	326.	23.	166.7	0.295	2.622
93.5	10452.	5633.	*	114.	241.	296.	25.	166.7	0.295	2.622
94.0	9737.	5248.	*	99.	209.	257.	28.	166.7	0.295	2.622
94.5	9848.	5308.	*	101.	214.	262.	27.	166.7	0.295	2.622
95.0	10479.	5662.	*	116.	242.	300.	25.	167.4	0.294	2.632
95.5	10861.	5869.	*	124.	260.	322.	23.	167.4	0.294	2.632
96.0	11221.	6048.	*	132.	277.	341.	22.	166.7	0.295	2.622
96.5	11811.	6366.	*	146.	307.	378.	20.	166.7	0.295	2.622
97.0	12413.	6690.	*	161.	340.	417.	18.	166.7	0.295	2.622
97.5	13623.	7361.	*	196.	409.	506.	15.	167.4	0.294	2.632
98.0	13696.	7418.	*	199.	414.	515.	15.	168.0	0.292	2.642
98.5	12321.	6690.	*	163.	335.	420.	18.	168.6	0.291	2.652
99.0	12703.	6898.	*	173.	356.	447.	17.	168.6	0.291	2.652
99.5	12695.	6893.	*	173.	356.	446.	17.	168.6	0.291	2.652
100.0	12163.	6588.	*	157.	326.	407.	19.	168.0	0.292	2.642
100.5	11728.	6337.	*	145.	303.	375.	20.	167.4	0.294	2.632
101.0	11010.	5920.	*	126.	267.	326.	23.	166.1	0.297	2.612
101.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
102.0	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0
102.5	0.	0.	*	0.	0.	0.	0.	0.0	0.0	0.0

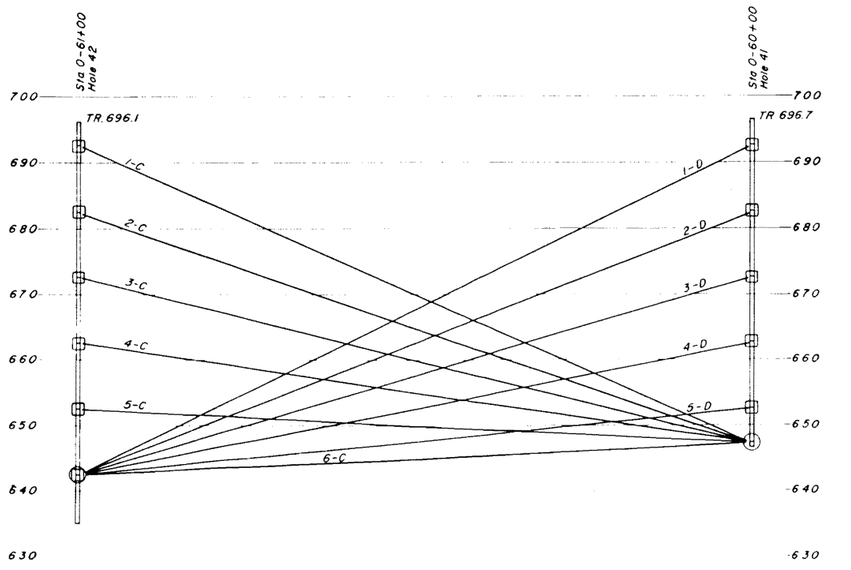
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

3-D ELASTIC PROPERTIES TABULATION
STA. 0-62+00
DEPTH 88.0 - 101.0
Figure 2.5-108

Figure 2.5-108 3-D Elastic Properties Tabulation Sta. 0-62+00 Depth 88.0 - 101.0



SECTION 61+00



RANGE O

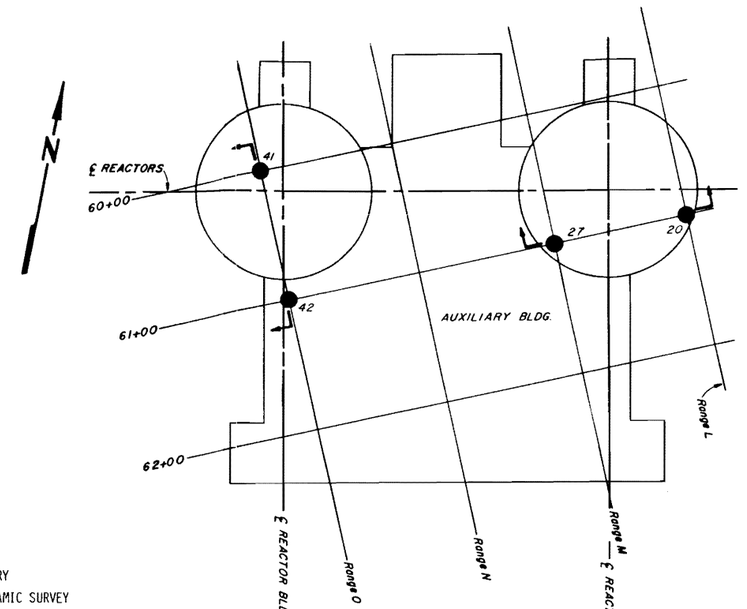
SUMMARY

CROSS-HOLE DYNAMIC SURVEY

Line Number	Compressional Velocity ft/sec. measured	Shear Velocity ft/sec. Calculated	Density lbs/ft^3 Assumed	Poisson's Ratio Assumed	Dynamic Young's Modulus PSI X 10^6 Calculated
1-A	12182	6734	170	0.28	426
2-A	12114	6696	170	0.28	421
3-A	13083	7232	170	0.26	491
4-A	12718	7030	170	0.28	464
5-A	12953	7160	170	0.28	481
6-A	12208	6748	170	0.28	427
1-B	9936	5311	165	0.3	263
2-B	10560	5743	170	0.29	317
3-B	10686	5811	170	0.29	319
4-B	11222	6203	170	0.28	363
5-B	11111	6142	170	0.28	354
6-B	11588	6405	170	0.29	386
7-B	12251	6788	170	0.28	433
1-C	11070	6119	170	0.28	351
2-C	9709	5280	165	0.29	256
3-C	10779	5959	170	0.28	333
4-C	10141	5606	170	0.28	295
5-C	11122	6148	170	0.28	355
6-C	11209	6196	170	0.28	360
1-D	11632	6430	170	0.28	388
2-D	11977	6620	170	0.28	411
3-D	11690	6463	170	0.28	392
4-D	11422	6313	170	0.28	374
5-D	10339	5715	170	0.28	307

NOTES:

1. THE LINES ON THE SECTIONS BETWEEN SHOT POINTS AND GEOPHONE LOCATIONS INDICATE ONLY THE TRAVEL DIRECTION OF THE COMPRESSIONAL WAVE.
2. THE FOUNDATION ROCK IS COMPOSED OF THE CONASAUGA FORMATION. THIS FORMATION CONSISTS OF CONTORTED GRAY-GREEN SHALE INTERBEDDED WITH LENSES OF LIMESTONE.
3. THE ASSUMED DENSITIES AND POISSON'S RATIOS ARE BASED ON THE RESULTS FROM THE BOREHOLE SURVEYS THAT WERE MADE BY THE BIRDWELL DIVISION OF SIESMOGRAPH SERVICE CORPORATION.



KEY PLAN

LEGEND:

Nx WIRELINE CORE DRILL HOLE

TR - TOP OF ROCK ELEVATION.

GEOPHONE SETTING.

SHOT LOCATION.

SCALE:

PLAN 50 0 50 100 Feet

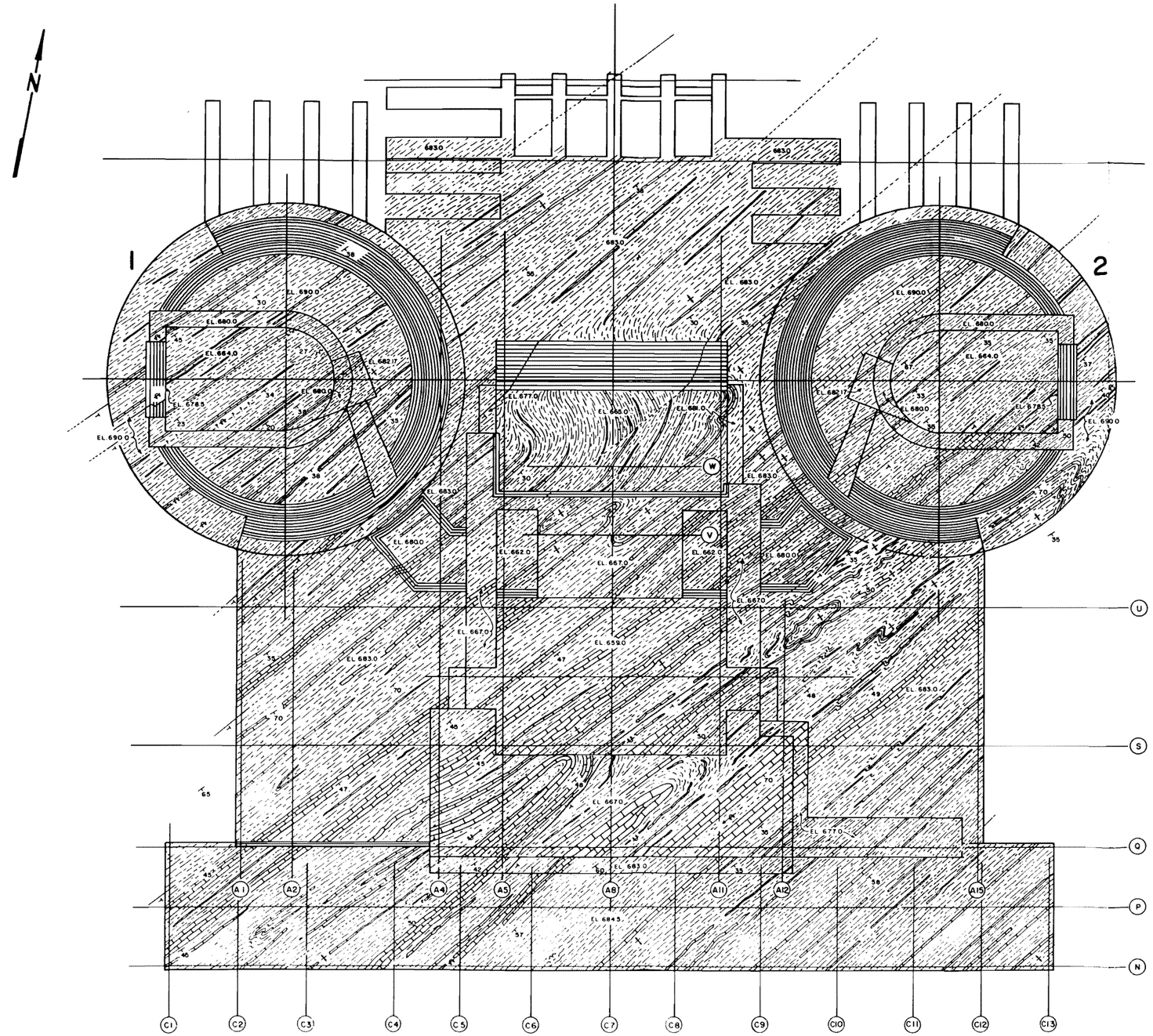
SECTION 10 0 10 20 Feet

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

CROSS-HOLE DYNAMIC
SECTIONS AND SUMMARY

Figure 2.5-109

Figure 2.5-109 Cross-Hole Dynamic Sections And Summary



LEGEND

- Limestone
- Shale
- Thrust fault T, upper plate; dashed where inferred
- 90 – Strike and dip of beds
- 90 – Crumbled beds and average dip
- Anticlinal axis
- Synclinal axis
- Overturned anticline showing direction of dip of limbs and direction of plunge
- Overturned syncline showing direction of dip of limbs and direction of plunge
- Doubly plunging anticline
- Doubly plunging syncline

NOTES:

1. Due to the complexly folded and contorted characteristics of the foundation rock, plan view geology presentation has been simplified considerably.
2. Turbine and control building outline taken from construction drawing number 4IN10072-1 R2 which was revised as construction progressed.
3. Discordant lithologic presentation due to elevation changes across neat vertical line construction excavations.
4. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age.

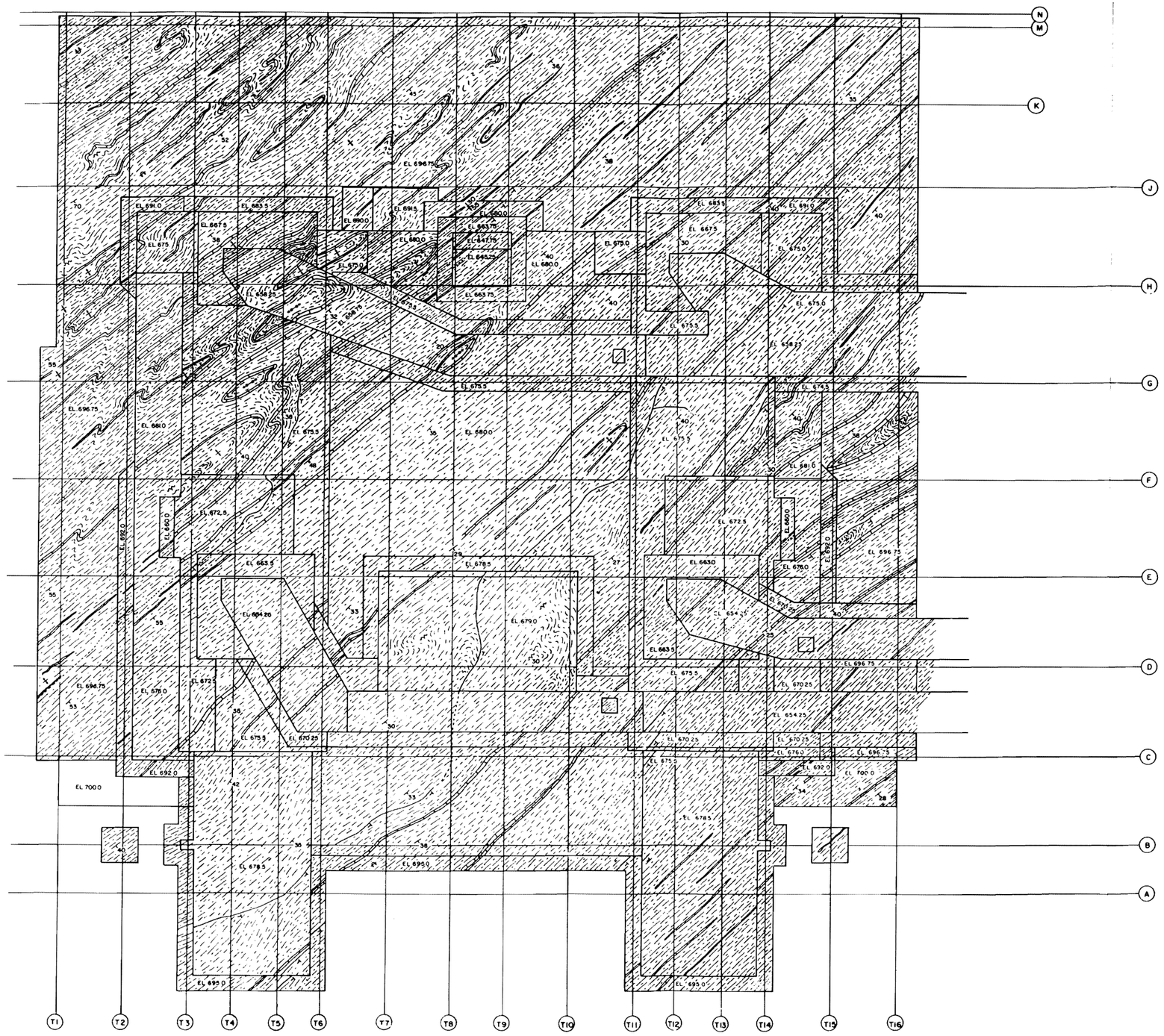
SCALE: 16 0 16 32 Feet

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

PLAN VIEW GEOLOGIC MAP OF REACTOR, AUXILIARY, AND CONTROL BUILDINGS

Figure 2.5-110

Figure 2.5-110 Plan View Geologic Map of Reactor, Auxiliary And Control Buildings



LEGEND

- Limestone
- Shale
- Thrust fault T, upper plate; dashed where inferred
- Strike and dip of beds
- Crumpled beds and average dip
- Anticlinal axis
- Synclinal axis
- Overturned anticline showing direction of dip of limbs and direction of plunge
- Overturned syncline showing direction of dip of limbs and direction of plunge
- Doubly plunging anticline
- Doubly plunging syncline

NOTES:

1. Due to the complexly folded and contorted characteristics of the foundation rock, plan view geology presentation has been simplified considerably
2. Turbine and control building outline taken from construction drawing number 4INI0071-1 R3 which was revised as construction progressed
3. Discordant lithologic presentation due to elevation changes across neat vertical line construction excavations.
4. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age.

SCALE:

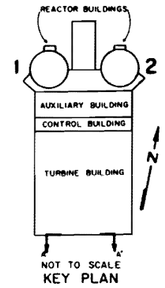
16 0 16 32 Feet

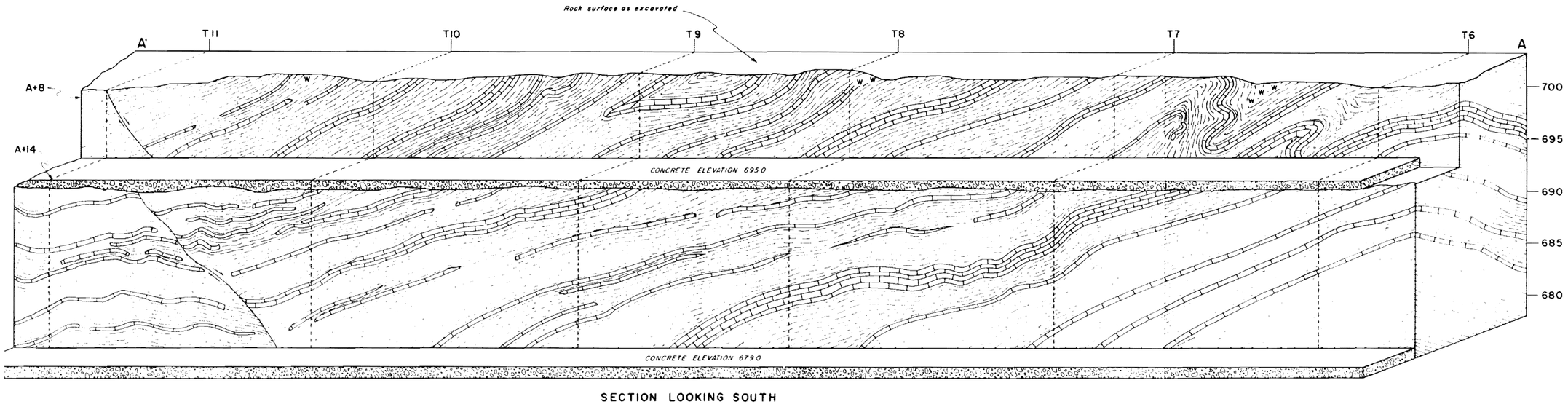
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

PLAN VIEW GEOLOGIC
MAP OF TURBINE BUILDING

Figure 2.5-111

Figure 2.5-111 Plan View Geologic Map of Turbine Building





LEGEND

- THRUST FAULT
- LIMESTONE - FINE- TO COARSE-GRAINED, WHITE TO DARK GREY TO PINK, THIN, MEDIUM TO MASSIVE BEDDED, SOME BEDS GLAUCONITIC AND/OR ARGILLACEOUS.
- SHALE - VARICOLORED RED, GREY, GREEN AND PURPLE, FISSILE, CALCAREOUS SHALE WHICH FREQUENTLY IS TIGHTLY FOLDED, CRUMPLED, CONTORTED AND BOUNDED BY SLICKENSIDED SURFACES.
- WEATHERED - SLAKED, OR WEATHERED SHALE, WEATHERED GLAUCONITIC LIMESTONE AND/OR CLAY, REMOVED PRIOR TO EMPLACEMENT OF PROTECTIVE CONCRETE.
- PROTECTIVE CONCRETE

NOTES:

1. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age.
2. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified.

SCALE:

4 0 4 8 FEET

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GEOLOGIC SECTION ALONG A+8
AND A+14 LINES FROM T6 TO T11

Figure 2.5-112

Figure 2.5-112 Geologic Section Along A+8 And A+14 Lines From T6 To T11

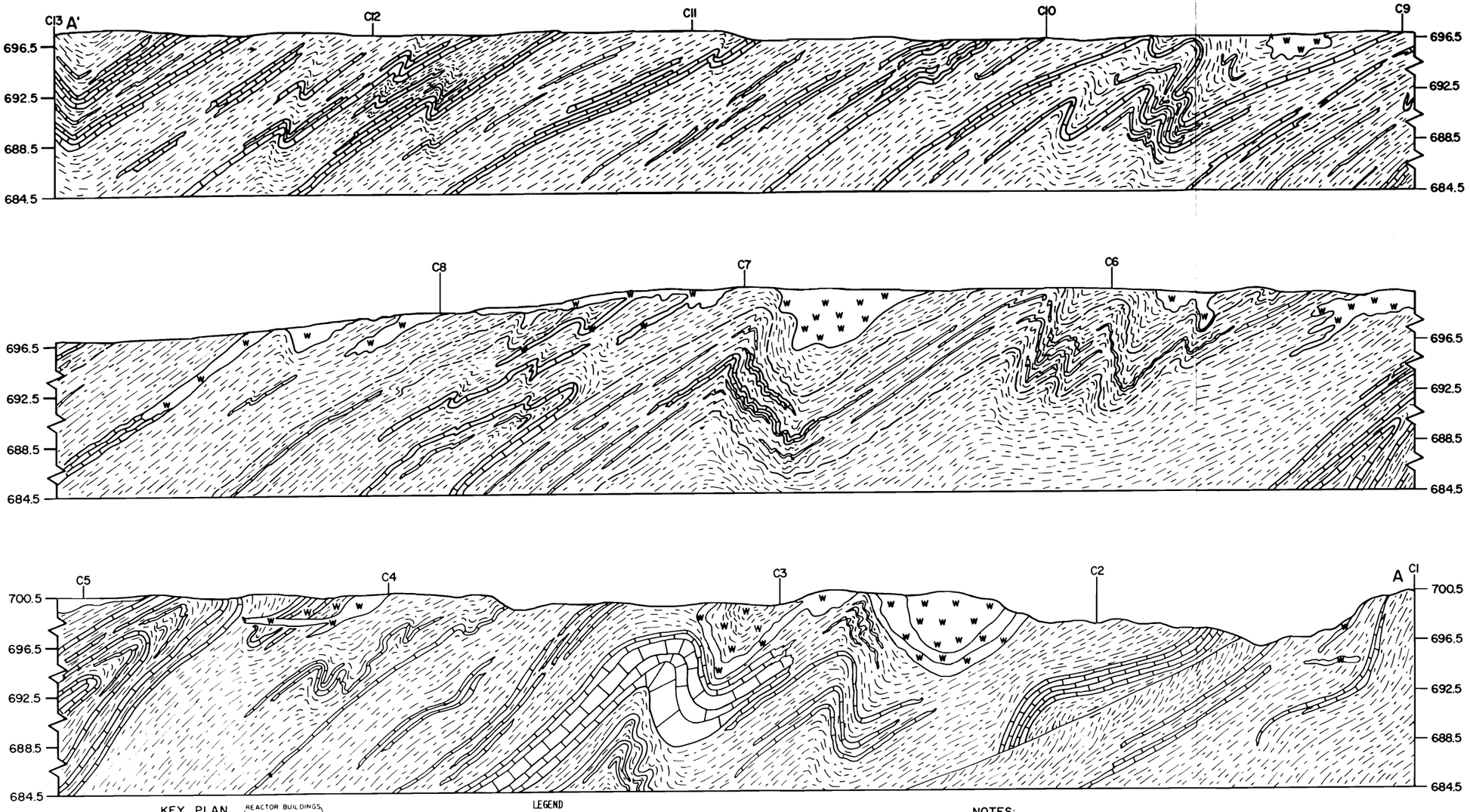
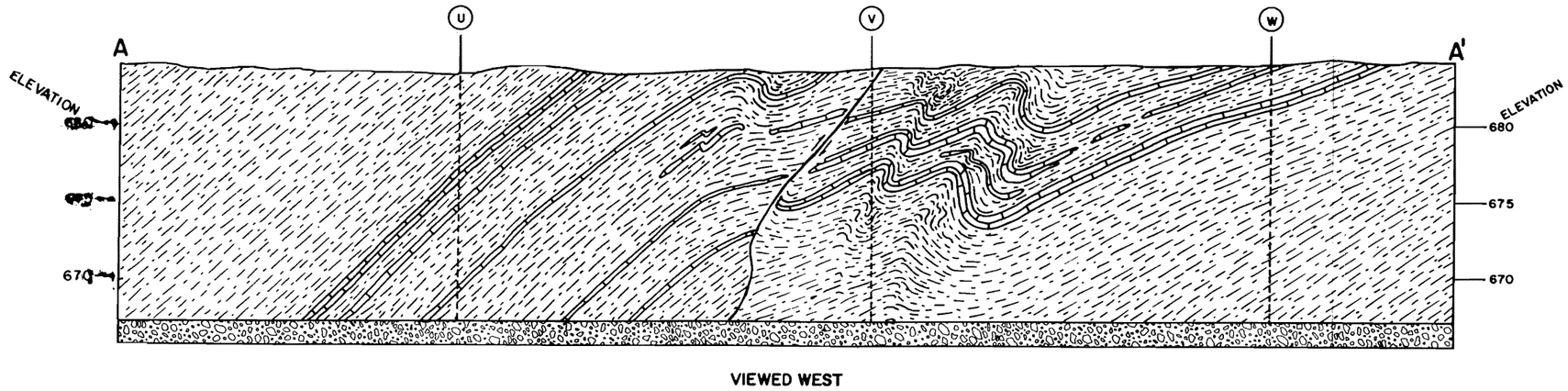
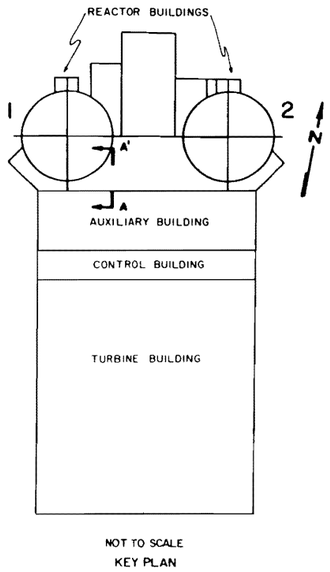


Figure 2.5-113 Geologic Section Along N Line From Cl To C13





LEGEND

- THRUST FAULT
- LIMESTONE - FINE- TO COARSE-GRAINED, WHITE TO DARK GREY TO PINK, THIN, MEDIUM TO MASSIVE BEDDED, SOME BEDS GLAUCONITIC AND, OR ARGILLACEOUS.
- SHALE - VARICOLORED RED, GREY, GREEN AND PURPLE, FISSILE, CALCAREOUS SHALE WHICH FREQUENTLY IS TIGHTLY FOLDED, CRUMPLED, CONTORTED AND BOUNDED BY SLICKENSIDED SURFACES.
- PROTECTIVE CONCRETE

NOTES:

1. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age.
2. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified considerably.

SCALE:

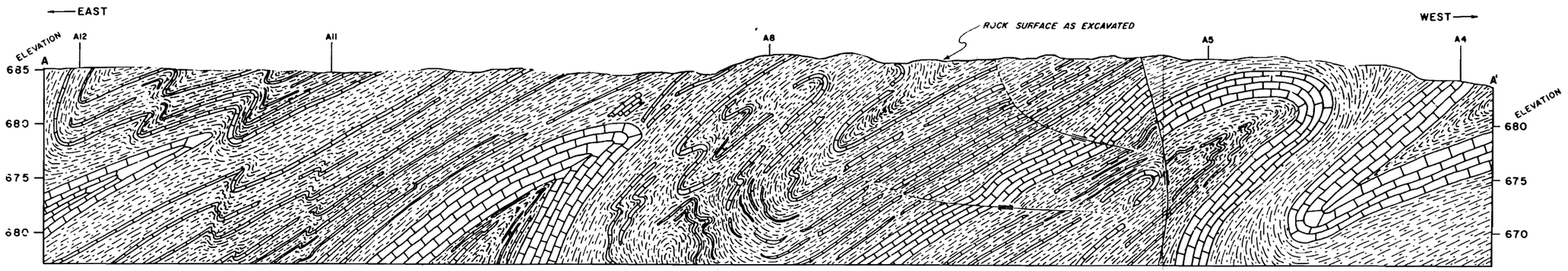
4 0 4 8 Feet

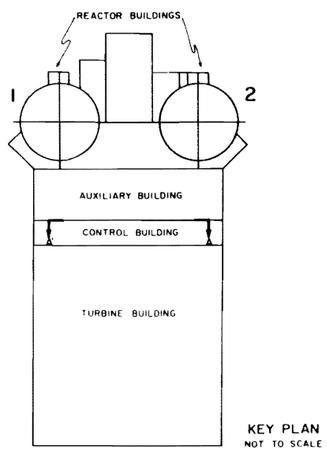
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SECTION ALONG A4+9.5
FROM T+3.5 TO W+12.5
LOOKING WEST

Figure 2.5-114

Figure 2.5-114 Section Along A4+9.5 From T+3.5 To W+12.5





LEGEND

- THRUST FAULT
- LIMESTONE - FINE- TO COARSE-GRAINED, WHITE TO DARK GREY TO PINK, THIN, MEDIUM TO MASSIVE BEDDED, SOME BEDS GLAUCONITIC AND, OR ARGILLACEOUS.
- SHALE - VARICOLORED RED, GREY, GREEN AND PURPLE, FISSILE, CALCAREOUS SHALE WHICH FREQUENTLY IS TIGHTLY FOLDED, CRUMPLED, CONTORTED AND BOUNDED BY SLICKENSIDED SURFACES.

NOTES:

1. All rock encountered in excavation identified as Lower Conasauga Formation of Middle Cambrian age.
2. Due to complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified considerably

SCALE:

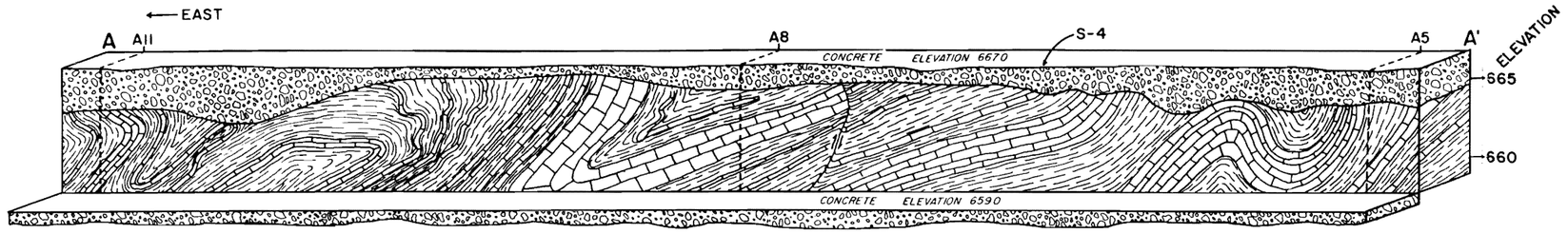
4 0 4 8 FEET

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

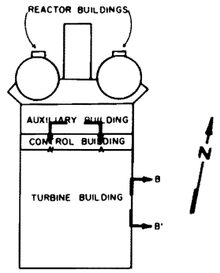
GEOLOGIC SECTION AND
PANORAMIC PHOTOGRAPH
Q-4 LINE FROM A4-3 TO A12+3

Figure 2.5-115

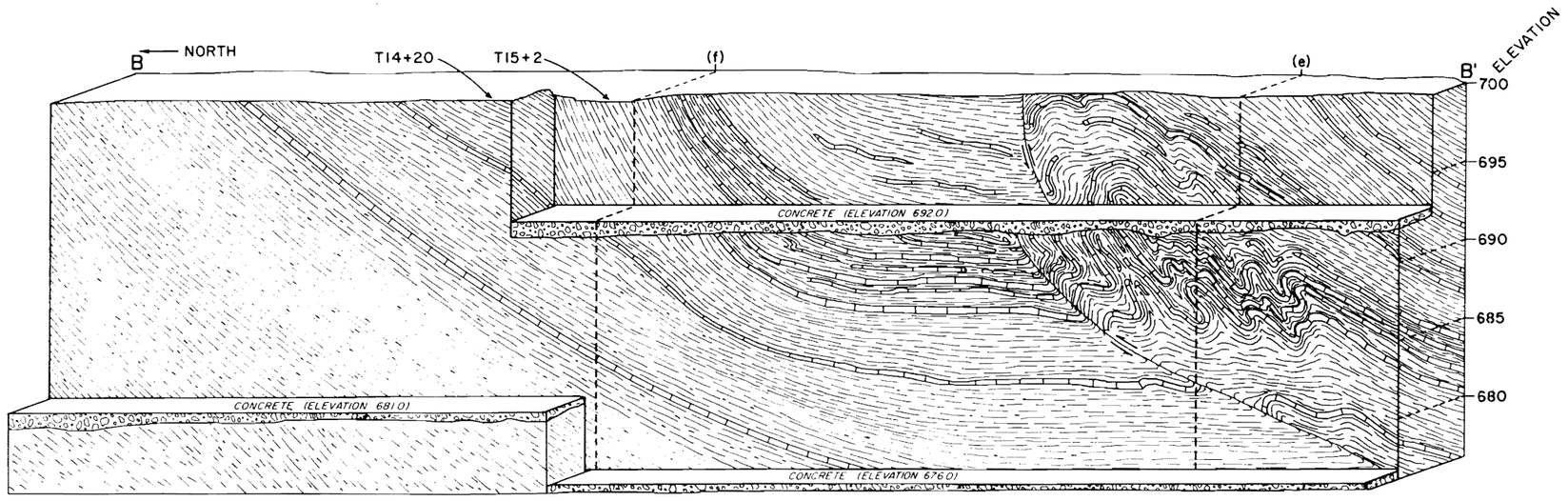
Figure 2.5-115 Geologic Section and Panoramic Photograph Q-4 Line From A4-3 To A12+3



SECTION ALONG S-4
LOOKING SOUTH



KEY PLAN
NOT TO SCALE



SECTION ALONG T14+20 & T15+2
LOOKING EAST

LEGEND

- THRUST FAULT
- LIMESTONE - FINE- TO COARSE-GRAINED, WHITE TO DARK GREY TO PINK, THIN, MEDIUM TO MASSIVE BEDDED, SOME BEDS GLAUCONITIC AND, OR ARGILLACEOUS.
- SHALE - VARICOLORED RED, GREY, GREEN AND PURPLE, FISSILE, CALCAREOUS SHALE WHICH FREQUENTLY IS TIGHTLY FOLDED, CRUMPLED, CONTORTED AND BOUNDED BY SLICKENSIDED SURFACES.
- PROTECTIVE CONCRETE

SCALE

4 0 4 8 Feet

NOTES:

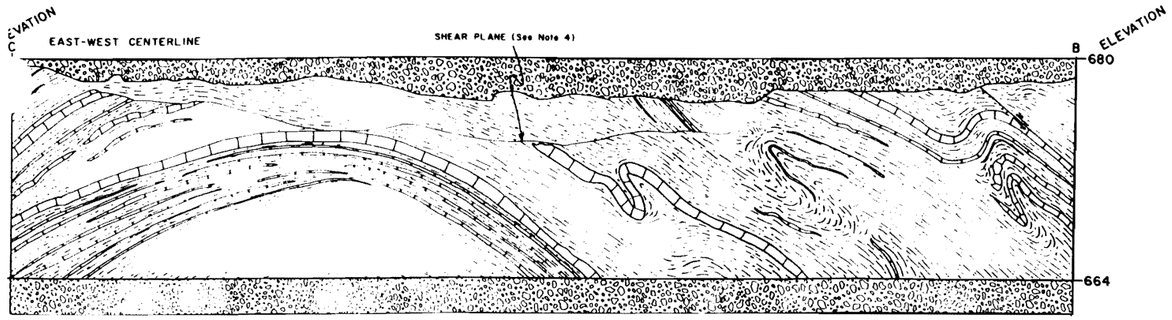
1. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age.
2. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified.

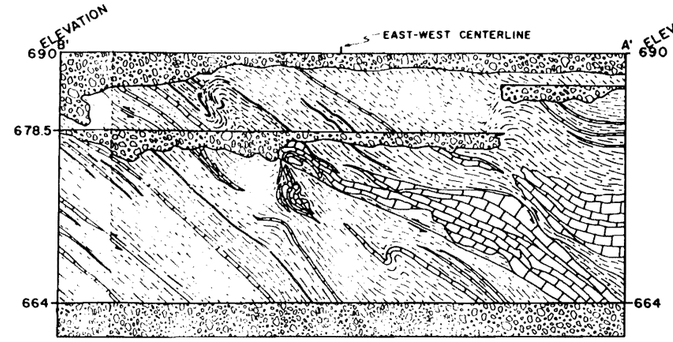
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

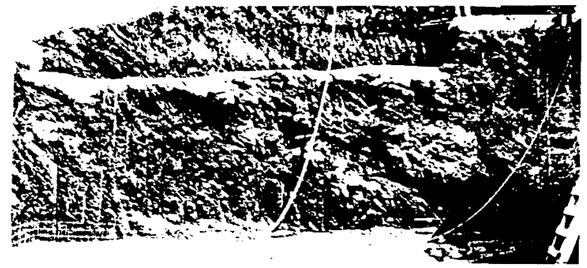
GEOLOGIC SECTIONS
AUXILIARY AND TURBINE BUILDINGS

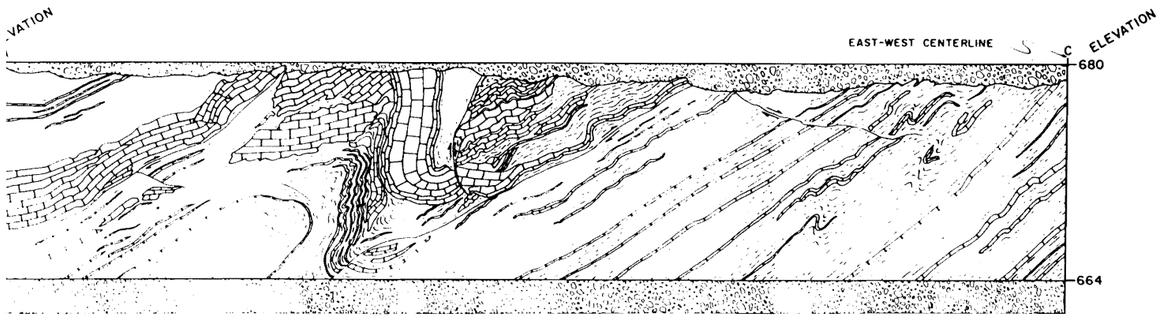
Figure 2.5-116

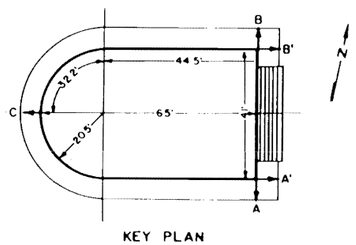
Figure 2.5-116 Geologic Sections Auxiliary And Turbine Buildings











KEY PLAN

LEGEND

- THRUST FAULT
- LIMESTONE - FINE- TO COARSE-GRAINED, WHITE TO DARK GREY TO PINK, THIN, MEDIUM TO MASSIVE BEDDED; SOME BEDS GLAUCONITIC AND/OR ARGILLACEOUS.
- SHALE - VARICOLORED RED, GREY, GREEN AND PURPLE, FISSILE; CALCAREOUS SHALE WHICH FREQUENTLY IS TIGHTLY FOLDED, CRUMPLED, CONTORTED AND BOUNDED BY SLICKENSIDED SURFACES.
- W - WEATHERED [illegible] SHALE, WEATHERED GLAUCONITIC LIMESTONE AND/OR CLAY REMOVED PRIOR TO EMPLACEMENT OF PROTECTIVE CONCRETE
- PROTECTIVE CONCRETE

NOTES:

1. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified considerably
2. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age
3. Graphic presentations not to scale due to photographic distortions
4. Strata above shear plane gives evidence to have been displaced to the northwest

SCALE

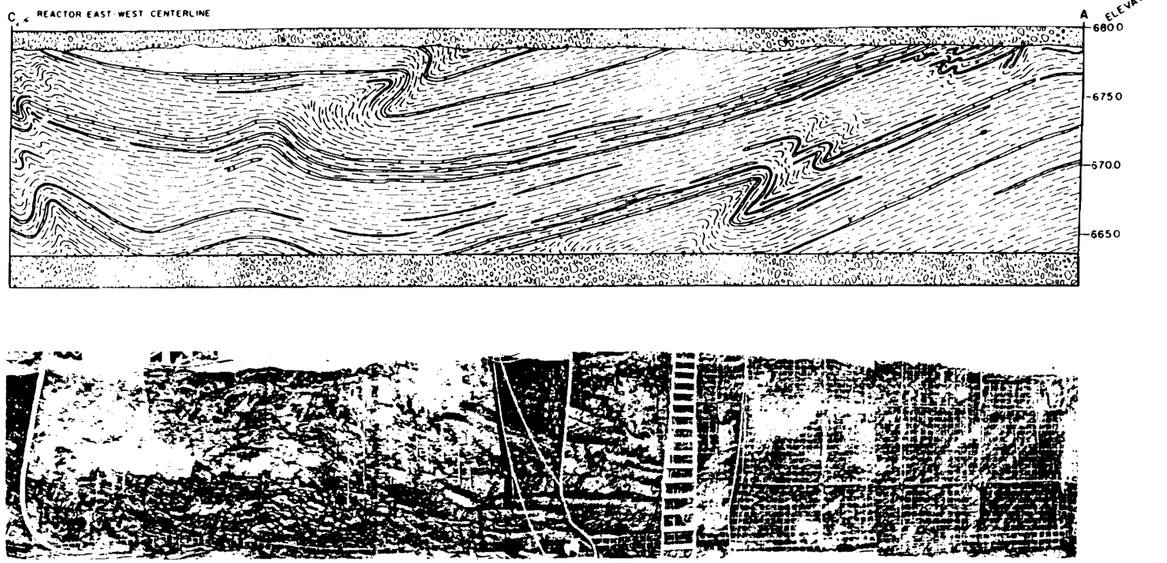
See note 3

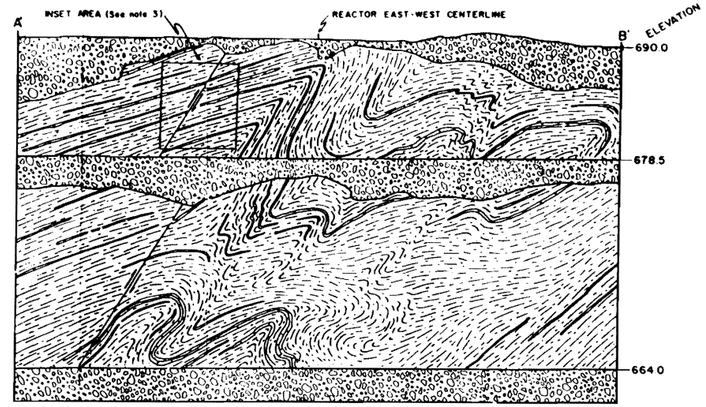
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

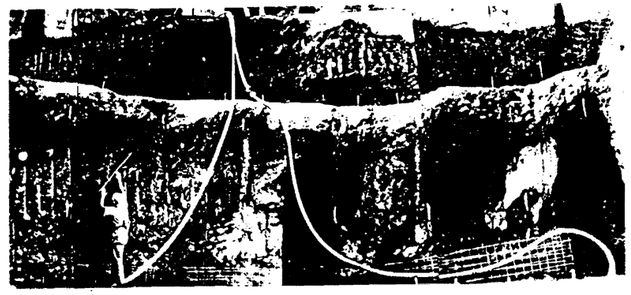
UNIT 2
GEOLOGIC SECTIONS AND
PANORAMIC PHOTOGRAPHS

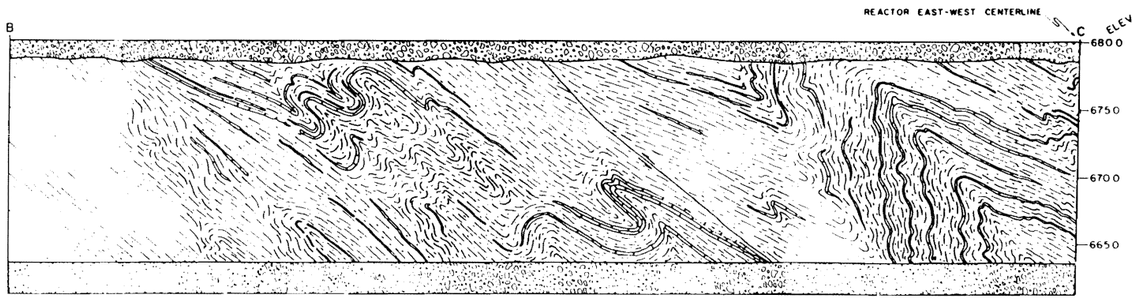
Figure 2.5-117

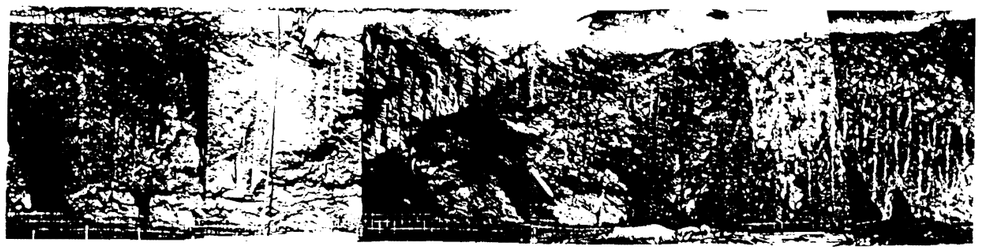
Figure 2.5-117 Geologic Sections And Panoramic Photographs (Unit 2)

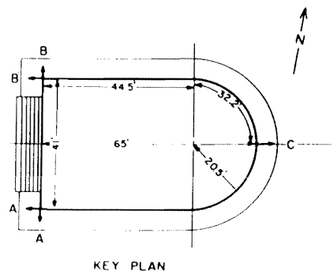












KEY PLAN

NOTES

1. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified considerably
2. Graphic presentations not to scale due to photographic distortions
3. See closeup photograph of inset area (Photograph #14186-1)
4. All rock encountered in excavation identified as Lower Conasauga Formation of Middle Cambrian age

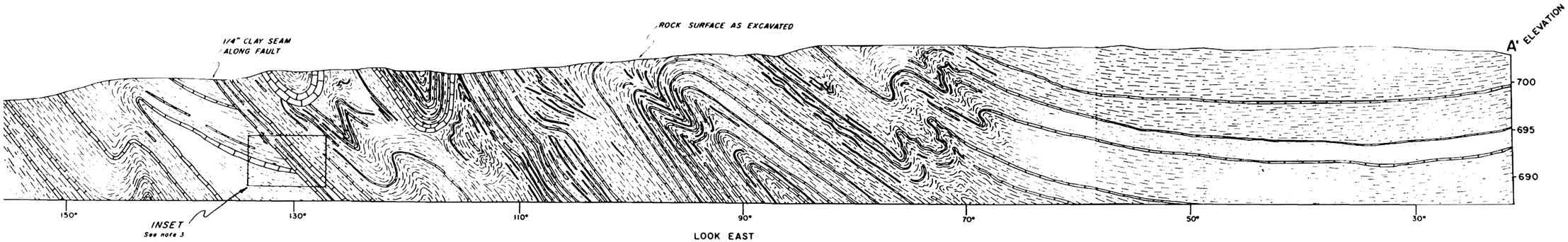
SCALE
See note 3

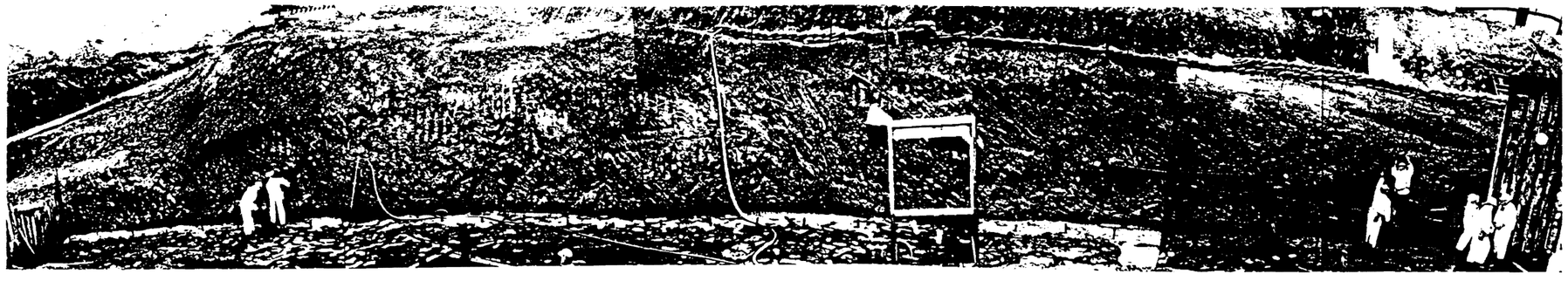
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

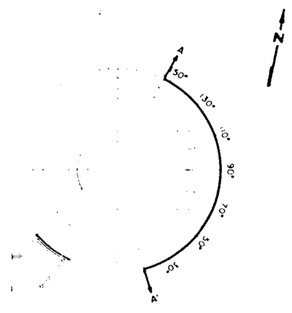
UNIT 1
GEOLOGIC SECTIONS AND
PANORAMIC PHOTOGRAPHS

Figure 2.5-118

Figure 2.5-118 Geologic Sections And Panoramic Photographs (Unit 1)







KEY PLAN

LEGEND

- THRUST FAULT
- LIMESTONE - FINE- TO COARSE-GRAINED, WHITE TO DARK GREY TO PINK, THIN, MEDIUM TO MASSIVE BEDDED. SOME BEDS GLAUCONITIC AND/OR ARGILLACEOUS.
- SHALE - VARICOLORED RED, GREY, GREEN AND PURPLE, FISSILE, CALCAREOUS SHALE WHICH FREQUENTLY IS TIGHTLY FOLDED, CRUMPLED, CONTORTED AND BOUNDED BY SLICKENSIDED SURFACES.

NOTES:

1. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age
2. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified
3. See closeup photograph of inset area (photograph N° 90863E)

SCALE

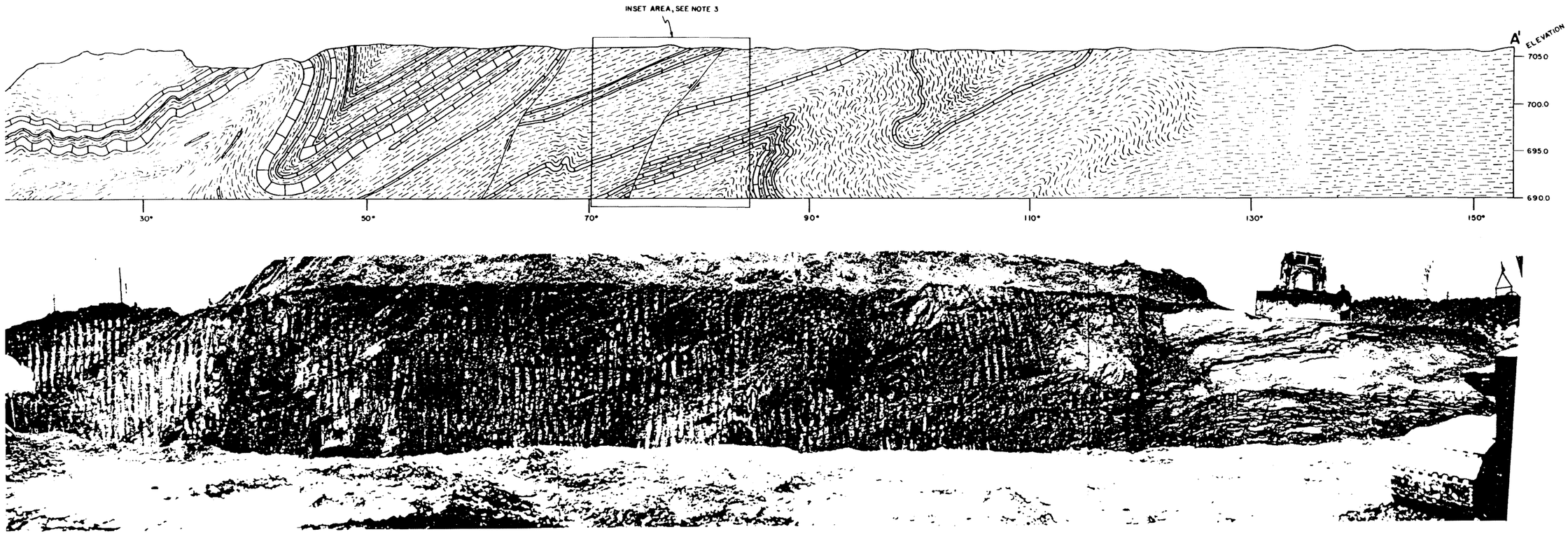
0 4 8 FEET

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

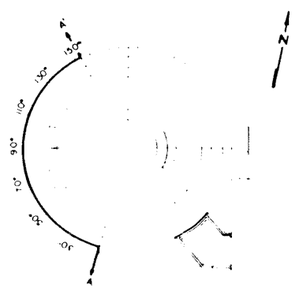
GEOLOGIC SECTION AND PANORAMIC PHOTOGRAPH OF REACTOR 2 EAST PERIMETER WALL

Figure 2.5-119

Figure 2.5-119 Geologic Sections and Panoramic Photographs of Reactor 2 East Perimeter Wall



VIEWED WEST



KEY PLAN

LEGEND

THRUST FAULT

LIMESTONE - FINE- TO COARSE-GRAINED, WHITE TO DARK GREY TO PINK, THIN, MEDIUM TO MASSIVE BEDDED, SOME BEDS GLAUCONITIC AND OR ARGILLACEOUS.

SHALE - VARICOLORED RED, GREY, GREEN AND PURPLE, FISSILE, CALCAREOUS SHALE WHICH FREQUENTLY IS TIGHTLY FOLDED, CRUMPLED, CONTORTED AND BOUNDED BY SLICKENSIDED SURFACES

NOTES

1. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age
2. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified
3. See closeup photograph of inset area (photograph 88906 ( ))

SCALE

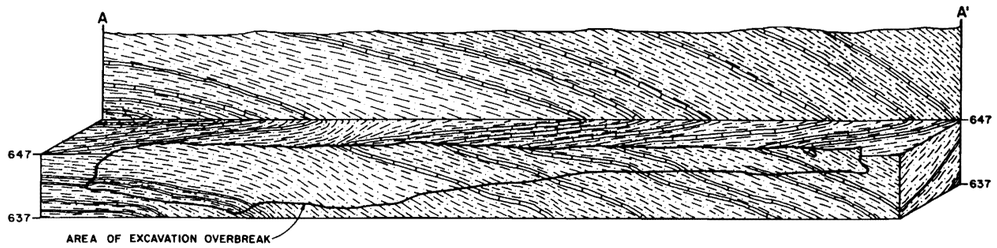
0 4 8FEET

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

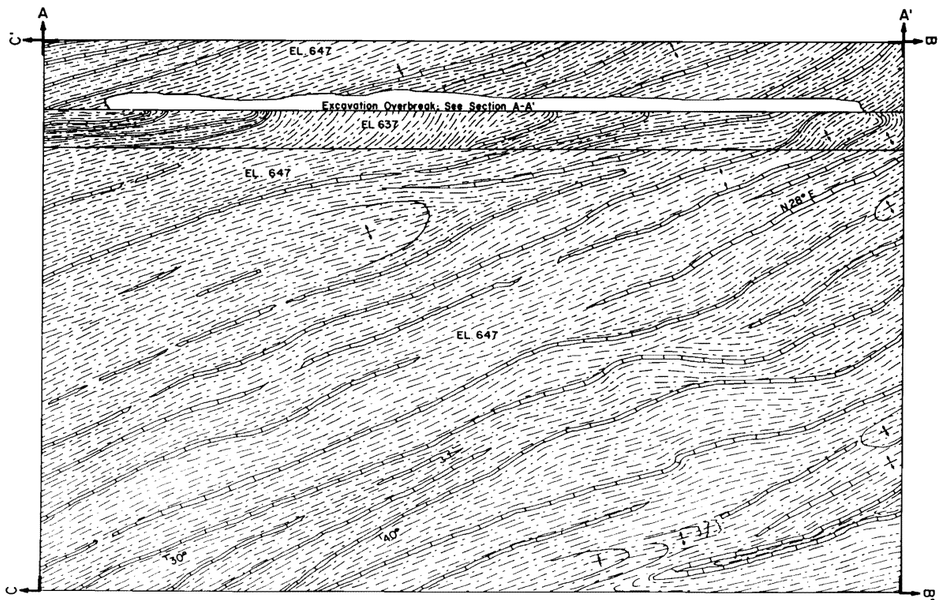
GEOLOGIC SECTION AND PANORAMIC PHOTOGRAPH OF REACTOR 1 WEST PERIMETER WALL

Figure 2.5-120

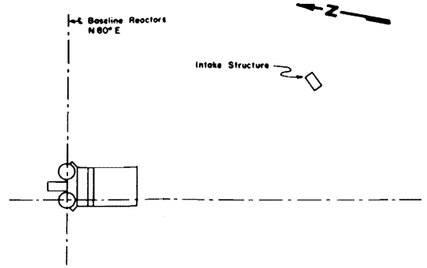
Figure 2.5-120 Geologic Section and Panoramic Photograph of Reactor 1 West Perimeter Wall



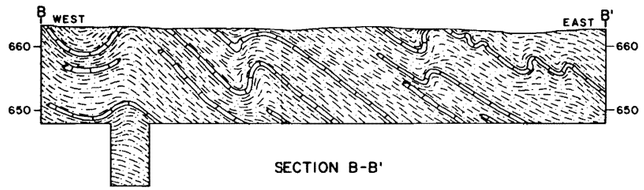
SECTION A-A'



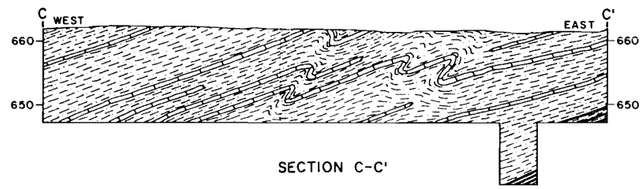
PLAN



KEY PLAN
NOT TO SCALE



SECTION B-B'



SECTION C-C'

NOTES:

1. All rock encountered in excavation identified as lower Conasauga Formation of Middle Cambrian age.
2. Due to the complexly folded and contorted characteristics of the foundation rock, the geologic sections have been simplified

SCALE:

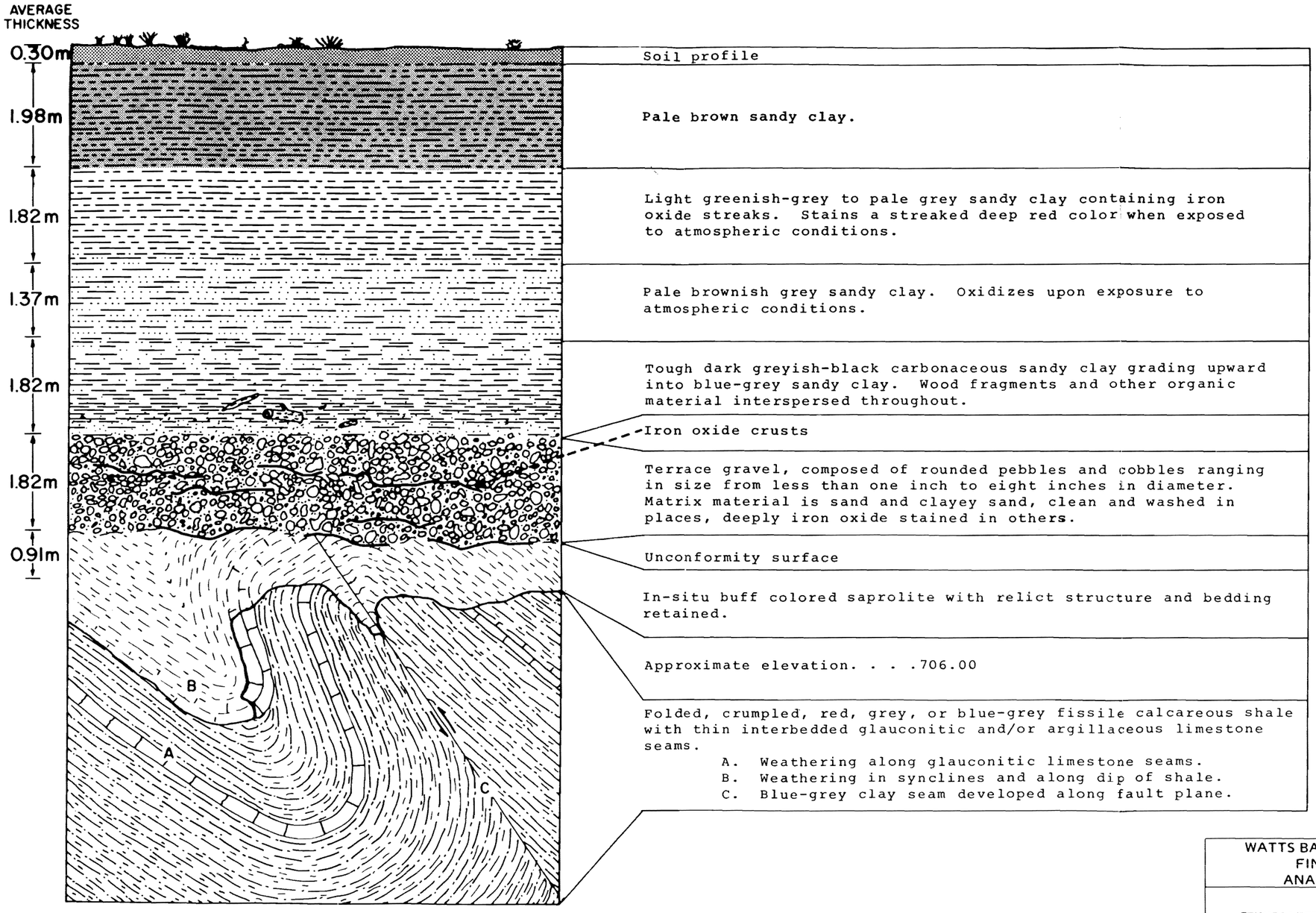
10 0 10 20 FEET

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GEOLOGIC PLAN AND SECTIONS
INTAKE STRUCTURE FOUNDATION

Figure 2.5-121

Figure 2.5-121 Geologic Plan And Sections Intake Structure Foundation



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

GENERALIZED GEOLOGIC SECTION
AND SOIL PROFILE

Figure 2.5-122

Figure 2.5-122 Generalized Geologic Section And Soil Profile

Watts Bar Nuclear Plant Tennessee Valley Authority 88902-F January 16, 1974 Gary W. Krantz, Knoxville	Fault shown cutting across Auxiliary Building at A4+28 feet and east-west reactor centerline, through SE perimeter of Reactor #1, and into Auxiliary Building West Wall near U line. Viewed southwest.

Figure 2.5-123

Figure 2.5-123 Fault Shown Cutting Across Auxiliary Building at A4+28 Feet and East-West Reactor Centerline, Through SE Perimeter of Reactor #1, and Into Auxiliary Building West Wall Near U Line. Viewed Southwest.

Watts Bar Nuclear Plant Tennessee Valley Authority 88906-H December 13, 1973 Gary W. Krantz, Knoxville	Fault in Auxiliary Building Wall, approximately 9 feet west of A5 and 6 feet south of east-west reactor centerline. Fault continues across SE perimeter of Reactor #1. Viewed southwest.

Figure 2.5-124

Figure 2.5-124 Fault In Auxiliary Building Wall, Approximately 9 Feet West Of A5 and 6 Feet South of East-West Reactor Centerline. Fault Continues Across SE Perimeter of Reactor #1. Viewed Southwest.

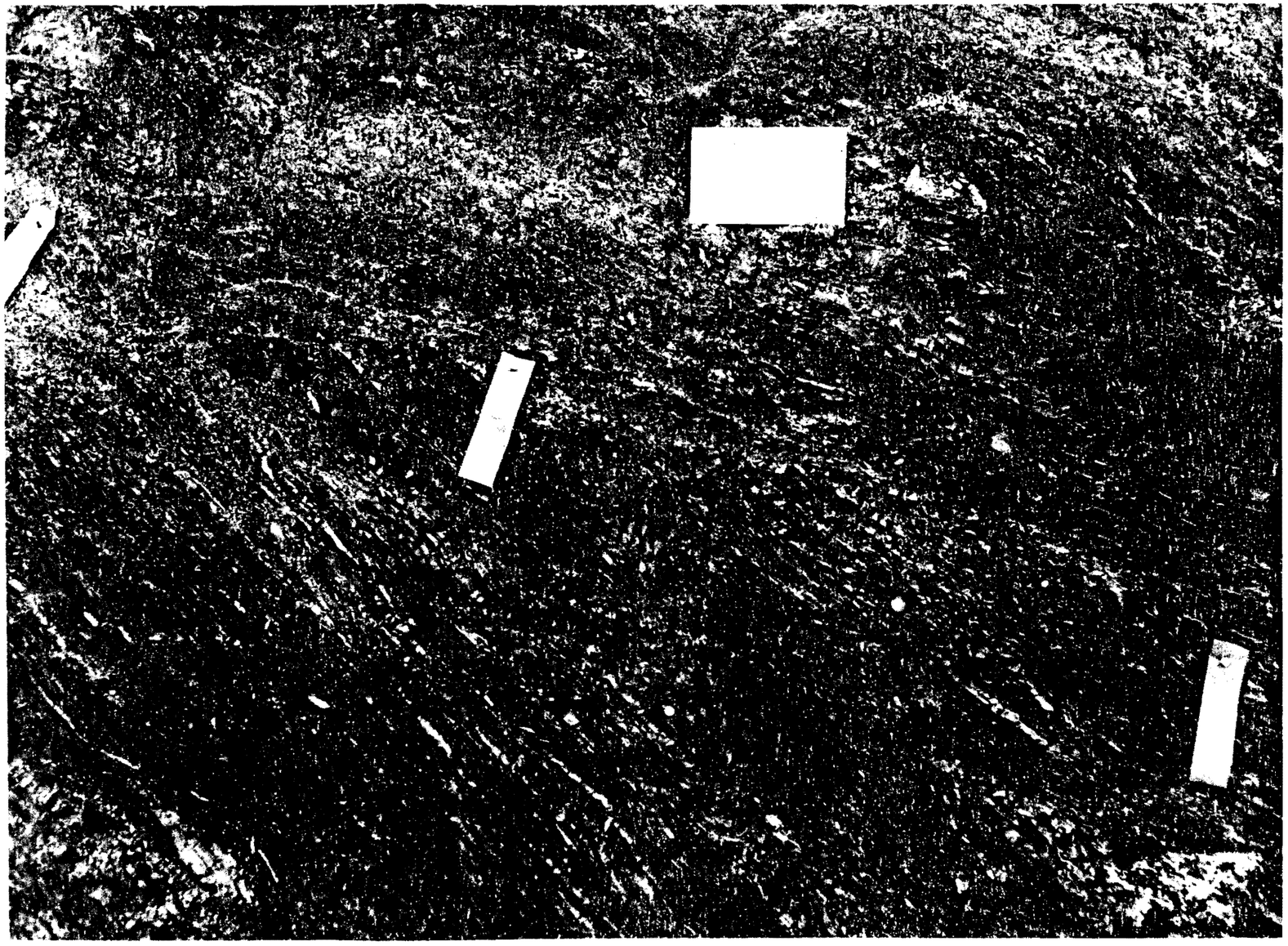
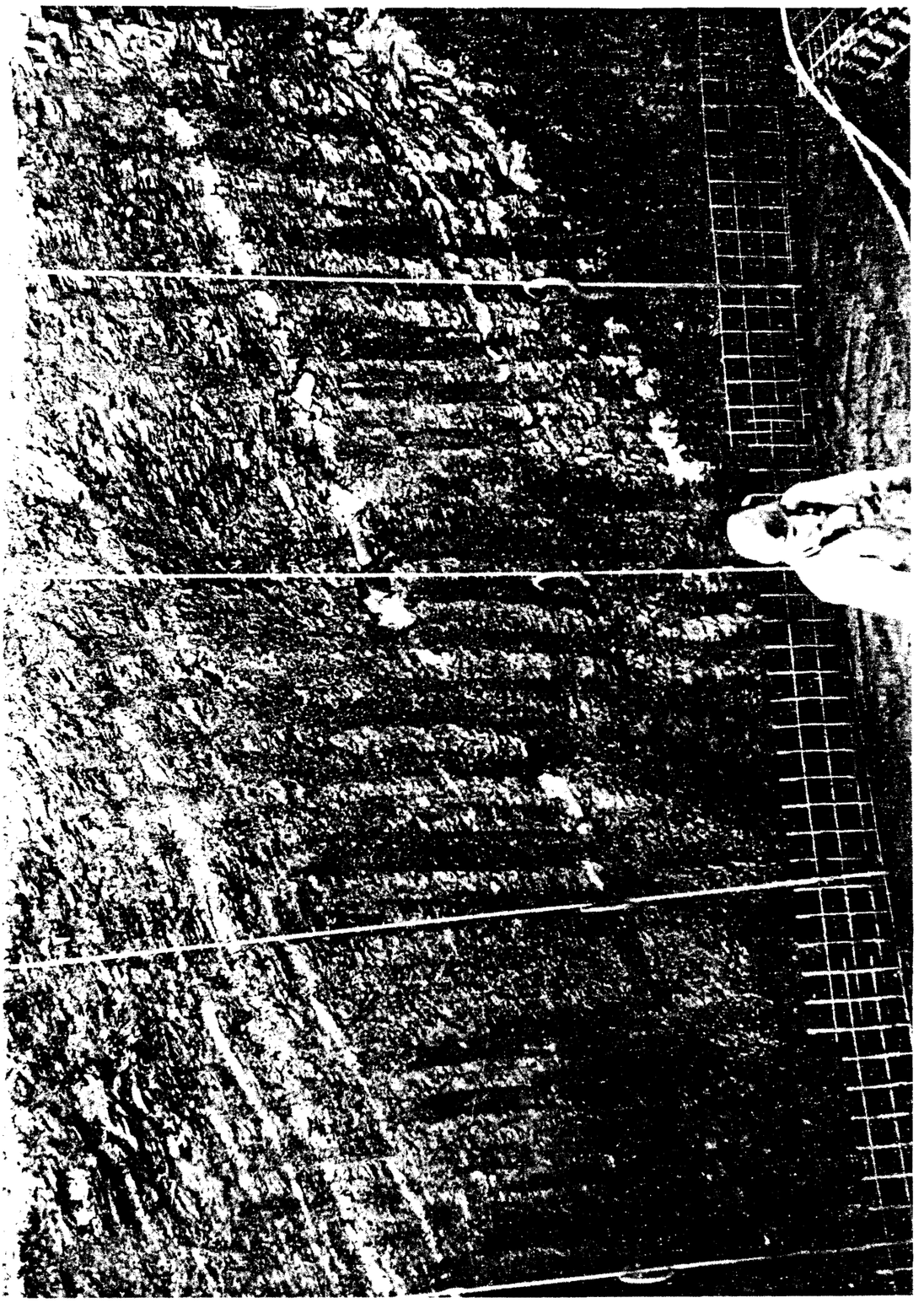


Figure 2.5-125

UP

Watts Bar Nuclear Plant Tennessee Valley Authority 90865-B March 7, 1974 Gary W. Krantz, Knoxville	Minor thrust fault and associated one-eighth inch clay seam located in east foundation cut at q line and C13+12 feet. Viewed east.

Figure 2.5-125 Minor Thrust Fault and Associated One-Eighth Inch Clay Seam Located In East Foundation Cut at Q Line and C13+I2 Feet. Viewed East.



Watts Bar Nuclear Plant
Tennessee Valley Authority
88906-L December 17, 1973
Gary W. Krantz, Knoxville

Closeup of Reactor #1 normal fault at 72 degrees. Viewed west.

Figure 2.5-126 Closeup of Reactor #1 Normal Fault at 72 Degrees. Viewed West.

Figure 2.5-126

Watts Bar Nuclear Plant
Tennessee Valley Authority
14186-1 March 14, 1974
Gary W. Krantz, Knoxville

Closeup of fault in Reactor #1 cavity west wall between elevations of 678.5 and 690.0 feet. Viewed west. Scale: 1 inch = 0.56 feet.

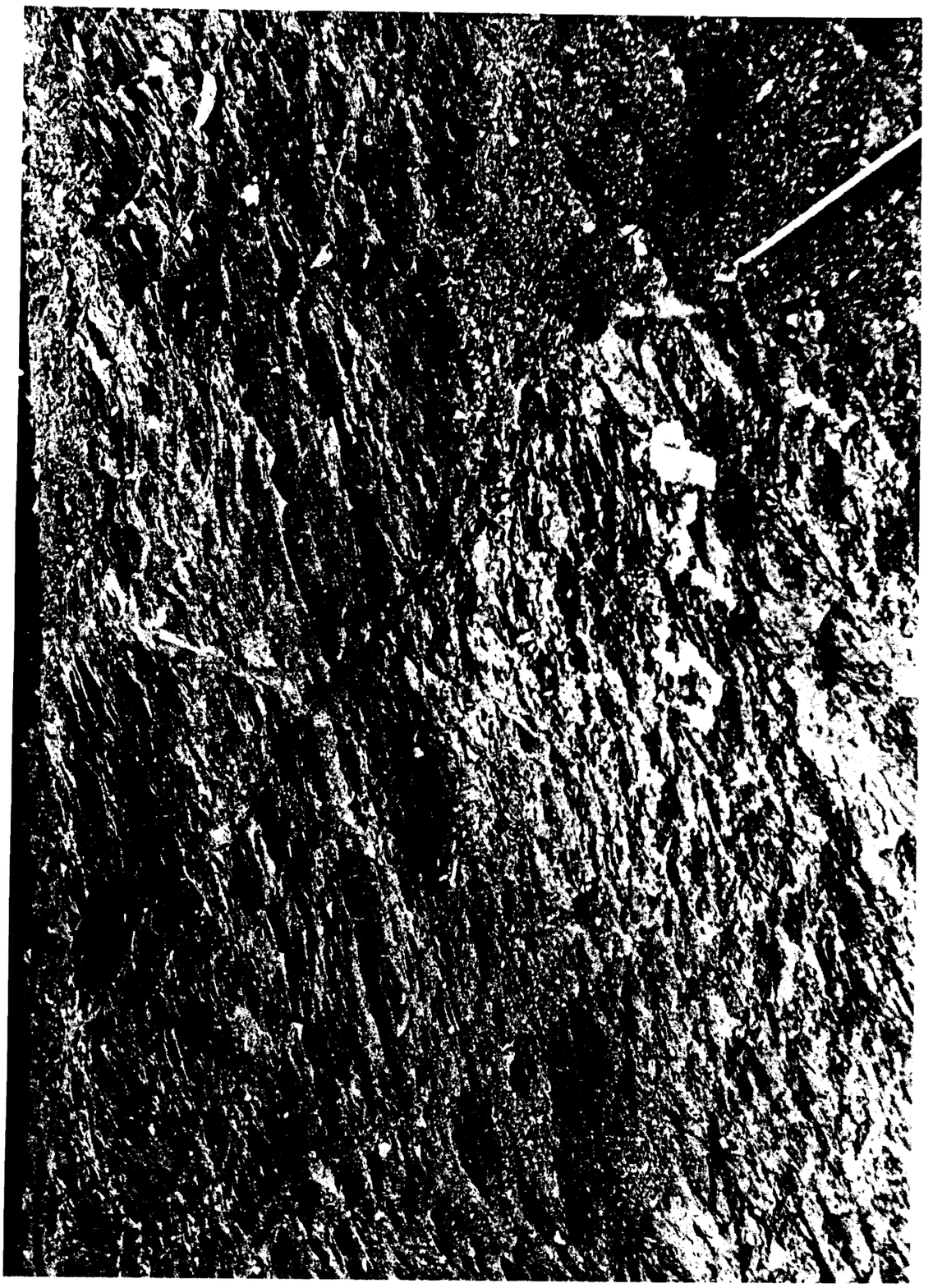
Figure 2.5-127

Figure 2.5-127 Closeup of Fault In Reactor #1 Cavity West Wall Between Elevations of 678.5 And 690.0 Feet. Viewed West. Scale: 1 Inch = 0.56 Feet.

Figure 2.5-128

Watts Bar Nuclear Plant Tennessee Valley Authority 88906-I December 13, 1973 Gary W. Krantz, Knoxville	Fault in Auxiliary Building at All and east-west reactor centerline. Fault continues NE through NW perimeter of Reactor #2 Building. Viewed northeast.

Figure 2.5-128 Fault In Auxiliary Building at All And East-West Reactor Centerline. Fault Continues NE Through NW Perimeter of Reactor #2 Building. Viewed Northeast.

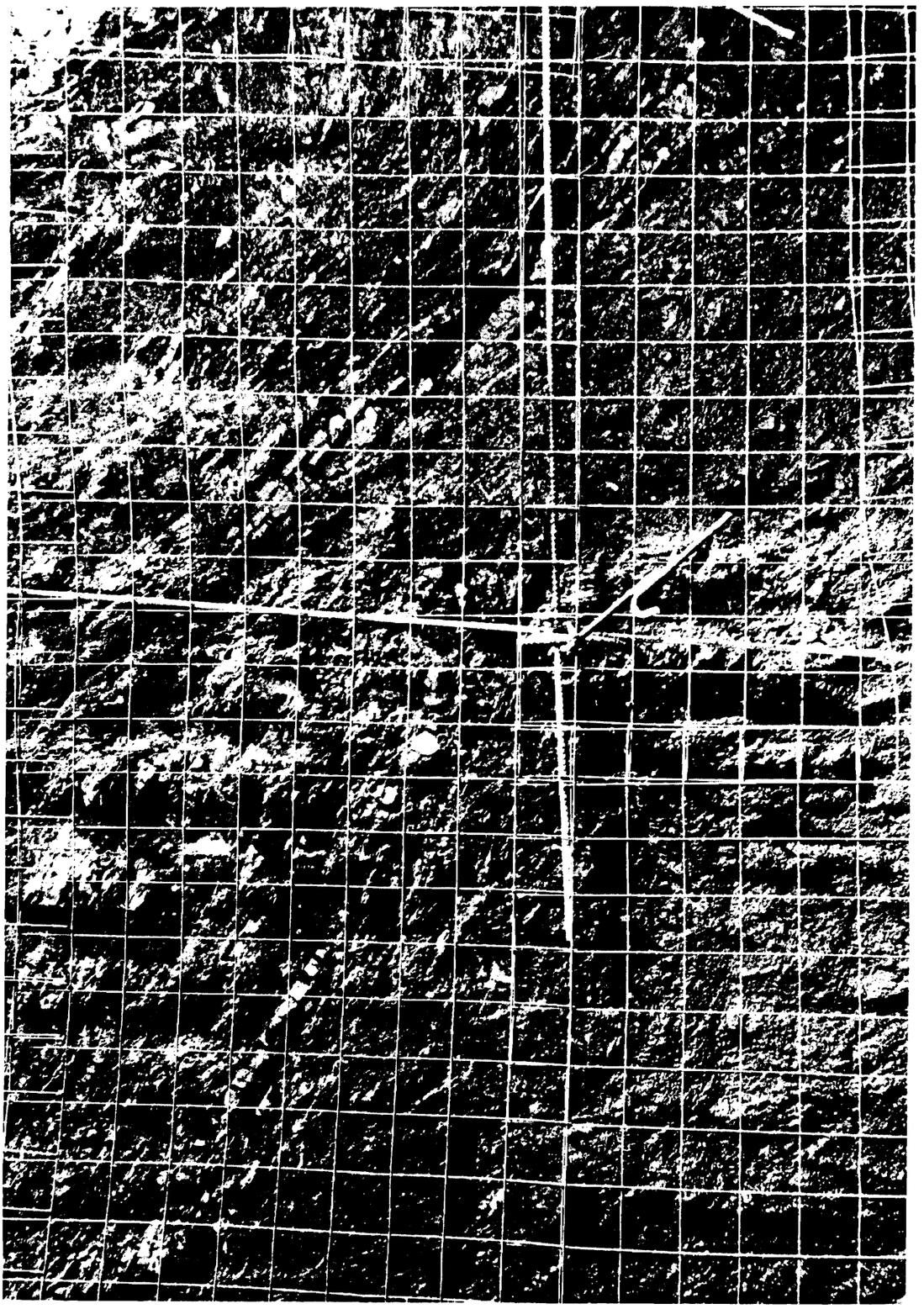


Watts Bar Nuclear Plant
Tennessee Valley Authority
88902-J January 16, 1974
Gary W. Krantz, Knoxville

Gravity or normal fault on northeast Reactor #1 perimeter at 233 degrees. Fault plane dips north at 40 degrees. Viewed west.

Figure 2.5-129

Figure 2.5-129 Gravity or Normal Fault on Northeast Reactor #1 Perimeter at 233 Degrees. Fault Plane Dips North at 40 Degrees. Viewed West.



Watts Bar Nuclear Plant
Tennessee Valley Authority
90863 E February 1, 1974
Gary W. Krantz, Knoxville

Fault in Reactor #2 East Wall at approximately 130 degrees. Viewed east.

Figure 2.5-130 Fault in Reactor #2 East Wall at Approximately 130 Degrees. Viewed East.

Figure 2.5-130

Watts Bar Nuclear Plant
Tennessee Valley Authority
90863 P February 20, 1974
Gary W. Krantz, Knoxville

Fault in Reactor #2 Cavity Wall at approximately 354 degrees. Elevation 680.0 at base. Viewed southwest.

Figure 2.5-131

Figure 2.5-131 Fault in Reactor #2 Cavity Wall at Approximately 354 Degrees. Elevation 680.0 at Base. Viewed Southwest.

Watts Bar Nuclear Plant Tennessee Valley Authority 90865 H March 7, 1974 Gary W. Krantz Knoxville	Fault in south wall of discharge channel showing truncation by overlying terrace gravel deposit.

Figure 2.5-132

Figure 2.5-132 Fault In South Wall of Discharge Channel Showing Truncation By Overlying Terrace Gravel Deposit.

Watts Bar Nuclear Plant
Tennessee Valley Authority
90865D March 7, 1974
Gary W. Krantz, Knoxville

Fault in north wall of discharge channel showing truncation by terrace gravel deposit.

Figure 2.5-133 Fault In North Wall of Discharge Channel Showing Truncation By Terrace Gravel Deposit.

Figure 2.5-133

Watts Bar Nuclear Plant
Tennessee Valley Authority
88902-P January 16, 1974
Gary W. Krantz, Knoxville

Fault truncation by terrace gravel deposit at 20 feet east of A8 and 18.50 feet north of Y. Elevation at bench cut is 706.35. Viewed north.
A = Terrace gravel deposit
B = Iron oxide crust
C = Buff colored saprolitic shale residuum
D = Blue-grey clay seam along fault

Figure 2.5-134

Figure 2.5-134 Fault Truncation by Terrace Gravel Deposit at 20 Feet East of A8 and 18.50 Feet North of Y. Elevation at Bench Cut is 706.35. Viewed North.

Watts Bar Nuclear Plant
Tennessee Valley Authority
January 16, 1974
Gary W. Krantz, Knoxville

Fault in vertical excavation cut at 20 feet east of A8 and 18.50 feet north of Y. Viewed north. For enlargement of inset area see next photograph.

Figure 2.5-135

Figure 2.5-135 Fault in Vertical Excavation Cut at 20 Feet East of A8 and 18.50 Feet North of Y. Viewed North.

Figure 2.5-136

Watts Bar Nuclear Plant Tennessee Valley Authority January 16, 1974 Gary W. Krantz, Knoxville	Inset Area. Blue-grey clay seam along fault trace where truncated by terrace gravel deposit. Location: 20 feet east of A8 and 18.50 feet north of Y. Viewed north.

Figure 2.5-136 Inset Area. Blue-Grey Clay Seam Along Fault Trace Where Truncated by Terrace Gravel Deposit. Location: 20 Feet East of A8 And 18.50 Feet North of Y. Viewed North.

Watts Bar Nuclear Plant Tennessee Valley Authority 90865-C March 7, 1974 Gary W. Krantz, Knoxville	Saprolite - terrace gravel contact. Hematitic crusts are seen to be dispersed at several levels in the terrace gravel. Viewed south in the exhaust cut approximately 150 feet east of the powerhouse foundation.

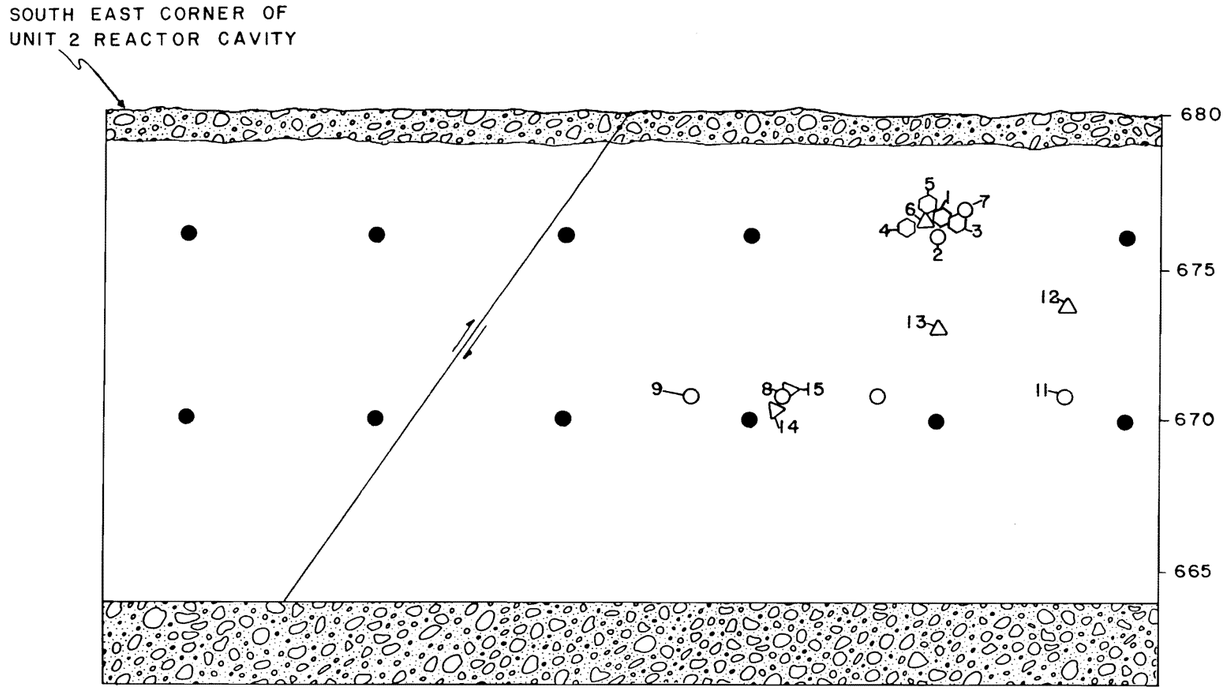
Figure 2.5-137

Figure 2.5-137 Saprolite - Terrace Gravel Contact. Hematitic Crusts are Seen to be Dispersed at Several Levels in the Terrace Gravel. Viewed South in the Exhaust Cut Approximately 150 Feet East of The Powerhouse Foundation.

Figure 2.5-138

Watts Bar Nuclear Plant Tennessee Valley Authority 86554 P March 11, 1974 Gary W. Krantz Knoxville	Site of wood specimen collection for Carbon 14 age dating. Location is 3 feet above terrace gravel deposit. Scale: Opened Brunton compass = 8.5 inches. Location: Approximately 18.5' North of Y at A5 Line. Approximate elevation 717.5.

Figure 2.5-138 Site of Wood Specimen Collection for Carbon 14 Age Dating. Location is 3 Feet Above Terrace Gravel Deposit. Scale: Opened Brunton Compass = 8.5 Inches. Location: Approximately 18.51 North of Y at A5 Line. Approximate Elevation 717.5.



PERCUSSION HOLE LAYOUT FOR HORIZONTAL AND ANGLED HOLES

1 ⬡ ---
2 ⬡
3 ⬡ } Drilled during J-bar installation
4 ⬡
5 ⬡ --
6 △
7 ○----- Angle hole inclined 36° bearing S 40° E
8 ○-----Horizontal bearing S 8-10° E
9 ○-----Horizontal bearing S 8-10° E
10 ○-----Horizontal bearing S 8-10° E
11 ○-----Horizontal bearing S 50° E
12 △---- Horizontal bearing S 50° E
13 △----Horizontal bearing S 50° E
14 △---Horizontal bearing S 60° E
15 △----Angle hole inclined 30° bearing S 8° E

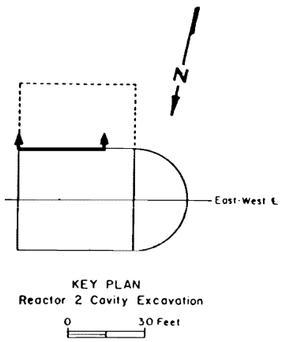
LEGEND

○ Exploration hole where disintegrated zone was intersected

△ Exploration hole where disintegrated zone was not intersected

● #9 J-Bar, grouted in with hi-early neat cement grout

Protective concrete



KEY PLAN
Reactor 2 Cavity Excavation
0 30 Feet

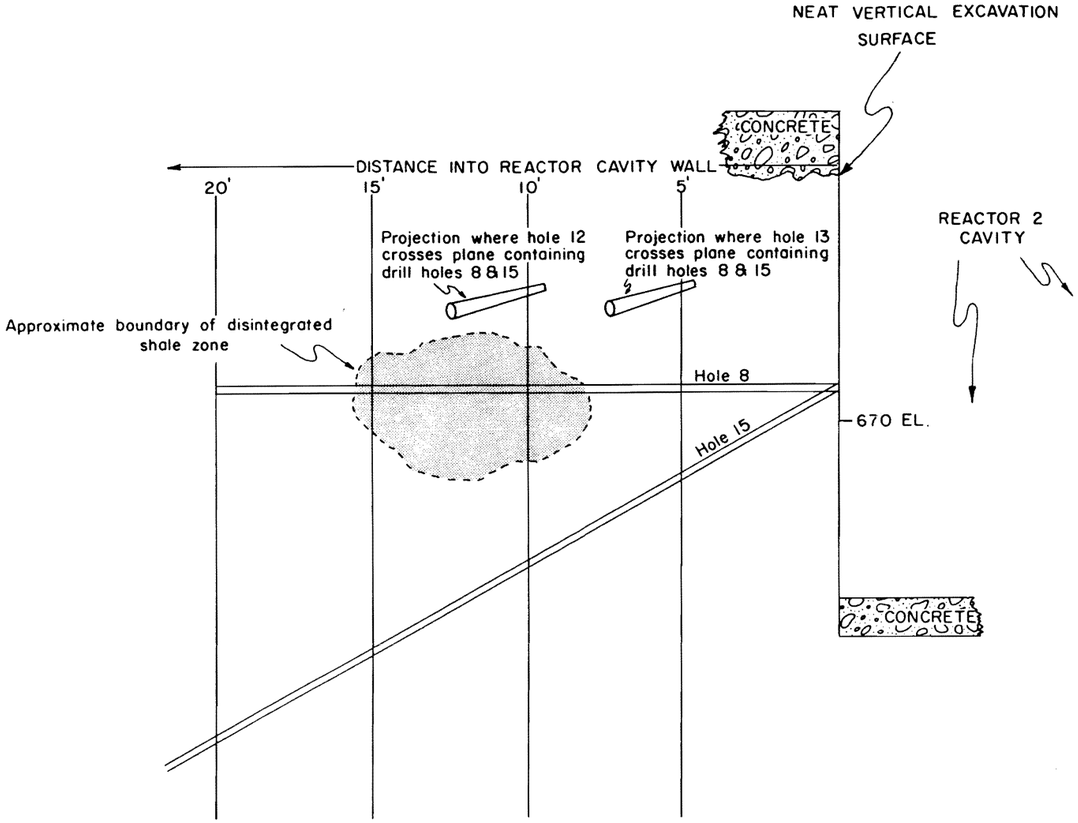
NOTE:

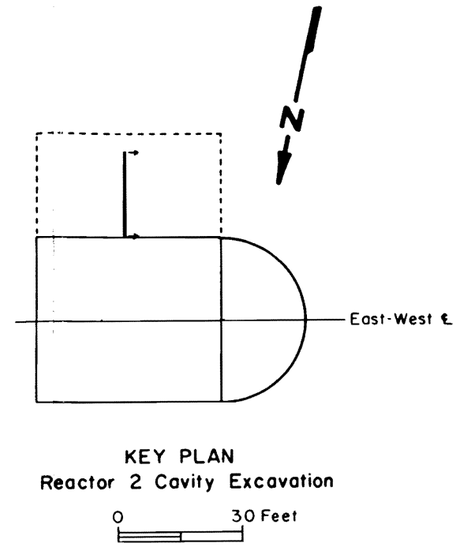
1. Bearings taken with a hand-held Brunton compass.

SCALE:
0 4 Feet

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
LAYOUT DIAGRAM FOR HORIZONTAL AND ANGLE HOLES
Figure 2.5-139

Figure 2.5-139 Layout Diagram For Horizontal and Angle Holes





SCALE:
0 4 Feet

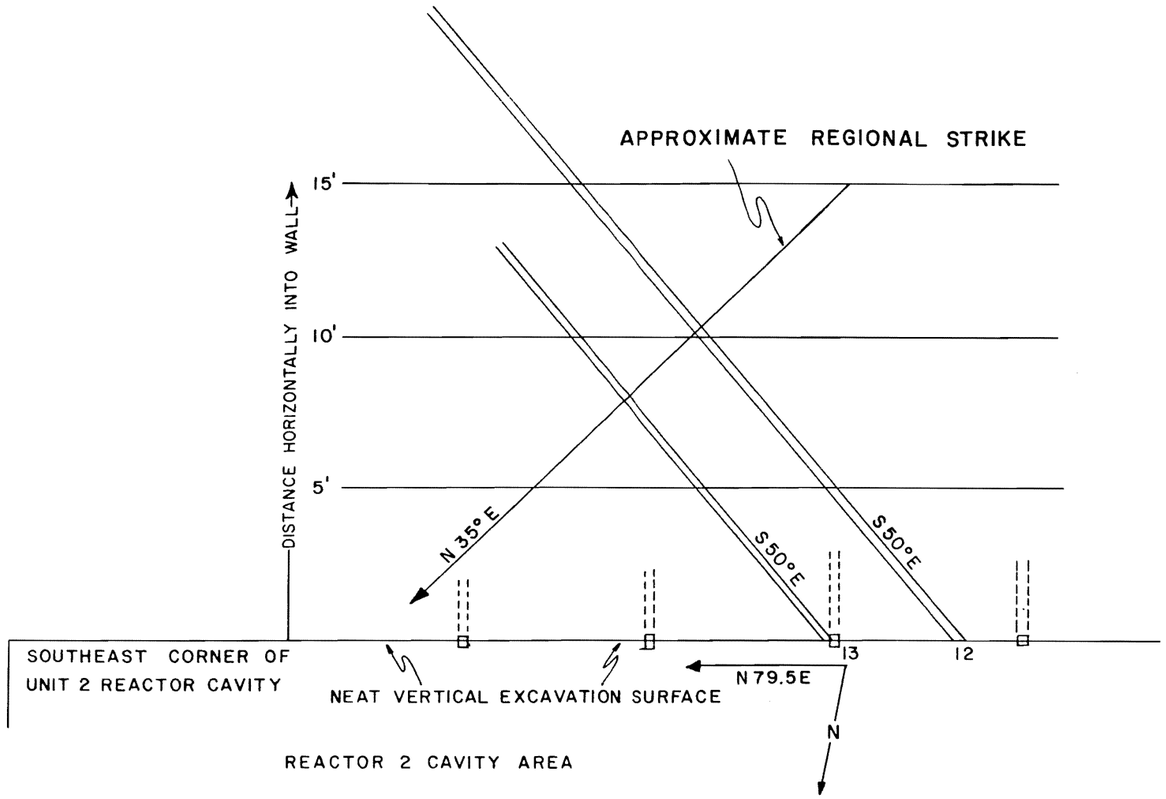
NOTE:
1. Bearings taken with a hand-held Brunton compass.

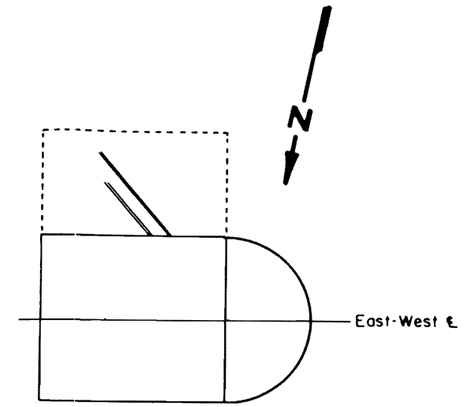
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

PLANE INTERSECTING DISINTEGRATED SHALE POCKET

Figure 2.5-140

Figure 2.5-140 Plane Intersecting Disintegrated Shale Pocket





KEY PLAN
Reactor 2 Cavity Excavation

0 30 Feet

LEGEND:

9 J-Bars grouted with hi-early neat cement grout. Out of plane of the drawing.

Percussion holes drilled horizontally

SCALE:

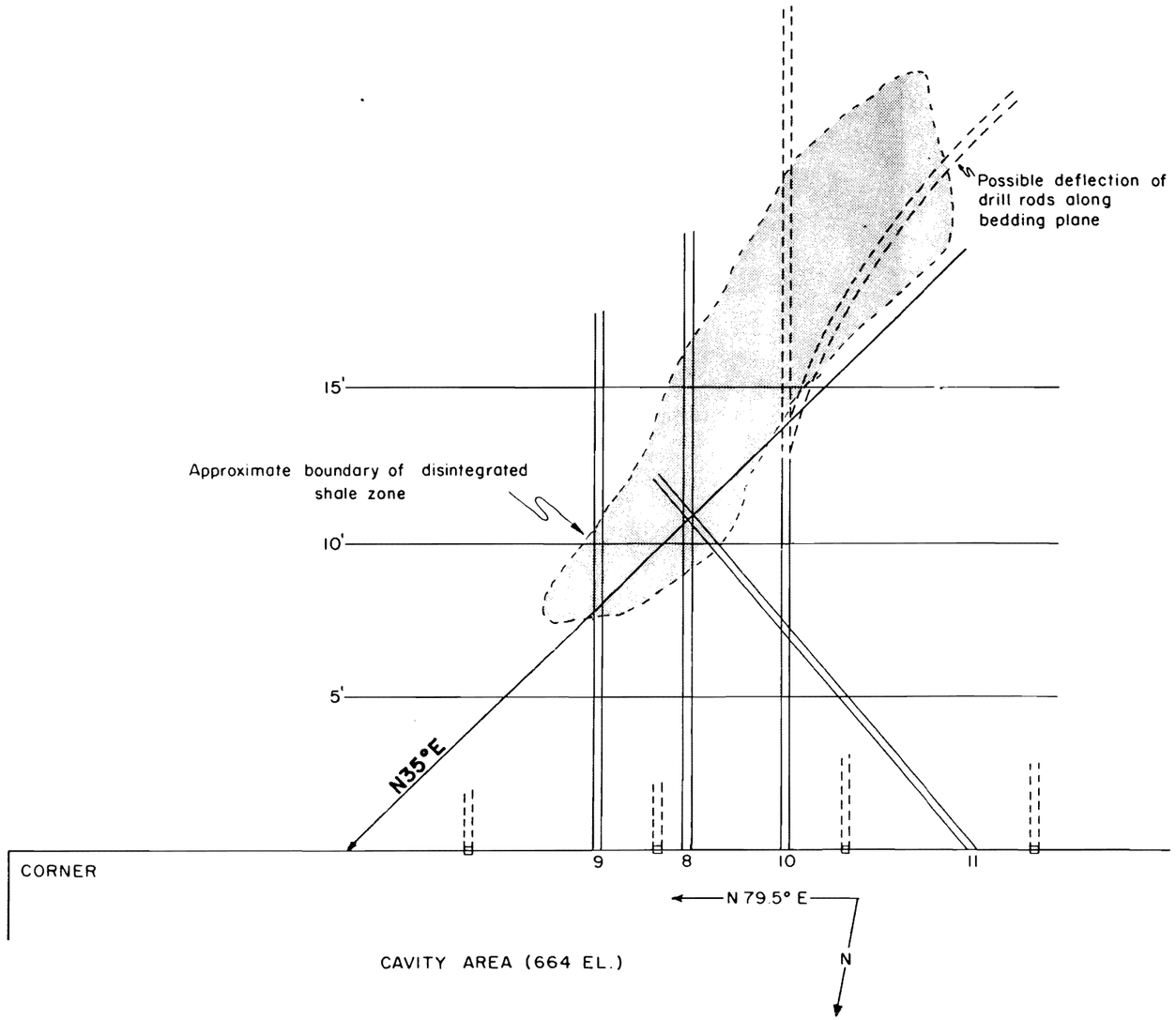
0 4 Feet

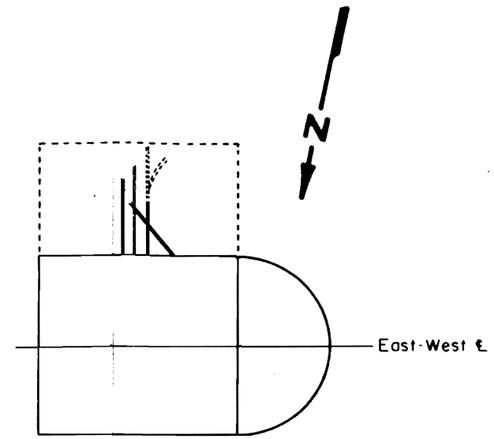
NOTE:

1. Bearings taken with a hand-held Brunton compass.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
PLANE VIEW ONTO THE 673 ELEVATION
Figure 2.5-141

Figure 2.5-141 Plane View Onto The 673 Elevation





KEY PLAN
Reactor 2 Cavity Excavation

0 30 Feet

LEGEND:

▫ ▫ ▫ ▫ #9 J-Bars, grouted with hi-early neat cement grout

Percussion holes drilled horizontally.

SCALE:

0 4 Feet

NOTE:

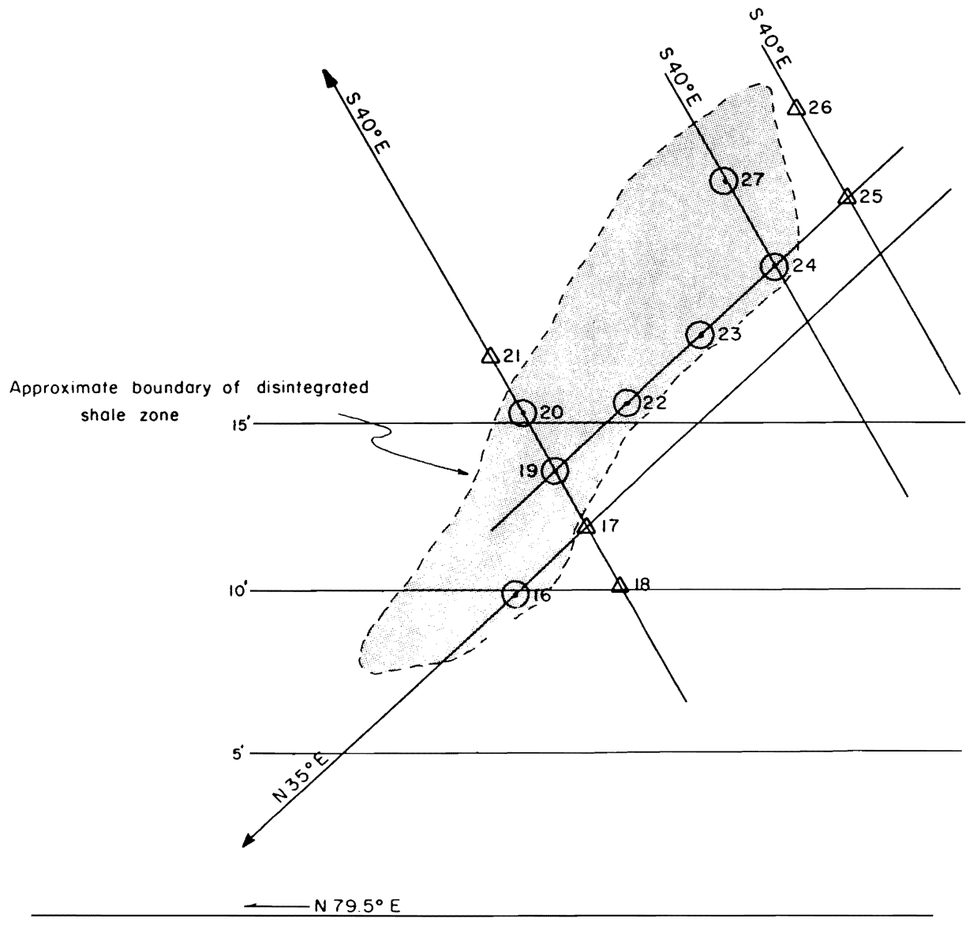
1. Bearings taken with a hand-held Brunton compass.

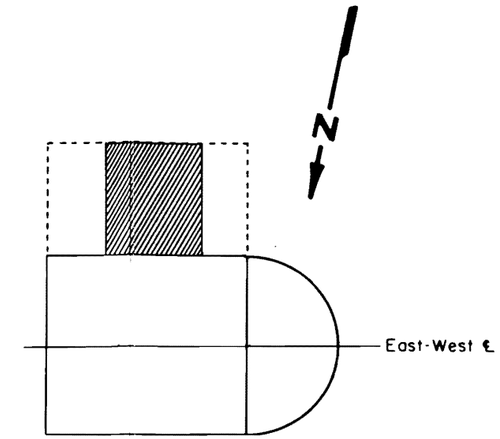
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

PLANE VIEW ONTO
THE 671 ELEVATION

Figure 2.5-142

Figure 2.5-142 Plane View Onto The 671 Elevation





KEY PLAN
Reactor 2 Cavity Excavation

0 30 Feet

LEGEND:

△ Drill hole...Zone of disintegrated shale not intersected.

⊙ Drill hole...Zone of disintegrated shale intersected.

SCALE:

0 4 Feet

NOTE:

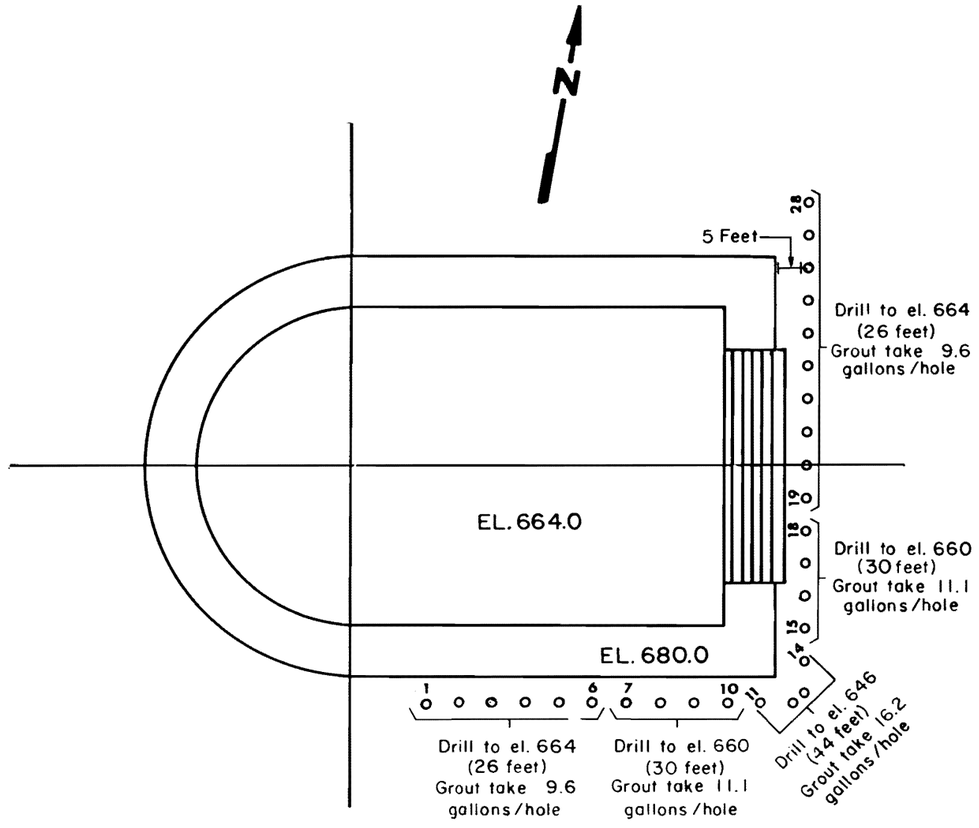
1. Bearings taken with a hand-held Brunton compass.

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

DRILL LAYOUT DIAGRAM FOR
VERTICAL HOLES VIEWED
ONTO THE 671 ELEVATION

Figure 2.5-143

Figure 2.5-143 Drill Layout Diagram For Vertical Holes Viewed Onto The 671 Elevation

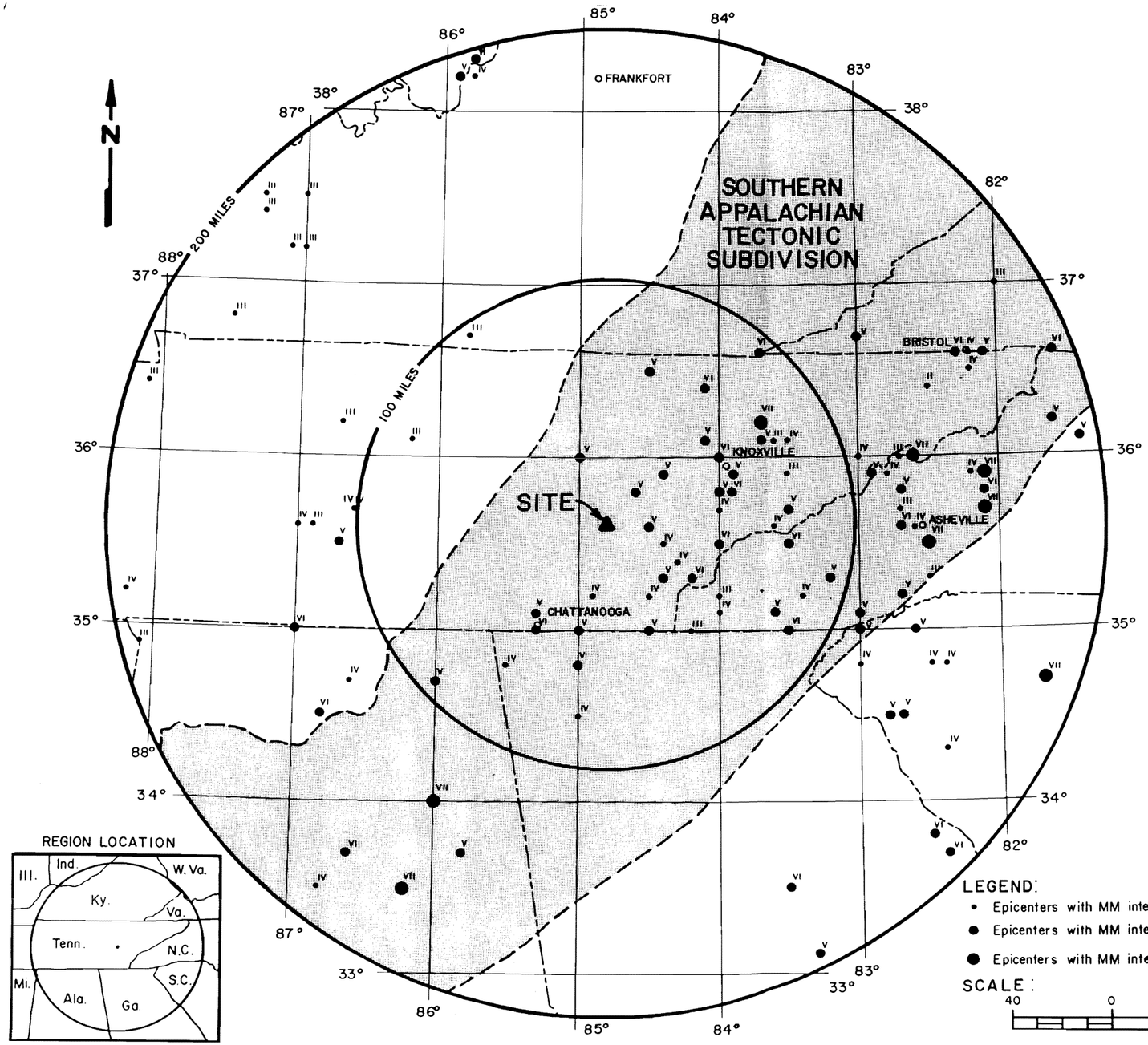


NOTES:

1. Drawing not to scale.
2. Grout take computations based on 3 inch percussion hole volumes.
3. Percussion holes drilled on 4 foot centers, 5 feet from vertical walls as shown.
4. Where grout takes occur in excess of 2 gallons more than specified, split space grout holes to 2 foot centers.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
REACTOR 2 GROUT LAYOUT Figure 2.5-144

Figure 2.5-144 Reactor 2 Grout Layout



REGION LOCATION

MODIFIED MERCALLI INTENSITY SCALE OF 1931 (ABRIDGED)

I. NOT FELT EXCEPT BY A VERY FEW UNDER ESPECIALLY FAVORABLE CIRCUMSTANCES. (I ROSSI-FOREL SCALE)

II. FELT ONLY BY A FEW PERSONS AT REST, ESPECIALLY ON UPPER FLOORS OF BUILDINGS. DELICATELY SUSPENDED OBJECTS MAY SWING. (I TO II ROSSI-FOREL SCALE)

III. FELT QUITE NOTICEABLY INDOORS, ESPECIALLY ON UPPER FLOORS OF BUILDINGS, BUT MANY PEOPLE DO NOT RECOGNIZE IT AS AN EARTHQUAKE. STANDING MOTOR CARS MAY ROCK SLIGHTLY. VIBRATION LIKE PASSING TRUCK. DURATION ESTIMATED. (III ROSSI-FOREL SCALE)

IV. DURING THE DAY FELT INDOORS BY MANY, OUTDOORS BY FEW. AT NIGHT SOME AWAKENED. DISHES, WINDOWS, DOORS DISTURBED; WALLS MADE CREAKING SOUND. SENSATION LIKE HEAVY TRUCK STRIKING BUILDING. STANDING MOTOR CARS ROCKED NOTICEABLY. (IV TO V ROSSI-FOREL SCALE)

V. FELT BY NEARLY EVERYONE; MANY AWAKENED. SOME DISHES, WINDOWS, ETC. BROKEN; A FEW INSTANCES OF CRACKED PLASTER; UNSTABLE OBJECTS OVERTURNED. DISTURBANCES OF TREES, POLES, AND OTHER TALL OBJECTS SOMETIMES NOTICED. PENDULUM CLOCKS MAY STOP. (V TO VI ROSSI-FOREL SCALE)

VI. FELT BY ALL; MANY FRIGHTENED AND RUN OUTDOORS. SOME HEAVY FURNITURE MOVED; A FEW INSTANCES OF FALLEN PLASTER OR DAMAGED CHIMNEYS. DAMAGE SLIGHT. (VI TO VII ROSSI-FOREL SCALE)

VII. EVERYBODY RUNS OUTDOORS. DAMAGE NEGLIGIBLE IN BUILDINGS OF GOOD DESIGN AND CONSTRUCTION; SLIGHT TO MODERATE IN WELL-BUILT ORDINARY STRUCTURES; CONSIDERABLE IN POORLY BUILT OR BADLY DESIGNED STRUCTURES; SOME CHIMNEYS BROKEN. NOTICED BY PERSONS DRIVING MOTOR CARS. (VIII ROSSI-FOREL SCALE)

VIII. DAMAGE SLIGHT IN SPECIALLY DESIGNED STRUCTURES; CONSIDERABLE IN ORDINARY SUBSTANTIAL BUILDINGS WITH PARTIAL COLLAPSE; GREAT IN POORLY BUILT STRUCTURES. PANEL WALLS THROWN OUT OF FRAME STRUCTURES. FALL OF CHIMNEYS, FACTORY STACKS, COLUMNS, MONUMENTS, WALLS. HEAVY FURNITURE OVERTURNED. SAND AND MUD EJECTED IN SMALL AMOUNTS. CHANGES IN WELL WATER. DISTURBED PERSONS DRIVING MOTOR CARS. (VIII + TO IX ROSSI-FOREL SCALE)

IX. DAMAGE CONSIDERABLE IN SPECIALLY DESIGNED STRUCTURES; WELL DESIGNED FRAME STRUCTURES THROWN OUT OF PLUMB; GREAT IN SUBSTANTIAL BUILDINGS WITH PARTIAL COLLAPSE. BUILDINGS SHIFTED OFF FOUNDATIONS. GROUND CRACKED CONSPICUOUSLY. UNDERGROUND PIPES BROKEN. (IX + ROSSI-FOREL SCALE)

X. SOME WELL-BUILT WOODEN STRUCTURES DESTROYED; MOST MASONRY AND FRAME STRUCTURES DESTROYED WITH FOUNDATIONS; GROUND BADLY CRACKED. RAILS BENT. LANDSLIDES CONSIDERABLE FROM RIVER BANKS AND STEEP SLOPES. SHIFTED SAND AND MUD. WATER SPLASHED (SLOPPED) OVER BANKS. (X ROSSI-FOREL SCALE)

XI. FEW, IF ANY, (MASONRY) STRUCTURES REMAIN STANDING. BRIDGES DESTROYED. BROAD FISSURES IN GROUND. UNDERGROUND PIPE LINES COMPLETELY OUT OF SERVICE. EARTH SLUMPS AND LAND SLIPS IN SOFT GROUND. RAILS BENT GREATLY.

XII. DAMAGE TOTAL. WAVES SEEN ON GROUND SURFACES. LINES OF SLIGHT AND LEVEL DISTORTED. OBJECTS THROWN UPWARD INTO THE AIR.

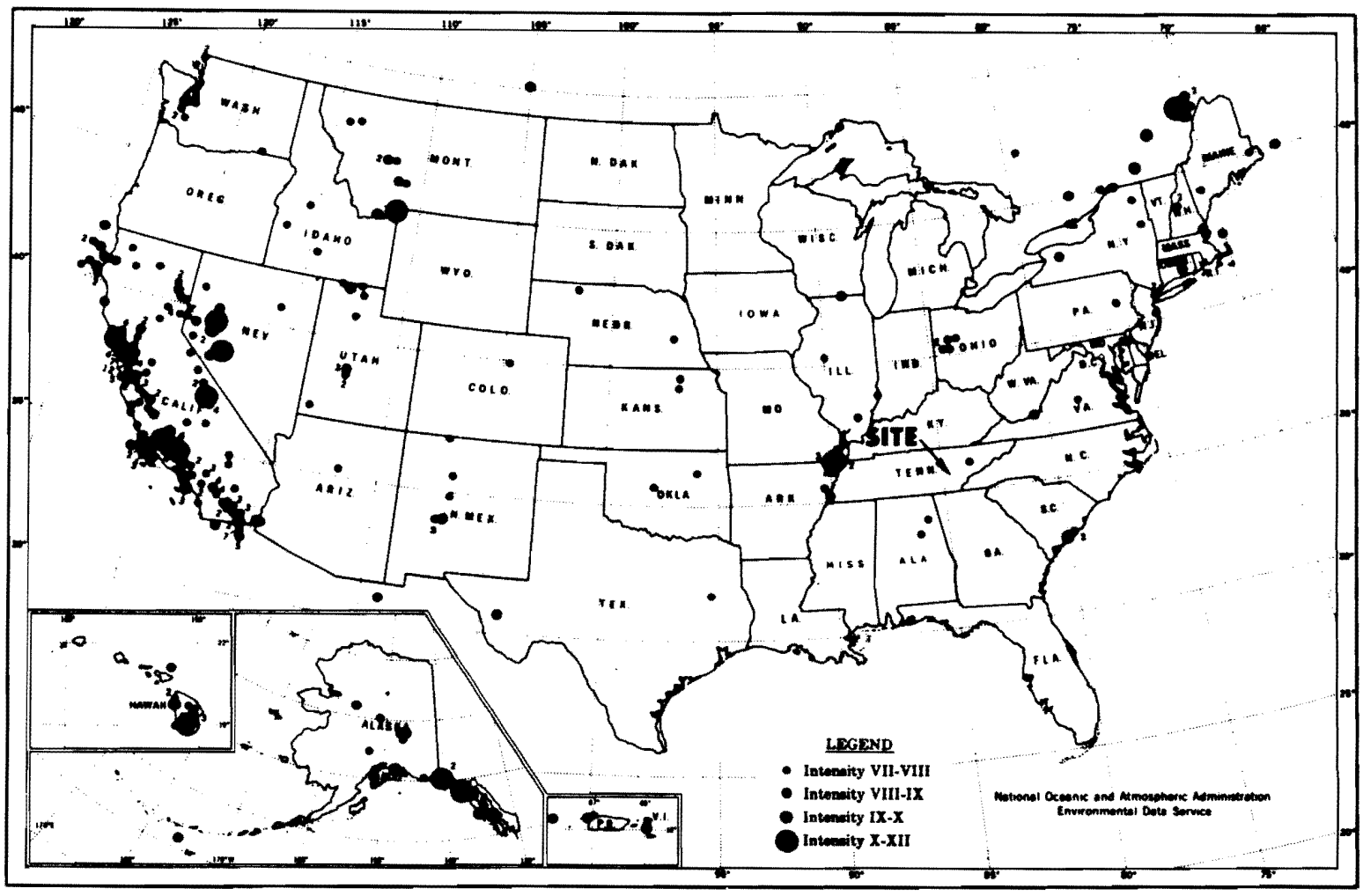
LEGEND:

- Epicenters with MM intensities II – IV
- Epicenters with MM intensities V – VI
- Epicenters with MM intensities VII – VIII

SCALE: 40 0 40 Miles

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
EARTHQUAKE EPICENTERS
Figure 2.5-145

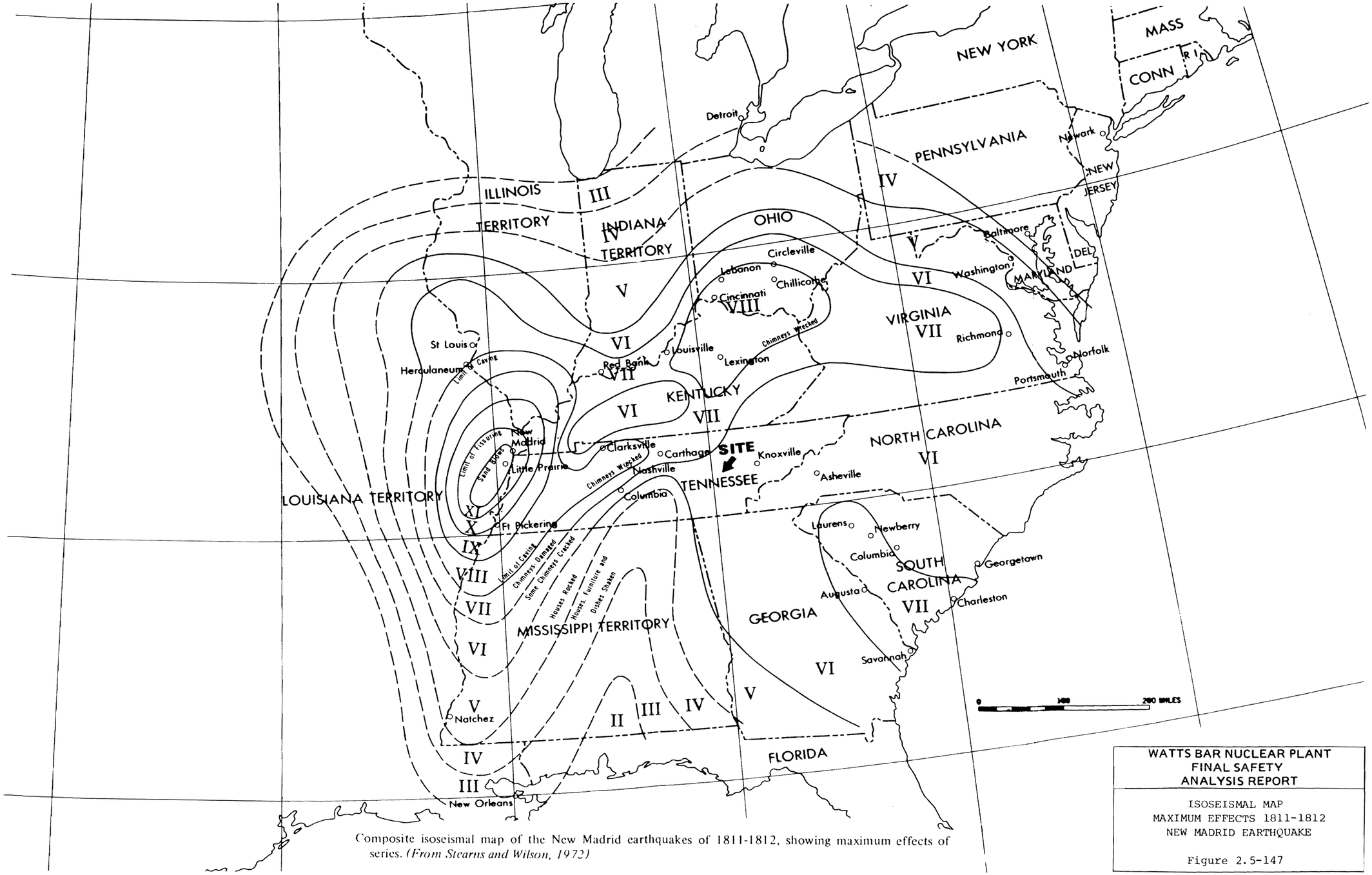
Figure 2.5-145 Earthquake Epicenters



Damaging earthquakes in the United States from earliest history through 1972.
(From NOAA, 1974)

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
MAJOR EARTHQUAKES IN UNITED STATES THROUGH 1972 Figure 2.5-146

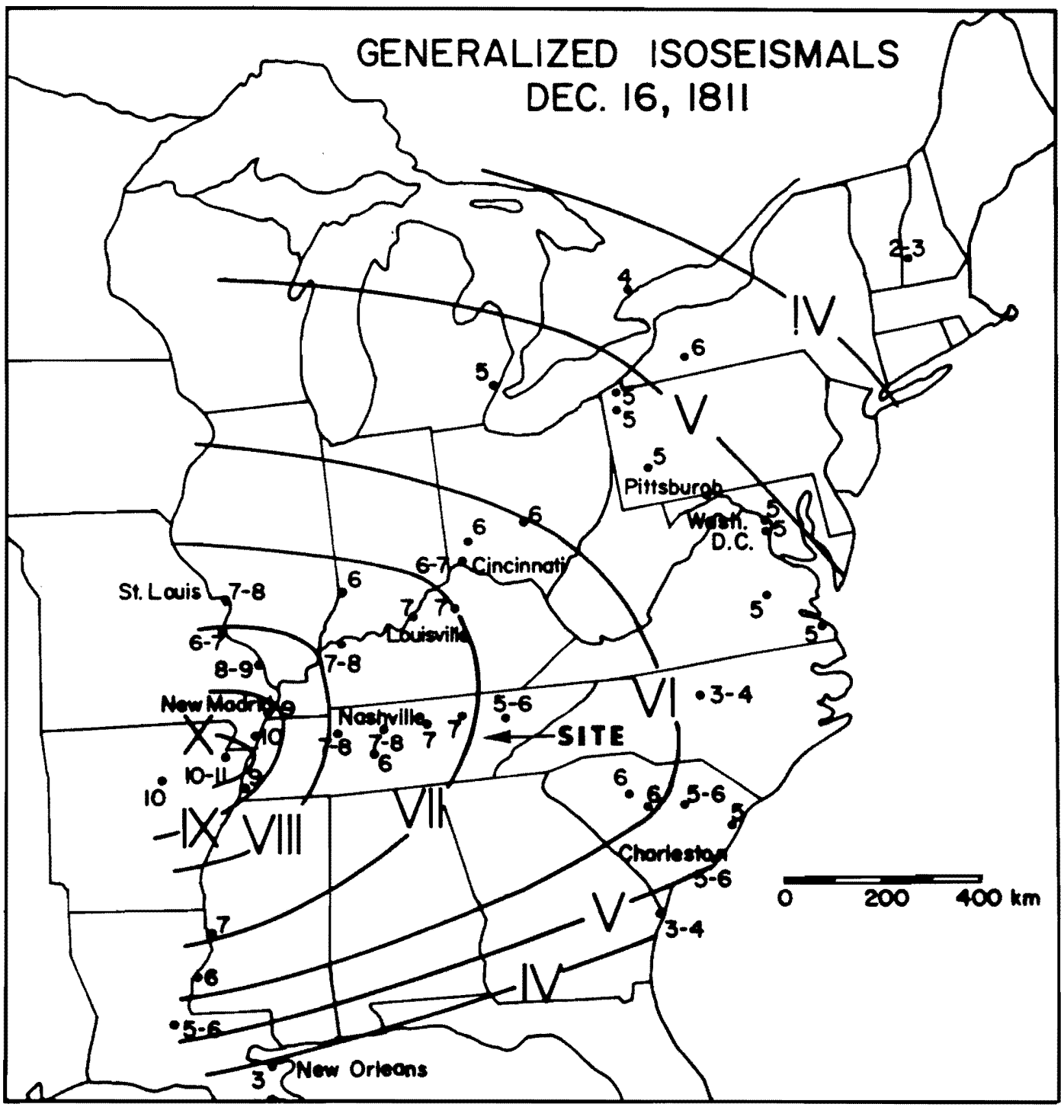
Figure 2.5-146 Major Earthquake In United States Through 1972



Composite isoseismal map of the New Madrid earthquakes of 1811-1812, showing maximum effects of series. *(From Stearns and Wilson, 1972)*

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP MAXIMUM EFFECTS 1811-1812 NEW MADRID EARTHQUAKE Figure 2.5-147

Figure 2.5-147 Isoseismal Map Maximum Effects 1811-1812 New Madrid Earthquake

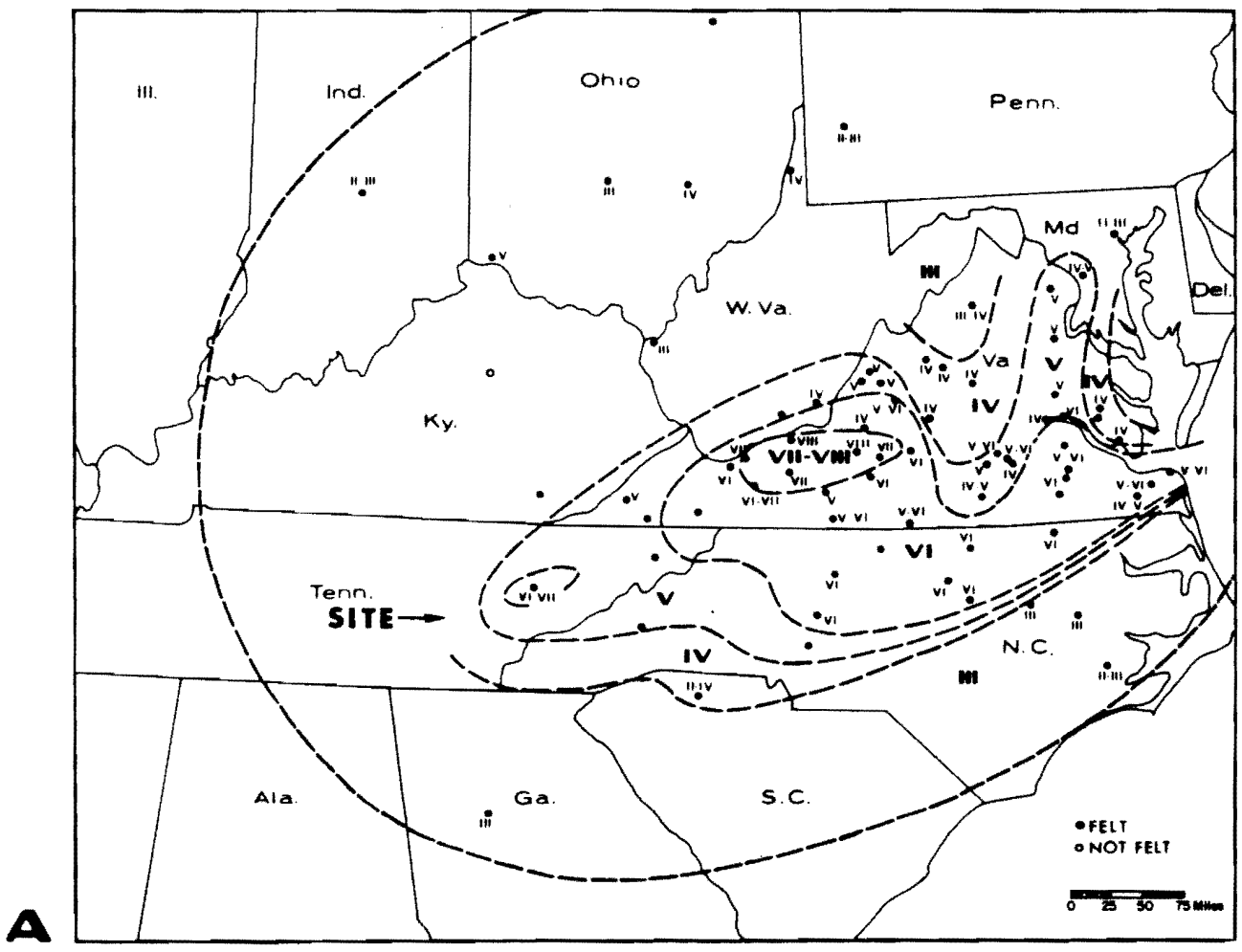


Generalized isoseismal map of the New Madrid earthquake of December 16, 1811. *(From Nuttli, 1972)*

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP 1811 NEW MADRID EARTHQUAKE Figure 2.5-148

Figure 2.5-148 Isoseismal Map 1811 New Madrid Earthquake

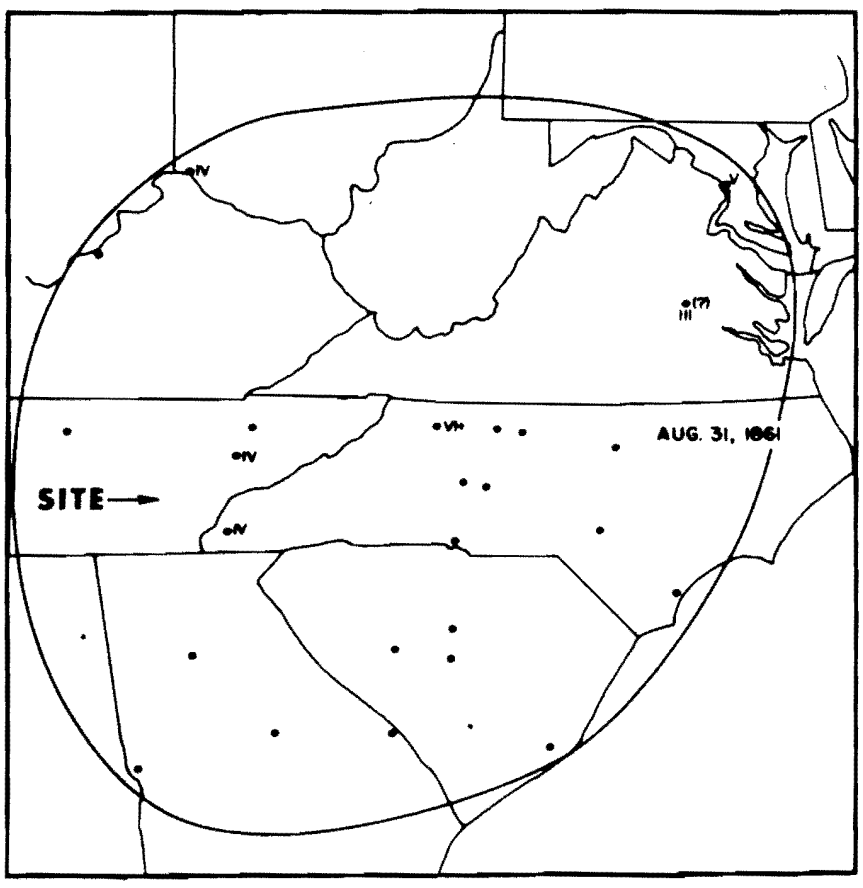
EARTHQUAKE OF MAY 31 1897 GILES COUNTY VIRGINIA
(MONDAY 1358 Hrs), FELT AREA 280 000 SQ MI



A

From Hopper and Bollinger, 1971

EARTHQUAKE OF AUGUST 31, 1861,
VIRGINIA, (SATURDAY, 0522 Hrs.),
FELT AREA: 300,000 SQ. MI., (BOLLINGER, 1969)



B

From Hopper and Bollinger, 1971

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

FELT AREA MAPS

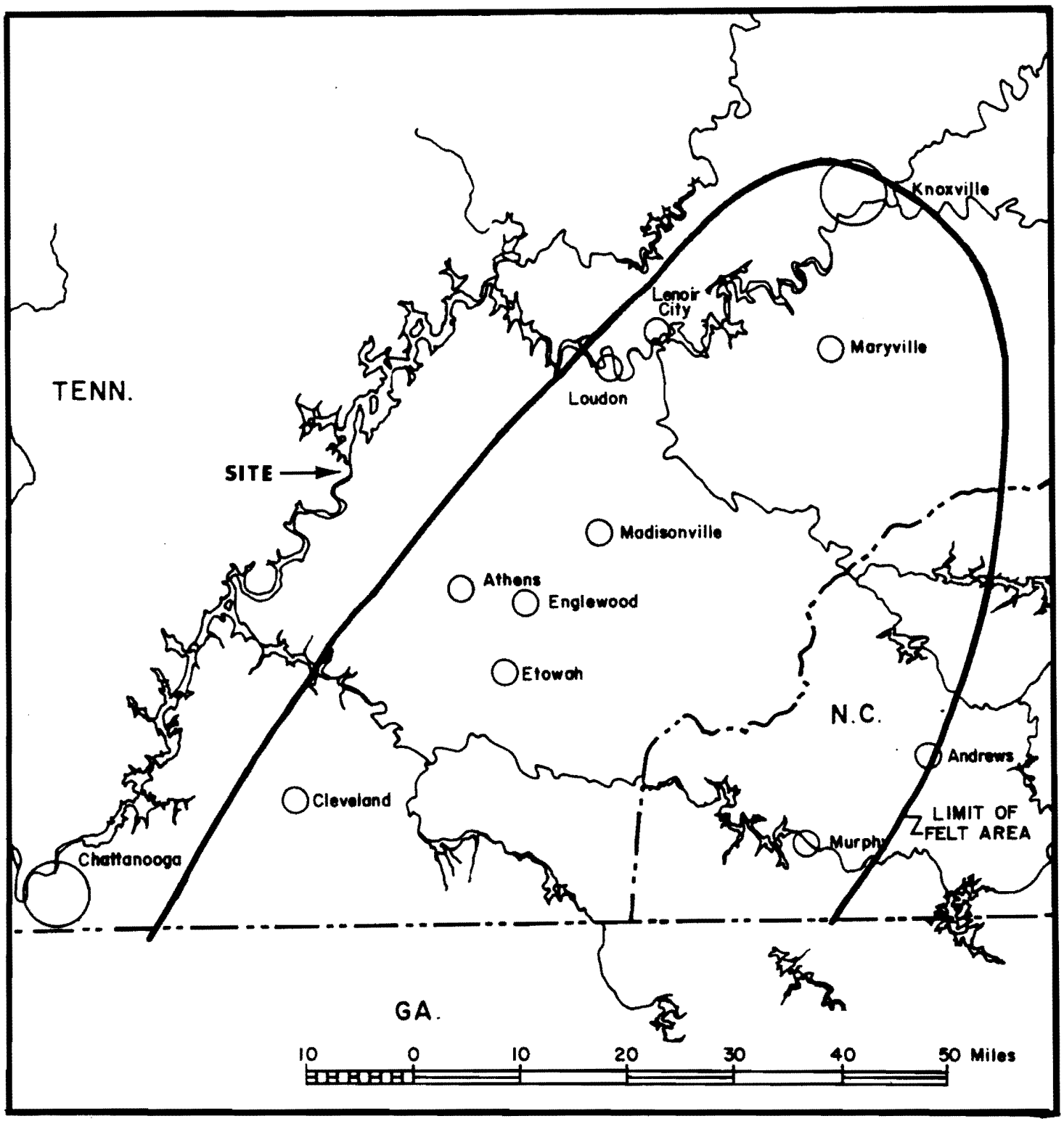
Figure 2.5-149

Figure 2.5-149 Felt Area Maps

Isoseismal map of the Charleston, South Carolina earthquake of August 31, 1886. *(From Dutton, 1889)*

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP 1886 CHARLESTON, S.C. EARTHQUAKE Figure 2.5-150

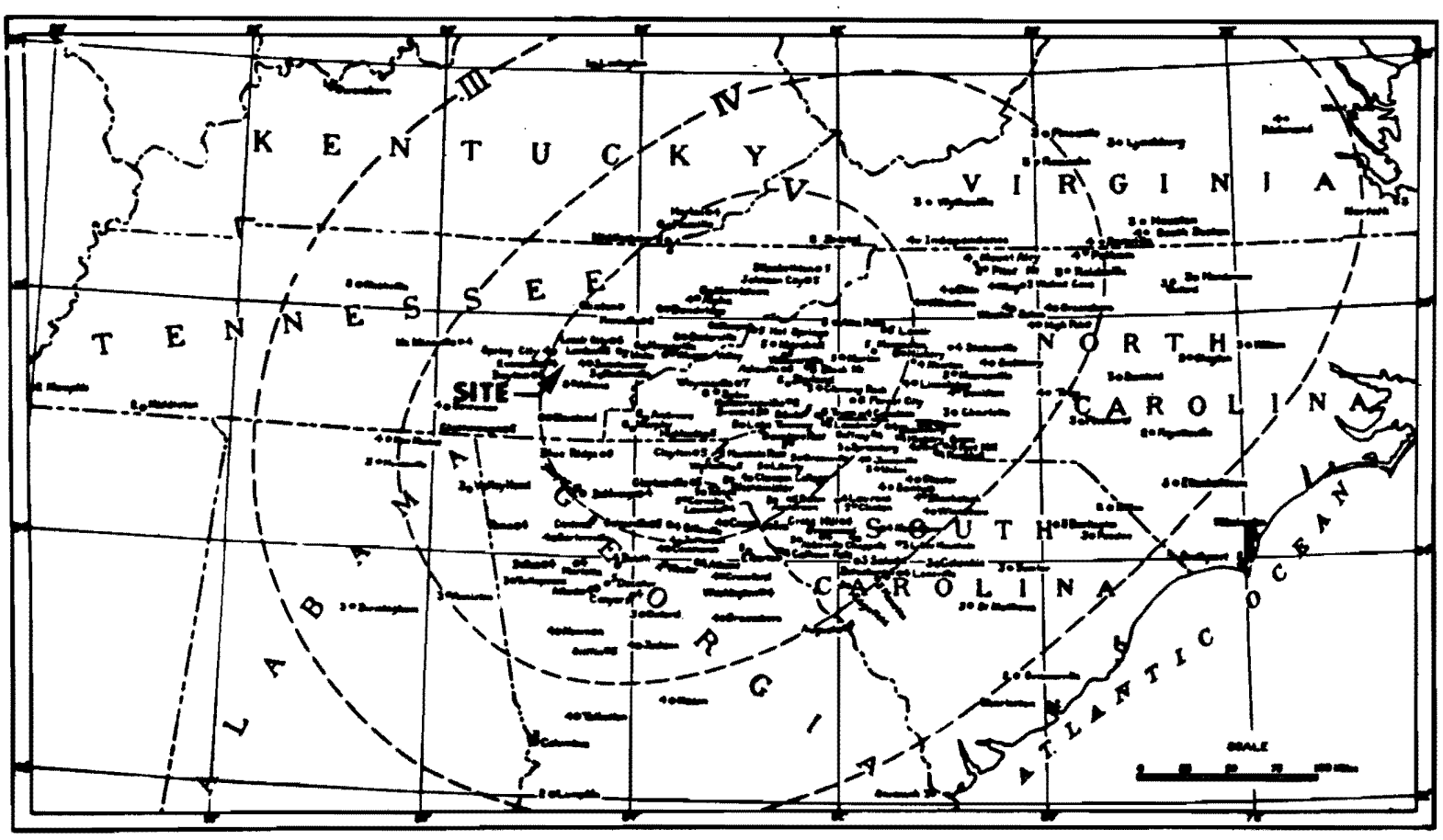
Figure 2.5-150 Isoseismal Map 1886 Charleston, S.C. Earthquake



Felt area map of the east Tennessee earthquake of April 17, 1913.
(From Gordon, 1913)

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
FELT AREA MAP EAST TENNESSEE EARTHQUAKE OF APRIL 17, 1913 Figure 2.5-151

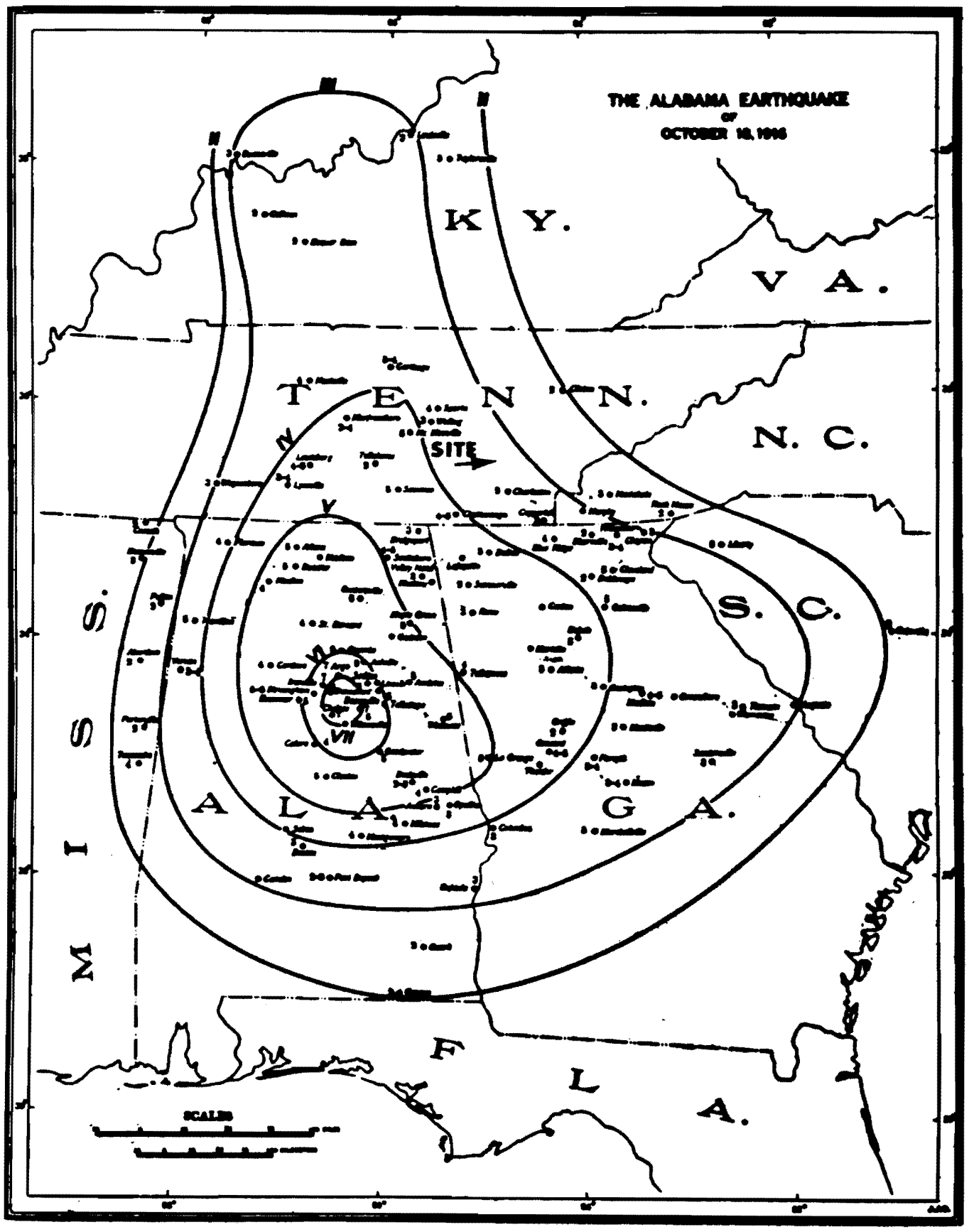
Figure 2.5-151 Felt Area Map East Tennessee Earthquake of April 17, 1913



Isoseismal map of the Southern Appalachians earthquake of February 21, 1916. *(From Tabor, 1916)*

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP 1916 SOUTHERN APPALACHIAN EARTHQUAKE Figure 2.5-152

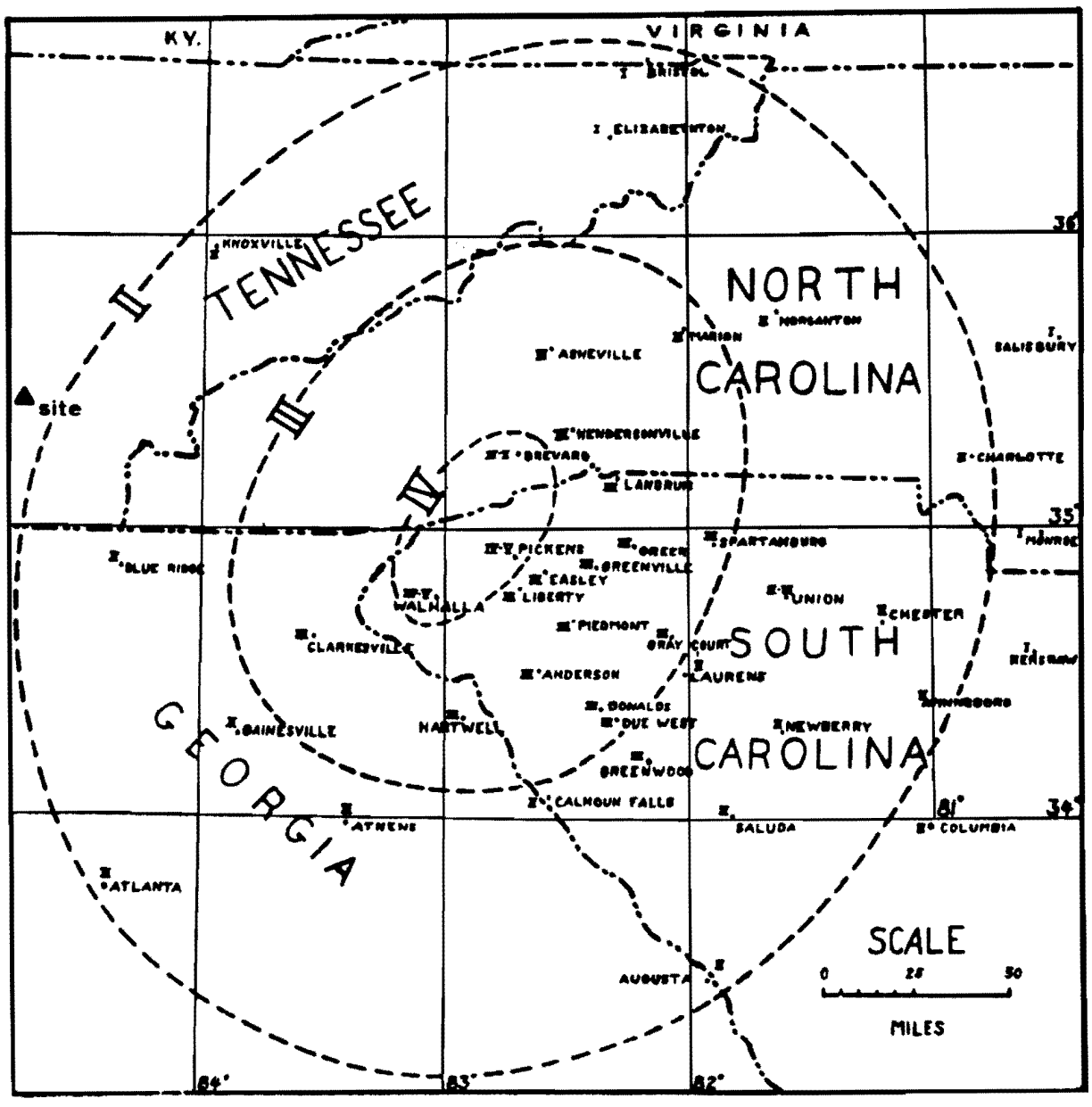
Figure 2.5-152 Isoseismal Map 1916 Southern Appalachian Earthquake



Isoseismal map of the Alabama earthquake of October 18, 1916. *(From Finch, 1916)*

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP 1916 ALABAMA EARTHQUAKE Figure 2.5-153

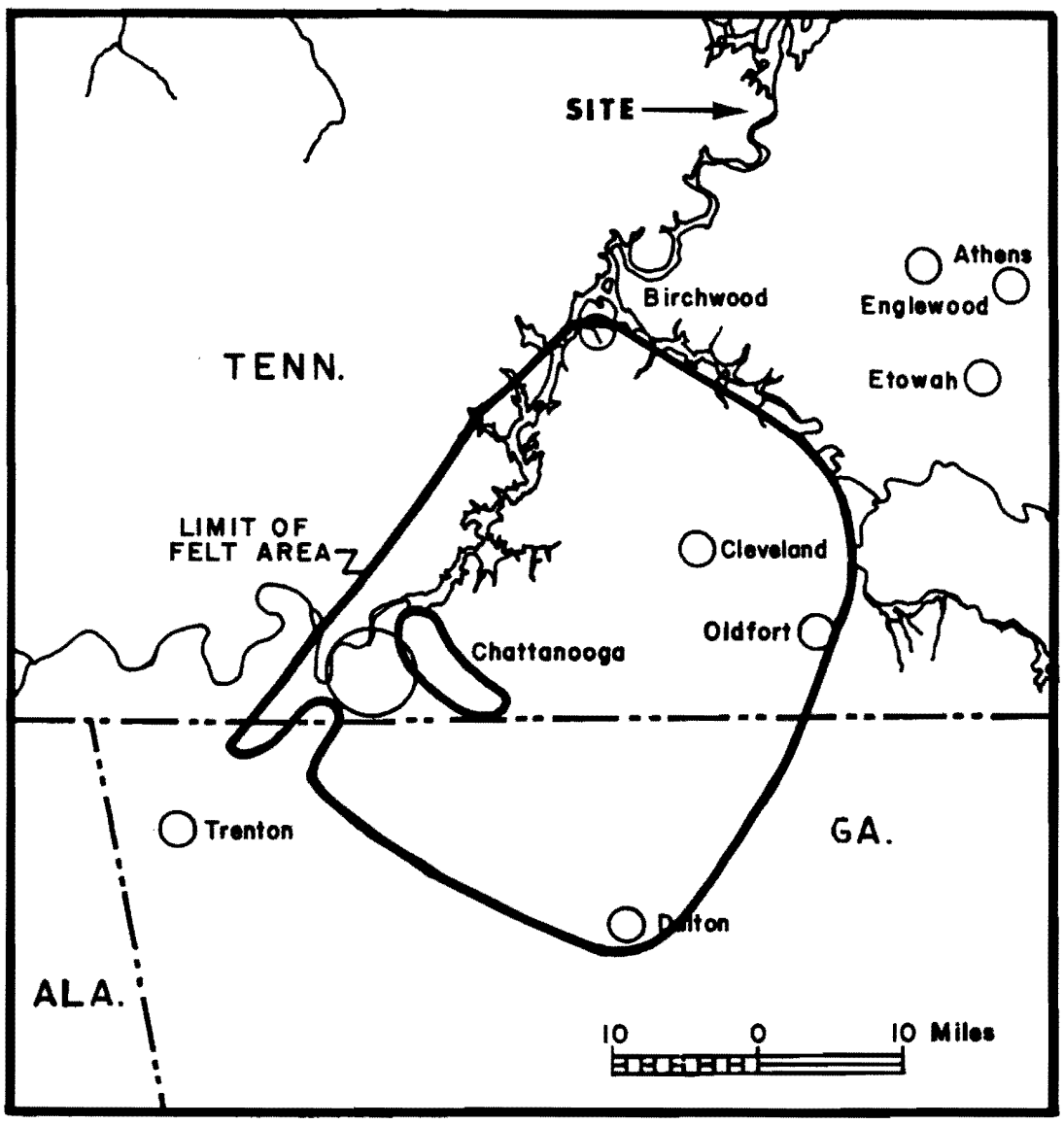
Figure 2.5-153 Isoseismal Map 1916 Alabama Earthquake



Isoseismal map of the Southern Appalachian earthquake of October 20, 1924. *(From Neumann, 1924)*

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP 1924 SOUTHERN APPALACHIAN EARTHQUAKE Figure 2.5-154

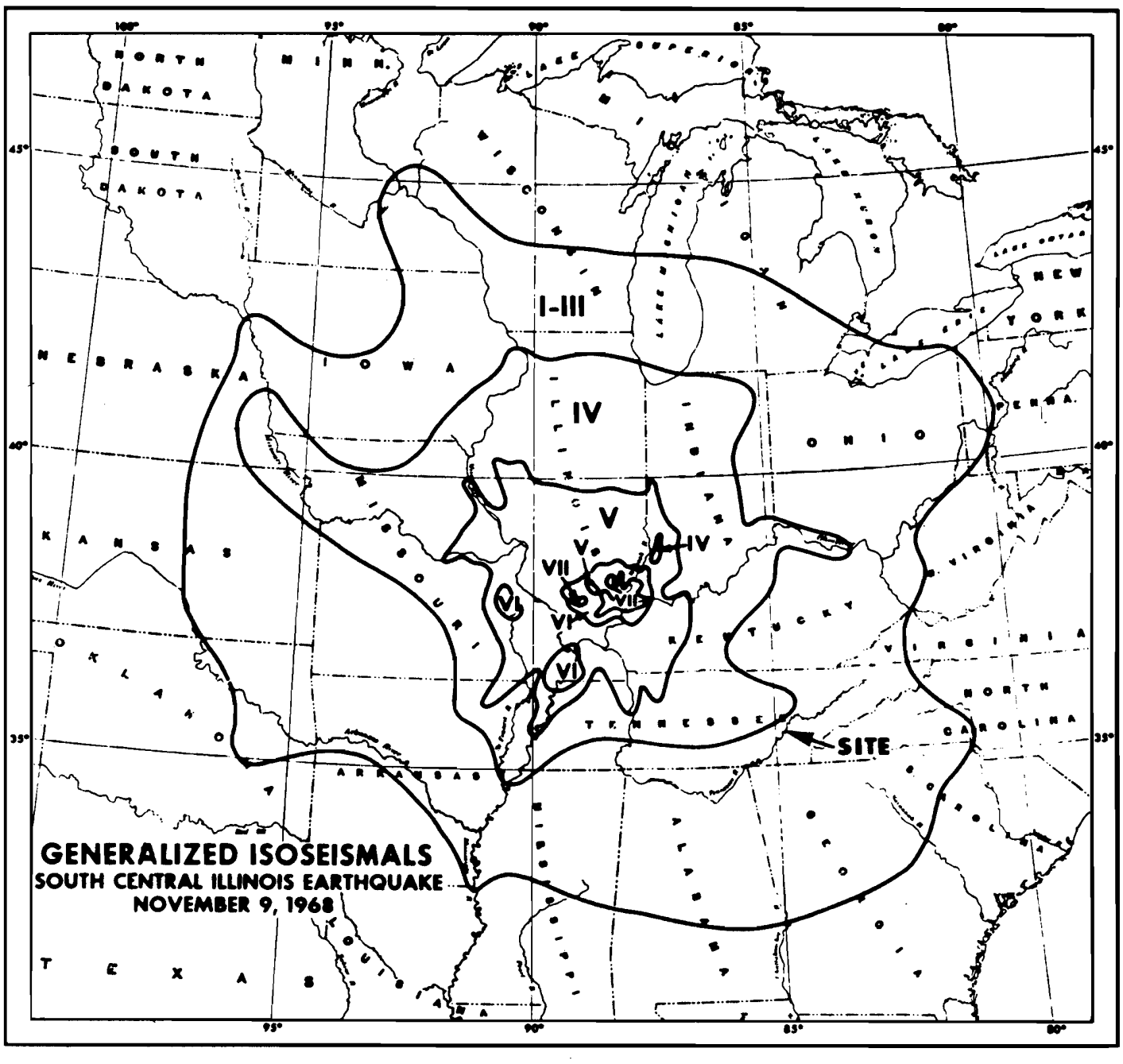
Figure 2.5-154 Isoseismal Map 1924 Southern Appalachian Earthquake



Felt area map of the Chattanooga earthquake of October 19, 1940.
(From Brill, 1940)

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
FELT AREA MAP 1940 CHATTANOOGA EARTHQUAKE Figure 2.5-155

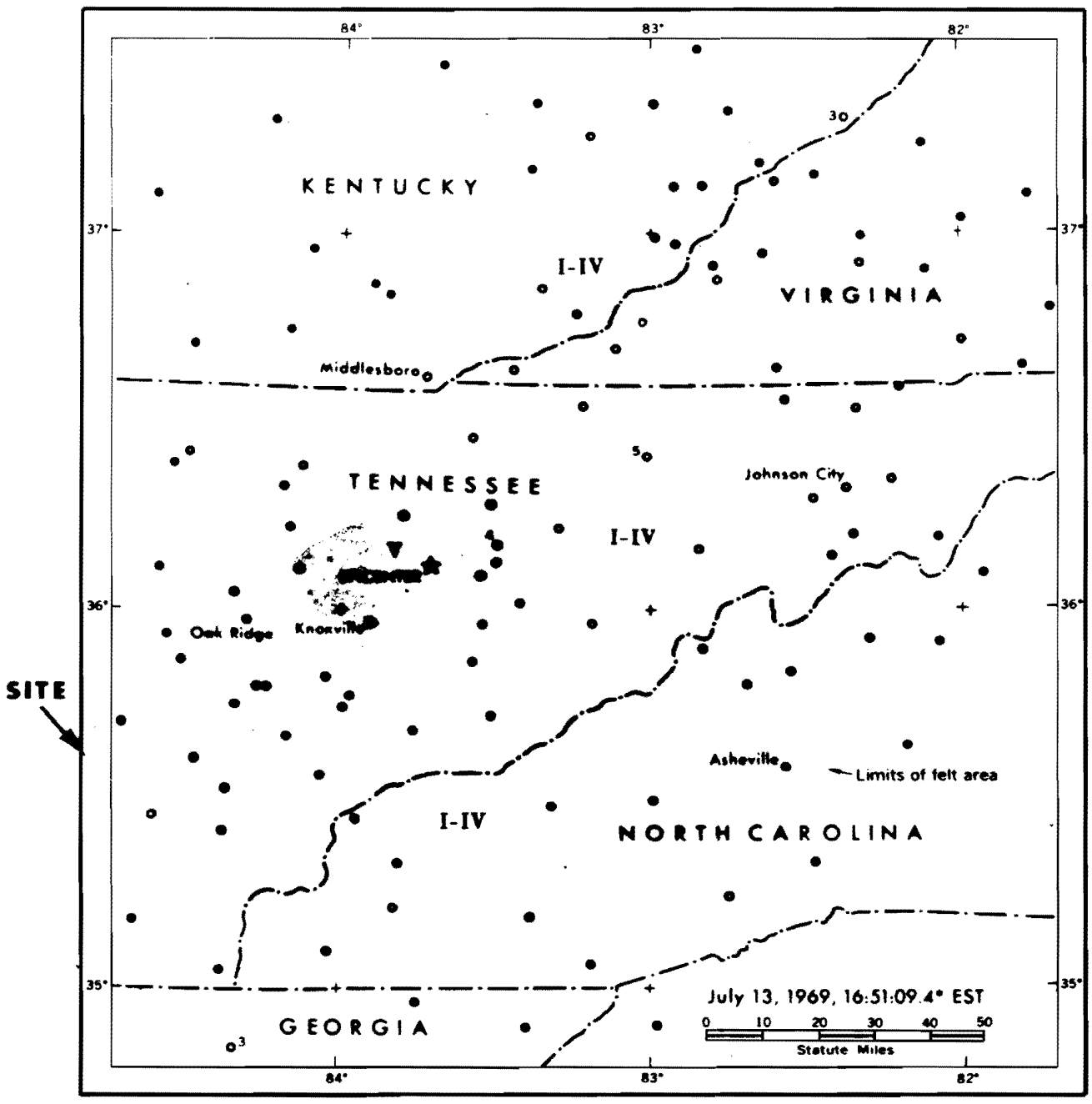
Figure 2.5-155 Felt Area Map 1940 Chattanooga Earthquake



Isoseismal map of the Hamilton County, Illinois earthquake of November 9, 1968. *(From Gordon and others, 1968)*

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP 1968 SOUTHERN ILLINOIS EARTHQUAKE Figure 2.5-156

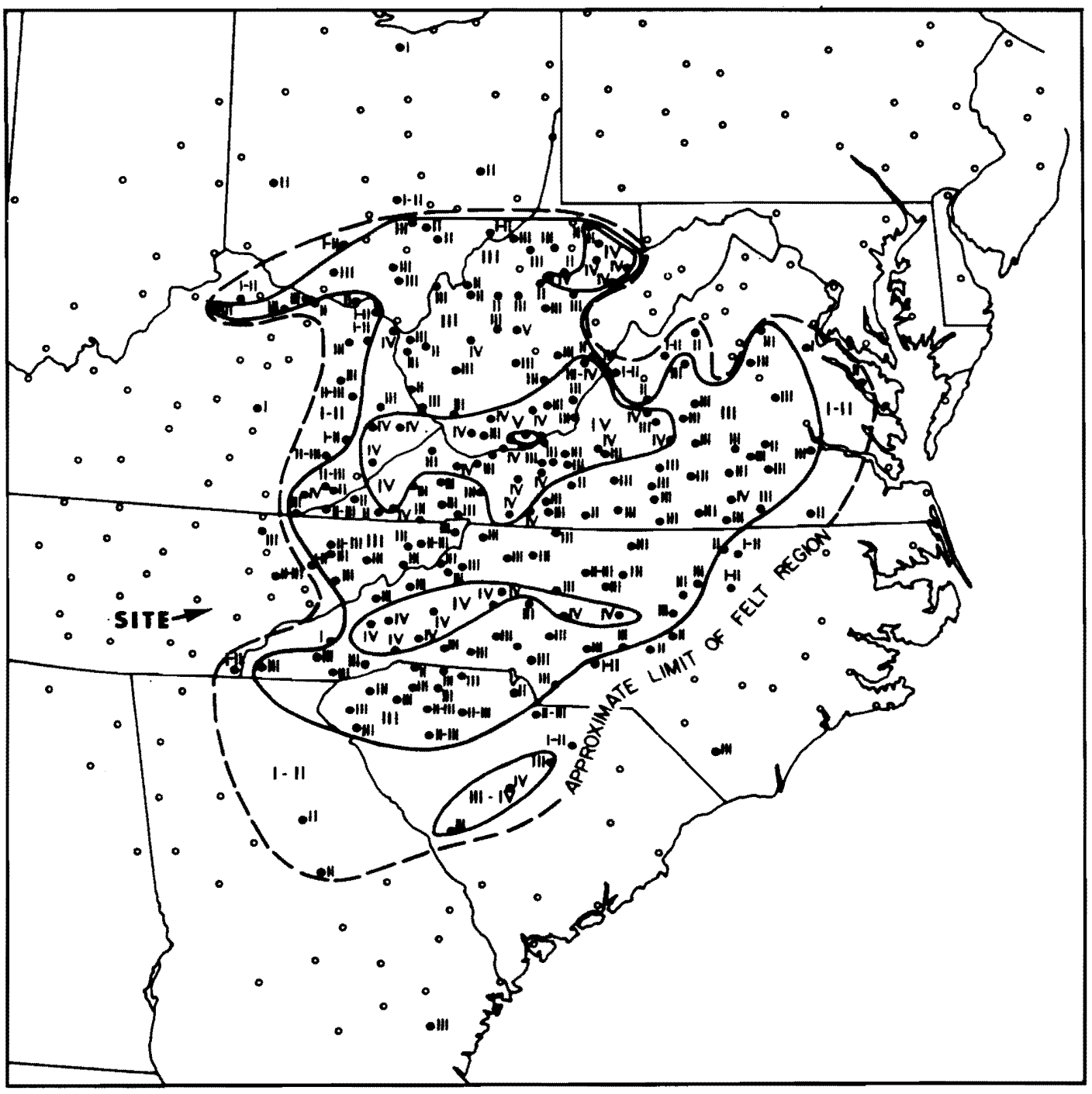
Figure 2.5-156 Isoseismal Map 1968 Southern Illinois Earthquake



Felt area map of the East Tennessee earthquake of July 13, 1969. (*From NOAA, 1971*)

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
FELT AREA MAP EAST TENNESSEE EARTHQUAKE JULY 13, 1969 Figure 2.5-157

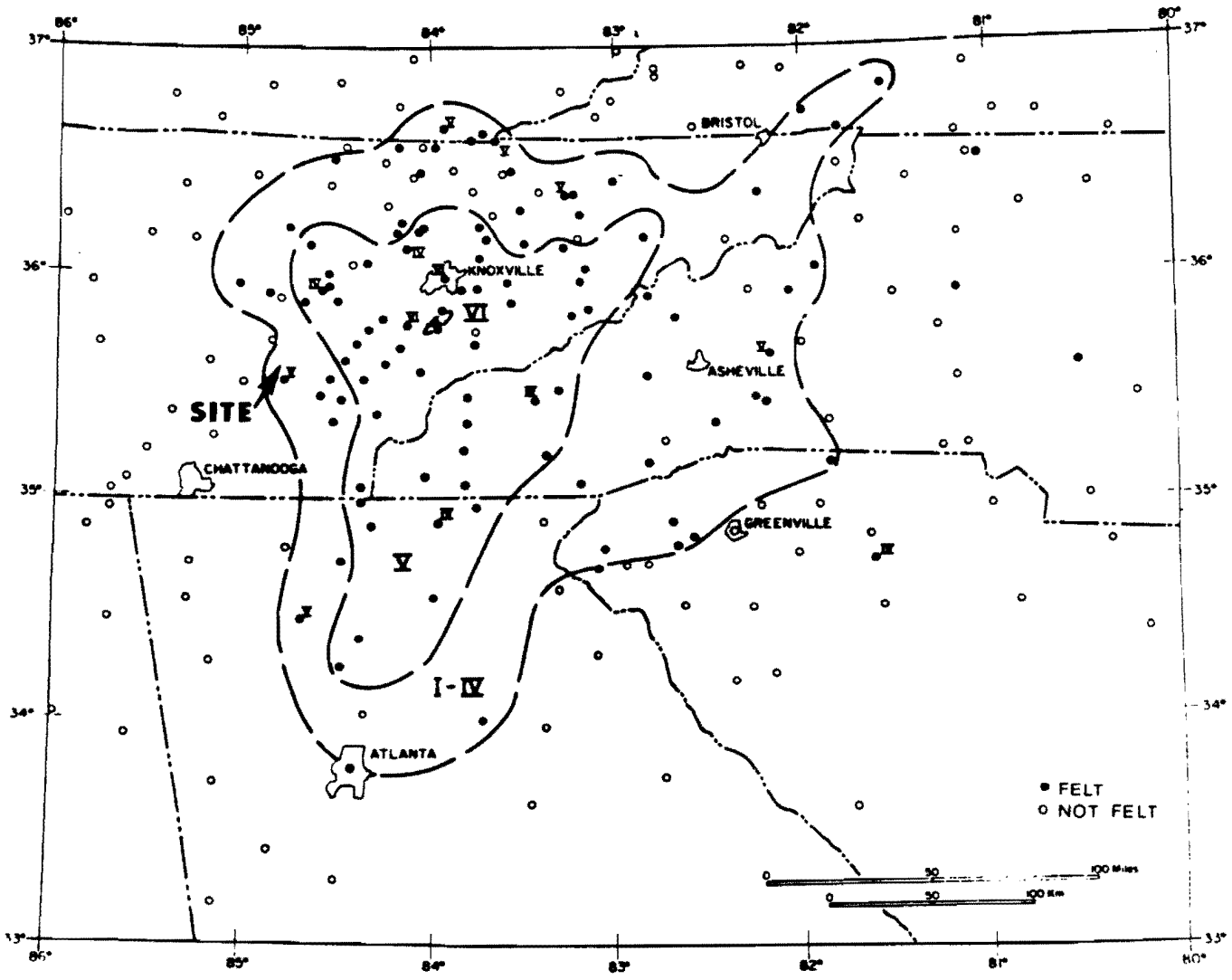
Figure 2.5-157 Felt Area Map East Tennessee Earthquake July 13, 1969



Isoseismal map of the Elsgood, West Virginia earthquake of November 19, 1969. (*From Bollinger and Hopper, 1972*)

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP ELSGOOD, WEST VIRGINIA EARTHQUAKE NOVEMBER 20, 1969 Figure 2.5-158

Figure 2.5-158 Isoseismal Map Elsgood, West Virginia Earthquake (November 20, 1969)

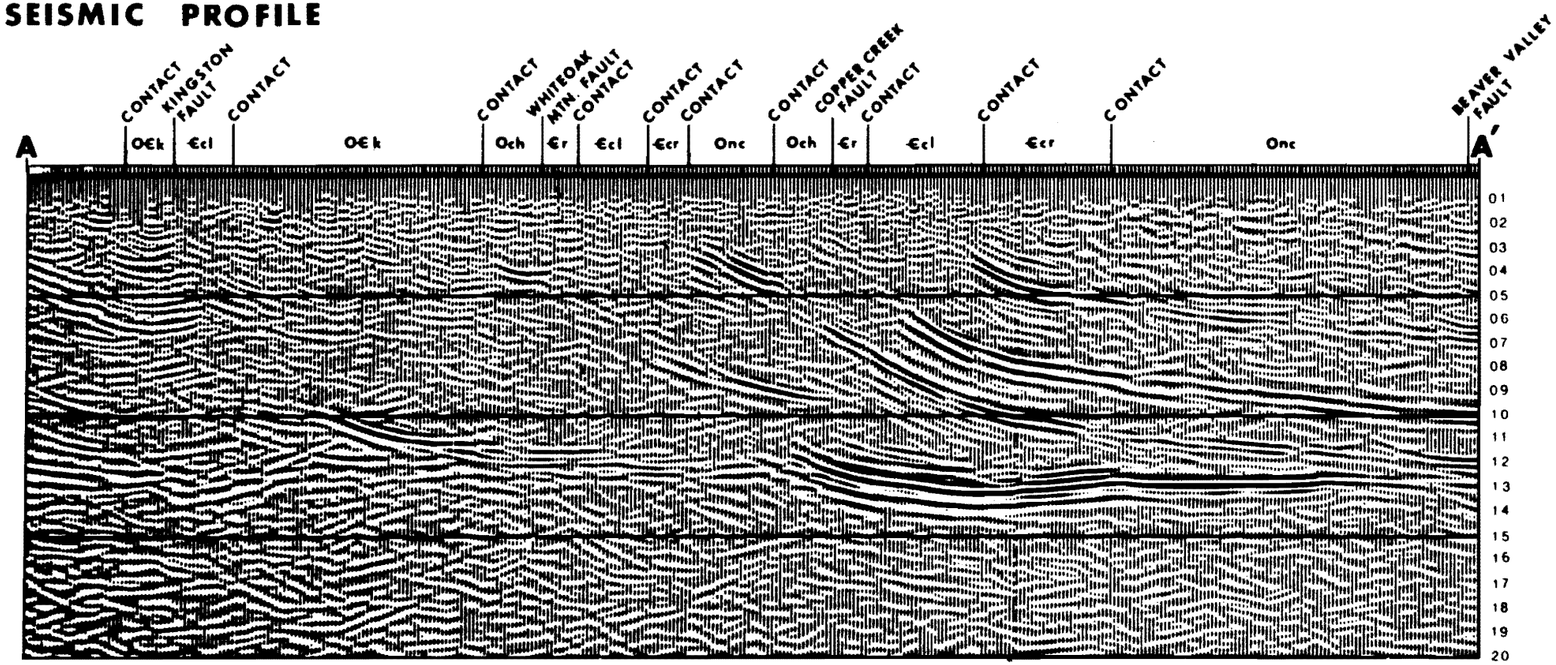


Isoseismal map of the Maryville-Alcoa, Tennessee earthquake of November 30, 1973. (*From Bollinger and others, 1973*)

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
ISOSEISMAL MAP MARYVILLE-ALCOA EARTHQUAKE NOVEMBER 30, 1973 Figure 2.5-159

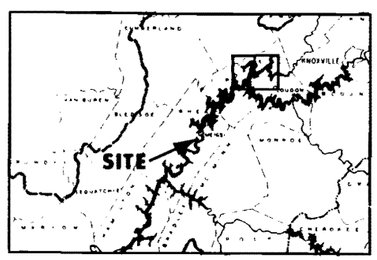
Figure 2.5-159 Isoseismal Map Maryville-Alcoa Earthquake November 30, 1973

SEISMIC PROFILE

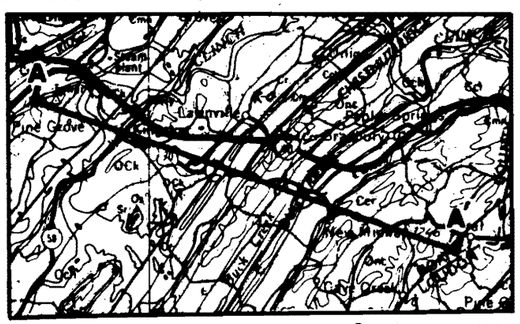


Data from Geophysical Services Inc

INDEX MAP



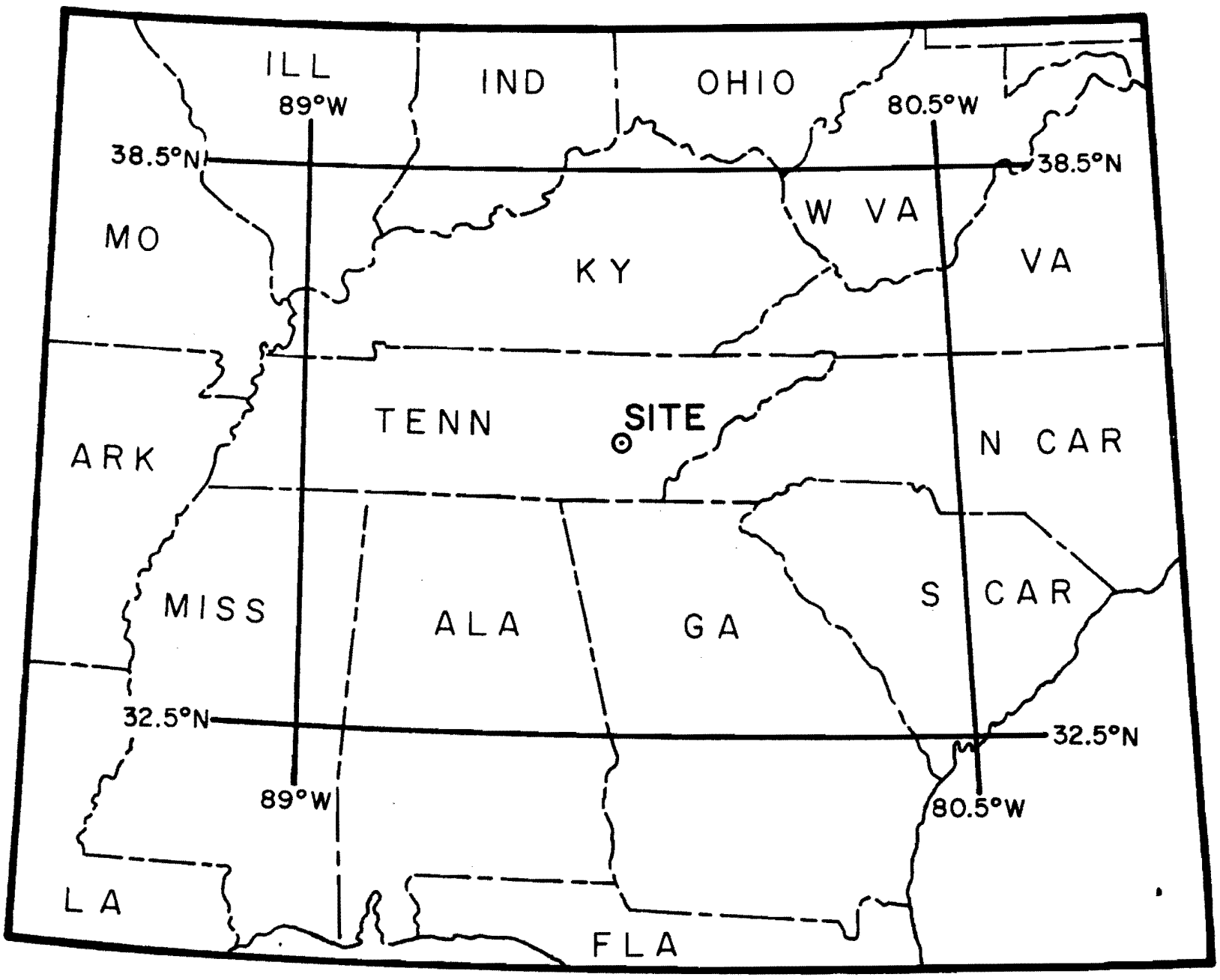
LOCATION MAP



From Hardeman, 1966

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
SEISMIC REFLECTION PROFILE Figure 2.5-160

Figure 2.5-160 Seismic Reflection Profile



Revised by Amendment 33.

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
INDEX MAP - ALL EARTHQUAKES LATITUDE 32.5-38.5 NORTH LONGITUDE 80.5-89.0 WEST Figure 2.5-161

Figure 2.5-161 Index Map - All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

SEISMIC HISTORY OF THE SOUTHEAST REGION OF THE UNITED STATES

THIS IS A CHRONOLOGICAL LISTING OF ALL EARTHQUAKES HAVING EPICENTERS IN THE RECTANGULAR PORTION OF THE SOUTH-EAST REGION BOUNDED BY THE FOLLOWING GEODETIC COORDINATE LINES --

SOUTHERN BOUNDARY - 32.5 -DEGREE NORTH LATITUDE
NORTHERN BOUNDARY - 38.5 -DEGREE NORTH LATITUDE
EASTERN BOUNDARY - 80.5 -DEGREE WEST LONGITUDE
WESTERN BOUNDARY - 89.0 -DEGREE WEST LONGITUDE

YEAR	DATE	TIME-HR-MIN-SEC	LAT - LONG	LOCALITY AND NOTES	FELT-SQ.MI.	MAG/INT	REFERENCES
1776	NOV 6	0 0 0.0	(35.0 83.0)	JACKSON CO.,WEST NC		IV-V	-6
1799	APR 11	8 20 0.0	(34.3 80.6)	CAMDEN,SC-STRONG			B-14
1817	JAN 8	9 34 0.0	(37.0 81.0)	VA-NC-SC-MD AREA			B-9
1829	MAY 0	0 0 0.0	(35.6 88.8)	JACKSON,TENN-STRONG			-7
1839	SEP 5	0 0 0.0	(36.7 88.6)	MAYFIELD,KY		III-IV	D-6
1843	AUG 9	0 0 0.0	(35.6 87.0)	COLUMBIA AND SOMERVILLE,TENN		III-IV	-6
1844	NOV 28	12 0 0.0	(36.0 84.0)	KNOXVILLE,TENN		VI	BD-5,6
1852	APR 29	18 0 0.0	(36.6 81.6)	VA-NC-TENN REGION	150000	VI	BD-5,6,10
1854	NOV 22	21 0 0.0	(37.1 81.5)	TAZEWELL CITY,VA			-9
1859	MAR 22	0 0 0.0	(37.2 81.5)	TAZEWELL CITY,VA			B-9
1872	MAR 26	0 0 0.0	(37.1 88.6)	PADUCAH,KY		III	-6
1872	JUN 17	20 0 0.0	(33.1 83.3)	MILLEDGEVILLE,GA		V	D-5
1874	FEB 10	0 0 0.0	(35.7 82.1)	MCDOWELL COUNTY,NC-50-100 SHOCKS FROM FEB 10 TO APR 17		II-VII	ABF-6,5
1874	FEB 22	0 0 0.0	(35.7 82.1)	MCDOWELL CO. NC-MOST SEVERE OF SERIES		II-VII	ABF-6,5
1874	MAR 17	0 0 0.0	(35.7 82.1)	MCDOWELL-AFTERSHOCK		II-VII	BF-6,5
1874	MAR 26	0 0 0.0	(35.7 82.1)	MCDOWELL-AFTERSHOCK		II-VII	BF-6,5
1874	APR 14	0 0 0.0	(35.7 82.1)	MCDOWELL-AFTERSHOCK		II-VII	BF-6,5
1874	APR 17	0 0 0.0	(35.7 82.1)	MCDOWELL-AFTERSHOCK		II-VII	BF-6,5
1875	JUL 28	23 5 0.0	(33.1 83.3)	MILLEDGEVILLE,GA			B-7
1875	NOV 2	2 55 0.0	(33.8 82.5)	NORTHERN GEORGIA	25000	VI	AB-5,6
1875	NOV 12	7 0 0.0	(35.9 83.9)	KNOXVILLE,TENN		III-IV	B-6
1876	SEP 25	6 0 0.0	(38.0 88.0)	S ILL-S IND-N KY AREA		VI	A-6
1876	SEP 25	6 15 0.0	(38.0 88.0)	S ILL-S IND-N KY-2ND AND STRONGEST SHOCK		VI	-6
1876	DEC 21	15 30 0.0	(36.9 81.1)	WYTHEVILLE,VA			-9
1877	APR 26	22 0 0.0	(35.2 83.4)	FRANKLIN,NC		III-IV	-6
1877	MAY 25	0 0 0.0	(35.9 83.9)	KNOXVILLE,TENN		III-IV	-6

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EARTHQUAKE LISTING
ALL EARTHQUAKES
LATITUDE 32.5-38-5 NORTH
LONGITUDE 80.5-89.0 WEST
SHEET 1 OF 8
Figure 2.5-162

Figure 2.5-162 Earthquake Listing All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1877	NOV	16	7	20	0.0	(35.5 | 84.0)	W NC AND E TN-FELT AT KNOXVILLE,TN AND MURPHY,NC	5000	IV-V	D-9,5
1878	NOV	24	3	0	0.0	(35.1 | 84.0)	MURPHY,NC		III-IV	B-6,7
1879	JUL	26	17	45	0.0	(37.0 | 89.0)	CAIRO AND MOUND CITY, ILLINOIS		II-III	-6
1879	OCT	26	0	0	0.0	(34.5 | 81.1)	WINNSBORO,SC			-7
1879	DEC	12	24	0	0.0	(35.2 | 80.8)	CHARLOTTE,NC		V-VI	A-5
1879	DEC	13	7	0	0.0	(35.2 | 80.8)	CHARLOTTE-AFTERSHOCK			-5
1880	JAN	28	0	0	0.0	(36.0 | 82.7)	BALD MOUNTAIN,NC			AB-6
1880	JAN	29	0	0	0.0	(36.0 | 82.7)	BALD MTN-AFTERSHOCK		II-III	B-6
1880	FEB	10	0	0	0.0	(36.0 | 82.7)	BALD MTN-AFTERSHOCK		II-III	B-6
1882	OCT	15	17	30	0.0	(35.1 | 84.0)	MURPHY,NC		III-IV	-6
1884	MAR	31	10	0	0.0	(33.1 | 83.3)	MILLEDGEVILLE,GA		III	-7
1884	APR	30	11	46	0.0	(35.2 | 84.0)	OGREETA,CHEROKEE CO., NC-LOW RUMBLING SOUND OF EARTHQUAKE HEARD, NO TREMOR REPORTED			B-6
1884	AUG	25	0	45	0.0	(35.9 | 83.9)	KNOXVILLE,TENN		IV	48D-6
1885	FEB	2	12	10	0.0	(36.9 | 81.1)	WYTHEVILLE,VA		IV	B-9
1885	AUG	6	13	0	0.0	(36.2 | 81.6)	BLUE RIDGE MTNS., WATAUGA CO.,WEST NC		IV-V	BD-5
1885	AUG	13	0	0	0.0	(36.2 | 81.6)	BLUE RIDGE MTNS., WATAUGA CO.,WEST NC		IV	-7
1885	OCT	17	22	30	0.0	(33.0 | 82.8)	SANDERSVILLE,GA		IV	-7
1886	FEB	5	1	0	0.0	(32.8 | 88.0)	SUMTER CO.,ALA	1600	V	-5
1886	FEB	13	0	0	0.0	(32.8 | 88.0)	SUMTER CO.,ALA			-5
1886	SEP	3	5	0	0.0	(36.9 | 81.1)	WYTHEVILLE,VA			-9
1886	SEP	25	2	56	0.0	(36.9 | 81.1)	WYTHEVILLE,VA			A-9
1886	SEP	25	3	10	0.0	(36.9 | 81.1)	WYTHEVILLE-AFTERSHOCK			A-9
1888	MAR	17	0	0	0.0	(36.4 | 82.5)	JONESBORO,TENN			F-6
1889	SEP	28	0	0	0.0	(35.2 | 84.5)	PARKSVILLE,POLK CO., TN-NIGHT,LIGHT SHOCK		III-IV	-6
1891	JUL	27	2	28	0.0	(37.9 | 87.5)	EVANSVILLE,IND		VI	D-5
1895	JUL	27	0	0	0.0	(35.2 | 88.2)	SAVANNAH,TENN		III-IV	-6
1895	OCT	3	0	0	0.0	(35.2 | 88.2)	MEMPHIS,TENN-LT SHOCK		III	-6
1897	MAY	1	4	0	0.0	(37.0 | 89.0)	ILL-W TN-W KY-S IND		IV-V	-5,6
1897	MAY	3	17	18	0.0	(37.1 | 80.7)	NEAR ROANOKE,VA	150000	VI-VII	BD-5,6,9
1897	MAY	31	18	58	0.0	(37.3 | 80.7)	GILES COUNTY,VA	280000	VIII	ABCD-5,6,9
1897	SEP	4	0	0	0.0	(36.9 | 81.1)	WYTHEVILLE,VA			-9
1897	OCT	22	3	20	0.0	(36.9 | 81.1)	WYTHEVILLE,VA	20000	V	F-5,9,6
1898	FEB	5	20	0	0.0	(37.0 | 81.0)	PULASKI-WYTHEVILLE,VA		IV	B-9
1898	MAR	30	0	30	0.0	(36.7 | 85.8)	MT.HERMON,MONROE CO., KENTUCKY		III	-6
1898	NOV	25	20	0	0.0	(37.0 | 81.0)	PULASKI-WYTHEVILLE,VA		IV-V	B-9
1899	FEB	13	9	30	0.0	(37.0 | 81.0)	WESTERN VA- 4 SHOCKS, STRONGLY FELT IN E TN	30000	V	AF-5,6,9
1899	APR	30	2	5	0.0	(38.5 | 87.0)	SOUTHWESTERN,IND	40000	VI-VII	D-5,6
1902	MAY	17	0	0	0.0	(37.3 | 80.7)	PEARISBURG,VA			-9
1902	MAY	29	7	30	0.0	(35.1 | 85.3)	CHATTANOOGA,TENN		V	BDF-5,6

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EARTHQUAKE LISTING
ALL EARTHQUAKES
LATITUDE 32.5-38.5 NORTH
LONGITUDE 80.5-89.0 WEST
SHEET 2 OF 8
Figure 2.5-163

Figure 2.5-163 Earthquake Listing All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1902	OCT	18	18	0	0.0	(35.0 | 85.3)	SE TENN-NW GEORGIA	1500	III-V	AF-6
1902	OCT	18	22	0	0.0	(35.0 | 85.3)	TN-GA AREA-MAIN SHOCK	1500	V-VI	AF-6,5
1904	MAR	5	0	30	0.0	(35.7 | 83.5)	MARYVILLE,TENN	5000	V	BF-5,6
1905	JAN	27	0	0	0.0	(34.0 | 86.0)	NEAR GADSDEN,ALA	250000	VIII	ACD-6,5
1905	JAN	28	0	0	0.0	(34.0 | 86.0)	GADSDEN-SECOND SHOCK	250000	VIII	ACD-6,5
1908	DEC	31	0	0	0.0	(36.9 | 89.0)	BLANDVILLE,KY-SEVERAL LIGHT SHOCKS			
1909	OCT	8	10	0	0.0	(34.8 | 85.0)	NW GA-FELT AT DALTON AND RINGGOLD,GA	800	IV-V	-7
1911	APR	22	3	0	0.0	(35.2 | 82.7)	CAESAR'S HEAD,SC,BLUE RIDGE AT NC-SC BORDER	600	V	C-6,5,7
1912	OCT	23	1	15	0.0	(32.7 | 83.5)	DUBLIN,MACON AND PERRY,GA	1500	IV	-7
1912	DEC	7	19	10	0.0	(34.7 | 81.7)	UNION COUNTY,SC		III-IV	-6,5
1913	JAN	1	18	28	0.0	(34.7 | 81.7)	UNION COUNTY,SC	43000	VII-VIII	BD-5,6
1913	MAR	13	5	0	0.0	(34.5 | 85.0)	CALHOUN AND GORDON COUNTIES,GA		IV	-7
1913	MAR	28	21	50	0.0	(36.2 | 83.7)	KNOXVILLE,TENN	2700	VII	BD-6,5
1913	APR	17	16	30	0.0	(35.3 | 84.2)	NEAR DUCKTOWN,TN	3500	V-VI	BD-6,5
1913	MAY	2	6	0	0.0	(35.5 | 84.4)	NEAR MADISONVILLE,TN		III	B-6
1913	JUN	9	15	30	0.0	(35.8 | 88.9)	HUMBOLDT,TENN		III	BF-6
1913	AUG	3	16	45	0.0	(35.9 | 83.9)	KNOXVILLE,TENN		IV	B-6
1914	JAN	24	3	24	0.0	(35.6 | 84.5)	NIOTA AND SWEETWATER IN SE TENN		IV-V	AF-6,5
1914	JAN	24	3	41	0.0	(35.6 | 84.5)	NIOTA AND SWEETWATER IN SE TENN-AFTERSHOCK		IV-V	AF-6,5
1914	MAR	5	20	5	0.0	(33.5 | 83.5)	NEAR ATLANTA,GA	100000	VI	-6,5
1915	JAN	14	9	20	0.0	(36.6 | 82.1)	BRISTOL,TENN-VA		III-IV	-6
1915	FEB	5	6	55	0.0	(37.6 | 88.7)	HARRISBURG,ILL		IV-V	-7
1915	OCT	26	7	40	0.0	(36.7 | 88.6)	MAYFIELD,KY		V	DF-5,6
1915	OCT	29	6	0	0.0	(35.8 | 82.7)	NEAR MARSHALL,NC	1200	V	B-5,6
1916	FEB	21	22	39	0.0	(35.5 | 82.5)	NEAR WAYNESVILLE,NC	500000	VI-VII	ABD-6,5
1916	MAR	2	5	2	0.0	(34.5 | 82.7)	ANDERSON,SC-6 SHOCKS		IV-V	-7
1916	AUG	26	18	35	0.0	(36.0 | 81.0)	STATESVILLE AND TAYLORSVILLE,NC-STRONG,LINCOLNTON,NC REPORTED THREE SHOCKS	3800	V	AB-6
1916	AUG	26	19	36	0.0	(36.0 | 81.0)	STATESVILLE AND TAYLORSVILLE,NC-AFTERSHOCK	3800	V	AB-5,6
1916	OCT	18	22	4	0.0	(33.5 | 86.2)	BIRMINGHAM,ALA	170000	VII	ACD-6,5,7
1916	OCT	19	3	52	0.0	(33.5 | 86.2)	BIRMINGHAM-AFTERSHOCK			A-6
1916	OCT	19	8	0	0.0	(36.7 | 88.7)	MAYFIELD,KY		III	-6
1916	OCT	22	0	0	0.0	(33.5 | 86.2)	BIRMINGHAM-AFTERSHOCK			A-6
1916	NOV	4	12	15	0.0	(33.5 | 86.2)	BIRMINGHAM-AFTERSHOCK			A-6
1917	JAN	2	9	30	0.0	(36.1 | 83.9)	NEAR MCMILLAN,KNOX CO.,TN-THOUGHT BY SOME TO BE EXPLOSION			F-6
1917	JAN	25	21	15	0.0	(36.1 | 83.5)	JEFFERSON CITY,TENN		III	A-6
1917	JAN	26	12	15	0.0	(36.1 | 83.5)	TALBOTT,JEFFERSON CO. TENN-AFTERSHOCK		III	A-6
1917	JAN	27	20	0	0.0	(36.1 | 83.5)	JEFFERSON CITY,TENN-AFTERSHOCK		III	-6

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Figure 2.5-164

Figure 2.5-164 Earthquake Listing All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1917	MAR	5	2	7	0.0	(35.9 | 83.9)	KNOXVILLE,TENN-ACCOUNT SUGGESTS ANOTHER UNREPORTED SHOCK A FEW DAYS EARLIER		III	D-6
1917	MAR	25	21	15	0.0	(36.1 | 83.5)	JEFFERSON CITY AND TALBOTT,TENN		III-IV	AB-6,7
1917	MAR	26	12	50	0.0	(36.1 | 83.5)	TALBOTT,TENN-AFTERSHOCK		III	B-6
1917	MAR	27	20	0	0.0	(36.1 | 83.5)	JEFFERSON CITY,TENN-TALBOTT AFTERSHOCK		III-IV	D-6
1917	APR	19	0	0	0.0	(37.0 | 82.0)	SW VIRGINIA		III	-9,6
1917	JUN	30	2	23	0.0	(32.7 | 87.5)	ROSEMARY,ALA		V	AB-6,5,7
1917	JUN	30	2	50	0.0	(32.7 | 87.5)	ROSEMARY-AFTERSHOCK		V	B-6,7
1918	JAN	16	15	45	0.0	(35.9 | 83.9)	KNOXVILLE,TENN		V	BD-6
1918	JUN	22	0	59	0.0	(36.1 | 84.1)	NEAR LENOIR CITY,TENN	3000	IV-V	AB-6,5,7
1920	APR	7	20	45	0.0	(36.4 | 88.1)	SPRINGVILLE,TENN-ONE SHOCK,A HEAVY JAR, QUAKE QUESTIONABLE		III	-6
1920	DEC	24	7	0	0.0	(36.0 | 85.0)	ROCKWOOD,TENN		V	B-6,5
1921	JUL	15	0	0	0.0	(36.6 | 82.3)	MENDOTA,VA		V-VI	D-6,5,9
1921	SEP	2	14	0	0.0	(36.2 | 86.3)	STATESVILLE,TENN-SEVERAL SHOCKS FELT		III	B-6
1921	DEC	15	13	20	0.0	(35.8 | 84.6)	NEAR KINGSTON,TENN-FELT FROM KINGSTON TO DAYTON,EAST TO ATHENS		V	BD-6
1922	MAR	22	22	30	0.0	(37.3 | 88.6)	SOUTHERN ILL	25000	V	AD-6,5
1922	MAR	23	2	20	0.0	(37.3 | 88.6)	S ILL-SECOND SHOCK	25000	V	D-6,5
1922	MAR	23	21	45	0.0	(37.0 | 88.0)	WESTERN KENTUCKY		V	-6,5
1922	MAR	30	2	20	0.0	(35.5 | 86.7)	FARMINGTON,MARSHALL CO.,TENN		V	B-6
1922	MAR	30	2	21	0.0	(36.5 | 82.2)	ARCADIA,SULLIVAN CO., TENN		IV	A-6
1922	MAR	30	22	20	0.0	(36.5 | 82.2)	ARCADIA-AFTERSHOCK		IV	-6
1923	OCT	18	19	30	0.0	(35.3 | 82.5)	HENDERSONVILLE AND SALUDA,NC			-7
1923	OCT	28	17	15	0.0	(34.9 | 88.1)	RIVERTON,ALA		III	-7
1924	JAN	1	1	6	0.0	(34.8 | 82.5)	GREENVILLE,SC		IV	-7
1924	APR	2	11	15	0.0	(37.1 | 88.6)	PADUCAH,KY		IV	-6
1924	OCT	20	8	30	0.0	(35.0 | 82.6)	PICKENS COUNTY,SC	56000	V	BD-5,6
1924	NOV	13	5	30	0.0	(36.6 | 82.1)	BRISTOL,TENN-VA		IV-V	AD-6,7
1925	APR	27	4	5	0.0	(38.0 | 87.5)	SOUTHWESTERN,IND	100000	V-VI	BD-5,6
1925	MAY	13	12	0	0.0	(36.7 | 88.6)	MAYFIELD,KY	3000	V	-5,6
1925	MAY	15	0	0	0.0	(37.0 | 81.0)	SWIFT CREEK,VA			A-9
1925	SEP	2	11	55	0.0	(37.8 | 87.6)	NEAR HENDERSON,KY	75000	V-VI	ACD-5,6
1926	MAR	22	14	30	0.0	(37.6 | 88.7)	HARRISBURG,ILL		IV	-7
1926	JUL	8	9	50	0.0	(35.9 | 82.1)	SOUTH MITCHELL CO.,NC		VI-VII	BCDF-6,5
1927	MAY	7	8	28	0.0	(36.5 | 89.0)	NEAR NEW MADRID,MO	130000	VII	BD-6,5
1927	JUN	16	12	0	0.0	(34.7 | 86.0)	NEAR SCOTTSBORO,ALA	2500	V	BDF-6,5
1927	JUL	20	8	58	0.0	(35.9 | 83.9)	KNOXVILLE,TENN-QUAKE QUESTIONABLE			BDF-6
1927	OCT	8	12	56	0.0	(35.0 | 85.3)	CHATTANOOGA,TENN		V	AD-6

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Figure 2.5-165 Earthquake Listing All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1928	MAR 7	2 45	0.0	(35.6	86.9)	REPORTED AT FRANKLIN, LYNNVILLE,COLUMBIA IN MIDDLE TENN		II-III	B-1,6
1928	NOV 3	4 3	0.0	(36.0	82.6)	NE TENN-W NC BORDER REGION-FELT IN ALA, GA,VA,KY AND SC	40000	VI-VII	CD-5,6,1,9
1928	NOV 20	3 45	0.0	(35.9	82.8)	W NC-E TENN BDR.AREA-FELT AT ASHVILLE AND HOT SPRINGS,NC, JOHNSON CITY AND GREENVILLE,TENN	10000	IV	-6
1929	OCT 28	2 15	0.0	(34.3	82.4)	DUE WEST,SC			B-1
1930	AUG 30	9 28	0.0	(35.9	84.4)	E TENN NEAR KINGSTON-FELT ALSO AT LENOIR CITY,OLIVER SPRINGS, AND LAWNVILLE,TENN		V	B-1,6
1930	OCT 16	21 50	0.0	(36.0	84.0)	KNOXVILLE,TENN		III-IV	ABD-1,6
1930	OCT 17	2 15	0.0	(36.0	84.0)	KNOXVILLE-AFTERSHOCK			-6
1930	DEC 10	0 2	0.0	(34.3	82.4)	DUE WEST,SC	300		A-1
1931	APR 1	23 30	0.0	(36.8	87.5)	HOPKINSVILLE AND LOVELACEVILLL,KY-FELT AT CAIRO,ILL		III	-1,6
1931	MAY 5	12 18	0.0	(33.7	86.6)	NORTHERN ALA-FELT IN GA AND POSSIBLY SC	6500	V-VI	BD-1,6,5
1931	MAY 6	12 18	0.0	(34.3	82.4)	DUE WEST,SC (POSSIBLE DATE MAY 5 TO CORRES-POND TO N ALA SHOCK)			B-1
1931	NOV 27	9 23	0.0	(36.2	86.7)	NASHVILLE,TENN		III	-6,1
1934	OCT 30	2 26	0.0	(37.5	88.5)	NEAR HARTSVILLE,POPE COUNTY,ILL-ON HEROD FAULT	1500	IV	-1
1935	JAN 1	8 15	0.0	(35.1	83.6)	GA-NC BORDER-DAMAGE AT DAHLONEGA,GA,AND ALMOND AND GAY,NC, CENTERED NEAR HAYES-VILLE,NC,FELT IN TENN	7000	V	BD-6,5,1
1936	JAN 1	8 0	0.0	(35.0	84.2)	GA-NC BDR.BETWEEN BLUE RIDGE,GA AND MURPHY,NC-FELT ALSO IN DUCKTOWN BASIN OF TENN		III	-6,2
1938	MAR 31	10 10	0.0	(35.6	83.6)	NC-TENN BORDER AREA-FELT FROM ASHVILLE AND MURPHY,NC TO KNOXVILLE,TENN		III-IV	-6,2
1939	MAY 5	3 45	0.0	(33.7	85.8)	ANNISTON,ALA-FELT ALSO AT OXFORD LAKE, BLUE MTN.,TALLEDEGA, CHOCCOLOCCO,JENIFER		V	D-5,6,2
1939	JUN 24	10 0	0.0	(34.7	86.6)	HUNTSVILLE,ALA			AB-2,6
1939	JUN 24	11 27	0.0	(34.7	86.6)	HUNTSVILLE-2ND AND STRONGEST SHOCK, FELT AT PULASKI,TENN		III-IV	AB-2,6
1939	JUN 24	12 45	0.0	(34.7	86.6)	HUNTSVILLE-AFTERSHOCK			B-2,6
1940	MAY 31	19 3	0.0	(37.1	88.6)	PADUCAH,KY-FELT AT CAIRO,ILL	1000	IV-V	D-6,2
1940	OCT 19	5 55	0.0	(35.0	85.0)	S TENN-N GA BDR AREA-FELT IN CHATTANOOGA, CLEVELAND,CHARLESTON, TENN,AND DALTON AND RINGGOLD,GA	500	IV	BD-6,2
1940	DEC 25	1 50	0.0	(35.9	82.9)	ASHEVILLE,NC-GREEN-VILLE,TENN BORDER RGN		III	A-2,6
1940	DEC 25	6 49	0.0	(35.9	82.9)	NC-TENN MAIN SHOCK	7000	V	ABD-6,2

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Figure 2.5-166

Figure 2.5-166 Earthquake Listing All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1940	DEC 26	5	0	0.0	(35.7 | 82.7)	NC-TENN AFTERSHOCK, FELT AT ASHEVILLE,NC		III	B-6
1941	MAR 4	6	15	0.0	(35.9 | 83.9)	KNOXVILLE,TENN-FELT AT ROCKFORD,BLOUNT COUNTY,TENN		III	B-3,6
1941	MAY 10	11	12	0.0	(35.6 | 82.6)	ASHEVILLE,NC		III	-6,3
1941	SEP 8	9	45	0.0	(35.0 | 85.3)	CHATTANOOGA,TENN	100	III-IV	B-3,6
1942	NOV 1	3	20	0.0	(34.5 | 81.1)	WINNSBORO,SC			F-3
1943	JUL 29	4	30	0.0	(33.5 | 82.0)	AUGUSTA,GA-SEISMIC ORIGIN QUESTIONED			-3
1945	JUN 14	3	25	0.0	(35.0 | 84.5)	CLEVELAND,TENN-FELT TO BLUE RIDGE,GA	4000	V	B-6,3,5
1945	JUL 26	11	32	20.0	34.3	81.4	MURRAY LAKE,SC-NEAR COLUMBIA	25000	IV-V	BD-6,3,5
1946	APR 7	5	0	0.0	(35.2 | 84.9)	CLEVELAND,TENN		III-IV	BF-3
1947	JUN 6	12	55	0.0	(35.9 | 83.9)	KNOXVILLE,TENN		III	B-6
1947	DEC 28	0	5	0.0	(35.0 | 85.3)	SE TENN-NW GA AREA-FELT STRONGLY IN MISSIONARY RIDGE AND CHATTANOOGA AREA OF TENN AND ROSSVILLE,GA	300	IV	D-6,3
1948	FEB 10	0	4	0.0	(36.4 | 84.1)	LAFOLLETTE,TENN		V-VI	B-6,3
1949	SEP 16	21	30	0.0	(36.7 | 83.0)	NEAR PENNINGTON GAP, LEE CO.,VA		II-III	A-6
1949	SEP 17	9	30	0.0	(36.7 | 83.0)	LEE CO.,VA-MAIN SHOCK,WIDELY FELT		IV-V	B-9,3,6
1950	JUN 19	4	19	0.0	(35.7 | 84.0)	ALCOA,TENN-FELT AT KNOXVILLE,TENN AND IN N CAROLINA		IV	BD-6,3,11
1952	FEB 6	16	12	0.0	(33.5 | 86.8)	BIRMINGHAM,ALA	100	IV	D-3
1952	JUN 11	20	20	0.0	(36.6 | 82.4)	JOHNSON CITY,TENN			-3
1953	NOV 10	14	53	0.0	(35.9 | 83.9)	KNOXVILLE,TENN			B-3,11
1953	DEC 5	13	45	0.0	(35.9 | 83.9)	KNOXVILLE,TENN			B-11
1954	JAN 2	2	25	0.0	(36.6 | 83.7)	MIDDLESBORO,KY-FELT IN KY,TN,VA AND NC		VI	D-3,5
1954	JAN 22	0	0	0.0	(35.3 | 84.4)	NEAR ETOWAH AND ATHENS,TENN		V	BD-3,5
1955	JAN 6	20	30	0.0	(36.6 | 82.2)	BRISTOL,TENN-VA-FELT BY FEW ON UPPER FLOOR OF TALL BLDGS IN KNOXVILLE,TENN		IV	-9,3
1955	JAN 12	17	25	0.0	(35.8 | 84.0)	BLOUNT AND KNOX CTYS. TN-FELT AT BLUE GRASS AND MARYVILLE,TENN		IV	-3
1955	JAN 25	19	34	0.0	(35.9 | 83.9)	KNOXVILLE,TENN		IV	B-3
1955	SEP 28	7	1	42.0	(36.6 | 81.4)	NC-VA BORDER AREA	1700	V	BD-3,5
1956	JAN 5	8	0	0.0	(34.3 | 82.4)	DUE WEST,SC		IV	A-3
1956	JAN 5	8	30	0.0	(34.3 | 82.4)	DUE WEST-AFTERSHOCK		IV	-3
1956	MAY 19	19	0	0.0	(34.3 | 82.4)	DUE WEST,SC		IV	AB-3
1956	MAY 27	23	25	0.0	(34.3 | 82.4)	DUE WEST-AFTERSHOCK		IV	B-3
1956	SEP 7	13	36	1.0	35.5	84.0	NEAR KNOXVILLE,TENN-FELT IN TN,KY AND NC	8300	VI	ABD-3,5,1
1956	SEP 7	13	49	20.0	35.5	84.0	EAST TENN-AFTERSHOCK	8300	VI	BD-3,5,11
1956	SEP 9	22	45	0.0	(35.7 | 86.6)	COLLEGE GROVE,TENN		IV	B-3
1957	JAN 25	18	15	0.0	(36.6 | 83.7)	NORTOWN,KY-A SUBURB OF MIDDLESBORO,KY		VI	-3

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Figure 2.5-167 Earthquake Listing All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1957	MAR 26	8 27 6.0	(37.0	88.4)	PADUCAH,KY-FELT AT SMITHLAND,KY		V	BDF-3,5
1957	APR 23	9 23 39.0	(34.5	86.8)	N ALA-FELT ALSO IN GA	11500	VI	BD-5,3,11
1957	MAY 14	14 24 58.0	(35.7	82.0)	W NC-FELT SC AND TN	8100	VI	BD-5,3,11
1957	JUN 23	6 34 18.0	36.5	84.5	E-CENTRAL TENN-FELT IN HARDIN VALLEY AND CLINCH R.VALLEY AND AT CONCORD,DIXIE LEE JUNCTION,OAK RIDGE,TN		V	-5,3,11
1957	JUL 2	9 33 1.0	(35.5	82.5)	W NC-FELT STRONGLY IN MADISON AND BUNCOMBE, COUNTY,NC AND DAMAGE AT FLAG POND,TENN		VI	D-5,3
1957	NOV 24	20 6 17.0	35.0	83.5	NC-TENN BDR.RGN.-FELT IN SC,NC,GA AND TENN	4100	VI	BD-5,3
1958	JAN 28	4 57 0.0	(37.0	89.0)	ILL-KY-MO BORDER AREA	300	V	D-3,5
1958	MAY 16	22 30 0.0	(35.6	82.6)	ASHEVILLE,NC		IV	-3
1958	OCT 20	6 16 0.0	(34.5	82.8)	ANDERSON,SC		V	BF-5,3
1958	NOV 8	2 41 43.0	38.4	87.9	ILL-IND BORDER-FELT IN ILL,IND,MO AND KY	33000	VI	D-3,5,11
1959	JUN 13	1 15 0.0	(35.4	84.3)	TELLICO PLAINS,TENN-FELT IN SEVERAL CTYS OF E TENN AND CHERO-KEE CTY,NC	900	IV	B-3,5
1959	AUG 12	18 6 7.0	35.0	87.0	ALA-TN BORDER AREA	2800	VI	BD-3,5,11
1960	FEB 9	14 0 6.0	(35.3	82.5)	HENDERSON COUNTY,NC			-3
1960	APR 15	10 10 10.0	(35.8	84.0)	NEAR KNOXVILLE,TENN	1300	V	BD-3,5
1962	JUN 27	1 28 55.7	37.7	88.5	S ILL-FELT IN PADUCAH AND WICKLIFFE,KY AND IN MO		5.5	BD-3,5,11
1963	APR 11	17 45 0.0	(34.8	82.4)	GREENVILLE,SC		IV	B-3
1963	AUG 3	0 37 50.3	37.0	88.8	ILL-KY BORDER AREA-DEPTH ABOUT 13 KM		3.6	BD-3,5
1963	OCT 28	22 38 35.0	36.7	81.0	NEAR GALAX,VA-FELT IN VA AND NC	1300	V	ABD-3,5,9
1963	OCT 29	1 57 0.0	36.7	81.0	GALAX,VA-AFTERSHOCK	1300	V	BD-3,9
1964	JAN 20	13 37 52.0	(35.9	82.2)	CANE RIVER,NC AREA		IV	-3
1964	FEB 18	10 31 11.5	34.8	85.5	DE KALB CO.,NE ALA-FELT IN GA,DEPTH 15KM		4.4	B-3
1964	MAR 13	1 20 18.1	32.8	83.4	CENTRAL GA-FELT IN BALDWIN,BIBB,JONES AND WILKINSON COUNTY	400	4.4	B-3
1964	APR 20	19 4 46.0	(34.0	81.0)	NEAR COLUMBIA,SC		V	B-3
1964	JUL 28	0 0 0.0	(36.0	83.9)	KNOXVILLE,TENN			-3
1964	OCT 13	16 30 0.0	(35.9	83.9)	KNOXVILLE,TENN			-3
1965	SEP 9	4 37 16.0	(34.7	81.2)	CHESTER,SC			A-3
1965	SEP 9	14 42 20.0	(34.7	81.2)	CHESTER,SC-AFTERSHOCK			A-3
1965	SEP 10	7 32 0.0	(34.7	81.2)	CHESTER,SC-AFTERSHOCK			A-3
1965	SEP 12	17 25 2.0	(34.7	81.2)	CHESTER,SC-AFTERSHOCK			A-3
1966	AUG 24	6 0 0.0	(35.9	83.9)	KNOXVILLE,TENN		IV	B-3
1967	OCT 23	9 4 10.0	33.4	80.7	S CENTRAL SC-FELT AT GOOSE CREEK, COLUMBIA COTTAGEVILLE, AND CHARLESTON		3.8	-3
1968	MAR 8	5 38 15.0	37.3	80.8	NEAR NARROWS,VA		3.9	-4,9,11
1968	SEP 22	21 41 18.0	34.0	81.5	CENTRAL SC-FELT AT COLUMBIA	400	3.7	B-4,11

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EARTHQUAKE LISTING
ALL EARTHQUAKES
LATITUDE 32.5-38.5 NORTH
LONGITUDE 80.5-89.0 WEST
SHEET 7 OF 8
Figure 2.5-168

Figure 2.5-168 Earthquake Listing All Earthquakes Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1968	NOV 9	17 1 41.0	38.0	88.5	SOUTHERN ILL-FELT IN 23 STATES AND CANADA	400000	5.3	D-4,11
1968	DEC 11	15 0 0.0	(38.3	85.7)	LOUISVILLE,KY		V	-3,16
1969	JUL 13	21 51 9.4	36.1	83.7	E TENN-FELT IN PARTS OF KY,NC,TENN,AND VA		3.5	A-4
1969	JUL 14	9 13 14.5	36.1	83.7	E TENN-AFTERSHOCK		1.0	-12
1969	NOV 20	1 0 9.0	37.4	81.0	SOUTHERN PART W VA-FELT IN VA,GA,OHIO, KY,MD,NC,SC,W VA,AND TN ,DEPTH ABOUT 3 KM		4.3	D-4
1969	DEC 13	10 19 34.3	35.1	83.0	E NC-FELT AT SYLVA AND COLUMBUS,NC,AND GREENVILLE,PICKENS,SC			-4
1970	SEP 10	1 41 10.0	36.1	81.4	NW NORTH CAROLINA FELT IN NW N.CAROLINA	2000	2.5	-4,12,3
1971	MAR 14	17 27 51.3	33.1	87.9	CARROLTON,ALA-FELT		4.5	-4
1971	MAY 19	12 54 3.4	33.3	80.6	ORANGEBURG-BOWMAN AREA ,SC-FELT		3.4	-4
1971	JUL 13	11 41 44.0	(34.7	82.9)	SENECA,SC		IV	AP-13,12
1971	JUL 31	20 16 55.6	33.4	80.7	S CAROLINA-FELT IN ORANGEBURG,CO AREA	1300	III	-4,13
1971	AUG 11	3 52 7.0	(33.2	80.7)	ORANGEBURG,SC-SLIGHT			-13,12
1971	OCT 9	16 43 33.8	35.9	83.5	N CAROLINA-MINOR DAMAGE IN GATLINBURG-COSBY AREA		3.4	D-4
1973	JAN 7	22 56 6.1	37.4	87.3	KENTUCKY		3.2	-4
1973	OCT 30	22 58 39.0	35.8	84.0	E TENN		3.4	P-17
1973	NOV 30	7 48 41.2	35.8	84.0	E TENN-MINOR DAMAGE AT MARYVILLE		4.6	P-17
1974	AUG 2	8 52 9.8	33.8	82.4	GEORGIA-MINOR DAMAGE BOBBY BROWN ST. PARK		4.8	P-17
1975	FEB 10	18 52 48.3	36.1	83.6	E TENN		3.0	-12
1975	MAR 1	11 50 0.2	33.5	88.0	MISSISSIPPI		3.2	-17

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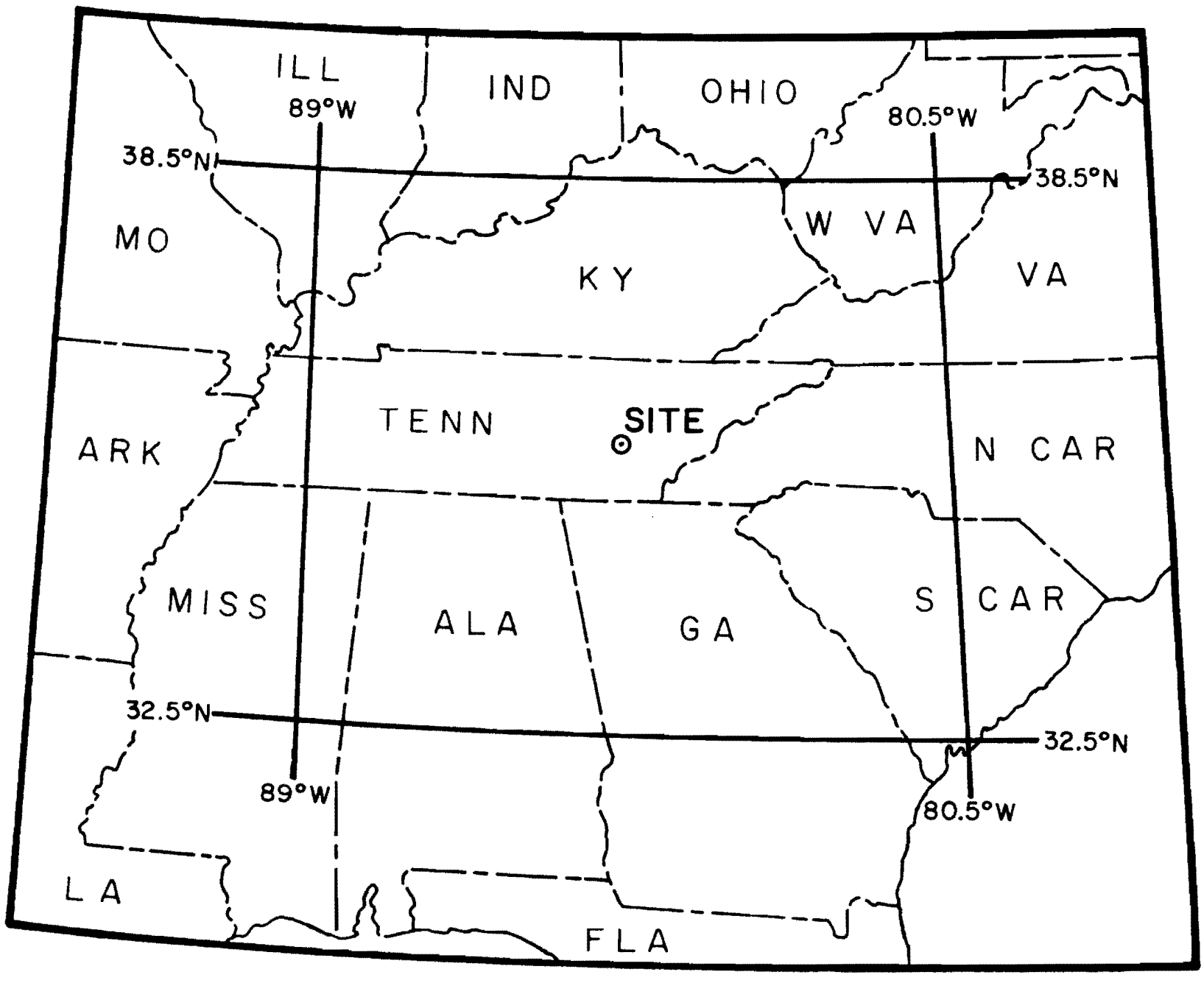
ALL EARTHQUAKES
LATITUDE 32.5-38.5 NORTH
LONGITUDE 80.5-89.0 WEST
SHEET 8 OF 8
Figure 2.5-169

Figure 2.5-169 Index Map -Earthquakes 4.3 Richter or Greater Latitude 32.5-38.5 North Longitude 80.5-89.0 West



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WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
INDEX MAP - EARTHQUAKES 4.3 RICHTER OR GREATER LATITUDE 32.5-38.5 NORTH LONGITUDE 80.5-89.0 WEST Figure 2.5-170

Figure 2.5-170 Earthquake Listing 4.3 Richter or Greater Latitude 32.5-38.5 North Longitude 80.5-89.0 West

SEISMIC HISTORY OF THE SOUTHEAST REGION OF THE UNITED STATES

THIS IS A CHRONOLOGICAL LISTING OF ALL EARTHQUAKES HAVING EPICENTERS IN THE RECTANGULAR PORTION OF THE SOUTH-EAST REGION BOUNDED BY THE FOLLOWING GEODETIC COORDINATE LINES --

SOUTHERN BOUNDARY - 32.5 -DEGREE NORTH LATITUDE
NORTHERN BOUNDARY - 38.5 -DEGREE NORTH LATITUDE
EASTERN BOUNDARY - 80.5 -DEGREE WEST LONGITUDE
WESTERN BOUNDARY - 89.0 -DEGREE WEST LONGITUDE

AND HAVING A RICHTER SCALE MAGNITUDE EQUAL TO OR GREATER THAN 4.3

YEAR	DATE	TIME-HR-MIN-SEC	LAT - LONG	LOCALITY AND NOTES	FELT-SQ.MI.	MAG/INT	REFERENCES
1844	NOV 28	12 0 0.0	(36.0 84.0)	KNOXVILLE,TENN		VI	BD-5,6
1852	APR 29	18 0 0.0	(36.6 81.6)	VA-NC-TENN REGION	150000	VI	BD-5,6,10
1872	JUN 17	20 0 0.0	(33.1 83.3)	MILLEDGEVILLE,GA		V	D-5
1875	NOV 2	2 55 0.0	(33.8 82.5)	NORTHERN GEORGIA	25000	VI	AB-5,6
1876	SEP 25	6 0 0.0	(38.0 88.0)	S ILL-S IND-N KY AREA		VI	A-6
1876	SEP 25	6 15 0.0	(38.0 88.0)	S ILL-S IND-N KY-2ND AND STRONGEST SHOCK		VI	-6
1879	DEC 12	24 0 0.0	(35.2 80.8)	CHARLOTTE,NC		V-VI	A-5
1886	FEB 5	1 0 0.0	(32.8 88.0)	SUMTER CO.,ALA	1600	V	-5
1891	JUL 27	2 28 0.0	(37.9 87.5)	EVANSVILLE,IND		VI	D-5
1897	MAY 3	17 18 0.0	(37.1 80.7)	NEAR ROANOKE,VA	150000	VI-VII	BD-5,6,9
1897	MAY 31	18 58 0.0	(37.3 80.7)	GILES COUNTY,VA	280000	VIII	ABCD-5,6,9
1897	OCT 22	3 20 0.0	(36.9 81.1)	WYTHEVILLE,VA	20000	V	F-5,9,6
1899	FEB 13	9 30 0.0	(37.0 81.0)	WESTERN VA- 4 SHOCKS, STRONGLY FELT IN E TN	30000	V	AF-5,6,9
1899	APR 30	2 5 0.0	(38.5 87.0)	SOUTHWESTERN,IND	40000	VI-VII	D-5,6
1902	MAY 29	7 30 0.0	(35.1 85.3)	CHATTANOOGA,TENN		V	BDF-5,6
1902	OCT 18	22 0 0.0	(35.0 85.3)	TN-GA AREA-MAIN SHOCK	1500	V-VI	AF-5,5
1904	MAR 5	0 30 0.0	(35.7 83.5)	MARYVILLE,TENN	5000	V	BF-5,6
1905	JAN 27	0 0 0.0	(34.0 86.0)	NEAR GADSDEN,ALA	250000	VIII	ACD-6,5
1905	JAN 28	0 0 0.0	(34.0 86.0)	GADSDEN-SECOND SHOCK	250000	VIII	ACD-6,5
1911	APR 22	3 0 0.0	(35.2 82.7)	CAESAR'S HEAD,SC,BLUE RIDGE AT NC-SC BORDER	600	V	C-6,5,7
1913	JAN 1	18 28 0.0	(34.7 81.7)	UNION COUNTY,SC	43000	VII-VIII	BD-5,6
1913	MAR 28	21 50 0.0	(36.2 83.7)	KNOXVILLE,TENN	2700	VII	BD-6,5
1913	APR 17	16 30 0.0	(35.3 84.2)	NEAR DUCKTOWN,TN	3500	V-VI	BD-6,5
1914	MAR 5	20 5 0.0	(33.5 83.5)	NEAR ATLANTA,GA	100000	VI	-6,5
1915	OCT 26	7 40 0.0	(36.7 88.6)	MAYFIELD,KY		V	DF-5,6
1915	OCT 29	6 0 0.0	(35.8 82.7)	NEAR MARSHALL,NC	1200	V	B-5,6
1916	FEB 21	22 39 0.0	(35.5 82.5)	NEAR WAYNESVILLE,NC	500000	VI-VII	ABD-6,5

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4.3 RICHTER OR GREATER
LATITUDE 32.5-38.5 NORTH
LONGITUDE 80.5-89.0 WEST
SHEET 1 OF 3
Figure 2.5-171

Figure 2.5-171 Earthquake Listing 4.3 Richter or Greater Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1916	AUG 26	18	35	0.0	(36.0 | 81.0)	STATESVILLE AND TAYLORSVILLE,NC-STRONG,LINCOLNTON,NC REPORTED THREE SHOCKS	3800	V	AB-6
1916	AUG 26	19	36	0.0	(36.0 | 81.0)	STATESVILLE AND TAYLORSVILLE,NC-AFTERSHOCK	3800	V	AB-5,6
1916	OCT 18	22	4	0.0	(33.5 | 86.2)	BIRMINGHAM,ALA	170000	VII	ACD-6,5,7
1917	JUN 30	2	23	0.0	(32.7 | 87.5)	ROSEMARY,ALA		V	AB-6,5,7
1917	JUN 30	2	50	0.0	(32.7 | 87.5)	ROSEMARY-AFTERSHOCK		V	B-6,7
1918	JAN 16	15	45	0.0	(35.9 | 83.9)	KNOXVILLE,TENN		V	BD-6
1920	DEC 24	7	0	0.0	(36.0 | 85.0)	ROCKWOOD,TENN		V	B-6,5
1921	JUL 15	0	0	0.0	(36.6 | 82.3)	MENDOTA,VA		V-VI	D-6,5,9
1921	DEC 15	13	20	0.0	(35.8 | 84.6)	NEAR KINGSTON,TENN-FELT FROM KINGSTON TO DAYTON,EAST TO ATHENS		V	BD-6
1922	MAR 22	22	30	0.0	(37.3 | 88.6)	SOUTHERN ILL	25000	V	AD-6,5
1922	MAR 23	2	20	0.0	(37.3 | 88.6)	S ILL-SECOND SHOCK	25000	V	D-6,5
1922	MAR 23	21	45	0.0	(37.0 | 88.0)	WESTERN KENTUCKY		V	-6,5
1922	MAR 30	2	20	0.0	(35.5 | 86.7)	FARMINGTON,MARSHALL CO.,TENN		V	B-6
1924	OCT 20	8	30	0.0	(35.0 | 82.6)	PICKENS COUNTY,SC	56000	V	BD-5,6
1925	APR 27	4	5	0.0	(38.0 | 87.5)	SOUTHWESTERN,IND	100000	V-VI	BD-5,6
1925	MAY 13	12	0	0.0	(36.7 | 88.6)	MAYFIELD,KY	3000	V	-5,6
1925	SEP 2	11	55	0.0	(37.8 | 87.6)	NEAR HENDERSON,KY	75000	V-VI	ACD-5,6
1926	JUL 8	9	50	0.0	(35.9 | 82.1)	SOUTH MITCHELL CO.,NC		VI-VII	BCDF-6,5
1927	MAY 7	8	28	0.0	(36.5 | 89.0)	NEAR NEW MADRID,MO	130000	VII	BD-6,5
1927	JUN 16	12	0	0.0	(34.7 | 86.0)	NEAR SCOTTSBORO,ALA	2500	V	BDF-6,5
1927	OCT 8	12	56	0.0	(35.0 | 85.3)	CHATTANOOGA,TENN		V	AD-6
1928	NOV 3	4	3	0.0	(36.0 | 82.6)	NE TENN-N NC BORDER REGION-FELT IN ALA, GA,VA,KY AND SC	40000	VI-VII	CD-5,6,1,9
1930	AUG 30	9	28	0.0	(35.9 | 84.4)	E TENN NEAR KINGSTON-FELT ALSO AT LENOIR CITY,OLIVER SPRINGS, AND LAWNVILLE,TENN		V	B-1,6
1931	MAY 5	12	18	0.0	(33.7 | 86.6)	NORTHERN ALA-FELT IN GA AND POSSIBLY SC	6500	V-VI	BD-1,6,5
1935	JAN 1	8	15	0.0	(35.1 | 83.6)	GA-NC BORDER-DAMAGE AT DAHLONEGA,GA,AND ALMOND AND GAY,NC, CENTERED NEAR HAYES-VILLE,NC,FELT IN TENN	7000	V	BD-6,5,1
1939	MAY 5	3	45	0.0	(33.7 | 85.8)	ANNISTON,ALA-FELT ALSO AT OXFORD LAKE, BLUE MTN.,TALLEDEGA, CHOCCOLOCCO,JENIFER		V	D-5,6,2
1940	DEC 25	6	49	0.0	(35.9 | 82.9)	NC-TENN MAIN SHOCK	7000	V	ABD-6,2
1945	JUN 14	3	25	0.0	(35.0 | 84.5)	CLEVELAND,TENN-FELT TO BLUE RIDGE,GA	4000	V	B-6,3,5
1948	FEB 10	0	4	0.0	(36.4 | 84.1)	LAFOLLETTE,TENN		V-VI	B-6,3
1954	JAN 2	2	25	0.0	(36.6 | 83.7)	MIDDLESBORO,KY-FELT IN KY,TN,VA AND NC		VI	D-3,5
1954	JAN 22	0	0	0.0	(35.3 | 84.4)	NEAR ETOWAH AND ATHENS,TENN		V	BD-3,5

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4.3 RICHTER OR GREATER
LATITUDE 32.5-38.5 NORTH
LONGITUDE 80.5-89.0 WEST
SHEET 2 OF 3
Figure 2.5-172

Figure 2.5-172 Earthquake Listing 4.3 Richter or Greater Latitude 32.5-38.5 North Longitude 80.5-89.0 West

1955	SEP 28	7 1 42.0	(36.6	81.4)	NC-VA BORDER AREA	1700	V	BD-3,5
1956	SEP 7	13 36 1.0	35.5	84.0	NEAR KNOXVILLE,TENN-FELT IN TN,KY AND NC	8300	VI	ABD-3,5,11
1956	SEP 7	13 49 20.0	35.5	84.0	EAST TENN-AFTERSHOCK	8300	VI	BD-3,5,11
1957	JAN 25	18 15 0.0	(36.6	83.7)	NOETOWN,KY-A SUBURB OF MIDDLESBORO,KY		VI	-3
1957	MAR 26	8 27 6.0	(37.0	88.4)	PADUCAH,KY-FELT AT SMITHLAND,KY		V	BDF-3,5
1957	APR 23	9 23 39.0	(34.5	86.8)	N ALA-FELT ALSO IN GA	11500	VI	BD-5,3,11
1957	MAY 14	14 24 58.0	(35.7	82.0)	W NC-FELT SC AND TN	8100	VI	BD-5,3,11
1957	JUN 23	6 34 18.0	36.5	84.5	E-CENTRAL TENN-FELT IN HARDIN VALLEY AND CLINCH R.VALLEY AND AT CONCORD,DIXIE LEE JUNCTION,OAK RIDGE,TN		V	-5,3,11
1957	JUL 2	9 33 1.0	(35.5	82.5)	W NC-FELT STRONGLY IN MADISON AND BUNCOMBE, COUNTY,NC AND DAMAGE AT FLAG POND,TENN		VI	D-5,3
1957	NOV 24	20 6 17.0	35.0	83.5	NC-TENN BDR.RGN.-FELT IN SC,NC,GA AND TENN	4100	VI	BD-5,3
1958	JAN 28	4 57 0.0	(37.0	89.0)	ILL-KY-MO BORDER AREA	300	V	D-3,5
1958	OCT 20	6 16 0.0	(34.5	82.8)	ANDERSON,SC		V	BF-5,3
1958	NOV 8	2 41 43.0	38.4	87.9	ILL-IND BORDER-FELT IN ILL,IND,MO AND KY	33000	VI	D-3,5,11
1959	AUG 12	18 6 7.0	35.0	87.0	ALA-TN BORDER AREA	2800	VI	BD-3,5,11
1960	APR 15	10 10 10.0	(35.8	84.0)	NEAR KNOXVILLE,TENN	1300	V	BD-3,5
1962	JUN 27	1 28 55.7	37.7	88.5	S ILL-FELT IN PADUCAH AND WICKLIFFE,KY AND IN MO		5.5	BD-3,5,11
1963	OCT 28	22 38 35.0	36.7	81.0	NEAR GALAX,VA-FELT IN VA AND NC	1300	V	ABD-3,5,9
1963	OCT 29	1 57 0.0	36.7	81.0	GALAX,VA-AFTERSHOCK	1300	V	BD-3,9
1964	FEB 18	10 31 11.5	34.8	85.5	DE KALB CO.,NE ALA-FELT IN GA,DEPTH 15KM		4.4	B-3
1964	MAR 13	1 20 18.1	32.8	83.4	CENTRAL GA-FELT IN BALDWIN,BIBB,JONES AND WILKINSON COUNTY	400	4.4	B-3
1964	APR 20	19 4 46.0	(34.0	81.0)	NEAR COLUMBIA,SC		V	B-3
1968	NOV 9	17 1 41.0	38.0	88.5	SOUTHERN ILL-FELT IN 23 STATES AND CANADA	400000	5.3	D-4,11
1968	DEC 11	15 0 0.0	(38.3	85.7)	LOUISVILLE,KY		V	-3,16
1969	NOV 20	1 0 9.0	37.4	81.0	SOUTHERN PART W VA-FELT IN VA,GA,OHIO, KY,MD,NC,SC,W VA,AND TN ,DEPTH ABOUT 3 KM		4.3	D-4
1971	MAR 14	17 27 51.3	33.1	87.9	CARROLTON,ALA-FELT		4.5	-4
1973	NOV 30	7 48 41.2	35.8	84.0	E TENN-MINOR DAMAGE AT MARYVILLE		4.6	F-17
1974	AUG 2	8 52 9.8	33.8	82.4	GEORGIA-MINOR DAMAGE		4.8	F-17

ROBBY BROWN ST. PARK

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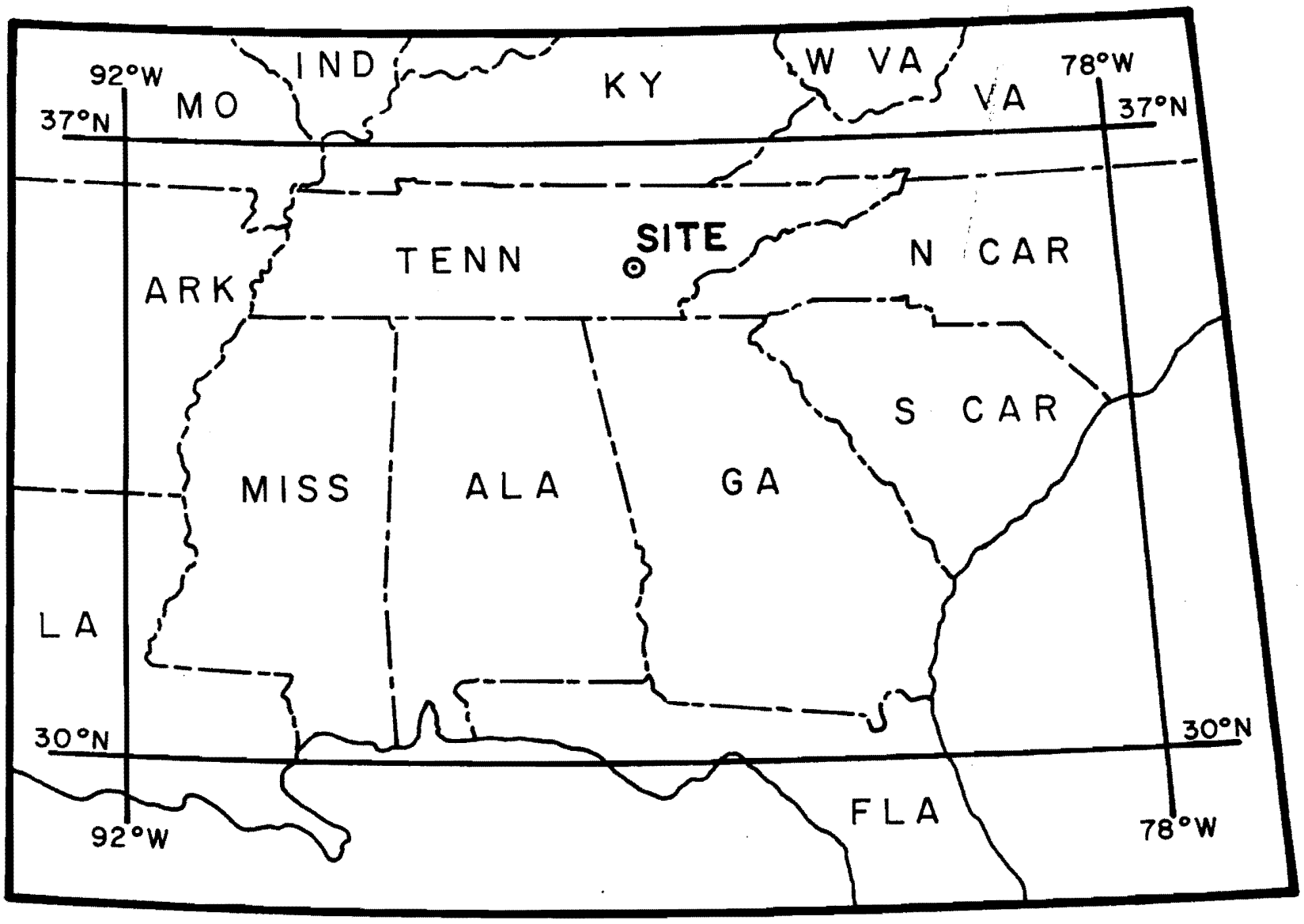
4.3 RICHTER OR GREATER
LATITUDE 32.5-38.5 NORTH
LONGITUDE 80.5-89.0 WEST
SHEET 3 OF 3
Figure 2.5-173

Figure 2.5-173 Index Map -Earthquakes 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West



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INDEX MAP - EARTHQUAKES
4.3 RICHTER OR GREATER
LATITUDE 30-37 NORTH
LONGITUDE 78-92 WEST

Figure 2.5-174

Figure 2.5-174 Earthquakes Listing 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West

SEISMIC HISTORY OF THE SOUTHEAST REGION OF THE UNITED STATES

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SOUTHERN BOUNDARY - 30.0 -DEGREE NORTH LATITUDE
NORTHERN BOUNDARY - 37.0 -DEGREE NORTH LATITUDE
EASTERN BOUNDARY - 78.0 -DEGREE WEST LONGITUDE
WESTERN BOUNDARY - 92.0 -DEGREE WEST LONGITUDE

AND HAVING A RICHTER SCALE MAGNITUDE EQUAL TO OR GREATER THAN 4.3

YEAR	DATE	TIME-HR-MIN-SEC	LAT - LONG	LOCALITY AND NOTES	FELT-SQ.MI.	MAG/INT	REFERENCES
1811	DEC 16	8 0 0.0	(36.6 89.6)	NEW MADRID,MO-FELT EXTENSIVELY EASTWARD, PERHAPS THE STRONGEST EVER IN U.S.,LIMITED DAMAGE BECAUSE POP. SPARCE,INTENSITY-XII	2000000		ABCD -5,6
1812	JAN 23	15 0 0.0	(36.6 89.6)	NEW MADRID,MO-SECOND MAIN SHOCK OF SERIES, INTENSITY-XII	2000000		ABCD-5,6
1812	FEB 7	9 45 0.0	(36.6 89.6)	NEW MADRID,MO-THIRD MAIN SHOCK OF SERIES, INTENSITY-XII			ABCD-5,6
1841	DEC 28	5 50 0.0	(36.5 89.2)	NEAR HICKMAN,KY		V	-16
1843	JAN 5	1 0 0.0	(35.2 90.0)	W TENN-FELT TO EAST	400000	VII	BCD-5,6
1844	NOV 28	12 0 0.0	(36.0 84.0)	KNOXVILLE,TENN		VI	BD-5,6
1852	APR 29	18 0 0.0	(36.6 81.6)	VA-NC-TENN REGION	150000	VI	BD-5,6,10
1855	FEB 2	8 0 0.0	(37.0 78.6)	CHARLOTTE COURT HOUSE,VA	9000	V	-16
1861	AUG 31	10 22 0.0	(36.6 78.5)	VIRGINIA	300000	VI	D-5,9,6,10
1865	AUG 17	15 0 0.0	(36.5 89.5)	NEW MADRID,MO-FELT WIDELY OVER MISS VAL.	24000	VII	D-6,5
1872	JUN 17	20 0 0.0	(33.1 83.3)	MILLEDGEVILLE,GA		V	D-5
1875	NOV 2	2 55 0.0	(33.8 82.5)	NORTHERN GEORGIA	25000	VI	AB-5,6
1875	DEC 23	4 45 0.0	(36.6 78.5)	ARVONIA,VA-5 SHOCKS IN QUICK SUCCESSION	50000	VII	ABD-5,9
1878	MAR 12	10 0 0.0	(36.8 89.2)	COLUMBUS,KY		V	CP-5,6
1878	NOV 19	5 52 0.0	(36.7 90.4)	TENN-MO-KY-ILL AREA	150000	VI-VIII	AD-6,5
1879	DEC 12	24 0 0.0	(35.2 80.8)	CHARLOTTE,NC		V-VI	A-5
1883	JAN 11	7 12 0.0	(37.0 89.2)	CAIRO,ILL-MAIN SHOCK	80000	V-VI	AD-6,5
1883	APR 12	8 30 0.0	(37.0 89.2)	CAIRO,ILL-AFTERSHOCK		VI-VII	DF-5,6
1883	JUN 11	0 0 0.0	(35.2 90.0)	MEMPHIS,TENN		VI-VII	-7
1883	DEC 5	15 20 0.0	(36.3 91.8)	MELBOURNE,ARK		V	BCD-5
1884	JAN 18	13 0 0.0	(34.3 78.0)	WILMINGTON,NC		V	D-5

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EARTHQUAKE LISTING
4.3 RICHTER OR GREATER
LATITUDE 30-37 NORTH
LONGITUDE 78-92 WEST
SHEET 1 OF 6
Figure 2.5-175

Figure 2.5-175 Earthquakes Listing 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West

1886	FEB 5	1	0	0.0	(32.8 | 88.0)	SUMTER CO.,ALA	1600	V	-5
1886	AUG 28	1	30	0.0	(33.1 | 80.2)	SUMMERVILLE,SC-CHARLESTON FORESHOCK		V	-14
1886	SEP 1	2	51	0.0	(32.9 | 80.0)	FIFTEEN MILES NW OF CHARLESTON,SC-ONE OF STRONGEST EVER TO OCCUR IN U.S.,EXTENSIVE DAMAGE,INTENSITY X	2000000		ABCD-5,6,8
1886	SEP 1	2	59	0.0	(32.9 | 80.0)	CHARLESTON,SC-2ND MAIN SHOCK,INT-X	2000000		ABCD-5,6,8
1886	SEP 1	5	5	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK			-14
1886	SEP 4	4	1	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK		VI	-8,14
1886	SEP 6	4	6	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK		VI	-8,14
1886	SEP 21	10	15	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK		V-VI	-14
1886	SEP 27	19	2	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK		VI	-14
1886	OCT 22	19	45	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK	30000	VII-VIII	-5,8,14
1886	NOV 5	17	20	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK	30000	VI-VII	-5,14
1887	JAN 4	11	44	0.0	(32.9 | 80.0)	CHARLESTON-AFTERSHOCK		VI	-14
1887	AUG 2	18	36	0.0	(37.0 | 89.2)	CAIRO,ILL		V	D-5,6
1888	JAN 12	15	54	0.0	(32.9 | 80.0)	CHARLESTON,SC		VII	-14
1889	JUL 20	1	32	0.0	(35.2 | 90.0)	MEMPHIS,TENN		V-VII	D-6,5
1891	SEP 27	4	55	0.0	(37.0 | 89.2)	CAIRO,ILL		V	D-5,6
1895	OCT 31	11	8	0.0	(37.0 | 89.4)	NEAR CHARLESTON,MO-4 ACRES OF GROUND SANK FORMING A LAKE, CONSIDERABLE DAMAGE AT CAIRO,ILL,FELT EXTENSIVELY EASTWARD	1000000	VIII-IX	ACD-6,5
1897	OCT 22	3	20	0.0	(36.9 | 81.1)	WYTHEVILLE,VA	20000	V	F-5,9,6
1899	FEB 11	9	30	0.0	(37.0 | 1.0)	WESTERN VA- 4 SHOCKS, STRONGLY FELT IN E TN	30000	V	AF-5,6,9
1900	OCT 13	4	15	0.0	(30.4 | 81.7)	JACKSONVILLE,FLA-8 DISTINCT SHOCKS FELT		V	AF-5
1902	MAY 29	7	30	0.0	(35.1 | 85.3)	CHATTANOOGA,TENN		V	BDF-5,6
1902	OCT 18	22	0	0.0	(35.0 | 85.3)	TN-GA AREA-MAIN SHOCK	1500	V-VI	AF-6,5
1903	JAN 24	1	15	0.0	(32.1 | 81.1)	NEAR SAVANNAH,GA	10000	VI	BD-5
1904	MAR 5	0	30	0.0	(35.7 | 83.5)	MARYVILLE,TENN	5000	V	BF-5,6
1905	JAN 27	0	0	0.0	(34.0 | 86.0)	NEAR GADSDEN,ALA	250000	VIII	ACD-6,5
1905	JAN 29	0	0	0.0	(34.0 | 86.0)	GADSDEN-SECOND SHOCK	250000	VIII	ACD-6,5
1905	AUG 22	5	8	0.0	(36.9 | 89.6)	NEAR SIKESTON,MO-FELT OVER WIDE AREA	40000	IV VI	BD-6,7
1907	APR 19	8	30	0.0	(32.9 | 80.0)	CHARLESTON,SC	10000	V	D-5
1908	OCT 28	0	27	0.0	(37.0 | 89.2)	CAIRO,ILL	5000	V	B-6,5
1909	OCT 23	7	10	0.0	(37.0 | 89.5)	SOUTHEASTERN,MO	40000	V-VI	-5,6
1911	APR 22	3	0	0.0	(35.2 | 82.7)	CAESAR'S HEAD,SC,BLUE RIDGE AT NC-SC BORDER	600	V	C-6,5,7
1912	JUN 12	10	30	0.0	(32.9 | 80.0)	SUMMERVILLE,SC	35000	VII	D-5
1912	JUN 20	0	0	0.0	(32.0 | 81.0)	SAVANNAH,GA		V	F-5
1913	JAN 1	18	28	0.0	(34.7 | 81.7)	UNION COUNTY,SC	43000	VII-VIII	BD-5,6
1913	MAR 28	21	50	0.0	(36.2 | 83.7)	KNOXVILLE,TENN	2700	VII	BD-6,5

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Figure 2.5-176

Figure 2.5-176 Earthquakes Listing 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West

1913	APR 17	16	30	0.0	(35.3	84.2)	NEAR DUCKTOWN,TN	3500	V-VI	BD-6,5
1914	MAR 5	20	5	0.0	(33.5	83.5)	NEAR ATLANTA,GA	100000	VI	-6,5
1914	SEP 22	7	4	0.0	(33.0	80.3)	NEAR SUMMERVILLE,SC	30000	V	B-5
1915	OCT 26	7	40	0.0	(36.7	88.6)	MAYFIELD,KY		V	DF-5,6
1915	OCT 29	6	0	0.0	(35.8	82.7)	NEAR MARSHALL,NC	1200	V	B-5,6
1915	DEC 7	18	40	0.0	(36.7	89.1)	CAIRO,ILL	60000	V-VI	D-6,5
1916	FEB 21	22	39	0.0	(35.5	82.5)	NEAR WAYNESVILLE,NC	500000	VI-VII	ABD-6,5
1916	AUG 26	18	35	0.0	(36.0	81.0)	STATESVILLE AND TAYLORSVILLE,NC-STRONG,LINCOLNTON,NC REPORTED THREE SHOCKS	3800	V	AB-6
1916	AUG 26	19	36	0.0	(36.0	81.0)	STATESVILLE AND TAYLORSVILLE,NC-AFTERSHOCK	3800	V	AB-5,6
1916	OCT 18	22	4	0.0	(33.5	86.2)	BIRMINGHAM,ALA	170000	VII	ACD-6,5,7
1916	DEC 19	5	42	0.0	(36.6	89.3)	HICKMAN,KY-TWO SHOCKS		V-VII	BD-6,5
1917	JUN 30	2	23	0.0	(32.7	87.5)	ROSEMARY,ALA		V	AB-6,5,7
1917	JUN 30	2	50	0.0	(32.7	87.5)	ROSEMARY-AFTERSHOCK		V	B-6,7
1918	JAN 16	15	45	0.0	(35.9	83.9)	KNOXVILLE,TENN		V	BD-6
1918	OCT 13	21	30	0.0	(36.1	91.1)	BLACK ROCK,ARK		V	AB-5,6
1920	DEC 24	7	0	0.0	(36.0	85.0)	ROCKWOOD,TENN		V	B-6,5
1921	JUL 15	0	0	0.0	(36.6	82.3)	MENDOTA,VA		V-VI	D-6,5,9
1921	DEC 15	13	20	0.0	(35.8	84.6)	NEAR KINGSTON,TENN-FELT FROM KINGSTON TO DAYTON,EAST TO ATHENS		V	BD-6
1922	MAR 21	21	45	0.0	(37.0	88.0)	WESTERN KENTUCKY		V	-6,5
1922	MAR 30	2	20	0.0	(35.5	86.7)	FARMINGTON,MARSHALL CO.,TENN		V	B-6
1922	MAR 30	4	53	0.0	(35.2	90.0)	MEMPHIS,TN-FELT IN TN,KY,MO AND ILL		V	-6
1923	OCT 28	17	10	0.0	(35.5	90.3)	MARKED TREE,ARK	40000	VII	CD-5,6,7
1923	NOV 26	23	25	0.0	(35.2	90.2)	E ARK AND W TENN-FELT STRONGLY AT MEMPHIS		VI	-6
1924	JAN 1	3	5	0.0	(35.4	90.3)	NEAR MEMPHIS,TENN	30000	V	-6,5
1924	MAR 2	11	18	0.0	(36.9	89.1)	E KY NEAR CAIRO,ILL	25000	V	-5,6
1924	OCT 20	8	30	0.0	(35.0	82.6)	PICKENS COUNTY,SC	56000	V	BD-5,6
1925	MAY 13	12	0	0.0	(36.7	88.6)	MAYFIELD,KY	3000	V	-5,6
1926	JUL 8	9	50	0.0	(35.9	82.1)	SOUTH MITCHELL CO.,NC		VI-VII	BCDF-6,5
1927	MAY 7	8	28	0.0	(36.5	89.0)	NEAR NEW MADRID,MO	130000	VII	BD-6,5
1927	JUN 16	12	0	0.0	(34.7	86.0)	NEAR SCOTTSBORO,ALA	2500	V	BDF-6,5
1927	AUG 13	16	0	0.0	(36.4	89.5)	TIPTONVILLE,TENN		V	D-6
1927	OCT 8	12	56	0.0	(35.0	85.3)	CHATTANOOGA,TENN		V	AD-6
1928	NOV 3	4	3	0.0	(36.0	82.6)	NE TENN-W NC BORDER REGION-FELT IN ALA, GA,VA,KY AND SC	40000	VI-VII	CD-5,6,1,9
1930	AUG 30	9	28	0.0	(35.9	84.4)	E TENN NEAR KINGSTON-FELT ALSO AT LENOIR CITY,OLIVER SPRINGS, AND LAWNVILLE,TENN		V	B-1,6
1931	MAY 5	12	18	0.0	(33.7	86.6)	NORTHERN ALA-FELT IN GA AND POSSIBLY SC	6500	V-VI	BD-1,6,5
1931	DEC 17	3	36	0.0	(34.0	89.7)	BATESVILLE,MISS	65000	VI-VII	D-5,6,1
1933	DEC 9	8	40	0.0	(35.8	90.2)	MANILA,ARK		V	DF-5,6,1

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Figure 2.5-177 Earthquakes Listing 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West

1934	AUG 20	0	47	0.0	(37.0 | 89.2)	NEAR RODNEY,SE MO	30000	V-VI	AD-6,1,5
1935	JAN 1	8	15	0.0	(35.1 | 83.6)	GA-NC BORDER-DAMAGE AT DAHLONEGA,GA,AND ALMOND AND GAY,NC, CENTERED NEAR HAYES-VILLE,NC,FELT IN TENN	7000	V	BD-6,5,1
1939	MAY 5	3	45	0.0	(33.7 | 85.8)	ANNISTON,ALA-FELT ALSO AT OXFORD LAKE, BLUE MTN.,TALLEDEGA, CHOCCOLOCCO,JENIFER		V	D-5,6,2
1940	DEC 25	6	49	0.0	(35.9 | 82.9)	NC-TENN MAIN SHOCK	7000	V	ABD-6,2
1941	NOV 17	3	9	0.0	(35.5 | 89.7)	NEAR COVINGTON,TENN		V	BD-6,3,5
1945	JUN 14	3	25	0.0	(35.0 | 84.5)	CLEVELAND,TENN-FELT TO BLUE RIDGE,GA	4000	V	B-6,3,5
1947	DEC 16	3	27	0.0	(35.7 | 90.0)	NEAR OSCEOLA,ARK-IN THE MEMPHIS AREA	10000	V	D-6,3
1948	FEB 10	0	4	0.0	(36.4 | 84.1)	LAFOLLETTE,TENN		V-VI	B-6,3
1949	JAN 14	3	45	0.0	(36.5 | 89.5)	W TENN-E ARK-SE MO AREA-FELT STRONGLY AT TIPTONVILLE,MEMPHIS	7000	V	B-6,3
1952	FEB 20	22	34	39.0	36.4	89.5	TENN-MO BORDER NEAR TIPTONVILLE,TENN-FELT ALSO IN ARK AND KY		V	D-3,5
1952	JUL 16	23	48	10.0	36.2	89.6	DYERSBURG,TENN		VI	AD-3,5
1952	NOV 19	0	0	0.0	(32.8 | 80.0)	CHARLESTON,SC		V	D-5,3
1954	JAN 7	2	25	0.0	(36.6 | 83.7)	MIDDLESBORO,KY-FELT IN KY,TN,VA AND NC		VI	D-3,5
1954	JAN 22	0	0	0.0	(35.3 | 84.4)	NEAR ETOWAH AND ATHENS,TENN		V	BD-3,5
1954	FEB 2	4	53	0.0	(36.7 | 90.3)	POPLAR BLUFF,MO-FELT IN PARTS OF MO,ARK, ILL,AND TENN		VI	D-3,5,11
1955	JAN 25	7	24	30.0	35.6	90.3	TENN-ARK-MO BDR. RGN-FELT FROM LEPANTO,ARK TO PADUCAH,KY AND BIRMINGHAM,ALA	30000	VI	D-3,5
1955	FEB 1	14	45	0.0	(30.4 | 89.1)	GULFPORT,MISS		V	BD-3,5
1955	MAR 29	9	2	40.0	(36.0 | 89.5)	FINLEY,TENN-FELT AT CARUTHERSVILLE,MO		VI	BD-3,5,11
1955	SEP 5	1	45	0.0	(36.0 | 89.5)	NEAR FINLEY AND DYERSBURG,TENN		V	BD-3,11
1955	SEP 28	7	1	42.0	(36.6 | 81.4)	NC-VA BORDER AREA	1700	V	BD-3,5
1955	DEC 13	7	43	0.0	(36.0 | 89.5)	WESTERN DYER CO.TENN-FELT AT FINLEY,TENN		V	A-3,5
1955	DEC 13	7	56	0.0	(36.0 | 89.5)	DYER CO.-AFTERSHOCK		V	-3,5
1956	JAN 29	4	14	15.0	35.6	89.6	TENN-ARK BORDER NEAR COVINGTON,TENN		VI	D-3,5
1956	SEP 7	13	36	1.0	35.5	84.0	NEAR KNOXVILLE,TENN-FELT IN TN,KY AND NC	8300	VI	ABD-3,5,11
1956	SEP 7	13	49	20.0	35.5	84.0	EAST TENN-AFTERSHOCK	8300	VI	BD-3,5,11
1956	OCT 29	9	23	44.0	(36.1 | 89.4)	CARUTHERSVILLE,MO		V	B-5,3,11
1957	JAN 25	18	15	0.0	(36.6 | 83.7)	NORTOWN,KY-A SUBURB OF MIDDLESBORO,KY		VI	-3
1957	MAR 26	8	27	6.0	(37.0 | 88.4)	PADUCAH,KY-FELT AT SMITHLAND,KY		V	BDF-3,5
1957	APR 23	9	23	39.0	(34.5 | 86.8)	N ALA-FELT ALSO IN GA	11500	VI	BD-5,3,11
1957	MAY 14	14	24	58.0	(35.7 | 82.0)	W NC-FELT SC AND TN	8100	VI	BD-5,3,11

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Figure 2.5-178 Earthquakes Listing 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West

1957	JUN 23	6	34	18.0	36.5	84.5	E-CENTRAL TENN-FELT IN HARDIN VALLEY AND CLINCH R.VALLEY AND AT CONCORD,DIXIE LEE JUNCTION,OAK RIDGE,TN		V	-5,3,11
1957	JUL 2	9	33	1.0	(35.5 | 82.5)	W NC-FELT STRONGLY IN MADISON AND BUNCOMBE, COUNTY,NC AND DAMAGE AT FLAG POND,TENN		VI	D-5,3
1957	NOV 24	20	6	17.0	35.0	83.5	NC-TENN BDR.RGN.-FELT IN SC,NC,GA AND TENN	4100	VI	BD-5,1
1958	JAN 26	16	56	0.0	(35.1 | 90.0)	MEMPHIS,TENN-FELT IN SE MO		V	D-3,5
1958	JAN 28	4	57	0.0	(37.0 | 89.0)	ILL-KY-MO BORDER AREA	300	V	D-3,5
1958	APR 8	22	25	33.0	(36.2 | 89.1)	OBION CO.,TENN	400	V	B-3,5
1958	APR 26	7	30	0.0	(36.3 | 89.5)	LAKE CO.,TENN-FELT AT CARUTHERSVILLE,MO		V	B-3,5
1958	OCT 20	6	16	0.0	(34.5 | 82.8)	ANDERSON,SC		V	BF-5,3
1958	NOV 19	18	15	0.0	(30.3 | 91.1)	BATON ROUGE,LA		V	F-3,5
1959	FEB 13	8	37	0.0	(36.2 | 89.5)	BOGOTO,TENN-2 SHOCKS	200	V	B-3,5
1959	AUG 3	6	8	30.0	33.0	79.5	SE S CAROLINA-FELT IN LARGE AREA OF E GA	25000	VI	BD-3,,11
1959	AUG 12	18	6	7.0	35.0	87.0	ALA-TN BORDER AREA	2800	VI	BD-3,5,11
1959	OCT 27	2	7	28.0	(34.5 | 80.3)	NE S CAROLINA-FELT IN NC,STRONG AT MCBEE,SC	4800	VI	BD-3,5
1959	DEC 21	15	25	0.0	(36.0 | 89.5)	FINLEY,TENN-FELT IN SE MO	400	V	D-3,,11
1960	JAN 28	21	38	0.0	(36.0 | 89.5)	DYER COUNTY,TENN		V	B-5,3
1960	MAR 12	12	47	40.0	33.0	79.0	NEAR COAST OF SC-FELT AT CHARLESTON	3500	V	-5,3
1960	APR 15	10	10	10.0	(35.8 | 84.0)	NEAR KNOXVILLE,TENN	1300	V	BD-3,5
1960	APR 21	10	45	0.0	(36.3 | 89.5)	LAKE COUNTY,TENN		V	BF-5,3
1960	JUL 24	3	37	30.0	(33.0 | 80.0)	CHARLESTON,SC		V	D-3,5
1962	FEB 2	6	43	34.0	36.5	89.6	NEW MADRID,MO-FELT IN ARK,ILL,KY,MO AND TN	35000	VI	BD-3,5,11
1962	JUL 23	6	5	18.4	36.1	89.8	SOUTHERN MO-FELT ALSO IN ARK AND TENN		VI	BD-3,5
1963	MAR 3	17	30	13.0	36.7	90.1	SE MO	100000	4.5	BD-5,3,11
1963	OCT 28	22	38	35.0	36.7	81.0	NEAR GALAX,VA-FELT IN VA AND NC	1300	V	ABD-3,5,9
1963	OCT 29	1	57	0.0	36.7	81.0	GALAX,VA-AFTERSHOCK	1300	V	BD-3,9
1964	FEB 18	10	31	11.5	34.8	85.5	DE KALB CO.,NE ALA-FELT IN GA,DEPTH 15KM		4.4	B-3
1964	MAR 13	1	20	18.1	32.8	83.4	CENTRAL GA-FELT IN BALDWIN,BIBB,JONES AND WILKINSON COUNTY	400	4.4	B-3
1964	APR 20	19	4	46.0	(34.0 | 81.0)	NEAR COLUMBIA,SC		V	B-3
1966	FEB 12	4	32	14.7	35.9	90.0	NE ARK-FELT AT DEL-BRIDGE,BLYTHEVILLE, MANILA,LEACHVILLE AND STEEL,ARK		4.3	-3
1968	FEB 10	1	34	32.0	36.6	89.5	NEW MADRID,MO REGION		4.5	-4,11
1970	DEC 24	10	17	57.1	36.7	89.5	NEW MADRID,MO-FELT AT POPLAR BLUFF		4.8	-4
1971	MAR 14	17	27	51.3	33.1	87.9	CARROLTON,ALA-FELT		4.5	-4
1971	OCT 1	18	49	39.4	35.8	90.4	JONESBORO,ARK-FELT IN ALA,IND,ILL,KY,MISS, MO AND TN		VI	D-4

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Figure 2.5-179 Earthquakes Listing 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West

1972	FEB 3	23 11 8.4	33.5	80.4	NEAR ORANGEBURG,SC-FELT THROUGHOUT SC, WESTERN NC AND AT AUGUSTA,GA.DEPTH 5KM	4.5	-4
1972	MAR 29	20 38 31.9	36.1	89.8	NEW MADRID,MO AREA-FELT IN MO,TENN,ARK, ILL,KY AND MISS	V	-4
1972	JUN 19	5 46 15.3	37.0	89.1	CAPE GIRARDEAU,MO-FELT IN WICKLIFFE,MO AND KEVIL,KY	4.5	-4
1973	NOV 30	7 48 41.2	35.8	84.0	E TENN-MINOR DAMAGE AT MARYVILLE	4.6	F-17
1974	AUG 2	8 52 9.8	33.8	82.4	GEORGIA-MINOR DAMAGE BOBBY BROWN ST. PARK	4.8	F-17
1974	NOV 22	5 25 55.5	32.9	80.1	SOUTH CAROLINA NORTH CHARLESTON SUMMERVILLE AREAS	4.7	F-17

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Figure 2.5-180 Earthquakes Listing 4.3 Richter or Greater Latitude 30-37 North Longitude 78-92 West