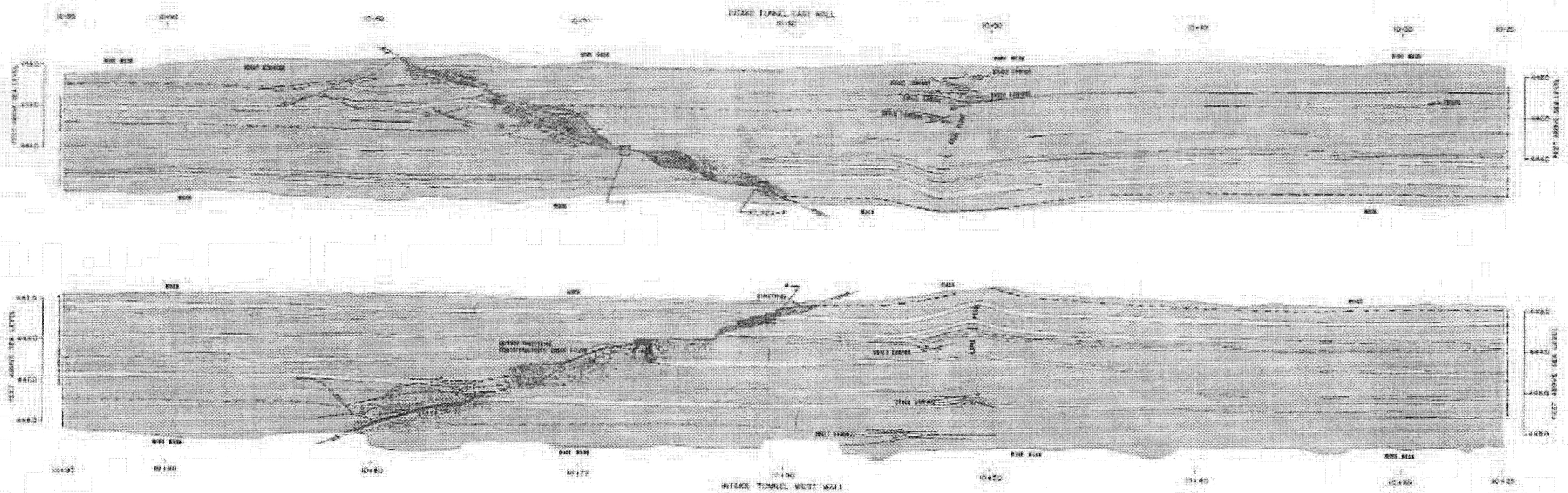


EXPLANATION

- FAULT BOXED ZONE. GRAY, PLASTIC CLAY GOUGE MATRIX WITH AGGREGATE OF RANDOMLY ORIENTED SILTSTONE AND SHALE FRAGMENTS.
- FAULT GOUGE STRINGER. <0.01 FT. THICK. ARROWS INDICATE DIRECTION OF RELATIVE MOVEMENT.
- JOINT/FRACTURE PATTERN.
- SILTSTONE.
- SILTSTONE LAMINA, DASHED WHERE BEDDING PLANE CONTINUOUSLY MAPPED BUT SILTSTONE LITHOLOGY THICKENS OUT.
- SHALE.
- SHALE LAMINA, AS LABELED.
- IRONSTONE CONCRETIONS
- MICRO-CRACK SAMPLE LOCATION NUMBER GIVEN.

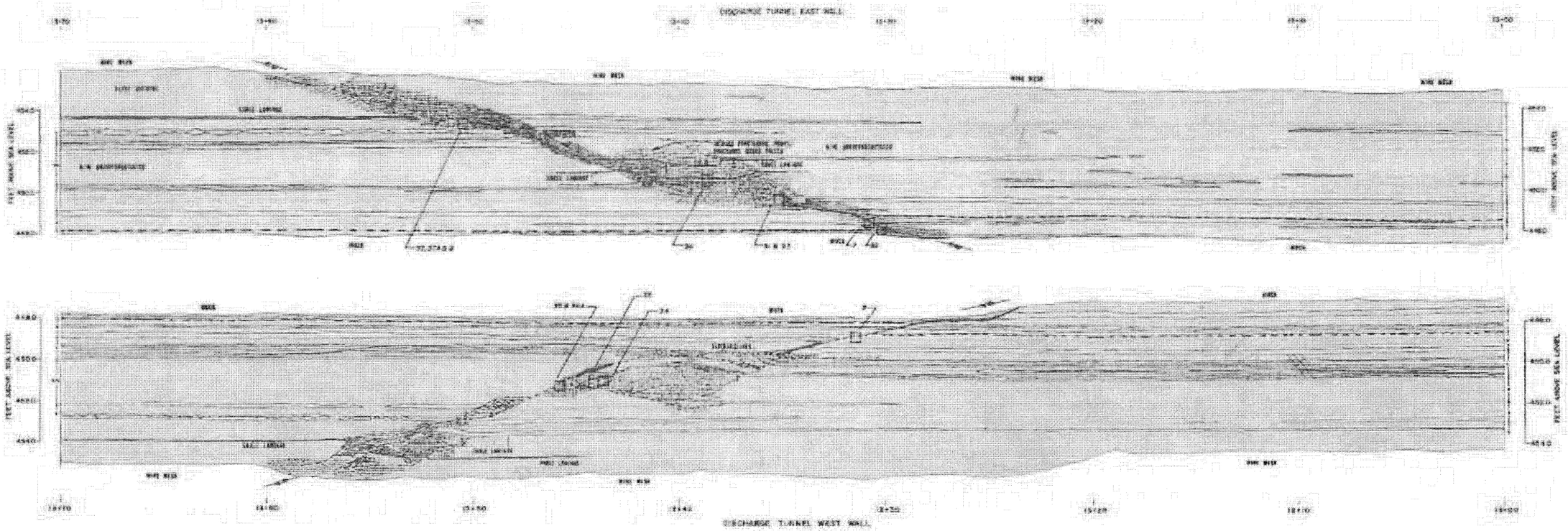
SCALE IN FEET 0 1 2 3 4

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Intake Tunnel Fault Map

Figure 2.5-50



EXPLANATION

- FAULT SOURCE ZONE, WEAK, PLASTIC CLAY GOUGE MATRIX WITH AGGREGATE OF RANDOMLY ORIENTED SILTSTONE AND SHALE FRAGMENTS.
- FAULT SOURCE STRINGER <0.1 FT. THICK. ARROWS INDICATE DIRECTION OF RELATIVE MOVEMENT.
- JOINT / FRACTURE PATTERN.
- SILTSTONE.
- SILTSTONE LAMINA, DASHED WHERE BEDDING PLANE CONTINUOUSLY MAPPED BUT SILTSTONE LITHOLOGY PINCHES OUT.
- SHALE.
- SHALE LAMINA, AS LABELED.
- IRONSTONE CONCRETIONS.
- MICRO-CRACK SAMPLE LOCATION, NUMBER GIVEN.

SCALE IN FEET

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Discharge Tunnel Fault Map

Figure 2.5-51

DISCHARGE TUNNEL EAST WALL

DISCHARGE TUNNEL WEST WALL

FEET ABOVE SEA LEVEL

EXPLANATION

- FAULT GOUGE ZONE. GRAY, PLASTIC CLAY GOUGE MATRIX WITH AGGREGATE OF RANDOMLY ORIENTED SILTSTONE AND SHALE FRAGMENTS.
- FAULT GOUGE STRINGER <0.1 FT. THICK. ARROWS INDICATE DIRECTION OF RELATIVE MOVEMENT.
- JOINT/FRACTURE PATTERN.
- SILTSTONE.
- SILTSTONE LAMINA, DASHED WHERE BEDDING PLANE CONTINUOUSLY MAPPED BUT SILTSTONE LITHOLOGY PINCHED OUT.
- SHALE.
- SHALE LAMINA, AS LABELED.
- IRONSTONE CONCRETIONS.
- MICRO-CRACK SAMPLE LOCATION NUMBER GIVEN.

SCALE IN FEET

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Discharge Tunnel Fracture Zone Map

Figure 2.5-52

LAKE ERIE

INTAKE TUNNEL

DISCHARGE TUNNEL

MINOR STREAM DIVERSION SEDIMENT CONTROL DAM

NORTHWEST STORM DRAINAGE SEDIMENT CONTROL DAM

MAJOR STREAM SEDIMENT CONTROL DAM

UNIT NO. 1 COOLING TOWER

UNIT NO. 2 COOLING TOWER

LOCKWOOD ROAD WASTE AREA

TRANSMISSION STATION

MICROWAVE TOWER

PLANT NORTH 45° 00' 00" EAST OF OHIO GRID NORTH

LEGEND

- GAS TESTING
- TOP OF BEDROCK PROBE LOCATIONS
- BORING LOCATIONS
- OBSERVATION WELLS
- PERMEABILITY TEST BORINGS
- DEEP WELL (PUMP WELL)
- SPECIAL TESTING TEST BORINGS (PRESSUREMETER)
- PIEZOMETER TEST BORINGS
- SEISMIC SURVEY TEST BORINGS
- RECHARGE TEST BORINGS
- TEST CAISSIONS
- T X SERIES-FAULT STUDY
- MONITORING WELLS
- TEST PITS

NOTES:

1. THE ELEVATION OF THE SURFACE OF THE WATER DURING THE PROBE READINGS WAS EL. 574.8 (U.S.G.S. DATUM)
2. THE ELEVATIONS USED ON THIS DRAWING REFERENCED TO THE U.S.G.S. DATUM.
3. BORING LOCATION I-76 NOT SHOWN - SEE DRAWING (N.777,169. E.2,369,347).
4. REACTOR COORDINATES:

	OHIO GRID	PLANT GRID
UNIT 1	N.780,545	N.48,486
	E.2,368,815	E.9,510
UNIT 2	N.780,346.775	N.49,255
	E.2,369,947.166	E.9,570

200' 0' 200' 400' SCALE IN FEET

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Site Exploration Plot Plan

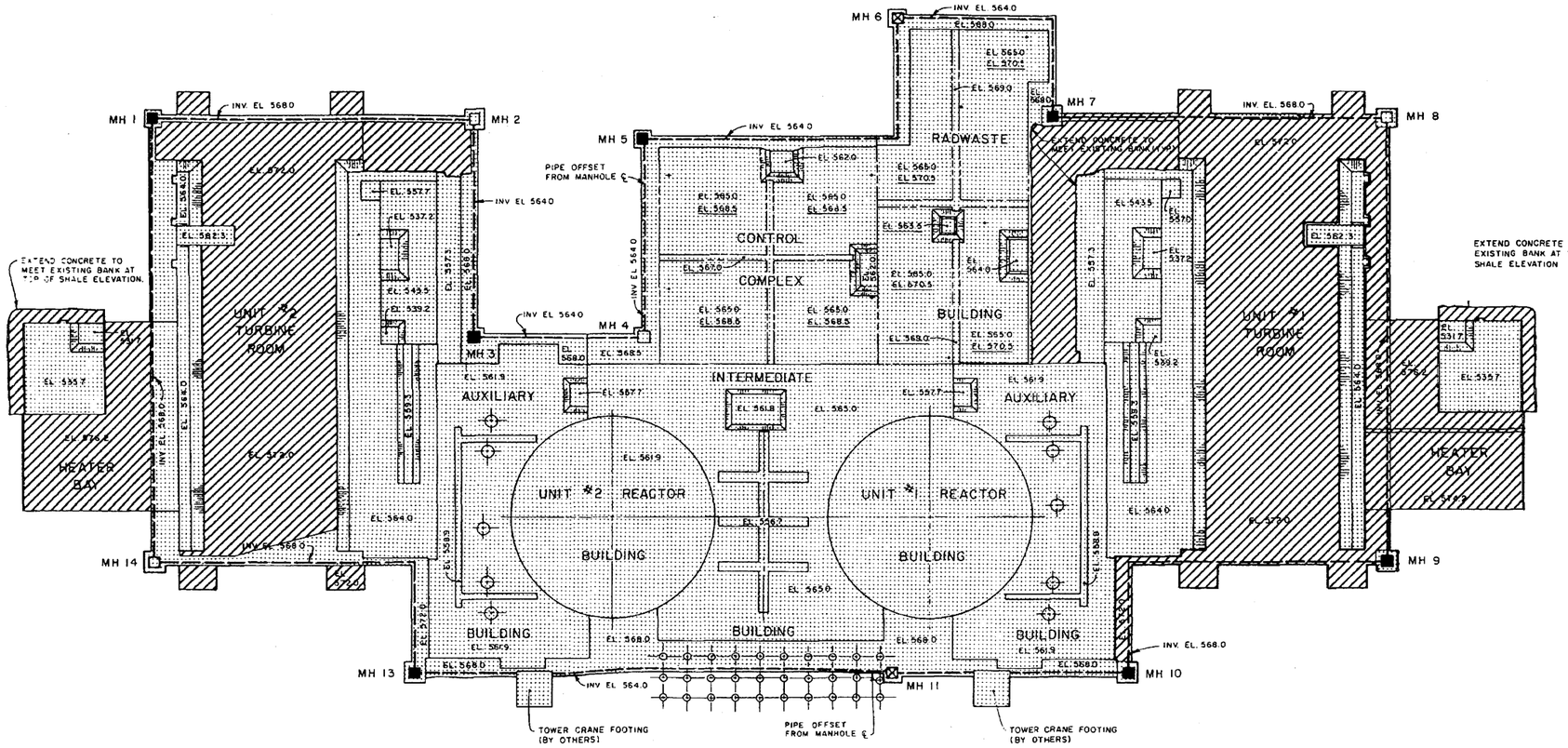
Figure 2.5-53

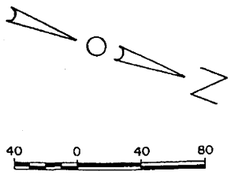
LEGEND

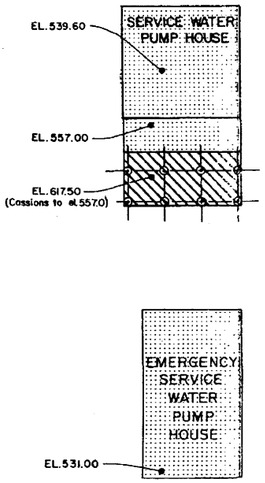
SHALE

LOWER TILL

UPPER TILL / LACUSTRINE







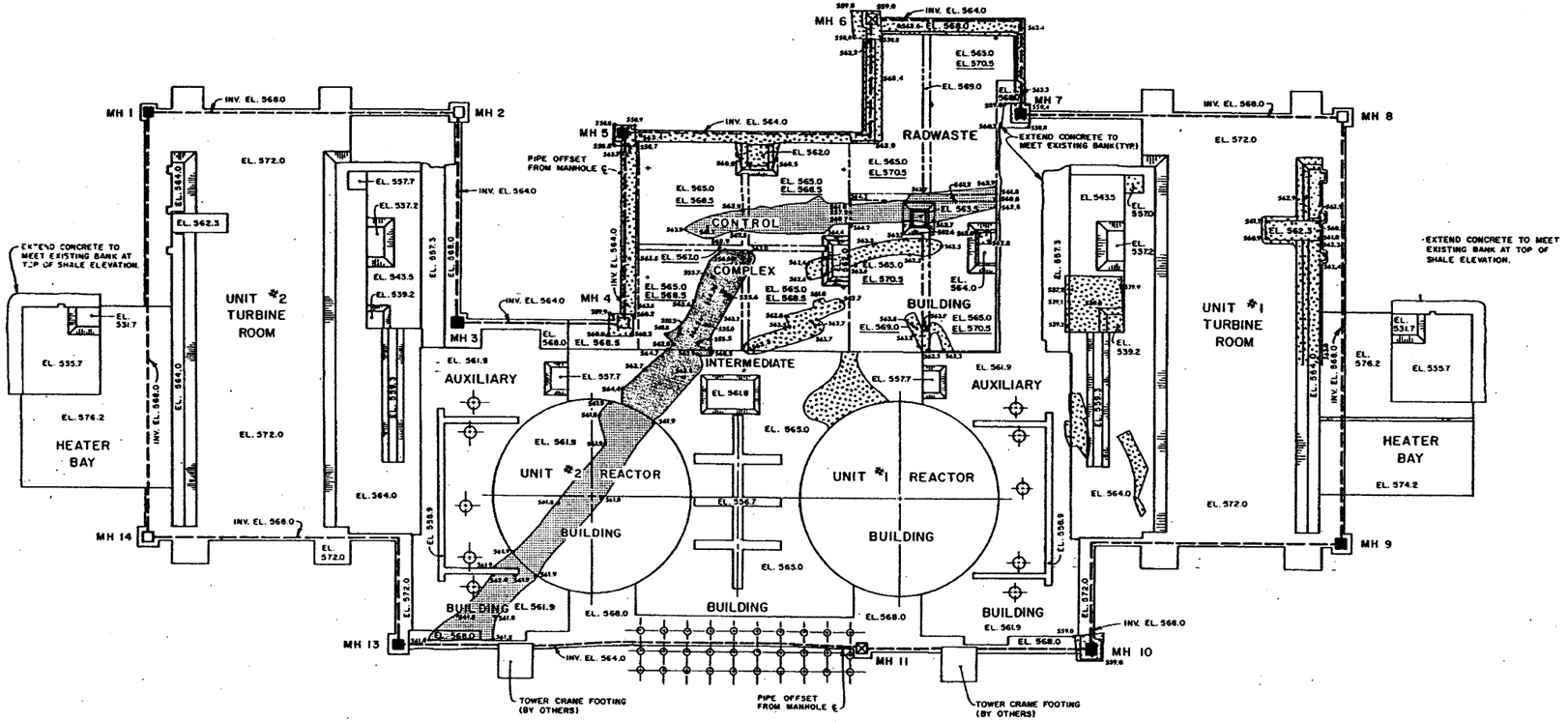
NOTE:
EACH COOLING TOWER RESTS ON 498 PILES. THE PILES ARE SEATED IN SHALE.

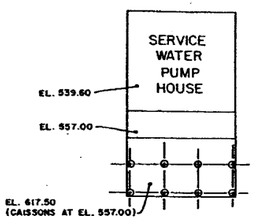
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Plant Structures Foundation Grade Materials

Figure 2.5-54





KEY

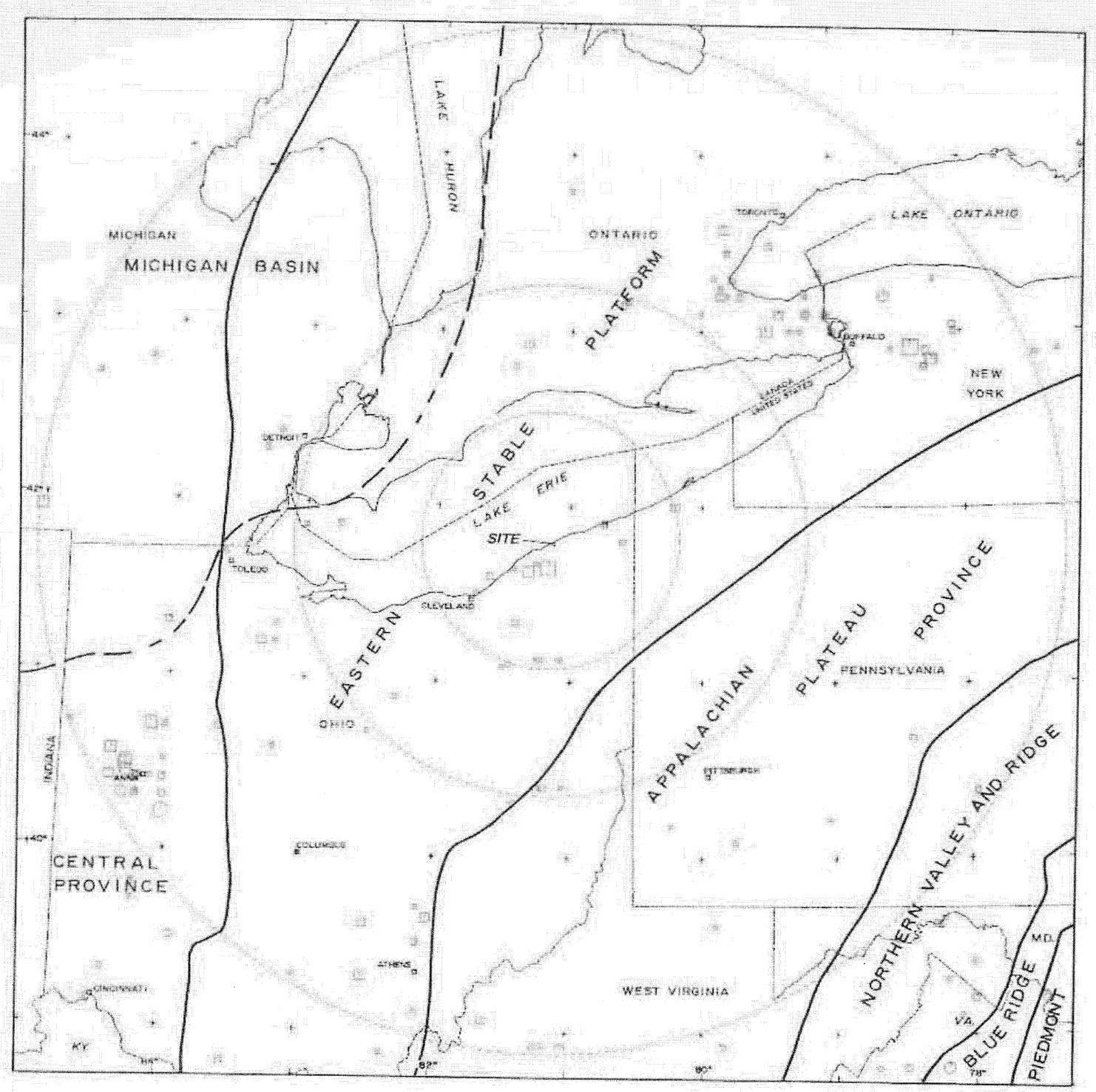
AMOUNT OVEREXCAVATED	
	0 – 3 FT
	3 – 10 FT.
	10 – 15 FT.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Foundation Overexcavation Plan

Figure 2.5-55



0 50 100 150 Miles
0 50 100 150 200 Kilometers

REGIONAL TECTONIC PROVINCES

Province Boundary

Michigan Basin Tectonic Province Boundary constructed from Midland ASLB LBP-85-2 (72, 271).

EARTHQUAKES

TIME WINDOW BEGINS DEC 1784, ENDS SEPT 1981

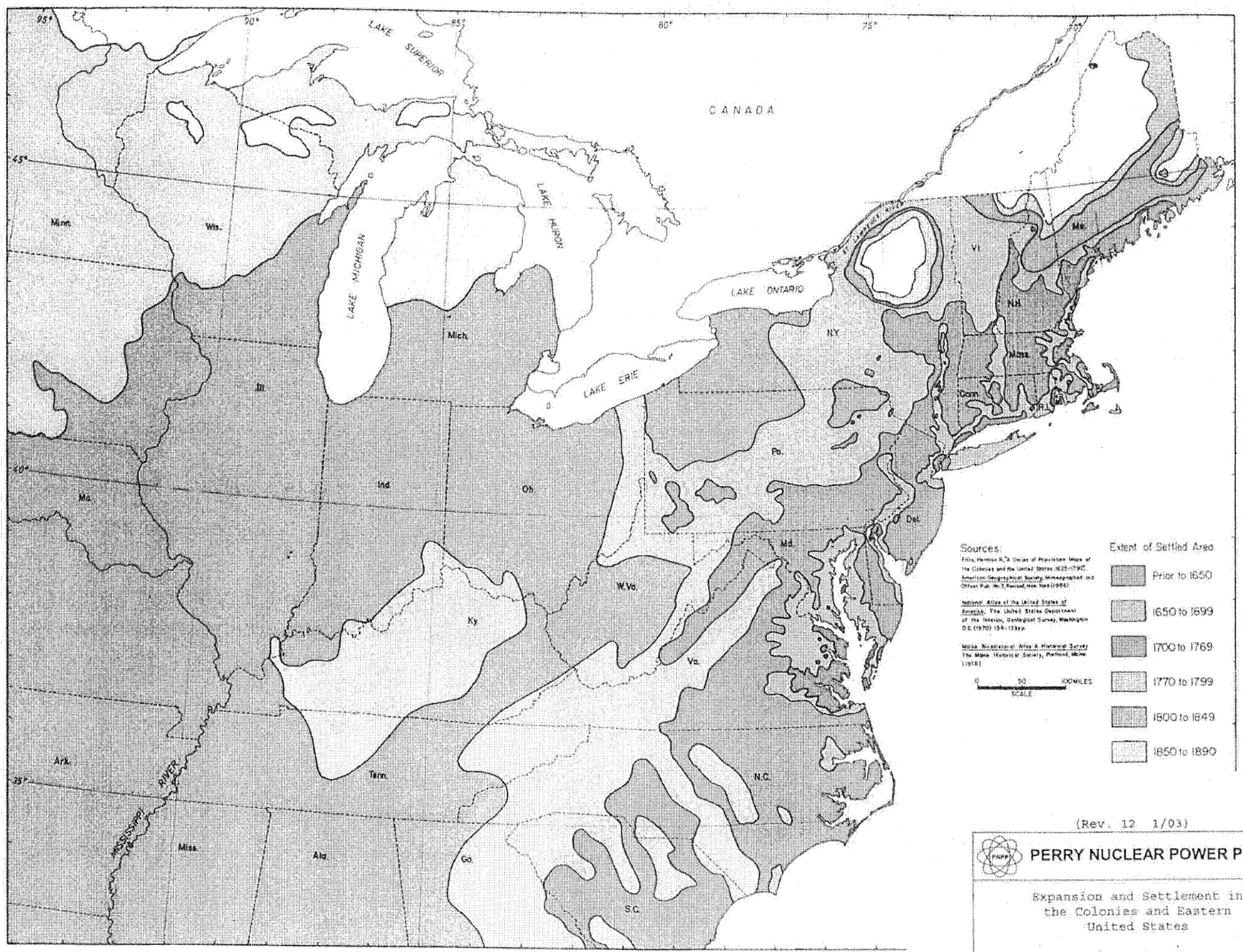
MAGNITUDE		INTENSITY	
●	3	●	III
■	4	■	IV
▲	5	▲	V
▽	6	▽	VI
□	7	□	VII
⊡	8	⊡	VIII

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Tectonic Provinces and Earthquakes

Figure 2.5-56

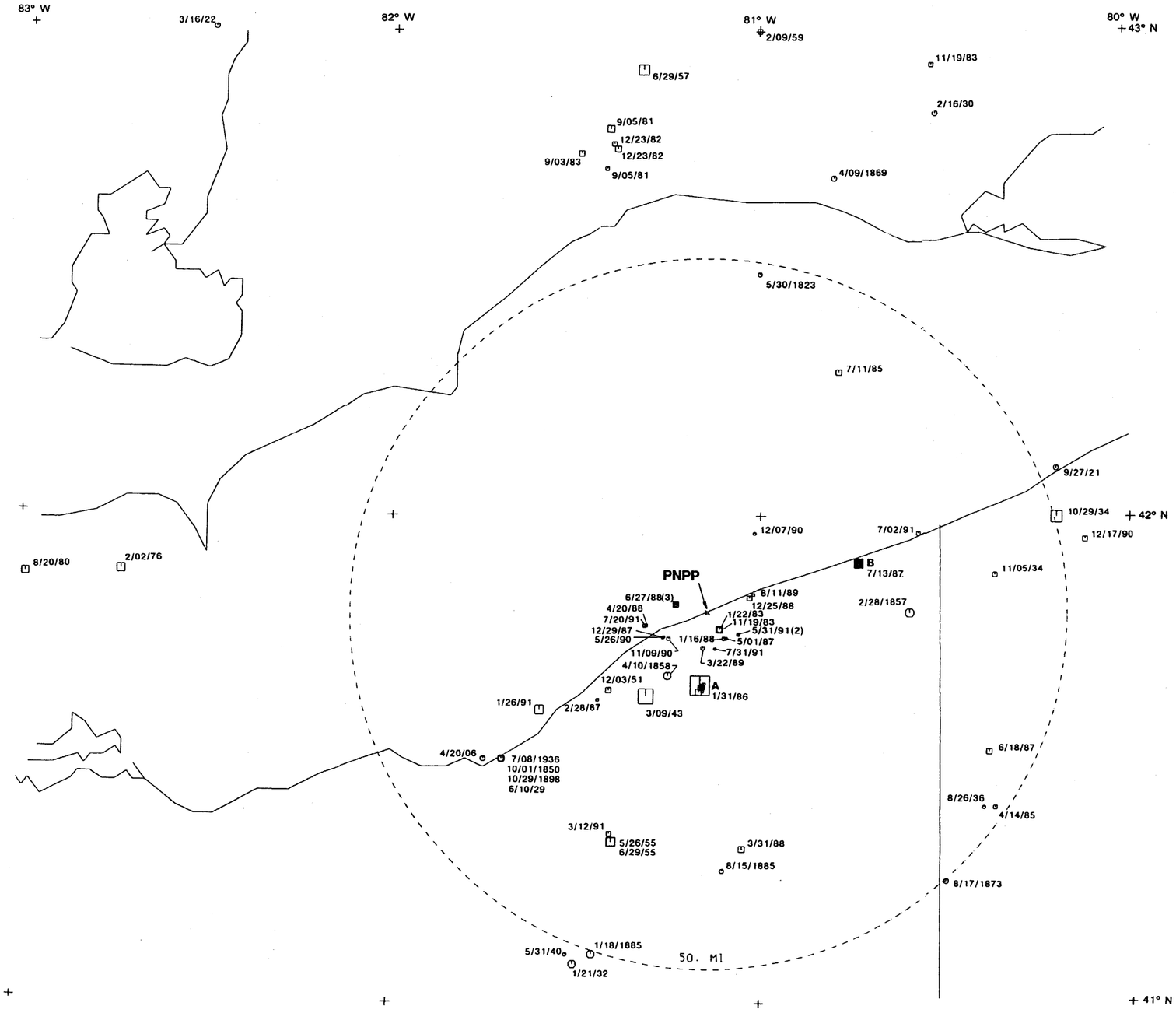


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

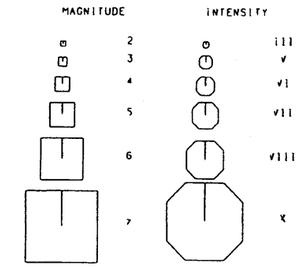
Expansion and Settlement in the Colonies and Eastern United States

Figure 2.5-57



LEGEND

MAGNITUDE RANGES FROM 1.0 TO 10.0
INTENSITY RANGES FROM I TO XII
TIME WINDOW BEGINS 1500 ENDS 2000



A

1/31/86
2/01/86
2/03/86
2/06/86
2/07/86
3/24/86
2/12/87
12/28/88
9/01/90

For further details on aftershock sequence, see Figure 2.5-67 and Table 2.5-18.

B

7/13/87 (12)
7/14/87 (2)
7/16/87 (5)
8/13/87
12/19/87
12/25/87
8/01/89 (5)
8/02/89 (4)
8/03/89
8/04/89
1/01/90
7/13/90
7/24/90
9/25/90
9/26/90 (4)
11/18/90
5/02/91

This earthquake sequence of more than 60 tremors is probably induced. (Armbruster et al., 1987)

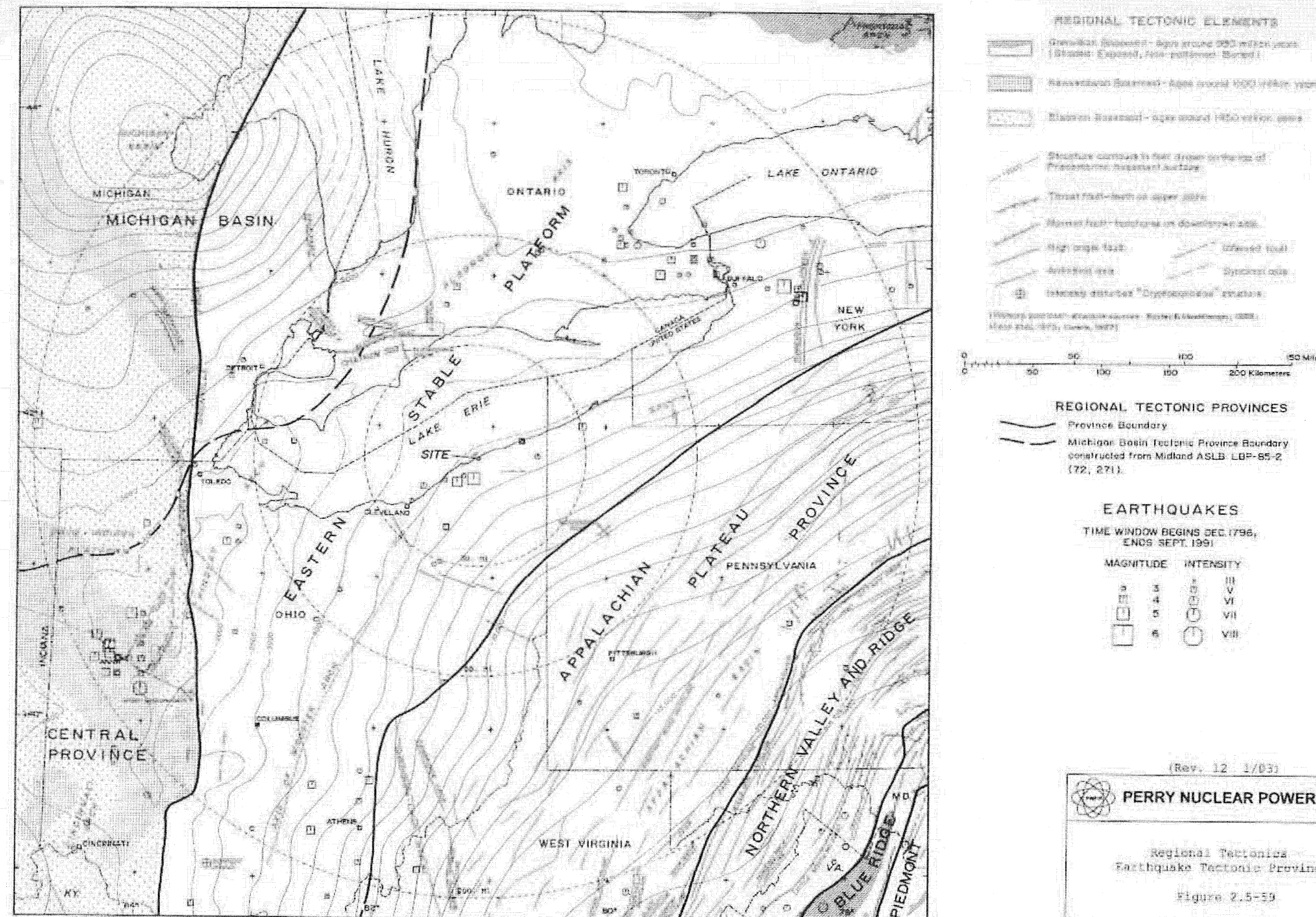
0 10 20 30 Km
0 10 20 Mi

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Seismicity Within 50 Mile Radius
M >1.0 Io ≥1.0

Figure 2.5-58

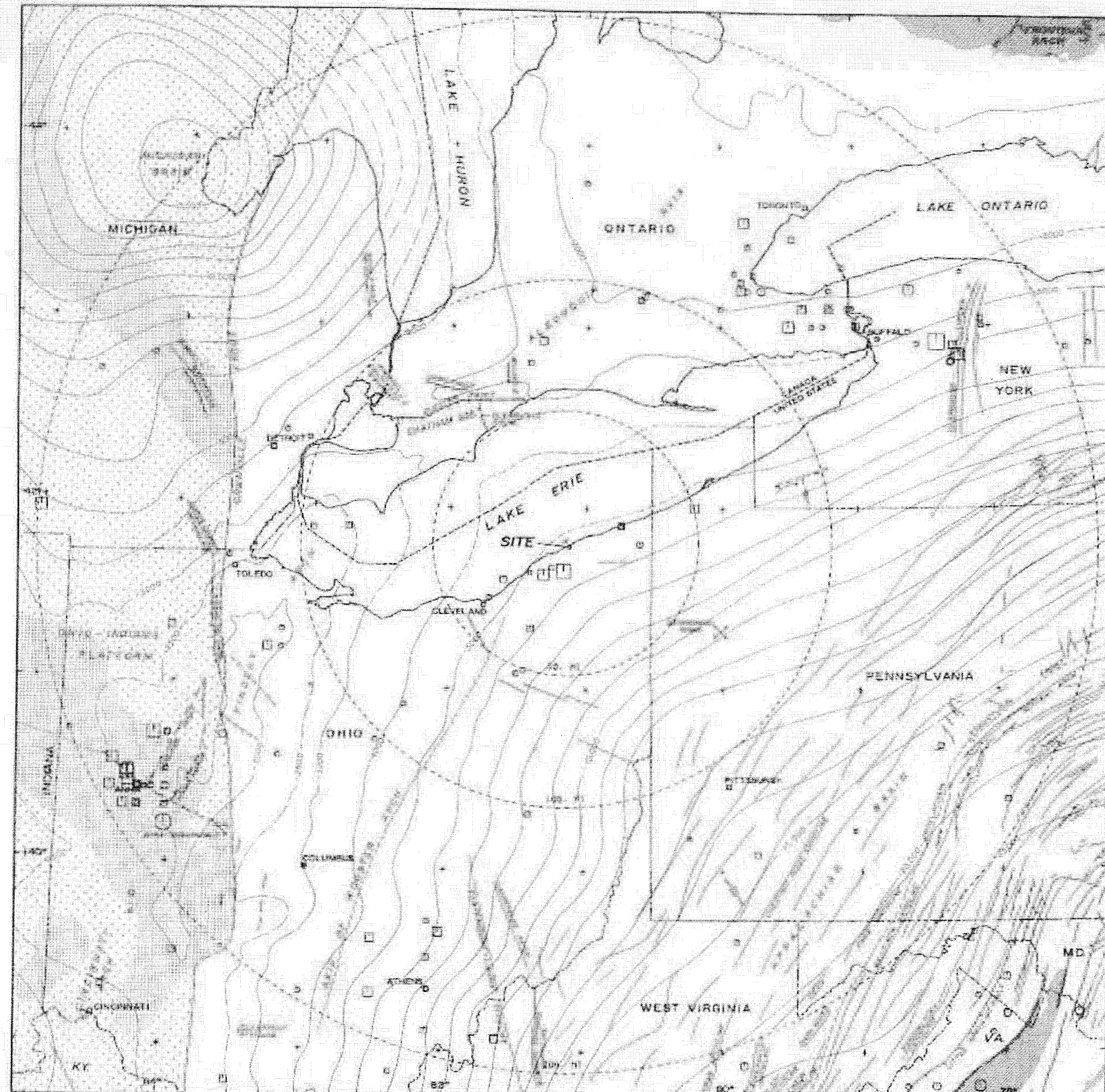


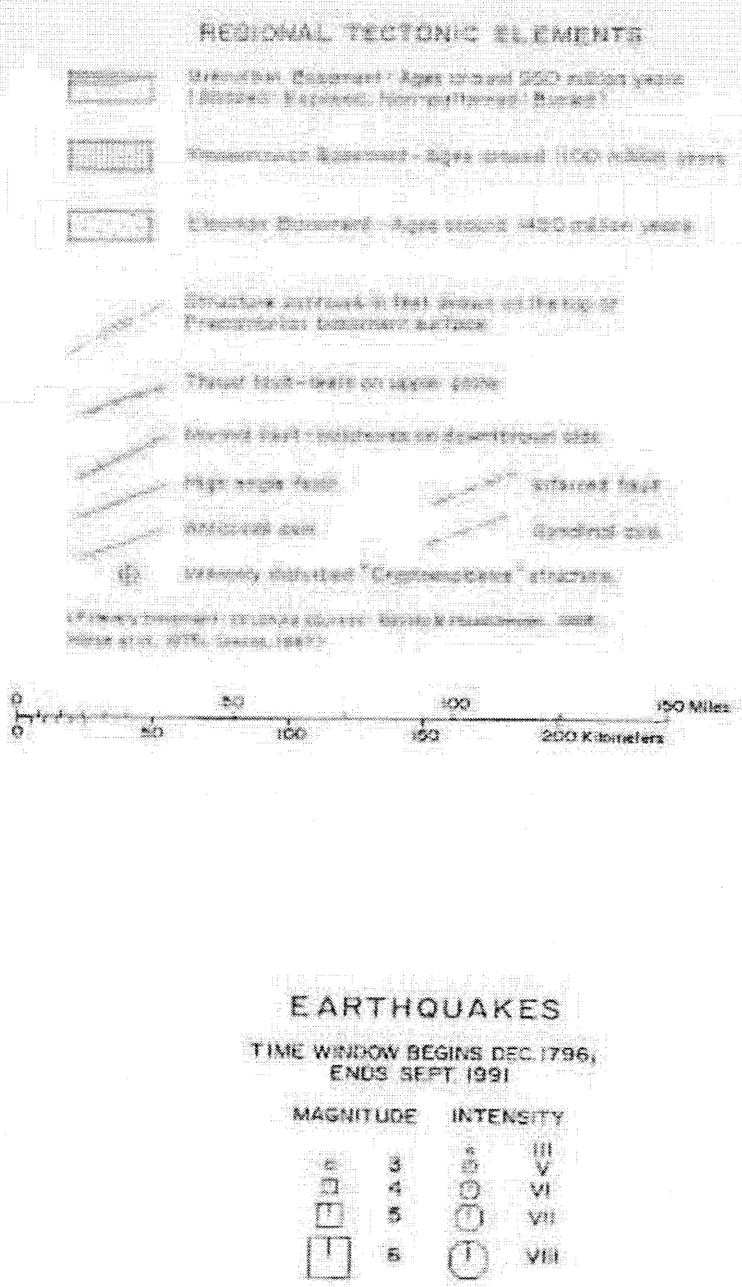
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Regional Tectonics
Earthquake Tectonic Provinces

Figure 2.5-59



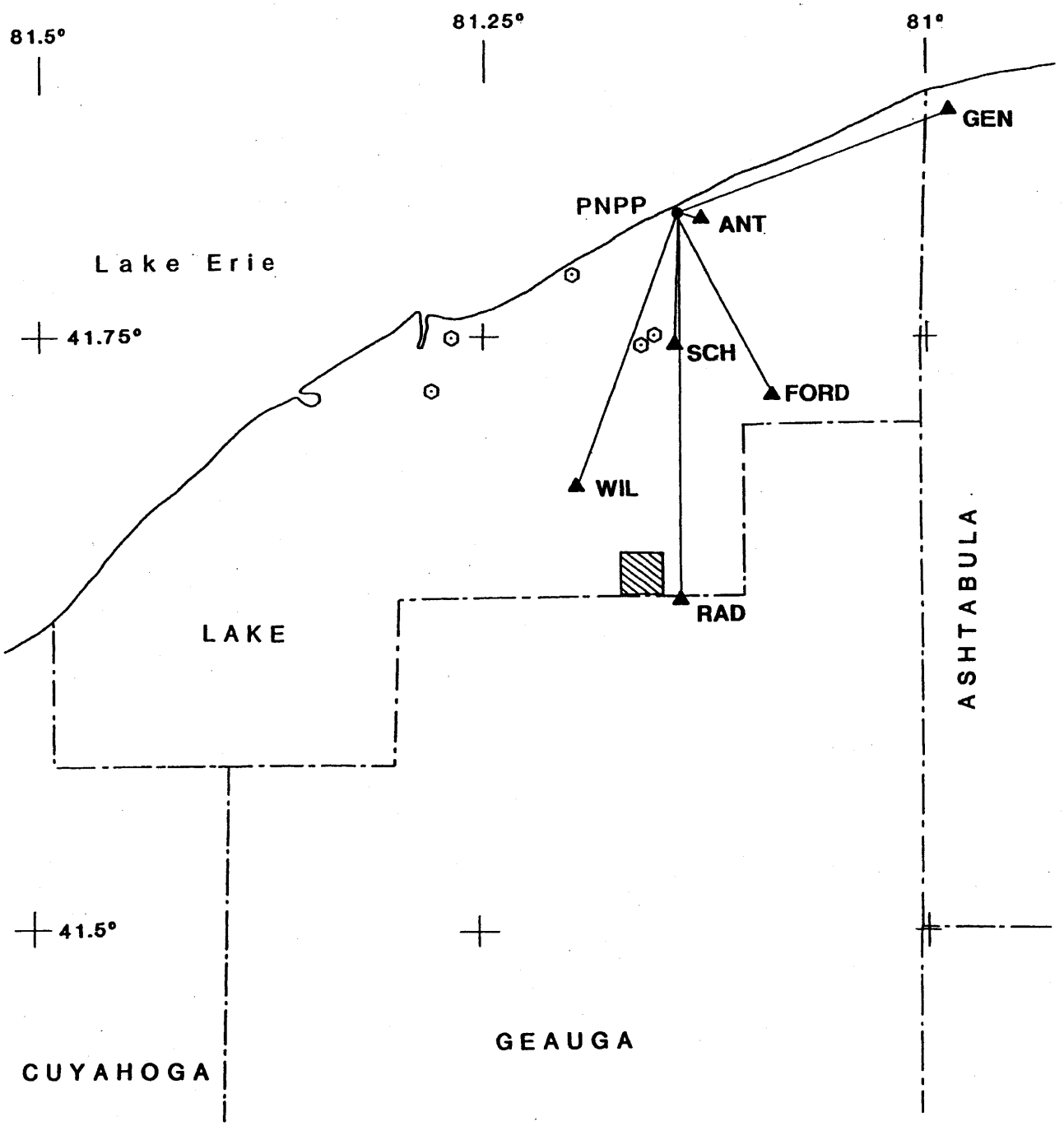


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Regional Tectonics and Earthquakes

Figure 2.5-60



▲ Station

⊙ Injection Well

Epicenter of Mainshock
January 31, 1986

0 5 Miles

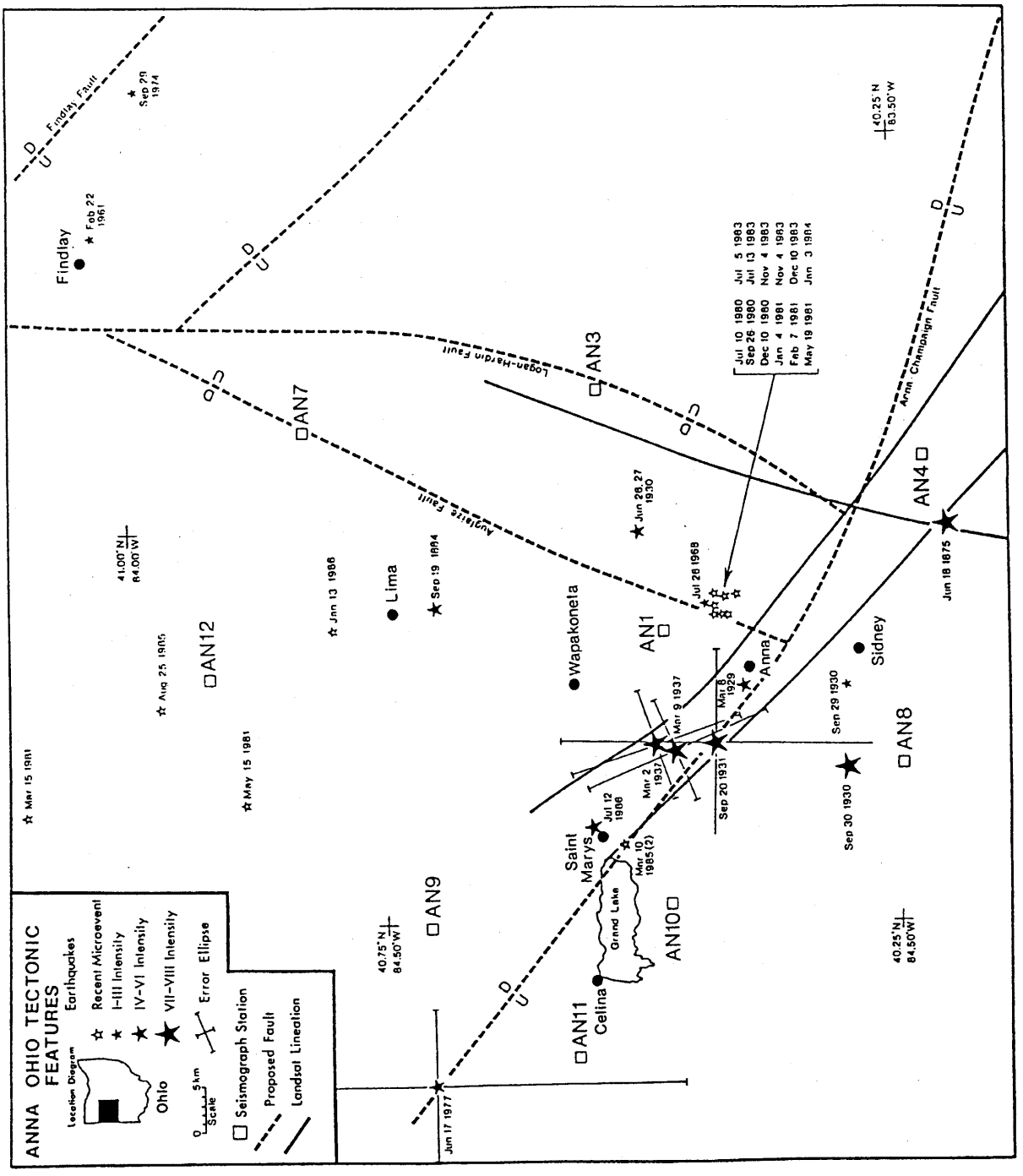
0 5 Km

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Telemetered Network Station
Configuration

Figure 2.5-61



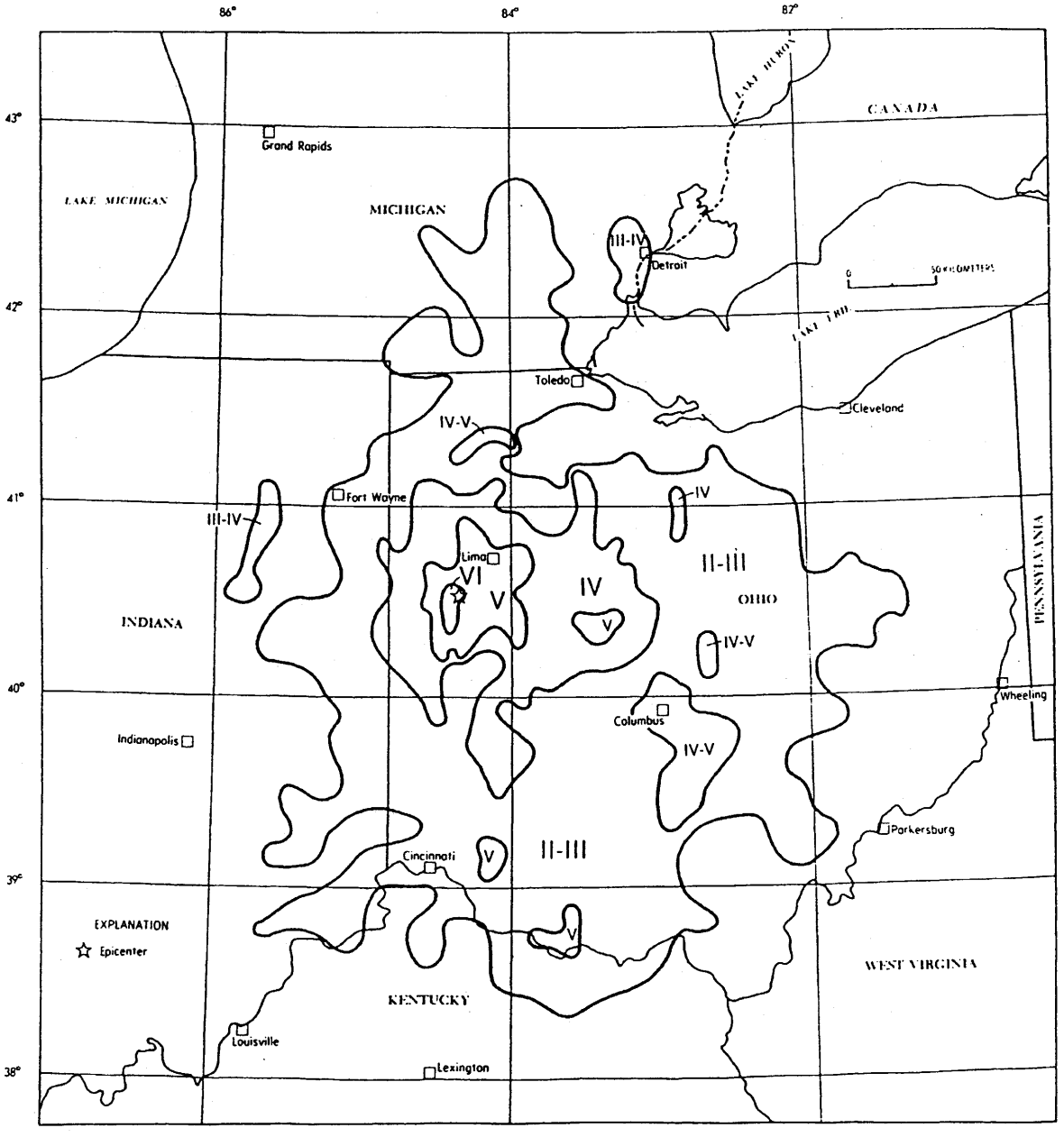
(Source: Christensen, et al., March 1987)(2)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

The Anna, Ohio Seismic Zone, Historical Seismicity, Proposed Faults, and Observed LANDSAT Lineaments

Figure 2.5-62



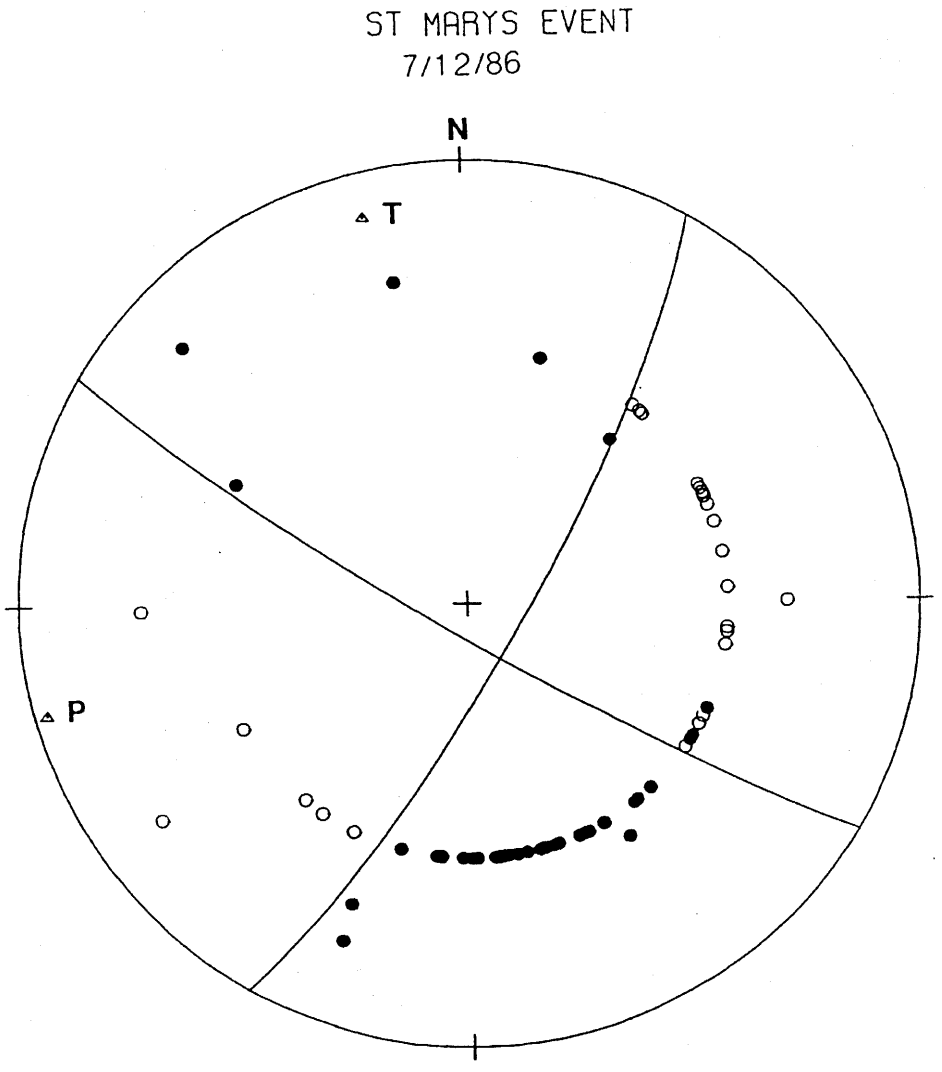
Source: C. W. Stover, U.S.G.S. in (2)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map of the
July 12, 1986
St. Marys' Earthquake

Figure 2.5-63



Focal Mechanism for the July 12, 1986, St. Marys, Ohio Earthquake. Compressional arrivals are shown as solid symbols and tensional as open symbols. The P and T axes are also shown.

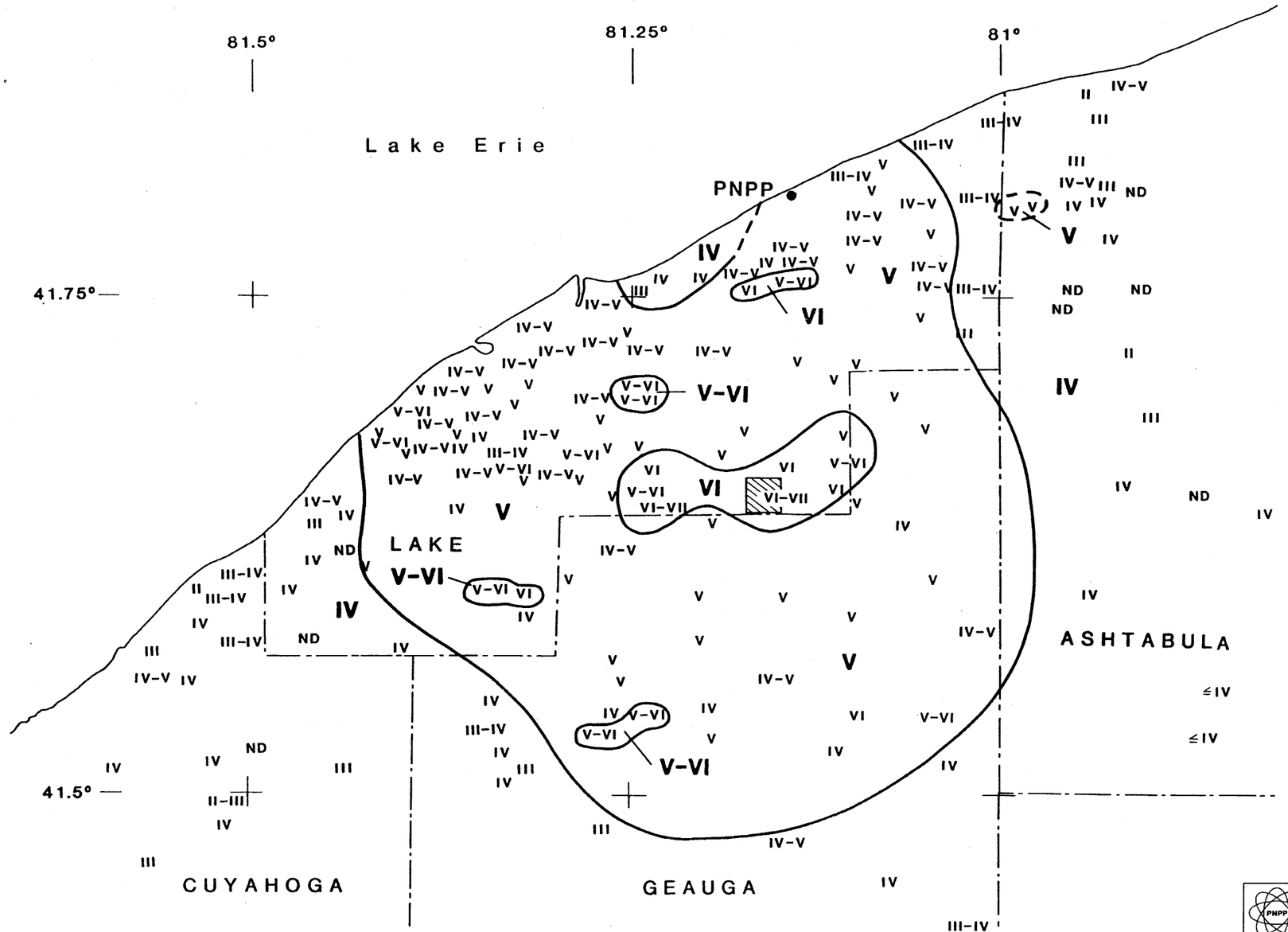
(Source: Christensen, et al., March 1987) (2)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Focal Mechanism for the
July 12, 1986 Earthquake

Figure 2.5-64

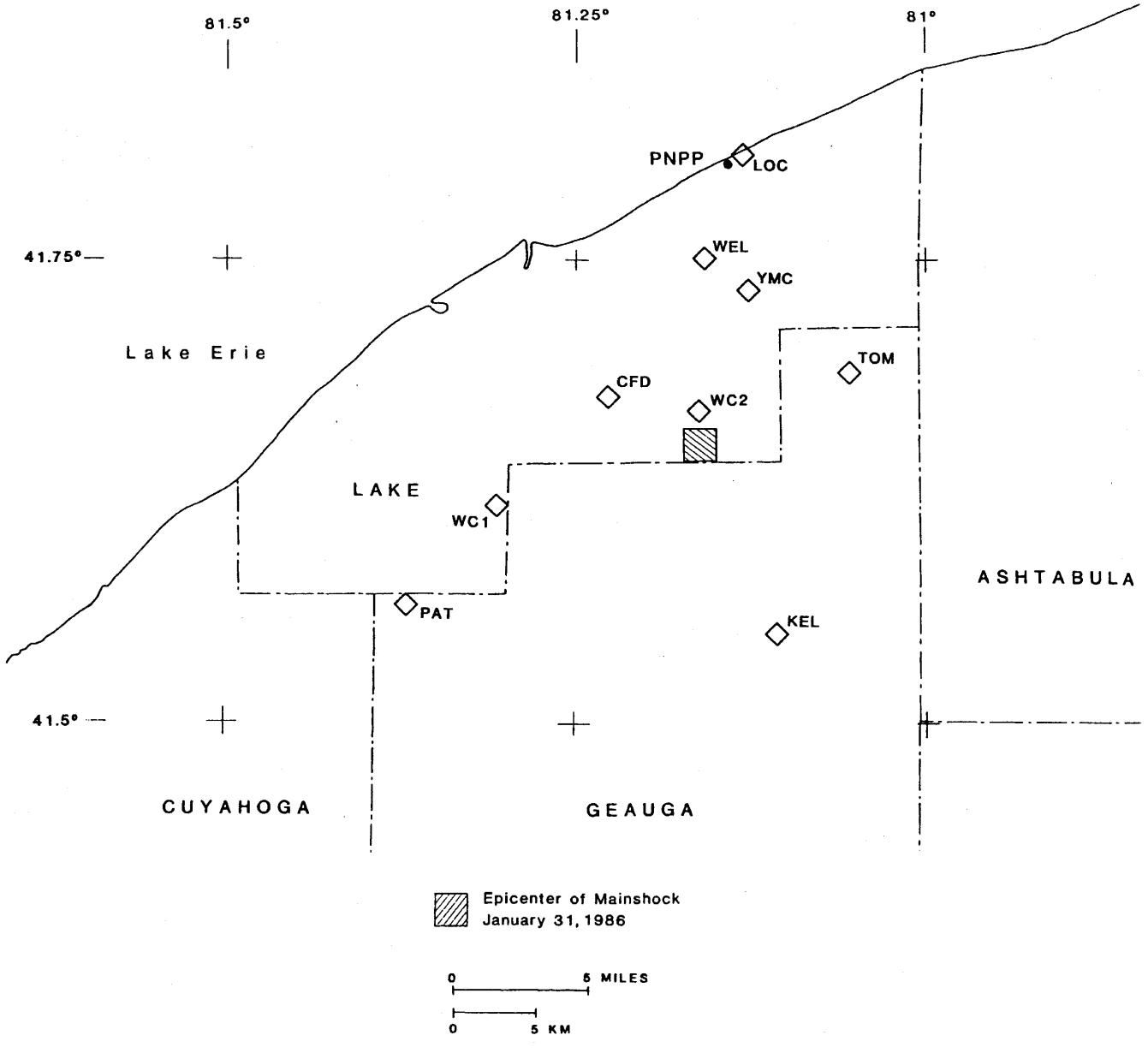


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map for
Northeastern Ohio for
Earthquake of January 31, 1986

Figure 2.5-65

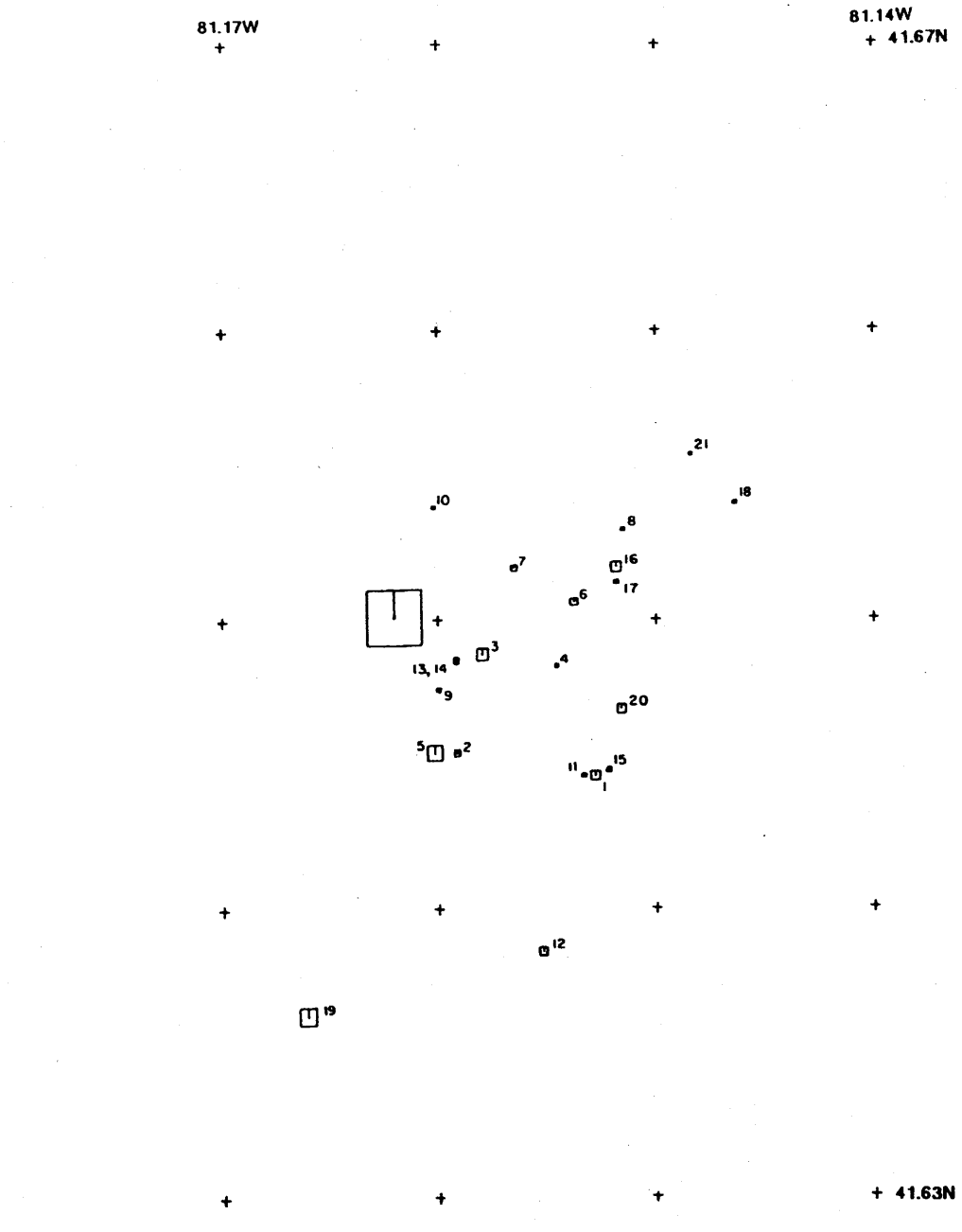


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Portable Network
Configuration from
March to October 1986

Figure 2.5-66



Magnitude

2

3

4

5

0 1 Km

0 1 Mile

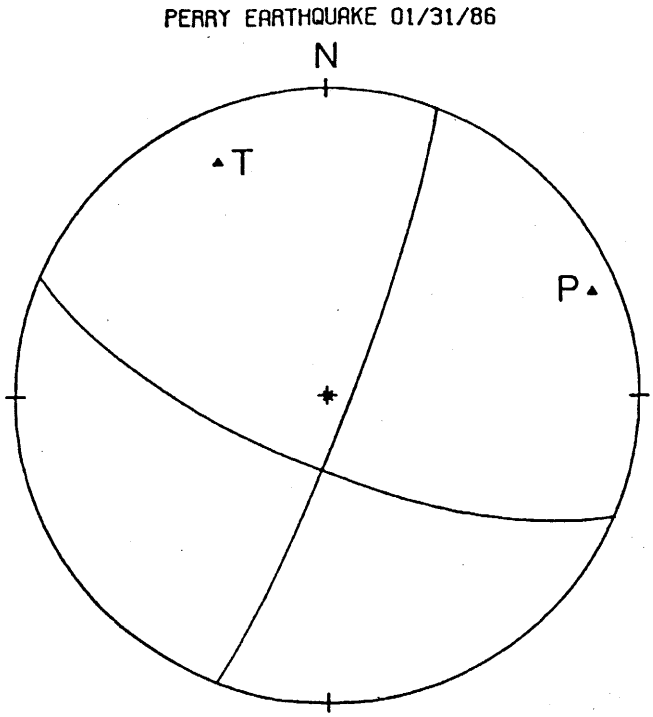
Note: See Table 2.5-18 for identification of events.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

January 31, 1986
Aftershock Sequence

Figure 2.5-67



Focal Mechanism for the January 31, 1986 Perry Earthquake Near Cleveland, Ohio (from the Harvard group as found in the PDE monthly listing). The compressional (P) and tensional (T) axes are shown.

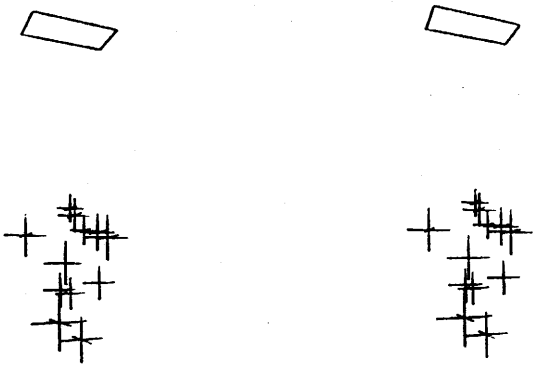
(Source: Christensen, et al., March 1987) (2)

(Rev. 12 1/03)

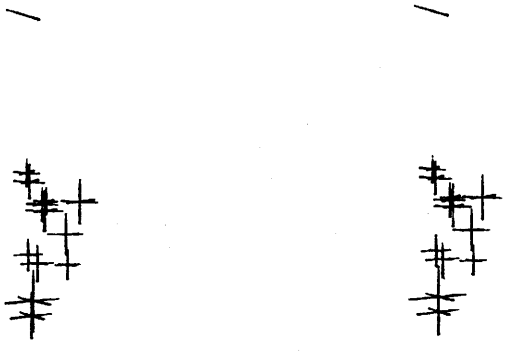
PERRY NUCLEAR POWER PLANT

Focal Mechanism for the
Janurary 31, 1986 Earthquake

Figure 2.5-68



CENTER POINT COORDS = 41.646 -81.156
CENTER POINT ELEV = -4.5 km
VIEW POINT COORDS = 41.623 -81.070
VIEW POINT ELEV = -4.5 km
SURF. DISTANCE (km) = 8.
AZIMUTH = 110.



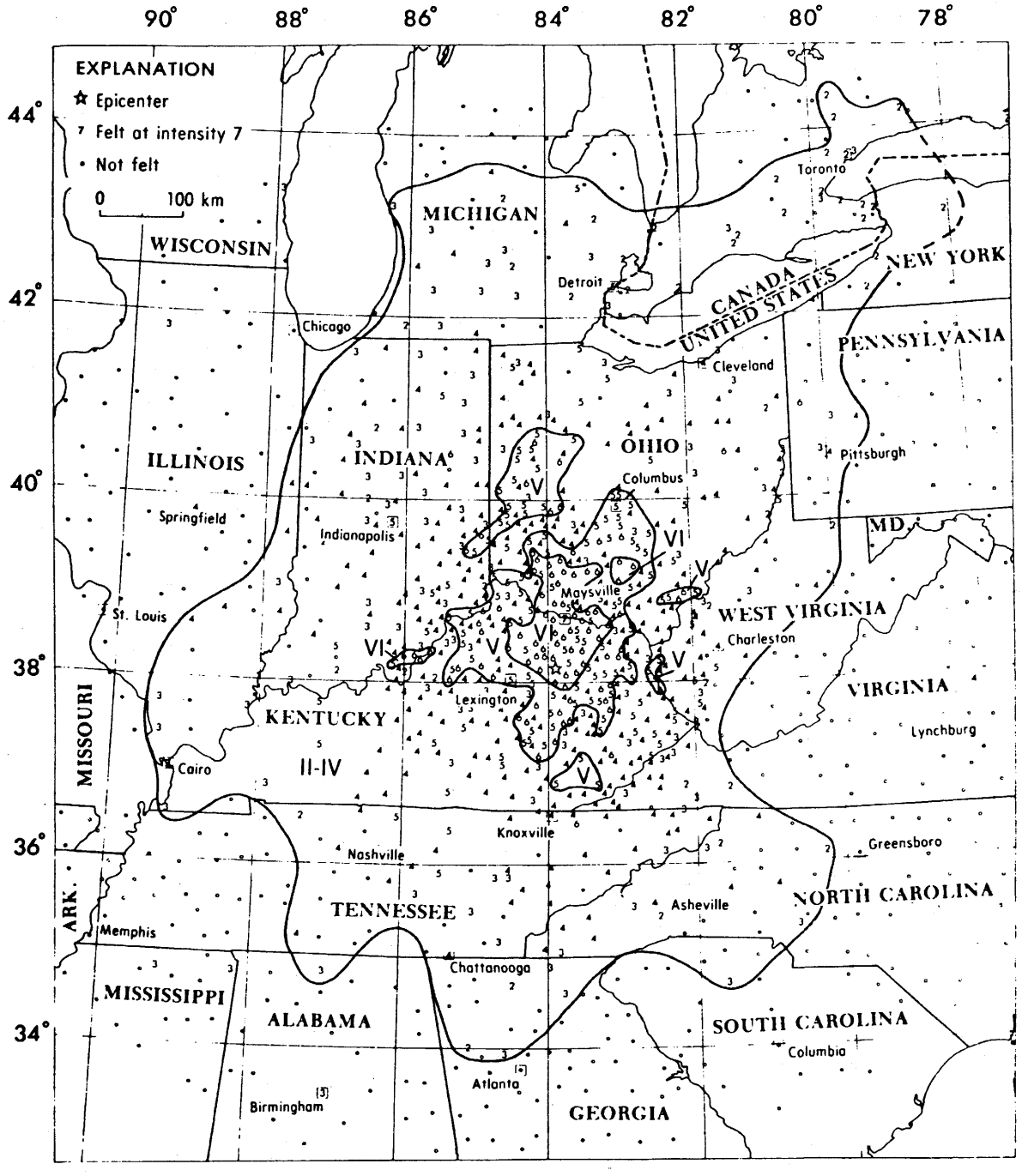
CENTER POINT COORDS = 41.646 -81.156
CENTER POINT ELEV = -4.5 km
VIEW POINT COORDS = 41.590 -81.200
VIEW POINT ELEV = -4.5 km
SURF. DISTANCE (km) = 7.
AZIMUTH = 211.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Stereo View of the
Aftershock Sequence

Figure 2.5-69



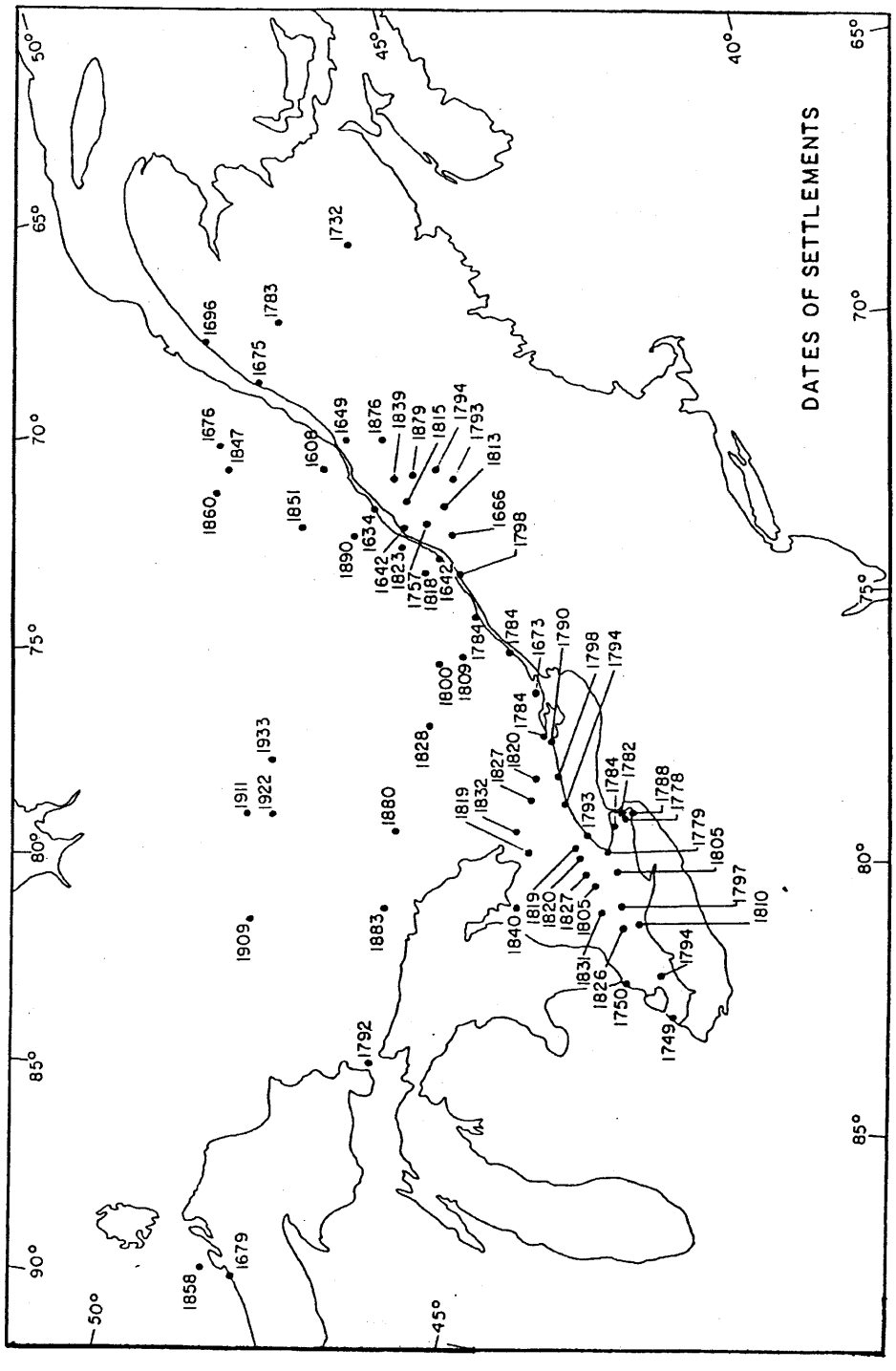
(Source: Stover and von Hake, 1982)(276)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map for the
Sharpsburg, Kentucky Earthquake
of July 27, 1980

Figure 2.5-70

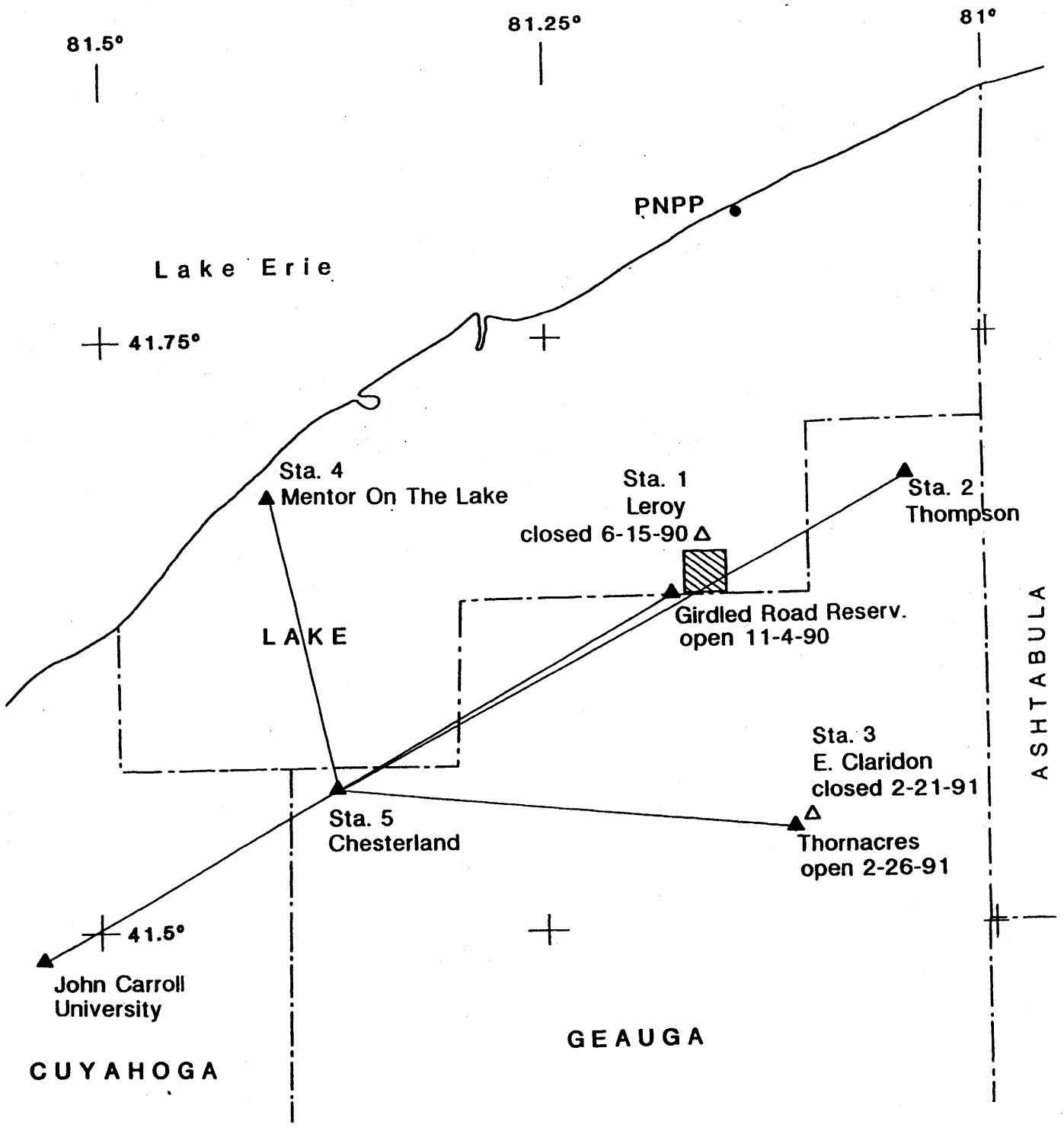


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Dates of Settlement in
Eastern Canada

Figure 2.5-71



Epicenter of Mainshock
January 31, 1986

0 5 Miles

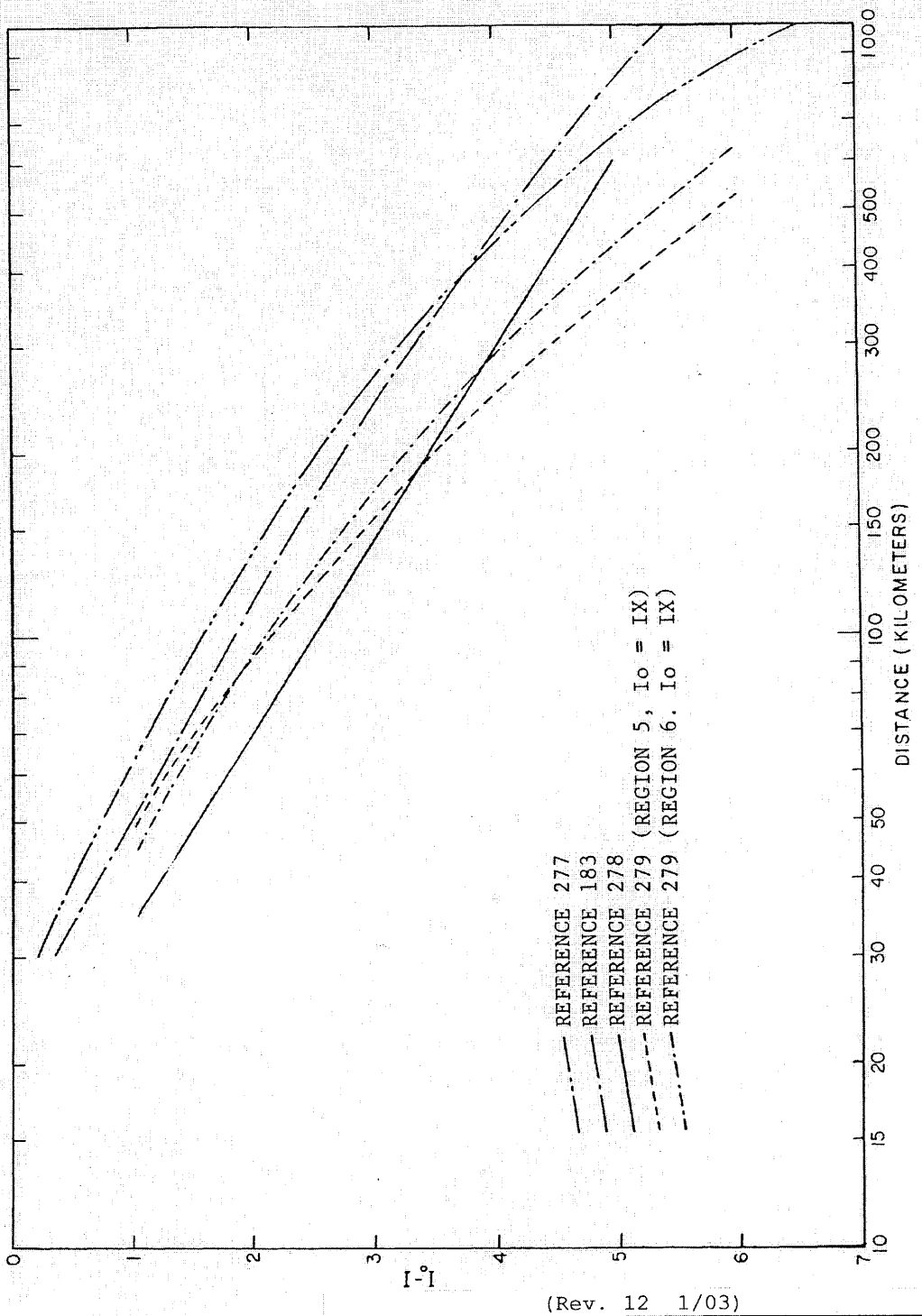
0 5 Km

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Configuration of
John Carroll University
Seismicity Network

Figure 2.5-72

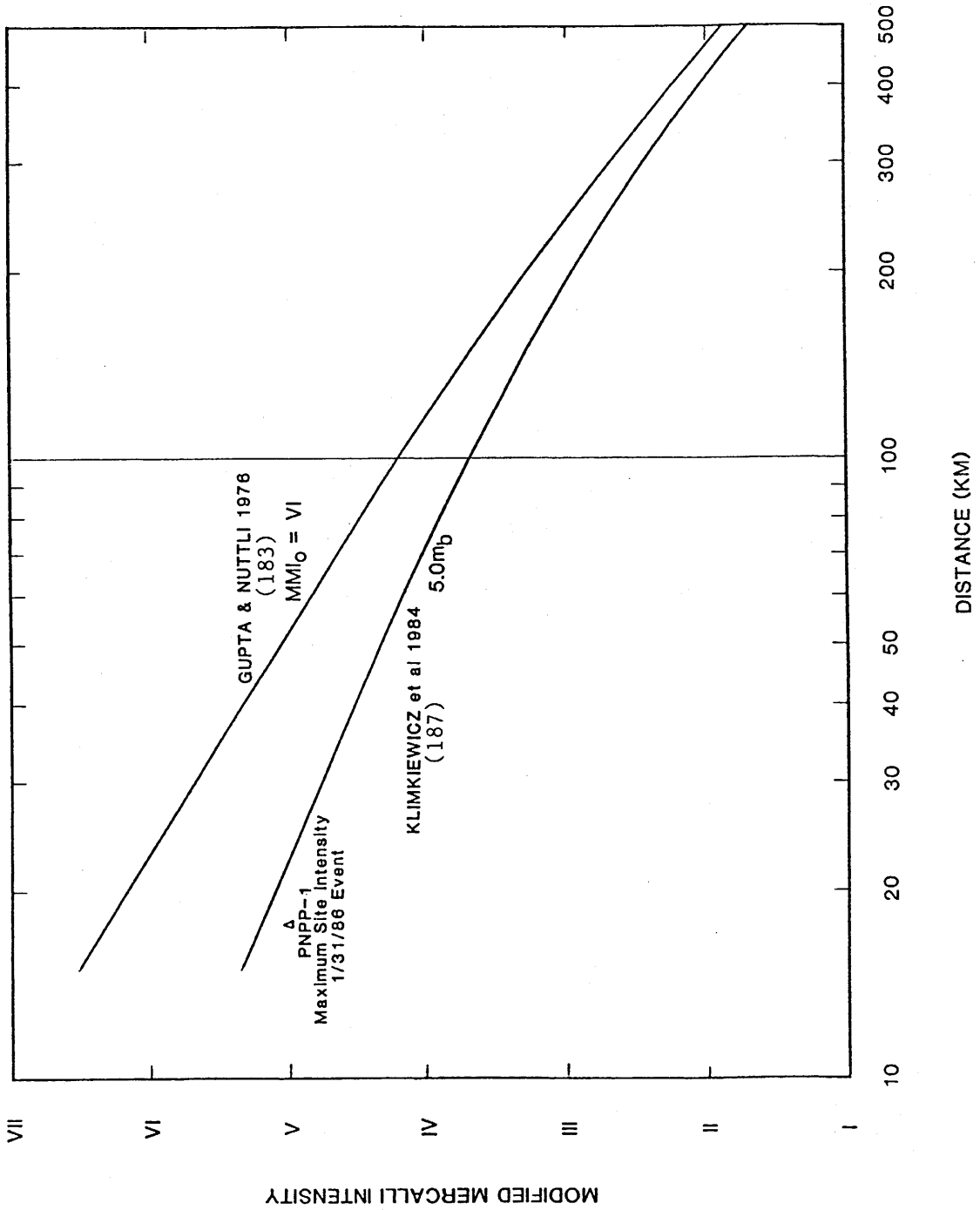


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Intensity Attenuation Curves
for Eastern North America

Figure 2.5-73

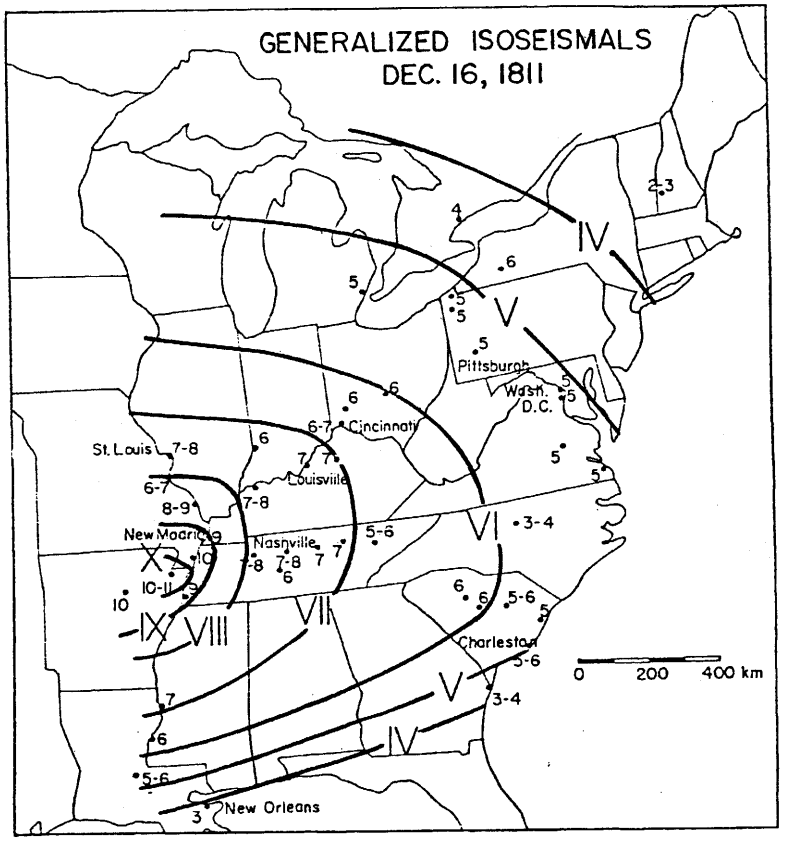


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Comparison of Attenuation Models Used to Estimate Site Intensities for Historical Events

Figure 2.5-74



Generalized isoseismal map of the earthquake of December 16, 1811 at 08h15m GMT. MM intensity values at individual points are given in Arabic numerals.
The isoseisms, labeled with Roman numerals, indicate the outer bound of the region of specified intensity.

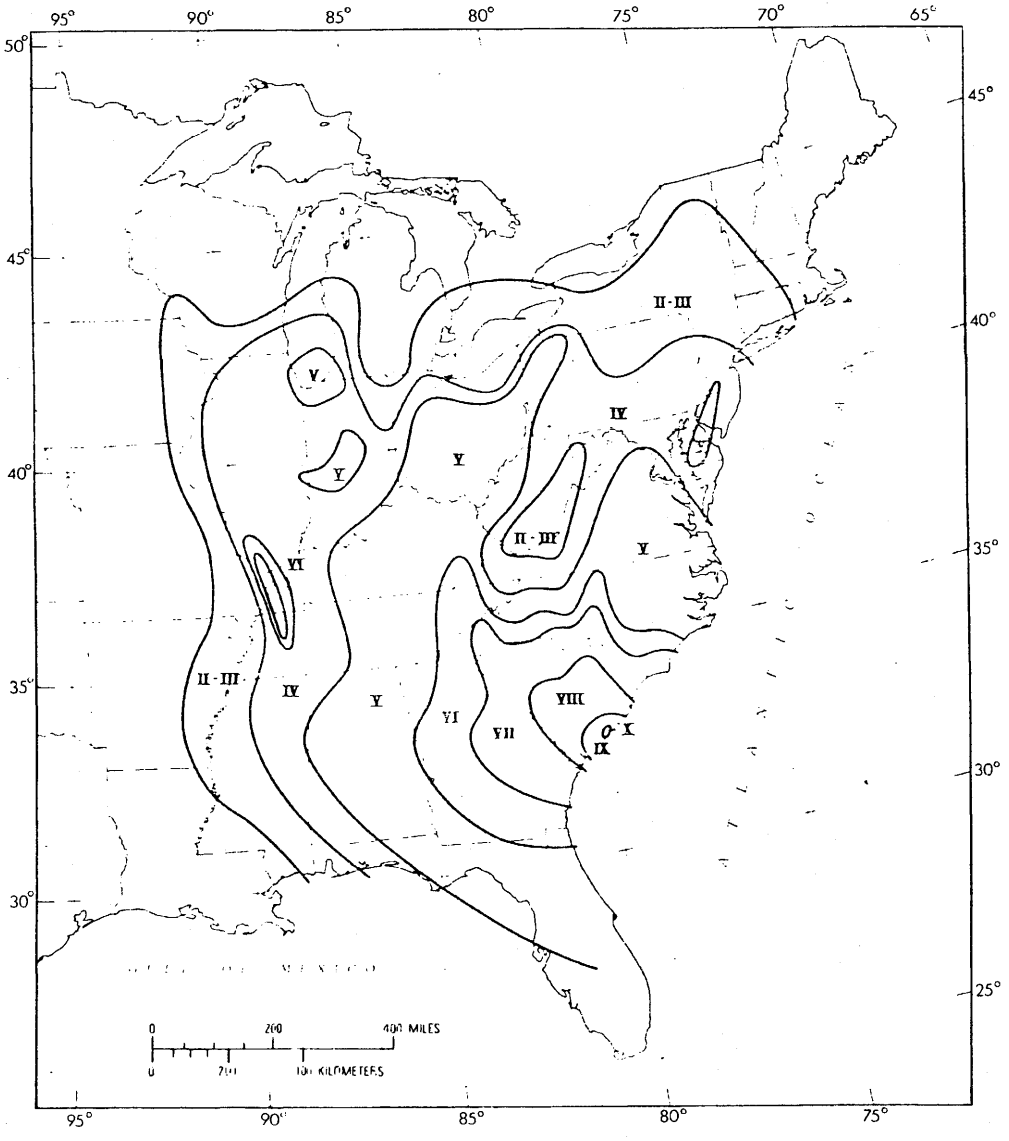
REFERENCE 280

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - Mississippi Valley Earthquake of 1811 and 1812

Figure 2.5-75



Isoseismal map of the Eastern United States contoured to show the broad regional patterns of the reported intensities for the 1886 Charleston earthquake. Contoured intensity levels are shown in Roman numerals.

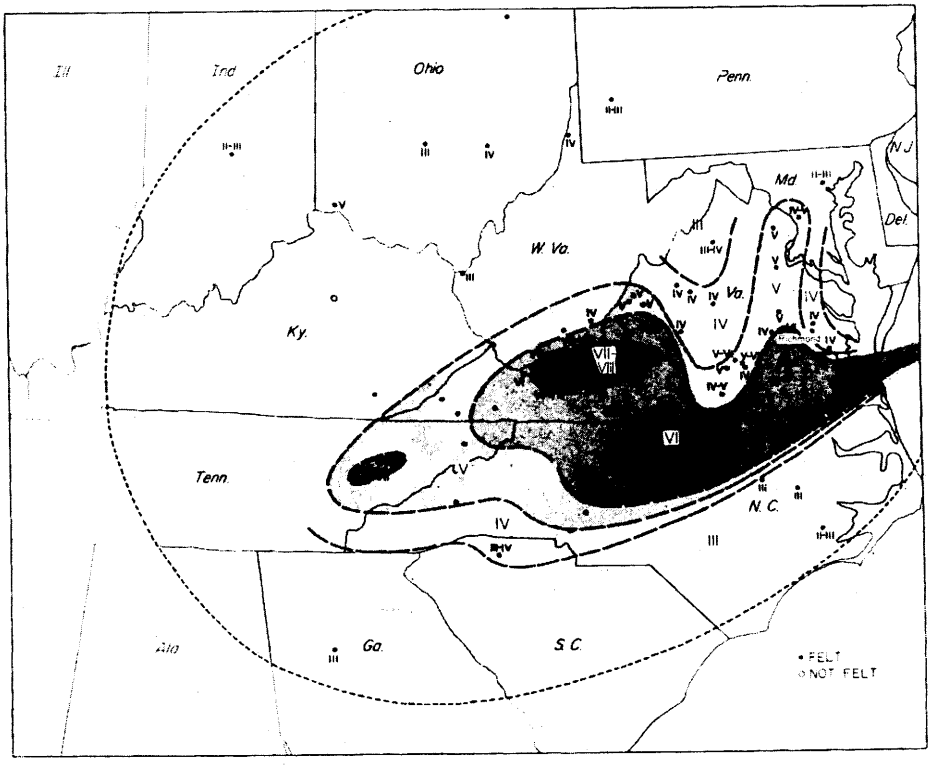
REFERENCE 281

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - 1886
Charleston Earthquake

Figure 2.5-76



Earthquake of May 31, 1897

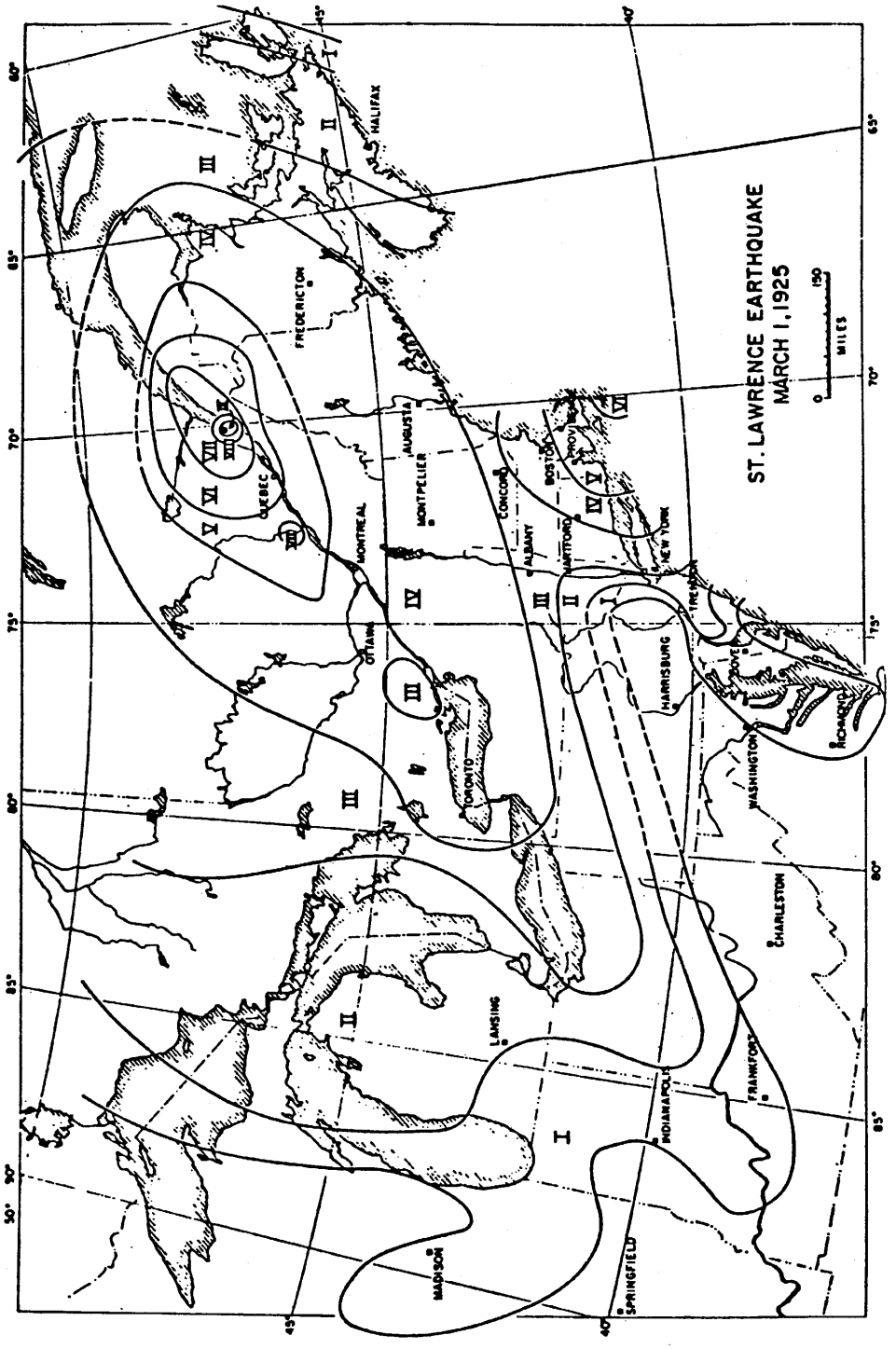
REFERENCE 150

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - Virginia
Earthquake of May 31, 1897

Figure 2.5-77



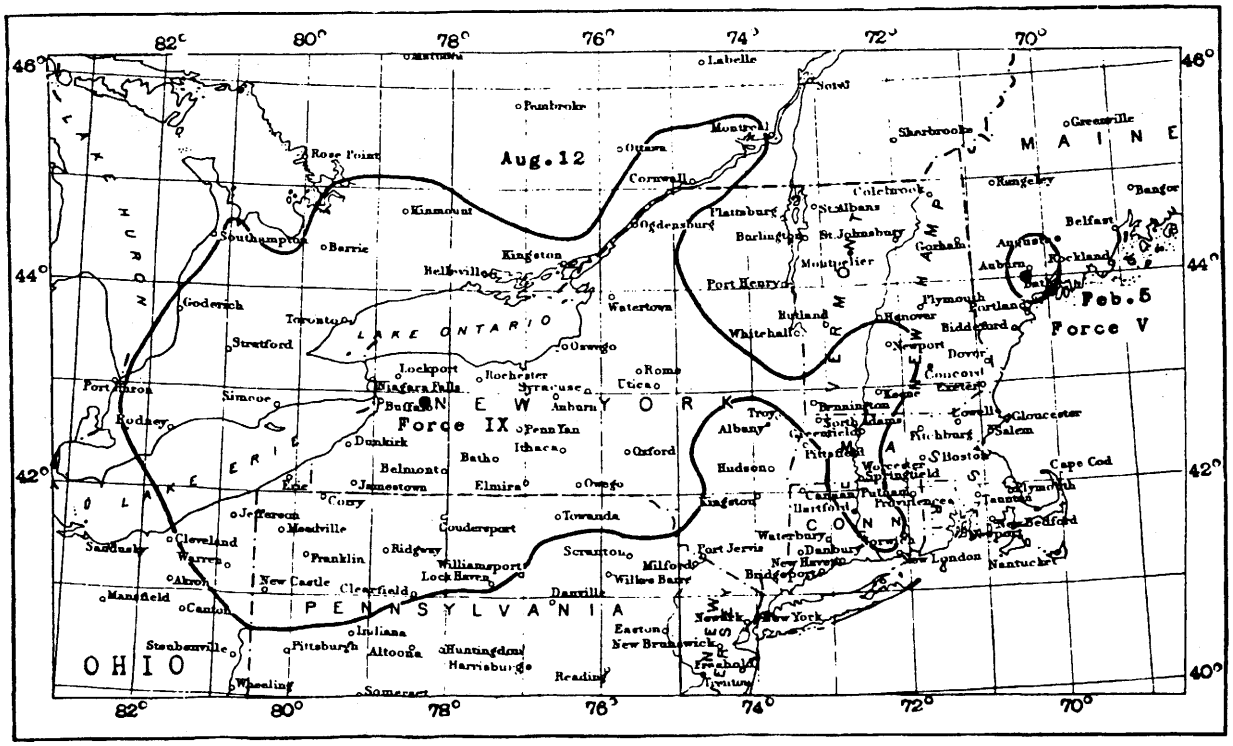
REFERENCE 282

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - St. Lawrence Earthquake, March 1, 1925

Figure 2.5-78



Areas affected by shocks of February 5 and August 12

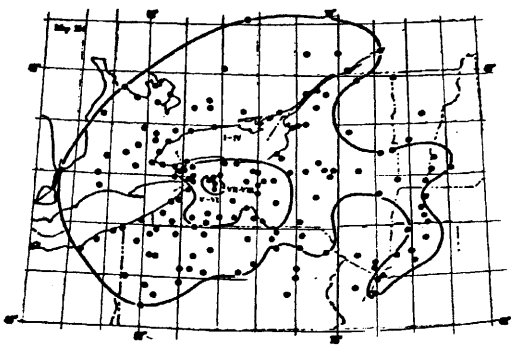
REFERENCE 283

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - United States
(Eastern, Attica, New York)
Earthquakes, 1929

Figure 2.5-79



The Attica, New York, Earthquake of August 12, 1929.

A Modification of REFERENCE 283 (Figure 3):
125,000 square miles.

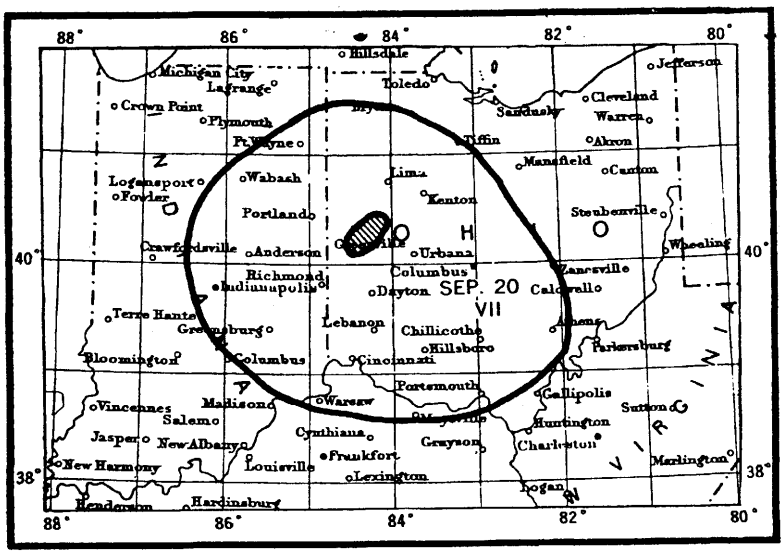
REFERENCE 147

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - Attica, New York Earthquake of August 12, 1929

Figure 2.5-80



Area affected by Anna, Ohio, shock of September 20

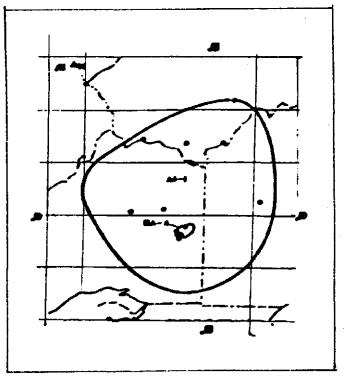
REFERENCE 284

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - Area Affected by
Anna, Ohio Earthquake
September 20, 1931

Figure 2.5-81



The Anna, Ohio, Earthquake of September, 1931.

A Modification of REFERENCE 215 (Figure 3):
45,000 square miles.

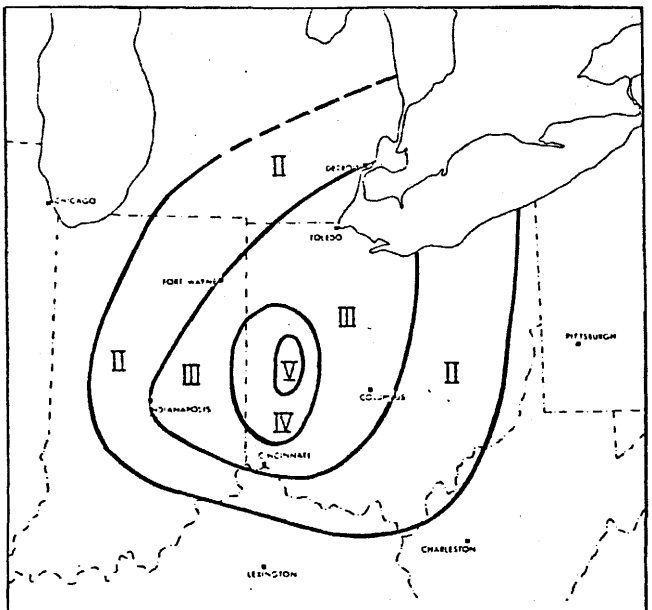
REFERENCE 147, Page 135

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - Area Affected by
Anna, Ohio Earthquake
September 20, 1931

Figure 2.5-82



ISOSEISMAL MAP of the MARCH 2, 1937 EARTHQUAKE
Intensities on the Modified Mercalli Scale

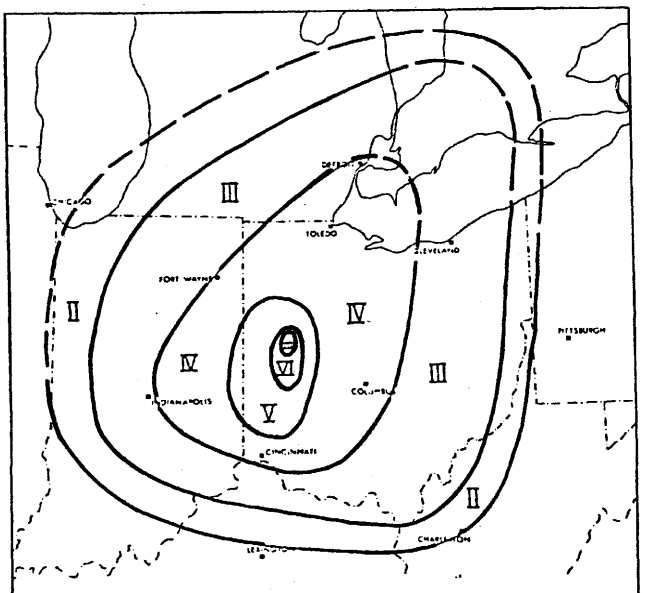
REFERENCE 1, P.12 (AFTER REFERENCE 160)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - Area Affected by
Anna, Ohio Earthquake,
March 2, 1937

Figure 2.5-83



ISOSEISMAL MAP of the MARCH 9, 1937 EARTHQUAKE
Intensities on the Modified Mercalli Scale

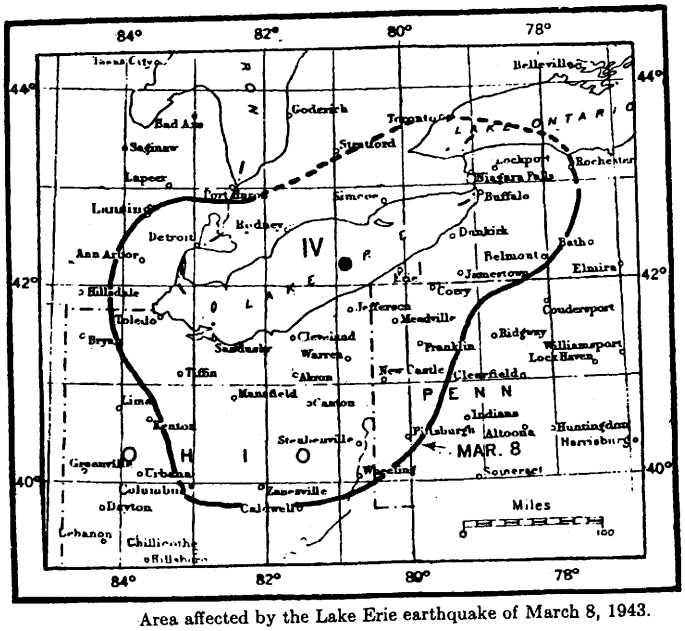
REFERENCE 285 (AFTER REFERENCE 160)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

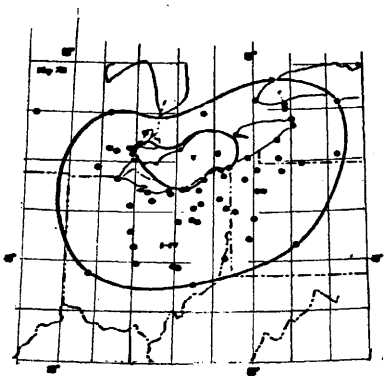
Isoseismal Map - Area Affected by
Anna, Ohio Earthquake,
March 2, 1937

Figure 2.5-84



Area affected by the Lake Erie earthquake of March 8, 1943.

REFERENCE 286



The Lake Erie Earthquake March 8, 1943.

A Modification REFERENCE 217 (Figure 4): 85,000 square miles.

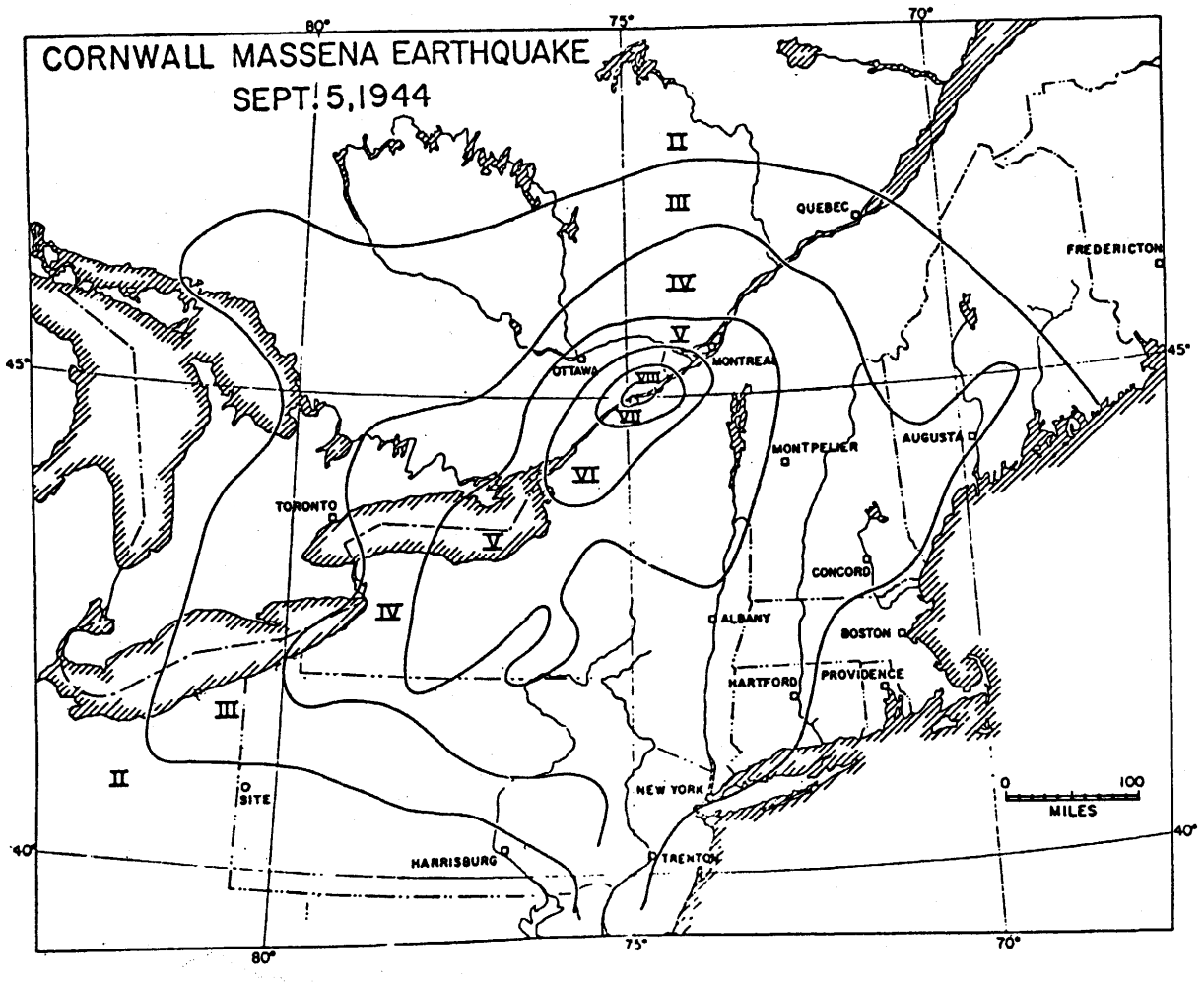
REFERENCE 147, page 135.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map - The Lake Erie Earthquake of March 8, 1943

Figure 2.5-85



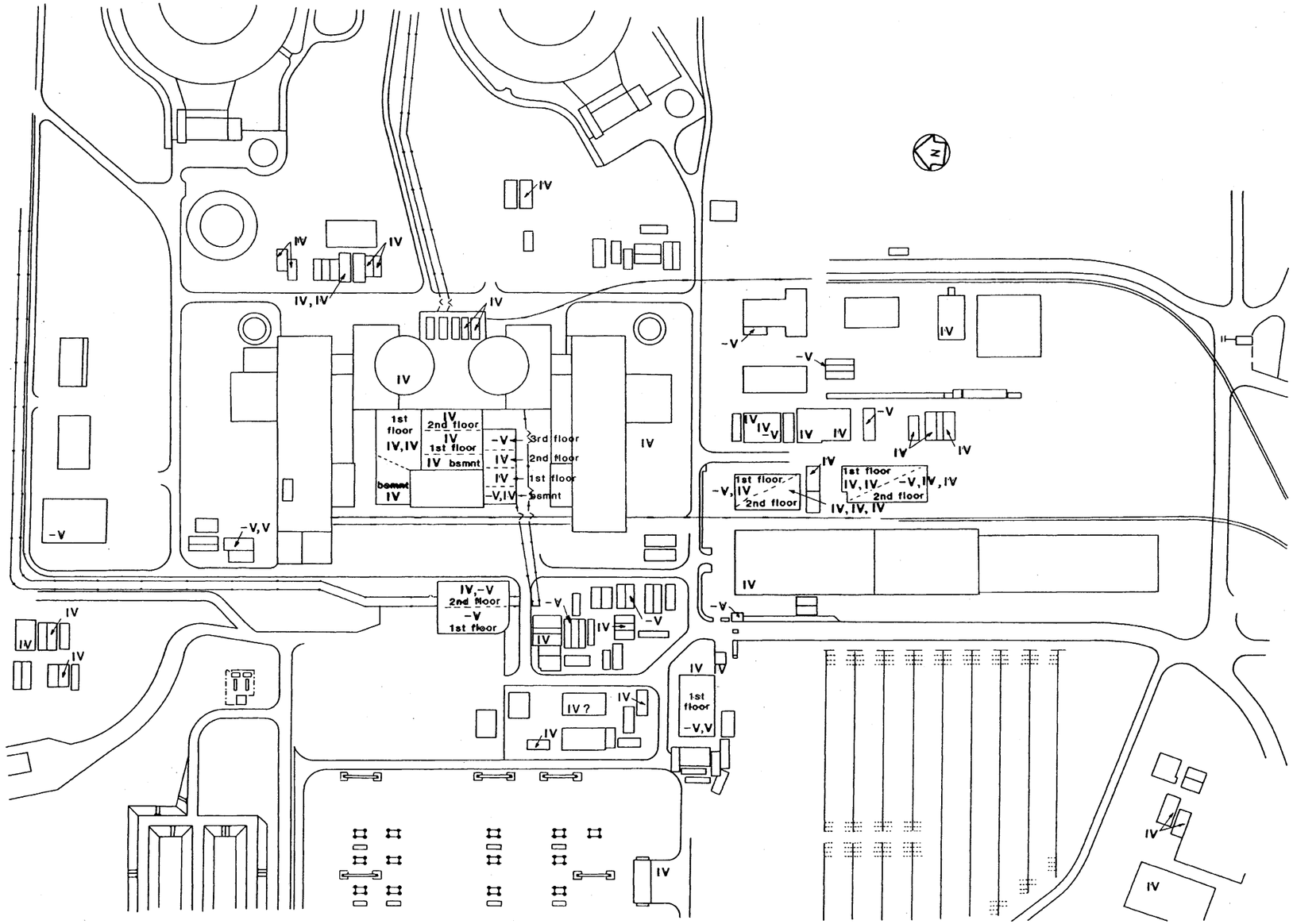
REFERENCE 147, page 135.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map – Cornwall
Massena Earthquake of
September 5, 1944

Figure 2.5-86

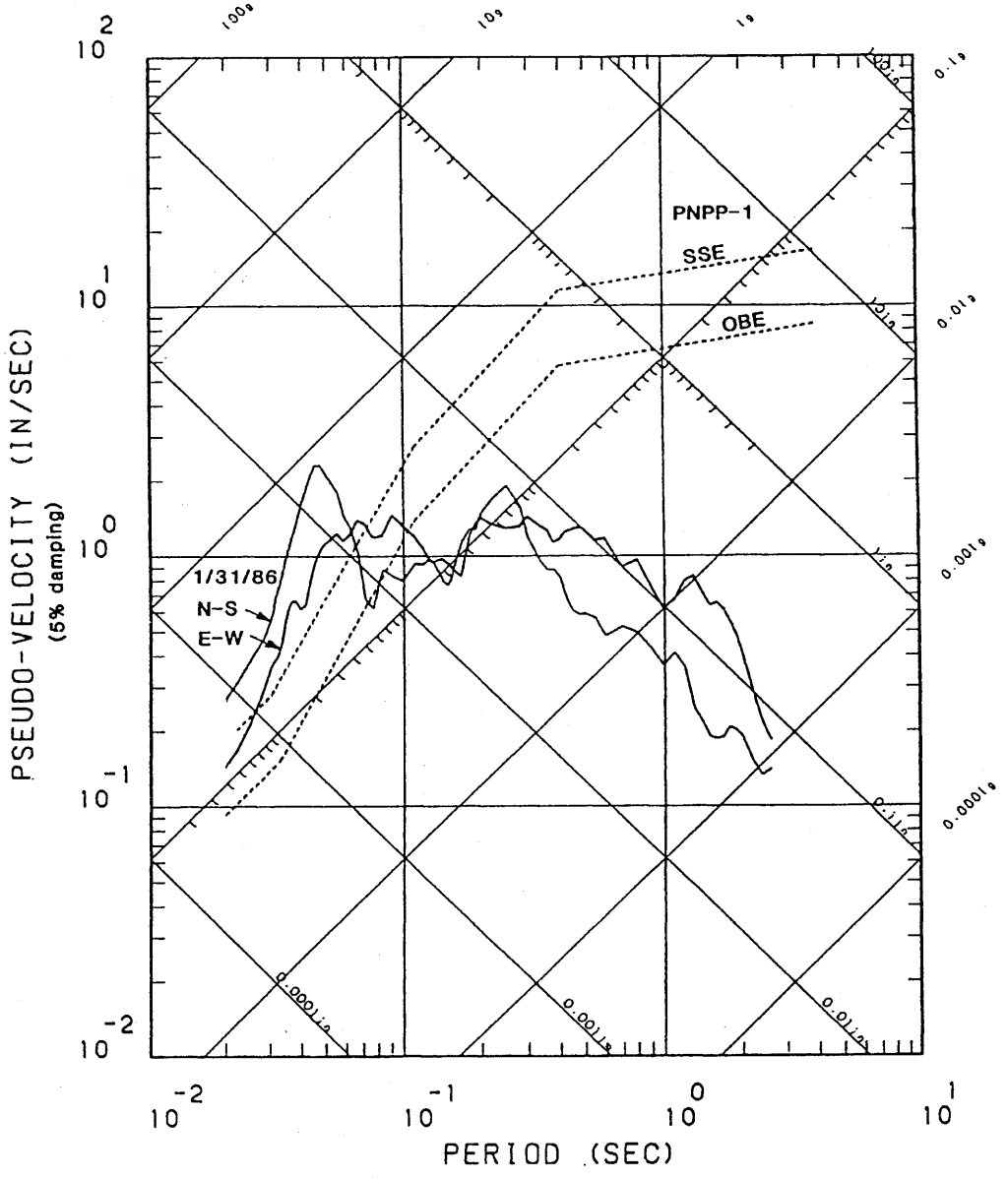


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Intensities at the PNPP Site
for the
January 31, 1986, Earthquake

Figure 2.5-87



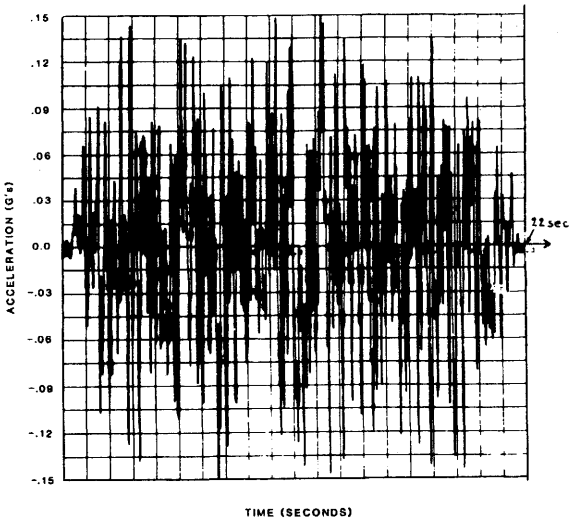
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

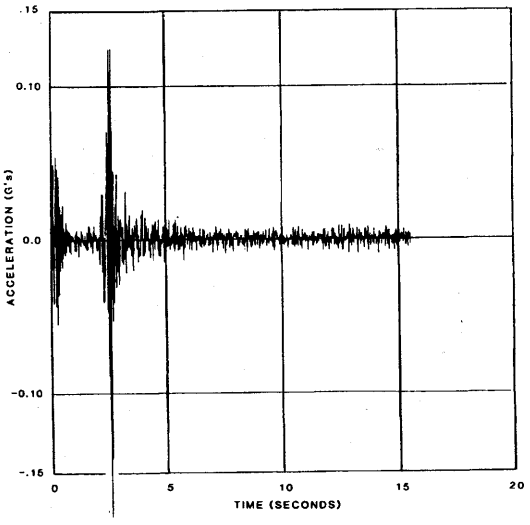
Comparison of PNPP-1 OBE and SSE Horizontal Spectra with January 31, 1986, Horizontal Spectra at Reactor Foundation

Figure 2.5-88

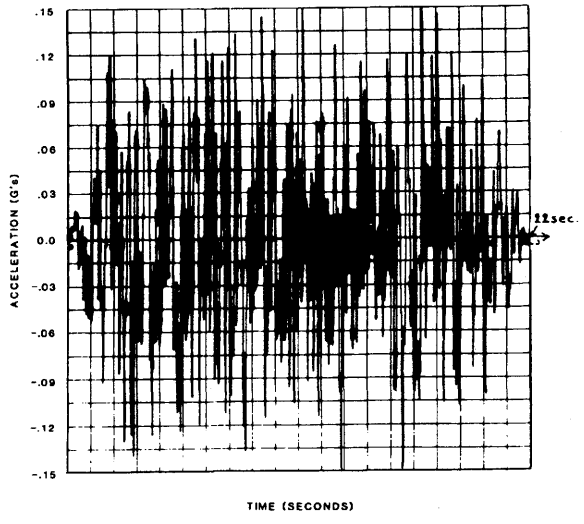
ACCELERATION TIME HISTORY MOTION - H1



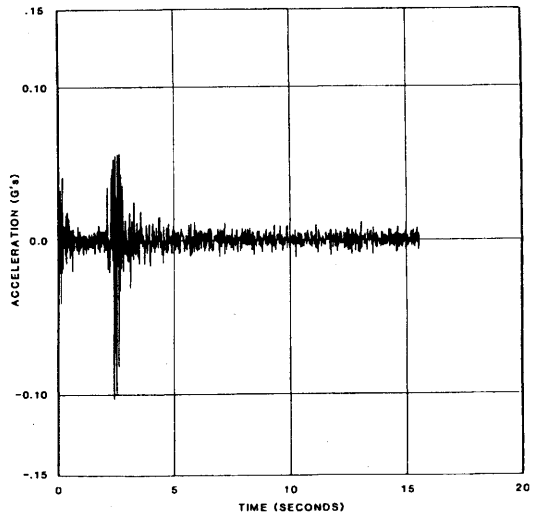
JANUARY 31, 1986 EARTHQUAKE ACCELEROGRAM
HORIZONTAL (N-S)



ACCELERATION TIME HISTORY MOTION - H2



JANUARY 31, 1986 EARTHQUAKE ACCELEROGRAM
HORIZONTAL (E-W)

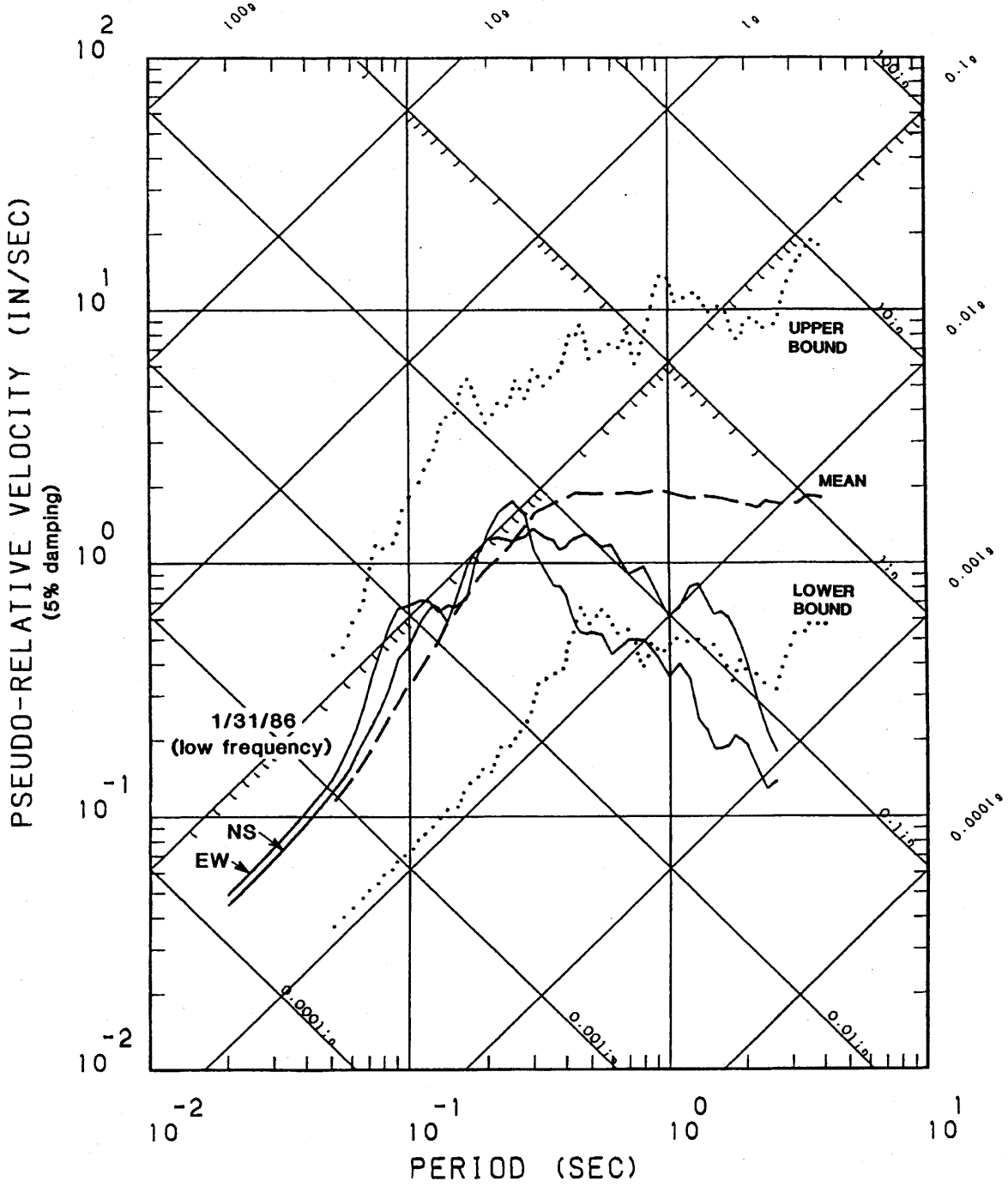


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Comparison of Design Time History -
H1 and January 31, 1986 - (N-S)
H2 and January 31, 1986 - (E-W)

Figure 2.5-89



R1651S.L10
R1651W.L10

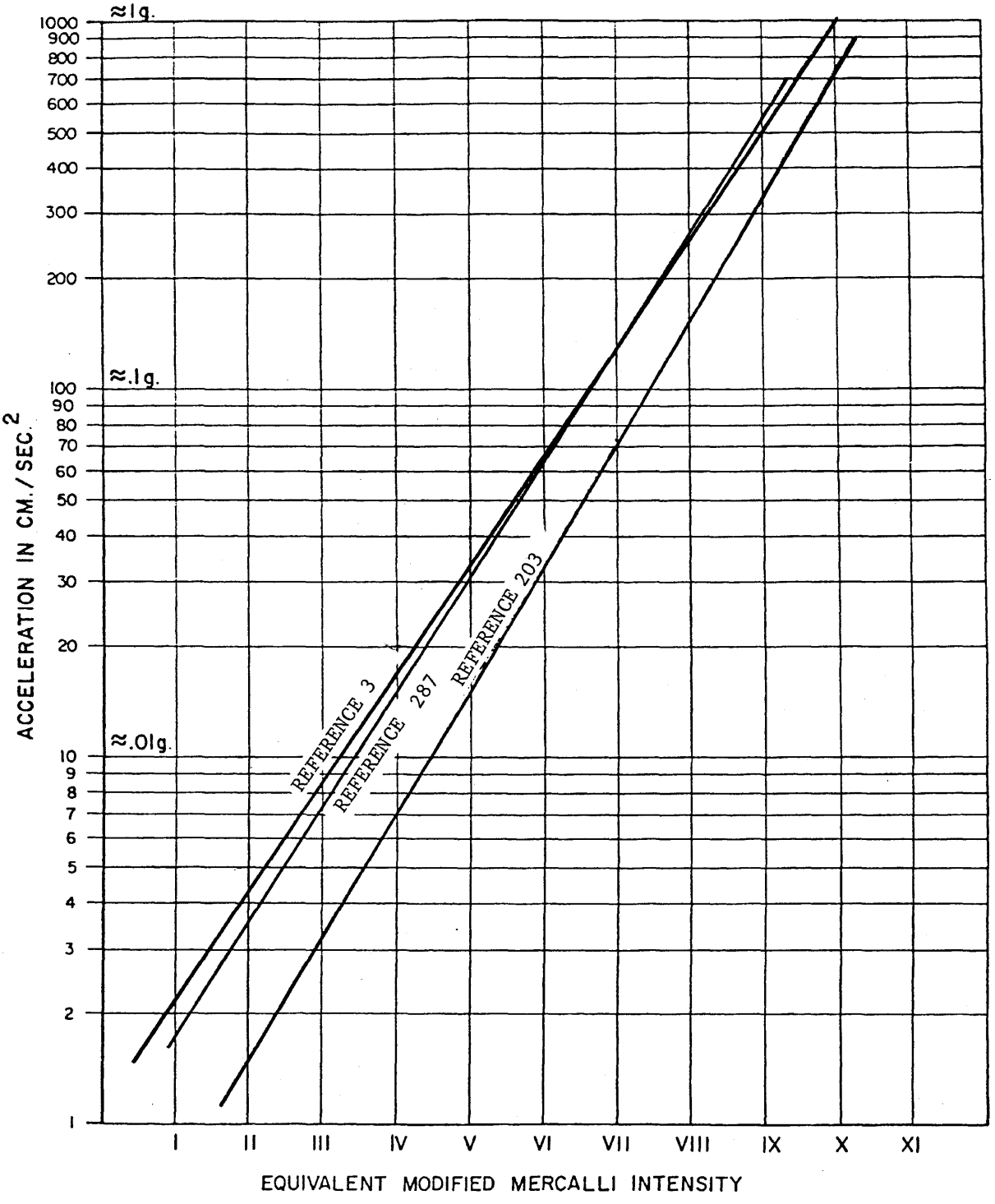
Mean, upper and lower bounds for V MM after O'Brien (1980)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Comparison of January 31, 1986, Low Frequency Horizontal Response Spectra with Response Spectra for MM Intensity V

Figure 2.5-90

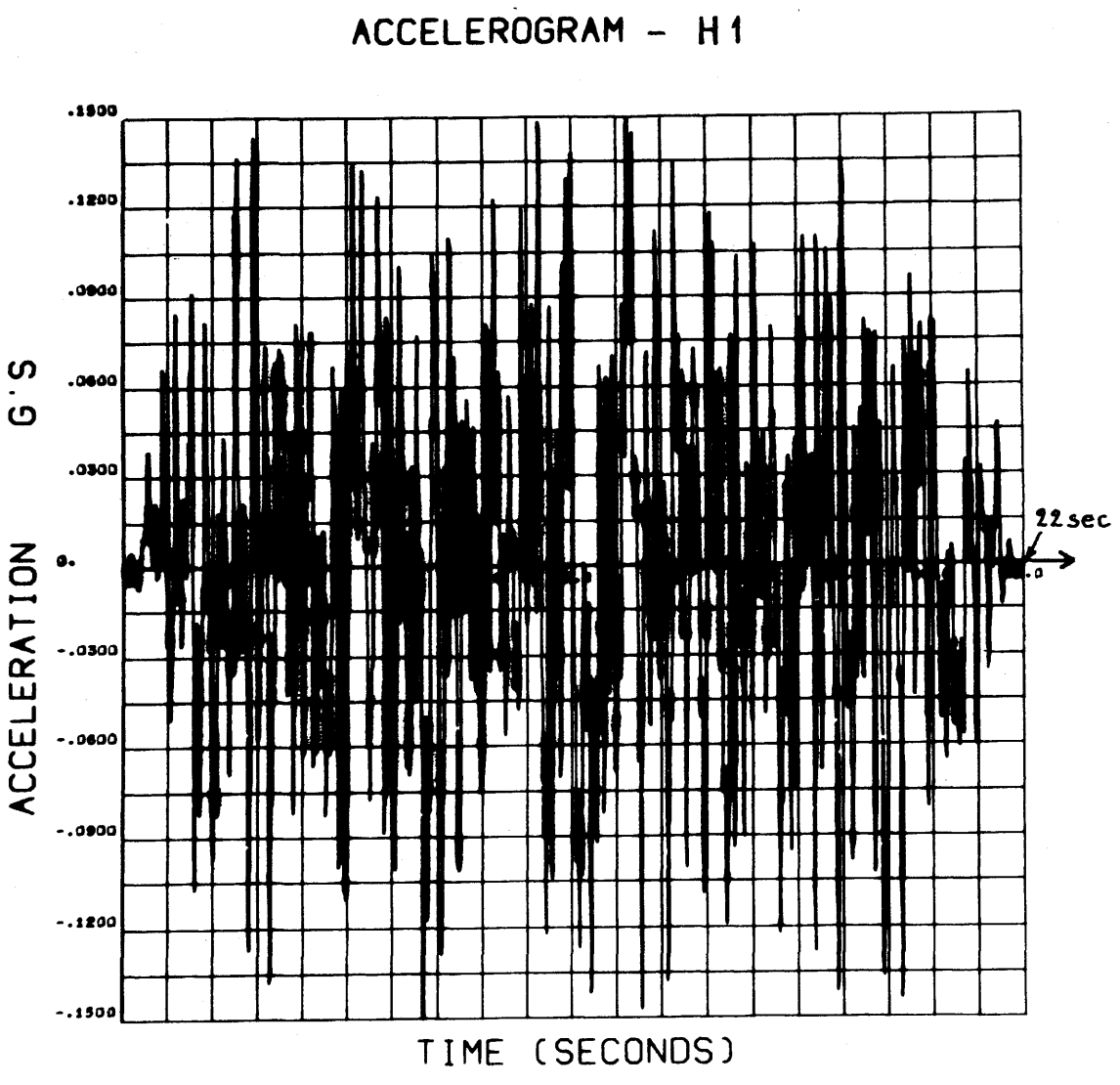


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Intensity Acceleration Relationships

Figure 2.5-91

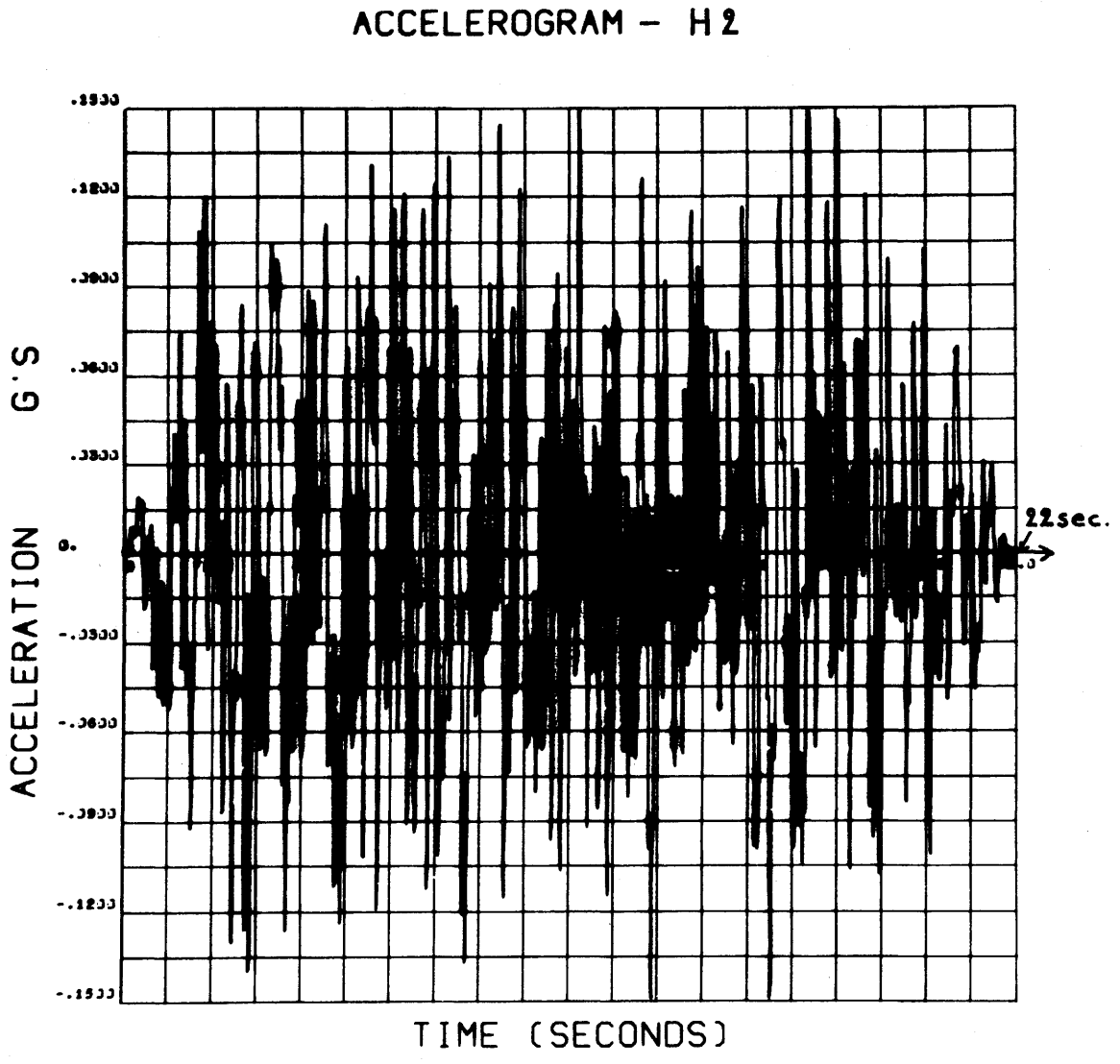


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Acceleration Time History - Motion H1

Figure 2.5-92

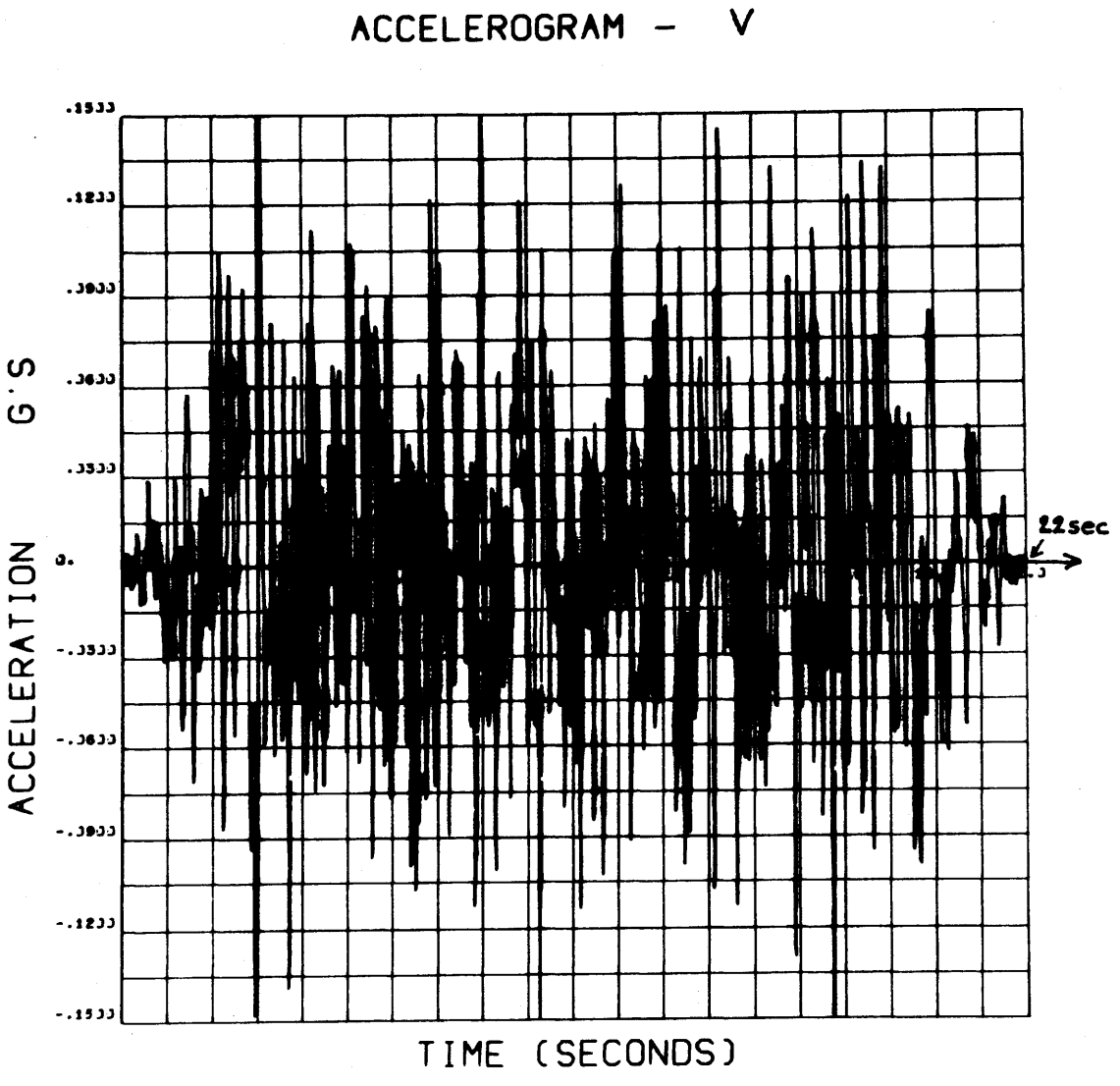


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Acceleration Time History -
Motion H2

Figure 2.5-93

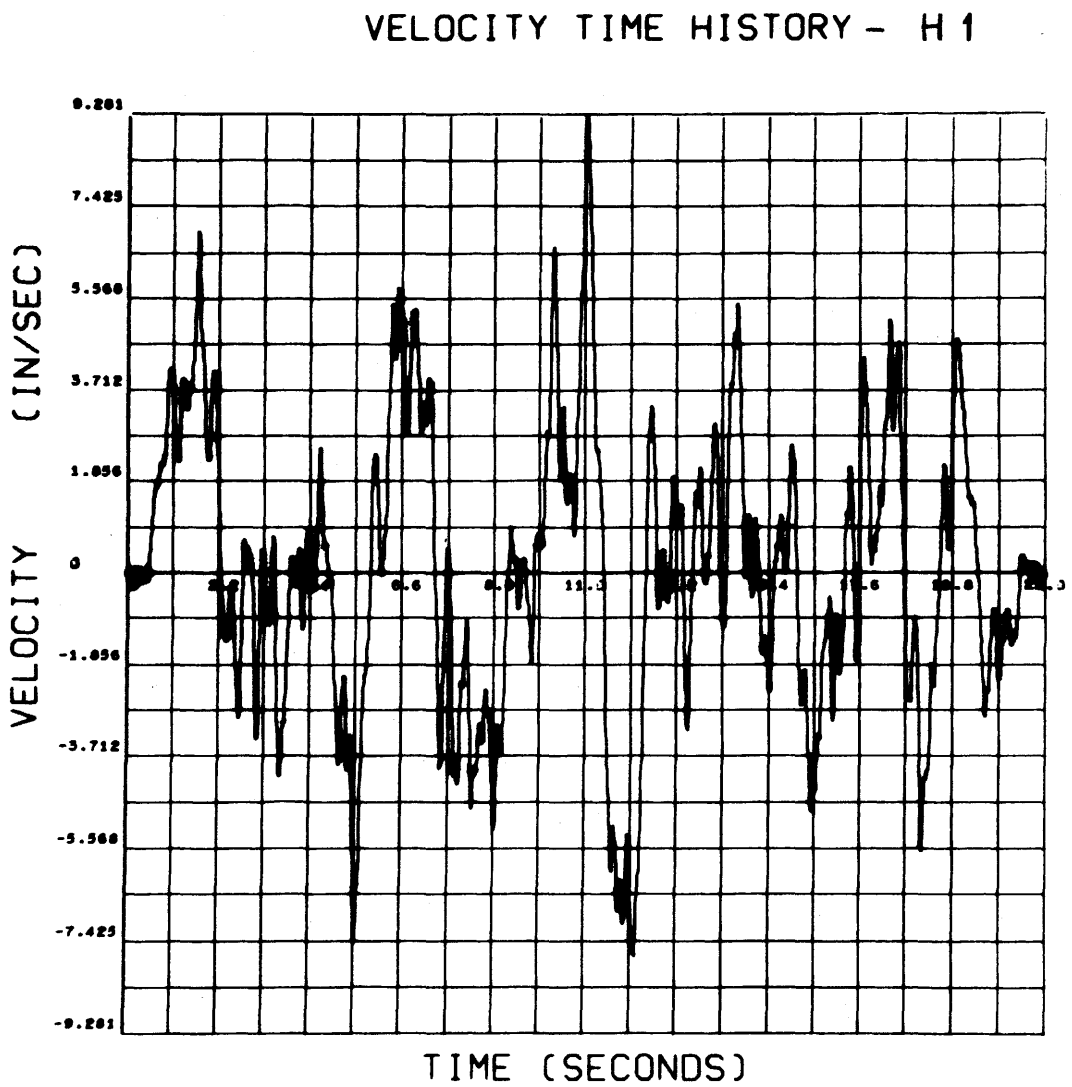


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Acceleration Time History -
Vertical Motion

Figure 2.5-94

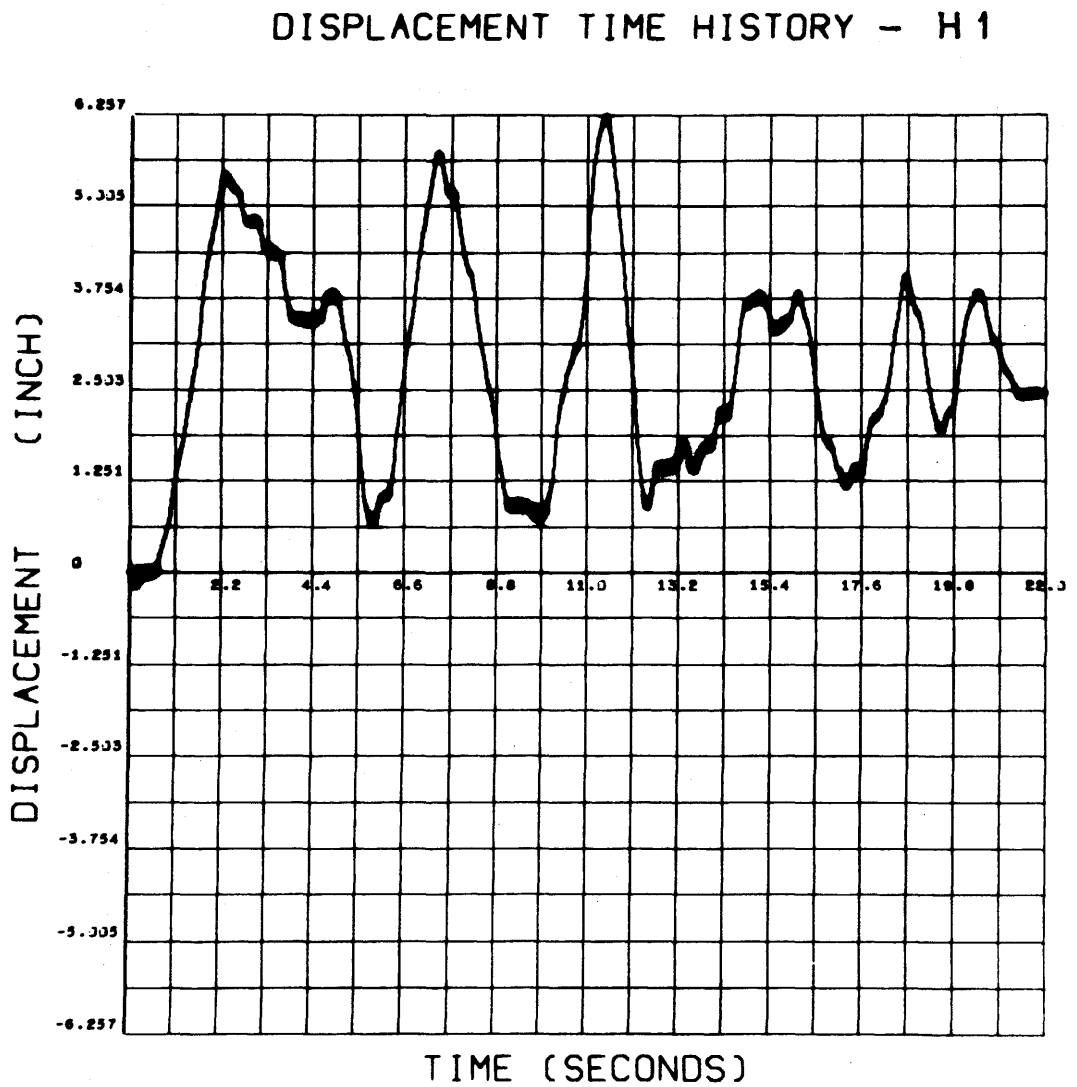


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Vertical Time History -
Motion H1

Figure 2.5-95

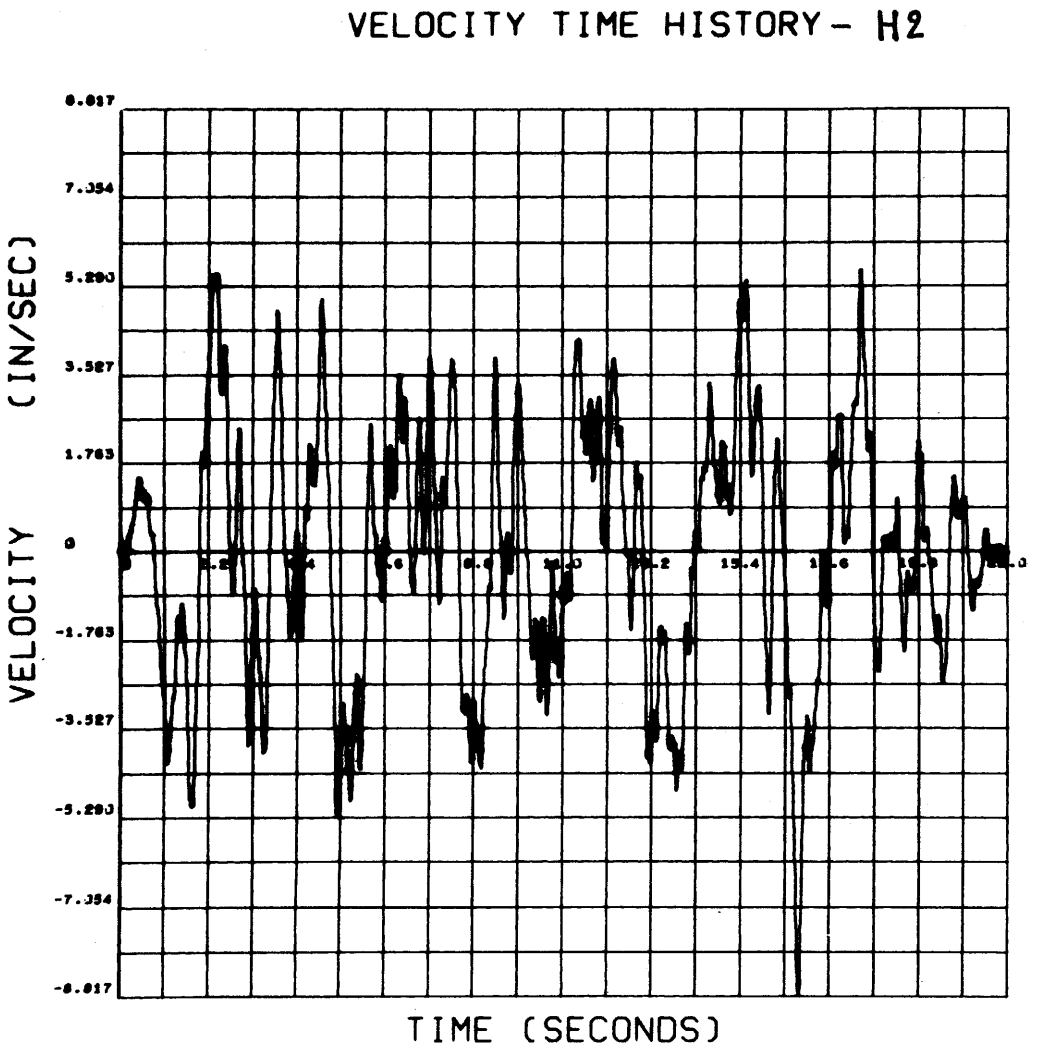


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Displacement Time History - Motion H1

Figure 2.5-96

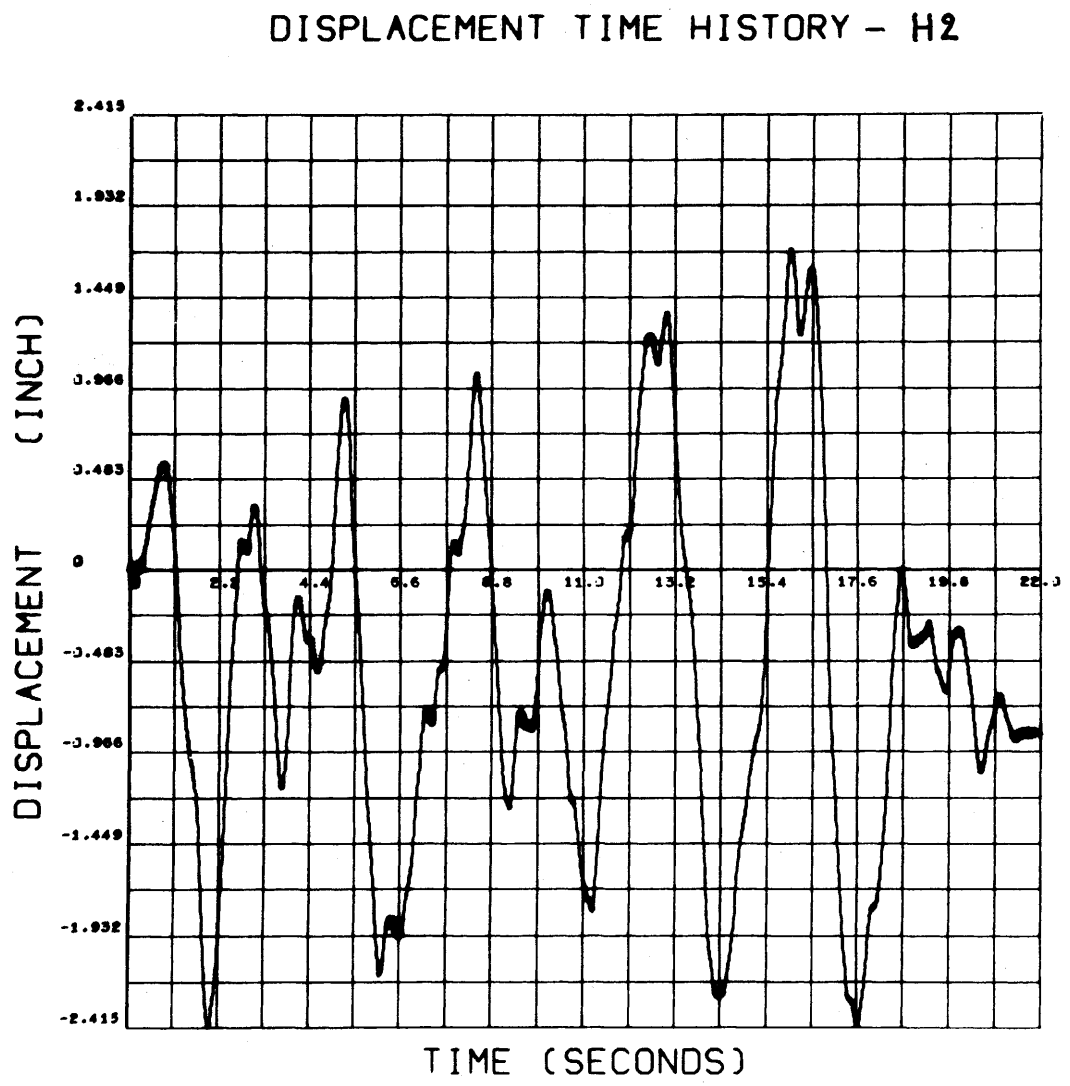


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Vertical Time History -
Motion H2

Figure 2.5-97

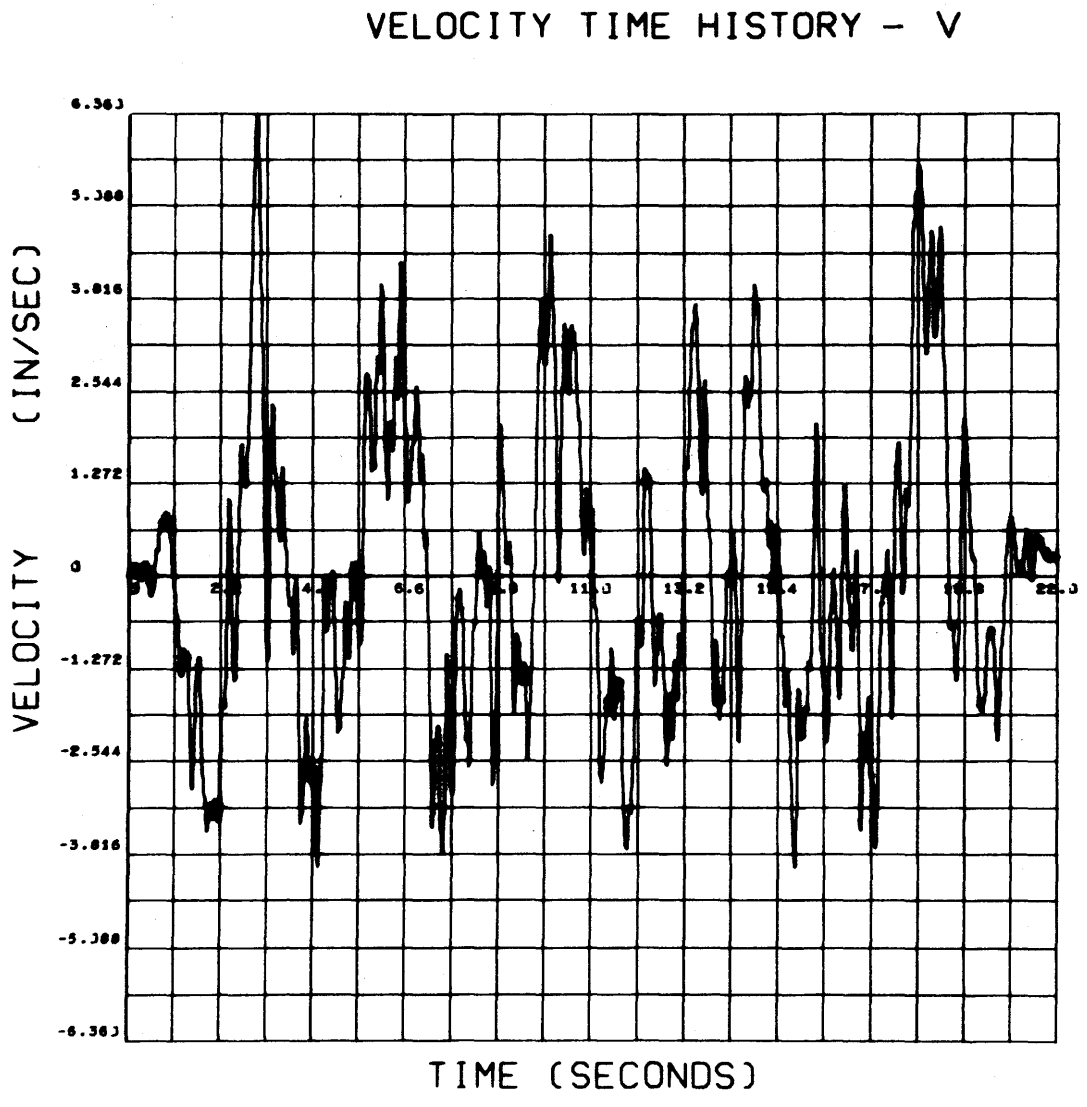


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Displacement Time History - Motion H2

Figure 2.5-98

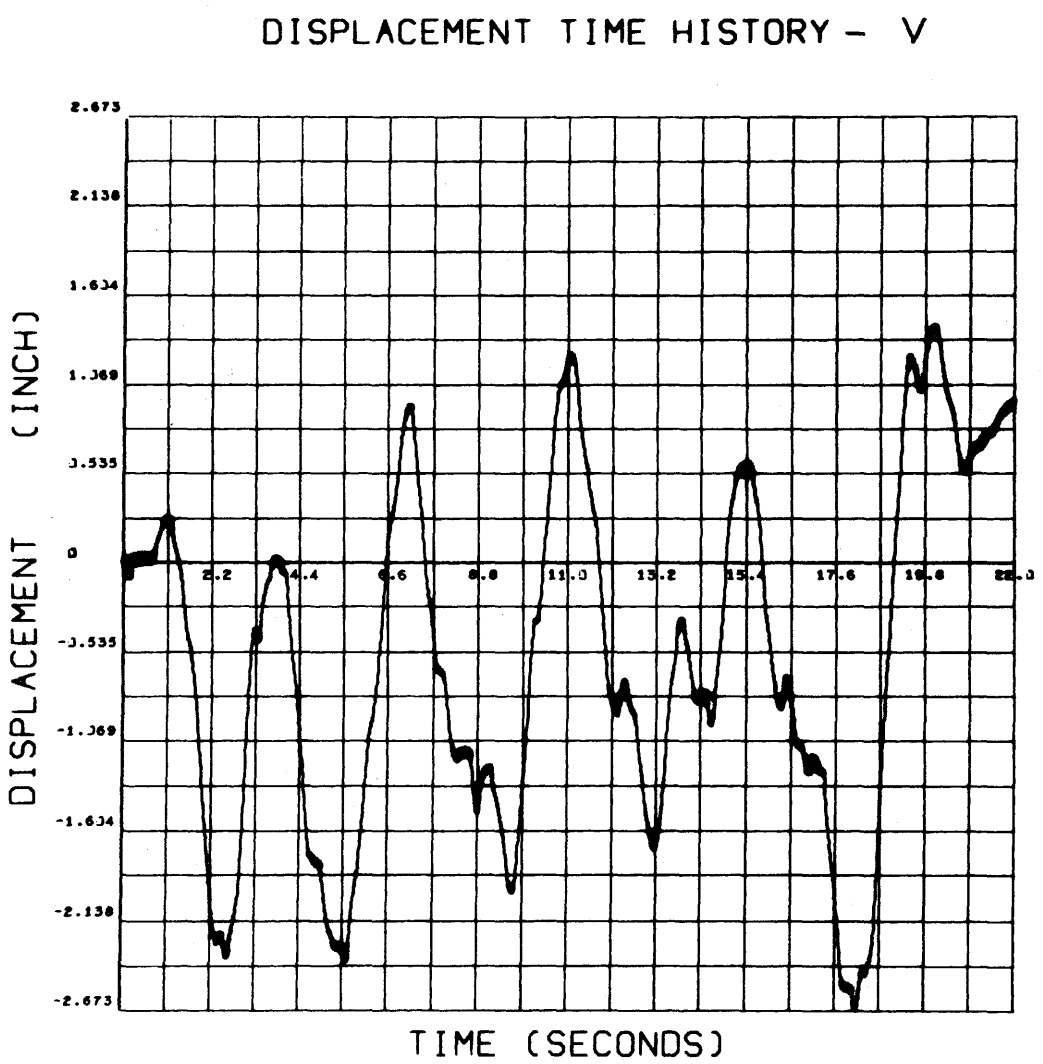


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Velocity Time History -
Vertical Motion

Figure 2.5-99

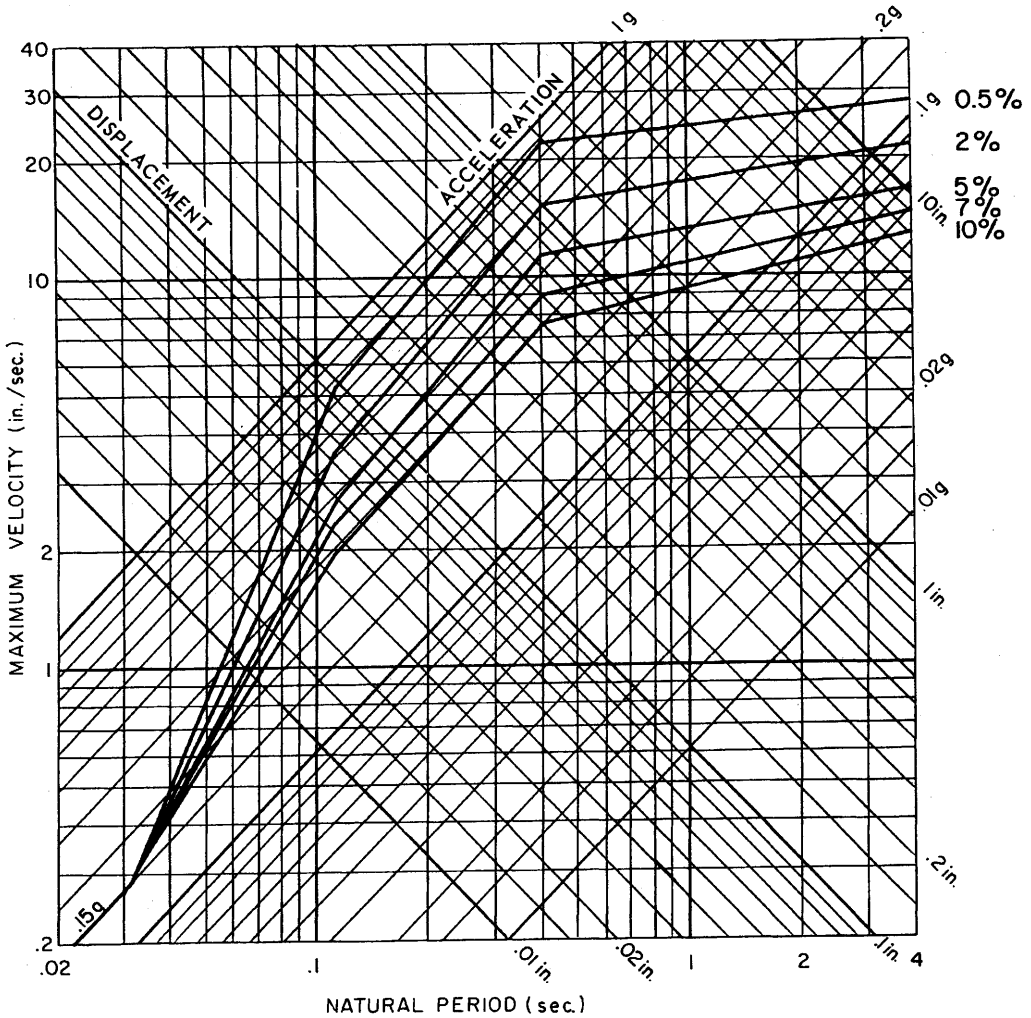


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Displacement Time History - Vertical Motion

Figure 2.5-100

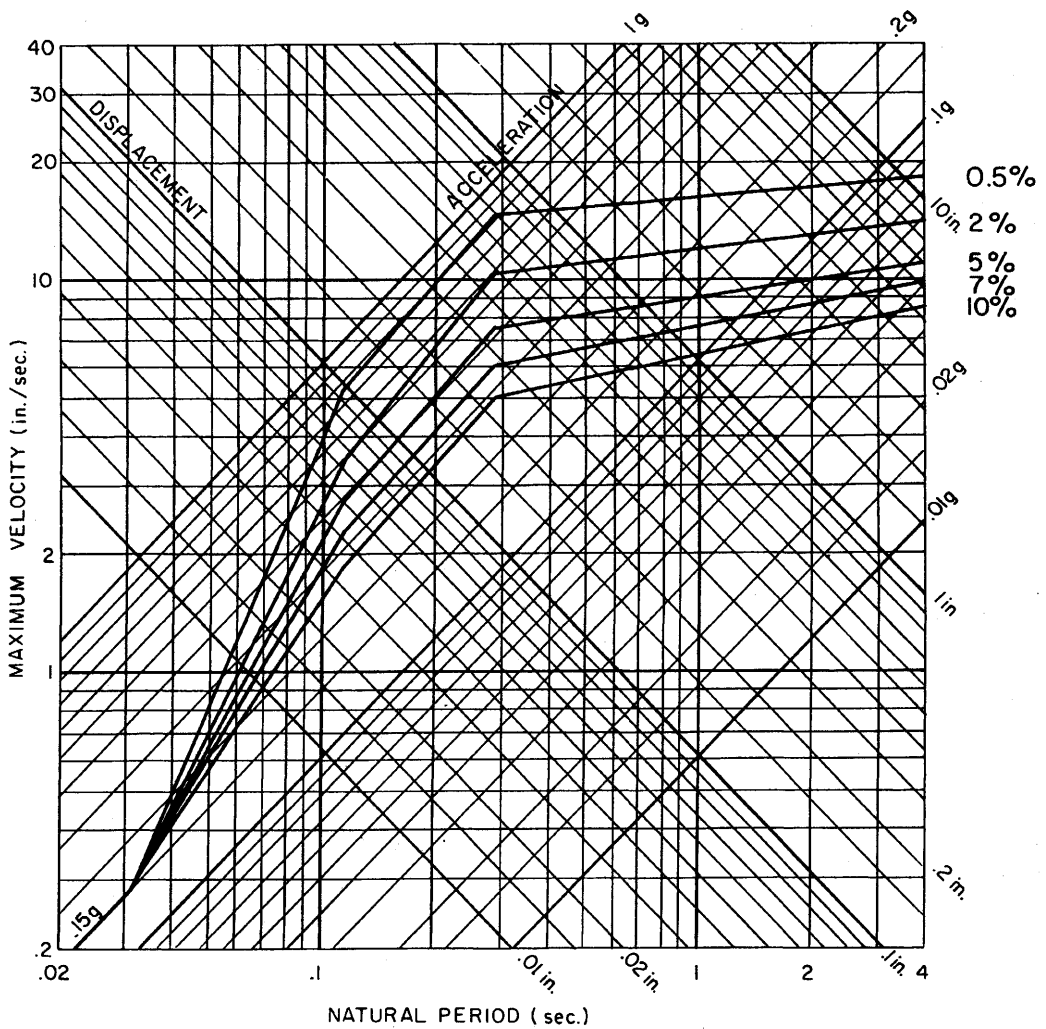


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Safe Shutdown Earthquake Design
Response Spectra -
Horizontal Motion

Figure 2.5-101



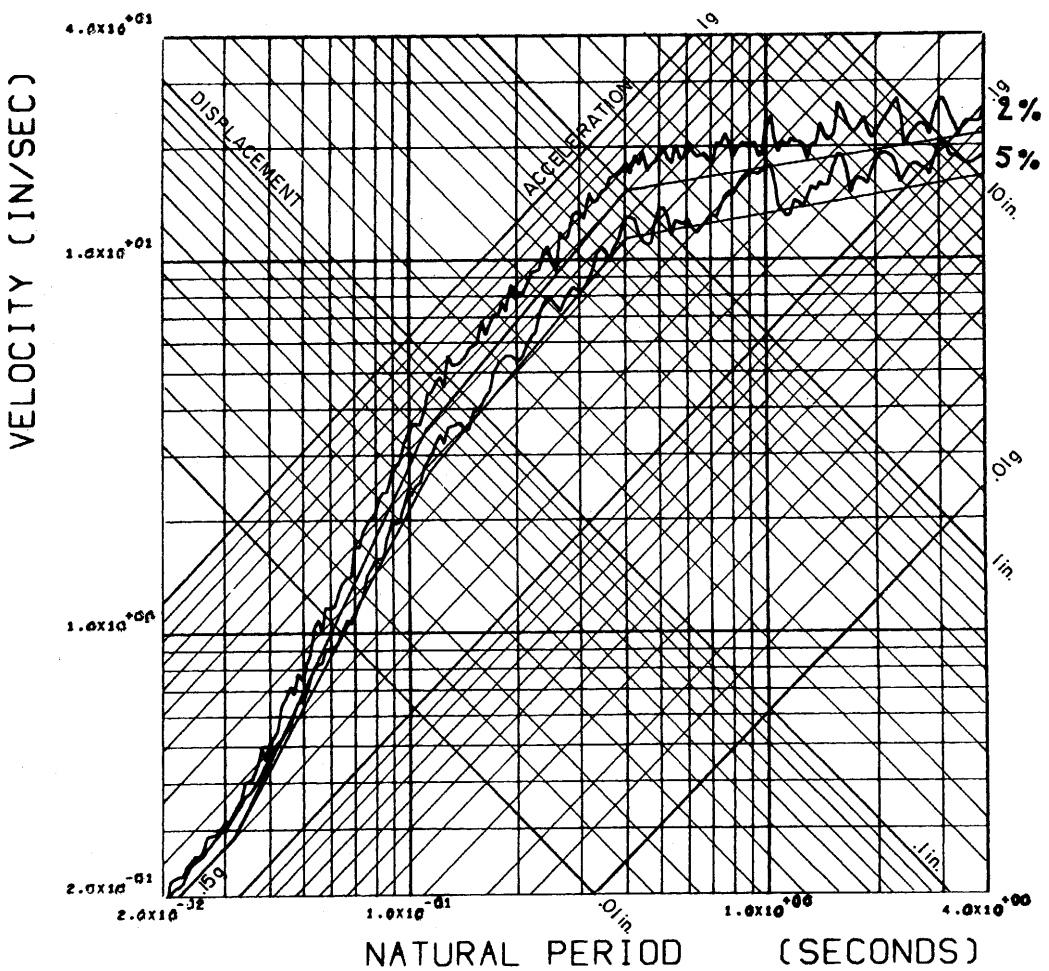
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Safe Shutdown Earthquake
Design Respose Spectra -
Vertical Motion

Figure 2.5-102

RESPONSE SPECTRUM - H1

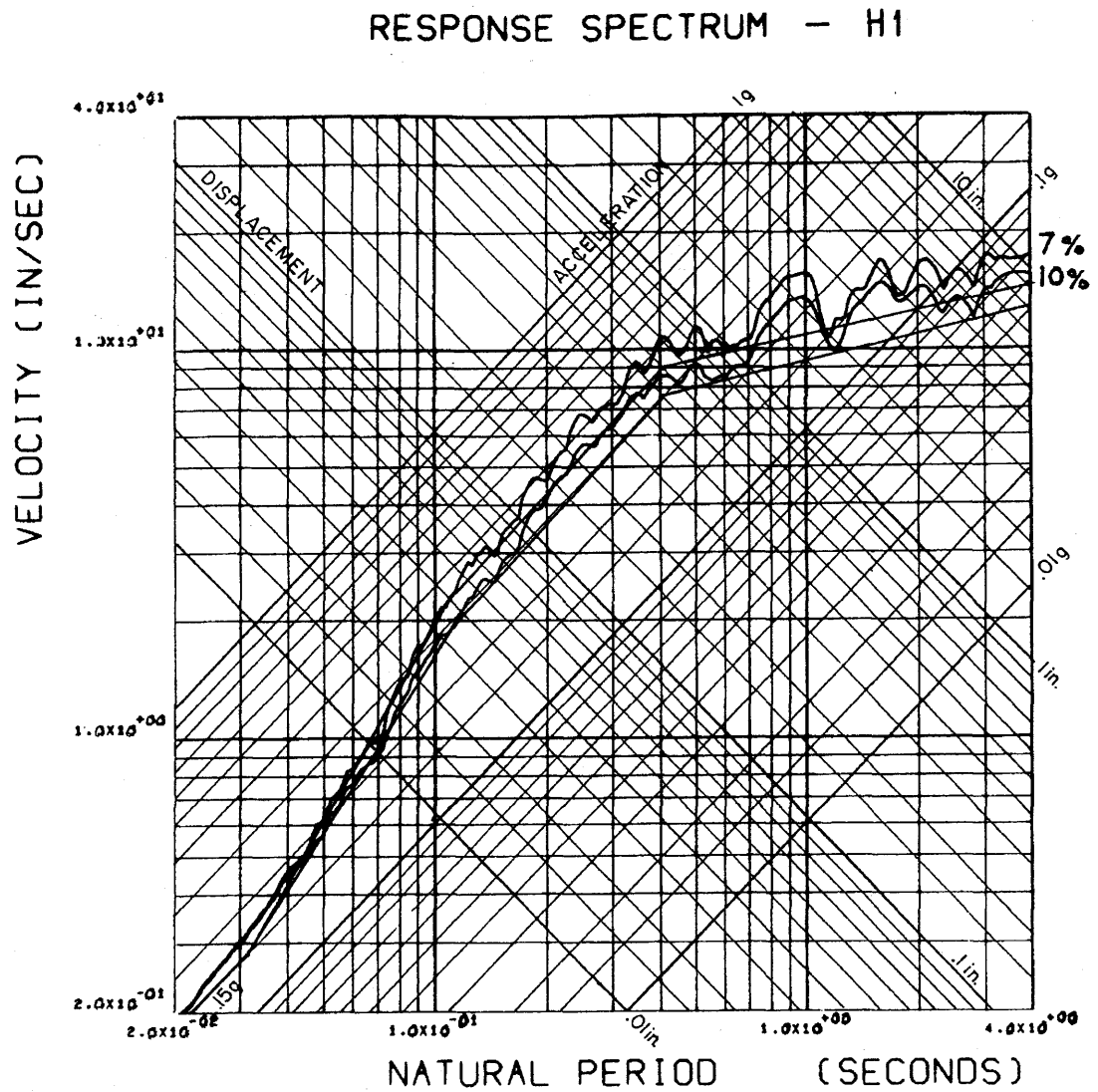


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Response Spectra - Horizontal Motion H1 (2% and 5% Damping)

Figure 2.5-103

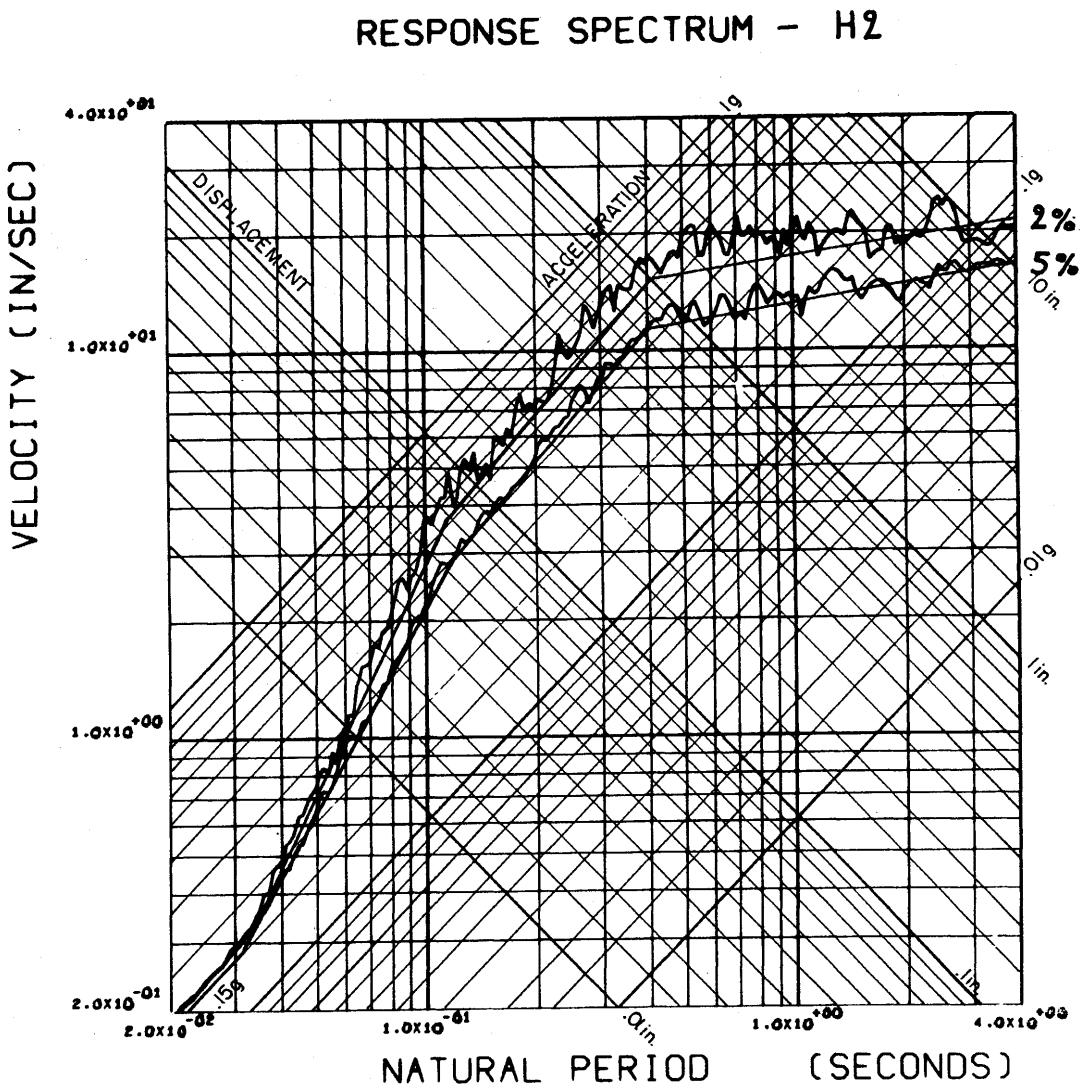


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Response Spectra – Horizontal
Motion H1 (7% and 10% Damping)

Figure 2.5-104

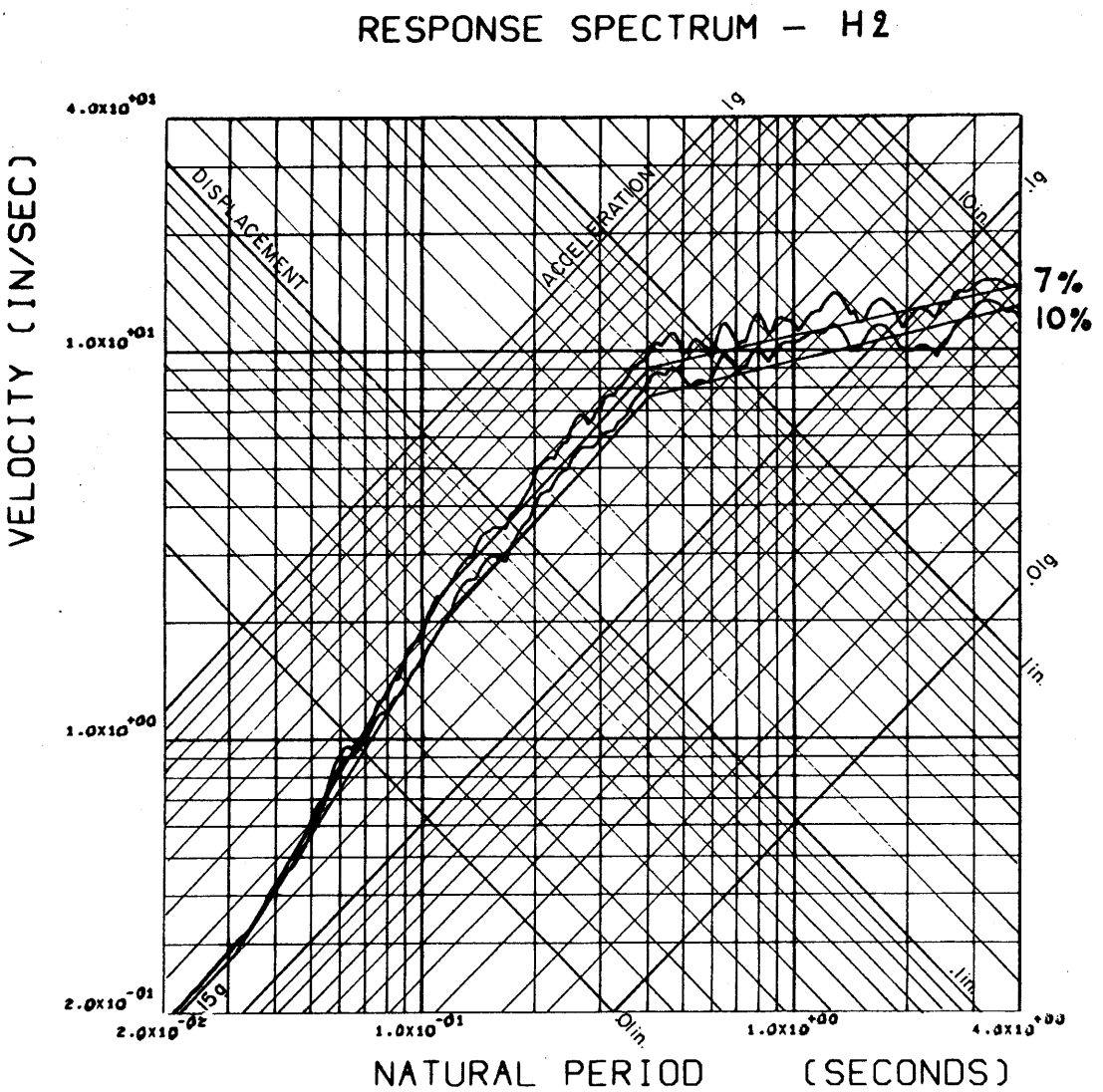


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Response Spectra - Horizontal Motion H2 (2% and 5% Damping)

Figure 2.5-105

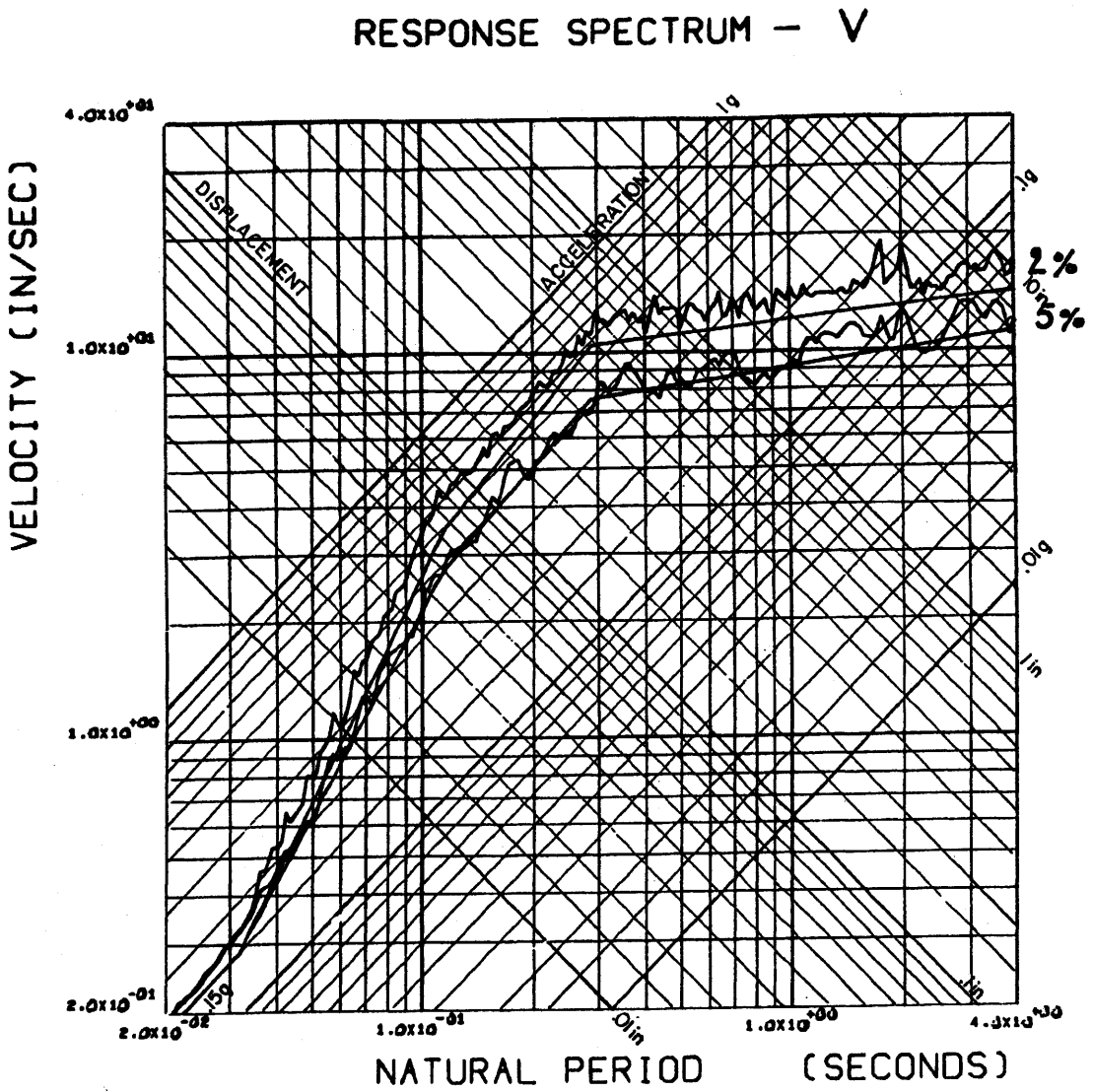


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Response Spectra - Horizontal
Motion H2 (7% and 10% Damping)

Figure 2.5-106

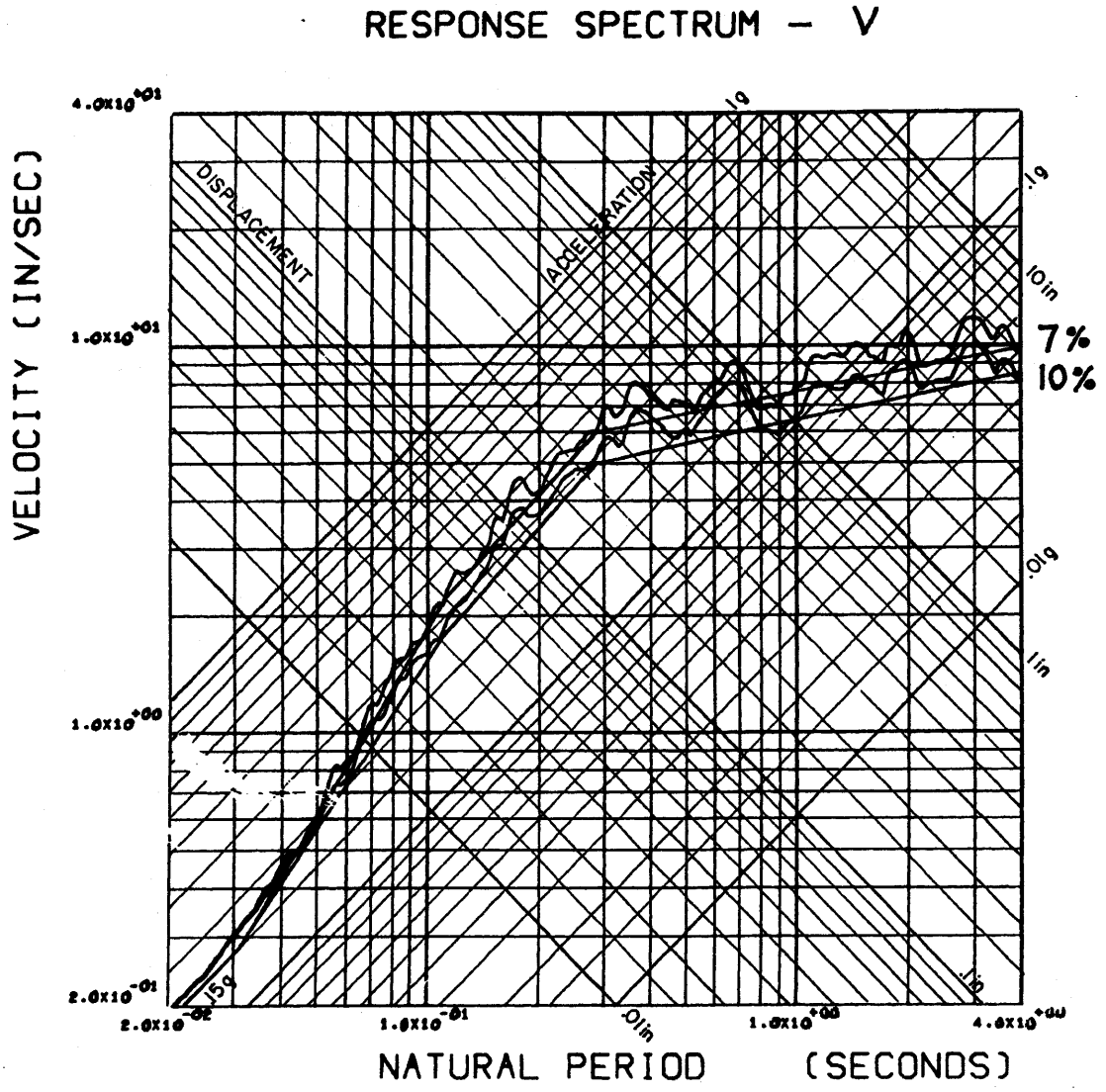


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Response Spectra – Vertical Motion (2% and 5% Damping)

Figure 2.5-107

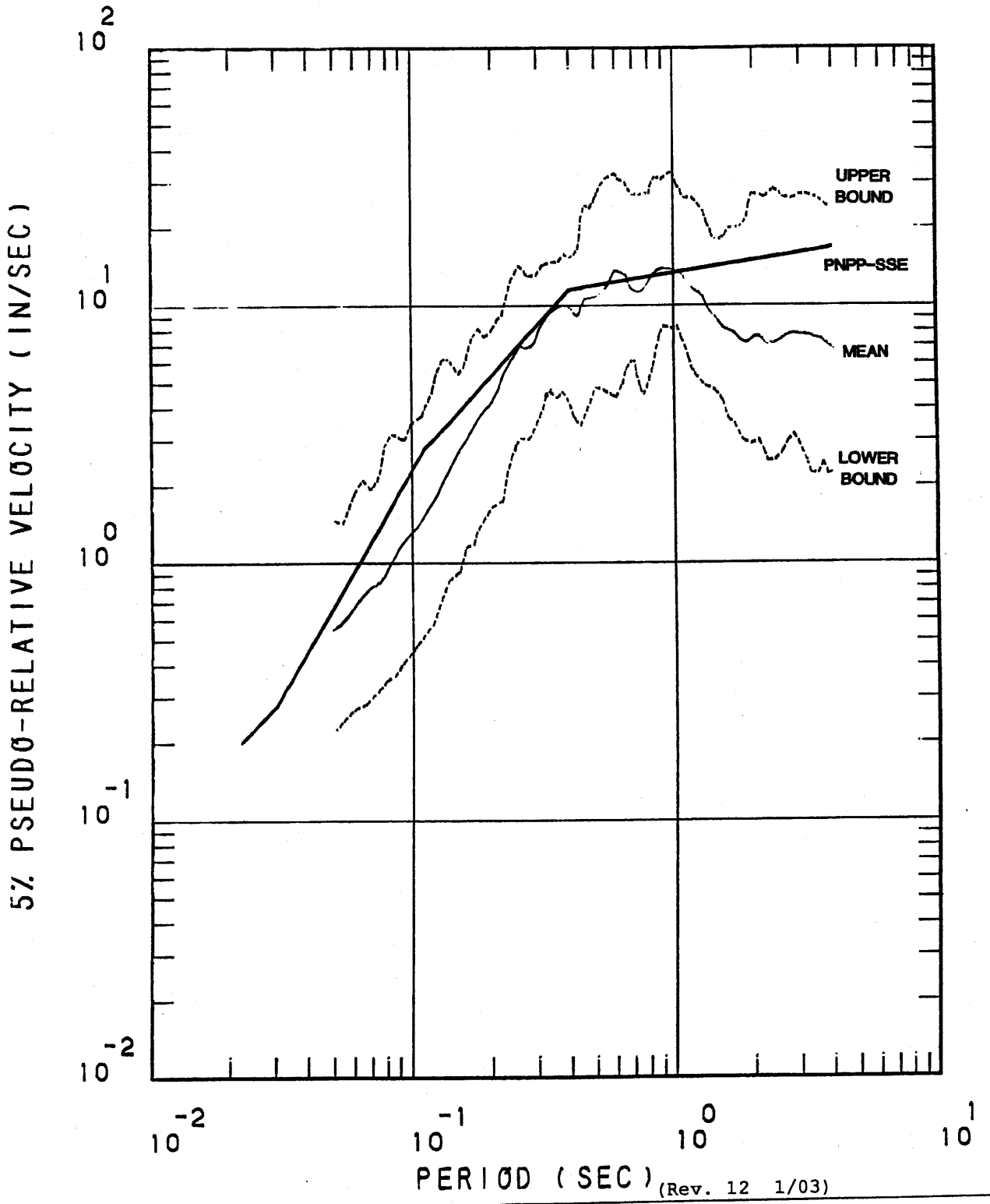


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Response Spectra - Vertical Motion (7% and 10% Damping)

Figure 2.5-108

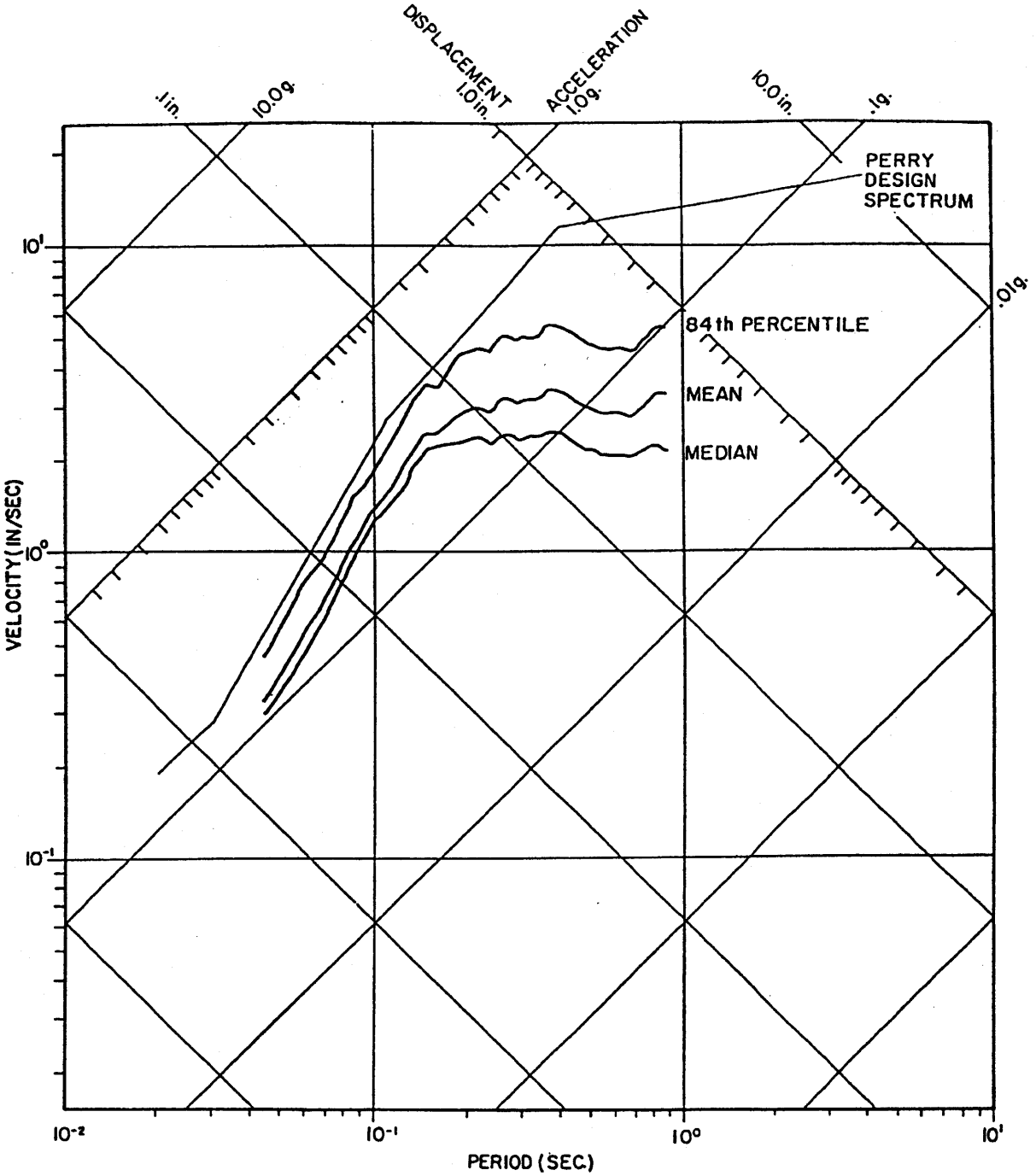


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Observed Response Spectra for Intensity VIII Effects vs. Design Response Specta

Figure 2.5-109



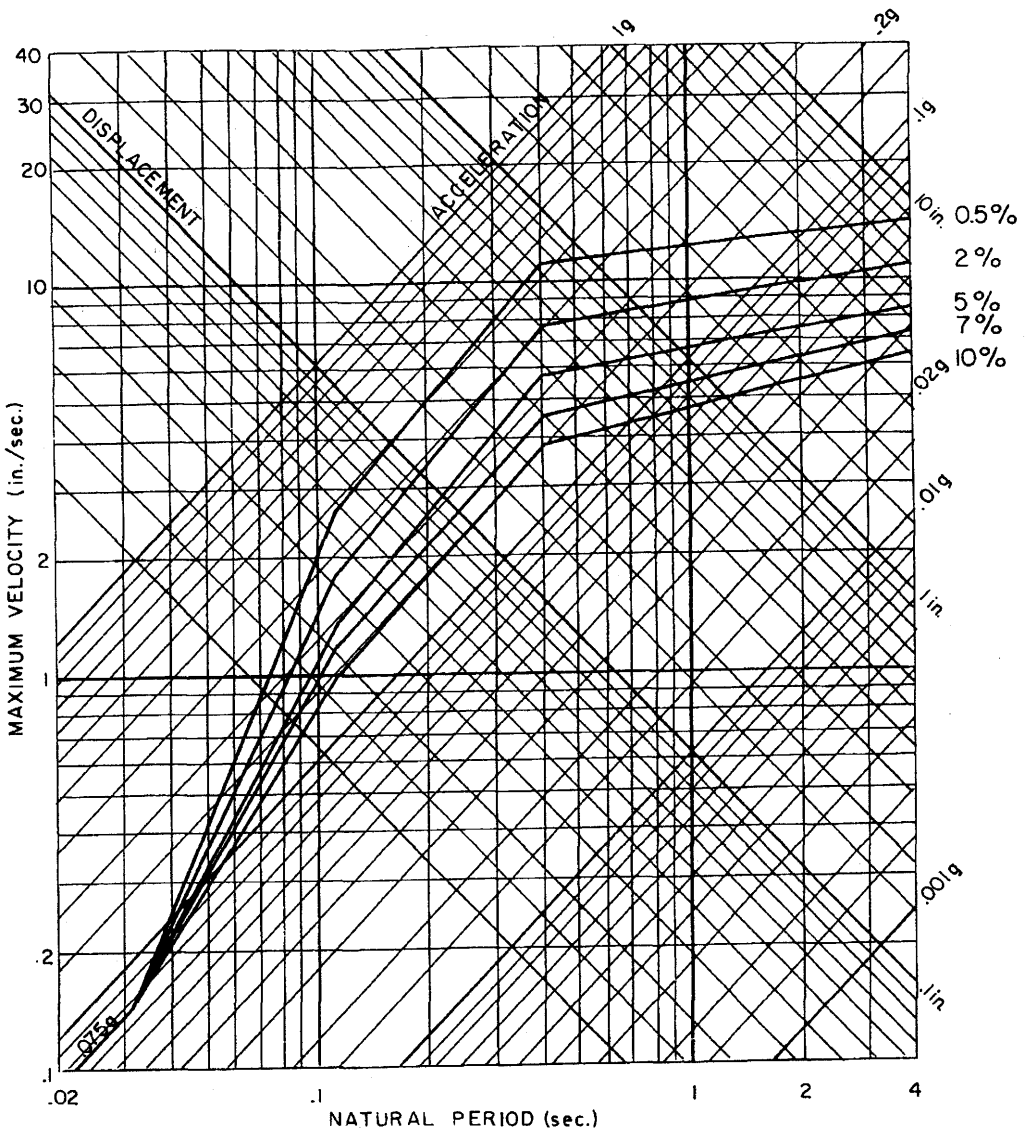
AVERAGE MAGNITUDE OF 5.7
AVERAGE DISTANCE OF 13 KM
ROCK FOUNDATIONS
(BASIC SUBSET, MAGNITUDE RANGE EXTENDED TO INCLUDE THREE EVENTS WITH MAGNITUDE M_L = 6.0, 6.0 AND 6.1, 5% DAMPING)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Site Specific Response Spectra
for the Perry Site
(5% Damping)

Figure 2.5-110

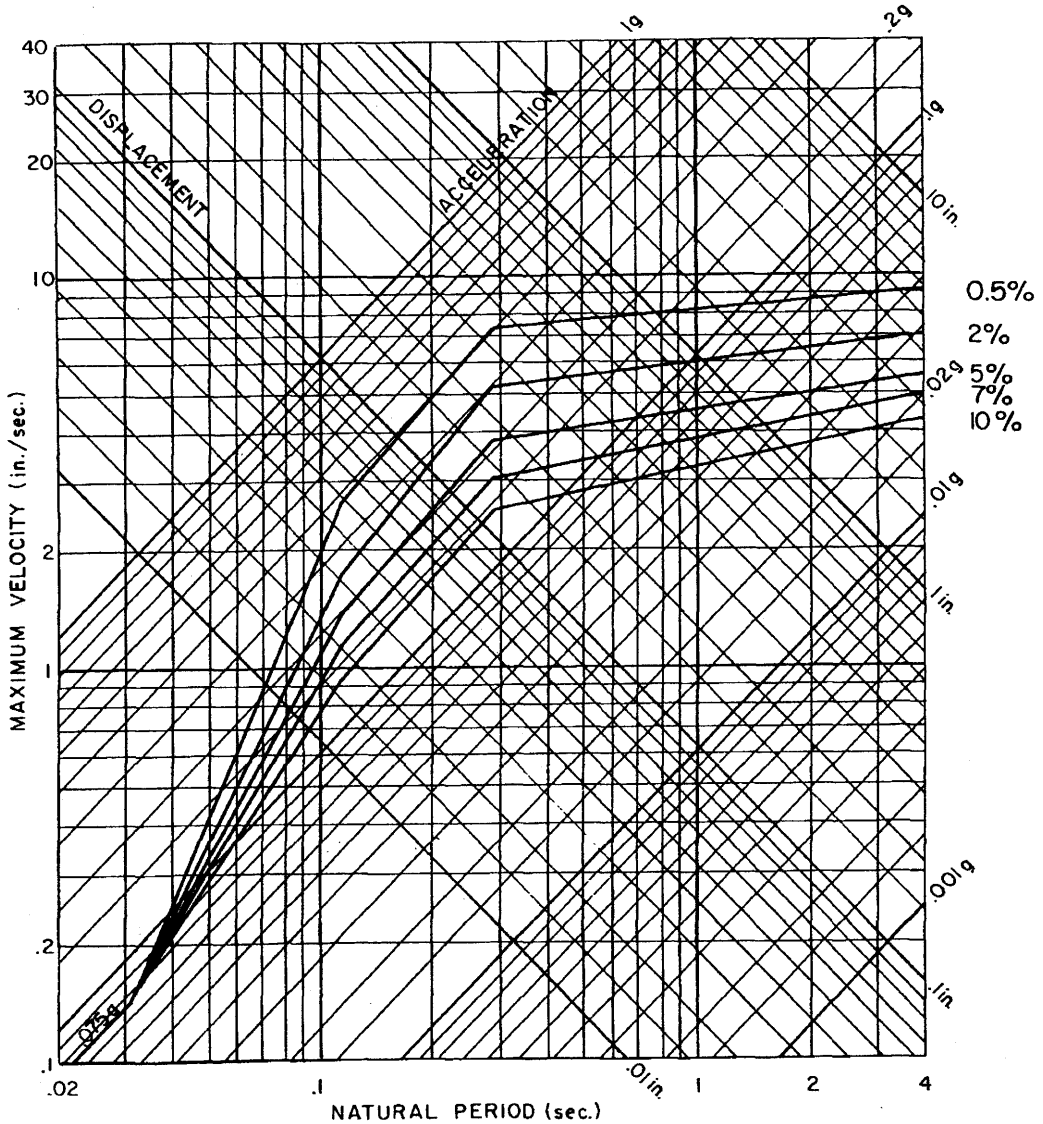


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Operating Basis Earthquake Design Response Spectra - Horizontal Motion

Figure 2.5-111

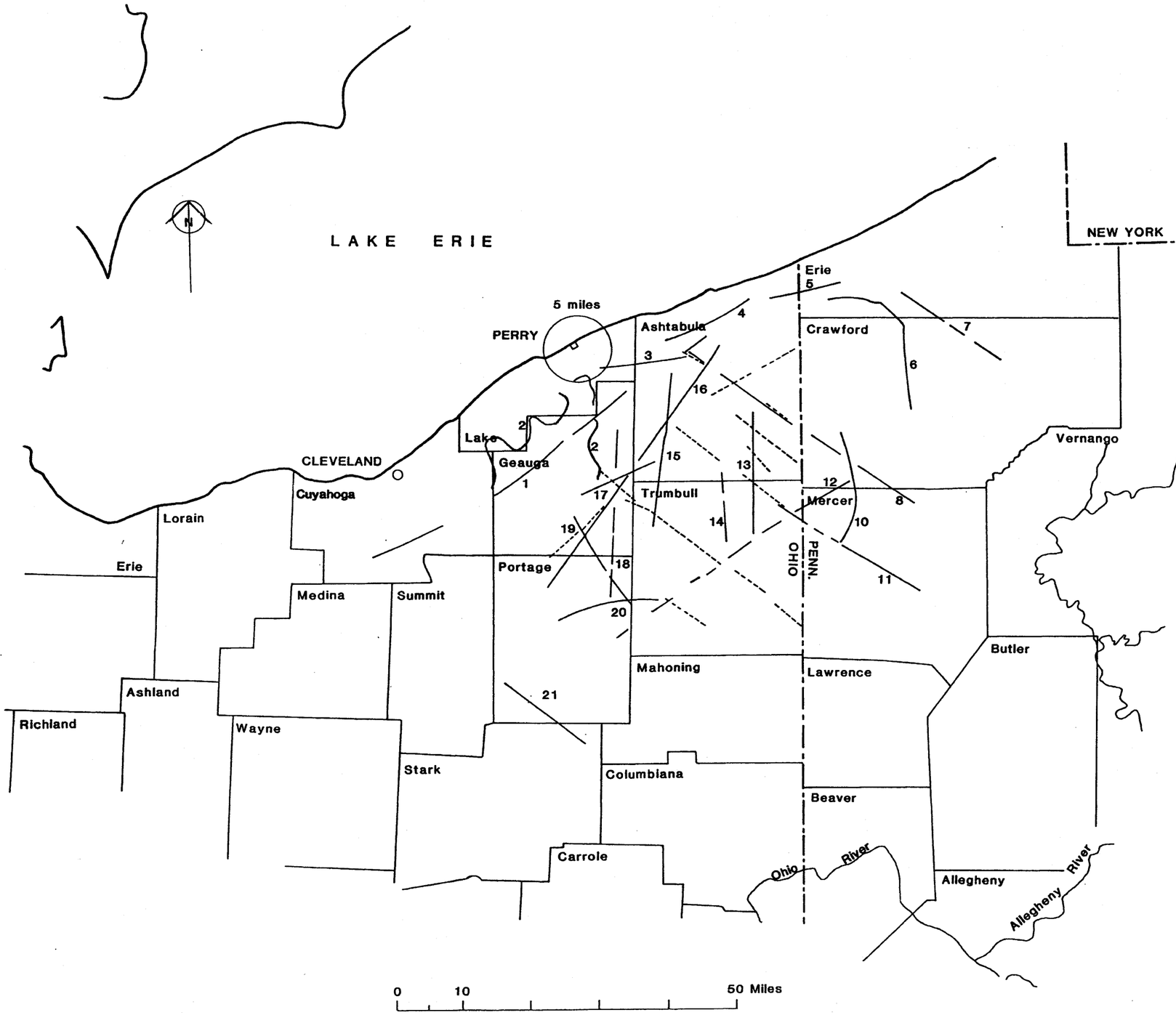


(Rev. 13 12/03)

PERRY NUCLEAR POWER PLANT

Operating Basis Earthquake Design Response Spectra - Vertical Motion

Figure 2.5-112



NOTE:

Numbers next to solid lineaments referred to in Section 2.5.3.2.

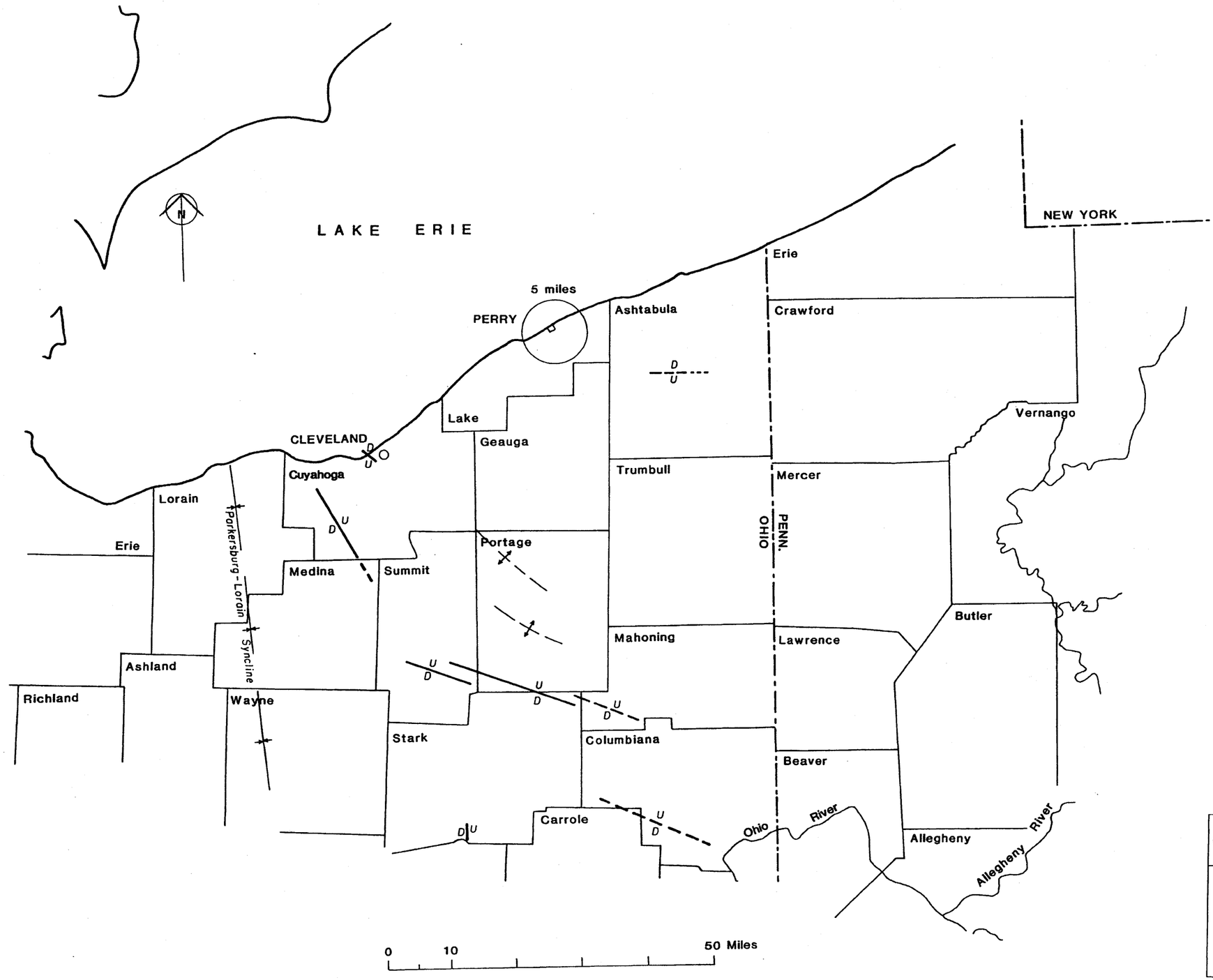
Dashed lineaments from Synthetic Aperture Radar Imagery, Cleveland 2° sheet, 1984.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

ERTS and SAR Lineaments

Figure 2.5-113



EXPLANATION

- Anticline
- Syncline
- Fault with displacement indicated

Note: All structures dashed where inferred.

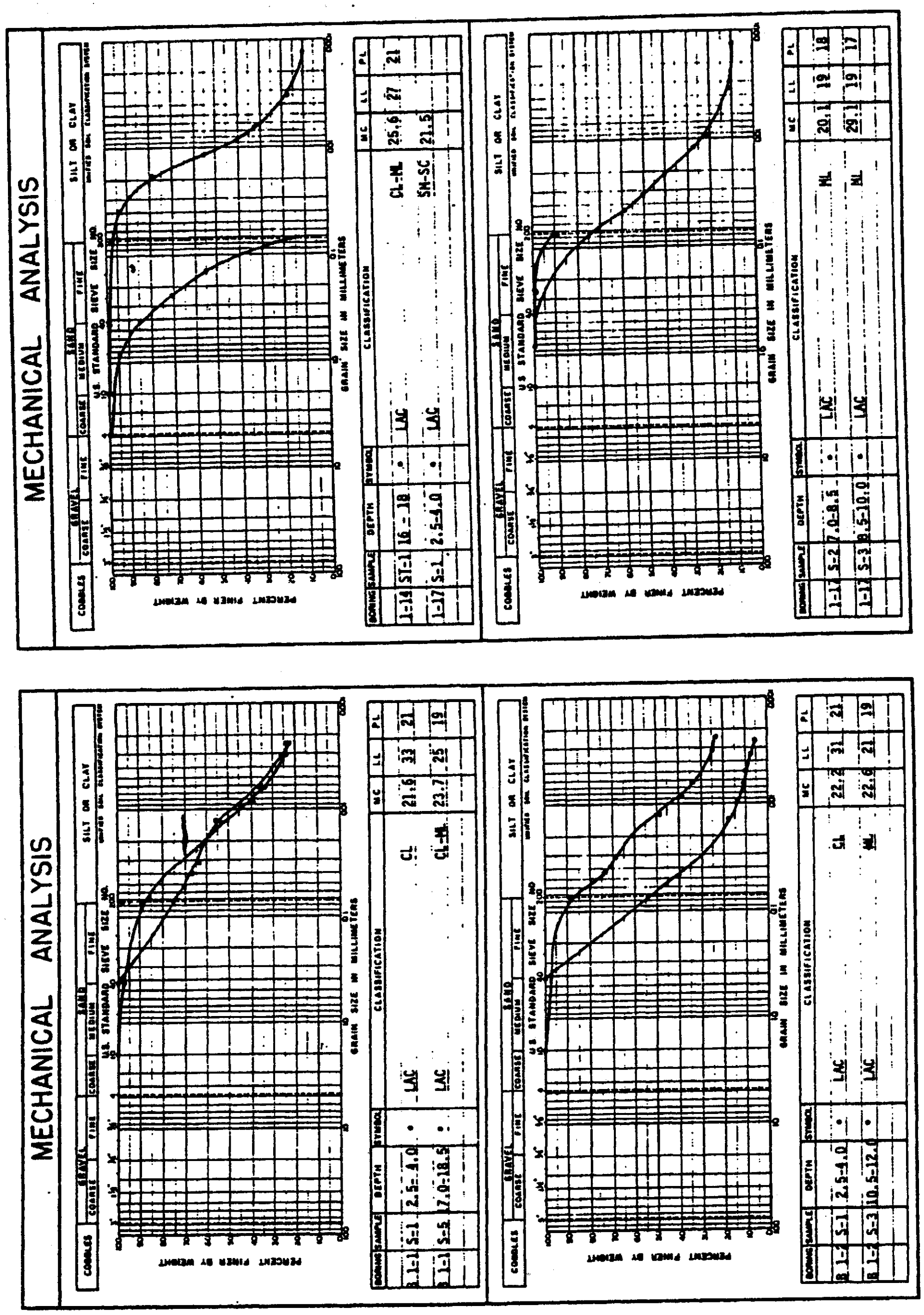
Source: (52 and 212)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Structure Map of Northeastern Ohio

Figure 2.5-114

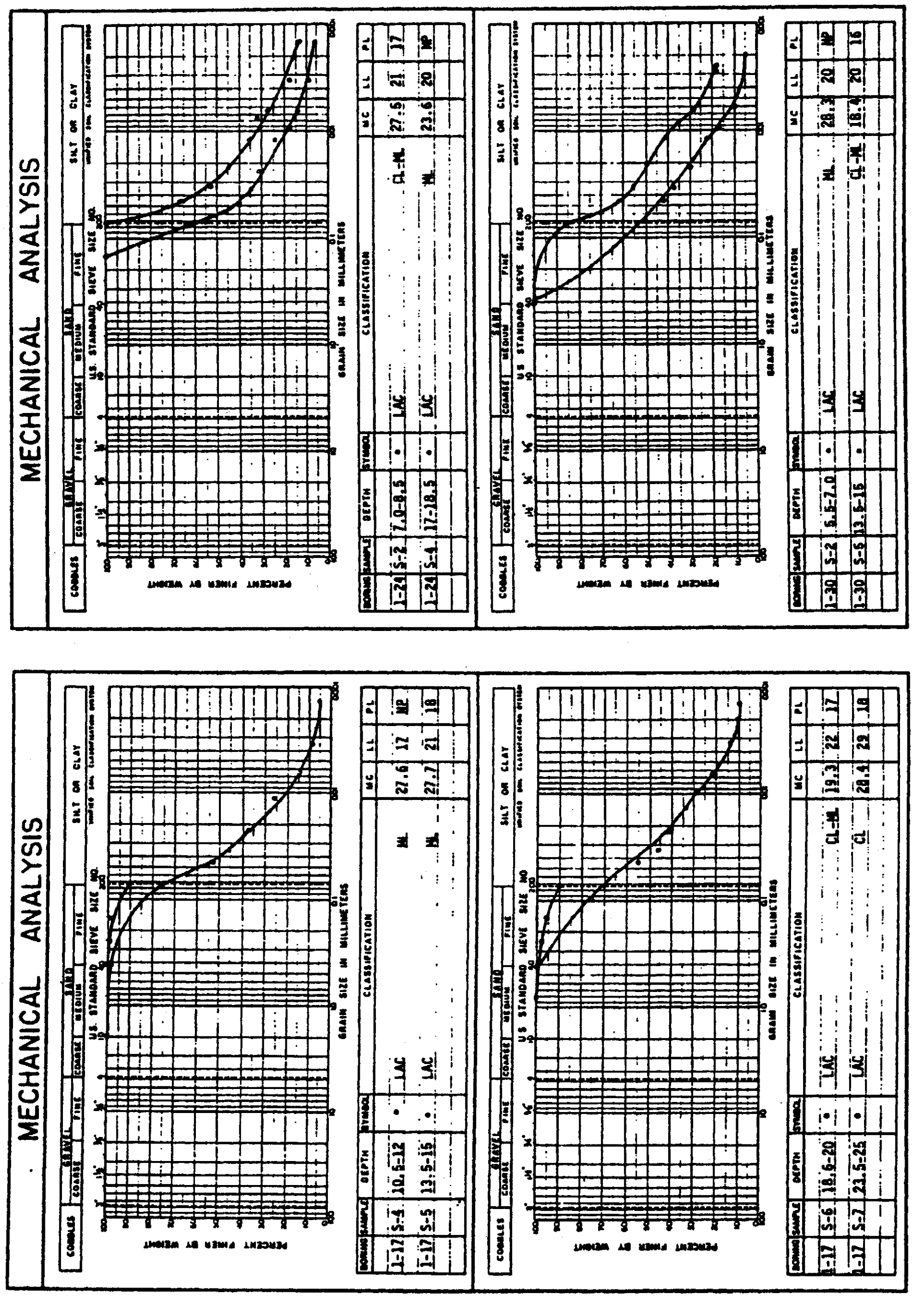


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lacustrine Sediments

Figure 2.5-115 (Sheet 1 of 6)

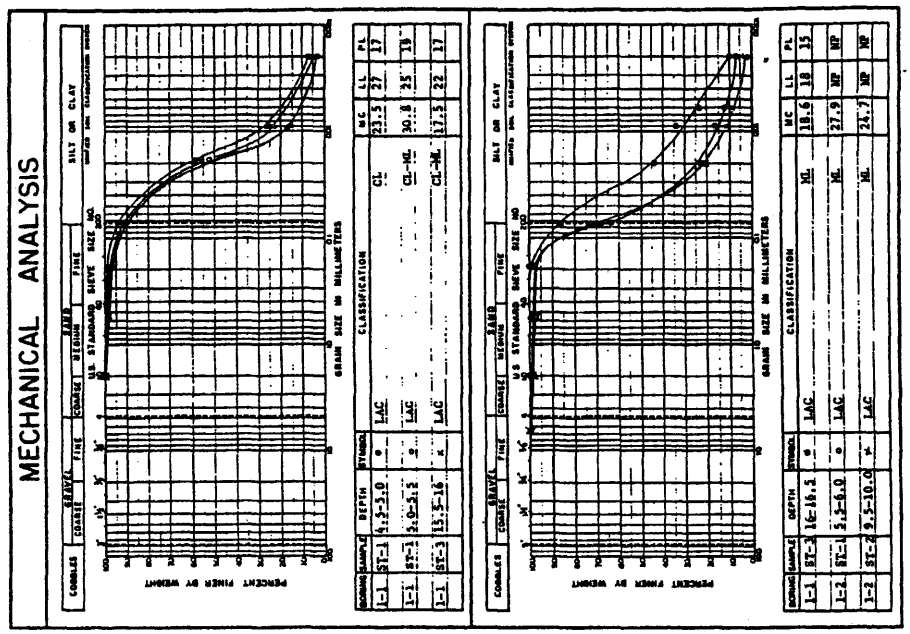


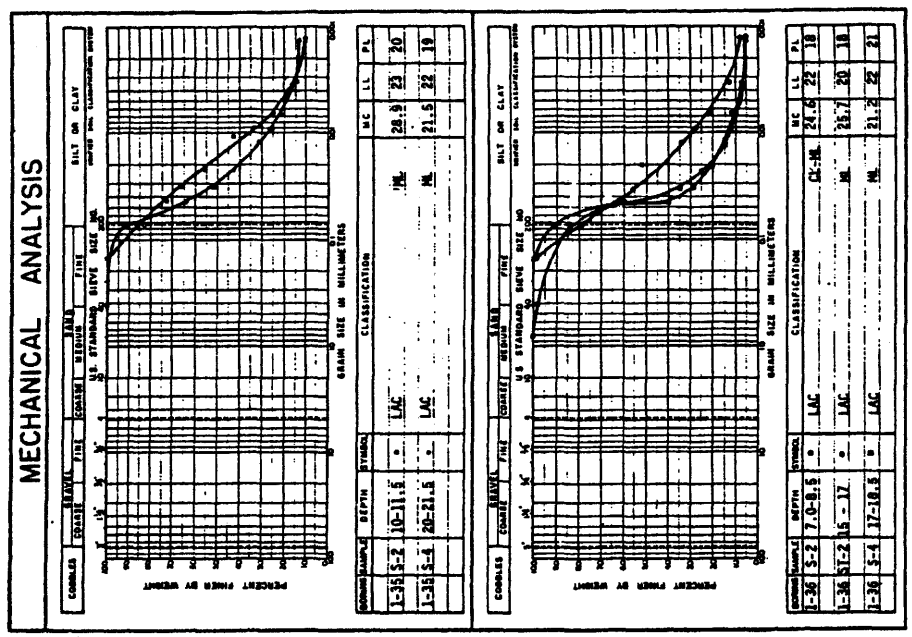
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lacustrine Sediments

Figure 2.5-115 (Sheet 2 of 6)





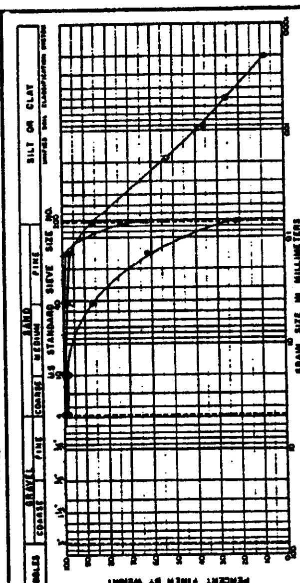
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

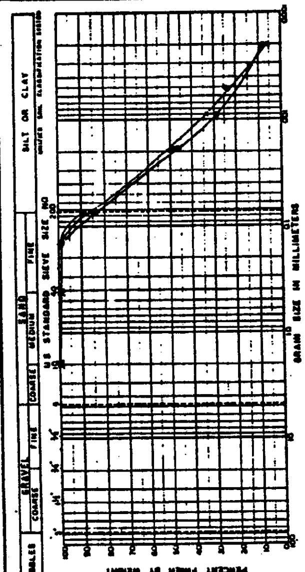
Grain Size Distribution Curves - Lacustrine Sediments

Figure 2.5-115 (Sheet 3 of 6)

MECHANICAL ANALYSIS

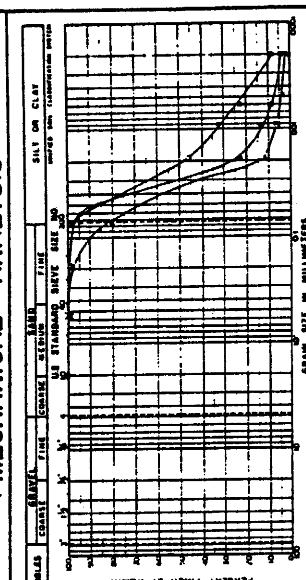


BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-17	1	2.5-4.0	●	LAC SM-SC	21.6	--	
	2	7.0-8.5	●	LAC CL	21.9	24	16
	3	8.5-10.0	x	LAC ML	25.7	18	15

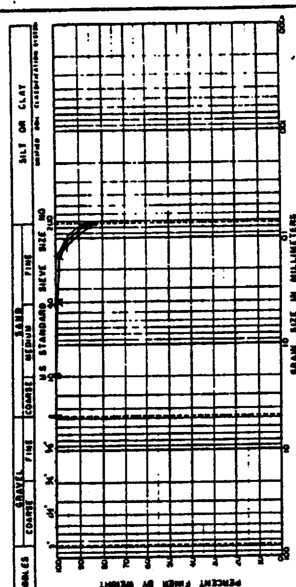


BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-17	4	10.5-12	●	LAC CL-ML	26.6	21	16
	5	13.5-15	●	LAC CL-ML	29.4	21	17
	6	18.5-20	x	LAC CL-ML	20.0	21	15

MECHANICAL ANALYSIS



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-2	ST-3	16.5-17	●	LAC ML	26.8	NP	NP
1-3	ST-1	8.5-9.0	●	LAC CL-ML	18.3	20	13
1-5	ST-1	24.5-25	x	LAC ML	21.8 (?)	NP	NP



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-7	1	2.5-4.0	●	LAC CL	24.1	26	18
1-7	2	5.5-7.0	●	LAC CL	21.1 (?)	24	17
1-7	4	10.5-12	x	LAC ML	27.2	18	13

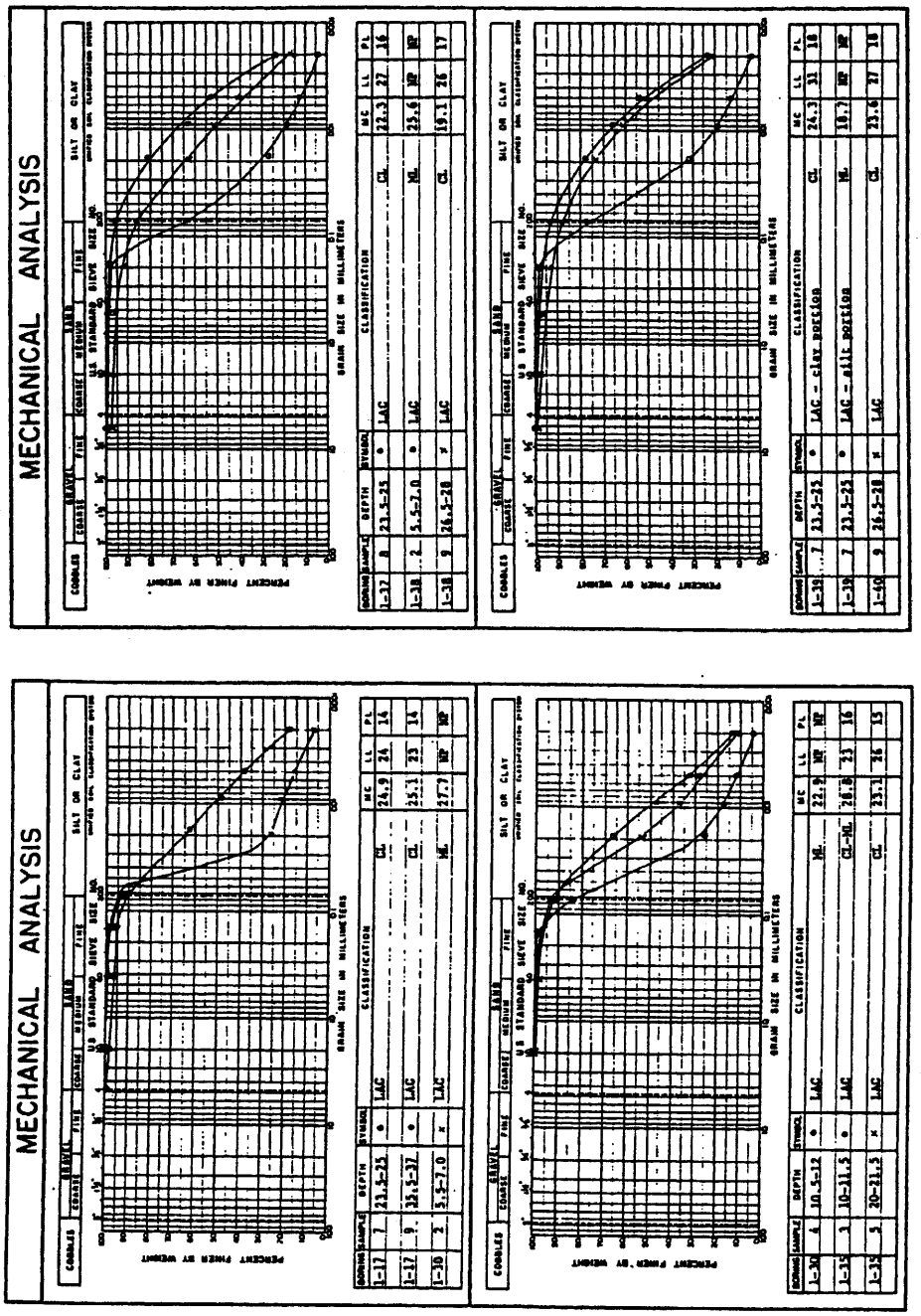
(Tested by Herron Testing Laboratories)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lacustrine Sediments

Figure 2.5-115 (Sheet 4 of 6)

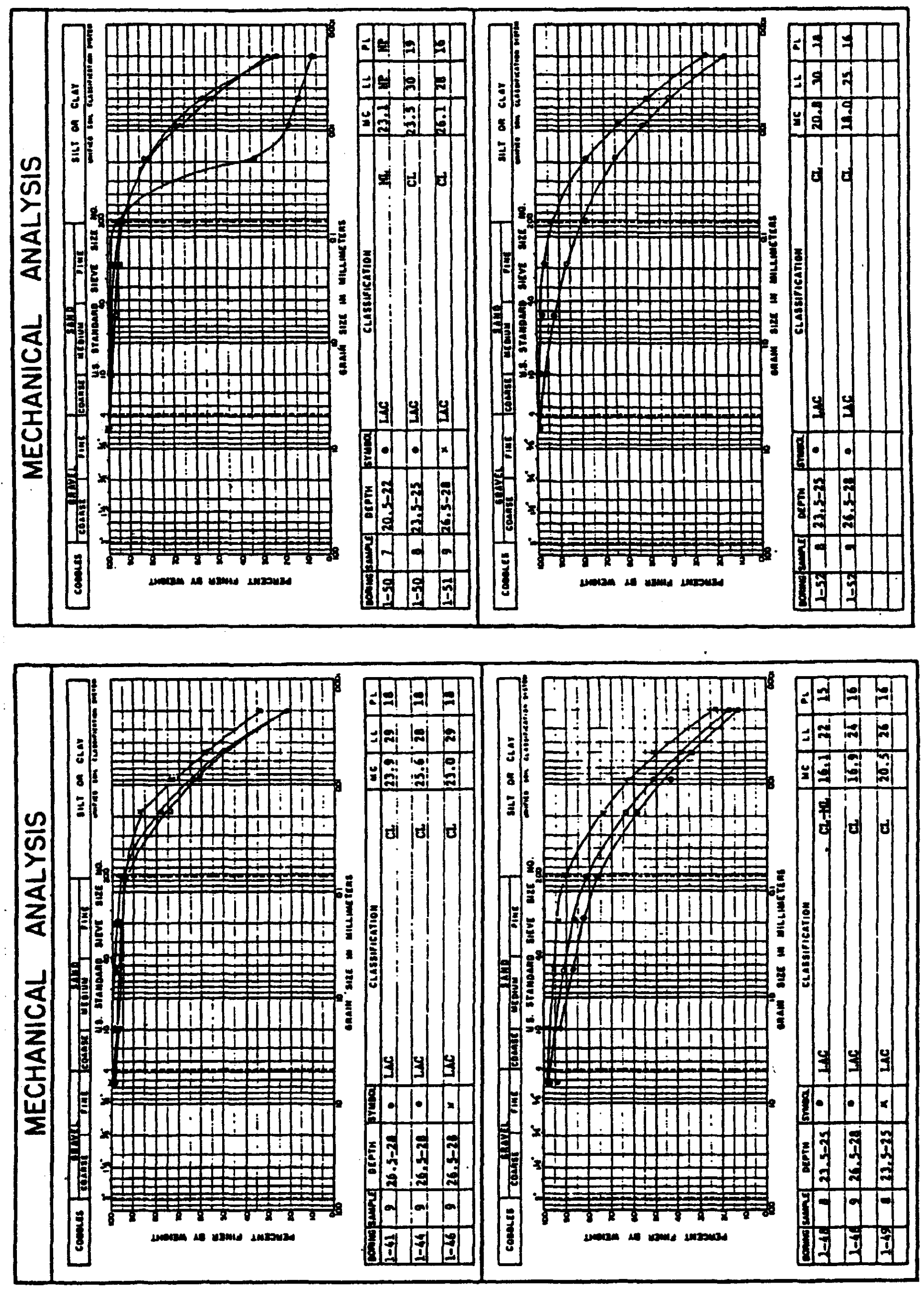


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lacustrine Sediments

Figure 2.5-115 (Sheet 5 of 6)



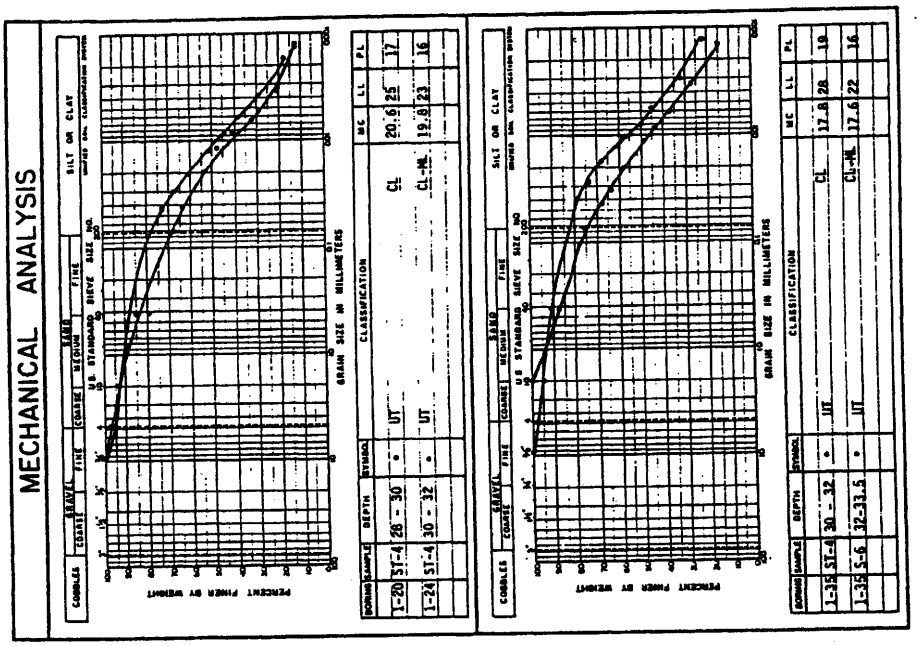
(Tested by Herron Testing Laboratories)

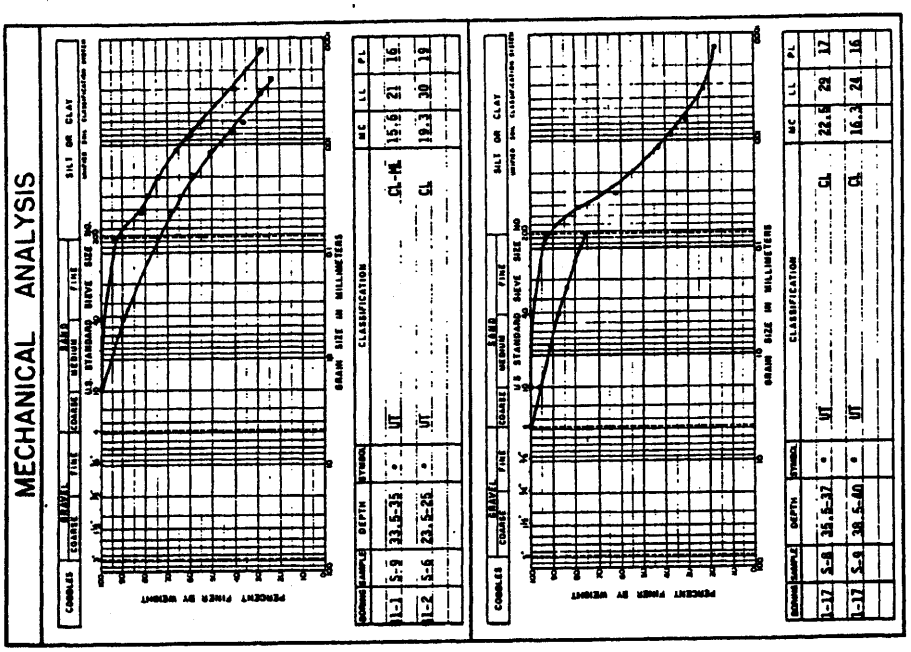
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves – Lacustrine Sediments

Figure 2.5-115 (Sheet 6 of 6)



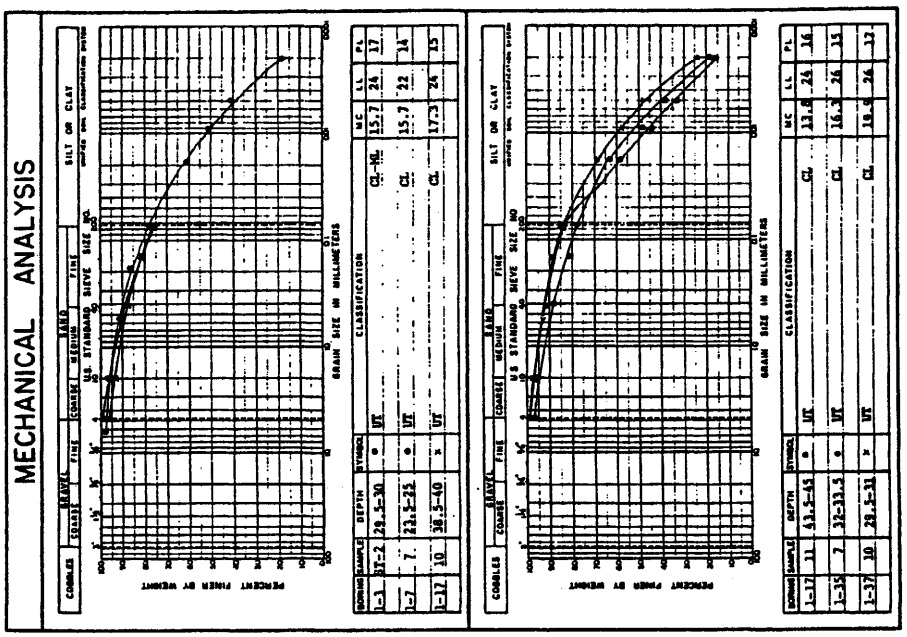


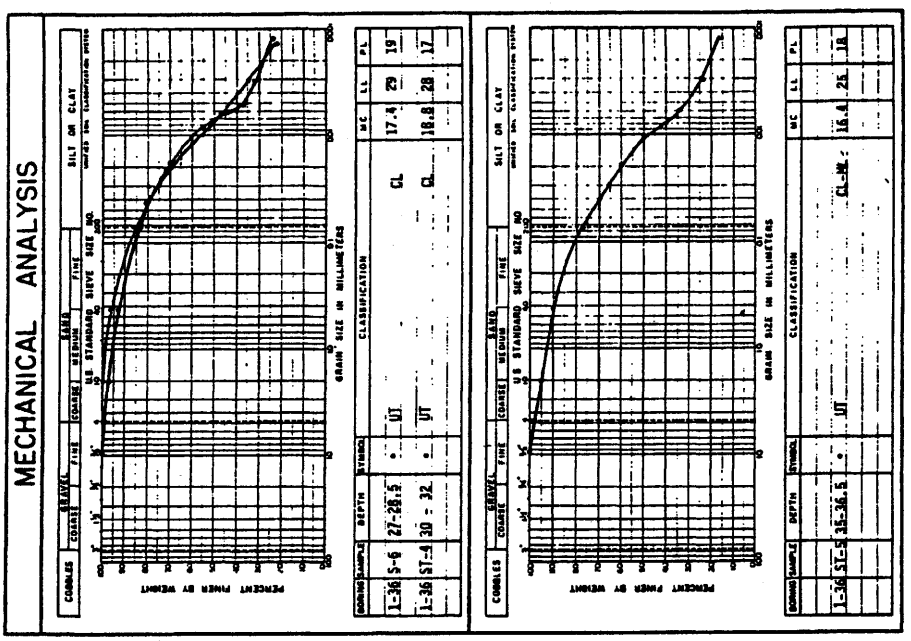
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Upper Till

Figure 2.5-116 (Sheet 1 of 5)





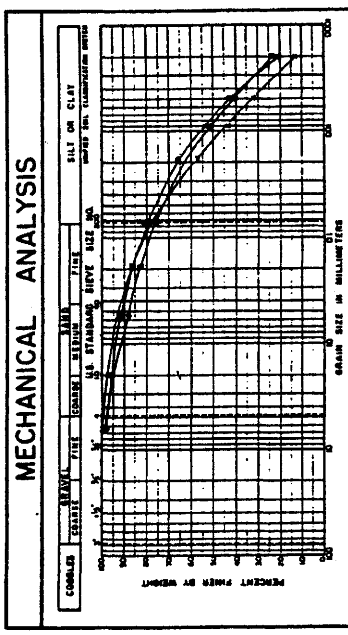
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

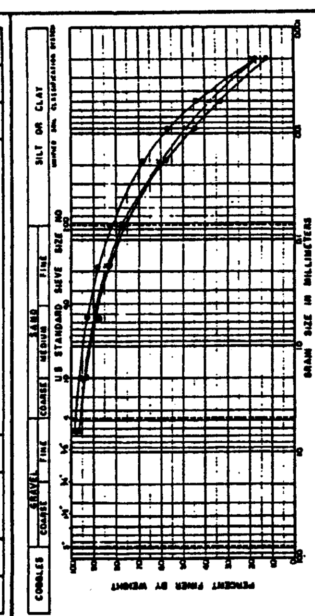
Grain Size Distribution Curves - Upper Till

Figure 2.5-116 (Sheet 2 of 5)

MECHANICAL ANALYSIS

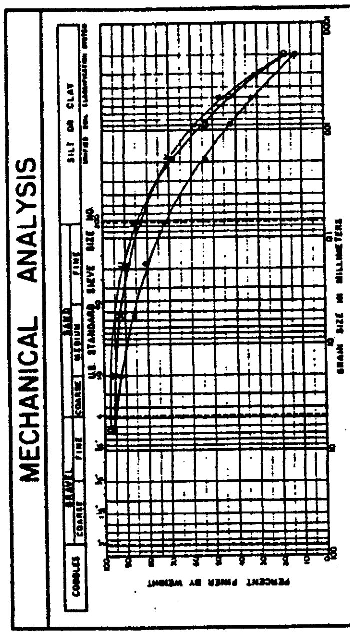


BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-38	10	29.5-31	●	UT CL	19.9	27	17
1-38	11	32.5-34	●	UT CL	15.2	20	15
1-38	12	35.5-37	x	UT CL	12.8	22	16

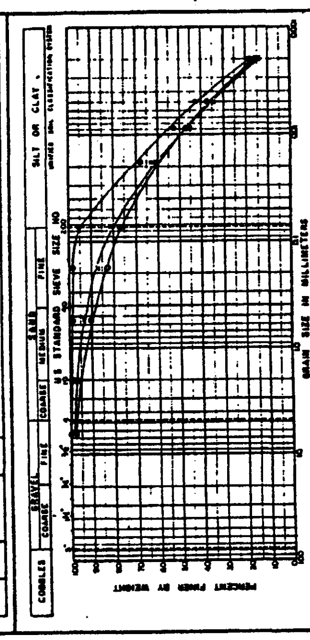


BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-39	8	28-29.5	●	UT CL	18.2	26	17
1-39	9	32.5-34	●	UT CL-ML	16.8	23	16
1-40	11	32.5-34	x	UT CL	18.7	26	14

MECHANICAL ANALYSIS



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-40	12	35.5-37	●	UT CL	15.5	22	14
1-41	10	29.5-31	●	UT CL	18.9	26	17
1-41	11	32.5-34	x	UT CL	19.8	27	17



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-43	10	29.5-31	●	UT CL	20.5	24	15
1-43	11	32.5-34	●	UT CL	15.7	25	16
1-43	12	35.5-37	x	UT CL	14.5	24	16

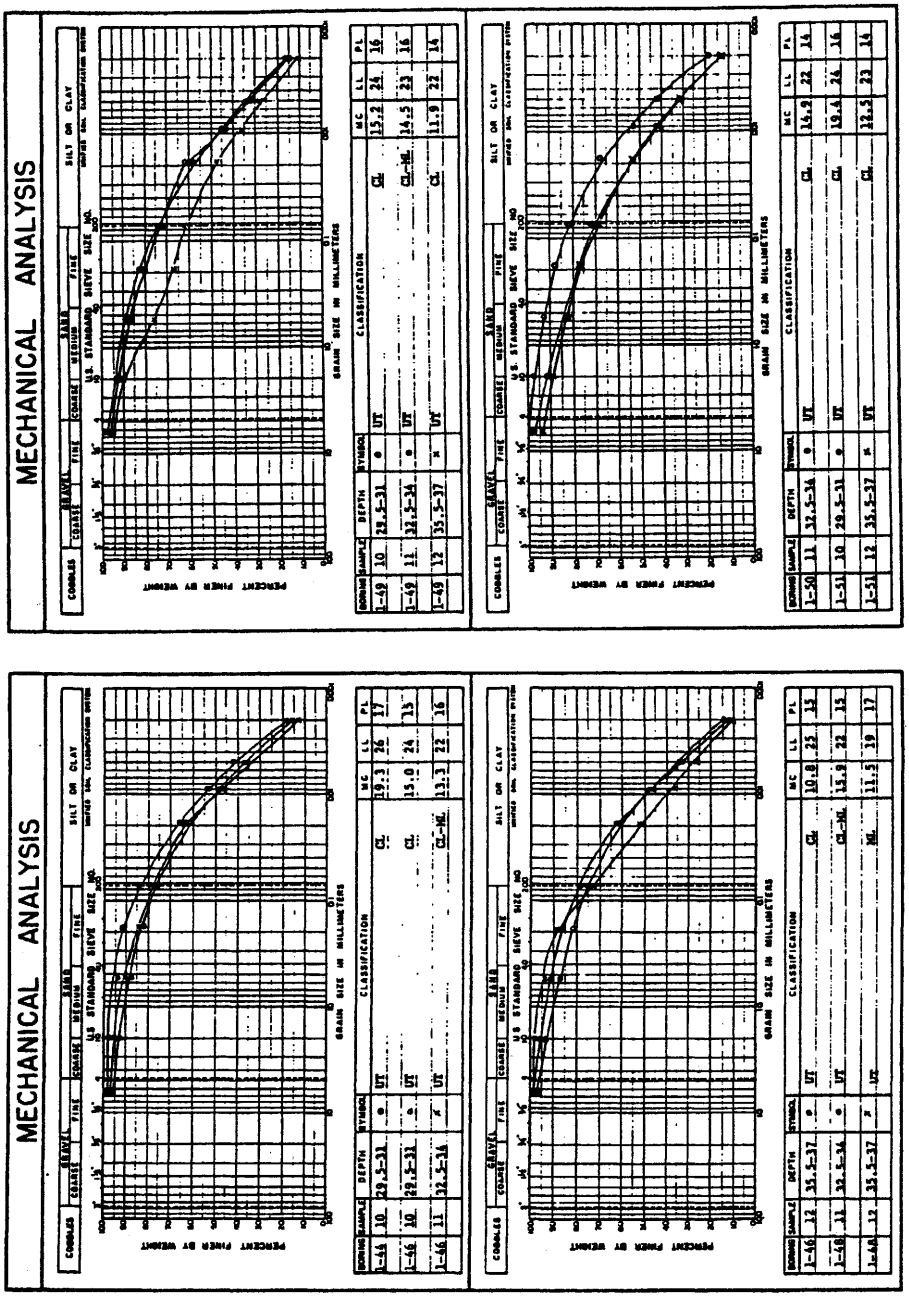
(Tested by Herron Testing Laboratories)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Upper Till

Figure 2.5-116 (Sheet 3 of 5)



(Tested by Herron Testing Laboratories)

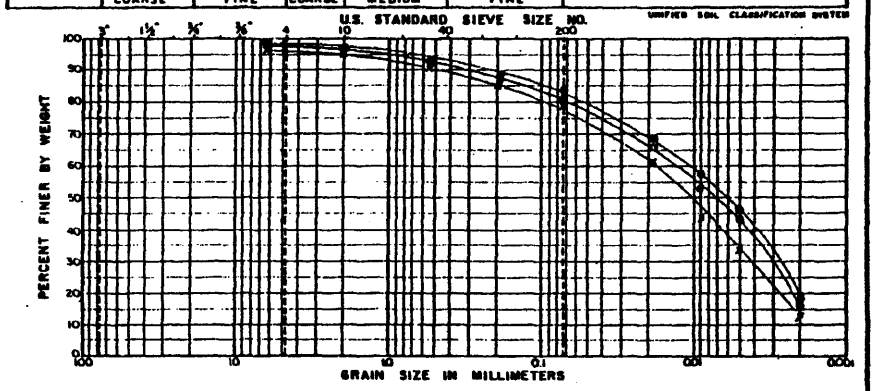
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

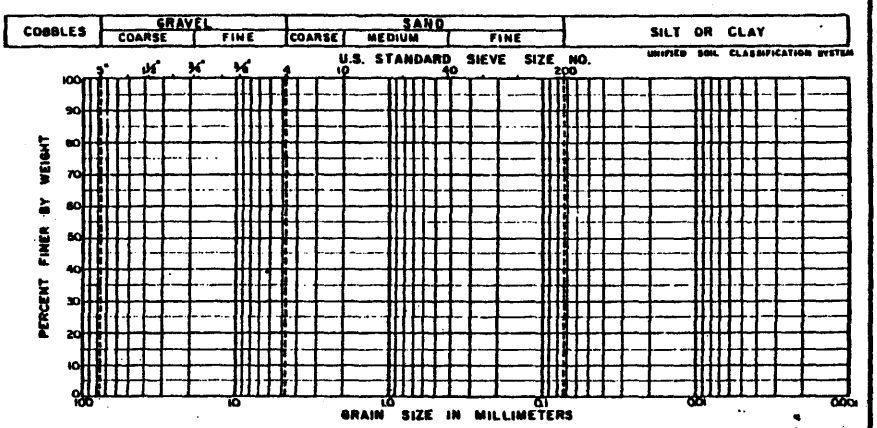
Grain Size Distribution Curves - Upper Till

Figure 2.5-116 (Sheet 4 of 5)

MECHANICAL ANALYSIS



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION		MC	LL	PL
1-52	10	29.5-31	•	UT	CL	19.7	27	16
1-52	11	32.5-34	•	UT	CL	18.2	25	17
1-52	12	35.5-37	x	UT	CL-ML	14.5	23	16



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL

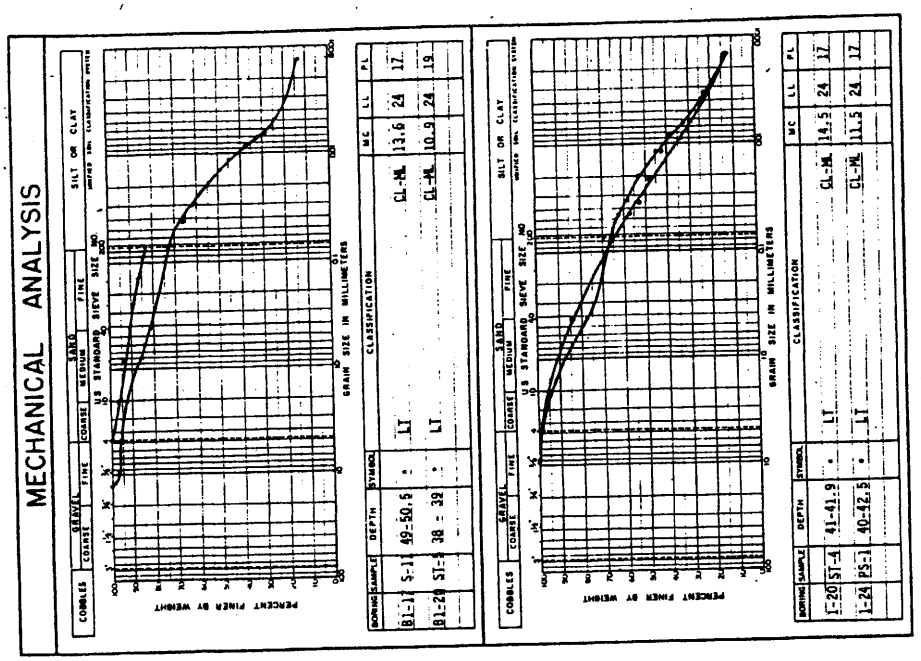
(Tested by Herron Testing Laboratories)

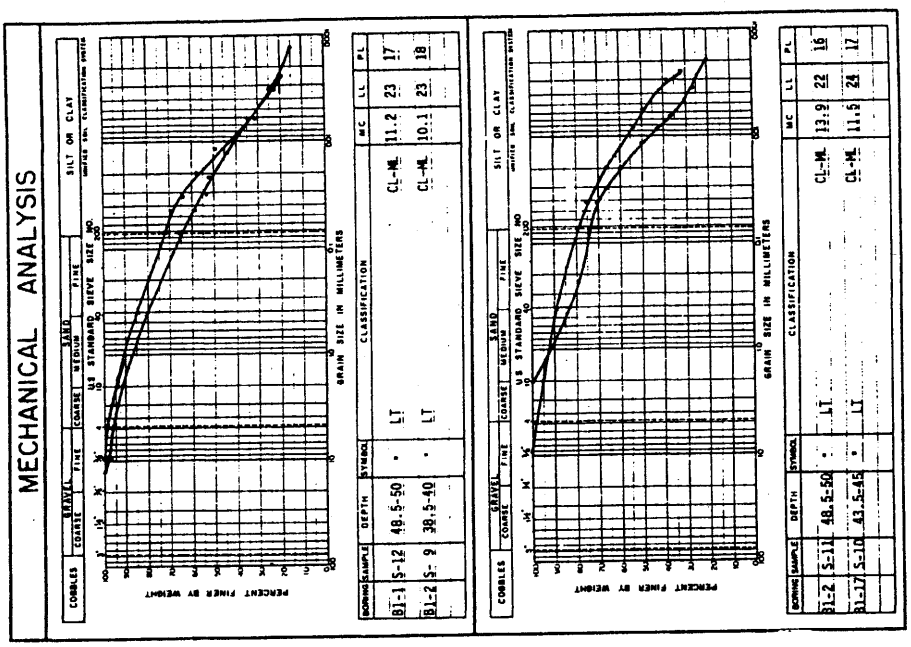
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Upper Till

Figure 2.5-116 (Sheet 5 of 5)



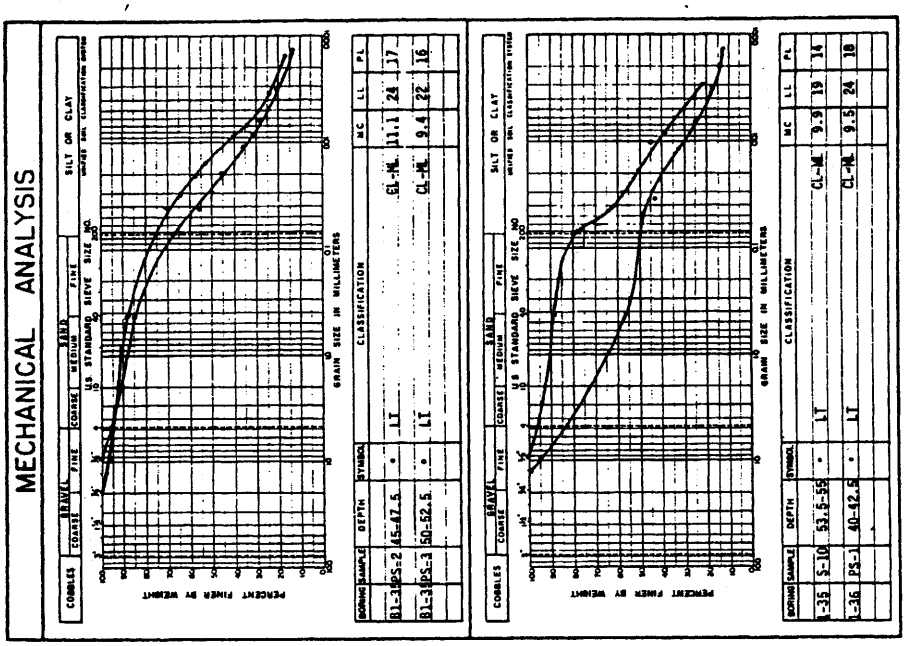


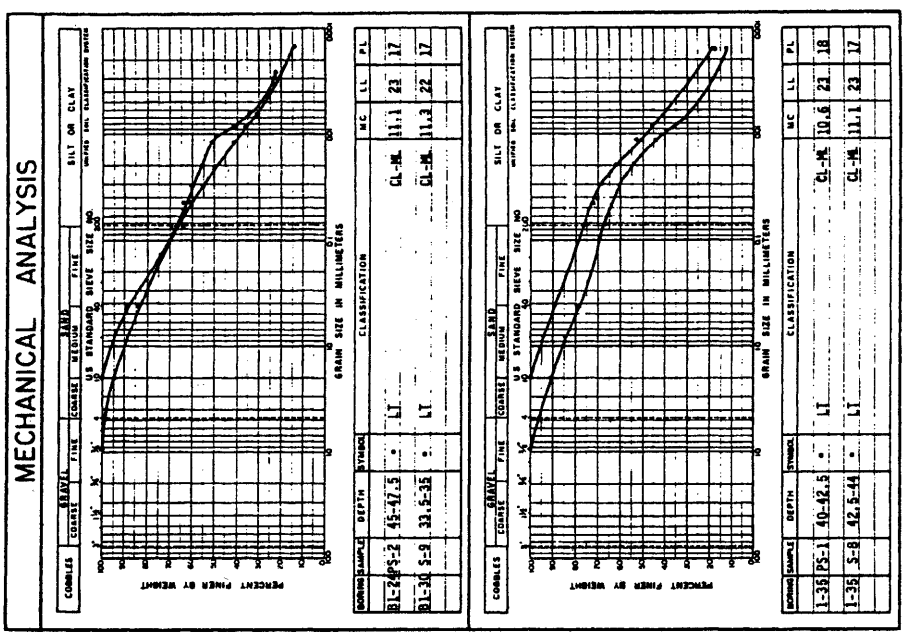
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves – Lower Till

Figure 2.5-117 (Sheet 1 of 6)



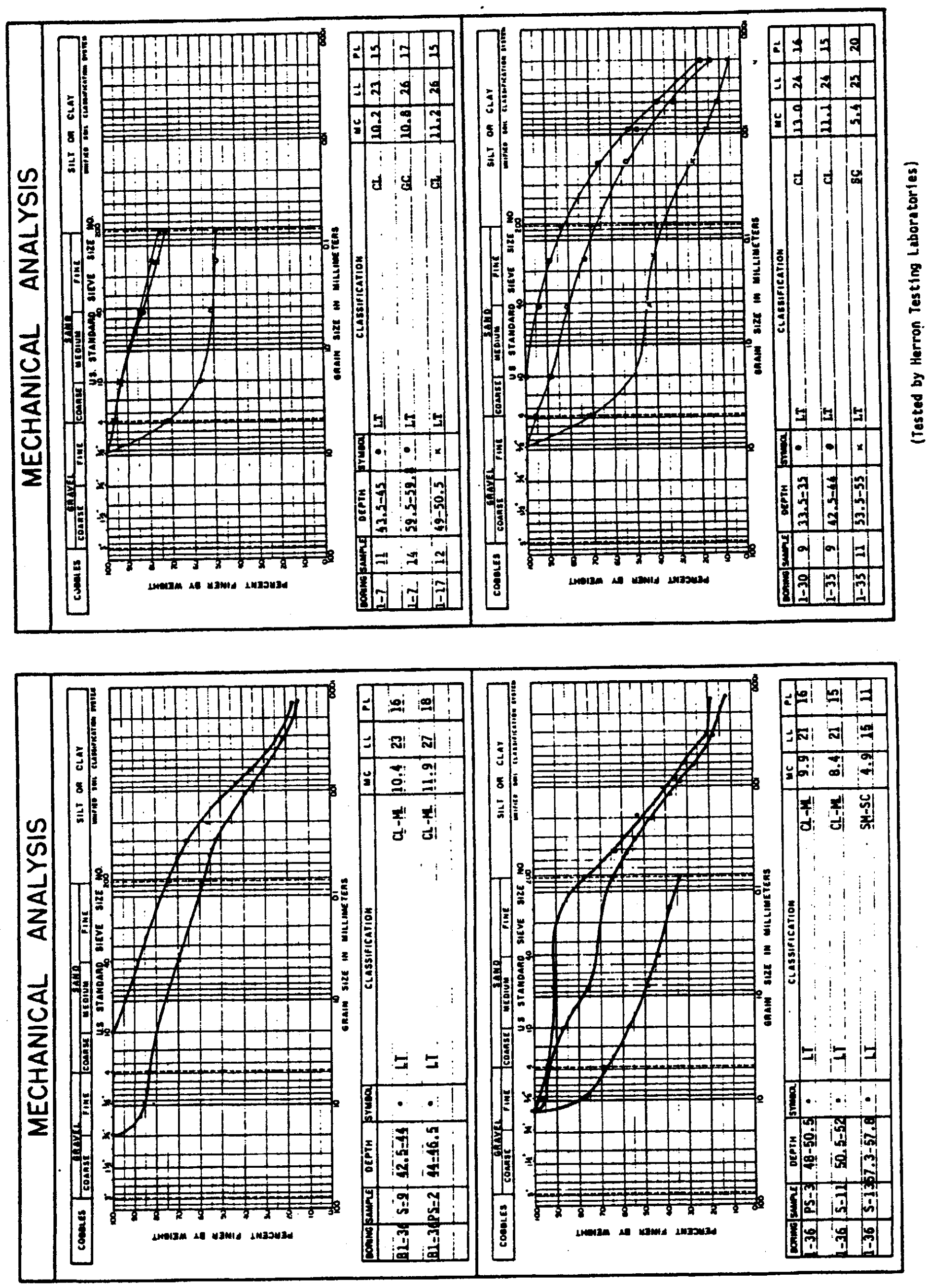


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lower Till

Figure 2.5-117 (Sheet 2 of 6)

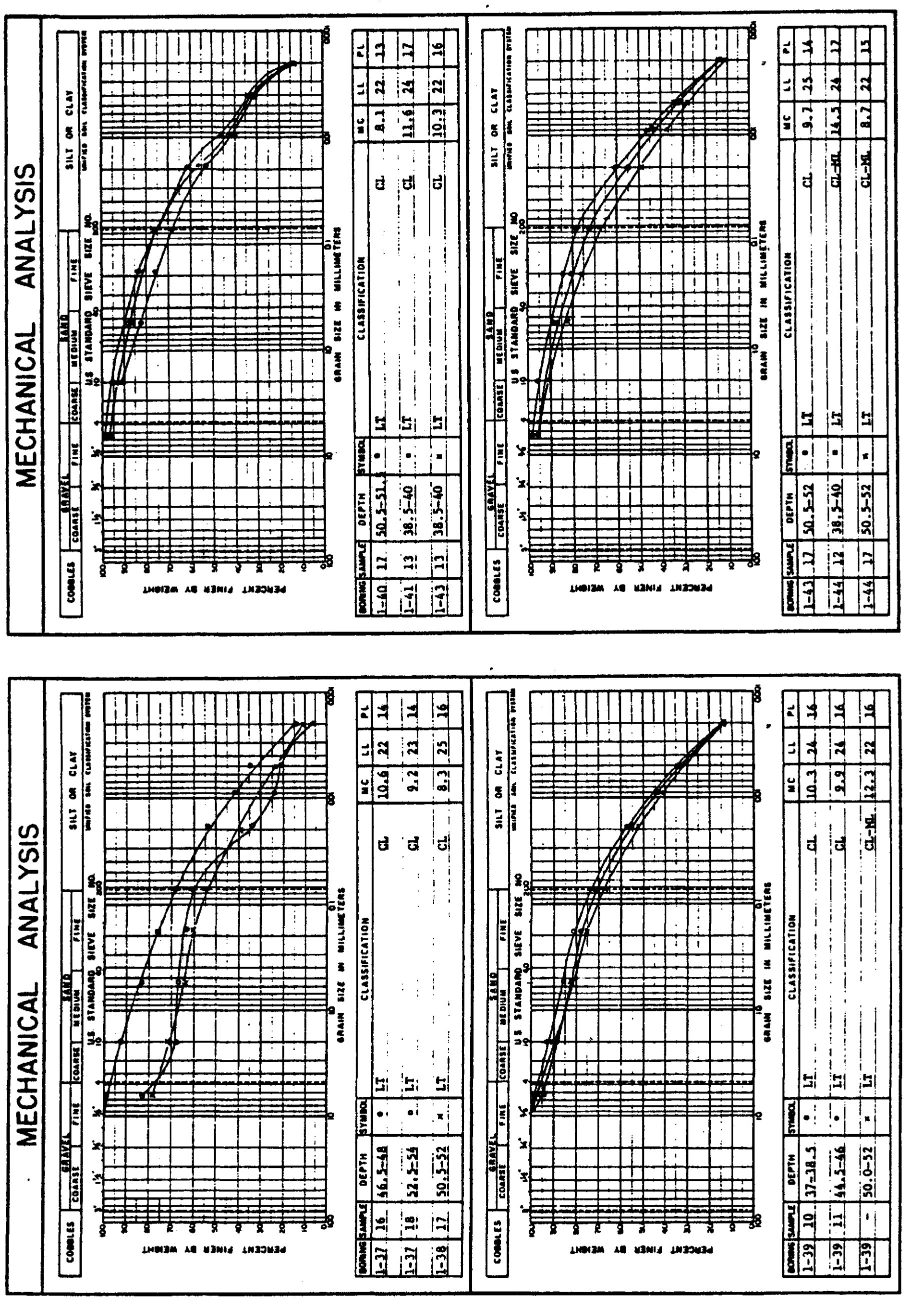


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lower Till

Figure 2.5-117 (Sheet 3 of 6)



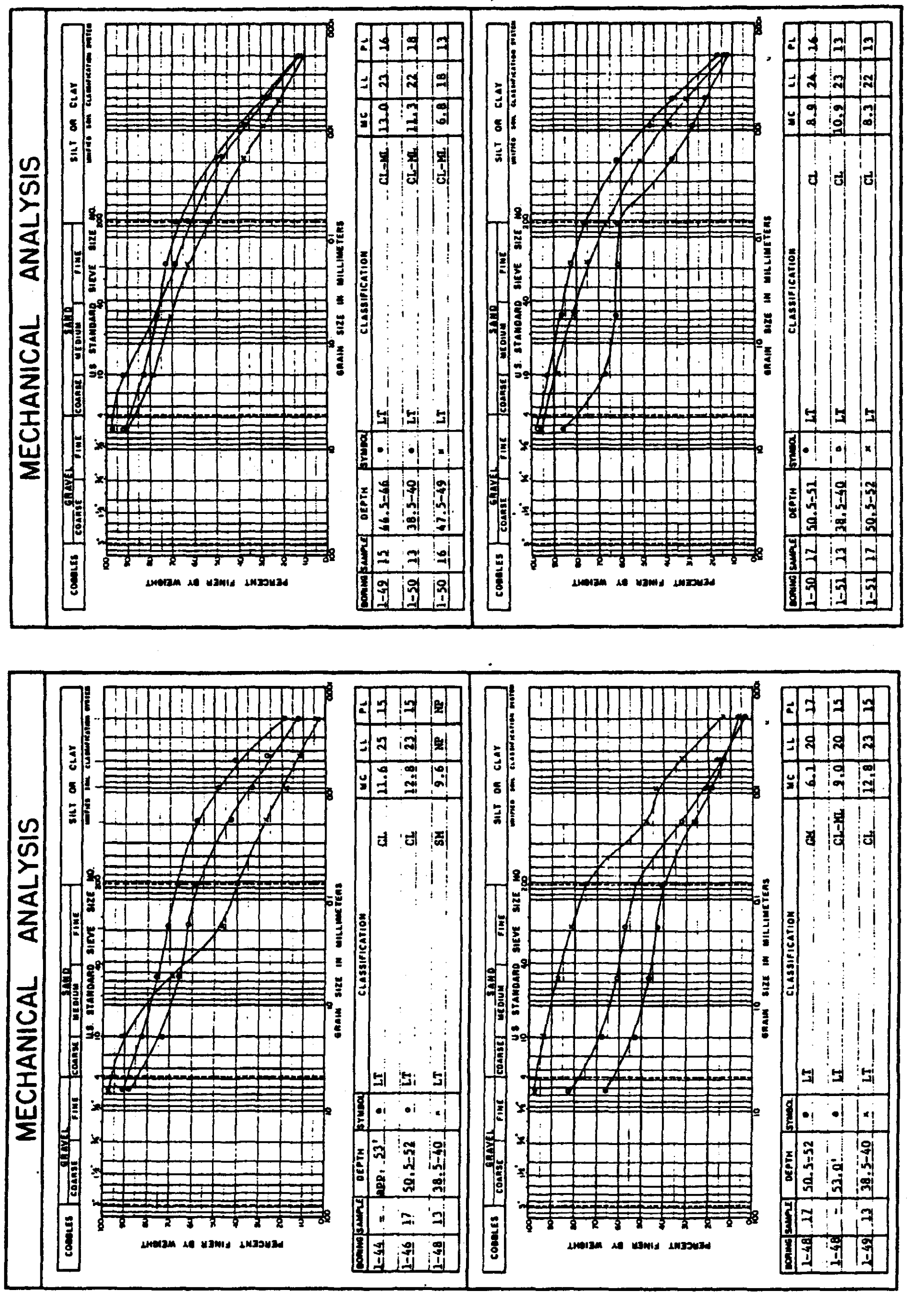
(Tested by Herron Testing Laboratories)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lower Till

Figure 2.5-117 (Sheet 4 of 6)



(Tested by Herron Testing Laboratories)

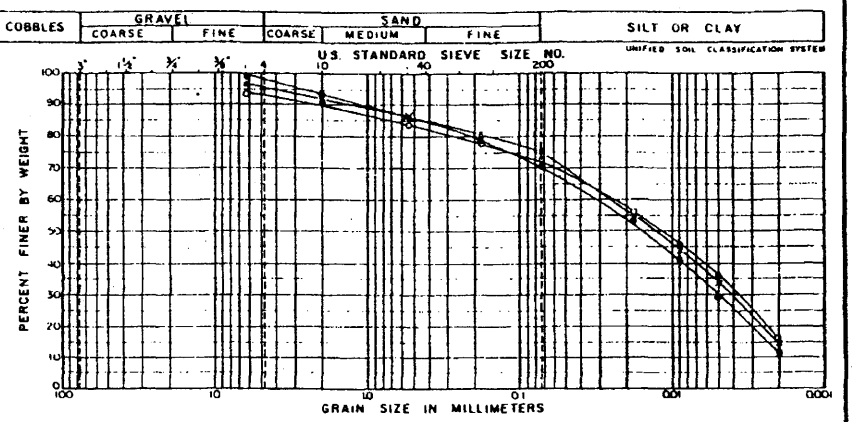
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

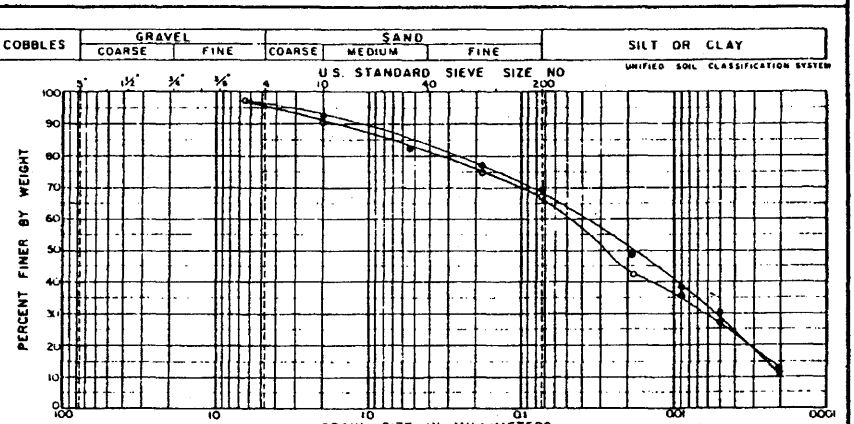
Grain Size Distribution Curves - Lower Till

Figure 2.5-117 (Sheet 5 of 6)

MECHANICAL ANALYSIS



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-52	13	38.5-40	•	LT CL	11.5	23	14
1-52	14	41.5-43	○	LT CL-ML	11.9	21	15
1-52	15	44.5-46	×	LT CL	10.9	24	16



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
1-52	16	47.5-49	○	LT CL	8.0	20	12
1-52	17	50.5-52	•	LT CL	8.3	22	13

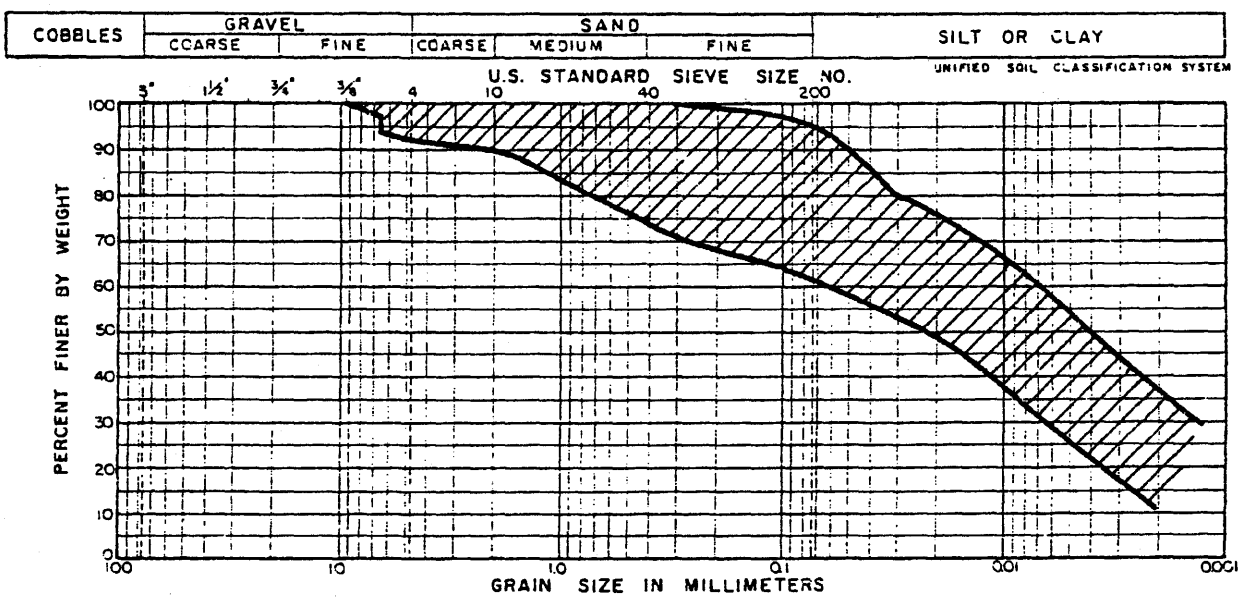
(Tested by Herron Testing Laboratories)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Lower Till

Figure 2.5-117 (Sheet 6 of 6)



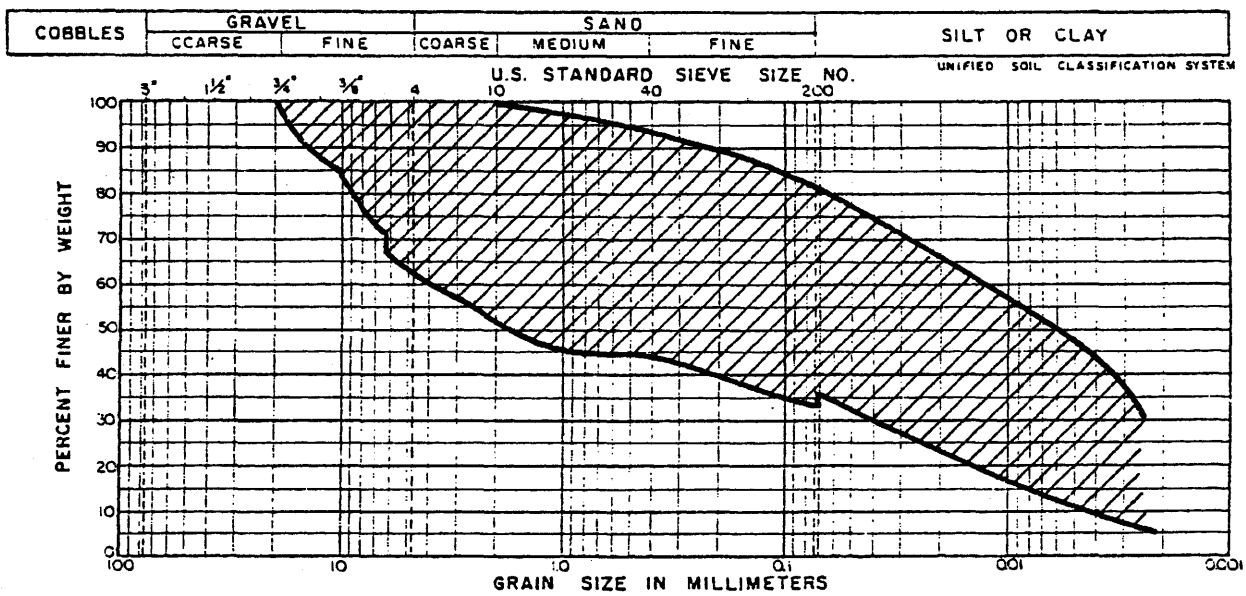
NOTE: RANGE REPRESENTS THE RESULTS OF 44 TESTS

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Range of Grain Size Distribution
Test Results for Upper Till

Figure 2.5-118



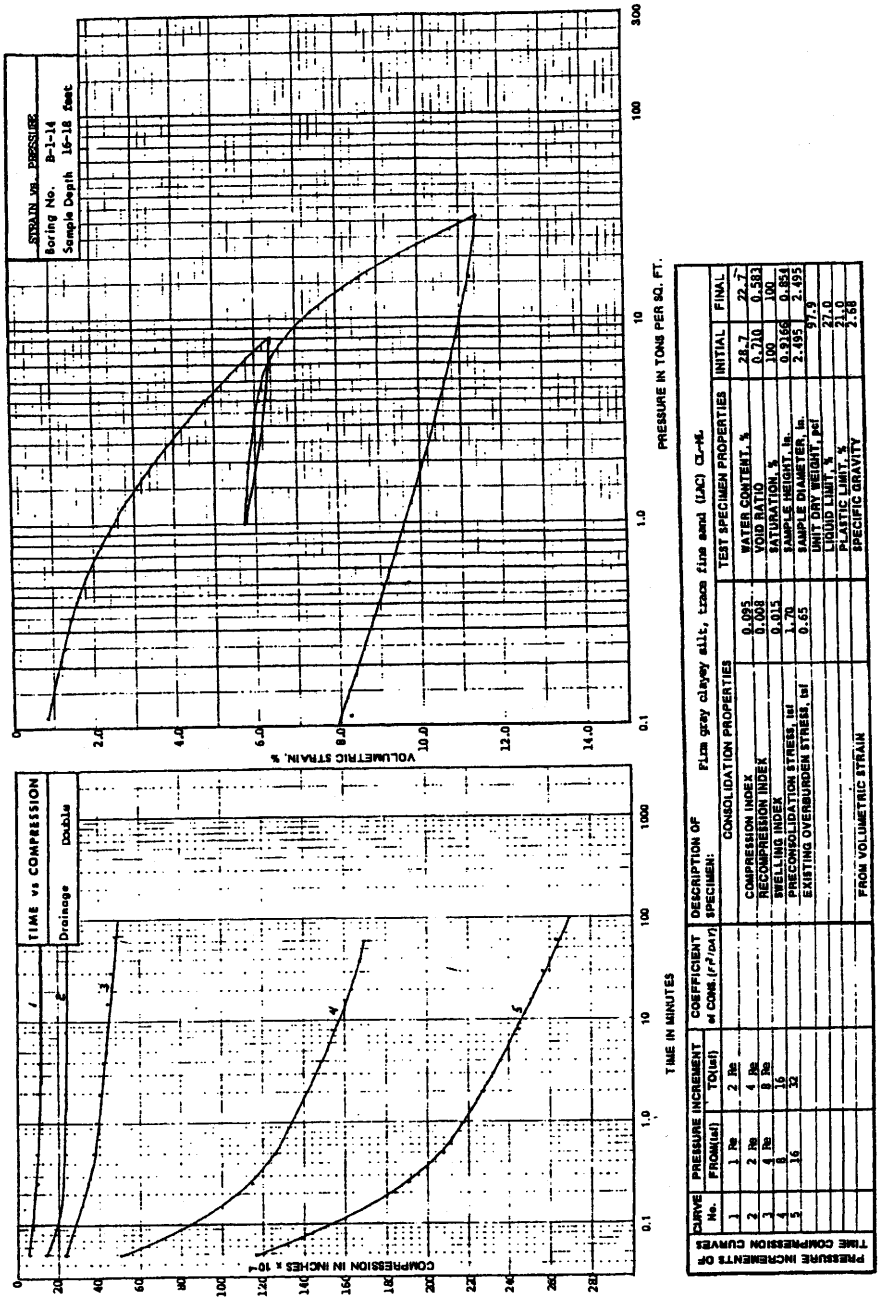
NOTE: RANGE REPRESENTS THE RESULTS OF 56 TESTS

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Range of Grain Size Distribution
Test Results for Lower Till

Figure 2.5-119

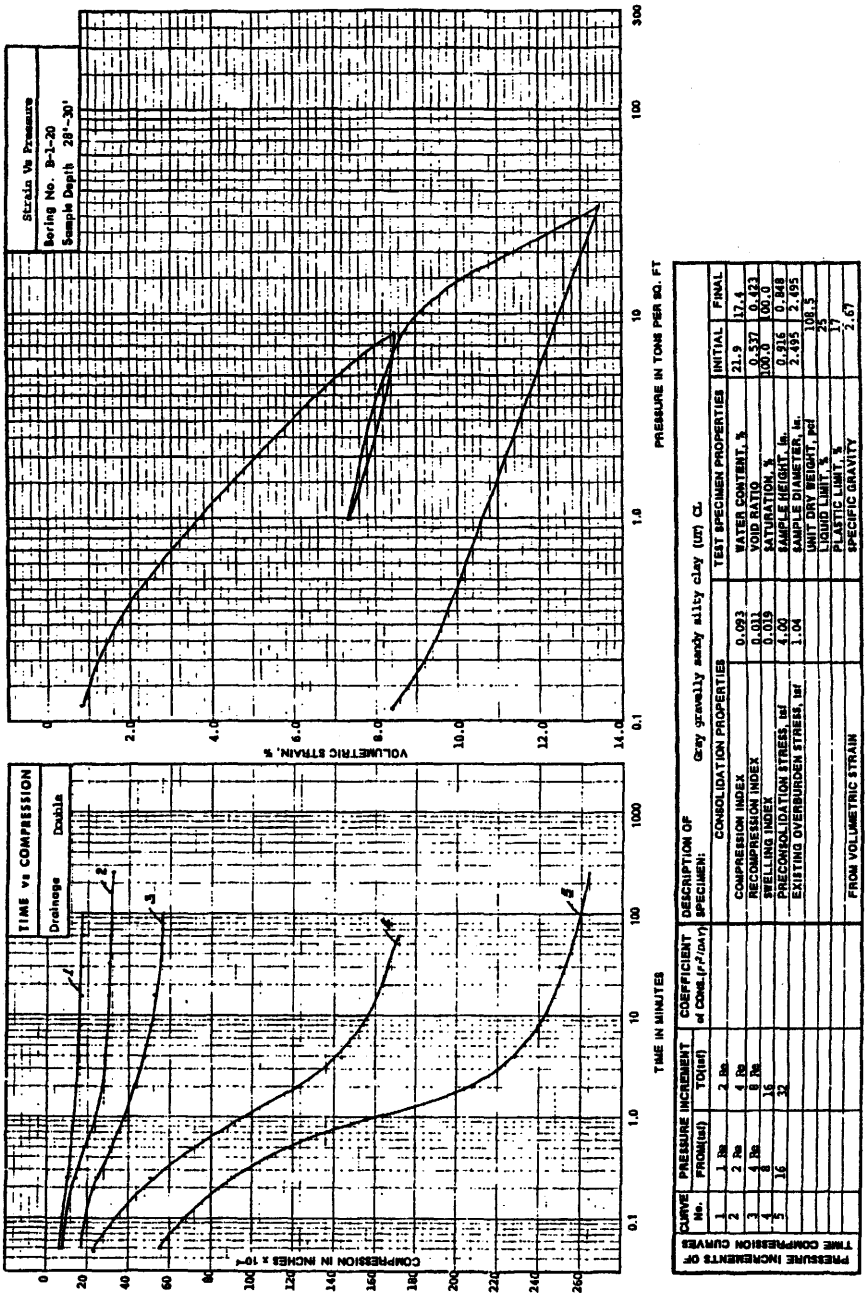


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Consolidation Test Curves - Lacustrine Sediments

Figure 2.5-120

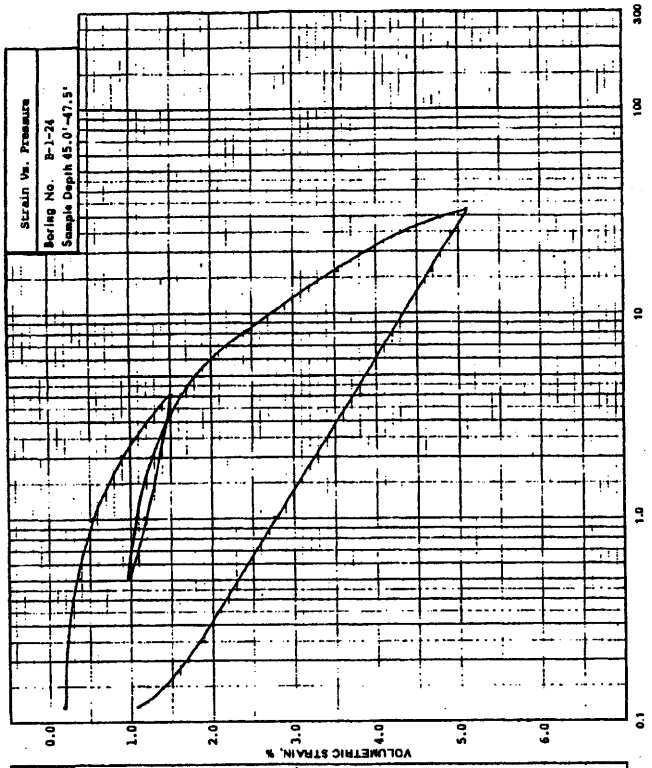


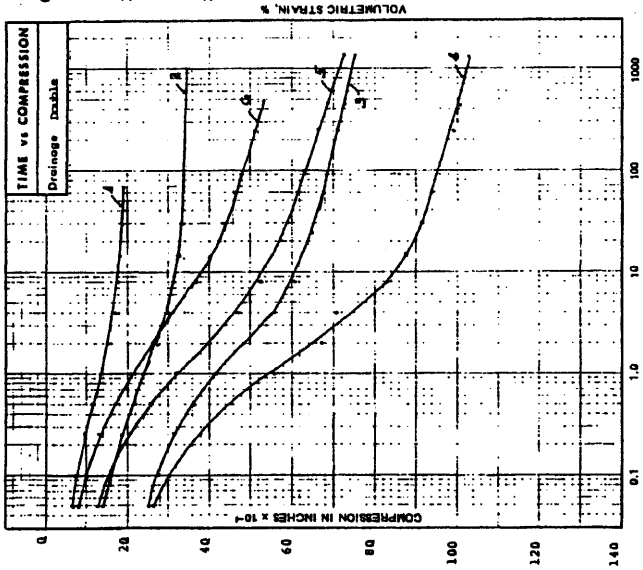
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Consolidation Test Curves - Upper Till

Figure 2.5-121





PRESSURE INCREMENTS OF TIME COMPRESSION CURVES

CURVE No.	PRESSURE INCREMENT FROM(tsf)	TO(tsf)	COEFFICIENT of CONS. (ft^2/Day)
1	1 Ra	2 Ra	
2	2 Ra	4 Ra	
3	4	8	
4	8	16	
5	16	24	
6	24	32	

DESCRIPTION OF SPECIMEN: Hard gray clayey silt, little sand and gravel (ML) CL-ML

CONSOLIDATION PROPERTIES	
COMPRESSION INDEX	0.051
RECOMPRESSION INDEX	0.006
SWELLING INDEX	0.016
PRECONSOLIDATION STRESS, tsf	6.00
EXISTING OVERBURDEN STRESS, tsf	1.60
FROM VOLUMETRIC STRAIN	

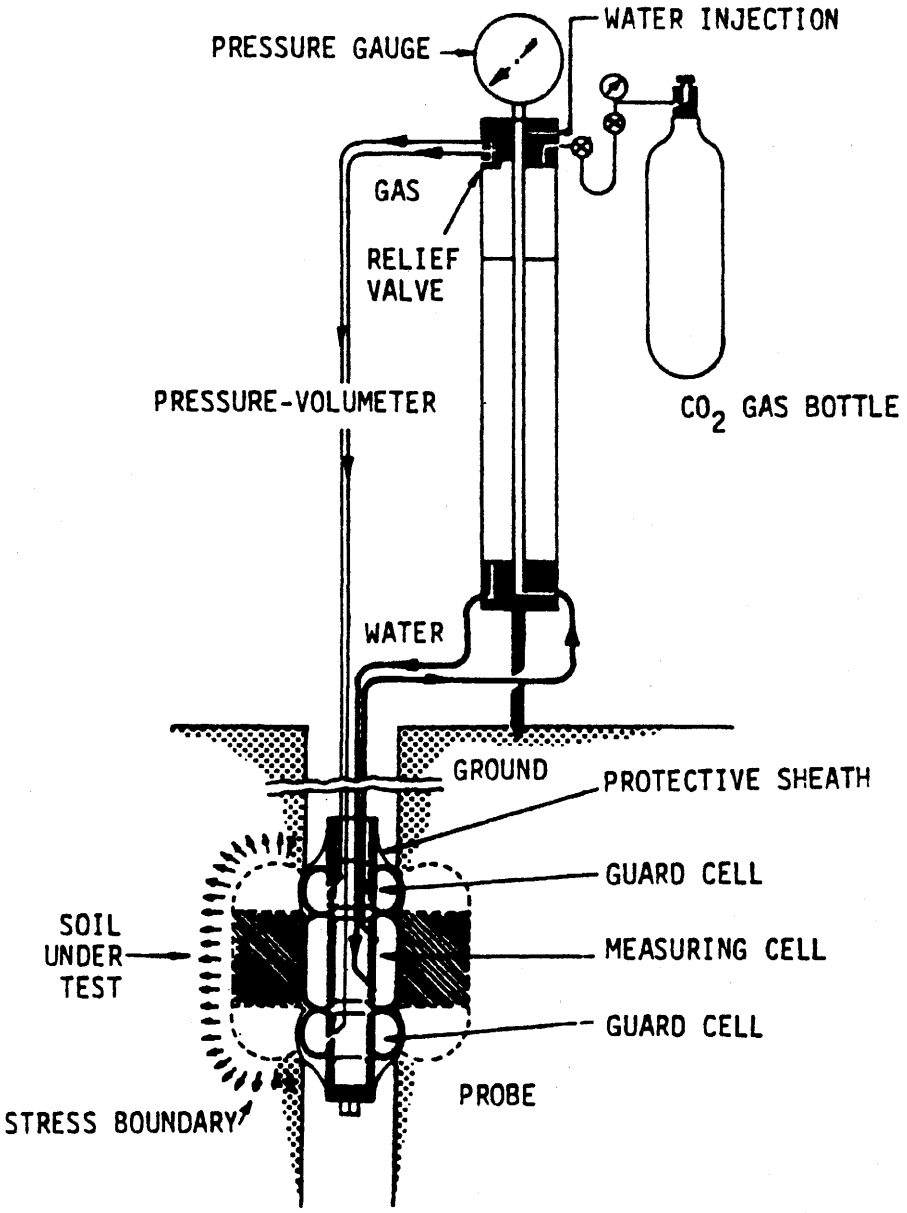
TEST SPECIMEN PROPERTIES	INITIAL	FINAL
WATER CONTENT, %	10.7	11.5
VOID RATIO	0.307	0.301
SATURATION, %	95.5	100.0
SAMPLE HEIGHT, in.	0.941	0.937
SAMPLE DIAMETER, in.	2.495	2.495
UNIT DRY WEIGHT, pcf	130.8	
LIQUID LIMIT, %	23	
PLASTIC LIMIT, %	17	
SPECIFIC GRAVITY	2.74	

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Consolidation Test Curves - Lower Till

Figure 2.5-122

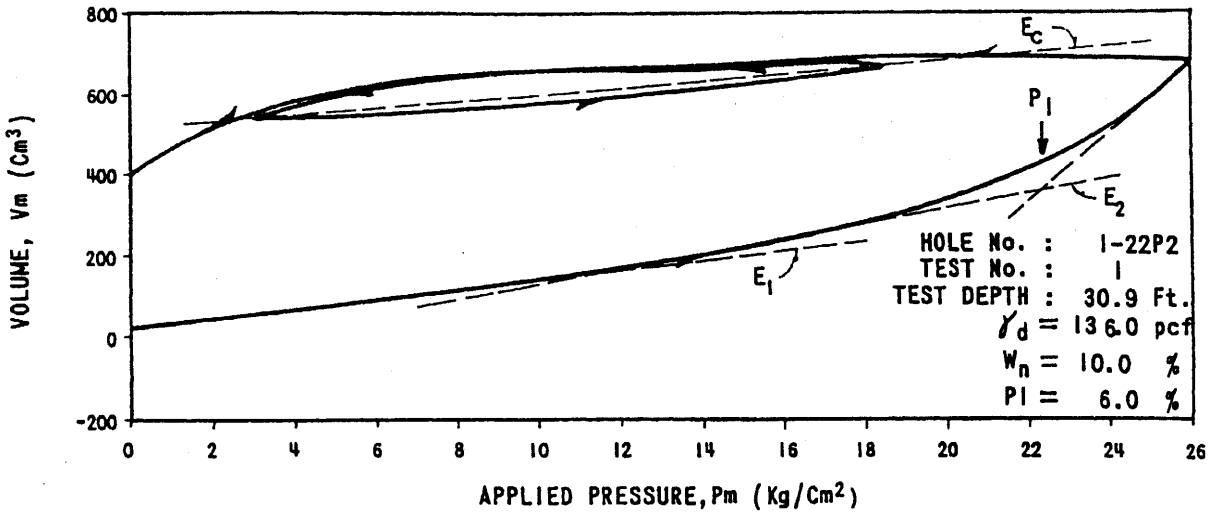


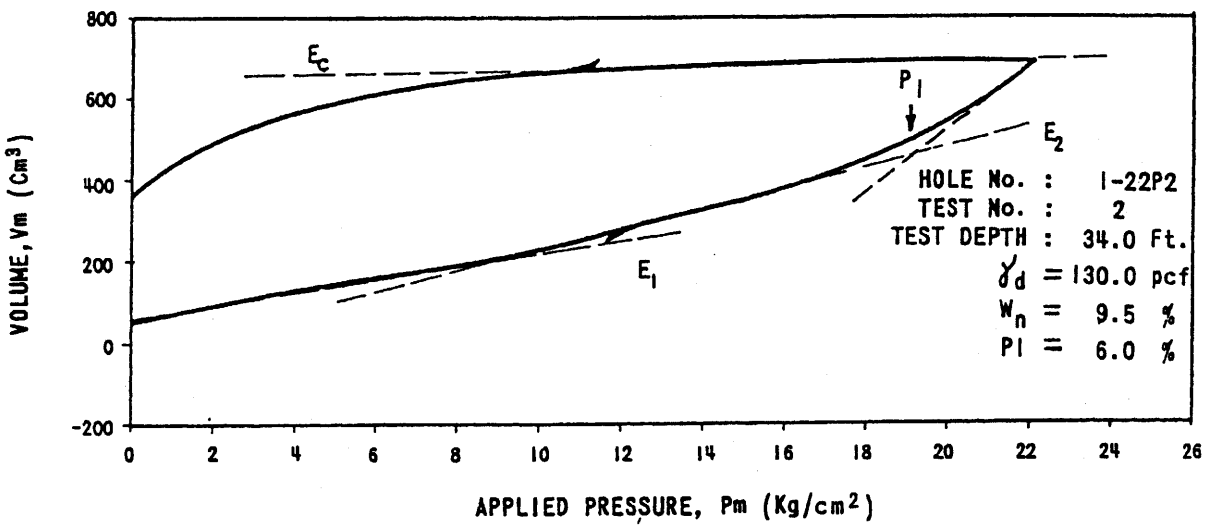
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Schematic Representation of Pressuremeter

Figure 2.5-123



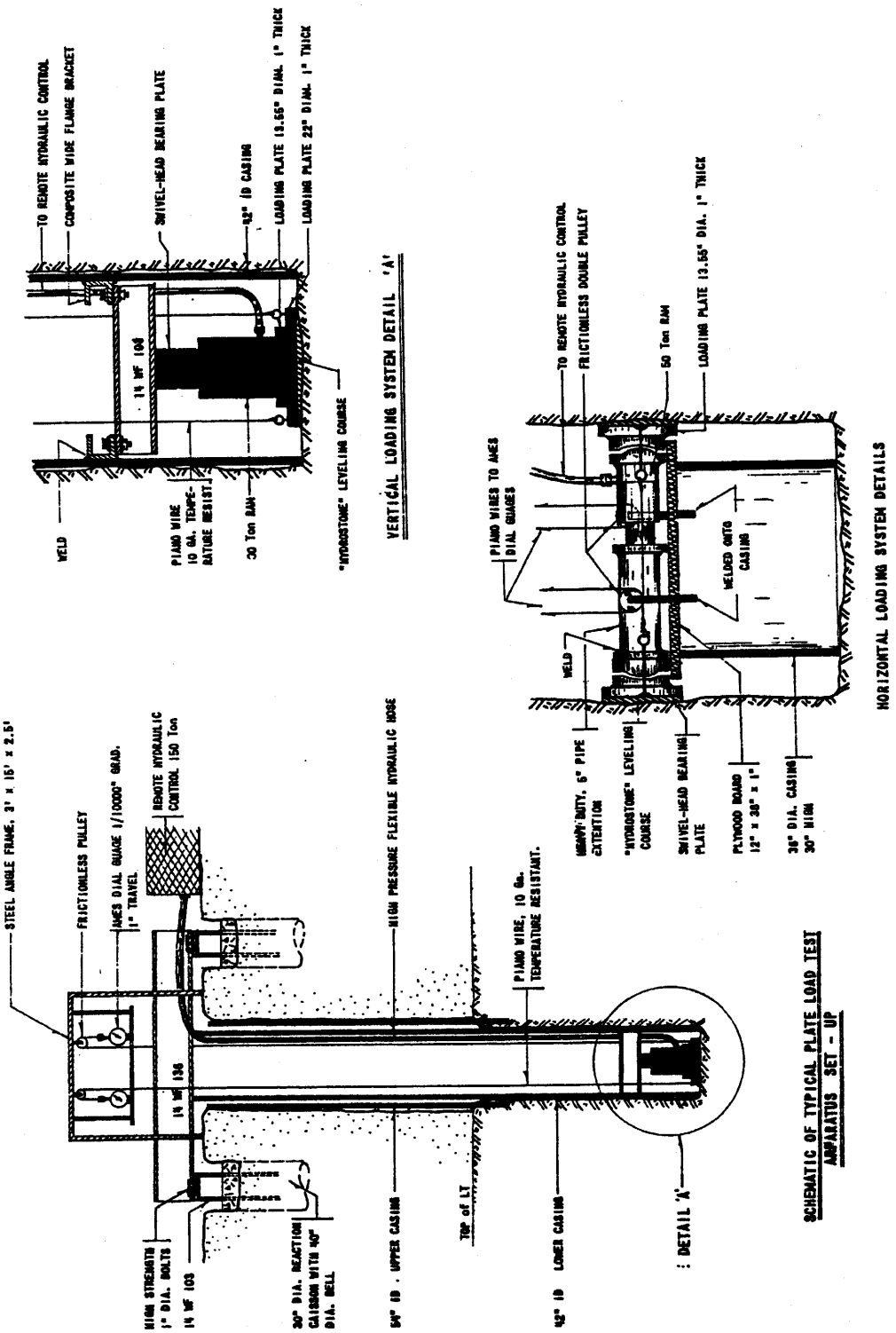


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Pressuremeter Test
Curves - Lower Till

Figure 2.5-124

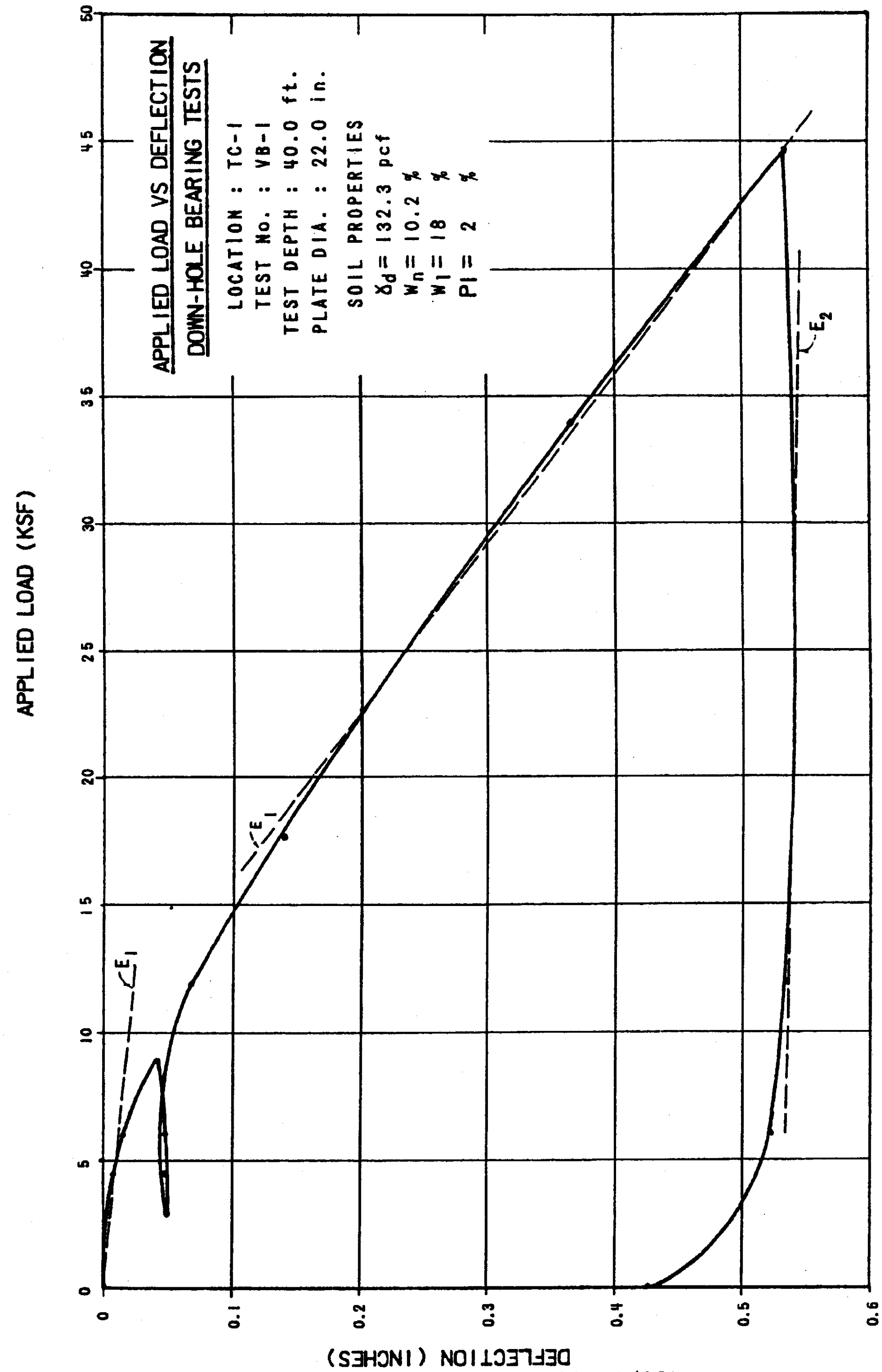


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Plate Loading Test Configuration

Figure 2.5-125

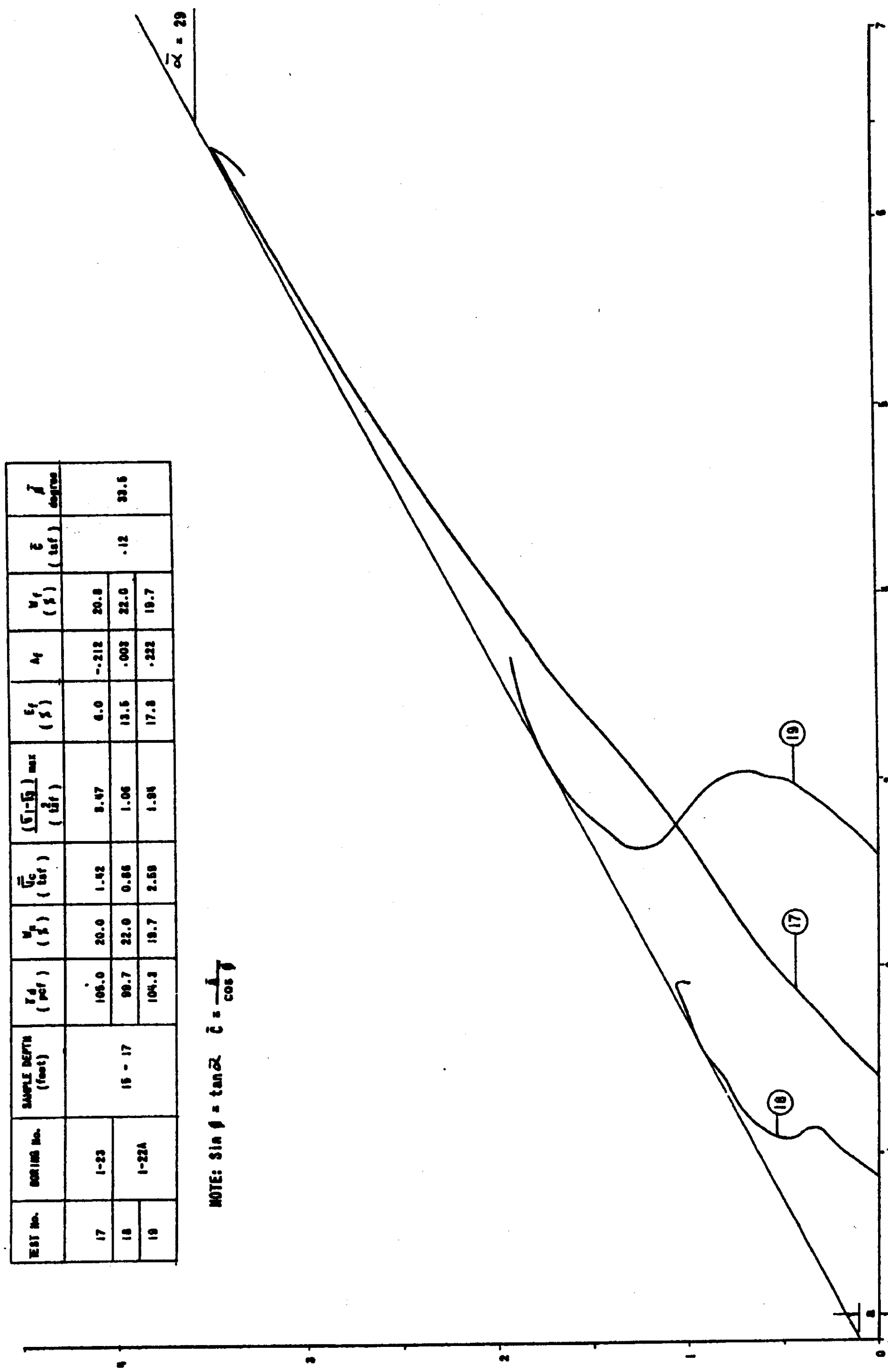


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Plate Loading Test Curve - Lower Till

Figure 2.5-126



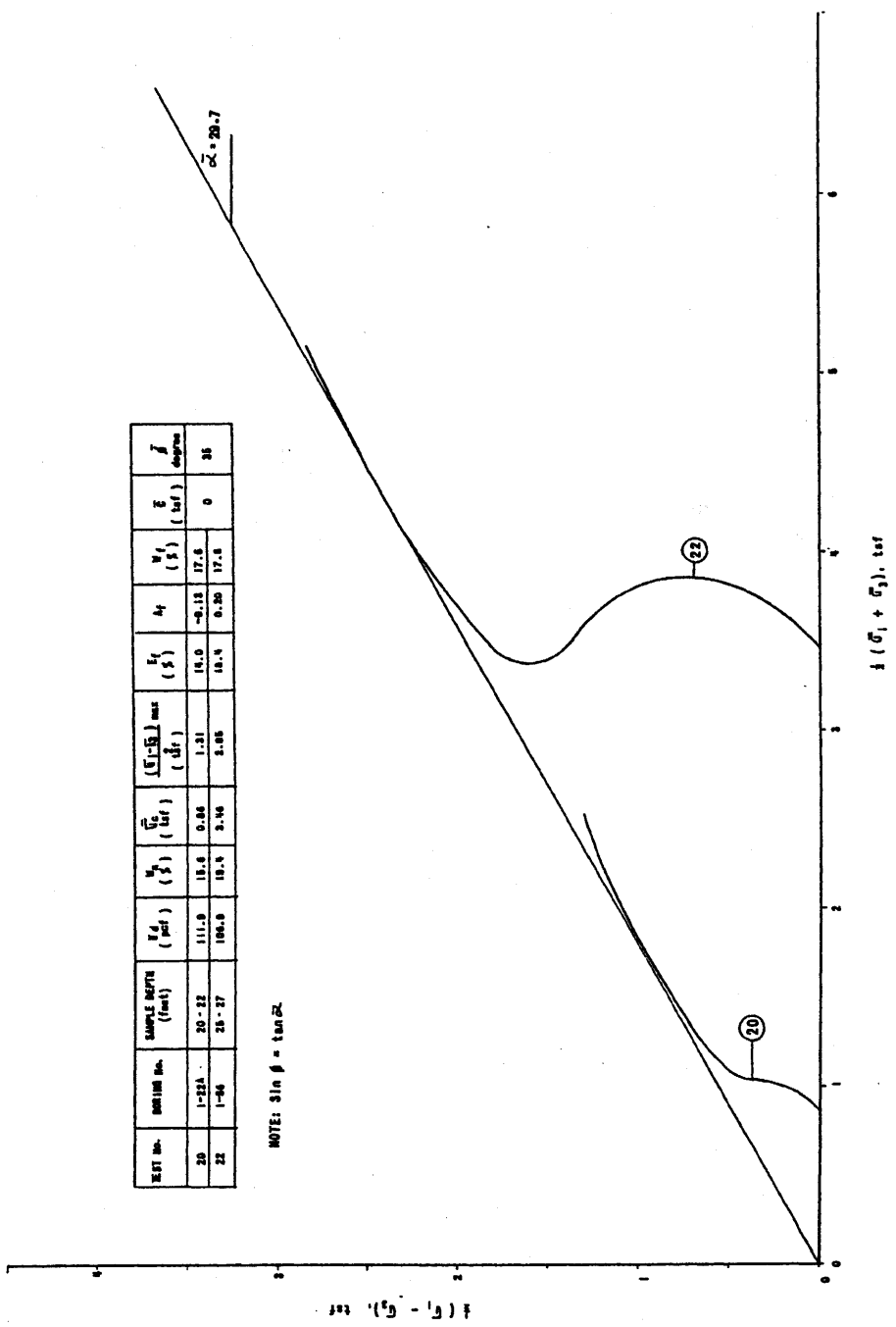
TEST No.	BORING No.	SAMPLE DEPTH (feet)	γ_d (pcf)	W_o (%)	$\bar{\sigma}_c$ (tsf)	$\frac{(\bar{\sigma}_1-\bar{\sigma}_3)}{2}$ max (tsf)	E_f (%)	A_f	W_f (%)	$\bar{c}$ (tsf)	$\bar{\phi}$ degree
17	1-23	15 - 17	105.0	20.0	1.42	3.47	6.0	-.212	20.8	.12	33.5
18	1-22A		99.7	22.0	0.86	1.06	13.5	.003	22.0		
19			104.3	19.7	2.58	1.94	17.8	.222	19.7		

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Effective Stress Paths - Lacustrine Sediments

Figure 2.5-127



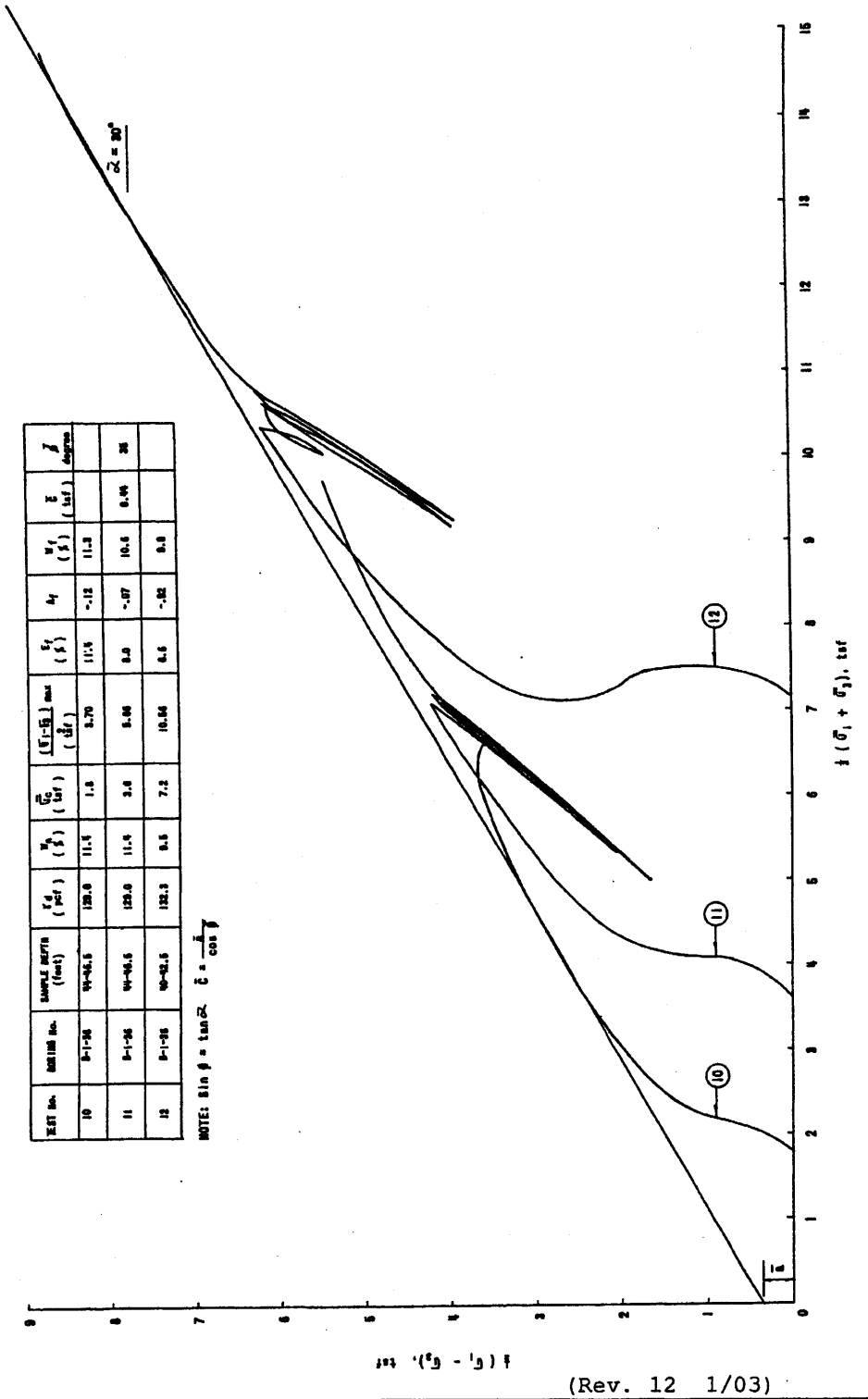
TEST No.	BORING No.	SAMPLE DEPTH (feet)	K_d (pcf)	W_c (%)	$\bar{c}_{cu}$ (ksf)	$(\sigma_1-\sigma_3)_{max}$ (ksf)	E_i (%)	A_f	W_f (%)	$\bar{c}$ (ksf)	$\bar{\phi}$ degrees
20	1-224	20 - 22	111.9	15.6	0.86	1.31	16.0	-0.15	17.6	0	35
22	1-86	25 - 27	106.6	15.4	2.16	2.85	15.9	0.20	17.8		

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Effective Stress Paths - Upper Till

Figure 2.5-128



TEST No.	BORING No.	SAMPLE DEPTH (feet)	γ_d (pcf)	w_n (%)	$\frac{c}{\cos\phi}$ (tsf)	$(\sigma_1-\sigma_3)_{max}$ (tsf)	ϵ_f (%)	A_f	w_f (%)	E (tsf)	ϕ degrees
10	B-1-96	94-96.5	128.8	11.4	1.8	5.70	11.5	-.12	11.3		
11	B-1-96	94-96.5	128.8	11.4	3.6	8.98	8.0	-.07	10.6	8.96	35
12	B-1-96	90-92.5	132.3	8.5	7.2	16.84	6.5	-.02	8.8		

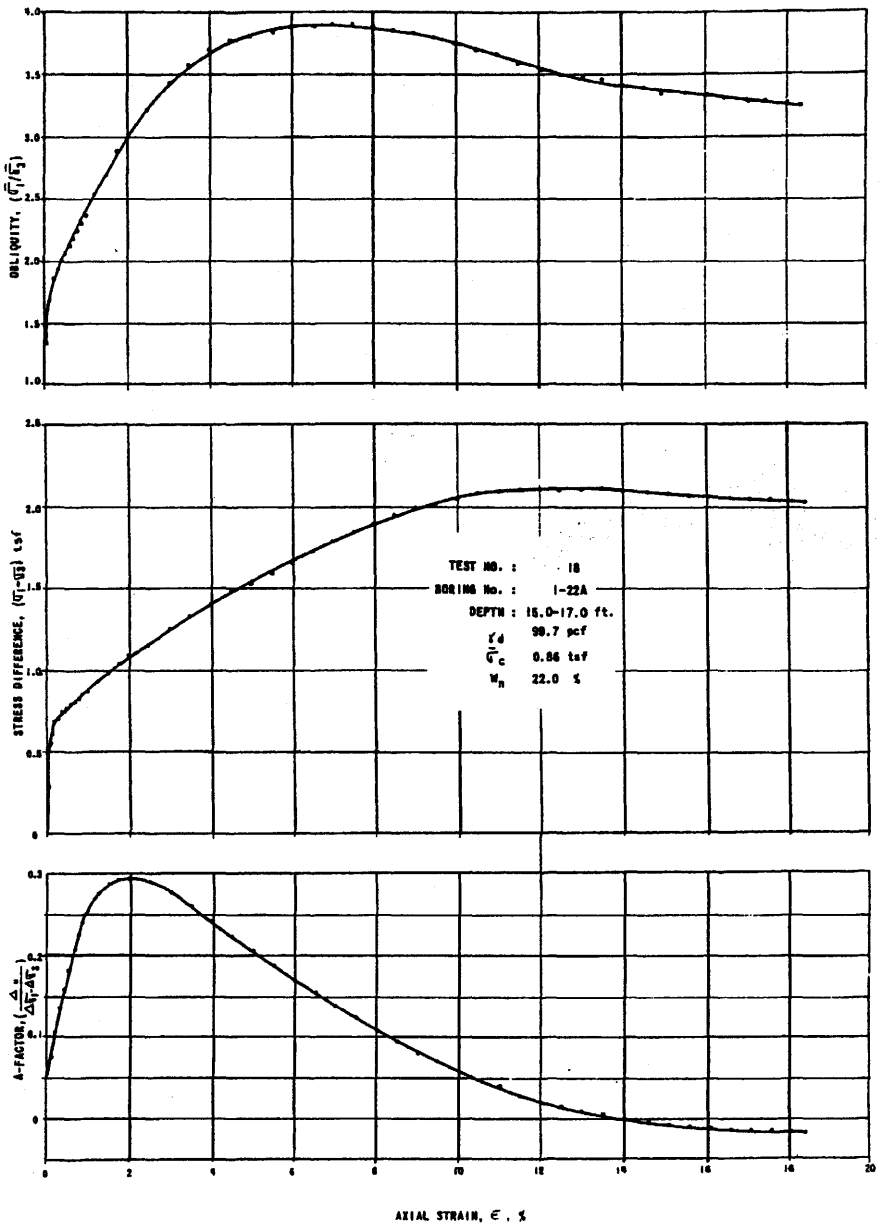
NOTE: $\sin\phi = \tan\alpha$ $\frac{c}{\cos\phi}$

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Effective Stress Paths - Lower Till

Figure 2.5-129

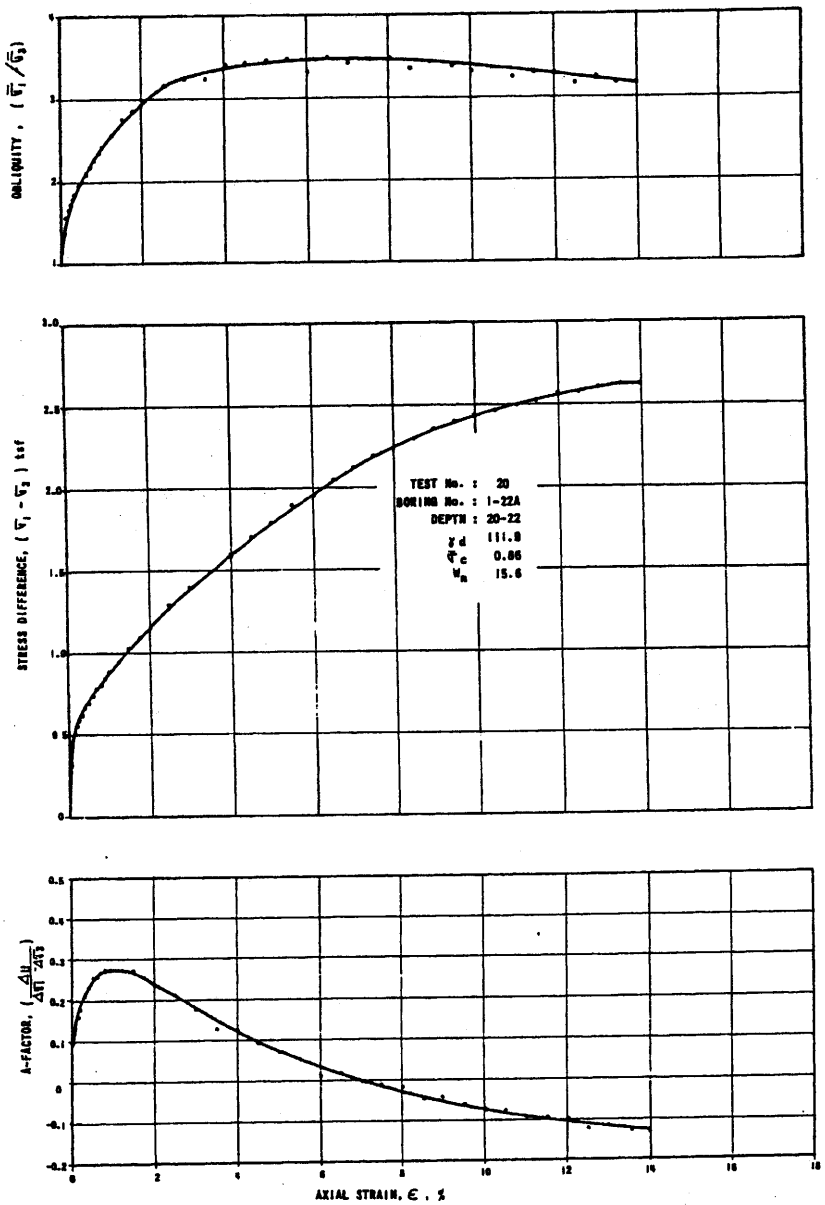


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Effective Stress - Strength Characteristics of Lacustrine Sediments

Figure 2.5-130

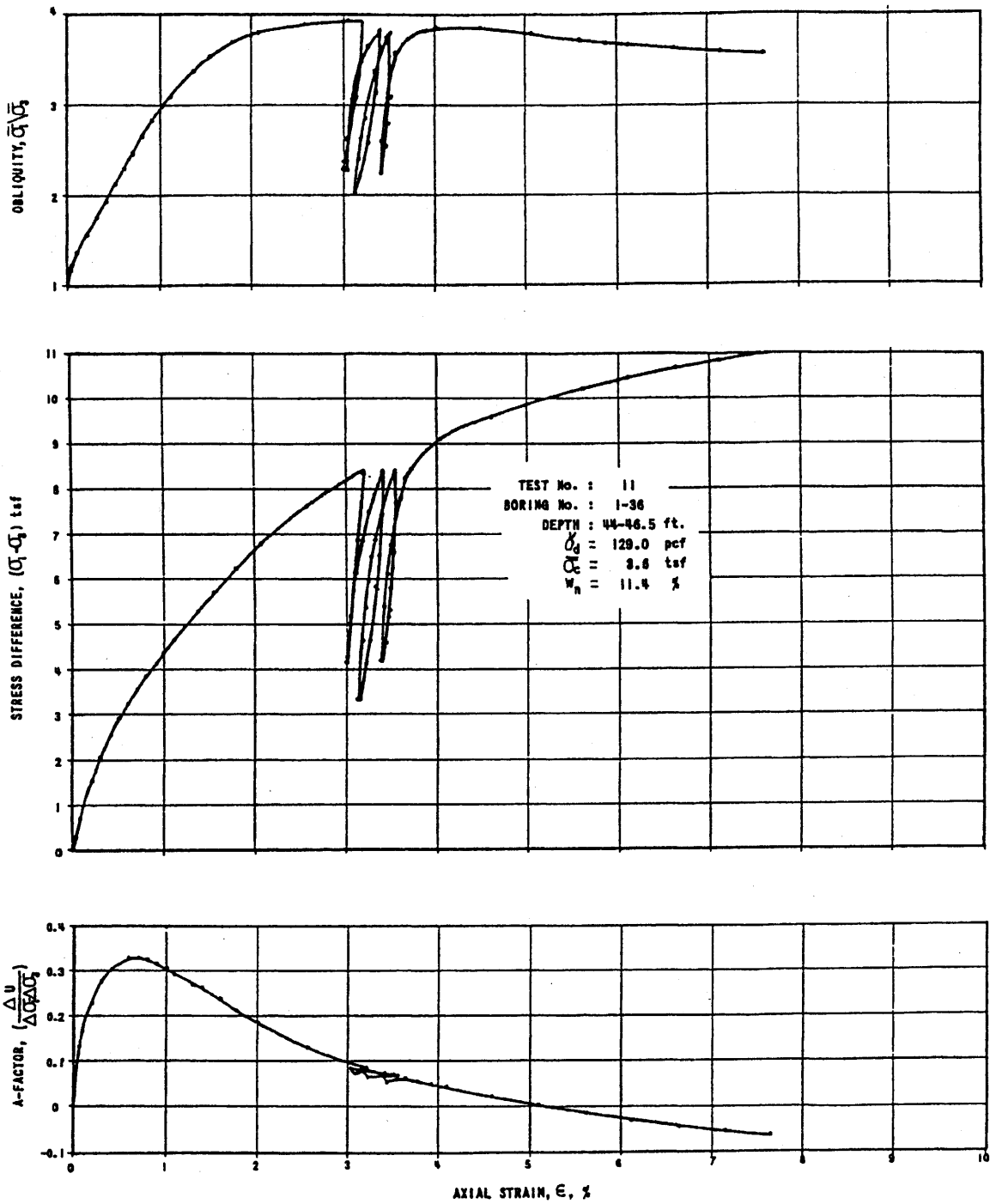


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Effective Stress - Strength Characteristecs of Lower Till

Figure 2.5-131

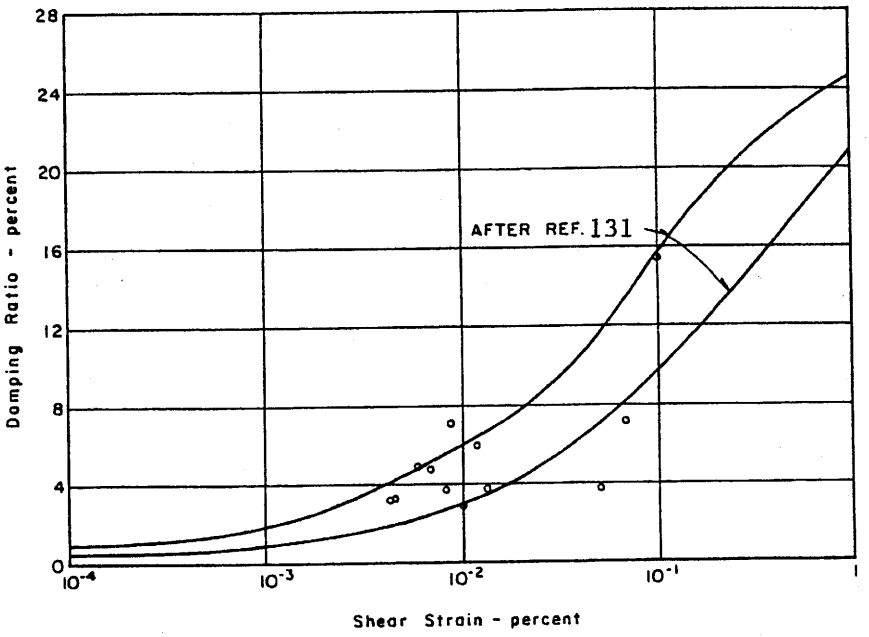


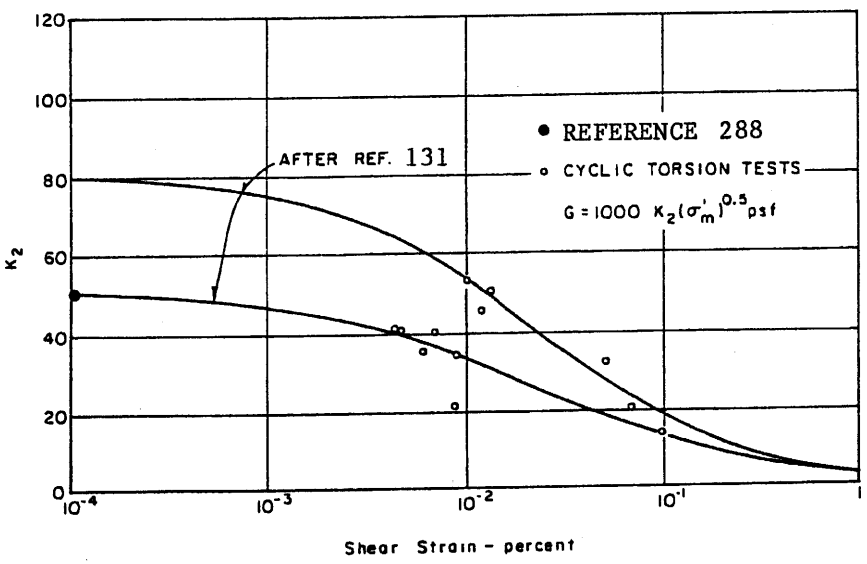
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Effective Stress - Strength Characteristics of Upper Till

Figure 2.5-132



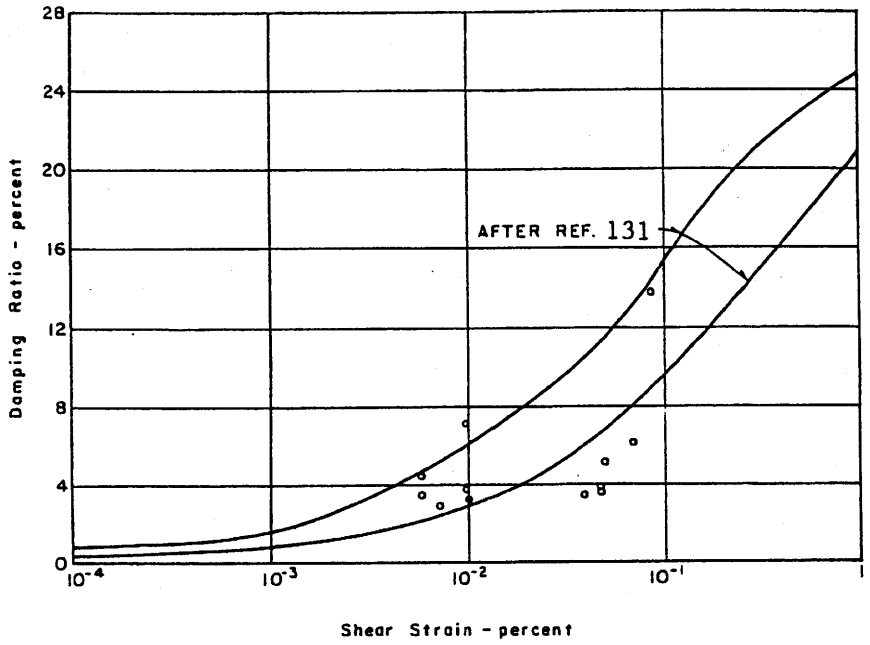


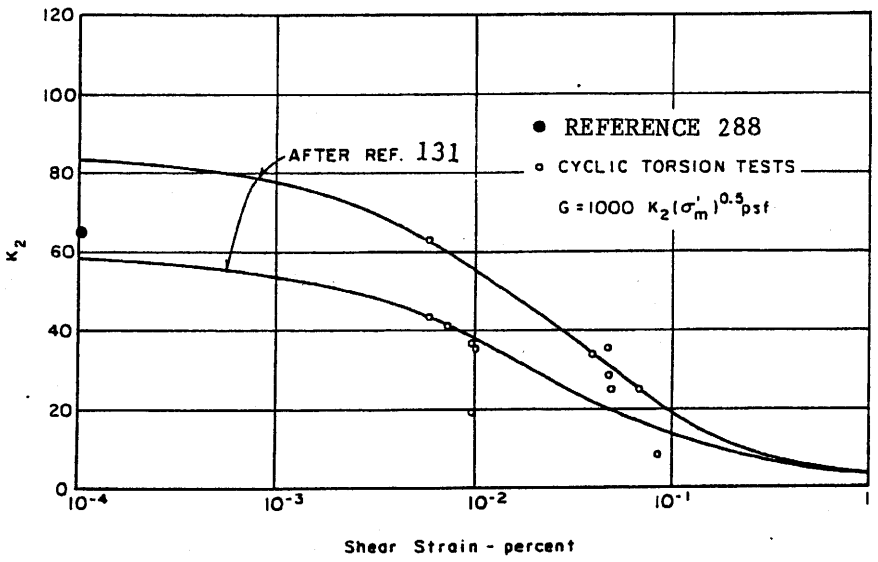
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Dynamic Properties of
Lacustrine Sediments

Figure 2.5-133



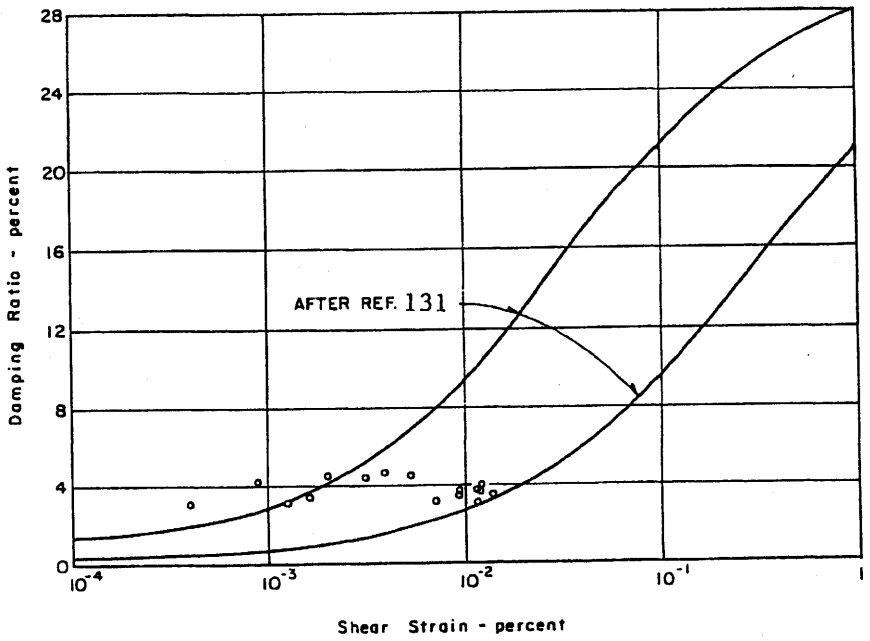


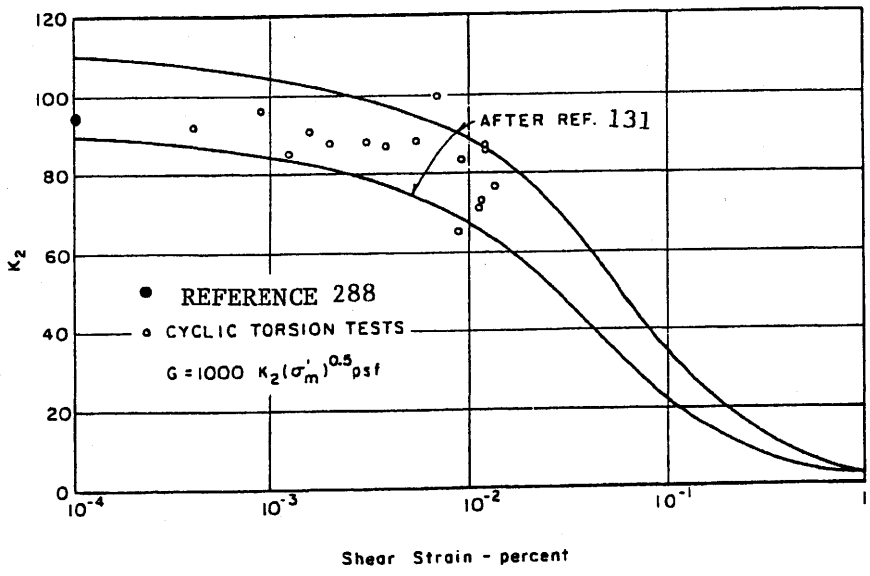
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Dynamic Properties of Upper Till

Figure 2.5-134





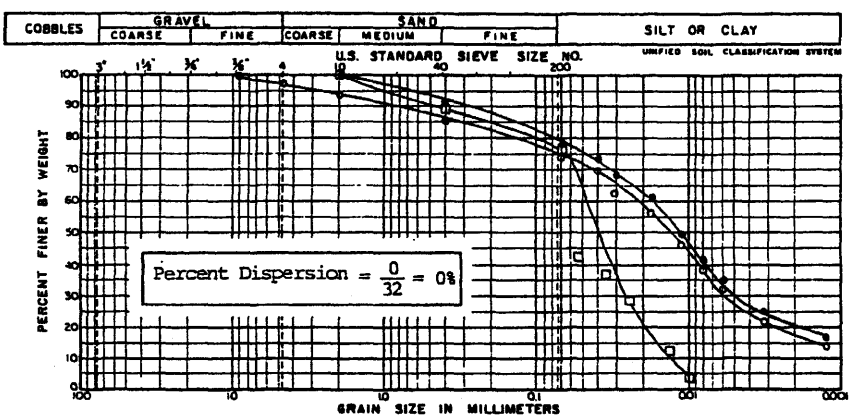
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

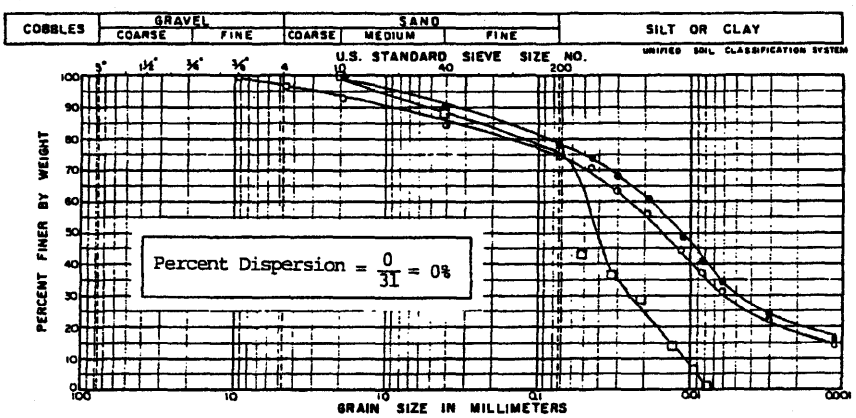
Dynamic Properties of Lower Till

Figure 2.5-135

MECHANICAL ANALYSIS



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
	S-1		○	Standard Grain Size Distribution - Entire Sample	10.0	21	14
	S-1		●	Standard Grain Size Distribution - Minus No. 10			
	S-1		□	Grain Size Distribution - Minus No. 10 without Deflocculation			



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
	S-2		○	Standard Grain Size Distribution - Entire Sample	9.9	20	15
	S-2		●	Standard Grain Size Distribution - Minus No. 10			
	S-2		□	Grain Size Distribution - Minus No. 10 without Deflocculation			

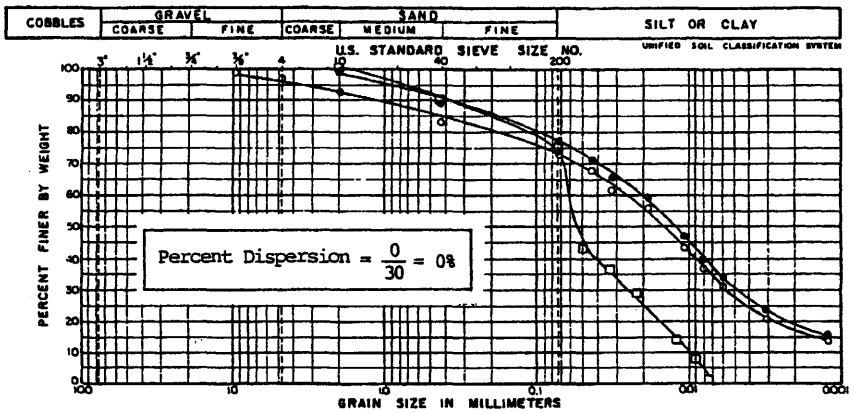
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

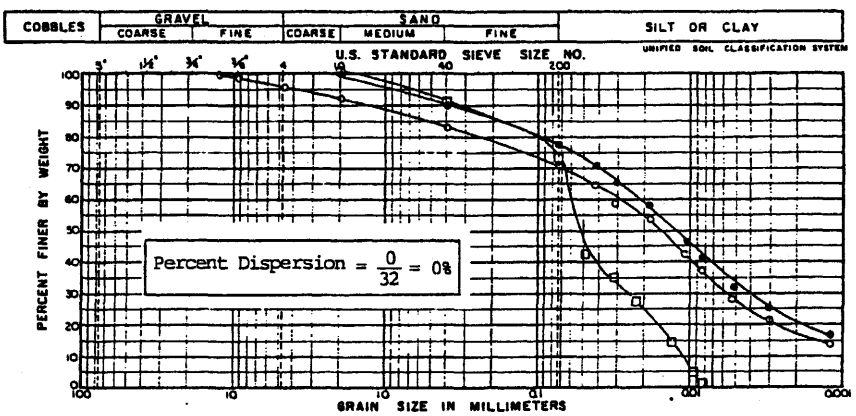
Soil Conservation Service
Tests on Lower Till

Figure 2.5-136 (Sheet 1 of 3)

MECHANICAL ANALYSIS



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
	S-3		○	Standard Grain Size Distribution - Entire Sample	10.2	21	15
	S-3		●	Standard Grain Size Distribution - Minus No. 10			
	S-3		□	Grain Size Distribution - Minus No. 10 without Deflocculation			



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
	S-4		○	Standard Grain Size Distribution - Entire Sample	10.1	20	16
	S-4		●	Standard Grain Size Distribution - Minus No. 10			
	S-4		□	Grain Size Distribution - Minus No. 10 without Deflocculation			

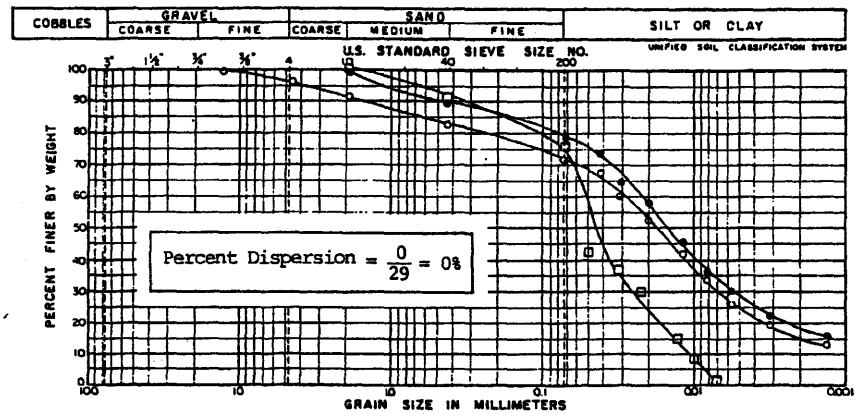
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

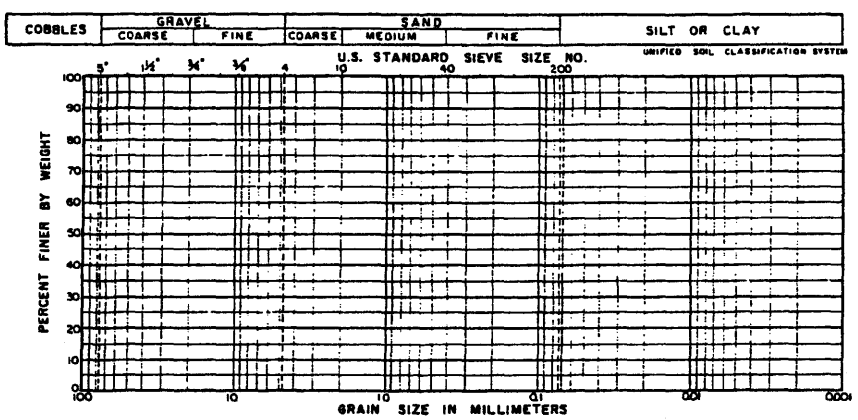
Soil Conservation Service
Tests on Lower Till

Figure 2.5-136 (Sheet 2 of 3)

MECHANICAL ANALYSIS



BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL
	S-5		○	Standard Grain Size Distribution - Entire Sample	9.8	20	17
	S-5		●	Standard Grain Size Distribution - Minus No. 10			
	S-5		□	Grain Size Distribution - Minus No. 10 without Deflocculation			



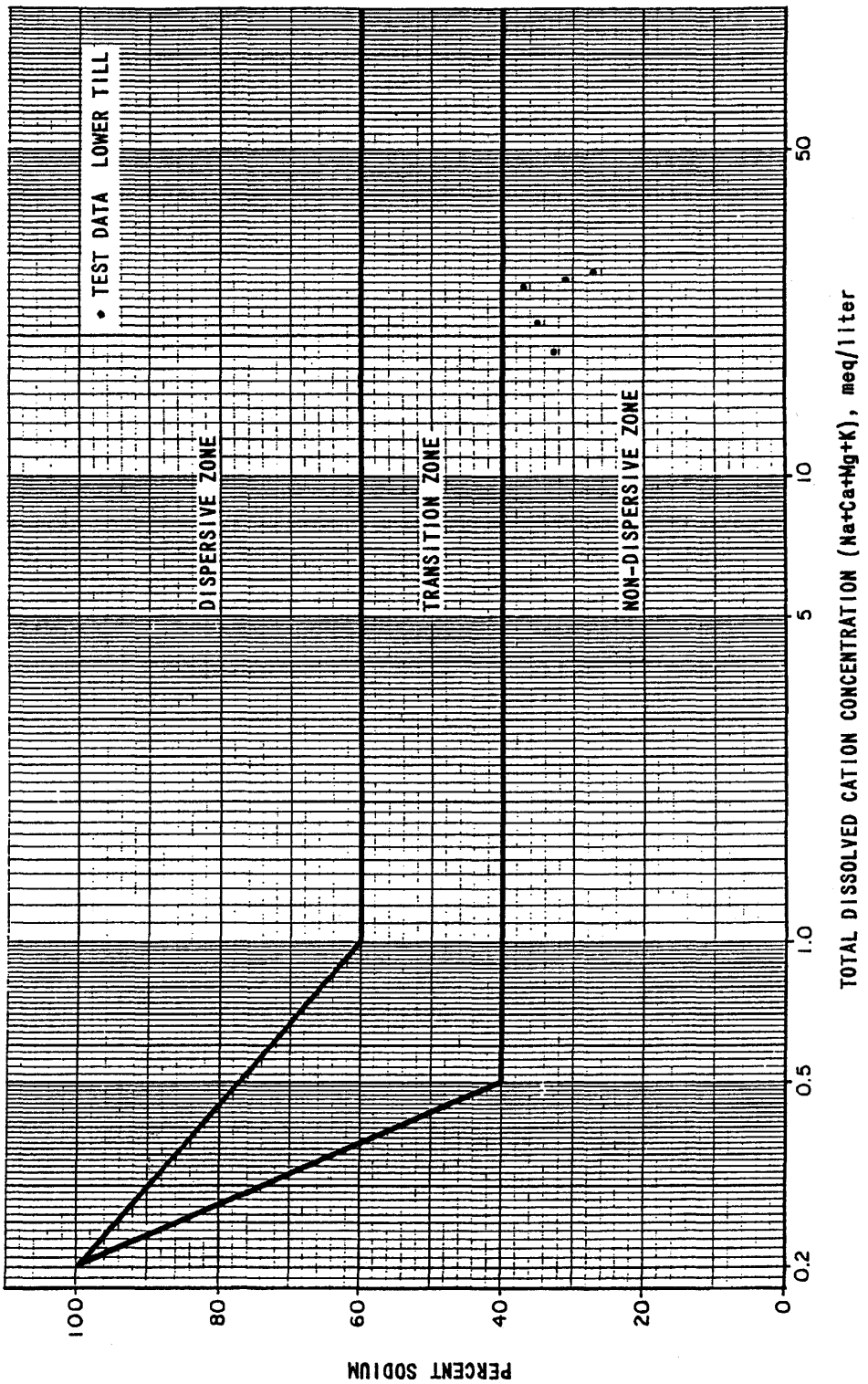
BORING	SAMPLE	DEPTH	SYMBOL	CLASSIFICATION	MC	LL	PL

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Soil Conservation Service
Tests on Lower Till

Figure 2.5-136 (Sheet 3 of 3)

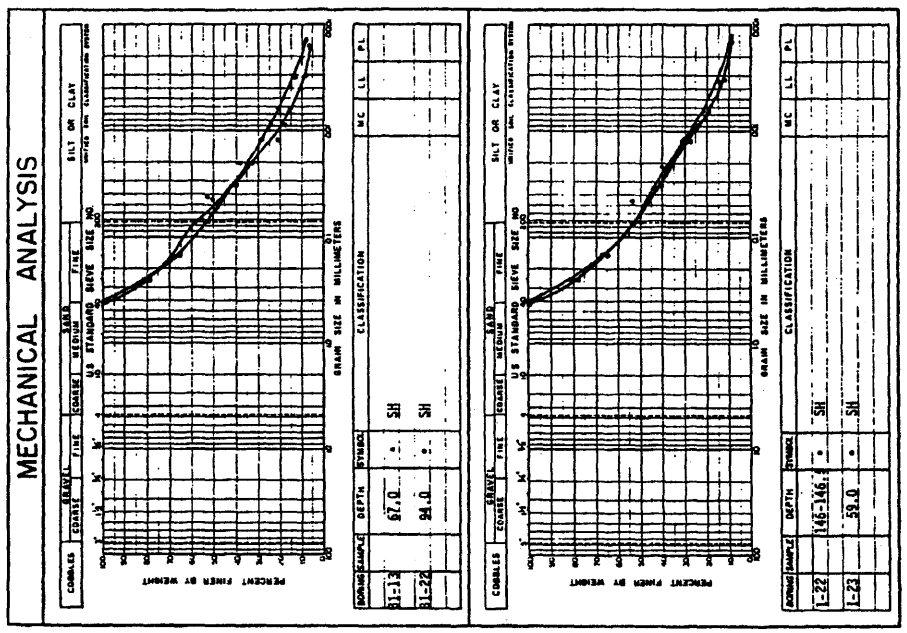


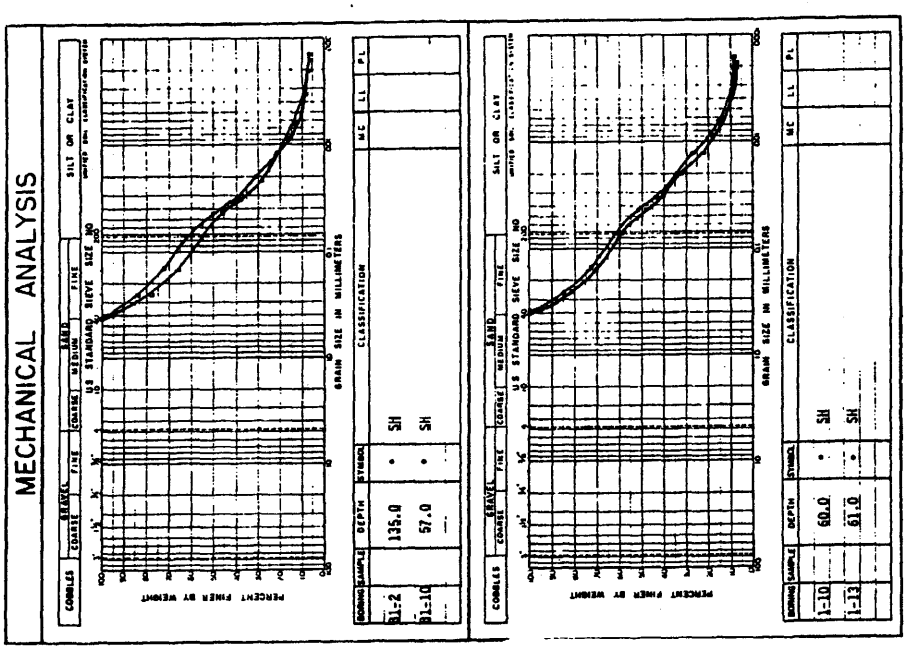
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Dissolved Salts in
Saturation Extract

Figure 2.5-137



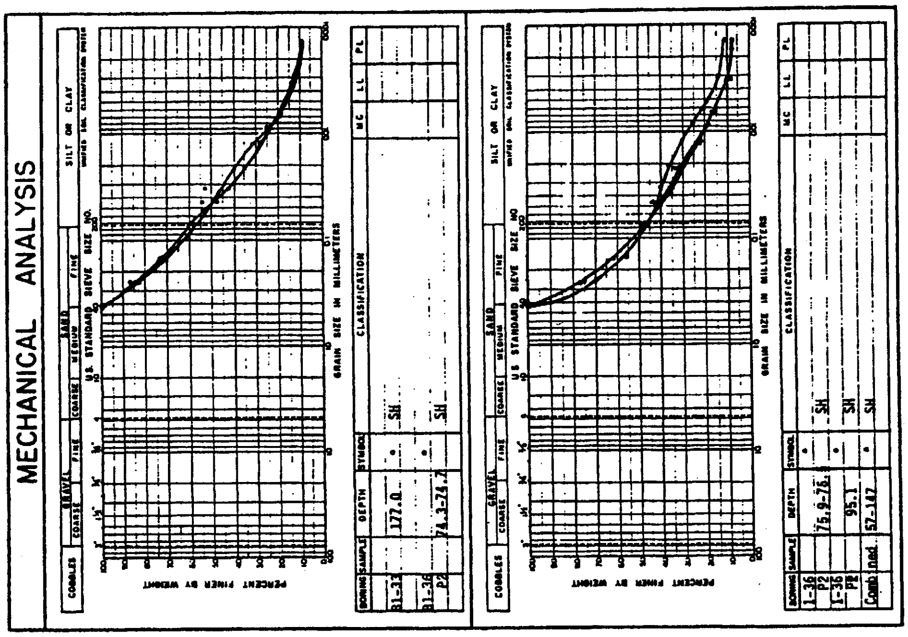


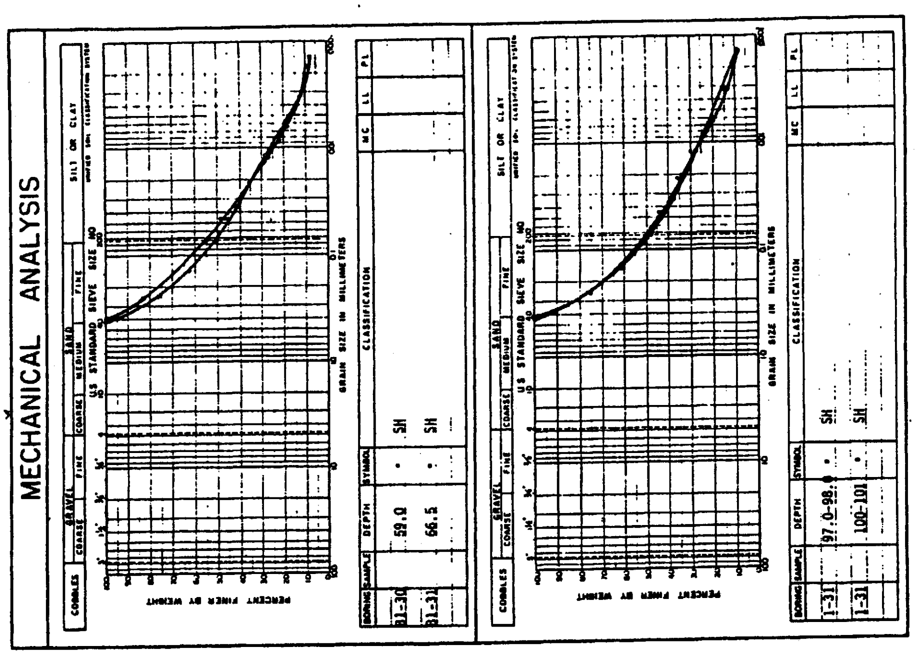
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Chagrin Shale

Figure 2.5-138 (Sheet 1 of 2)



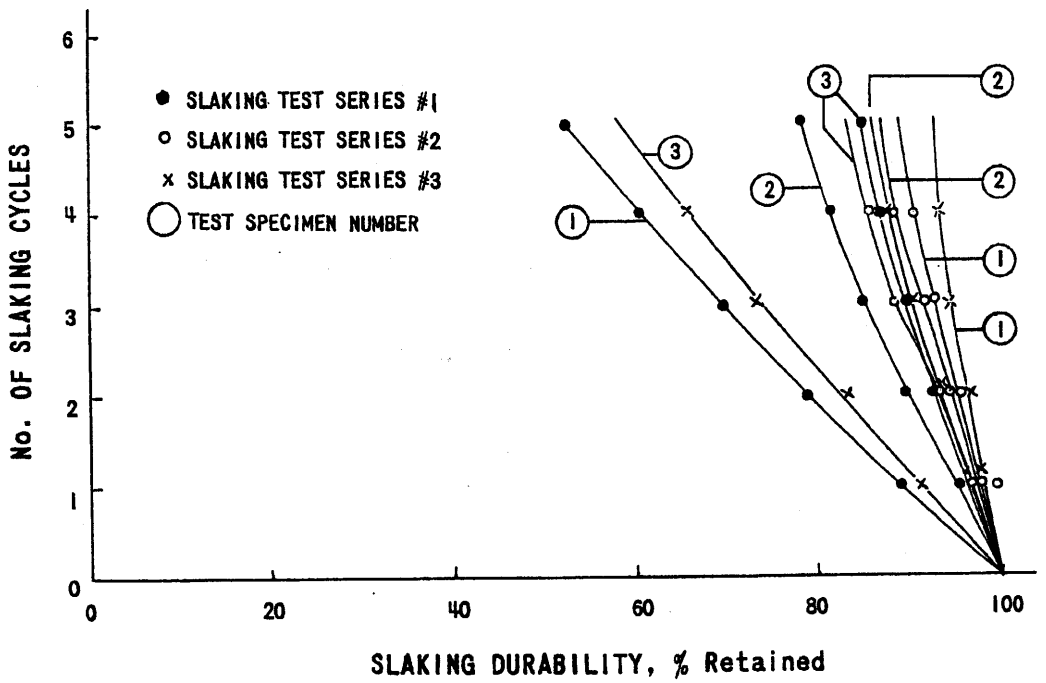


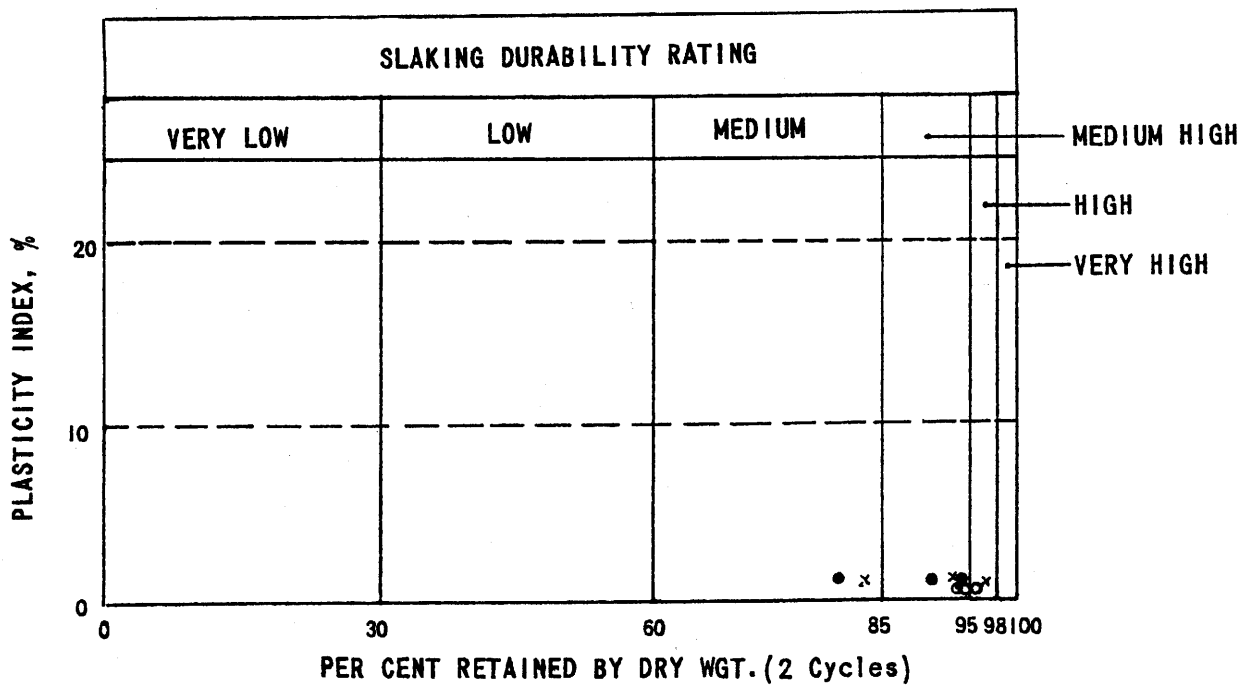
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Grain Size Distribution Curves - Chagrin Shale

Figure 2.5-138 (Sheet 2 of 2)





(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

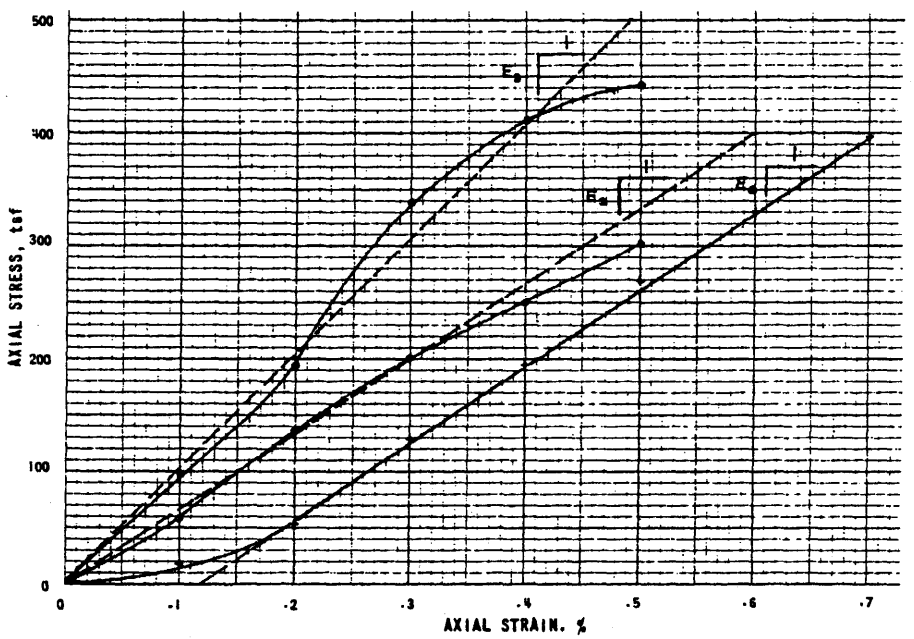
Wet-Dry Cycle Slaking Durability Test on Chagrin Shale

Figure 2.5-139

TYPICAL STRESS - STRAIN CHARACTERISTICS OF SHALE IN UNIAXIAL COMPRESSION

SYMBOL	BORING No.	SAMPLE DEPTH (Ft)	γ_d (pcf)	W_n (%)	ULTIMATE STRESS (taf)	ULTIMATE STRAIN (%)	E_s (taf x 10^3)
•	1 - 33	152	156.0	4.5	302	0.50	67
○	1 - 33	161	150.0	5.7	442	0.50	102
+	1 - 1	124	164.7	2.1	542	0.91	53

ALL SAMPLES EXHIBITED AN ABRUPT BRITTLE FAILURE

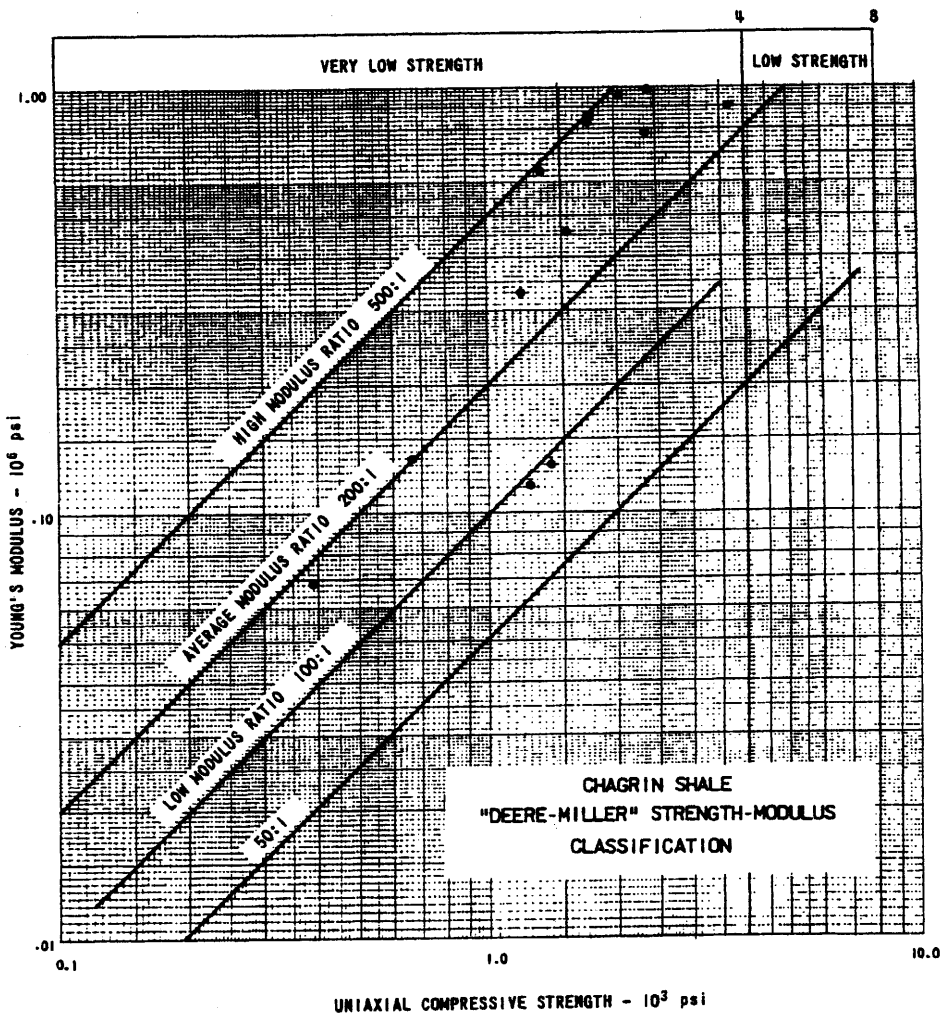


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Stress - Strain Characteristics of Shale in Uniaxial Compression

Figure 2.5-140

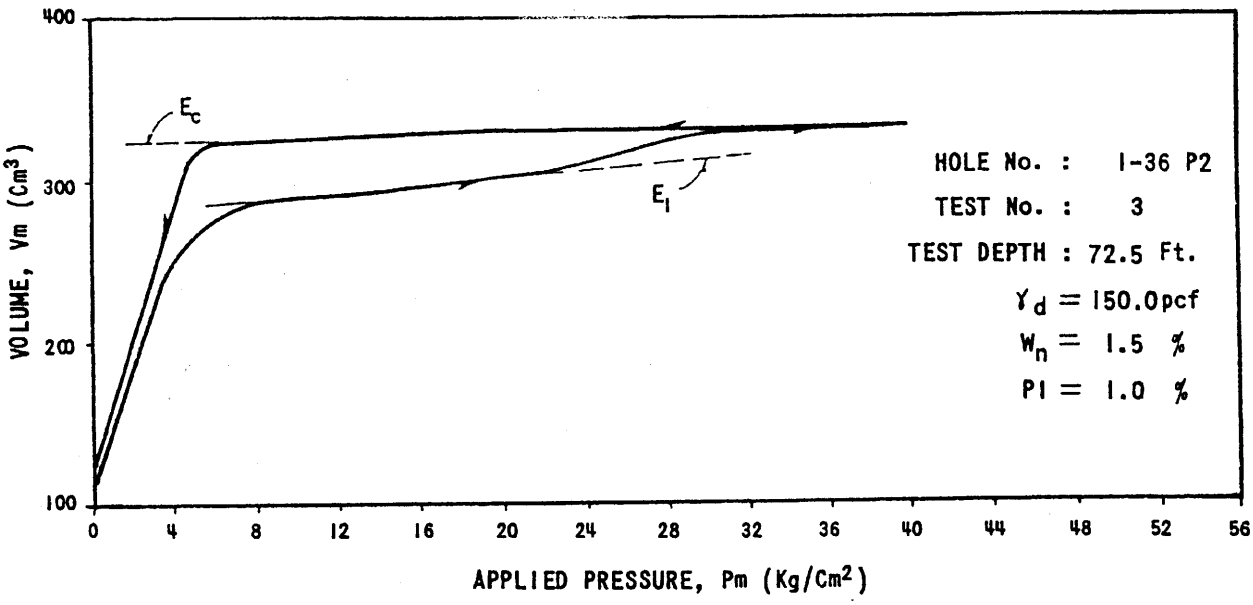


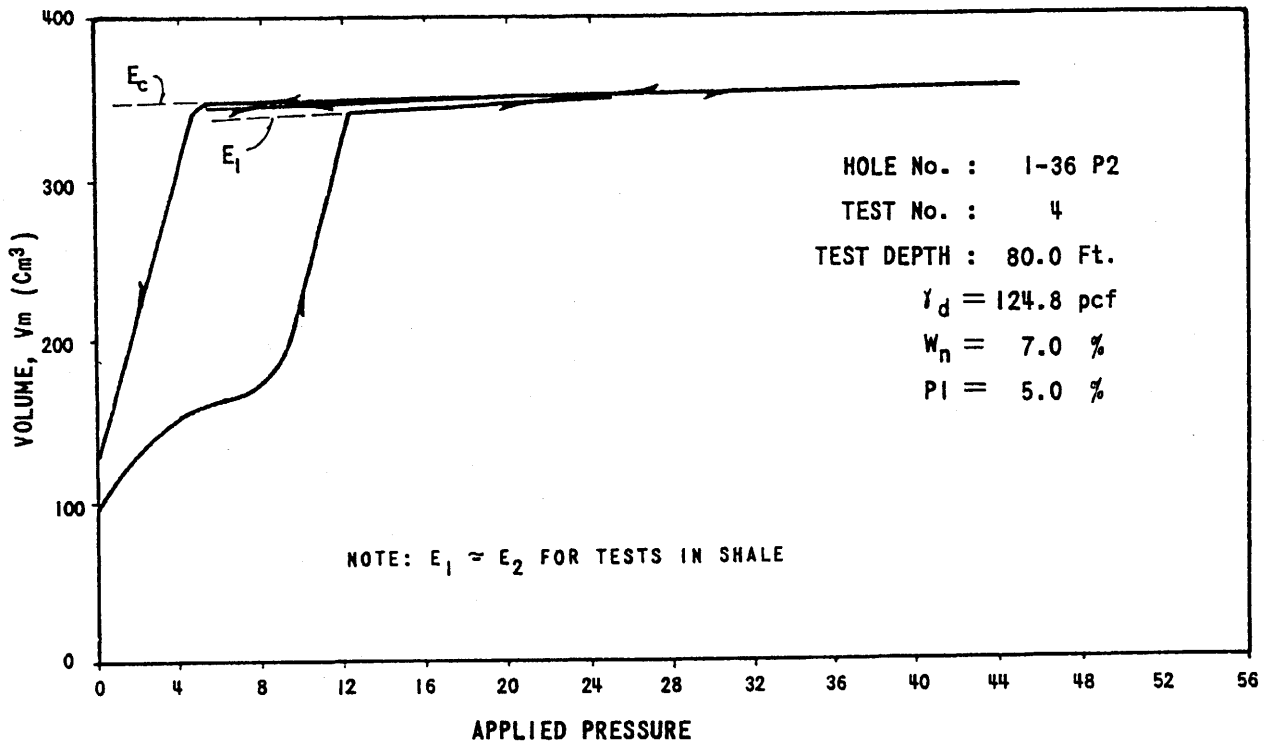
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Deere-Miller Strength - Modulus Classification of Chagrin Shale

Figure 2.5-141



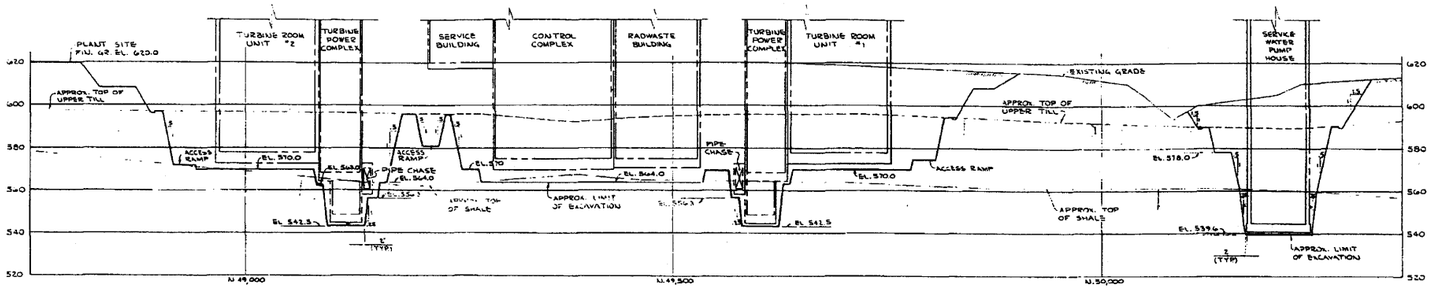


(Rev. 12 1/03)

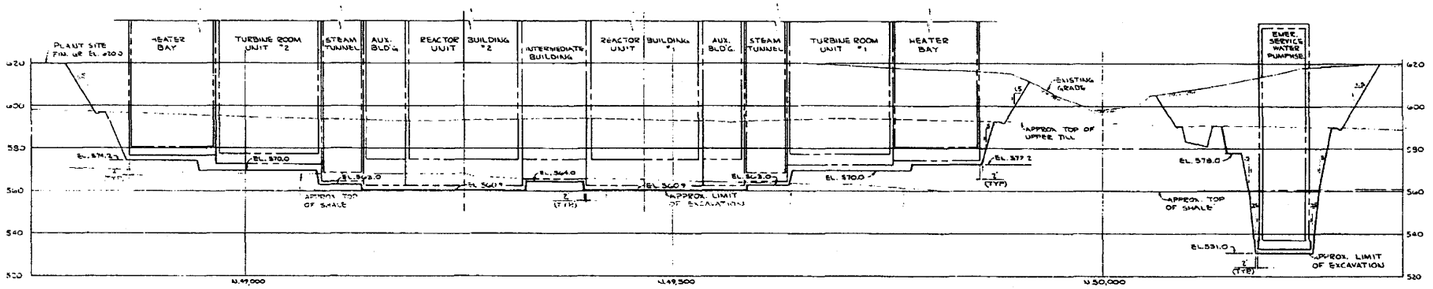
PERRY NUCLEAR POWER PLANT

Typical Pressuremeter Test
Results in Chagrin Shale

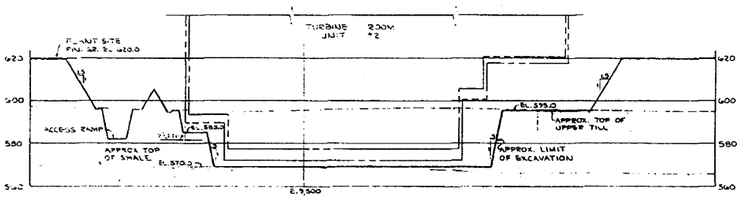
Figure 2.5-142



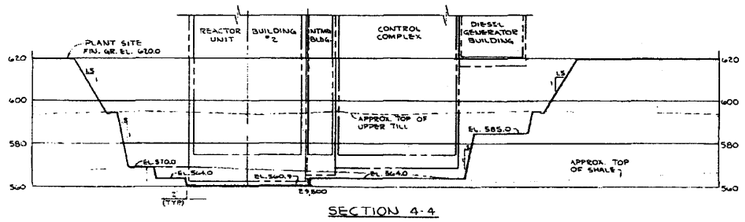
SECTION 1-1



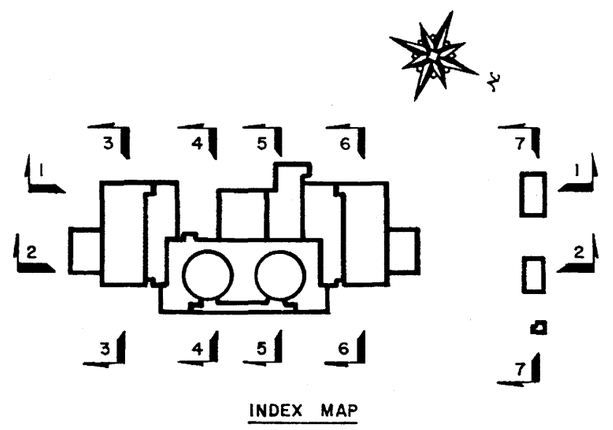
SECTION 2-2



SECTION 3-3



SECTION 4-4

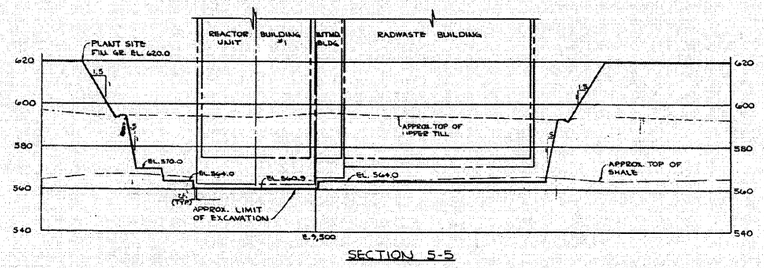


(Rev. 12 1/03)

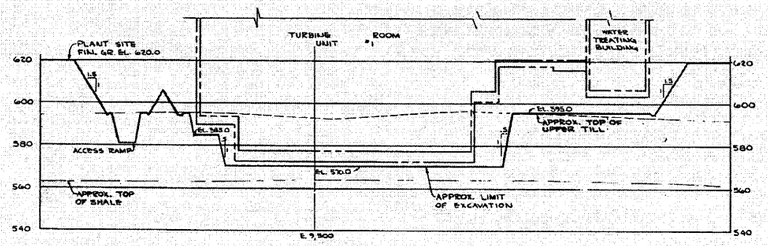
PERRY NUCLEAR POWER PLANT

Subsurface Stratigraphy and Excavation Sections (Preconstruction)

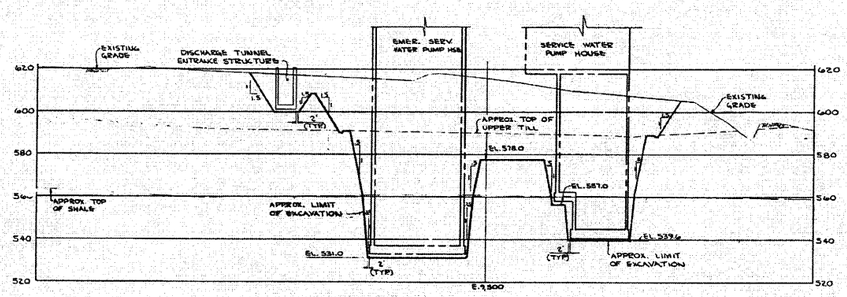
Figure 2.5-143 (Sheet 1 of 2)



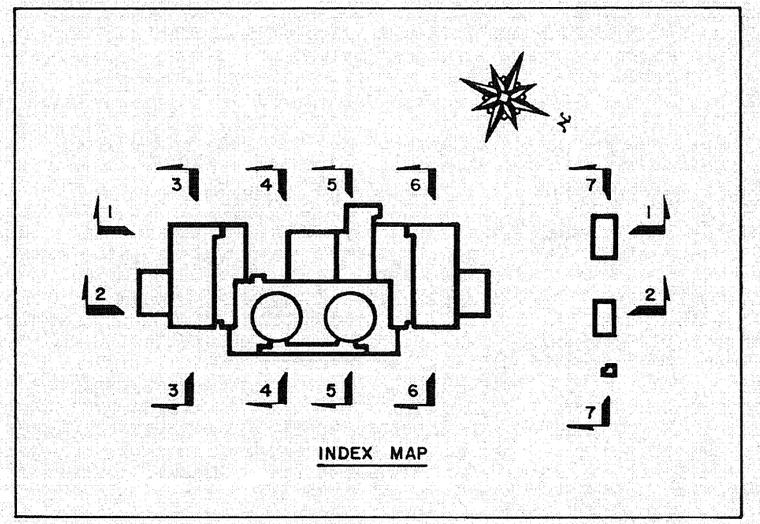
SECTION 5-5



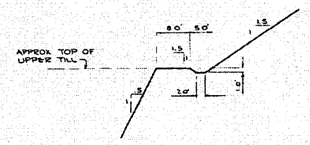
SECTION 6-6



SECTION 7-7



INDEX MAP



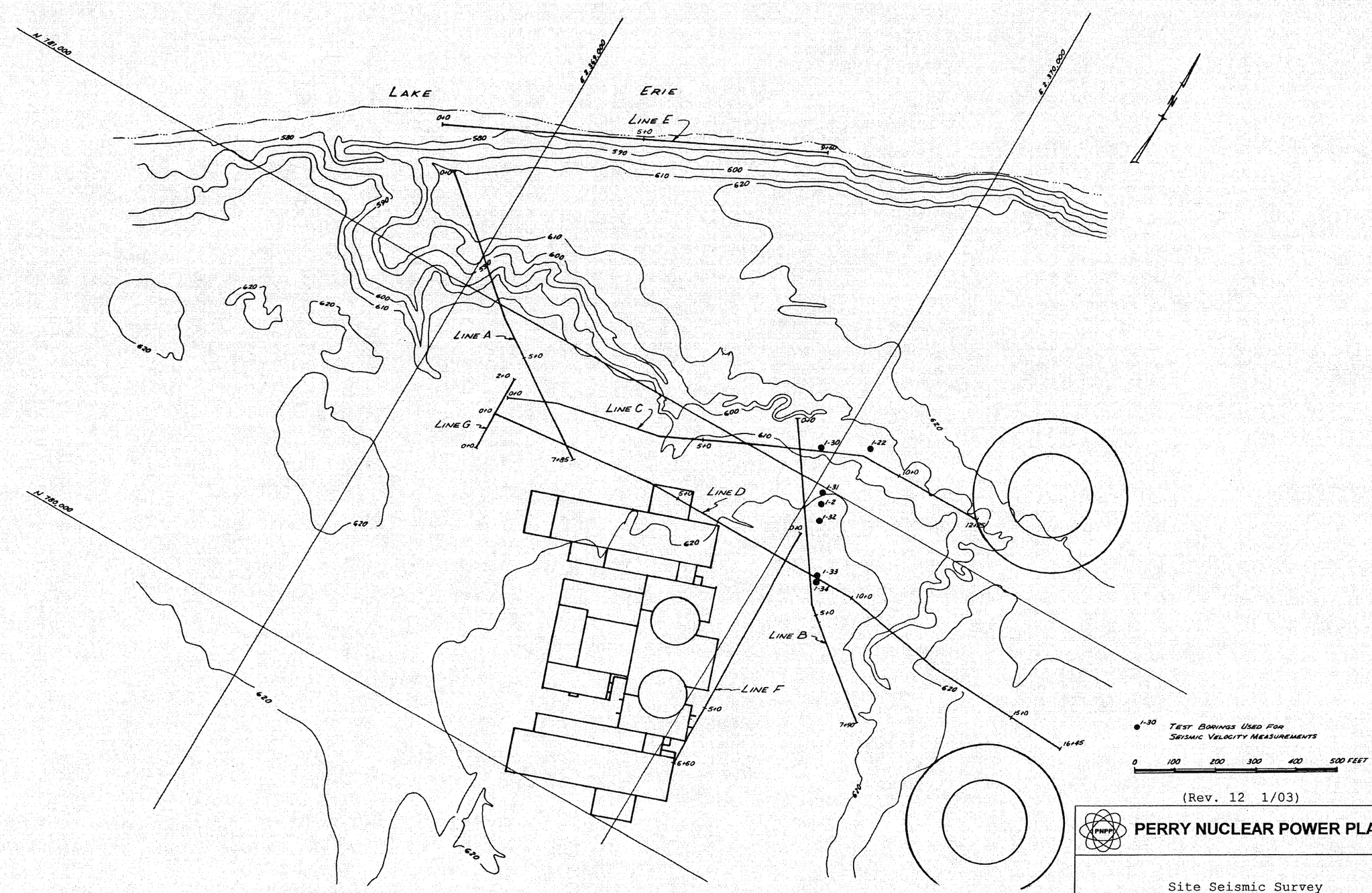
TYPICAL BENCH DETAIL
NO SCALE

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Subsurface Statigraphy and
Excavation Sections
(Preconstruction)

Figure 2.5-143 (Sheet 2 of 2)



(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Site Seismic Survey

Figure 2.5-144

Anticlinal fold and overthrust fault in Bedford formation on Bates Creek, southeast of Painesville.

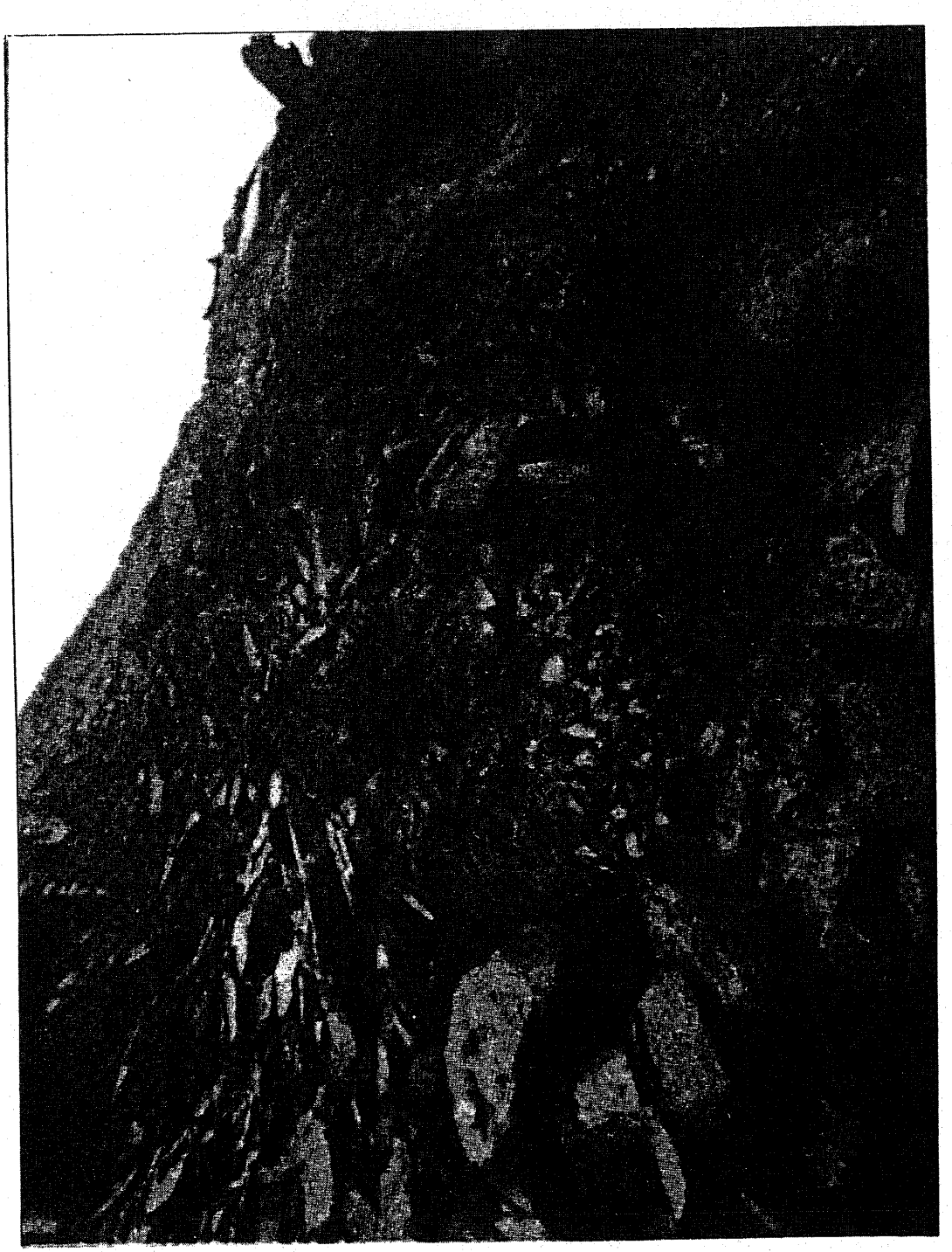
(Reference 289)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Warners Creek Thrust
Fault from Prosser

Figure 2.5-145



Anticline produced by buckling of the shales at the base of the landslide at Cleveland, Ohio. (Reference 289)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Anticline Produced by Sliding from Van Horn

Figure 2.5-146

UNSYMMETRICAL ANTICLINE

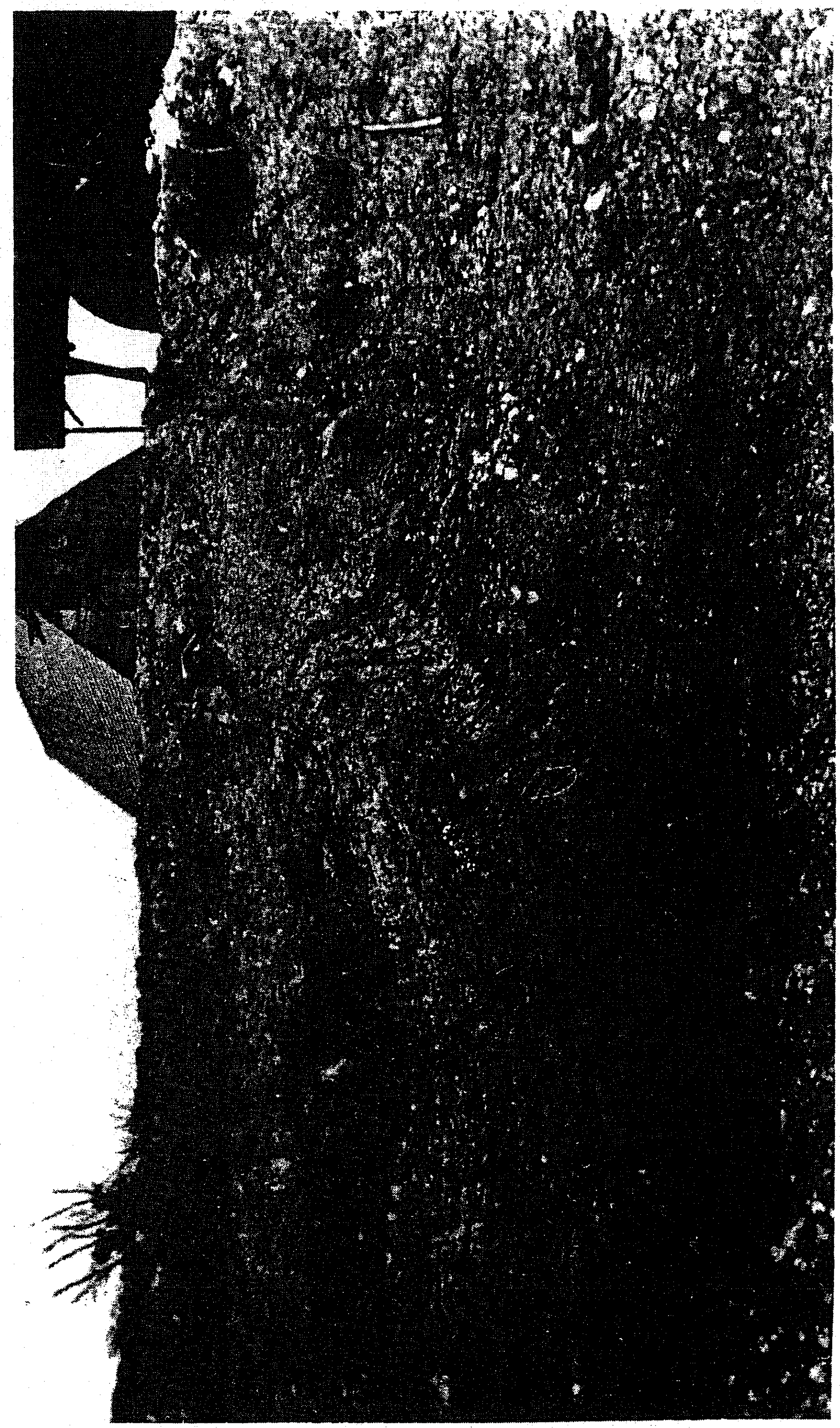
This shows 5 feet of disturbed shale overlain by 2 feet of glacial drift. (Reference 290)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Anticline in Shale from
Van Horn

Figure 2.5-147



UNSYMMETRICAL ANTICLINE WITH BOTTOM LAYERS HORIZONTAL

Eight feet of shale are covered by 2 feet of glacial drift. (Reference 290)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Anticline in Shale from
Van Horn

Figure 2.5-148

This view shows 3 feet of glacial sand and 5 feet of folded iron-stained shale having 3 well defined concretionary ironstone bands, 3 feet of blue shale with less folding, and 3 feet of horizontal shale. (Reference 290)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Anticline in Shale from Van Horn

Figure 2.5-149

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Aerial Photograph of Warners (Bates) Creek Fault

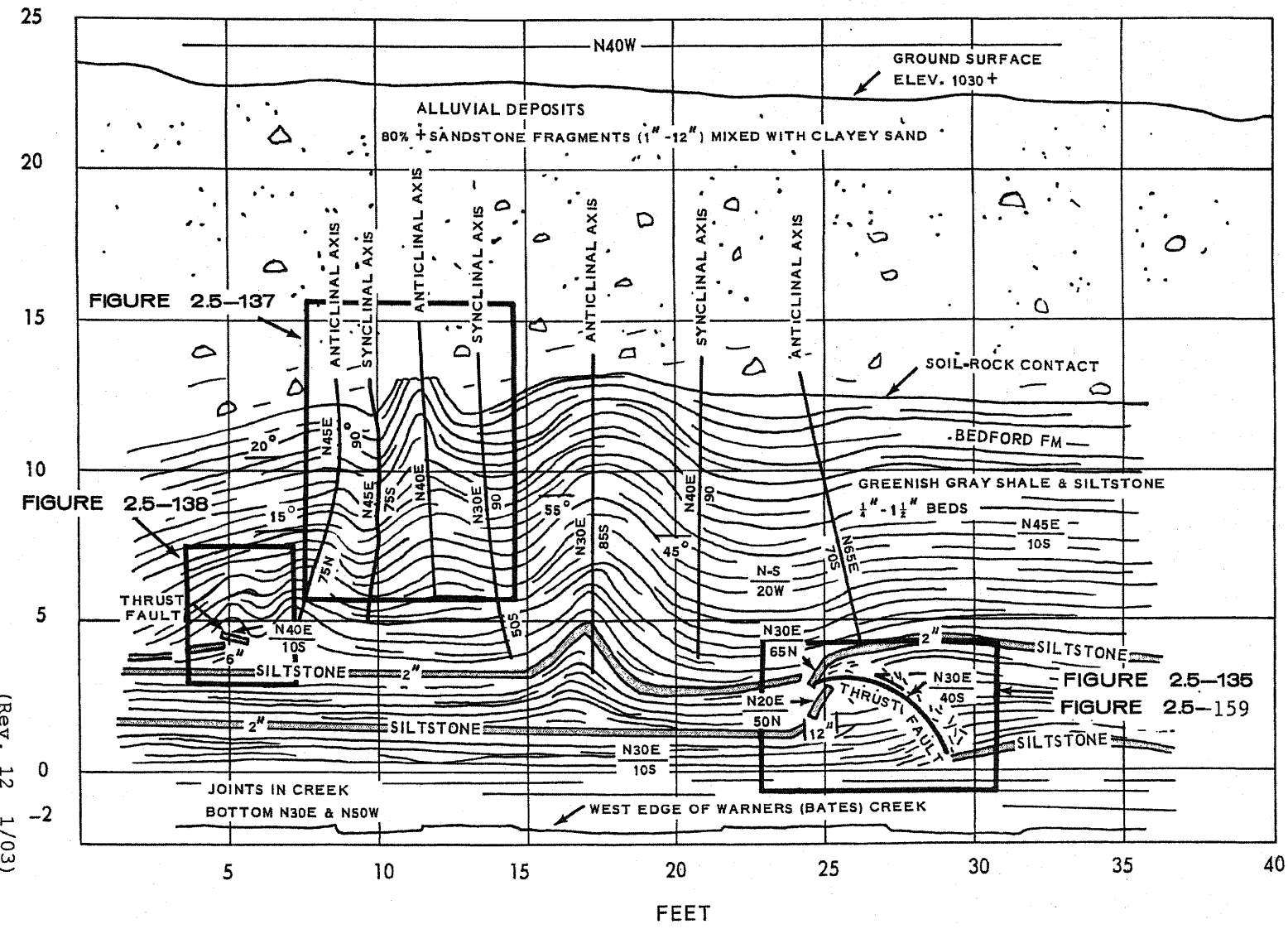
Figure 2.5-150

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Aerial Photograph of Hell Hollow Faults

Figure 2.5-151



(APPROXIMATELY TO SCALE)

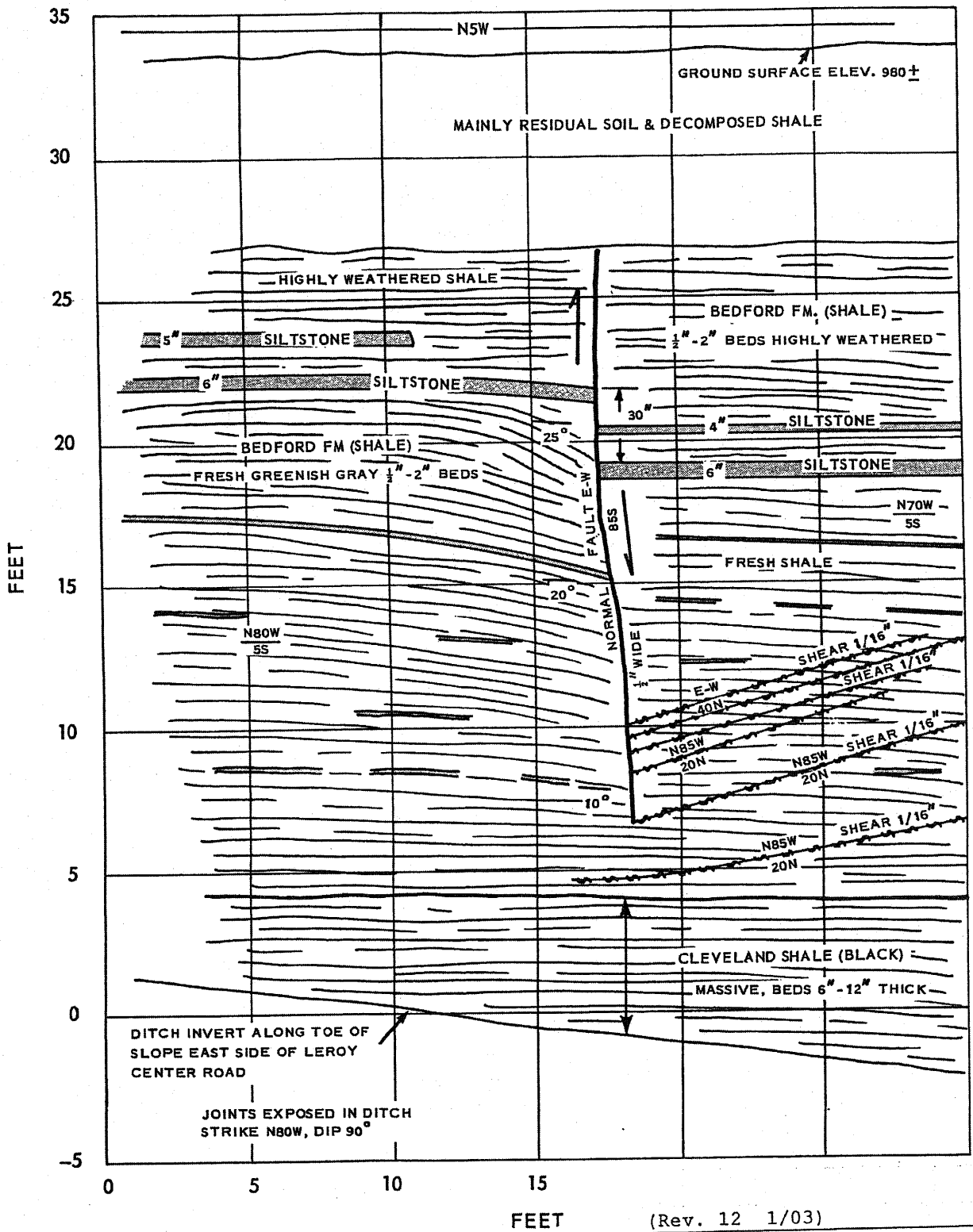
NOTE: WARNERS CREEK FAULT IS 8 MILES SOUTH OF PNPP SITE

PERRY NUCLEAR POWER PLANT

Sketch of Excavated Rock Slope
Showing Warners Creek Thrust Fault

Figure 2.5-152

(Rev. 12 1/03)



(Rev. 12 1/03)

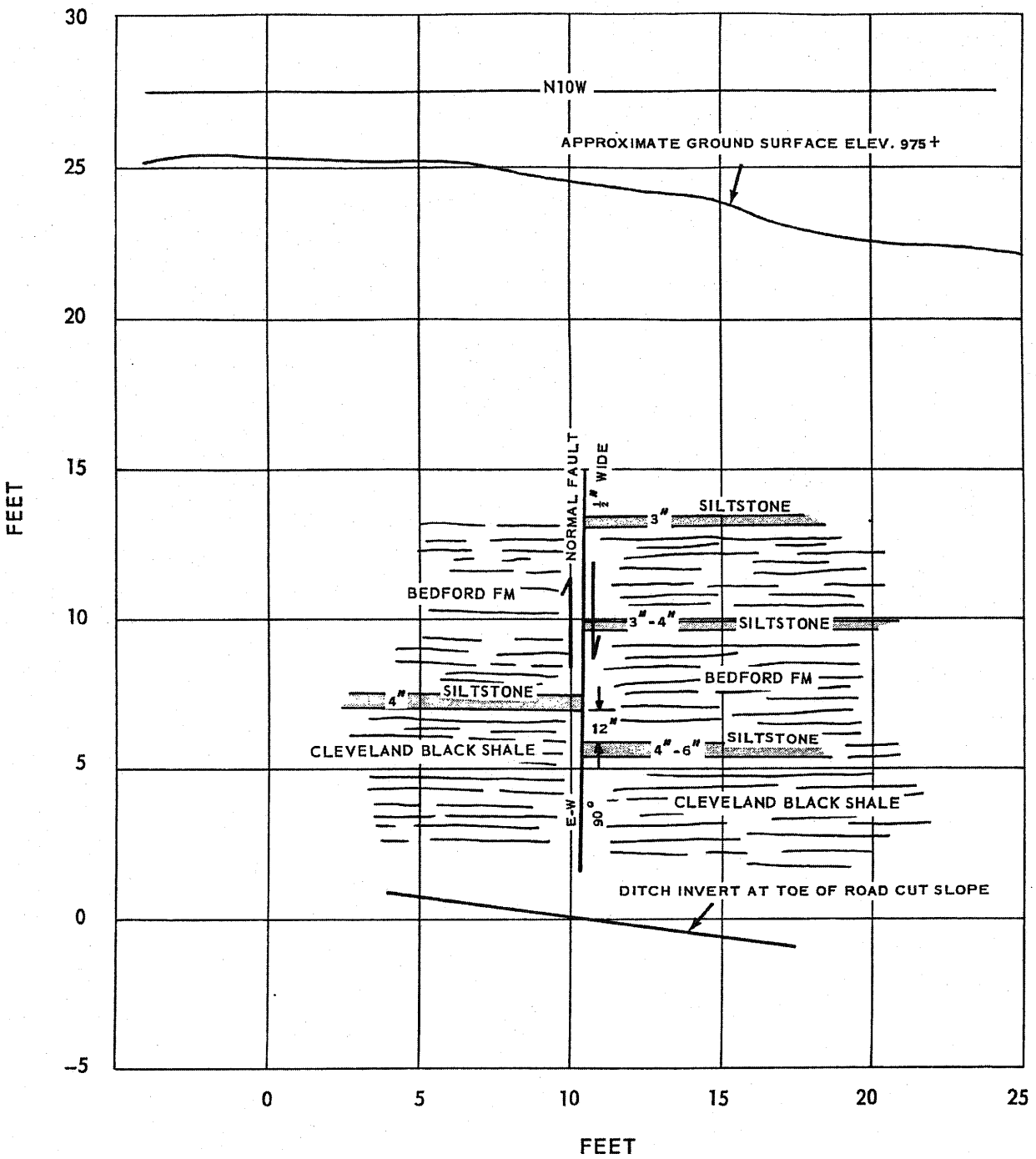
(APPROXIMATELY TO SCALE)

NOTE: FAULT #1 IS 7 MILES SE OF PERRY SITE

PERRY NUCLEAR POWER PLANT

Sketch of Excavated Rock Slope
Showing Hell Hollow Fault #1

Figure 2.5-153



(APPROXIMATELY TO SCALE)

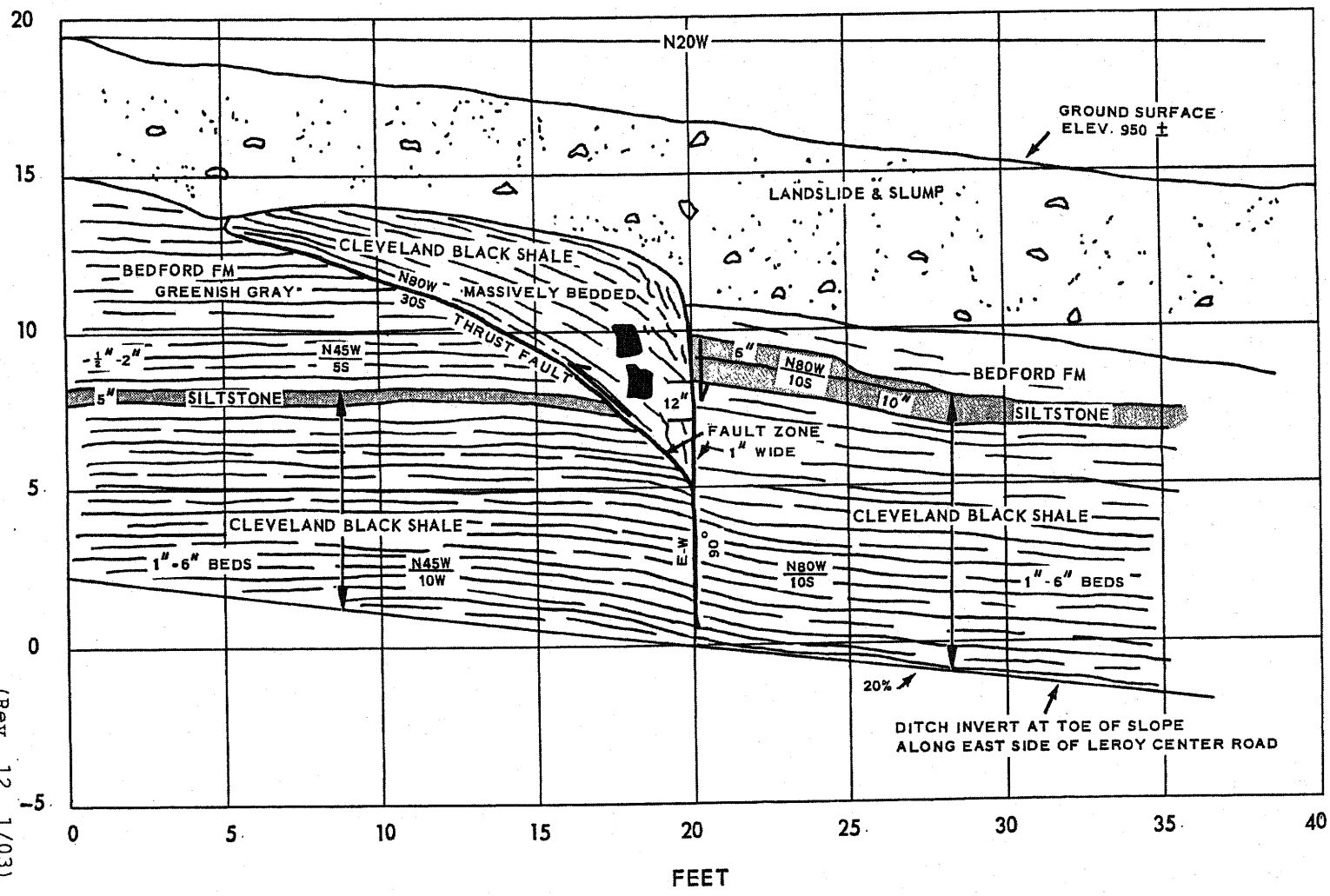
NOTE: FAULT #2 IS 40 FT SOUTH OF FAULT #1

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Sketch of Excavated Rock Slope
Showing Hell Hollow Fault #2

Figure 2.5-154



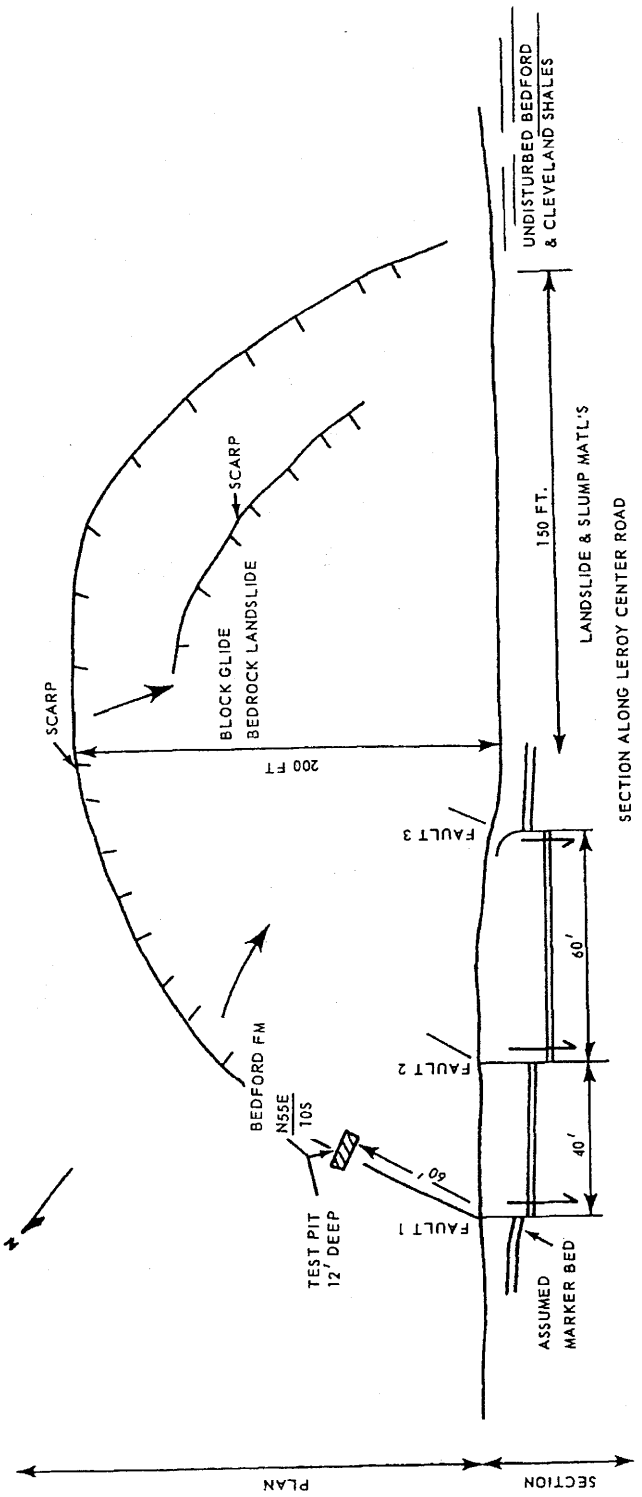
NOTE: FAULT #3 IS 60 FT SOUTH OF FAULT #2 AND 100 FT SOUTH OF FAULT #1

PERRY NUCLEAR POWER PLANT

(Rev. 12 1/03)

Sketch of Excavated Rock Slope
Showing Hell Hollow Fault #3

Figure 2.5-155

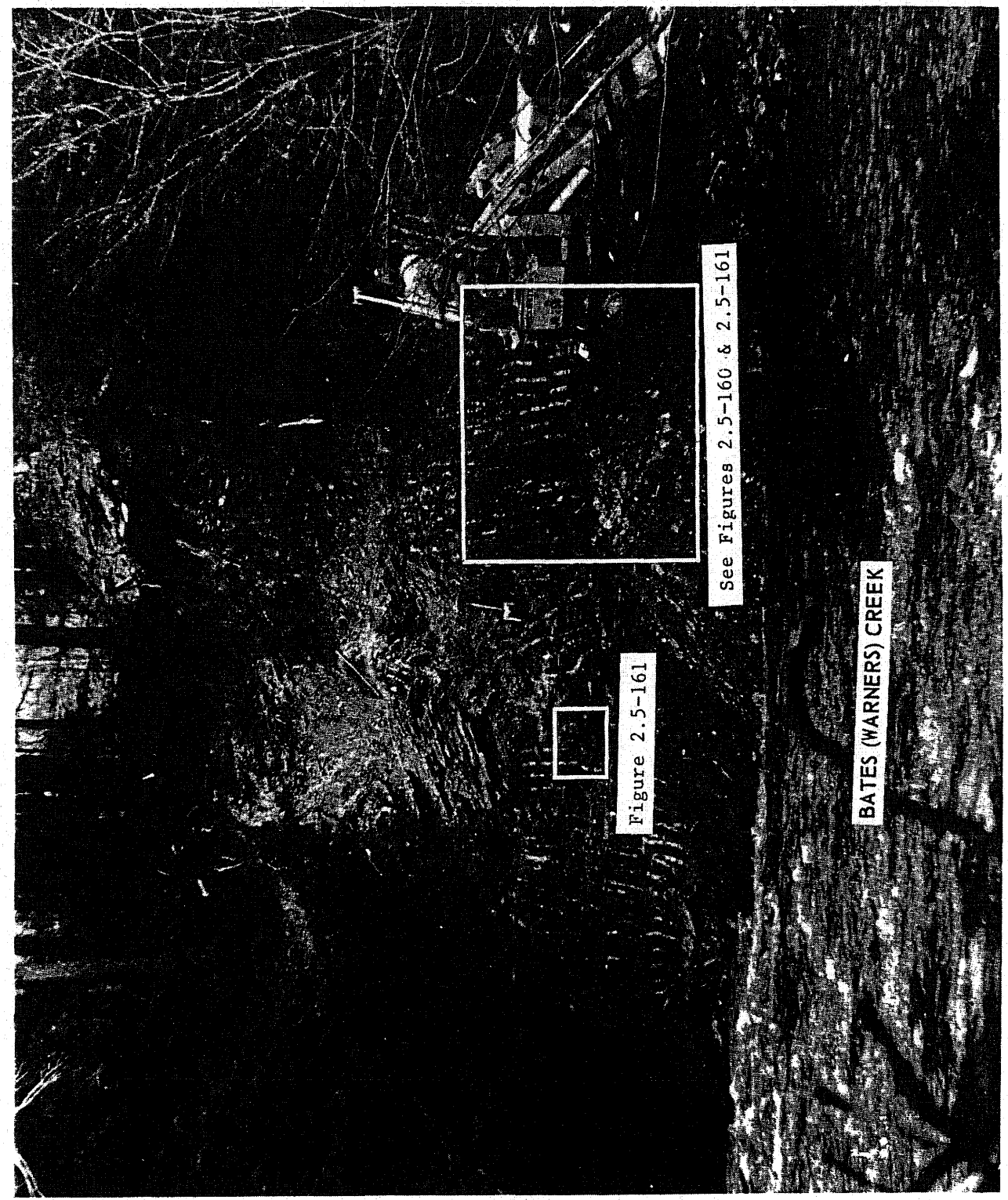


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Interpretative Sketch of
Hell Hollow Faults
Related to Slumping

Figure 2.5-156

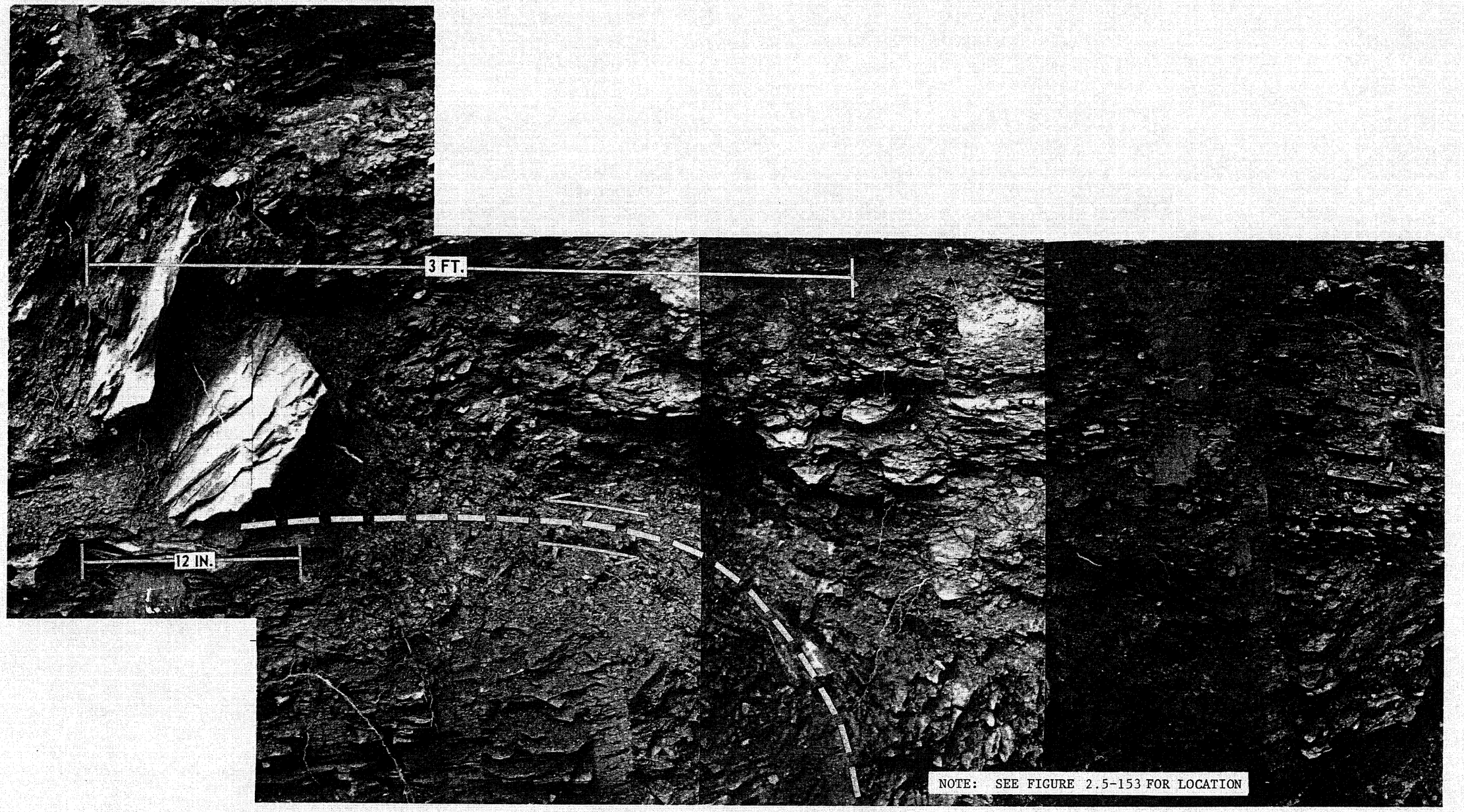


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Warners
(Bates) Creek Exposure

Figure 2.5-157



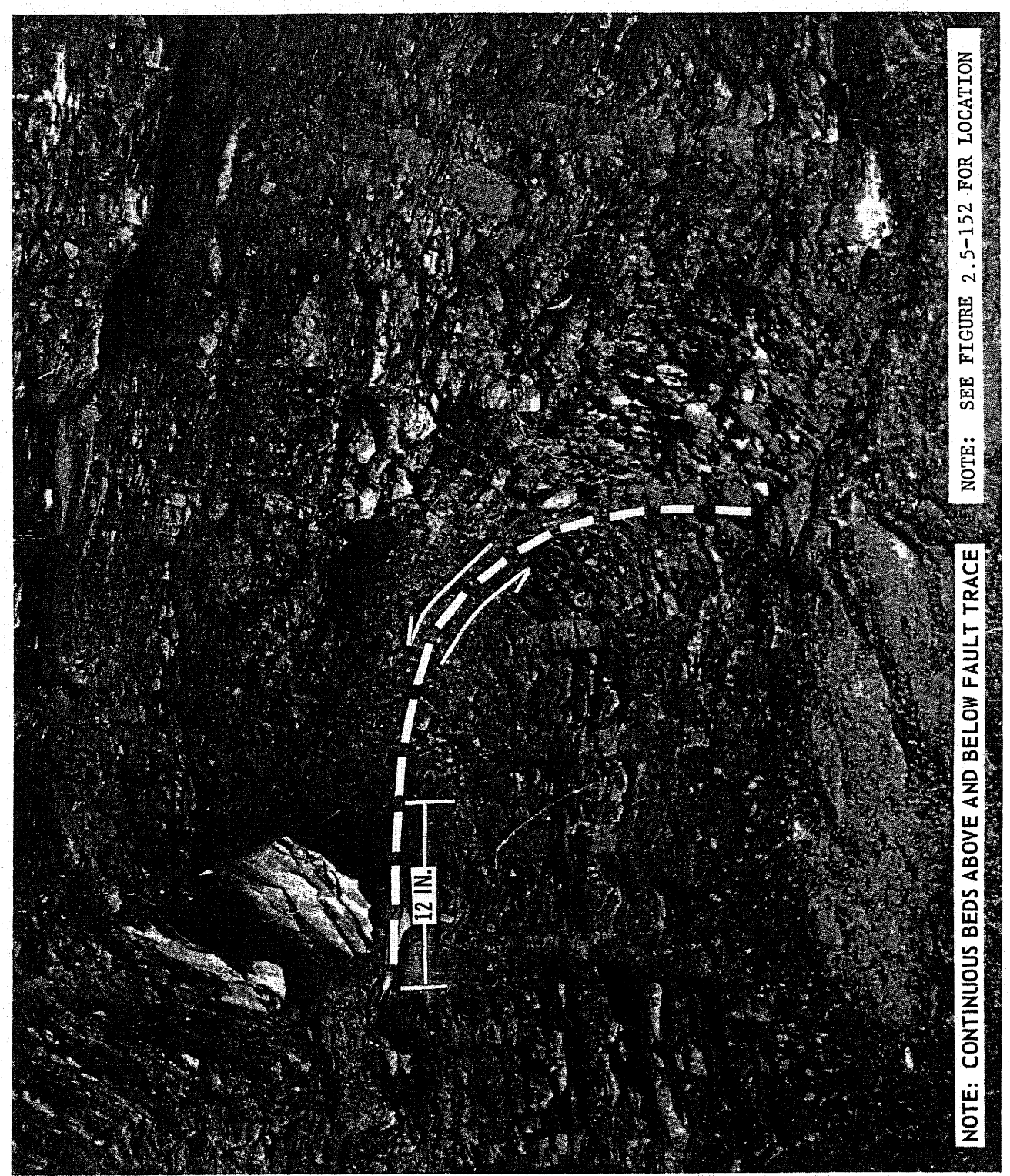
NOTE: SEE FIGURE 2.5-153 FOR LOCATION

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photographic Enlargement of Fault of Warners (Bates) Creek

Figure 2.5-158



(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photographic Enlargement of Fault of Warners (Bates) Creek

Figure 2.5-159

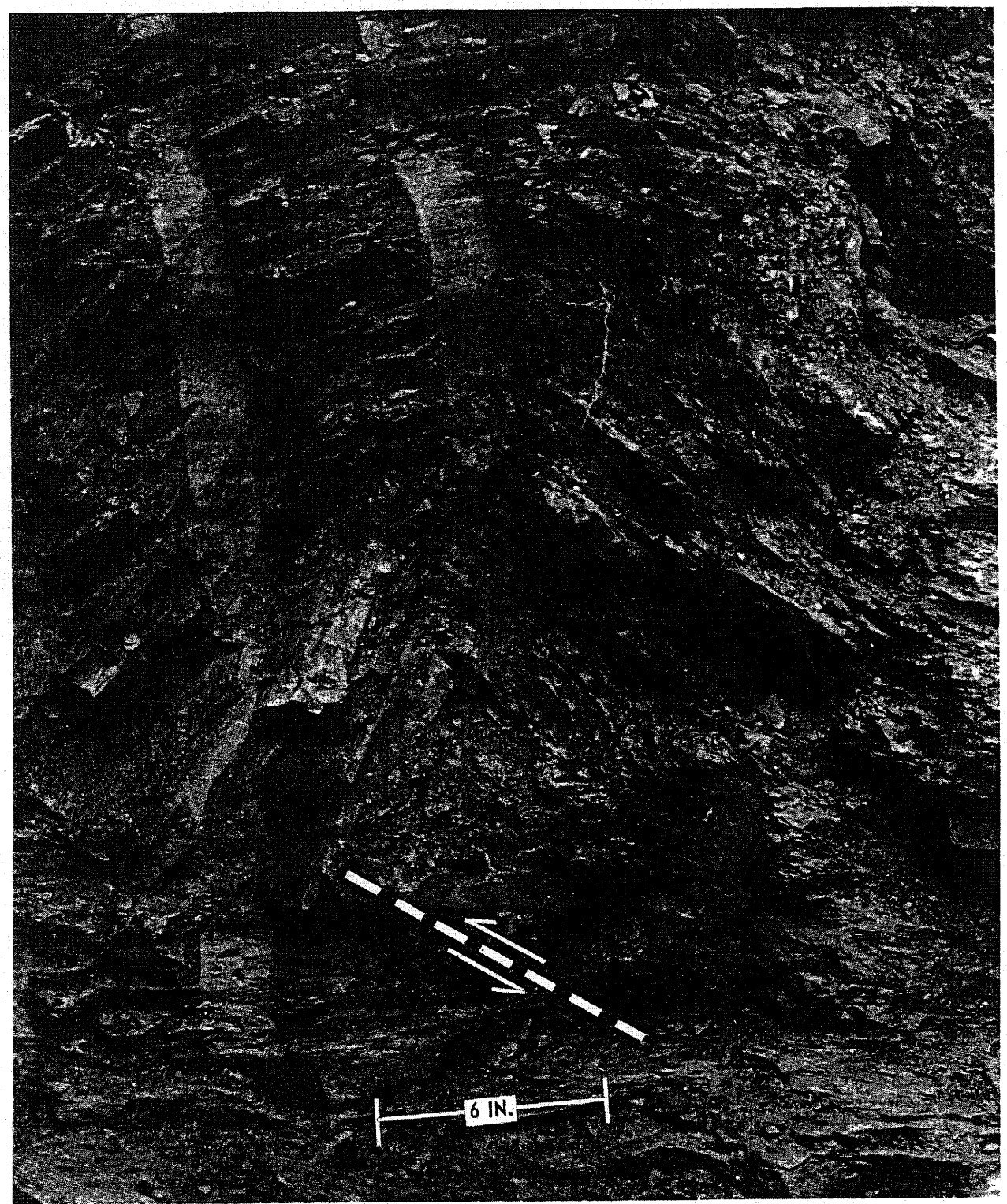
NOTE: See Figure 2.5-152 for Location.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photographic Enlargement of
Tightly Folded Strata at
Warners (Bates)

Figure 2.5-160



Note: See Figure 2.5-152 for Location.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Minor Thrust Fault,
20 ft North of Warners
(Bates) Creek Fault

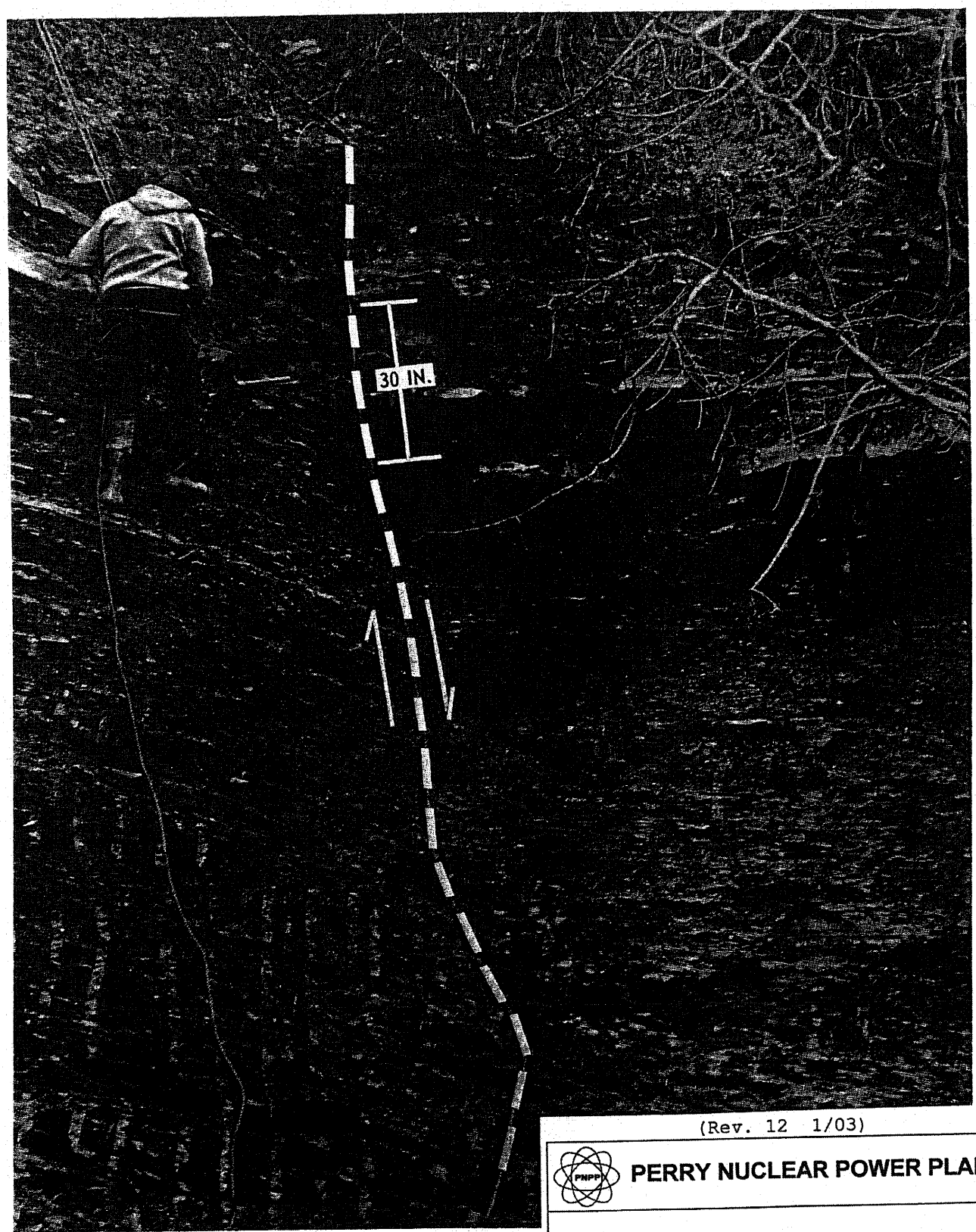
Figure 2.5-161

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Hell Hollow
Fault #1 Prior to Excavation

Figure 2.5-162

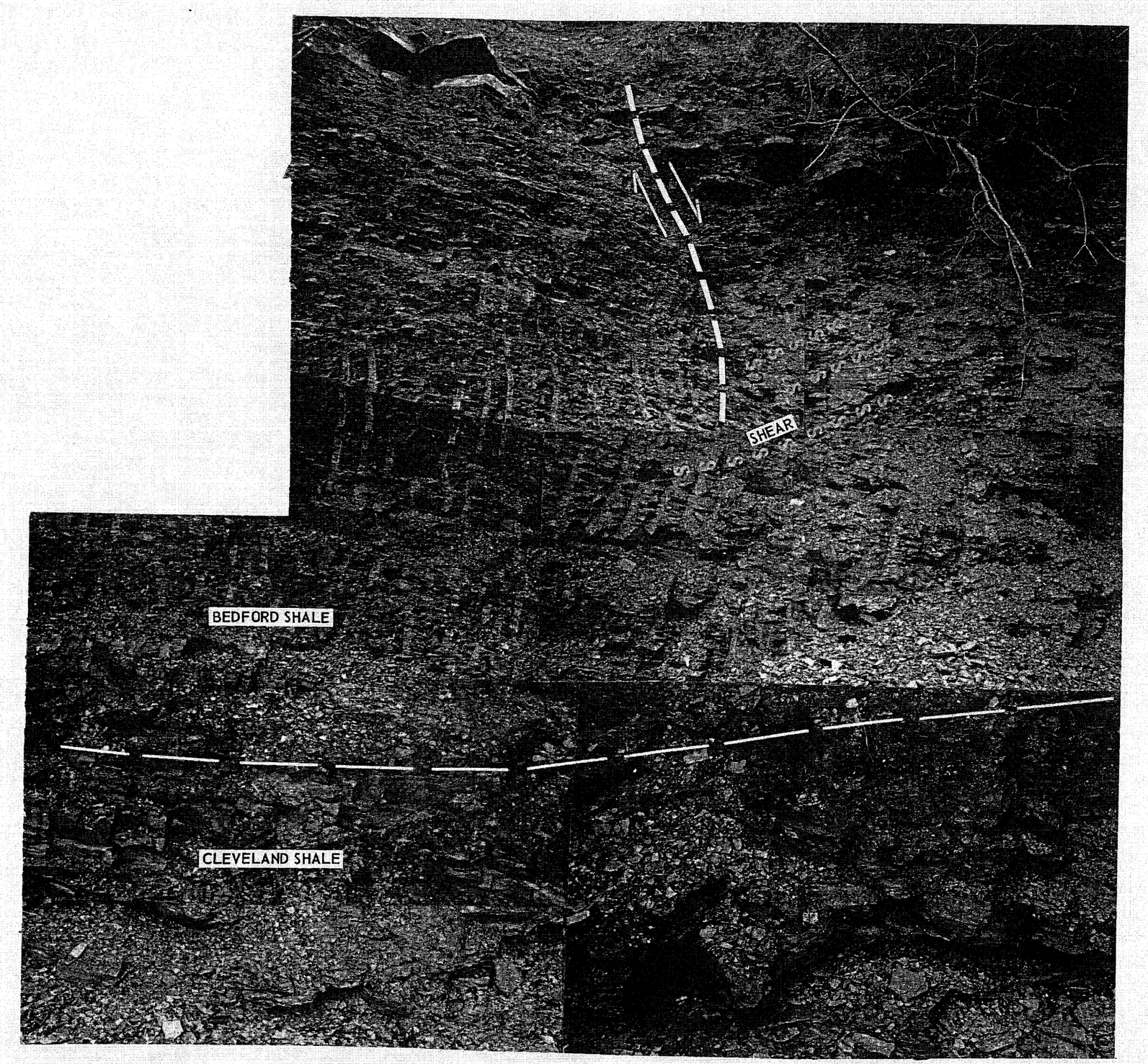


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Hell Hollow
Fault #1 After Excavation

Figure 2.5-163



(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photographic Enlargement of
Hell Hollow Fault #1
After Excavation

Figure 2.5-164

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Hell Hollow
Fault #2 After Excavation

Figure 2.5-165

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Hell Hollow
Fault #3 Prior to Excavation

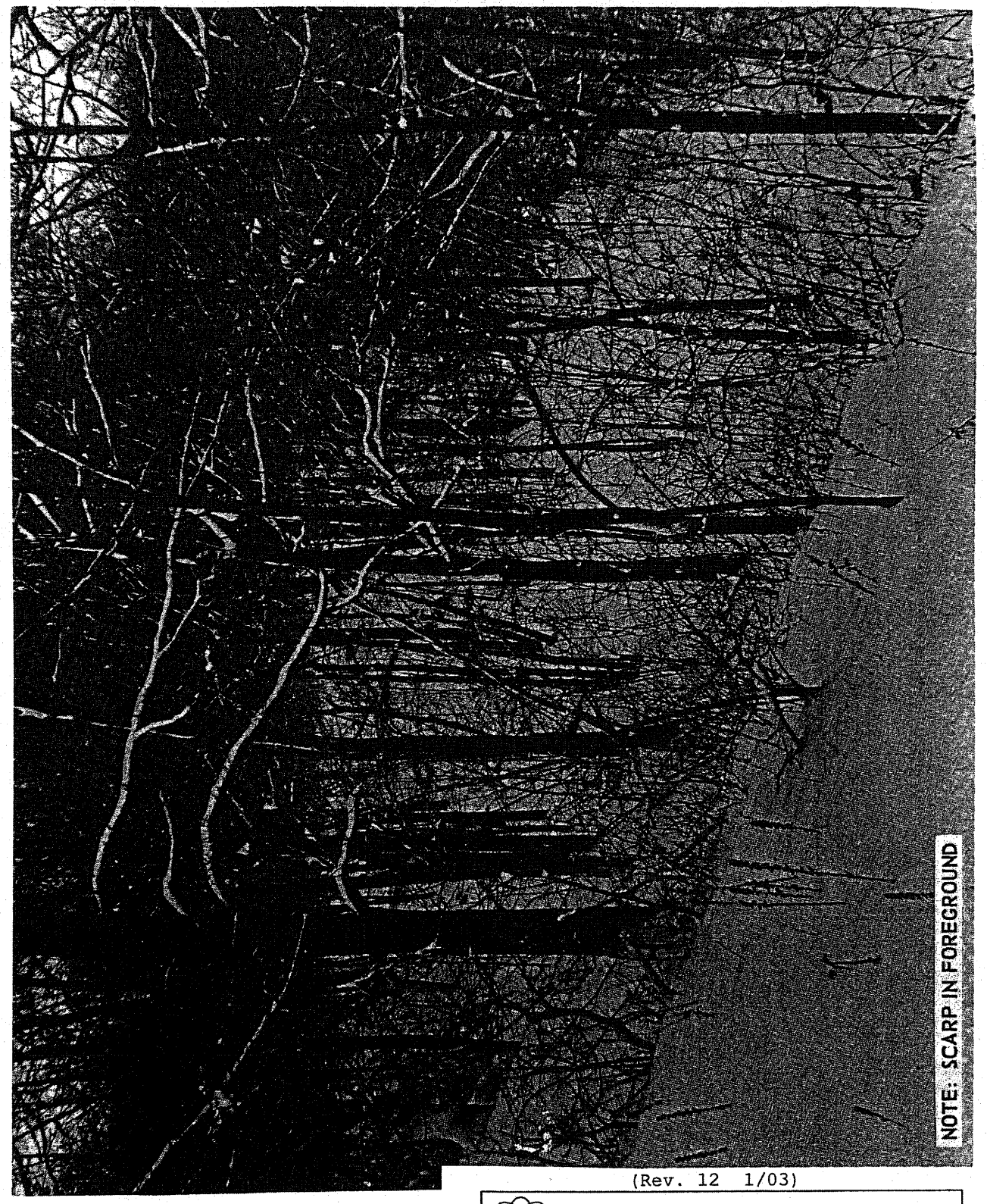
Figure 2.5-166

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Hell Hollow
Fault #3 After Excavation

Figure 2.5-167

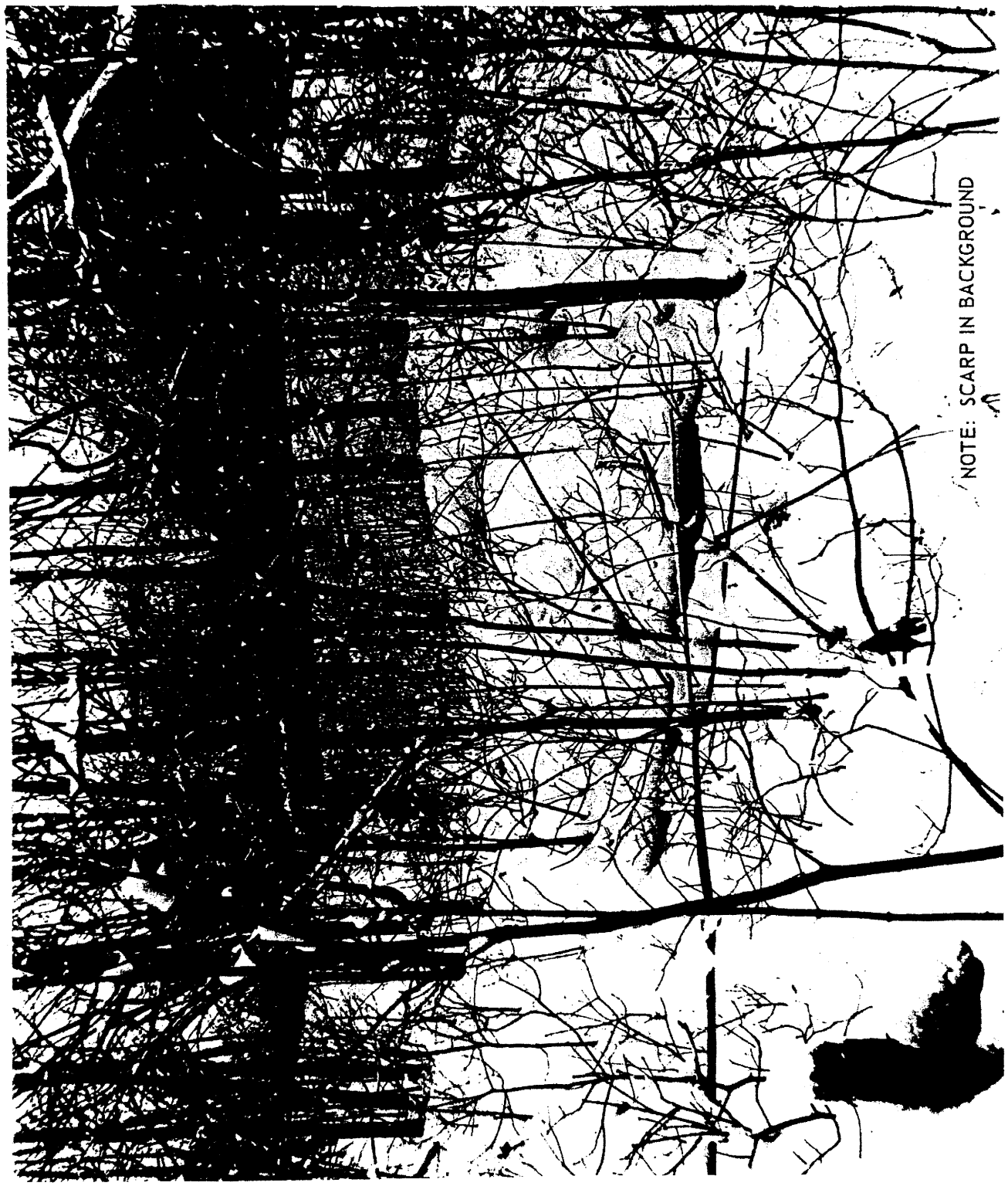


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Hell Hollow Slump
Area Facing South

Figure 2.5-168

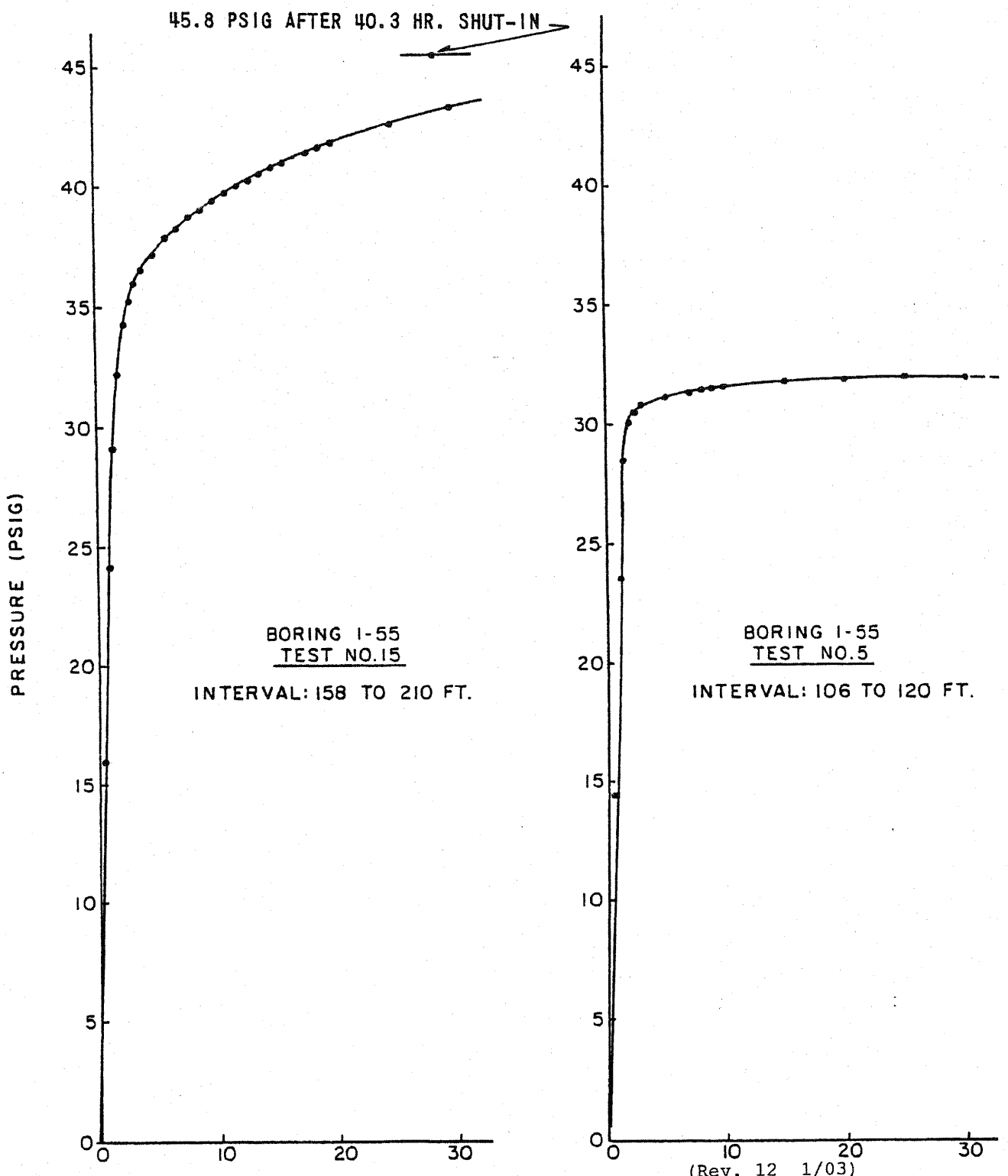


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photograph of Hell Hollow Slump
Area Facing East

Figure 2.5-169

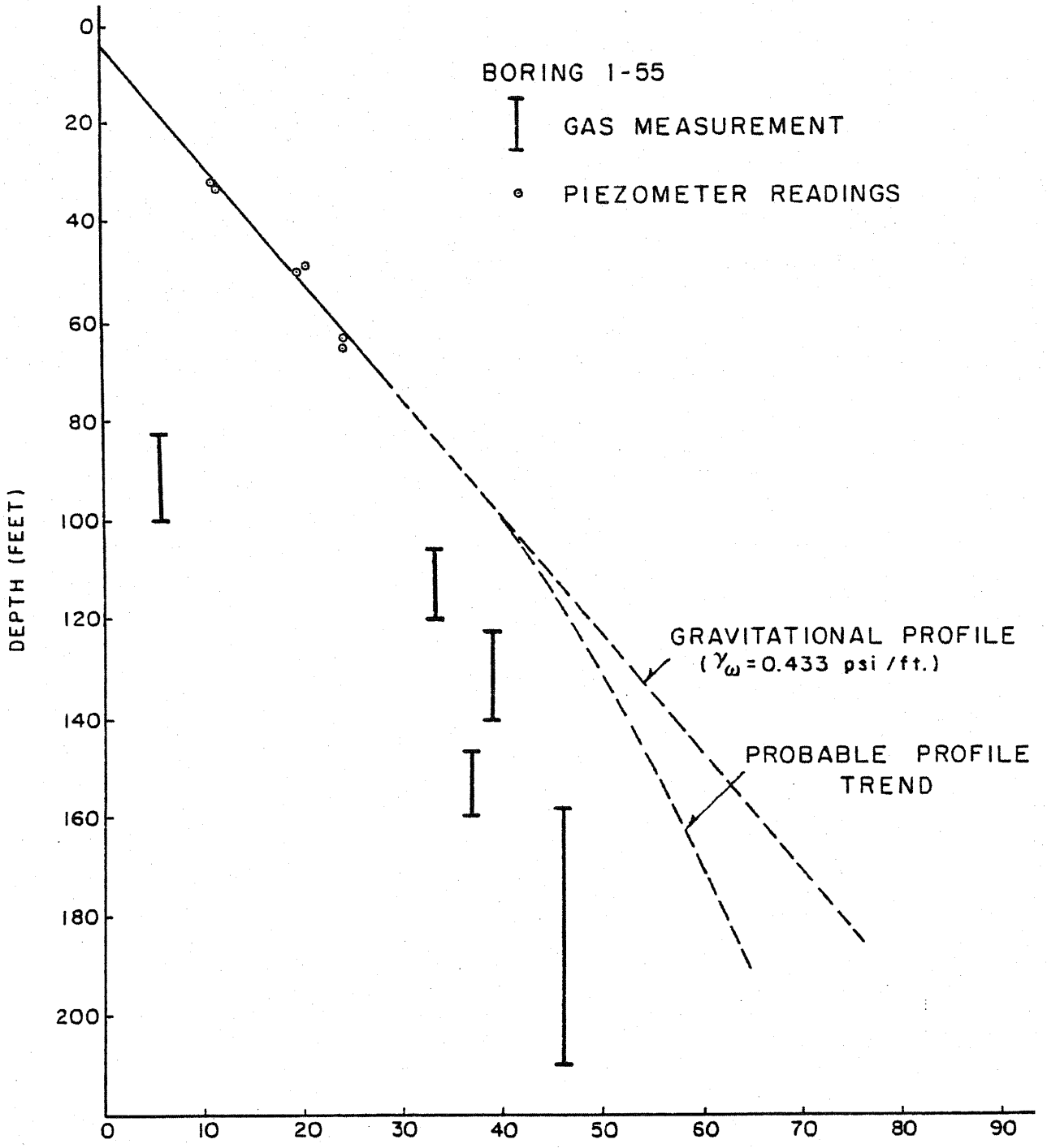


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Representative Records of
Pressure vs. Shut-in Time

Figure 2.5-170

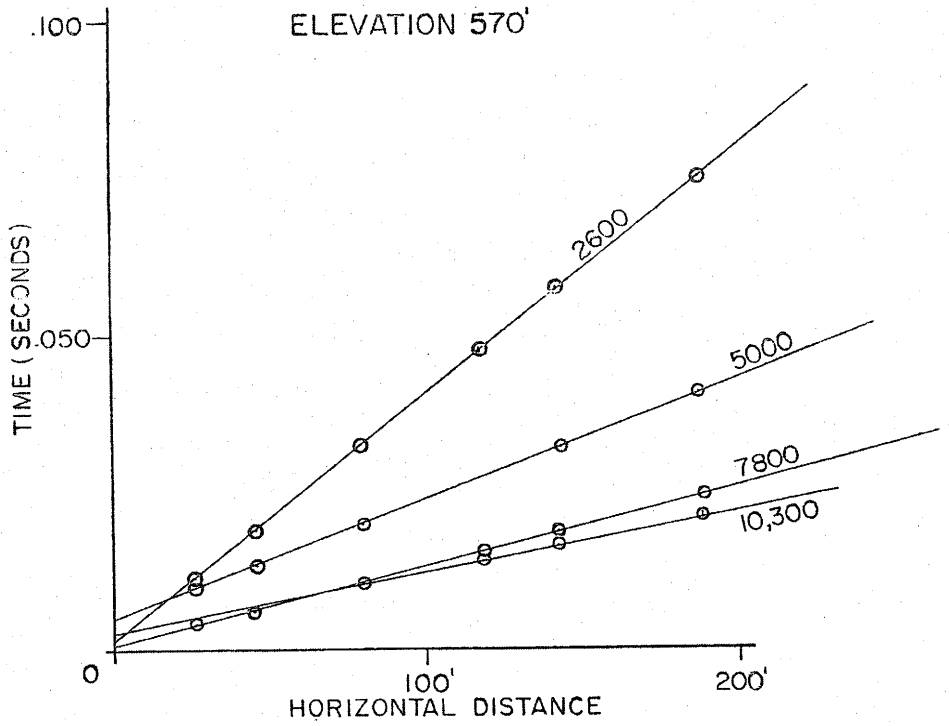


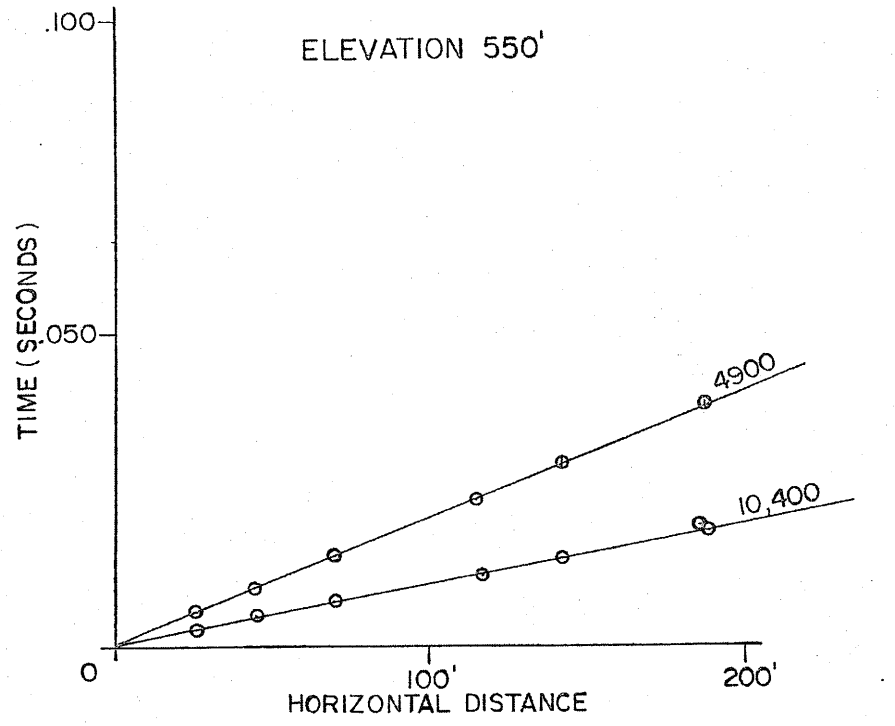
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Pressure vs. Depth

Figure 2.5-171



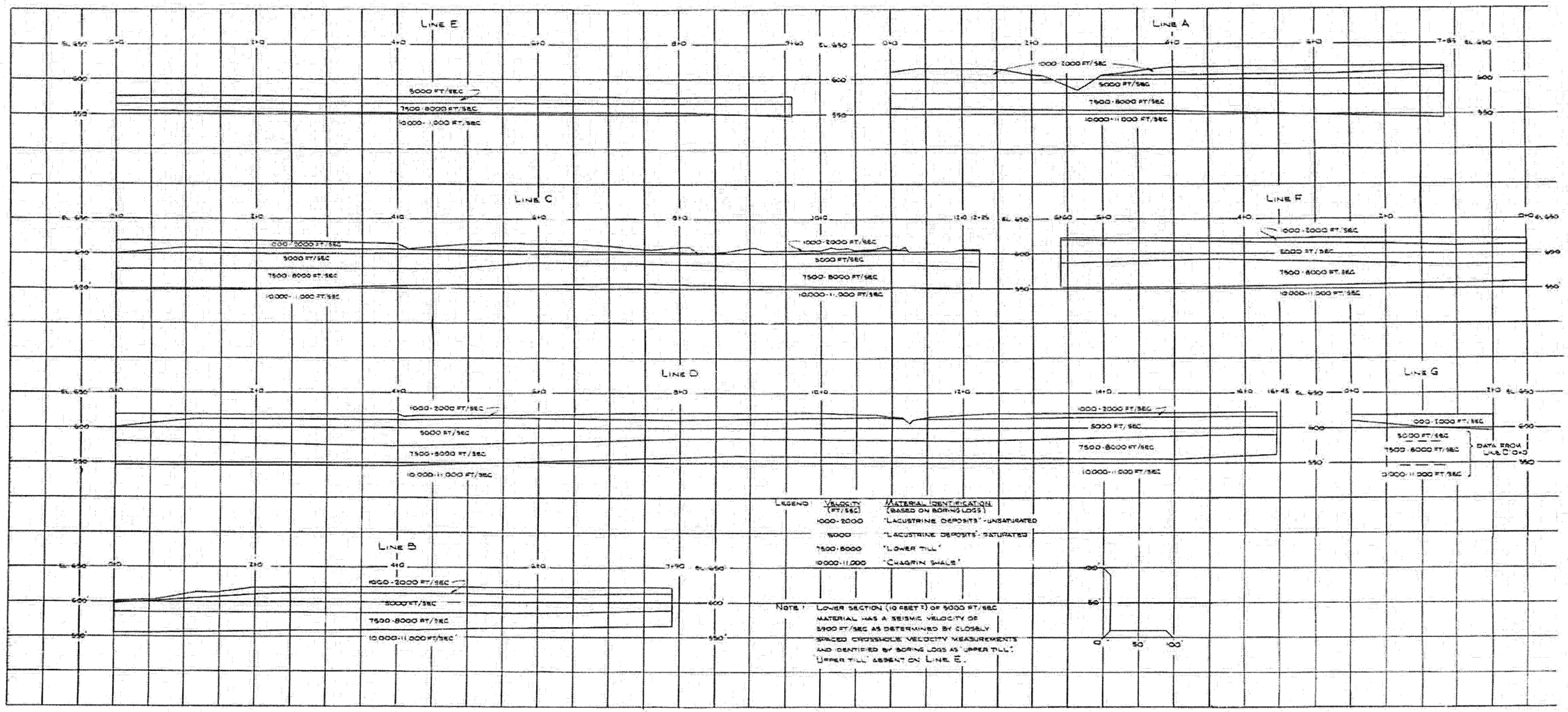


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Arrival Time vs. Distance

Figure 2.5-172



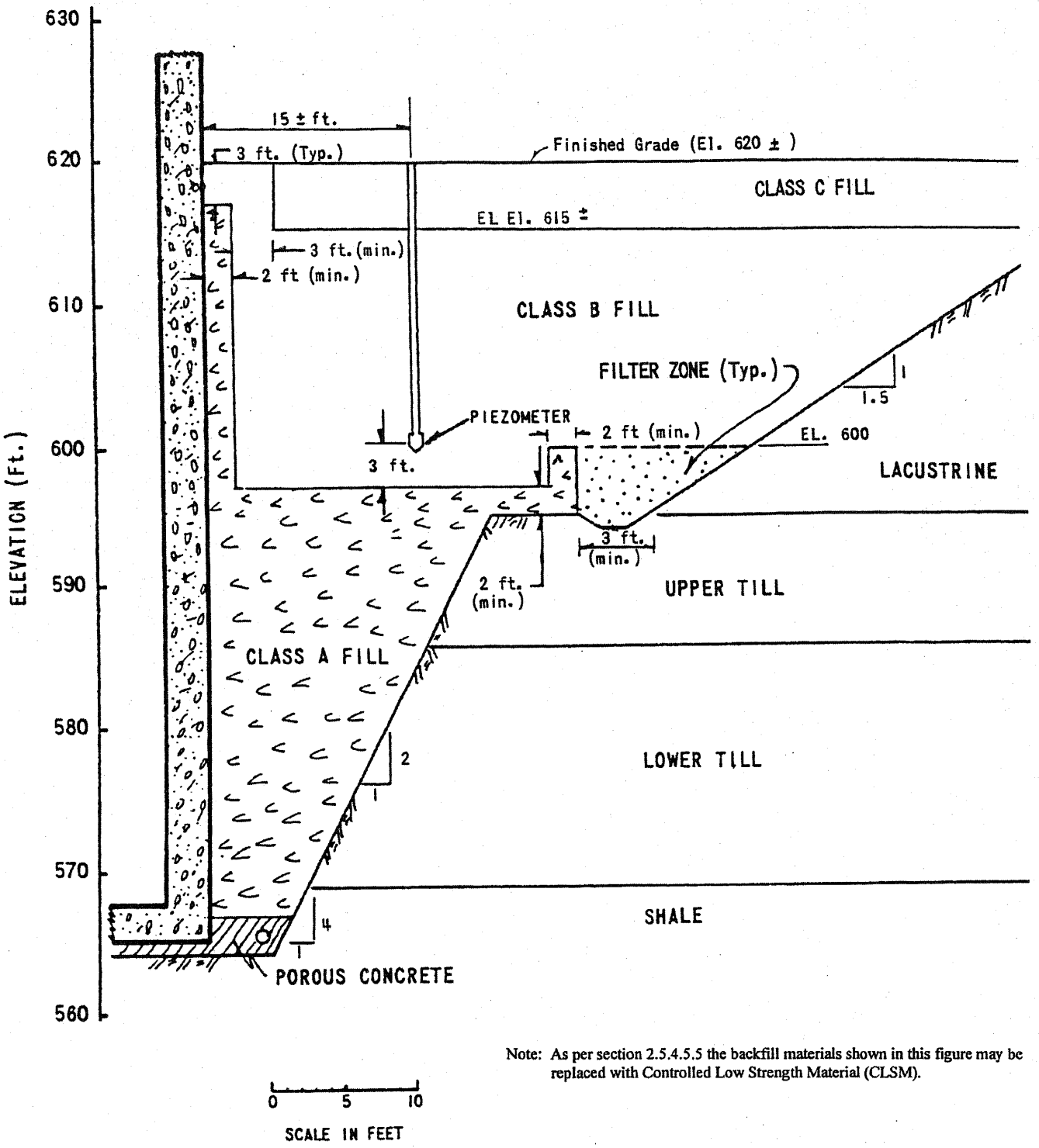
NOTE: See Figure 2.5-144 for Survey Line Traces.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Seismic Survey Profile

Figure 2.5-173



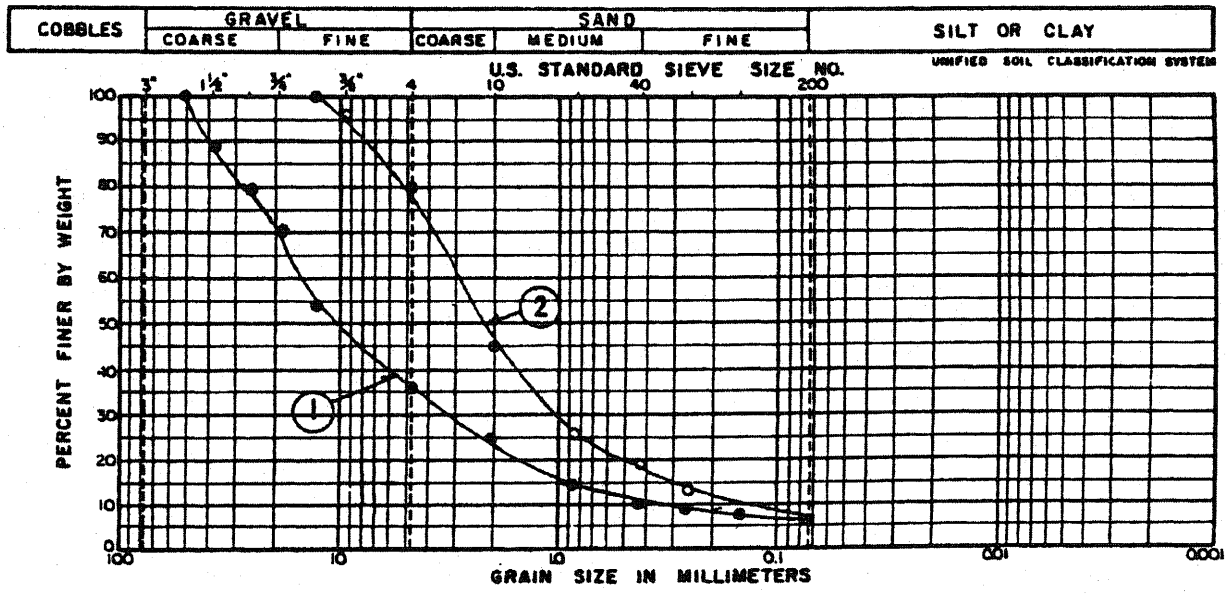
Note: As per section 2.5.4.5.5 the backfill materials shown in this figure may be replaced with Controlled Low Strength Material (CLSM).

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Backfill Section

Figure 2.5-174



(1) - QUARRY - RUN, CRUSHED DOLOMITIC LIMESTONE

(2) - TEST SAMPLE

(Rev. 12 1/03)

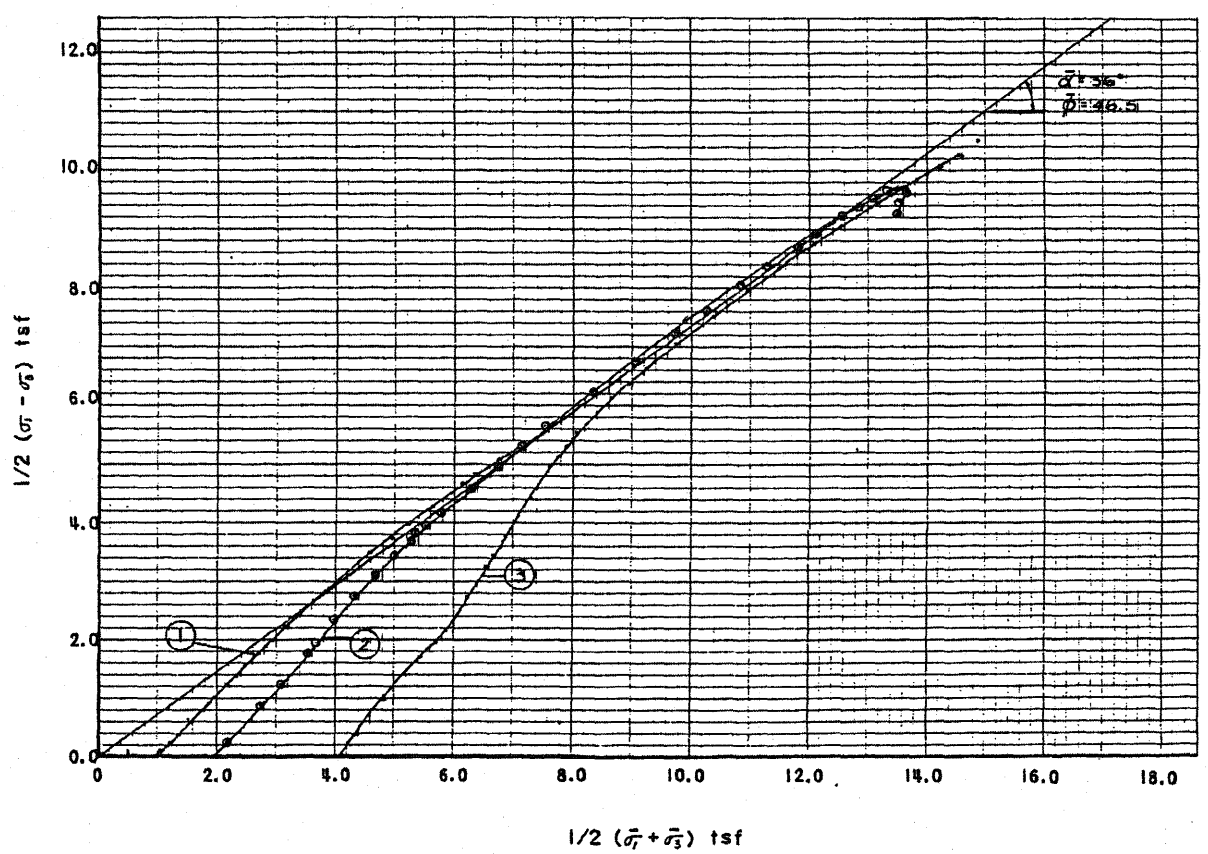
PERRY NUCLEAR POWER PLANT

Grain Size Distribution,
Class A Fill Design

Figure 2.5-175

Test No.	Unit Dry Wgt. (pcf)	Relative Density (%)	Effective Consol. Pressure (ksf) $\bar{\sigma}c$	Max. Stress Difference (ksf) $(\sigma 1-\sigma 3)_f$	Failure Strain ε_f (%)
①	120.7	85.0	2	31.3	12.9
②	120.6	85.0	4	37.4	9.0
③	120.9	86.0	6	42.0	8.3

NOTES: Maximum Density = 125 pcf
Minimum Density = 101 pcf

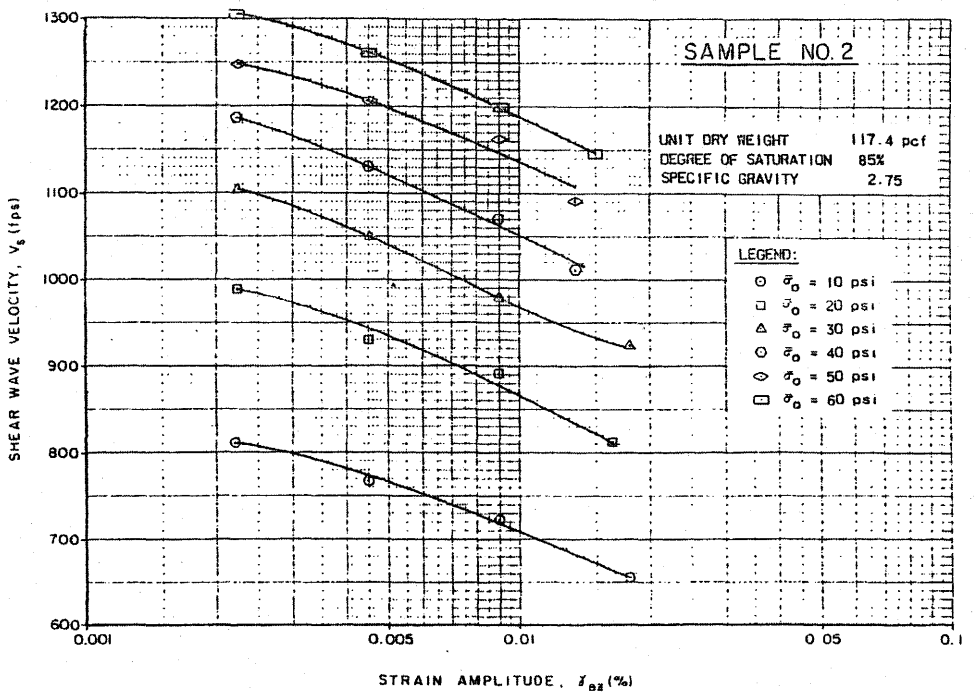


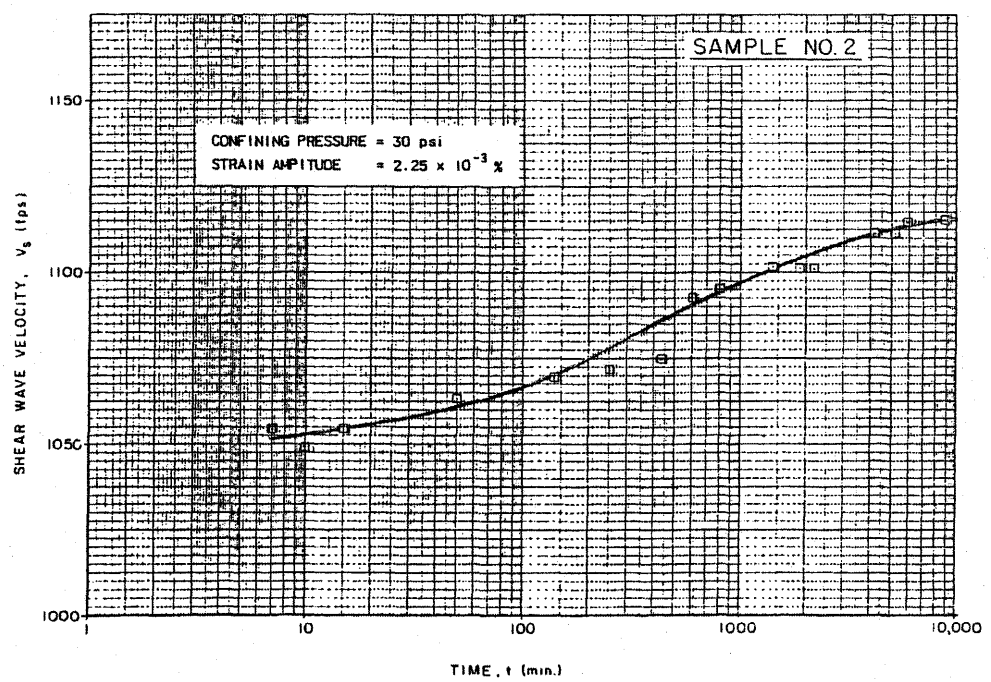
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Triaxial Compression
Test Results, Class A
Fill Design Investigation

Figure 2.5-176



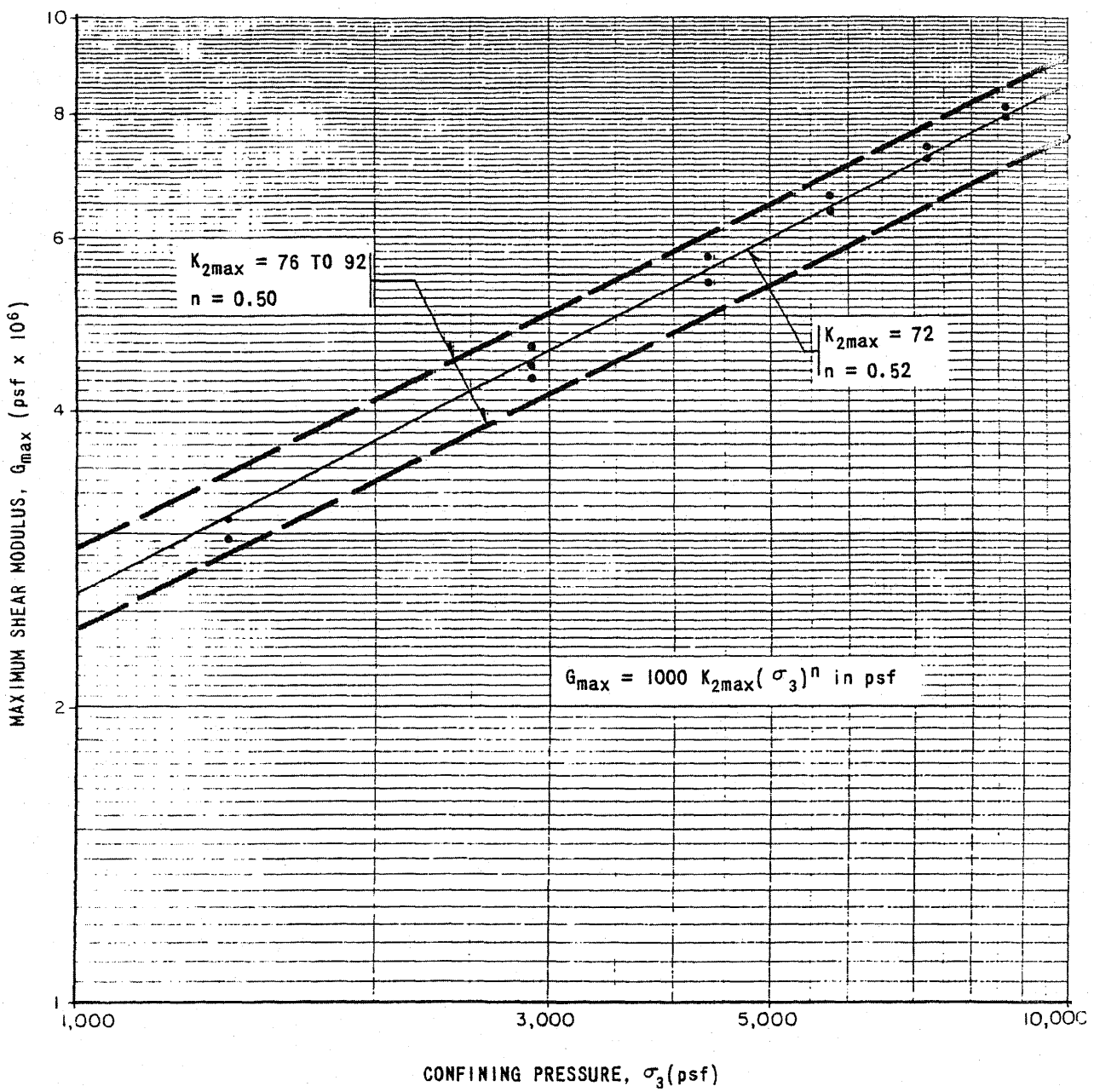


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Typical Results of High Amplitude Cyclic Torsion Tests, Class A Fill Design Investigations

Figure 2.5-177

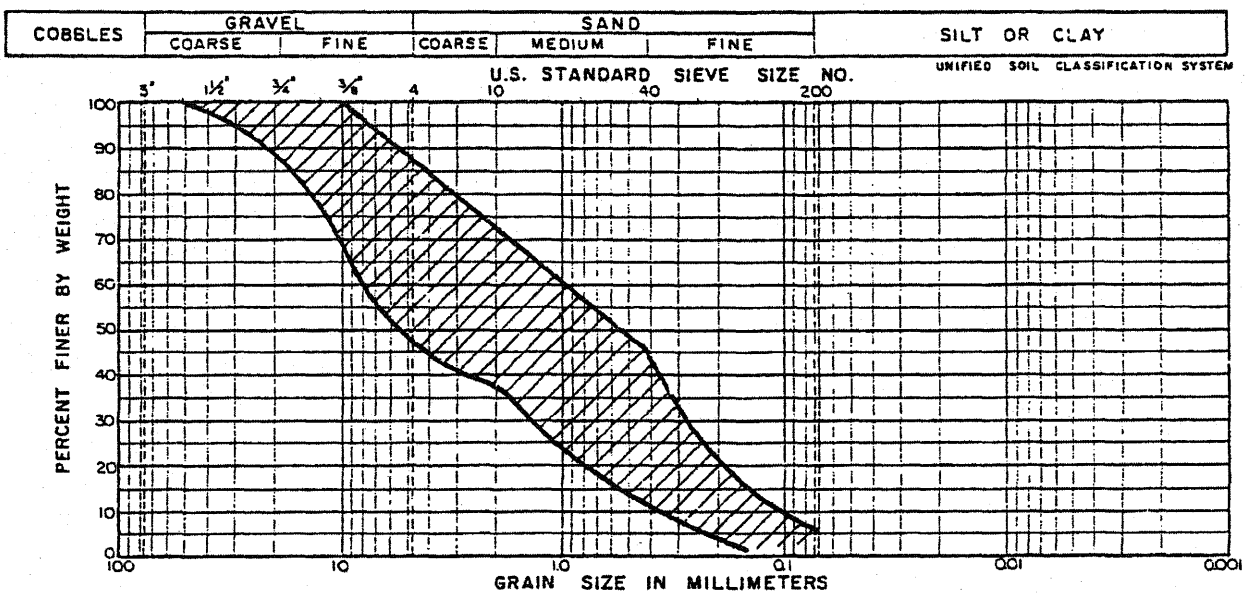


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Maximum Shear Modular vs.
Confining Pressure, Class A
Fill Design Investigation

Figure 2.5-178



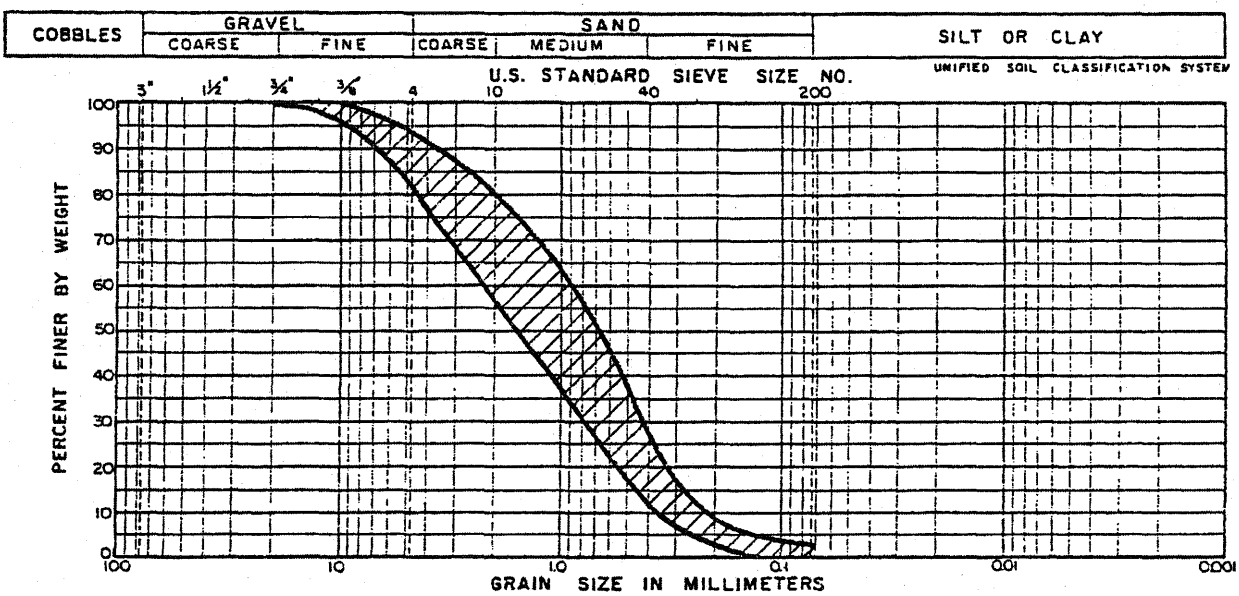
NOTE: RANGE IS ESTIMATED BASED ON A RANDOM SAMPLING OF APPROXIMATELY 675 TESTS

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Range of Grain Size Distribution
Test Results for Class A Fill
(Bestone Quarry)

Figure 2.5-179



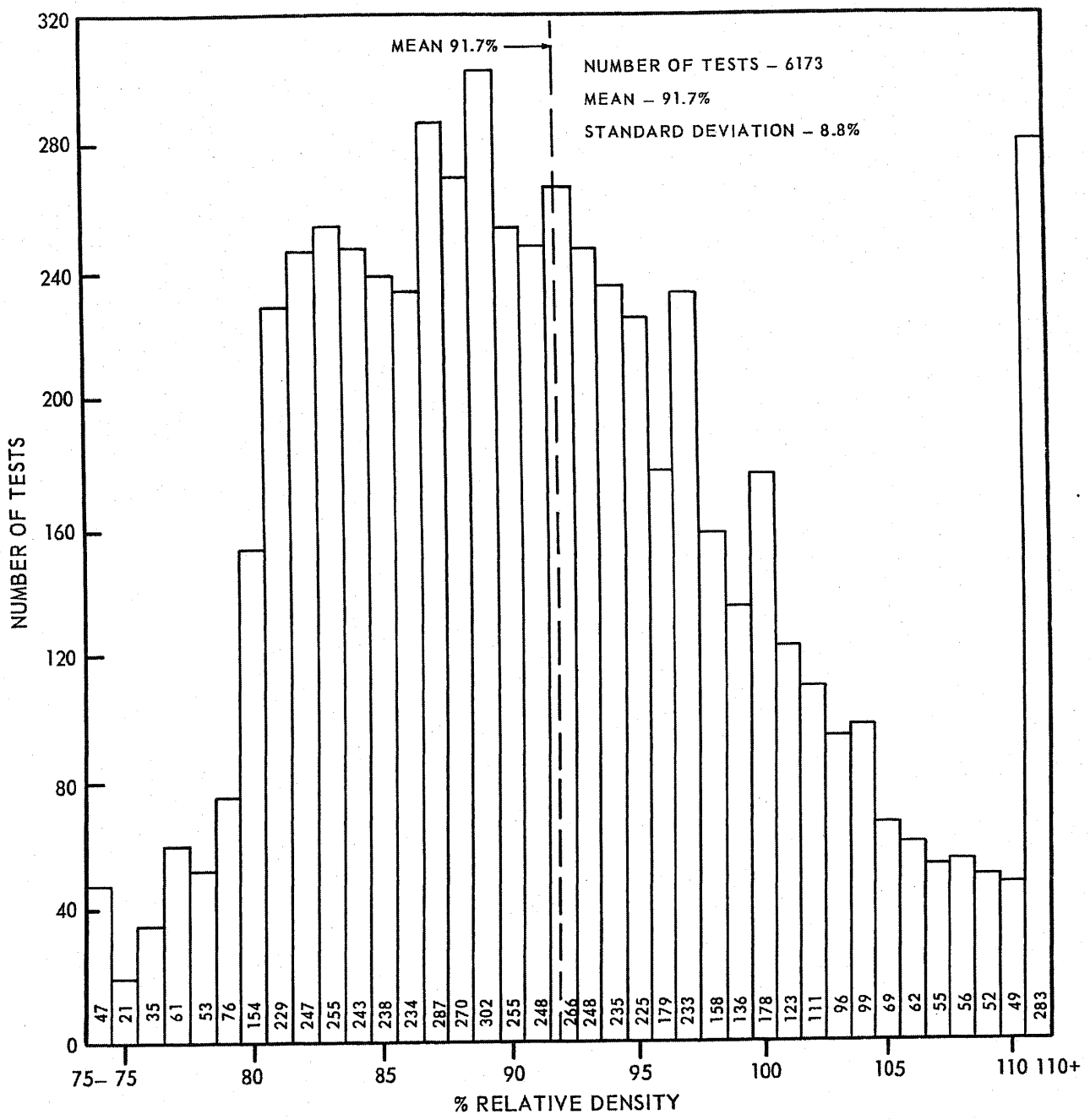
NOTE: RANGE IS ESTIMATED BASED ON A RANDOM SAMPLING OF APPROXIMATELY 5500 TESTS

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Range of Grain Size Distribution
Test Results for Class A Fill
(Sidley Quarry)

Figure 2.5-180

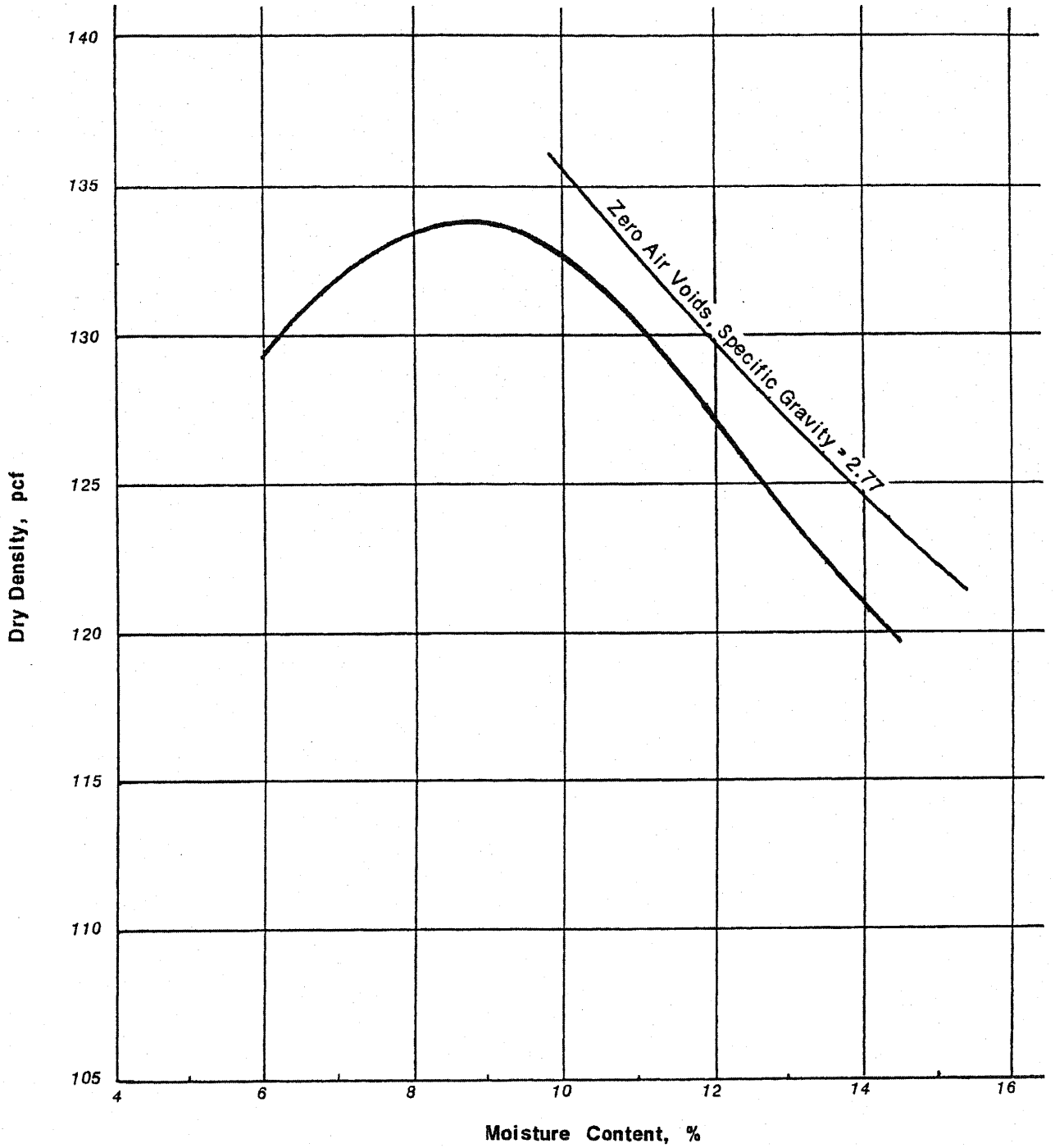


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Class A Fill - Field
Density Tests

Figure 2.5-181



(Rev. 12 1/03)

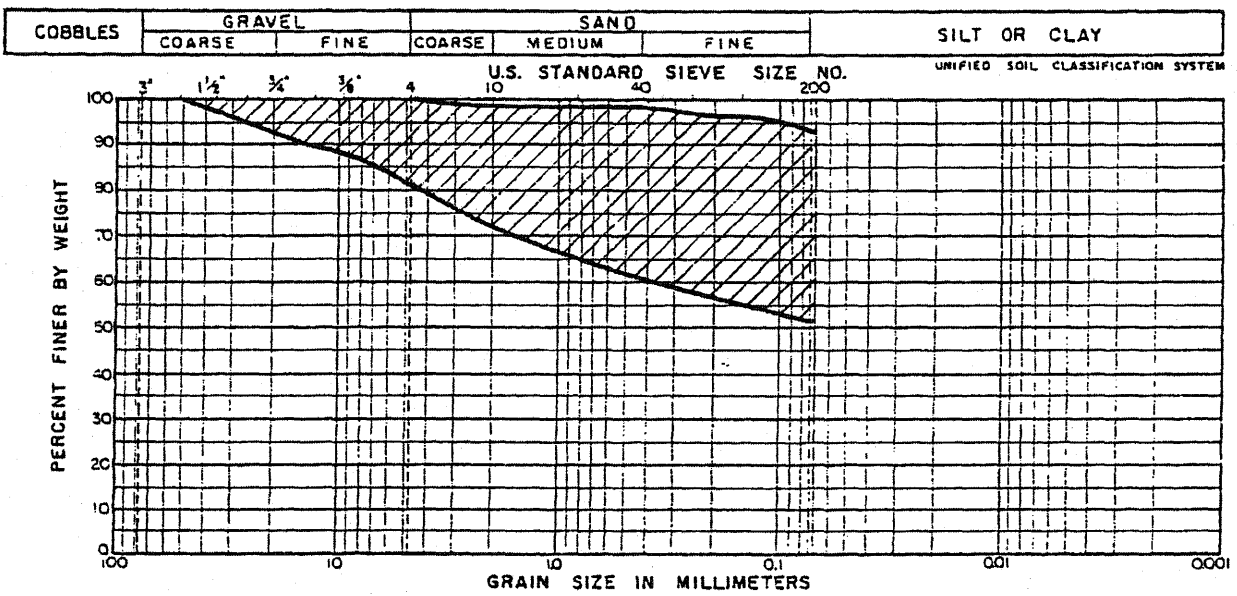
Maximum Dry Density: 133.7 pcf

Optimum Moisture: 8.9 %

PERRY NUCLEAR POWER PLANT

Typical Compaction Curve,
Class B Fill

Figure 2.5-182



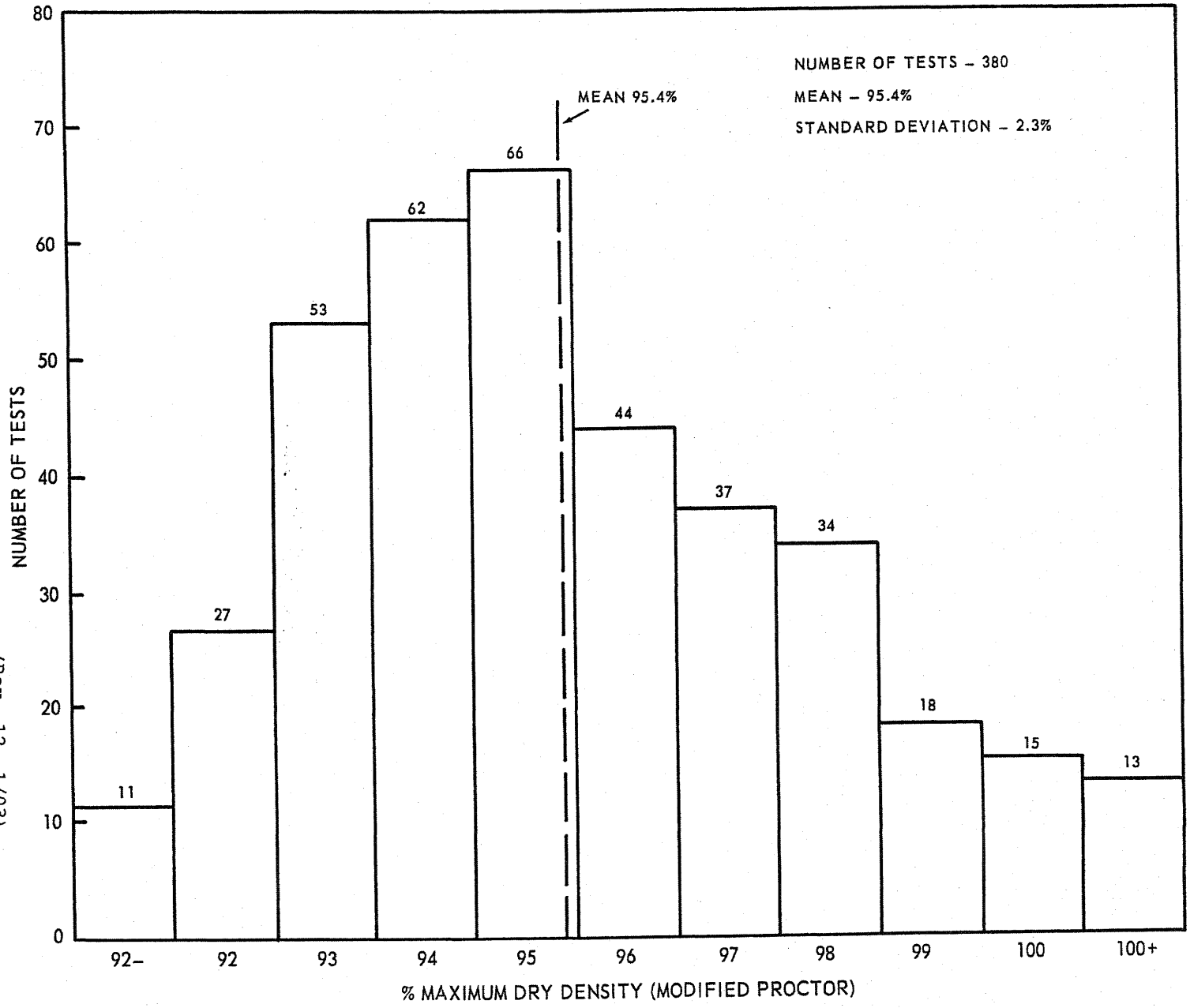
NOTE: RANGE IS ESTIMATED BASED ON A RANDOM SAMPLING OF APPROXIMATELY 200 TESTS

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Range of Grain Size Distribution
Test Results for Class B Fill

Figure 2.5-183

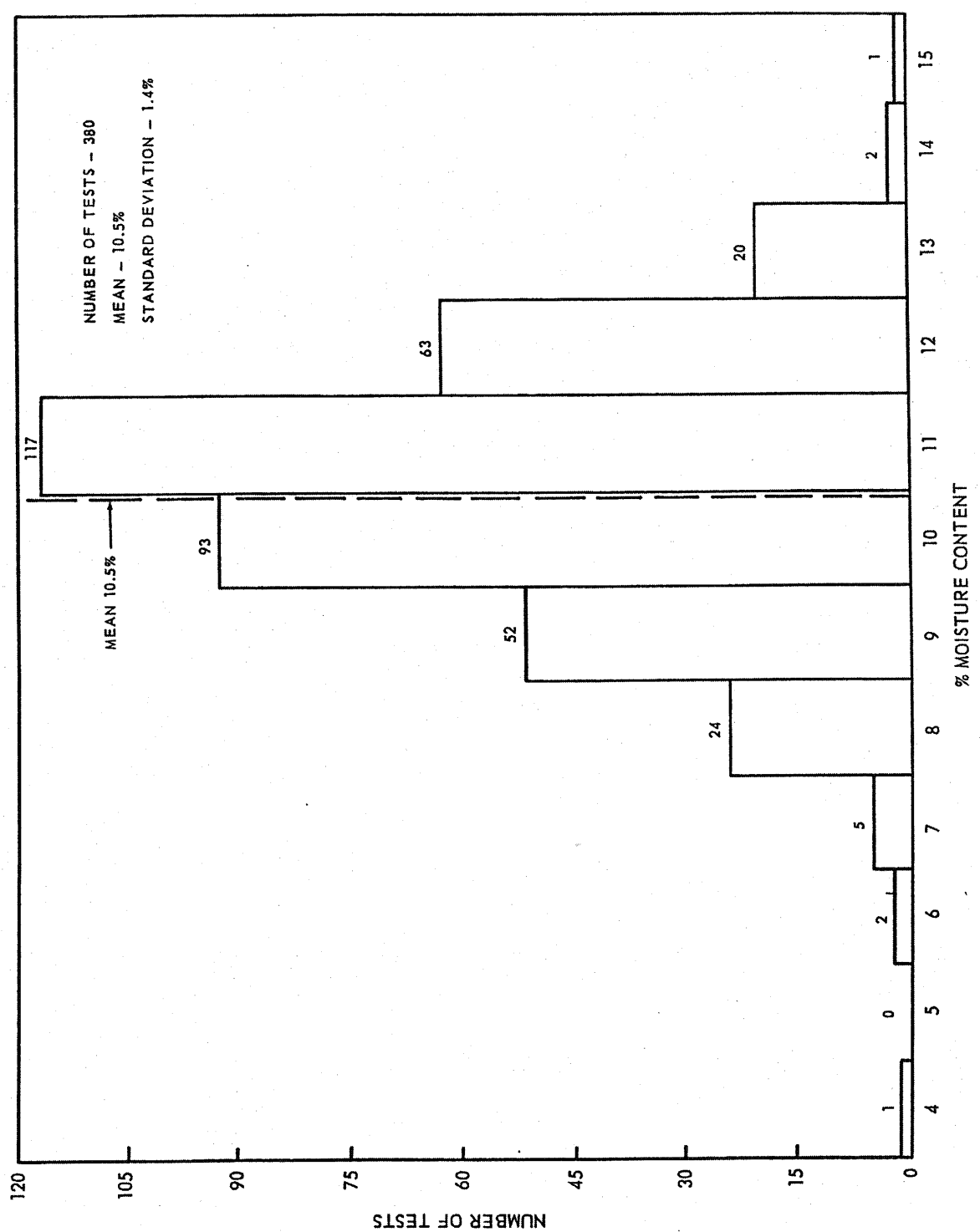


PERRY NUCLEAR POWER PLANT

(Rev. 12 1/03)

Class B Fill - Field Density Tests

Figure 2.5-184



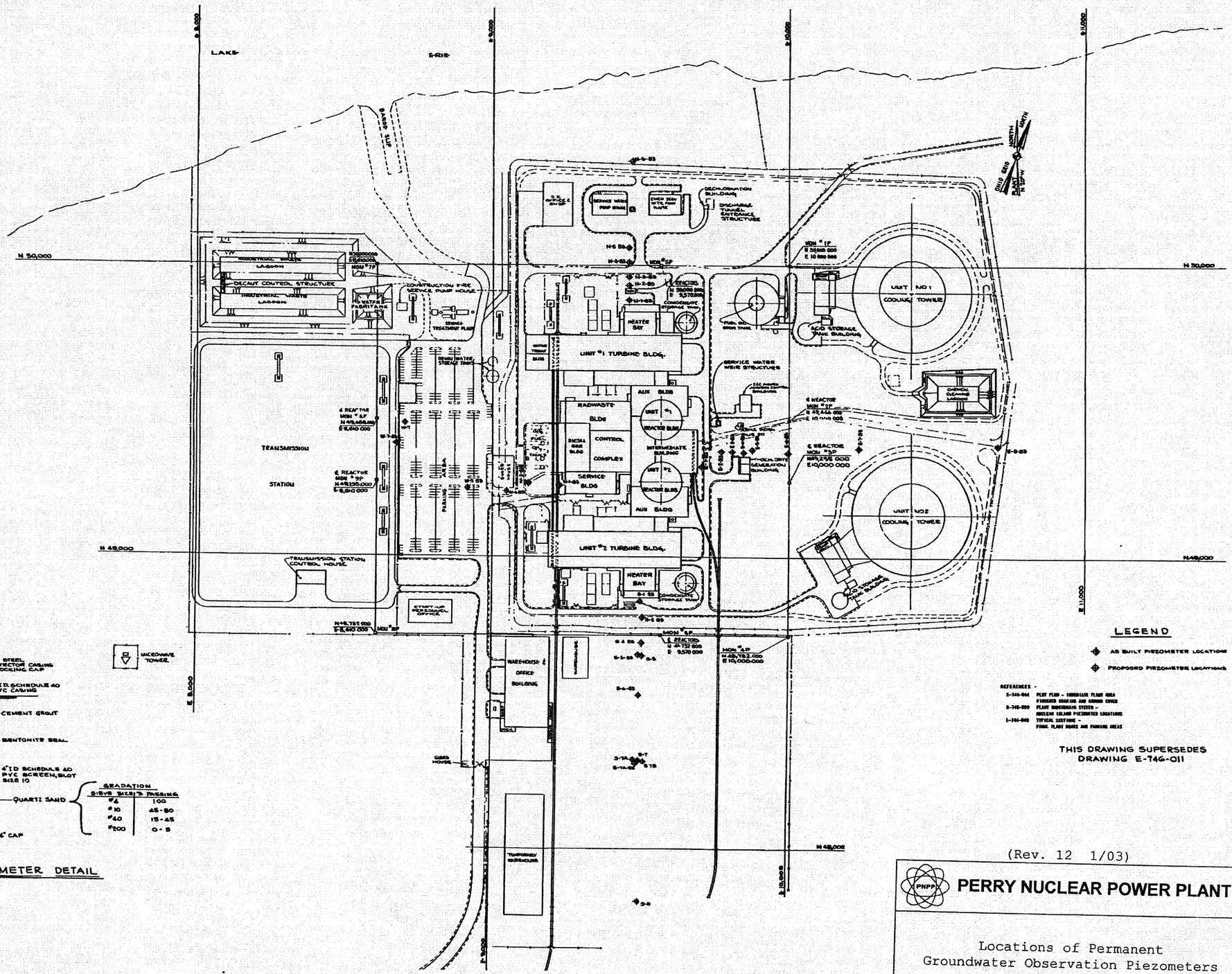
(Rev. 12 1/03)

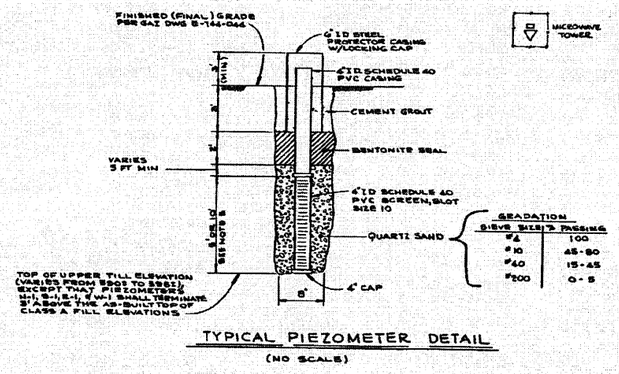
PERRY NUCLEAR POWER PLANT

Class B Fill - Field
Moisture Tests

Figure 2.5-185

PIEZOMETER LOCATION SCHEDULE		
PIEZOMETER	LOCATION	
	N COORD	E. COORD
N-1-85	49,880.43	9,458.89
N-2-85	49,929.51	9,460.46
N-3-85	49,999.31	9,460.63
N-4-85	50,009.13	9,460.59
N-5-85	50,039.40	9,458.54
N-6-85	50,151.64	9,471.80
S-1-85	48,845.38	9,500.18
S-2-85	48,750.46	9,505.26
S-4-85	48,108.22	9,505.64
S-5	48,460.0	9,500.9
S-6-85	48,467.09	9,498.40
S-8-85	48,329.57	9,488.54
S-7	48,300.1	9,488.5
S-7A	48,802.7	9,494.3
S-7A-85	48,301.62	9,488.51
S-7B	48,287.8	9,501.9
S-8	47,880.4	9,500.7
E-1-85	49,308.33	9,706.58
E-2-85	49,360.22	9,769.30
E-3-85	49,359.81	9,803.52
E-6-85	49,386.80	9,847.05
E-5-85	49,369.42	9,817.01
E-6-85	48,936.40	9,996.78
E-7-85	49,330.27	10,238.94
E-8-85	49,362.11	10,108.97
W-1-85	48,244.80	9,226.15
W-3-85	49,231.71	9,121.01
W-4-85	49,282.21	9,049.26
W-5-85	49,336.94	8,916.30
W-7	49,458.1	8,706.0
W-7-85	49,386.95	8,675.80





TYPICAL PIEZOMETER DETAIL

(NO SCALE)

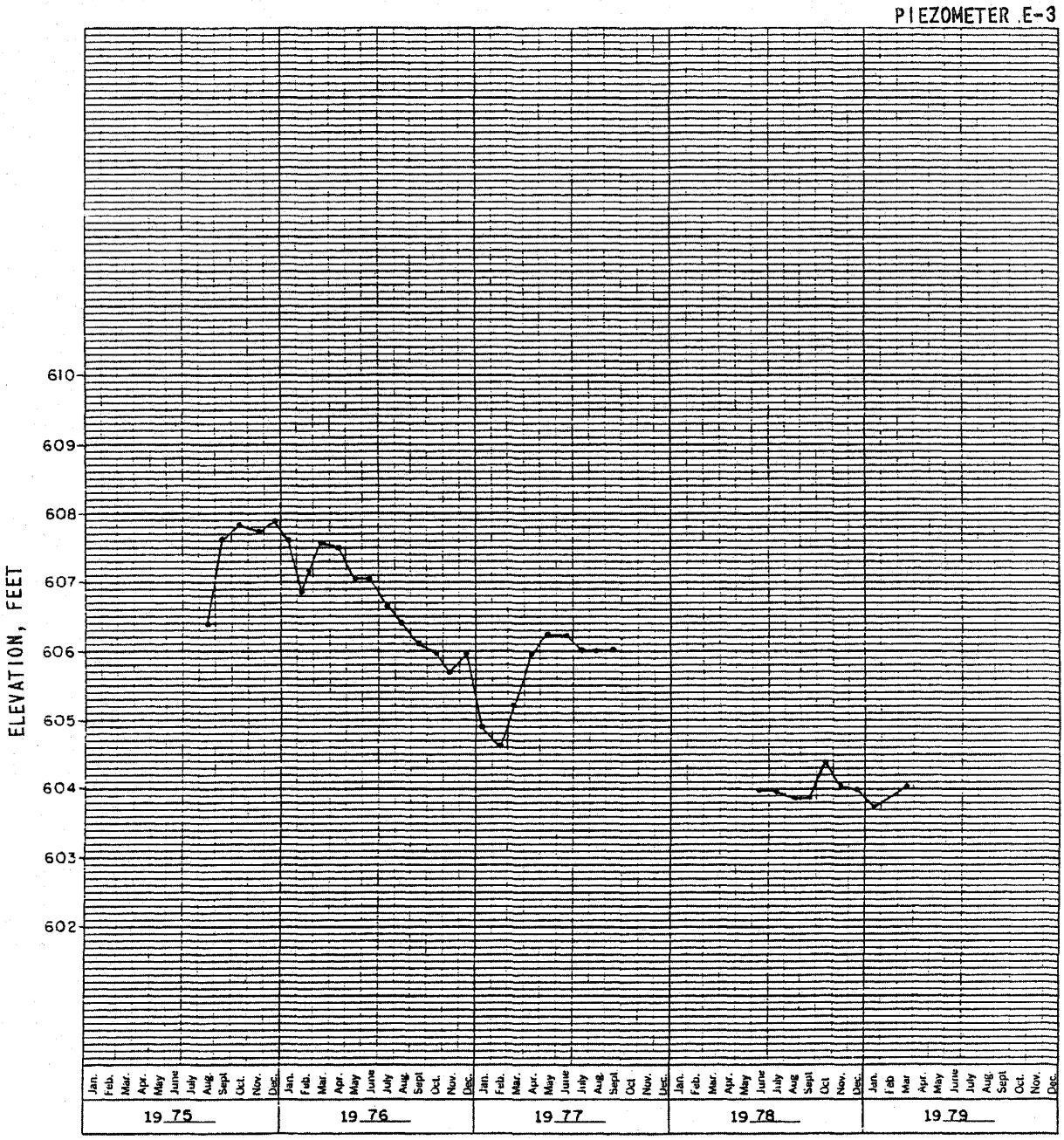
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Locations of Permanent Groundwater Observation Piezometers

Figure 2.5-186

PIEZOMETER E-3

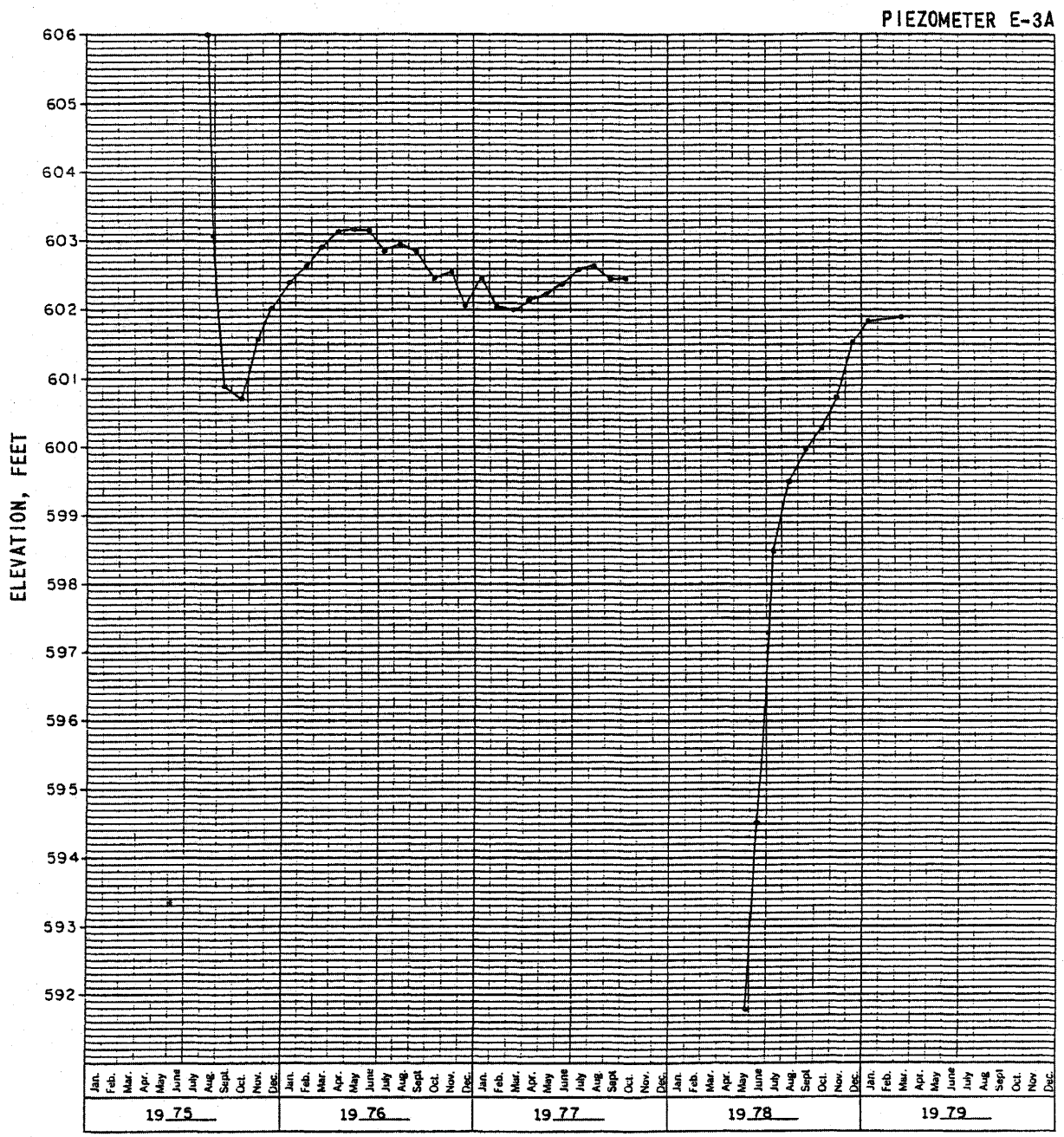


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 1 of 34)

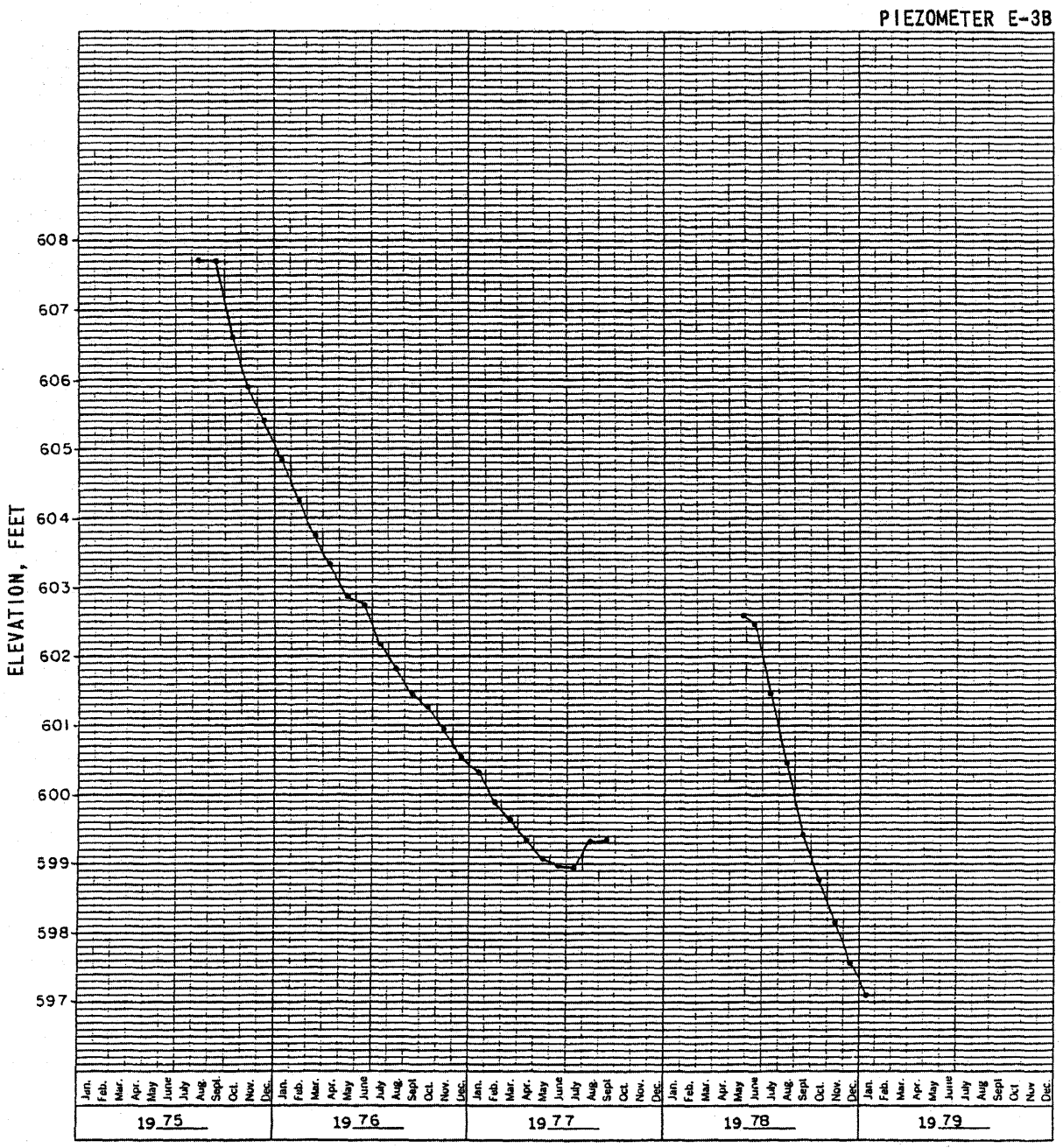


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 2 of 34)

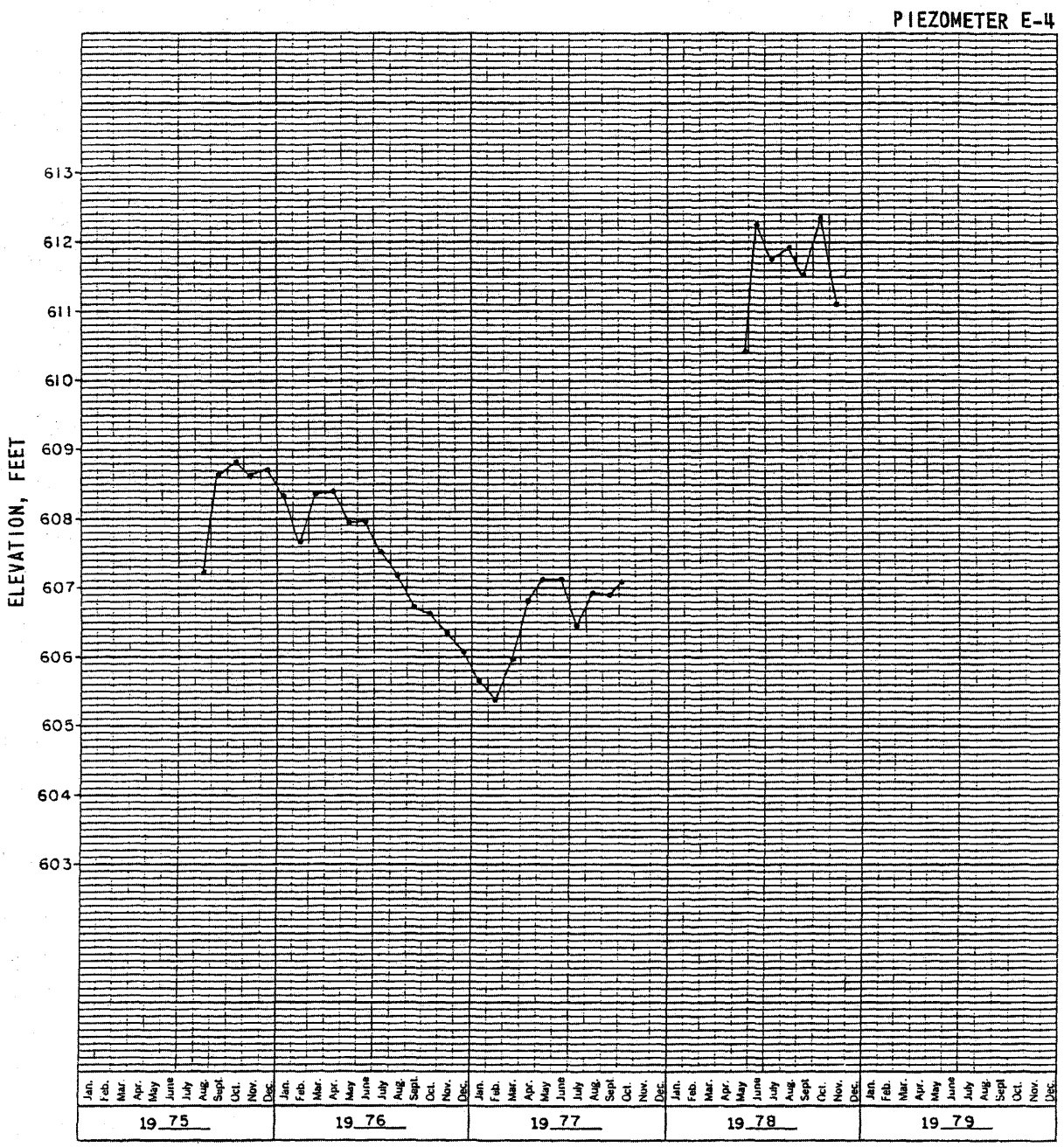


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 3 of 34)



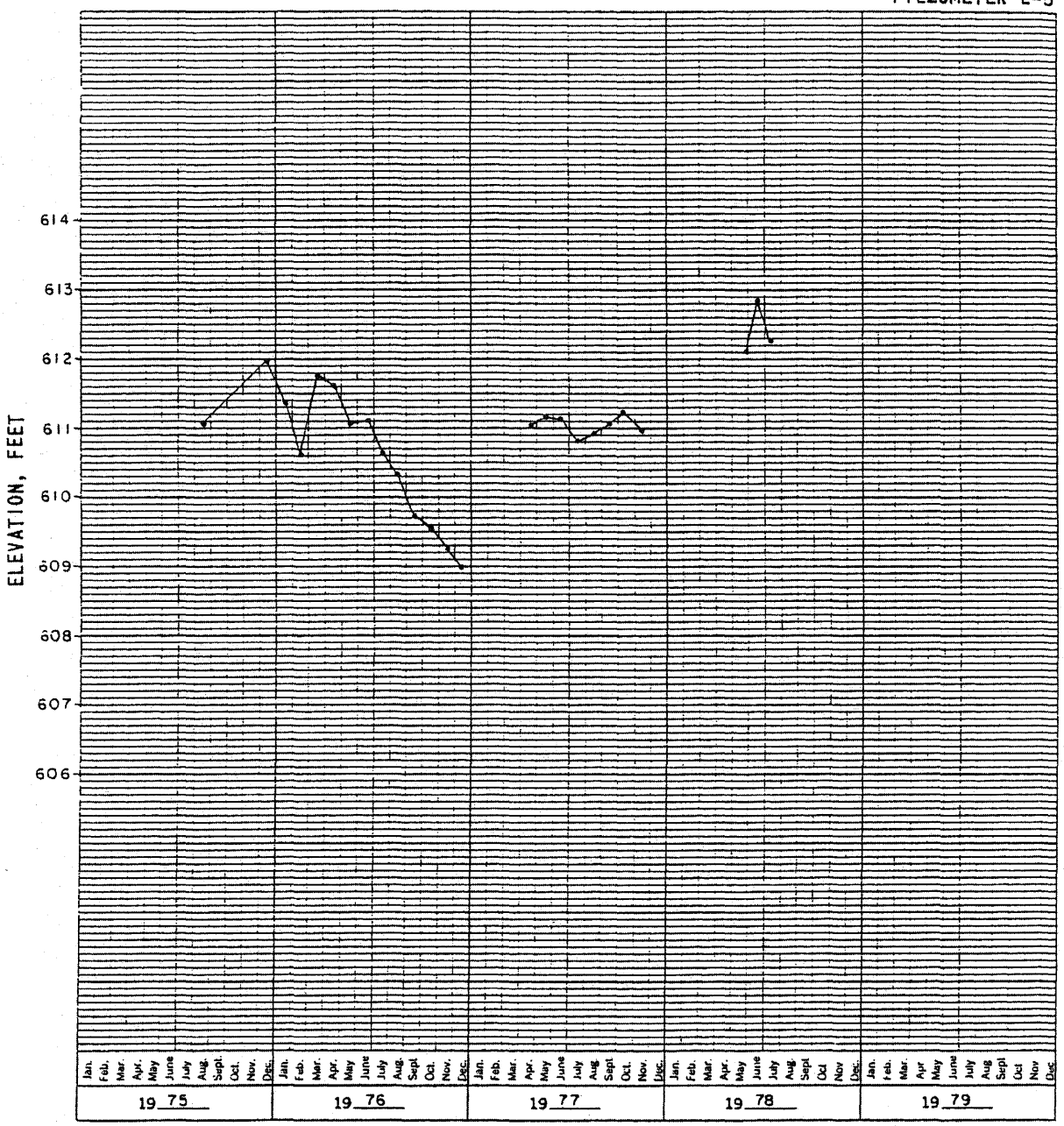
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 4 of 34)

PIEZOMETER E-5

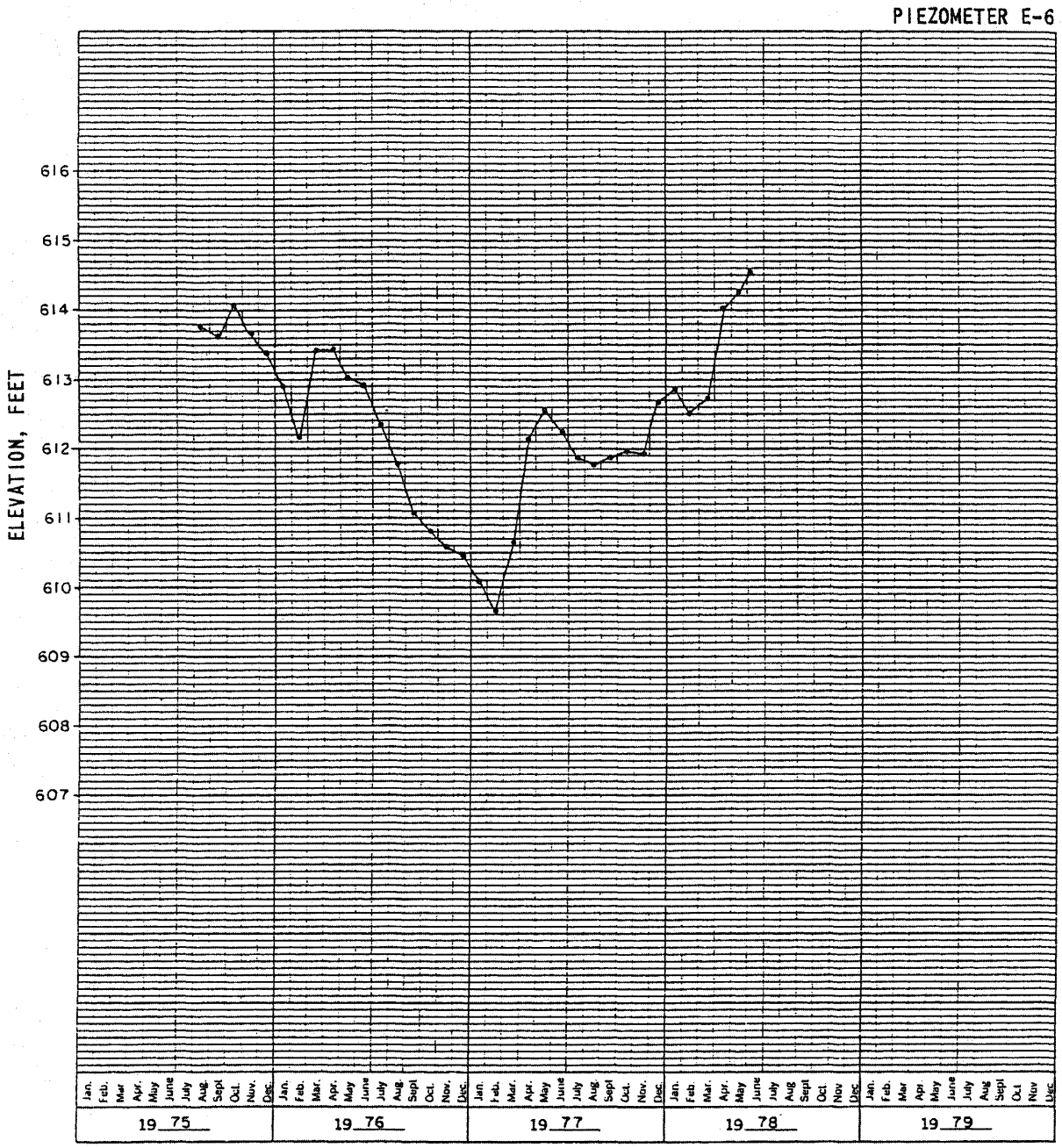


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 5 of 34)

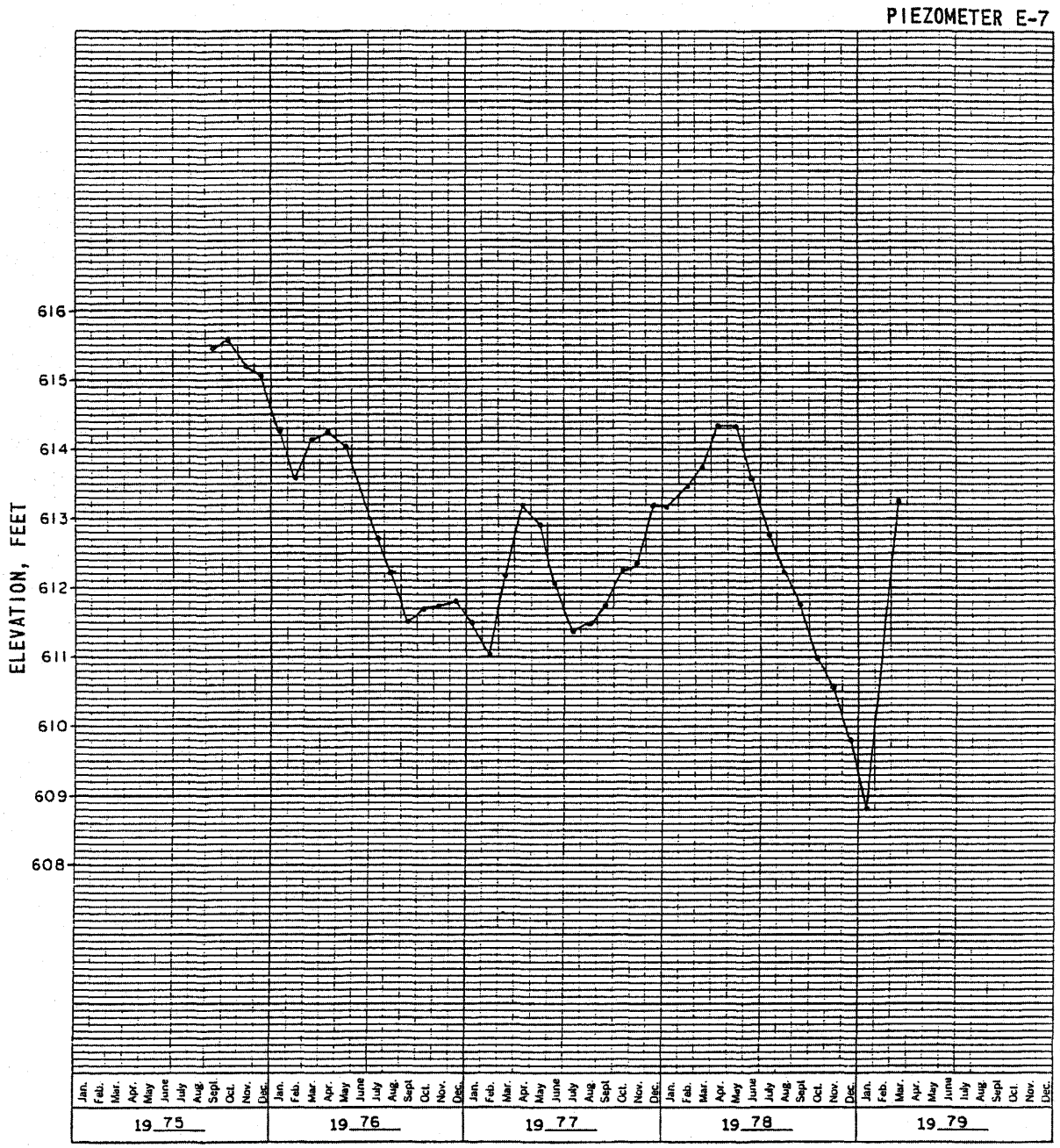


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 6 of 34)

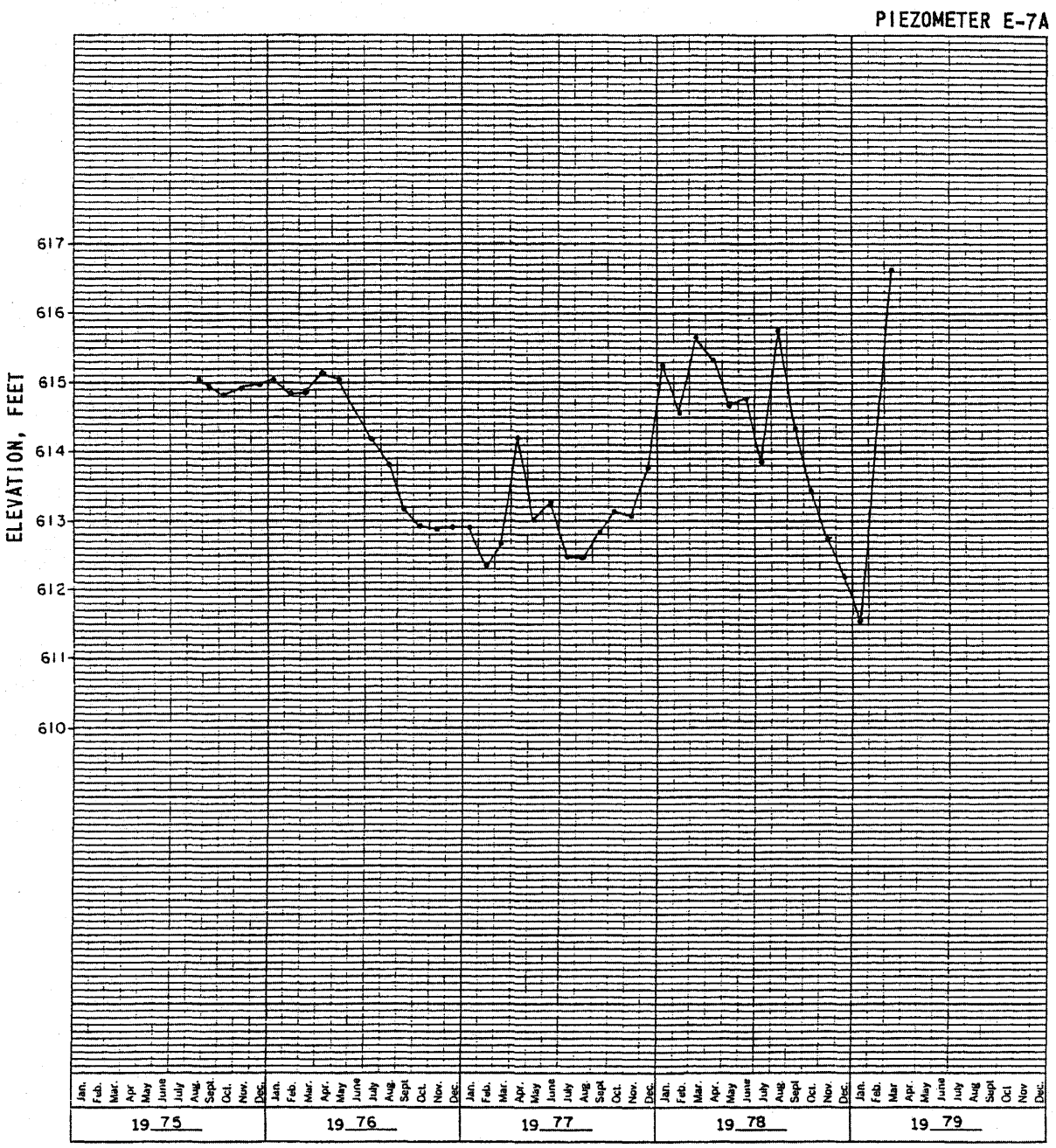


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 7 of 34)

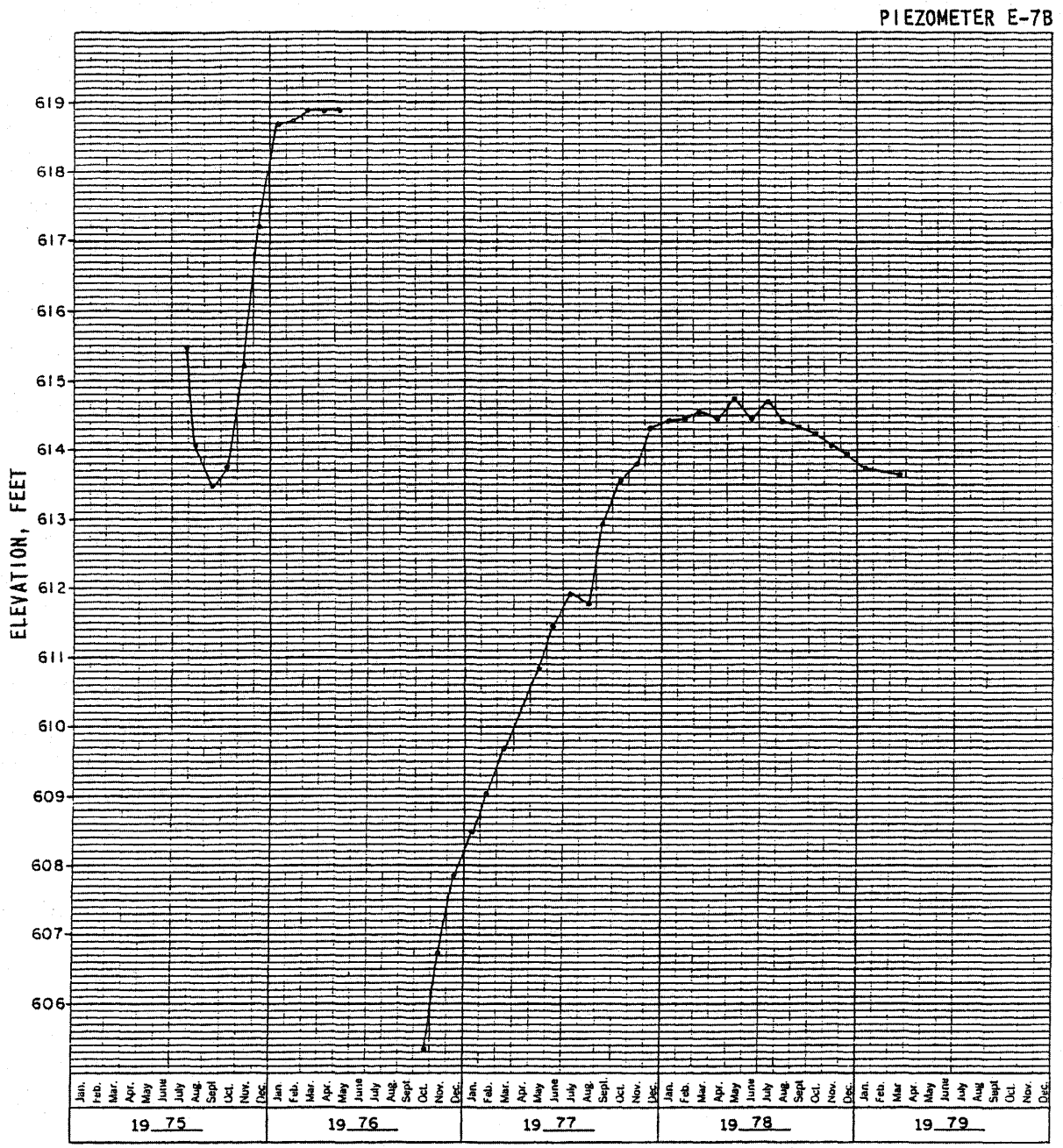


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 8 of 34)



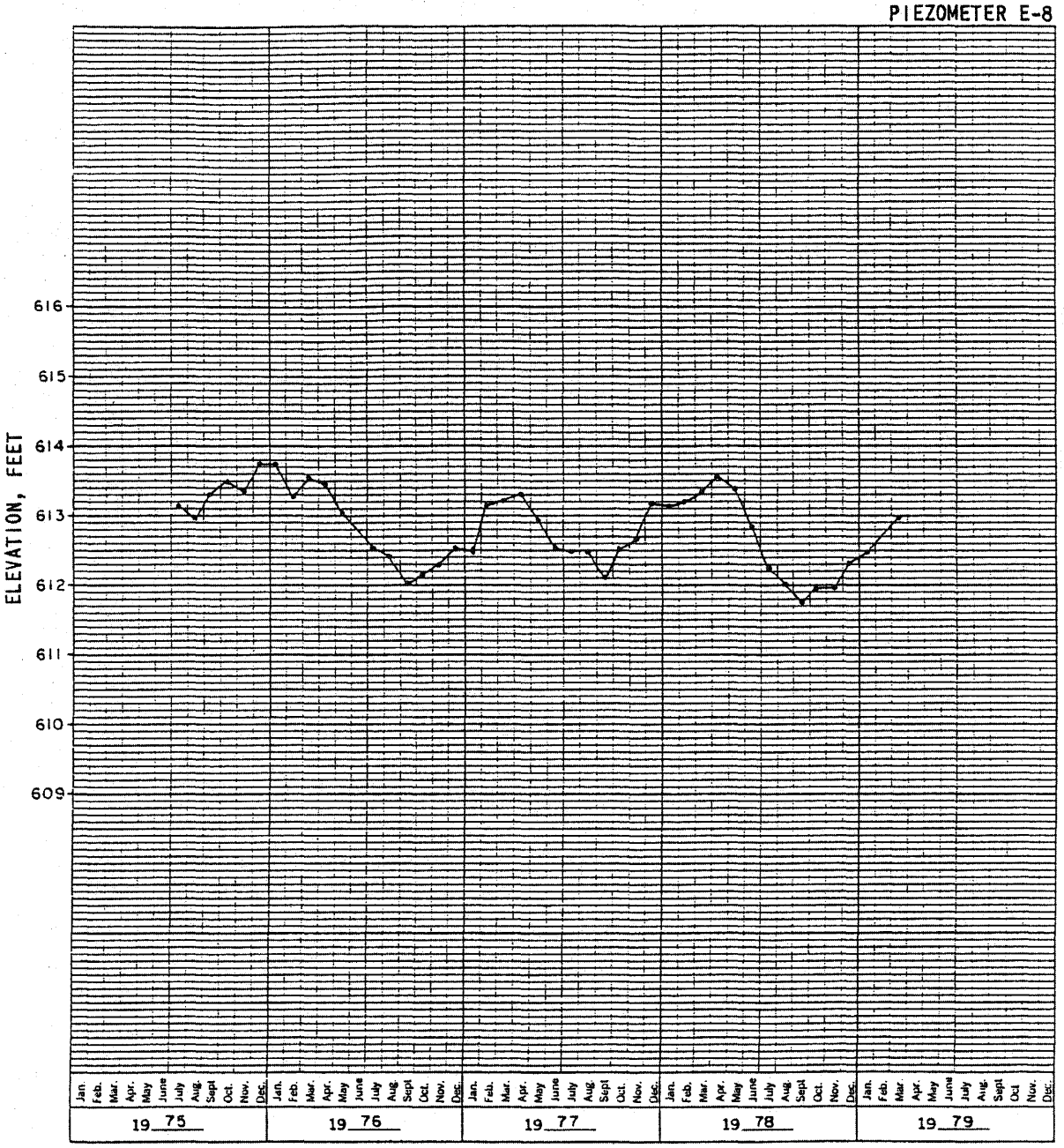
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 9 of 34)

PIEZOMETER E-8

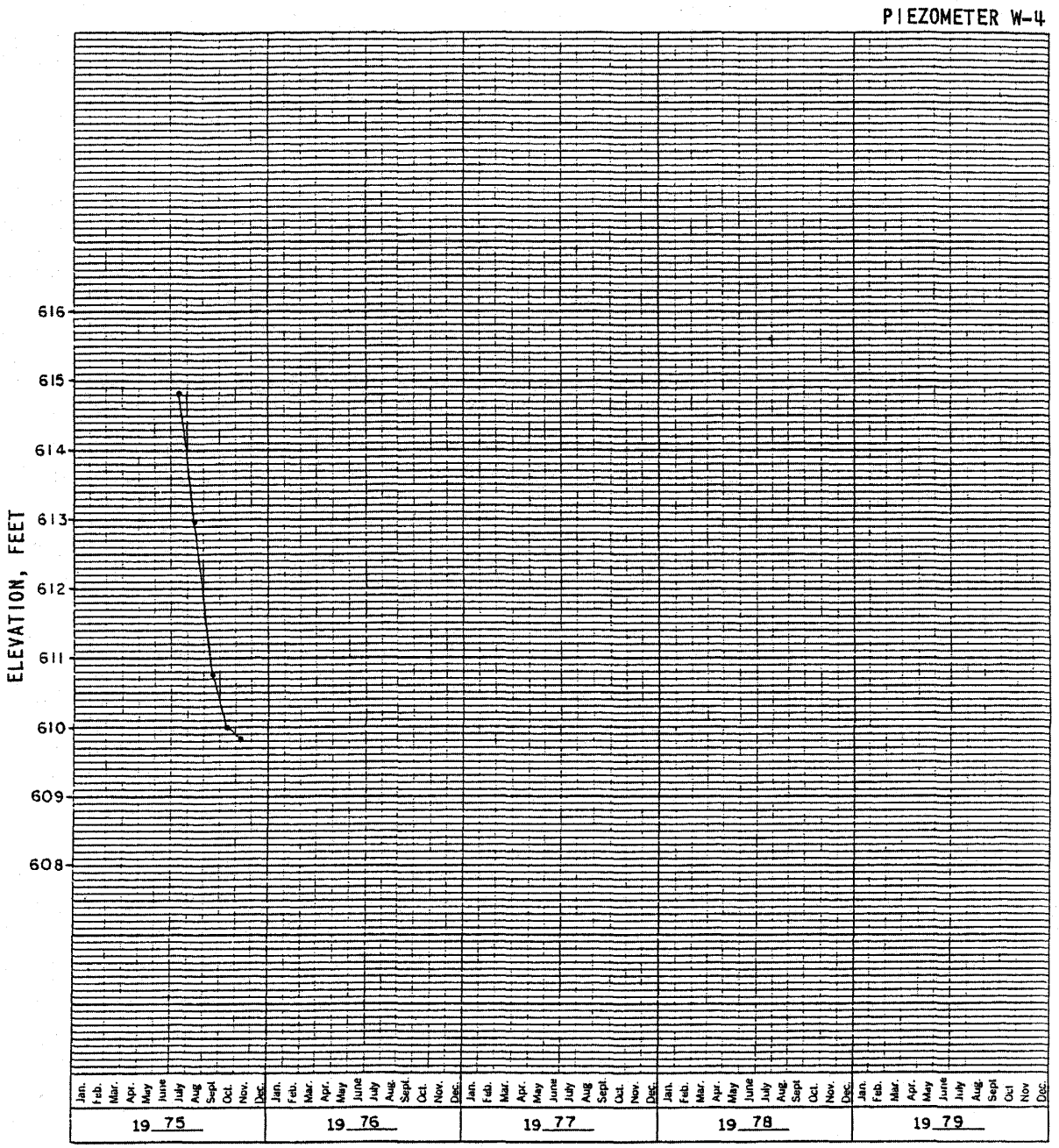


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 10 of 34)

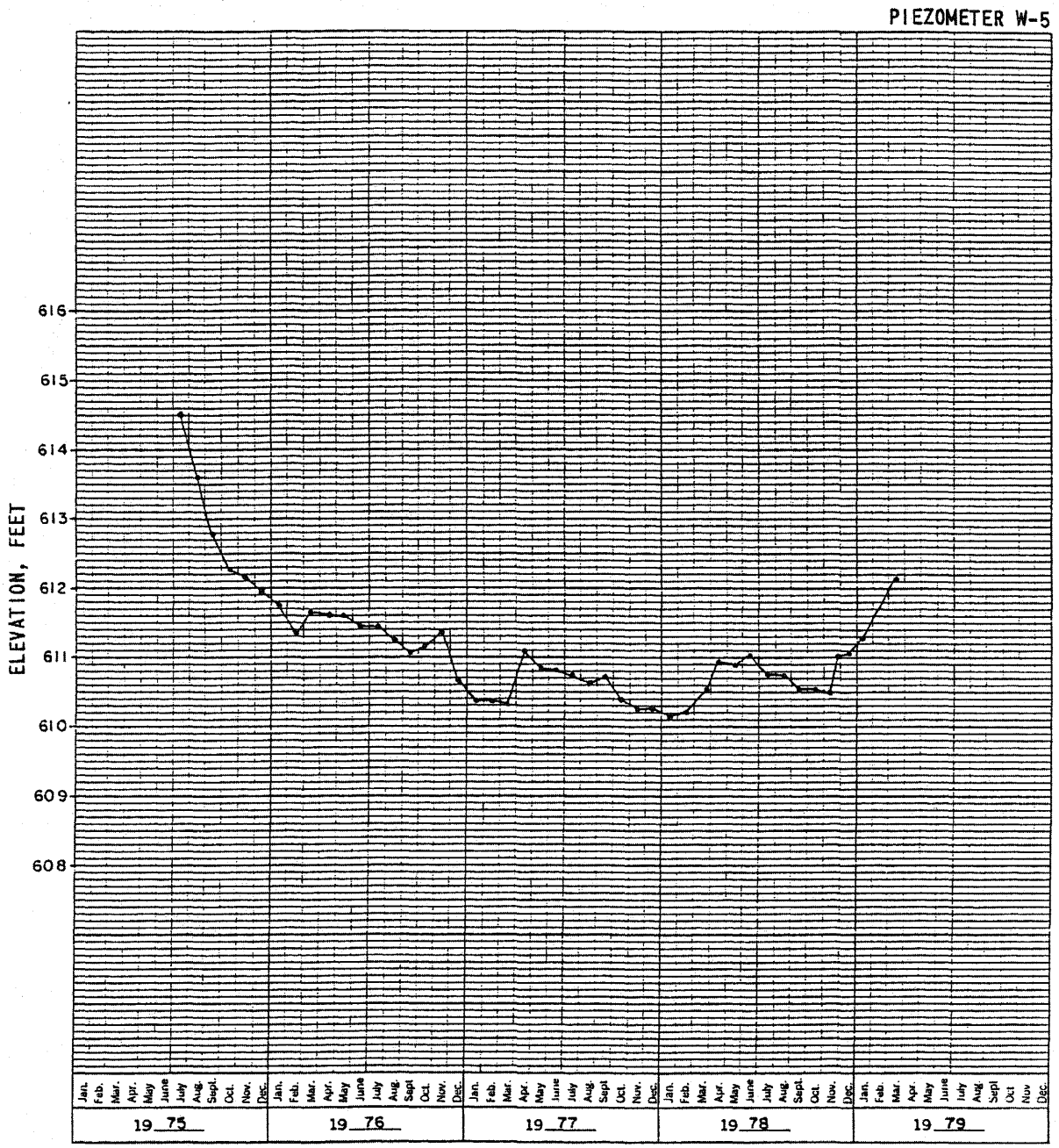


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 11 of 34)



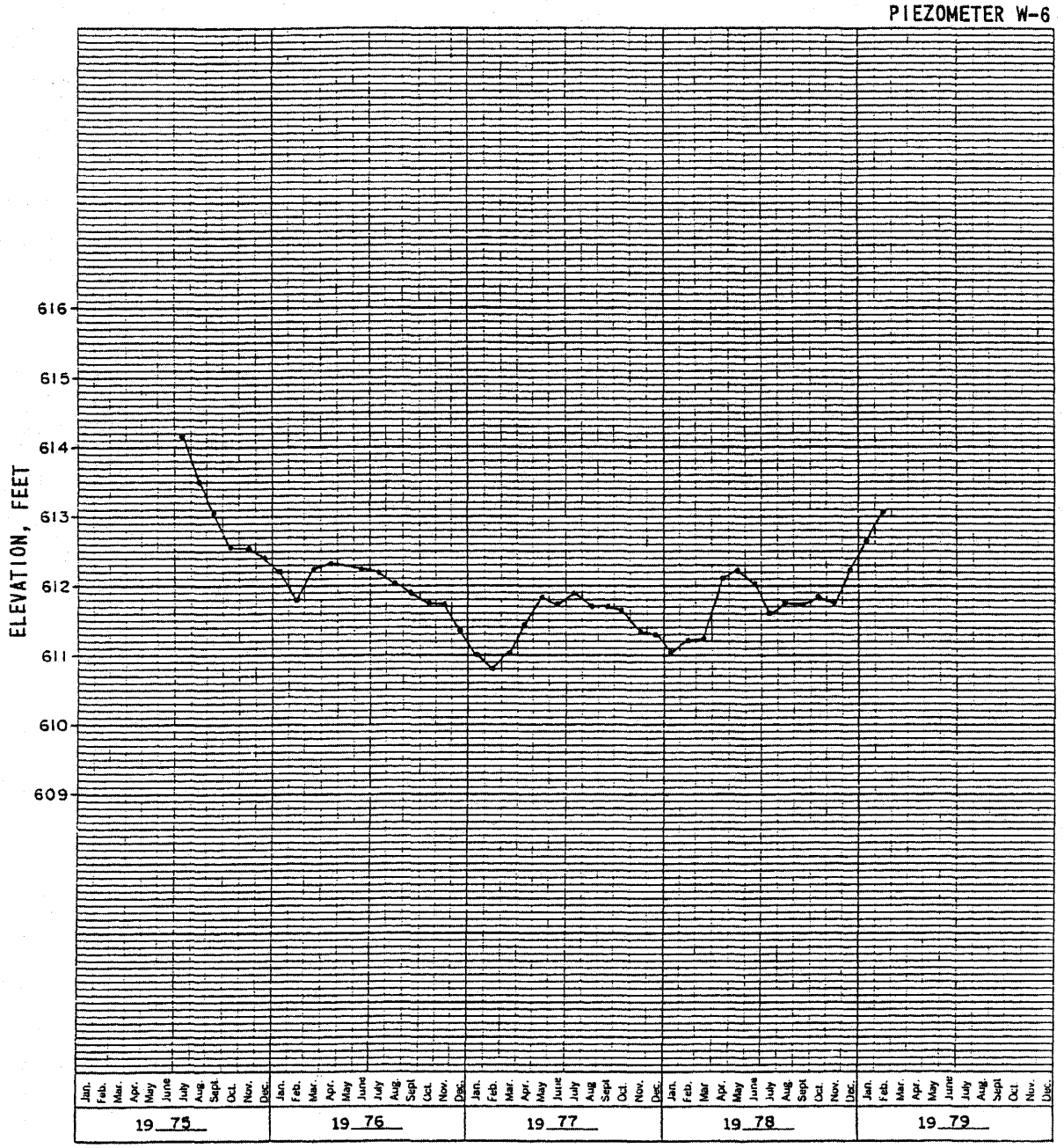
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 12 of 34)

PIEZOMETER W-6



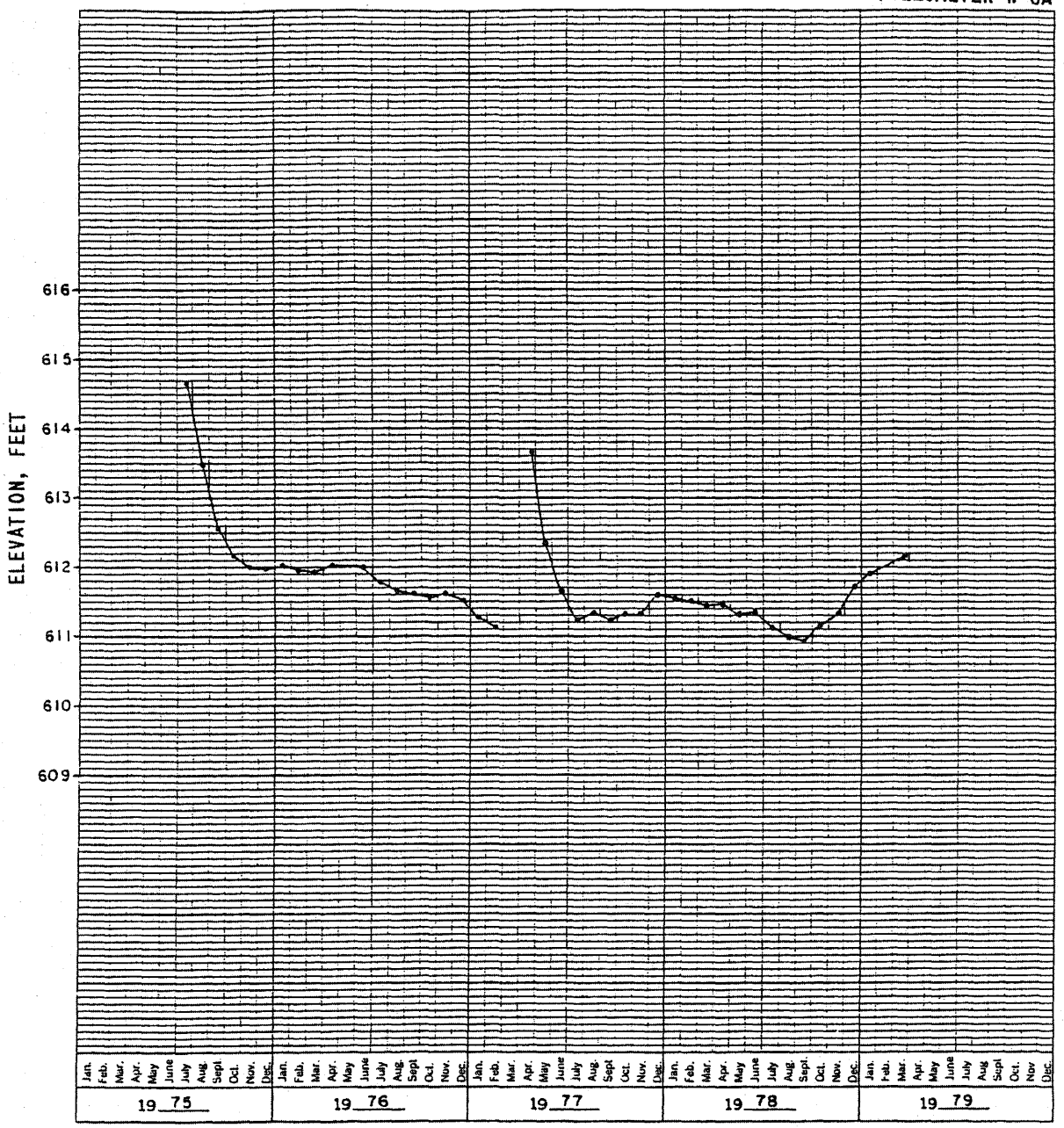
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 13 of 34)

PIEZOMETER W-6A

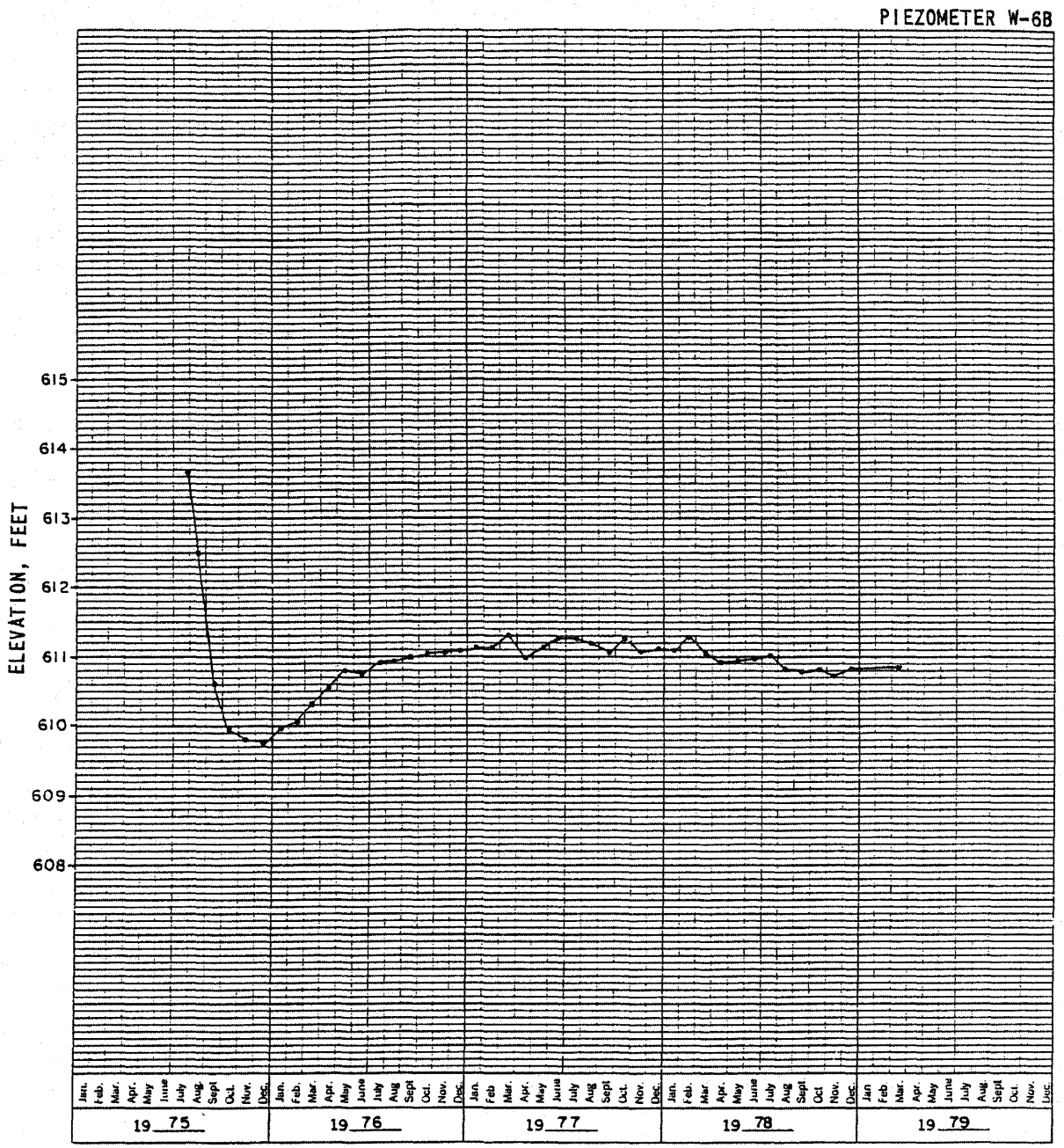


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 14 of 34)



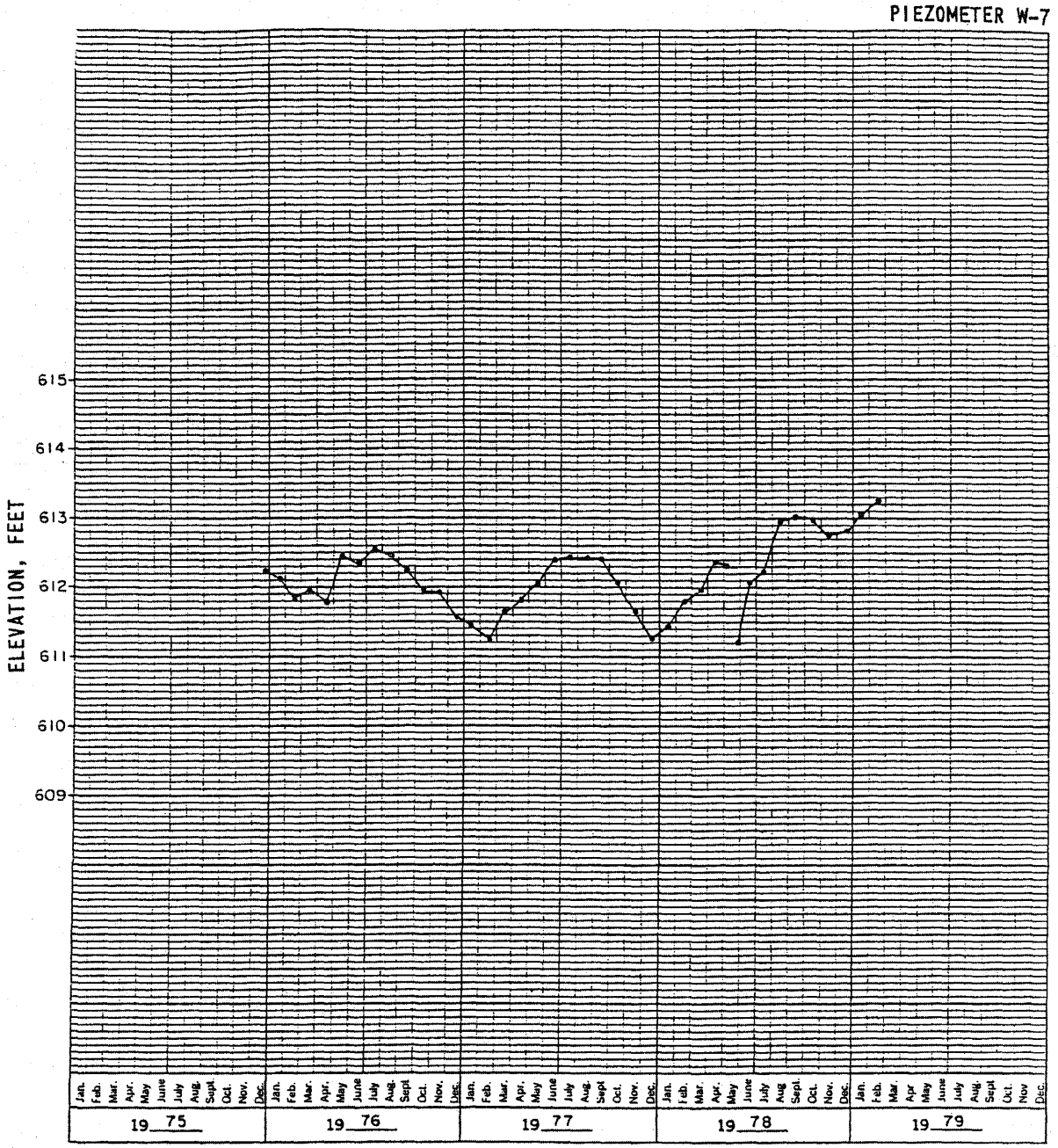
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 15 of 34)

PIEZOMETER W-7



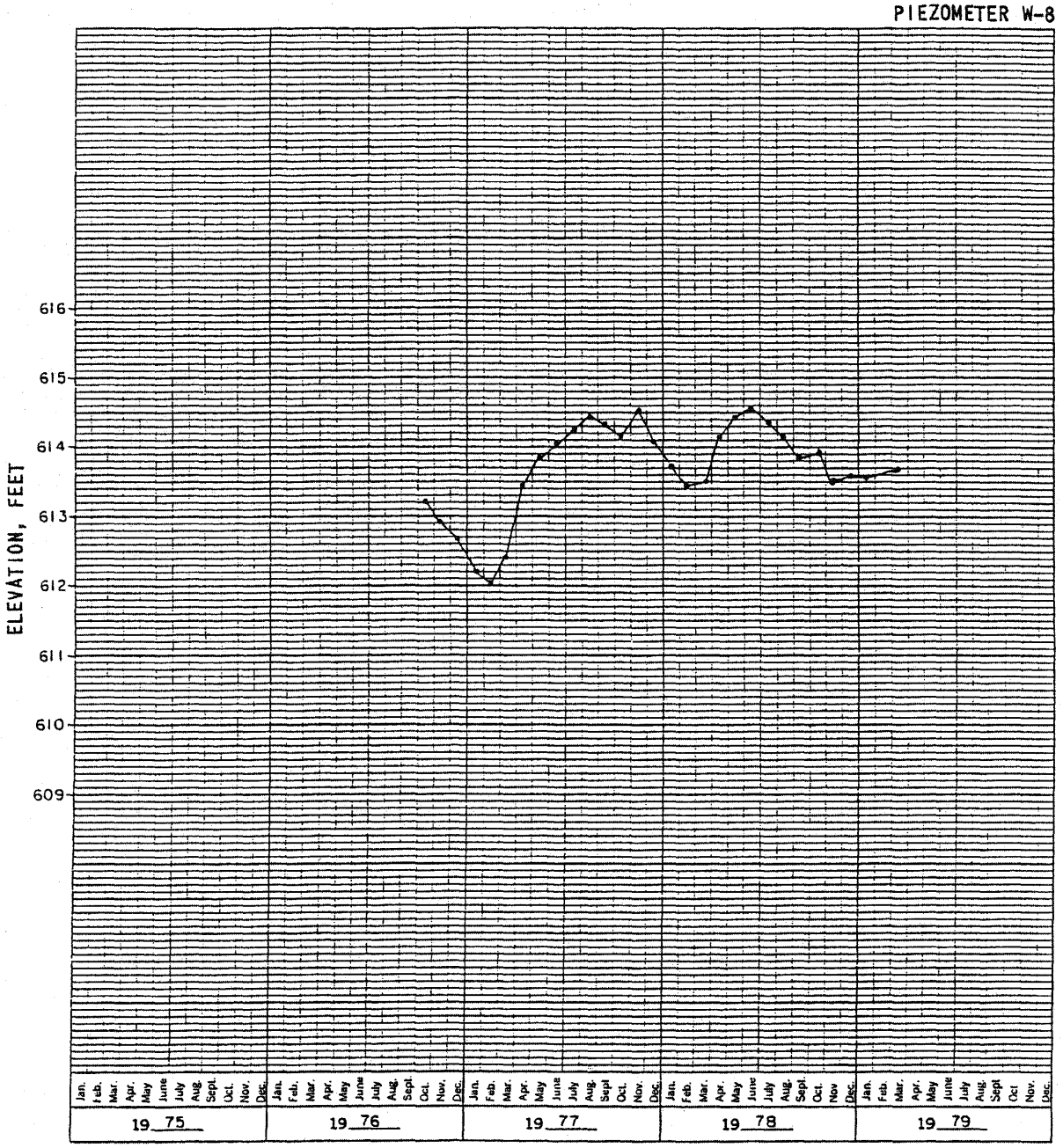
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 16 of 34)

PIEZOMETER W-8



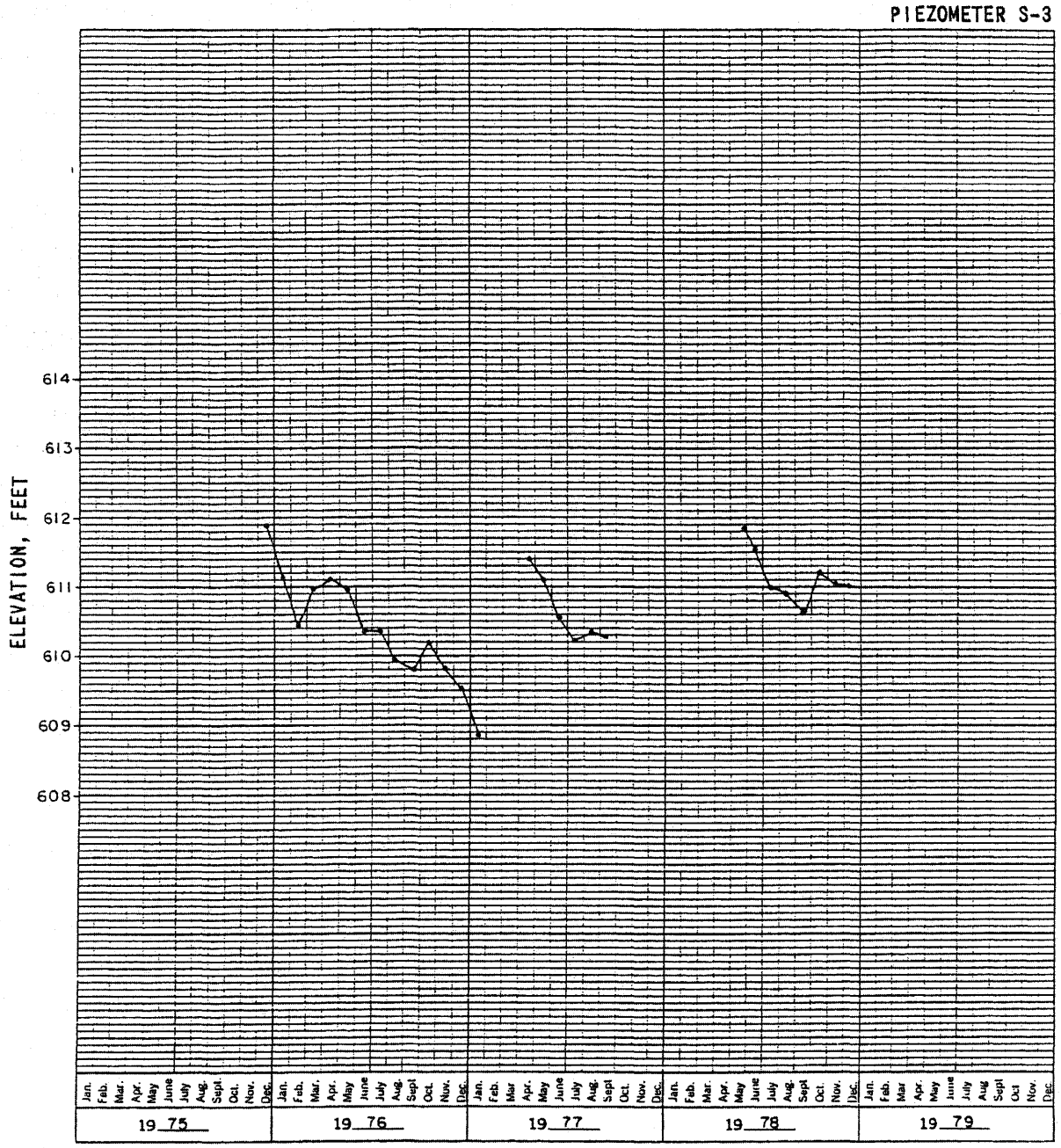
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 17 of 34)

PIEZOMETER S-3



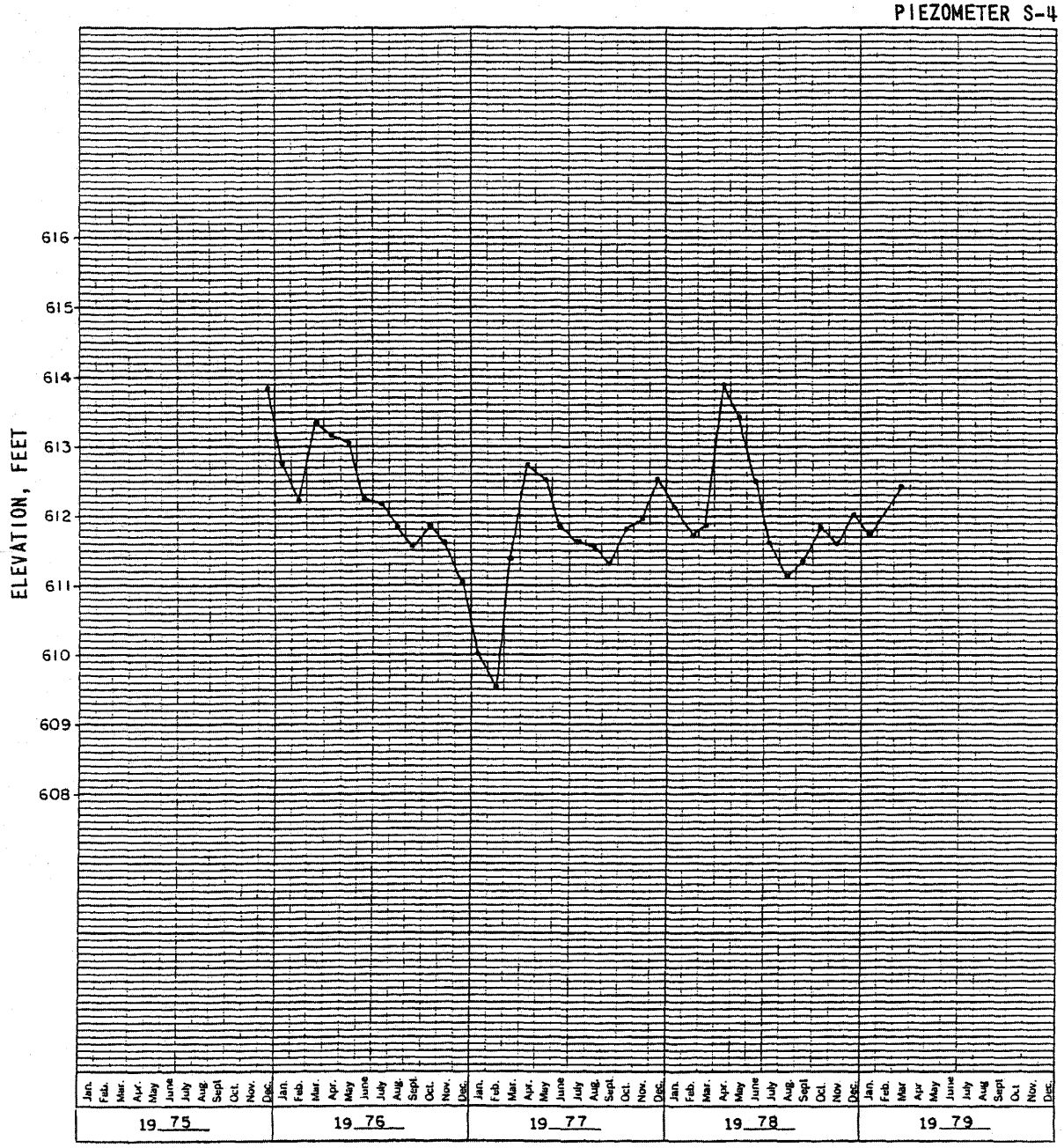
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 18 of 34)

PIEZOMETER S-4



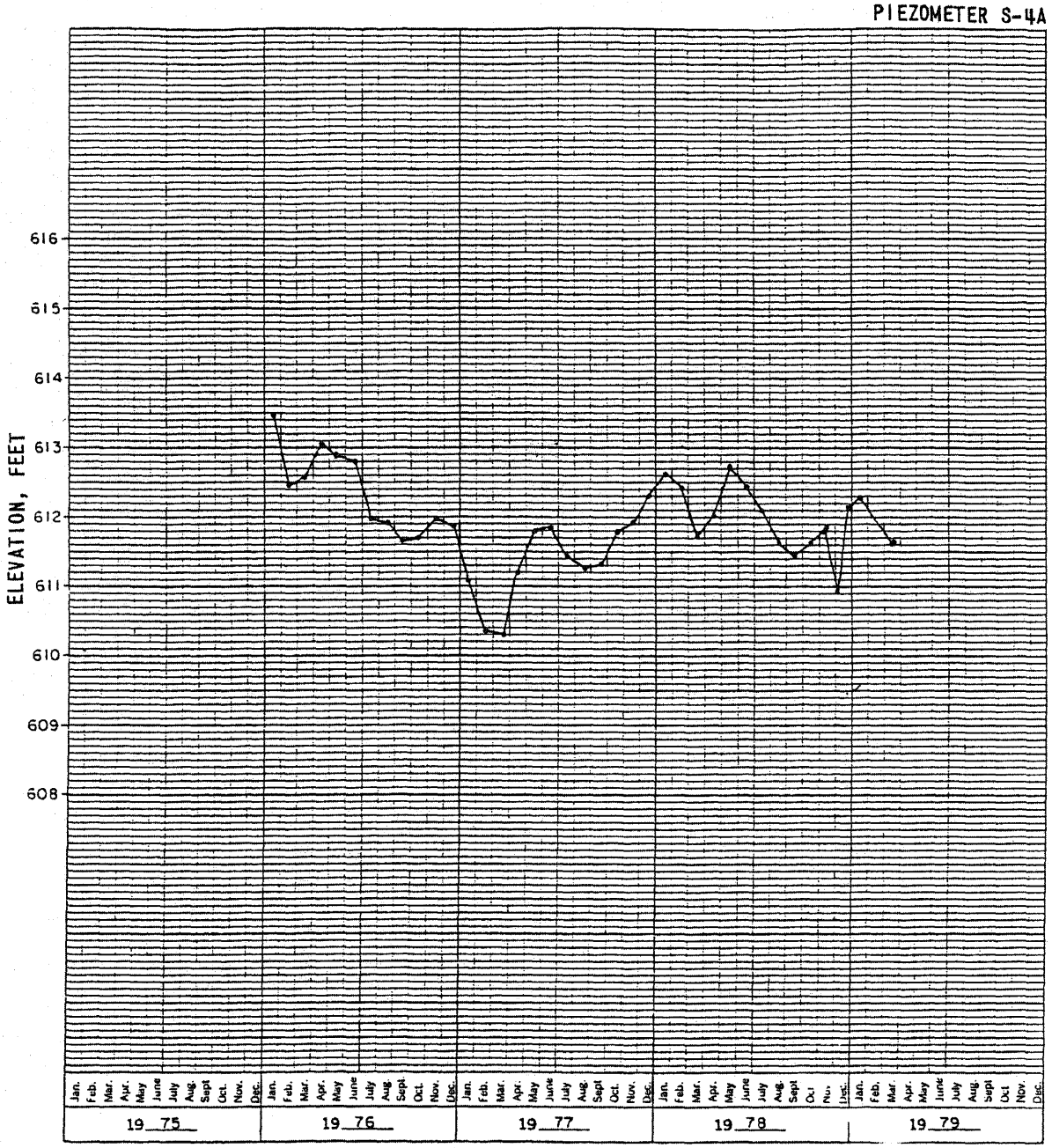
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 19 of 34)

PIEZOMETER S-4A



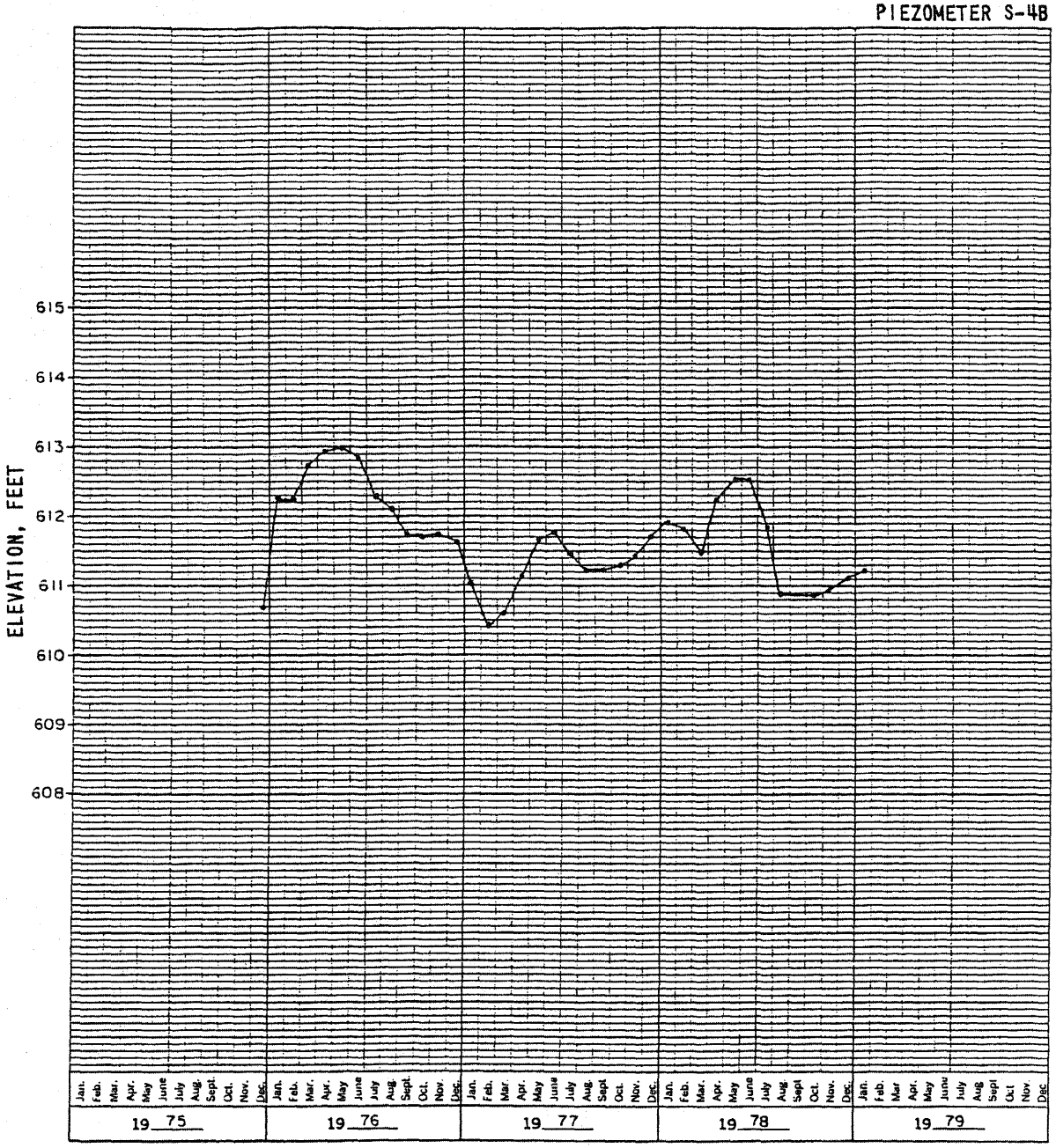
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 20 of 34)

PIEZOMETER S-4B

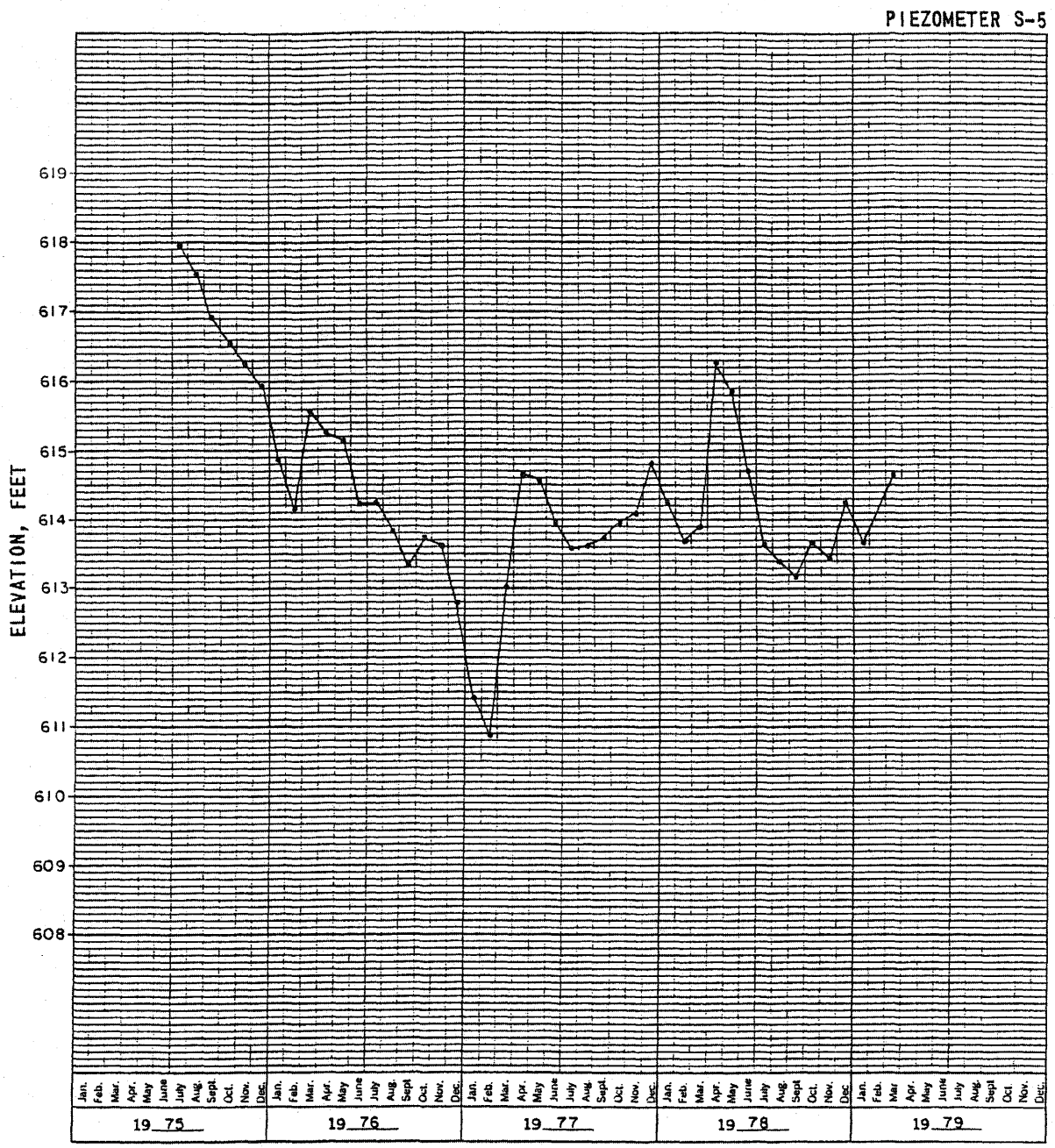


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 21 of 34)

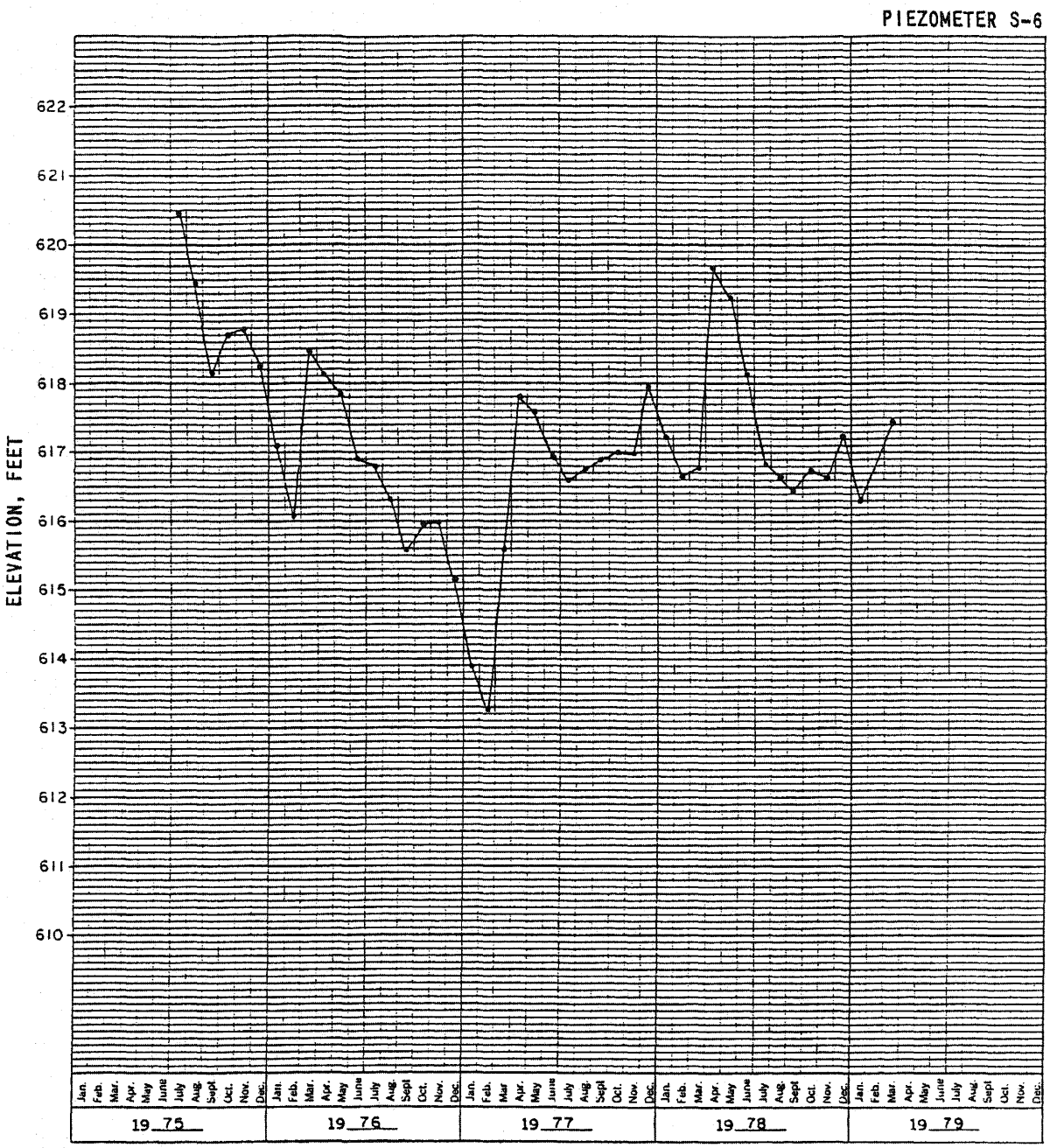


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 22 of 34)



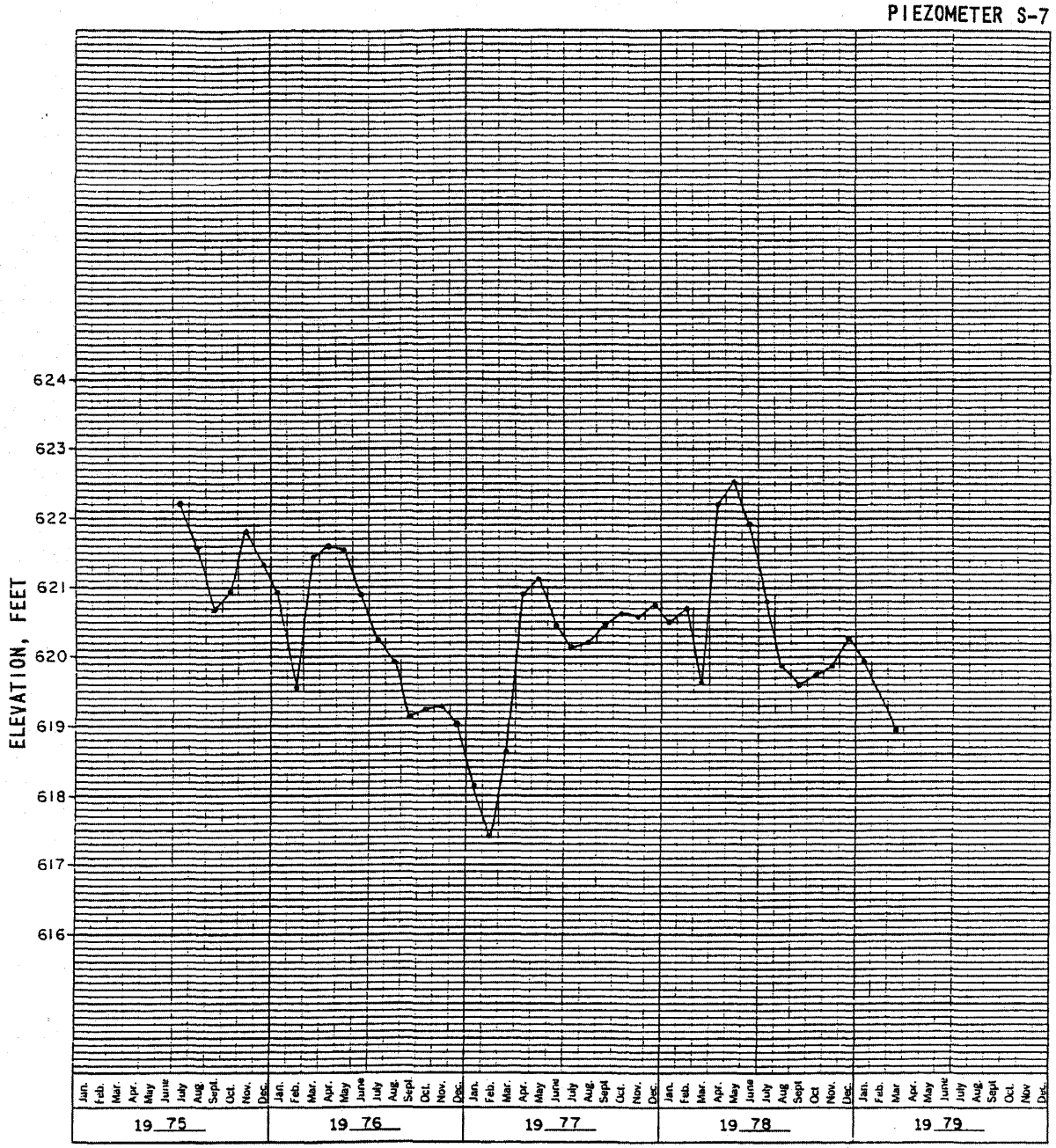
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 23 of 34)

PIEZOMETER S-7



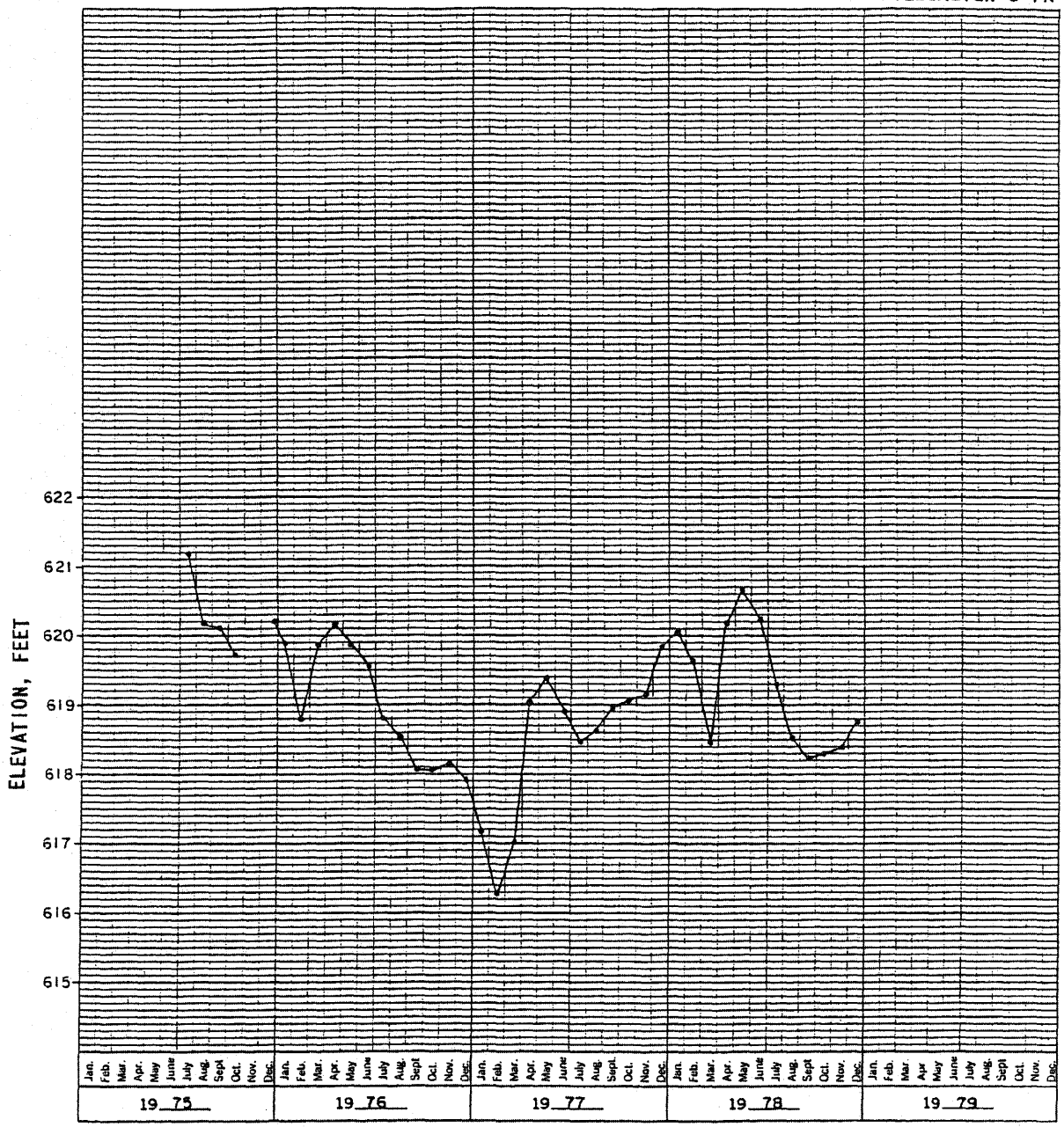
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 24 of 34)

PIEZOMETER S-7A



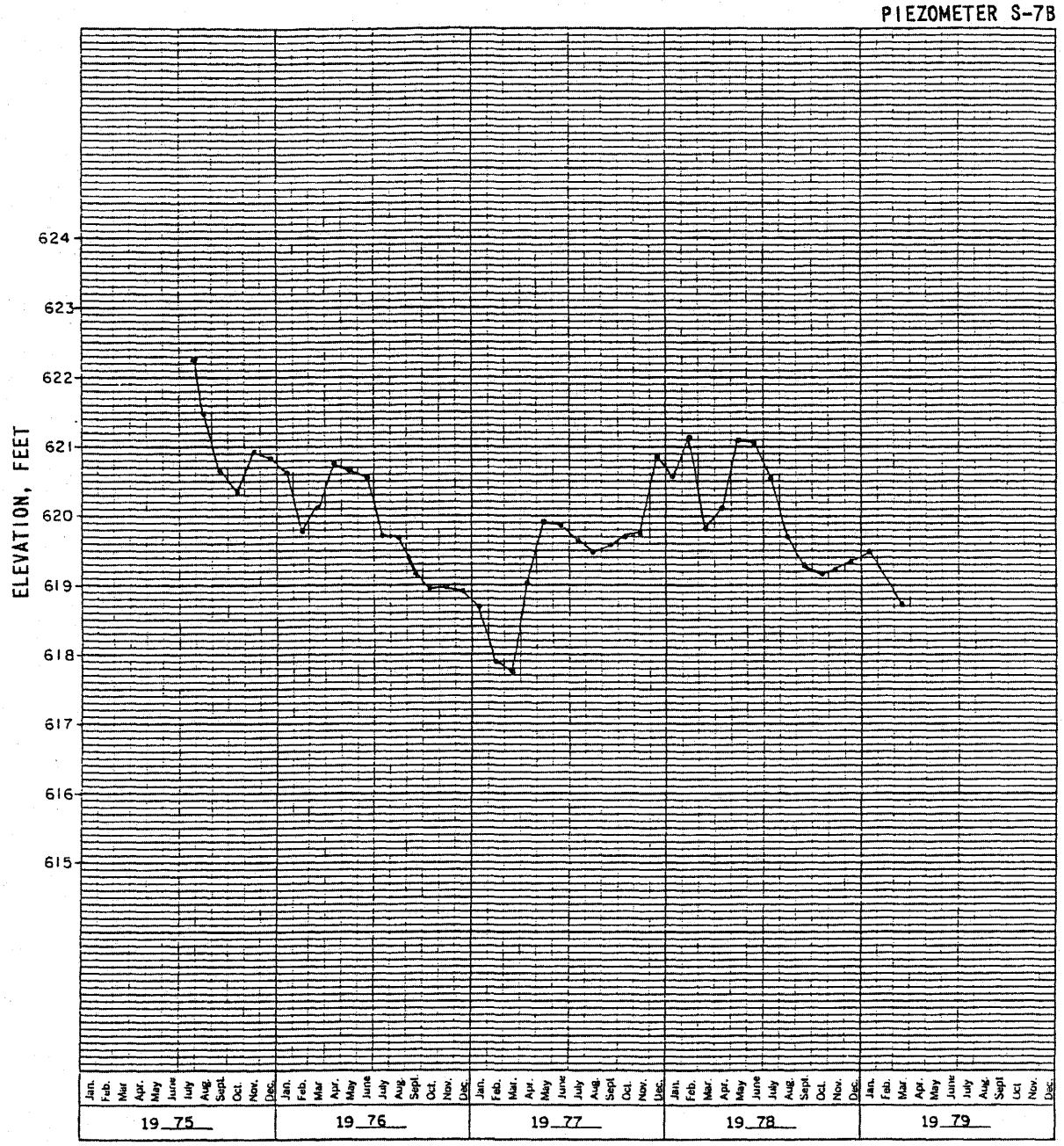
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 25 of 34)

PIEZOMETER S-7B



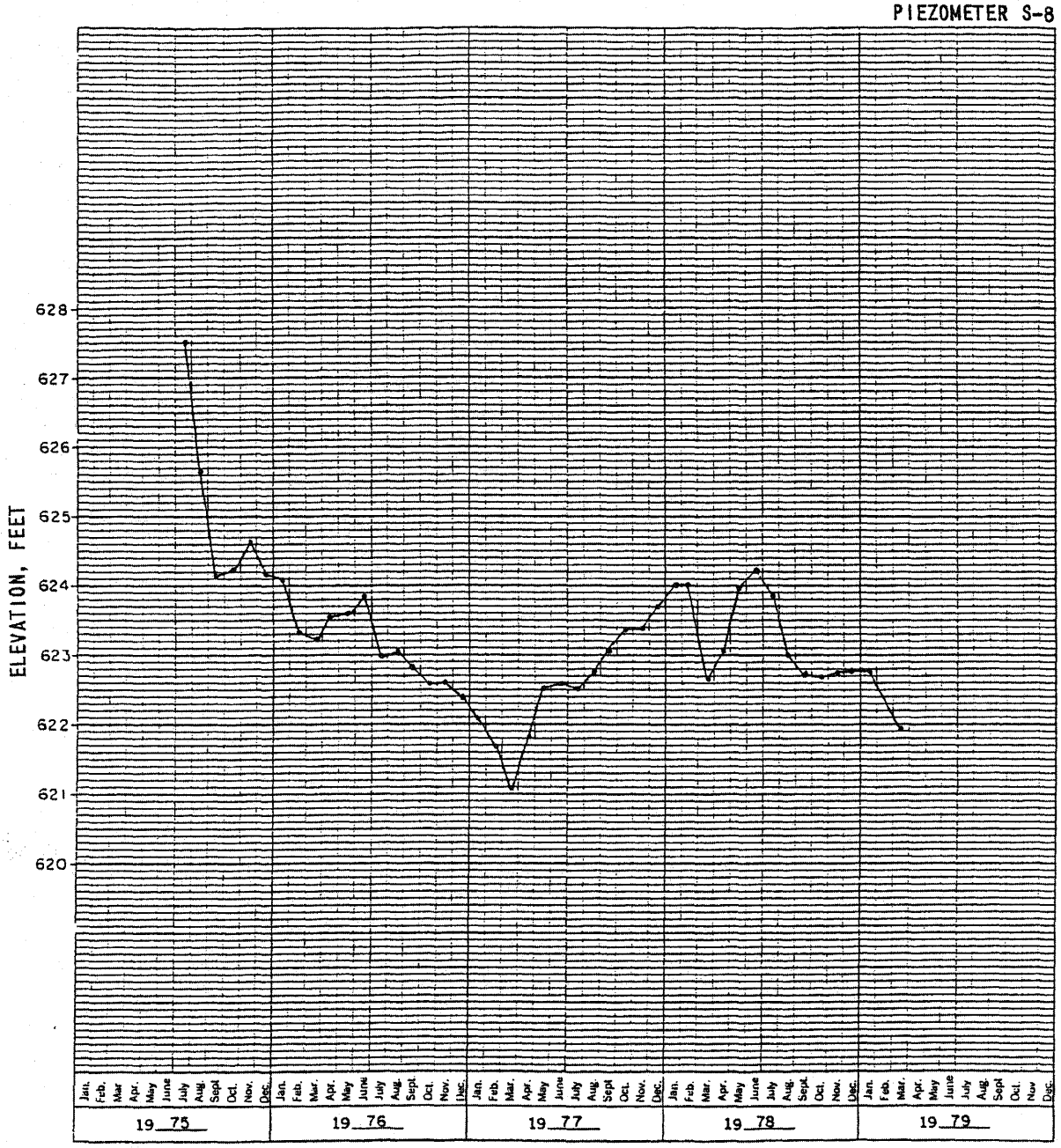
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 26 of 34)

PIEZOMETER S-8



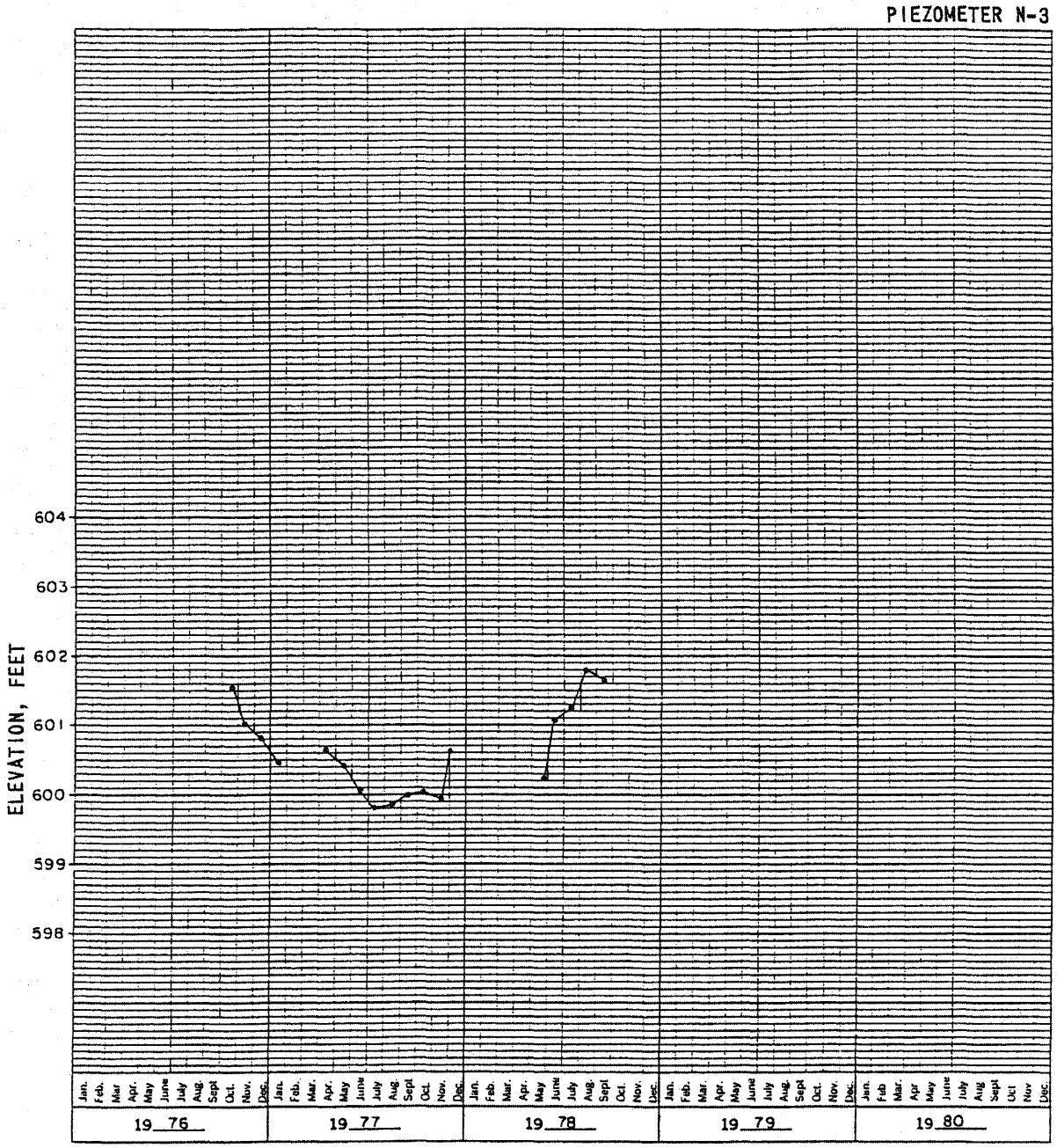
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 27 of 34)

PIEZOMETER N-3

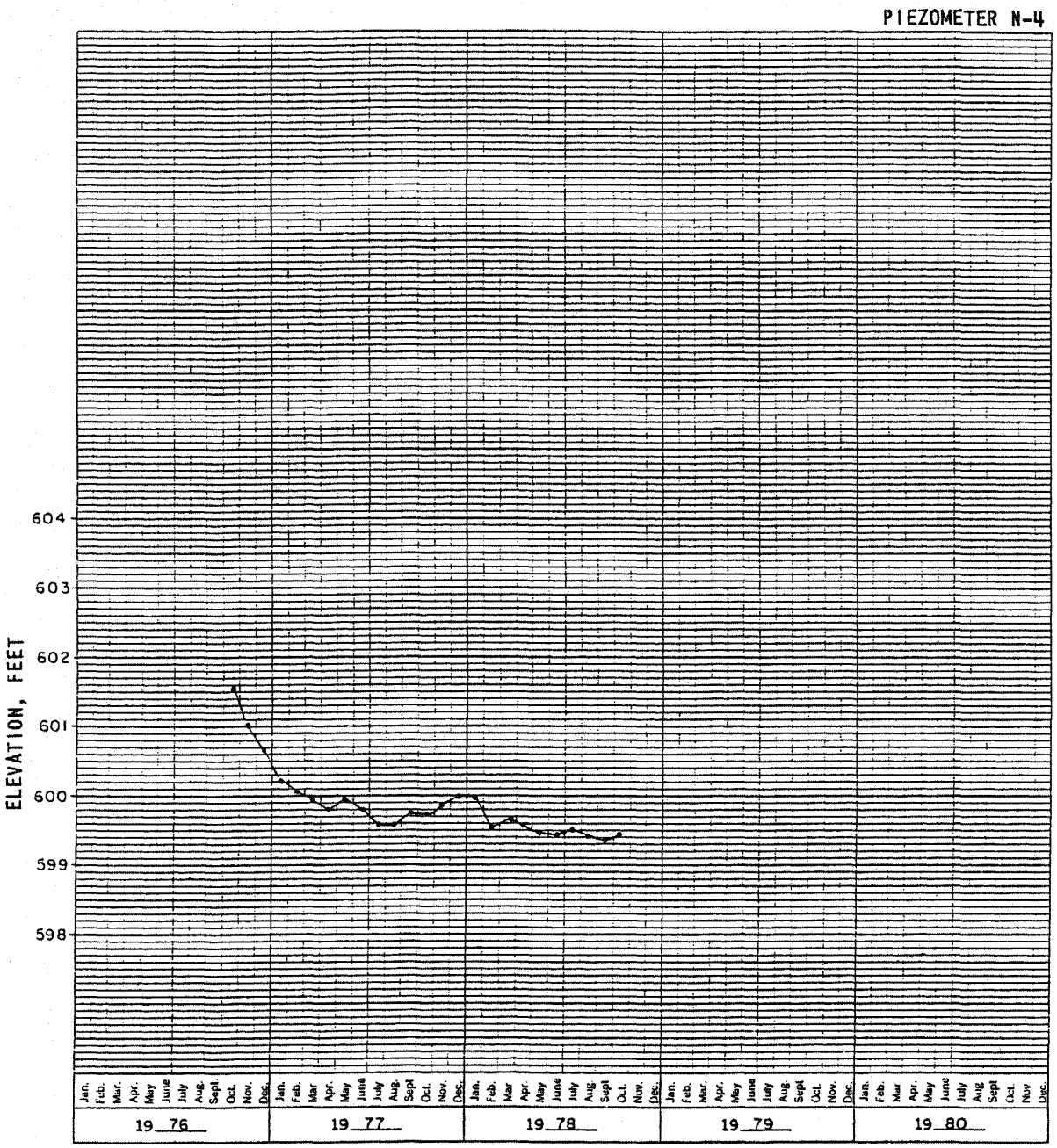


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 28 of 34)



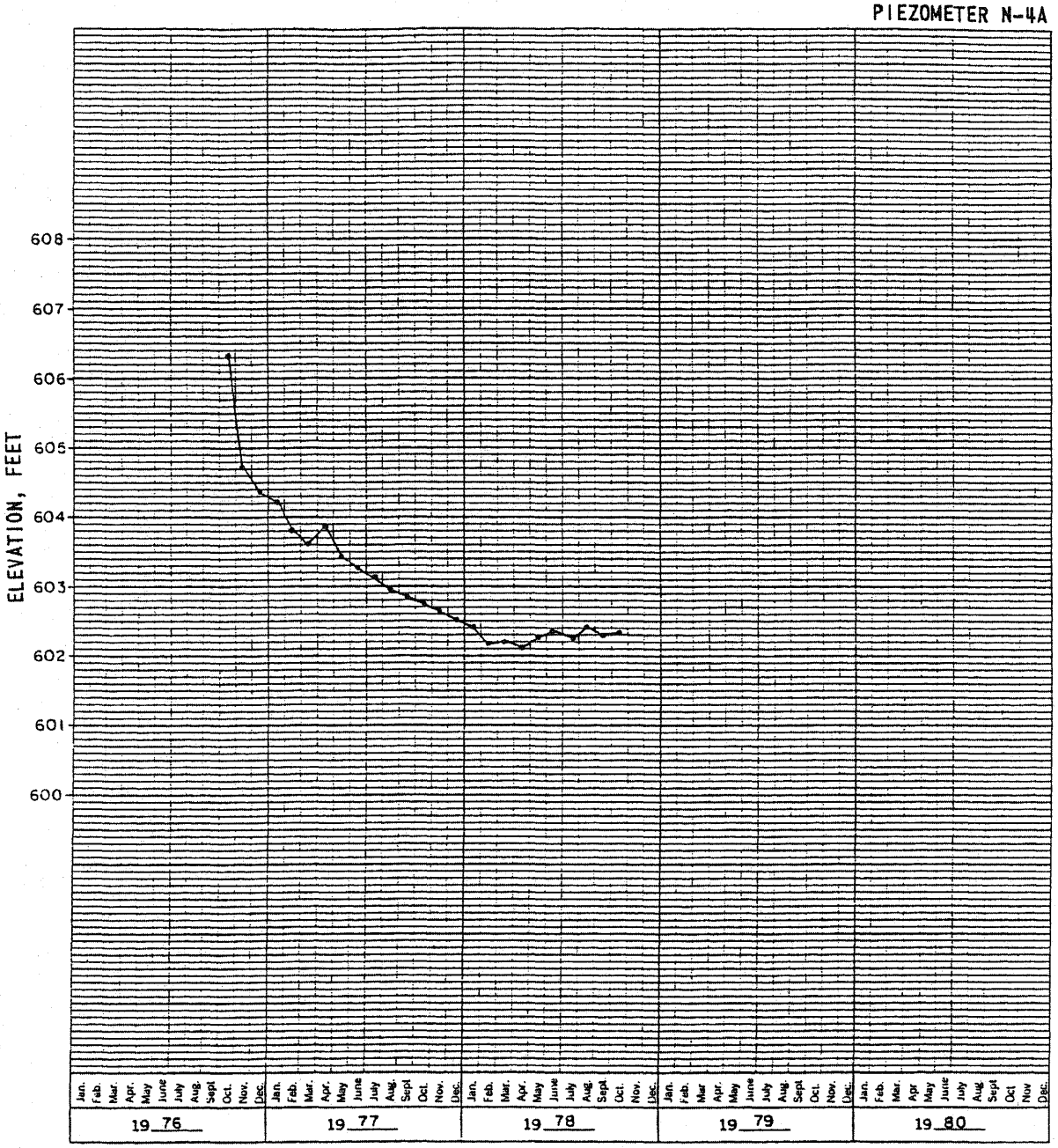
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 29 of 34)

PIEZOMETER N-4A

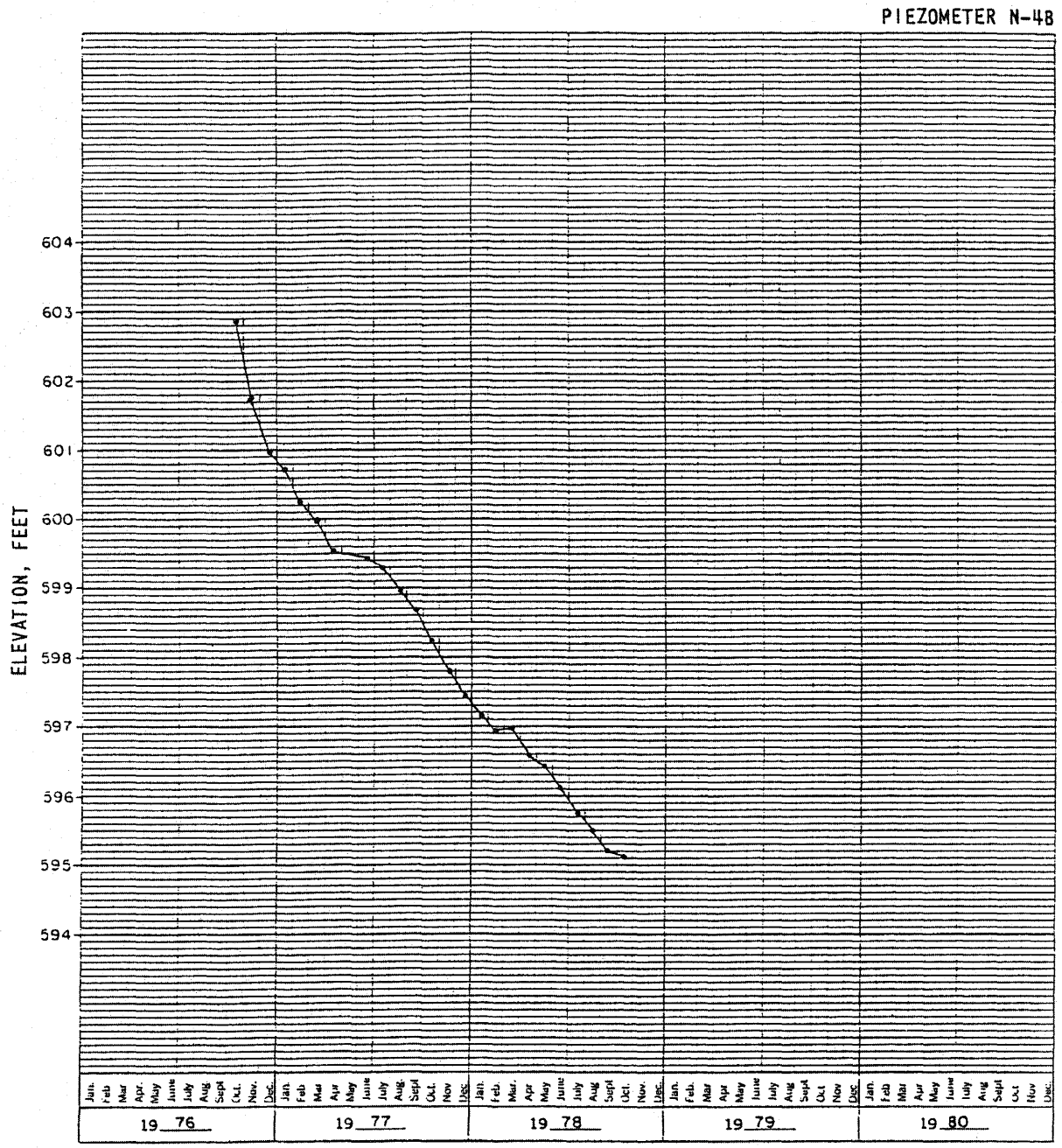


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 30 of 34)

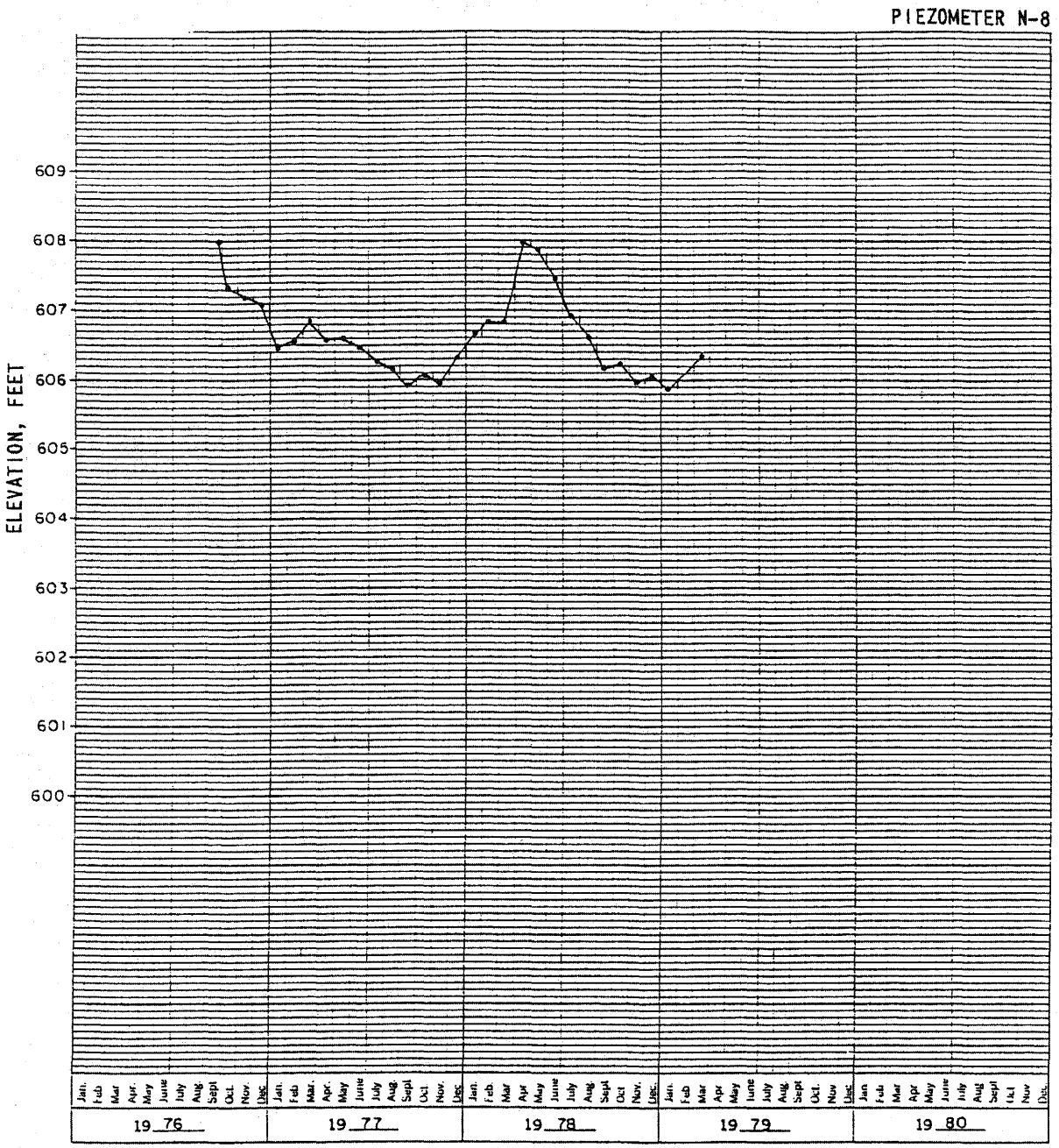


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 31 of 34)

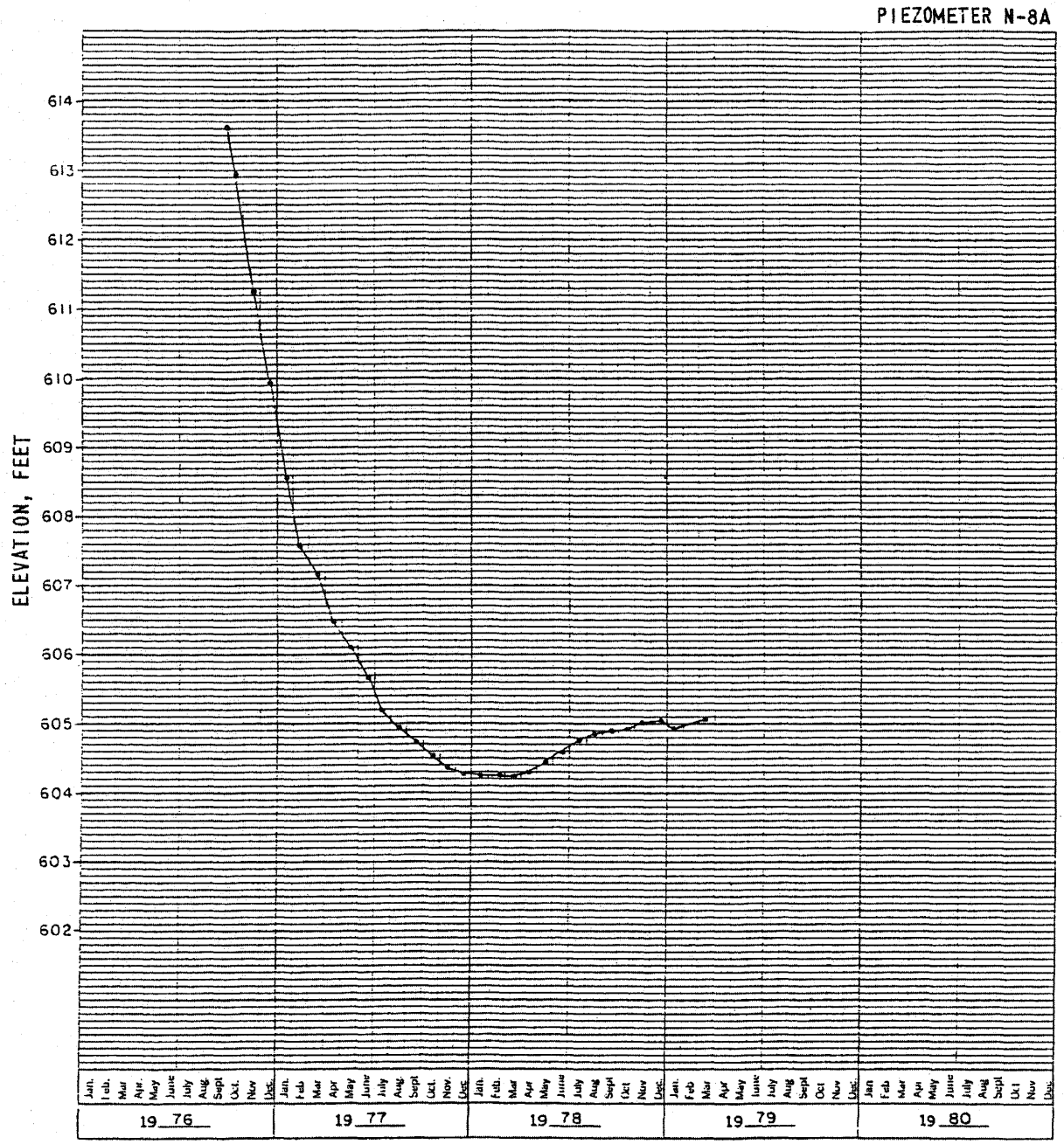


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 32 of 34)

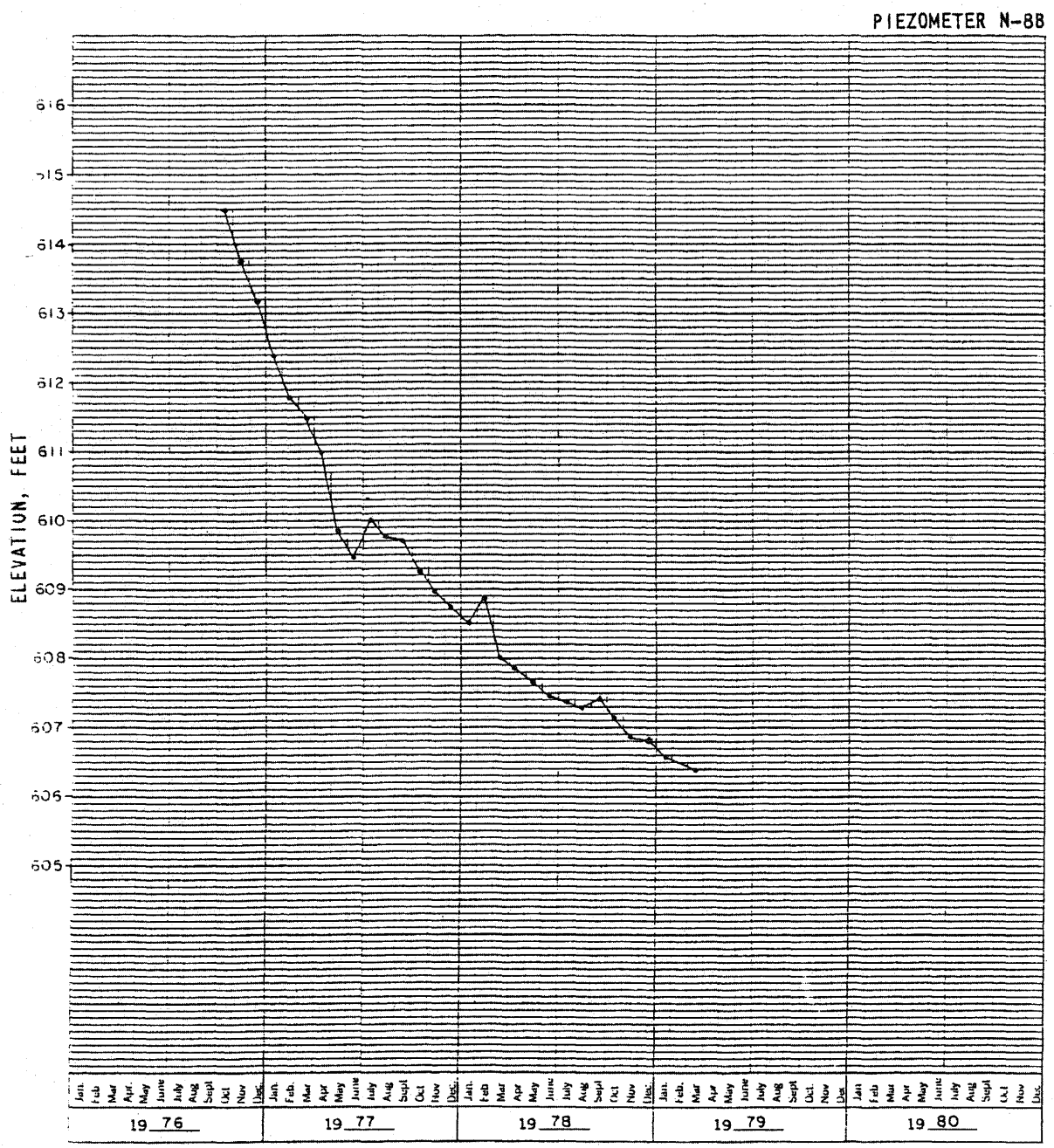


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 33 of 34)

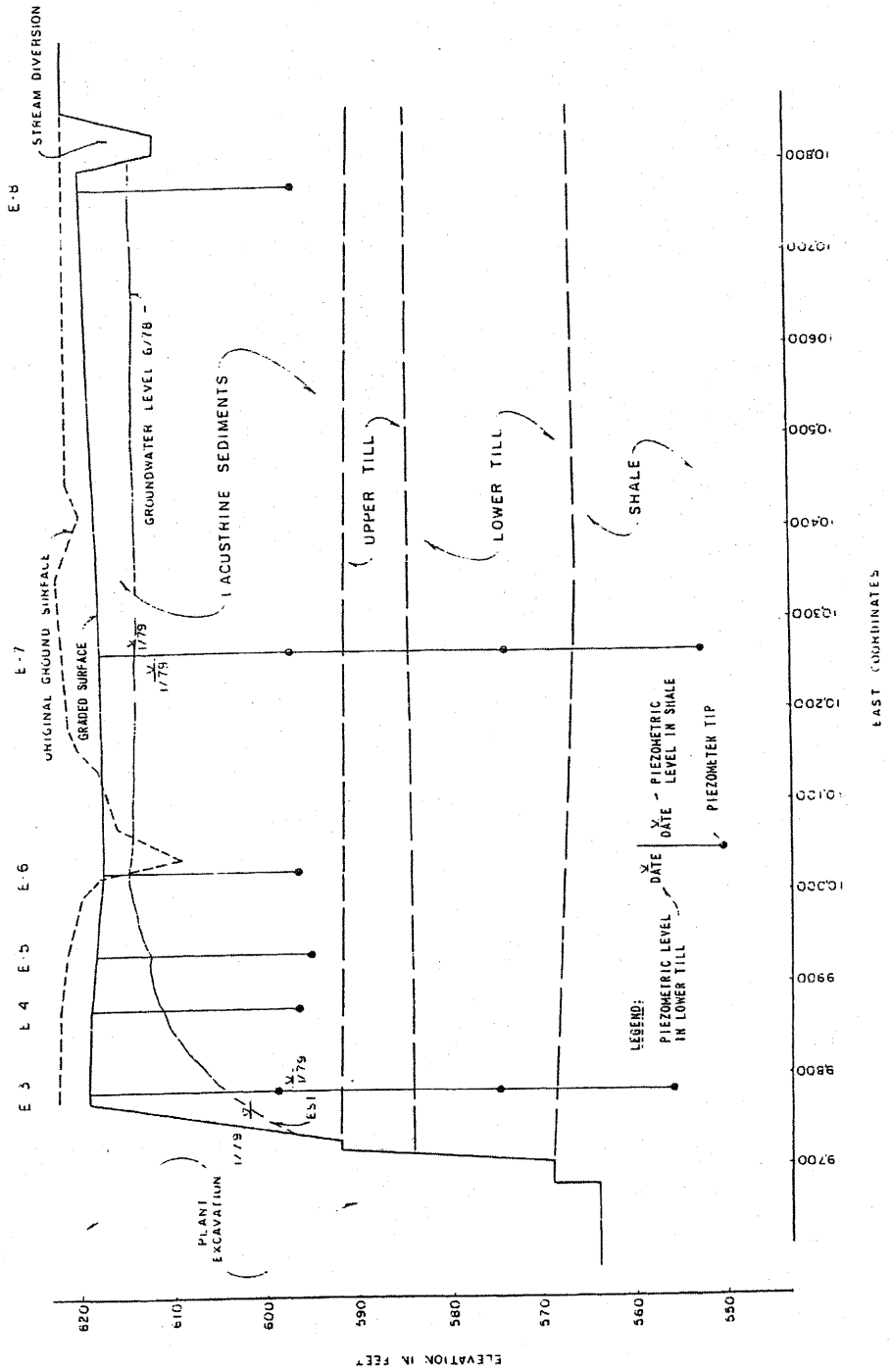


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Observation
Piezometric Readings

Figure 2.5-187 (Sheet 34 of 34)

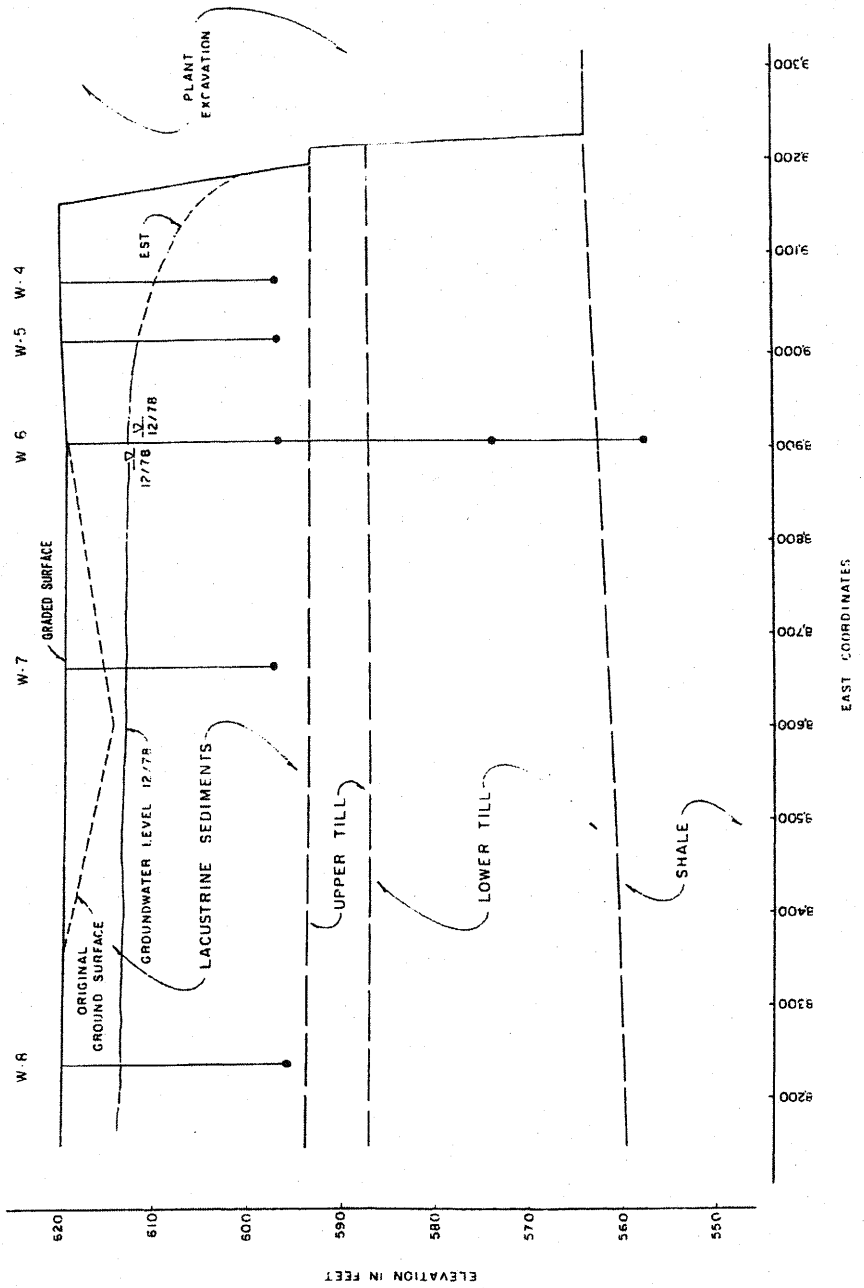


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Profiles

Figure 2.5-188 (Sheet 1 of 4)

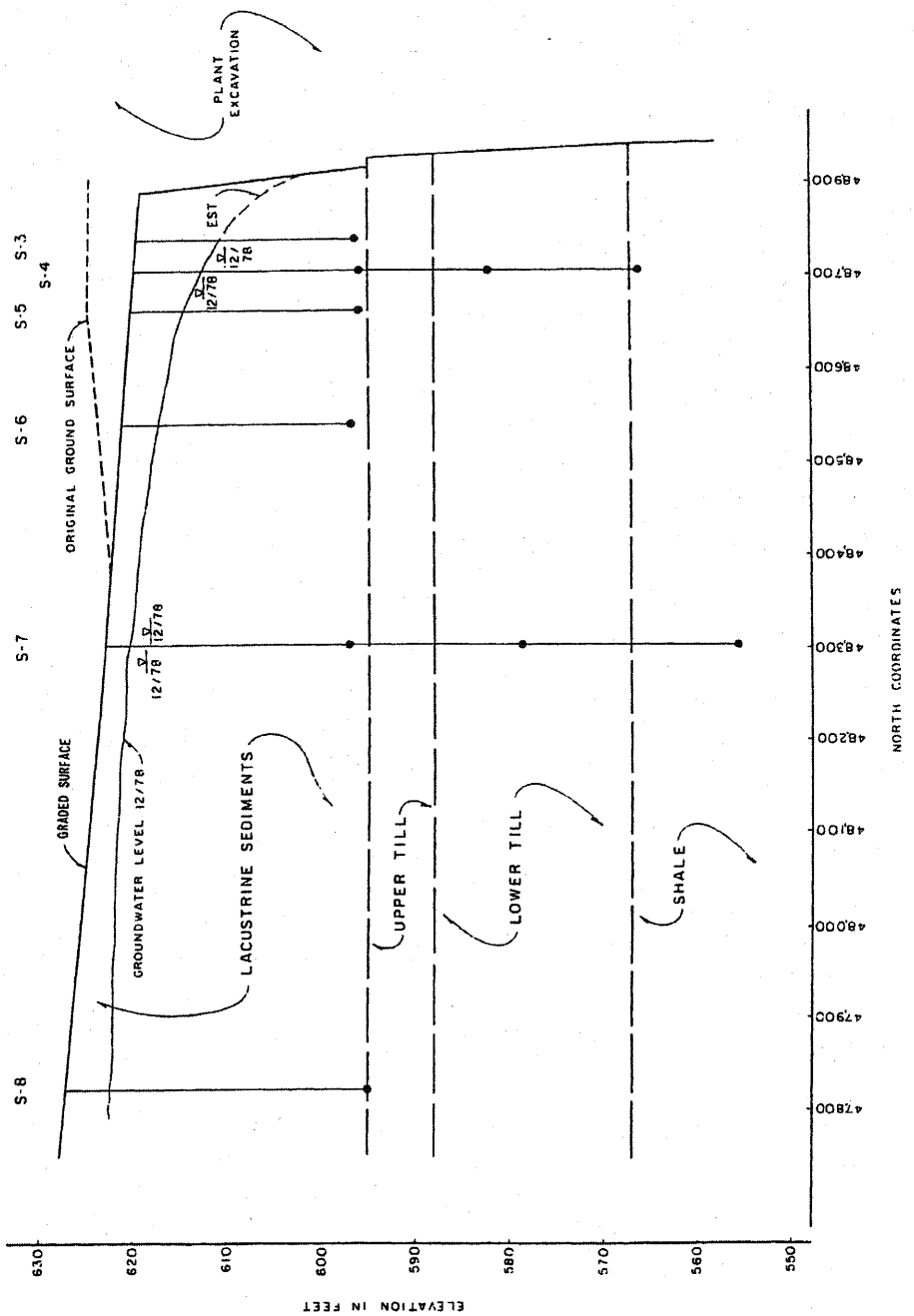


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Profiles

Figure 2.5-188 (Sheet 2 of 4)

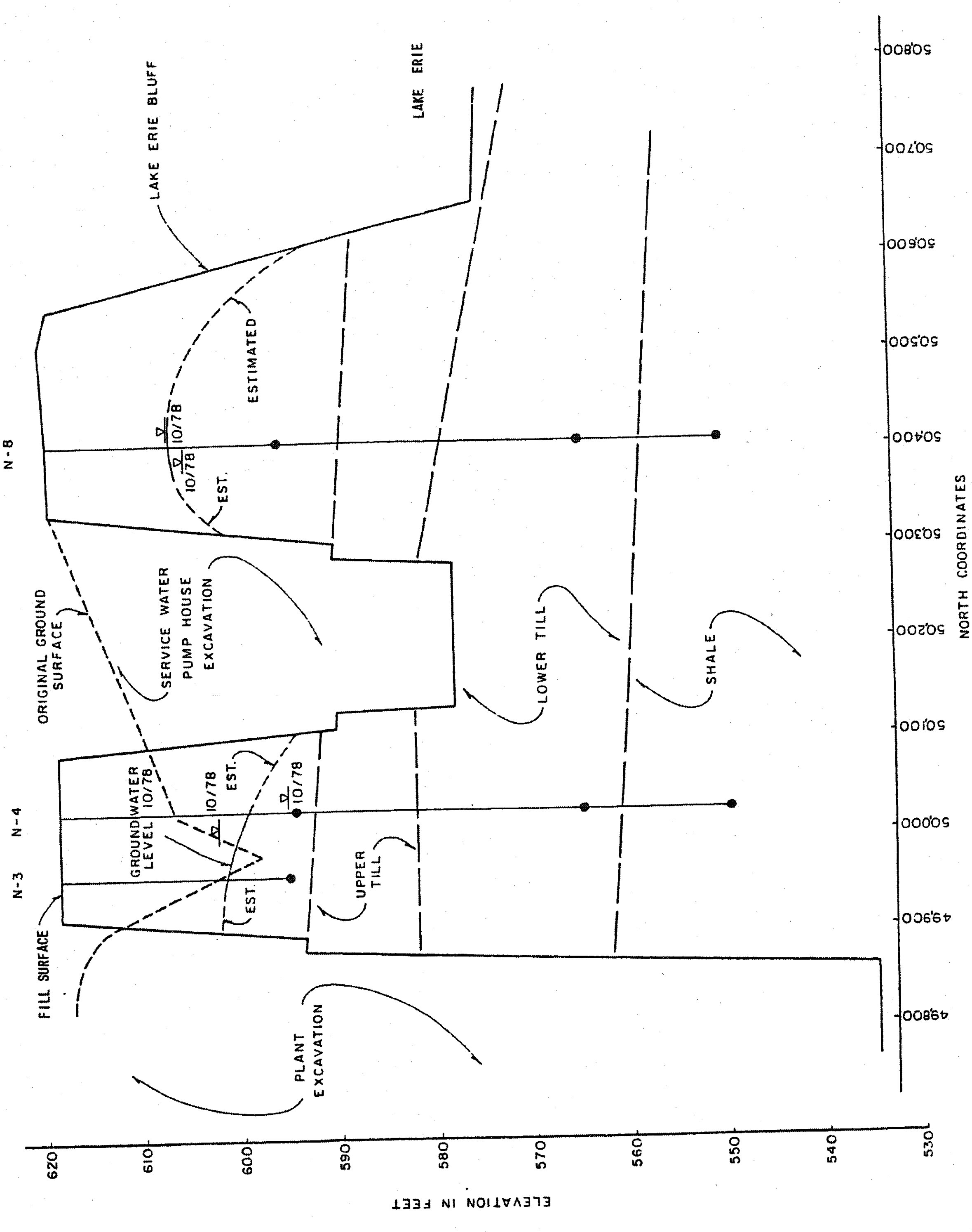


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Profiles

Figure 2.5-188 (Sheet 3 of 4)

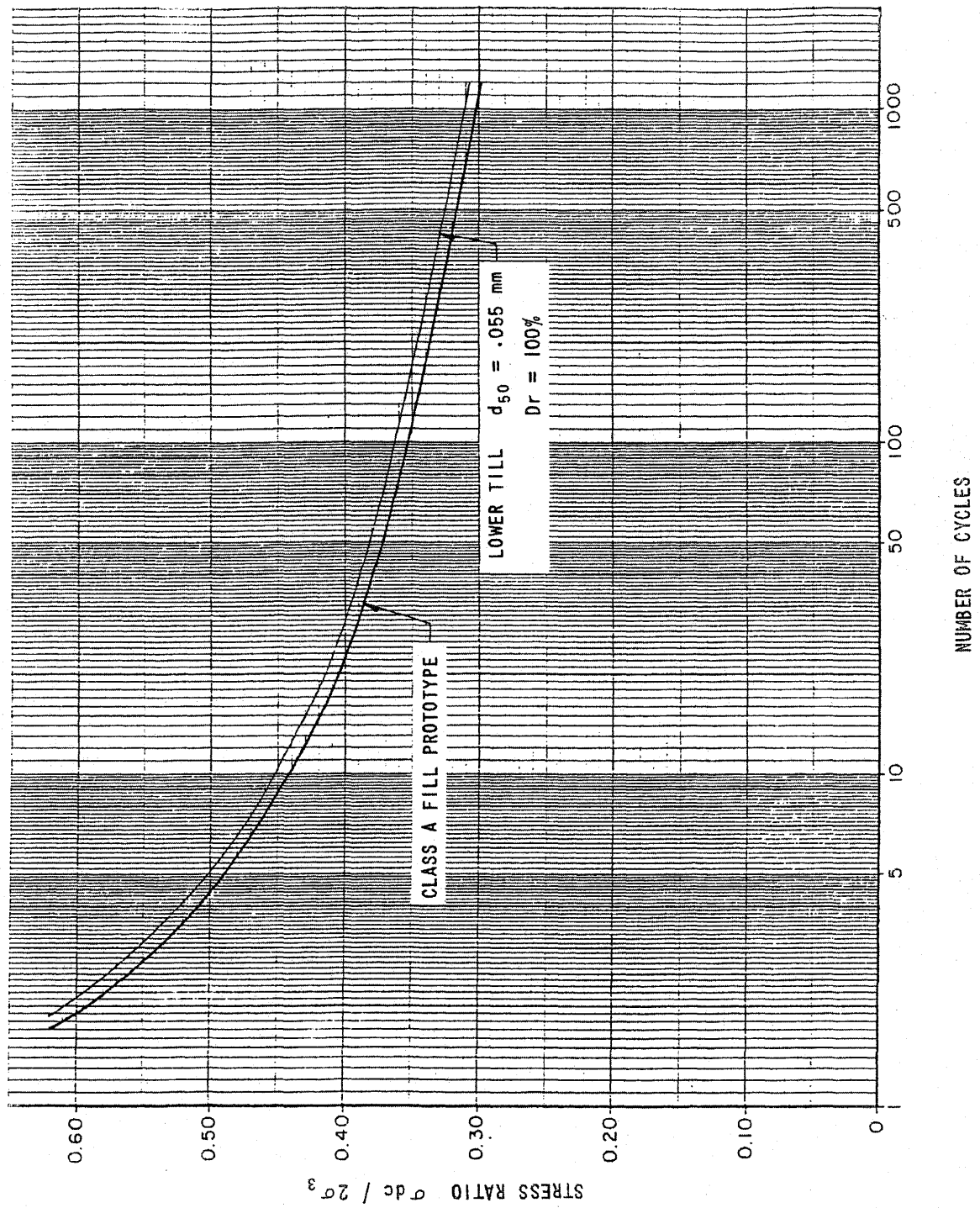


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Groundwater Profiles

Figure 2.5-188 (Sheet 4 of 4)

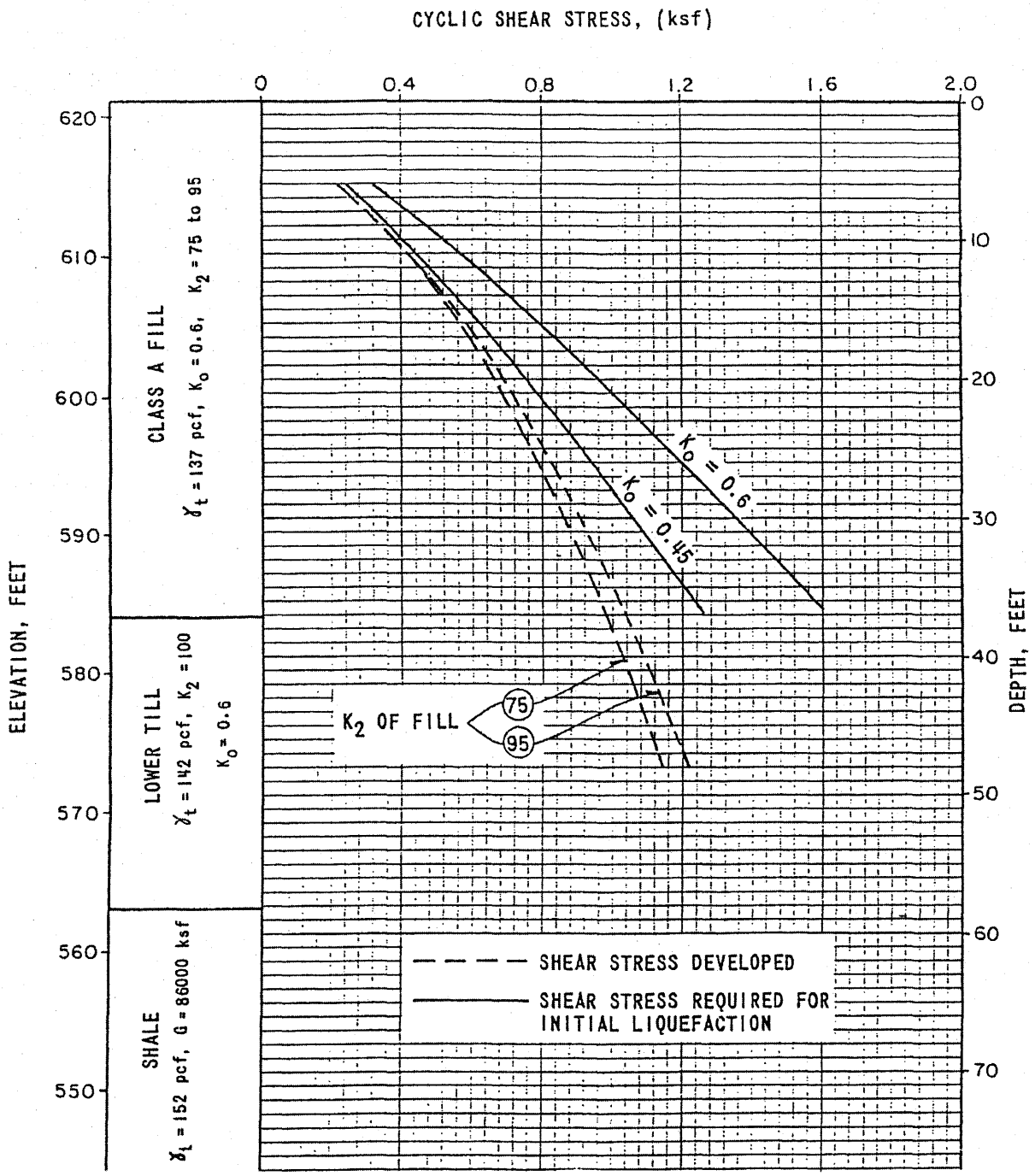


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Number of Cycles Required
for Initial Liquefaction

Figure 2.5-189

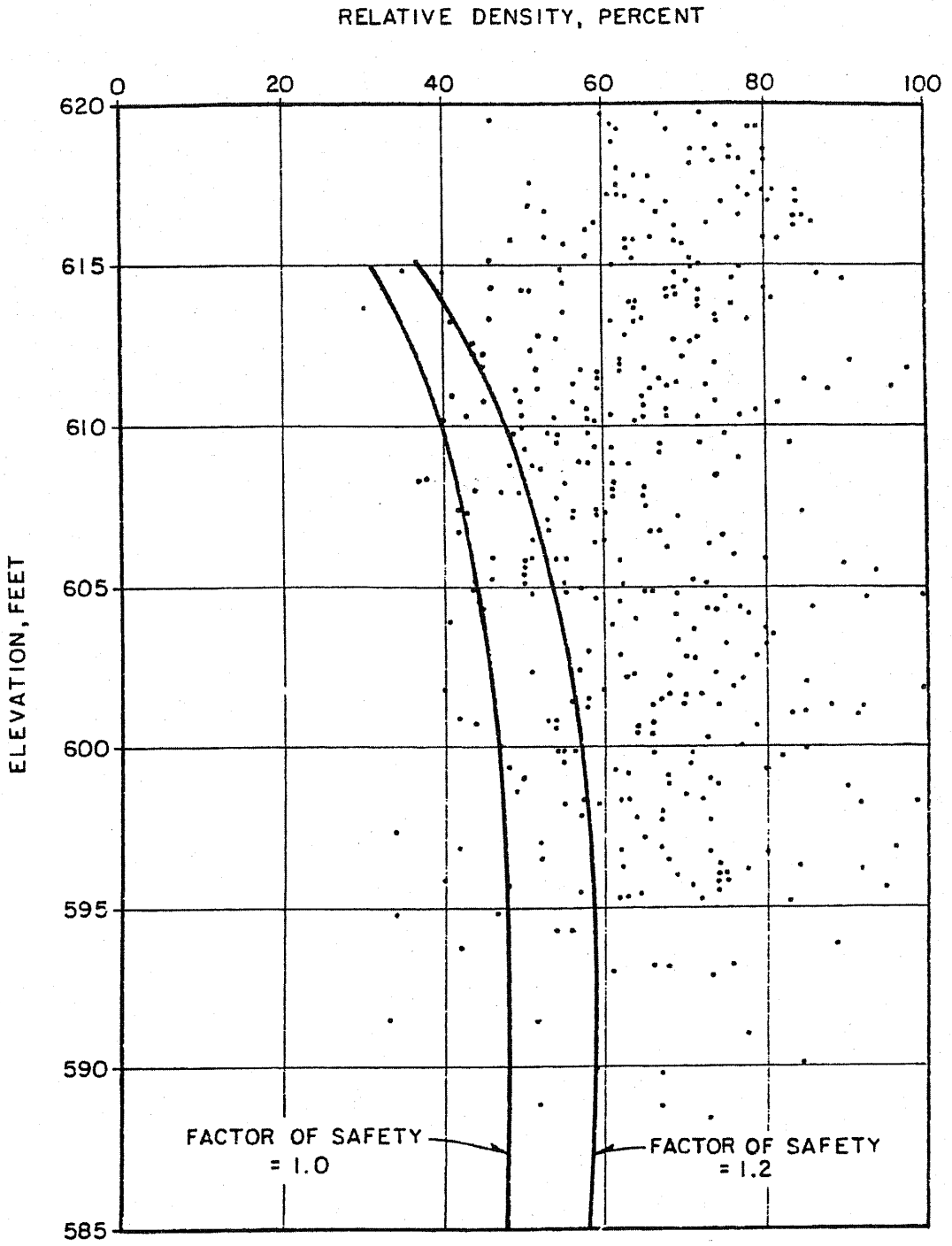


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Cycle Stress Developed and Required for Initial Liquefaction in 10 Stress Cycles

Figure 2.5-190

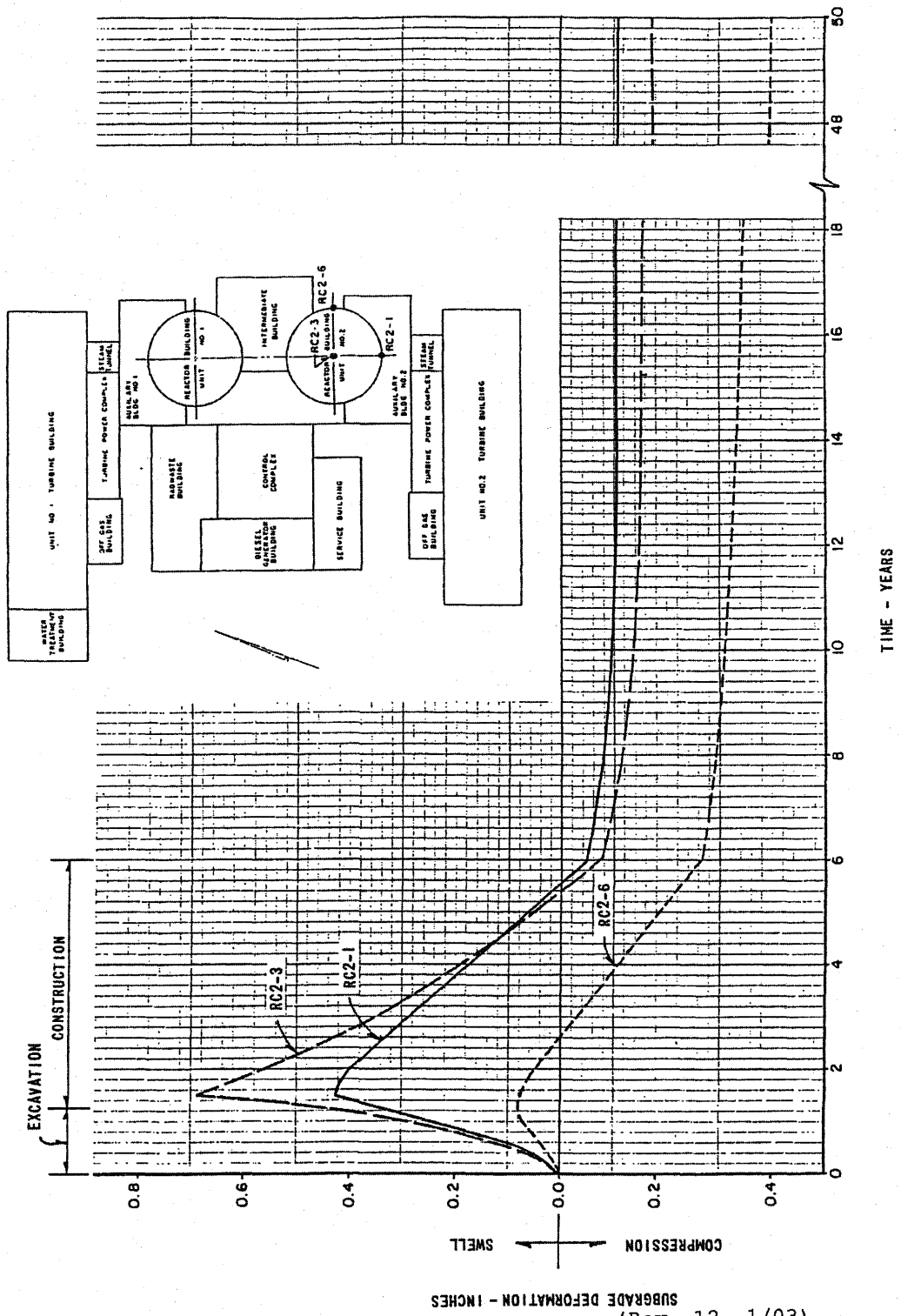


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Liquefaction Potential Analysis
of Lacustrine Sediments

Figure 2.5-191

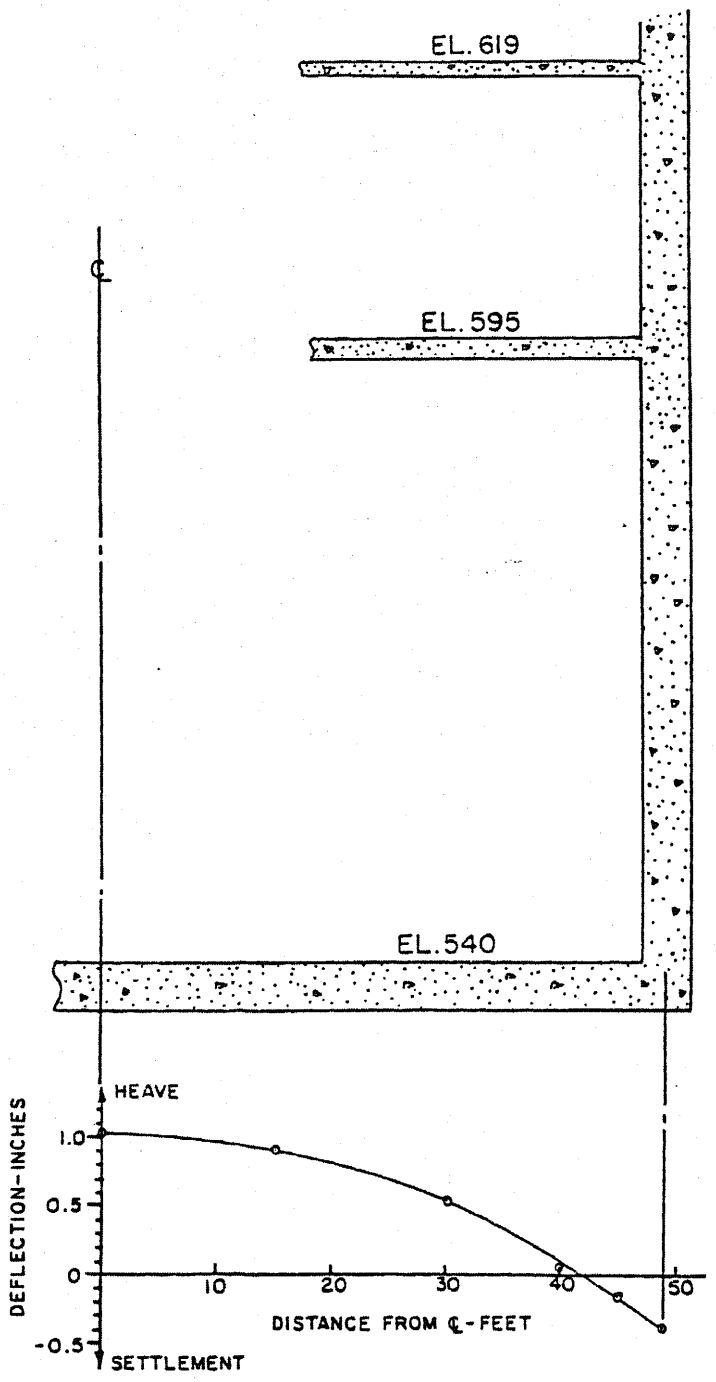


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Time-Deformation Analysis for
Reactor Building Complex

Figure 2.5-192



NOTES:

(1) K_o (SHALE) = 2.0

(2) K_o (FILL) ≐ 1.0

(3) ANALYSIS ASSUMES 33% OF TOTAL SHALE SWELL OCCURS BEFORE MAT PLACEMENT.

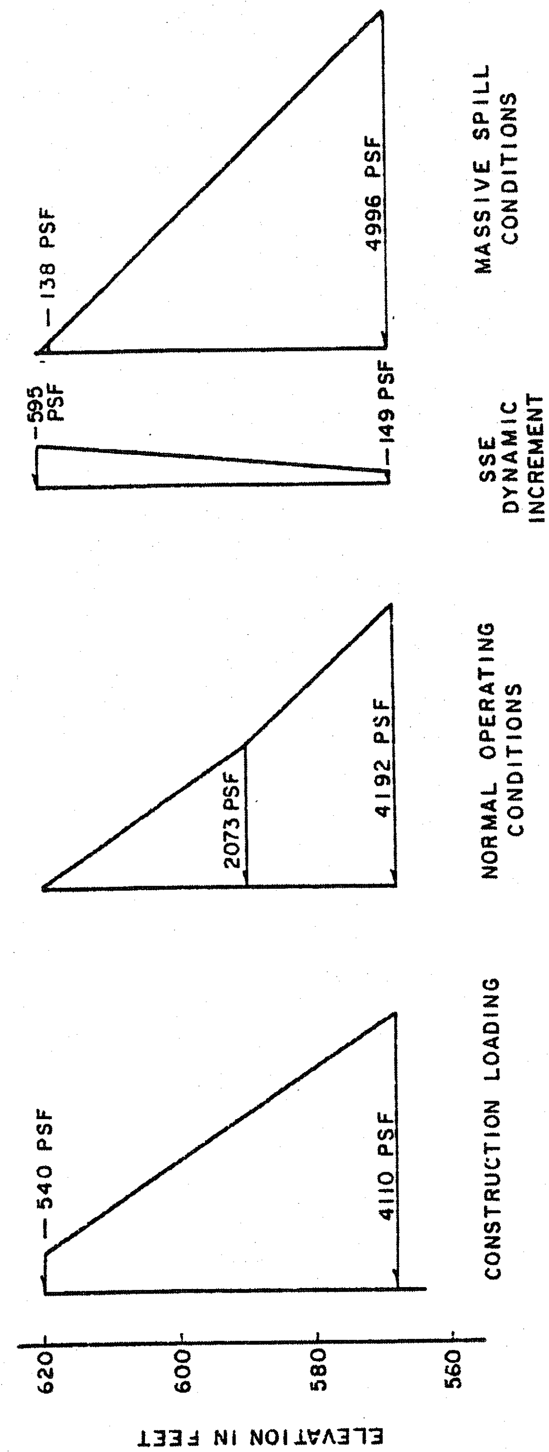
(4) DEFLECTION SHOWN IS FOR END OF CONSTRUCTION CONDITION PRIOR TO SERVICE LOADING.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Deformation Analysis for
Emergency Service Water Pumphouse

Figure 2.5-193



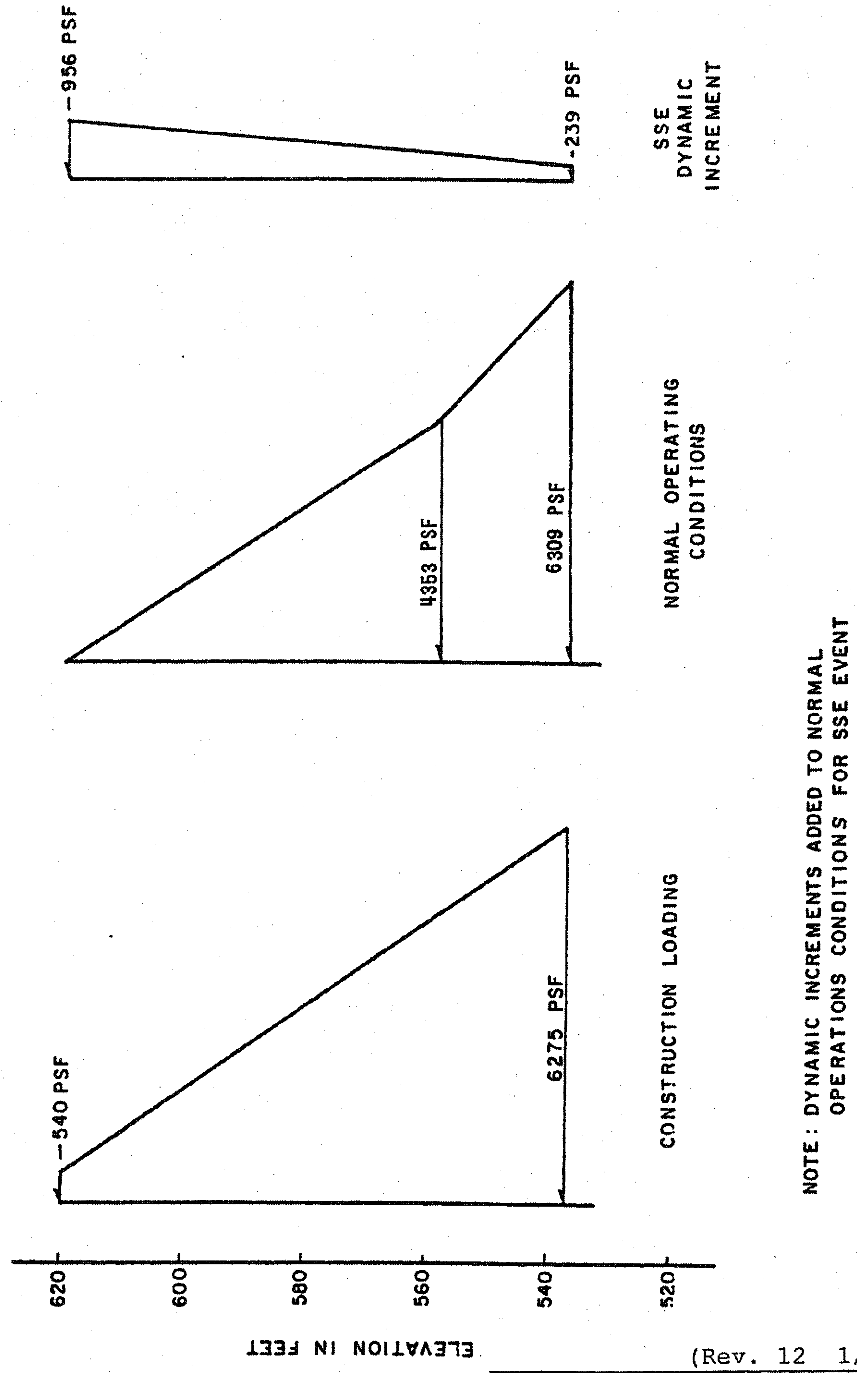
NOTE:
1. DYNAMIC INCREMENT ADDED TO NORMAL OPERATING CONDITIONS FOR SSE EVENT
2. ADDITIONAL LOADINGS DUE TO SURCHARGE FROM CRANES, RAILROADS OR ADJACENT FOUNDATIONS ADDED AS REQUIRED
3. FOR LOADS APPLICABLE TO EMERGENCY SERVICE WATER PUMPHOUSE SEE FIGURE 2.5-195

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Earth Pressure Diagrams for Rigid Subsurface Walls

Figure 2.5-194

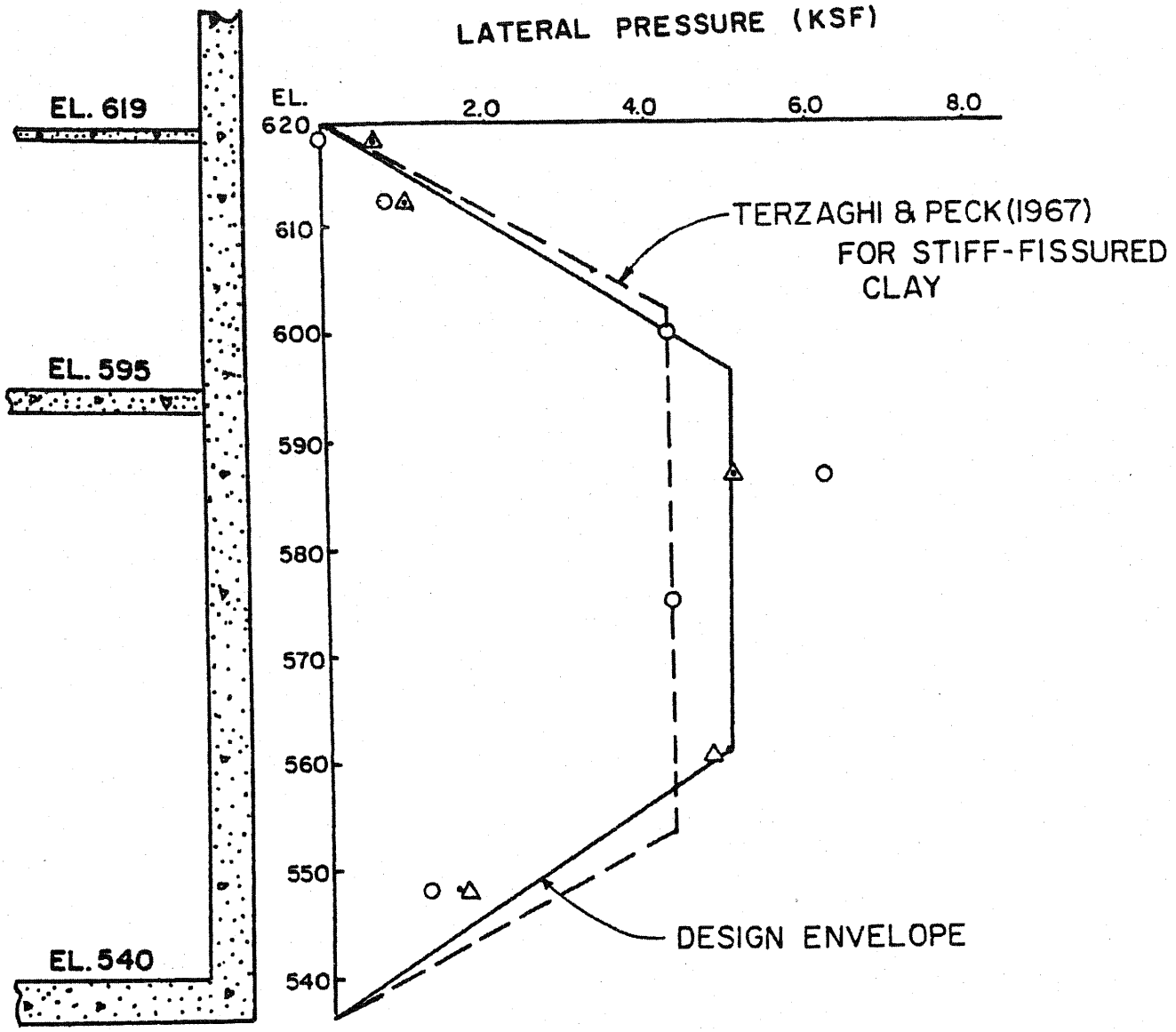


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Earth Pressure Diagrams
for Emergency Service Water
Pumphouse Subsurface Walls

Figure 2.5-195



LEGEND:

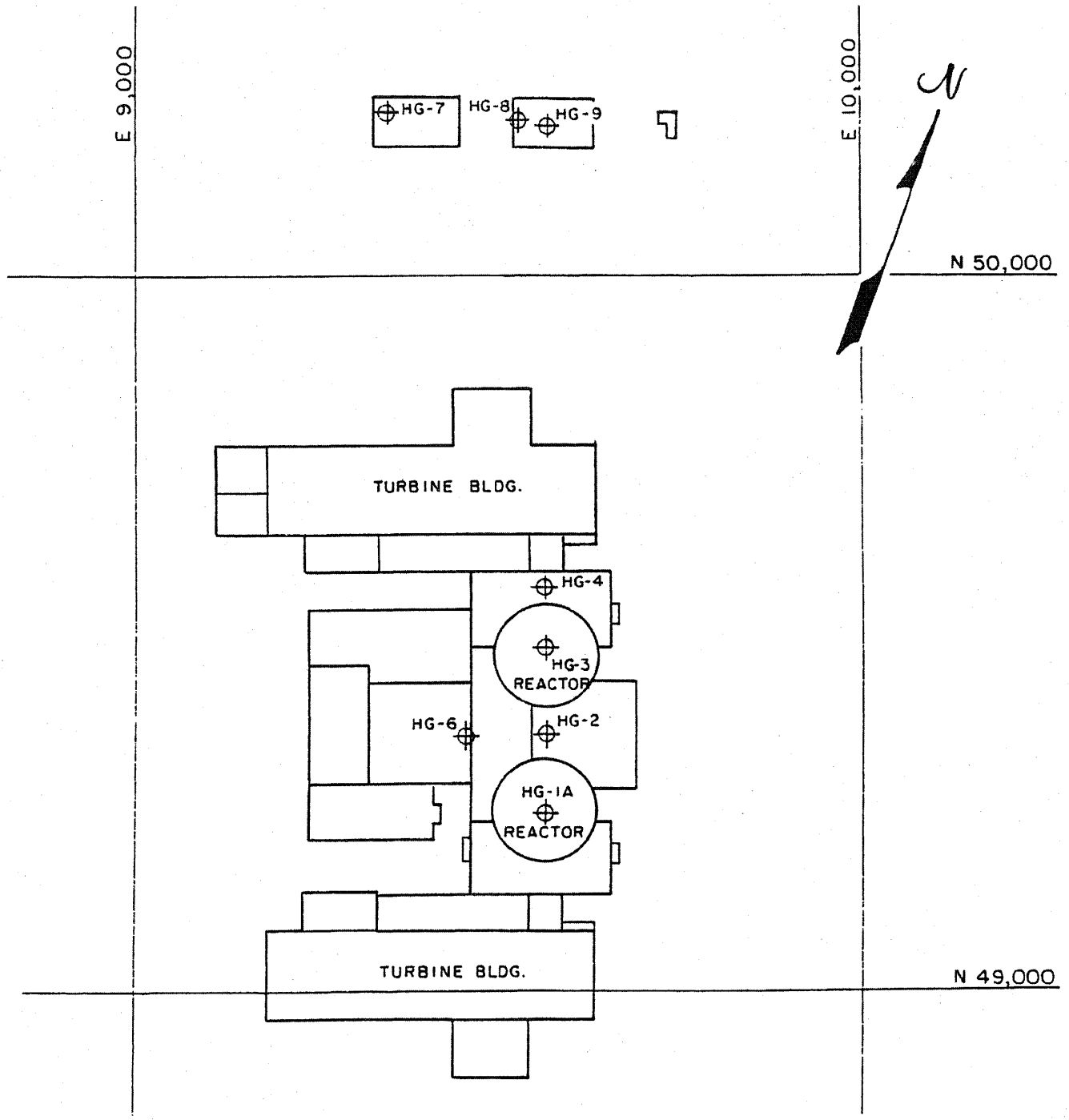
- o CASE 1; K_o(SHALE) = 2, K_o(FILL) = 1 INCREMENTAL WALL CONSTRUCTION
- Δ CASE 2; K_o(SHALE) = 2, K_o(FILL) = 1
- • CASE 3; K_o(SHALE) = 1, K_o(FILL) = 0.5

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Lateral Pressure - Emergency Service Water Pumphouse

Figure 2.5-196

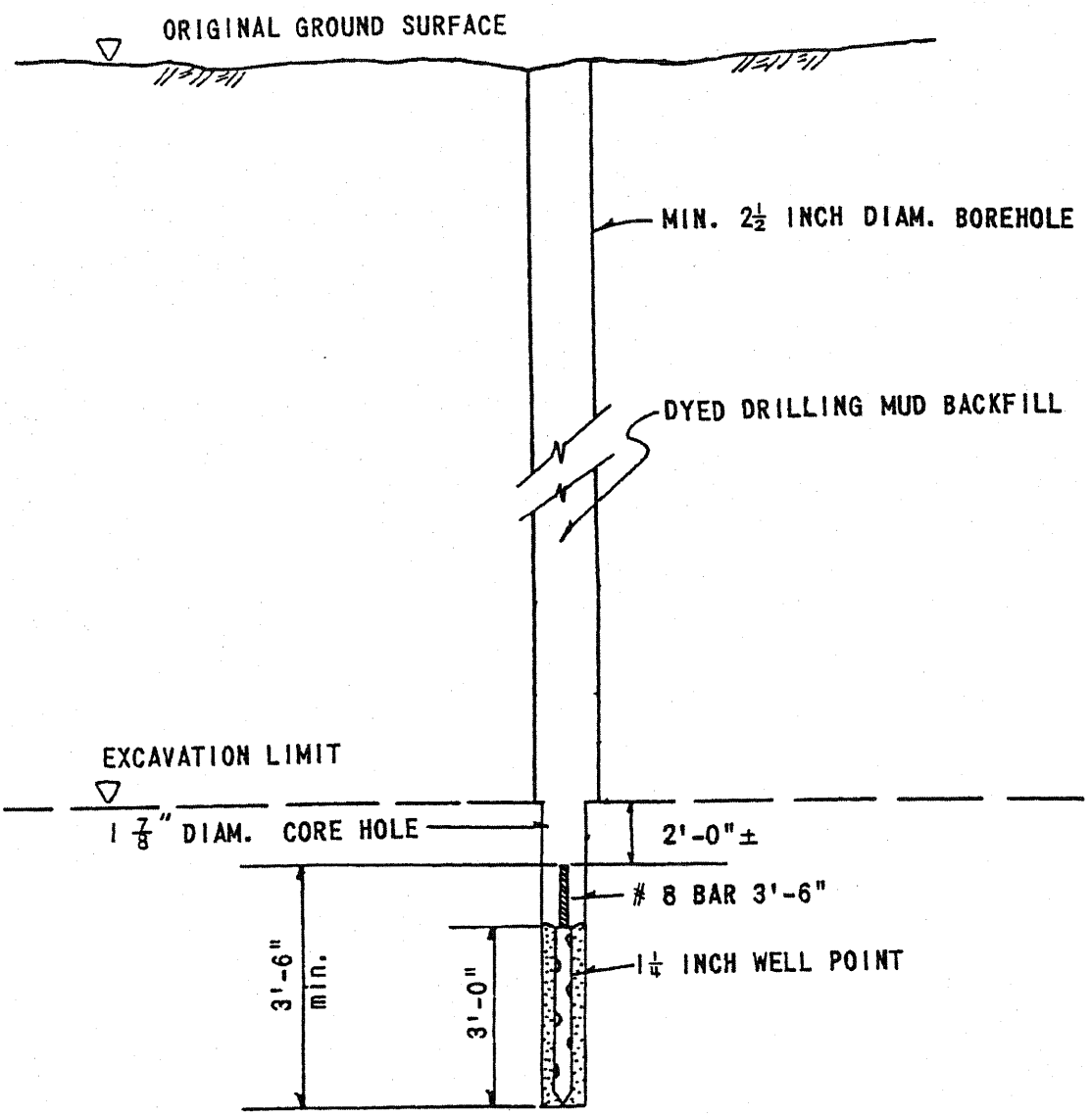


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Heave Gauge
Location Plan

Figure 2.5-197



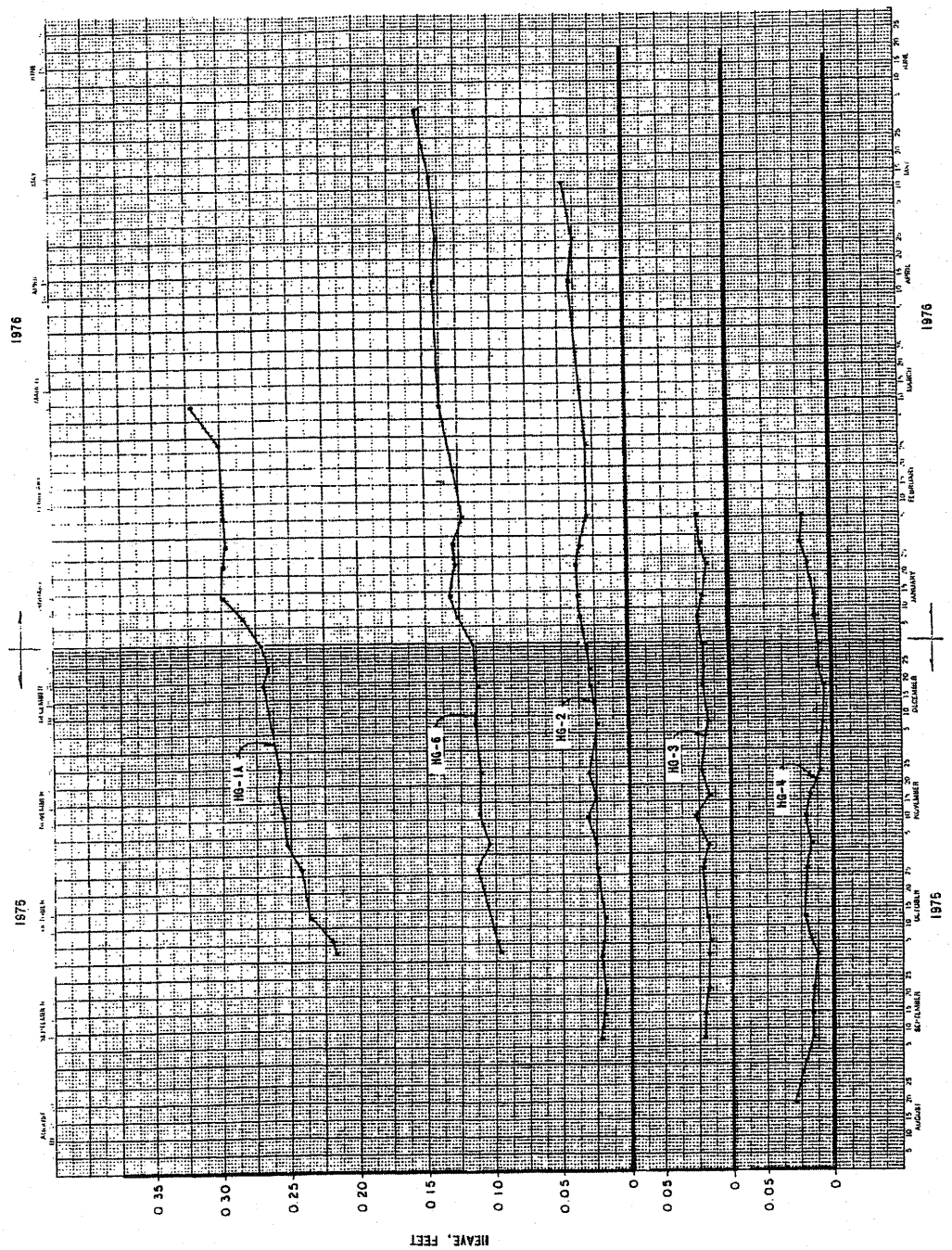
NOTE: # 8 BAR PLACED WITH AND DRIVEN INTO 1¼ INCH WELL POINT
ELEVATION OF TOP OF BAR ESTABLISHED FROM SURFACE

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Heave Gauge Detail

Figure 2.5-198

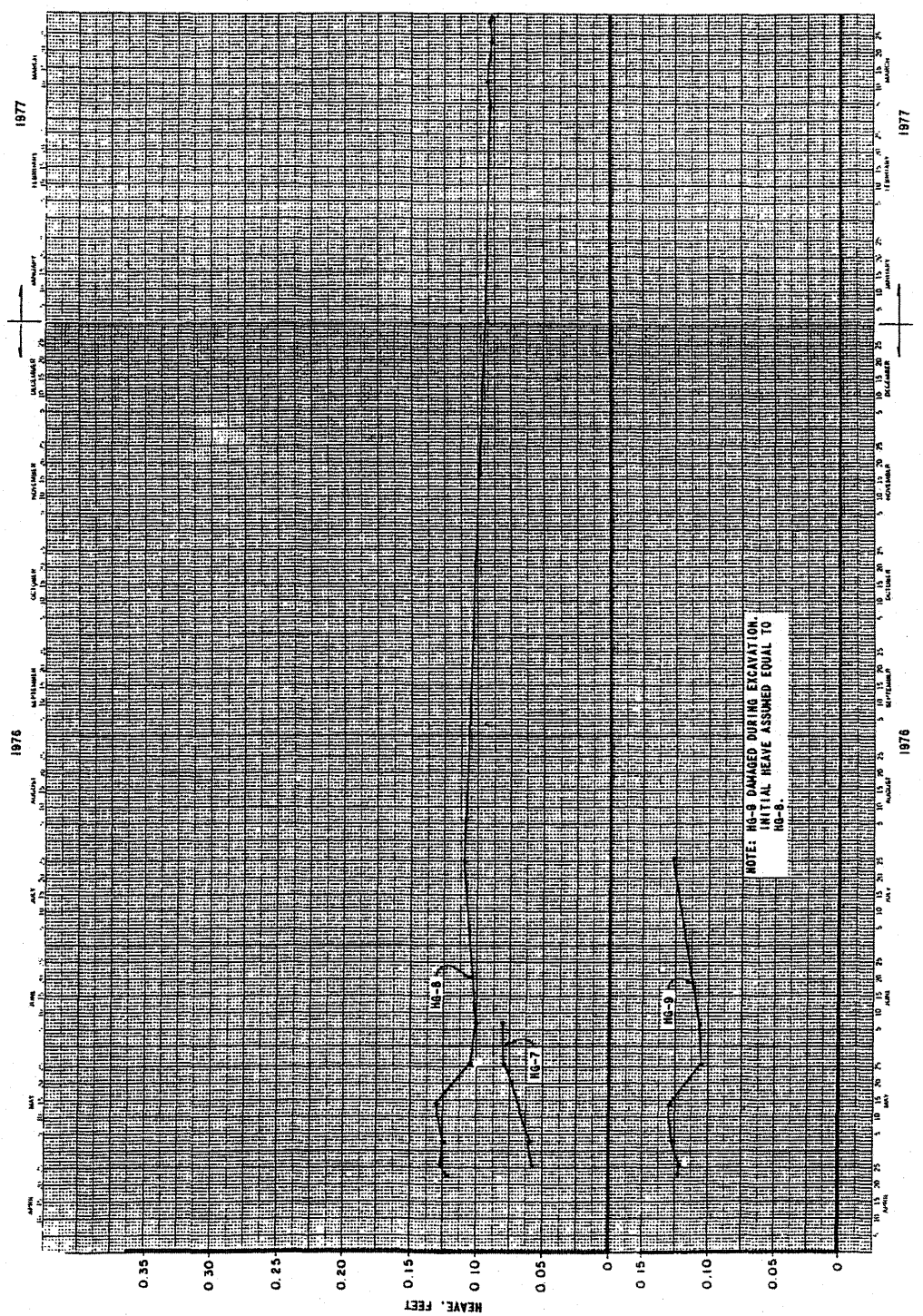


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Heave Gauge Monitoring Data

Figure 2.5-199 (Sheet 1 of 2)

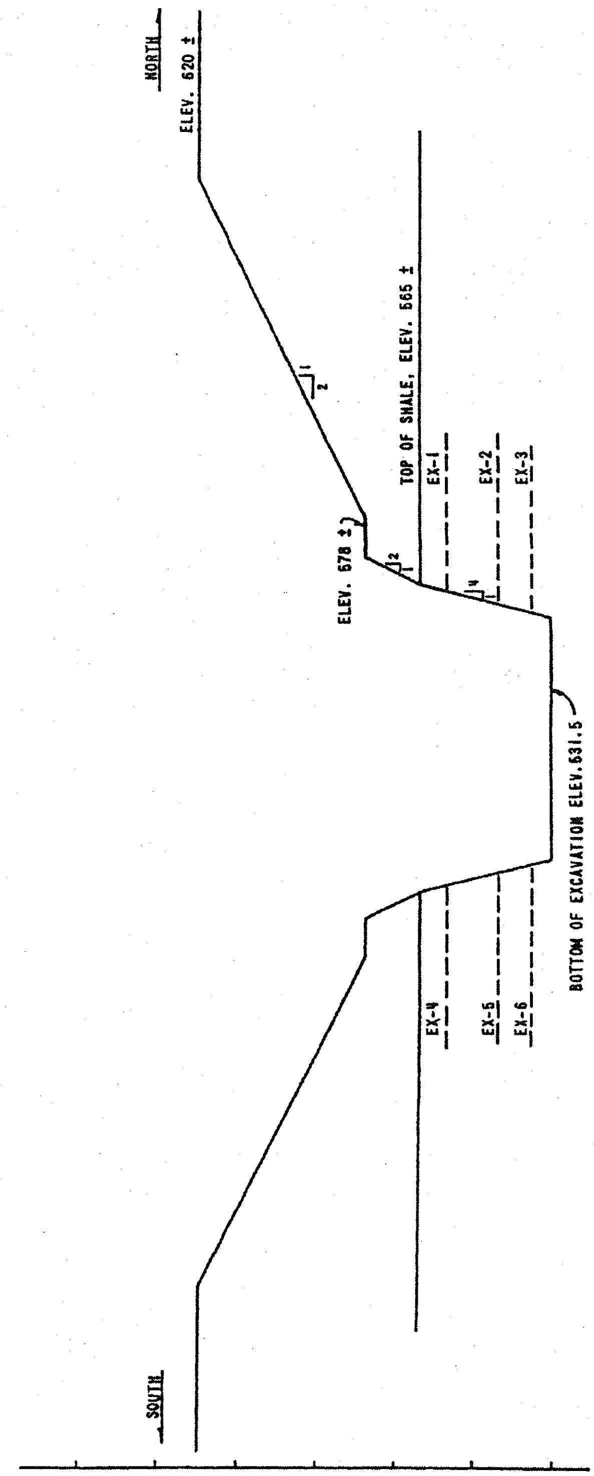


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Heave Gauge Monitoring Data

Figure 2.5-199 (Sheet 2 of 2)

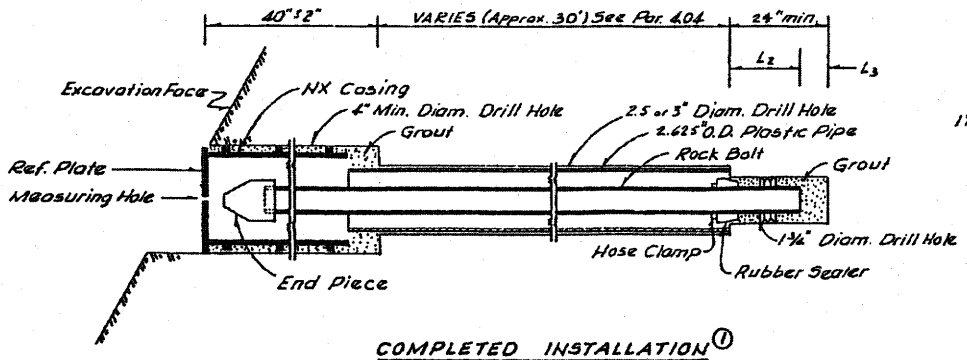


(Rev. 12 1/03)

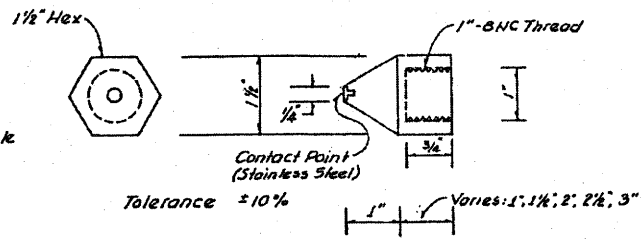
PERRY NUCLEAR POWER PLANT

Shale Extensometer Locations in Emergency Service Water Pumphouse Excavation

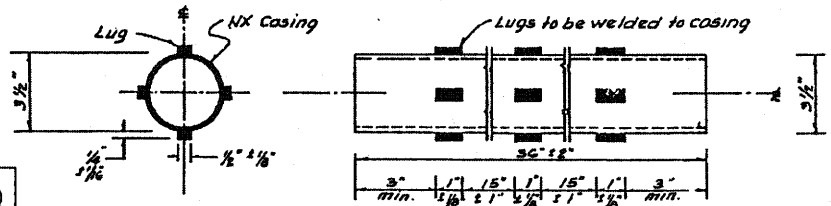
Figure 2.5-200



COMPLETED INSTALLATION ①



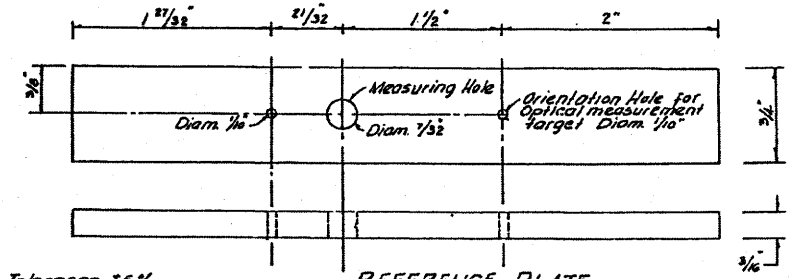
END PIECE



NX CASING WITH LUGS

NOTE:

① Temperature Probes & Leads not shown.



REFERENCE PLATE

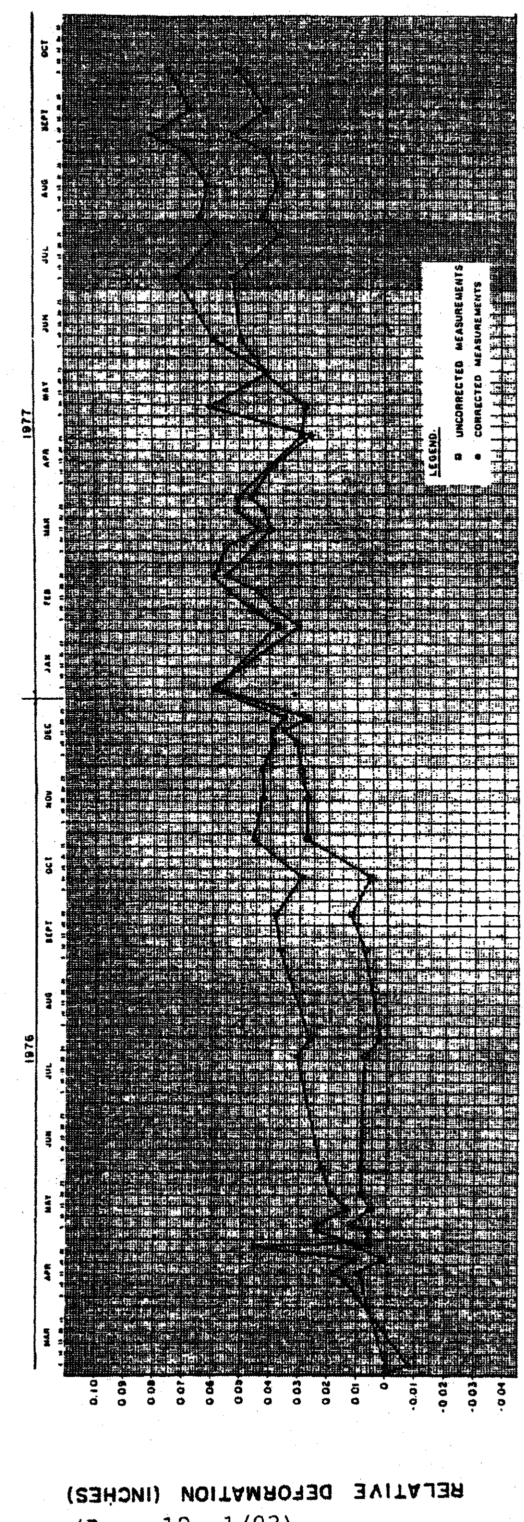
PERRY NUCLEAR POWER PLANT

(Rev. 12 1/03)

Installation Details,
Shale Extensometers

Figure 2.5-201

EXTENSOMETER EX-1

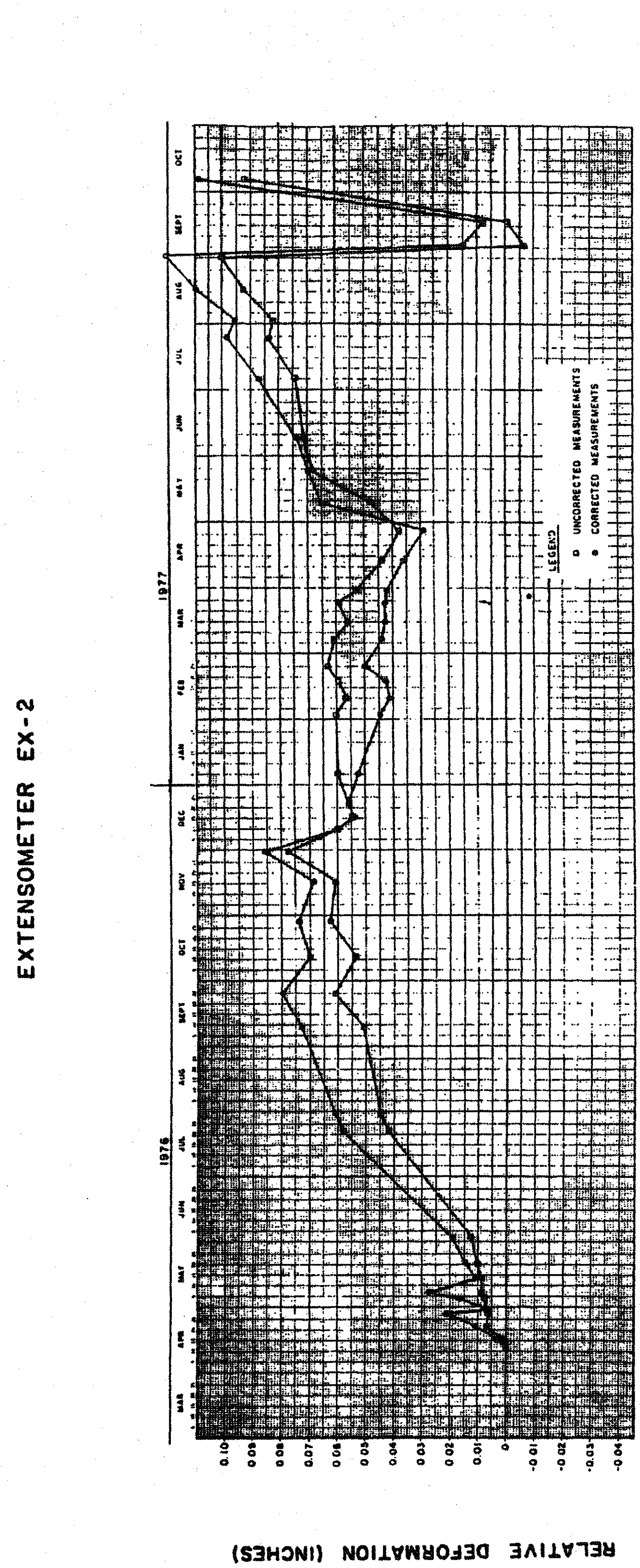


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Extensometers Monitoring Data

Figure 2.5-202 (Sheet 1 of 6)

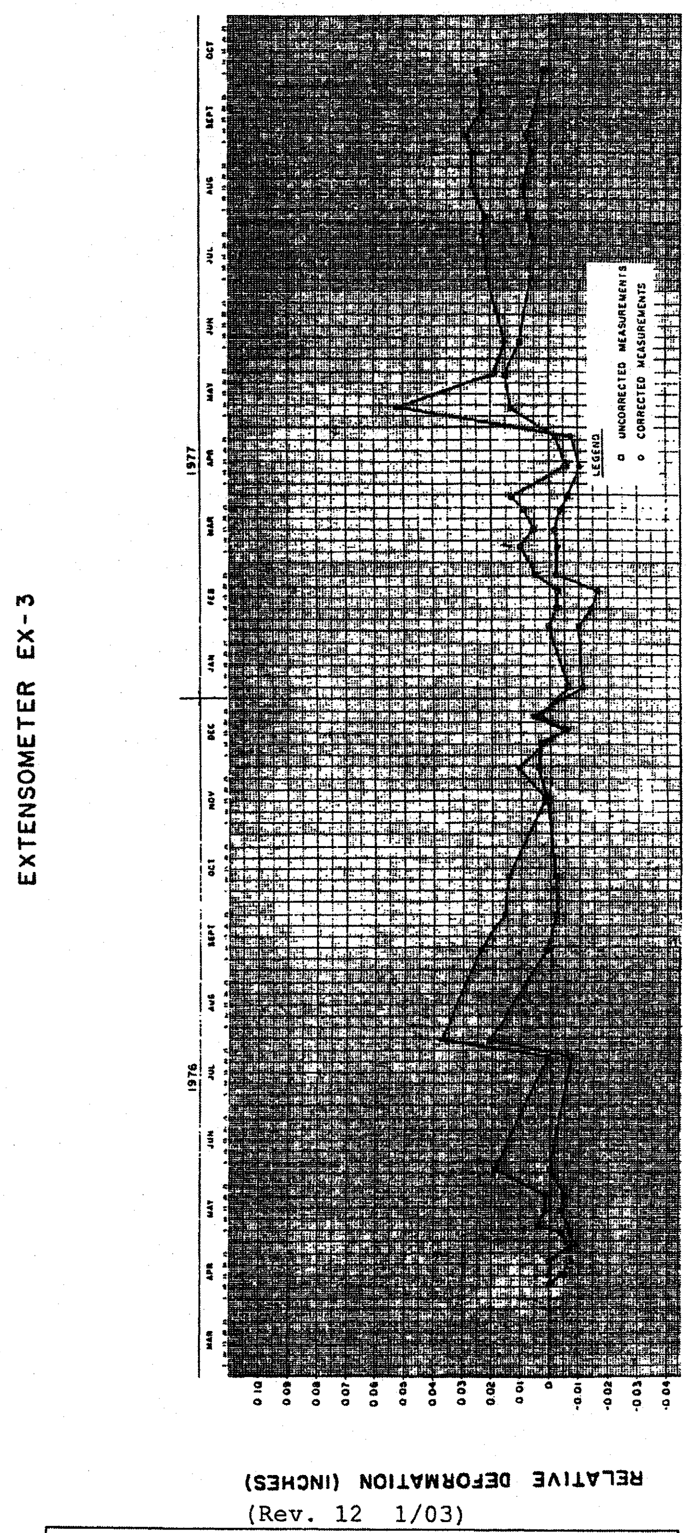


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Extensometers Monitoring Data

Figure 2.5-202 (Sheet 2 of 6)

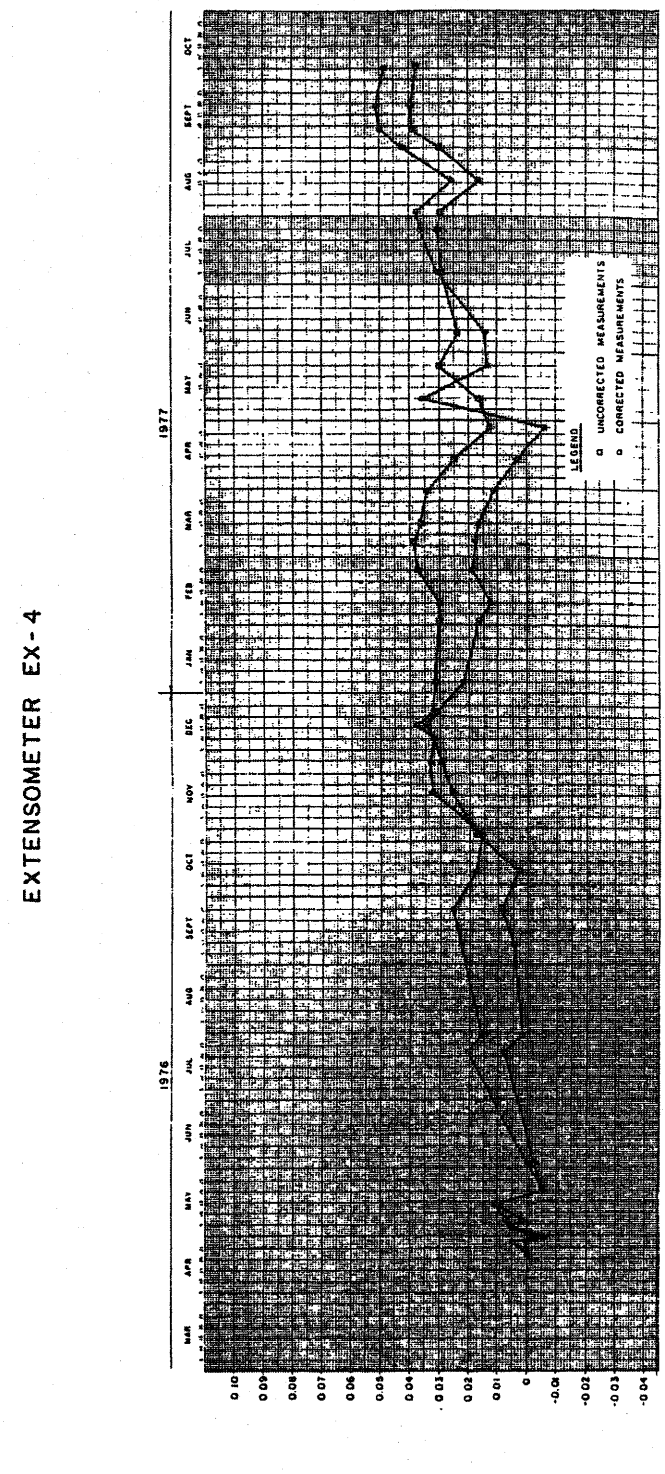


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Extensometers Monitoring Data

Figure 2.5-202 (Sheet 3 of 6)

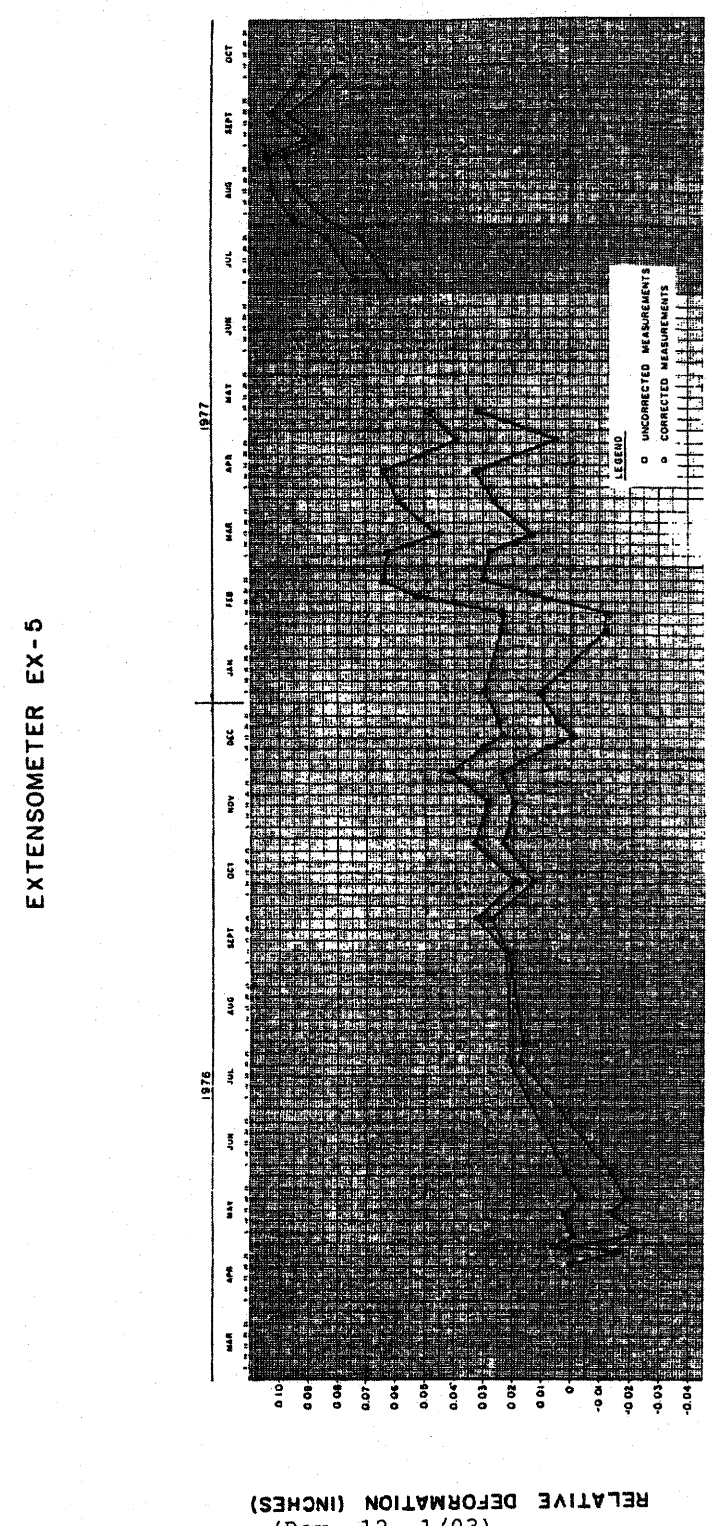


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Extensometers Monitoring Data

Figure 2.5-202 (Sheet 4 of 6)



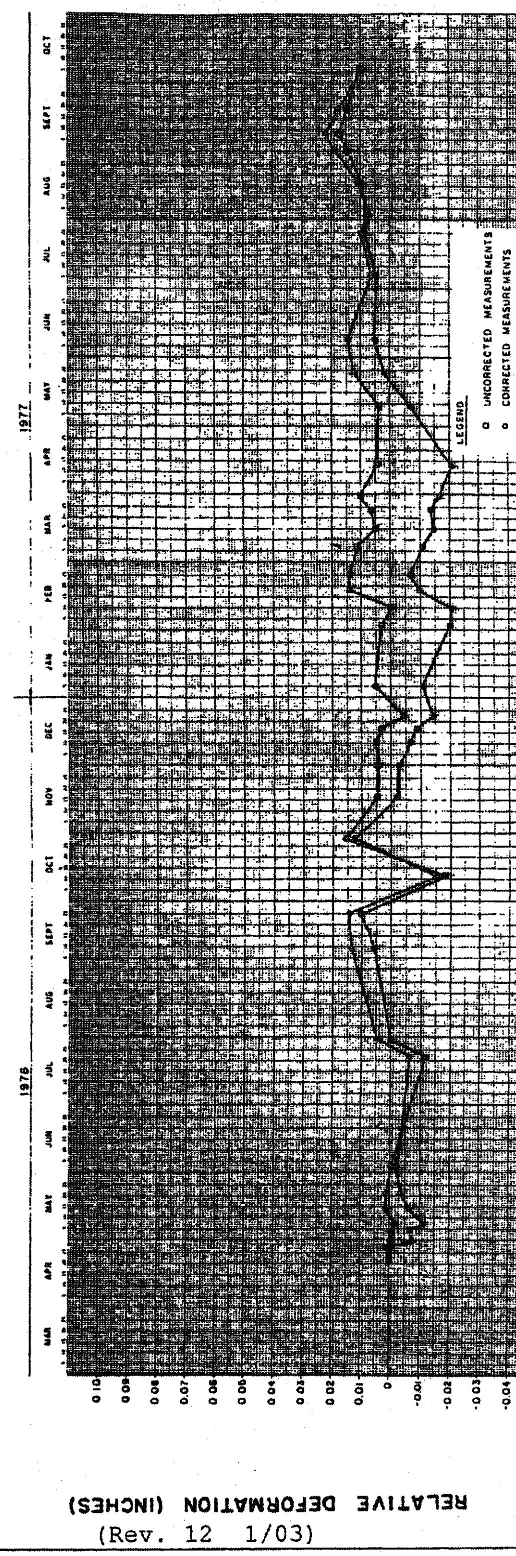
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Extensometers Monitoring Data

Figure 2.5-202 (Sheet 5 of 6)

EXTENSOMETER EX-6

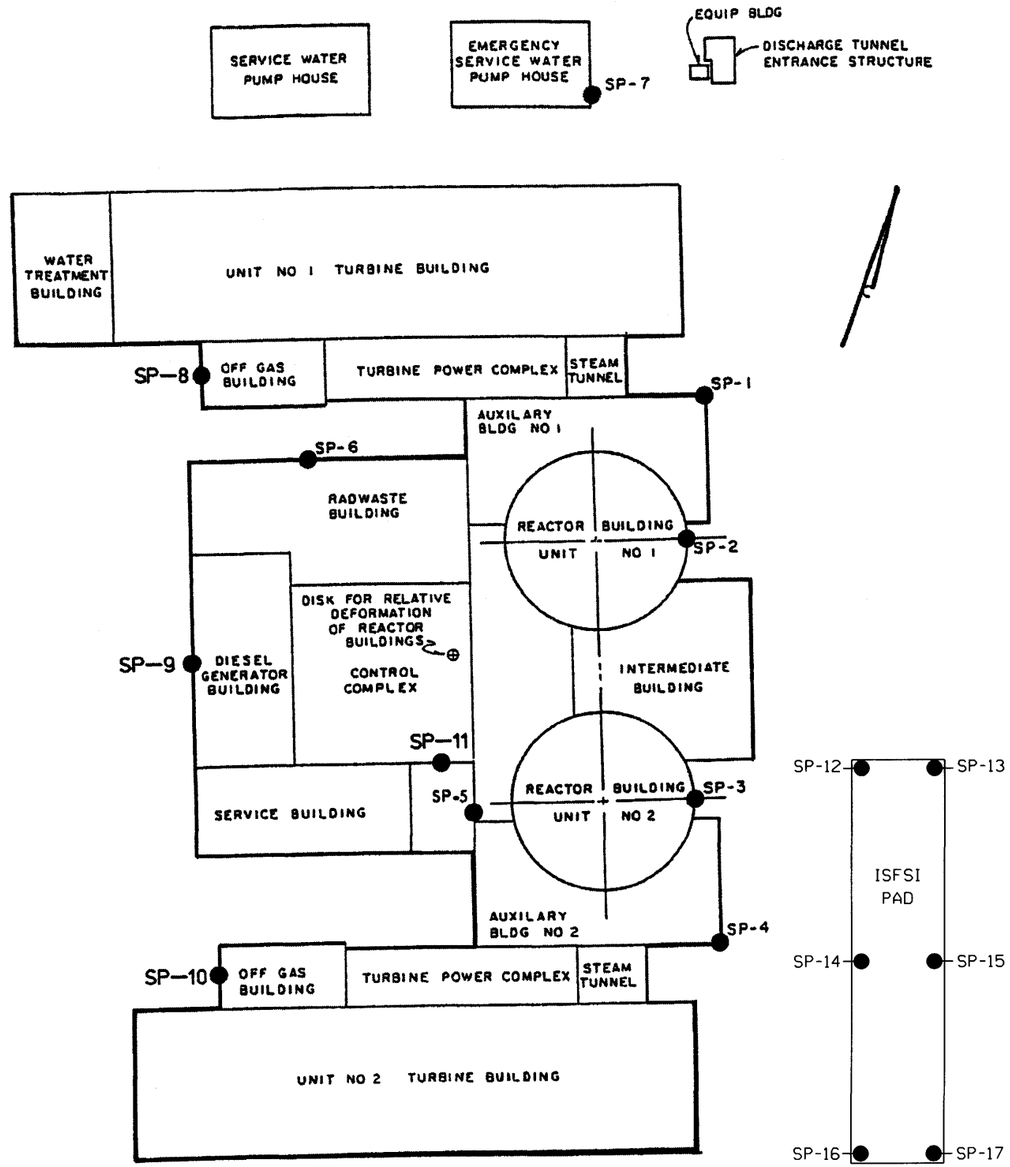


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Shale Extensometers Monitoring Data

Figure 2.5-202 (Sheet 6 of 6)

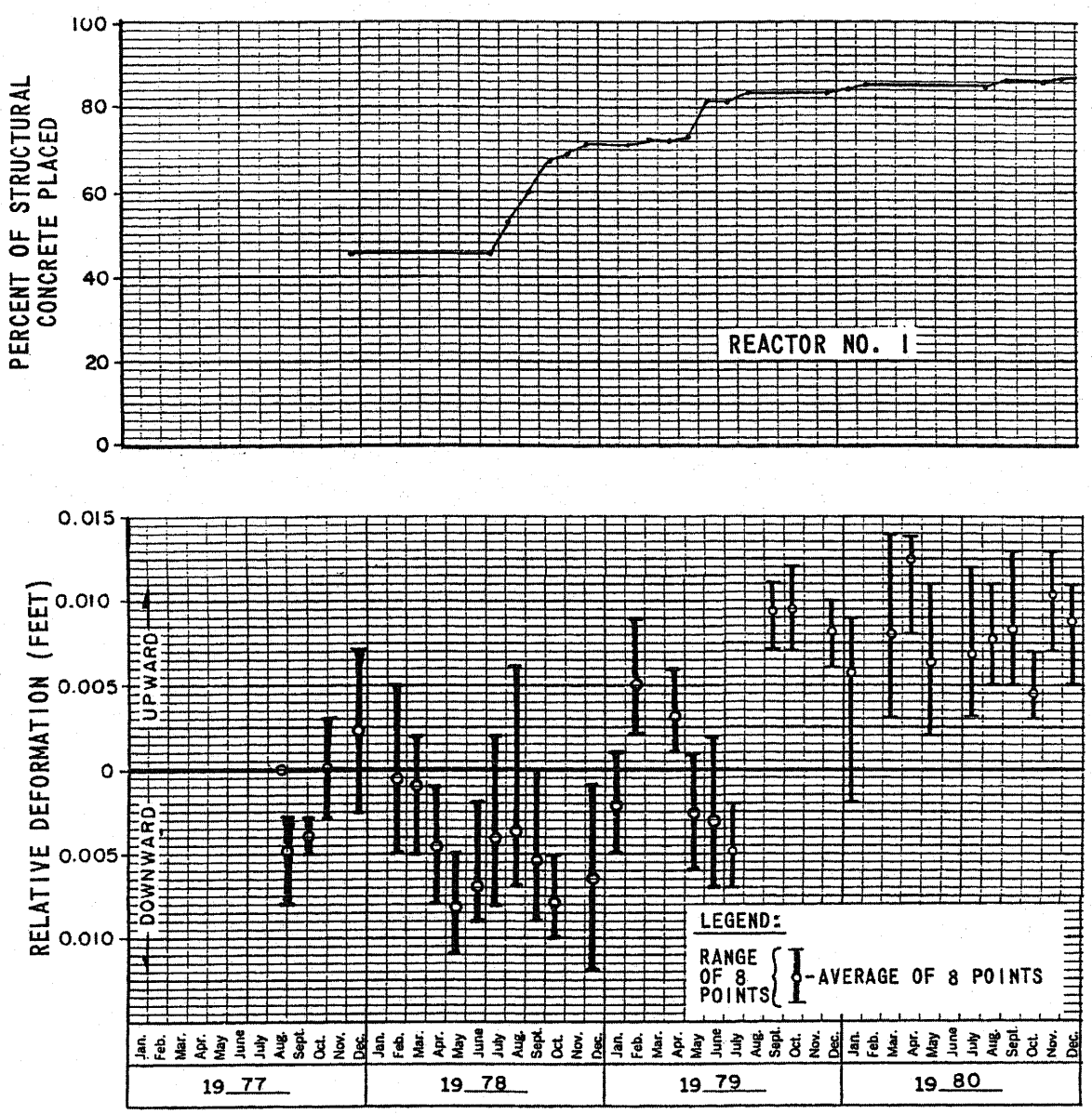


(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

SETTLEMENT MONUMENT
LOCATION PLAN

FIGURE 2.5-203



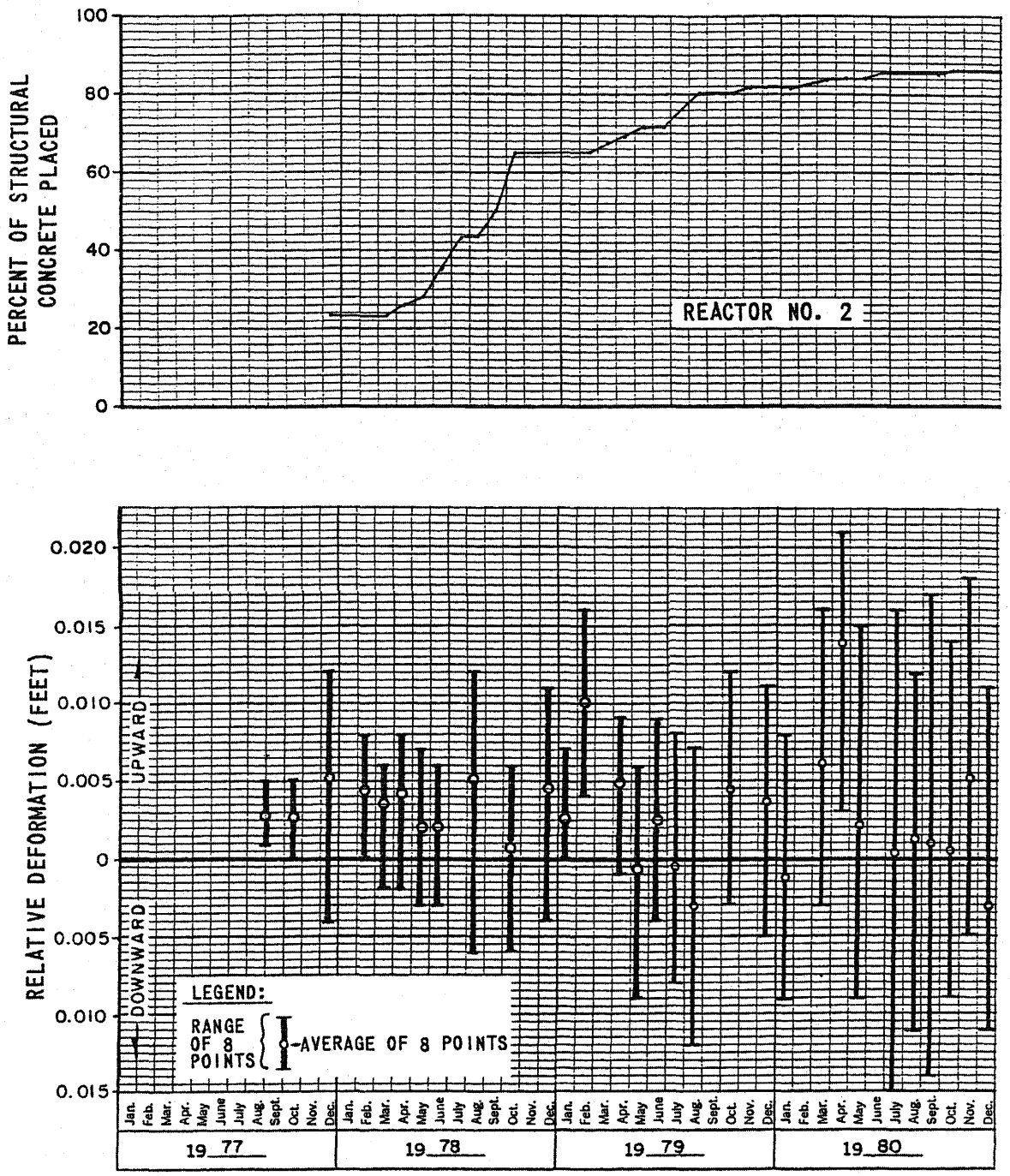
NOTE: MEASURED DEFORMATION IS RELATIVE TO MONUMENT WITHIN CONTROL COMPLEX

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Mat Deformation

Figure 2.5-204 (Sheet 1 of 2)



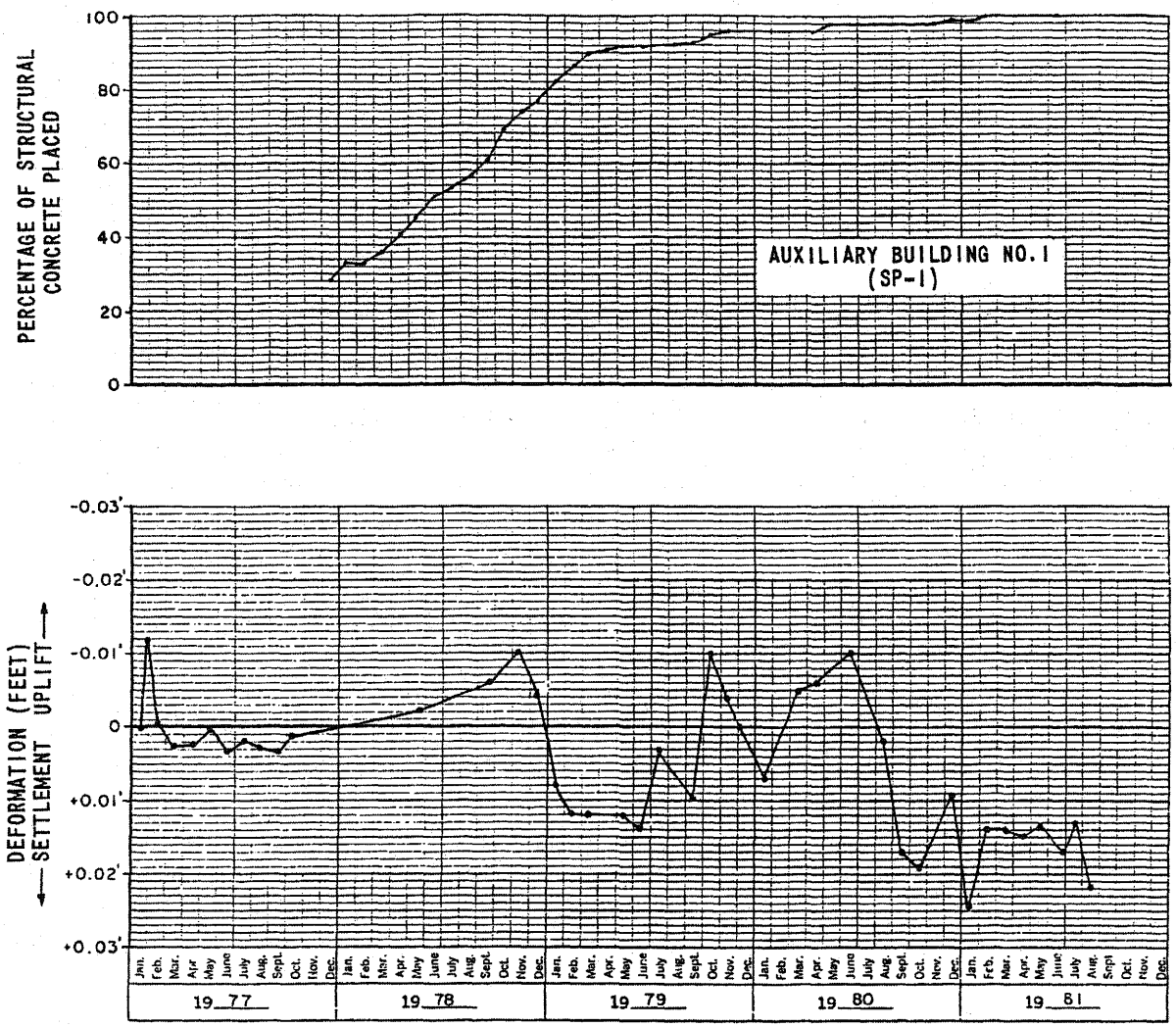
NOTE: MEASURED DEFORMATION IS RELATIVE TO MONUMENT WITHIN CONTROL COMPLEX

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Mat Deformation

Figure 2.5-204 (Sheet 2 of 2)

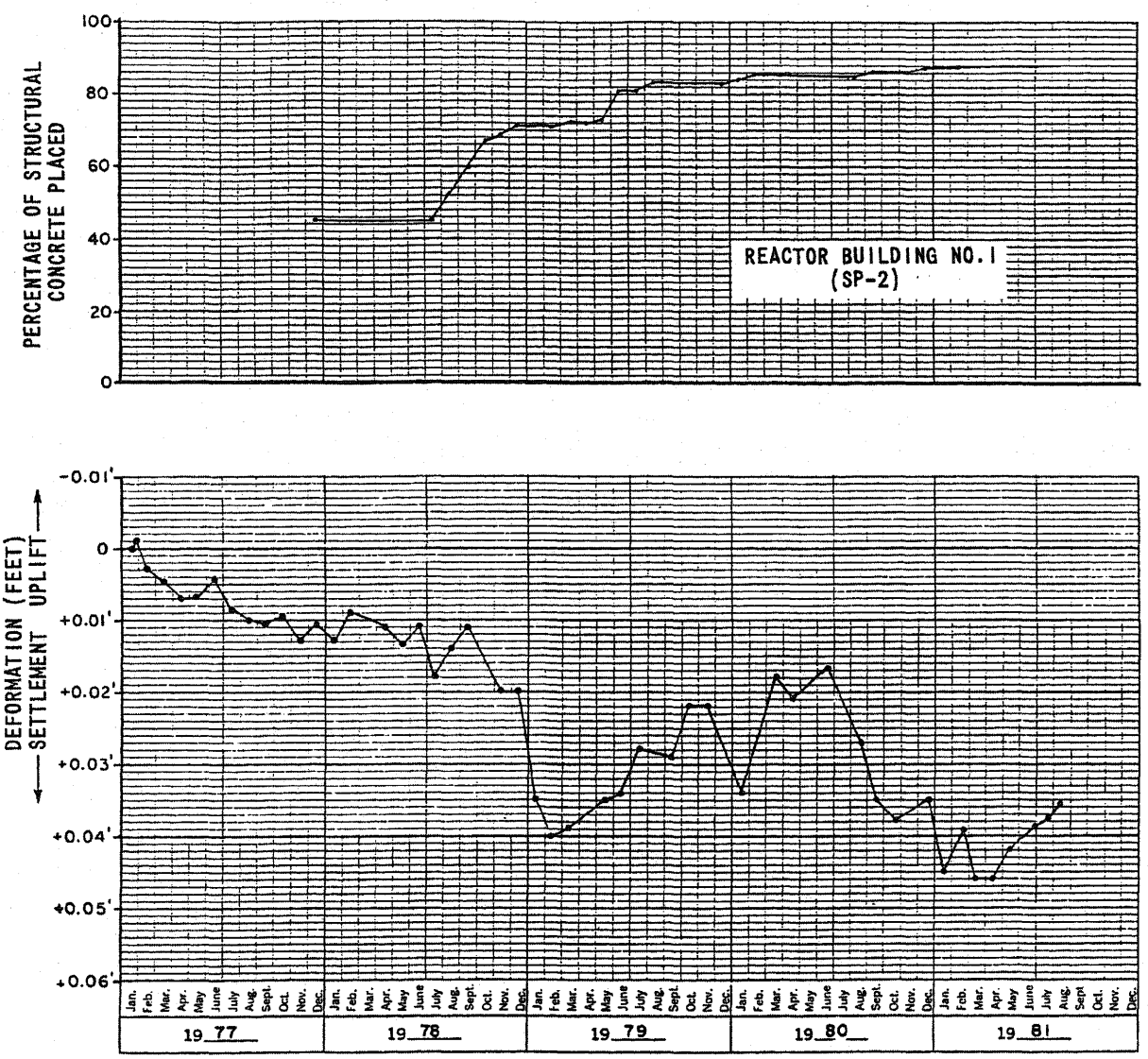


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-205 (Sheet 1 of 6)

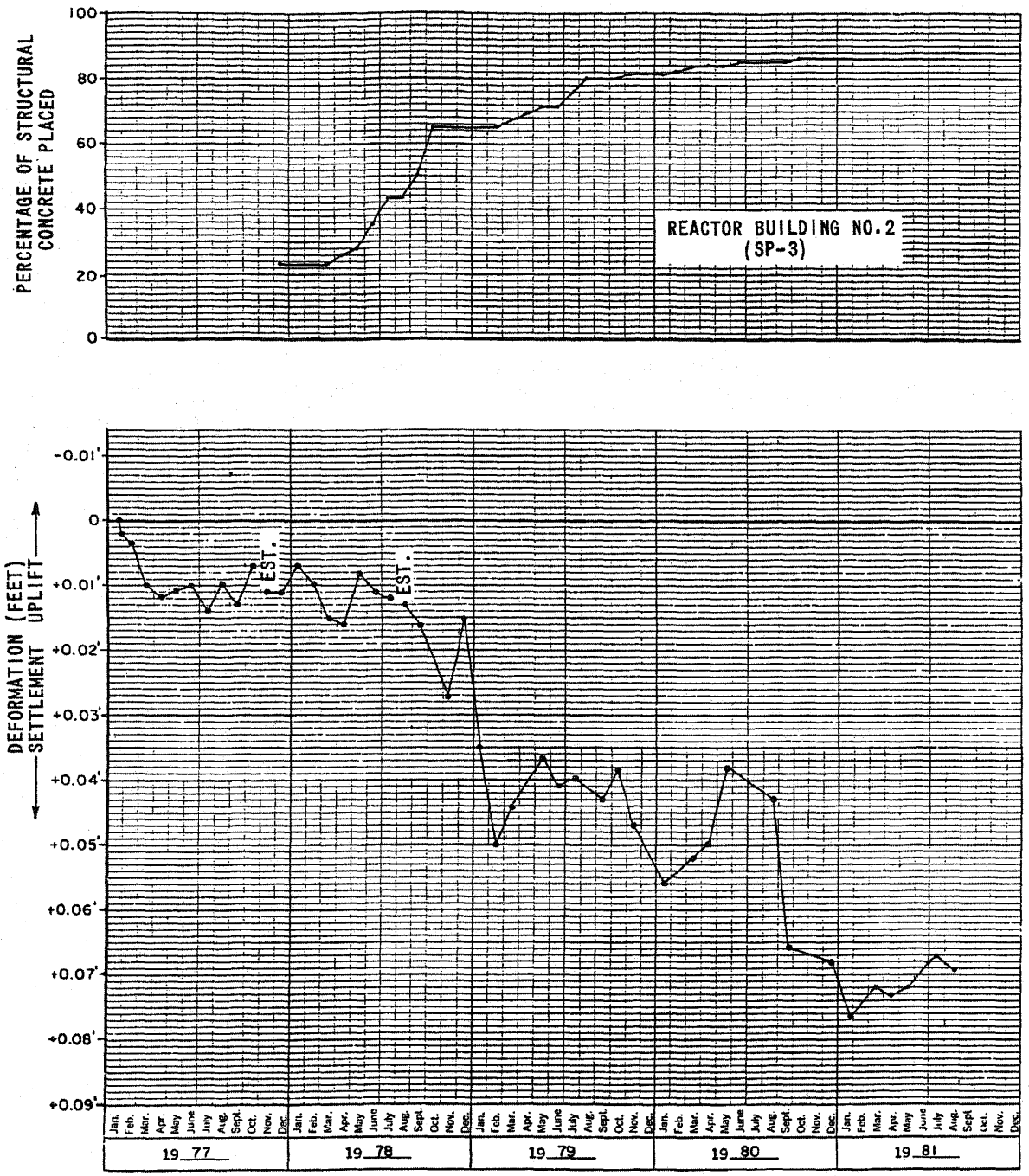


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-205 (Sheet 2 of 6)

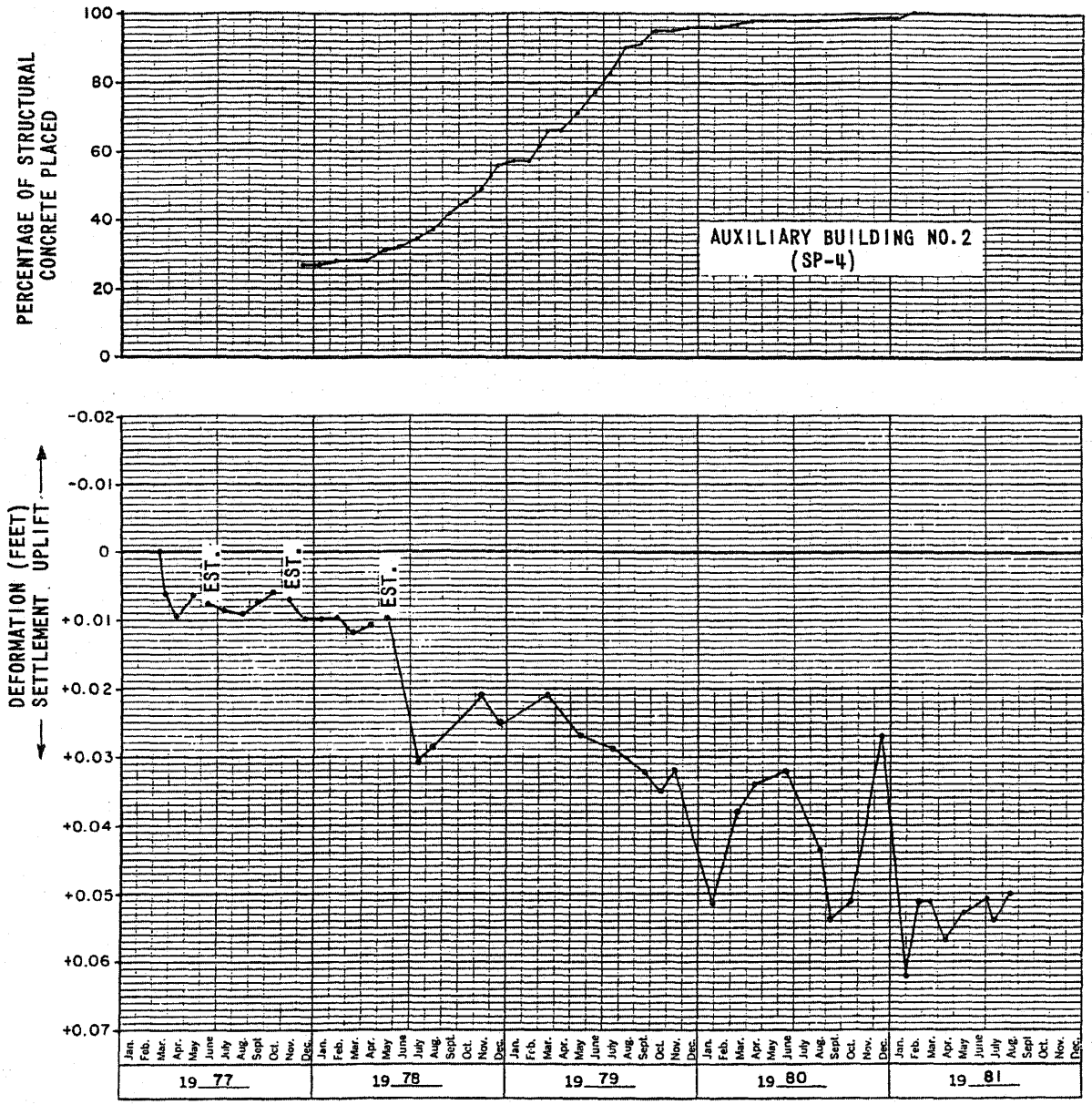


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-205 (Sheet 3 of 6)

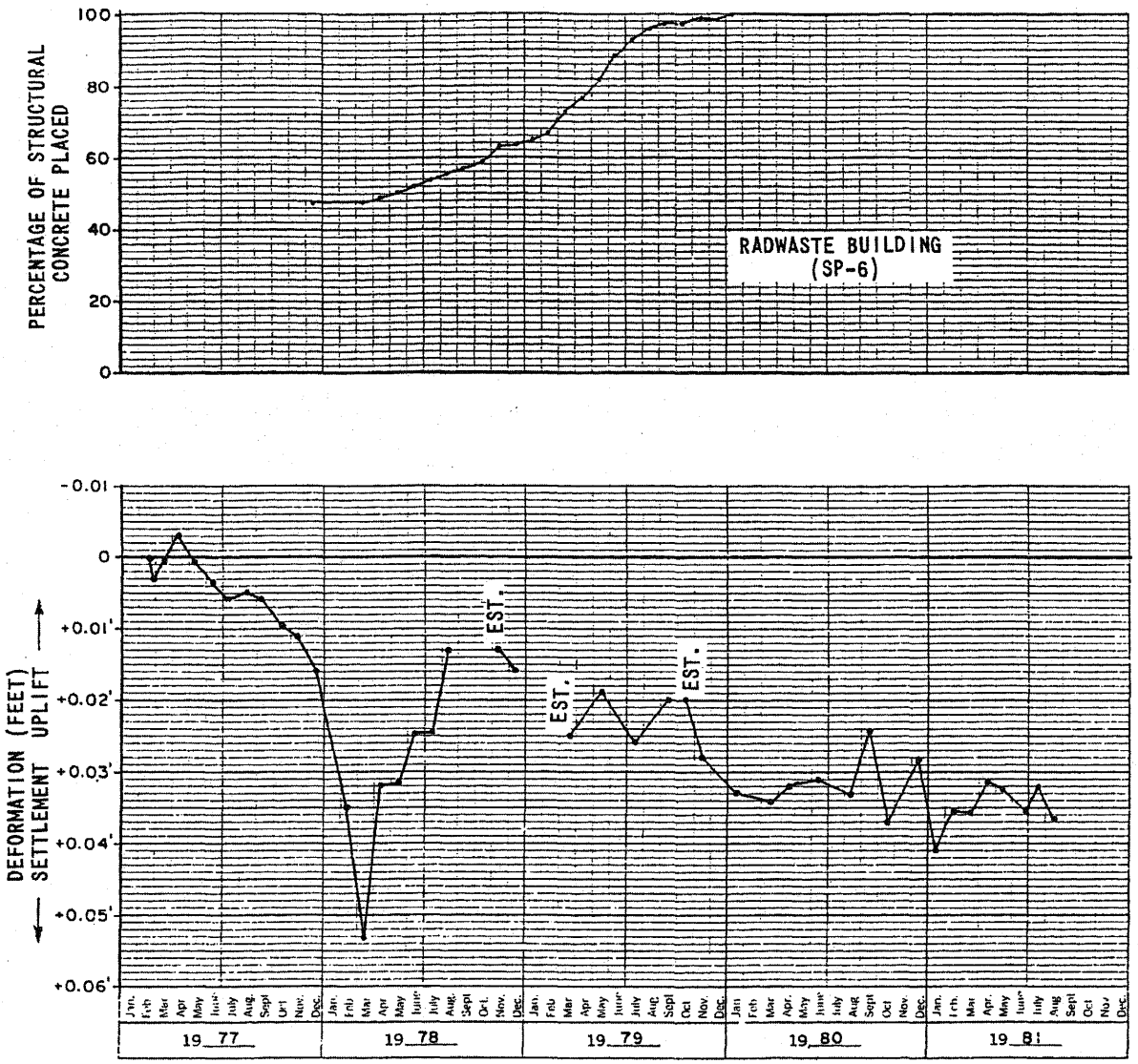


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-205 (Sheet 4 of 6)

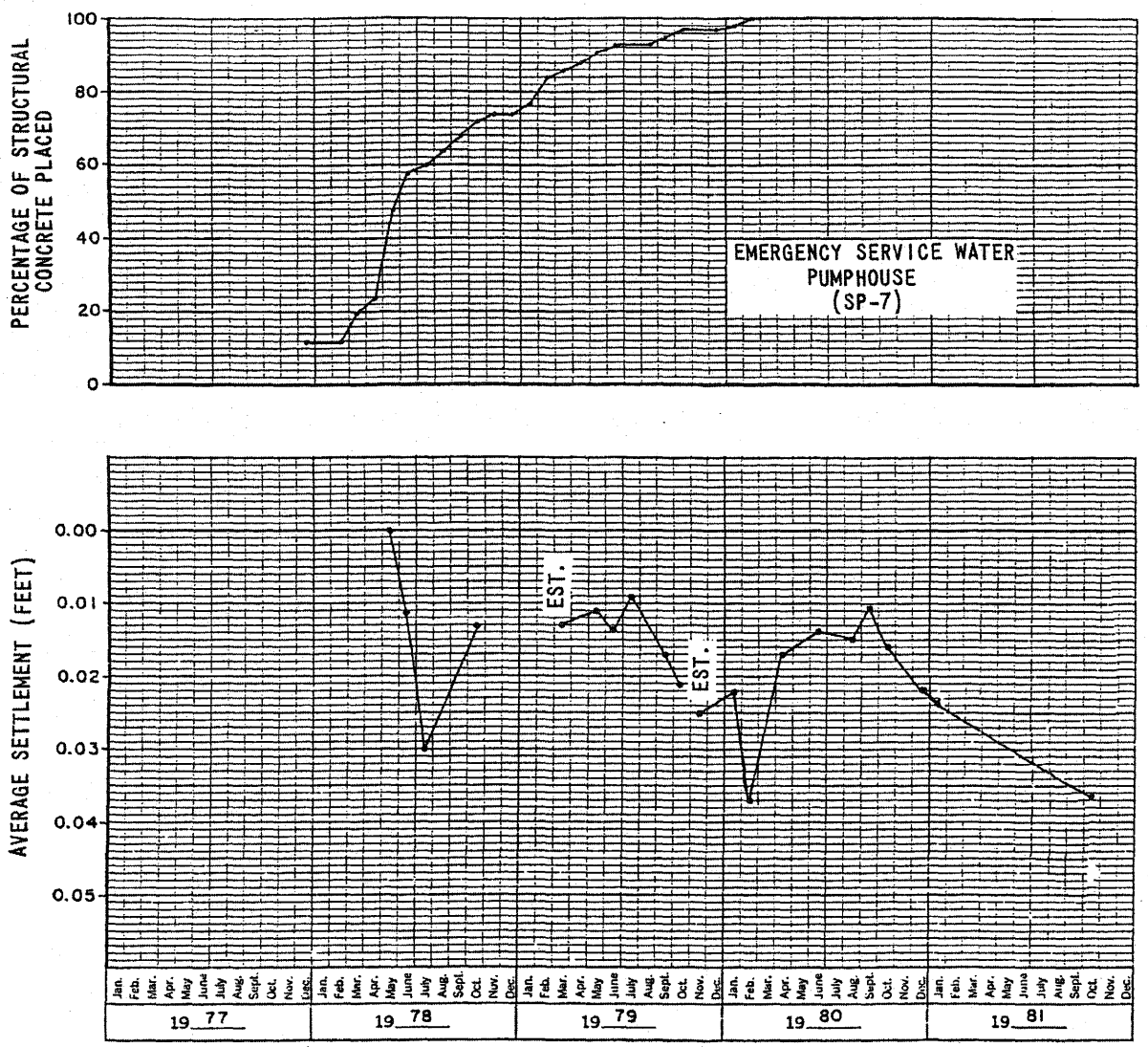


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-205 (Sheet 5 of 6)

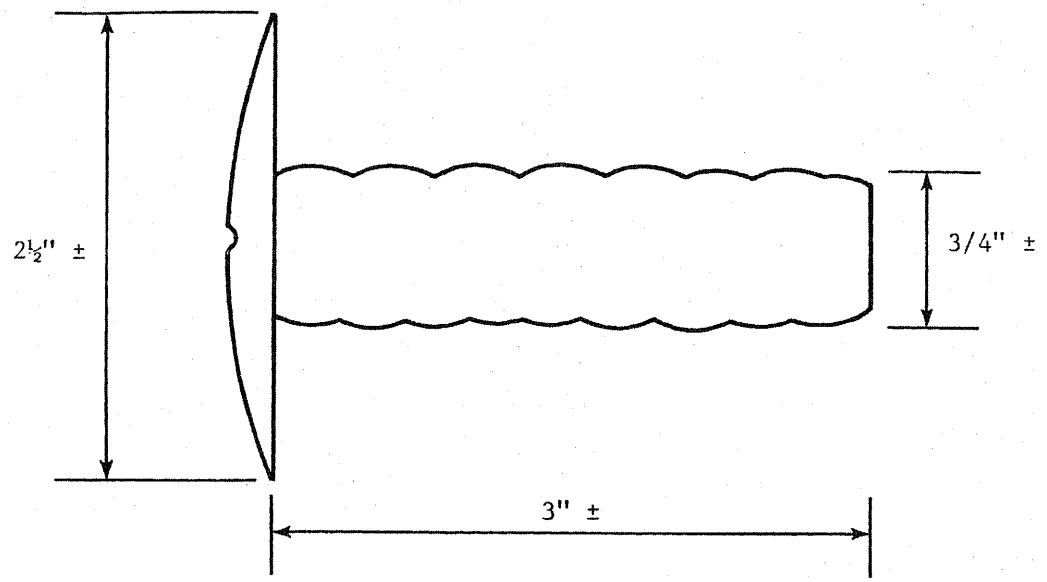


(Rev. 12 1/03)

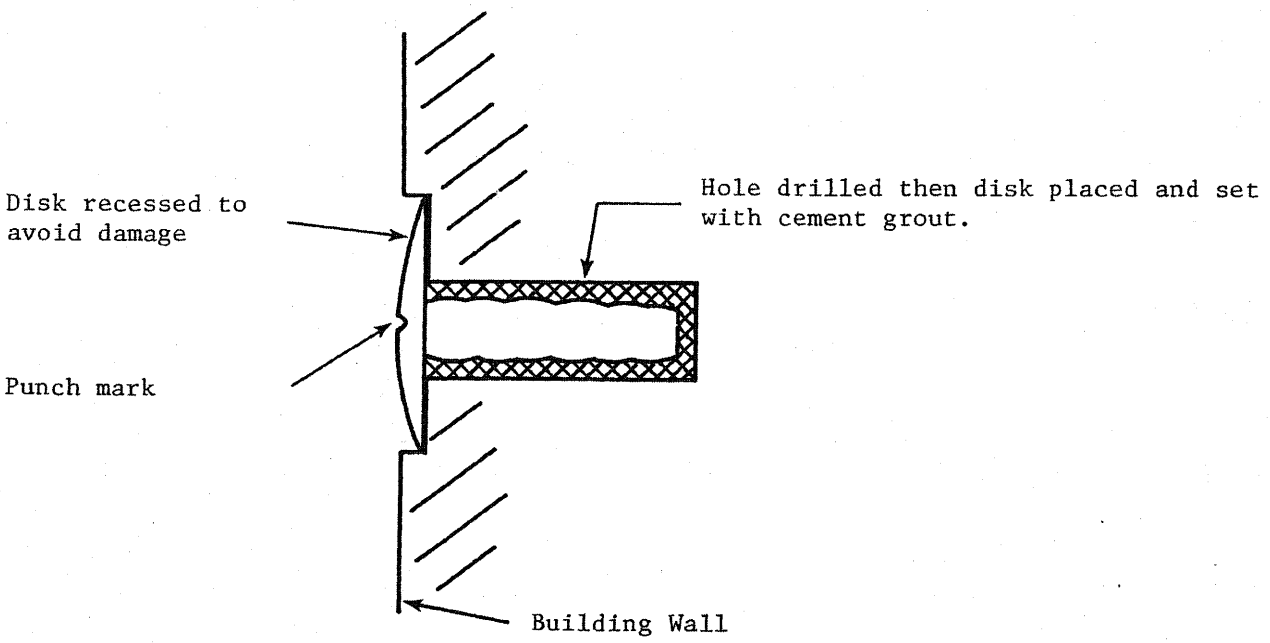
PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-205 (Sheet 6 of 6)



BRASS DISK DIMENSIONS



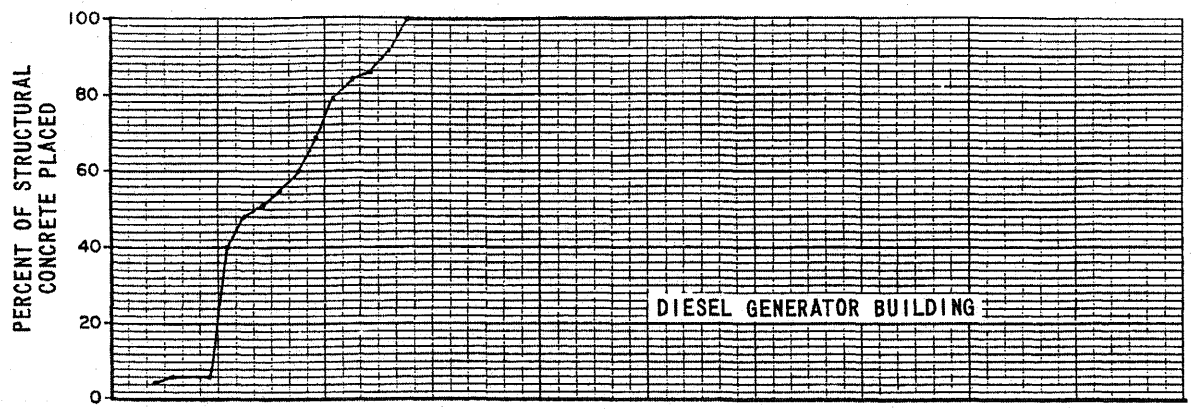
TYPICAL DISK INSTALLATION

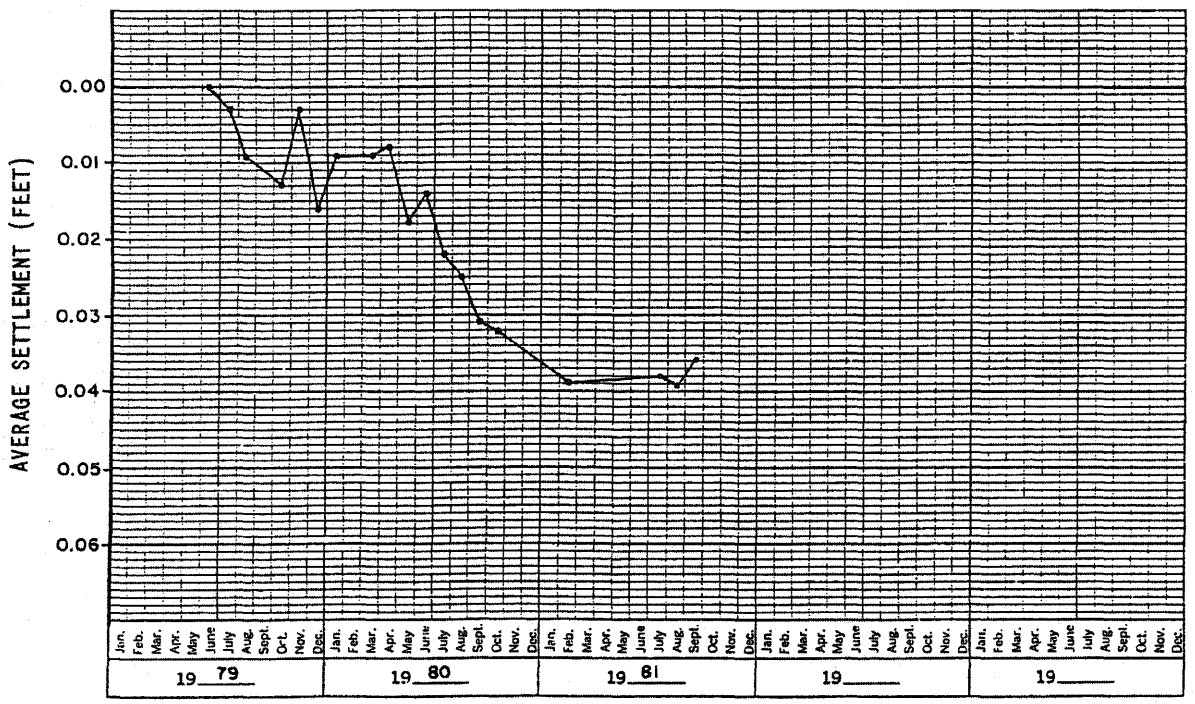
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Building Settlement
Monitoring Disks

Figure 2.5-206



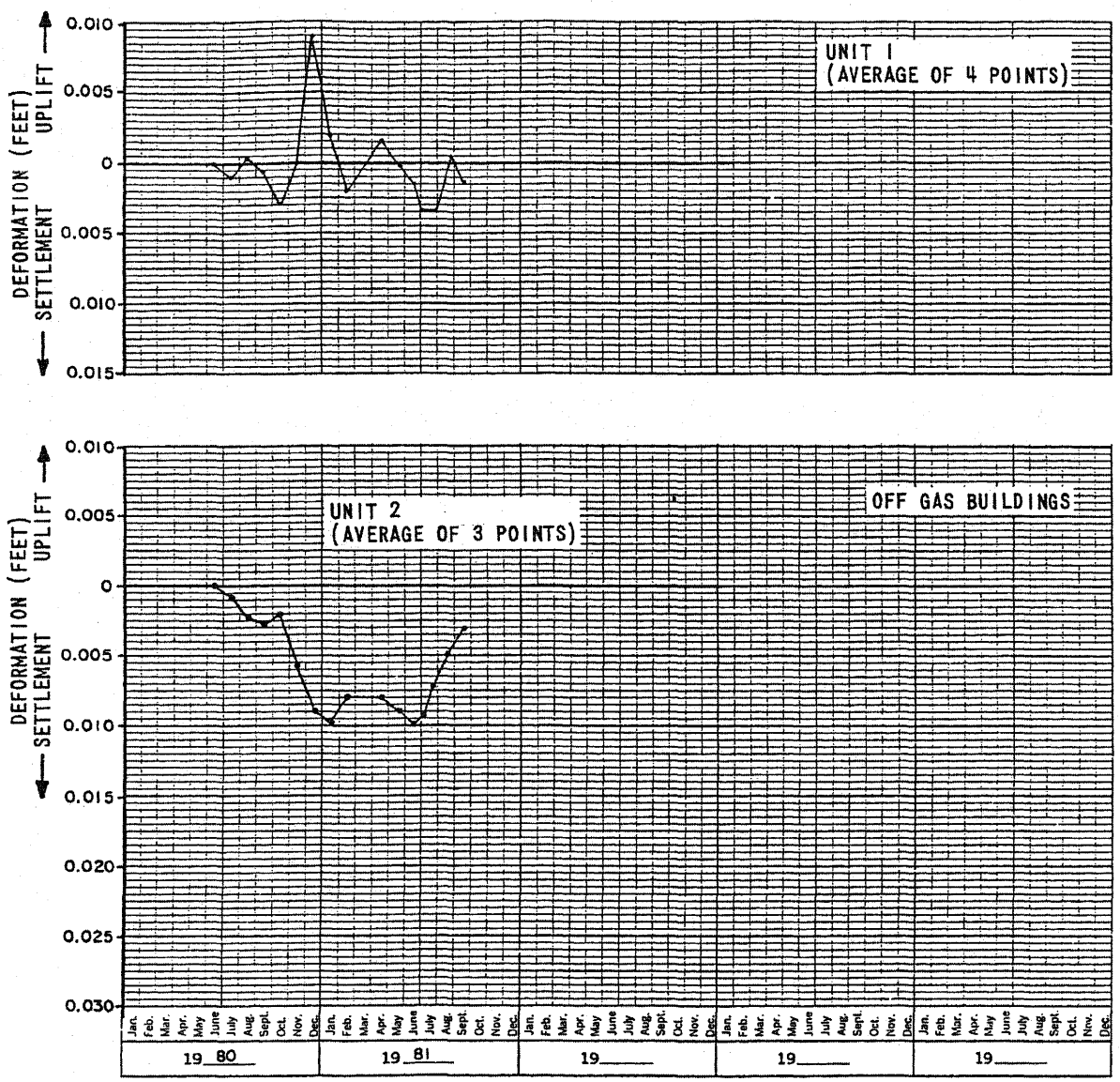


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-207



NOTE: STRUCTURAL CONCRETE PLACEMENT COMPLETED PRIOR TO SETTLEMENT MONITORING.

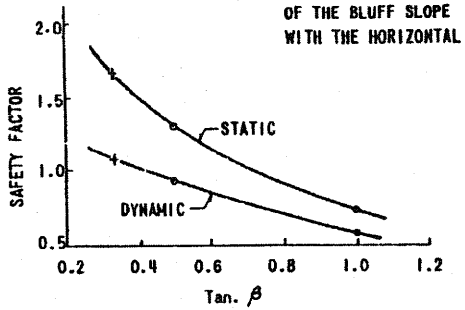
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement Observation Data

Figure 2.5-208

NOTE: β = ANGLE OF INCLINATION OF THE BLUFF SLOPE WITH THE HORIZONTAL



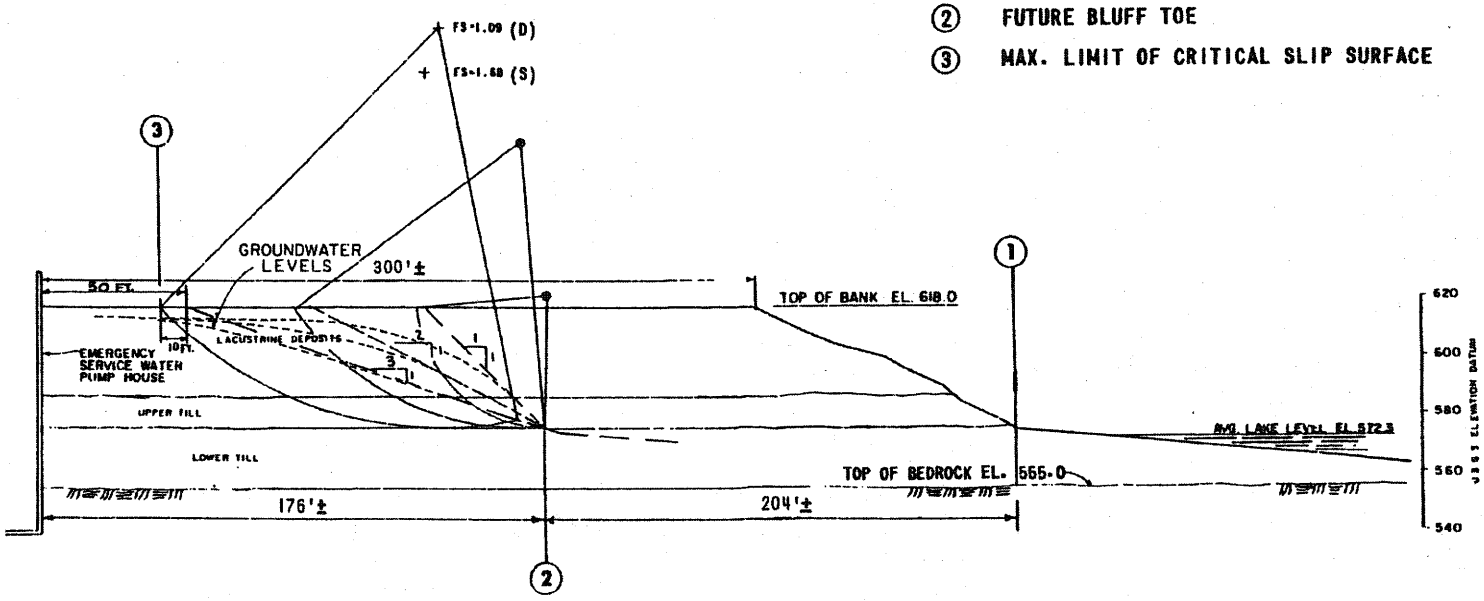
SYMBOL	AVERAGE SLOPE	FACTOR of SAFETY		MAX. ②-③ DISTANCE (Ft.)
		STATIC	DYNAMIC*	
•	1:1	0.73	0.56	46
o	2:1	1.32	0.94	86
+	3:1	1.68	1.09	136

* k_s = 0.15

① EXISTING TOE OF BLUFF SLOPE

② FUTURE BLUFF TOE

③ MAX. LIMIT OF CRITICAL SLIP SURFACE



PERRY NUCLEAR POWER PLANT

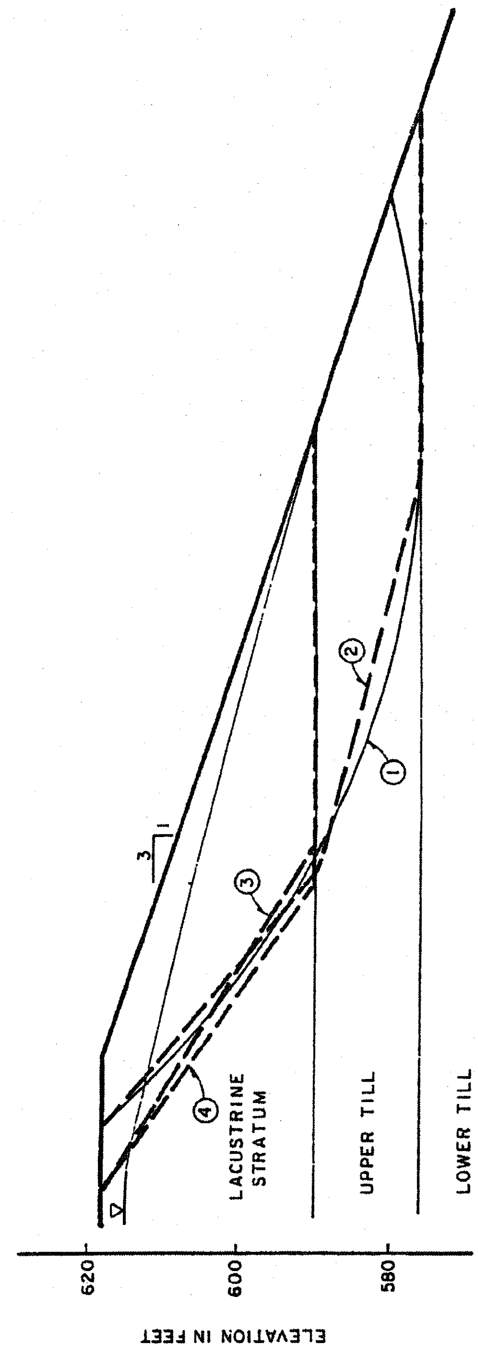
(Rev. 12 1/03)

Bluff Stability Analysis

Figure 2.5-209

FAILURE SURFACE NO.	METHOD	SEISMIC COEFFICIENT	FACTOR OF SAFETY
1	B	0.00	1.68
1	B	0.15g	1.09
2	M-P	0.00	1.69
2	M-P	0.15g	1.16
3	M-P	0.00	2.16
4	M-P	0.15g	1.45

NOTE : B = BISHOP METHOD
M-P = MORGENSTERN - PRICE METHOD

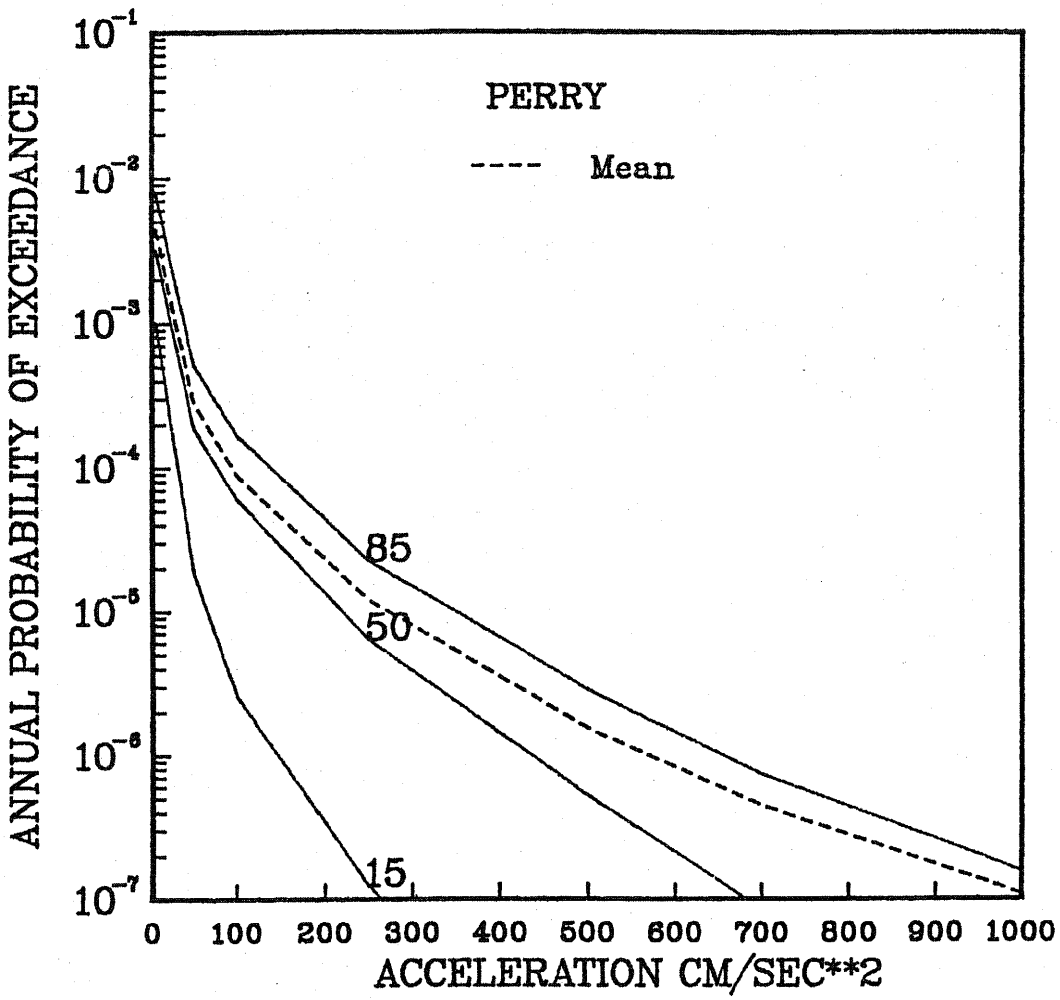


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Stability Analysis of
Lake Erie Bluff

Figure 2.5-210



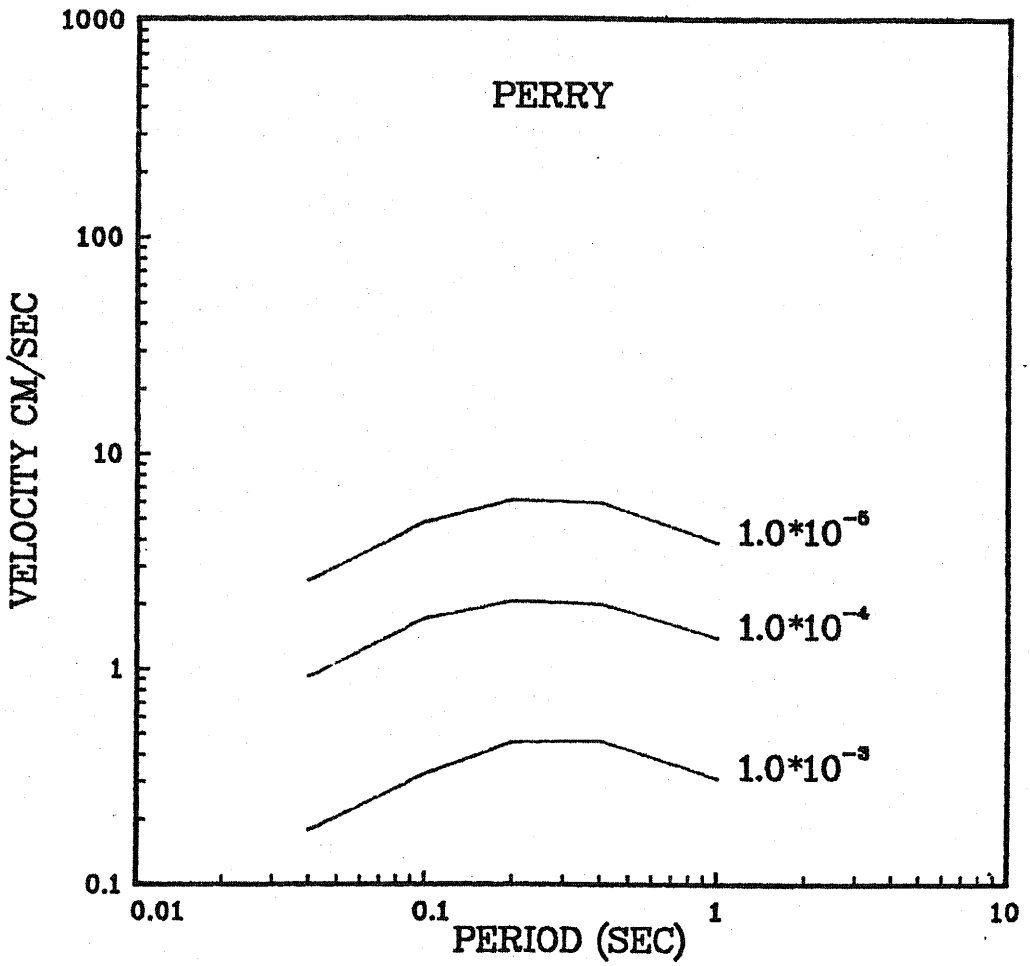
15th, 50th, 85th fractiles and mean annual probability of exceedance of peak ground acceleration from EPRI Report RP 101-53 (308)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

EPRI Seismic Hazard
Calculations Results
for PNPP

Figure 2.5-211



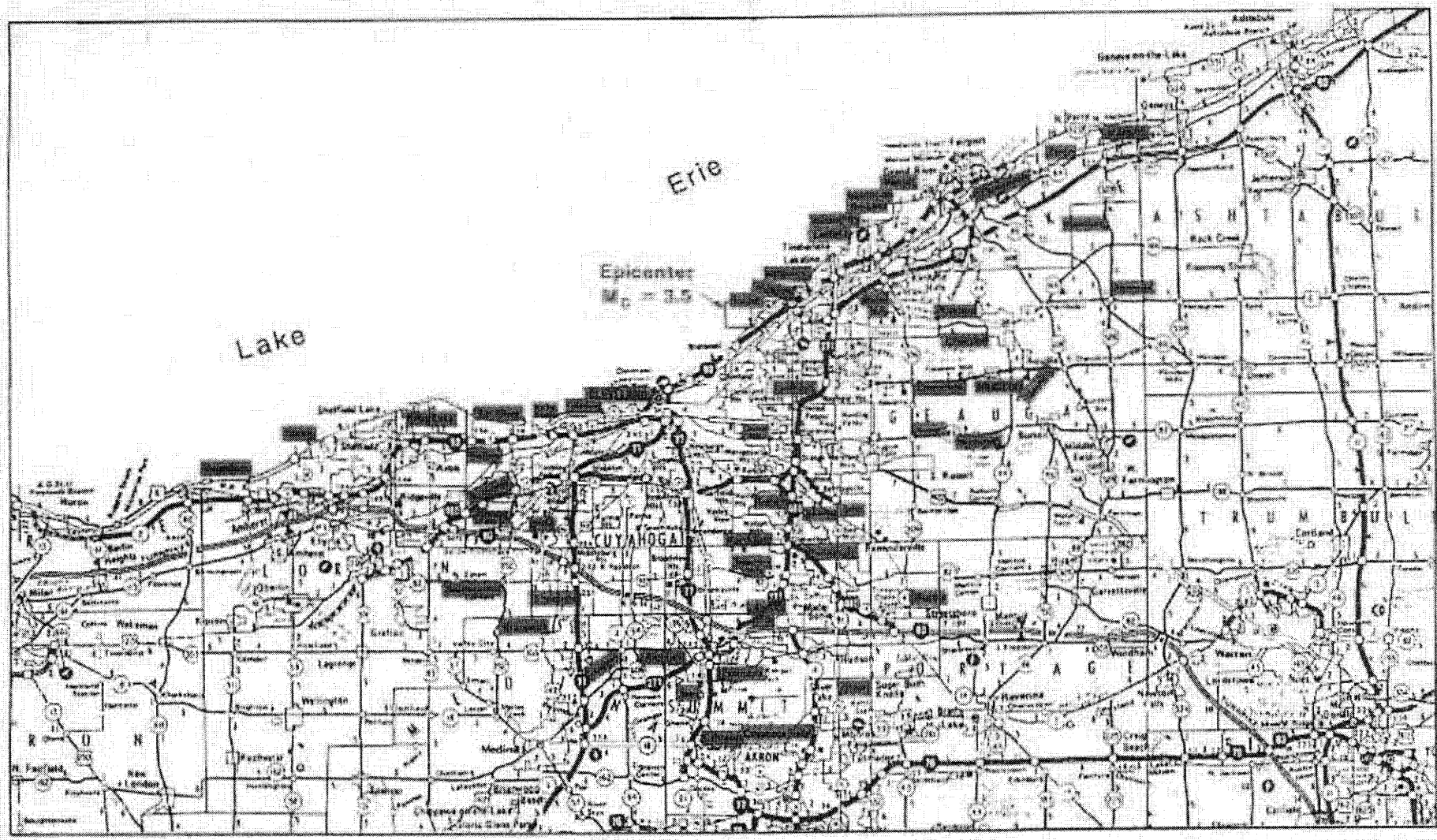
Median uniform hazard spectra at the 1.0E-3, 1.0E4 and 1.0E5 annual probability of exceedance from EPRI Report RP 101-53 (308)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

EPRI Seismic Hazard
Calculations Results
for PNPP

Figure 2.5-212



Base map: Official Transportation Map, Ohio Department of Transportation, 1987.

SCALE
0 5 10 15 20 Miles

Felt report location
(per police/sheriff, newspapers or phone calls to area residents)

Note: Epicentral symbol equivalent to uncertainty.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Distribution of Felt Reports
1/26/1991 Earthquake

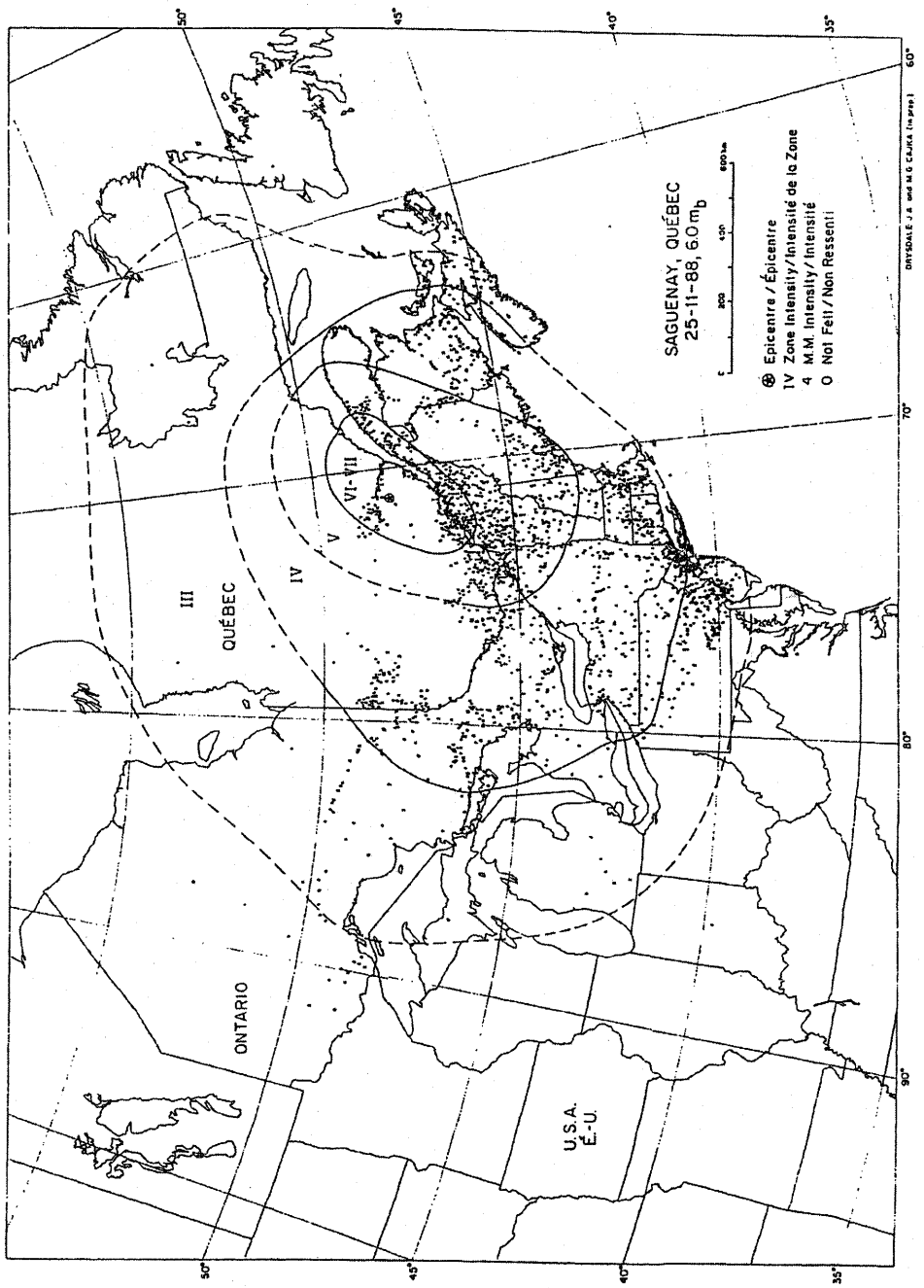
Figure 2.5-213

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Total Felt Area of
Dec. 28, 1988 (23:28 UT)
Microearthquake Mc=2.8

Figure 2.5-214



(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isoseismal Map
Saguenay Earthquake
November 25, 1988

Figure 2.5-215