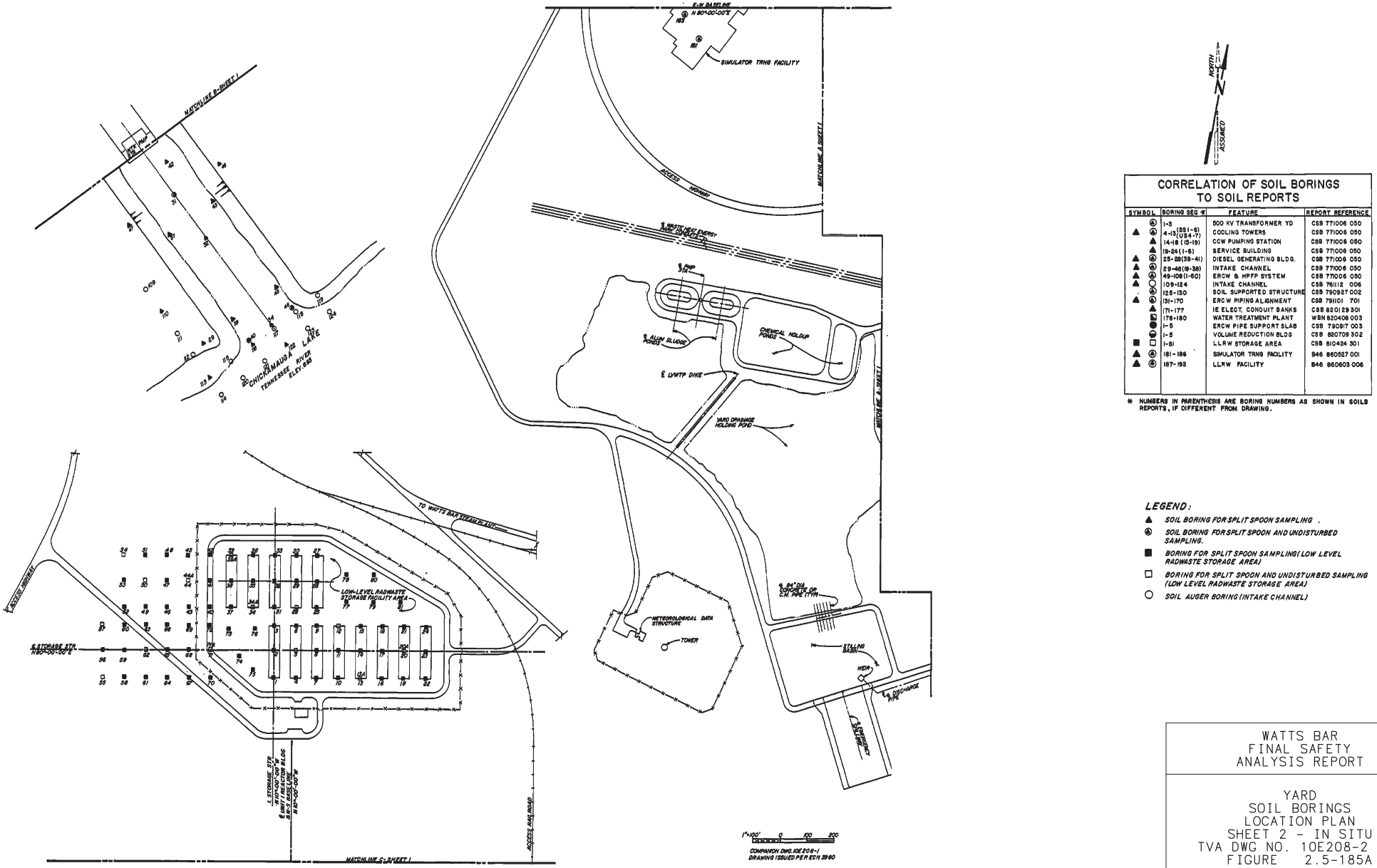
SECURITY-RELATED INFORMATION, WITHHELD UNDER 10CFR2.390

FIGURE 2.5-185



CORRELATION OF SOIL BORINGS TO SOIL REPORTS

SYMBOL	BORING SEQ #	FEATURE	REPORT REFERENCE
●	1-3	500 KV TRANSFORMER YD	CSB 771006 050
▲	4-13 (SS1-6) (US4-7)	COOLING TOWERS	CSB 771006 050
▲	14-18 (5-19)	CCW PUMPING STATION	CSB 771006 050
▲	19-24 (1-5)	SERVICE BUILDING	CSB 771006 050
▲ ◉	25-28 (39-41)	DIESEL GENERATING BLDG.	CSB 771006 050
▲ ◉	29-46 (19-38)	INTAKE CHANNEL	CSB 771006 050
▲ ◉	49-108 (1-60)	ERCW & HPFP SYSTEM	CSB 771006 050
▲ ○	109-124	INTAKE CHANNEL	CSB 761112 006
◉	125-130	SOIL SUPPORTED STRUCTURE	CSB 790927 002
▲ ◉	131-170	ERCW PIPING ALIGNMENT	CSB 791101 701
▲	171-177	IE ELECT. CONDUIT BANKS	CSB 820129 301
◪	178-180	WATER TREATMENT PLANT	WBN 820408 003
●	1-5	ERCW PIPE SUPPORT SLAB	CSB 790917 003
◒	1-5	VOLUME REDUCTION BLDG	CSB 820709 302
■ □	1-81	LLRW STORAGE AREA	CSB 810424 301
▲ ◉	181-186	SIMULATOR TRNG FACILITY	B46 860627 001
▲ ◉	187-192	LLRW FACILITY	B46 860603 006

* NUMBERS IN PARENTHESIS ARE BORING NUMBERS AS SHOWN IN SOILS REPORTS, IF DIFFERENT FROM DRAWING.

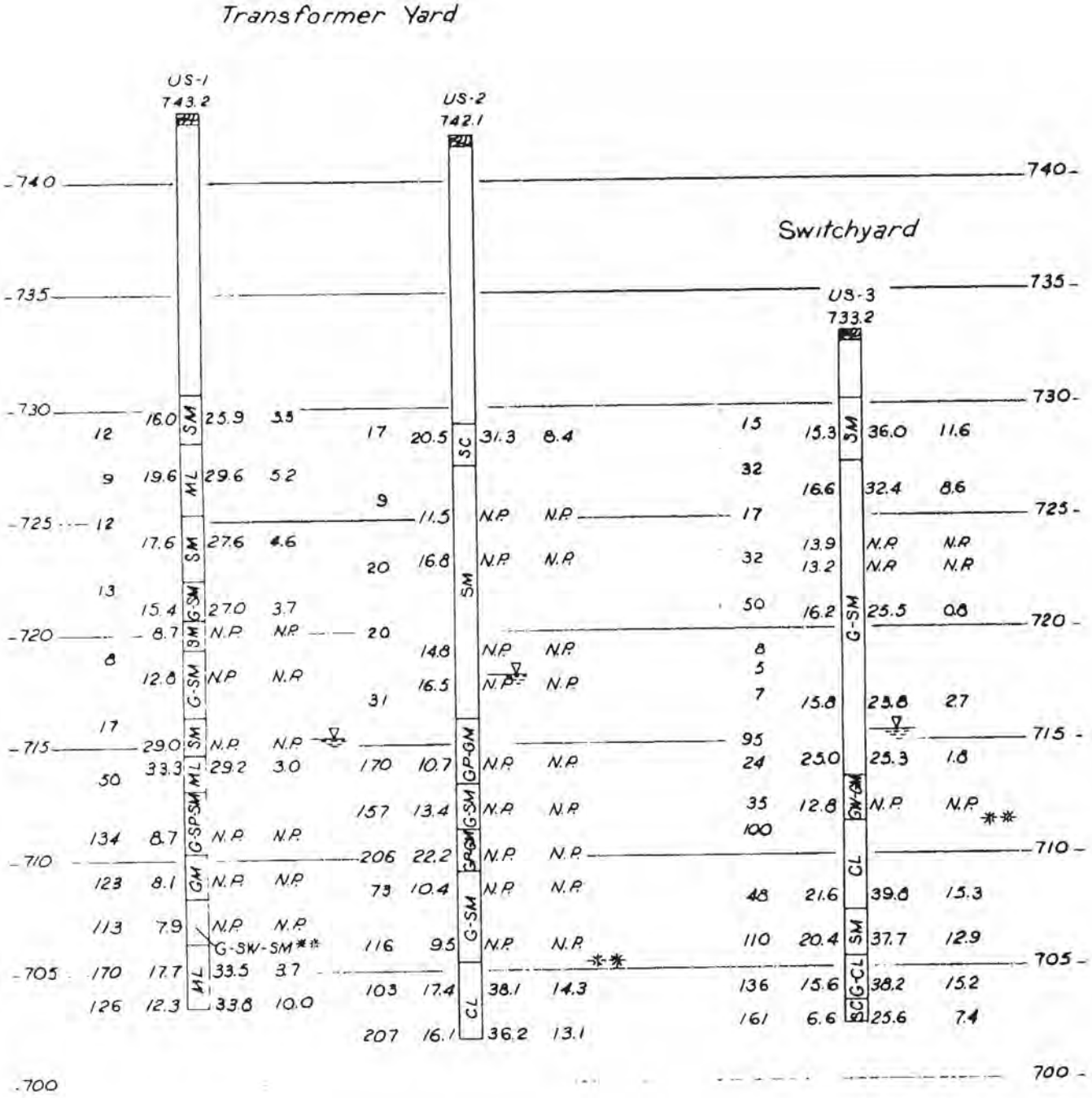
LEGEND:

- ▲ SOIL BORING FOR SPLIT SPOON SAMPLING .
- ◉ SOIL BORING FOR SPLIT SPOON AND UNDISTURBED SAMPLING.
- ■ BORING FOR SPLIT SPOON SAMPLING (LOW LEVEL RADWASTE STORAGE AREA)
- □ BORING FOR SPLIT SPOON AND UNDISTURBED SAMPLING (LOW LEVEL RADWASTE STORAGE AREA)
- ○ SOIL AUGER BORING (INTAKE CHANNEL)

WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

YARD
SOIL BORINGS
LOCATION PLAN
SHEET 2 - IN SITU
TVA DWG NO. 10E208-2 R2
FIGURE 2.5-185A

CAD MAINTAINED DRAWING



LEGEND

Hole No.
Elev.

* Blows | Natural Moisture Content | Liquid Limit | Plasticity Index | Classification

* Blows per foot with a 140 lb. hammer and a 30 inch drop on a 2 inch OD splitspoon.

** Top of weathered shale

Symbols

Watertable

Topsoil

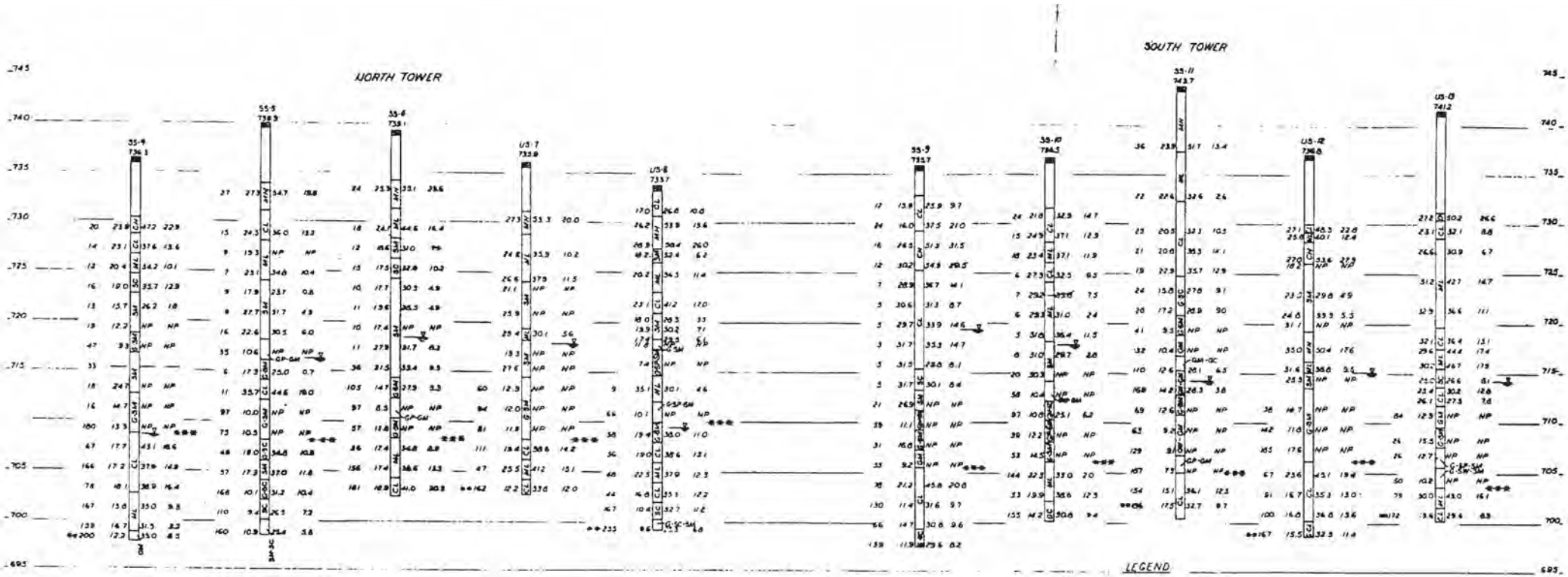
Scale 1"=5' Before Reduction

"HISTORICAL INFORMATION"

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

TRNASFORMER YARD & SWITCHYARD
SOIL INVESTIGATION

Figure 2.5-186

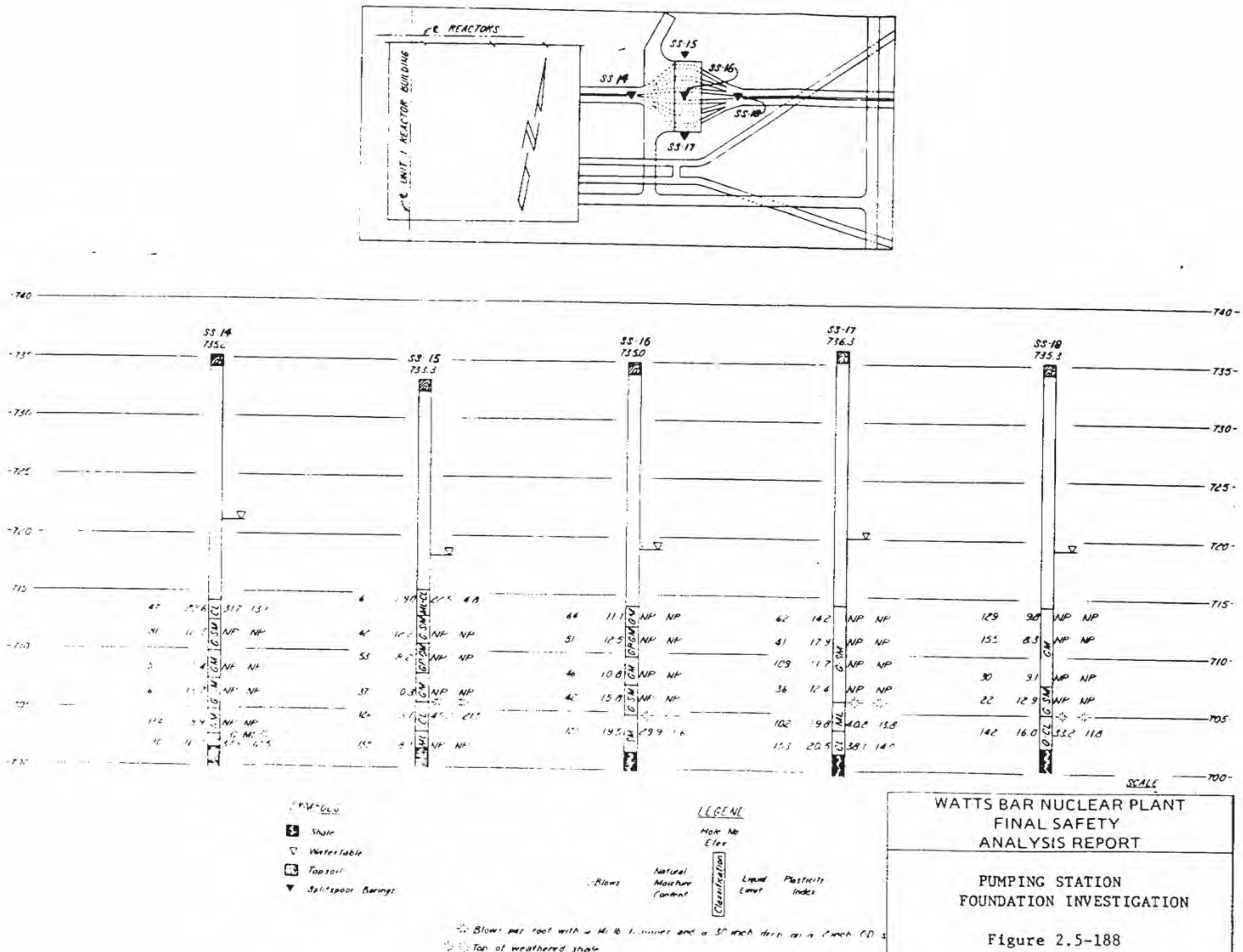


WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

COOLING TOWERS SOIL INVESTIGATION

Figure 2.5-187

"HISTORICAL INFORMATION"



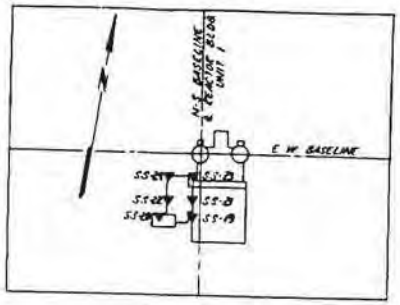
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

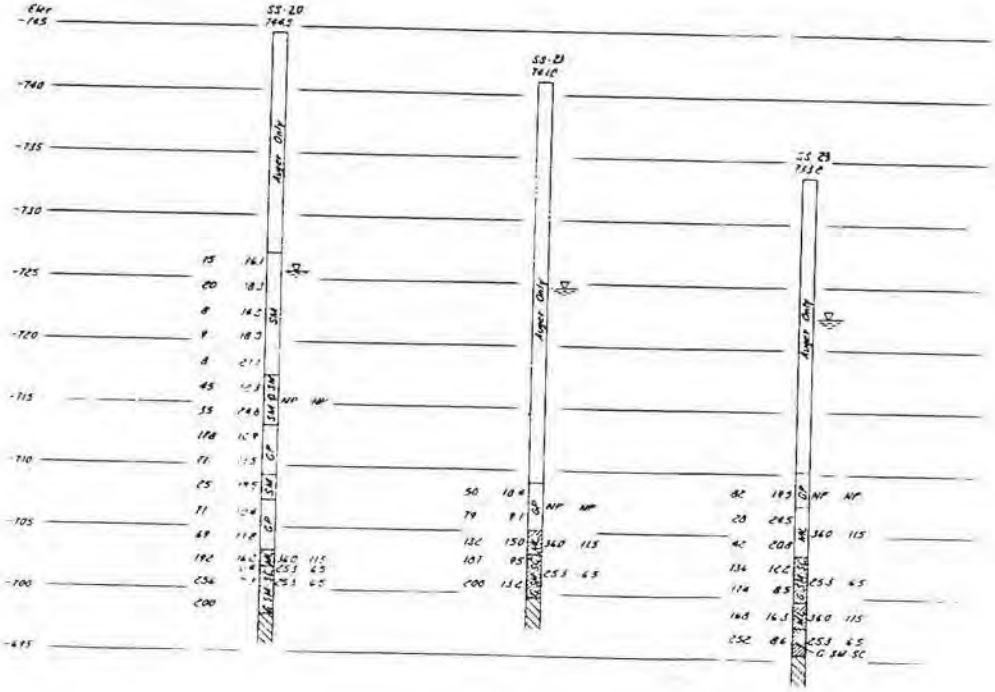
PUMPING STATION
FOUNDATION INVESTIGATION

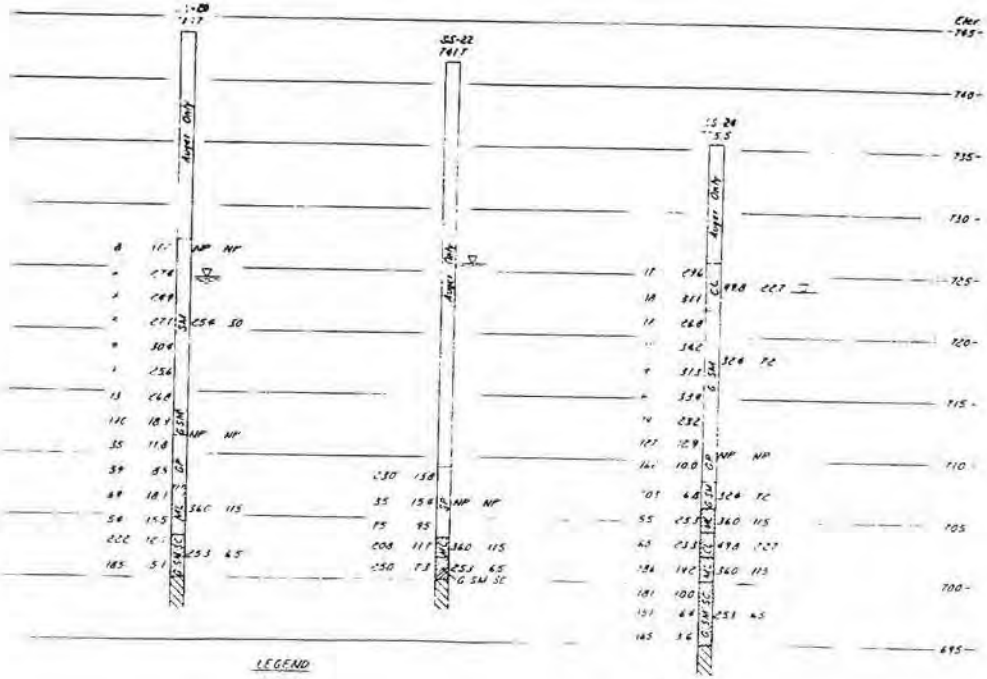
Figure 2.5-188

"HISTORICAL INFORMATION"

"HISTORICAL INFORMATION"





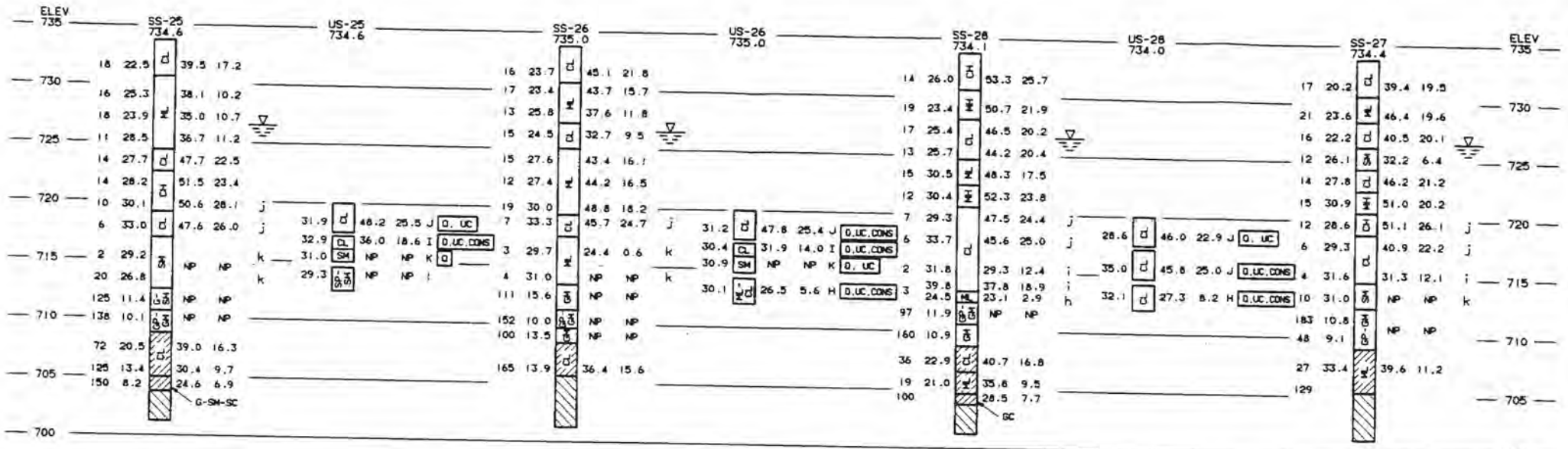


Blows per foot with a 140 lb hammer and a 30 inch drop on a 2 inch OD splitspoon

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

OFFICE & SERVICE BUILDING
FOUNDATION INVESTIGATION

Figure 2.5-189



SYMBOLS

- ▨ = WEATHERED SHALE
- ▧ = REFUSAL
- ▽ = WATERTABLE
- O = UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST
- UC = UNCONFINED COMPRESSION TEST
- CONS = CONSOLIDATION TEST

LEGEND

HOLE NO
ELEV

* BLOWS | NATURAL MOISTURE CONTENT | CLASSIFICATION | LIQUID LIMIT | PLASTICITY INDEX | SOIL TYPE | ENGINEERING TESTS

* BLOWS PER FOOT WITH A 140 LB HAMMER AND A 30 INCH DROP ON A 2 INCH OD SPLITSPOON

NOTE UNDISTURBED BORINGS DRILLED FROM BUILDING BOTTOM FLOOR ELEVATION 720. TO TOP OF FIRM GRAVEL

"HISTORICAL INFORMATION"

SCALE 1" = 5'

Amendment 63

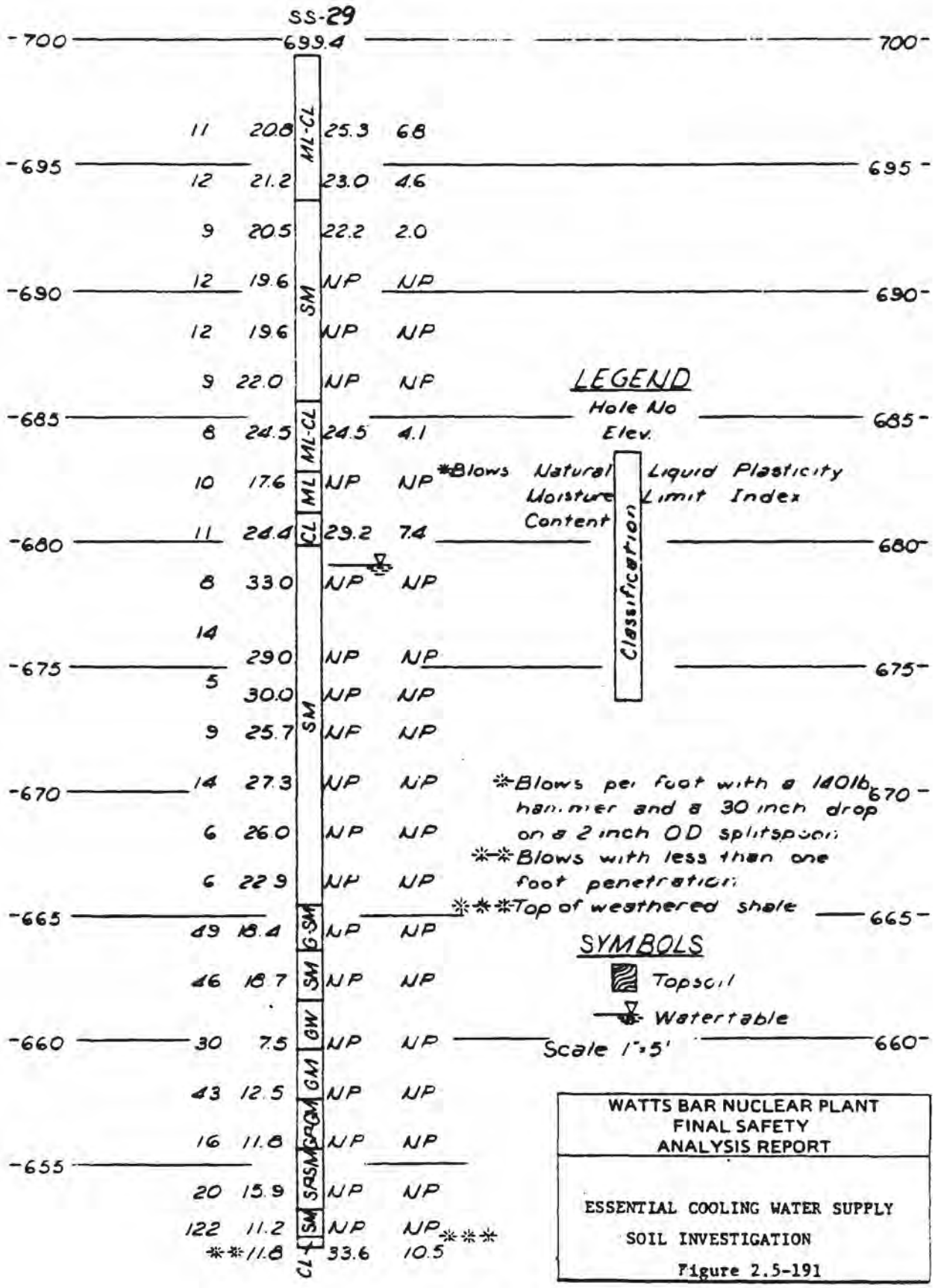
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

DIESEL GENERATOR BUILDING

SECTION AA & BB
FOUNDATION INVESTIGATION

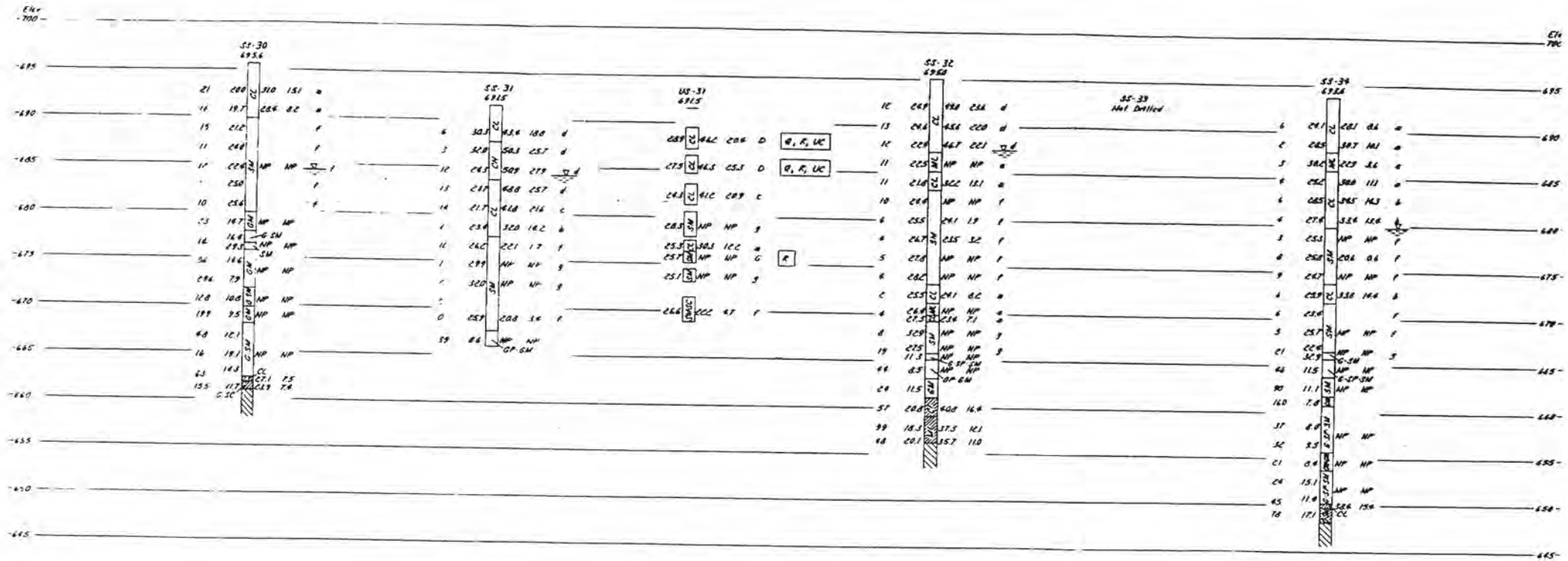
FIGURE 2 5-190

WBN-MIS484.0.0.0.JAW



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

ESSENTIAL COOLING WATER SUPPLY
SOIL INVESTIGATION
Figure 2.5-191



SYMBOLS

Weathered rock

Alluvial

Watertable

U Unconsolidated undrained triaxial compression test

R Consolidated undrained triaxial compression test

UC Unconfined compression test

LEGEND

Hole No.
Elev

Blows

Natural Moisture Content

Classification

Liquid Limit

Plasticity Index

Soil Type

Engineering Tests

Blows per foot with a 140 lb. hammer and a 30 inch drop on a 2 inch OD splitspoon

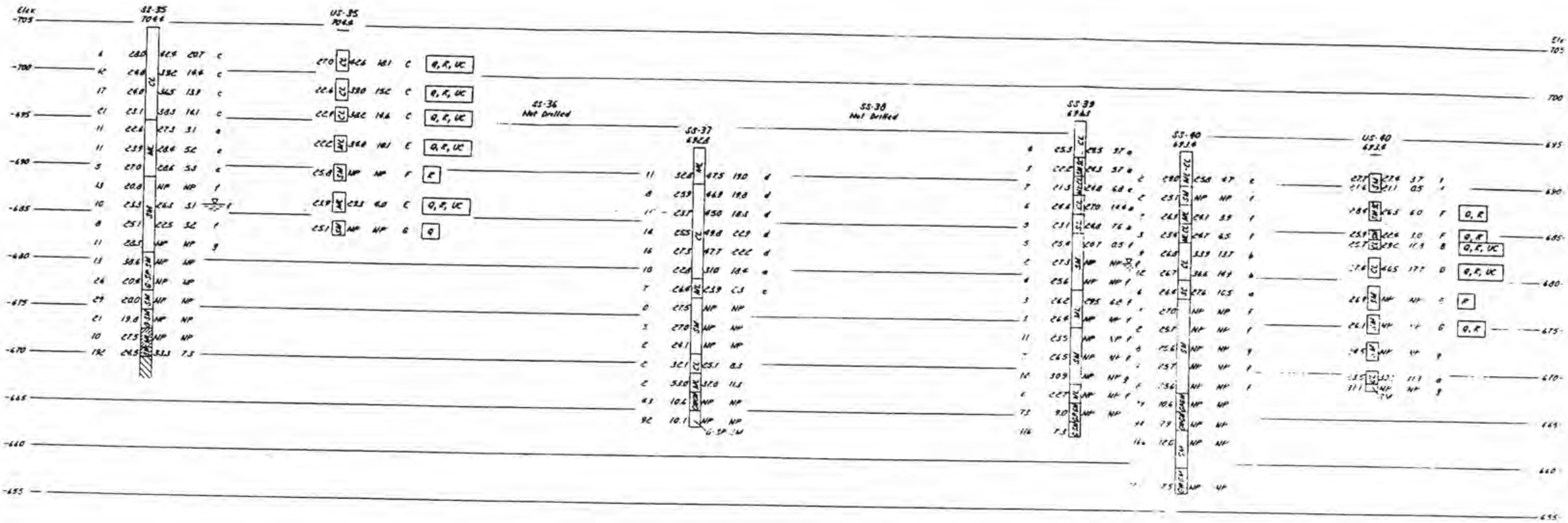
UNDC Undisturbed borings drilled to top of rock gravel

"HISTORICAL INFORMATION"

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INTAKE CHANNEL, SECTION DD
FOUNDATION INVESTIGATION

Figure 2.5-192



SYMBOLS

Weathered shale

Refusal

Watertable

Q: Unconsolidated undrained triaxial compression test

R: Consolidated undrained triaxial compression test

UC: Unconfined compression test

LEGEND

Blows | Natural Moisture Content | Classification | Liquid Limit | Plasticity Index | Soil Type | Engineering Tests

Blows per foot with a 140 lb hammer and a 30 inch drop on a 2 inch OD splitspoon

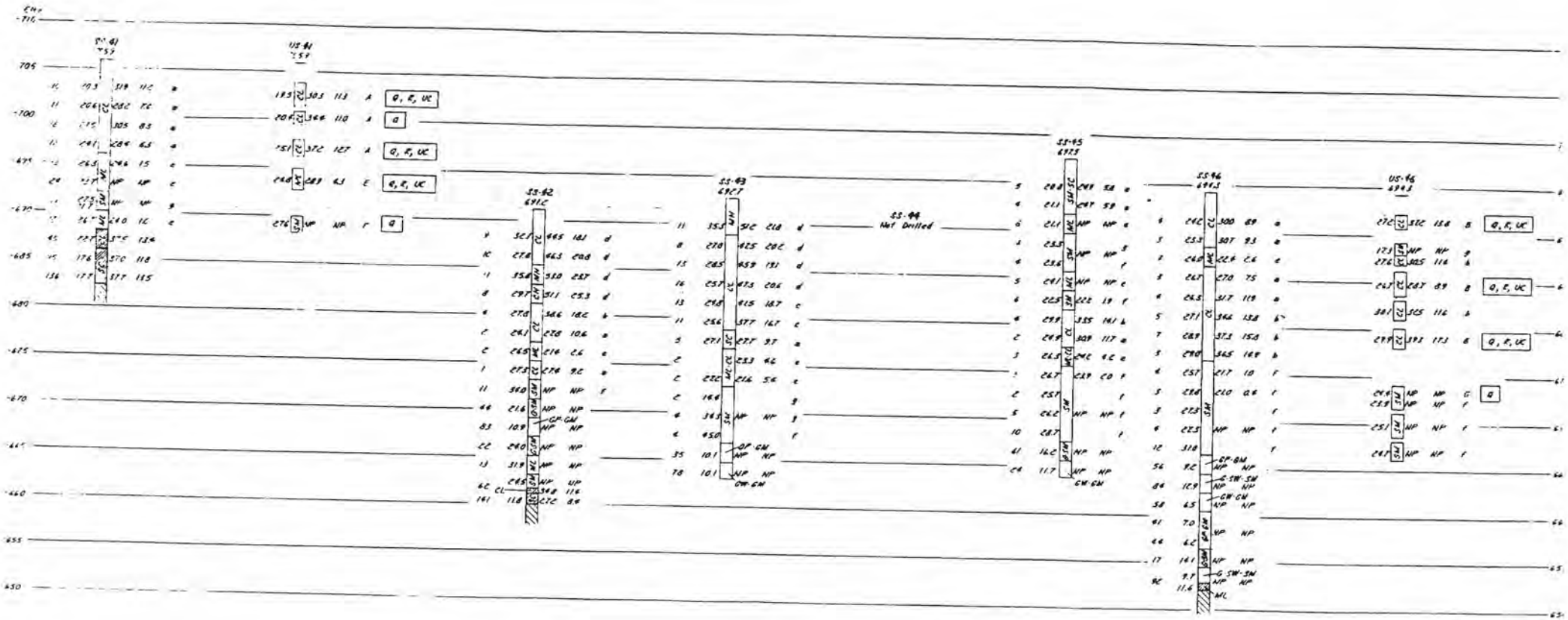
NOTE: Undisturbed borings drilled to top of firm gravel

"HISTORICAL INFORMATION"

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INTAKE CHANNEL, SECTION EE
FOUNDATION INVESTIGATION

Figure 2.5-193



SYMBOLS

Q - Unconsolidated undrained triaxial compression test

R - Consolidated undrained triaxial compression test

UC - Unconfined compression test

▨ - Weathered chalk

▨ - Refusal

LEGEND

Hole No.
Elev.

Blows* | Natural Moisture Content | Classification | Liquid limit | Plasticity Index | Soil Type | Engineering Tests

* Blows per foot with a 140 lb. hammer and a 30 inch drop on a 2 inch OD sampler.

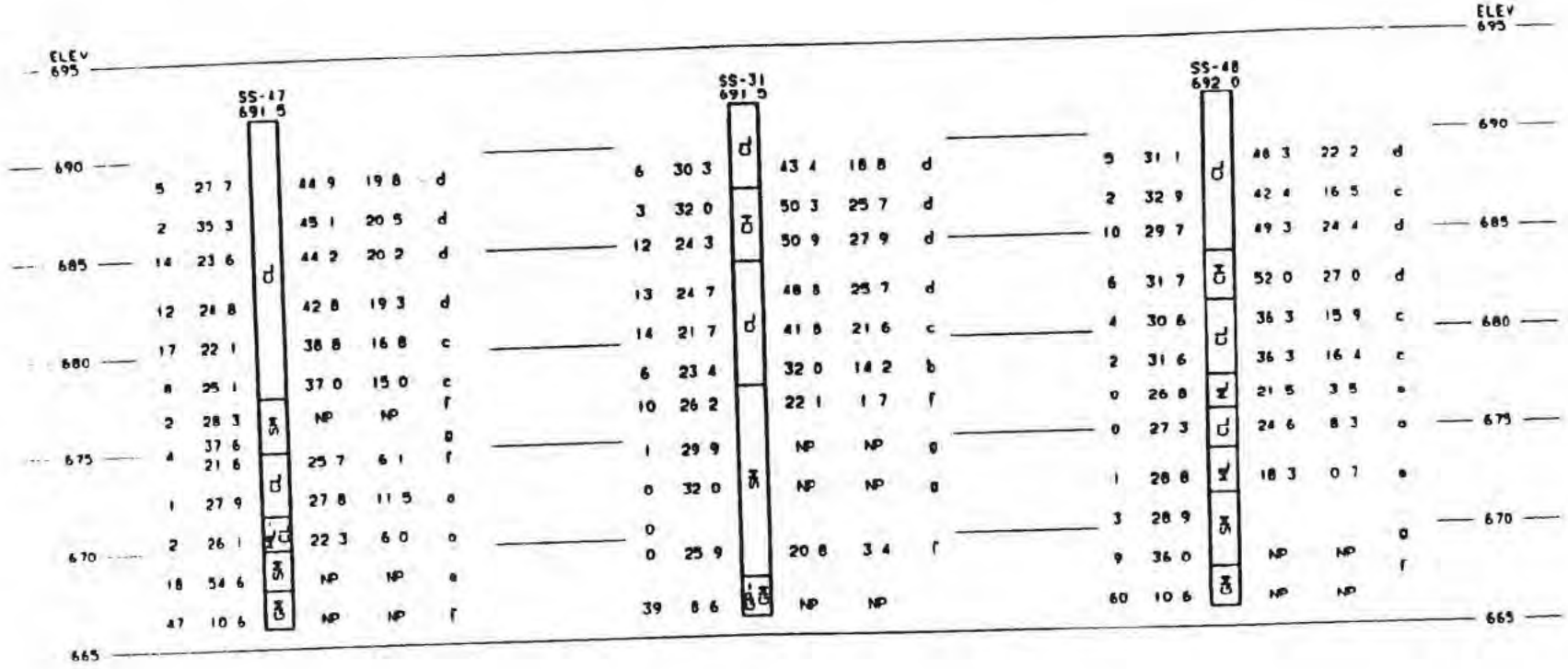
NOTE: Undisturbed borings started to top of fill material.

"HISTORICAL INFORMATION"

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INTAKE CHANNEL, SECTION CC
FOUNDATION INVESTIGATION

Figure 2.5-194



LEGEND

HOLE NO
ELEV

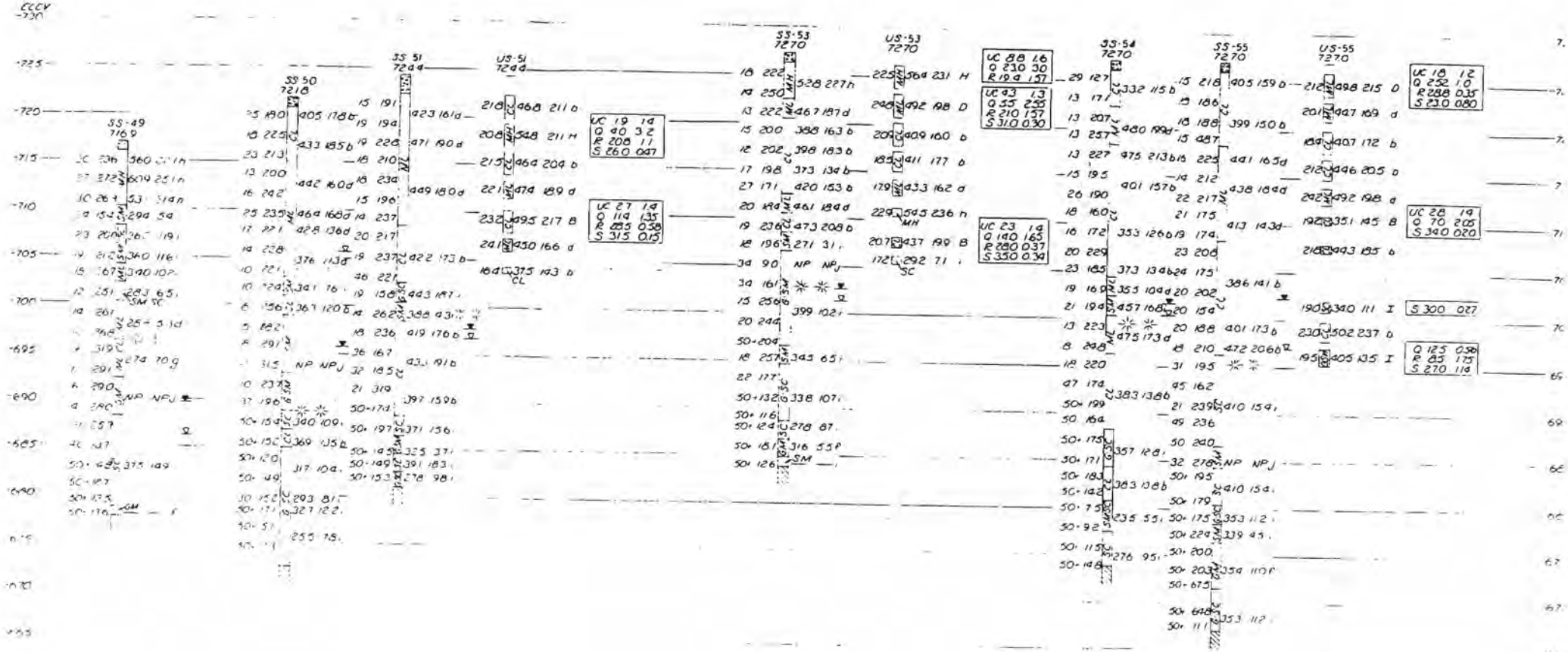
CLASSIFICATION

BLOWS | NATURAL MOISTURE CONTENT | LIQUID LIMIT | PLASTICITY INDEX | SOIL TYPE

BLOWS PER FOOT WITH A 140 LB HAMMER AND A 30 INCH DROP ON A 2 INCH OD SPLITSPOON

SCALE 1" = 5'

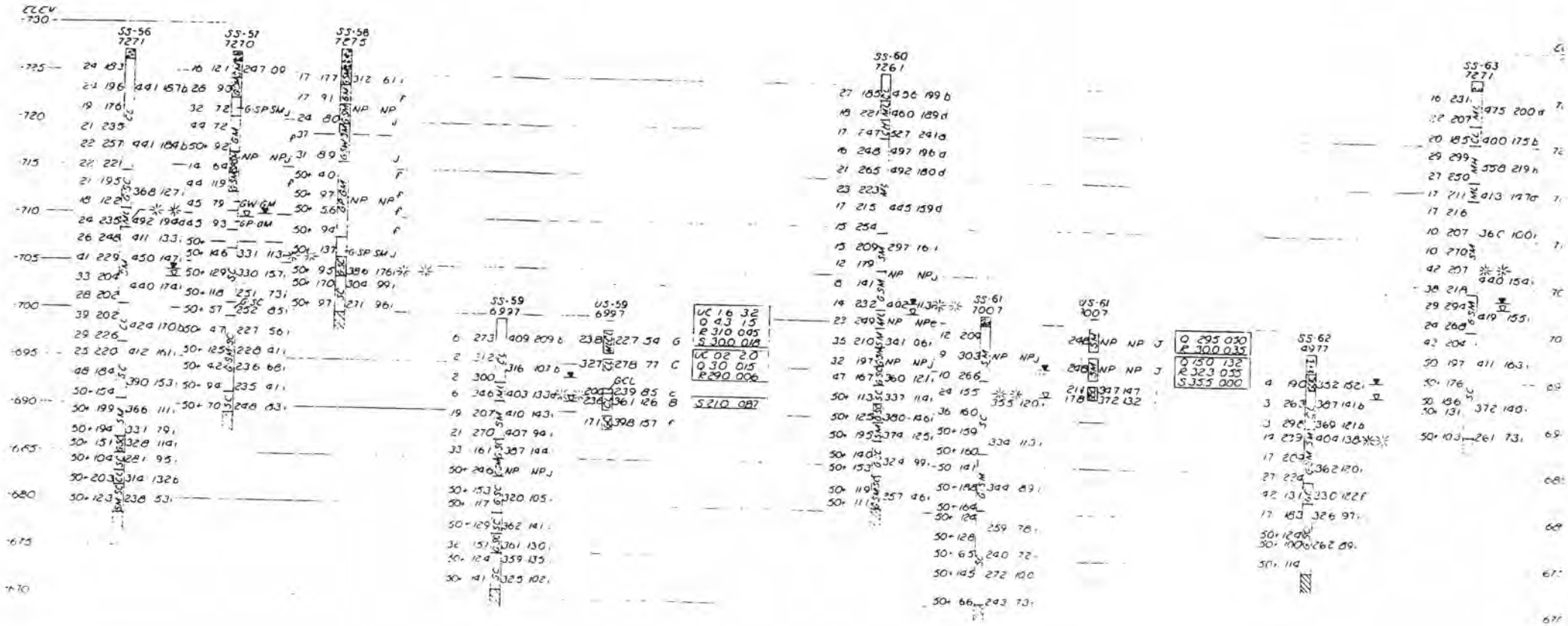
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
INTAKE CHANNEL SECTION FF FOUNDATION INVESTIGATION
FIGURE 2 5-195



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

CLASS IE CONDUITS
SOIL INVESTIGATION

Figure 2.5-196



SYMBOLS

- Limestone gravel
- Alluvial
- Q - Unconsolidated undrained triaxial compression test
- R - Consolidated undrained triaxial compression test
- S - Consolidated drained direct shear test
- UC - Unconfined compression test
- ▽ - 1 hour water table reading
- ▼ - 24 hour water table reading

LEGEND

Boring No.
Elevation

Blows	Natural Moisture Content	Liquid Limit	Plasticity Index	Soil Type	Type Test	Friction Angle (degrees) or Unconfined Compressive Strength	Cohesion (psf) or Sensitivity Ratio

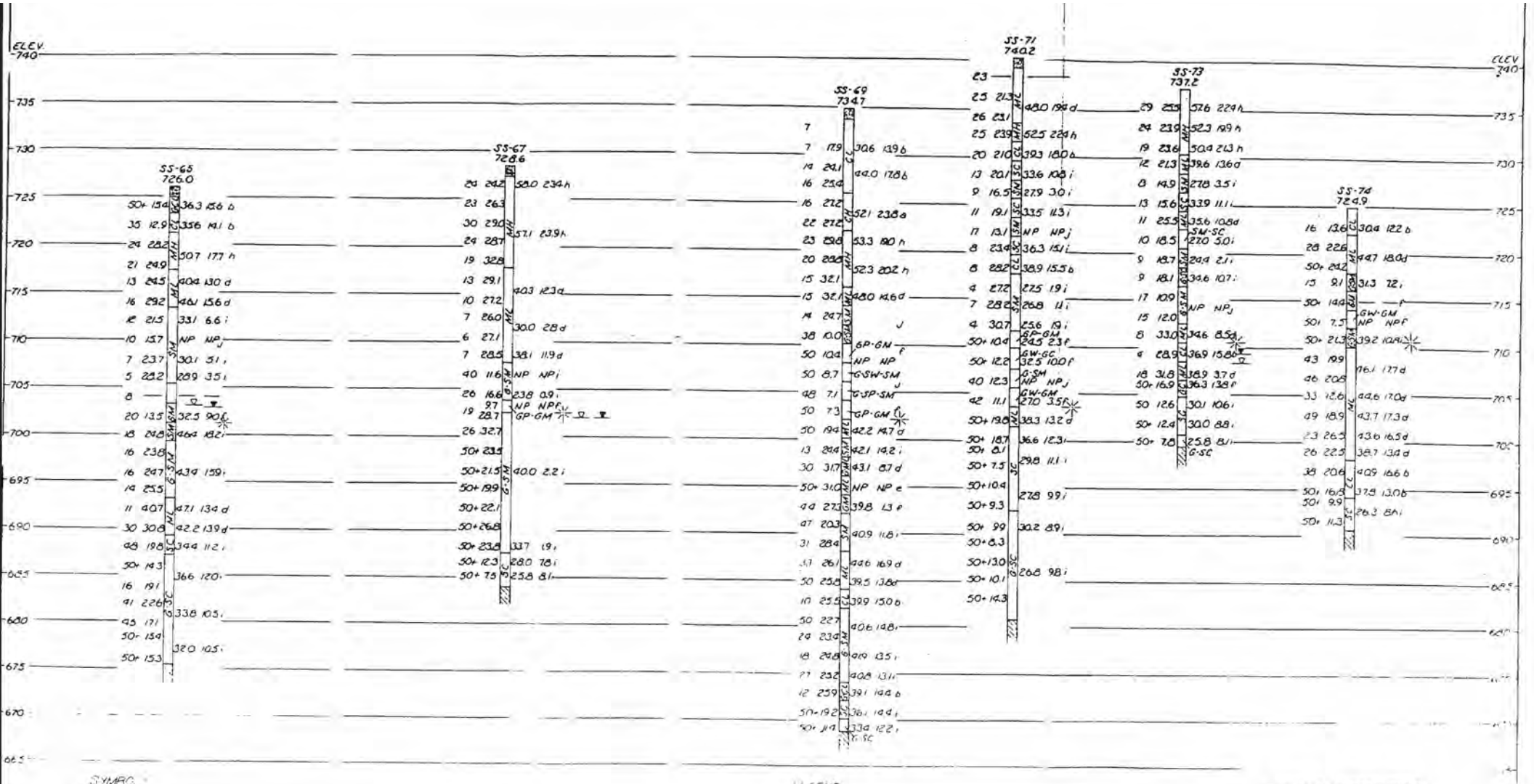
Classification

* Blows per foot with a 140 lb hammer and a 30 inch drop on a 2 inch (O.D. split spoon sampler
** 1/2 log of weathered shale

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

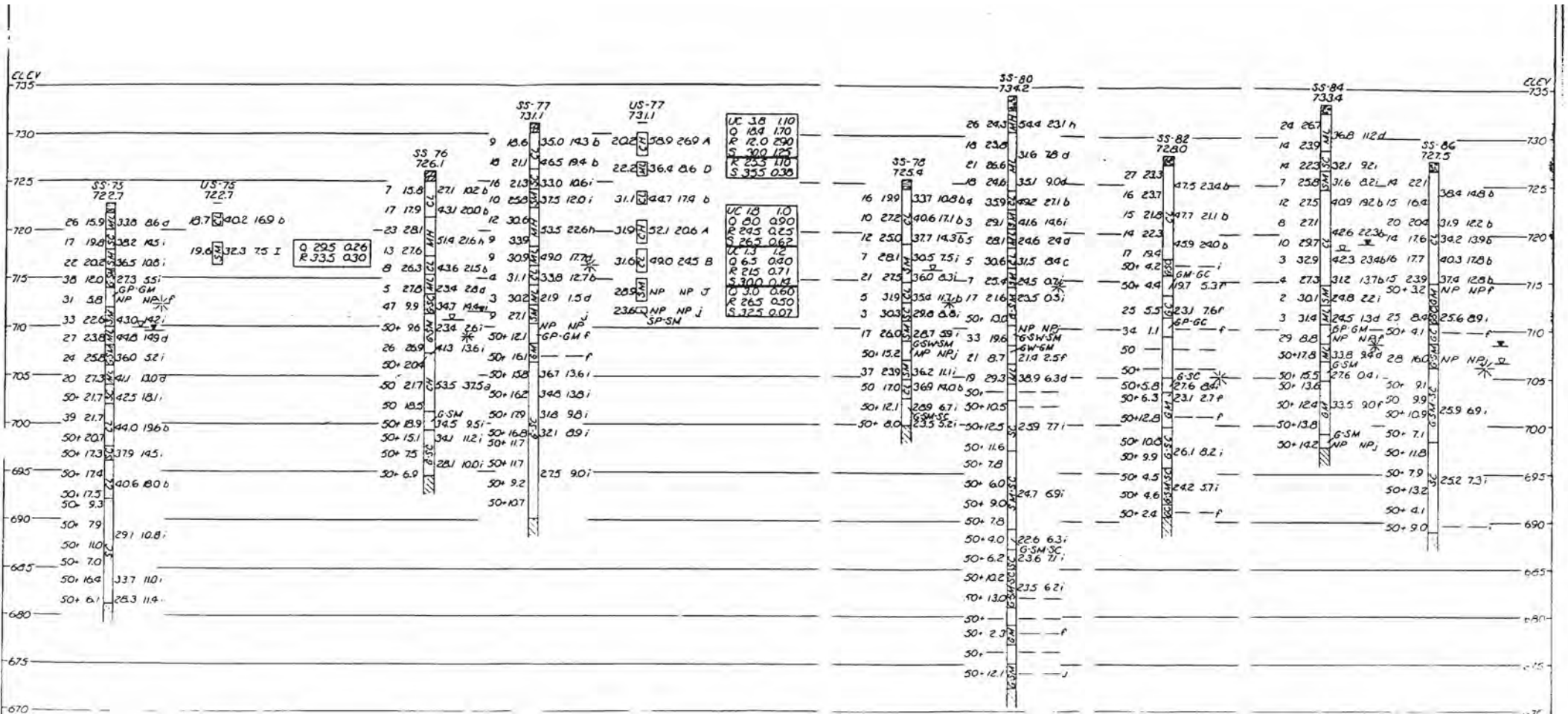
CLASS IE CONDUITS
SOIL INVESTIGATION

Figure 2.5-197



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL INVESTIGATION BORINGS
FOR ERCW AND HPFP SYSTEMS
Figure 2.5-198



SYMBOLS

- Topsoil
- Limestone gravel
- Clayey silt
- Refusal

Q - Unconsolidated undrained triaxial compression test
R - Consolidated undrained triaxial compression test at natural moisture
S - Consolidated drained direct shear test
UC - Unconfined compression test
▽ - One hour water table reading
▼ - Twenty four hour water table reading

LEGEND

Boring No.
Elevation

Blows	Natural Moisture Content	Liquid Limit	Plasticity Index	Soil Type	Classification	Type Test	Friction Angle (degrees)	Unconfined Compressive Strength (tsf)	Cohesion (tsf) or Sensitivity Ratio

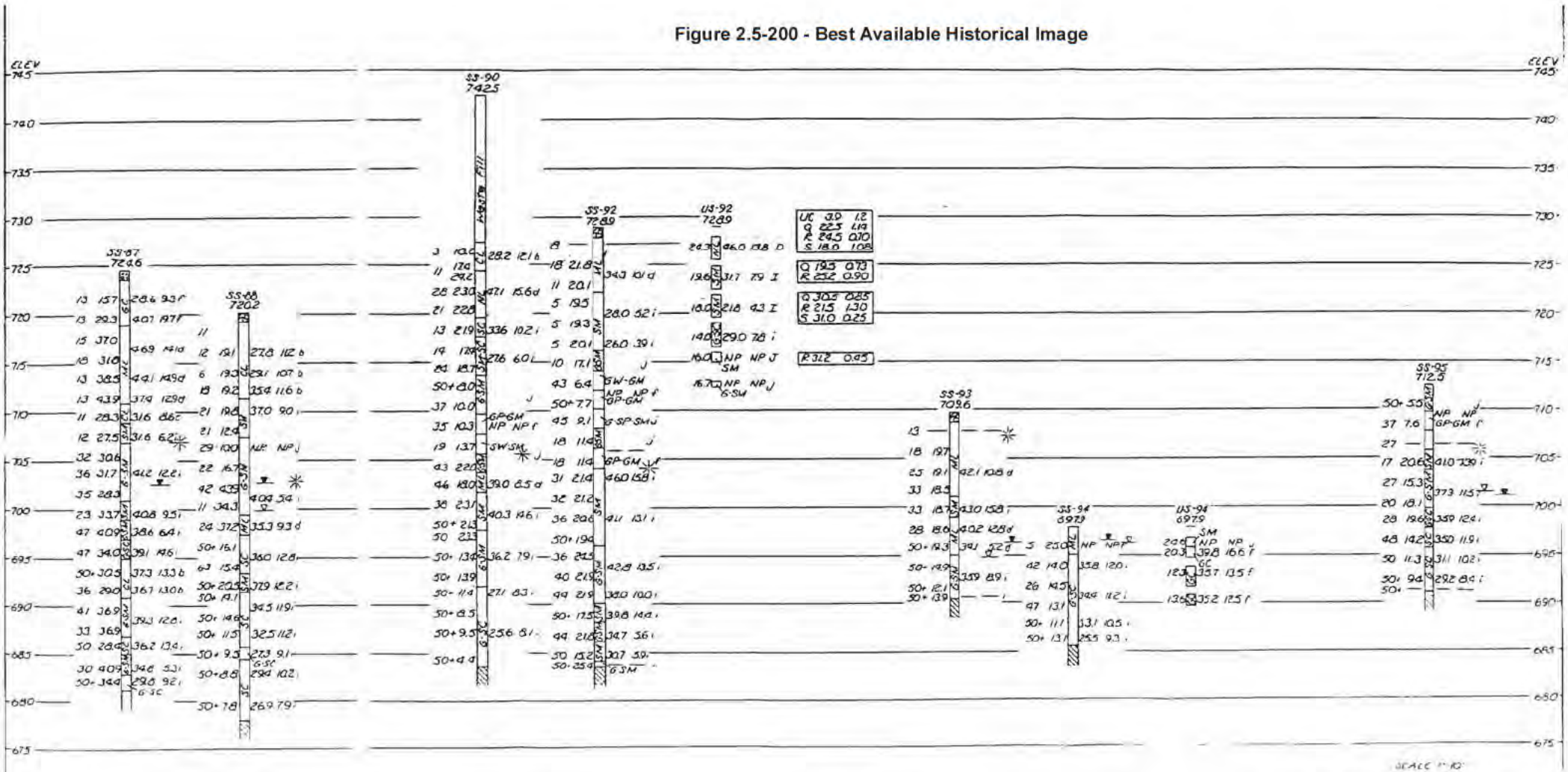
Note Blows per foot with a 140 lb hammer and a 30 inch drop on a 2 inch OD splitspoon sampler

* Top of weathered shale

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL INVESTIGATION BORINGS
FOR ERCW AND HPFP SYSTEMS
Figure 2.5-199

Figure 2.5-200 - Best Available Historical Image



SYMBOLS

- Topsoil
- Limestone gravel
- Refusal

Q - Unconsolidated undrained triaxial compression test
R - Consolidated undrained triaxial compression test at natural moisture
S - Consolidated drained direct shear test
UC - Unconfined compression test
S - One hour water table reading
T - Twenty four hour water table reading

LEGEND

Boring No.
Elevation

Blows | Natural Moisture Content | Liquid Limit | Plasticity Index | Soil Type

Friction Angle (degrees) or Cohesion (t.s.f.)

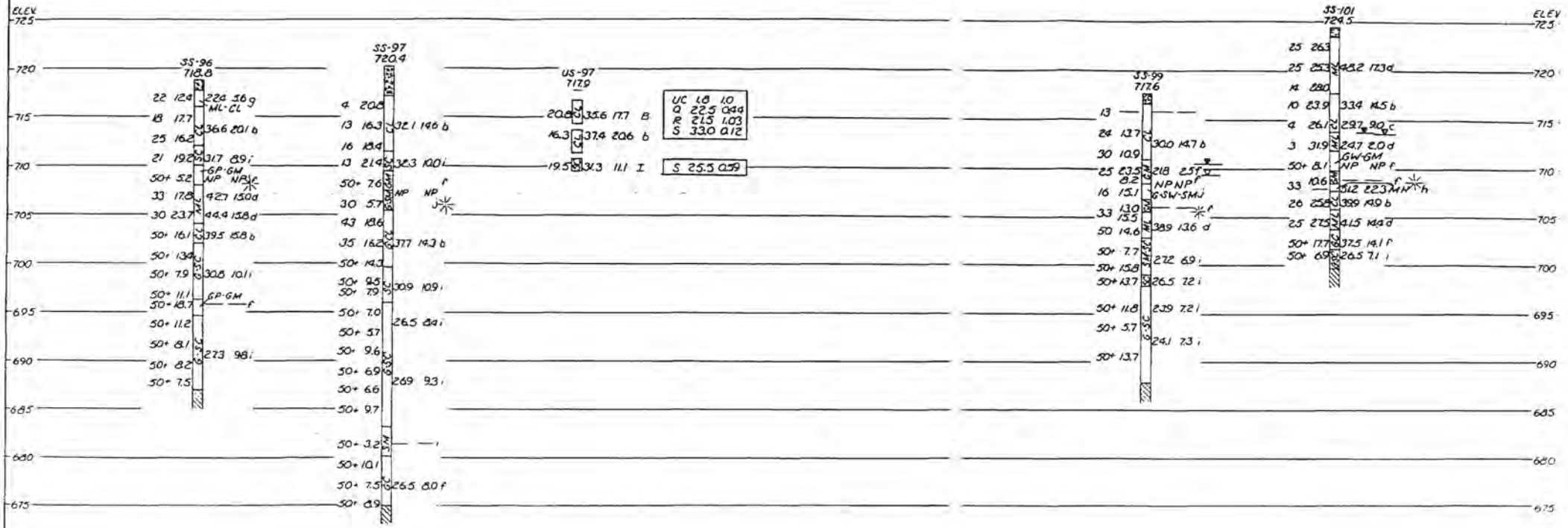
Type Test | Unconfined Compressive Strength (t.s.f.) | Sensitivity Ratio

Note Blows per foot with a 140 lb. hammer and a 30 inch drop on a 2 inch OD split spoon sampler.

Top of weathered shale

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL INVESTIGATION BORINGS
FOR ERCW AND HPFP SYSTEMS
Figure 2.5-200



"HISTORICAL INFORMATION"

SYMBOLS

- Topsoil
- Limestone gravel
- Clayey silt
- Refusal

Q - Unconsolidated undrained triaxial compression test
Q̄ - Consolidated undrained triaxial compression test at natural moisture
S - Consolidated drained direct shear test
UC - Unconfined compression test
R - One hour water table reading
▼ - Twenty four hour water table reading

LEGEND

Boring No.
Elevation

Blows	Natural Moisture Content	Liquid Limit	Plasticity Index	Soil Type	Type Test	Friction Angle (degrees)	or	Cohesion (tsf)
						Unconfined Compressive Strength (tsf)		Sensitivity Ratio

Classification

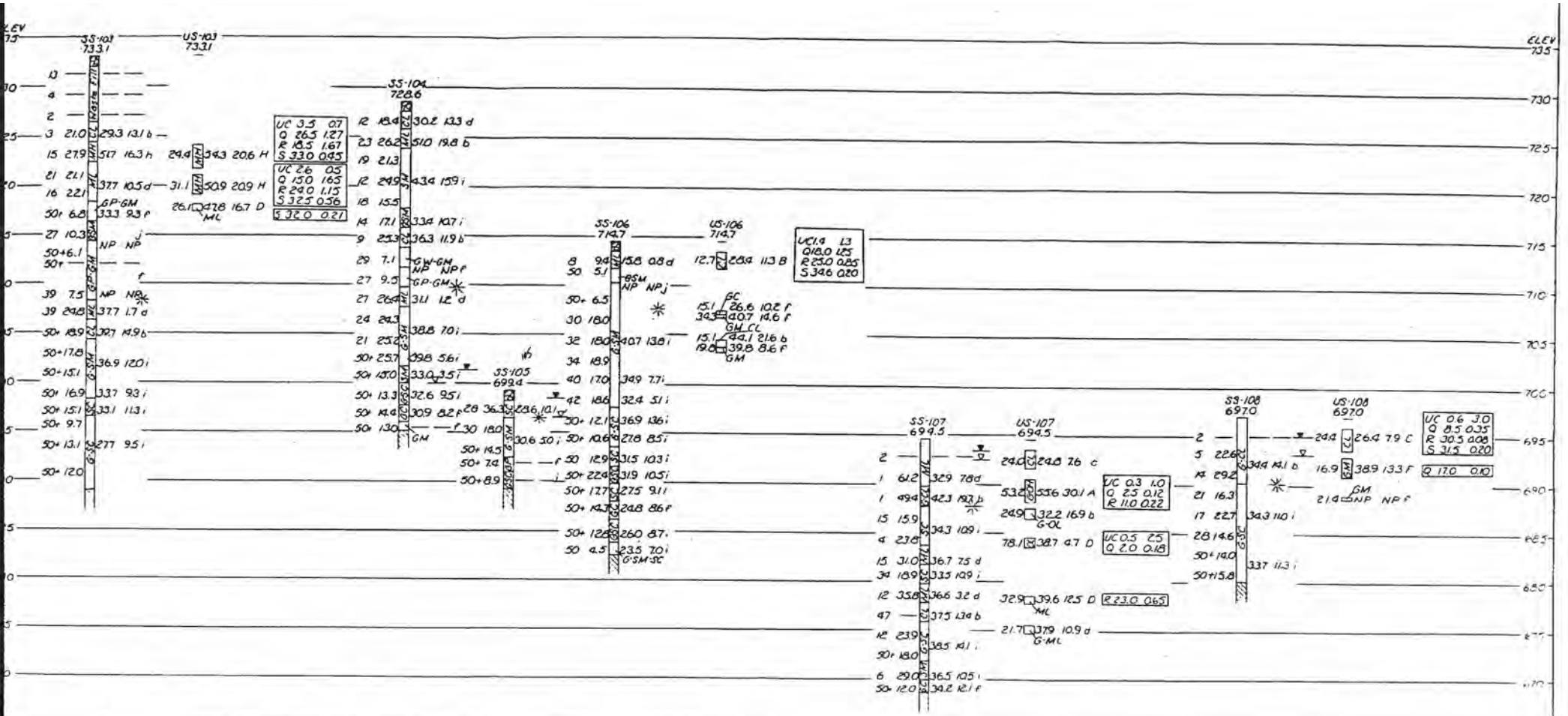
Note: Blows per foot with a 140 lb. hammer and a 30 inch drop on a 2 inch OD split spoon sampler

* Top of weathered shale

SCALE: 1" = 10'

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL INVESTIGATION BORINGS
FOR ERCW AND HPFP SYSTEMS
Figure 2.5-201



SYMBOLS

- Topsoil
- Refusal

Q - Unconsolidated undrained triaxial compression test
R - Consolidated undrained triaxial compression test at natural moisture
S - Consolidated drained direct shear test
UC - Unconfined compression test
▽ - One hour water table reading
▼ - Twenty four hour water table reading

LEGEND

Boring No.
Elevation

Blows | Natural Moisture Content | Classification | Liquid Limit | Plasticity Index | Soil Type

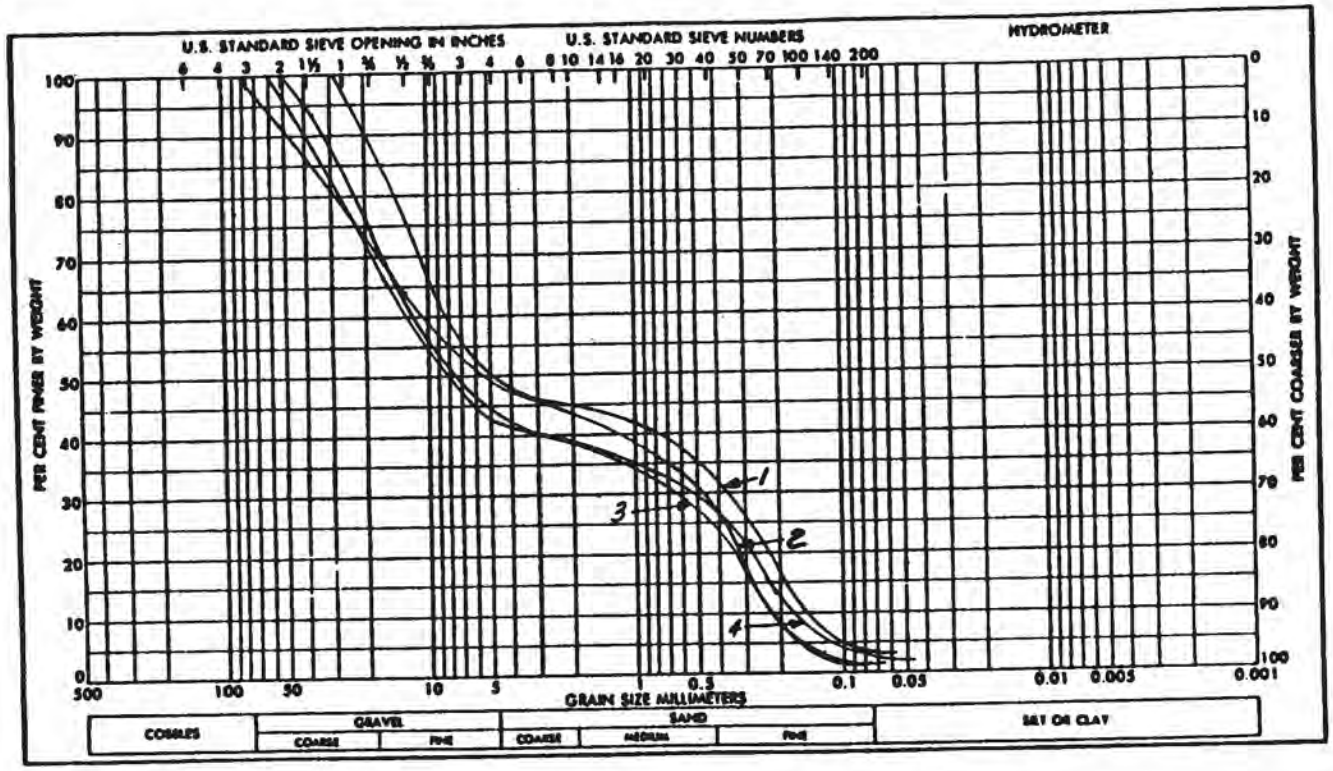
Type Test | Friction Angle (degrees) or Unconfined Compressive Strength (tsf) | Cohesion (tsf) or Sensitivity Ratio

Note: Blows per foot with a 140 lb hammer and a 30 inch drop on a 2 inch OD split-spoon sampler.

✳ Top of weathered shale

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL INVESTIGATION BORINGS
FOR ERCW AND HPFP SYSTEMS
Figure 2.5-202



Soil Symbol	GP	Liquid Limit, %	
Moisture Content, %		Plastic Limit, %	
Specific Gravity		Plasticity Index, %	
		Shrinkage Limit, %	

Remarks:

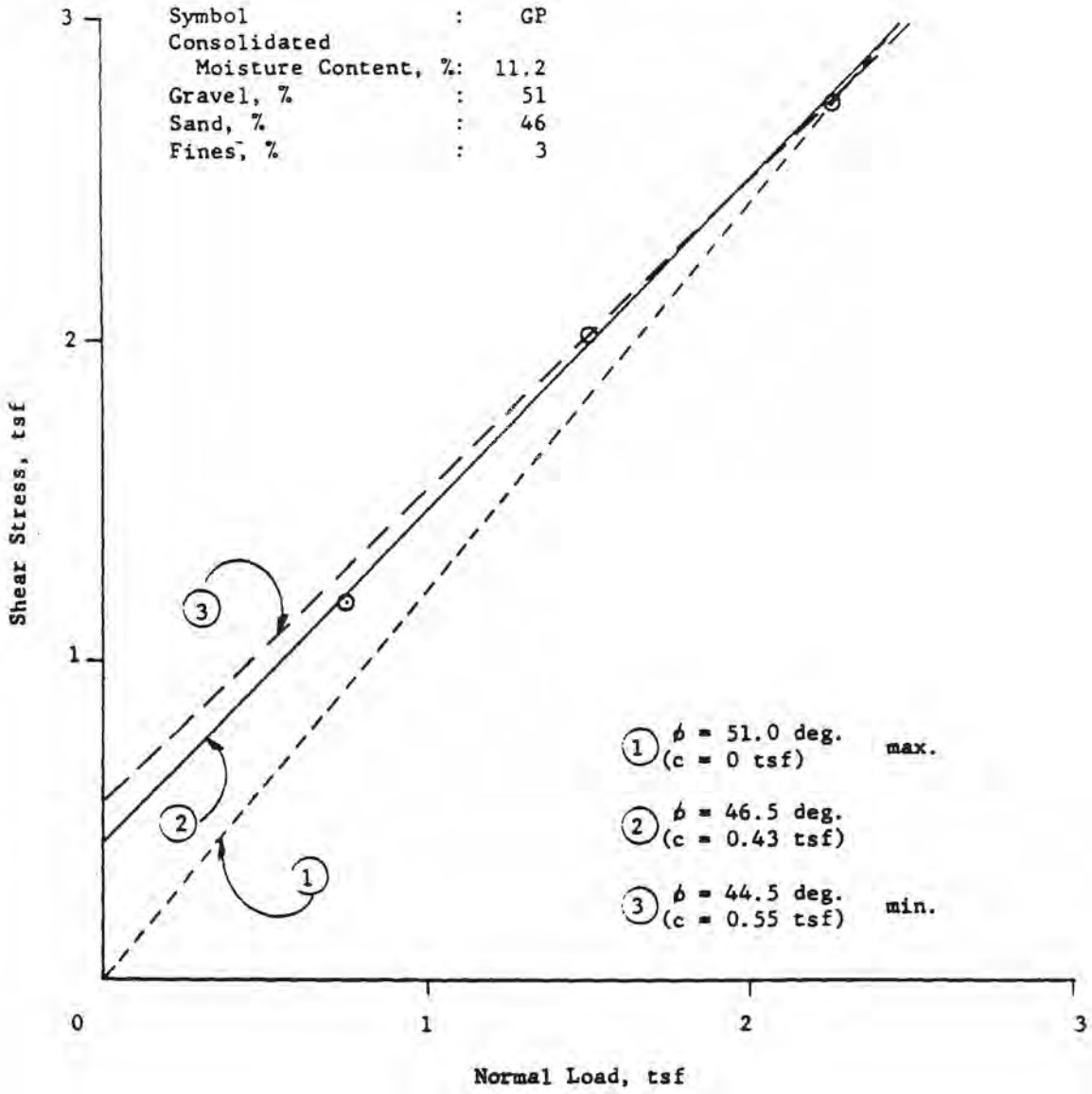
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INTAKE CHANNEL TRENCH

Figure 2.5-203

WATTS BAR NUCLEAR PLANT - INTAKE CHANNEL

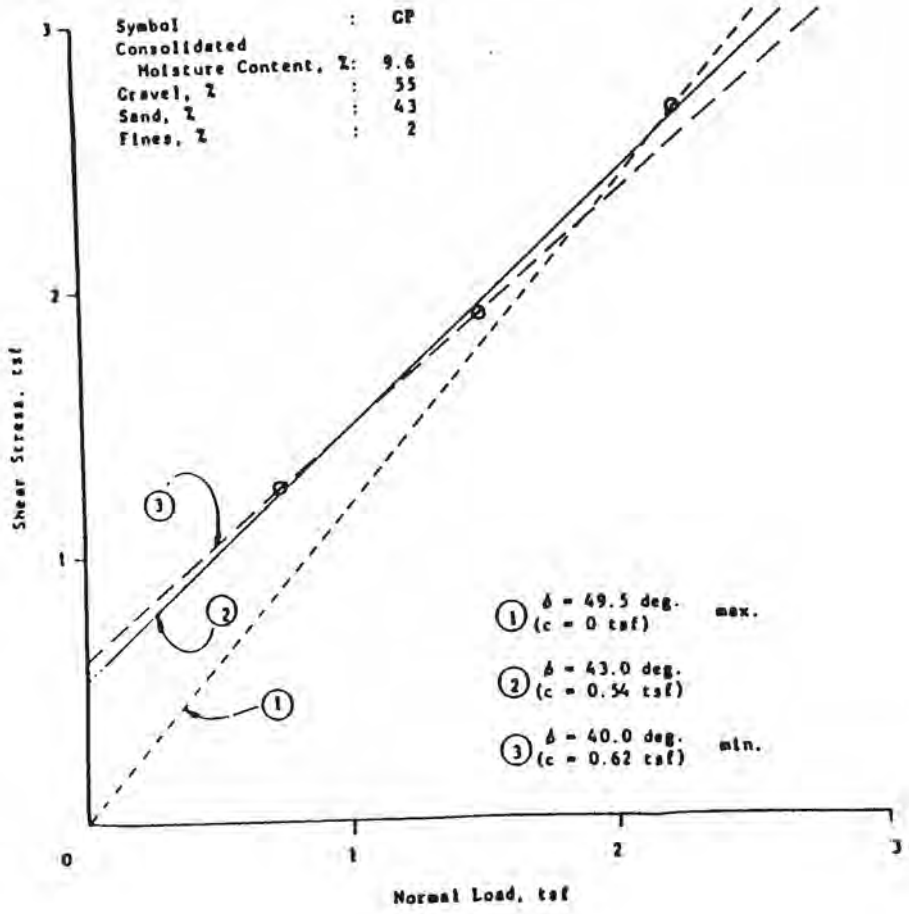
TEST 1



Normal Load tsf	Consolidated* Deformation in.	Shear Stress tsf	Consolidated* Dry Density pcf
0.75	0.1833	1.17	118.9
1.50	0.1543	2.02	120.5
2.25	0.2013	2.76	120.3

*Under an overburden pressure of 3000 psf.

Figure 2.5-204



Normal Load (tsf)	Consolidated * Deformation (in)	Shear Stress (tsf)	Consolidated * Dry Density (psf)
0.75	0.0987	1.25	126.3
1.50	0.0987	1.89	126.3
2.25	0.0842	2.65	125.5

*Under an overburden pressure of 3000 psf.

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INTAKE CHANNEL

STRENGTH EVALUATION
TEST 2

Figure 2.5-205

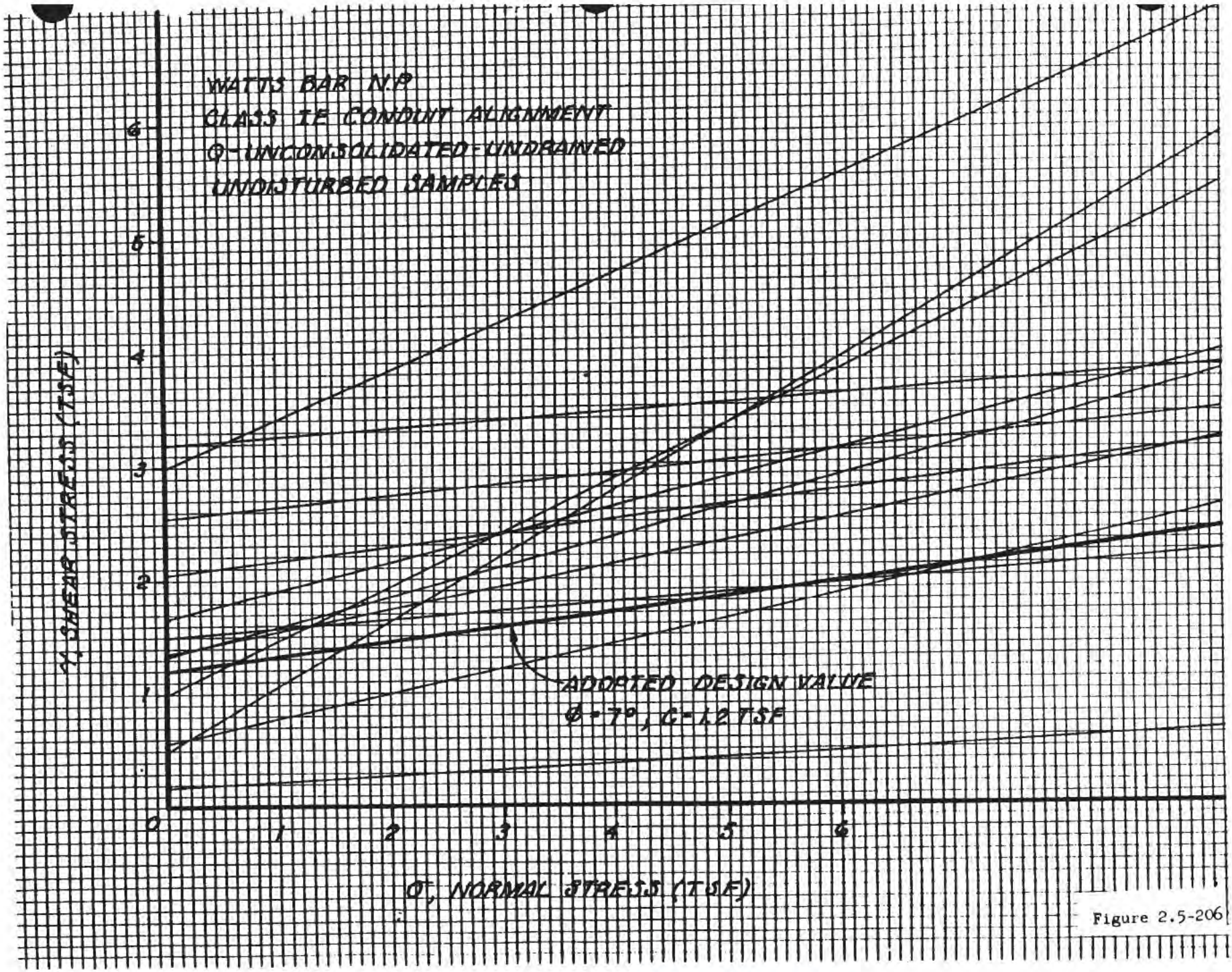
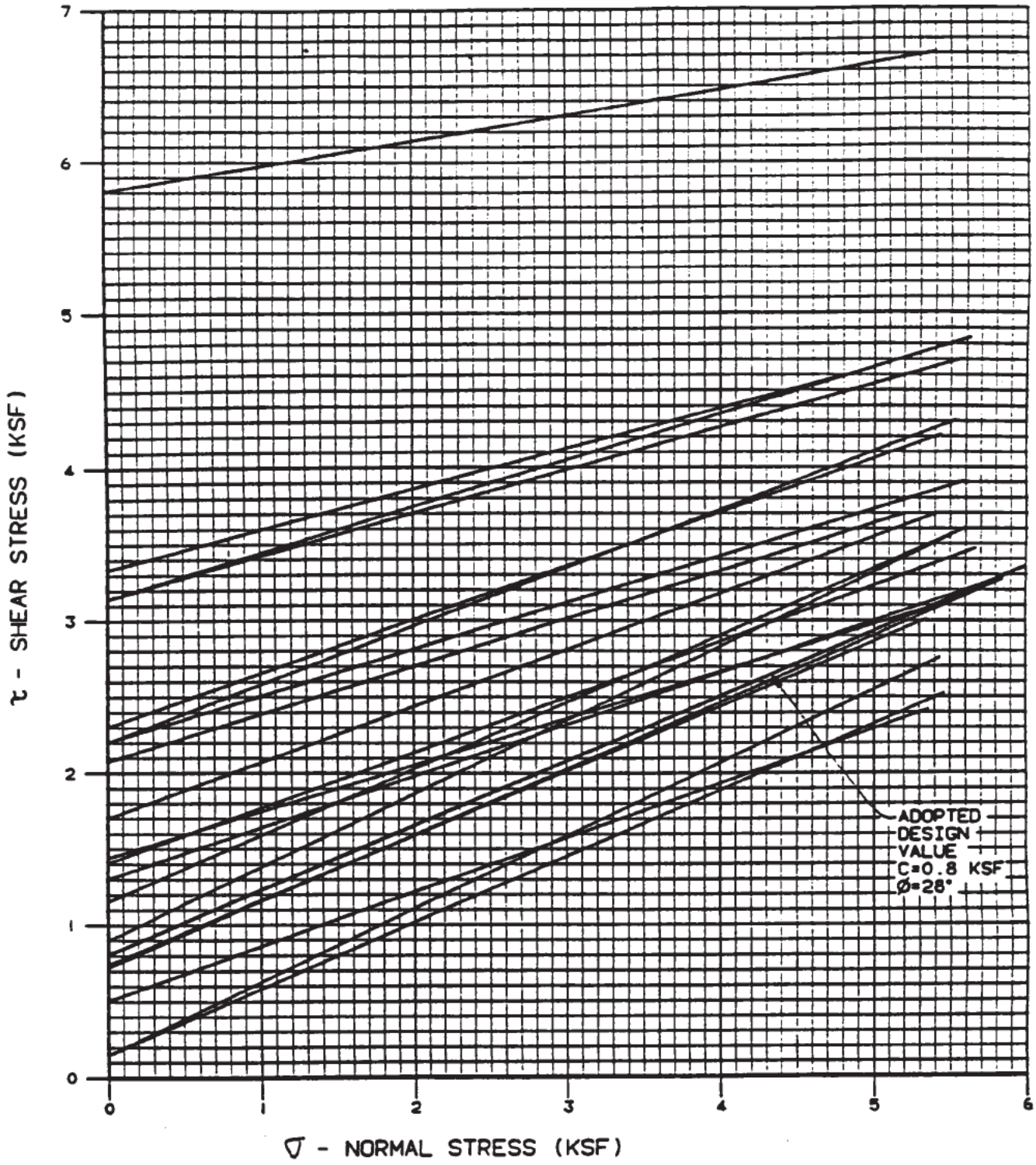


Figure 2.5-206



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

ERCW PIPING AND
IE CONDUIT ALIGNMENTS
R (CONSOLIDATED-UNDRAINED)
SILT AND CLAY SAMPLES
NATURAL MOISTURE CONTENT

figure 2.5-207

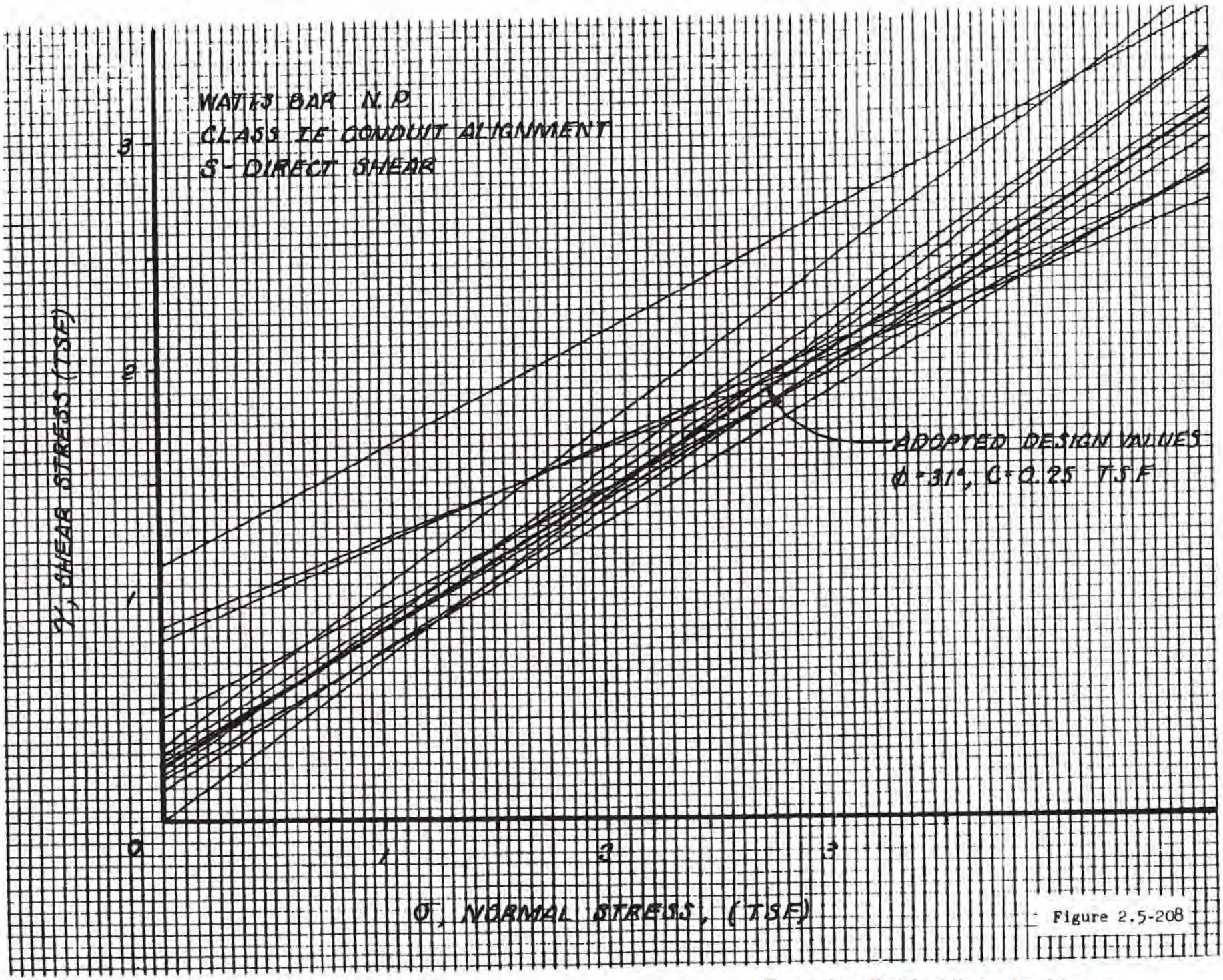
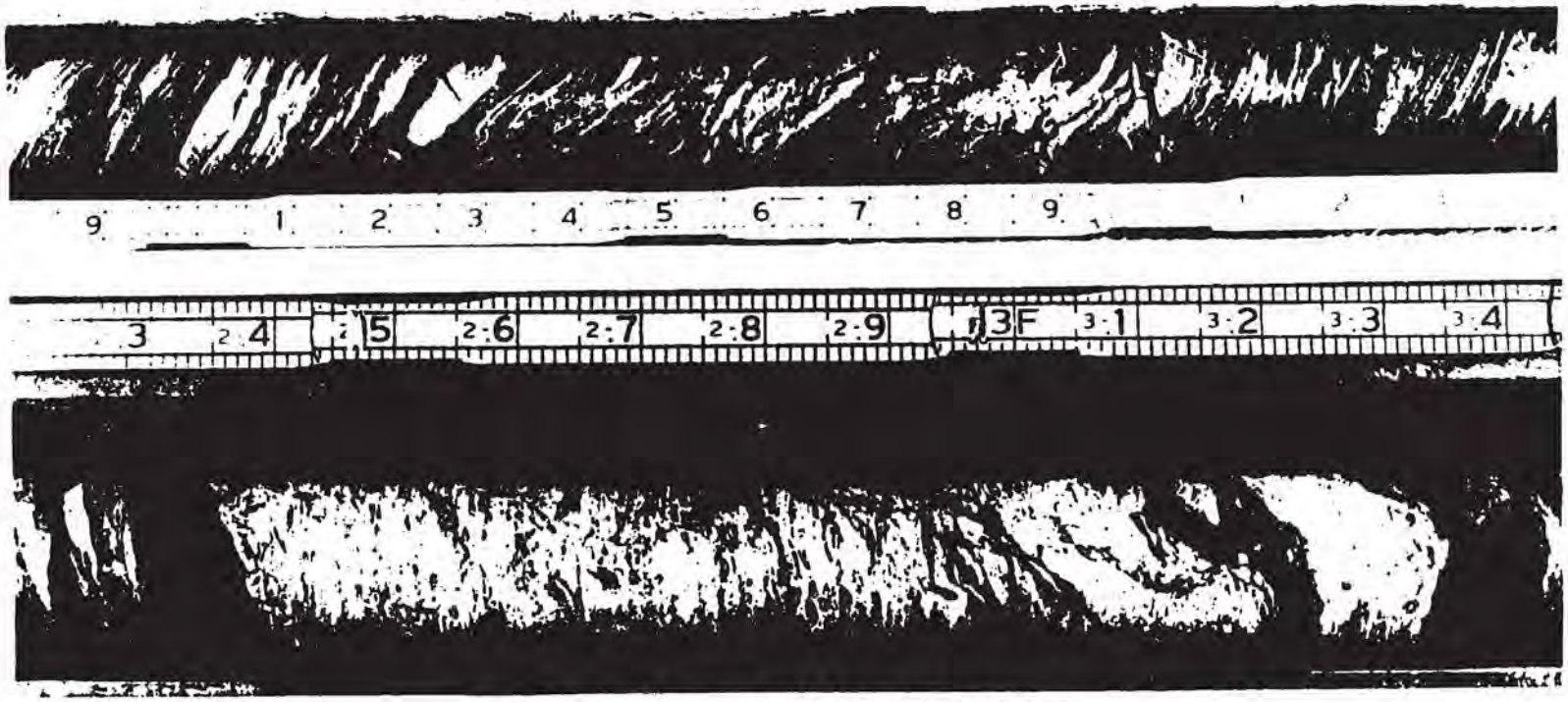


Figure 2.5-208

TYPE 1 – SOFT SHALE

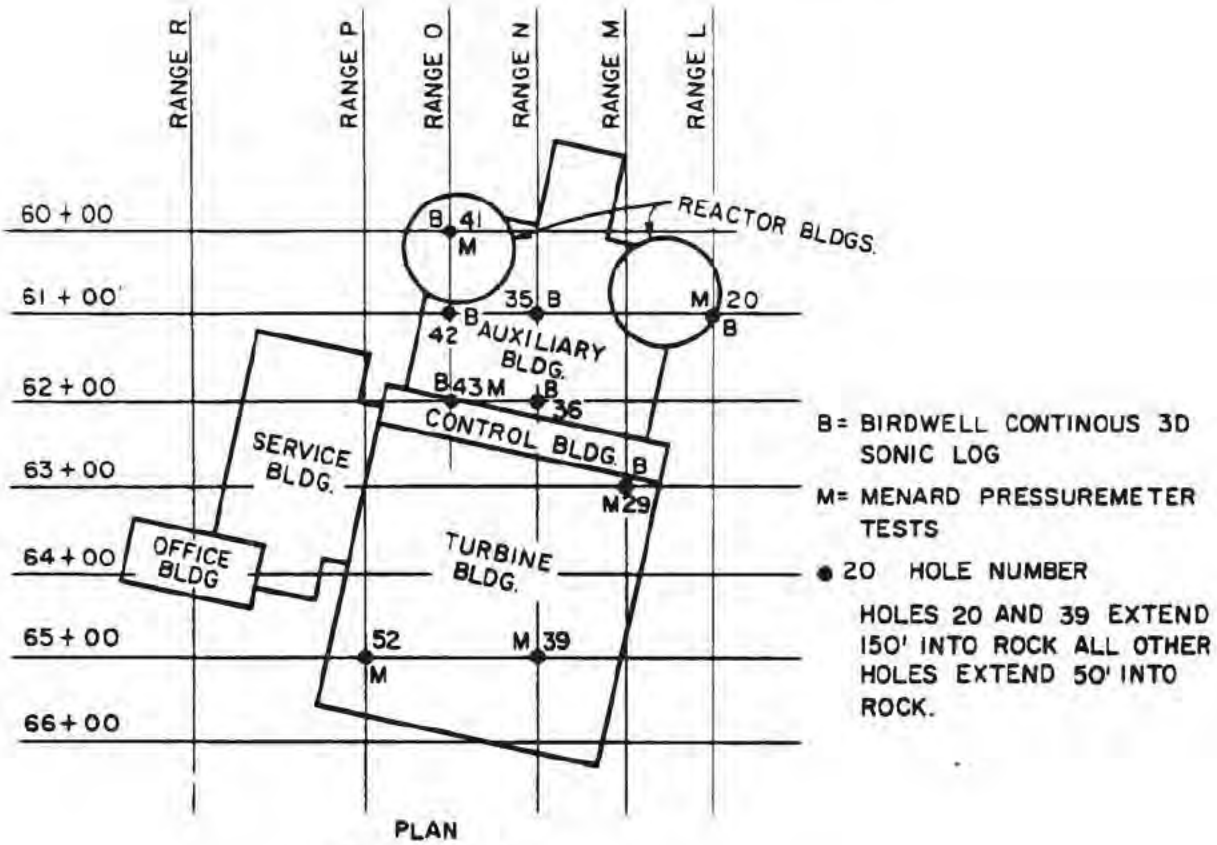
TYPE 2 – HARD SHALE



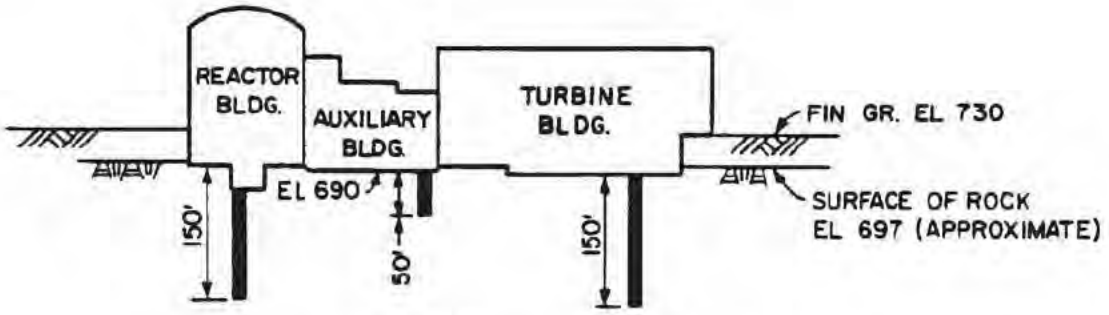
TYPE 3 – LIMESTONE

Figure 2.5-209

Best Available Historical Image

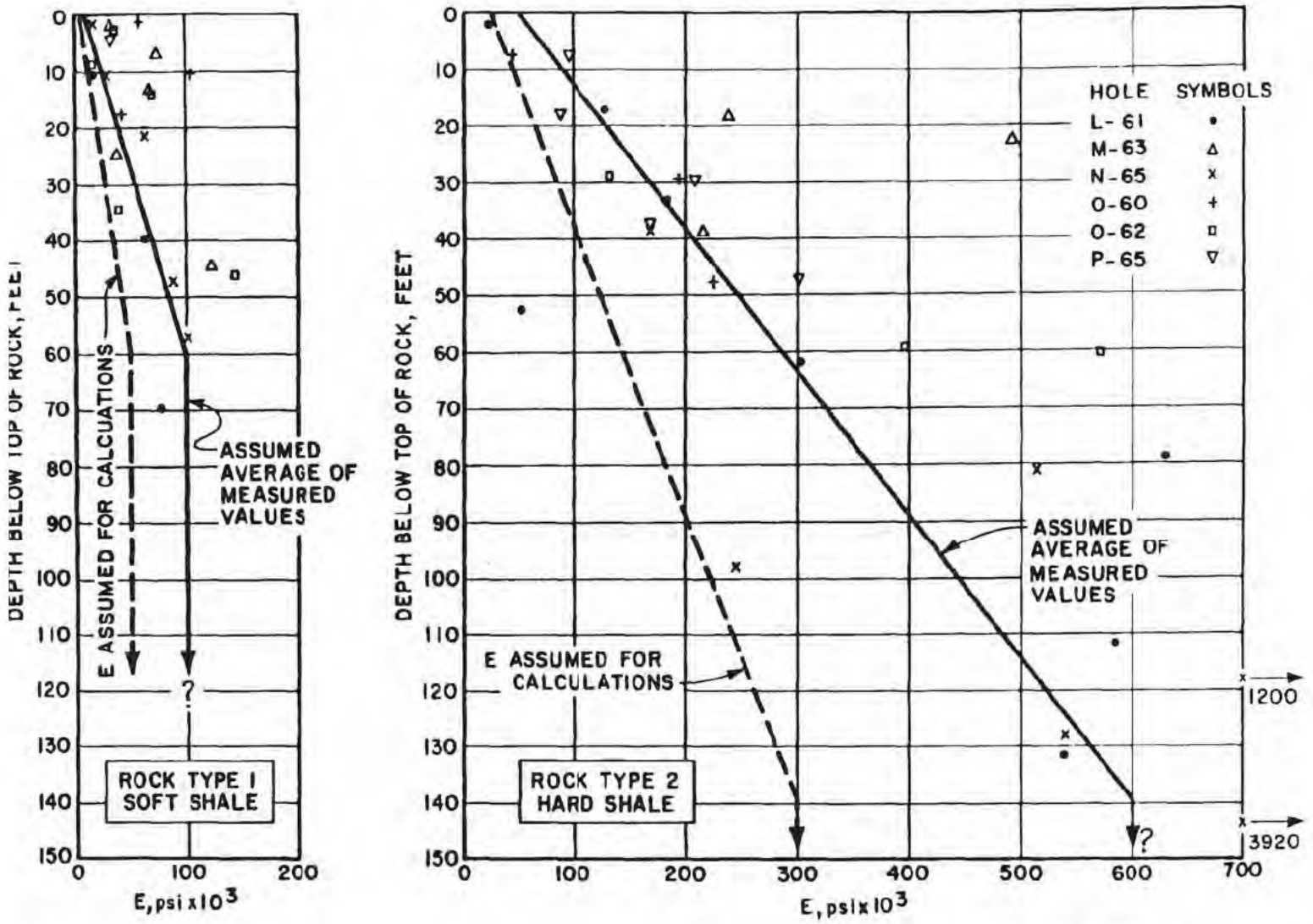


PLAN
Scale 1" = 200'



PROFILE
Scale 1" = 200'

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
LOCATION OF TEST HOLES Figure 2.5-210

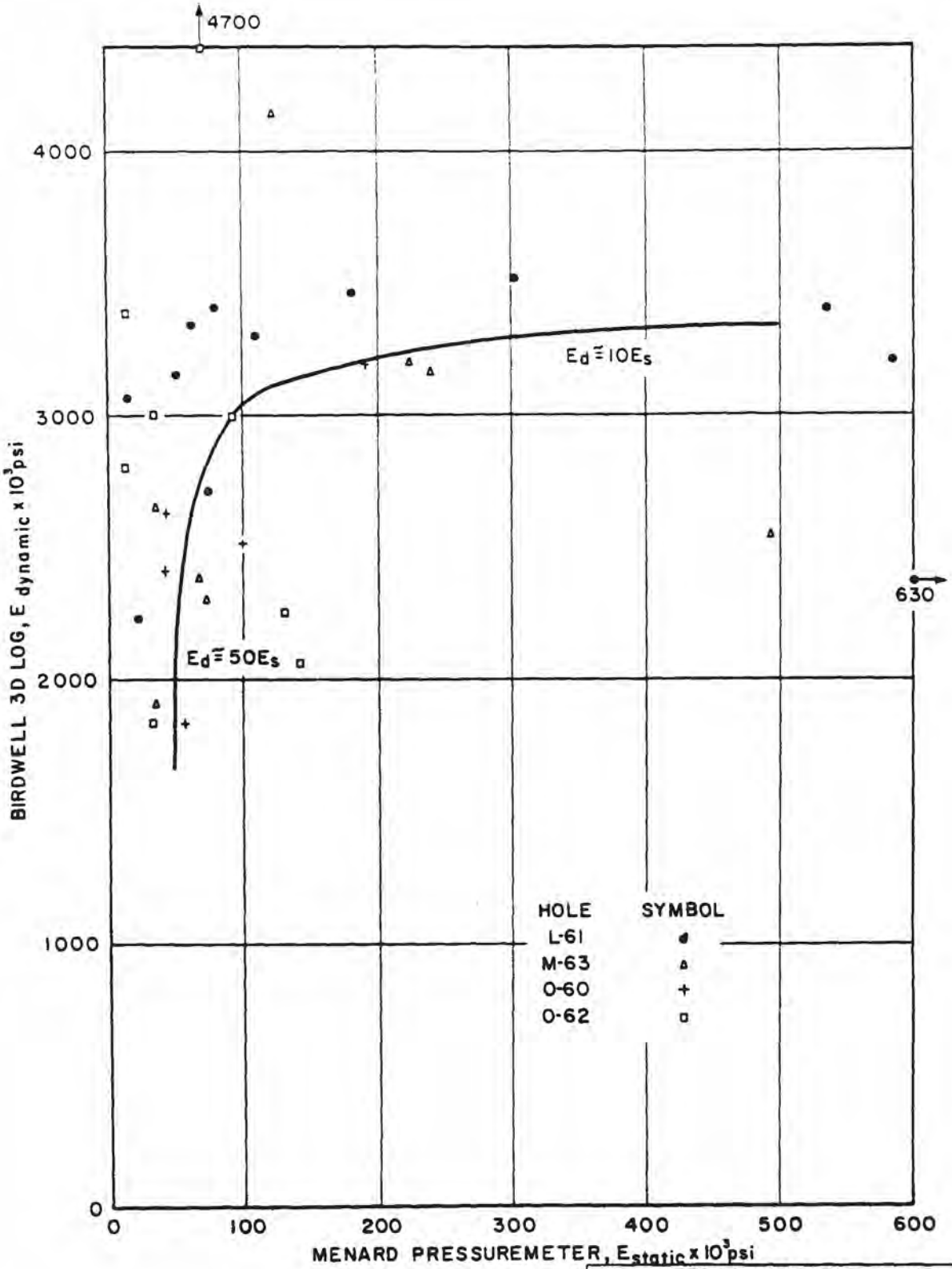


Best Available Historical Image

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

DEFORMATION MODULI FROM MENARD PRESSUREMETER TESTS

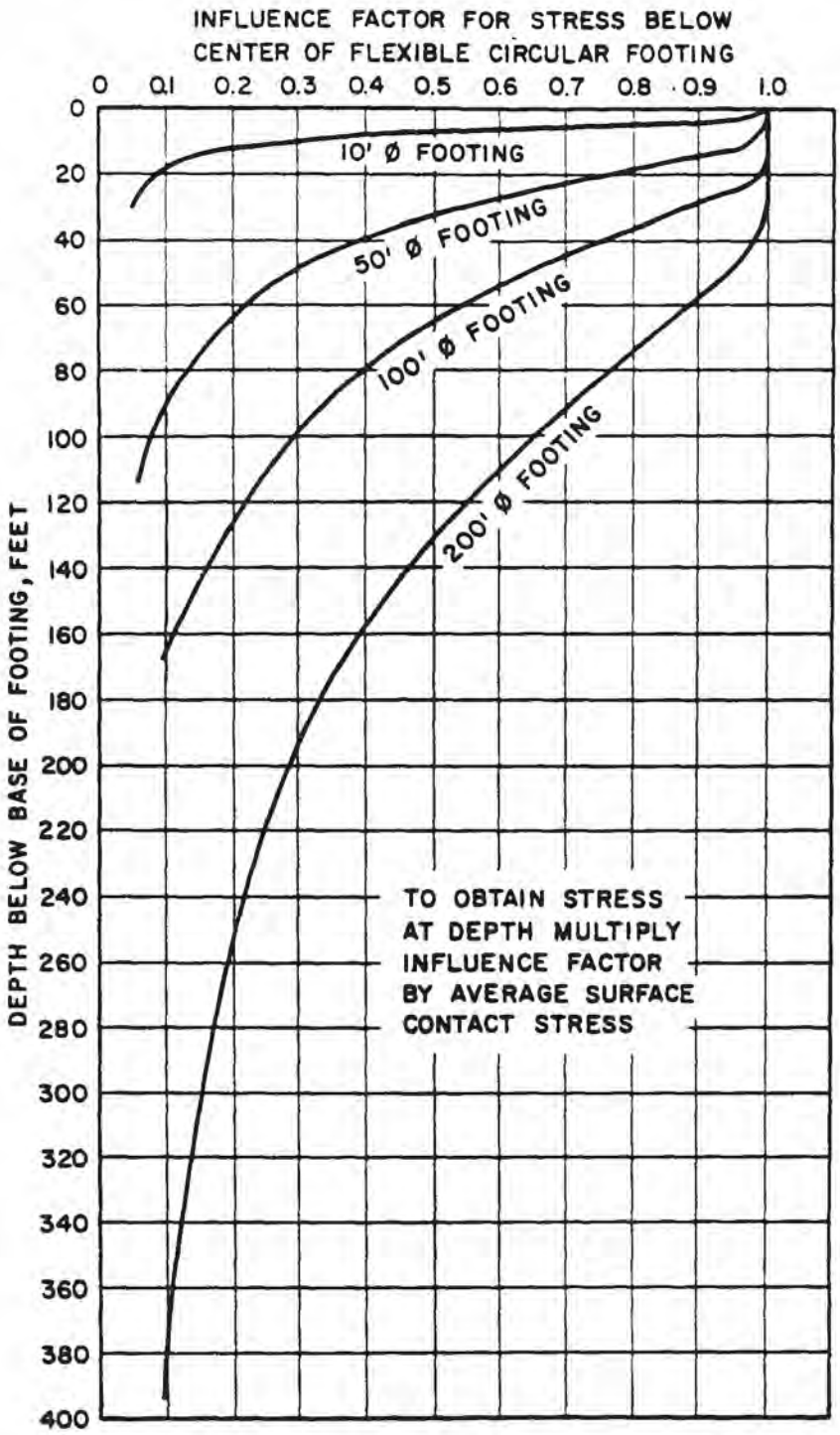
Figure 2.5-211



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

COMPARISON OF MODULI OBTAINED WITH MENARD PRESSUREMETER AND BIRDWELL 3D SONIC LOGGER

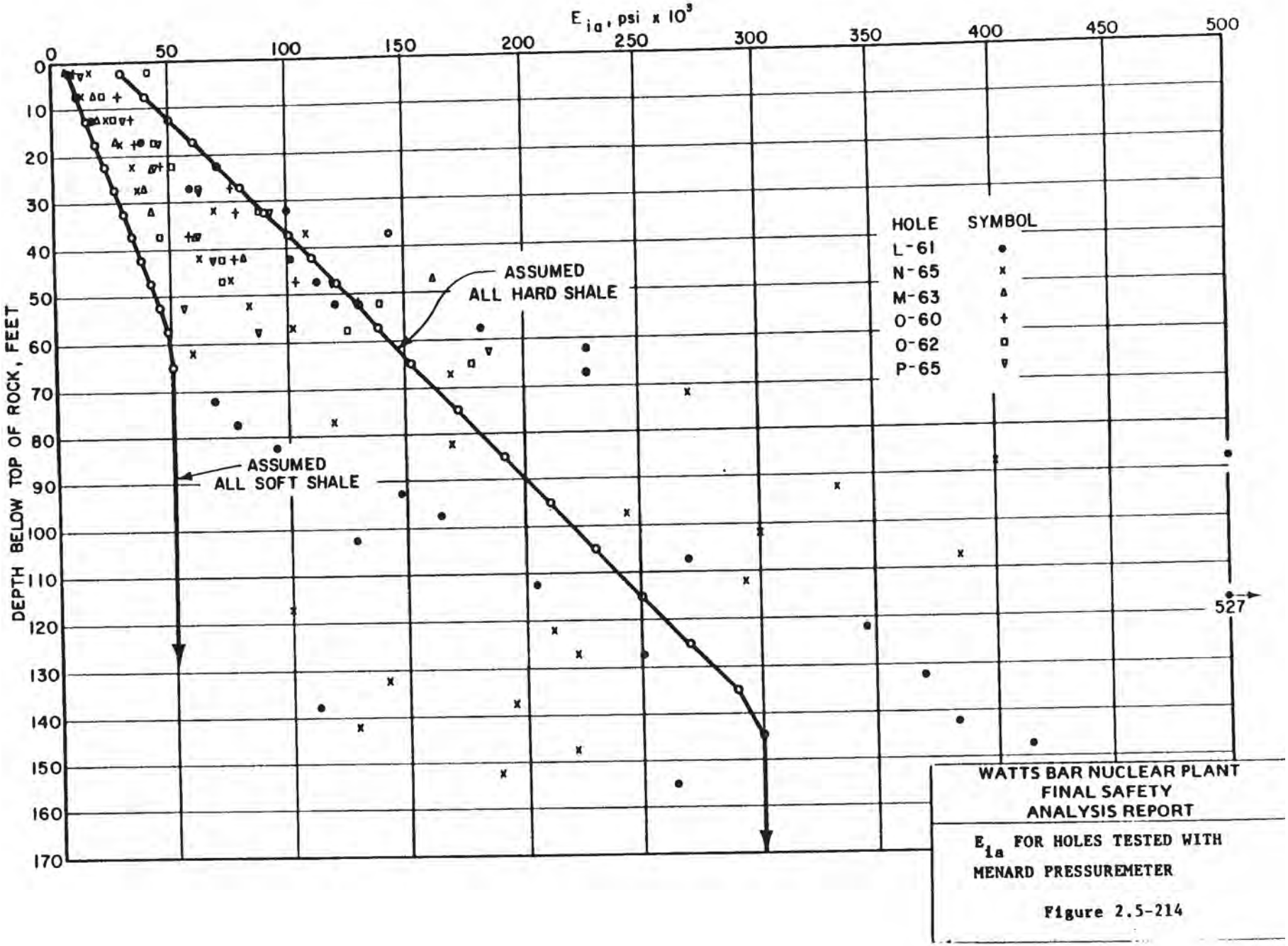
Figure 2.5-212



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INFLUENCE FACTORS FOR DETERMINING STRESSES BELOW THE CENTER OF FLEXIBLE CIRCULAR FOOTING 10, 50, 100, AND 200 FT. IN DIAMETER

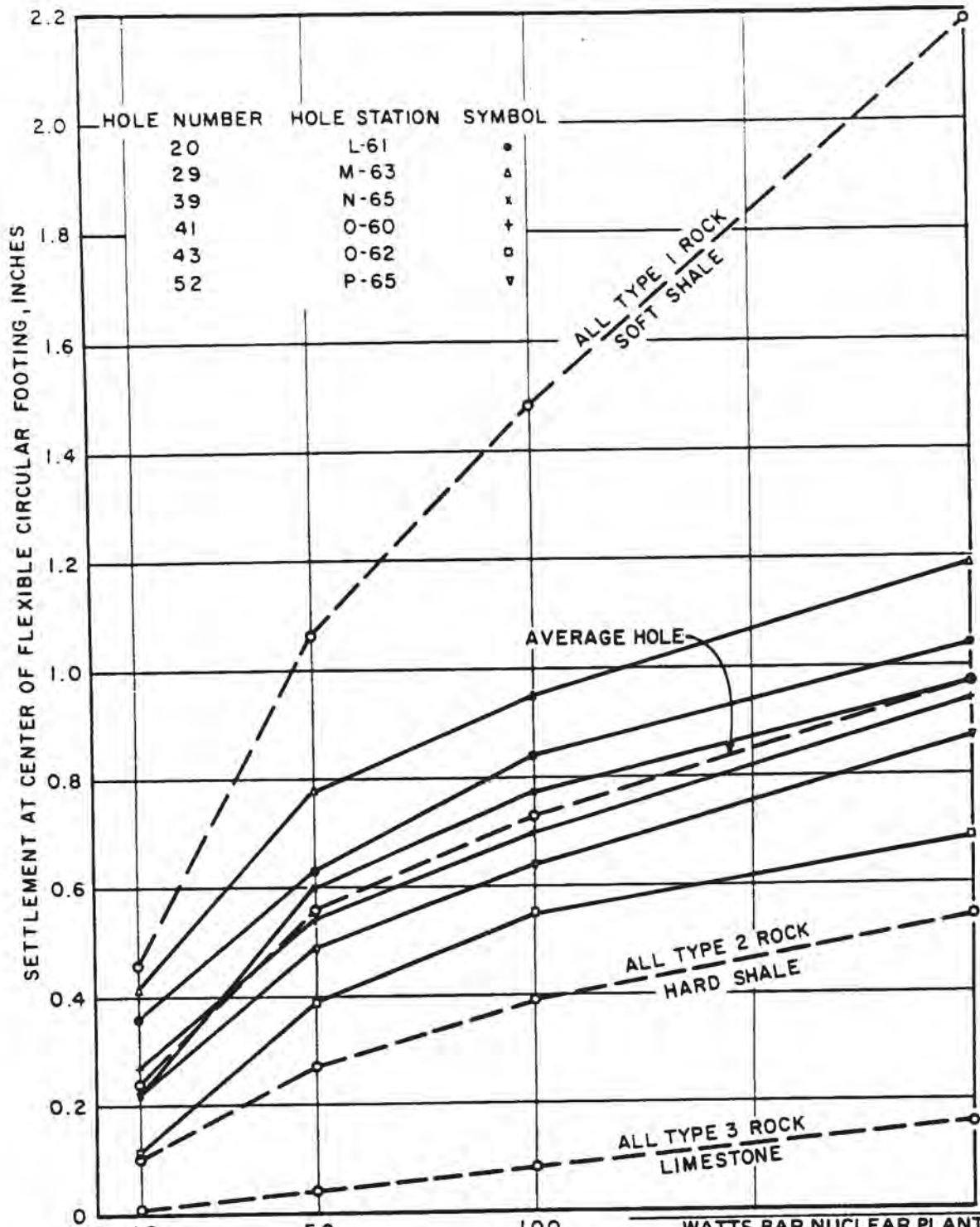
Figure 2.5-213



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

E_{ia} FOR HOLES TESTED WITH MENARD PRESSUREMETER

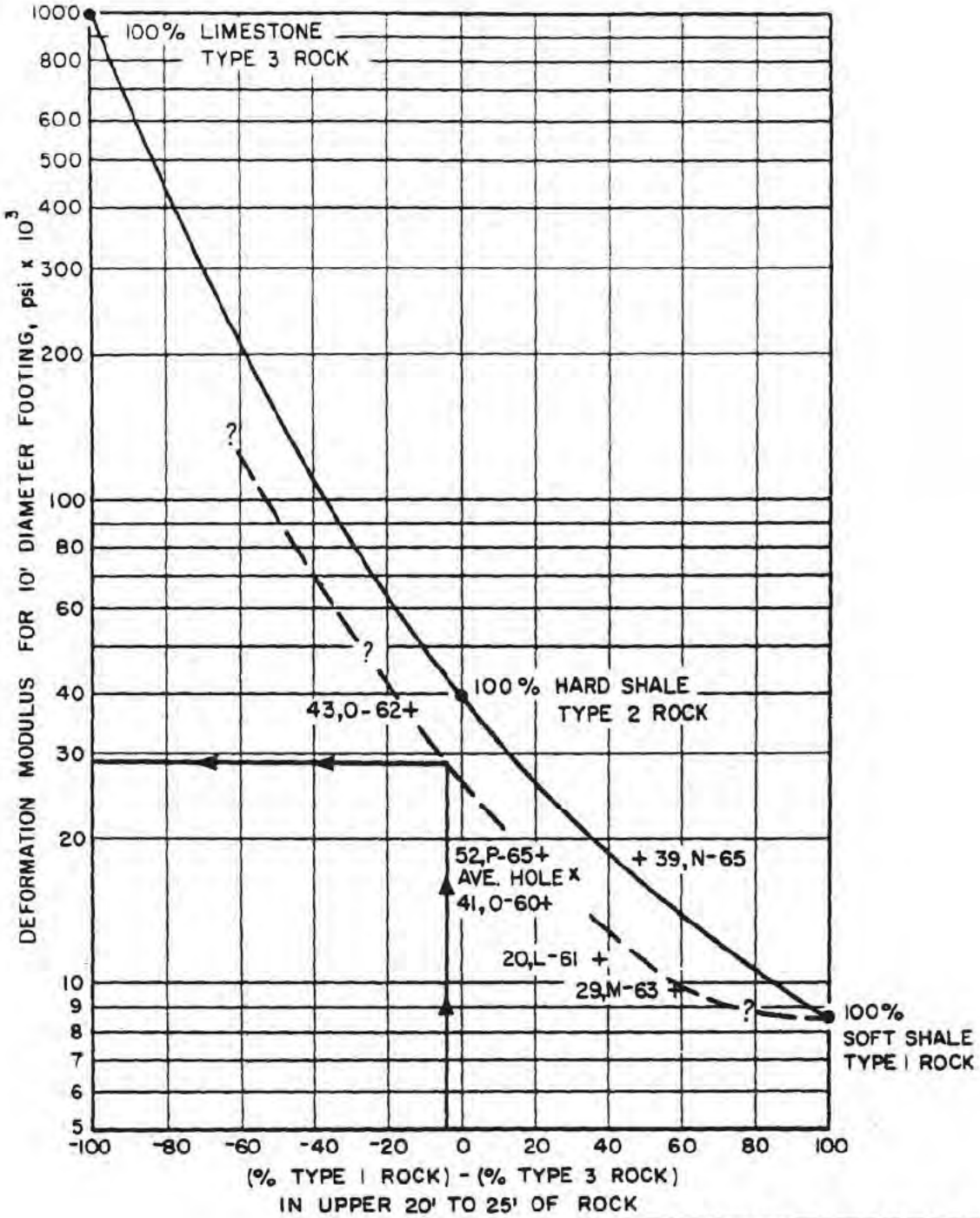
Figure 2.5-214



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT AT CENTER OF FLEXIBLE CIRCULAR FOOTING LOADED WITH SKSF

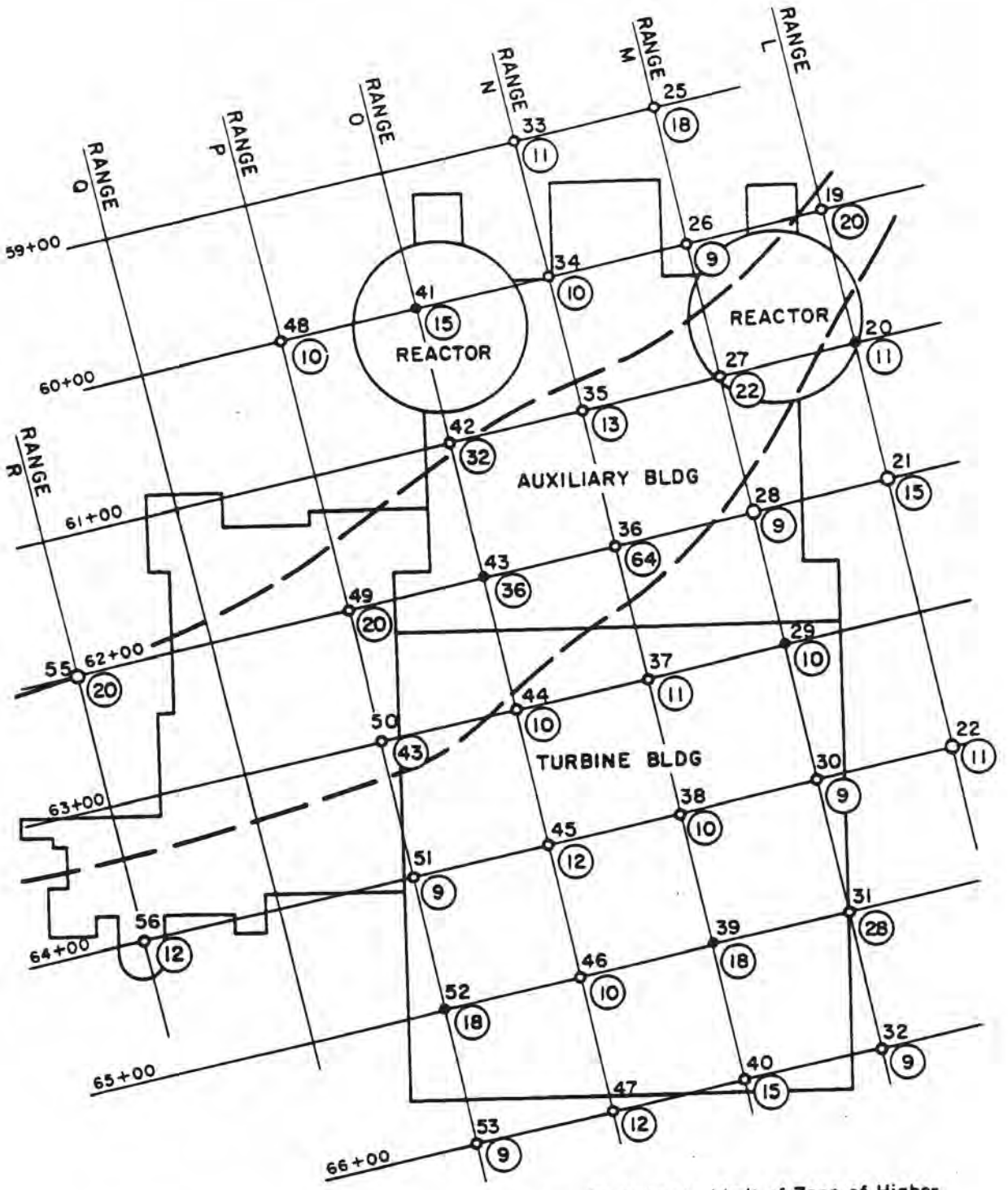
Figure 2.5-215



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

CORRELATION USED TO ESTIMATE AVERAGE MODULI FOR HOLES WHERE DETAILED CALCULATIONS WERE NOT MADE

Figure 2.5-216



— — Approximate Limit of Zone of Higher Modulus Surface Rock

●35 Hole Number

(13) Estimated Average Modulus for Top 20' of Rock, psi x 10^3

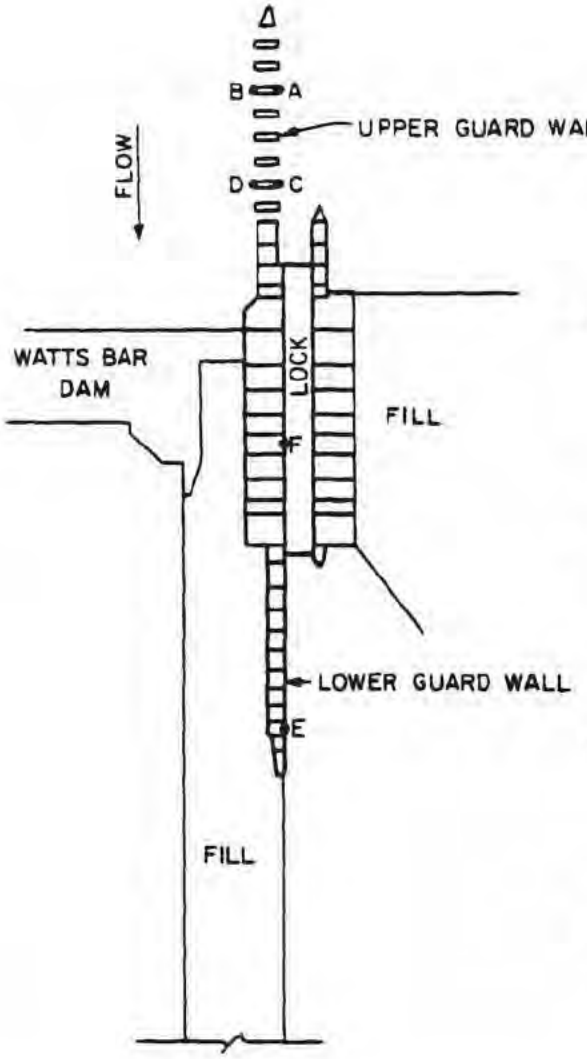
● Hole Logged and Pressuremeter Tested

○ Hole Logged but not Pressuremeter Tested

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

DISTRIBUTION OF DEFORMATION MODULI FOR 10 FOOT DIAMETER FOOTINGS

Figure 2.5-217



CALCULATED DEFORMATION MODULI

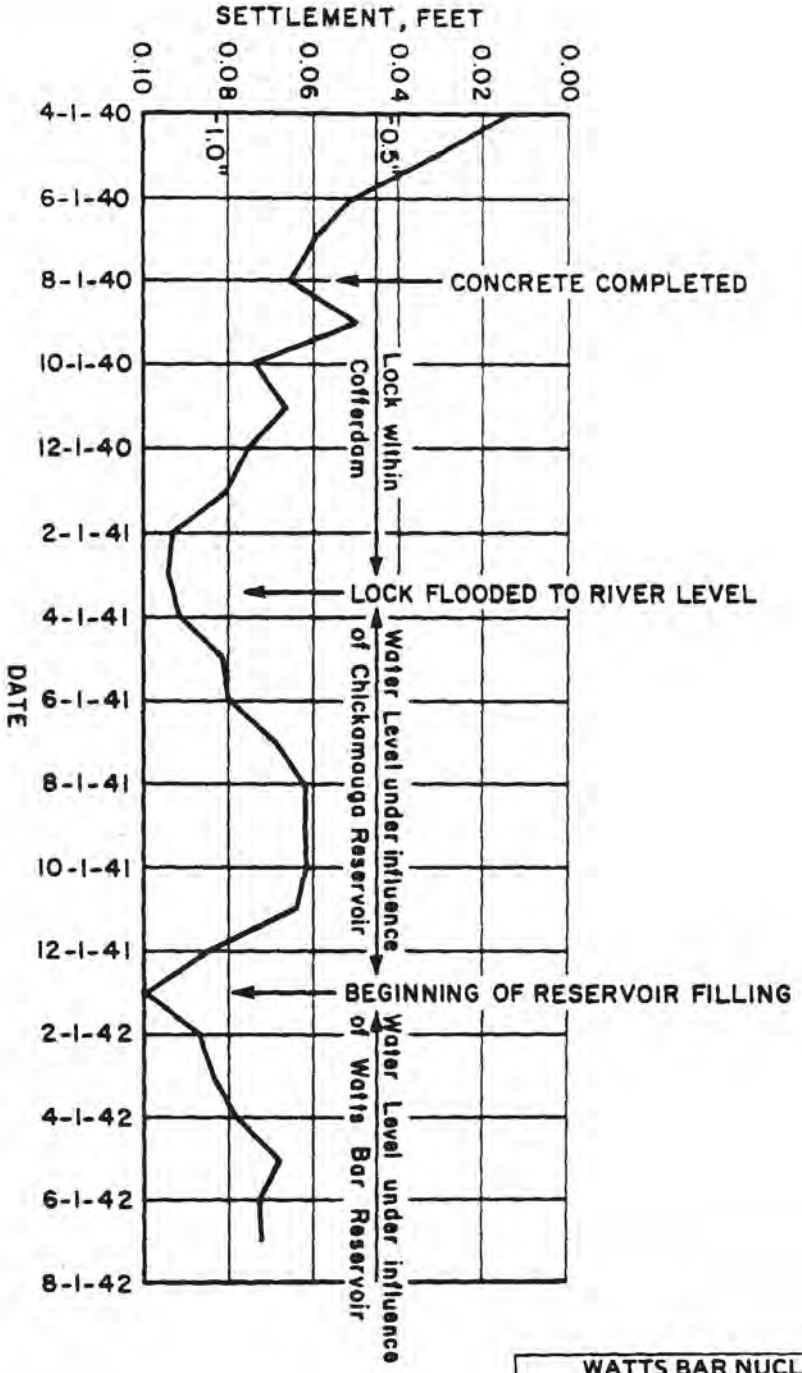
POINT	Deformation modulus calculated from settlement data assuming flexible foundation
A	25,000 psi
B	89,000 psi
C	23,500 psi
D	43,000 psi
E	99,000 psi

POINT	Deformation modulus calculated from settlement data assuming rigid foundation
A-B	43,000 psi
C-D	49,000 psi

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SIMPLIFIED PLAN OF LOCK FOUNDATION SHOWING LOCATION OF MODULUS CALCULATIONS

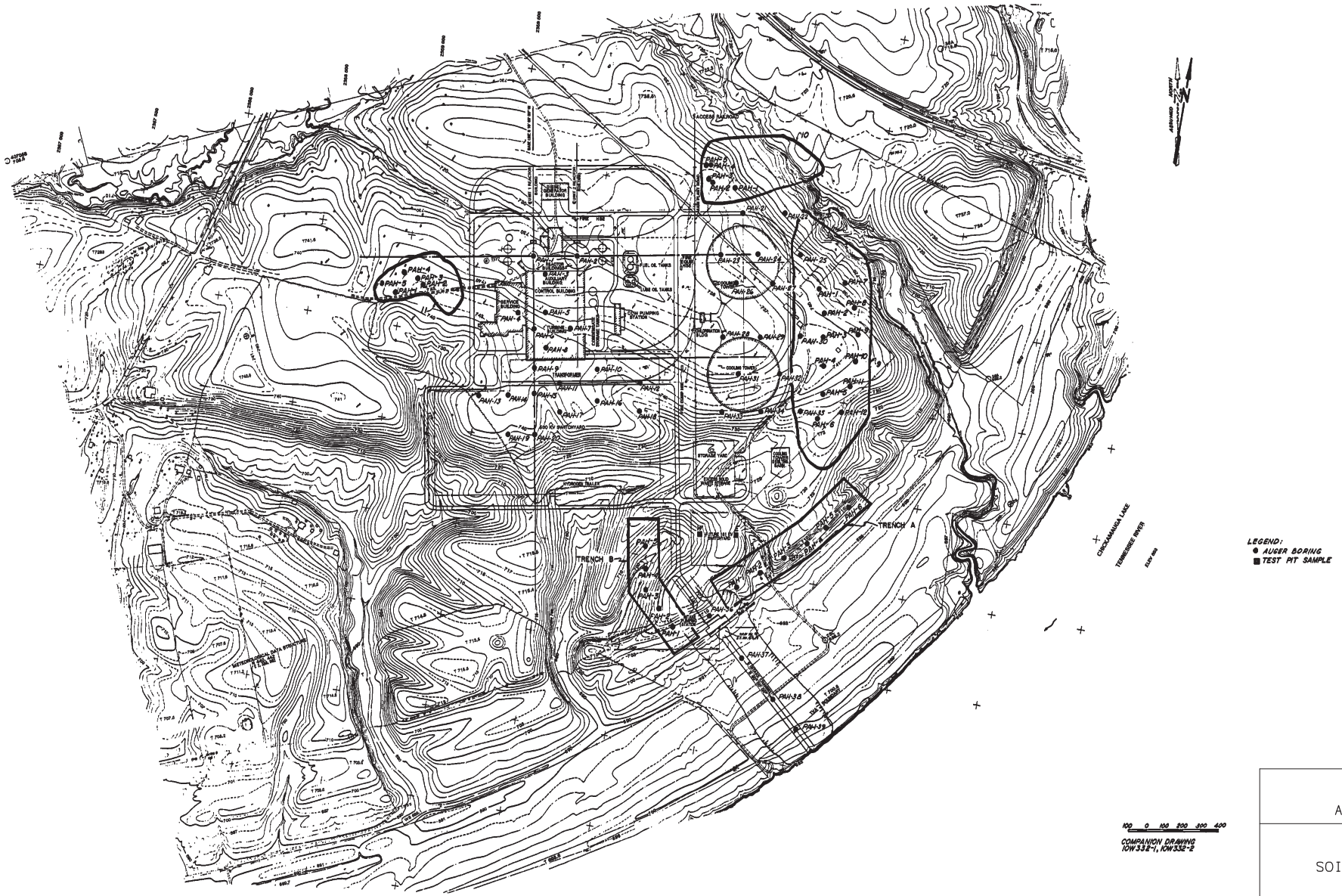
Figure 2.5-218



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SETTLEMENT OF FACE OF BLOCK R-10
(Point F, fig. 16)

Figure 2.5-219



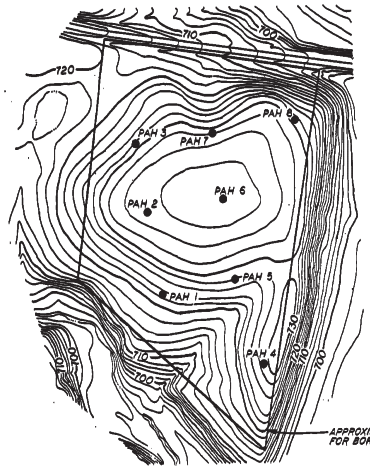
WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

YARD

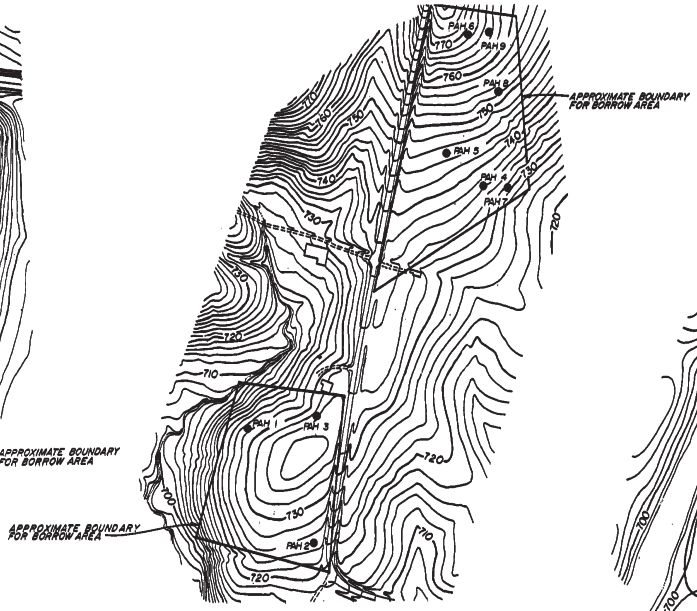
SOIL INVESTIGATIONS
BORROW SOILS

TVA DWG NO. 1OW331 R3
FIGURE 2.5-220

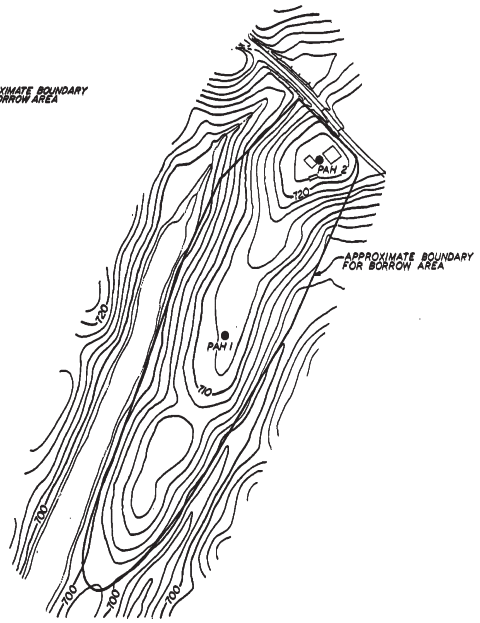
CAD MAINTAINED DRAWING



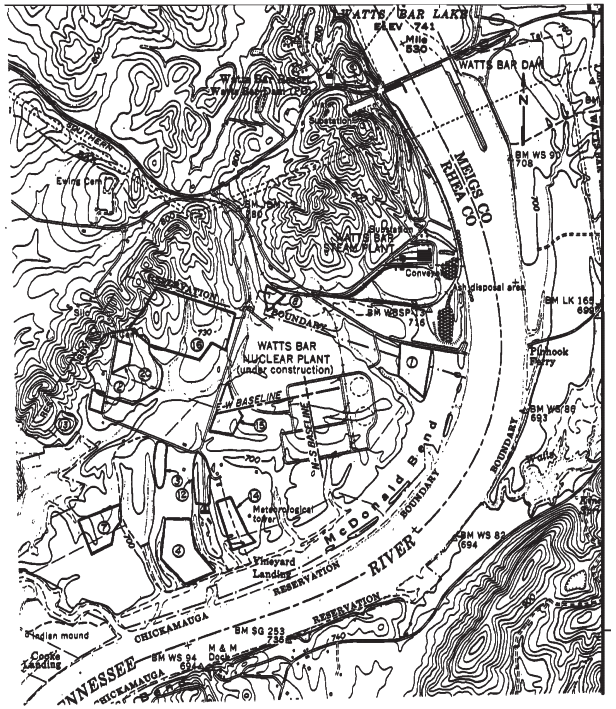
BORROW AREA 1



BORROW AREA 2



BORROW AREA 3



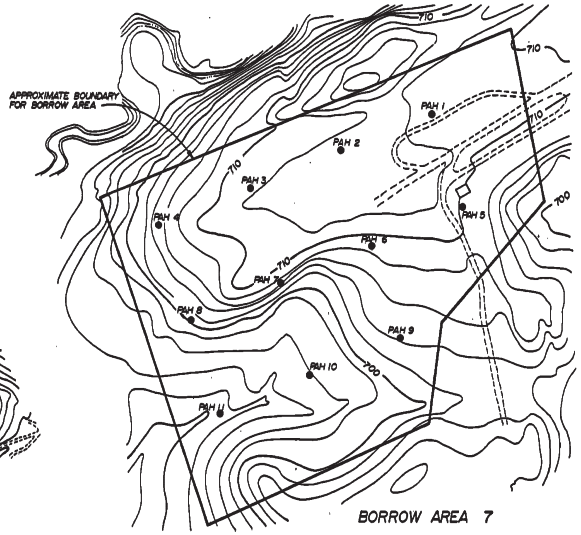
LOCATION PLAN

1"=1000' 0 1000 2000

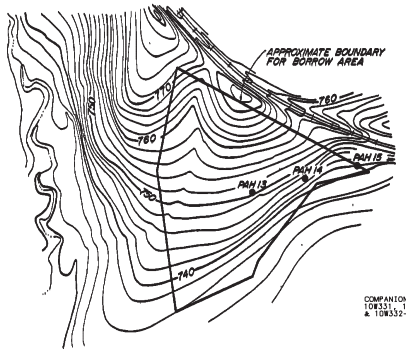
LEGEND:
● AUGER BORINGS

NOTE:
BORROW AREAS 5 AND 6 WERE NEVER ASSIGNED. ALL REFERENCES TO AREAS 5 AND 6 ARE FROM THE MAIN PLANT AREA AND ARE TO BE CLASSIFIED UNDER GENERAL PLANT SOIL CLASSIFICATION. BORROW AREA 2 WAS, AT INTERVALS DURING CONSTRUCTION, KNOWN AS BORROW AREAS 2A AND 2B.

BORROW AREA 4



BORROW AREA 7



BORROW AREA 8

NOT TO SCALE EXCEPT AS NOTED

COMPANION DRAWINGS:
1OW331, 1OW332-2 & 1OW332-3

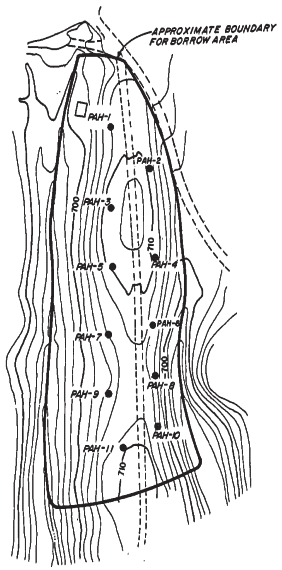
WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

YARD
SOIL INVESTIGATIONS
BORROW SOILS

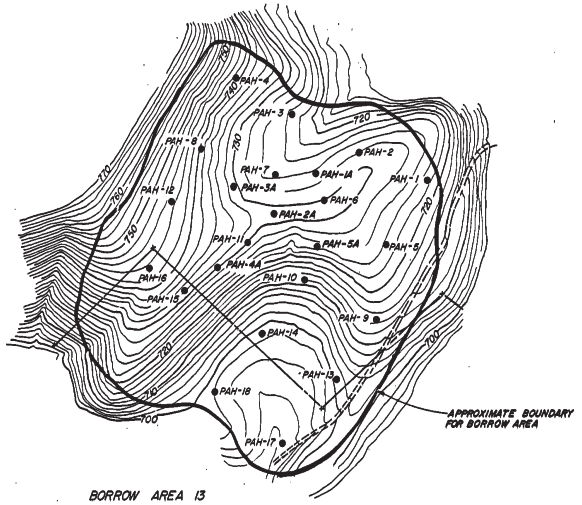
TVA DWG NO. 1OW332-1 R6
FIGURE 2.5-221

CAD MAINTAINED DRAWING

CAD MAINTAINED DRAWING



BORROW AREA 12



BORROW AREA 13

BORROW AREA 2C

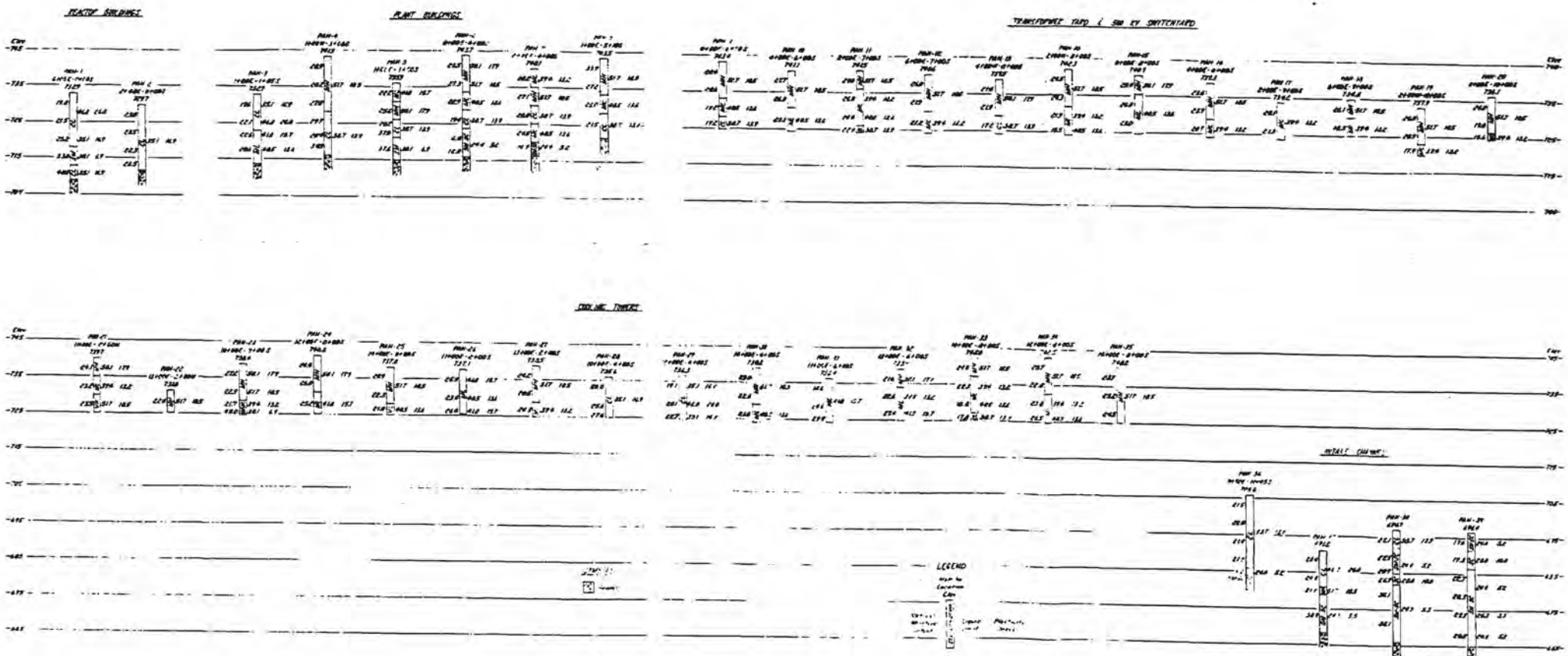
LEGEND:
● AUGER BORING

COMPANION DRAWINGS:
1OW331, 1OW332-1
& 1OW332-3

WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

YARD
SOIL INVESTIGATIONS
BORROW SOILS

TVA DWG NO. 1OW332-2 R2
FIGURE 2.5-221A

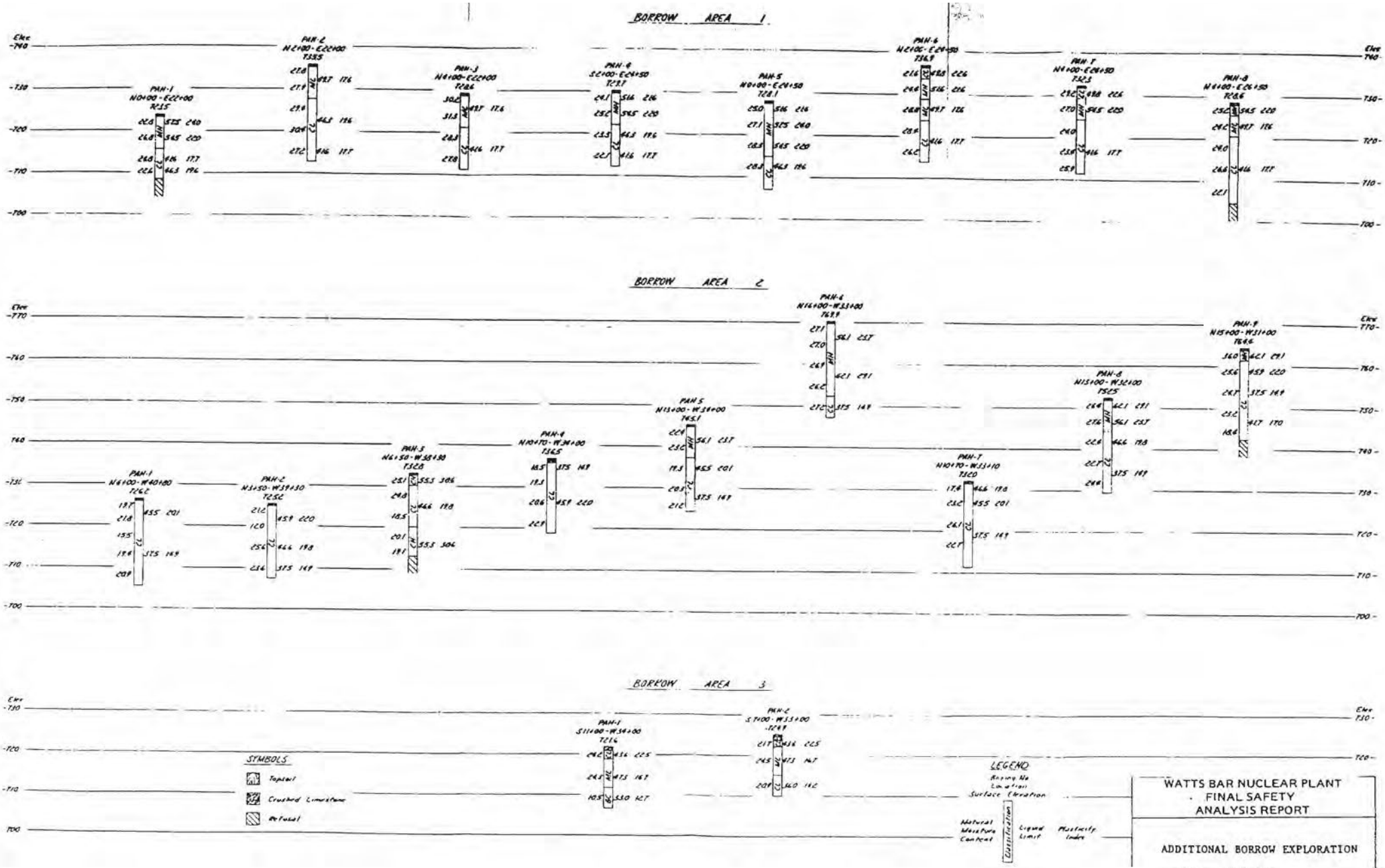


WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

BORROW INVESTIGATION

Figure 2.5-222

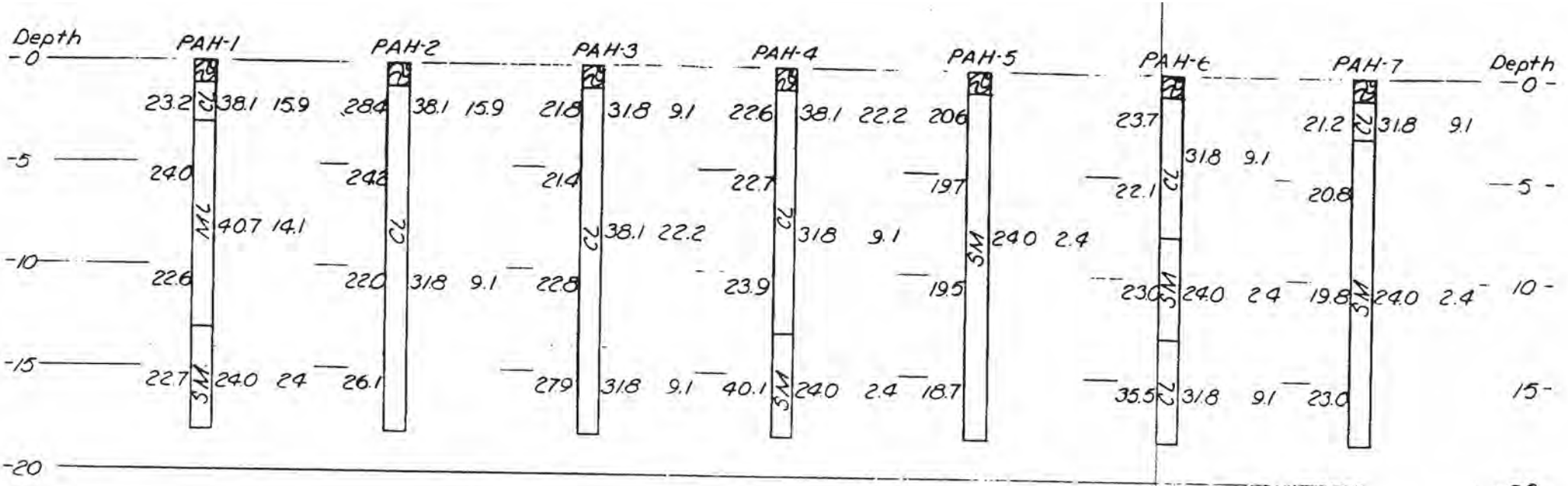
"HISTORICAL INFORMATION"



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

ADDITIONAL BORROW EXPLORATION

Figure 2.5-223



SYMBOLS

Topsoil

LEGEND

Boring No

Classification

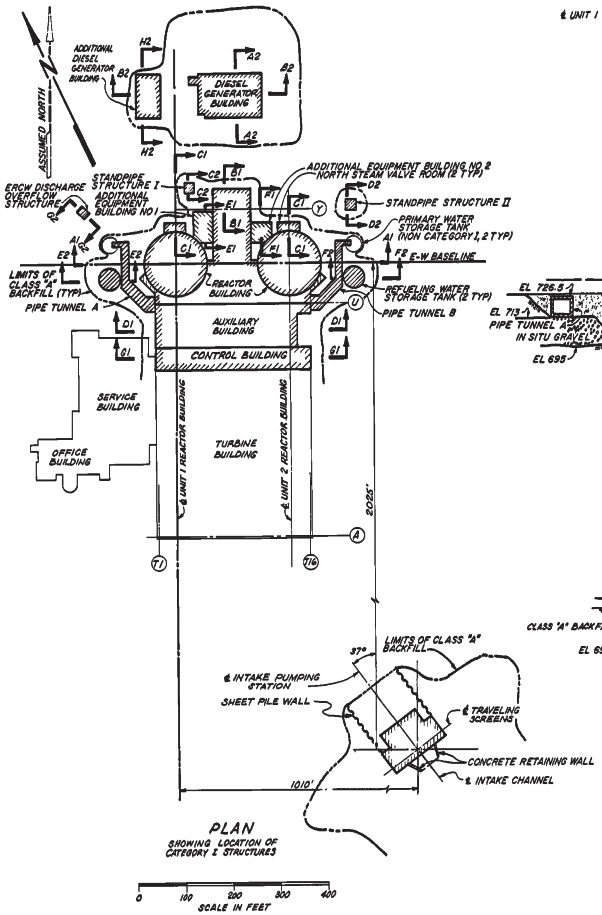
Natural Moisture Content | Liquid Limit | Plasticity Index

"HISTORICAL INFORMATION"

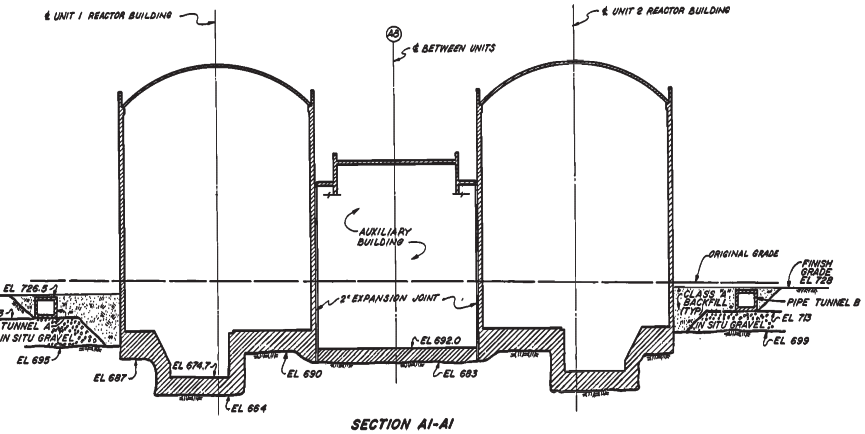
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

ADDITIONAL BORROW AREA 4

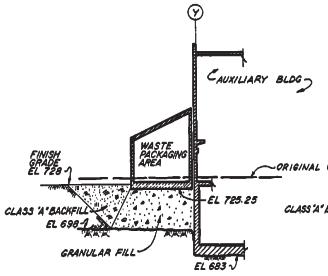
Figure 2.5-224



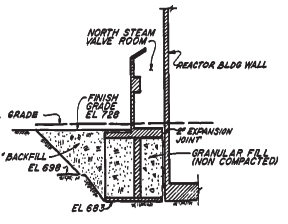
PLAN
SHOWING LOCATION OF CATEGORY I STRUCTURES



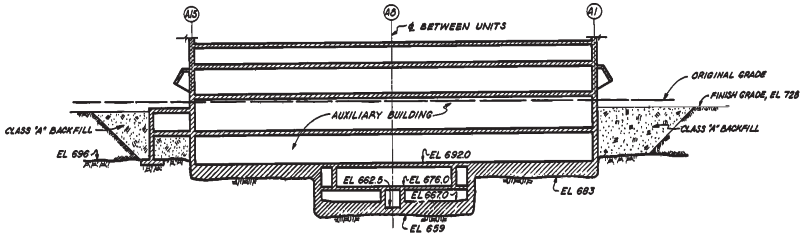
SECTION A1-A1



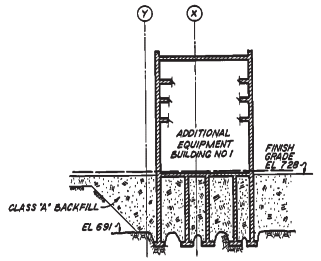
SECTION B1-B1



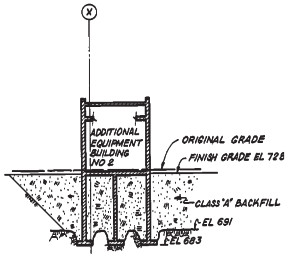
SECTION C1-C1



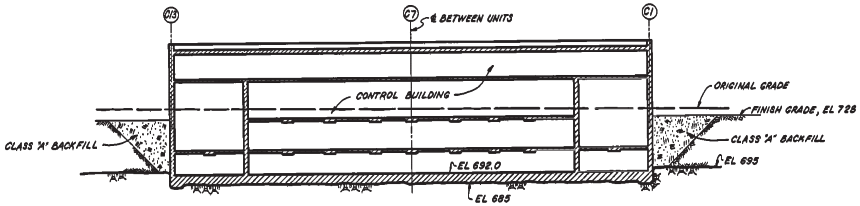
SECTION D1-D1



SECTION E1-E1



SECTION F1-F1



SECTION G1-G1

NOTE A
CLASS "A" BACKFILL AND GRANULAR FILL COMPACTED TO SPECIFICATION UNLESS OTHERWISE NOTED.

0 30 60 90 180
SCALE IN FEET UNLESS NOTED

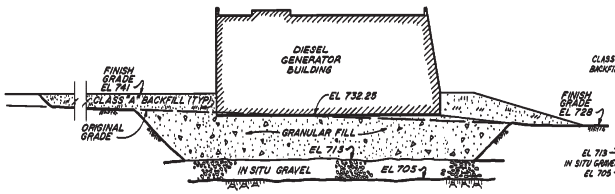
LEGEND:
- CATEGORY I STRUCTURES
- SOUND ROCK
- EXISTING EARTH
- CLASS "A" BACKFILL
- GRANULAR FILL
- IN SITU GRAVEL

COMPANION DRAWINGS:
10W336 & 10W337

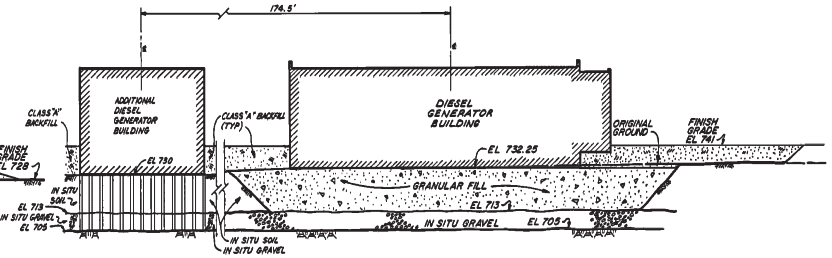
WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

MAIN PLANT
EXCAVATION AND BACKFILL
CATEGORY I STRUCTURES
SHEET 1
TVA DWG NO. 10W335 R4
FIGURE 2.5-225

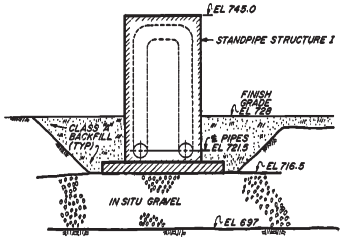
CAD MAINTAINED DRAWING



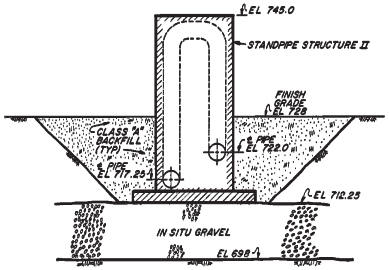
SECTION A2-A2



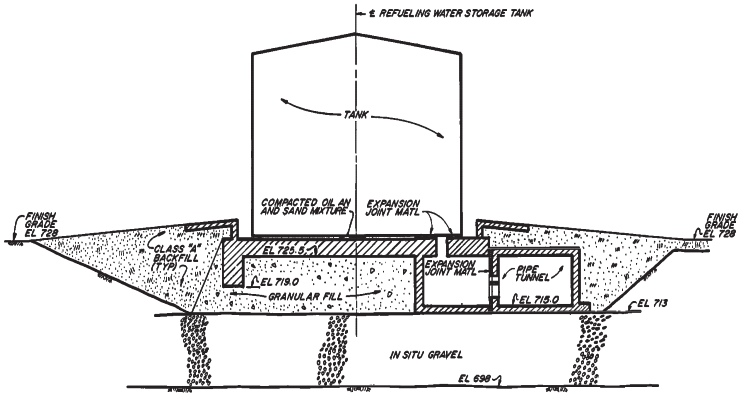
SECTION B2-B2



SECTION C2-C2
NTS

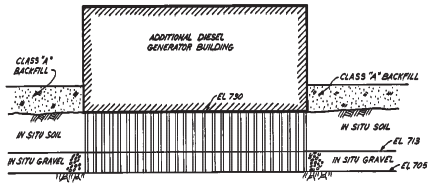


SECTION D2-D2
NTS



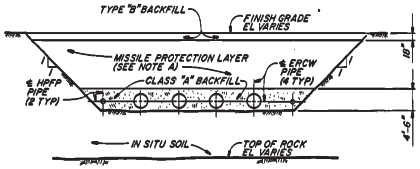
SECTION E2-E2
SECTION F2-F2 (OPP HAND)

1"=10' 0 10 20



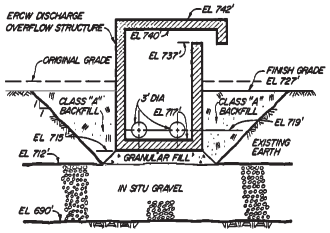
SECTION H2-H2

NOTE:
FOR LEGEND SEE 10W335



TYPICAL SECTION
ERCW AND HPFP PIPING

1"=10' 0 10 20



SECTION G2-G2
NTS

1"=20' 0 20 40

EXCEPT AS NOTED

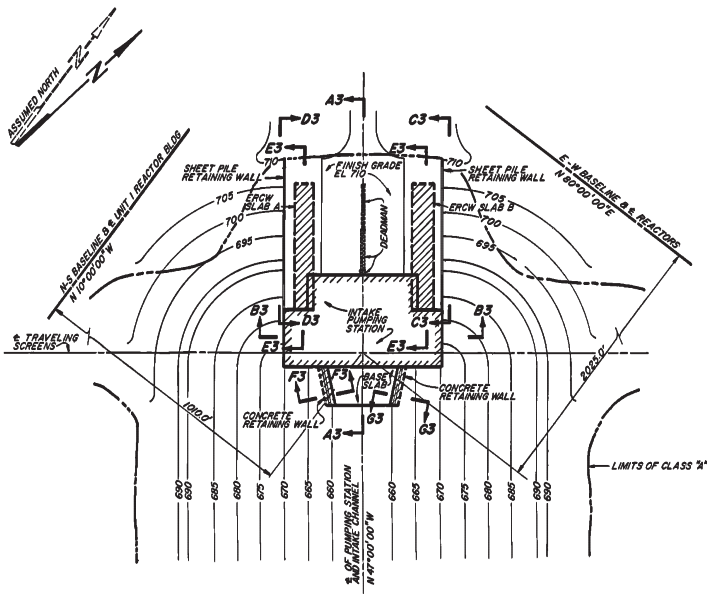
COMPANION DRAWINGS:
10W335 & 10W337

NOTE A:
MISSILE PROTECTION LAYER MAY CONSIST OF: MINIMUM OF 10 FT OF TYPE "B" BACKFILL, 2 FT OF CRUSHED STONE OR 18" THICK CONCRETE SLAB.

WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

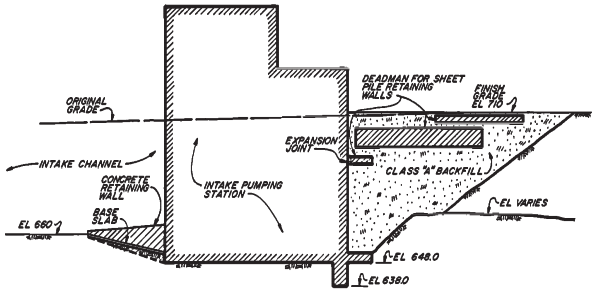
MAIN PLANT
EXCAVATION AND BACKFILL
CATEGORY I STRUCTURES
SHEET 2
TVA DWG NO. 10W336 R4
FIGURE 2.5-226

CAD MAINTAINED DRAWING

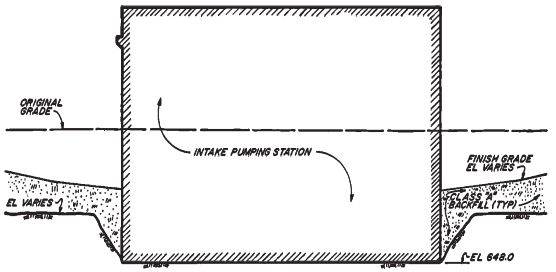


PLAN

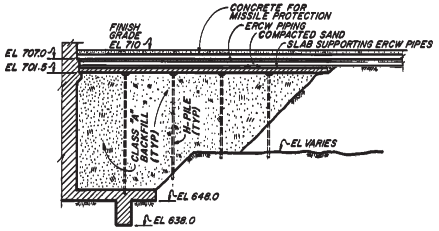
1"=40' 0 40 80



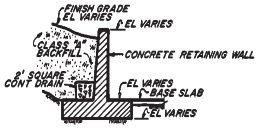
SECTION A3-A3



SECTION B3-B3



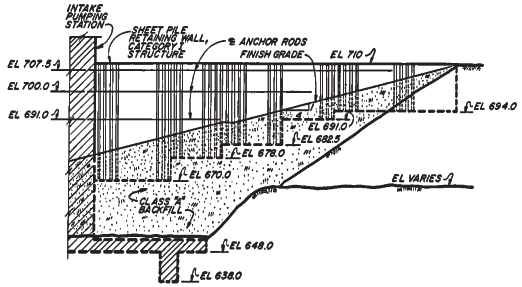
SECTION E3-E3



SECTIONS F3-F3 & G3-G3

NTS

NOTE:
FOR LEGEND SEE 10W335



SECTION C3-C3
SECTION D3-D3 (OPP HAND)

NTS

1"=20' 0 20 40

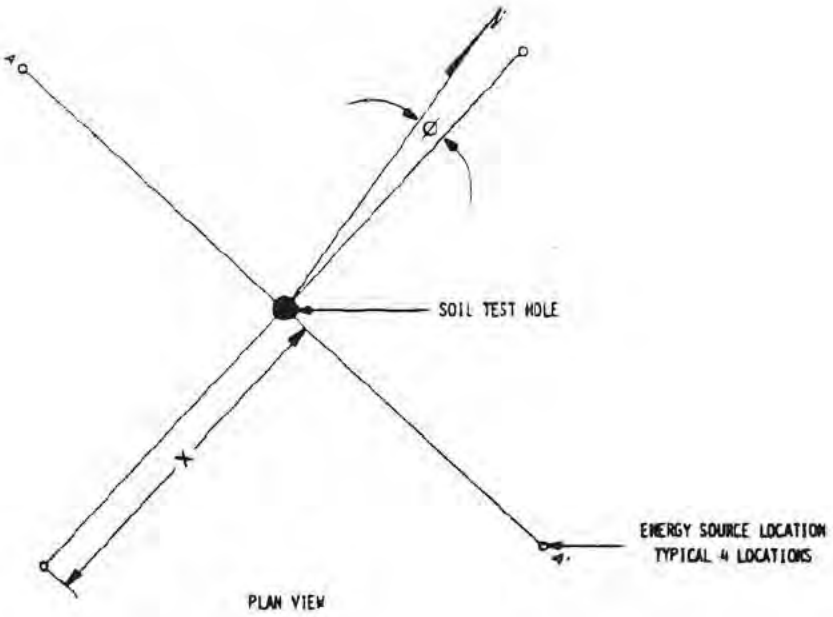
EXCEPT AS NOTED

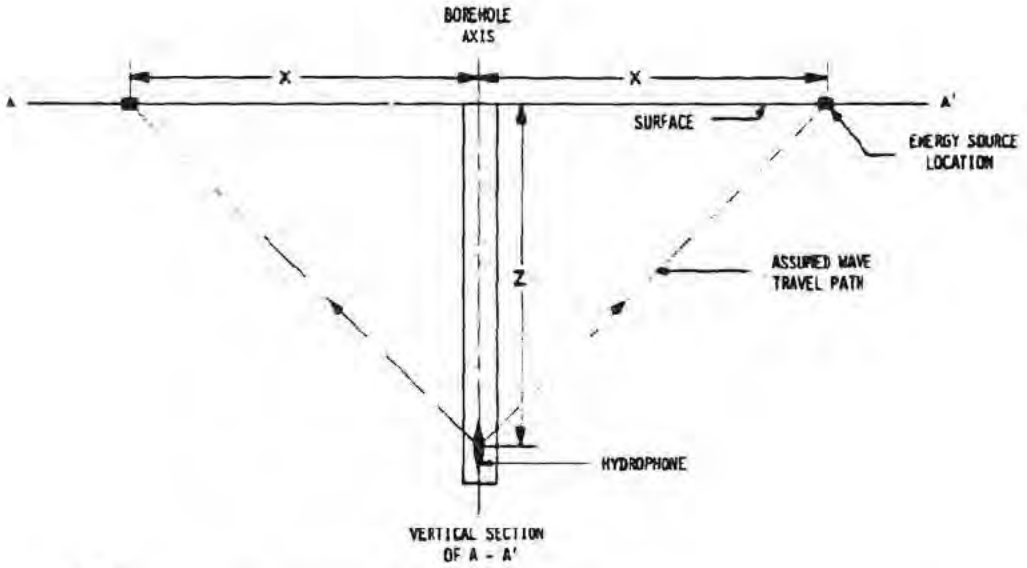
COMPANION DRAWINGS:
10W338 & 10W336

WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

MAIN PLANT
EXCAVATION AND BACKFILL
CATEGORY I STRUCTURES
SHEET 3
TVA DWG NO. 10W337 R2
FIGURE 2.5-226A

CAD MAINTAINED DRAWING





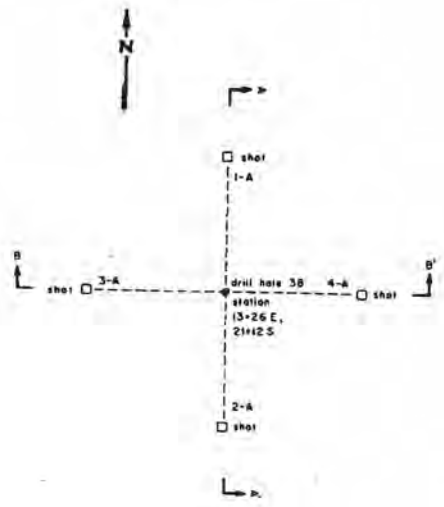
NOTES:

1. THIS DRAWING SHOWS A TYPICAL PLAN VIEW AND VERTICAL SECTION VIEW FOR ALL IN-SITU SOIL DYNAMIC MEASUREMENTS.
2. FOR DRILL HOLE LOCATIONS SEE FIGURE 2.5-185
3. COMPRESSIONAL AND SHEAR WAVES WERE EITHER OBTAINED BY STRIKING A STEEL PLATE WITH A SLEDGEHAMMER OR BY EXPLODING TWO FEET OF PRIMACORD ONE FOOT BELOW GROUND.
4. FOR EACH BOREHOLE EITHER EXPLOSIVES OR SLEDGEHAMMER WAS USED AS THE ENERGY SOURCE. A SINGLE TYPE OF SOURCE WAS USED FOR EACH HOLE, AS CONDITIONS REQUIRED.
5. WHERE POSSIBLE, ENERGY SOURCE LOCATIONS ARE PLACED IN A 90° ARRAY AT HORIZONTAL DISTANCE X FROM BOREHOLE AND ORIENTED NORTH, SOUTH, EAST, AND WEST. OTHERWISE, THE WHOLE ARRAY MAY BE ROTATED ABOUT THE BOREHOLE AXIS BY THE ANGLE ϕ ABOVE.

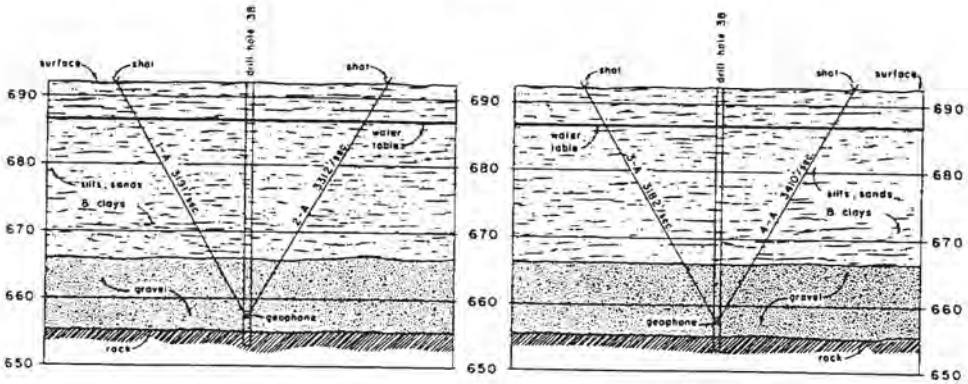
Historical

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

TYPICAL IN-SITU SOIL DYNAMICS
MEASUREMENT LAYOUT & SECTION
Figure 2.5-227

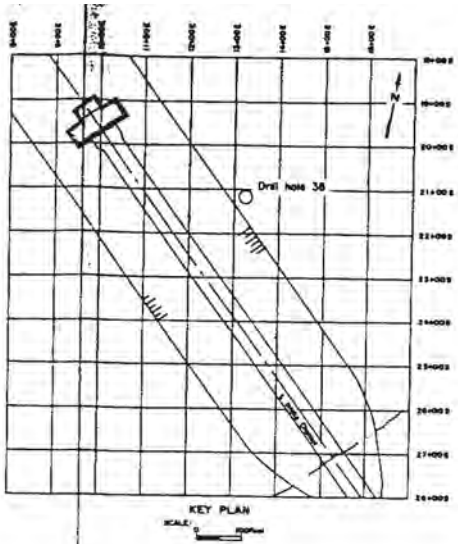


PLAN



SECTION A-A'

SECTION B-B'



Seismic Line Number	Seismic Path Distance (Feet)	Compressional Velocity Ft./Sec. Measured	Shear Velocity Ft./Sec. Calculated	Density Lbs/Cu.Ft. Assumed	Poisson's Ratio Assumed	Dynamic Shear Modulus PSI x 10^3 Calculated	Dynamic Young's Modulus PSI x 10^3 Calculated
1 - A	40.31	3191	962	90	0.45	17.97	52.11
2 - A	40.31	3312	999	90	0.45	19.36	56.13
3 - A	40.31	3182	959	90	0.45	17.87	51.81
4 - A	40.31	3410	1028	90	0.45	20.52	59.50
Average	40.31	3274	987	90	0.45	18.28	54.85

NOTES:

1. The lines on the sections between shot points and geophone locations indicate only the travel direction of compressional waves.

2. The types of soils are based on general soil data obtained from the Construction Services Branch.

4. The equipment used in making the time measurements consisted of a Bison seismograph 1570B and recorder 1540, and a Hall Scars geophone HP-8.

5. Using all 4 seismic lines the shear modulus with a 67% confidence interval is 17.070 psi to 20.180 psi and with a 90% confidence interval it is 16.410 psi to 21.440 psi.

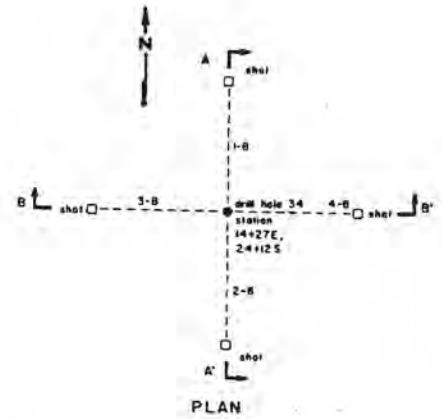
"HISTORICAL INFORMATION"

SCALE: 100 0 100 100 Feet

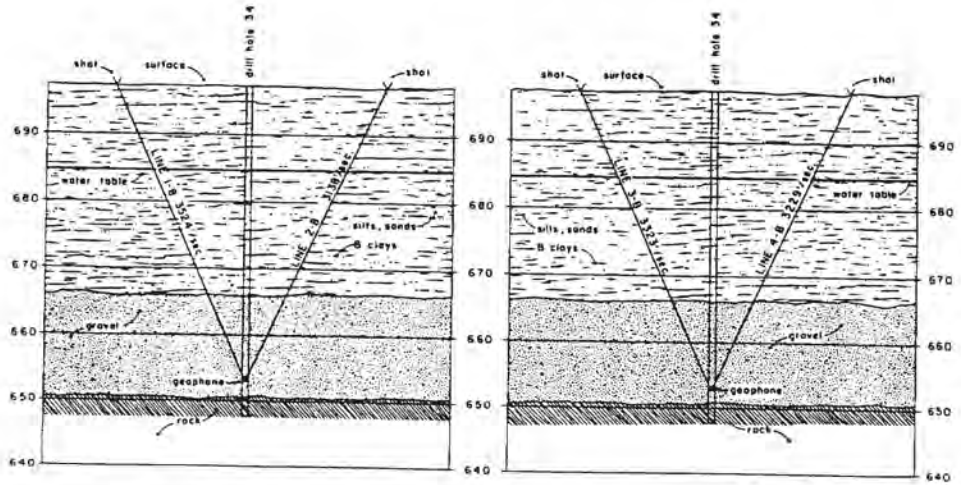
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL DYNAMICS INTAKE CHANNEL
STATION 13+ 26E, 21 + 12S

Figure 2.5-228

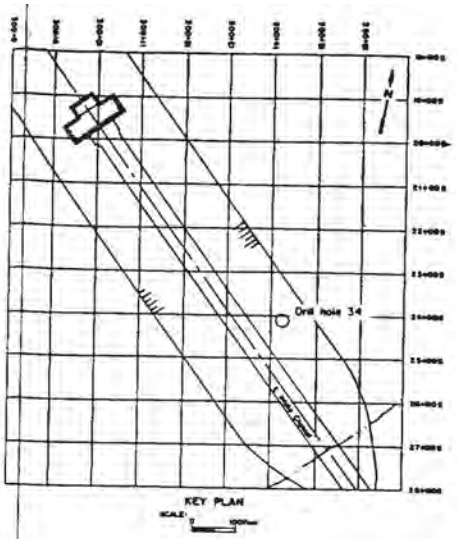


PLAN



SECTION A-A'

SECTION B-B'



Seismic Line Number	Seismic Path Distance (Feet)	Compressional Velocity Ft./Sec. Measured	Shear Velocity Ft./Sec. Calculated	Density Lbs/Cu.Ft. Assumed	Poisson's Ratio Assumed	Dynamic Shear Modulus PSI x 10^3 Calculated	Dynamic Young's Modulus PSI x 10^3 Calculated
1 - B	49.24	3524	1062	90	0.45	21.91	63.55
2 - B	49.24	3138	946	90	0.45	17.38	50.39
3 - B	49.24	3323	1002	90	0.45	19.48	56.51
4 - B	49.24	3229	973	90	0.45	18.39	53.35
Average	49.24	3303	996	90	0.45	19.25	55.83

NOTES:

1. The lines on the sections between shot points and geophone locations indicate only the travel direction of compressional waves.

2. The types of soils are based on general soil data obtained from the Construction Services Branch.

4. The equipment used in making the time measurements consisted of a Bison seismograph 1570B and recorder 1540, and a Hall Sears geophone MP-8.

5. Using all 4 seismic lines the shear modulus with a 67% confidence interval is 17,340 psi to 21,230 psi and with a 90% confidence interval it is 15,390 psi to 23,180 psi.

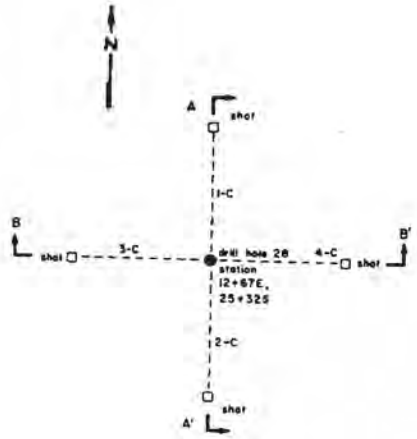
"HISTORICAL INFORMATION"

SCALE:

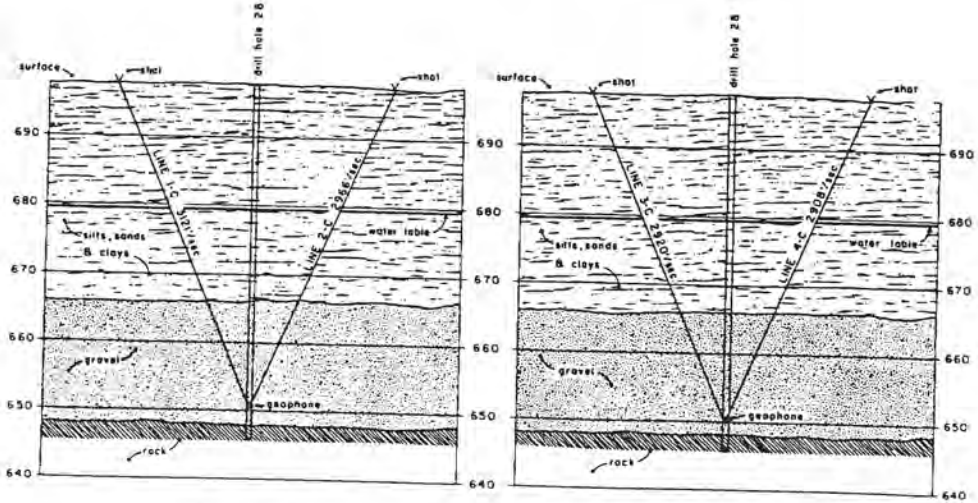
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL DYNAMICS INTAKE CHANNEL
STATION 14 + 27E, 24 + 12S

Figure 2.5-229

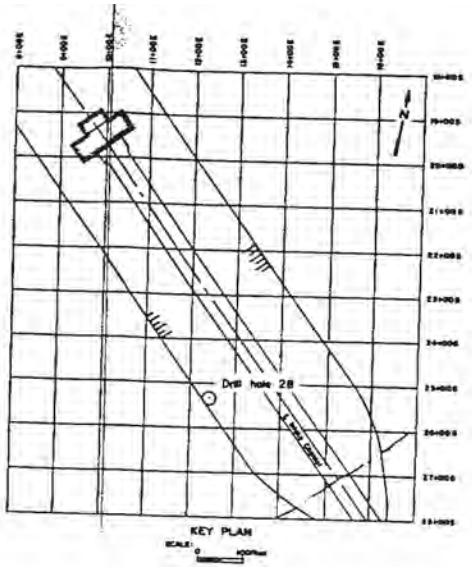


PLAN



SECTION A-A'

SECTION B-B'



SEISMIC LINE NUMBER	SEISMIC PATH DISTANCE (FEET)	COMPRESSIONAL VELOCITY FT./SEC. MEASURED	SHEAR VELOCITY FT./SEC. CALCULATED	DENSITY LBS/CU.FT. ASSUMED	POISSON'S RATIO ASSUMED	DYNAMIC SHEAR MODULUS PSI X 10^3 CALCULATED	DYNAMIC YOUNG'S MODULUS PSI X 10^3 CALCULATED
1 - C	52.0	3121	941	90	0.45	17.19	49.84
2 - C	52.0	2966	894	90	0.45	15.52	45.02
3 - C	52.0	2920	880	90	0.45	15.05	43.63
4 - C	52.0	2908	877	90	0.45	14.92	43.27
AVERAGE	52.0	2979	898	90	0.45	15.66	45.41

NOTES:

1. THE LINES ON THE SECTIONS BETWEEN SHOT POINTS AND GEOPHONE LOCATIONS INDICATE ONLY THE TRAVEL DIRECTION OF COMPRESSIONAL WAVES.

2. THE TYPES OF SOILS ARE BASED ON GENERAL SOIL DATA OBTAINED FROM THE CONSTRUCTION SERVICES BRANCH.

4. THE EQUIPMENT USED IN MAKING THE TIME MEASUREMENTS CONSISTED OF A BISON SEISMOGRAPH 1570B AND RECORDER 1540, AND A HALL SEARS GEOPHONE HP-D.

5. USING ALL 4 SEISMIC LINES THE SHEAR MODULUS WITH A 67% CONFIDENCE INTERVAL IS 14,620 PSI TO 16,710 PSI AND WITH A 90% CONFIDENCE INTERVAL IT IS 13,570 PSI TO 17,760 PSI.

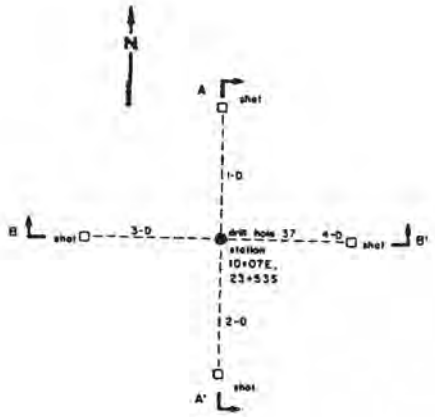
"HISTORICAL INFORMATION"

SCALE: 10 0 10 20 Feet

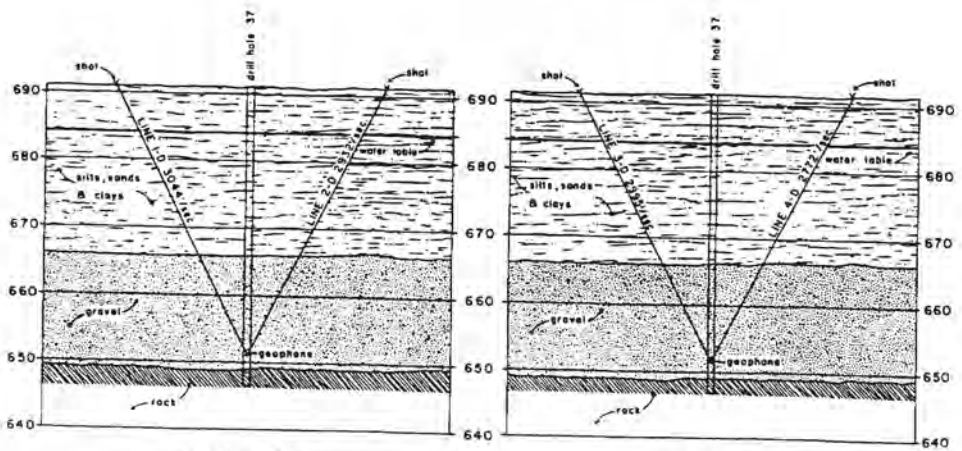
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL DYNAMICS INTAKE CHANNEL
STATION 12 + 67E, 25 + 32S

Figure 2.5-230

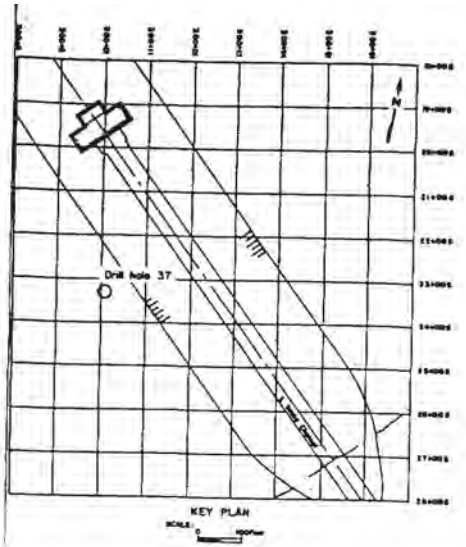


PLAN



SECTION A-A'

SECTION B-B'



Seismic Line Number	Seismic Path Distance (Feet)	Compressional Velocity Ft./Sec. Measured	Shear Velocity Ft./Sec. Calculated	Density Lbs/Cu.Ft. Assumed	Poisson's Ratio Assumed	Dynamic Shear Modulus psi x 10^3 Calculated	Dynamic Young's Modulus psi x 10^3 Calculated
1 - D	44.72	3048	918	90	0.45	16.35	47.42
2 - D	44.72	2932	884	90	0.45	15.17	43.99
3 - D	44.72	2995	903	90	0.45	15.83	45.90
4 - D	44.72	2772	836	90	0.45	13.56	39.32
Average	44.72	2936	885	90	0.45	15.21	44.11

NOTES:

1. The lines on the sections between shot points and geophone locations indicate only the travel direction of compressional waves.

2. The types of soils are based on general soil data obtained from the Construction Services Branch.

4. The equipment used in making the time measurements consisted of a Bison seismograph 1570B and recorder 1540, and a Hall Sears geophone MP-8.

5. Using all 4 seismic lines the shear modulus with a 67% confidence interval is 14,010 psi to 16,430 psi and with a 90% confidence interval it is 12,800 psi to 17,650 psi.

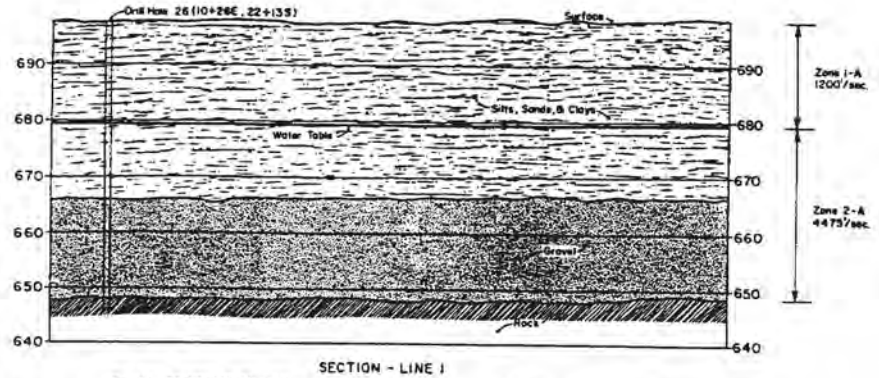
"HISTORICAL INFORMATION"

SCALE:

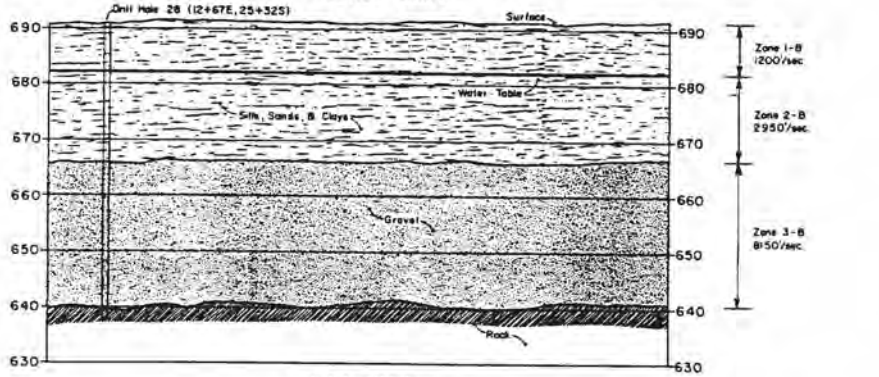
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL DYNAMICS INTAKE CHANNEL
STATION 10 + 07E, 23 + 53S

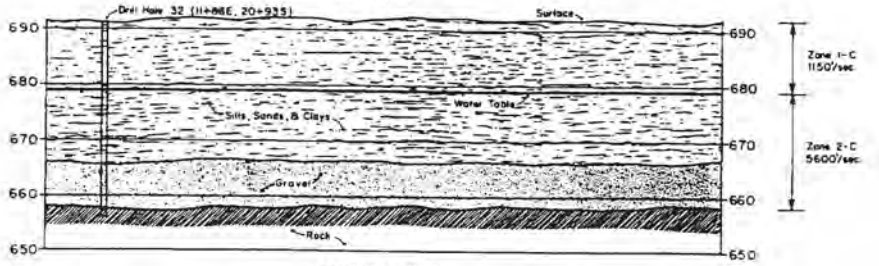
Figure 2.5-231



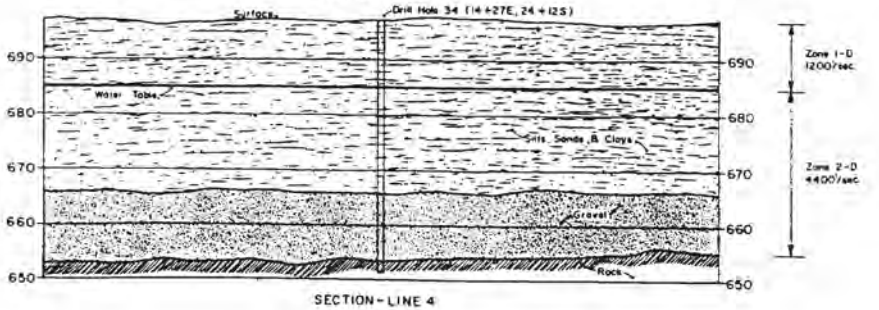
SECTION - LINE 1



SECTION - LINE 2



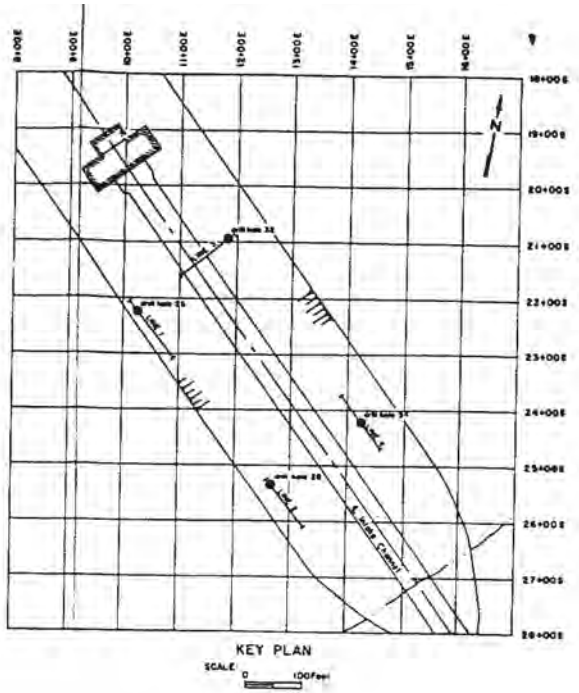
SECTION - LINE 3



SECTION - LINE 4

NOTES:

1. THE TYPES OF SOILS ARE BASED ON GENERAL SOIL DATA OBTAINED FROM THE CONSTRUCTION SERVICES BRANCH.
2. THE EQUIPMENT USED IN MAKING THE REFRACTION SURVEY CONSISTED OF A BISON SEISMOGRAPH 1570B AND RECORDER 1540.
3. THE REFRACTED COMPRESSIONAL VELOCITY OF 8150'/SEC. FOR LINE 2 IS ABNORMALLY HIGH FOR SATURATED GRAVELS. THIS VELOCITY IS NOT COMPATABLE WITH THE UP-HOLE SEISMIC VELOCITY MEASUREMENTS AND DOES NOT COMPARE FAVORABLE WITH LINES 1, 3 AND 4.
4. THE SOIL VELOCITIES BELOW THE WATER TABLE DO NOT DIFFERENTIATE BETWEEN SILTS AND GRAVELS. THIS MAY BE THE RESULT OF THE GRADATIONAL NATURE OF THE SOIL.
5. REFRACTED SHEAR VELOCITIES FOR ZONES 1 AND 2 ALONG LINES 1, 3 AND 4 WERE OBTAINED.
6. THE REFRACTION SEISMIC LINES WERE SURVEYED IN TWO DIRECTIONS WITH APPARENT VELOCITIES BEING AVERAGED FOR EACH LINE.



KEY PLAN

SCALE: 0 100 Feet

SEISMIC REFRACTION LINES
SOIL DYNAMIC PROPERTIES

Seismic Refraction Line	Velocity Zones Elevations	Compressional Velocity Ft./sec. Measured	Shear Velocity Ft./sec.	Density Lbs./cu. ft. Assumed	Poisson's Ratio Calculated	Dynamic Shear Modulus psi x 10^3 Calculated	Dynamic Young's Modulus psi x 10^3 Calculated
Line 1	697 - 679	1200	545 measured	90	0.37	5.77	15.80
	679 - 648	4750	1130 measured	90	0.46	32.44	94.72
Line 2	691 - 682	1200	545 calculated	90	0.37	5.77	15.80
	682 - 666	2950	803 calculated	90	0.46	12.51	36.54
	666 - 640	8150	2218 calculated	90	0.46	95.50	278.86
Line 3	691 - 679	1150	522 measured	90	0.37	5.29	14.51
	679 - 658	5600	1524 measured	90	0.46	45.09	131.66
Line 4	697 - 685	1200	545 measured	90	0.37	5.77	15.80
	685 - 654	4400	1150 measured	90	0.46	25.67	75.13

DYNAMIC SHEAR MODULUS
SEISMIC LINES 1, 3 AND 4
STANDARD DEVIATION

ZONE	67% CONFIDENCE INTERVAL psi x 10^3	90% CONFIDENCE INTERVAL psi x 10^3	AVERAGE psi x 10^3
1	5.53 to 5.88	5.05 to 6.16	5.81
2	9.85 to 24.54	14.68 to 54.11	34.40

"HISTORICAL INFORMATION"

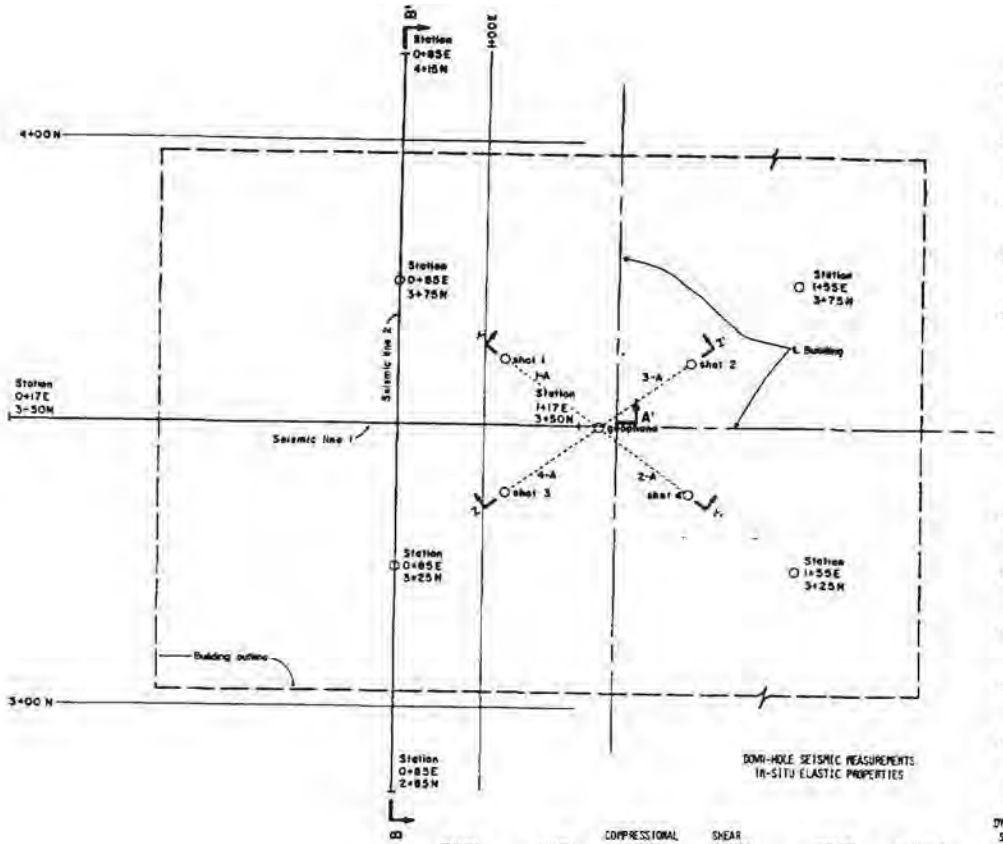
SCALE:

10 0 10 20 Feet

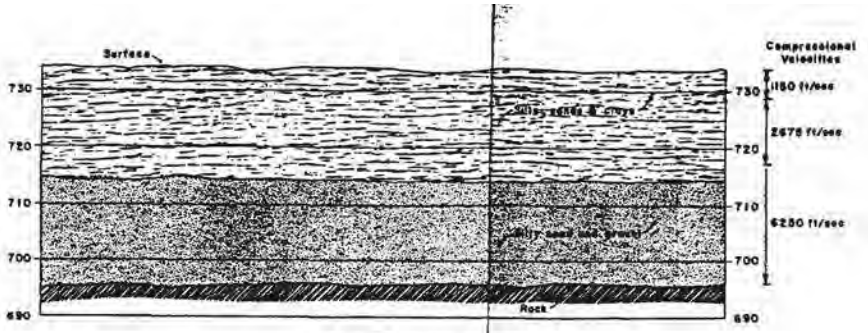
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SEISMIC REFRACTION DYNAMIC PROPERTIES INTAKE CHANNEL

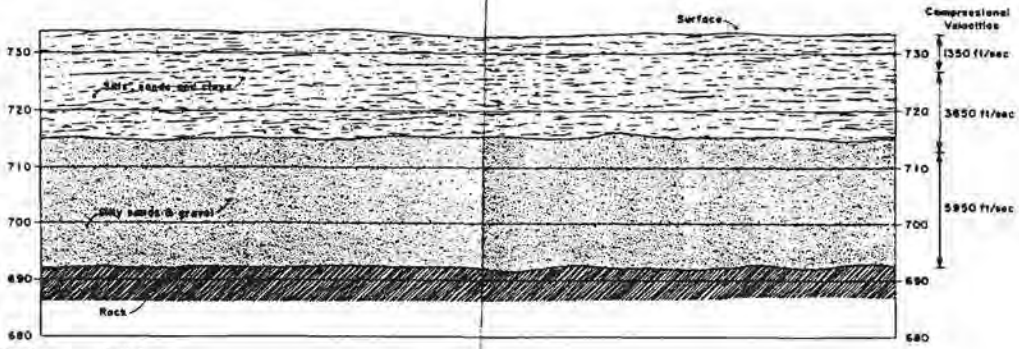
Figure 2.5-232



DOWN-HOLE SEISMIC MEASUREMENTS
IN-SITU ELASTIC PROPERTIES



SECTION A-A'

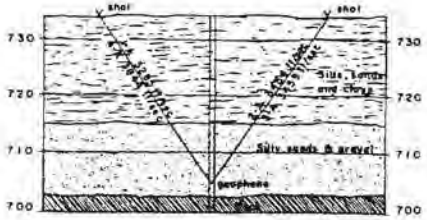


SECTION B-B'

SEISMIC LINE NUMBER	SEISMIC PATH DISTANCE (feet)	COMPRESSIONAL VELOCITY FT./SEC. MEASURED	SHEAR VELOCITY FT./SEC CALCULATED	DENSITY Lbs./Cu. Ft. ASSUMED	POISSON'S RATIO ASSUMED	DYNAMIC SHEAR MODULUS PSI x 10^3 CALCULATED	DYNAMIC YOUNG'S MODULUS PSI x 10^3 CALCULATED
1 - A	36.06	3205	966	90	0.45	18.13	52.56
2 - A	36.06	3458	1035	90	0.45	20.81	60.34
3 - A	36.06	3358	1011	90	0.45	19.85	57.56
4 - A	36.06	3844	1159	90	0.45	25.07	75.61
AVERAGE	36.06	3458	1042	90	0.45	21.11	61.23

NOTES:

1. THE TYPES OF SOILS ARE BASED ON GENERAL SOIL DATA OBTAINED FROM CONSTRUCTION SERVICES BRANCH.
2. THE EQUIPMENT USED IN MAKING THE REFRACTION SURVEY CONSISTED OF A BISON SEISMOGRAPH 1570B AND RECORDER 1540.
3. THE WATER TABLE FOR THE SEISMIC LINES WAS NOT RECORDED.
4. THE REFRACTION SEISMIC LINES WERE SURVEYED IN TWO DIRECTIONS WITH APPARENT VELOCITIES BEING AVERAGED FOR EACH LINE.



SECTIONS Y-Y' & Z-Z'

STANDARD DEVIATION
DOWN-HOLE SEISMIC MEASUREMENTS
DYNAMIC SHEAR MODULUS PSI x 10^3

67% CONFIDENCE INTERVAL	90% CONFIDENCE INTERVAL
17.79 to 24.63	16.37 to 28.05

SCALE:

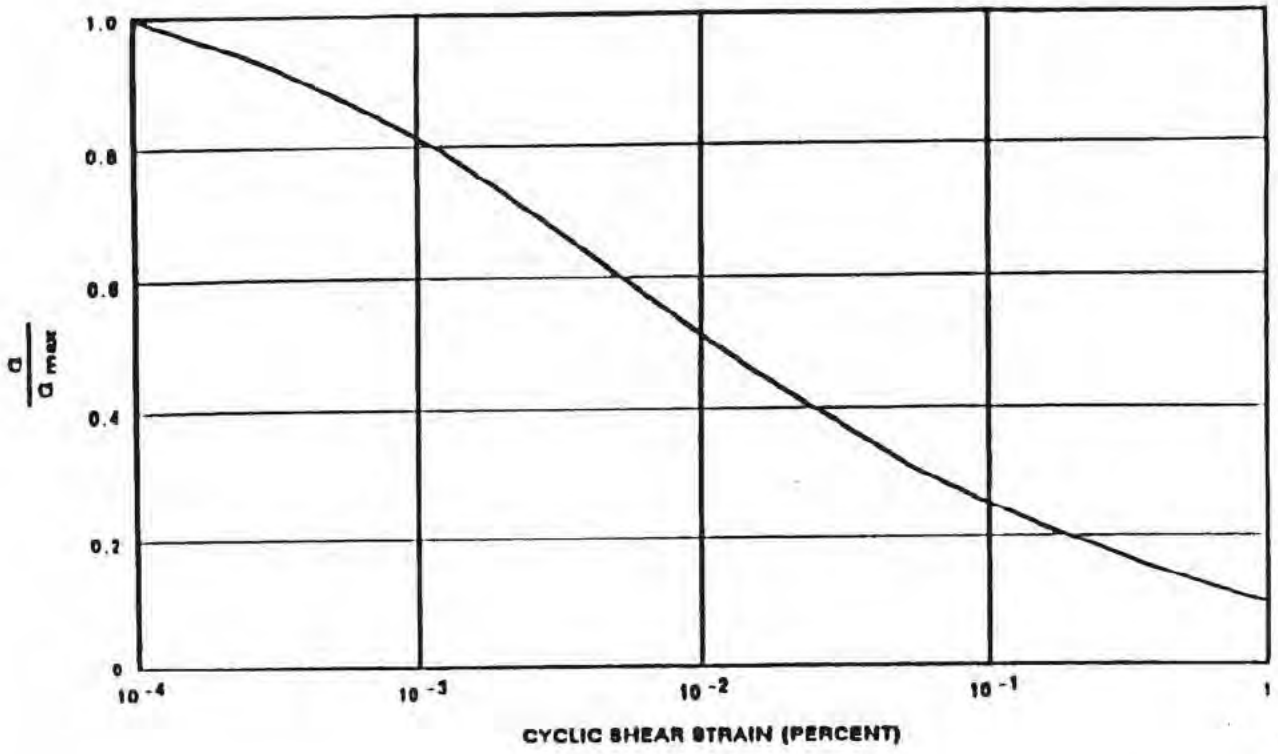
10 0 10 20 Feet

SEISMIC REFRACTION LINES
IN-SITU DYNAMIC PROPERTIES

SEISMIC REFRACTION LINE	VELOCITY ZONES ELEVATIONS	COMPRESSIONAL VELOCITY FT./SEC. MEASURED	SHEAR VELOCITY FT./SEC.	DENSITY Lbs./Cu. Ft. ASSUMED	POISSON'S RATIO CALCULATED	DYNAMIC SHEAR MODULUS PSI x 10^3 CALCULATED	DYNAMIC YOUNG'S MODULUS PSI x 10^3 CALCULATED
1	734 to 729	1150	552 CALCULATED	90	0.35	5.97	15.99
	729 to 717	2675	1176 CALCULATED	90	0.38	26.88	74.19
	717 to 697	6250	1701 CALCULATED	90	0.46	56.16	163.99
2	734 to 727	1350	695 MEASURED	90	0.35	8.08	21.84
	727 to 713	3650	1587 MEASURED	90	0.38	48.89	135.26
	713 to 692	5950	1619 CALCULATED	90	0.46	50.90	148.69

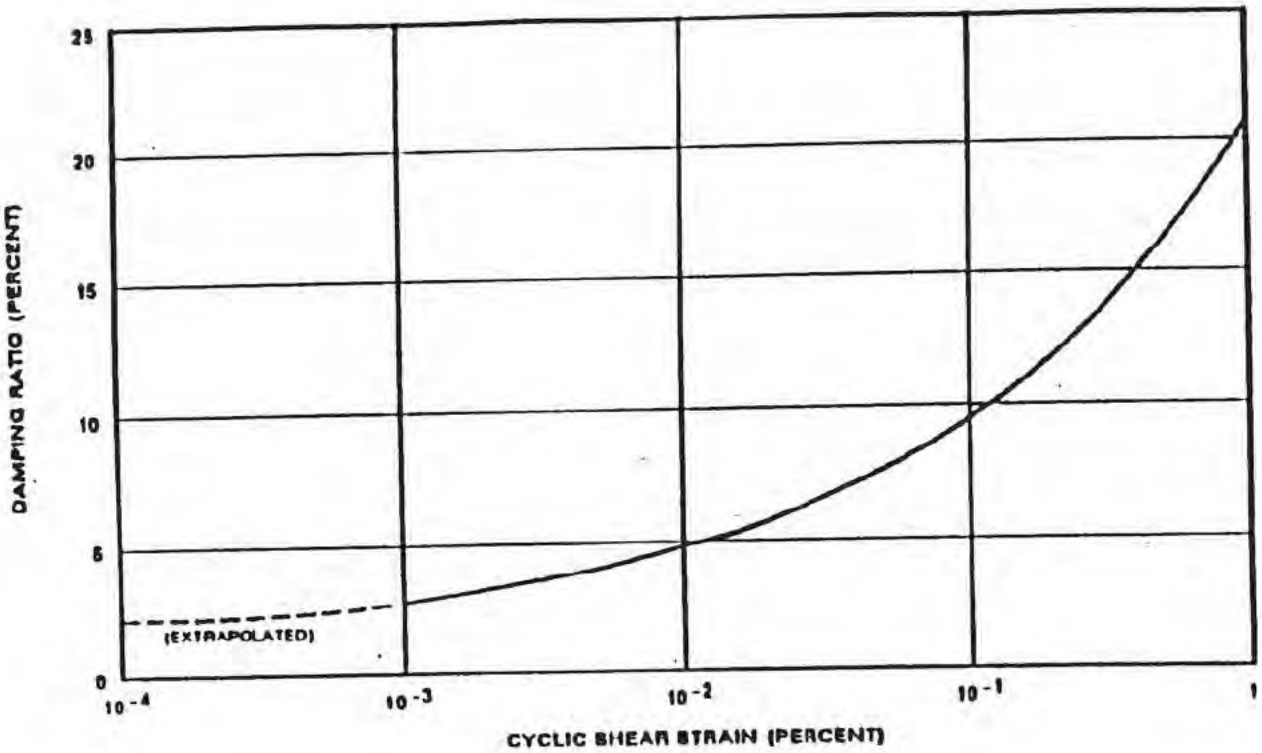
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL DYNAMICS DEISEL GENERATOR
BUILDING DOWN HOLE SEISMIC & REFRACTION MEASUREMENT
Figure 2.5-233



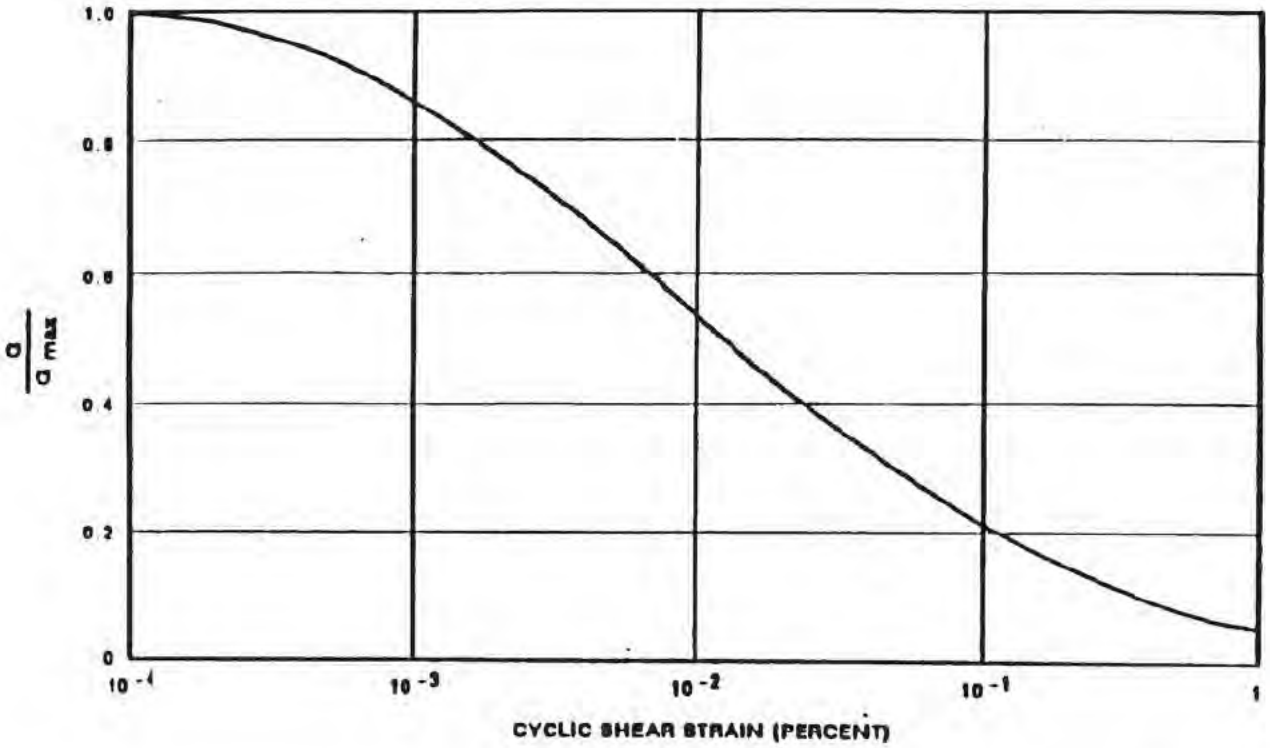
HISTORICAL

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
CLASS A BACKFILL SHEAR MODULUS REDUCTION WITH SHEAR STRAIN
Figure 2.5-233A



HISTORICAL

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
CLASS A BACKFILL DAMPING RATIO VARIATION WITH SHEAR STRAIN
Figure 2.5-233B



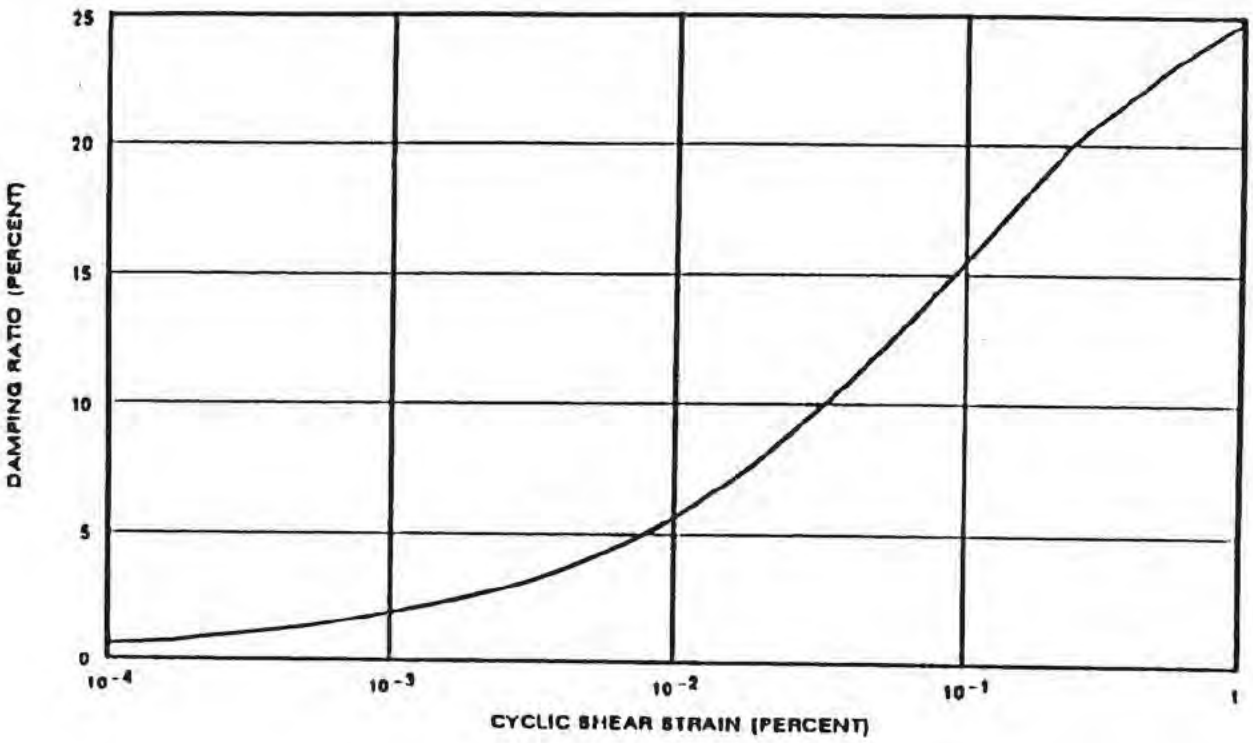
HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

CRUSHED STONE BACKFILL

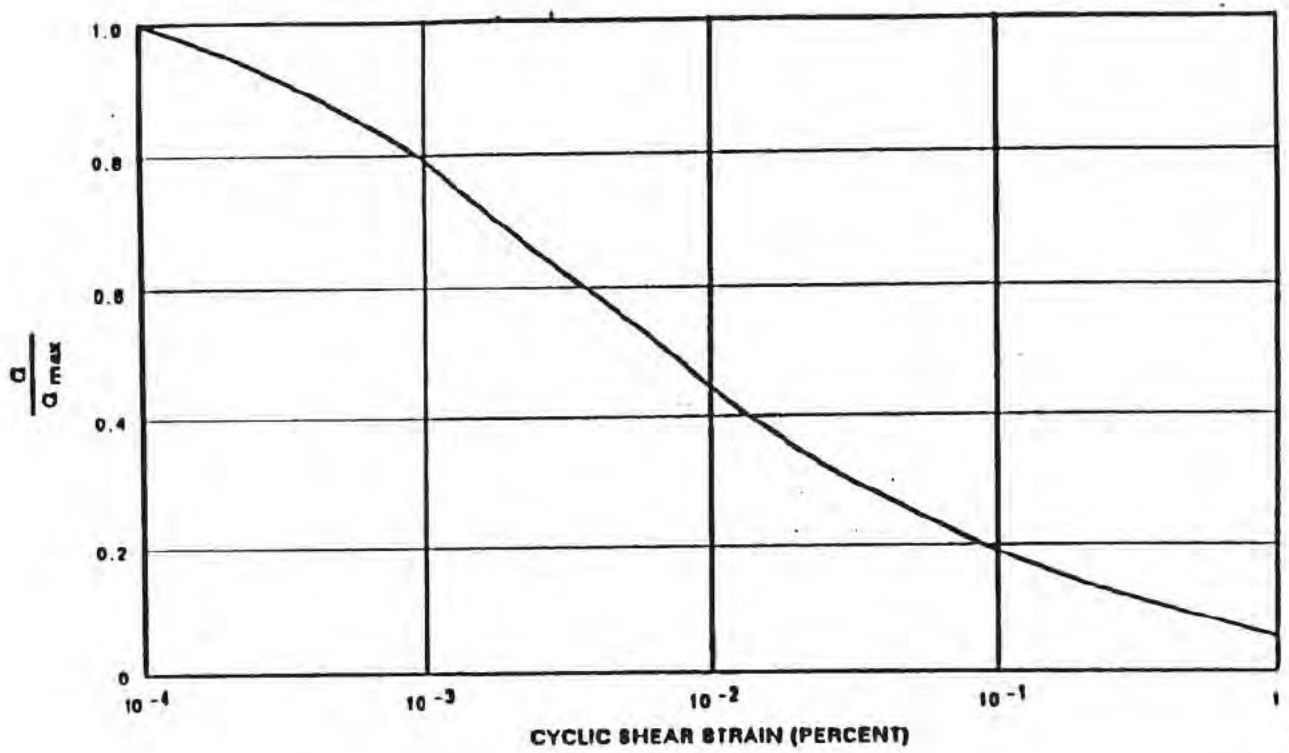
SHEAR MODULUS REDUCTION
WITH SHEAR STRAIN

Figure 2.5-233C



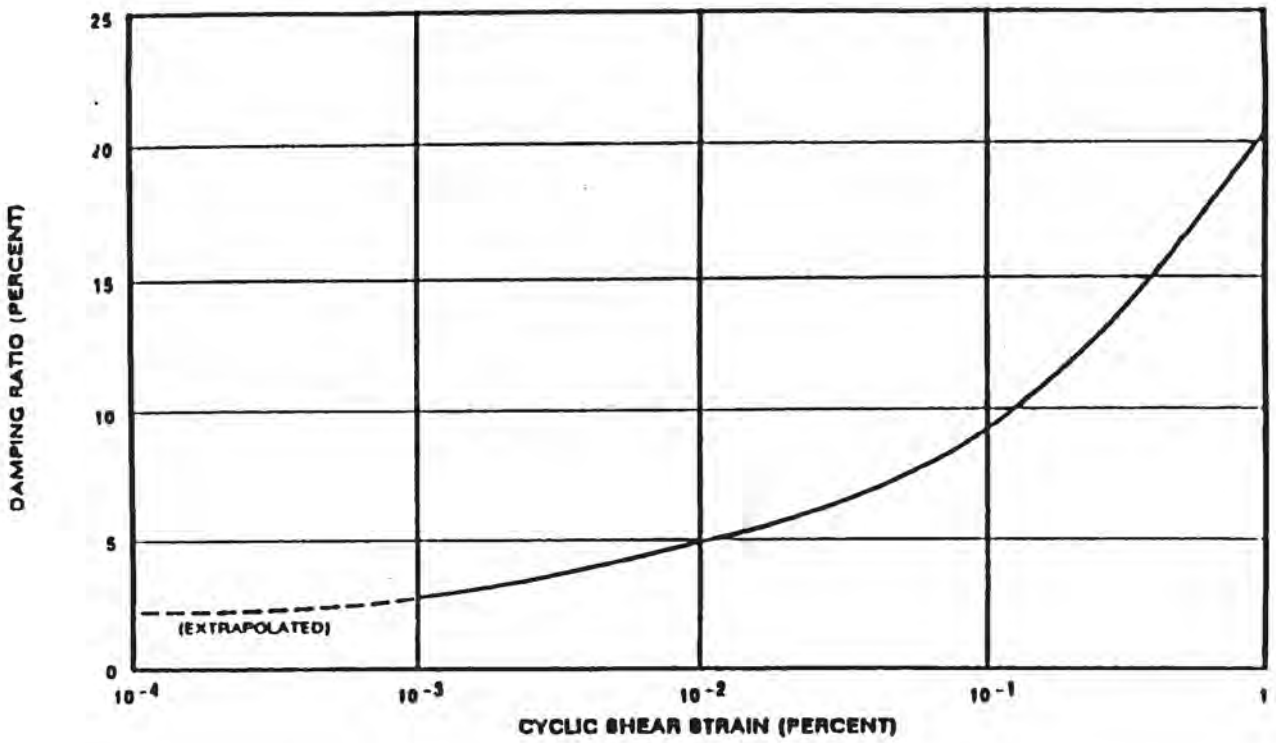
HISTORICAL

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
CRUSHED STONE BACKFILL DAMPING RATIO VARIATION WITH SHEAR STRAIN
Figure 2.5-233D



HISTORICAL

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
IN SITU COHESIVE SOILS SHEAR MODULUS REDUCTION WITH SHEAR STRAIN
Figure 2.5-233B

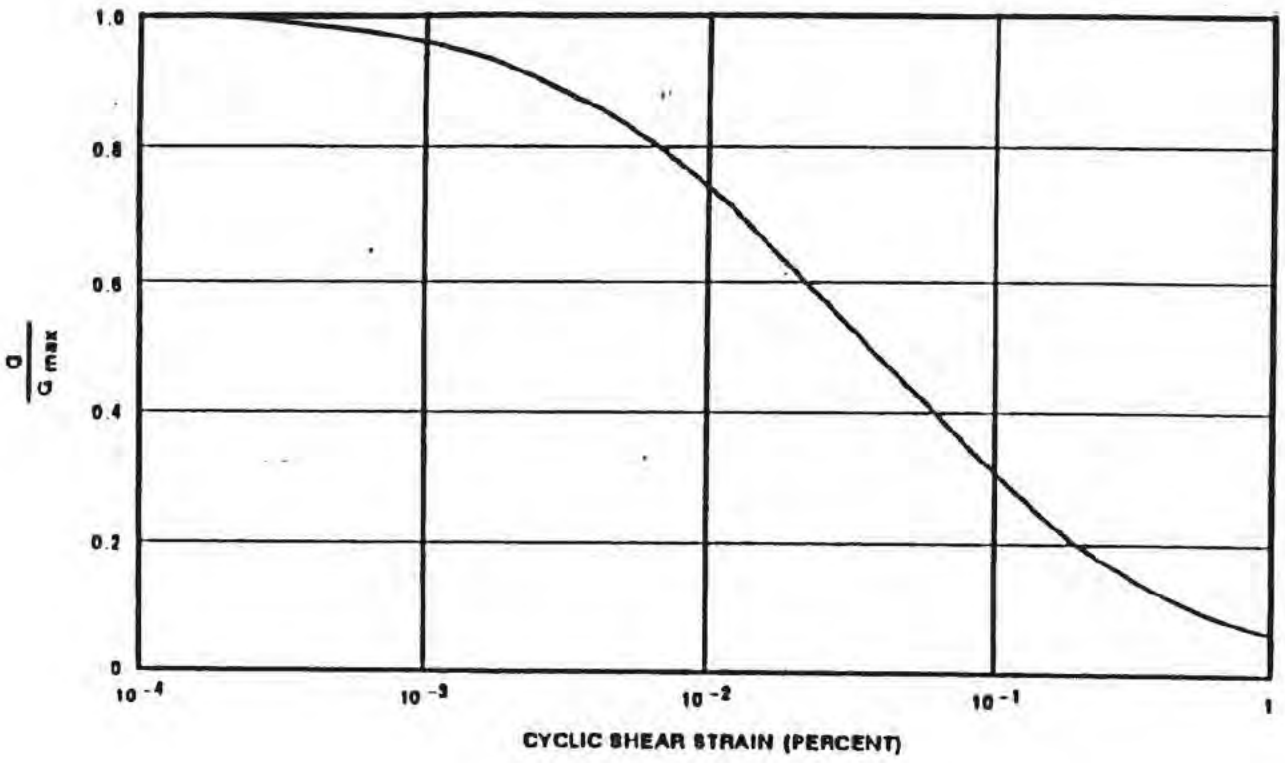


WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

IN SITU COHESIVE SOILS

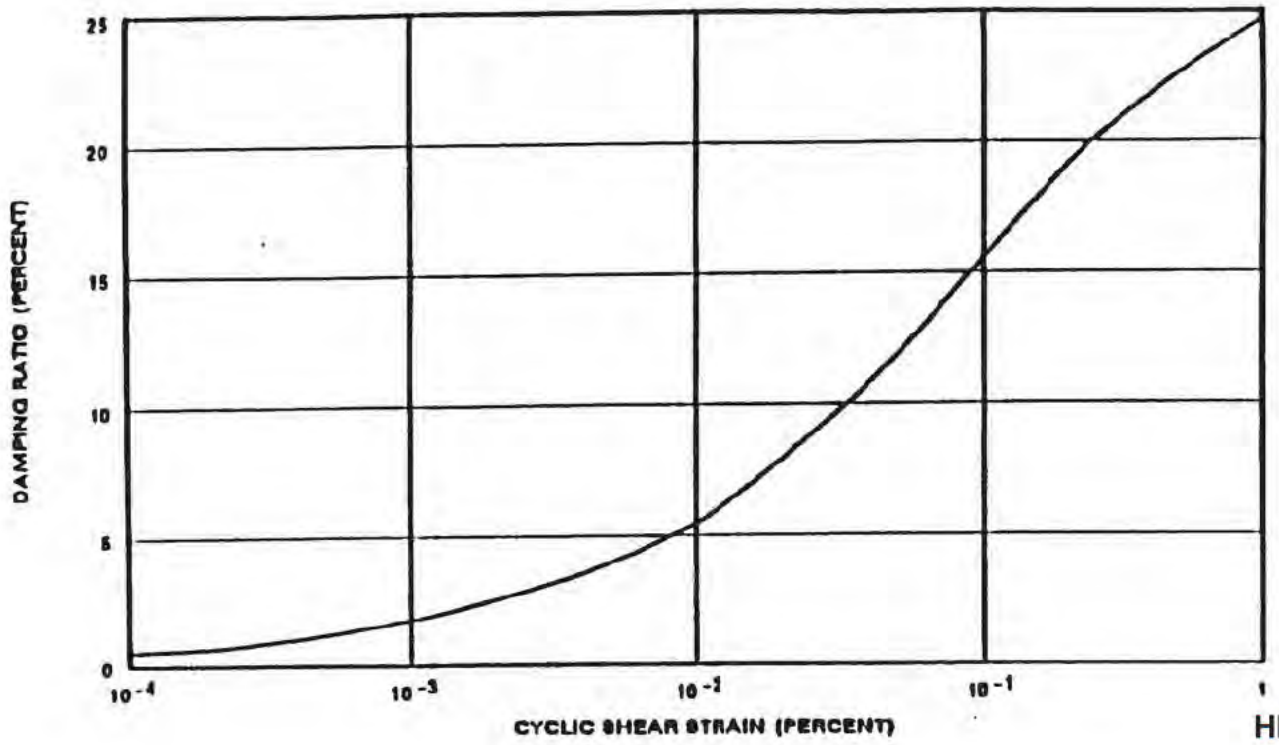
DAMPING RATIO VARIATION
WITH SHEAR STRAIN

Figure 2.5-233F



HISTORICAL

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
NON-PLASTIC IN SITU SOIL SHEAR MODULUS REDUCTION WITH SHEAR STRAIN
Figure 2.5-233D



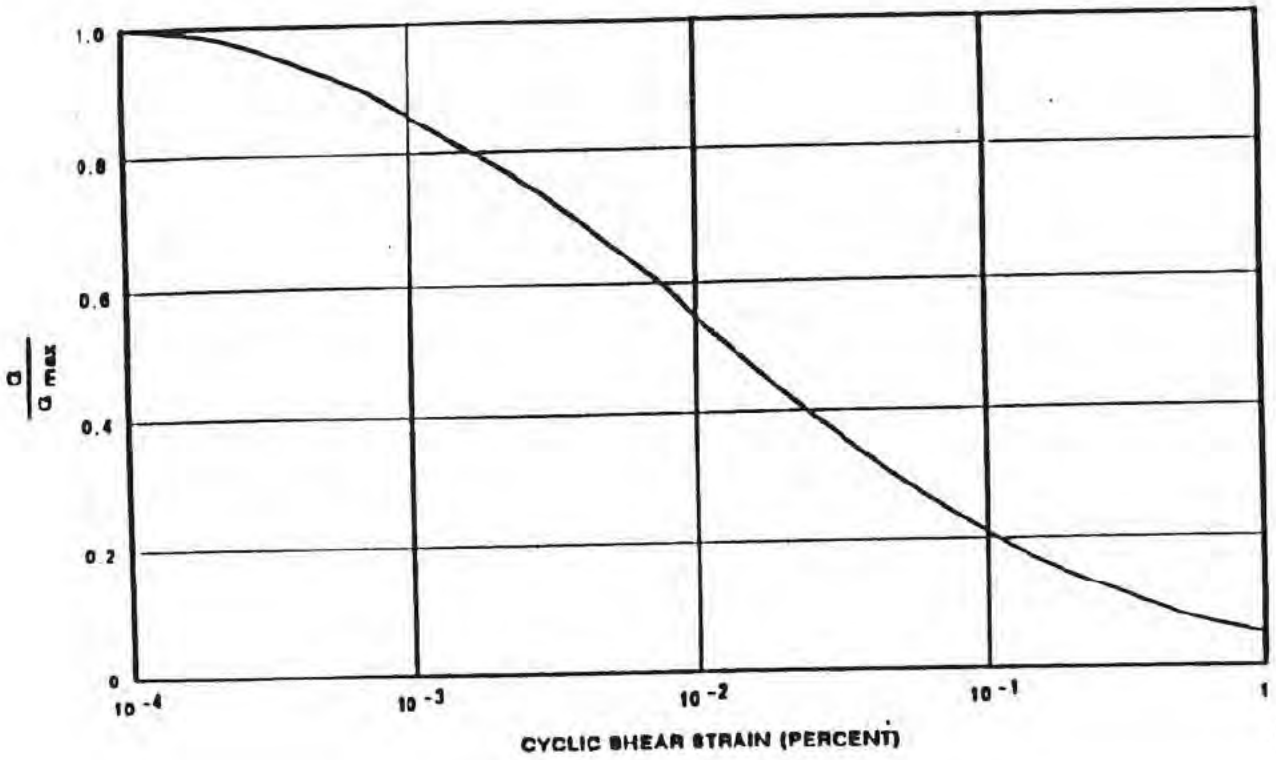
HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

NON-PLASTIC IN SITU SOILS

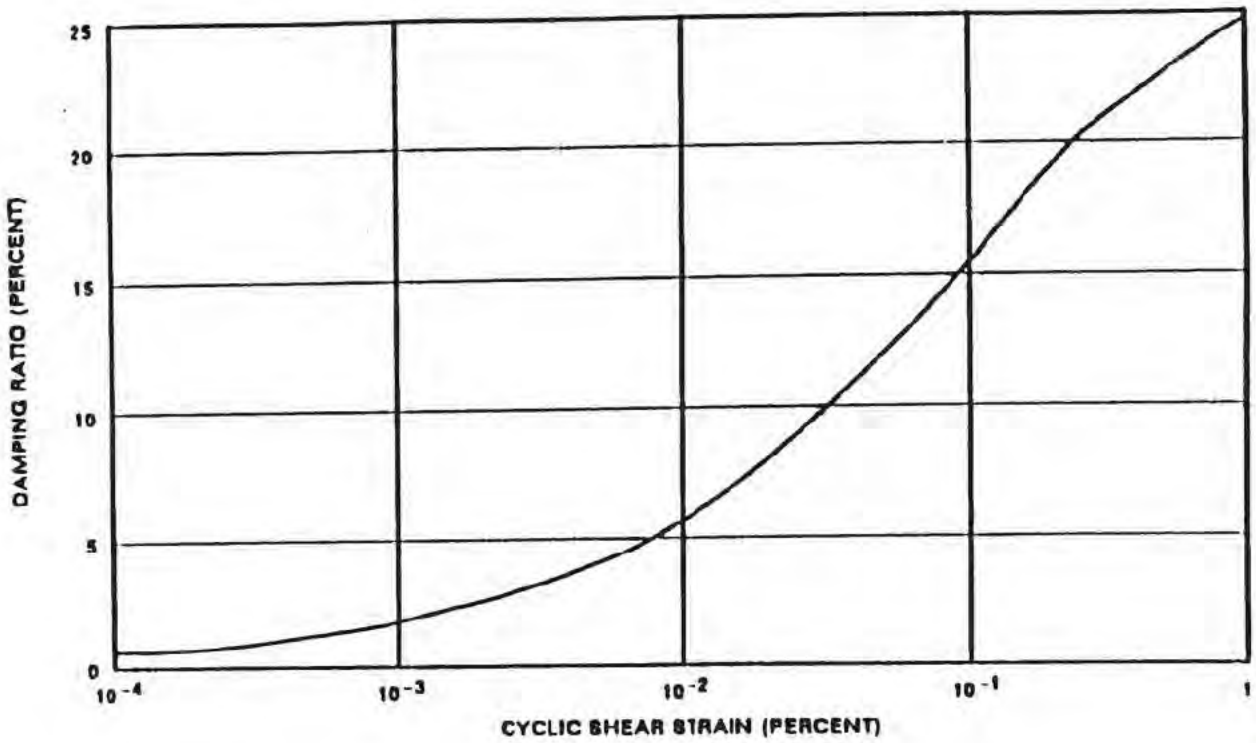
DAMPING RATIO VARIATION
WITH SHEAR STRAIN

Figure 2.5-233H



HISTORICAL

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
BASAL GRAVEL SHEAR MODULUS REDUCTION WITH SHEAR STRAIN
Figure 2.5-233I



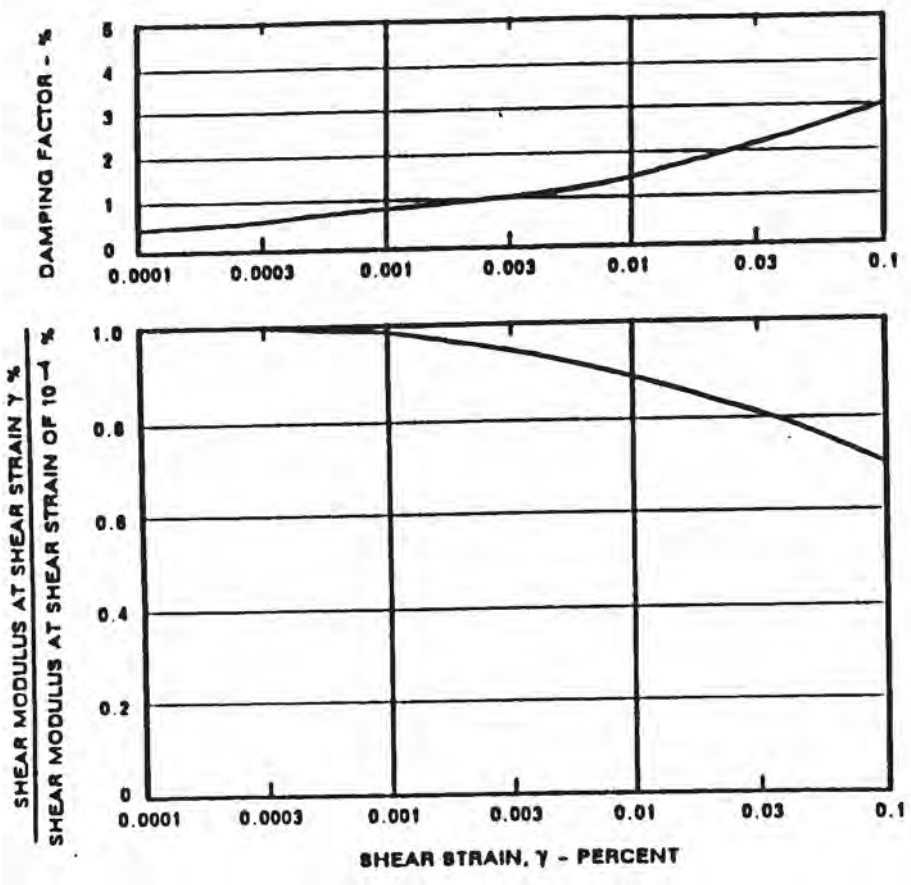
HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

BASAL GRAVEL

DAMPING RATIO VARIATION
WITH SHEAR STRAIN

Figure 2.5-233J

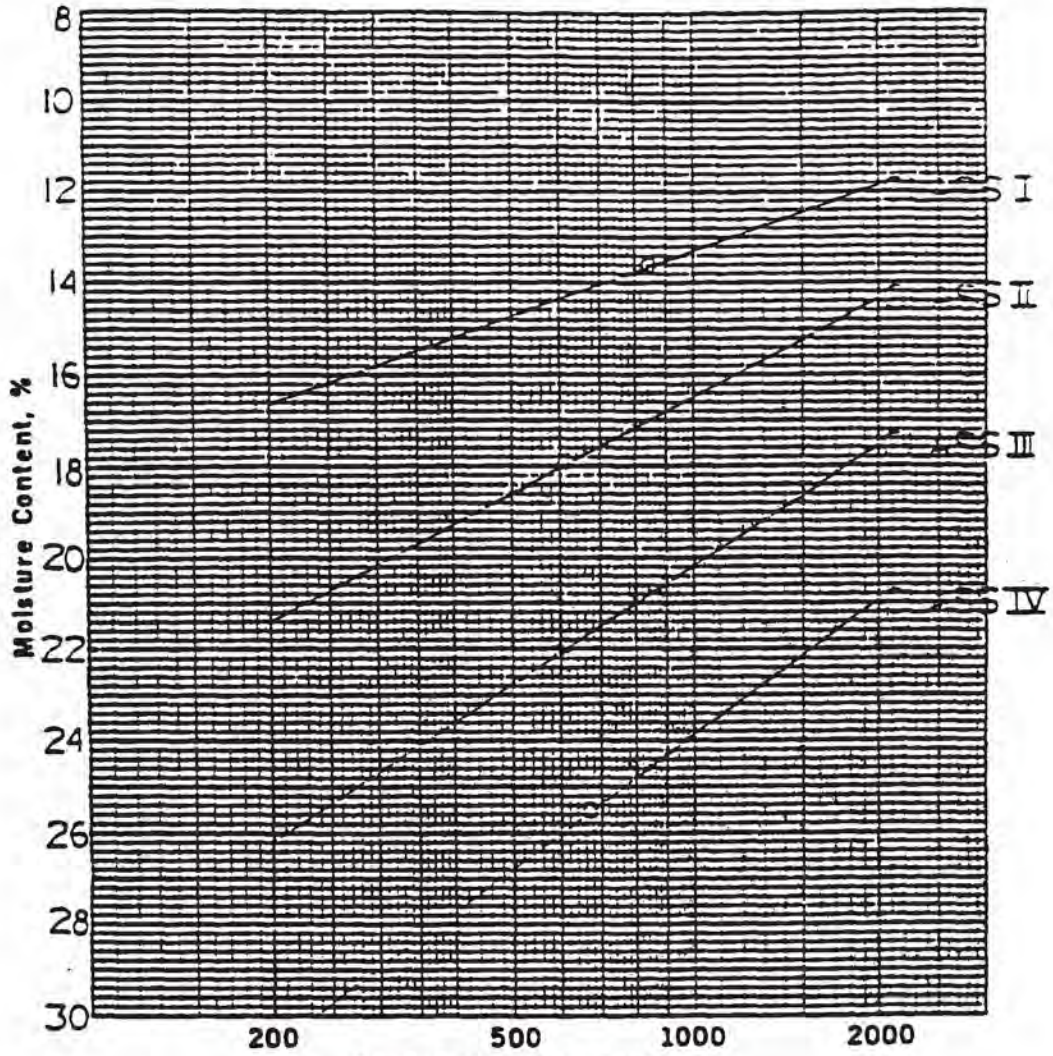


WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

WEATHERED SHALE

SHEAR MODULUS AND DAMPING
VARIATION WITH SHEAR STRAIN

Figure 2.5-233K



Soil Class	Optimum Moisture, %	Maximum Density, pcf	Penetration Resistance, psi
I-SC	13.6	116.3	850
II-CL	17.9	108.0	615
III-MH	21.8	101.1	615
IV-MH	25.5	94.2	680

Remarks:

REVISED 12-8-82

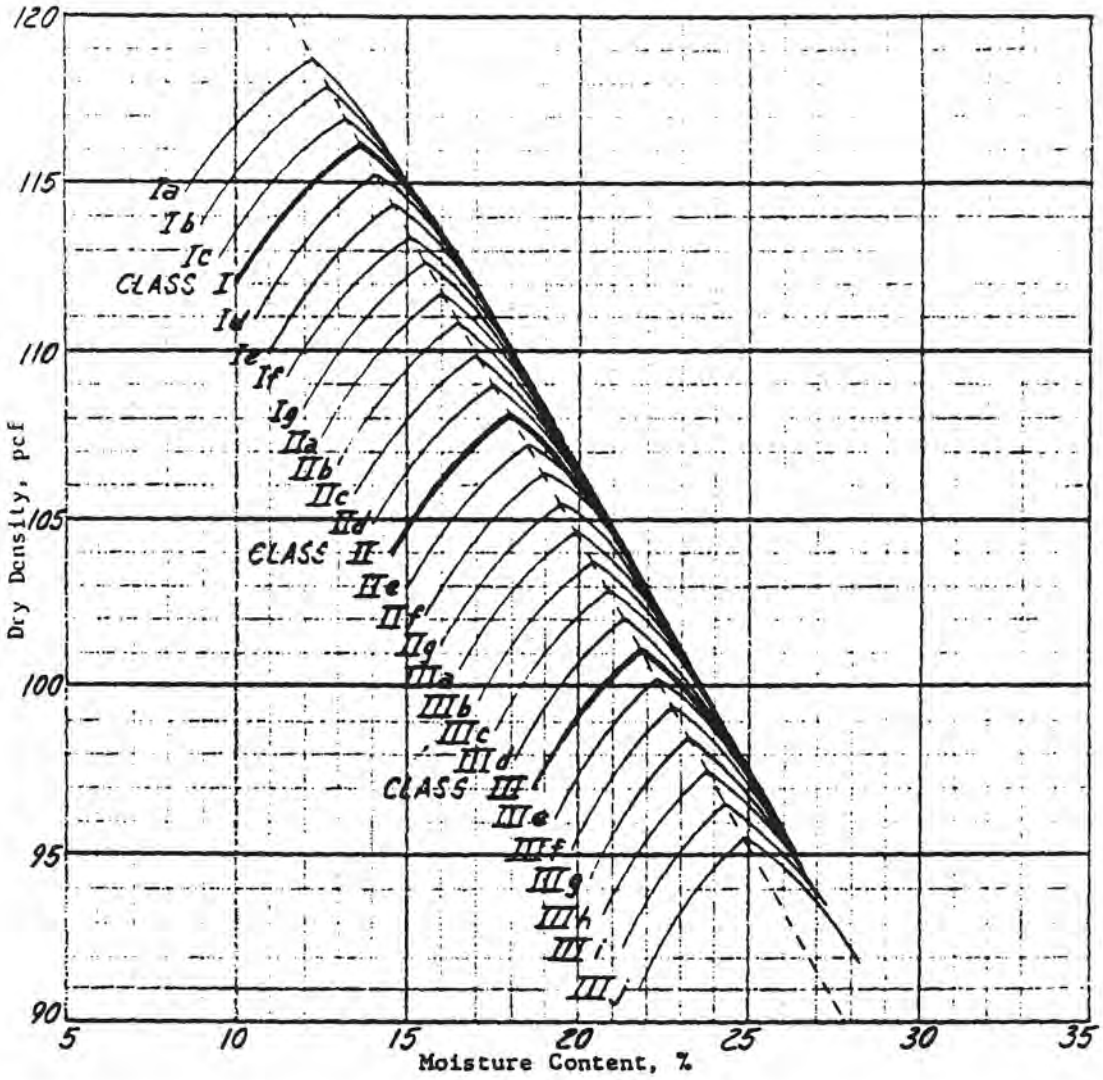
o Denotes Optimum Moisture

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

MAIN PLANT BORROW AREAS

MOISTURE-PENETRATION TEST

Figure 2.5-234



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density pcf
I-SC	0	54	25	21	2.71	25.4	7.8	13.6	116.3
II-CL	0	35	29	36	2.73	41.9	18.6	17.9	108.0
III-MH	0	24	30	46	2.76	50.6	22.1	21.8	101.1

Plus No. 4 Specific Gravity, SSD	
Plus No. 4 Absorption, %	

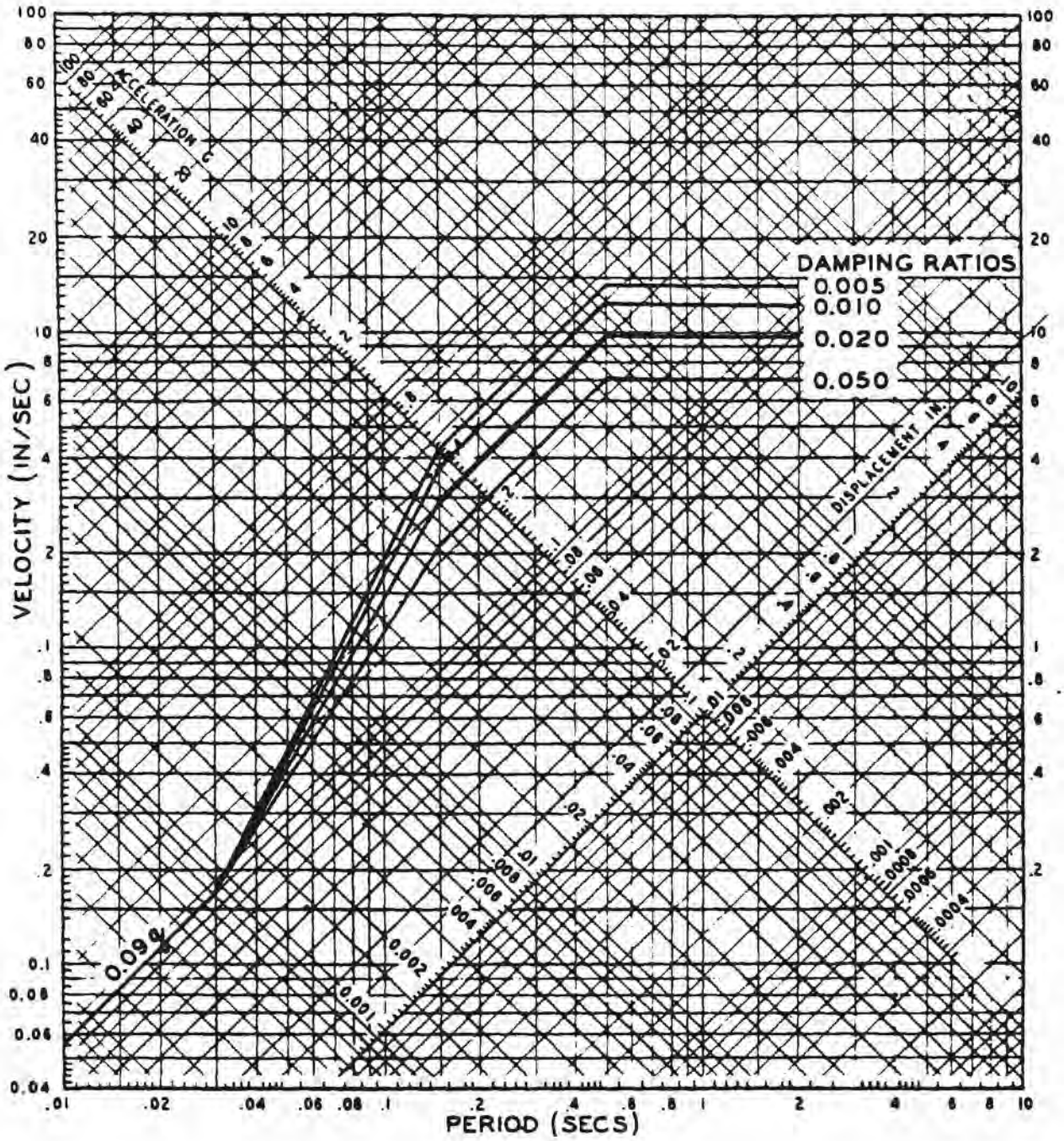
Remarks:

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

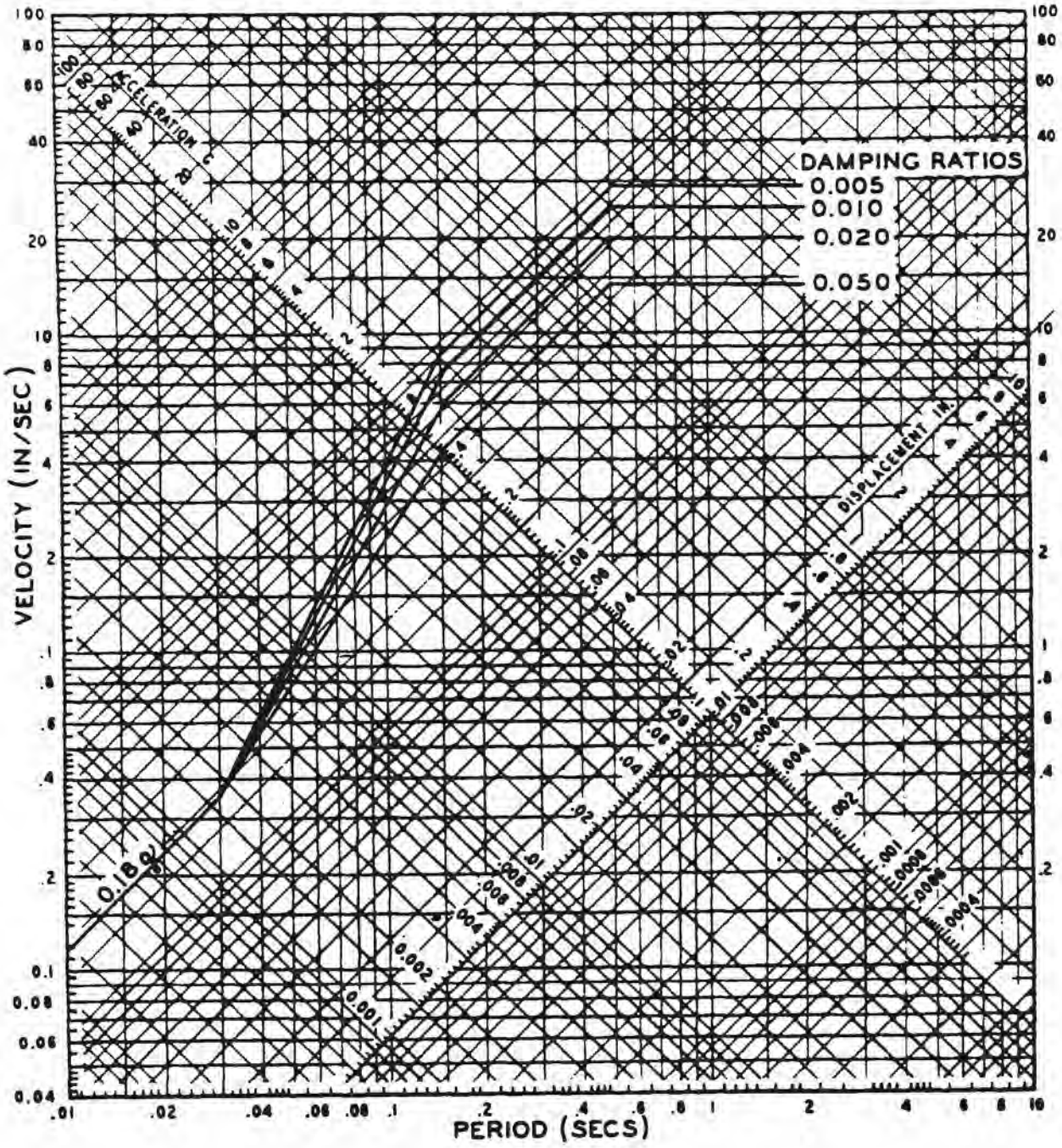
COMPACTION TEST
BORROW AREAS (family of curves)
date tested 1-5-73

Figure 2.5-235

Soil Form 14

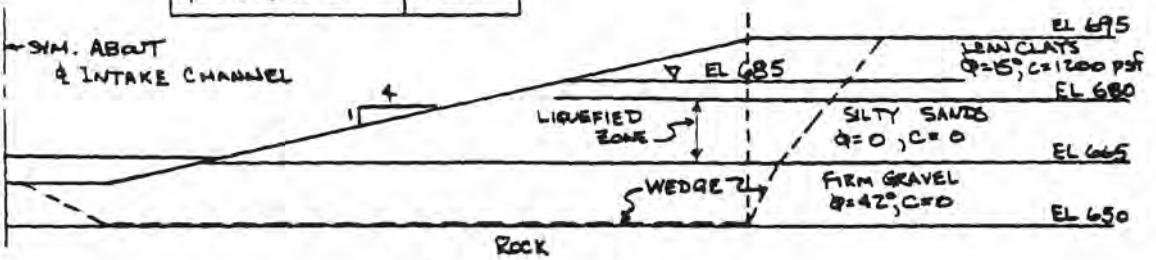


WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
OPERATING BASIS EARTHQUAKE RESPONSE SPECTRA FOR ROCK SUPPORT STRUCTURES Figure 2.5-236a



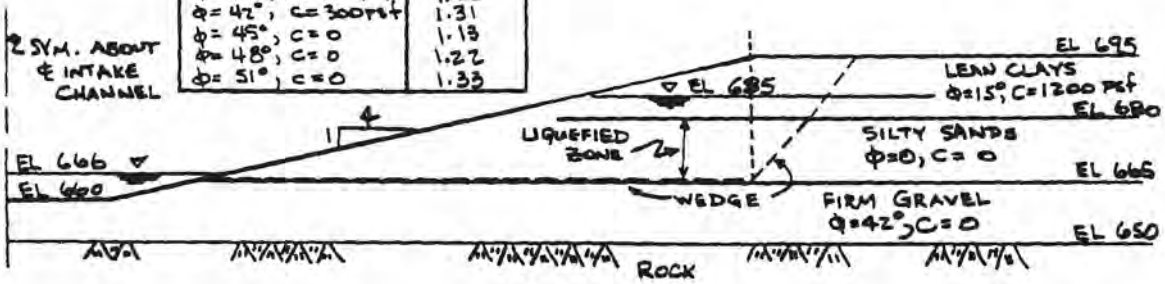
WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
SAFE SHUTDOWN EARTHQUAKE RESPONSE SPECTRA FOR ROCK SUPPORT STURCTURES Figure 2.5-236b

EARTHQUAKE DESIGN CASE 2 WEDGE @ EL. 650	
Soil Properties Used for Resistance on Sliding Wedge	Factor of Safety
$\phi = 42°$, C = 0	1.12
$\phi = 45°$, C = 0	1.20



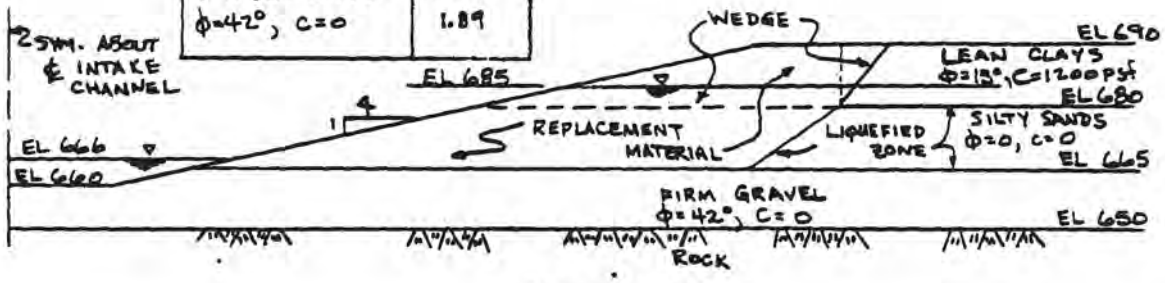
SECTION A-A

EARTHQUAKE DESIGN CASE 2 WEDGE @ EL. 665	
Soil Properties Used for Resistance on Sliding Wedge	Factor of Safety
$\phi = 15°$, C = 1200 psf	1.57
$\phi = 42°$, C = 0	1.04
$\phi = 42°$, C = 100 psf	1.13
$\phi = 42°$, C = 200 psf	1.22
$\phi = 42°$, C = 300 psf	1.31
$\phi = 45°$, C = 0	1.13
$\phi = 48°$, C = 0	1.22
$\phi = 51°$, C = 0	1.33



SECTION B-B

EARTHQUAKE DESIGN CASE 2 WEDGE @ EL 680	
Soil Properties Used for Resistance on Sliding Wedge	Factor of Safety
$\phi = 15°$, C = 1200 psf	2.77
$\phi = 42°$, C = 0	1.89



SECTION C-C

FIGURE 2.5-237
INTAKE CHANNEL
SEISMIC STABILITY ANALYSIS

NOTE:
Soils above firm gravel will be removed and replaced as compacted fill with controlled compaction density and moisture content at least as for back as the critical wedges shown.
See Figure 2.5-239

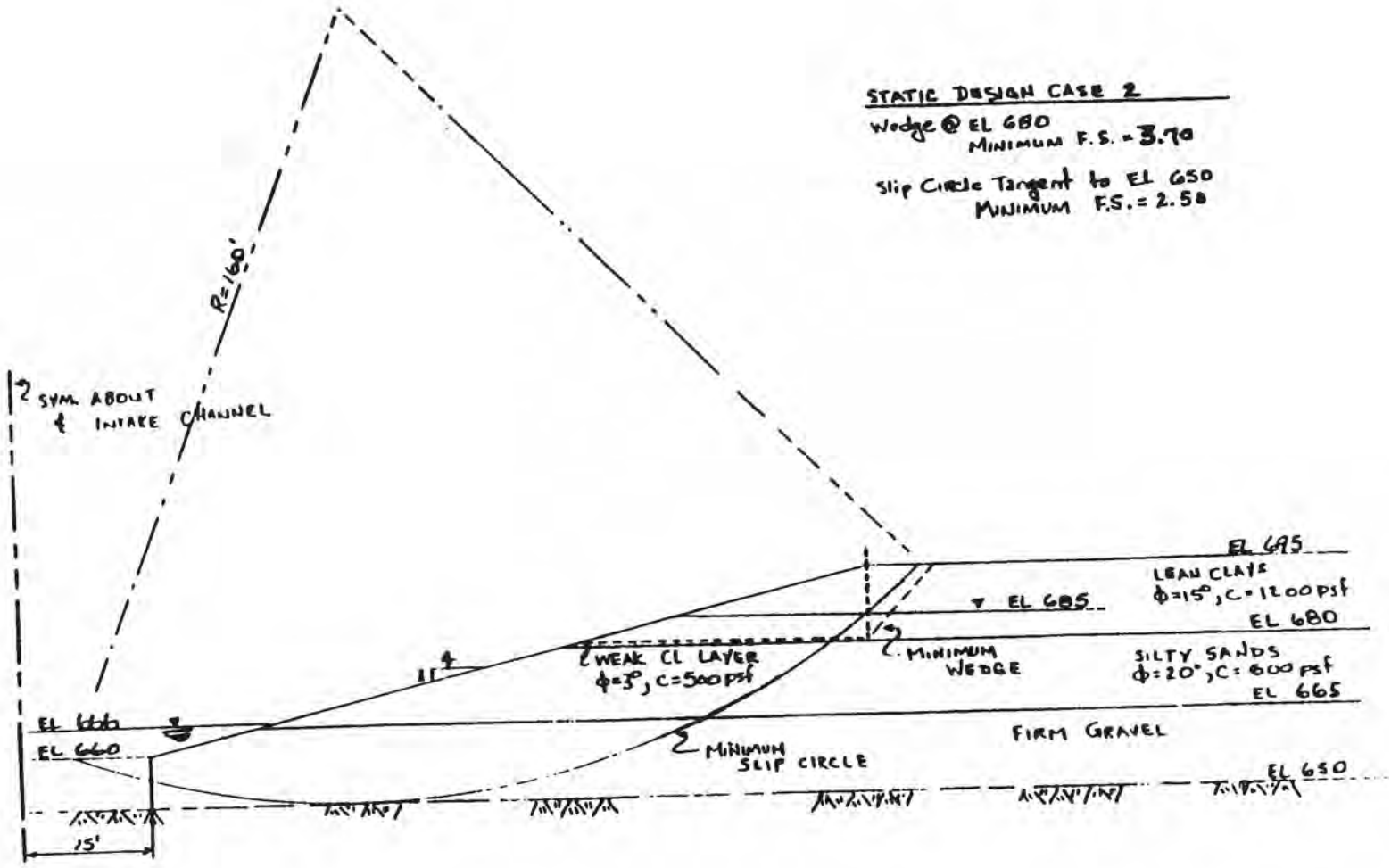


FIGURE 2.5-238

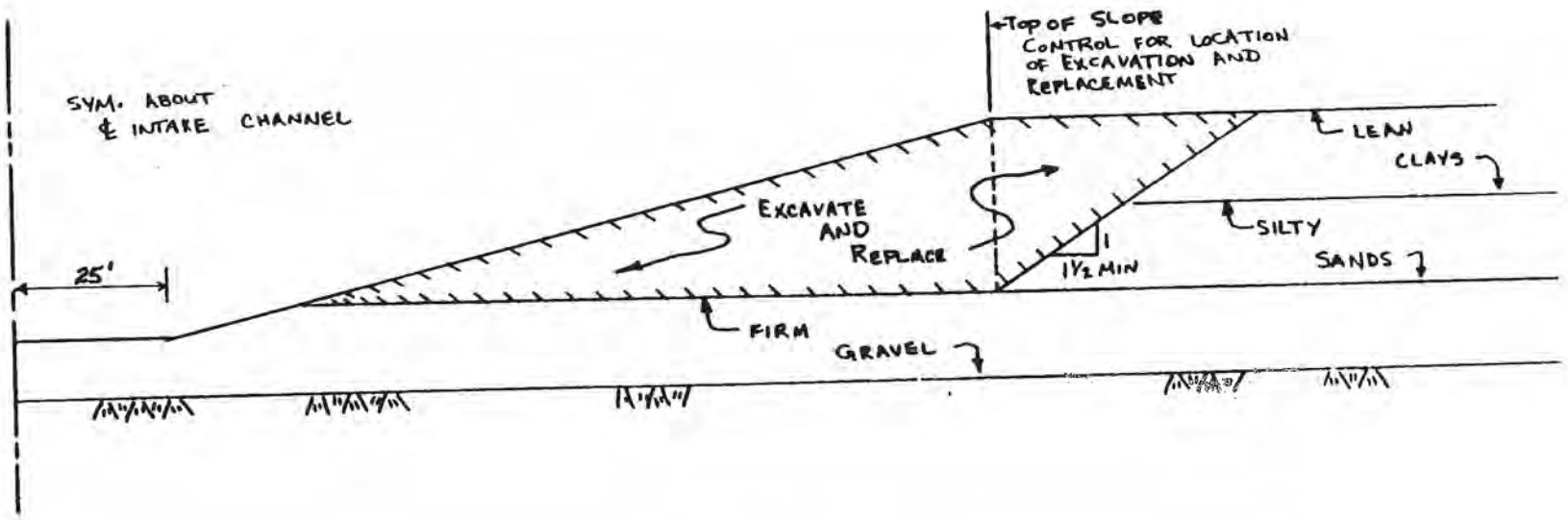
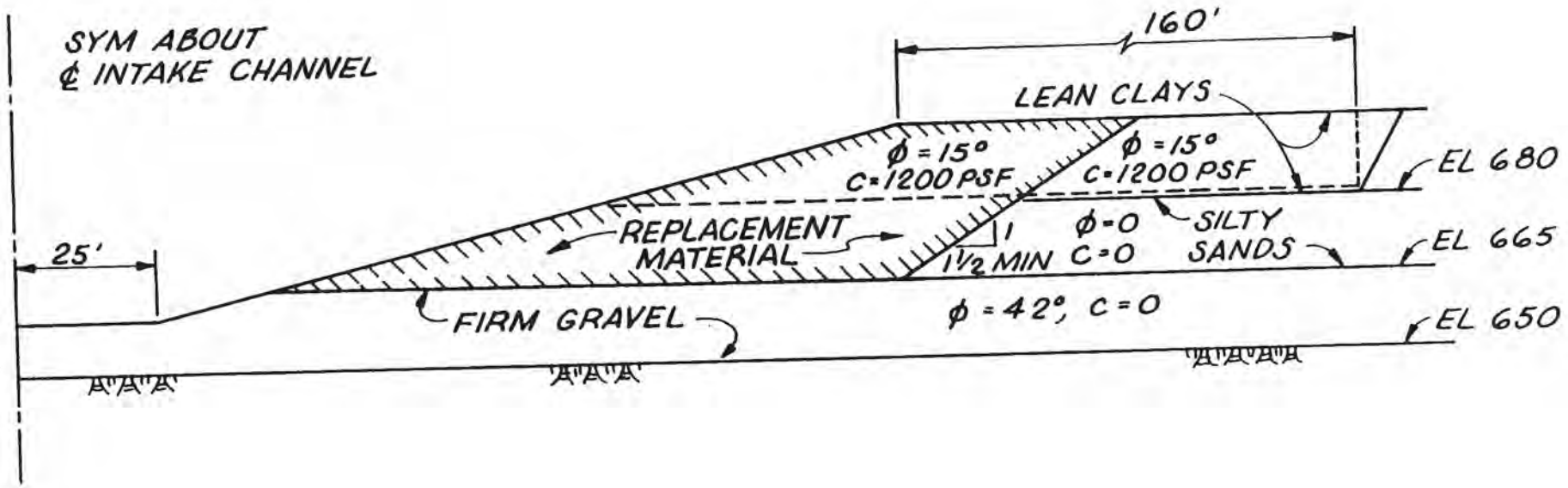
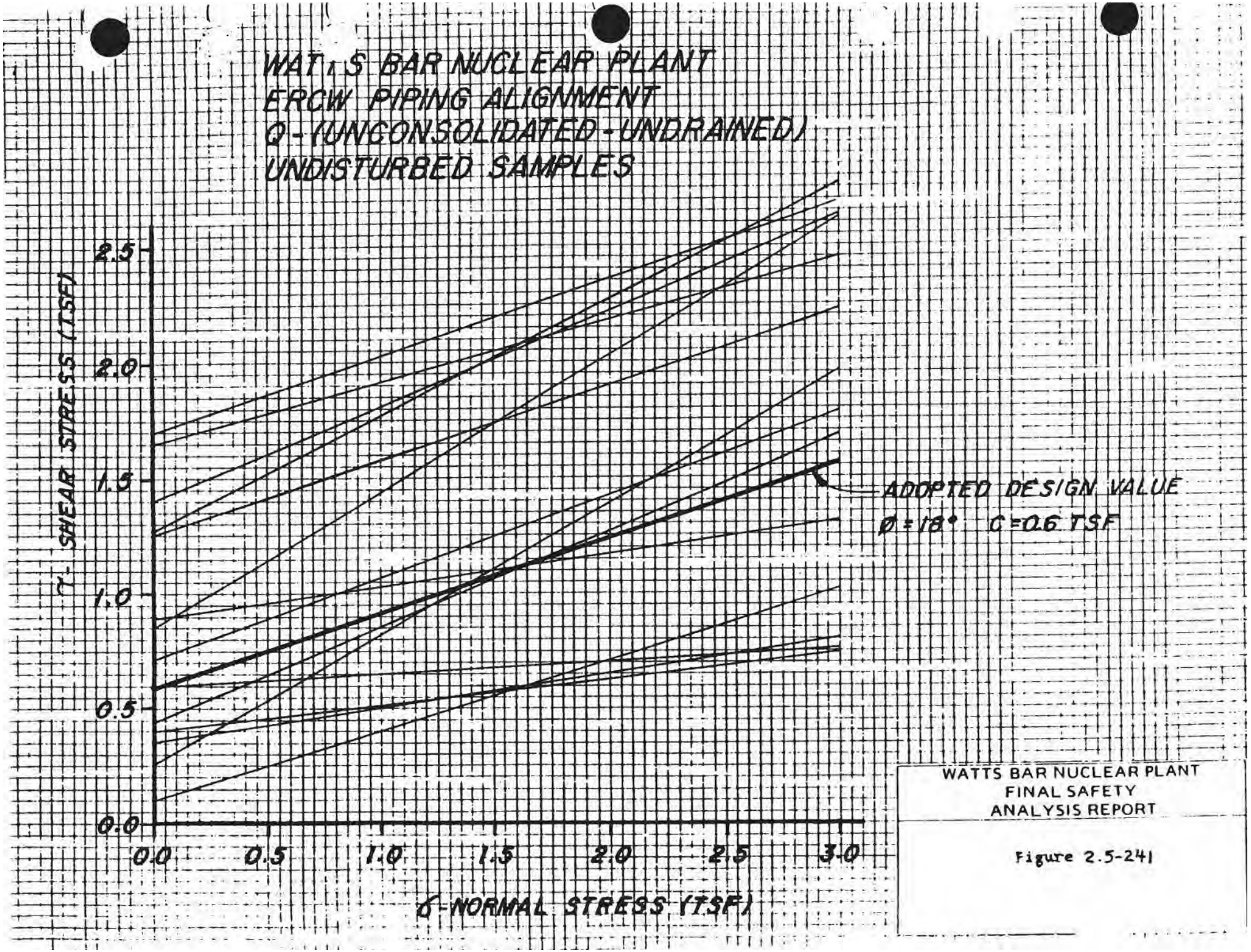


FIGURE 2.5-239
INTAKE CHANNEL - LATERAL
EXCAVATION & REPLACEMENT



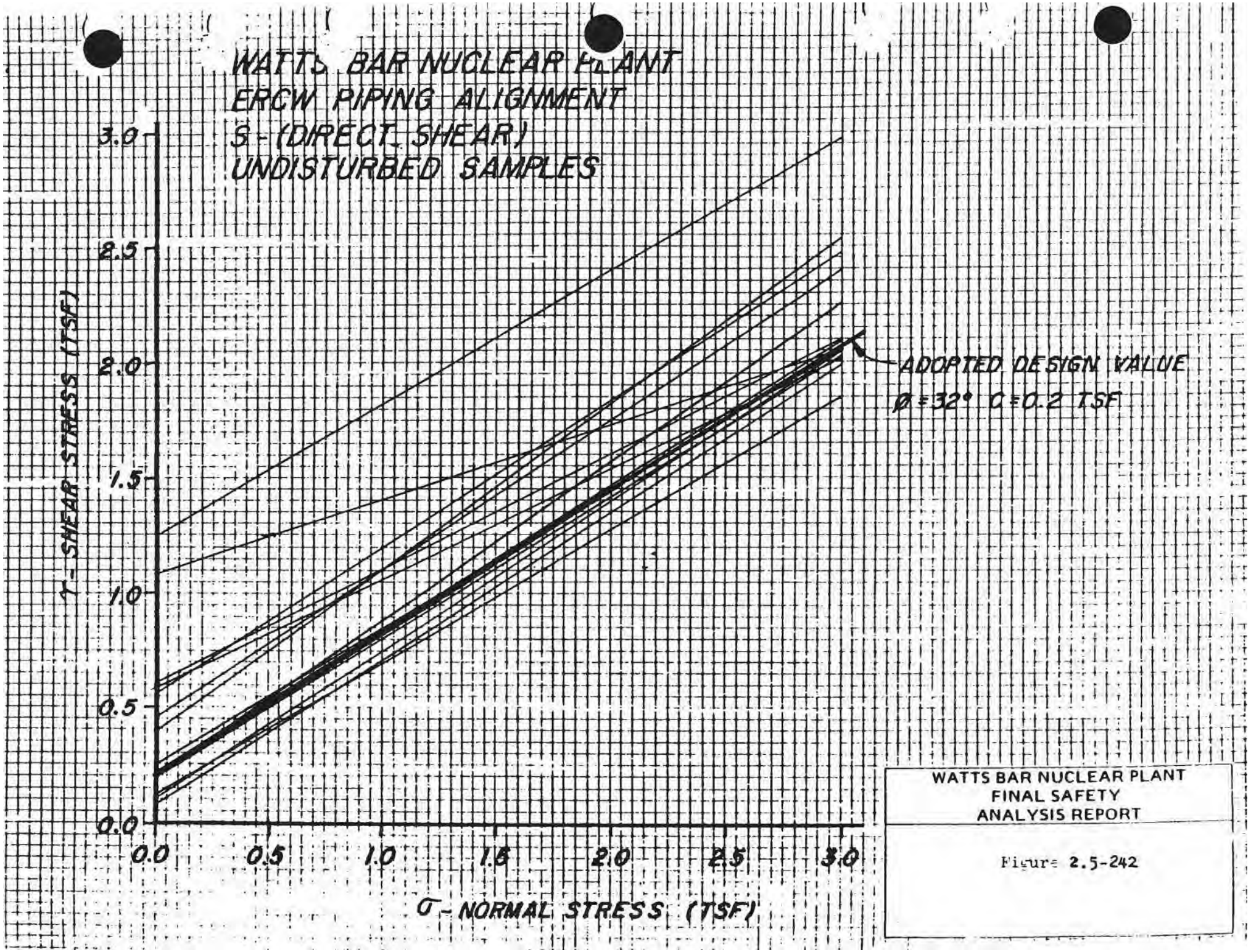
WEDGE USED TO DETERMINE HORIZONTAL DISPLACEMENT OF THE INTAKE CHANNEL BY NEWMARK'S METHOD

FIGURE 2.5-240



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Figure 2.5-241

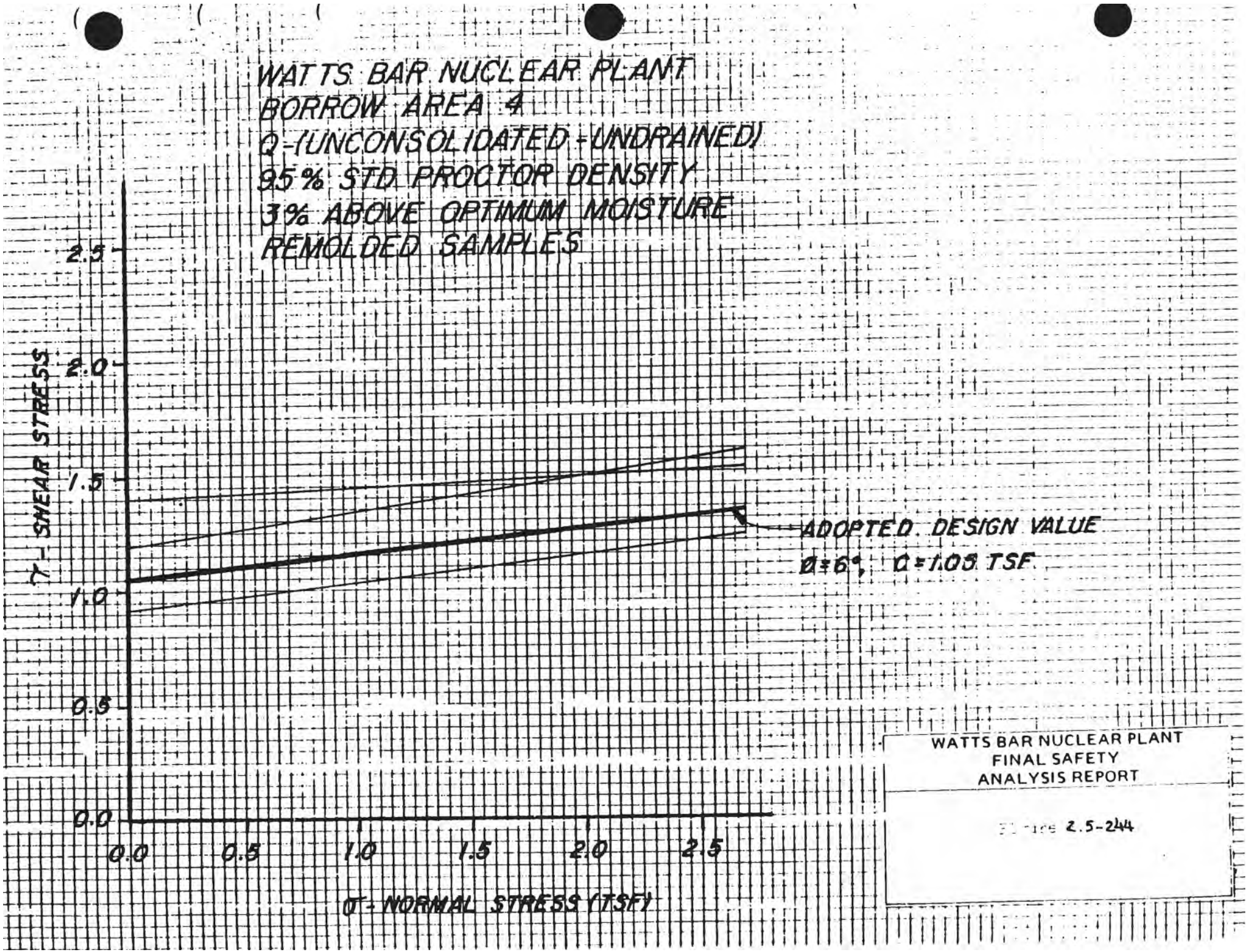


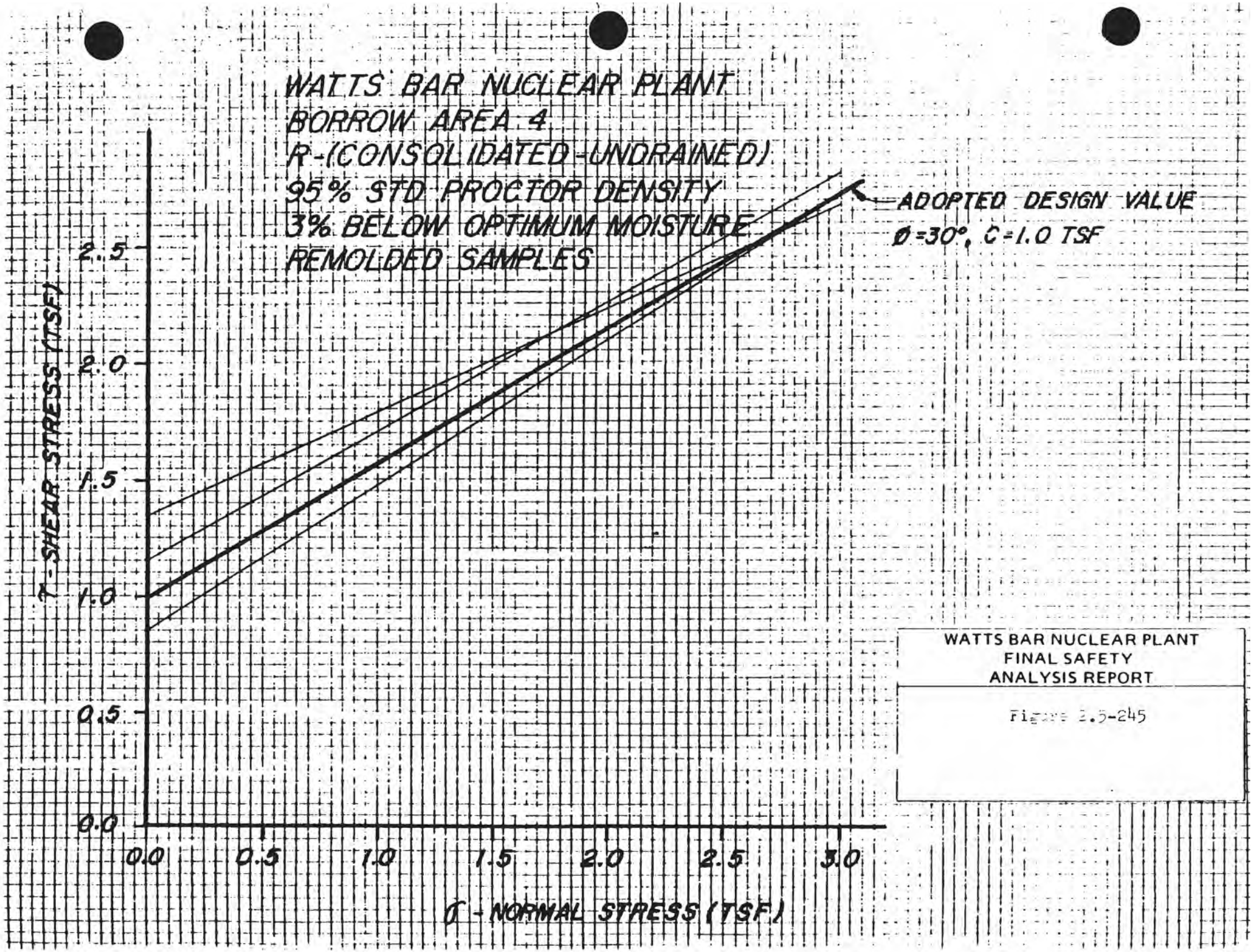
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Figure 2.5-242

FIGURE 2.5-243

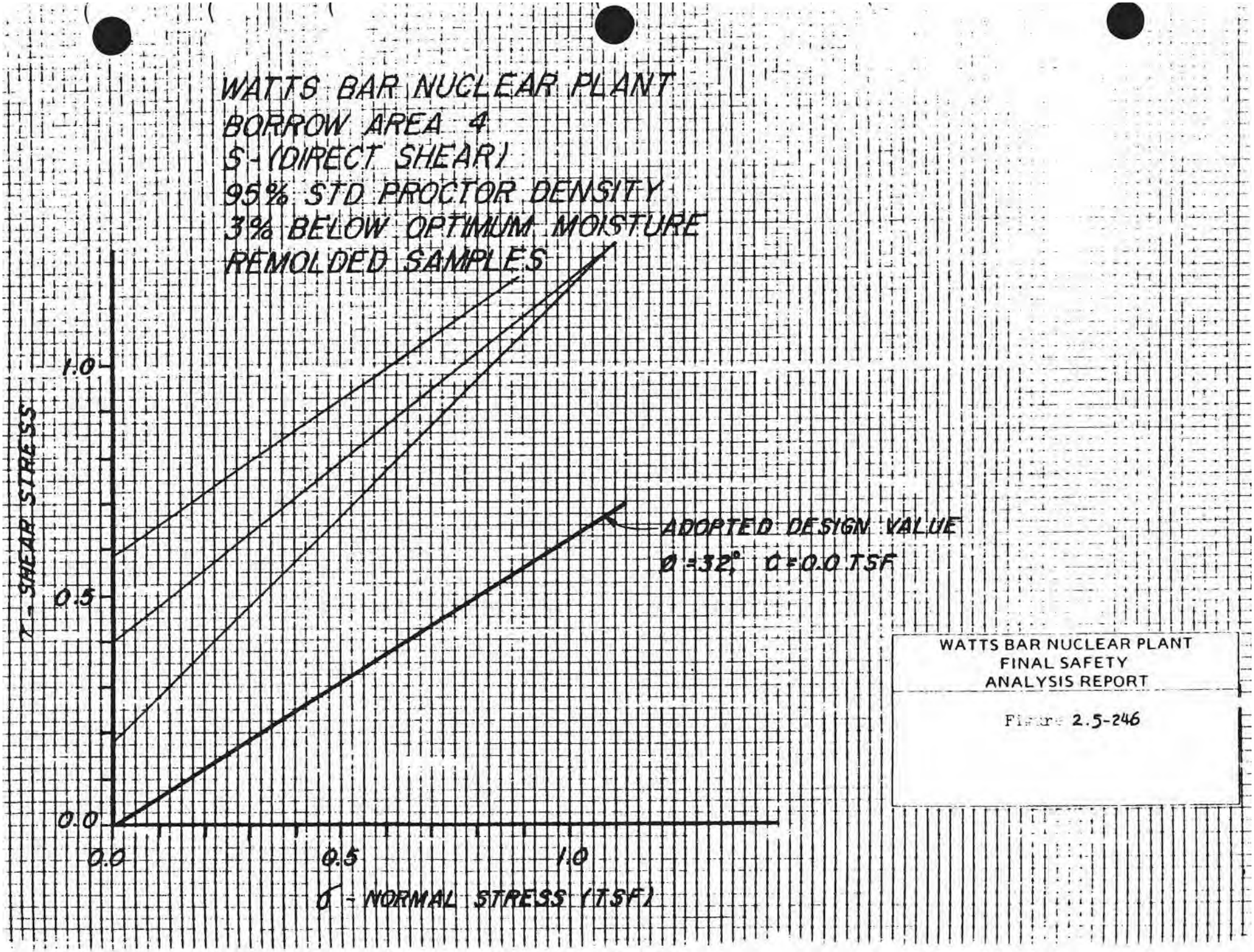
DELETED IN INITIAL UFSAR


WATTS BAR NUCLEAR PLANT
BORROW AREA 4
Q-(UNCONSOLIDATED-UNDRAINED)
95% STD. PROCTOR DENSITY
3% ABOVE OPTIMUM MOISTURE
REMOLDED SAMPLES
τ - SHEAR STRESS
σ - NORMAL STRESS (TSF)
0.0
0.5
1.0
1.5
2.0
2.5
ADOPTED DESIGN VALUE
Ø=6°, C=1.05 TSF



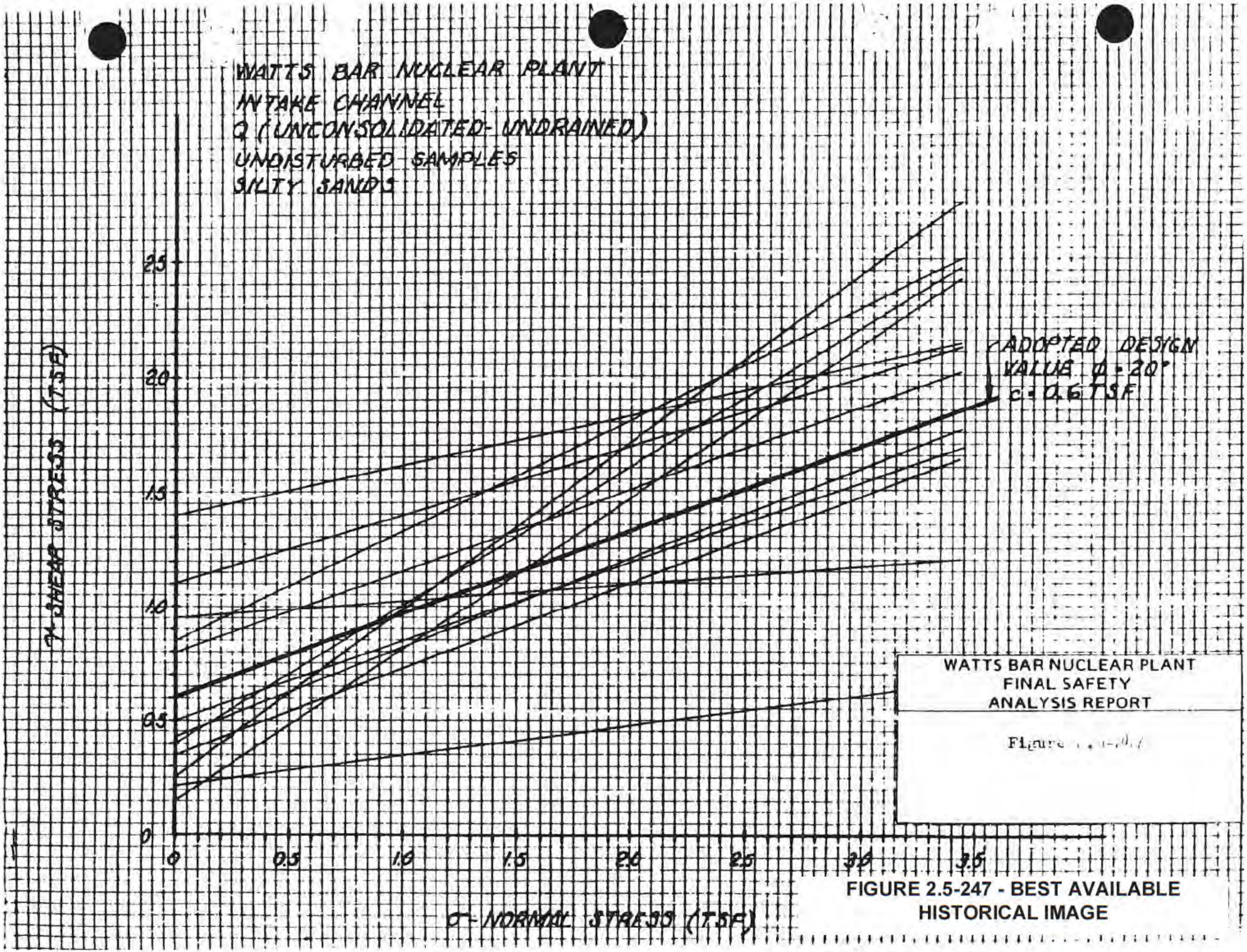
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Figure 2.5-245



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

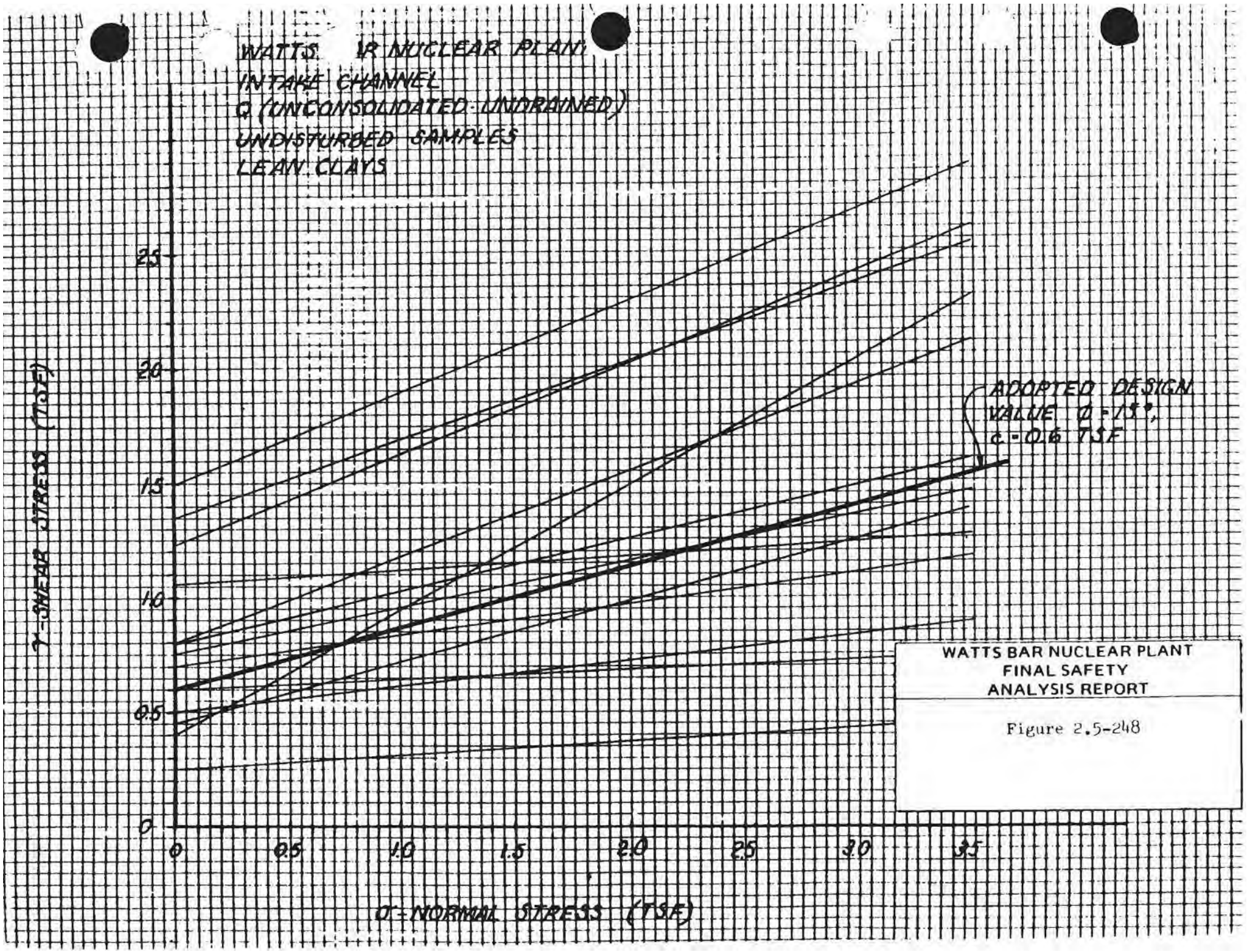
Figure 2.5-246



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

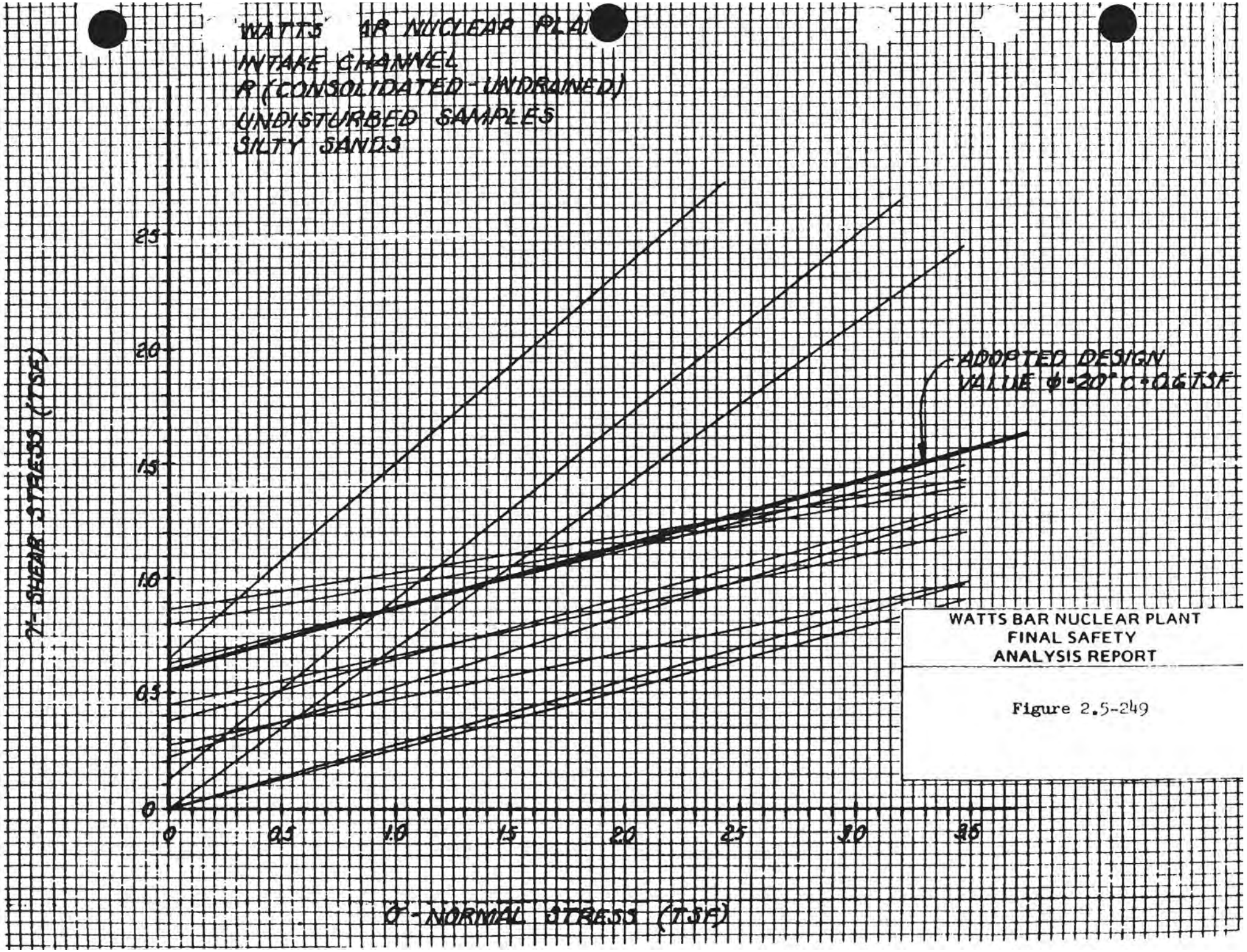
Figure

FIGURE 2.5-247 - BEST AVAILABLE HISTORICAL IMAGE



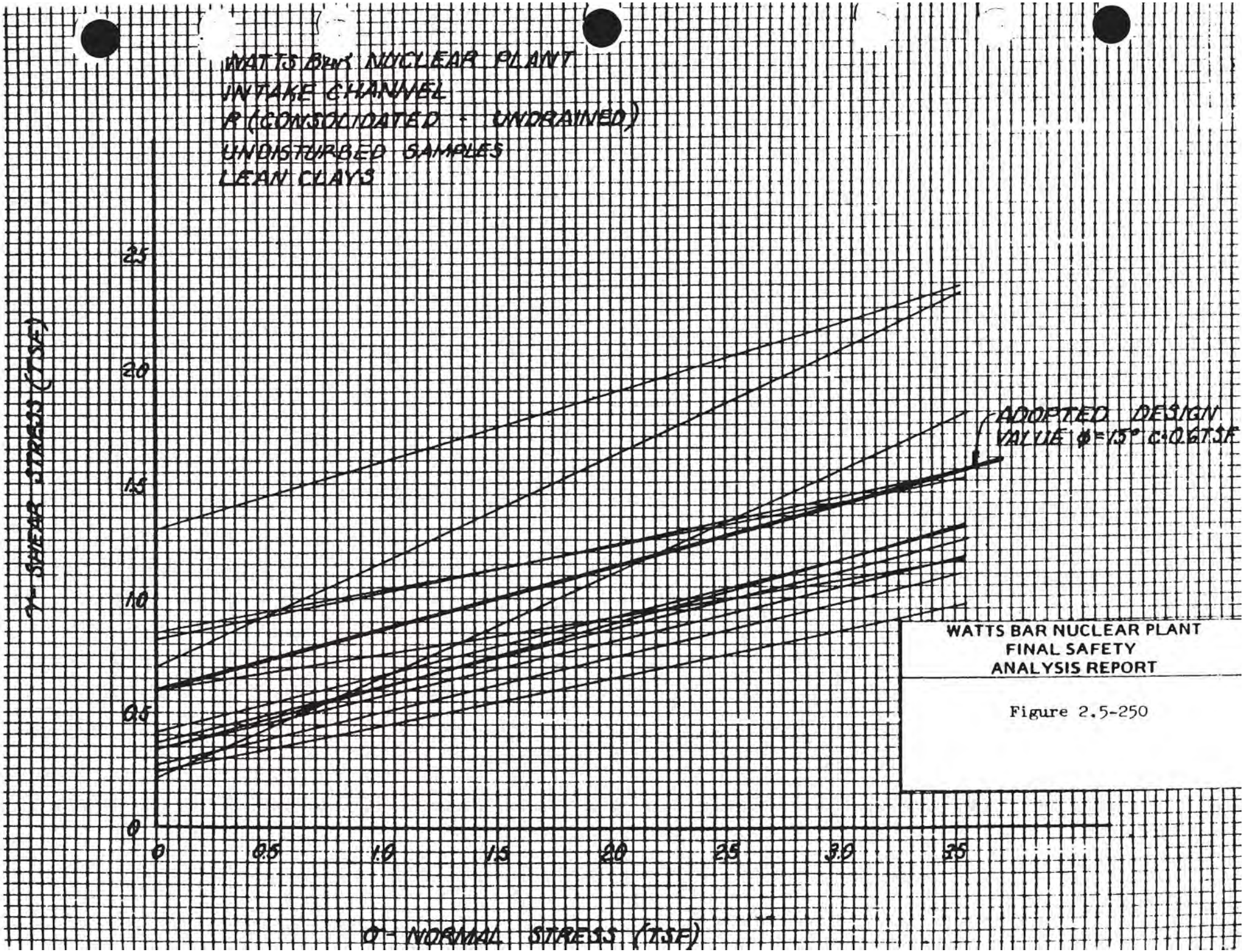
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Figure 2.5-248



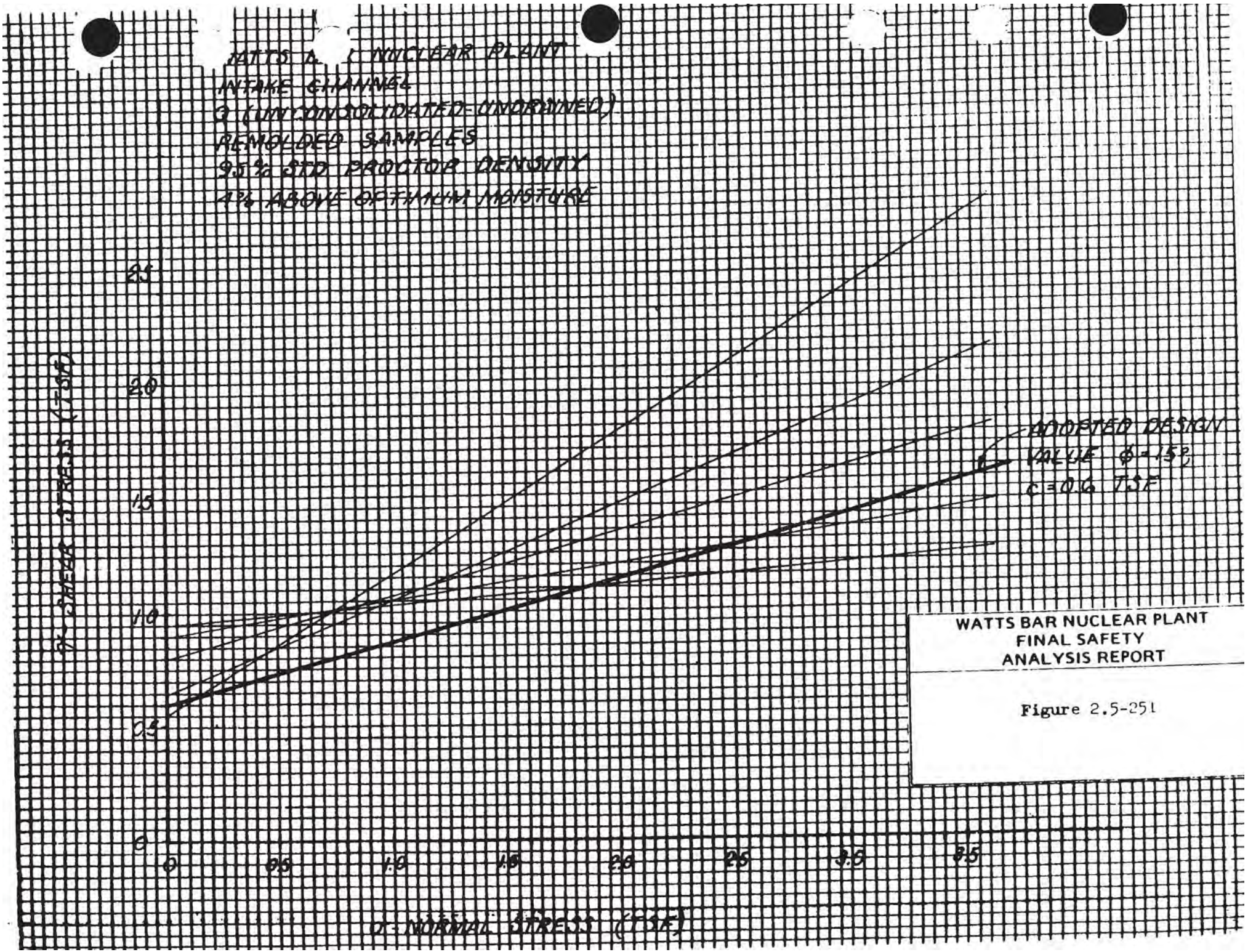
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Figure 2.5-249



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

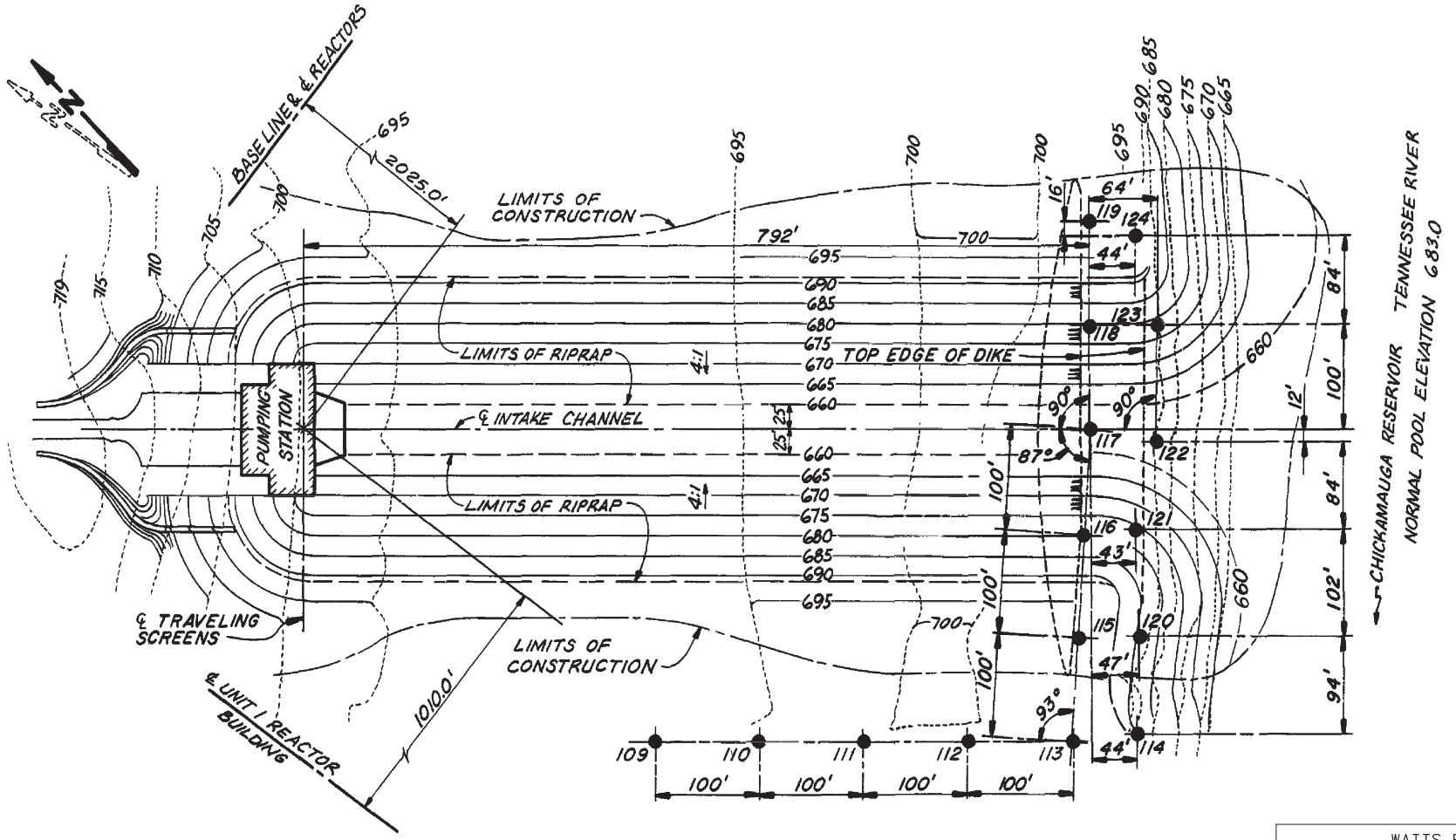
Figure 2.5-250



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

Figure 2.5-251

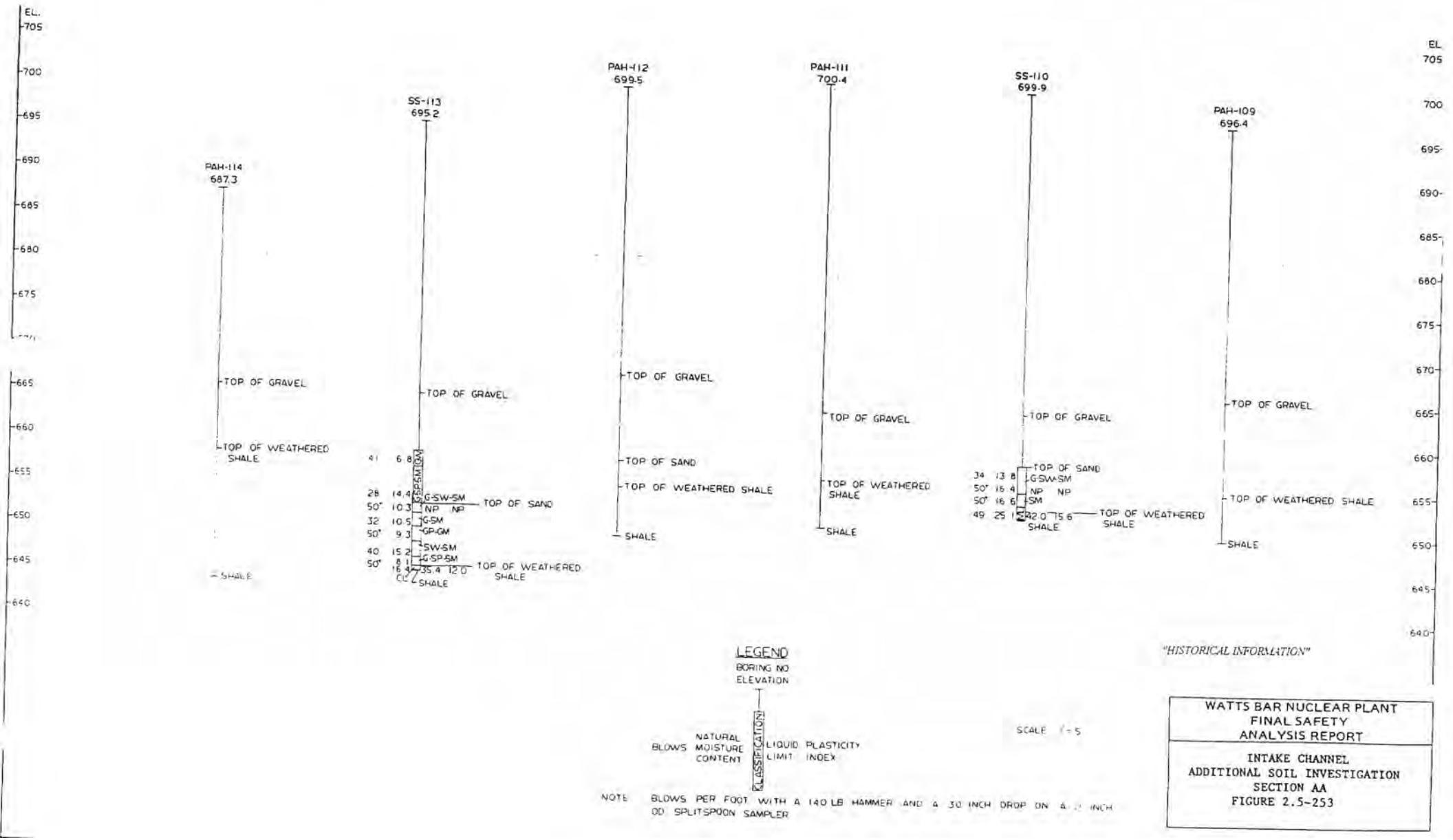
CAD MAINTAINED DRAWING



LEGEND:
● SOIL BORING

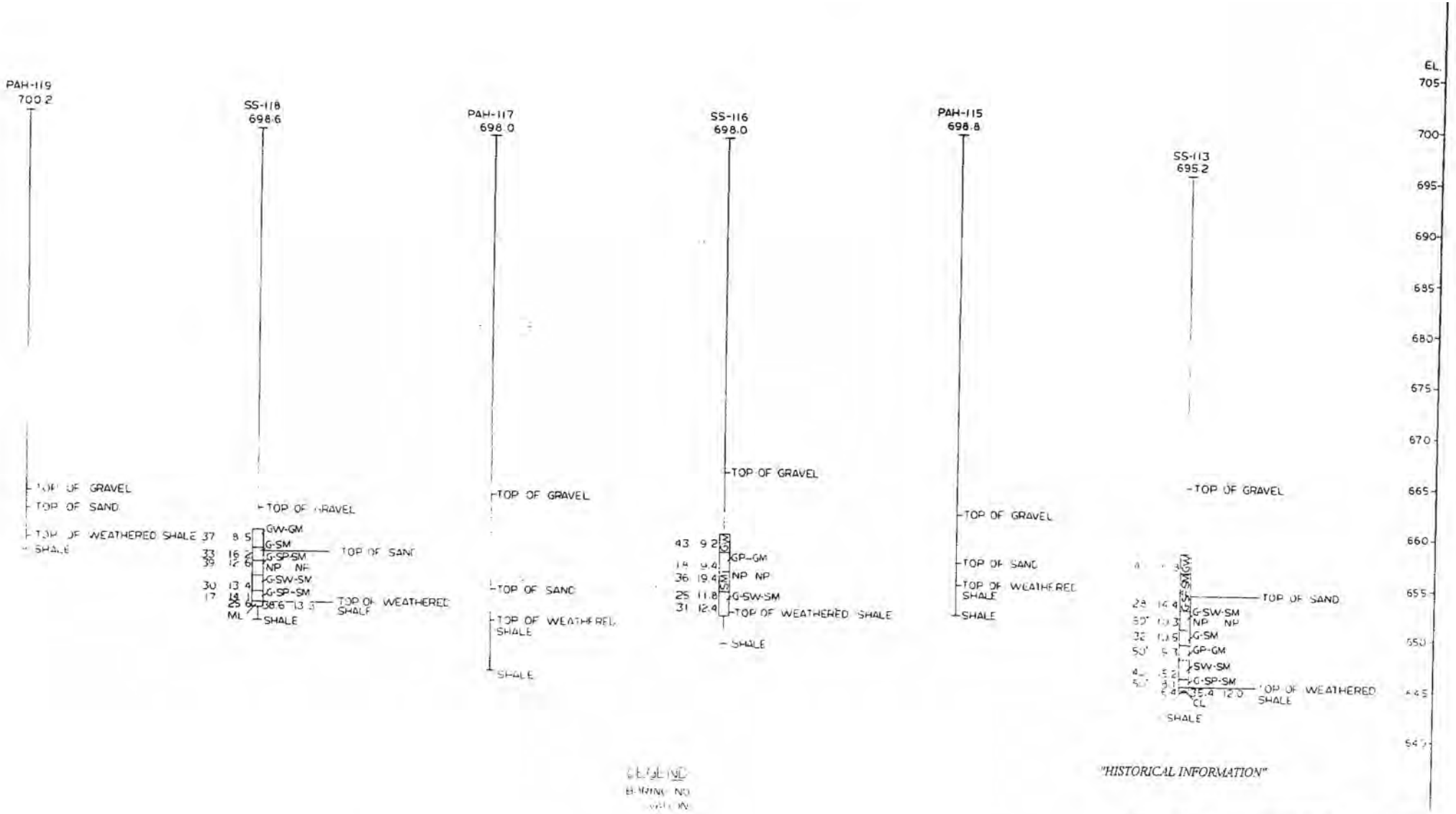
WATTS BAR
FINAL SAFETY
ANALYSIS REPORT

SITE STUDIES
INTAKE CHANNEL
ADDITIONAL SOILS
INVESTIGATION
TVA DWG NO. 10B333 R2
FIGURE 2.5-252



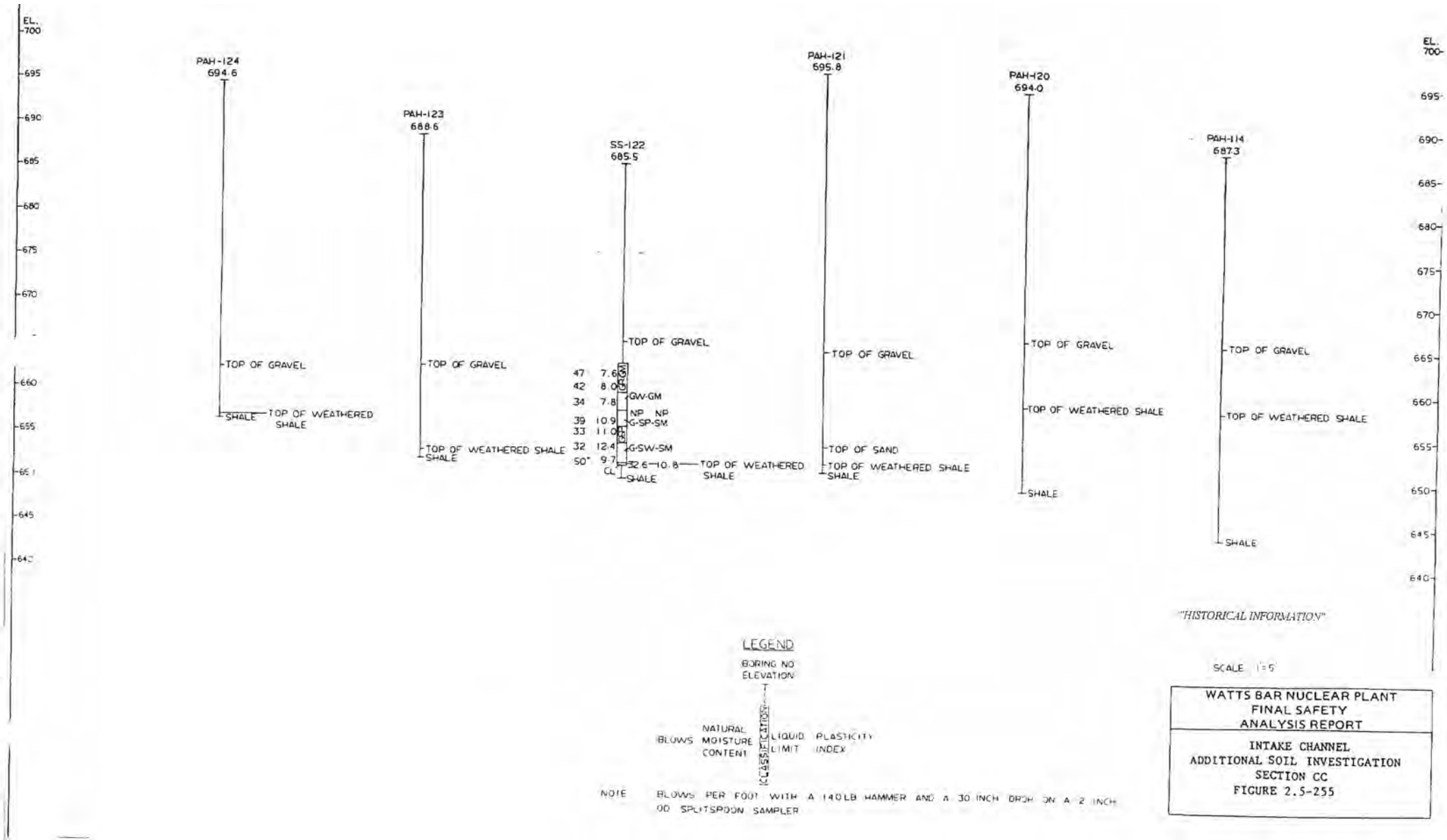
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INTAKE CHANNEL
ADDITIONAL SOIL INVESTIGATION
SECTION AA
FIGURE 2.5-253



"HISTORICAL INFORMATION"

WATTS BAR NUCLEAR PLANT FINAL SAFETY ANALYSIS REPORT
INTAKE CHANNEL ADDITIONAL SOIL INVESTIGATION SECTION BB FIGURE 2.5-254



"HISTORICAL INFORMATION"

LEGEND

BORING NO
ELEVATION

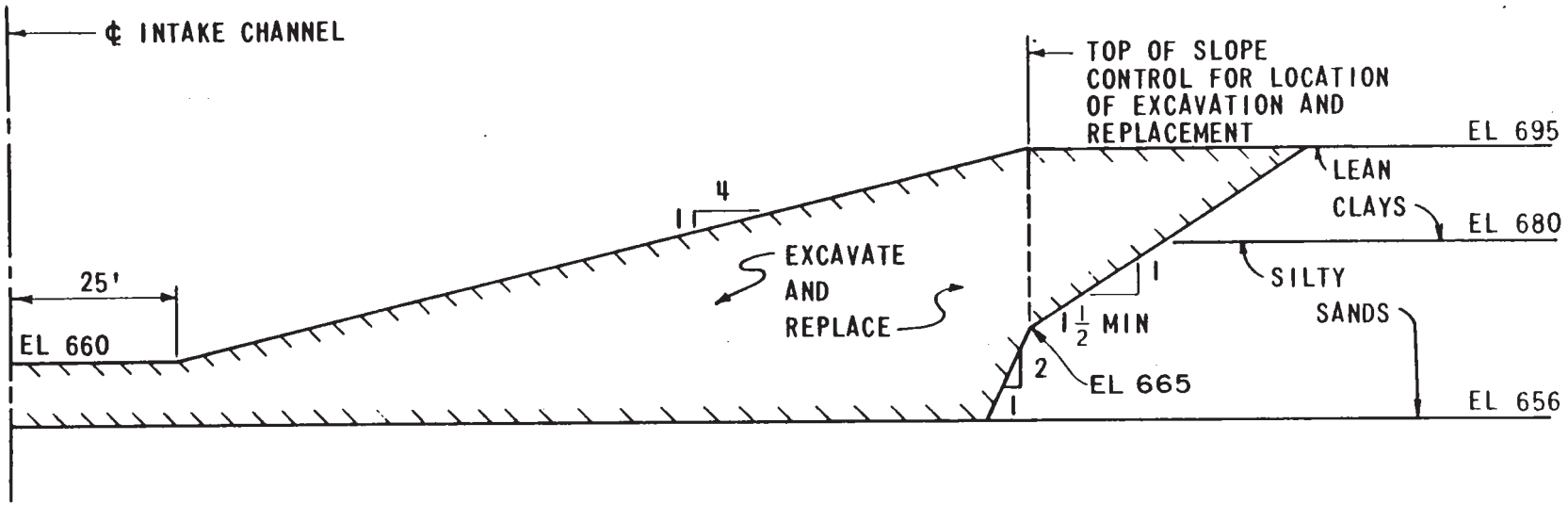
BLOWS | NATURAL MOISTURE CONTENT | CLASSIFICATION | LIQUID LIMIT | PLASTICITY INDEX

NOTE BLOWS PER FOOT WITH A 140 LB HAMMER AND A 30 INCH DROP ON A 2 INCH OD SPLITSPOON SAMPLER

SCALE 1"=5'

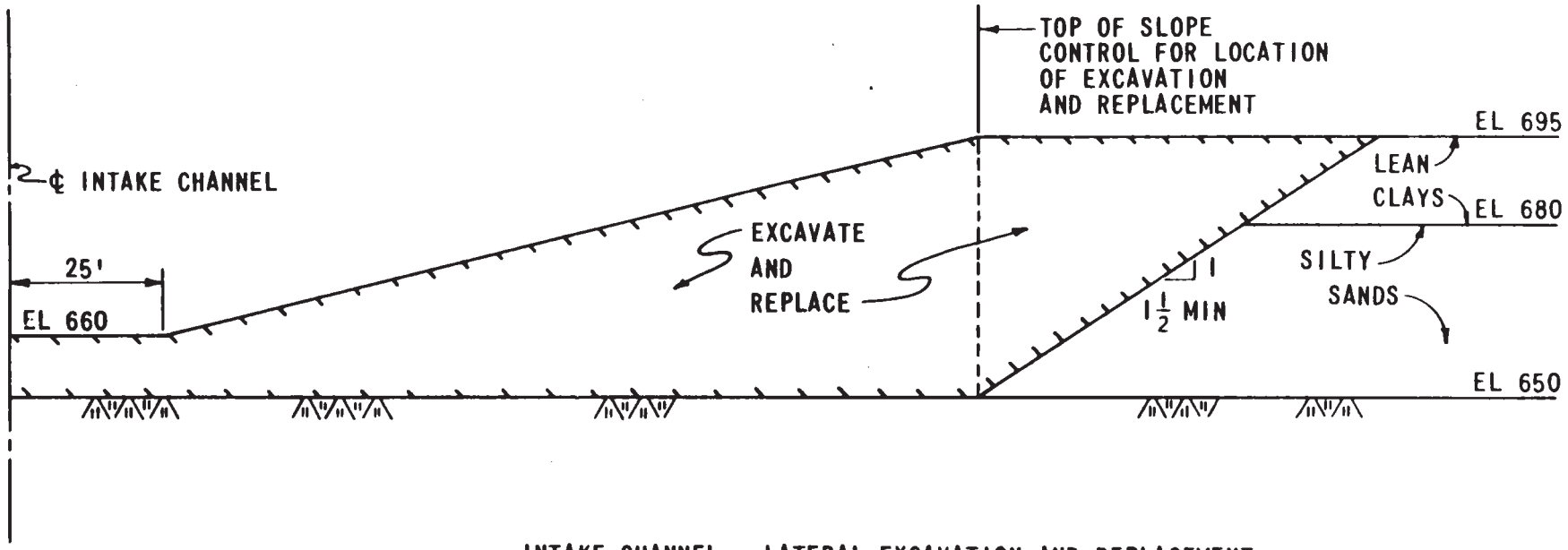
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

INTAKE CHANNEL
ADDITIONAL SOIL INVESTIGATION
SECTION CC
FIGURE 2.5-255



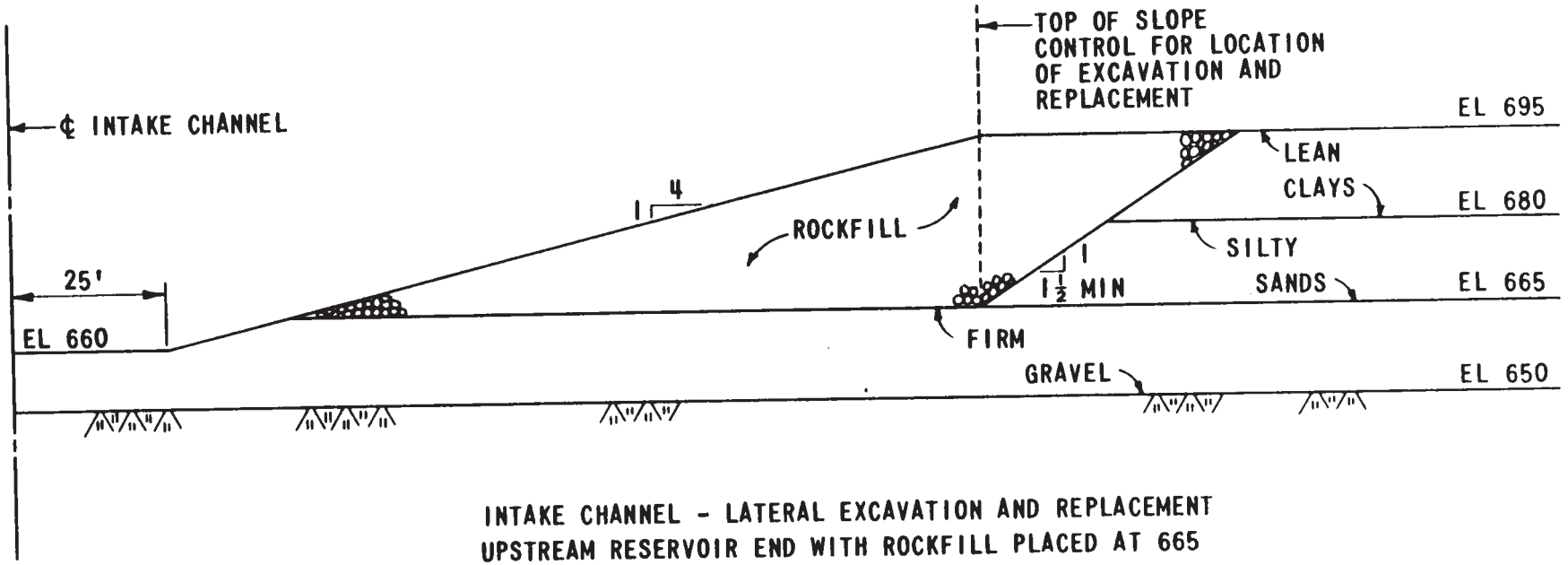
INTAKE CHANNEL - LATERAL EXCAVATION AND REPLACEMENT
DOWNSTREAM SIDE OF INTAKE CHANNEL WITH BEDROCK AT 656

FIGURE 2.5-256



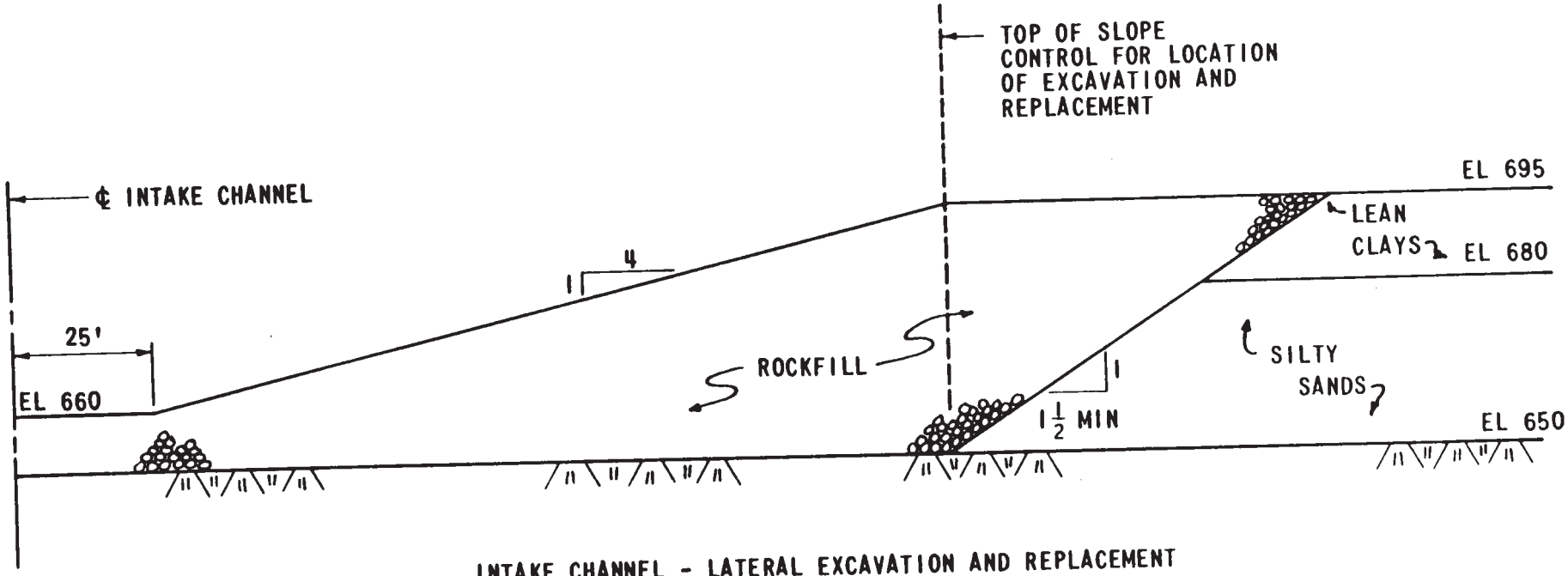
INTAKE CHANNEL - LATERAL EXCAVATION AND REPLACEMENT
DOWNSTREAM SIDE OF INTAKE CHANNEL WITH BEDROCK AT 650

FIGURE 2.5-257



INTAKE CHANNEL - LATERAL EXCAVATION AND REPLACEMENT
UPSTREAM RESERVOIR END WITH ROCKFILL PLACED AT 665

FIGURE 2.5-258



INTAKE CHANNEL - LATERAL EXCAVATION AND REPLACEMENT
DOWNSTREAM RESERVOIR END WITH ROCKFILL PLACED AT EL 650

FIGURE 2.5-259

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-1 Station 15+535 Range 43+82 W Surface El 699.1

Date Drilled 10-6-80 To 10-6-80 Prepared By JLB Checked By [illegible]

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0			ML	23.4	42	14		
	695			21.2	33	4		
5			CL	23.1	35	13		
	690							
10				24.2	30	9		▽
	685							DISCONTINUED
15								
	680							
20								
25								
30								
35								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-1
FIGURE 2.5-260

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-2 Station 15+92S Range 45+78W Surface El 693.3

Date Drilled 10-6-80 To 10-6-80 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0			CL-ML	20.4	41	15		
	695							
5			ML	20.8	33	12		
	690							
10				26.3	34	13		
	685							DISCONTINUED
15								
	680							
20								
25								
30								
35								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-2
FIGURE 2.5.26t

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-3 Station 16+315 Range 47+74W Surface El 695.2

Date Drilled 10-7-80 To 10-7-80 Prepared By JLB Checked By [illegible]

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	695		CL-ML	21.9	36	12		
				23.2	32	10		
5	690		CL	25.5	31	10		
10	685			26.2	32	12		
								DISCONTINUED
15	680							
20								
25								
30								
35								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-3
FIGURE 2.5-282

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-4 Station 16+715 Range 49+70 Surface El 695.5

Date Drilled 10-7-80 To 10-7-80 Prepared By JLB Checked By [illegible]

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	695		CL-ML	21.7	40	15		
5	690			22.7	38	13		
10	685		ML	27.7	43	13		
15	680		CL	25.1	45	25		
				24.4	44	21		
20	675							DISCONTINUED
25								
30								
35								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-4
FIGURE 2.5-263

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-5 Station 17+51S Range 43+58W Surface El 700.-

Date Drilled 10-9-80 To 10-9-80 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	700		ML	24.2	42	11		
5	695		CL-ML	20.7	28	5		
10	690			24.9	34	10		▽ NO RECOVERY-WET MATERIAL
15	685							DISCONTINUED
20								
25								
30								
35								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-5
FIGURE 2.5-264

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-6 Station 17+915 Range 45+54W Surface El 698.

Date Drilled 10-7-80 To 10-7-80 Prepared By JLB Checked By [illegible]

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0			ML	21.1	32	7		
	695							
5			CL	25.6	31	9		
	690							
10			CL-ML	24.1	27	6		
	685							DISCONTINUED
15								
	680							
20								
25								
30								
35								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-6
FIGURE 2.5.265

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N P Feature BORROW AREA 7

Boring PAH-7 Station 18+30S Range 47+50W Surface El 697.1

Date Drilled 10-7-80 To 10-7-80 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	695		CL-ML	21.9	49	18		
5	690		CL-ML	23.1	40	15		
10	685		CL	25.7	34	12		▽ NO RECOVERY - WET MATERIAL
15	680							DISCONTINUED
20								
25								
30								
35								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-7
FIGURE 2.5-266

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P Feature BORROW AREA 7

Boring PAH-8 Station 18+69S Range 49+46W Surface El 697.1

Date Drilled 10-7-80 To 10-7-80 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	695		CL	22.7	43	18		
5	690		CL-ML	23.6	38	13		
10	685		MH	26.9	53	23		
15	680		CL	24.7	42	19		
20	675							DISCONTINUED
25								
30								
35								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-8
FIGURE 2.5-267

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
(SS, PA, HA, TP BORING)
FIGURE 2.5-268
SHEET 1 OF 1

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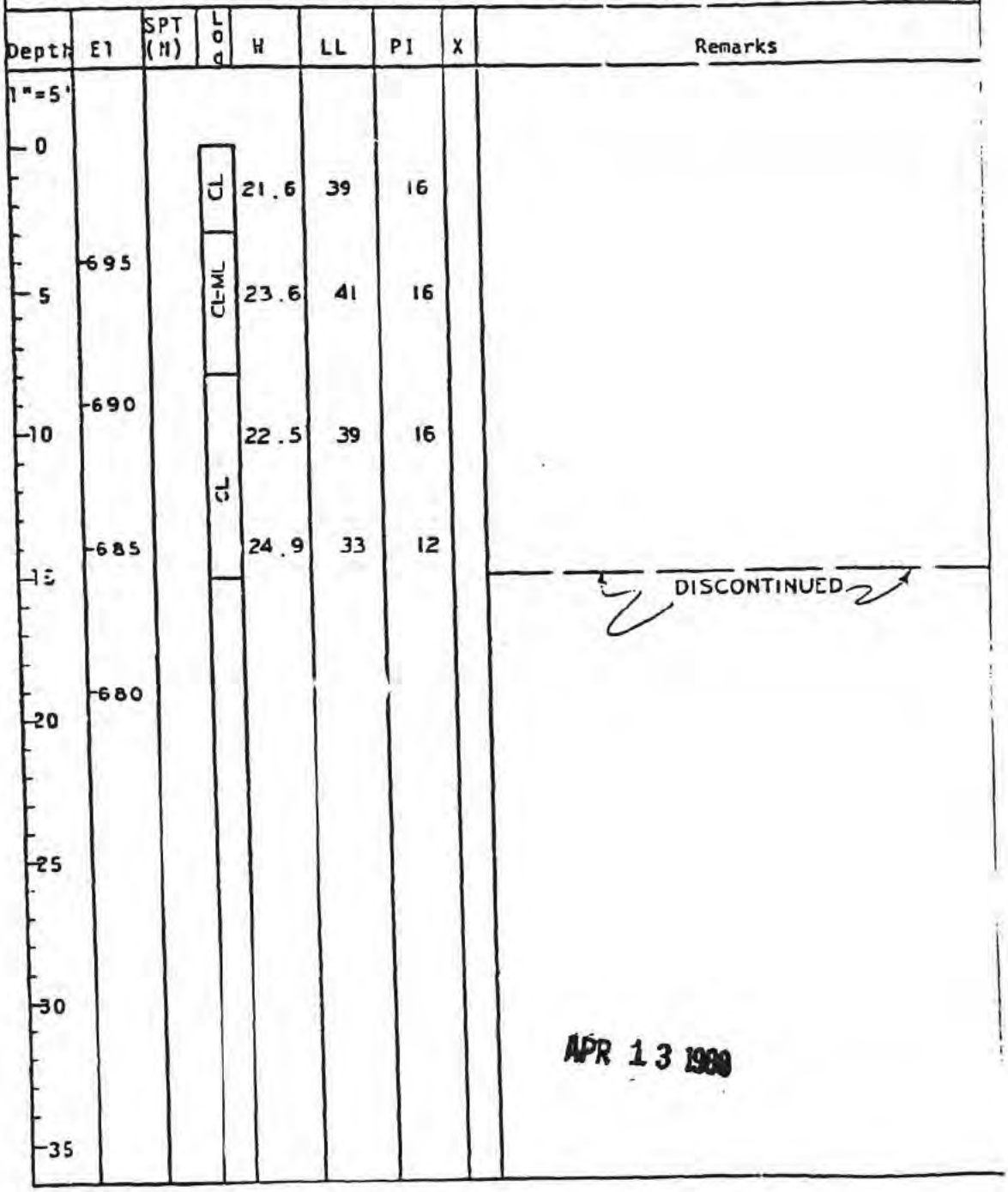
ATORY
NG)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-9 Station 19 + 89S Range 45 + 30W Surface El 699.0

Date Drilled 10-9-80 To 10-9-80 Prepared By LB Checked By WEI



APR 13 1989

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-10 Station 20+28S Range 47+26W Surface El 698.3

Date Drilled 10-9-80 To 10-9-80 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0			CL	25.2	47	22		
	695							
5			CL ML	25.1	46	18		
	690							
10			CH MH	26.5	52	23		
	685							
15			CL	25.7	48	23		
	680							DISCONTINUED
20								
	675							
25								
30								
35								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-10
FIGURE 2.5-269

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 1

Project WATTS BAR N. P. Feature BORROW AREA 7

Boring PAH-11 Station 20+68S Range 49+26W Surface El 696.5

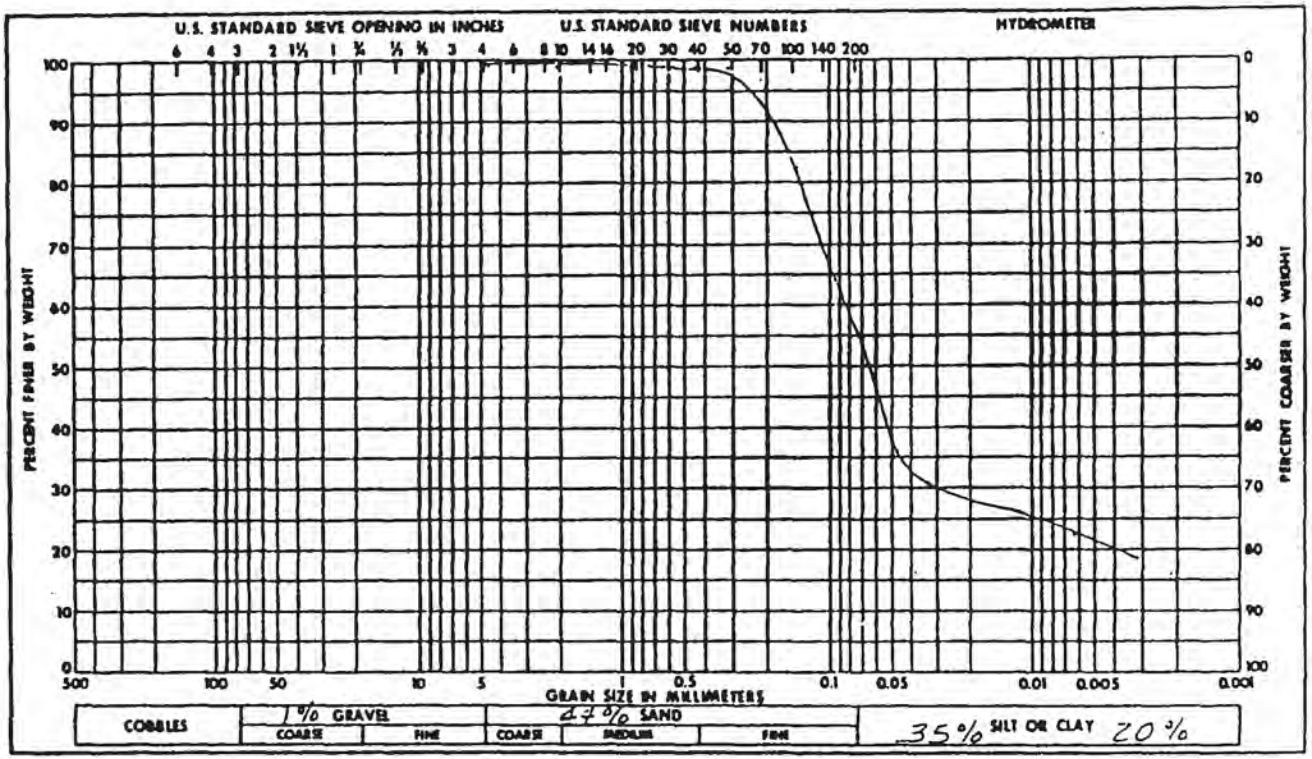
Date Drilled 10-9-80 To 10-9-80 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0	695		CL	21.0	49	23		
5			CL	21.2	44	19		
	690							
				25.2	46	22		
10								
	685		CH/MH	33.7	54	25		
15								
	680							DISCONTINUED
20								
	675							
25								
30								
35								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE-BORROW AREA 7-BORING PAH-11
FIGURE 2.5-270

LIQUEFACTION
FIGURE 2.5-351

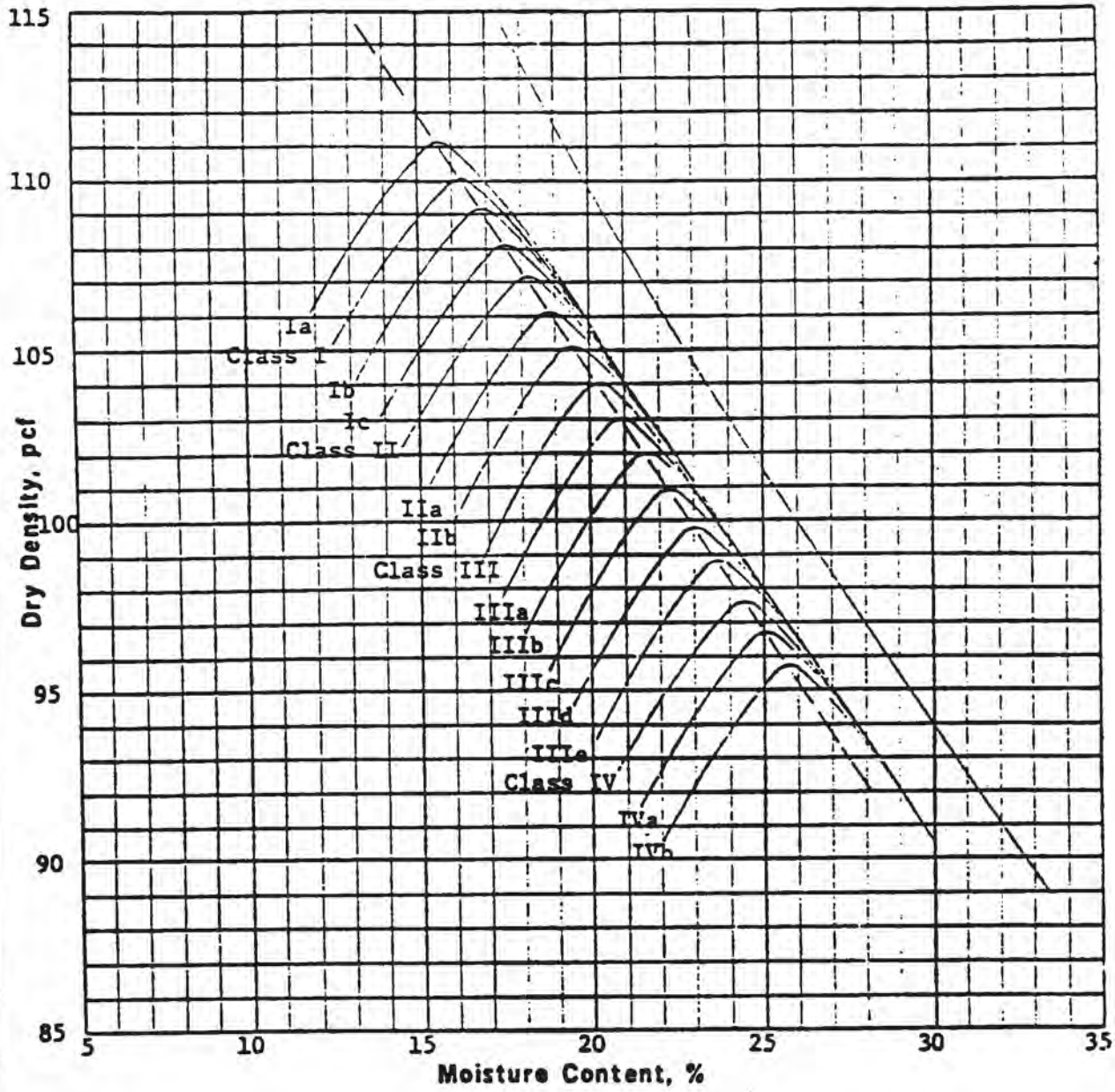


Soil Symbol	ML	Liquid Limit, %	28.2
Moisture Content, %	34.3	Plastic Limit, %	23.2
Specific Gravity	2.71	Plasticity Index, %	5.0
		Shrinkage Limit, %	

Remarks:

Project Watts Bar N.P.	
Feature Liquefaction	
Boring No. WS-65-1	Sample No. 5
Station 1367.0 S	Range 1005.7 E
Date 7-13-71	Elevation 703.8-703.3

GRAIN SIZE ANALYSIS



Soil Class	Gravel %	Sand %	Silt %	Clay %	Specific Gravity	LL %	PI %	Optimum Moisture, %	Maximum Density, pcf
I-CL	0	32	39	29	2.75	34	11	16.2	110.1
II-CL	0	34	35	31	2.72	34	12	18.2	107.2
III-CL	0	19	39	42	2.74	43	18	20.2	104.0
IV-CH-MH	0	6	42	52	2.74	54	25	24.4	97.7

Plus No. 4 Specific Gravity, S S D	
Plus No. 4 Absorption, %	

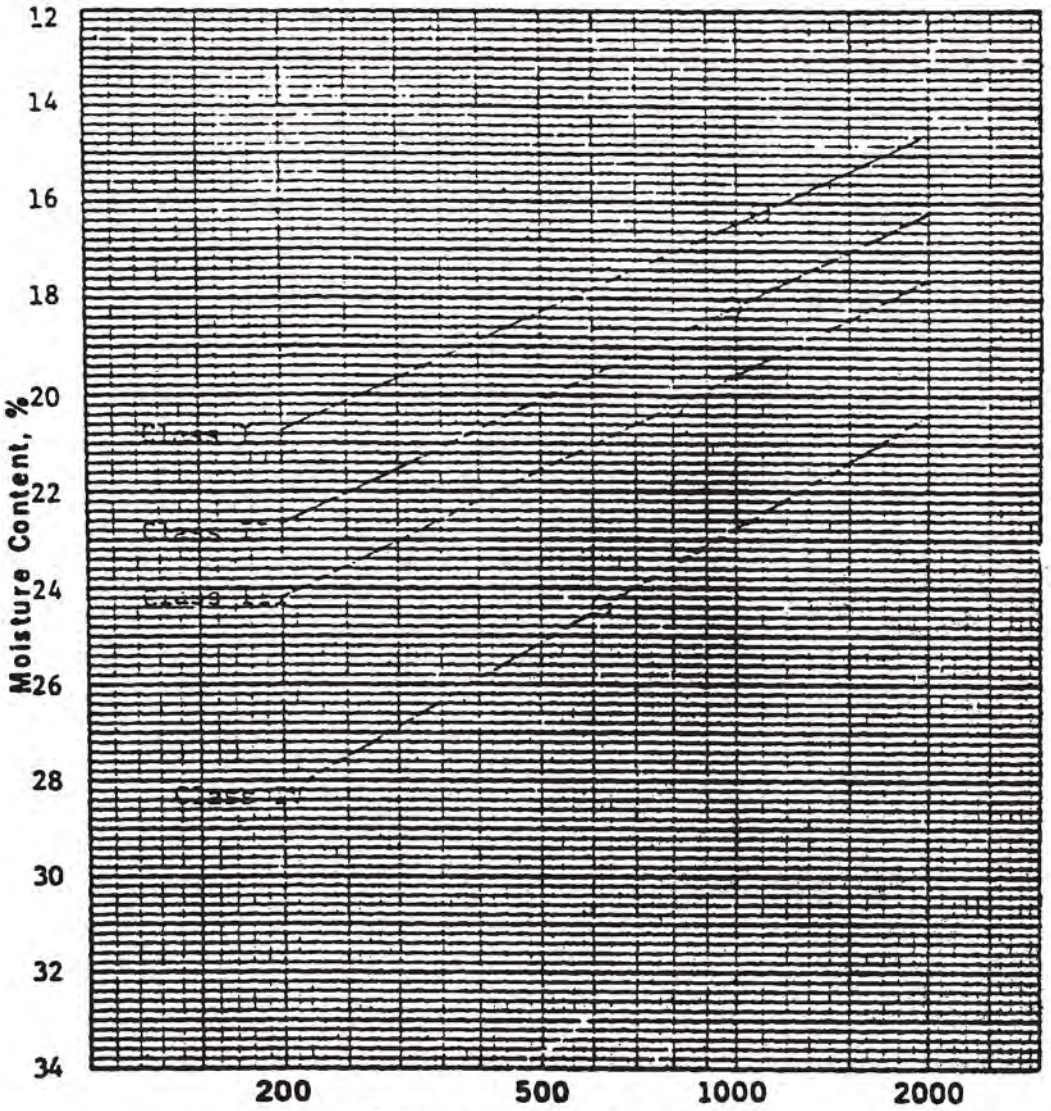
Remarks:

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

COMPACTION TEST (FAMILY OF CURVES)
BORROW AREA 7
FIGURE 2.5-271

TVA 10201 (CONST-12-76)

Tested by: CHF Reviewed by: CEF



Soil Class	Optimum Moisture, %	Maximum Density, pcf	Penetration Resistance, psi
I-CL	16.2	110.1	1100
II-CL	18.2	107.2	980
III-CL	20.2	104.0	800
IV-CH-MH	24.4	97.7	620

Remarks:

⊙ Denotes Optimum Moisture

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

MOISTURE-PENETRATION TEST-
BORROW AREA 7
FIGURE 2.5-272

TVA 10200 (CONST-6-77)

Tested by: CHF Reviewed by: CBF

SECURITY-RELATED INFORMATION, WITHHELD UNDER 10CFR2.390
FIGURE 2.5-273

SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF 1

PROJECT WATTS BAR N. P. FEATURE 1E CONDUIT BANKS

BORING SS-171 STATION 760+1E RANGE 1276.9S SURFACE ET 721.2

DATE DRILLED 11-25-81 TO 12-1-81 PREPARED BY JLB CHECKED BY HPP

DEPTH	ET	SPT (N)	LOG	W%	LL	PI	REMARKS
1"=5'							
0	720						1032 - GRAVEL FILL
5	715						
		20	SM-SC	24.6	40	14	ALLUVIUM
10	710	11		26.4	42	15	
		6	SM	26.7			
15		9	SP-SM	26.5	NP	NP	
	705	9		24.1			
		12		30.9			
20		50	SM	19.7	37	11	WEATHERED SHALE
	700	50/4"	ML	23.4	NP	NP	
25	695						BEDROCK
30							
35							

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE (SS, PA, HA, TP BORING) IE CONDUIT BANKS FIGURE 2.5-274

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF _

PROJECT WATTS BAR N. P. FEATURE 1 E CONDUIT BANKS

BORING SS-172 STATION 672.25E RANGE 1227.75S SURFACE EL 728.0

DATE DRILLED 12-7-81 TO 12-7-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	EL	SPT (N)	GOL	W	LL	PI	REMARKS
1"=5'							
0							1032-GRAVEL FILL
	725	17	CL	19.4	34	15	BACKFILL
5		14		20.9			
		8		23.3	36	16	
	720	15		21.4	41	18	
10		17		19.9	36	13	
	715	34		19.2	38	15	
		33	CL-ML	23.5	48	21	ALLUVIUM
15		29	CL	20.6	39	17	
	710	15		26.1	40	17	
20		15		23.7	42	18	
	705	30	GM	13.8	34	9	
25		43	SM	22.0	35	8	
		50		22.5	36	10	
	700	50+	SM-SC	21.2	35	11	WEATHERED SHALE
30		50		21.9	36	12	
	695	41	SM	22.6	36	11	
35							

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
(SS, PA, HA, TP BORING)
ID CONDUIT BANKS
FIGURE 2.5-275

SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF

PROJECT WATTS BAR N. P. FEATURE 1E CONDUIT BANKS

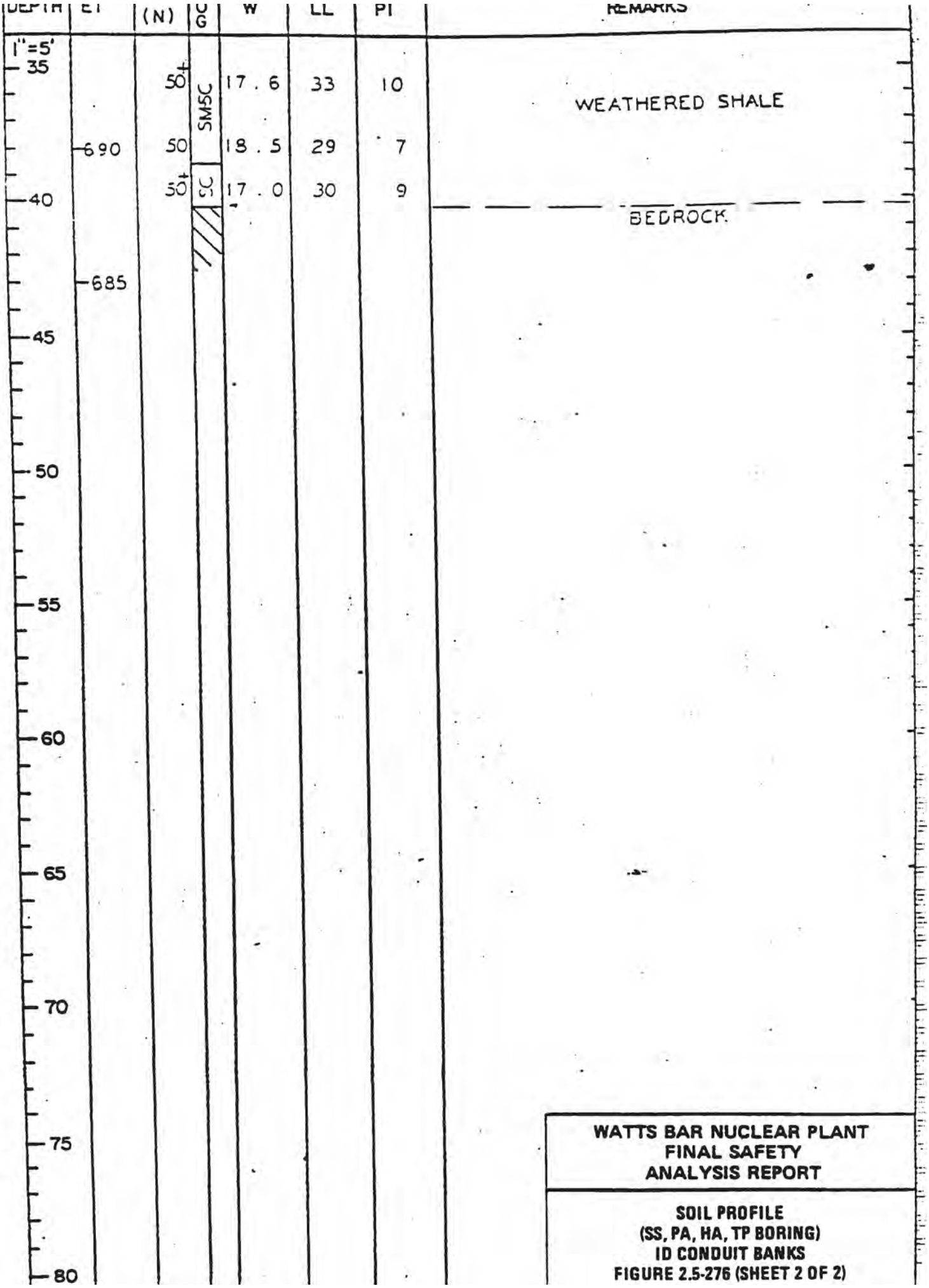
BORING SS-173 STATION 583.3E RANGE 1177.8S SURFACE EL 728.(

DATE DRILLED 12-2-81 TO 12-3-81 PREPARED BY JLB CHECKED BY HI

DEPTH	EL	SPT (N)	GOL.	W	LL	PI	REMARKS
1"=5'							
0							1032-GRAVEL FILL
	725	18	CL	22.3	46	20	
5		20	CL-ML	21.9	41	14	
	720	16	CL	19.3	40	16	
10		23	ML	20.4	39	13	ALLUVIUM
		25	SC	17.8	30	9	
	715	37		18.8	33	12	
15		28	ML-MH	25.0	49	17	
	710	25	SC	20.9	35	13	
20		20	SM-SC	20.6	37	12	
		28	SM	24.6	55	20	
	705		CH-MH		57	27	
		50+		22.9	42	14	
25		21		36.6	41	9	
	700	40	SM	23.5	48	11	WEATHERED SHALE
30		25		25.8	36	10	
		34		24.9	39	13	
	695	30	SM-SC	20.5	33	9	
35							

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
(SS, PA, HA, TP BORING)
ID CONDUIT BANKS
FIGURE 2.5-276 (SHEET 1 OF 2)



WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
(SS, PA, HA, TP BORING)
ID CONDUIT BANKS
FIGURE 2.5-276 (SHEET 2 OF 2)

TENNESSEE VALLEY AUTHORITY — CHATTANOOGA, TENNESSEE — CENTRAL LABORATORIES — ENGINEERING LABORATORY

SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF _

PROJECT WATTS BAR N. P. FEATURE 1 E CONDUIT BANKS

BORING SS-174 STATION 490.75E RANGE 1123.75S SURFACE EL 728.0

DATE DRILLED 12-3-81 TO 12-4-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	EL	SPT (N)	GOL	W	LL	PI	REMARKS
1"=5'							
0							1032-GRAVEL FILL
	725	40	ML	21.5	43	15	
5		18	CL	19.4	39	18	
		33	ML	21.9	44	15	
	720	47	CL	19.1	40	18	BACKFILL
10		47	ML	25 4	44	15	
		45		21.3	38	12	
	715	40	SC	15.5	32	13	
15		41	CL ML	19.0	39	15	
	710	50+	SM	18.3	NP	NP	ALLUVIUM
20		50+	GC	14.2	—	—	
		50+	CL ML	21.3	44	16	
	705						
25		50+		—	—	—	
		50+	ML	21.6	40	13	WEATHERED SHALE
	700	50+	SM	21.6	38	12	
30		50+	SM-SC	18.8	32	8	
	695						
35							

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
(SS, PA, HA, TP BORING)
ID CONDUIT BANKS
FIGURE 2.5-277

SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF

PROJECT WATTS BAR N. P. FEATURE 1 E CONDUIT BANKS

BORING SS-175 STATION 405.75E RANGE 1072.85 SURFACE ET 728.0

DATE DRILLED 12-3-81 TO 12-4-81 PREPARED BY JLB CHECKED BY HDA

DEPTH	ET	SPT (N)	GOL G	W	LL	PI	REMARKS
1"=5'							
0							1032-GRAVEL FILL
	725						
5		14	SC	15.9	37	17	ALLUVIUM
		21	CL-ML	24.5	47	20	
	720						
10		19	SC	17.8	37	16	
		31	ML	20.8	40	13	
	715						
		38	SC	15.5	32	12	
15		22	CH	33.0	54	26	
		33		25.0	38	10	
	710						
20		47		23.6	39	12	WEATHERED SHALE
		42	SM	23.1	43	15	
	705						
		30		31.4			
25		41		25.7	NP	NP	
							DISCONTINUED
	700						
30							
35							

Added by Amendment 49

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE (SS, PA, HA, TP BORING) ID CONDUIT BANKS
FIGURE 2.5-278

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

SHEET 1 OF _

PROJECT WATTS BAR N. P FEATURE 1 E CONDUIT BANKS

BORING SS-176 STATION 377.25E RANGE 968.75S SURFACE EL 728.0

DATE DRILLED 12-7-81 TO 12-8-81 PREPARED BY JLB CHECKED BY HPM

DEPTH	EL	SPT (N)	GOL	W	LL	PI	REMARKS
1"=5'							
0							1032-GRAVEL FILL
	725	35	SC	15.5	32	12	BACKFILL
		29	SM	11.0	20	1	
5		47	SP-SM	5.3	NP	NP	
	720	50+	SM	11.1			
10		50+	SM-SC	27.2	26	5	ALLUVIUM
		50+		7.8			
		50+	GP-GM	13.3	NP	NP	
	715	50+	GM	11.5			
15		50+		13.0			
	710	50+	CL-ML	27.5	41	16	
20		47	SM-SC	21.5	39	13	
		50+		19.6	36	12	WEATHERED SHALE
	705	50+	CL-ML	23.8	40	13	
25		50+	SM-SC	20.6	36	11	
	700						DISCONTINUED
30							
35							

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
(SS, PA, HA, TP BORING)
ID CONDUIT BANKS
FIGURE 2.5-279

TENNESSEE VALLEY AUTHORITY

SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS,PA,HA,TP BORING)

SHEET 1 OF

PROJECT WATTS BAR N.P. FEATURE I.E. CONDUIT BANKS

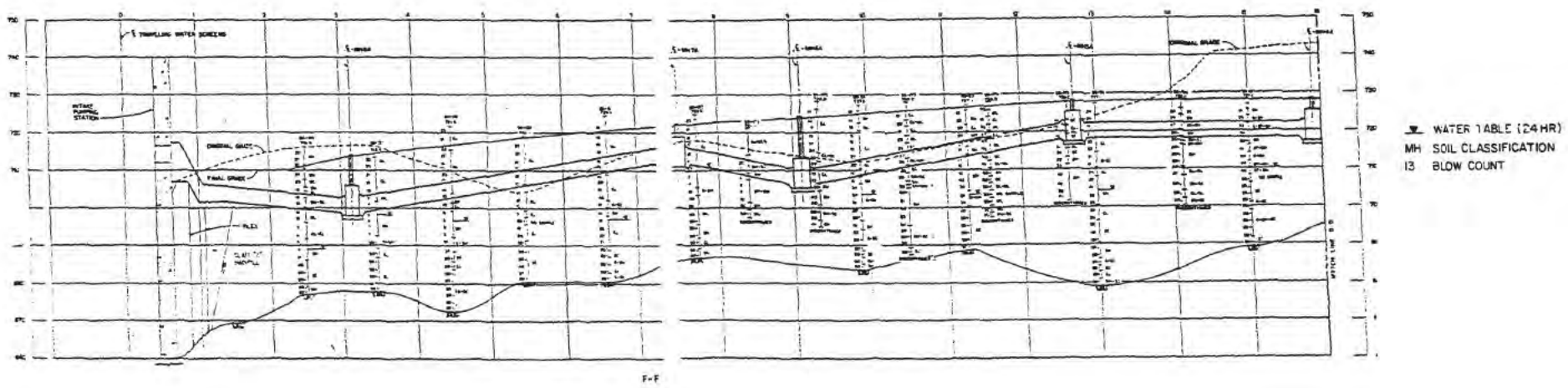
BORING SS-177 STATION 353.25E RANGE 753.75S SURFACE El 728.0

DATE DRILLED 12-10-81 TO 12-10-81 PREPARED BY JLB CHECKED BY HPN

DEPTH	El	SPT (N)	LOG	W	LL	PI	REMARKS
1" = 5'							
0							1032-GRAVEL FILL
	725	50+	CL	16.7	34	15	BACKFILL
		50		8.5	NP	NP	
5							
		20		15.4	24	1	
	720	50+	SM	13.8			
10		50+		14.2			
		50+		SP-SM 9.2			
	715						ALLUVIUM
		50+		SW-SM 16.3	NP	NP	
15		50+	SM	11.2			
	710	50+		SP-SM 11.7			
20		50+	SM	13.1			
		50+		12.1 GP-GM			
	705						WEATHERED SHALE
		50+		8.2 SM-SC	26	6	
25							BEDROCK
	700						
30							
35							

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
(SS, PA, HA, TP BORING)
ID CONDUIT BANKS
FIGURE 2.5-280

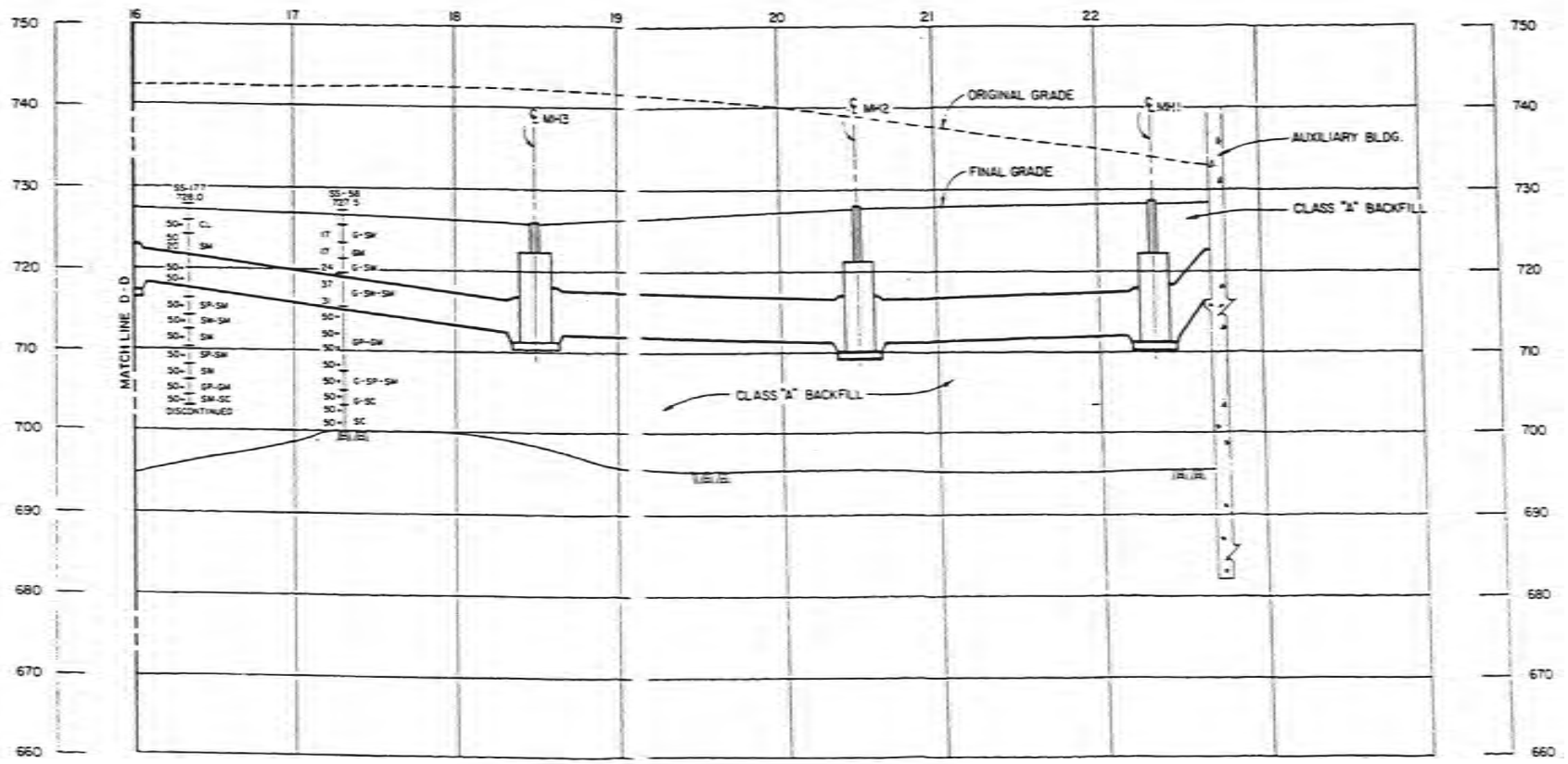


F-F

Watts Bar Nuclear Plant
Final Safety Analysis Report

Category 1 Conduit Banks
Section FF, Sheet 1 of 2
Figure 2.5-281

Historical

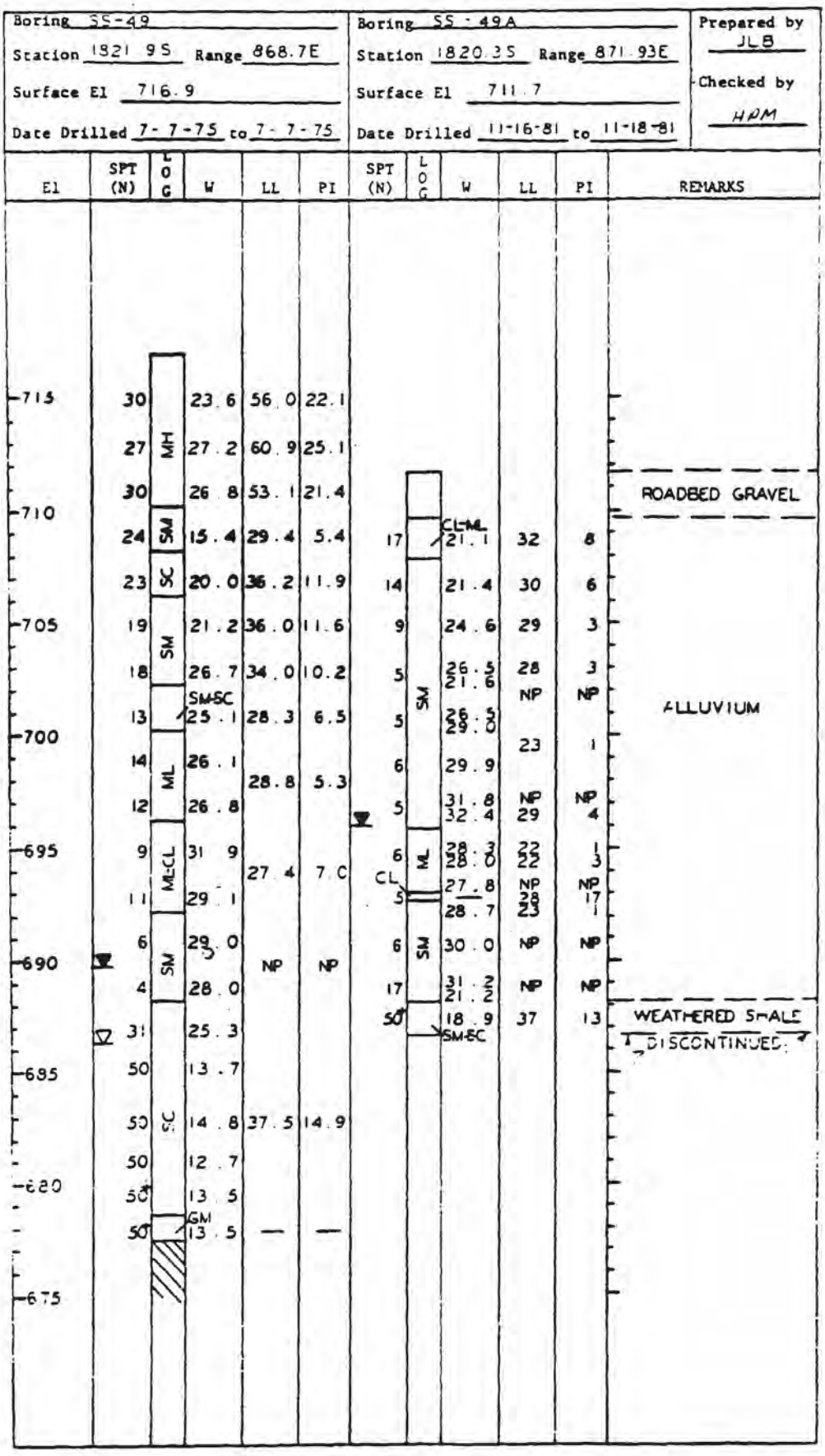


Watts Bar Nuclear Plant
Final Safety Analysis Report

Category 1 Conduit Banks
Section FF, Sheet 2 of 2
Figure 2.5-281

Historical

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-282

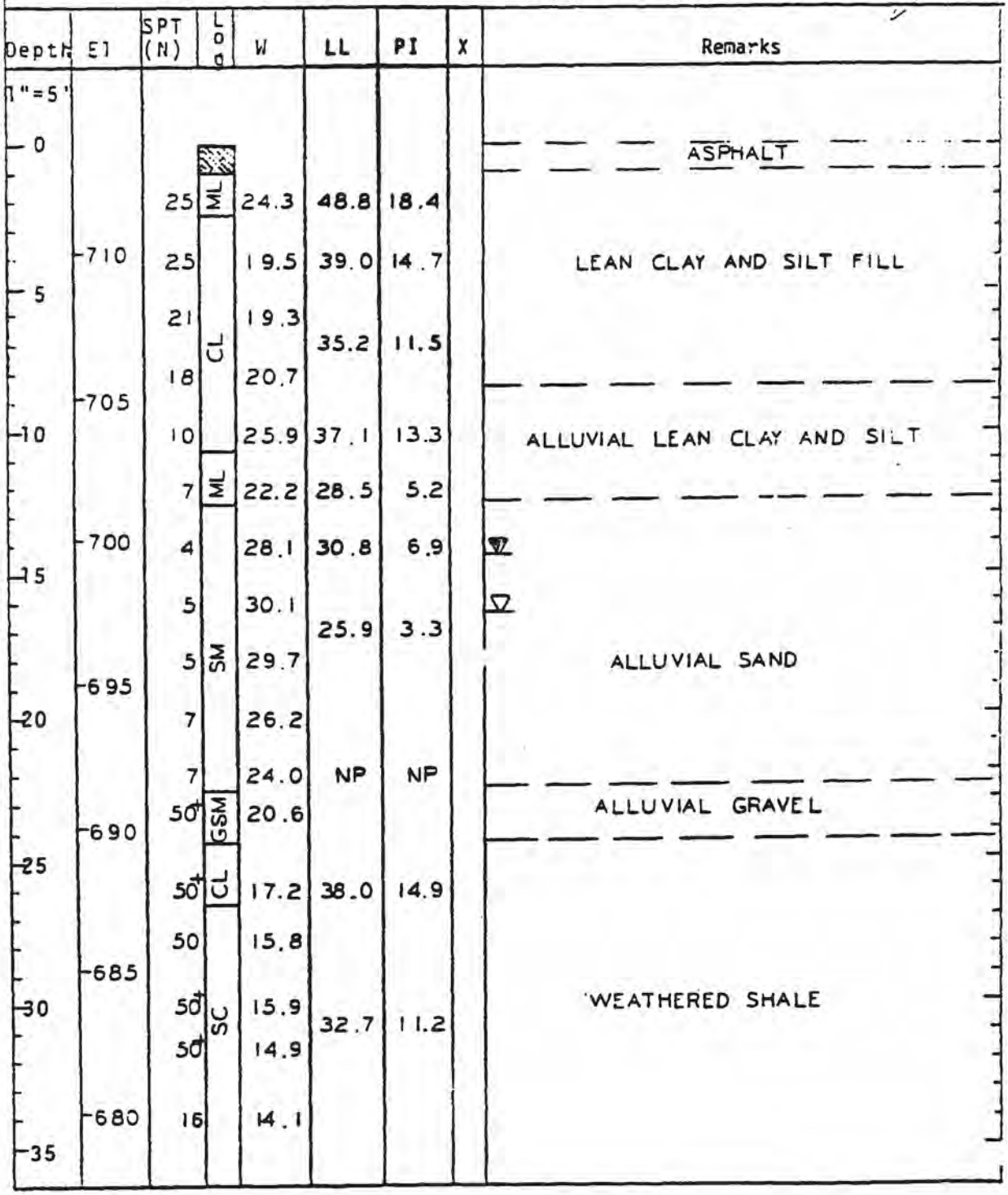
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-283
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-131 Station 1755.0S Range 805.0E Surface El 713.9

Date Drilled 6-1-79 To 6-4-79 Prepared By JLB Checked By JCJ



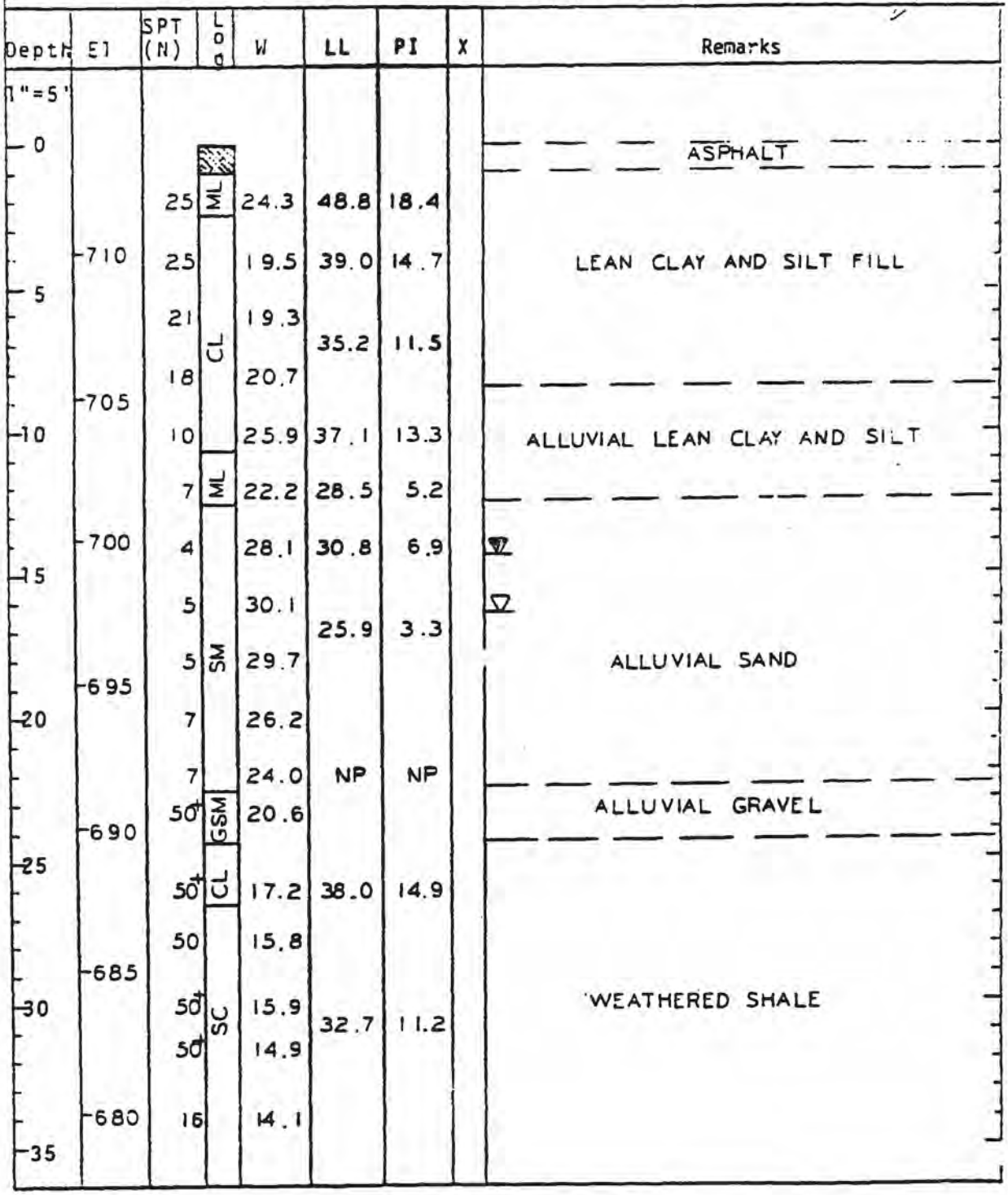
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-283
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-131 Station 1755.0S Range 805.0E Surface El 713.9

Date Drilled 6-1-79 To 6-4-79 Prepared By JLB Checked By JCJ



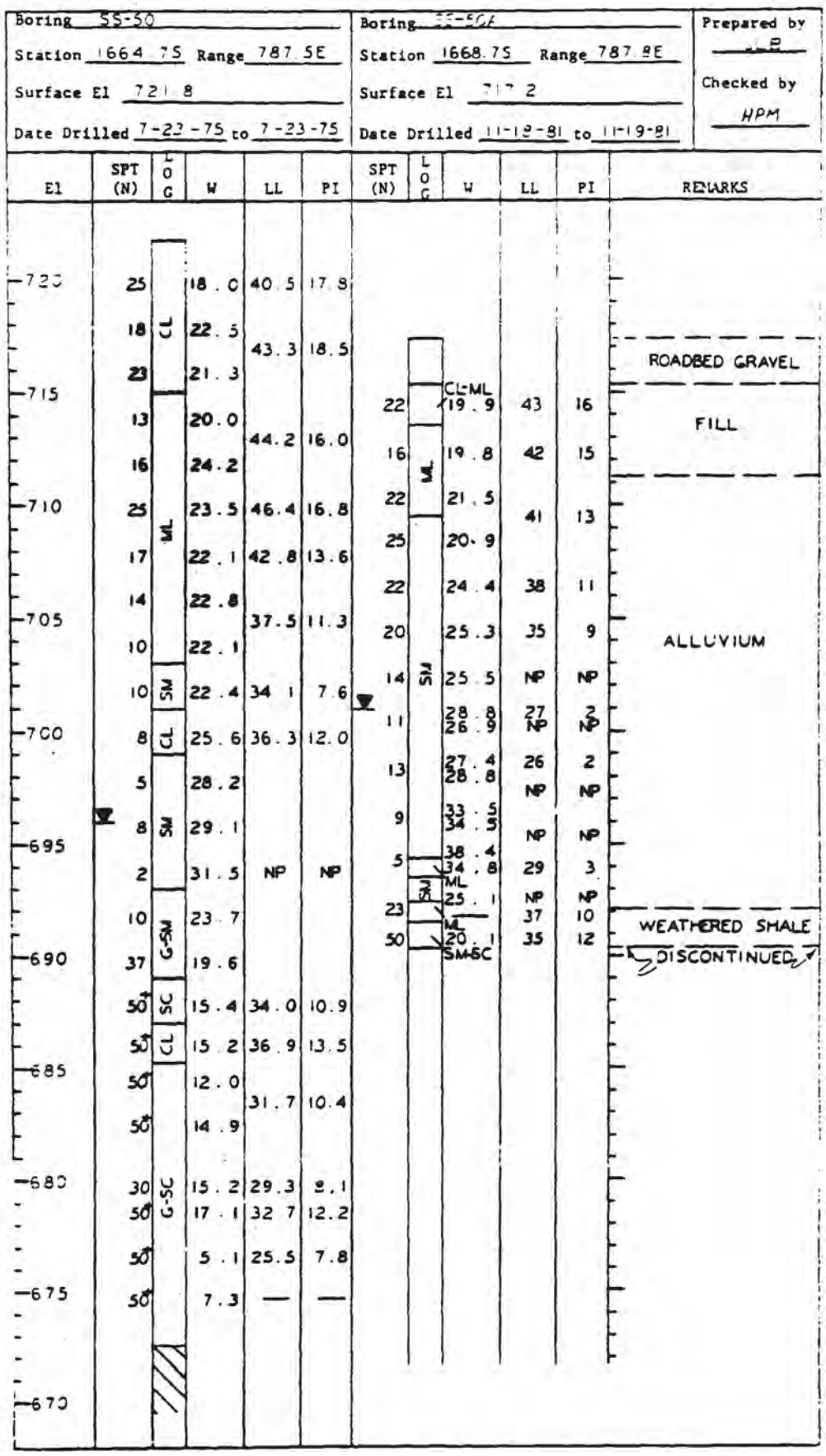
Project WATTS BAR N. P. Boring SS-131

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
-35		50+	SC	10.8	32.7	11.2		WEATHERED SHALE
								BEDROCK
	675							
-40								
	670							
-45								
-50								
-55								
-60								
-65								
-70								
-75								
-80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-283
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-284

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-285
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-132 Station 1560.0 S Range E 785.0 E Surface El 719.1

Date Drilled 6-4-79 To 6-5-79 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5								
0								
		22		19.6				
	715							
5		22		20.3				
		19		22.3				
					44.7	17.9		ALLUVIAL SANDY LEAN CLAY
	710	14	CL	21.3				
10								
		15		21.8				
		13		23.5				▽
	705							
15		14		23.6	42.0	17.8		▽
		13		25.7	43.1	15.2		
			ML					ALLUVIAL LEAN SILT
	700	15		23.4	45.8	17.5		
20								
		5	CL	25.9	40.4	16.8		
		50+		—	—	—		NO SAMPLE RECOVERY
	695							
25		18		22.7				LAMINATED RESIDUAL CLAY
			CL		40.8	16.6		
		29		19.3				
	690	50+		20.2				
30		50+		16.5				WEATHERED SHALE
			SC		37.1	12.9		
		50+		15.6				
	685							
35		48		16.6				

Project WATTS BAR N. P. Boring SS-132

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
-35								
		37	SC	19.1	37.1	12.9		NO SAMPLE RECOVERY
		50+						
	680							BEDROCK
-40								
	675							
-45								
-50								
-55								
-60								
-65								
-70								
-75								
-80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-285
SHEET 2 OF 2

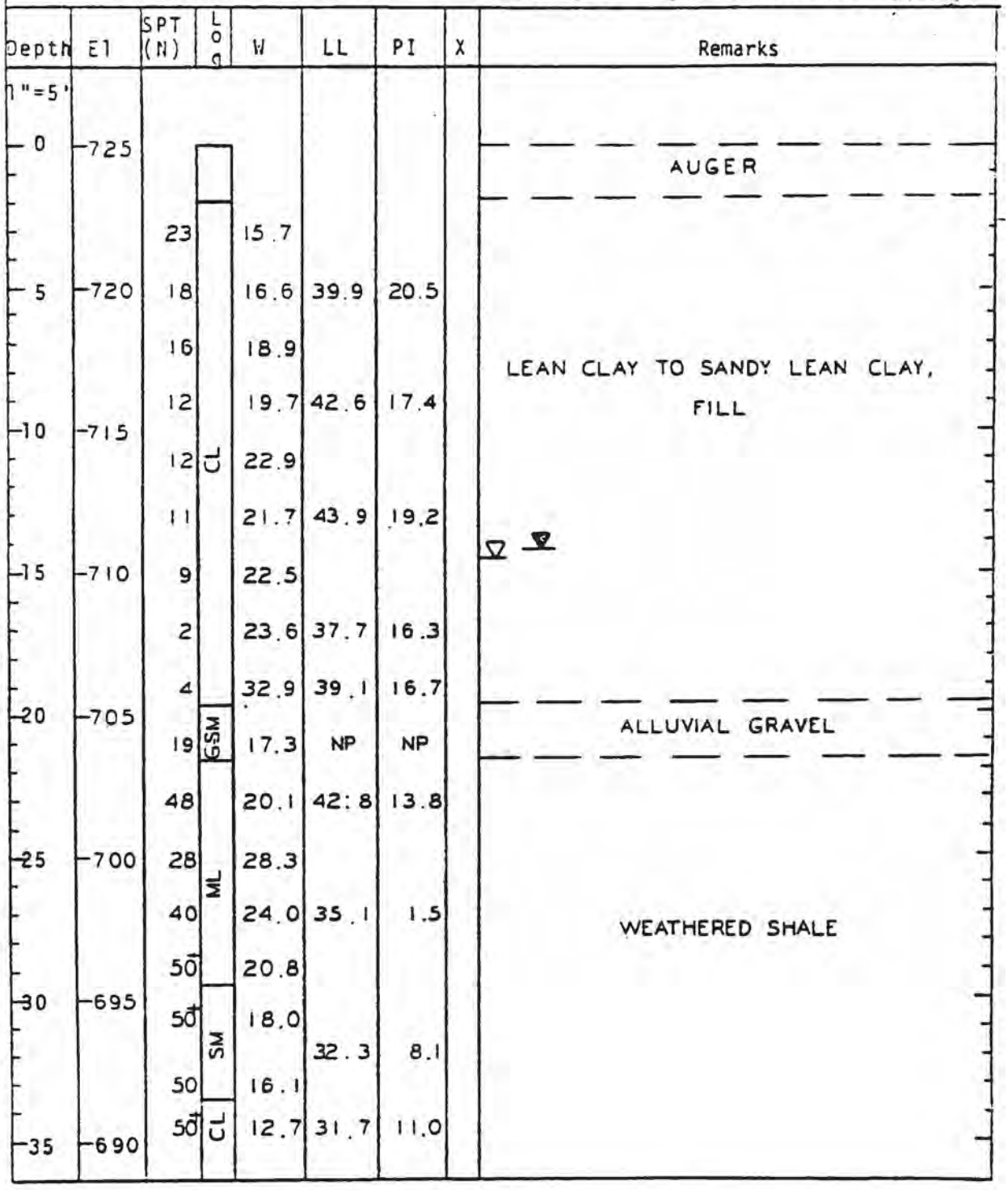
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

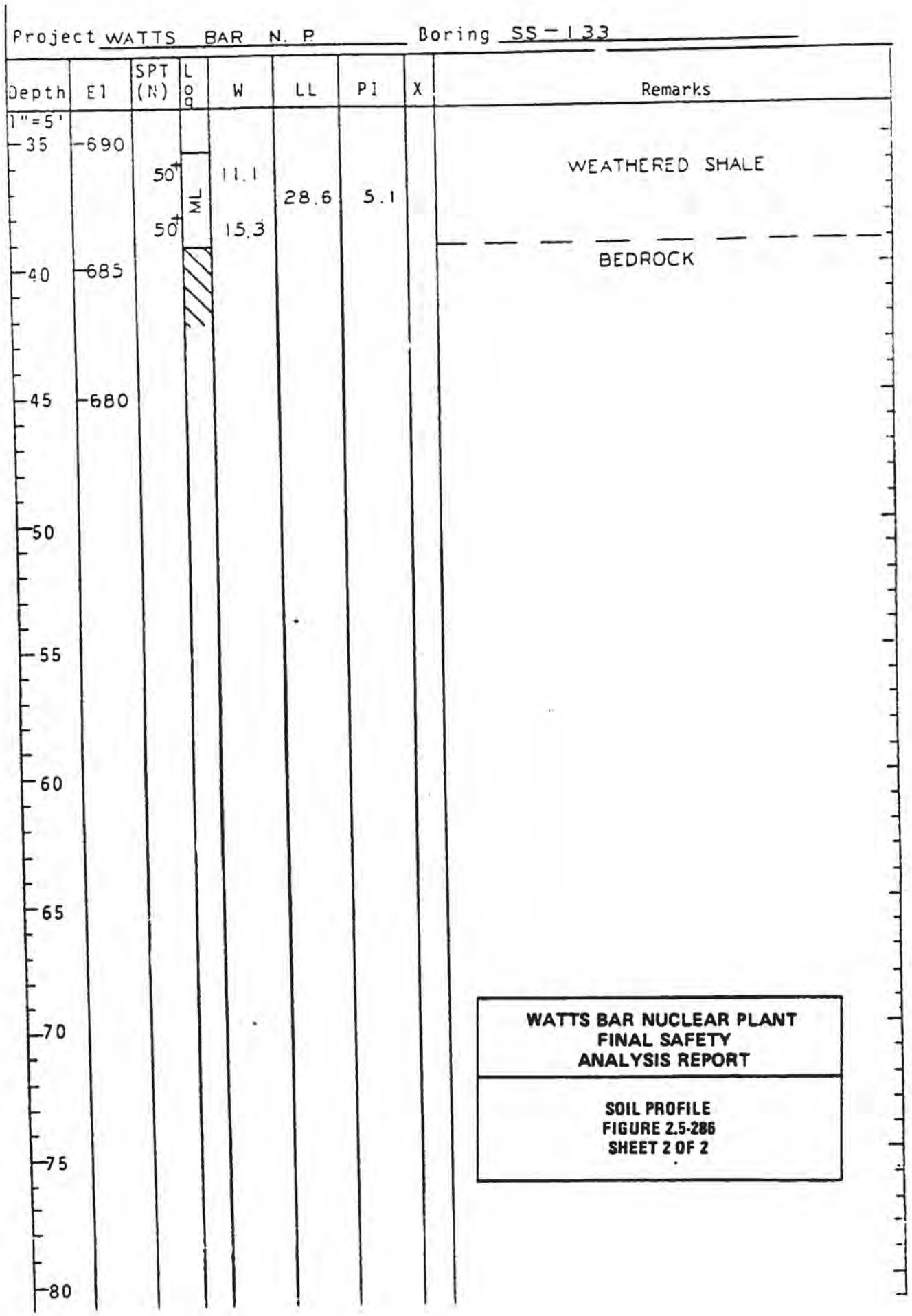
SOIL PROFILE
FIGURE 2.5-286
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-133 Station 1361.0S Range 785.0E Surface El 725.0

Date Drilled 6-4-79 To 6-4-79 Prepared By JLB Checked By





WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-286
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-287
SHEET 1 OF 2

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-134 Station 1373.0S Range 900.0 E Surface El 726.5

Date Drilled 6-6-79 To 6-7-79 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
	725	10	CL	20.0				
		16		16.9	28.0	8.4		
5								
	720	14		18.9				ALLUVIAL SANDY LEAN CLAY
		15		18.7	36.2	17.1		
10		8		21.7				
	715	13		20.9				
		2		23.8	39.1	19.5		
15								
	710	3	SM	29.3				ALLUVIAL SAND
		8		27.5	NP	NP		
20		27	GM	11.4				ALLUVIAL GRAVEL
	705	50+		10.0				
		50+		18.1				
25		50+	CL	18.1				
	700	50+		16.5	39.3	15.2		
		50+		16.6				WEATHERED SHALE
30								
	695	50+	SC	20.4				
		42		16.2	36.7	13.5		
35								

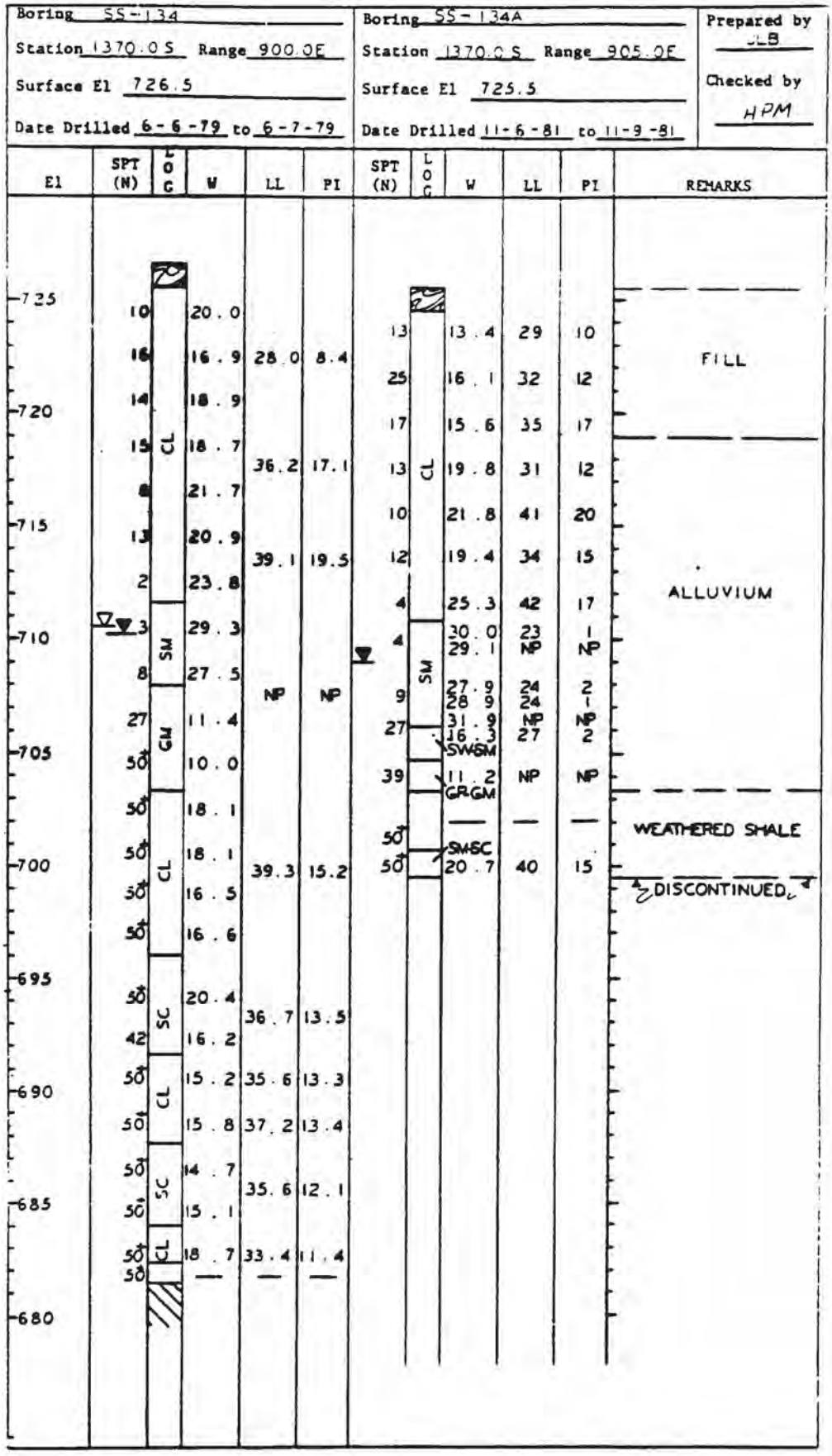
Project WATTS BAR N. P Boring SS-134

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
-35								
		50/4	CL	15.2	35.6	13.3		
	690	50/4	CL	15.8	37.2	13.4		WEATHERED SHALE
-40		50/4	SC	14.7	35.6	12.1		
	685	50/4	SC	15.1				
		50/4	CL	18.7	33.4	11.4		
-45		50/4		—	—	—		NO SAMPLE RECOVERY
	680							BEDROCK
-50								
-55								
-60								
-65								
-70								
-75								
-80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-287
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-288

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-289
SHEET 1 OF 2

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-135 Station 1370.0S Range 1000.0 E Surface El 726.9

Date Drilled 5-30-79 To 6-1-79 Prepared By JLB Checked By CBG

Depth	El	SPT (N)	AOL	W	LL	PI	X	Remarks
1"=5'								
0								
	725	7	CL	—	30.9	12.2		SANDY LEAN CLAY FILL
		13		19.4	32.7	9.7		
5		13		19.3	37.8	19.6		
	720	21	ML	—	48.0	19.6		ALLUVIAL SANDY SILT
		14		26.7	46.5	16.5		
10								
	715	12		26.3	42.2	13.8		
		11	SM	23.6	34.1	8.7		
15		12		20.1	30.0	4.4		
	710	8		—				ALLUVIAL SAND
		8		—	NP	NP		
20								
	705	8		25.3				
		8		—	32.3	11.8		LAMINATED RESIDUAL CLAY
			CL					
25		22	G-SM	28.9	44.5	15.8		
	700	26		25.7	43.5	16.7		WEATHERED SHALE
		50	SM	20.4	38.9	12.7		
30								
	695	48		21.3	38.6	12.4		
		43		23.3	37.9	10.5		
35								

Project WATTS BAR N. P Boring SS-135

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+	CL	17.9	34.3	11.3		
	690	50+	CL	—	35.1	13.1		
		50+	SC	15.6	34.1	12.0		WEATHERED SHALE
40		50+	SC	12.3	30.7	10.7		
	685		CL					
		50+	CL	20.6	**36.1**	16.1		
45		50+	CL	11.2	**28.5**	8.7		
								BEDROCK
	680							
50								
	675							
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-289
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE

Boring SS-135	Station 1373.0 S Range 1000.0 E	Surface Elev 726.9	Date Drilled 5-30-79 To 6-1-79
Boring SS-135A	Station 1362.3 S Range 1004.5 E	Surface Elev 726.5	Date Drilled 11-9-81 To 11-10-81

Prepared By JLB
Checked By HAM

El	SPT (N)	LOG	W	LL	PI	SPT (N)	LOG	W	LL	PI	REMARKS
725	7		—	30.9	12.2	18	CL	16.1	28	7	
	13	CL	19.4	32.7	9.7	20		16.6	33	13	FILL
	13		19.3	37.8	19.6		CL-ML				
720	21		—	48.0	19.6	21		19.8	40	15	
	14	ML	26.7	46.5	16.5	19	ML	24.7	41	13	
						19		26.7	41	12	
715	12		26.3	42.2	13.8						
	11		23.6	34.1	8.7	13		24.3	31	3	
	12		20.1	30.0	4.4	7		22.8			
710	8	SM	—	—	—	7	SM	24.3	NP	NP	
						5		34.2			ALLUVIUM
	8		—	—	—	8		27.0	22	1	
				NP	NP		ML	32.1	27	2	
	8		25.3						39	7	
705			—			7	SM	32.1	25	2	
	8		—	32.3	11.8			30.9	NP	NP	
		CL				50/4"		16.7	—	—	
	22	C-SM	28.9	44.5	15.8		GM-GC				
700	26		25.7	43.5	16.7	36/4"	GM	30.1	46	14	
	50/4"		20.4	38.9	12.7						DISCONTINUED
		SM									WEATHERED SHALE
695	48		21.3	38.6	12.4						
	43		23.3	37.9	10.5						
	50/4"	CL	17.9	34.3	11.3						
690	50/4"		—	35.1	13.1						
	50/4"	SC	15.6	34.1	12.0						
	50/4"		12.3	30.7	10.7						
685		CL									
	50/4"		20.6	36.1	16.1						
	50/4"		11.2	28.5	8.7						
680											

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-280

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE

Boring SS-65	Boring SS-65B	Prepared by JLB
Station 1374.85 Range 1097.5E	Station 1362.35 Range 1091.0E	Checked by HPM
Surface El 726.0	Surface El 727.2	
Date Drilled 7-25-75 to 7-25-75	Date Drilled 11-13-81 to 11-13-81	

El	SPT (N)	LOG	W	LL	PI	SPT (N)	LOG	W	LL	PI	REMARKS
725	50	SC	15.4	36.3	15.6	1	SC	14.1	28	8	FILL
	35	CL	12.9	35.6	14.1	20	CL	12.5	32	14	
	24	MH	28.2	50.7	17.7	25	MH	28.3	55	8	ALLUVIUM
720	21		24.9			18		28.9	51	15	
	13	ML	24.5	40.4	13.0	12	ML	29.1	42	12	
	16		29.2	46.1	15.6	14		26.7	35	6	
715	12		21.5	33.1	6.6	9		25.7	29	2	
	10	SW	15.7	NP	NP	6	SW	27.5	25	1	
710	7		23.7	30.1	5.1	3		33.1 32.9	NP	NP	
	5		28.2	28.9	3.5	5		32.5	25	1	
705	8		—	—	—	7		27.1 30.8	26 25	2 1	
	20	GM	13.5	32.5	9.0	37		32.7 10.7	NP	NP	
	18	SW	24.8	46.4	18.2			21.9	44	14	WEATHERED SHALE
700	16		23.8								DISCONTINUED
	16	G-SW	24.7	43.4	15.9						
695	14		25.5								
	11	ML	40.7	47.1	13.4						
690	30		30.8	42.2	13.9						
	48	SC	19.8	34.4	11.2						
	50/4		14.3								
685				36.6	12.0						
	16		19.1								
	41	G-SC	22.6								
				33.8	10.5						
680	45		17.1								
	50/4		15.4								
				32.0	10.5						
	50		15.3								
675											

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-281

WATTS BAR NUCLEAR PLANT
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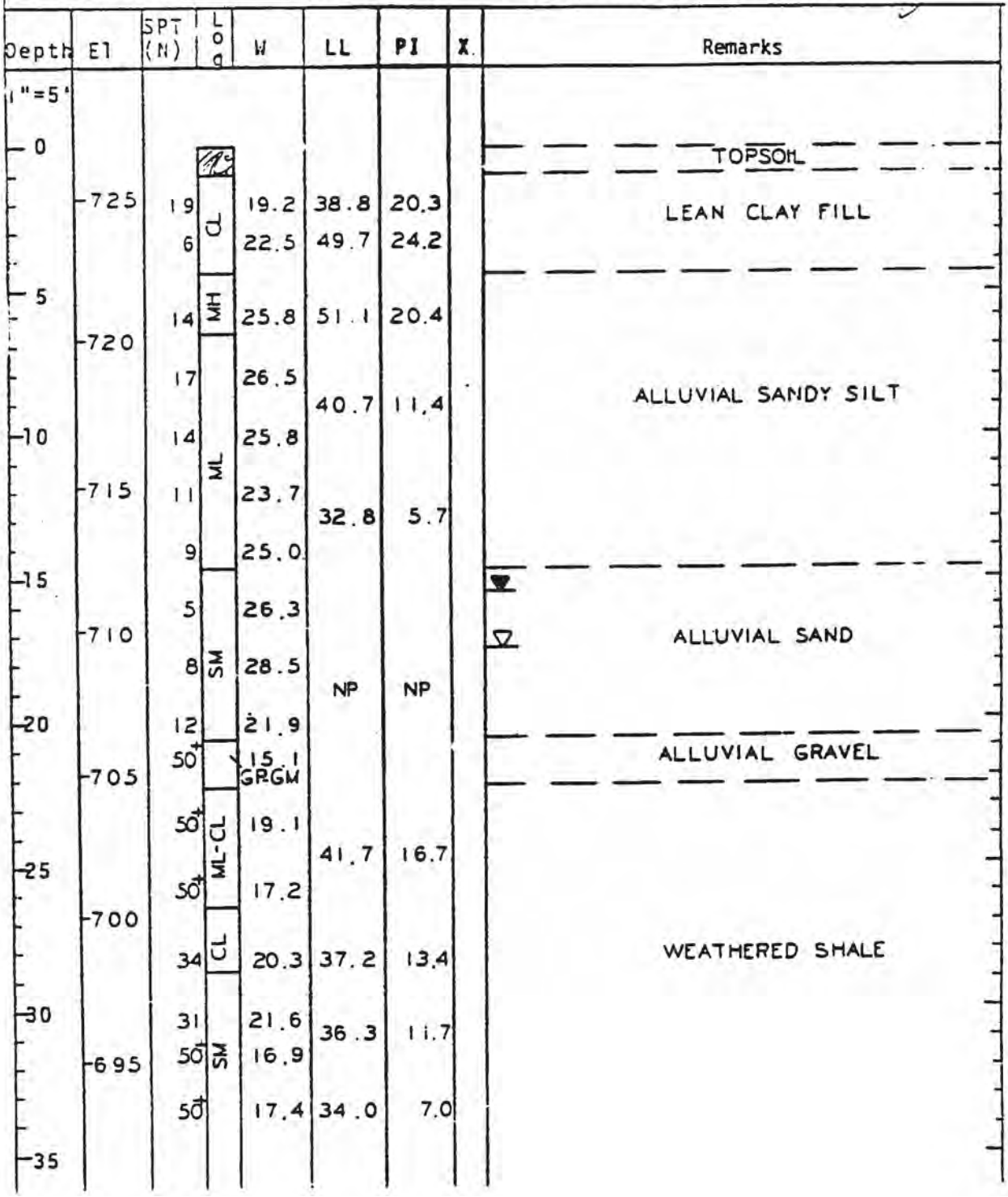
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-292
SHEET 1 OF 2

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-136 Station 1373.7 S Range 1215.0 E Surface El 726.9

Date Drilled 6-22-79 To 6-22-79 Prepared By JLB Checked By ACJ



Project WATTS BAR N. P. Boring SS-136

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35								
	690	50	SM	21.0	33.3	3.7		
		50+		20.3				WEATHERED SHALE
40		50+		12.6	35.3	13.2		
	685	50+	SC	12.8				
					31.4	9.6		
		50+		14.9				
45								BEDROCK
	680							
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-292
SHEET 2 OF 2

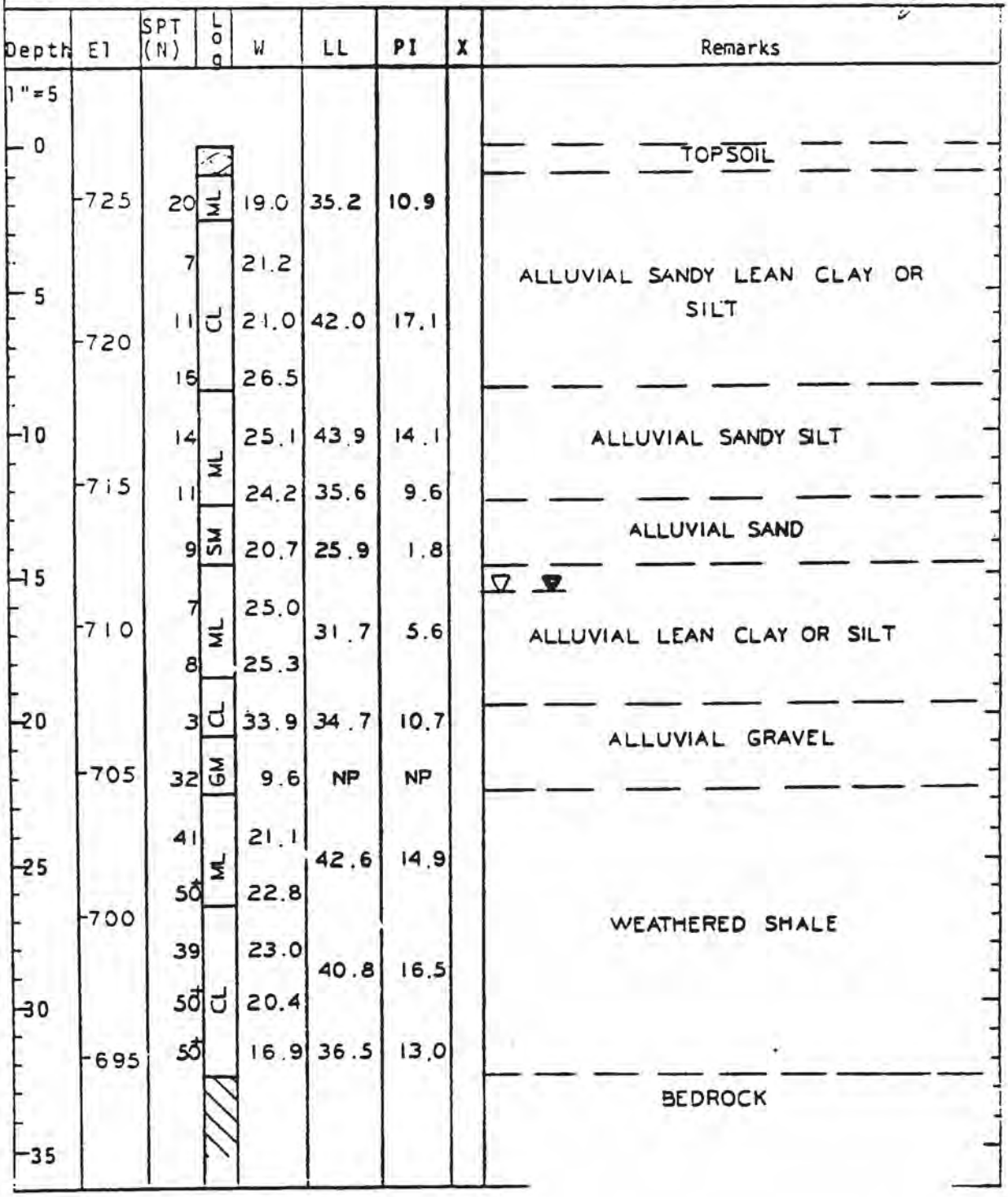
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-293
SHEET 1 OF 1

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-137 Station 1375.0 S Range 1300.0 E Surface El 726.9

Date Drilled 6-7-79 To 6-8-79 Prepared By JLB Checked By CC



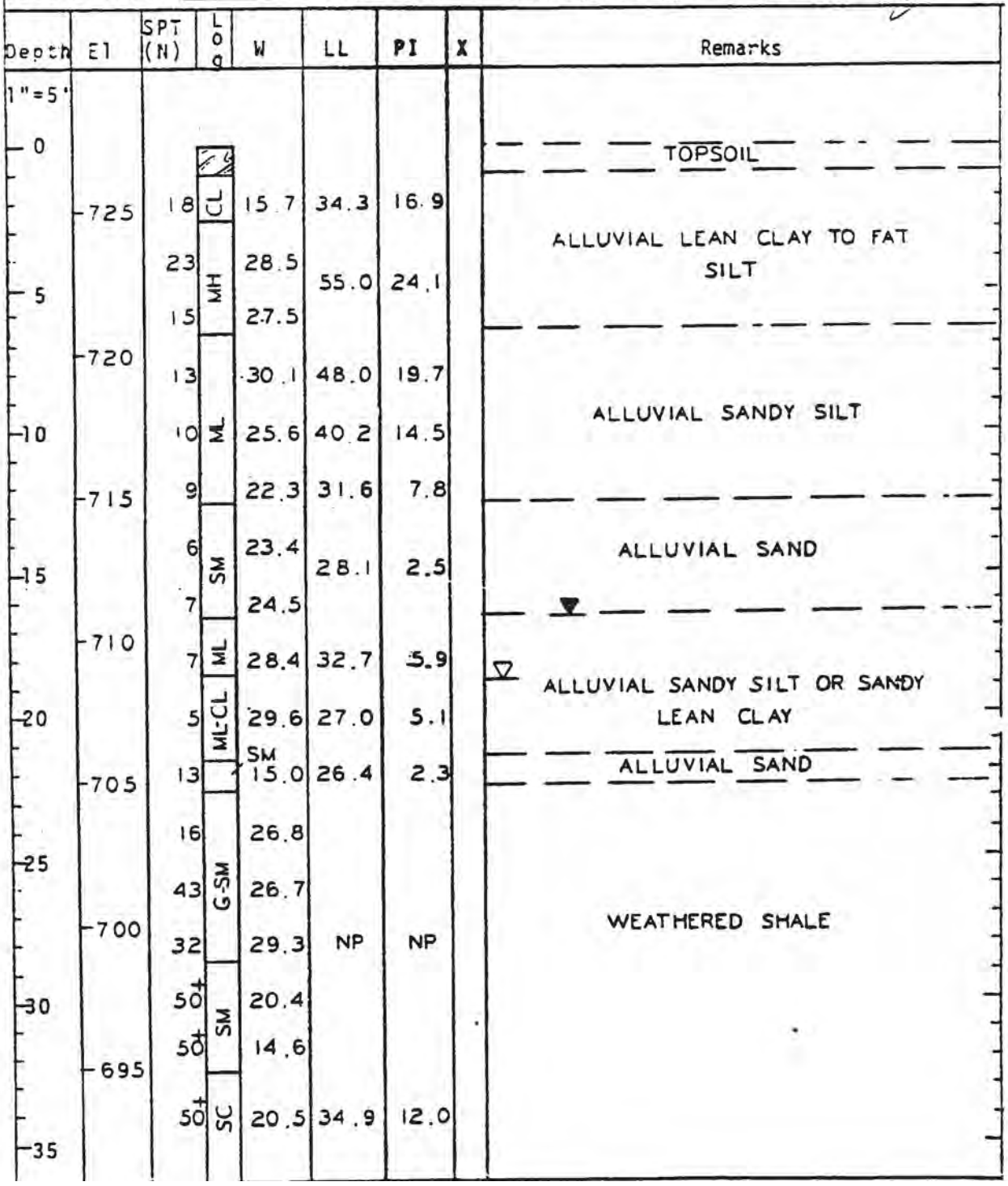
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-294
SHEET 1 OF 2

Project WATTS BAR N P Feature ERCW ALIGNMENT

Boring SS-138 Station 1373.0 S Range 1400.0 E Surface El 727.2

Date Drilled 6-8-79 To 6-11-79 Prepared By JLB Checked By



Project WATTS BAR N. P Boring SS-138

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+	SC	14.8	34.9	12.0		
	690							WEATHERED SHALE
		32		22.1				
			SM		33.0	6.2		
40		50		21.8				
		50+		12.1	NP	NP		
	685							BEDROCK
45								
	680							
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-294
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE

Boring SS-138 | Station 1373.05 | Range 1400.0E | Surface El 727.2 | Date Drilled 6-8-79 to 6-11-79

Boring SS-138A | Station 1368.8S | Range 1406.5E | Surface El 726.7 | Date Drilled 11-12-81 to 11-12-81

Prepared by JLB | Checked by HPM

El	SPT (N)	USC	W	LL	PI	SPT (N)	USC	W	LL	PI	REMARKS
725	18	CL	15.7	34.3	16.9	50	GC	6.7	35	18	FILL
	23	MH	28.5	55.0	24.1						
	15		27.5			32	ML-MH	27.3	50	19	
720	13		30.1	48.0	19.7	19		30.9	48	18	ALLUVIUM
	10	ML	25.6	40.2	14.5	16	ML	27.1	39	13	
715	9		22.3	31.6	7.8	12		25.1	33	6	
	6	SM	23.4	28.1	2.5	8		25.1	29	3	
	7		24.5			8		22.1	NP	NP	
710	7	ML	28.4	32.7	5.9	12	SM	27.1	29	1	
	5	ML-CL	29.6	27.0	5.1	4		35.6 / 28.1	29 / 25	2 / 2	
	13	SM	15.0	26.4	2.3	9		27.8 / 29.1	22 / NP	1 / NP	
705	16		26.8			22	GM / SM	10.6 / 38.4	NP	NP	
	43	G-SM	26.7			50		25.8	36	2	WEATHERED SHALE
700	32		29.3	NP	NP						DISCONTINUED
	50	SM	20.4								
	50		14.6								
695	50	SC	20.5	34.9	12.0						
	50		14.8								
690	32		22.1								
	50	SM	21.8	33.0	6.2						
	50		12.1	NP	NP						
685											
680											

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-295

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-296
SHEET 1 OF 2

Project WATTS BAR N.P Feature ERCW ALIGNMENT

Boring SS-139 Station 1375.0 S Range 1500.0E Surface El 727 5

Date Drilled 6-11-79 To 6-12-79 Prepared By JLB Checked By [illegible]

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								TOPSOIL
	725	16	CL	15.8	34.7	17.3		SANDY LEAN CLAY FILL
		11		14.4				
5		9	CL-CH	22.0	50.1	25.0		ALLUVIAL LEAN TO FAT CLAY
	720	10		25.9				
10		15		26.4	47.2	17.7		ALLUVIAL SANDY SILT
	715	13	ML	23.8	36.9	11.0		
		9		19.2				
15		8	SM	15.5	NP	NP		ALLUVIAL SANDY SILT AND SILTY SAND
	710	9		18.2				
20		7	ML	32.8	31.0	3.9		▽
		14	SM	22.1	NP	NP		
	705	50/4	GM	7.5				ALLUVIAL GRAVEL
25		49	CL	17.0	36.7	14.6		
	700	50/4		18.9	33.1	11.5		WEATHERED SHALE
		50/4		13.7				
30		50/4	SC	16.0	32.9	12.6		
	695	50/4		11.8				
35								

Project WATTS BAR N.P Boring SS-139

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50/4"	SM	15.0	NP	NP		
	690	50/5"		12.2				
		50/4"	CL	13.1	30.6	10.0		
40		50/3"		9.5	—	—		
	685	50/4"		10.7	—	—		WEATHERED SHALE
45		50/4"		18.0	—	—		
	680	50/4"	GSC	10.1				
					30.7	10.3		
50		50/4"		16.6				
		50/4"	GSM/SC	13.4	27.2	7.0		
	675	50/4"	GSM	9.4	NP	NP		
55								BEDROCK
	670							
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-296
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-297
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-140 Station 1334.25 Range 1560.8 E Surface El 726.7

Date Drilled 6-11-79 To 6-11-79 Prepared By JLB Checked By DCG

Depth	El	SPT (N)	Soil	W	LL	PI	X	Remarks
1"=5'								
0								
	725	21	CL	12.7	35.0	17.4		
		8		13.9	—	—		
5		9		20.0	43.1	19.0		
	720		CH-MH					
		16		27.4	60.9	30.0		ALLUVIAL SILT AND CLAY
10		11		22.0				
					36.5	7.4		
	715	8		24.3				
		7	ML	24.6				
15					34.1	6.2		
		12		25.0				
	710							
		3		17.4				
					NP	NP		
20		4	SM	38.7				ALLUVIAL SAND
	705	29	CL	17.4	43.1	18.4		LAMINATED RESIDUUM
		44	ML-CL	18.3	44.2	18.7		
25								
		40	ML	21.9	35.2	6.1		WEATHERED SHALE
	700							
		50	CL	16.8	36.9	14.0		
30		41	SM	22.3	37.4	7.4		
			CL-ML					
	695	50±		20.0	36.3	13.2		
		50±	ML-CL	18.7	35.4	10.8		
35								

Project WATTS BAR N. P. Boring SS-140

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+	CL	11.3	32.2	11.4		WEATHERED SHALE
	-690	50+		—	—	—		— — — — — — — — — —
								BEDROCK
40								
	-685							
45								
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-297
SHEET 2 OF 2

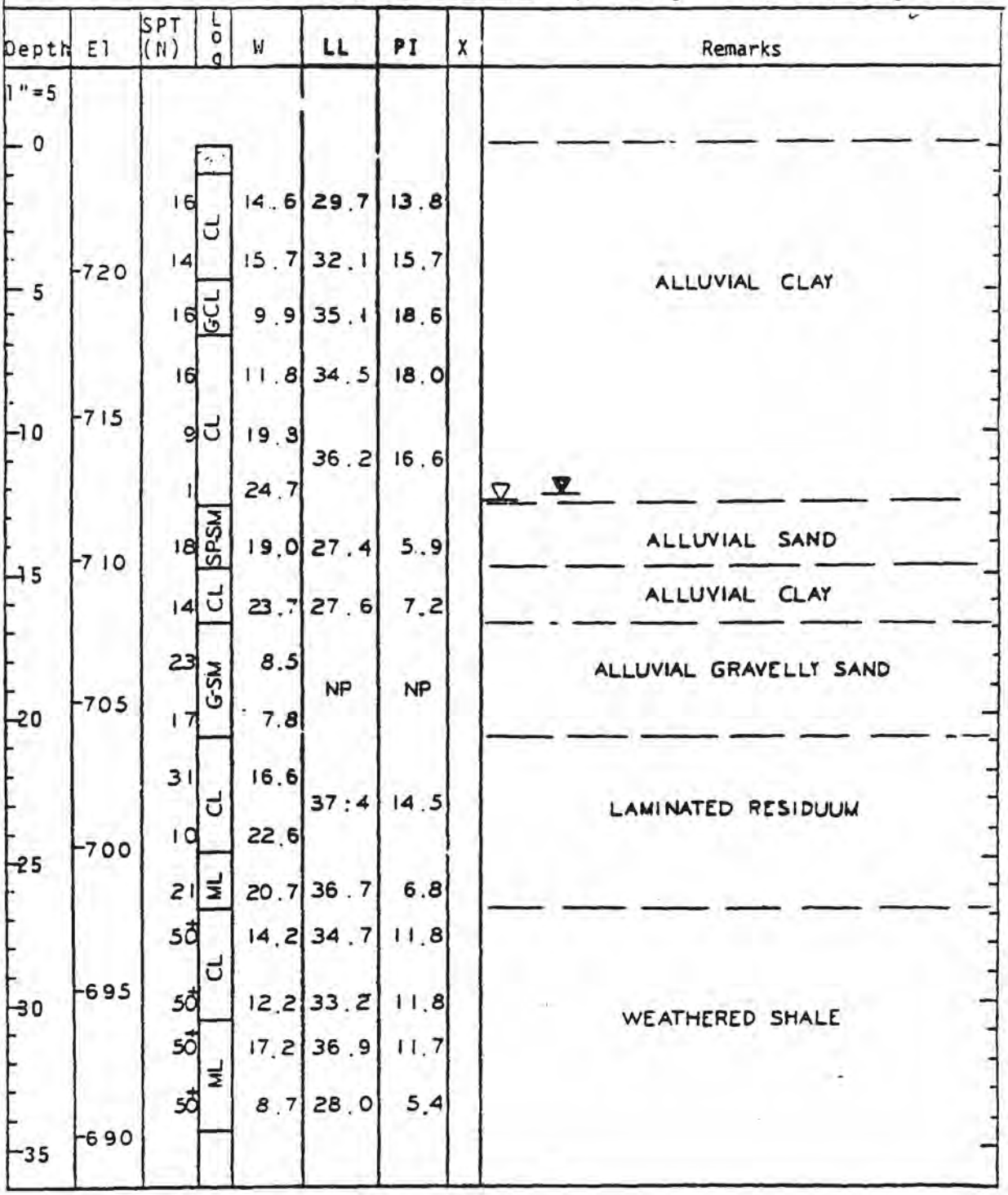
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-298
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-141 Station 1187. 5 S Range 1707. 5 E Surface El 724.6

Date Drilled 6-11-79 To 6-12-79 Prepared By JLB Checked By



Project WATTS BAR N.P. Boring SS-141

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+	SC	14.4	30.1	9.4		
		50+	CL	10.6	25.8	7.7		WEATHERED SHALE
		50+	CL-ML	9.8	22.6	5.0		
40	685							BEDROCK
45	680							
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-298
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-299
SHEET 1 OF 2

Project WATTS BAR N.P Feature ERCW ALIGNMENT

Boring SS-142 Station 1012.5 S Range 1882.5 E Surface El 721.8

Date Drilled 6-12-79 To 6-13-79 Prepared By JLB Checked By [illegible]

Depth	El	SPT (N)	Soil	W	LL	PI	X	Remarks
1"=5'								
0								
	720	13	CL	14.1	33.9	19.0		
		24		13.9	31.7	14.2		
5		18	GCL	14.0	36.1	17.9		
	715	11	CL	14.8	37.9	-19.2		▽ ▼
10		12	ML-CL	20.1	38.7	13.5		ALLUVIAL CLAY
	710	15		22.4				
		11		—	38.4	15.0		
15		12		23.3				
	705	10	CL	21.9	36.7	16.4		
20		16		17.0				
	700	9		24.1	41.3	17.6		
		4		26.2	42.0	20.2		
25		11	GCL	19.0	48.4	26.6		
	695	33	CL	15.1	35.4	13.7		LAMINATED RESIDUUM
30		24	ML-CL	17.9	35.8	12.3		
	690	50/4	CL	13.0	35.6	15.7		
		49	ML-CL	15.7	34.4	10.0		WEATHERED SHALE
35								

Project WATTS BAR N. P Boring SS-142

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35								
	685	41	G-SC	14.7	—	—		
		50+		11.3	31.5	10.6		
		50+		8.7				
40								WEATHERED SHALE
	680	50+	SC	7.6				
					26.7	8.1		
		50+		7.8				
45		50+		12.6				
	675							BEDROCK
50								
	670							
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-299
SHEET 2 OF 2

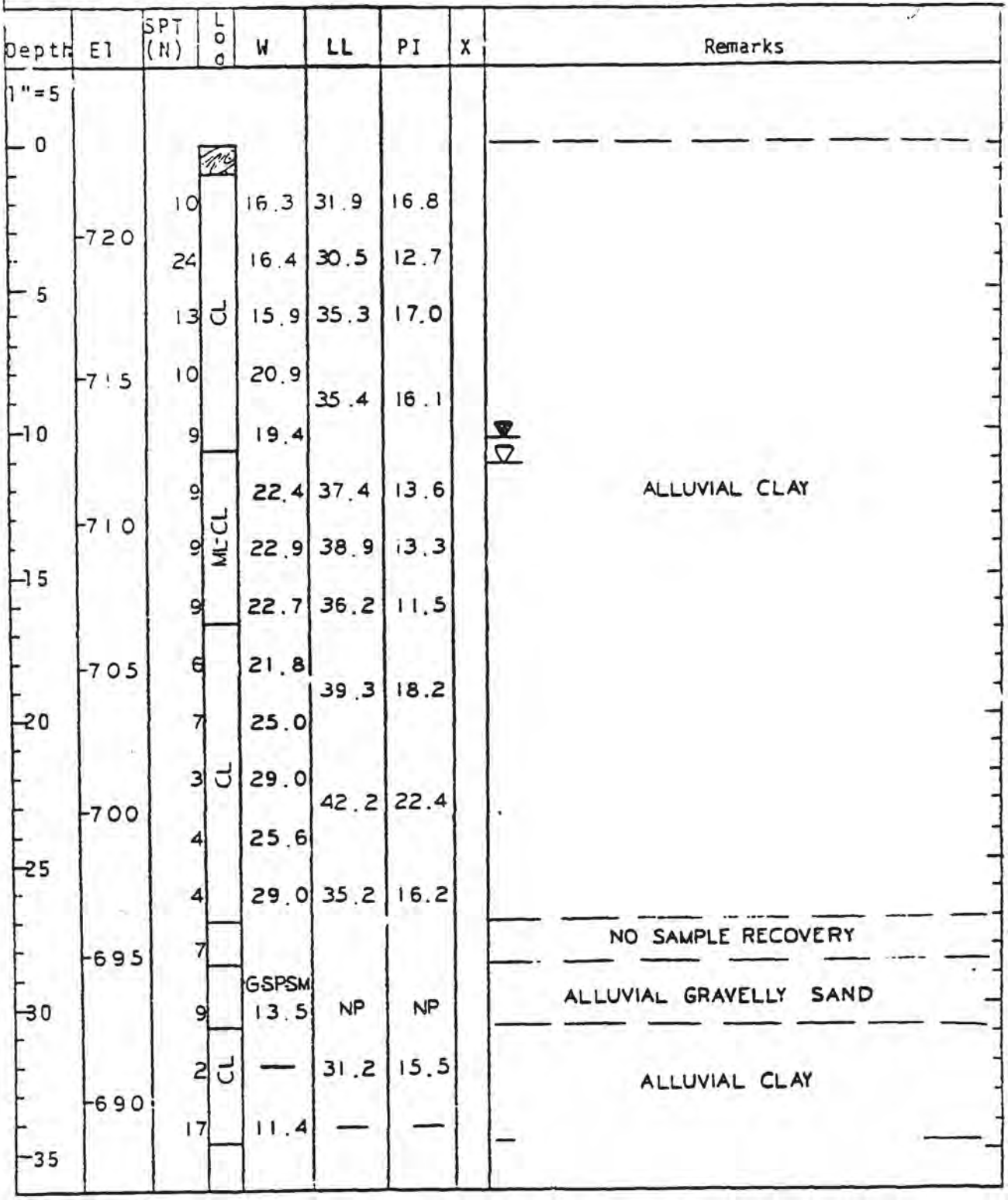
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-300
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-143 Station 965.0 S Range 1923.2 E Surface El 723.1

Date Drilled 6-14-79 To 6-14-79 Prepared By JLB Checked By



Project WATTS BAR N.P Boring SS-143

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
-35								LAMINATED RESIDUUM
		27	SM	21.2	28.9	2.6		
	685	50	SC	16.3	30.8	9.7		
		50/		11.1				
-40								WEATHERED SHALE
		50/4		13.9	29.8	10.9		
	680		G-SC					
		34		15.2	29.6	9.2		
-45		50/4	SC	14.0	28.0	7.6		
								BEDROCK
	675							
-50								
-55								
-60								
-65								
-70								
-75								
-80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-300
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE

ISSUED
JUN 26 1981

Boring SS-143	Boring SS-143A	Prepared by
Station 969.0S Range 1923.2E	Station 975.0S Range 1930.0E	ILB
Surface El 723.1	Surface El 723.0	Checked by
Date Drilled 6-14-79 to 6-14-79	Date Drilled 11-19-81 to 11-20-81	HPM

El	SPT (N)	LOG	W	LL	PI	SPT (N)	LOG	W	LL	PI	REMARKS
720	10		16.3	31.9	16.9	12	SC	15.0	33	16	
	24		16.4	30.5	12.7	20		13.3	31	13	FILL
	13	CL	15.9	35.3	17.0	13	CL	19.6	35	16	
715	10		20.9	35.4	16.1	12	CL-ML	21.8	33	10	
	9		19.4			9	SC	22.4	29	10	
	9		22.4	37.4	13.6	4	ML	36.5 / 30.1	41 / 43	20 / 13	
710	9	ML-CL	22.9	38.9	13.3	2		21.6	39	11	
	9		22.7	36.2	11.5	8	CL	37.2	36	19	ALLUVIUM
	6		21.8			1	SC	29.1	38	18	
705	7		25.0	39.3	18.2	0		41.4	39	20	
	3	CL	29.0			3	SM-SC	21.2	21	5	
700	4		25.6	42.2	22.4	4	CL	24.9	25	8	
	4		29.0	35.2	16.2	8	SC	43.1	37	11	
	7		—	—	—	16		33.8	34	12	
695	9	G-SP-SM	13.5	NP	NP	31	SM	25.9	NP	NP	WEATHERED SHALE
	2		—	31.2	15.5						DISCONTINUED
690	17	CL	11.4	—	—						
	27	SM	21.2	28.9	2.6						
685	50		16.3	30.8	9.7						
	50*	SC	11.1								
	50*		13.9	29.8	10.9						
680	34	G-SC	15.2	29.6	9.2						
	50*	SC	14.0	28.0	7.6						
675											

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-301

SOIL PROFILE (SS, PA, HA, TP BORING)

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-144 Station 865.15 Range 1923.2 E Surface El 729.0

Date Drilled 6-13-79 To 6-14-79 Prepared By JLB Checked By [illegible]

Depth	El	SPT (N)	USCS	W	LL	PI	X	Remarks
1"=5'								
0								
		11	CL	17.2	41.8	25.8		
	725	16		14.0	39.0	20.5		
5		19		20.8				
		20	ML-CL	20.2	36.6	-12.8		
	720	22		17.4				
10		18		19.9				ALLUVIAL CLAY
	715	20	CL	18.9	37.7	14.8		
15		20		20.2				▽ ▼
		15		25.3	41.8	25.8		
	710	19	ML-CL	24.7	43.5	16.7		
20		8		20.9				
	705	5	CL	24.4	42.6	16.7		
25		3		27.0	38.0	15.8		
		14	CL-CH	21.1	50.6	24.6		
	700	17	ML	22.6	—	—		
30		37	MECL	18.3	39.8	14.9		LAMINATED RESIDUUM
	695	16	SM-SC	26.4	35.1	11.5		
35								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-302
SHEET 1 OF 2

Project WATTS BAR N. P. Boring SS-144

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
-35								LAMINATED RESIDUMM
		17	SM-SC	19.2	35.1	11.5		
		30		17.2				
	690							
-40		42	CL	18.8	36.7	13.9		WEATHERED SHALE
		50+	SC	19.8	36.0	13.7		
			SM-SC					
	685	50		17.5	31.7	9.0		
-45		50+	CL	5.7	26.6	7.5		
								BEDROCK
	680							
-50								
-55								
-60								
-65								
-70								
-75								
-80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-302
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-303
SHEET 1 OF 2

Project WATTS BAR N.P Feature ERCW ALIGNMENT

Boring SS-145 Station 665.0 S Range 1923.2 E Surface El 737.1

Date Drilled 6-14-79 To 6-19-79 Prepared By JLB Checked By

Depth	El	SPT (N)	USCS	W	LL	PI	X	Remarks
1"=5'								
0								
	735	15	CL	17.3	41.6	23.2		
		21	ML-CL	19.0	39.1	14.3		CLAY FILL
5		25		17.9				
	730	23	ML	22.8	47.2	-19.1		
10		20		18.6	42.1	16.1		
	725	17	ML-CL	19.0	41.3	16.6		ALLUVIAL FILL
		16		17.3				
15		9		17.1				
	720	10	SM	13.7	NP	NP		ALLUVIAL SILTY SAND
20		14		9.3				
		21	GSPSM	11.0				
	715	22	GSM	14.5	23.8	3.6		ALLUVIAL GRAVELLY SAND
25		50+		7.1				
	710	37	GSPSM	8.7				
30		50+		8.5	NP	NP		
		35	GM	8.2				ALLUVIAL GRAVEL
	705	33	GPGM	8.2				
35								

Project WATTS BAR N.P. Boring SS-145

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+		13.4	38.7	16.2		
	700	50+	CL	13.7	33.0	11.4		WEATHERED SHALE
		50+		8.4	26.8	8.1		
40								BEDROCK
	695							
45								
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-303
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-304
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-146 Station 565.0 S Range 1923.2 E Surface El 741.4

Date Drilled 6-19-79 To 6-20-79 Prepared By JLB Checked By

Depth	El	SPT (N)	USCS	W	LL	PI	X	Remarks
1"=5'								
0								
	740	17	CL	10.0	29.3	12.8		
		20		13.9	29.6	11.1		
5								CLAY FILL
	735	11		12.6	30.7	12.0		
		13		13.5	36.0	-19.2		
		14	CL-ML	14.2	47.7	21.2		
10								
	730	22	ML	13.4	44.9	14.9		
		21	CL-ML	10.2				ALLUVIAL SILT & CLAY
15					39.2	13.7		
	725	20		11.1				
			SM-SC					SILTY CLAYEY SAND
		13		12.3	28.4	6.3		
20		16	GSM	12.8				
	720	10	SM	11.2				ALLUVIAL GRAVELLY SAND
		16	G-SM	7.1				
25								
	715	10		16.4	NP	NP		
		10	SM	16.5				ALLUVIAL SAND
30		14		8.4				
	710	39	GP	3.2				ALLUVIAL GRAVEL
		13	G-SM	14.6	21.6	1.9		ALLUVIAL GRAVELLY SAND
35								

Project WATTS BAR N. P. Boring SS-146

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+	G-SP	4.6				ALLUVIAL GRAVELLY SAND
	705							
		41	GM	5.5				ALLUVIAL GRAVEL
40		47	G-SM	7.2				ALLUVIAL GRAVELLY SAND
	700				NP	NP		
		36	GM	6.6				ALLUVIAL GRAVEL
		26		7.8				
45			G-SP	12.1				
	695	22	ML	27.4	35.9	4.1		
		19	ML-CL	26.0	38.6	12.6		LAMINATED RESIDUUM
50		50+		14.0	36.8	13.6		WEATHERED SHALE
	690							
		16	SC	19.5	38.5	14.3		
		6	MH	18.5	49.7	18.6		
55								
	685	39		16.8				
					37.6	11.6		LAMINATED RESIDUUM
		13	ML	17.7				
60		26		14.5				
	680				32.0	4.5		
		9		19.2				
		22		16.8				
65								
	675	31	CL	15.4	33.0	10.8		
		30		15.0				WEATHERED SHALE
		50+	SM	17.3	NP	NP		
70			ML-CL					
	670	50+		7.6	23.3	6.4		
								BEDROCK
75								
	665							
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-304
SHEET 2 OF 2

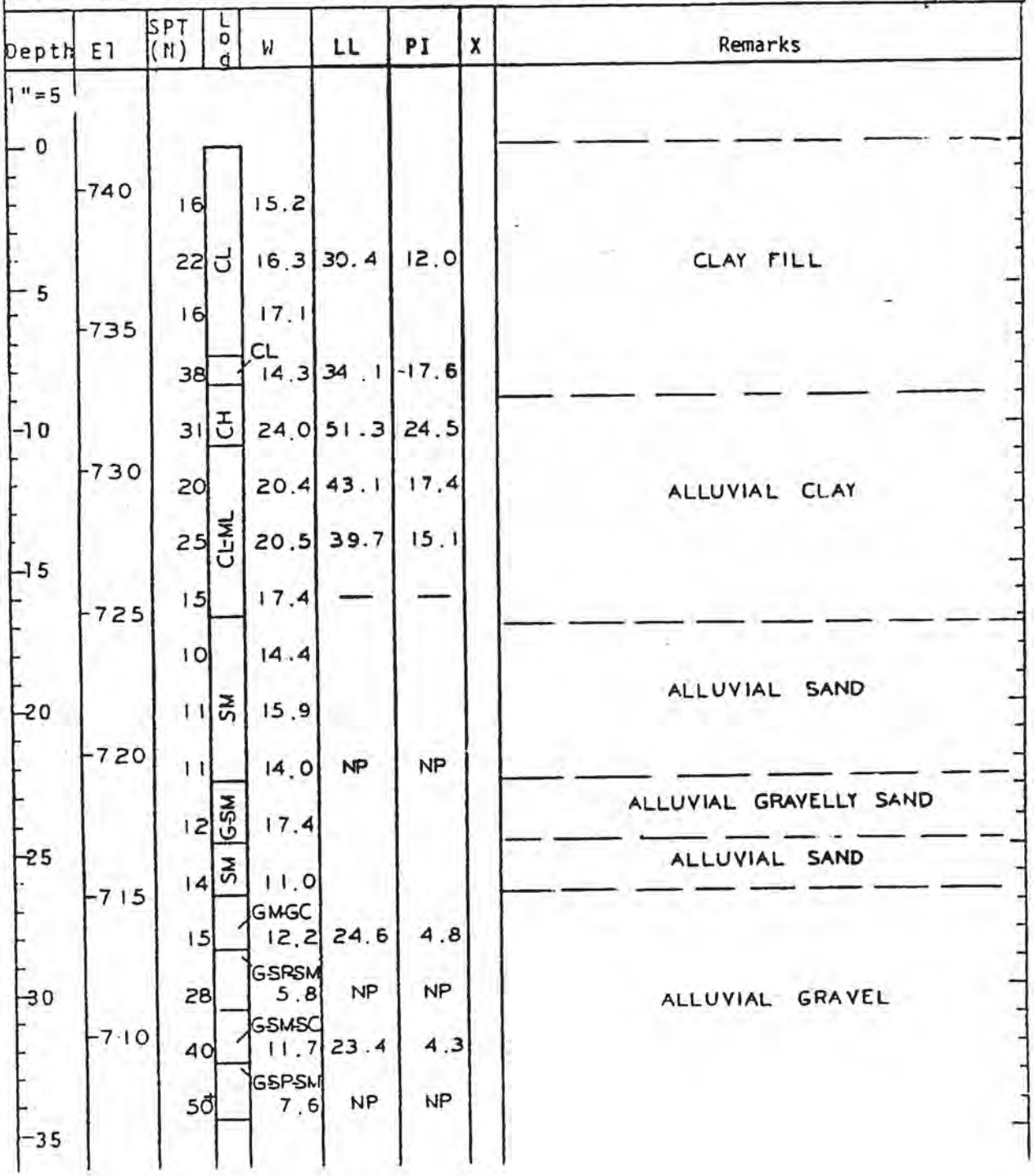
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-305
SHEET 1 OF 2

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-147 Station 464.1S Range 1866.4E Surface El 741.7

Date Drilled 6-20-79 To 6-21-79 Prepared By JLB Checked By DCL



Project WATTS BAR N.P. Boring SS-147

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35								
	705	50+	GP GM	7.7				ALLUVIAL GRAVEL
		29	GP GM	8.5	NP	NP		▽
		18	GSM	17.1				
40								
	700	47		28.5	36.8	5.2		WEATHERED SHALE
		30		21.8	39.2	12.0		LAMINATED RESIDUUM
45								
	695	20	ML	34.1	48.2	10.5		
		50+	ML	19.0	42.5	15.2		WEATHERED SHALE
50		43		20.5	37.8	11.9		
	690	21		25.0	44.4	16.8		LAMINATED RESIDUUM
		24	CL	17.8	35.2	13.1		
55								
	685	28	CL	16.1	28.6	7.9		WEATHERED SHALE
		50+	CL	10.7	29.1	7.3		BEDROCK
60								
	680							
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-305
SHEET 2 OF 2

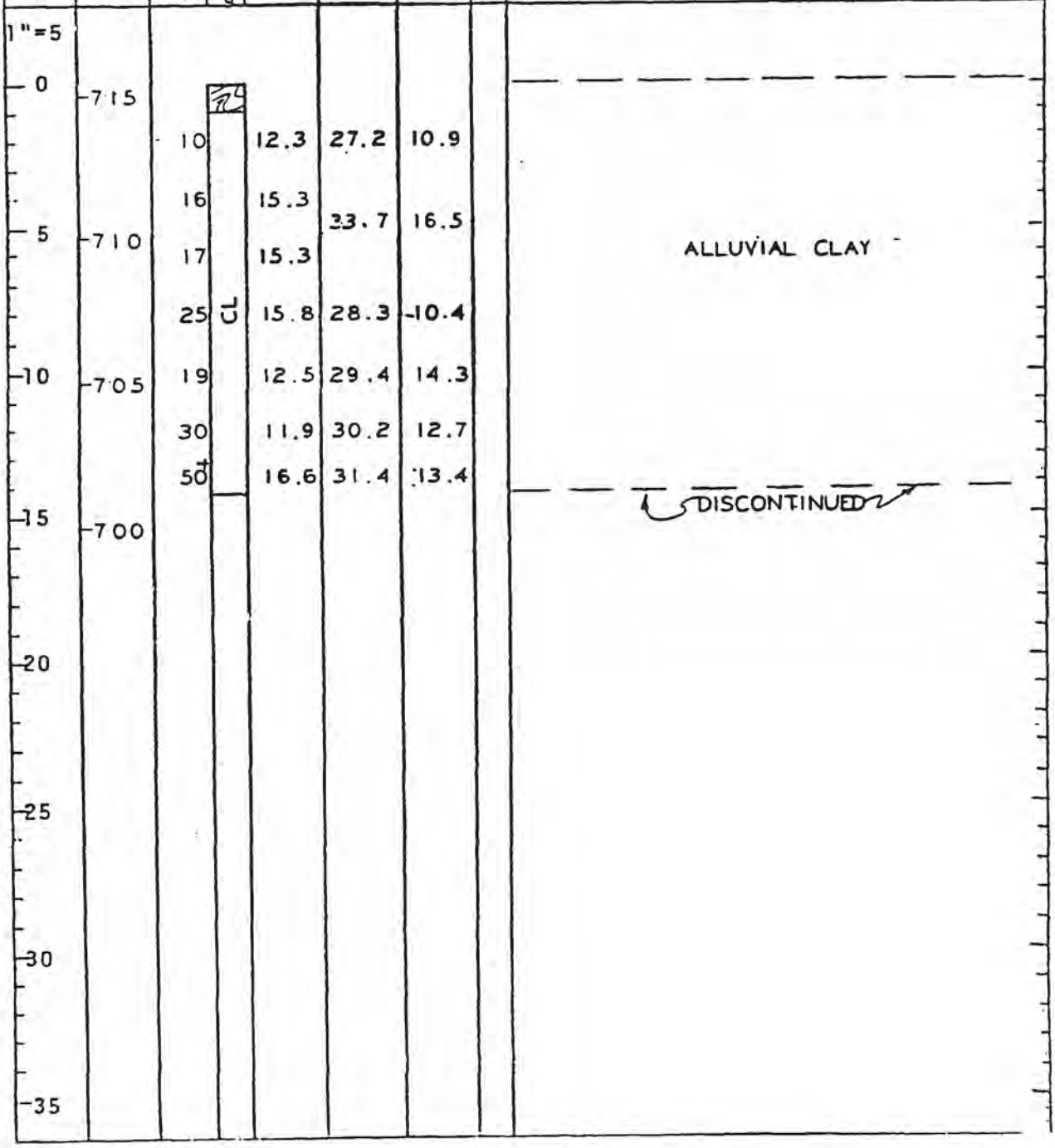
WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-306
SHEET 1 OF 1

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-148A Station 265.0 S Range 1923.0 E Surface El 715.4

Date Drilled 6-19-79 To 6-19-79 Prepared By JLB Checked By



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-307
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-148B Station 259.0S Range 1865.5 E Surface El 736.6

Date Drilled 6-19-79 To 6-21-79 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
	735							
5								NO SAMPLING ALLUVIAL CLAY
	730							
10								
	725							
15								
	720	38	G-SM	8.2				ALLUVIAL GRAVELLY SAND
		26		11.2	NP	NP		
			GW-GM					ALLUVIAL GRAVEL
20		23		7.0				
	715	25		20.3	44.8	16.1		LAMINATED RESIDUUM
		50+		17.1	45.9	18.9		
25		50+	ML	19.4				
	710				36.3	10.2		WEATHERED SHALE
		50+		19.4				
30		37		20.1	38.8	11.2		
	705	46	CL-ML	17.6	40.9	15.2		
		41	CL	14.8	34.9	12.3		
35								

Project WATTS BAR N. P. Boring SS-148B

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+	CL	9.8	30.1	11.2		WEATHERED SHALE
	700	50+	ML	6.6	23.5	7.1		
								BEDROCK
40	695							
45								
50								
55								
60								
65								
70								
75								
80								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-307
SHEET 2 OF 2

TENNESSEE VALLEY AUTHORITY
SINGLETON MATERIALS ENGINEERING LABORATORY
SOIL PROFILE (SS, PA, HA, TP BORING)

Sheet 1 Of 2

Project WATTS BAR N P Feature ERCW ALIGNMENT

Boring SS-129 Station 65 0S Range 1923 5E Surface El 705 9

Date Drilled 6-20-79 To 6-21-79 Prepared By JLE Checked By ACO

Depth	El	SPT (N)	USCS	W	LL	PI	X	Remarks
1"=5'								
0	705	7	CL	14.4	32.5	16.8		ALLUVIAL CLAY
		11		18.2	31.9	11.0		
5	700	10		20.5	36.1	16.0		
		13	SC	17.3	30.9	-11.7		ALLUVIAL CLAYEY SAND
10	695	23		23.7	43.4	15.0		LAMINATED RESIDUUM
		16	ML	25.8	36.4	4.9		
		29		21.9	38.6	8.1		
15	690	40	CL	19.3	45.0	19.3		
		25	ML	22.9	36.2	8.5		
20	685	35		20.5				
		30	CL-ML	17.4	32.4	8.8		WEATHERED SHALE
		43	SM	15.7	28.9	3.2		
25	680	50+	GS/SC	12.7	29.1	6.1		
		50+	ML	9.5	31.4	10.4		
		50+		14.9	27.8	3.6		
30	675	50+	SM/SC	8.0	22.3	5.0		
		50+		11.7				
35								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE

Figure 2.5-308
SHEET 1 OF 2

Project WATTS BAR N. P. Boring SS-149

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								WEATHERED SHALE
35		50+	GSM	4.2	NP	NP		
	670							BEDROCK
40	665							
45								
50								
55								
60								
65								
70								
75								
80								

HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-308
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

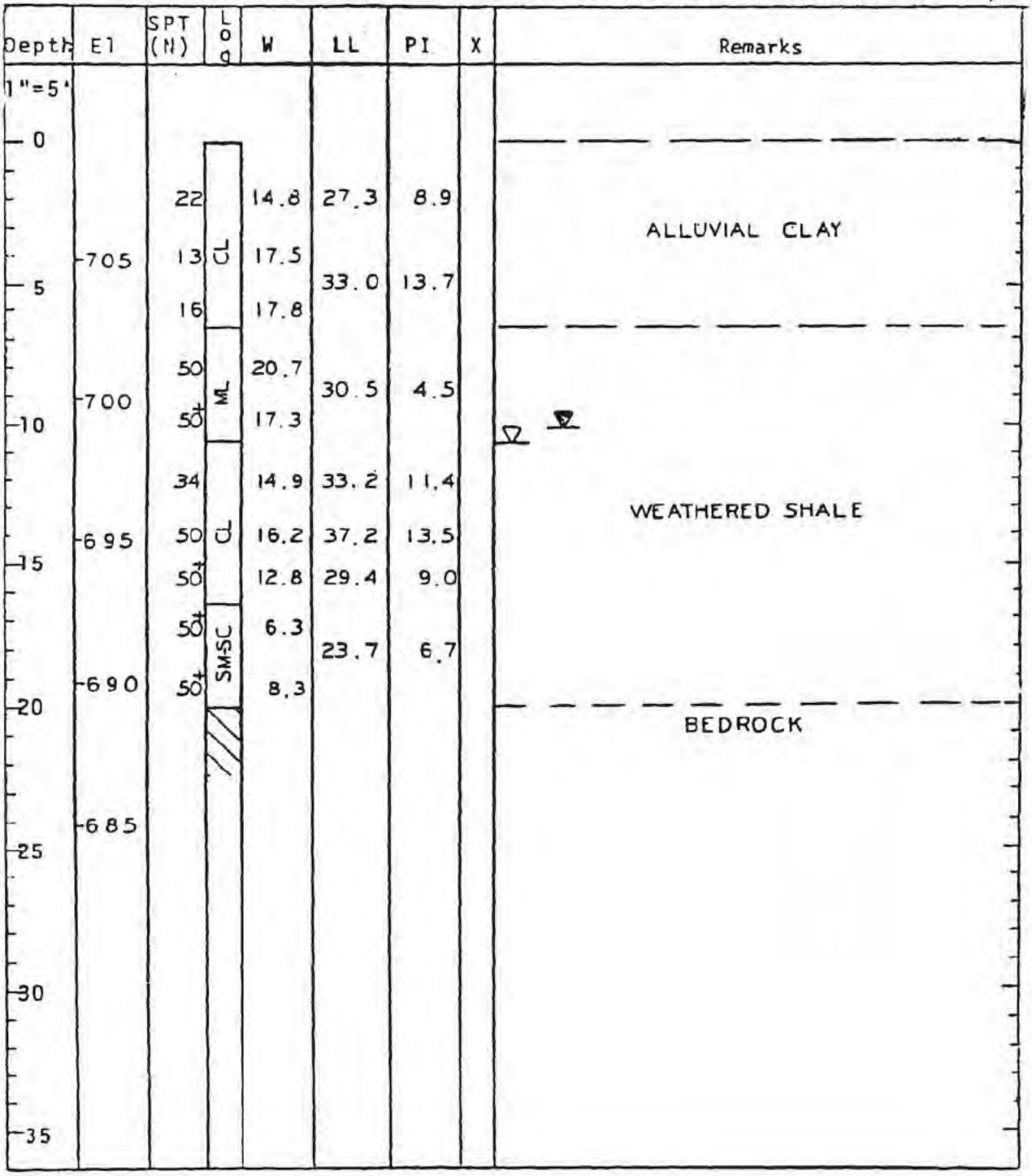
SOIL PROFILE
FIGURE 2.5-309
SHEET 1 OF 1

HISTORICAL

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-150 Station 135.0 N Range 1923.2 E Surface El 709.1

Date Drilled 6-22-79 To 6-22-79 Prepared By JLB Checked By



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

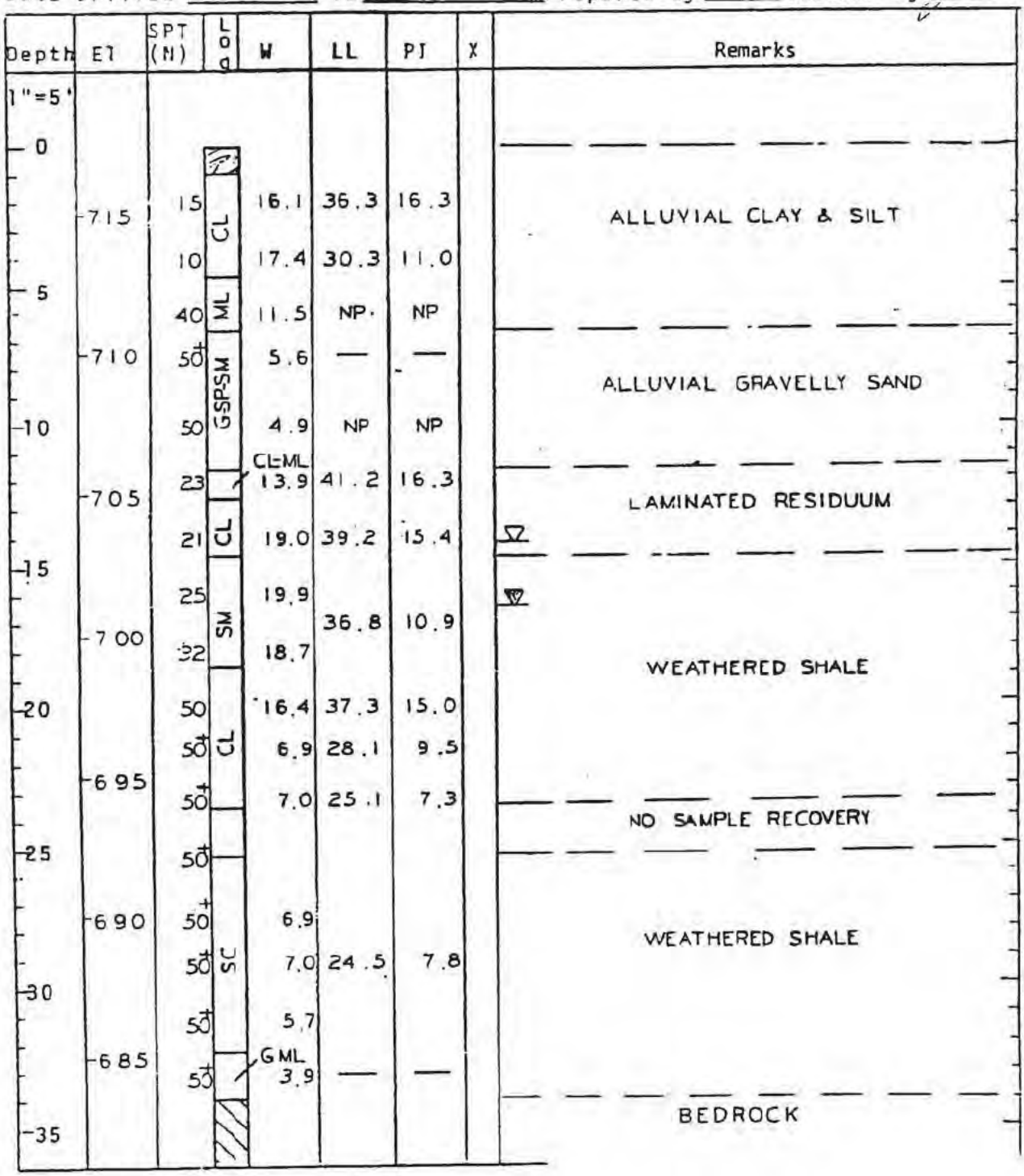
SOIL PROFILE
FIGURE 2.5-310
SHEET 1 OF 1

HISTORICAL

Project WATTS BAR N.P Feature ERCW ALIGNMENT

Boring SS-151 Station 285.8 N Range 1824.9 E Surface El 717.5

Date Drilled 6-25-79 To 6-25-79 Prepared By JLE Checked By



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

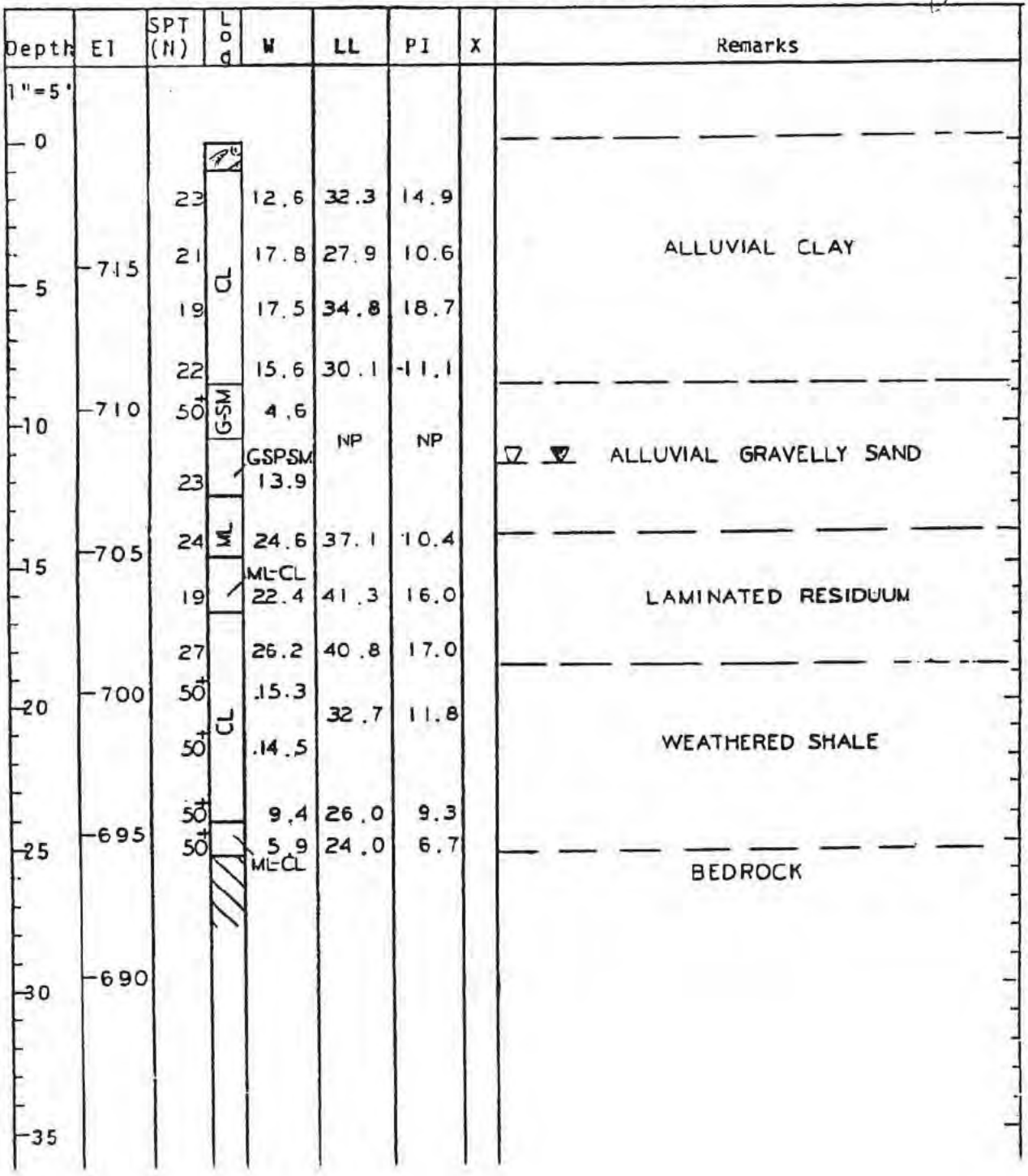
SOIL PROFILE
FIGURE 2.5-311
SHEET 1 OF 1

HISTORICAL

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-152 Station 465.1N Range 1693.1E Surface El 719.6

Date Drilled 6-25-79 To 6-25-79 Prepared By JLB Checked By



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

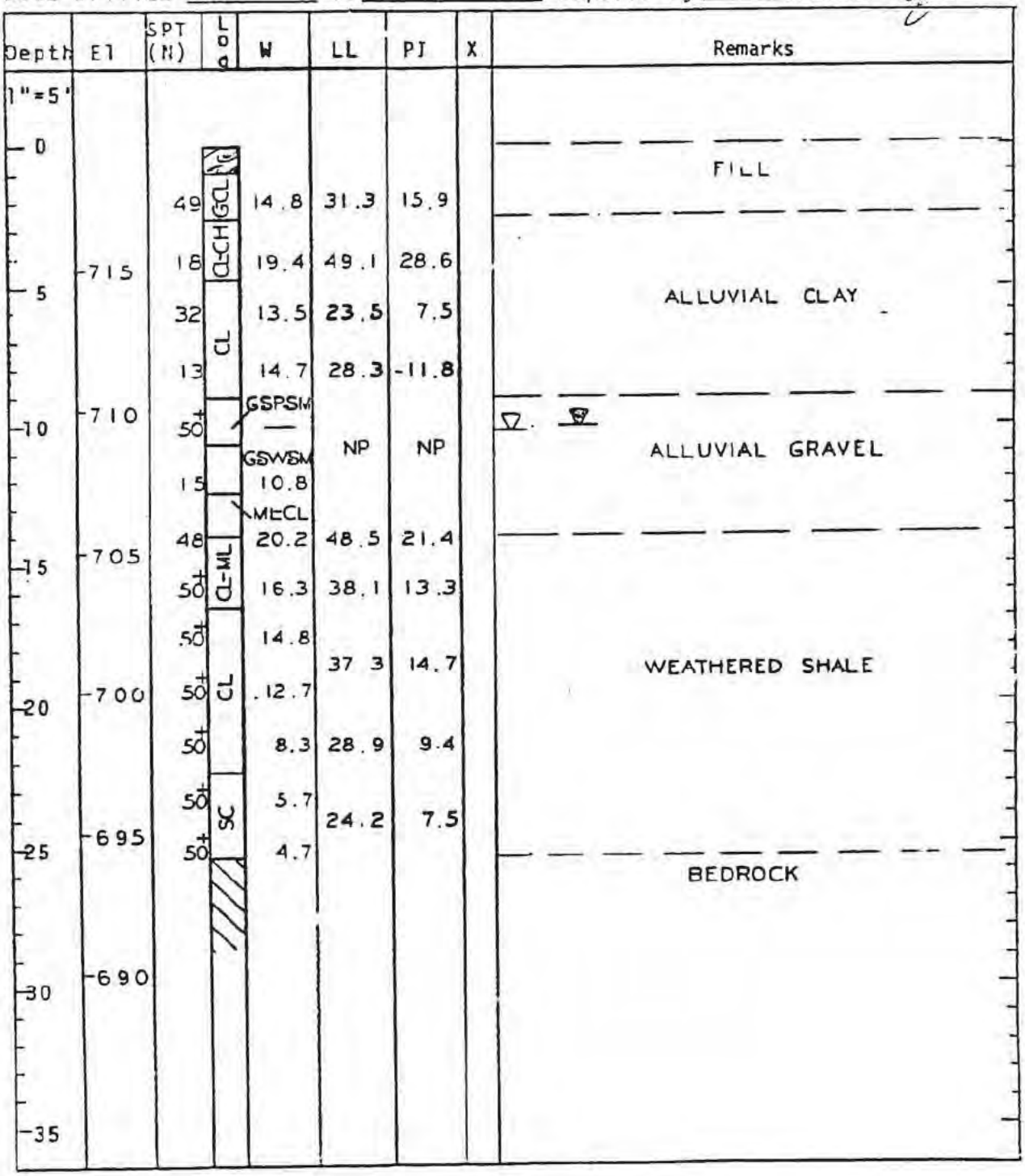
SOIL PROFILE
FIGURE 2.5-312
SHEET 1 OF 1

HISTORICAL

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-153 Station 585.0N Range 1540.0E Surface El 719.7

Date Drilled 6-26-79 To 6-26-79 Prepared By JLB Checked By



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-313
SHEET 1 OF 1

Project WATTS BAR N.P Feature ERCW ALIGNMENT

Boring SS-154 Station 633.5 N Range 1444.4E Surface El 719.7

Date Drilled 6-26-79 To 6-26-79 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
0								
		25	CL	14.8	31.6	13.7		
	715	25	CL	13.2	27.6	10.7		ALLUVIAL CLAY
5		23	CL	14.1	23.0	9.2		
		20	CL	13.1				▽
	710	50+	GSM	8.8				ALLUVIAL GRAVELLY SAND
10			GSPSM		NP	NP		
		29	GSPSM	10.2				
		20	CL	17.4				LAMINATED RESIDUUM
15	705				38.2	15.6		
		27	CL	17.6				
		50+	CL	9.6				
20	700	50+	CL	8.0	29.4	10.8		
		50+	CL	6.1				
		50+	SC	5.5				WEATHERED SHALE
25	695				26.0	8.5		
		50+	SC	5.3				
		50+	CL	8.7	24.0	7.5		
		50+	M-CL	5.4	—	—		
30	690							
		50+	ML-CL	7.2	23.0	6.9		
								BEDROCK
35	685							

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

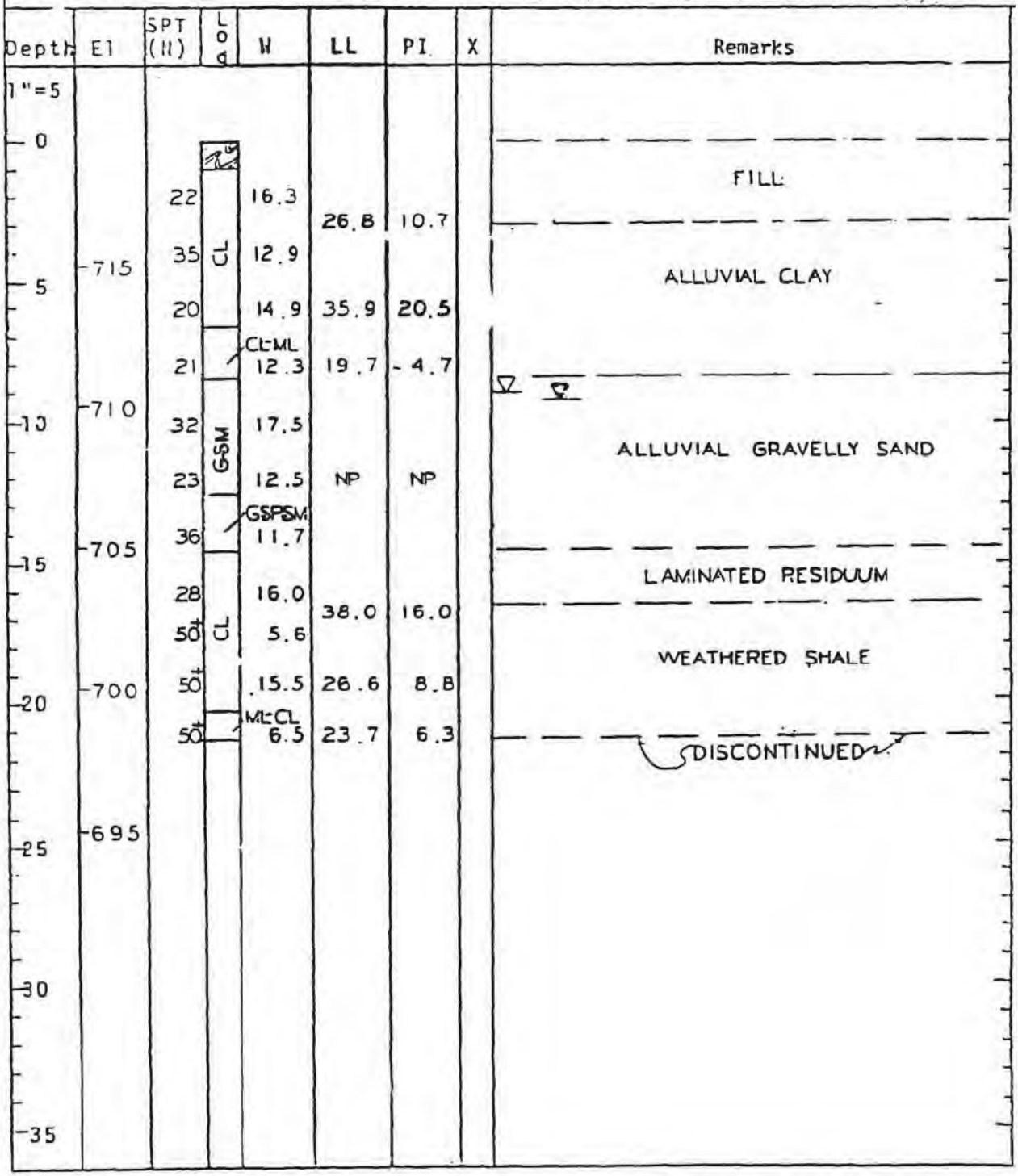
SOIL PROFILE
FIGURE 2.5-314
SHEET 1 OF 1

HISTORICAL

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-155 Station 664.1 N Range 1410.0 E Surface El 719.5

Date Drilled 6-26-79 To 6-26-79 Prepared By JLB Checked By



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

HISTORICAL

SOIL PROFILE
FIGURE 2.5-315
SHEET 1 OF 1

Project WATTS BAR N P Feature ERCW ALIGNMENT

Boring SS-156 Station 664.8 N Range 1210 0 E Surface El 720.4

Date Drilled 6-26-79 To 6-26-79 Prepared By JLB Checked By GCP

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5								
0	720							
		14	CL	13.0	30.8	14.3		
		10		17.7	32.4	15.0		ALLUVIAL SILT & CLAY
5	715	16	ML	29.1	37.2	2.9		
		15	MCCL	14.7	22.4	6.4		
		13	ML	18.0	15.9	1.3		
10	710	29	GSM	13.2	NP	NP		ALLUVIAL GRAVELLY SAND
		22	GSPSM	8.1				
15	705	34	ML-CL	20.3	33.2	10.6		WEATHERED SHALE
		41		15.0	30.3	6.5		
		50/4"	SC	13.7	32.6	11.2		
20	700	50/4"		6.9	—	—		BEDROCK
25	695							
30								
35								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

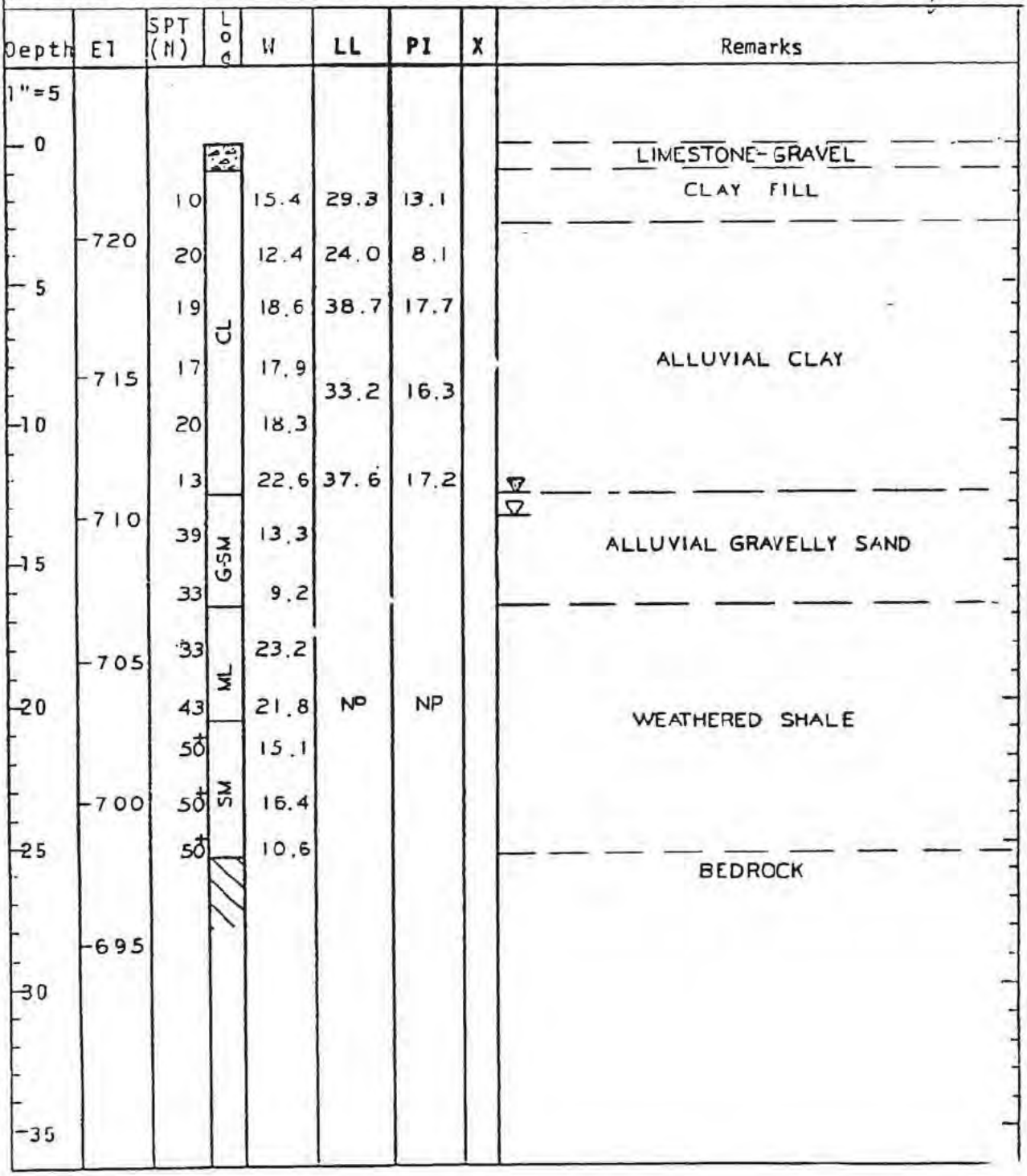
SOIL PROFILE
FIGURE 2.5-316
SHEET 1 OF 1

HISTORICAL

Project WATTS BAR N P Feature ERCW ALIGNMENT

Boring SS-157 Station 664.8 N Range 1110.0 E Surface El 723.5

Date Drilled 6-27-79 To 6-27-79 Prepared By JLB Checked By ACL



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-317
SHEET 1 OF 1

BEST AVAILABLE HISTORICAL

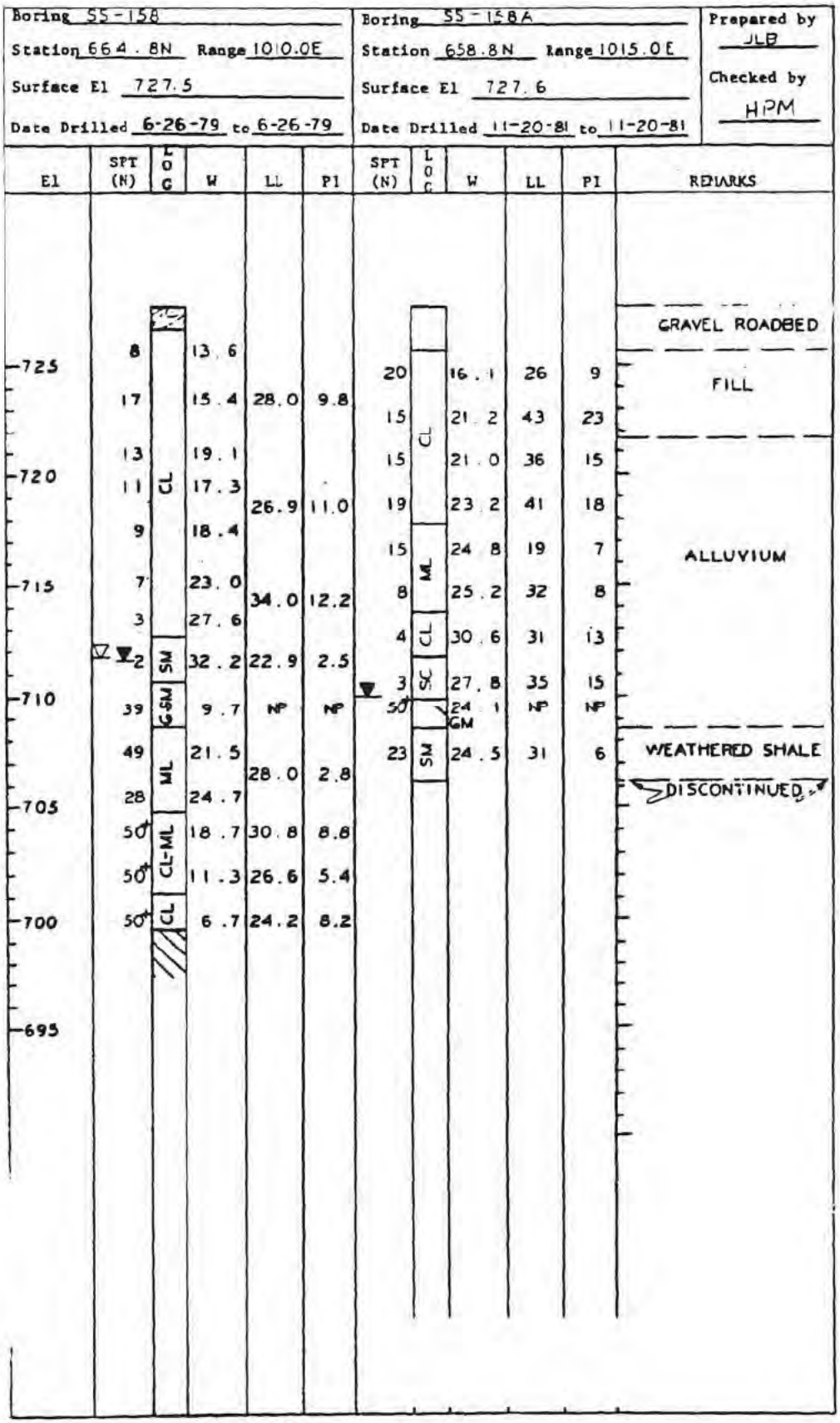
Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-158 Station 664.8 N Range 1010.0 E Surface El 727.5

Date Drilled 6-26-79 To 6-27-79 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5								
0								
	725	8		13.6				CLAY FILL
		17		15.4	28.0	9.8		
5								
		13		19.1				
	720	11	CL	17.3				
					26.9	11.0		ALLUVIAL CLAY
10		9		18.4				
	715	7		23.0				
					34.0	12.2		
		3		27.6				
15								▽ ▽ ALLUVIAL SAND
		2	SM	32.2	22.9	2.5		
	710							ALLUVIAL GRAVELLY SAND
		39	G-SM	9.7	NP	NP		
20		49		21.5				
			ML		28.0	2.8		
		28		24.7				WEATHERED SHALE
	705	50+	CL-ML	18.7	30.8	8.8		
25		50		11.3	26.6	5.4		
		50+	CL	6.7	24.2	8.2		
	700							BEDROCK
30								
	695							
35								

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE



BEST AVAILABLE - HISTORICAL

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-318

SOIL PROFILE
FIGURE 2.5-319
SHEET 1 OF 1

HISTORICAL

Project WATTS BAR N. P Feature ERCW ALIGNMENT

Boring SS-159 Station 640.0 N Range 810.0 E Surface El 731.7

Date Drilled 6-27-79 To 6-27-79 Prepared By JLB Checked By QCL

Depth	El	SPT (N)	USCS	W	LL	PI	X	Remarks
1"=5								
0								GRAVEL
	730	11	CL	16.4	31.2	11.8		
		21		25.6	—	—		
5		17		26.6	—	—		
	725	18	ML	23.8	39.5	13.2		ALLUVIAL CLAY
10		14		25.6				
	720	11	CL	25.8	32.8	13.4		
		6	CLML	29.4	26.8	4.2		
15								▽ ▽
	715	5	CL	27.1	34.6	16.1		
		3		25.6	29.3	13.3		
20		20	GSM	13.7	NP	NP		ALLUVIAL GRAVEL
	710	50+	GM	9.9				
		43	CL	20.2	38.7	16.4		
25		43	CLML	28.4	36.1	12.6		
	705	41	CL	21.3	39.4	15.7		WEATHERED SHALE
		50+		18.4	37.0	14.3		
30		43		9.7	31.4	11.9		
	700	50+		10.6				
35								DISCONTINUED

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-320
SHEET 1 OF 1

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-160 Station 566.0 N Range 740.0 E Surface El 732.9

Date Drilled 6-27-79 To 6-27-79 Prepared By JLB Checked By QCE

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5								
0								CLAY FILL
	730	13	CL	21.5	35.8	17.9		
		21		22.8	39.2	16.1		ALLUVIAL CLAY
5		21		21.4				
	725	15		14.7	30.2	- 6.0		
10		13		24.0	30.0	6.0		
		15	SM	22.5	NP	NP		ALLUVIAL SAND
	720	7		23.8	24.2	1.7		
15		12		25.8	27.0	3.0		
		5	SM-SC	30.2	32.1	8.5		
	715	21		22.0				
20		5	GM	24.3	26.2	2.2		ALLUVIAL GRAVEL
	710	50+	GP-GM	9.6	NP	NP		
25		39	SM-SC	16.8	29.5	7.5		
	705	29	CL	21.1	38.7	16.3		
		50+	ML	16.9	30.6	6.7		WEATHERED SHALE
30		50+	CL-ML	15.1	23.7	15.9		
	700	50+		10.1				
								DISCONTINUED
35								

SOIL PROFILE
FIGURE 2.5-321
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-161 Station 488.0N Range 670.0E Surface El 732.4

Date Drilled 6-28-79 To 6-28-79 Prepared By JLB Checked By CCJ

Depth	El	SPT (N)	USCS	W	LL	PI	X	Remarks
1"=5'								
0								
	730	20	CH	26.2	57.6	30.0		
		14	ML	21.1	41.2	14.4		ALLUVIAL SAND TO CLAY
5		9	CL-ML	25.1	43.0	16.5		
	725	8	SC	28.2	34.4	-11.9		
10		5	CL	25.3	29.7	8.4		
	720	6	SC	25.3	30.8	9.4		
		9	SM	18.4	NP	NP	▽	ALLUVIAL SILT & SAND
15		10		21.5				
	715	3	CL-ML	35.8	36.8	13.2		
20		5	ML	30.9	25.7	2.3		
		37	GM	11.1	NP	NP		ALLUVIAL GRAVEL
	710	19	G-SM	12.7				
25		45		21.0				
	705	50/4"	CL-ML	16.8	41.1	16.6		
30		50/4"		18.6				WEATHERED SHALE
	700	25		19.8	38.9	14.3		
		50/4"	CL	22.2	46.1	20.4		
			SC	12.2	29.1	9.6		
35								

Project WATTS BAR N. P. Boring SS-161

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
-35		50/4"	SC	7.7	29.1	9.6		WEATHERED SHALE
	695	50/2"		6.3				DISCONTINUED
-40								
	690							
-45								
-50								
-55								
-60								
-65								
-70								
-75								
-80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-321
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE

Boring SS-161	Boring SS-161A	Prepared by JLB
Station 488.0 N Range 670.0 E	Station 488.0N Range 675.0E	Checked by HPM
Surface El 732.4	Surface El 732.9	
Date Drilled 6-28-79 to 6-28-79	Date Drilled 11-23-81 to 11-23-81	

El	SPT (N)	Loc	W	LL	PI	SPT (N)	Loc	W	LL	PI	REMARKS
730	20	CH	26.2	57.6	30.0	33	CH	28.4	62	34	
	14	ML	21.1	41.2	14.4	26	SM	19.2	39	12	
	9	CL-ML	25.1	43.0	16.5	13	CL	24.3	36	13	
725	8	SC	28.2	34.4	11.9	12	SM-SC	21.8	32	8	
	5	CL	25.3	30.8	9.4	9	SC	22.4	28	8	ALLUVIUM
	6	SC	25.3	29.7	8.4	10	SW	23.8	26	2	
720	9	SW	18.4	NP	NP	13		17.8 17.0	NP	NP	
	10		21.5			23	SC	14.0	29	9	
715	3	CL-ML	35.8	36.8	13.2	5	ML	35.7	38	12	
	5	ML	30.9	25.7	2.3	5	CL	33.0 32.4	34 27	13 9	
	37	GW	11.1	NP	NP	50	SW	15.4			
710	19	GP-GM	12.7			40	GP-GM	10.3	NP	NP	
	45	SW-SM	21.0			16	SW	44.2			WEATHERED SHALE
	50/4"		16.8	41.1	16.6						DISCONTINUED
705	50/4"	CL-ML	18.6								
	25		19.8	38.9	14.3						
700	50/2"	CL	22.2 12.2	46.1	20.4						
	50/4"	SC	7.7	29.1	9.6						
695	50/4"		6.3								
690											

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-322

BEST AVAILABLE HISTORICAL IMAGE

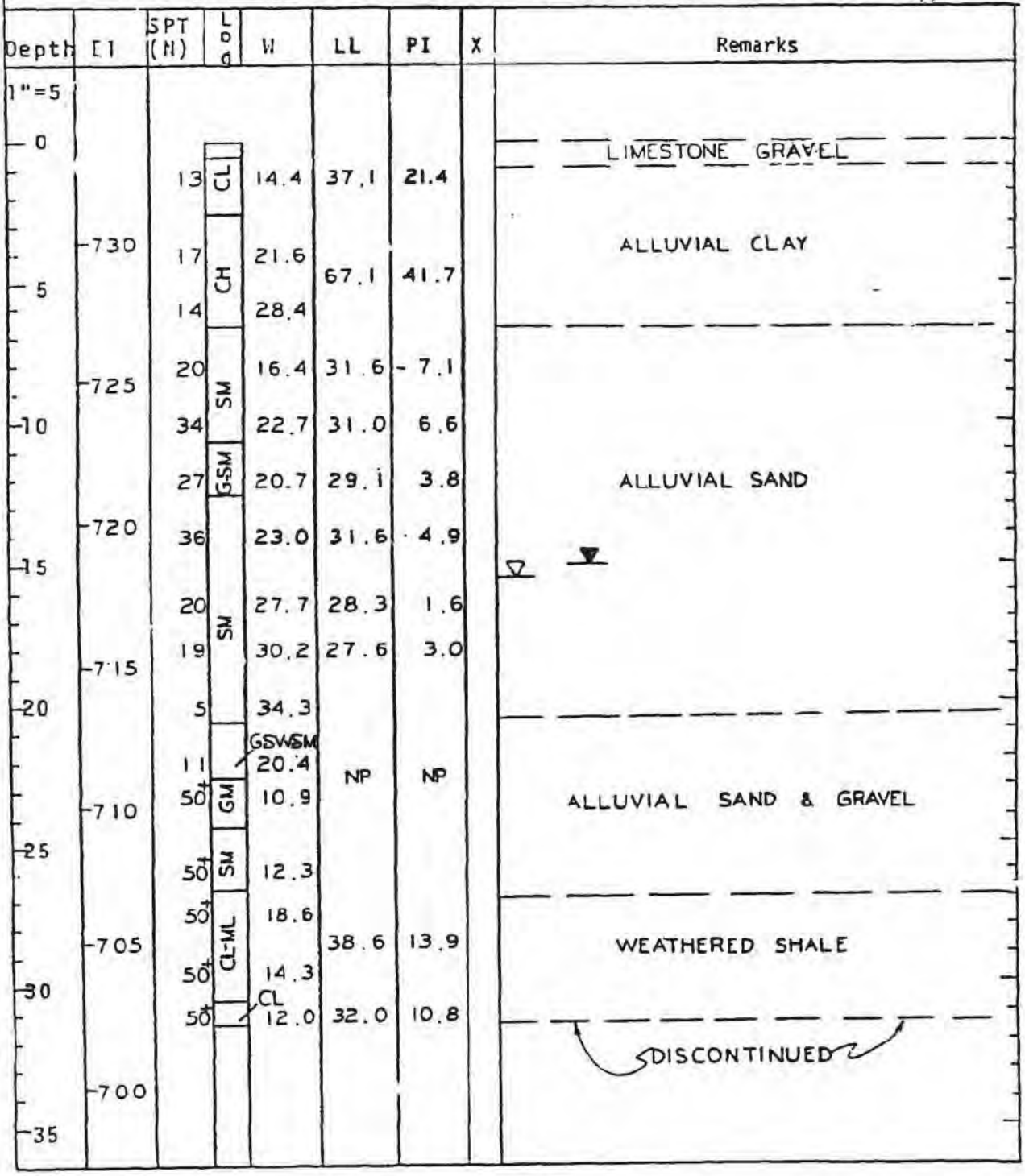
WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-323
SHEET 1 OF 1

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-162 Station 488.0 N Range 560.0E Surface El 733.8

Date Drilled 6-28-79 To 6-28-79 Prepared By JLB Checked By



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-324
SHEET 1 OF 1

BEST AVAILABLE HISTORICAL IMAGE

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-163 Station 488.0 N Range 450.0 E Surface El 737.0

Date Drilled 6-28-79 To 6-28-79 Prepared By JLB Checked By

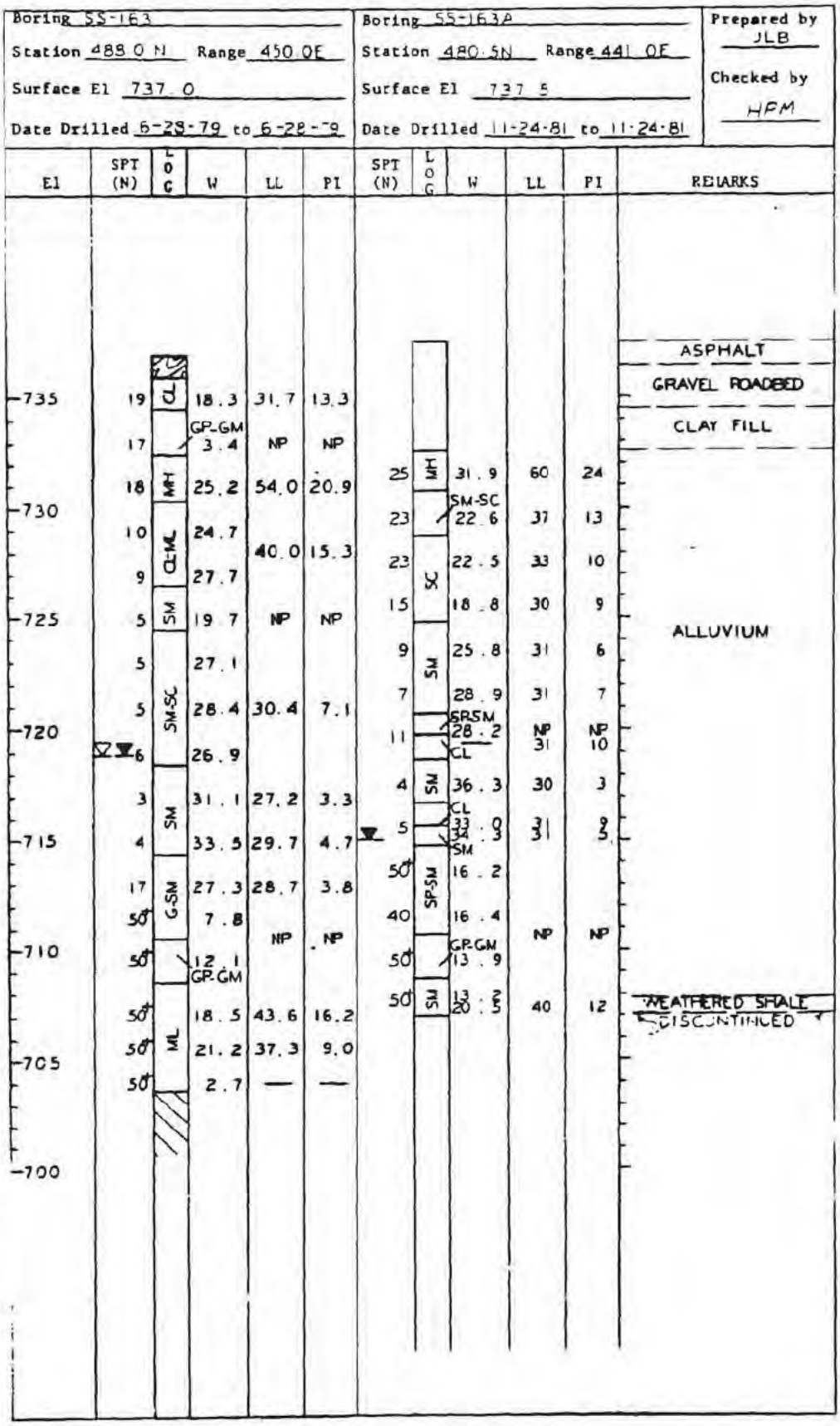
Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5								
0								GRAVEL
	735	19	CL	18.3	31.7	13.3		ALLUVIAL CLAY
		17	GRGM	3.4	NP	NP		ALLUVIAL GRAVEL
5		18	MH	25.2	54.0	20.9		
	730	10	CL-ML	24.7	40.0	15.3		ALLUVIAL CLAY & SILT
10		9		27.7				
	725	5	SM	19.7	NP	NP		
		5		27.1				
15		5	SM-SC	28.4	30.4	7.1		ALLUVIAL SAND
	720	6		26.9				▽ ▼
20		3	SM	31.1	27.2	3.3		
	715	4		33.5	29.7	4.7		
		17	G-SM	27.3	28.7	3.8		
25		50+		7.8				ALLUVIAL GRAVEL
	710	50+		12.1	NP	NP		
		50+	GRGM					
30		50+		18.5	43.6	16.2		
	705	50+	ML	21.2	37.3	9.0		WEATHERED SHALE
		50+		2.7	—	—		
35								DISCONTINUED

BEST HISTORICAL AVAILABLE IMAGE

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-325

WATTS BAR NUCLEAR PLANT ERCW
SOIL PROFILE



WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-326
SHEET 1 OF 2

BEST AVAILABLE HISTORICAL IMAGE

Project WATTS BAR N.P. Feature ERCW ALIGNMENT

Boring SS-164 Station 488.0 N Range 230.0 E Surface El 741.0

Date Drilled 6-28-79 To 6-29-79 Prepared By JLB Checked By ACJ

Depth	El	SPT (N)	SOIL	W	LL	PI	X	Remarks
1"=5'								
0								BACKFILL
	740	20	GCL	6.9	28.3	10.5		
		14	SMSC	16.7	27.0	5.4		ALLUVIAL SAND & GRAVEL
5		50+	G-SM	1.7	NP	NP		
	735	20	CL-ML	24.7	48.7	21.3		ALLUVIAL CLAY & SILT
10		31	CH-MH	—	52.7	24.5		
	730	21	SMSC	20.8	38.6	12.7		ALLUVIAL SAND
		15	ML	22.3				
15					39.4	13.1		ALLUVIAL CLAY & SILT
	725	16		25.6				
		9	CH	26.2	60.3	36.3		
20		6	CL-ML	28.2	36.0	12.1		
	720	9	SMSC	27.4	31.5	8.6		
		15	G-SP-SM	16.2				
25					NP	NP		
	715	20		20.9				
		11	SM	26.6	31.1	5.7		ALLUVIAL SAND & GRAVEL
30		50+	G-SP-SM	11.0				
	710	50		14.9	NP	NP		
		26	CL	13.2	46.7	22.7		WEATHERED SHALE
35								

Project WATTS BAR N. P. Boring SS-164

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35								
	705	39	CL-ML	14.0	45.0	18.9		WEATHERED SHALE
		50+	G-SM	—	—	—		
		50+		7.4	—	—		
40								
	700							BEDROCK
45								
	695							
50								
55								
60								
65								
70								
75								
80								

BEST AVAILABLE HISTORICAL IMAGE

WATTS BAR NUCLEAR PLANT
FINAL SAFETY ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-326
SHEET 2 OF 2

BEST AVAILABLE HISTORICAL IMAGE

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-327
SHEET 1 OF 2

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-165 Station 488.0 N Range 120.0 E Surface El 740.7

Date Drilled 6-29-79 To 6-29-79 Prepared By JLB Checked By

Depth (1"=5)	El	SPT (N)	Log	W	LL	PI	X	Remarks
0	740	50		—	—	—		SANDY SILT
5	735	13	CL	19.8	31.2	13.0		
		20	CL-CH	27.2	50.6	23.6		ALLUVIAL CLAY & SILT
10	730	18	ML	20.7	44.7	16.3		
		11	CL-ML	22.9	35.8	12.2		
		13	ML	28.5	44.5	16.6		
15	725	11	CL	26.7	36.7	14.4		
		12	SM	21.8	34.1	9.2		
20	720	5	ML	31.9	37.4	11.5		ALLUVIAL SAND & SILT
		6	CL-ML	31.2	39.0	14.2		
		3	SM-SC	33.3	30.7	8.1		
25	715	2		34.4				
		27	G-SC	17.7	—	—		
30	710	50	GP-GM	10.5				ALLUVIAL GRAVEL
		47		10.5	NP	NP		
35		34	GW-GM	11.6				

Project WATTS BAR N. P. Boring SS-165

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35	705	49	ML	19.0	37.1	11.6		LAMINATED RESIDUUM
		50/4"		7.9	27.6	7.7		
		50/4"	G-SC	—	—	—		NO SAMPLE RECOVERY
40	700	50/4"		8.7	27.6	7.7		LAMINATED RESIDUUM
								DISCONTINUED
45	695							
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-327
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-328
SHEET 1 OF 2

BEST AVAILABLE HISTORICAL IMAGE

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-166 Station 488.0 N Range 10.0 E Surface El 740.5

Date Drilled 6-29-79 To 6-29-79 Prepared By JLB Checked By

Depth	El	SPT (N)	USCS	W	LL	PI	X	Remarks
1"=5								
0	740	12	CL	20.5	38.5	18.4		FILL
		50+	GSM	3.0	NP	NP		
5	735	24	GP-GM	0 7				
		17	CL-ML	25.1	48.1	21.1		
10	730	17		24.0				
		21	CL	25.8	39.6	15.9		ALLUVIAL SILT & CLAY
		12	ML	24.2	30.0	5.6		
15	725	18	CL-ML	23.4	33.2	10.8		
		16		28.1	40.3	14 6		
20	720	13	ML	29.6	48.8	19.8		
		11		32.2				
		6	CL-ML	28.4	31.4	9.1		
25	715	5	CL	29.3	36.8	14.3		
		5	SC	27.1	26.7	9.6		ALLUVIAL SAND OR GRAVEL
		50+	GSPSM	12.6	NP	NP		
30	710	50+		10.1				
		50	CL-ML	15.2	34 .1	10.7		WEATHERED SHALE
35								

Project WATTS BAR N. P. Boring SS-166

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35	705	50+	ML	13.8	31.5	7.1		WEATHERED SHALE
		50+		12.9	—	—		
								DISCONTINUED
40	700							
45								
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-328
SHEET 2 OF 2

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-329
SHEET 1 OF 1

BEST AVAILABLE HISTORICAL IMAGE

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-167 Station 420.0N Range 83.3W Surface El 739.7

Date Drilled 7-2-79 To 7-2-79 Prepared By JLB Checked By COR

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5								
0								
		18	CL-ML	17.0	27.7	6.2		
		12	CL	13.4	29.8	10.4		FILL
5	735	13		21.8	43.2	25.0		
		25	G-SC	23.7	—	—		
10	730	23	CH-MH	25.6	51.9	23.4		
		21		22.6				
		16	CL-ML	25.1	43.4	18.5		
15	725	14		27.4	46.0	19.4		ALLUVIAL CLAY
		14		27.3				
20	720	13		28.8	46.5	21.6		
		10	CL	30.2				
		6		32.1	44.7	19.5		
25	715	5		31.8	32.7	12.1		
		2		34.1	31.0	15.2		
		50+	G-SM	10.1	NP	NP		ALLUVIAL GRAVELLY SAND
30	710	50+	CL-ML	12.8	26.2	4.6		
		50+		10.9	30.1	7.2		WEATHERED SHALE
35	705							BEDROCK

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.5-330
SHEET 1 OF 2

BEST AVAILABLE HISTORICAL IMAGE

Project WATTS BAR N. P. Feature ERCW ALIGNMENT

Boring SS-168 Station 319.8 N Range 65.3 W Surface El 739.6

Date Drilled 7-2-79 To 7-3-79 Prepared By JLB Checked By

Depth	El	SPT (N)	Log	W	LL	PI.	X	Remarks
1"=5'								
0								
				CL-ML				
		17		15.5	28.9	6.2		CLAY FILL
	735	11		16.5				
5								
		12		16.9	27.4	7.0		
		12	CL	17.3				
10	730	8		16.6	29.6	9.5		
		14		20.1	43.6	22.8		
15	725			CL-CH				
		18		25.9	50.7	27.2		ALLUVIAL CLAY
		9		25.6	41.8	20.5		
20	720	11		28.6			▼	
		7	CL	31.1	43.7	19.5		
		2		29.0	36.7	18.6	▽	
25	715	1		28.4	25.5	9.0		
		50+		GP-GM 9.5	NP	NP		ALLUVIAL GRAVEL
		50+		GW-GM 8.9				
30	710	50+		17.2	36.2	13.7		WEATHERED SHALE
		50+	CL	13.9	34.1	13.1		
35	705							

Project WATTS BAR N.P. Boring SS-168

Depth	El	SPT (N)	Log	W	LL	PI	X	Remarks
1"=5'								
35		50+	SC	8.5	27.3	8.0		WEATHERED SHALE
		50+		7.3				DISCONTINUED
	700							
40								
45								
50								
55								
60								
65								
70								
75								
80								

WATTS BAR NUCLEAR PLANT
FINAL SAFETY
ANALYSIS REPORT

SOIL PROFILE
FIGURE 2.6-330
SHEET 2 OF 2