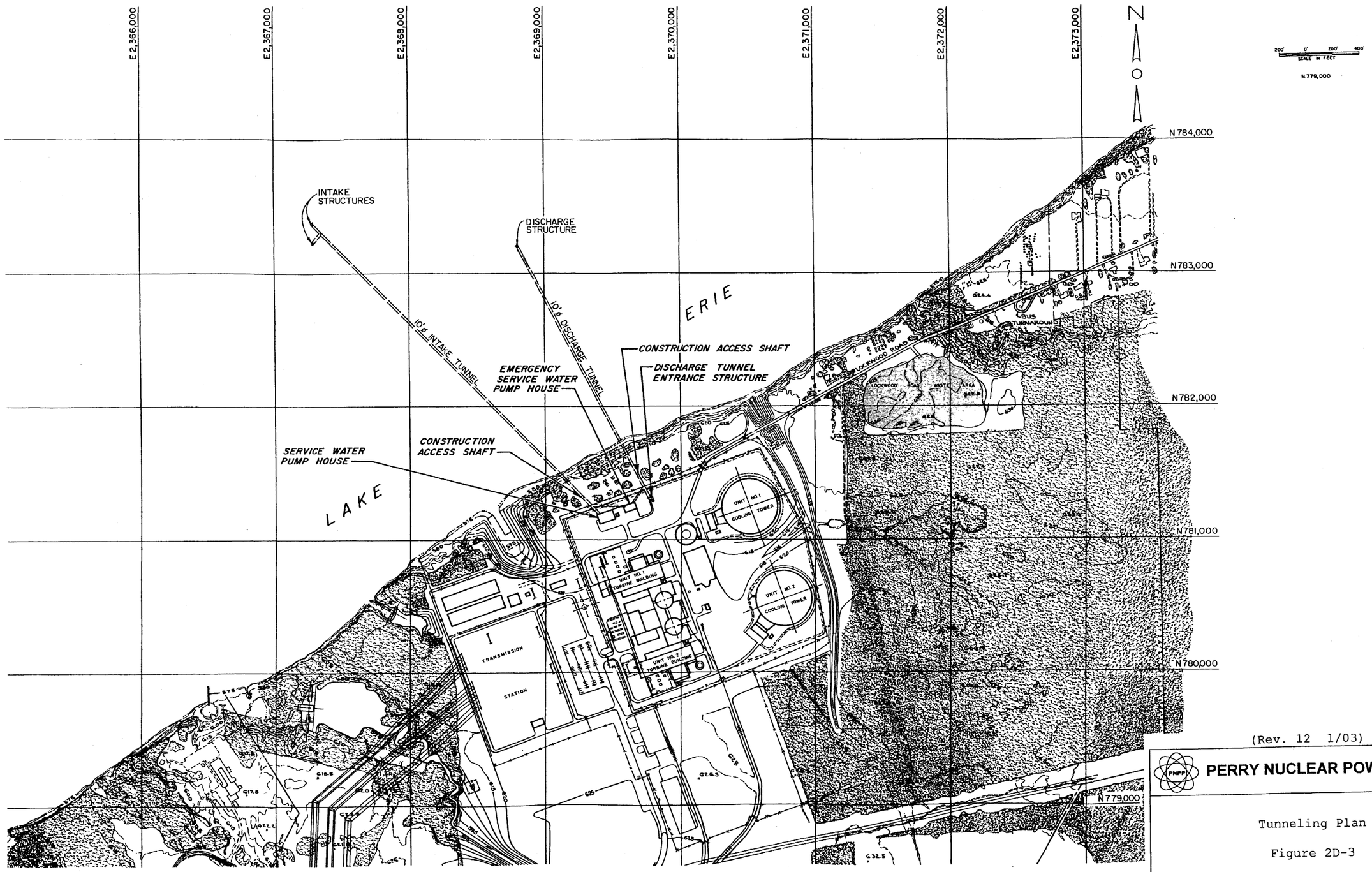
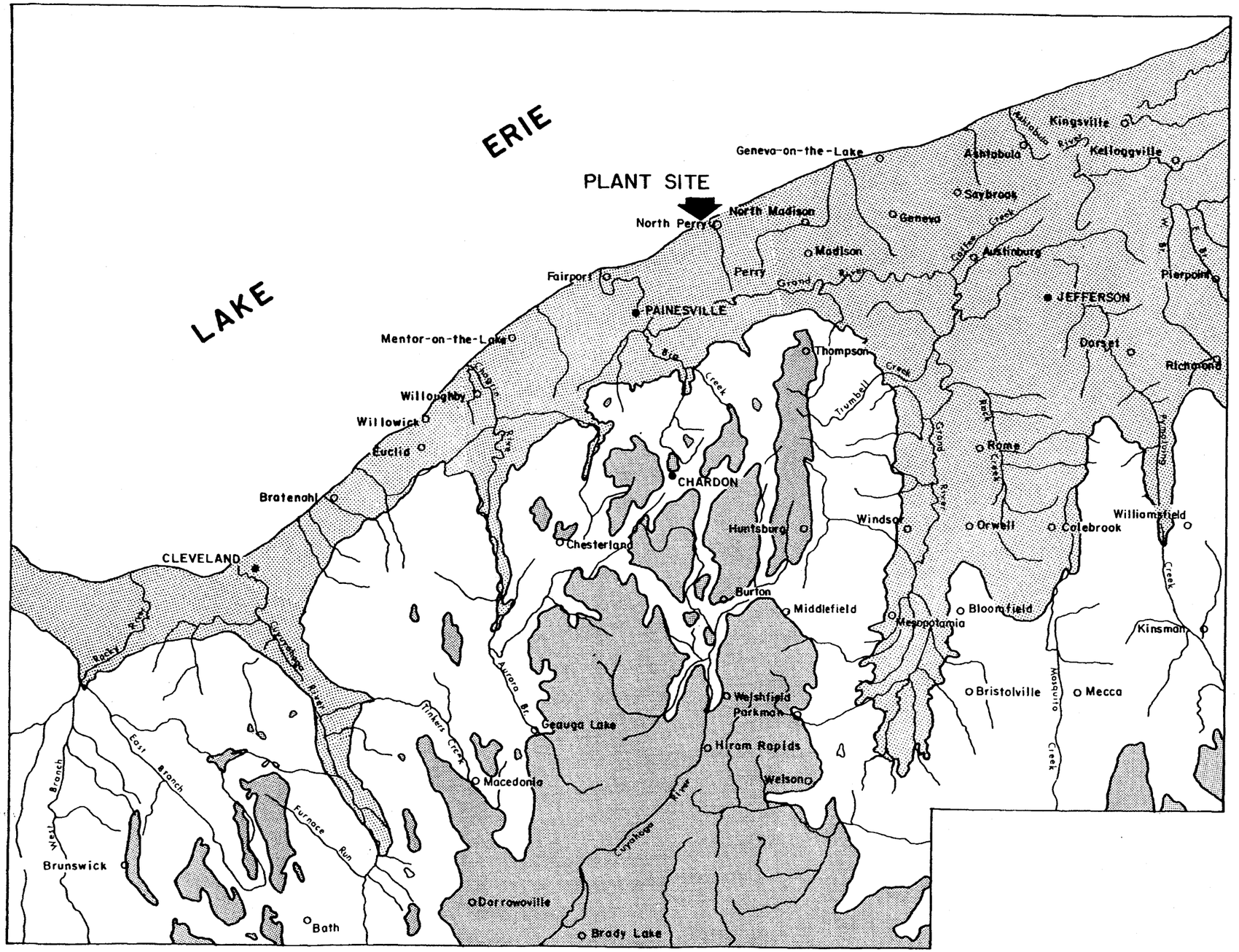


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Tunneling Plan

Figure 2D-3



N

LEGEND

POTTSVILLE & ALLEGHENY (COAL, S.S., SH, L.S.) PENNSYLVANIAN

WAVERLY & MAXVILLE (SH, S.S., L.S.) MISSISSIPPI

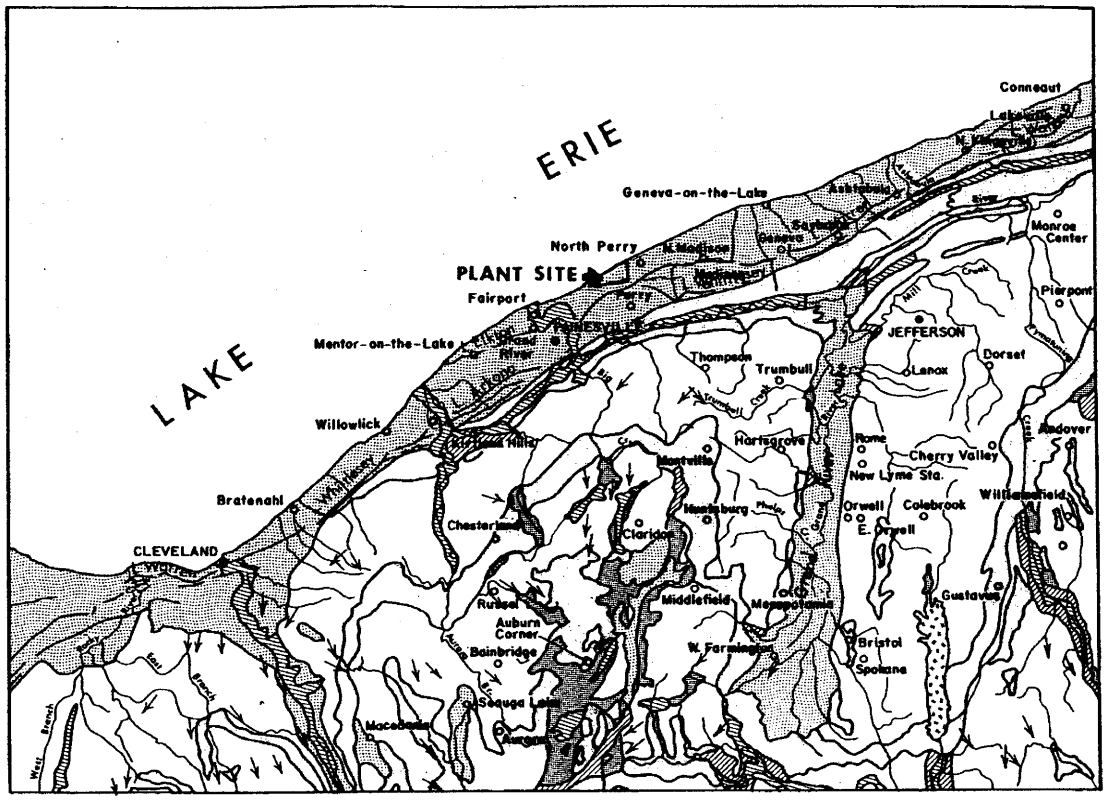
OLENTANGY & OHIO (SHALES) DEVONIAN

(Rev. 13 12/03)

PERRY NUCLEAR POWER PLANT

Bedrock Geologic Map of Northeastern Ohio

Figure 2D-4



8 0 8 16

SCALE IN MILES

(AFTER REFERENCE 83)

LEGEND

- GROUND MORAINE — ILLINOIS
- LACUSTRINE DEPOSITS — WISCONSIN
- LACUSTRINE DEPOSITS — PRE-WISCONSIN
- ALLUVIUM — WISCONSIN
- OUTWASH — WISCONSIN
- KAMES AND ESKERS — WISCONSIN
- GROUND MORAINE — WISCONSIN
- END MORAINE — WISCONSIN
- Elkton BEACH DEPOSITS — WISCONSIN
- STRIATIONS

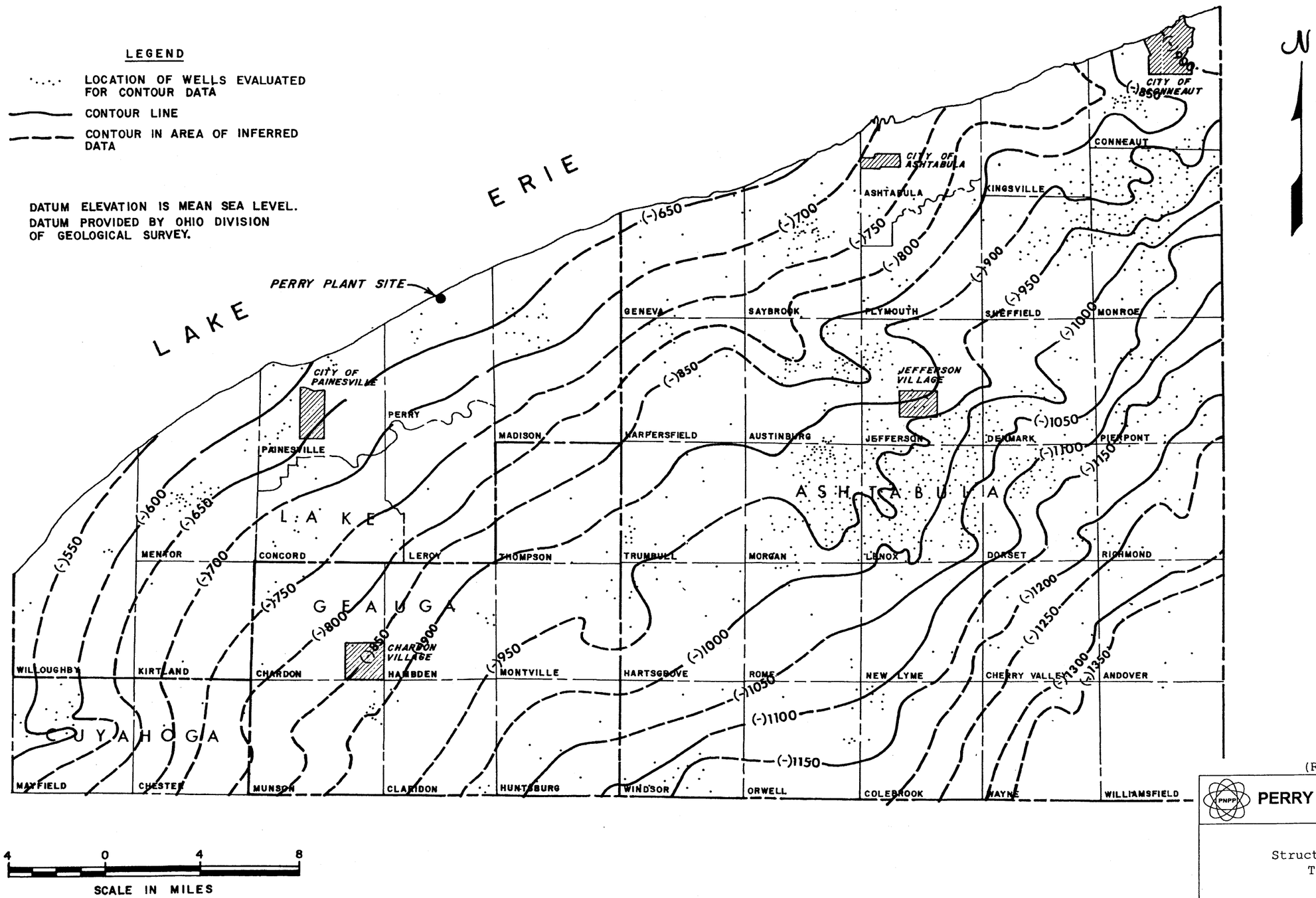
N

(Rev. 13 12/03)

PERRY NUCLEAR POWER PLANT

Glacial Map of
Northeastern Ohio

Figure 2D-5

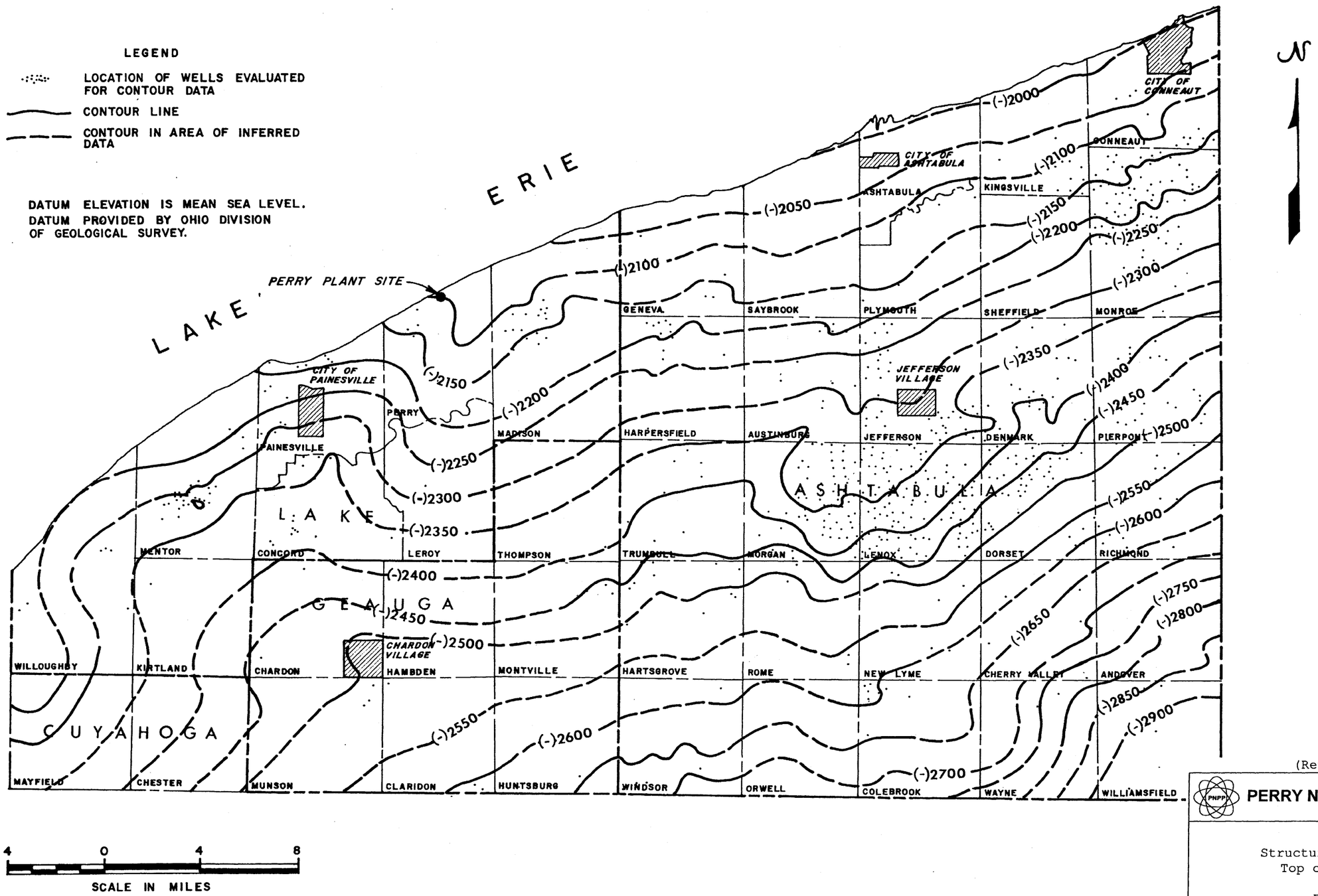


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Structural Contour Map -
Top of Big Lime

Figure 2D-6

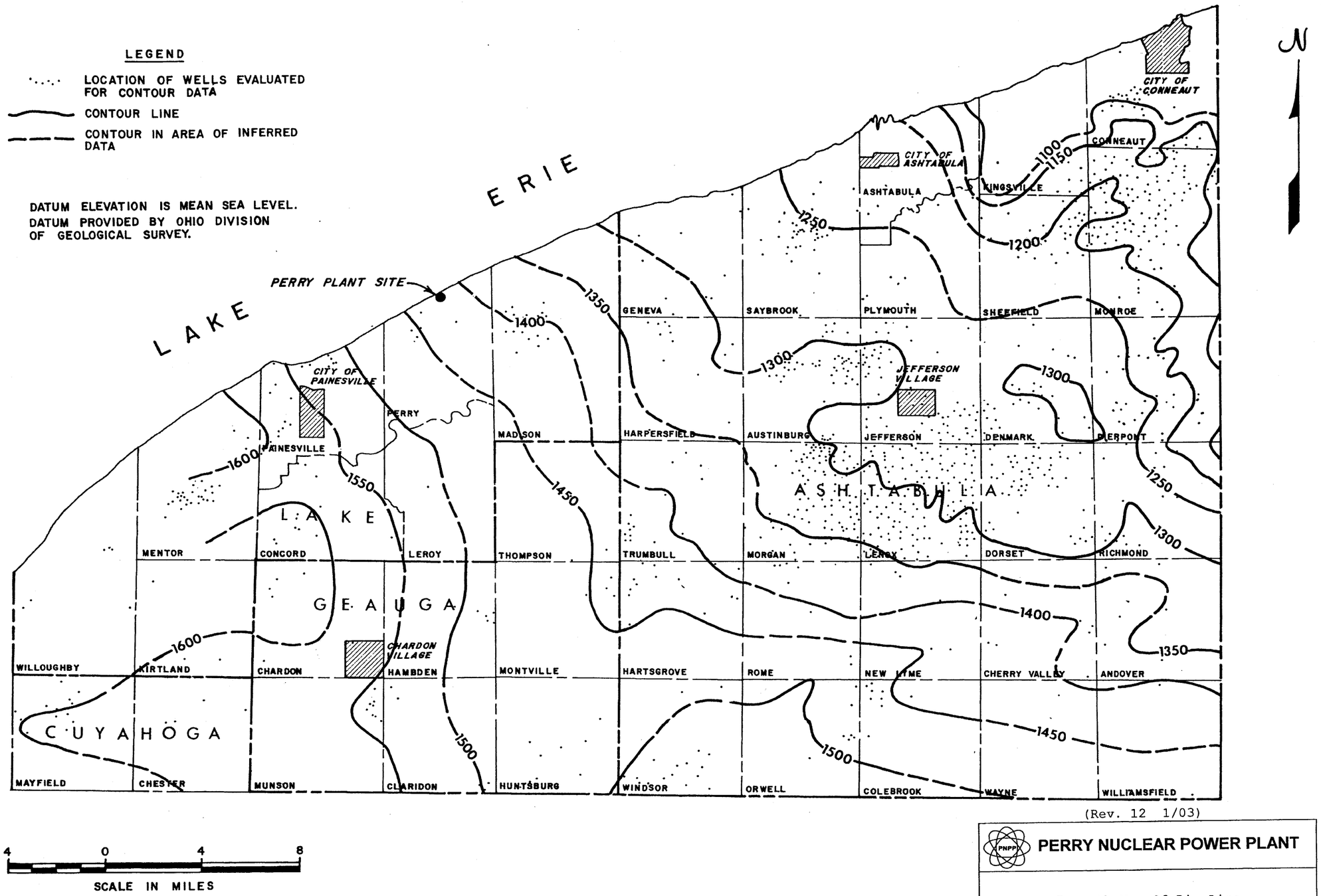


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Structural Contour Map -
Top of Packer Shell

Figure 2D-7

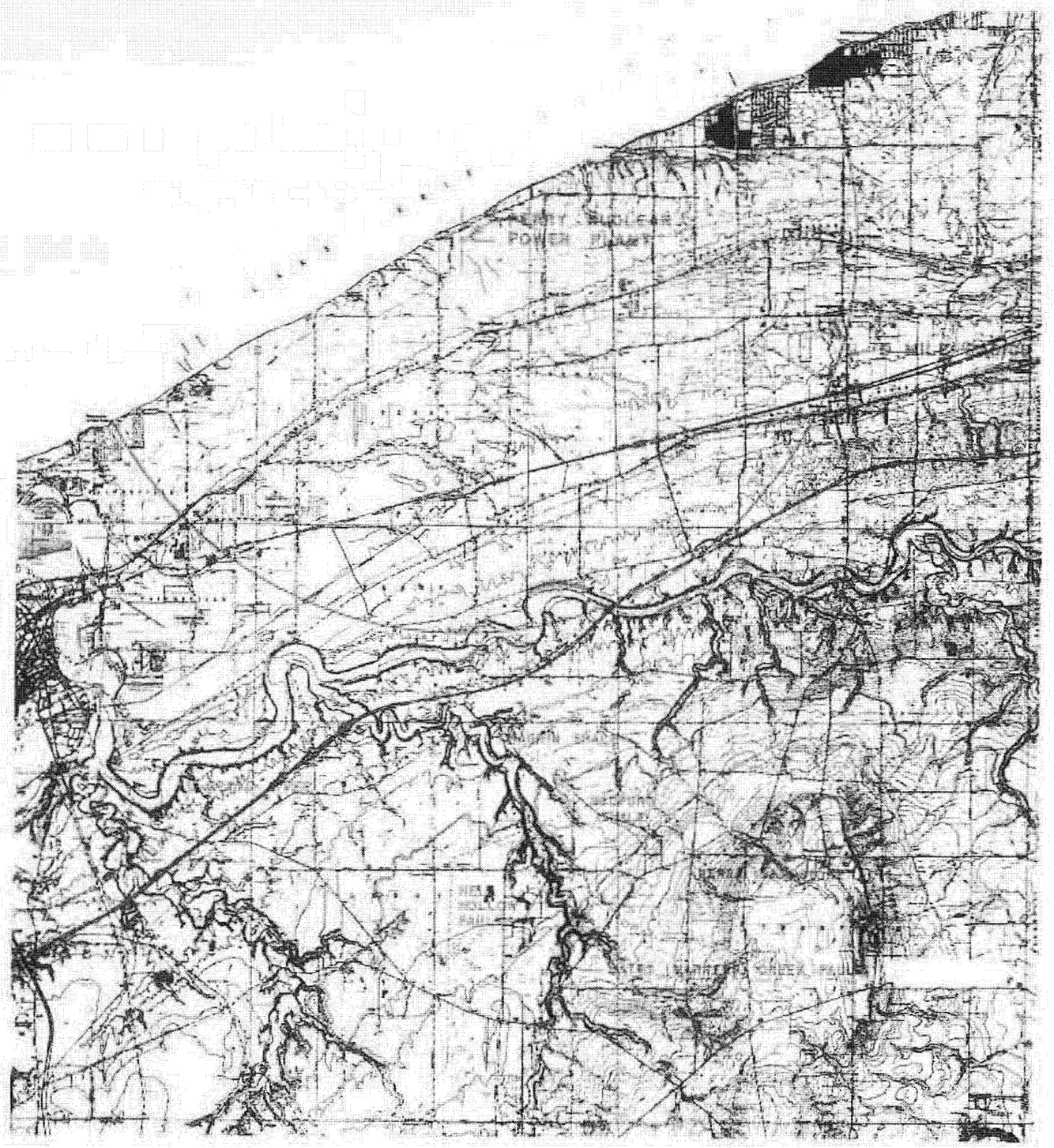


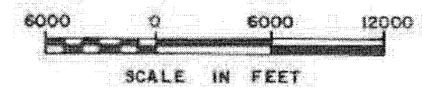
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Isopath Map Of Big Lime
And Niagaran Shale

Figure 2D-8





LEGEND

OBSERVED OUTCROPS

APPROXIMATE CONTACT OF CHAGRIN SHALE - BEDFORD SHALE

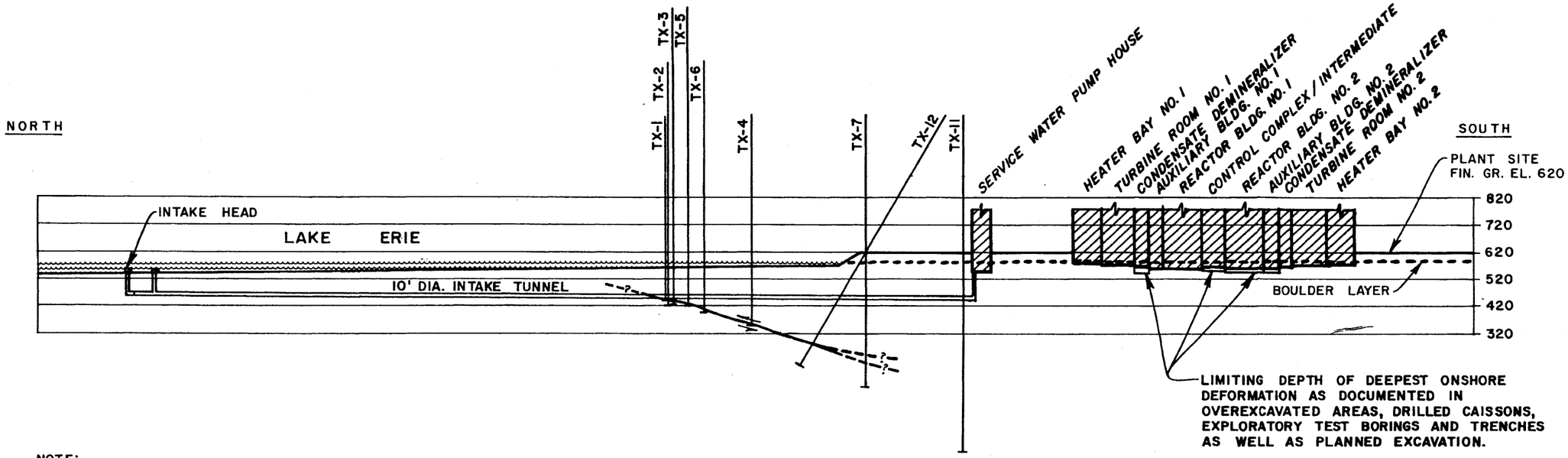
APPROXIMATE CONTACT OF BEDFORD SHALE - BEREA SANDSTONE

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Fault and Outcrop Location Map

Figure 2D-9



NOTE:
PLANNED EXCAVATION LIMITS ARE SHOWN BY DIAGONAL PATTERN, AND OVEREXCAVATION BY STIPPLED PATTERN.

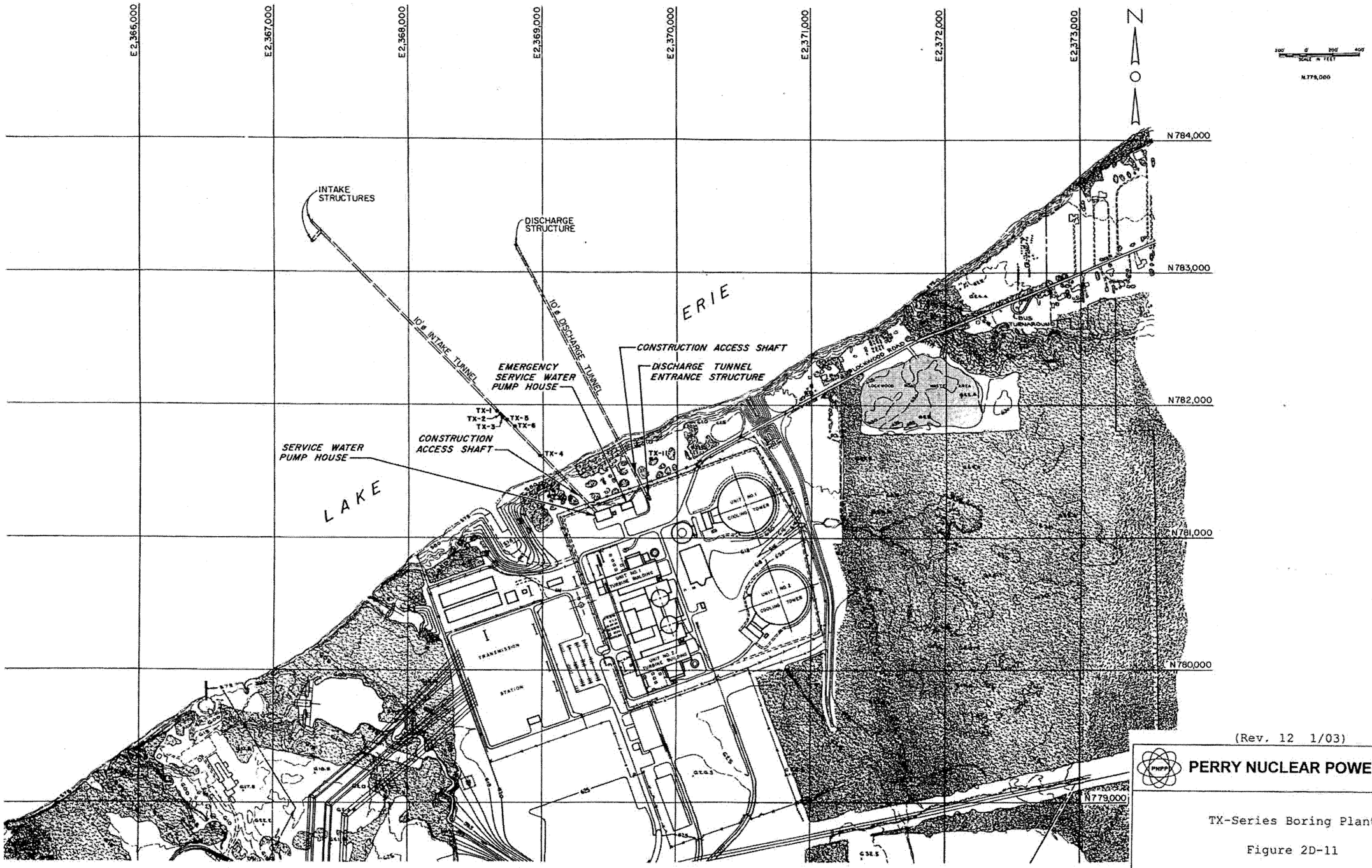
400 0 400 800
SCALE IN FEET

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Schematic Northwest-Southeast Cross Section, Perry Nuclear Power Plant

Figure 2D-10

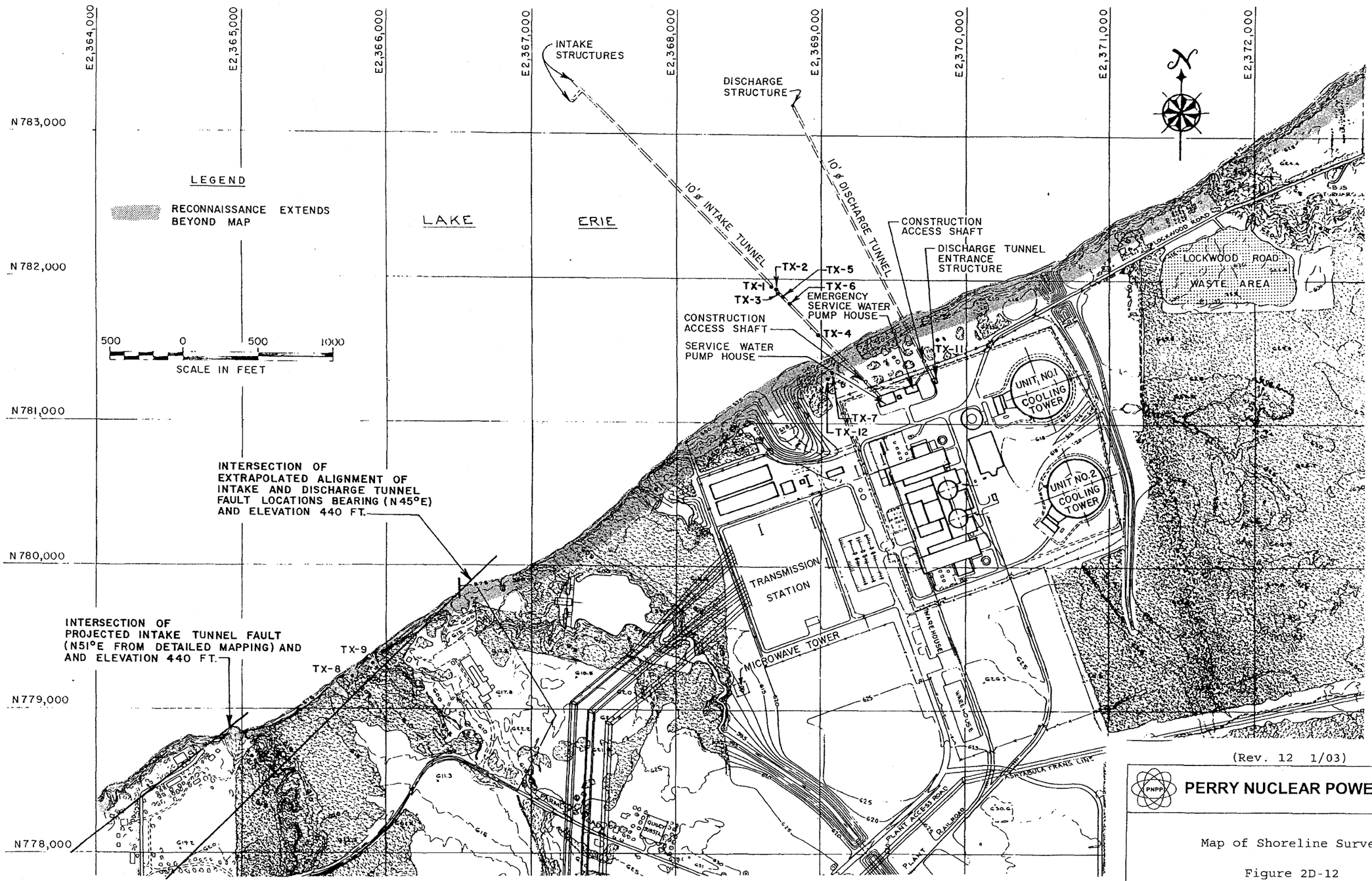


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

TX-Series Boring Plant

Figure 2D-11

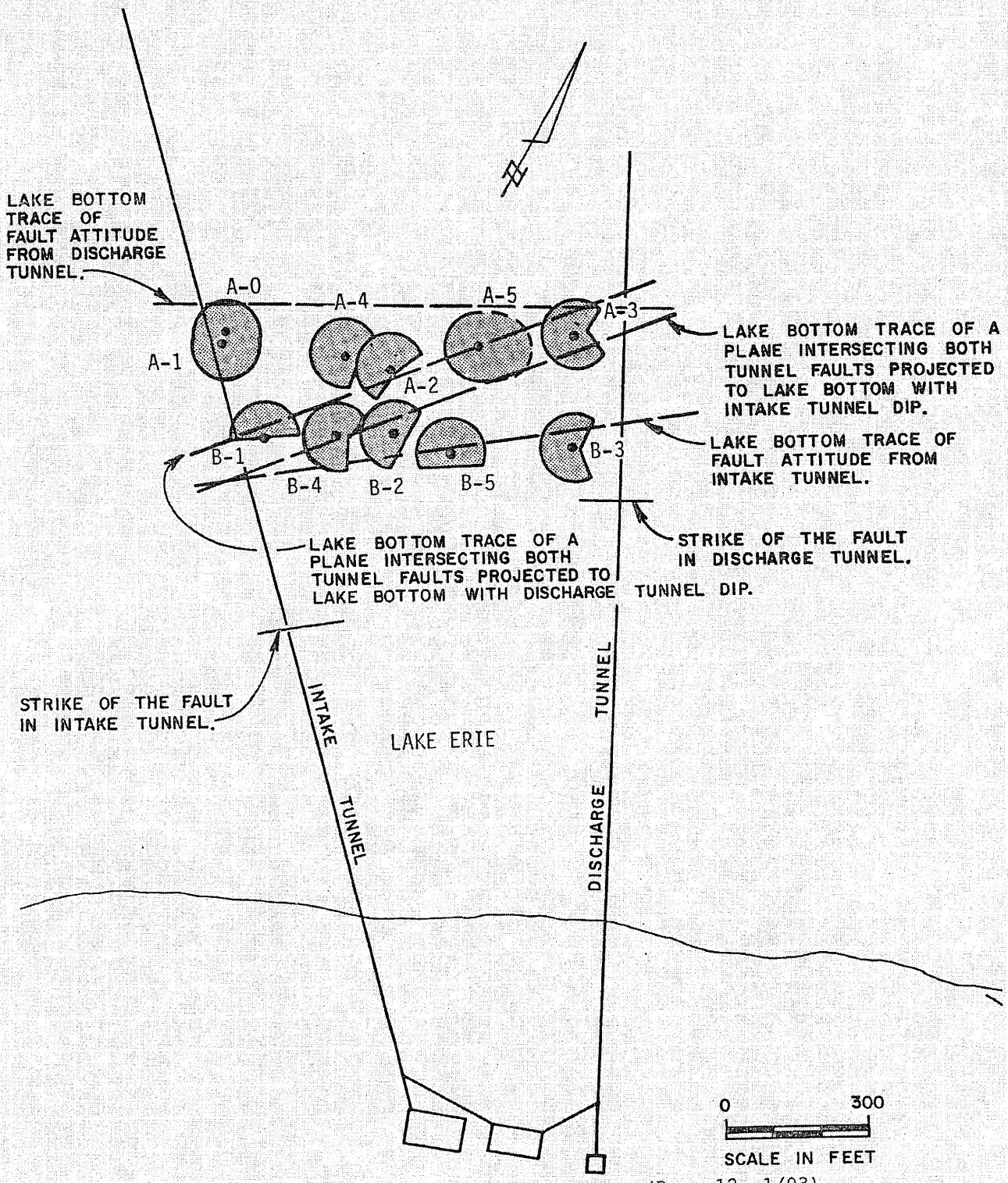


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Map of Shoreline Survey

Figure 2D-12



(Rev. 12 1/03)

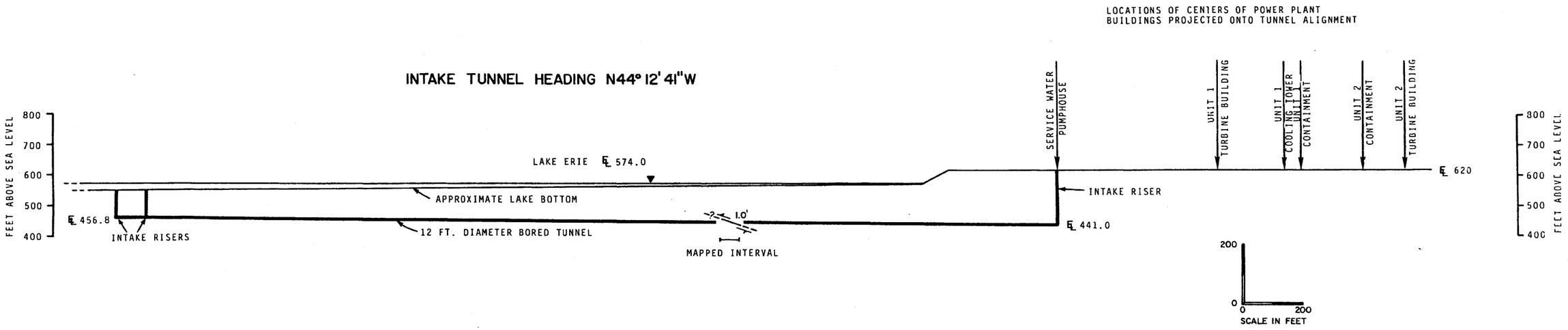
PERRY NUCLEAR POWER PLANT

= STATION LOCATION

= AREA OF COVERAGE ABOUT EACH STATION

Location Map, Video Survey Lake Erie Bottom

Figure 2D-13



EXPLANATION

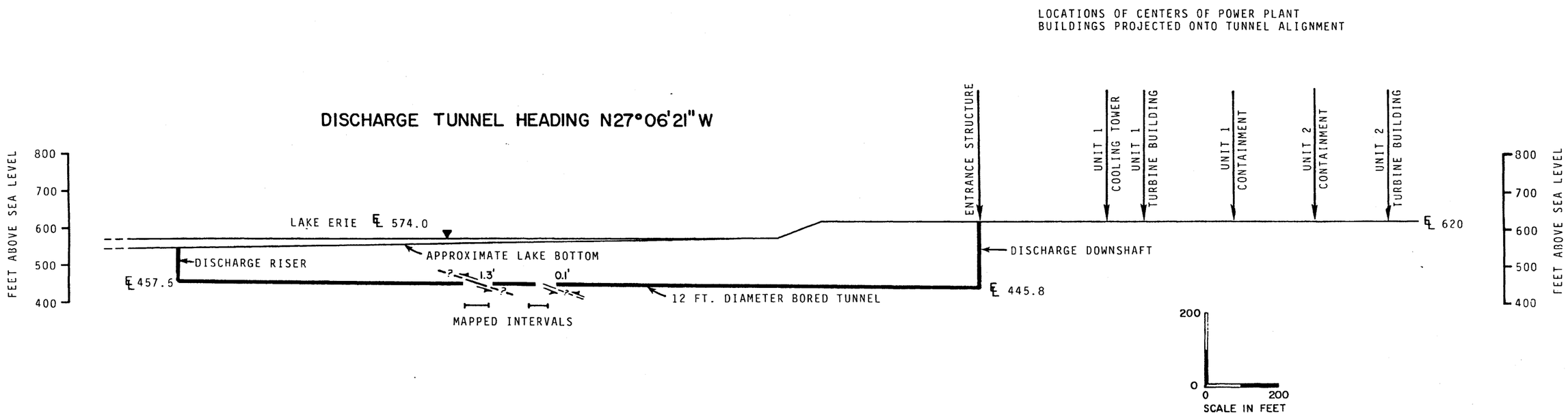
1.0' THRUST FAULT, DASHED AND QUESTIONED WHERE PROJECTED. ARROWS INDICATE DIRECTION OF RELATIVE MOVEMENT. DISPLACEMENT IN FEET AND TENTHS.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Longitudinal Section,
Intake Tunnel

Figure 2D-14



EXPLANATION

1.3'

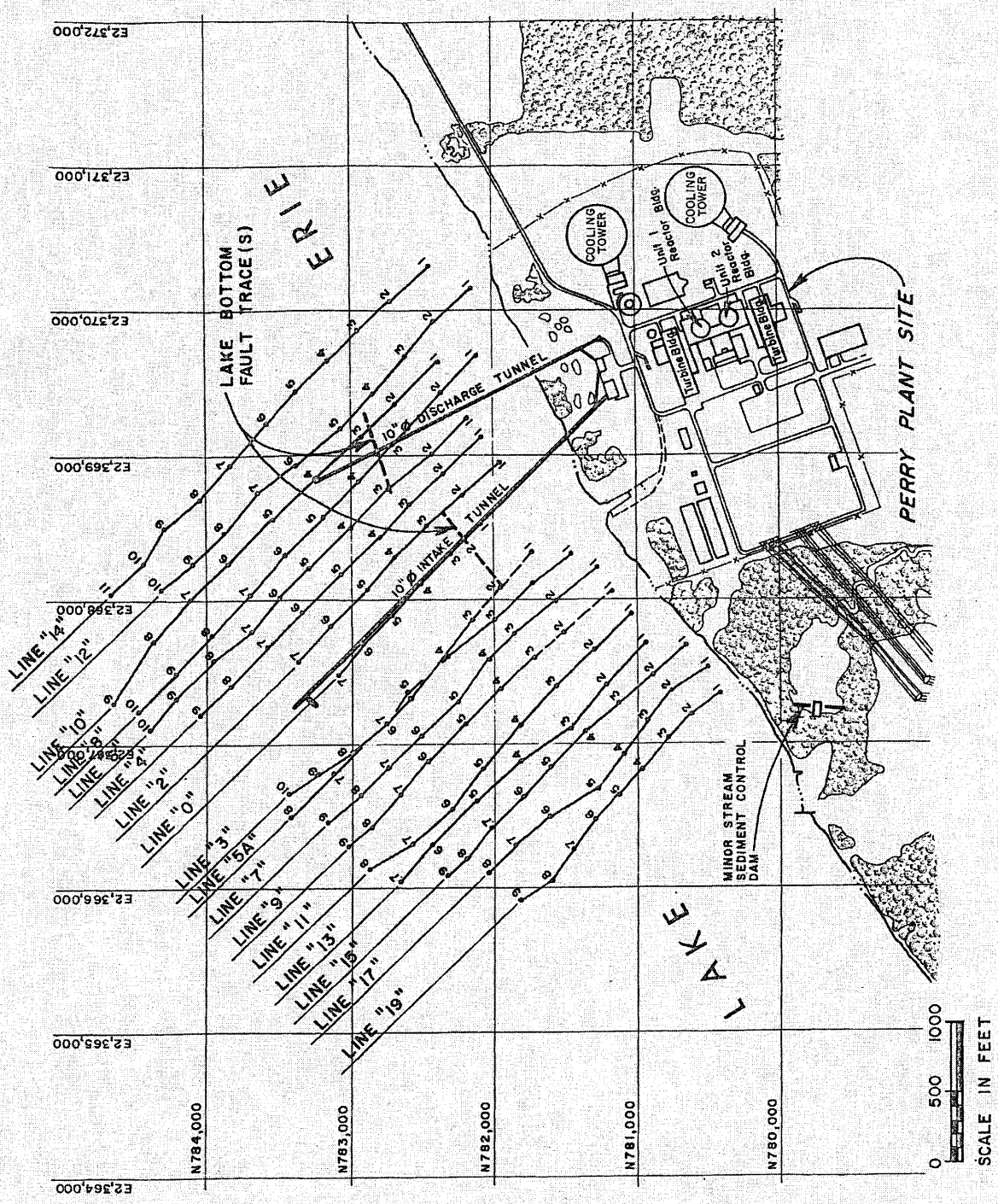
THRUST FAULT, DASHED AND QUESTIONED WHERE PROJECTED. ARROWS INDICATE DIRECTION OF RELATIVE MOVEMENT. DISPLACEMENT IN FEET AND TENTHS.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Longitudinal Section,
Discharge Tunnel

Figure 2D-15

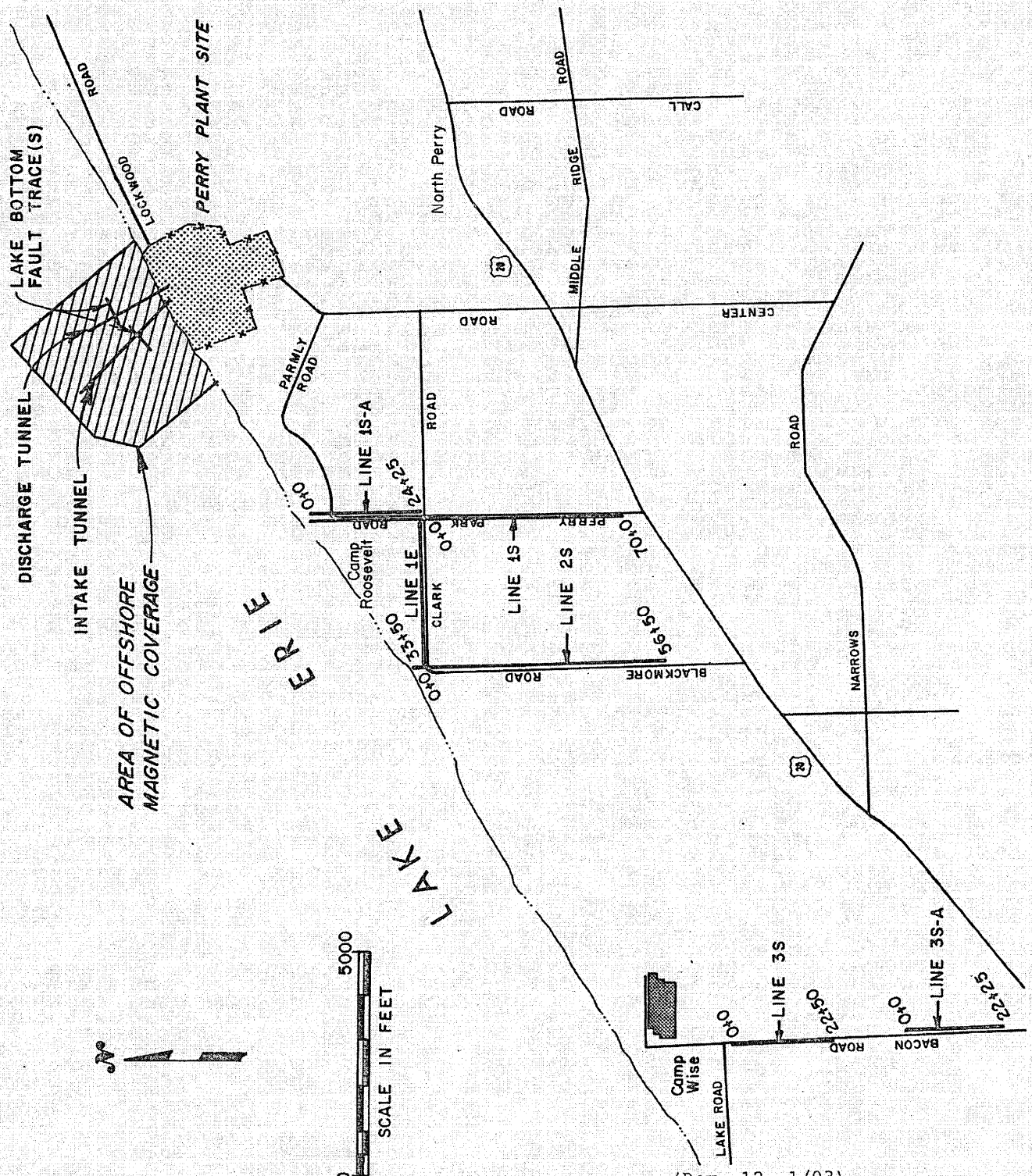


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Location Map,
Offshore Magnetic Survey

Figure 2D-16

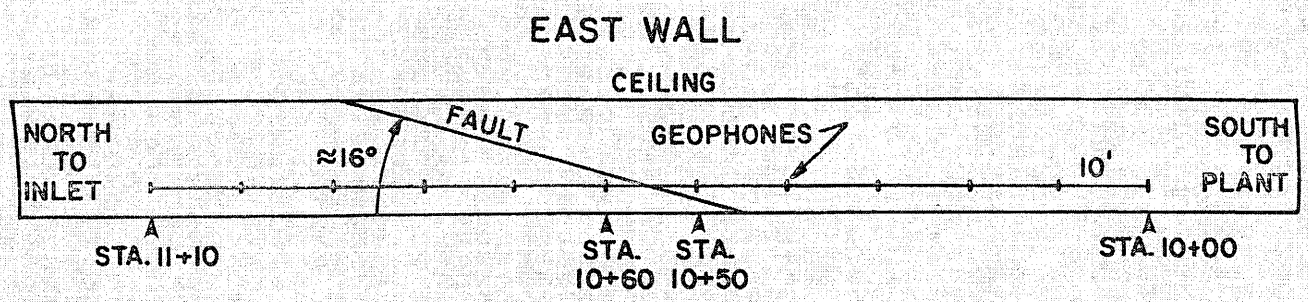


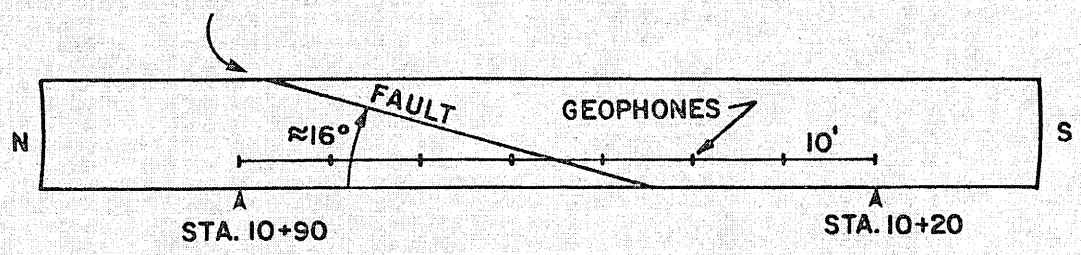
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

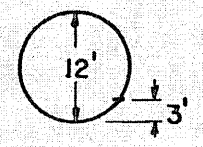
Location Map,
Onshore Magnetic Survey

Figure 2D-17





3 ELEMENT GEOPHONE
AT EACH STATION

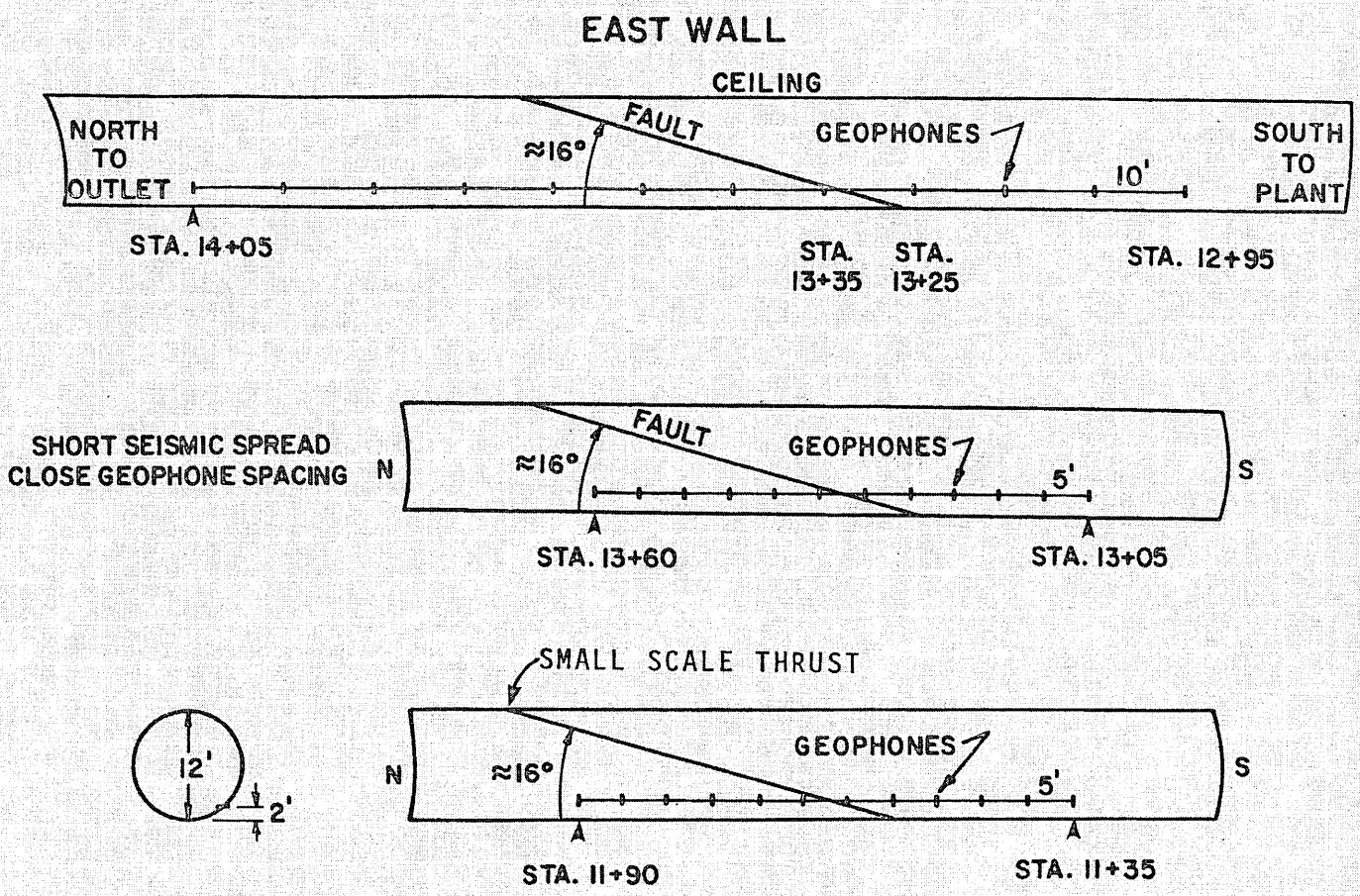


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Location Map,
Seismic Spreads, Intake Tunnel

Figure 2D-18

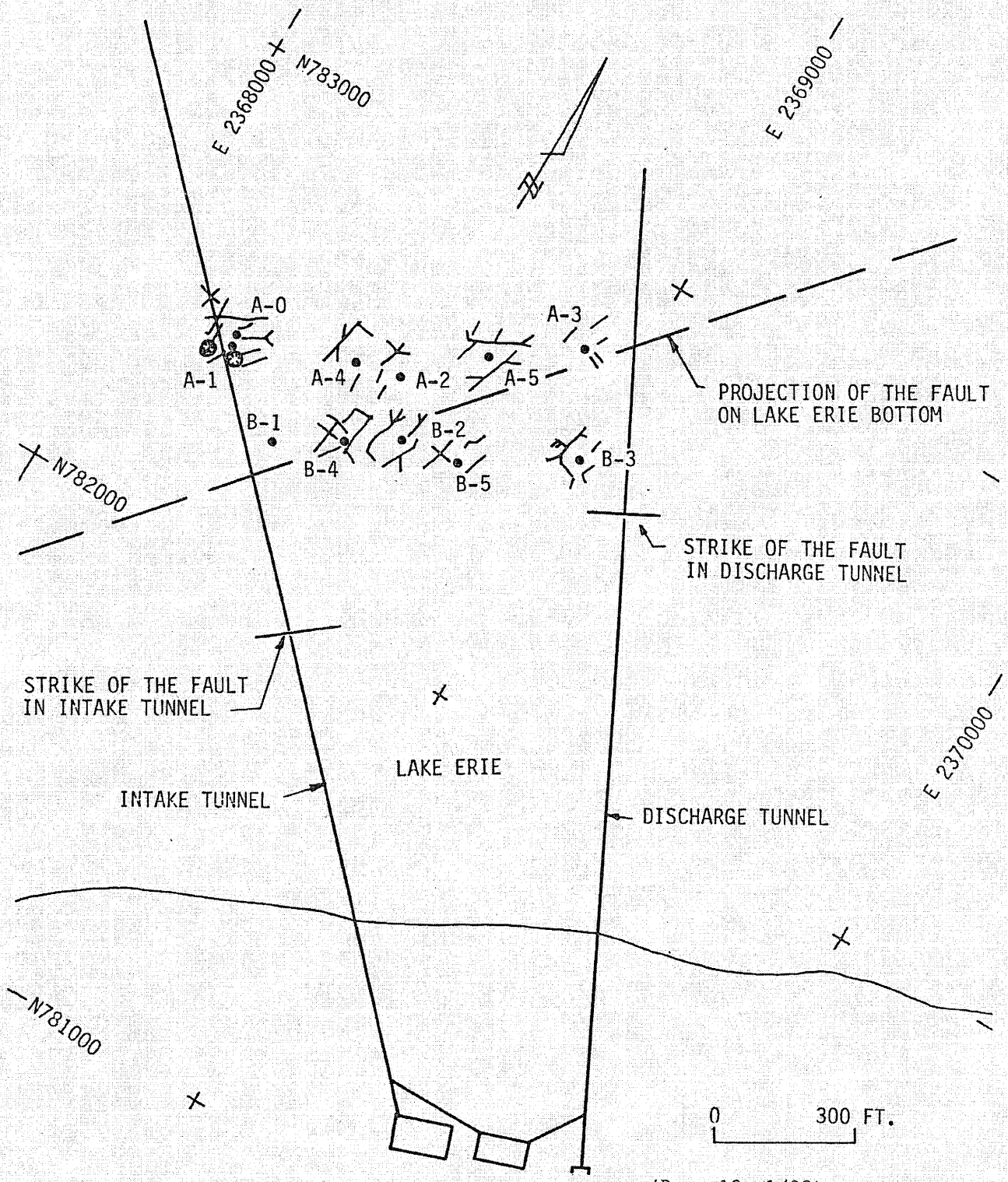


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Location Map,
Seismic Spreads, Discharge Tunnel

Figure 2D-19



(Rev. 12 1/03)

● = STATION LOCATION

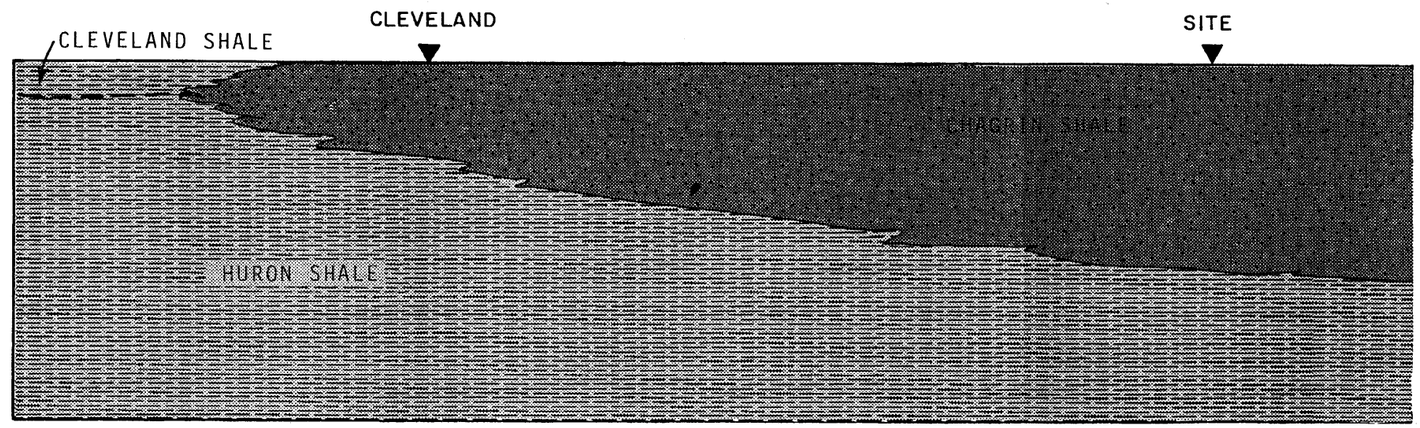
= FRACTURE

= SHALLOW DEPRESSION IN BEDROCK SURFACE

PERRY NUCLEAR POWER PLANT

Schematic Map,
Lake Bottom Fractures

Figure 2D-20



NOTE: SECTION ORIENTED NORTHESTERLY.

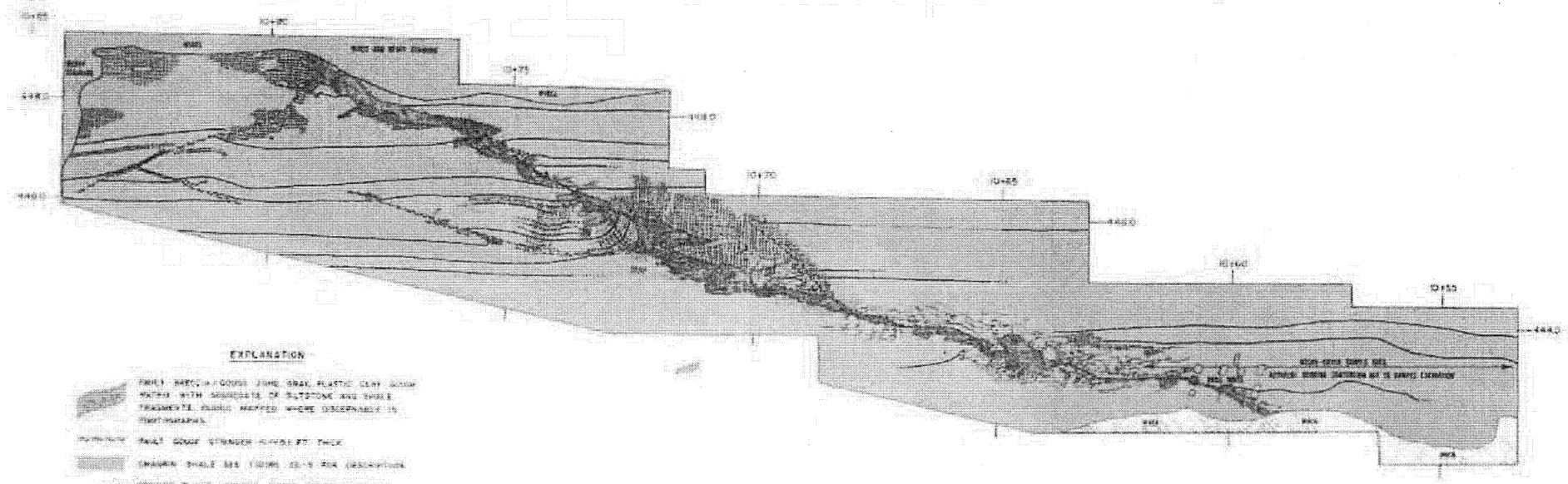
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Sketch of Facies Relationships
Among the Huron, Chagrin,
& Cleveland Shales

Figure 2D-21

INTAKE TUNNEL EAST WALL



EXPLANATION

NOTES:

1. MAP TRACE DERIVED FROM PHOTOGRAPHS ONLY. MINOR FLAWS ARE MAPPED, NOT INDICATED. SILTSTONE BEDS ON STRATIGRAPHIC UNITS.
2. SCALE INDICATED BY STATIONING AND ELEVATION TICKS. VARIATION DUE TO PHOTOGRAPHIC DISTORTION.

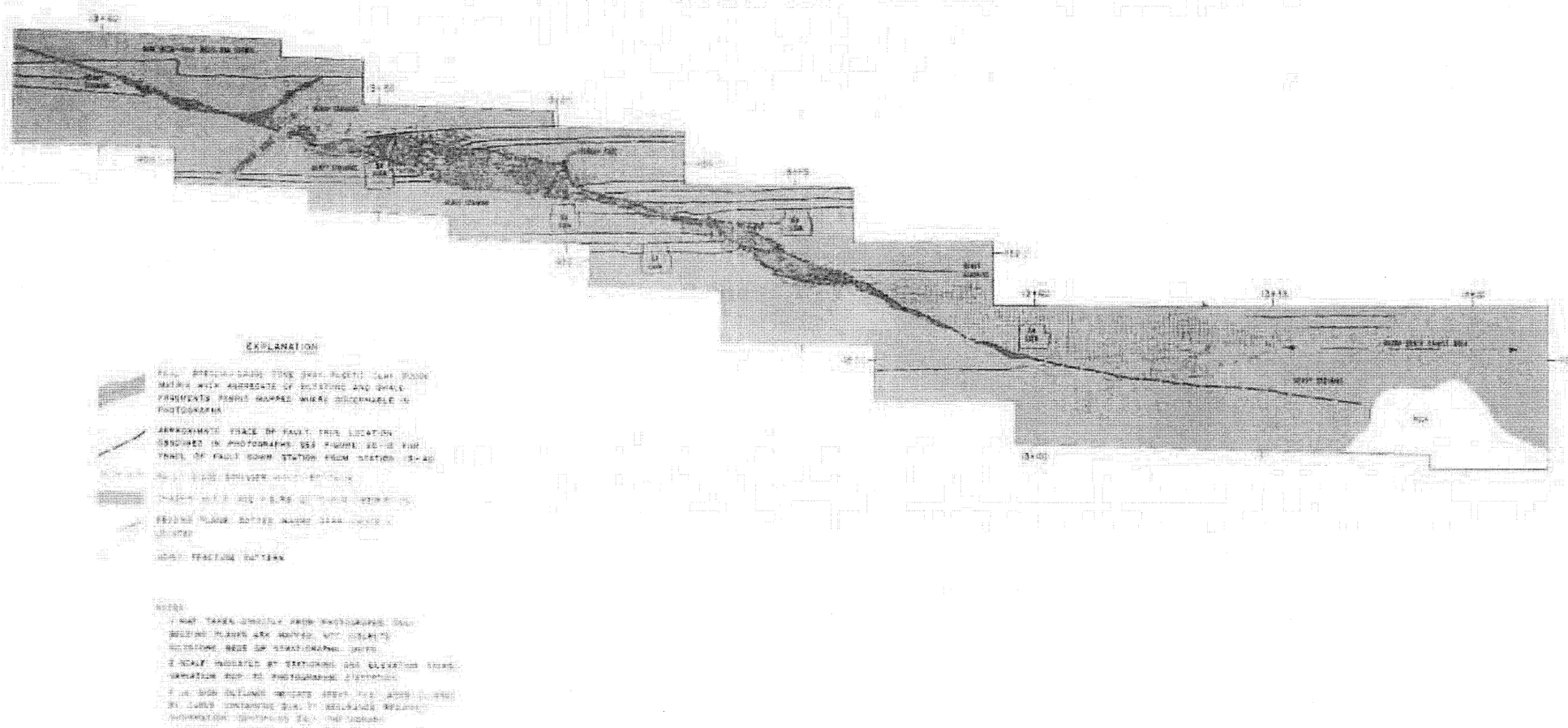
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Detailed Map,
Intake Tunnel Fault

Figure 2D-22

DISCHARGE TUNNEL EAST WALL

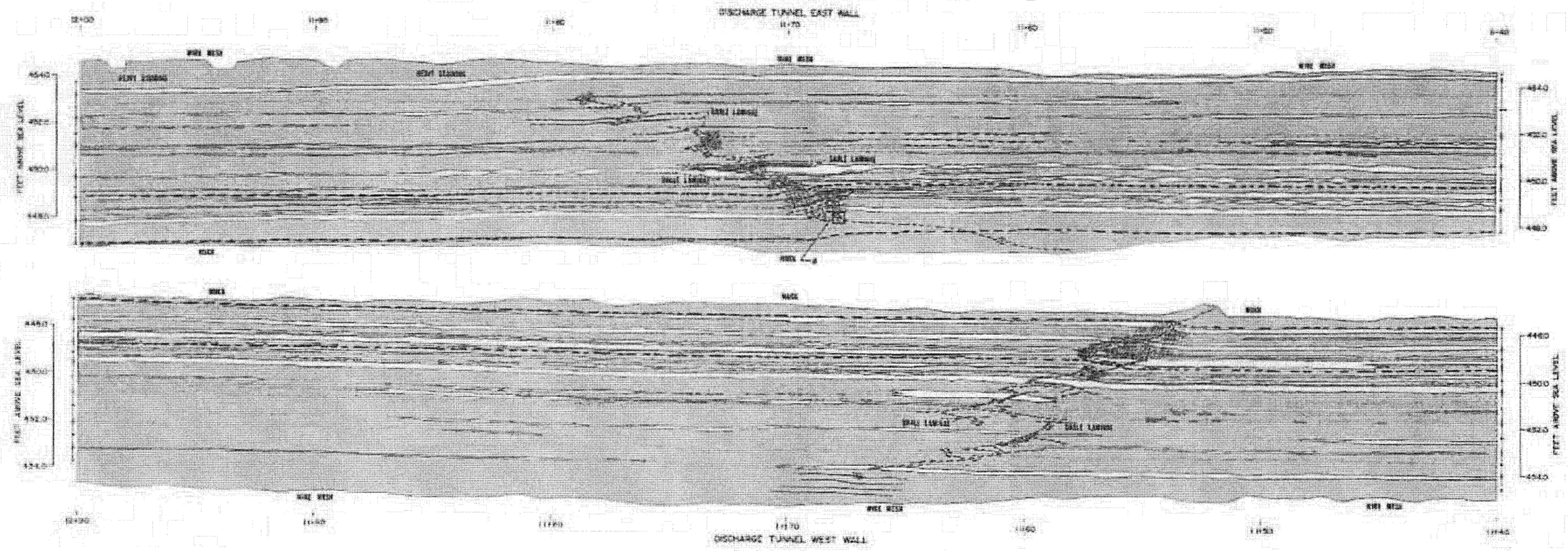


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Detailed Map,
Discharge Tunnel Fault

Figure 20-23



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.

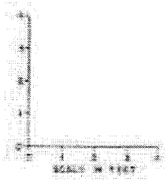
SILTSTONE LAMINA, DASHED WHERE BEDDING PLANE CONTINUOUSLY MAPPED BUT SILTSTONE LITHOLOGY PINCHED OUT.

SHALE.

SHALE LAMINA, AS LABELED.

IRONSTONE CONCRETIONS.

MICRO-CRACK SAMPLE LOCATION NUMBER GIVEN.



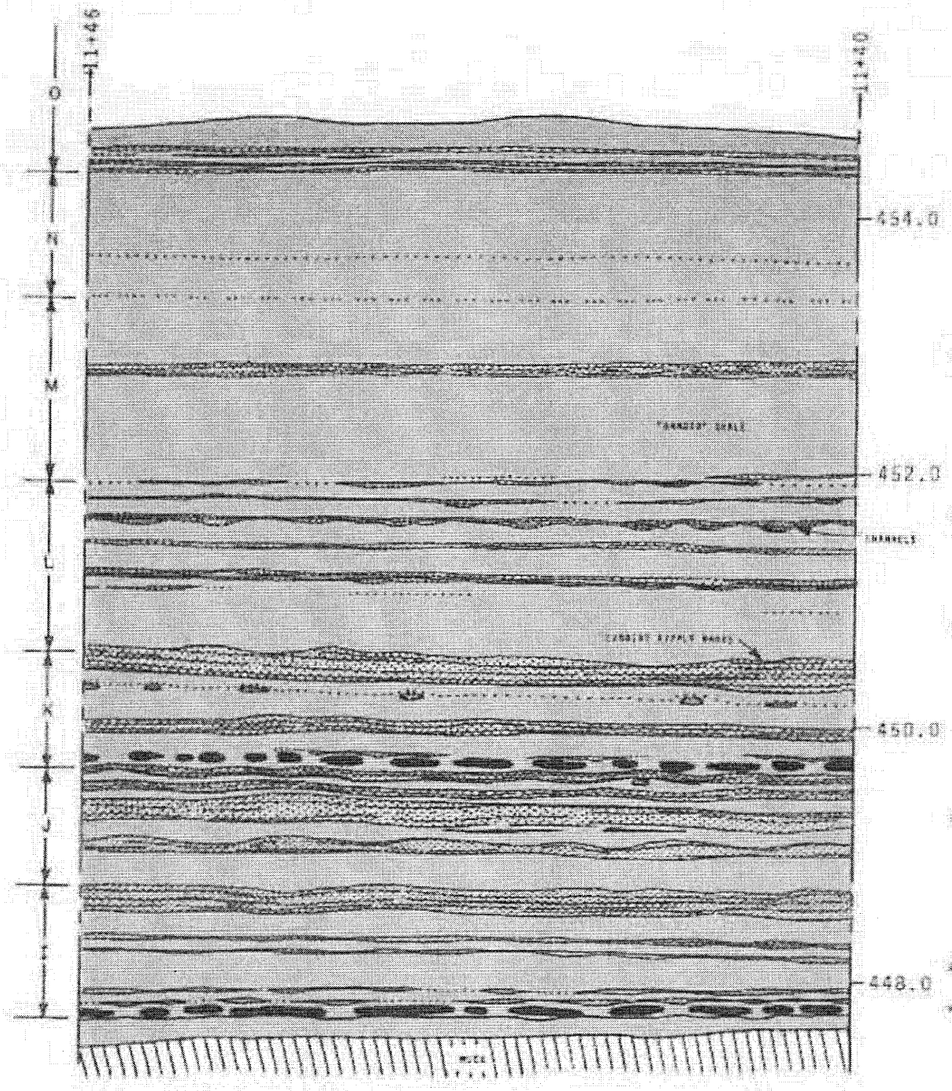
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Detailed Stratigraphic Section, Intake Tunnel East Wall Station 10+30-10+40

Figure 2D-24

DISCHARGE TUNNEL EAST WALL



UNIT O: CLAY SHALE: DARK GRAY, WITH BLOCKY FRACTURE; WITH SEVERAL PLANAR PARALLEL LAMINAE OF BROWNISH-BLACK (FERROMANGANESE) CLAY SHALE. TOP OF UNIT IS A 10-THICK ZONE OF INTERLAMINATED SILTSTONE AND SILTY SHALE; BASAL 1 TO 2 FT IS MORE WAVY, INTERLAMINATED BROWNISH-BLACK CLAY SHALE, LIGHT-GRAY SILTSTONE, AND SUBORDINATE DARK GRAY SHALE. SILTSTONES IN LOWER PART TYPICAL AND SMALL RANGE FROM 2 TO 8 MM IN THICKNESS. UPPERMOST SILTSTONE OF THIS BEDSET BECOMES MUCH THICKER NORTH OF STATION 11+35.

UNIT N: CLAY SHALE: DARK GRAY, WITH BLOCKY TO CONCHOIDAL FRACTURE, WITH ONE PROMINENT MEDIAL SILTSTONE BEAT, ABOUT 1 CM THICK, DISCONTINUOUS, PARALLEL LAMINAE, 1 TO 2 MM THICK, OF LIGHT-GRAY SILTSTONE AND BROWNISH-BLACK (FERROMANGANESE) CLAY SHALE VERY COMMON ABOVE MEDIAL SILTSTONE; SINGLE DISCONTINUOUS SILTSTONE LAMINA NEAR BASE OF UNIT. UNIT N-UNIT M BOUNDARY IS A MINOR SURFACE AT THIS STATION; NORTHWARD FROM STATION 11+35, A PROMINENT SILTSTONE SEPARATES UNITS N AND M.

UNIT M: CLAY SHALE AND SILTSTONE: DARK GRAY, MASSIVE, WITH BLOCKY TO CONCHOIDAL FRACTURE. MEDIAL PART OF SILTSTONE CONSISTS OF BROADLY WAVY INTERLAMINATIONS OF LIGHT-GRAY SILTSTONE AND BROWNISH-GRAY SILTY SHALE, OVERLAIN BY A SINGLE DISCONTINUOUS (LENTICULAR) BED OF LIGHT-GRAY SILTSTONE. FERROMANGANESE (?) CLAY SHALE AS VERY THIN DISCONTINUOUS PARALLEL LAMINAE ABOVE MEDIAL SILTSTONE, AND AS PLANAR CONTINUOUS PARALLEL LAMINAE IN LOWER PART OF UNIT. BASAL ONE-HALF HAS "BANDED" ASPECT.

UNIT L: CLAY SHALE AND SILTSTONE: LOWER ONE-HALF IS CLAY SHALE, DARK GRAY, WITH NUMEROUS DARK BROWNISH-GRAY, FERROMANGANESE(?), BROADLY WAVY LAMINAE, WITH "BANDED" ASPECT, BLOCKY FRACTURE. UPPER ONE-HALF IS DARK GRAY CLAY SHALE WITH SEVERAL BROADLY WAVY SILTSTONE BEDS OF 1 TO 3 CM IN THICKNESS; UPPER BEDS DISCONTINUOUS, LOWER BEDS CONTINUOUS. SMALL CHANNELS PRESENT AS SHOWN.

UNIT K: CLAY SHALE, SILTSTONE, AND IRONSTONE: DARK-GRAY, SLIGHTLY SILTY CLAY SHALE WITH CONCHOIDAL FRACTURE, WITH NUMEROUS BROADLY WAVY THIN LAMINAE OF BROWNISH-GRAY FERROMANGANESE(?) CLAY SHALE. UPPERMOST 8 CM IS MORE MODERATE DEGREE OF PLANAR, THINLY INTERLAMINATED SILTSTONE AND SOFTLY SILTSTONE WITH PARTINGS OF DARK-GRAY SHALE. BOTTOMMOST PART OF THIS SILTSTONE IS RIPPLE-MARKED. MEDIAL SILTSTONE, UP TO 3 CM THICK, HAS VARIOUS-CONTOUR CURVED RIPPLES AT TOP. BASE OF UNIT CONTAINS RIB OF CLOSELY SPACED IRONSTONE CONCRETIONS ABOUT 1.5 CM THICK.

UNIT J: CLAY SHALE AND SILTSTONE: DARK GRAY CLAY SHALE, WITH NUMEROUS THIN LAMINAE, 1 TO 2 MM THICK, OF DARK BROWNISH-GRAY FERROMANGANESE(?) CLAY SHALE. UPPERMOST 18 CM IS MORE BROADLY THIN OF PLANAR, THINLY INTERLAMINATED LIGHT-GRAY SILTSTONE AND SOFTLY DARK-GRAY SHALE; SMALL LOAD CASTS UNDER BASE OF MANY SILTSTONE LAMINAE. PYRITE-BEARING SOCKS LOCALLY ON TOPS OF SILTSTONE LAMINAE. TOMMOST UNIT J CONTAINS A MEDIAL PLANAR AND SMALLER BED OF SILTSTONE.

UNIT I: CLAY SHALE, SILTSTONE, AND IRONSTONE: SAME LITHOLOGY AS UNIT K, EXCEPT AS INDICATED GRAPHICALLY.

NOTE: UNITS I AND J WERE MEASURED AND DESCRIBED AT STATION 11+40, UNITS A THROUGH H WERE MEASURED AND DESCRIBED AT STATION 11+35.

EXPLANATION

- SILTSTONE.
- SILTSTONE LAMINA, DASHED WHERE BEDDING PLANE CONTINUOUSLY MAPPED BUT SILTSTONE LITHOLOGY PINCHED OUT.
- SHALE.
- IRONSTONE CONCRETIONS.

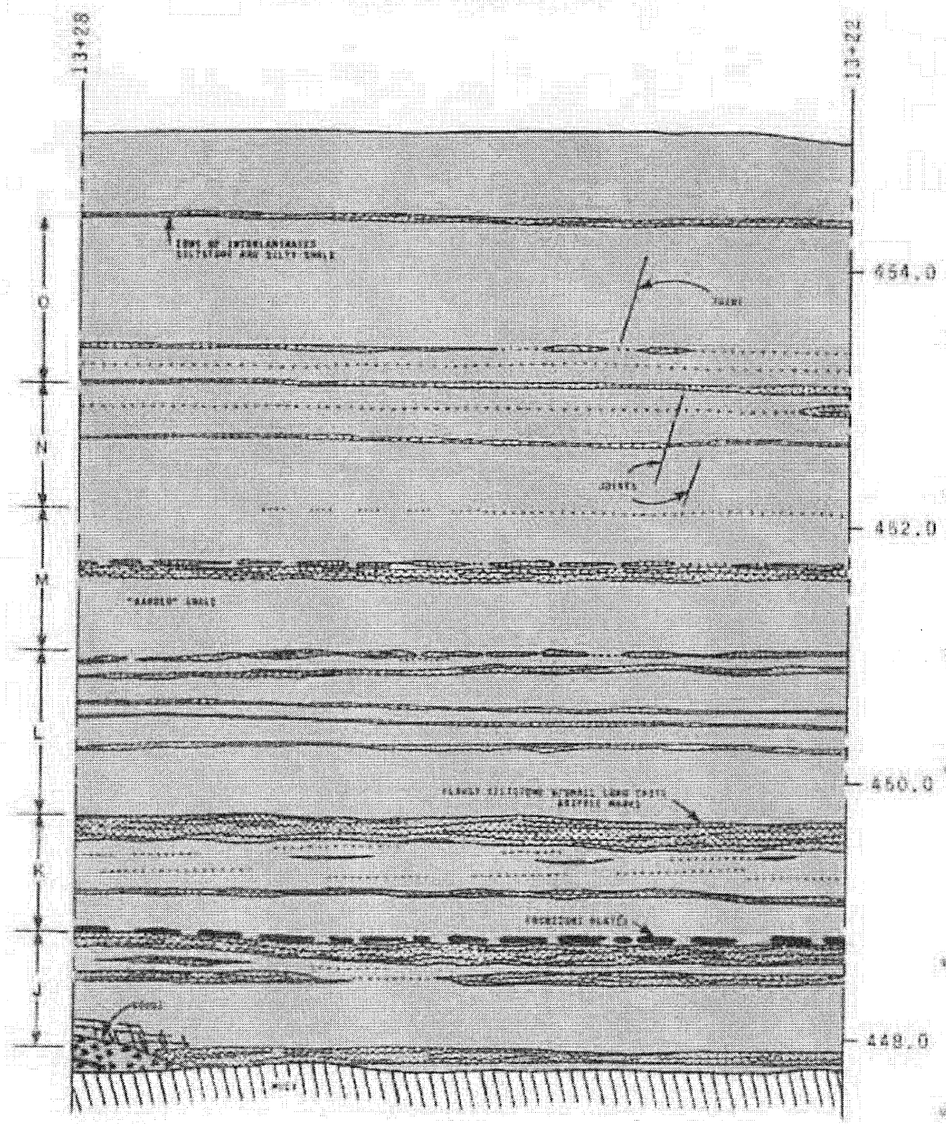
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Detailed Stratigraphic Section,
Discharge Tunnel
East Wall Station 11+40-11+46

Figure 2D-25

DISCHARGE TUNNEL EAST WALL



UNIT O: CLAY SHALE: DARK GRAY, WITH BLOCKY FRACTURE; WITH SEVERAL PLANAR PARALLEL LAMINAE OF BROWNISH-BLACK (SIDERITIC?) CLAY SHALE. TOP OF UNIT IS 8 CM-THICK ZONE OF INTERLAMINATED SILTSTONE AND SILTY SHALE; BASAL 8 CM IS BROADLY WAVY, INTERLAMINATED BROWNISH-BLACK CLAY SHALE, LIGHT-GRAY SILTSTONE, AND DOLOMITIC GRAY CLAY SHALE. SILTSTONES IN LOWER PART FINER AND THIN. WAVES FROM 2 TO 4 MM IN THICKNESS. UPPERMOST SILTSTONE OF THIS BEDSET DISAPPEARS FROM THICKER NORTH OF STATION 13+55.

UNIT N: CLAY SHALE: DARK GRAY, WITH BLOCKY TO CONCHOIDAL FRACTURE; WITH ONE PROMINENT MEDIAL SILTSTONE ZONE, MAINLY 1 CM THICK. DISCONTINUOUS PARALLEL LAMINAE, 1 TO 3 MM THICK, OF LIGHT-GRAY SILTSTONE AND BROWNISH BLACK (FERROGINOUS?) CLAY SHALE VERY COMMON ABOVE MEDIAL SILTSTONE; SINGLE DISCONTINUOUS SILTSTONE LAMINA NEAR BASE OF UNIT. UNIT N-UNIT M BOUNDARY IS A BEDDING SURFACE AT THIS STATION; NORTHWARD FROM STATION 13+55, A PROMINENT SILTSTONE SEPARATES UNITS N AND M.

UNIT M: CLAY SHALE AND SILTSTONE: DARK GRAY, MASSIVE, WITH BLOCKY TO CONCHOIDAL FRACTURE; MEDIAL ZONE OF SILTSTONE CONSISTS OF BROADLY WAVY INTERLAMINATIONS OF LIGHT-GRAY SILTSTONE AND BROWNISH-GRAY SILTY SHALE, OVERLAIN BY A SINGLE DISCONTINUOUS (LENTICULAR) BED OF LIGHT-GRAY SILTSTONE; (FERRUGINOUS?) CLAY SHALE AT VERY THIN DISCONTINUOUS PARALLEL LAMINAE ABOVE MEDIAL SILTSTONE, AND AS PLANAR CONTINUOUS PARALLEL LAMINAE IN LOWER PART OF UNIT. BASAL ONE-HALF HAS "BANDED" ASPECT.

UNIT L: CLAY SHALE AND SILTSTONE: LOWER ONE-HALF IS CLAY SHALE, DARK GRAY, WITH NUMEROUS DARK BROWNISH-GRAY, FERRUGINOUS(?), BROADLY WAVY LAMINAE, WITH "BANDED" ASPECT, BLOCKY FRACTURE. UPPER ONE-HALF IS GRAY CLAY SHALE WITH SEVERAL BROADLY WAVY SILTSTONE BEDS UP TO 3 CM IN THICKNESS; UPPER BEDS DISCONTINUOUS, LOWER BEDS CONTINUOUS, SMALL CHANNELS PRESENT AS SHOWN.

UNIT K: CLAY SHALE, SILTSTONE, AND IRONSTONE: DARK-GRAY, SLIGHTLY SILTY, CLAY SHALE WITH CONCHOIDAL FRACTURE, WITH NUMEROUS BROADLY WAVY THIN LAMINAE OF BROWNISH-GRAY FERROGINOUS(?) CLAY SHALE. UPPERMOST 6 CM IS WAVY MEDIAN ZONE OF FLAGGY, SMALLY INTERLAMINATED SILTSTONE AND SHALY SILTSTONE WITH PARTINGS OF DARK-GRAY SHALE, NORTHWARD THE TOP OF THIS SILTSTONE IS RIPPLE-MARKED MEDIAL SILTSTONE, UP TO 3 CM THICK, HAS STRAIGHT-CRESTED CURRENT RIPPLES AT TOP. BASE OF UNIT CONTAINS BED OF ROUGHLY OVALOID IRONSTONE CONCRETIONS ABOUT 2.5 CM THICK.

UNIT J: CLAY SHALE AND SILTSTONE: DARK GRAY CLAY SHALE, WITH BROADLY WAVY LAMINAE, UP TO 2 MM THICK, OF DARK BROWNISH-GRAY FERROGINOUS(?) CLAY SHALE. UPPERMOST 15 CM IS WAVY MEDIAN ZONE OF FLAGGY, THINLY INTERLAMINATED LIGHT-GRAY SILTSTONE AND LIGHT, DARK-GRAY SHALE; SMALL LONG CRESTS COVER BASE OF WAVY SILTSTONE LAMINAE; MICRO-RIPPLES OCCUR LOCALLY ON TOPS OF SILTSTONE LAMINAE. NORTHWARD UNIT J CONTAINS A MEDIAL PINCHING AND SWELLING BED OF SILTSTONE.

UNIT I: CLAY SHALE, SILTSTONE, AND IRONSTONE: SAME SEQUENCE AS UNIT E, EXCEPT AS INDICATED DIAGRAMMATICALLY.

NOTE: UNITS I AND J WERE MEASURED AND RECORDED AT STATION 13+40; UNITS A THROUGH O WERE MEASURED AND RECORDED AT STATION 13+28.

EXPLANATION

FAULT GOUGE ZONE. GRAY, PLASTIC CLAY GOUGE MATRIX WITH AGGREGATE OF RANDOMLY ORIENTED SILTSTONE AND SHALE FRAGMENTS.

SILTSTONE.

SILTSTONE LAMINA, DASHED WHERE BEDDING PLANE CONTINUOUSLY MAPPED BUT SILTSTONE LITHOLOGY PINCHED OUT.

SHALE.

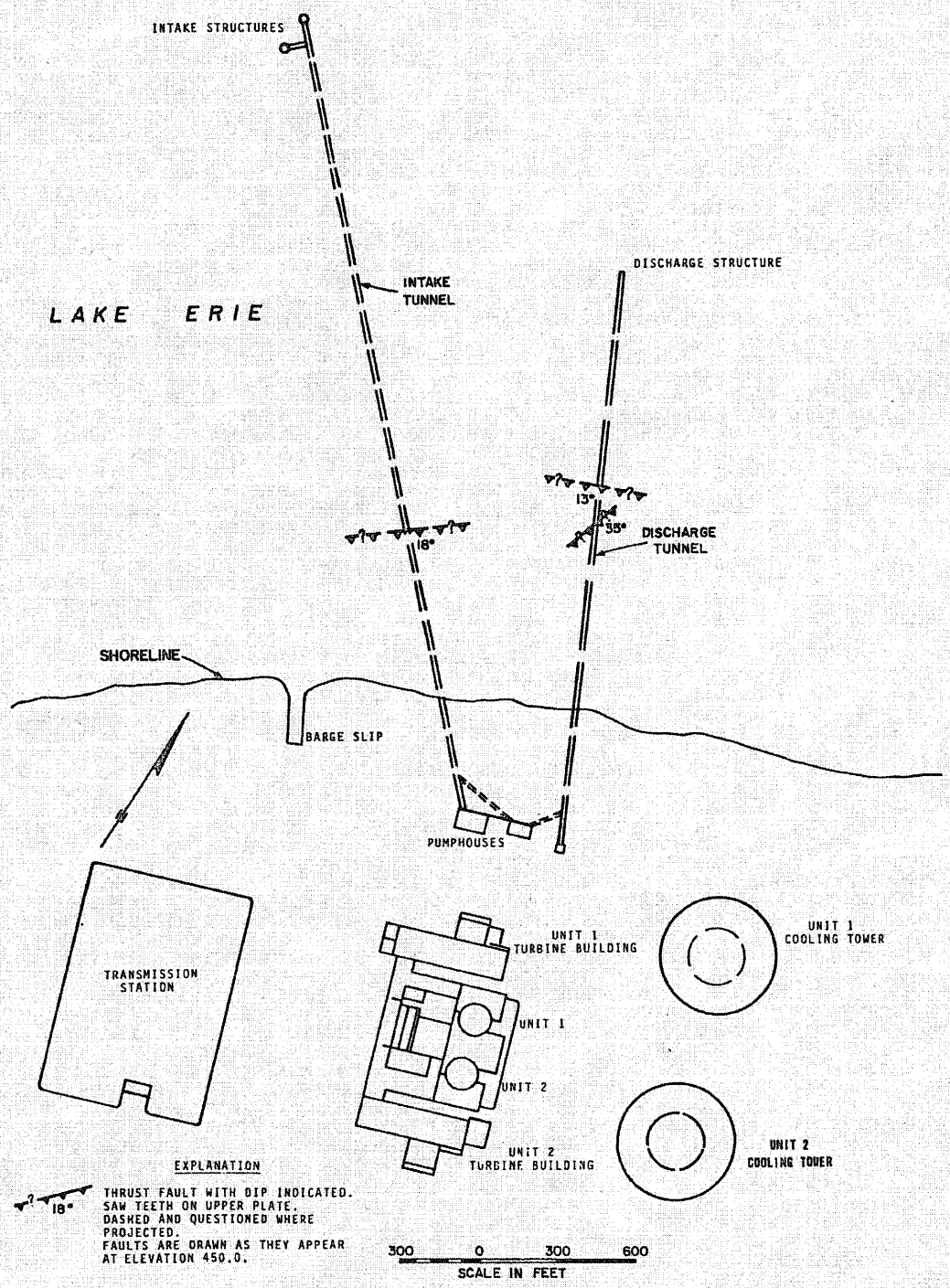
IRONSTONE CONCRETIONS.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Detailed Stratigraphic Section,
Discharge Tunnel East Wall
Station 13+22-13+28

Figure 2D-26

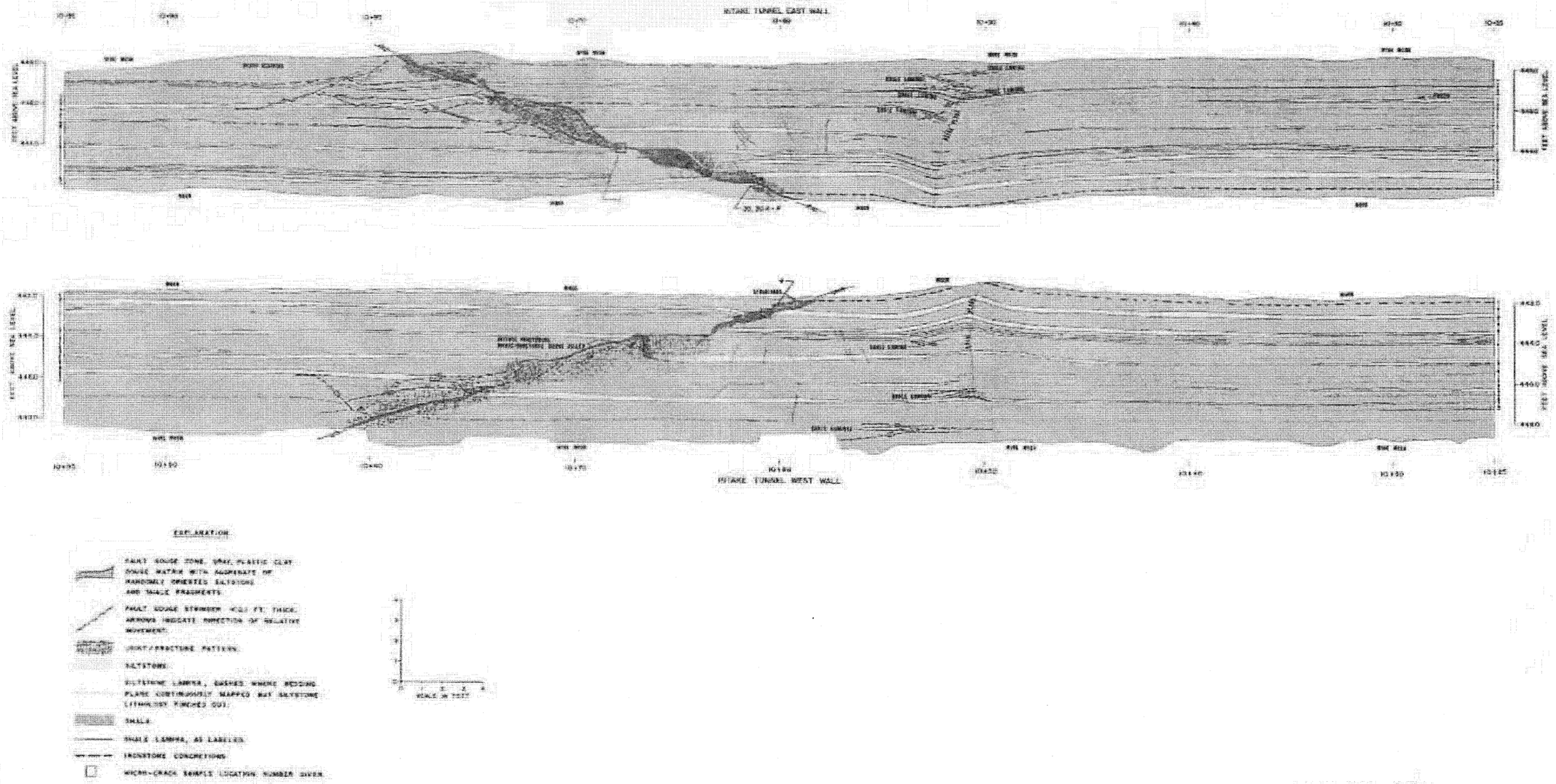


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Geologic Structure Map,
Intake & Discharge Tunnel Faults

Figure 2D-27

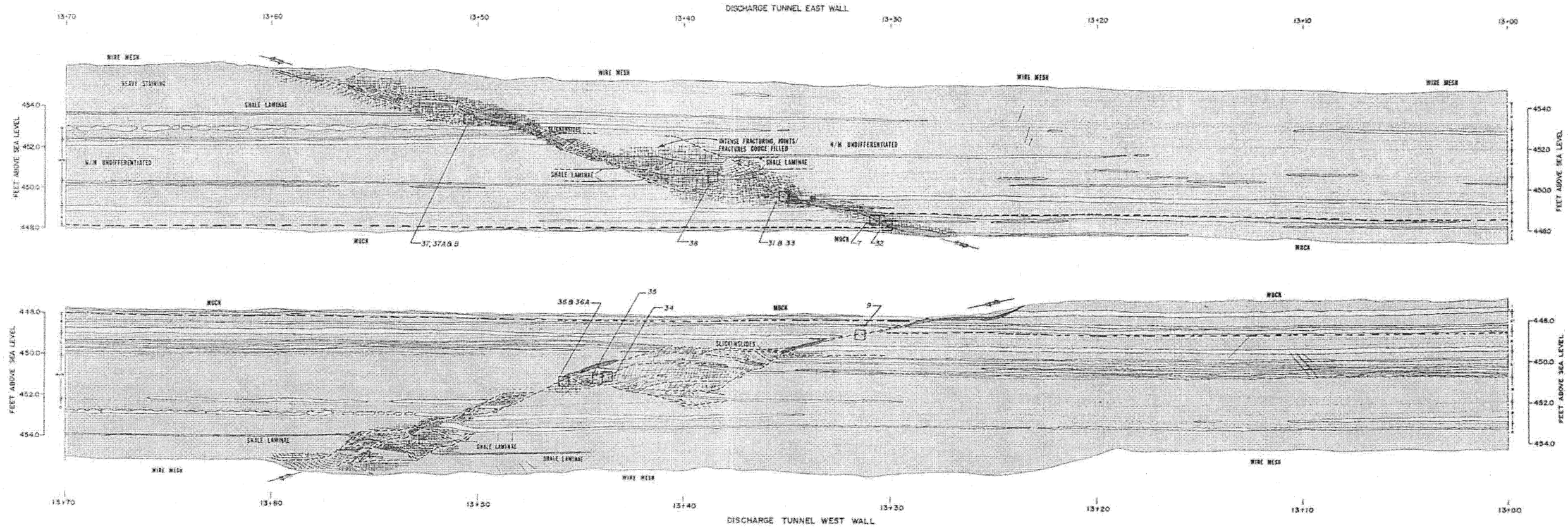


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

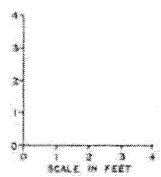
Intake Tunnel Wall Maps,
Stations 10+25-10+95

Figure 2D-28



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.



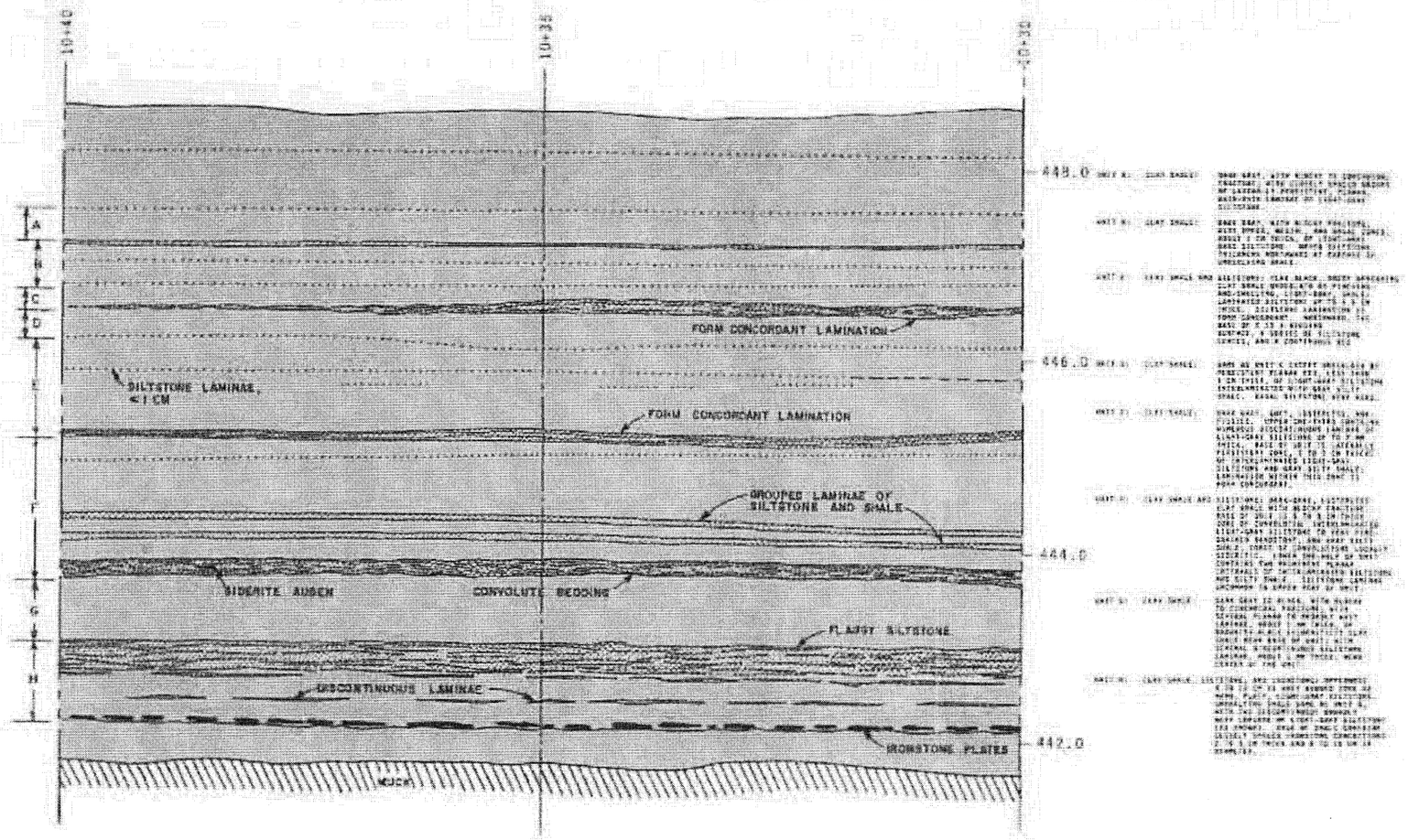
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Discharge Tunnel Wall Maps, Stations 13+100-12+00

Figure 2D-29

INTAKE TUNNEL EAST WALL



EXPLANATION

SILTSTONE.

SILTSTONE LAMINA, DASHED WHERE BEDDING PLANE CONTINUOUSLY MAPPED BUT SILTSTONE LITHOLOGY PINCHED OUT.

SHALE.

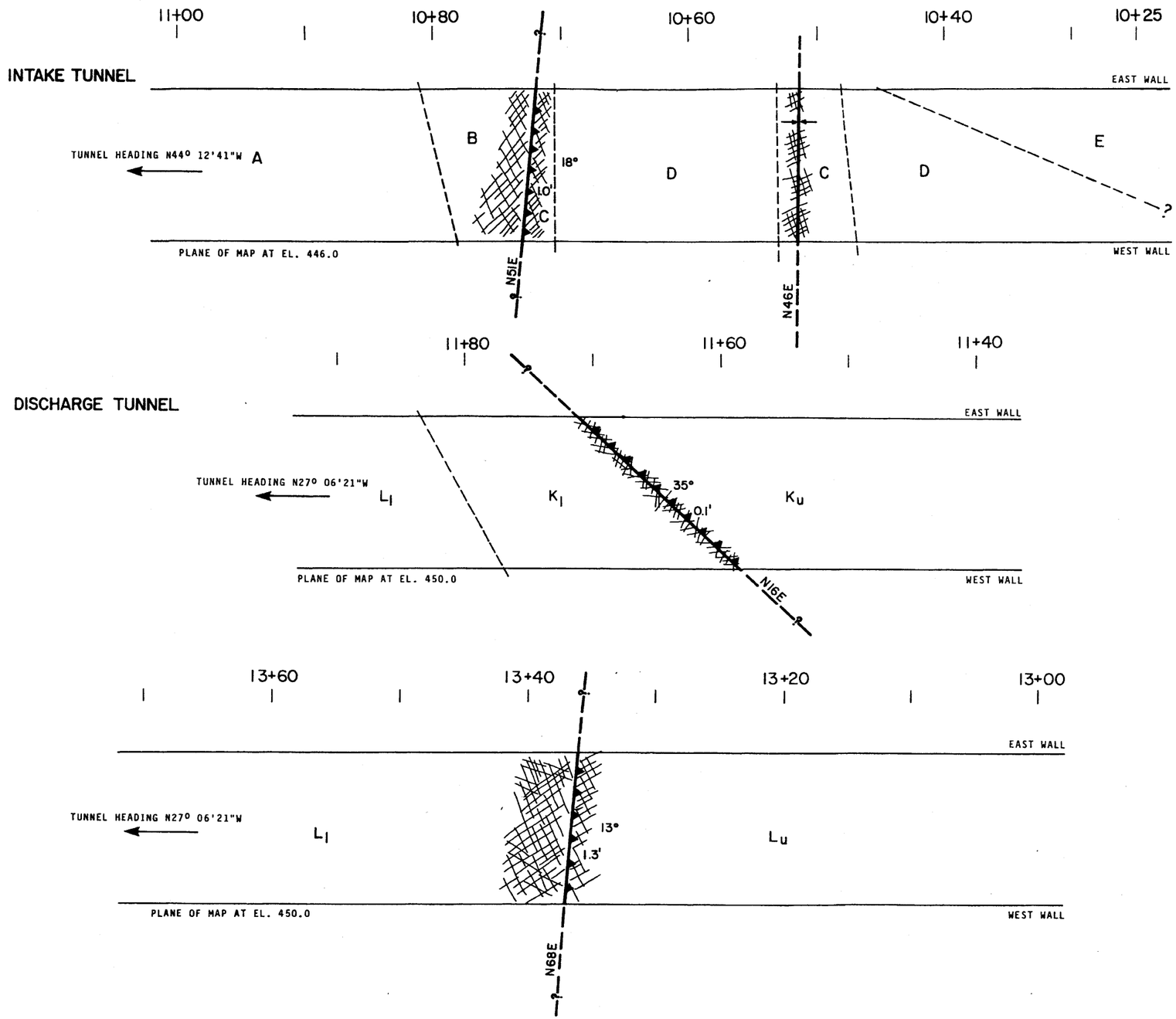
IRONSTONE CONCRETIONS.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Discharge Tunnel Wall Maps, Stations 11+40-12+00

Figure 2D-30



EXPLANATION

A — STRATIGRAPHIC UNITS: A, B, C, D, E, K, L. UNITS K AND L ARE SUBDIVIDED INTO UPPER AND LOWER SECTIONS AS INDICATED BY SUBSCRIPTS.

0.1' 35° — THRUST FAULT SHOWING DISPLACEMENT AND DIP

STRATIGRAPHIC UNIT CONTACT.

SEVERELY FRACTURED ROCK.

SYNCLINAL FOLD AXIS.

NOTES: 1. SEE FIGURES 22, 23, AND 24 FOR STRATIGRAPHIC UNIT RELATIONSHIPS.

2. MAPS COMPILED FROM INTAKE AND DISCHARGE TUNNEL WALL MAPS, SEE FIGURES 26, 27, AND 28.

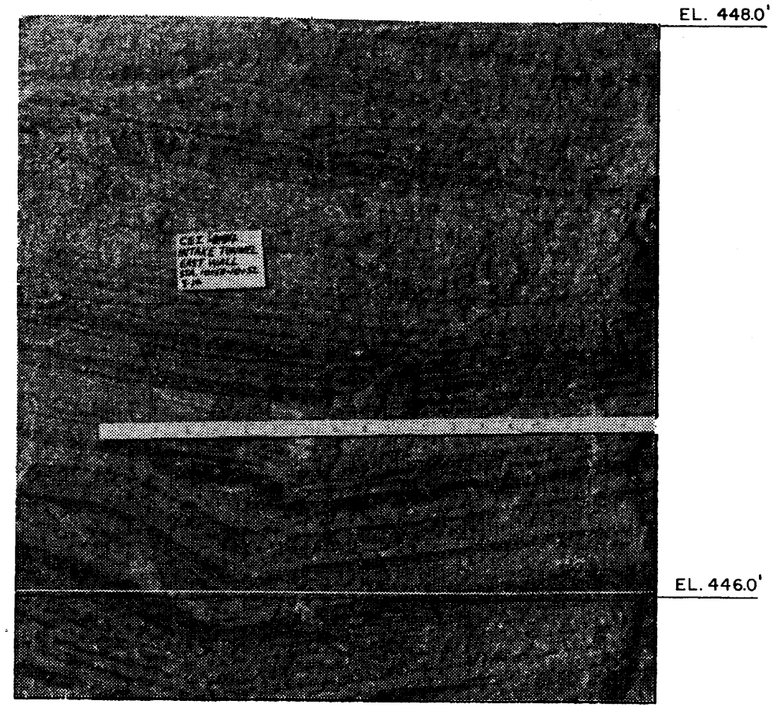
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Geologic Maps,
Intake & Discharge Tunnels

Figure 2D-31

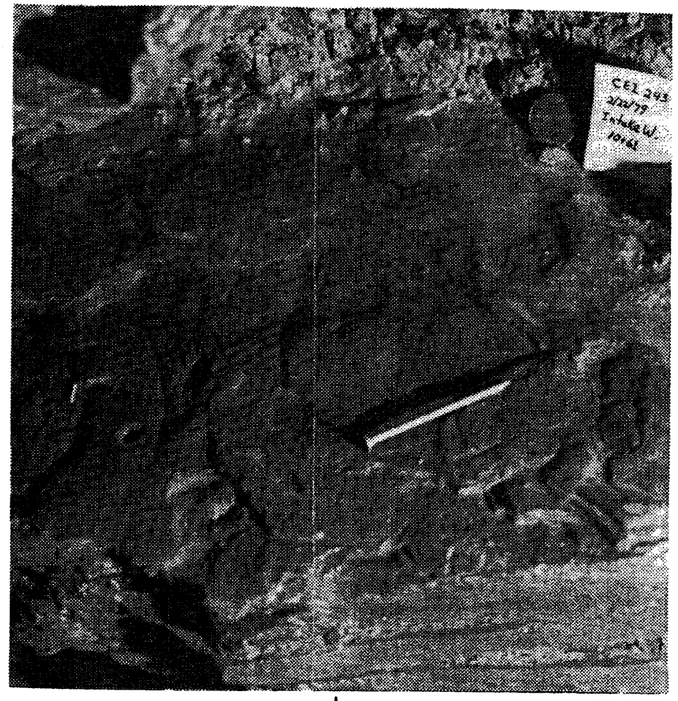
1.



10+51

ASSYMMETRIC FOLD; STATION 10+51, EAST WALL INTAKE TUNNEL. NOTE FAULTED NW LIMB OF FOLD.

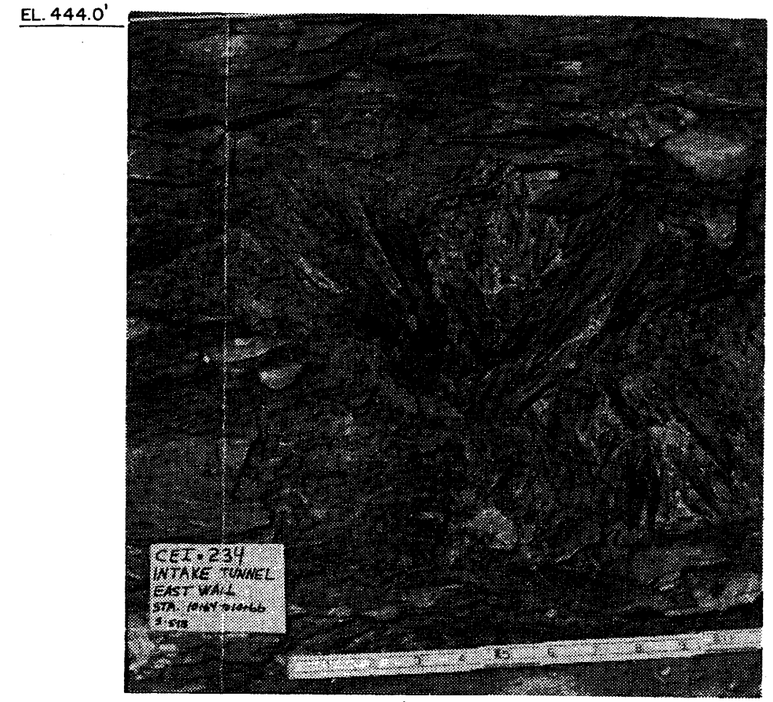
2.



10+61

STRIATIONS; WEST WALL INTAKE TUNNEL, STATION 10+61. STRIATIONS ON FOOTWALL, TREND N 37° W PARALLEL TO NAIL.

3.



10+65

FRACTURED AND DRAGGED STRATA; EAST WALL INTAKE TUNNEL, STATION 10+65.

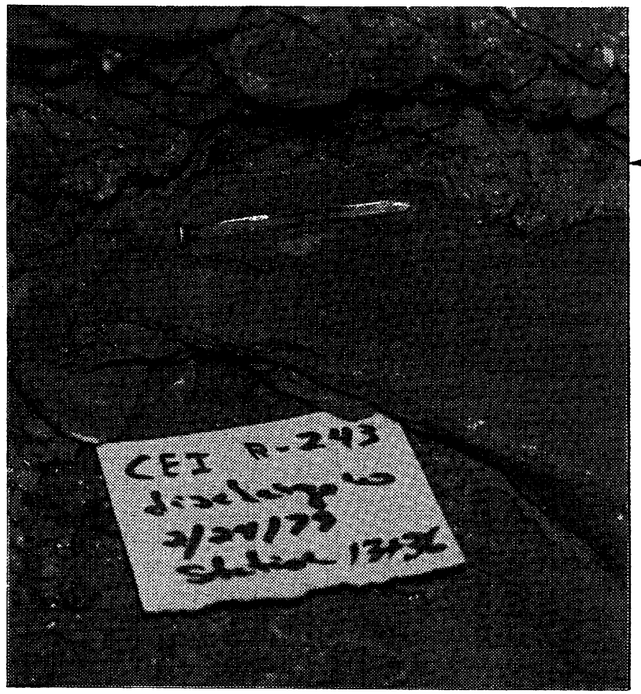
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photographs, Structural Details, Intake Tunnel

Figure 2D-32

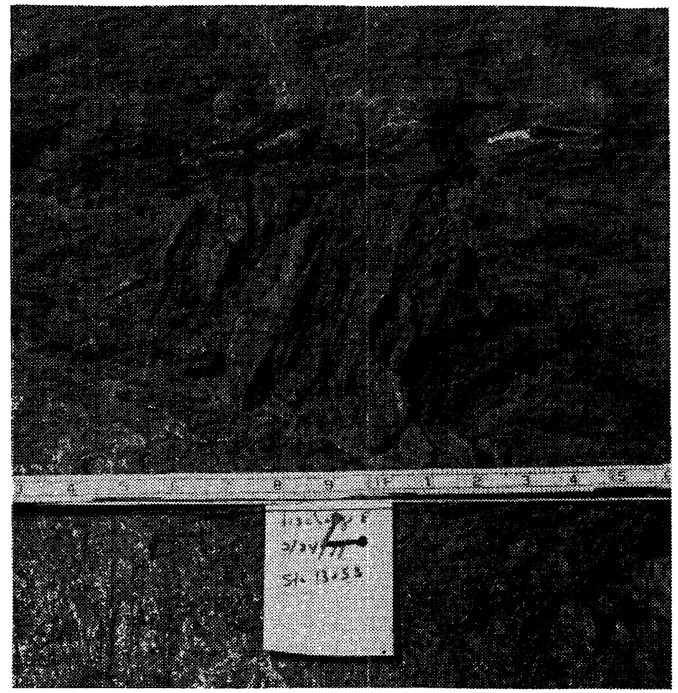
1.



13+36

STRIATIONS AND GOUGE; WEST WALL DISCHARGE TUNNEL, STATION 13+36. STRIATIONS TREND N22°W PARALLEL TO NAIL (TWO INCHES LONG). NOTE ANGULAR SHALE AND SILTSTONE FRAGMENTS IN GOUGE.

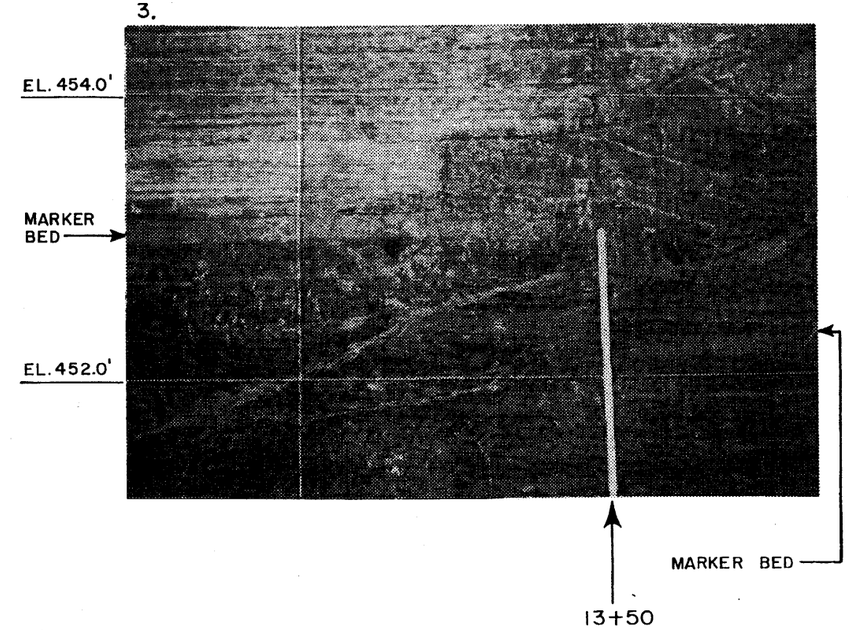
2.



13+53

DRAG FOLD; STATION 13+53, EAST WALL DISCHARGE TUNNEL.

3.



DRAG FOLDS, KINKING AND FAULT SPLAYS; STATION 13+50 WEST WALL DISCHARGE. SCALE GIVEN BY STATIONING AND RULE.

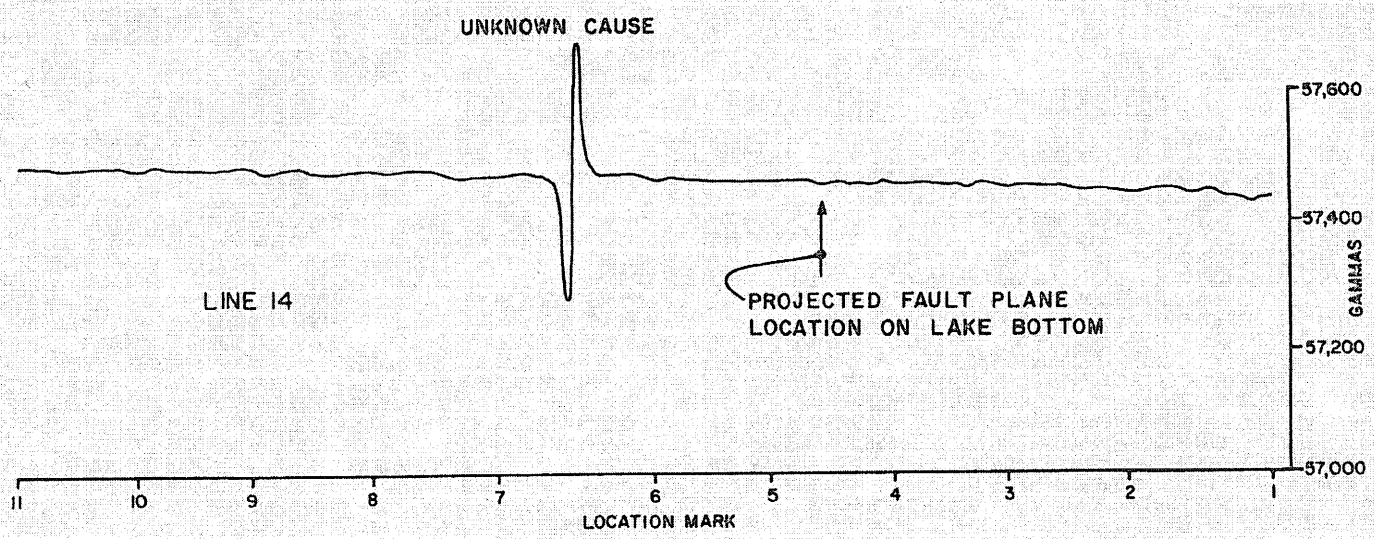
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Photographs, Structural Details, Discharge Tunnel

Figure 2D-33

NOTE: MARK SEPARATION APPROXIMATELY 1000'



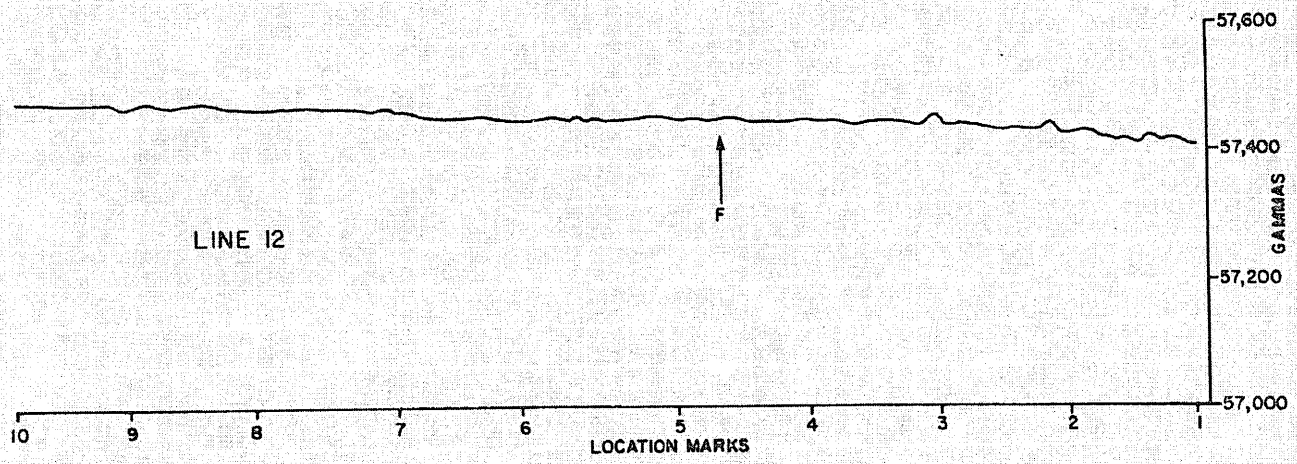
(Rev. 12 1/03)

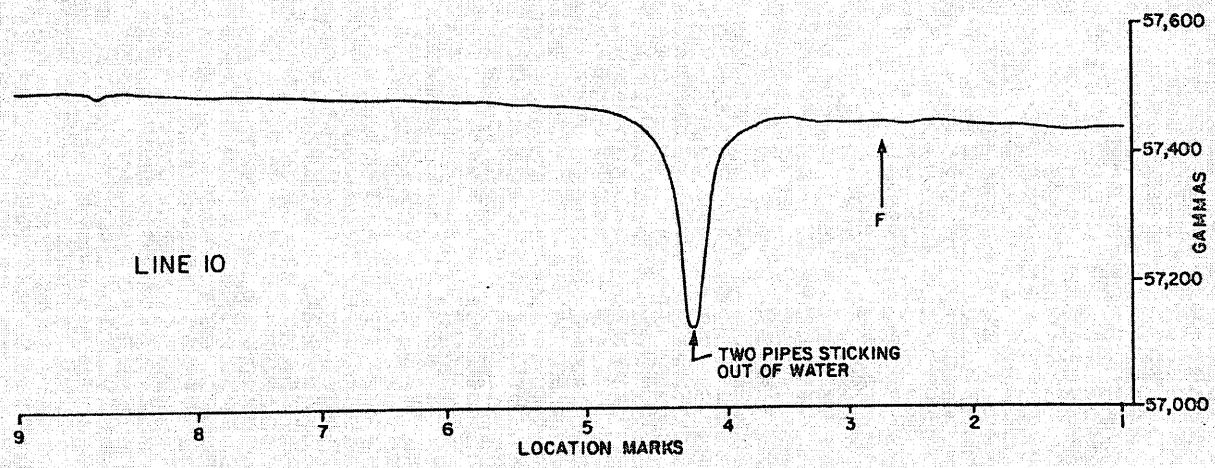
PERRY NUCLEAR POWER PLANT

Offshore for Shipborne
Magnetic Profile 14

Figure 2D-34

NOTE: MARK SEPARATION APPROXIMATELY 1000'





EXPLANATION

↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

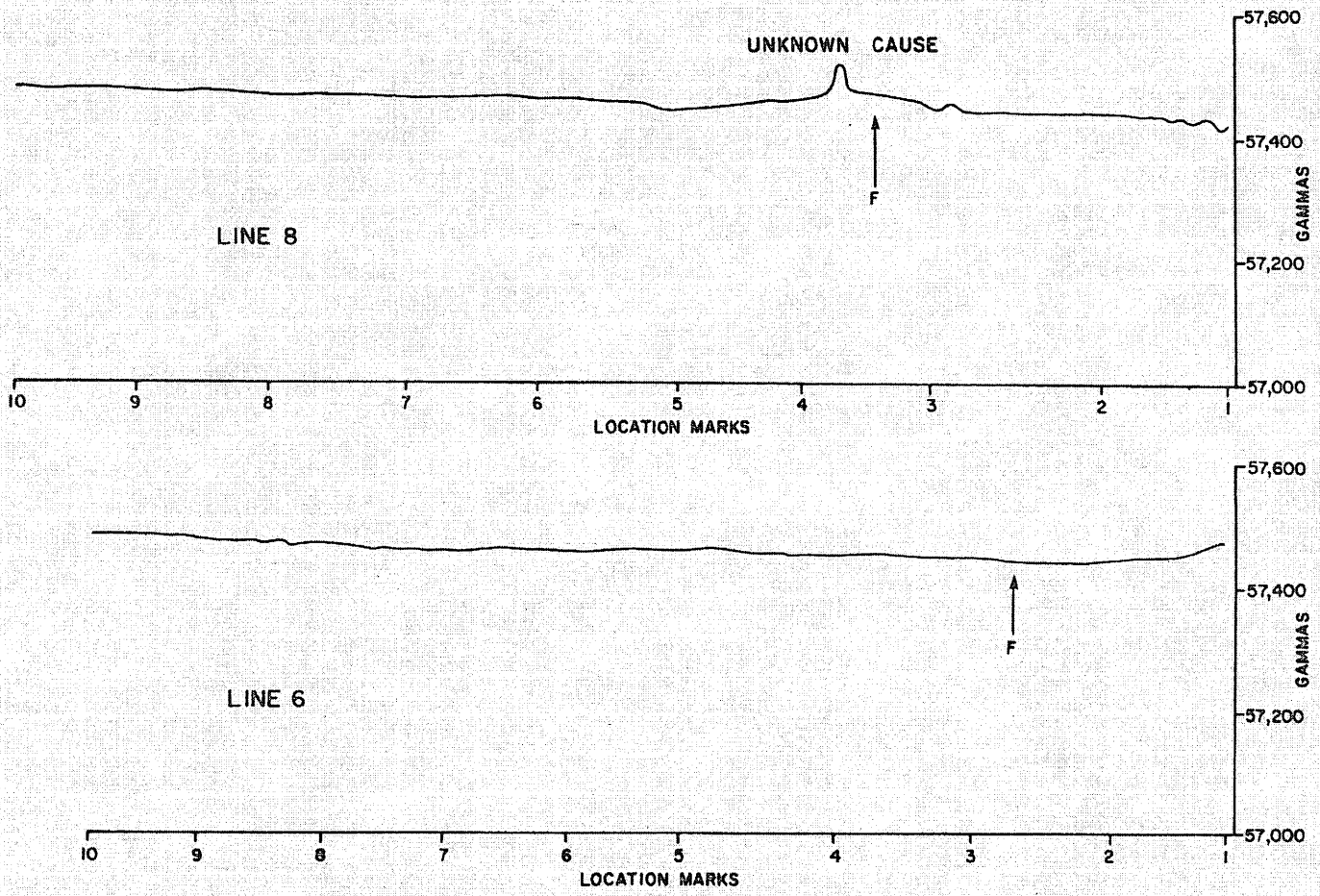
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Offshore for Shipborne
Magnetic Profiles 10 and 12

Figure 2D-35

NOTE: MARK SEPARATION APPROXIMATELY 1000'



EXPLANATION

↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

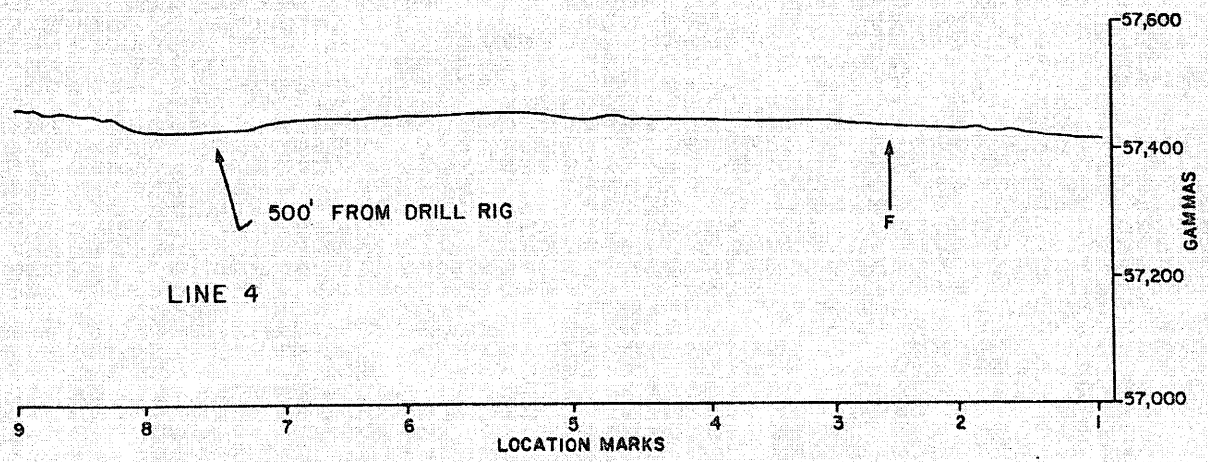
(Rev. 12 1/03)

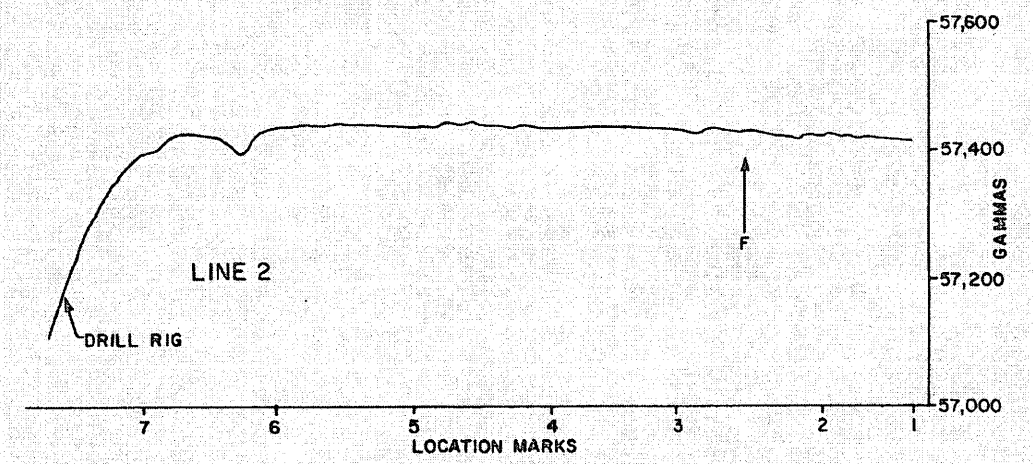
PERRY NUCLEAR POWER PLANT

Offshore for Shipborne
Magnetic Profiles 6 and 8

Figure 2D-36

NOTE: MARK SEPARATION APPROXIMATELY 1000'





EXPLANATION

↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

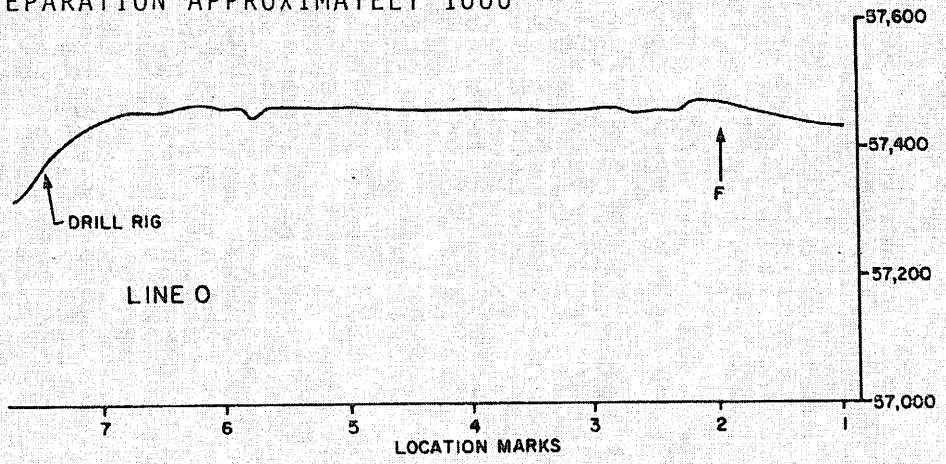
(Rev. 12 1/03)

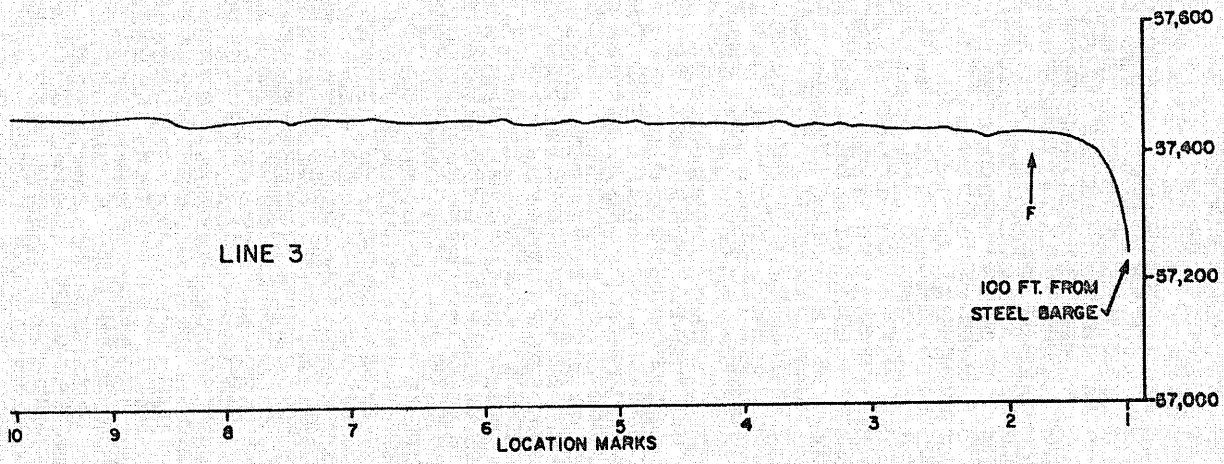
PERRY NUCLEAR POWER PLANT

Offshore for Shipborne Magnetic Profiles 2 and 4

Figure 2D-37

NOTE: MARK SEPARATION APPROXIMATELY 1000'





EXPLANATION

↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

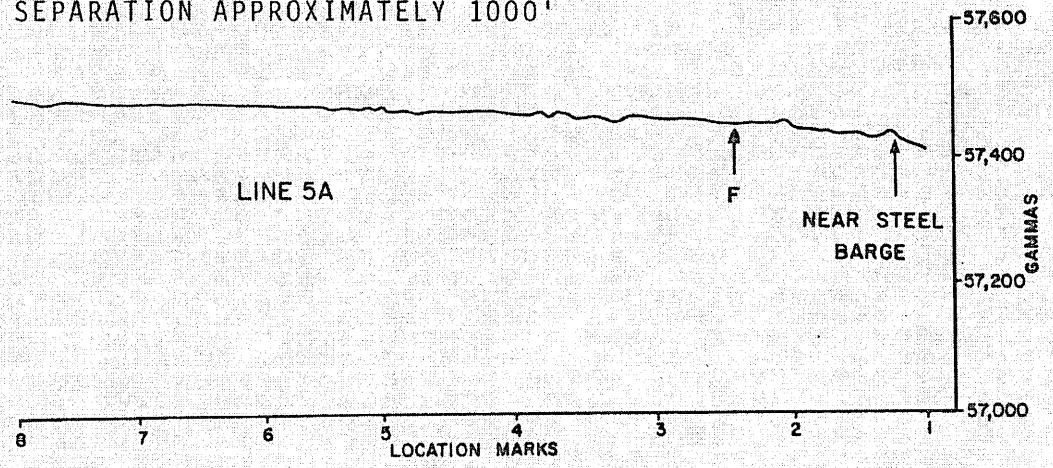
(Rev. 12 1/03)

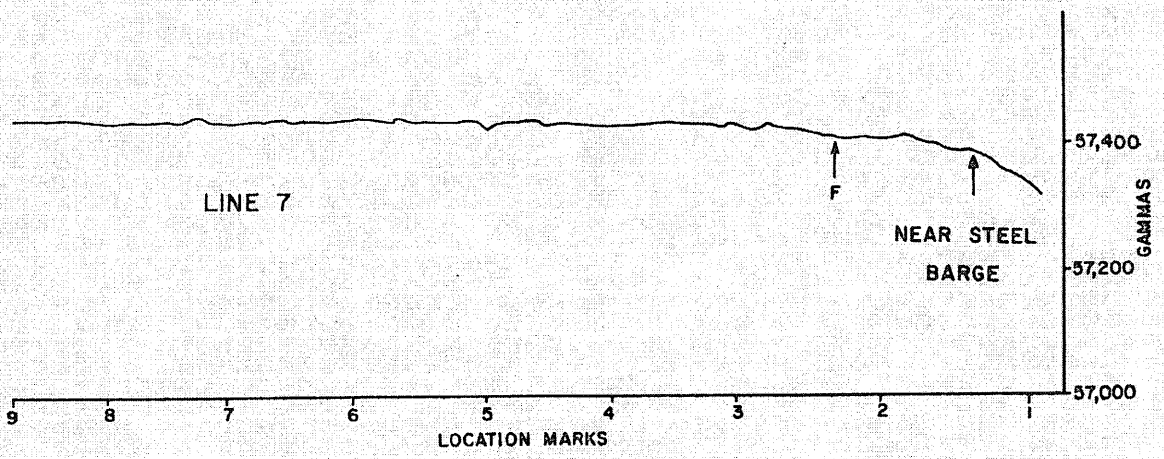
PERRY NUCLEAR POWER PLANT

Offshore for Shipborne
Magnetic Profiles 0 and 3

Figure 2D-38

NOTE: MARK SEPARATION APPROXIMATELY 1000'





EXPLANATION

↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

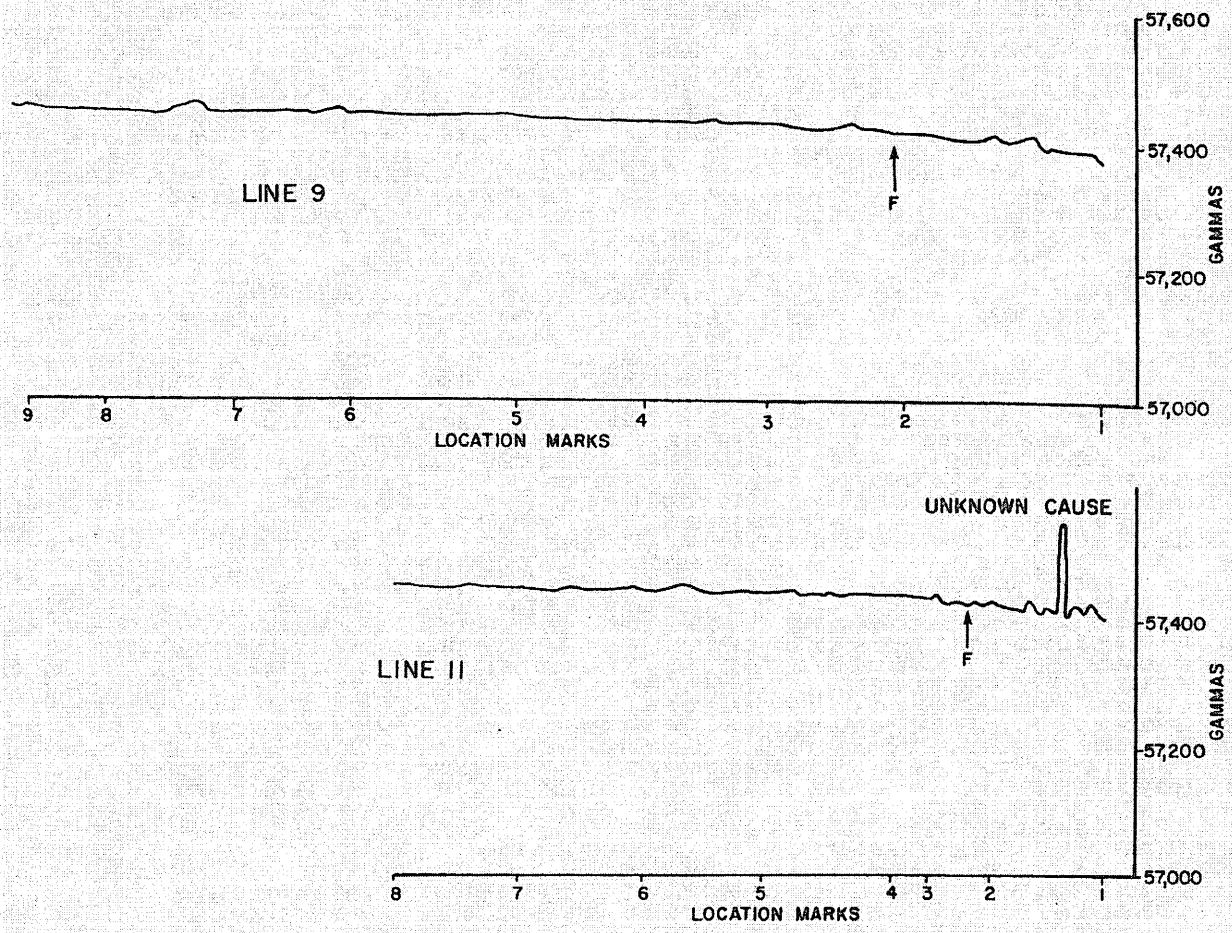
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Offshore for Shipborne
Magnetic Profiles 5A and 7

Figure 2D-39

NOTE: MARK SEPARATION APPROXIMATELY 1000'



EXPLANATION

↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

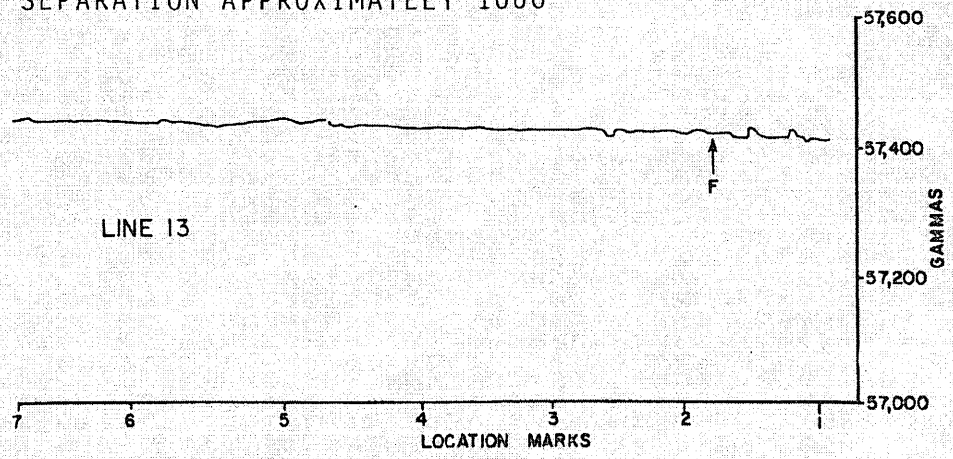
(Rev. 12 1/03)

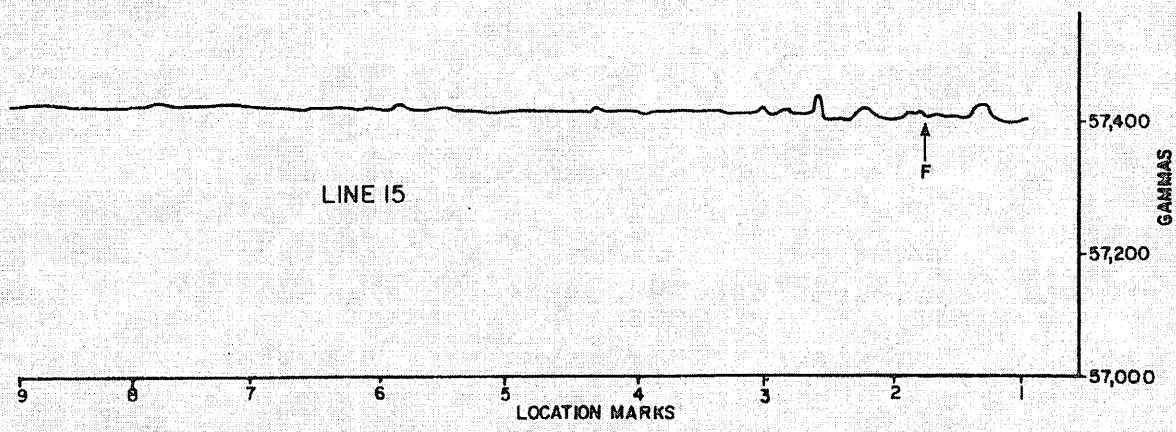
PERRY NUCLEAR POWER PLANT

Offshore for Shipborne Magnetic Profiles 9 and 11

Figure 2D-40

NOTE: MARK SEPARATION APPROXIMATELY 1000'





EXPLANATION

↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

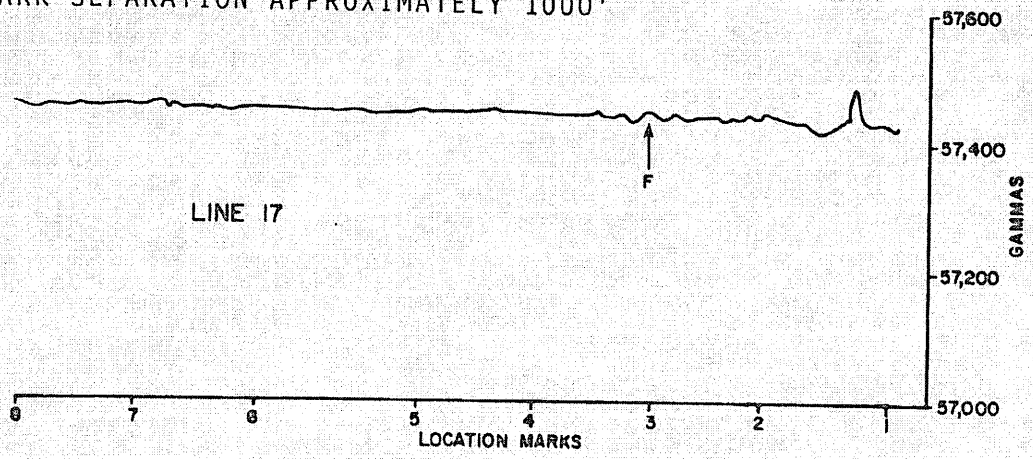
(Rev. 12 1/03)

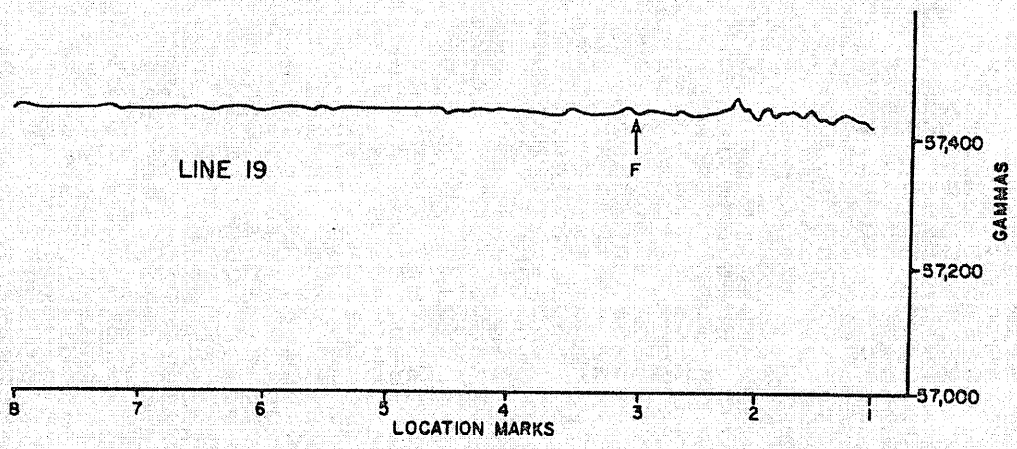
PERRY NUCLEAR POWER PLANT

Offshore for Shipborne
Magnetic Profiles 13 and 15

Figure 2D-41

NOTE: MARK SEPARATION APPROXIMATELY 1000'





EXPLANATION

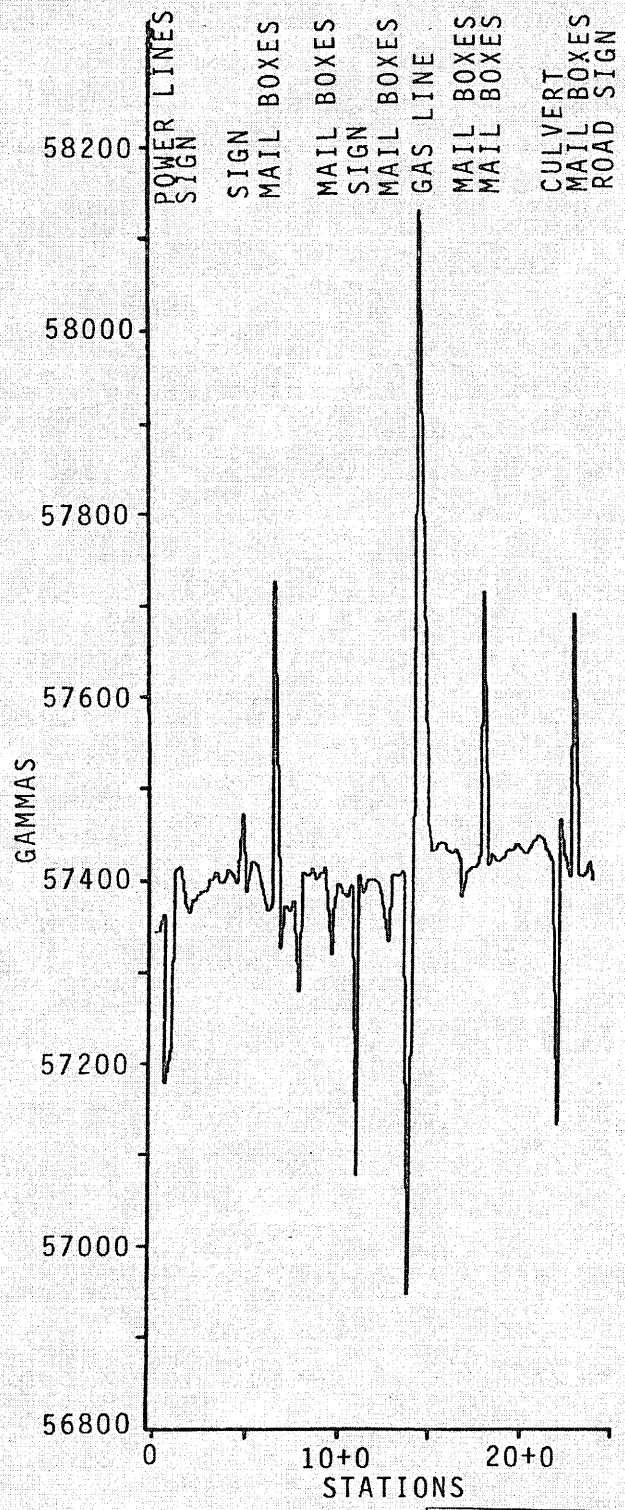
↑ PROJECTED FAULT LOCATION ON LAKE BOTTOM.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Offshore for Shipborne
Magnetic Profiles 17 and 19

Figure 2D-42



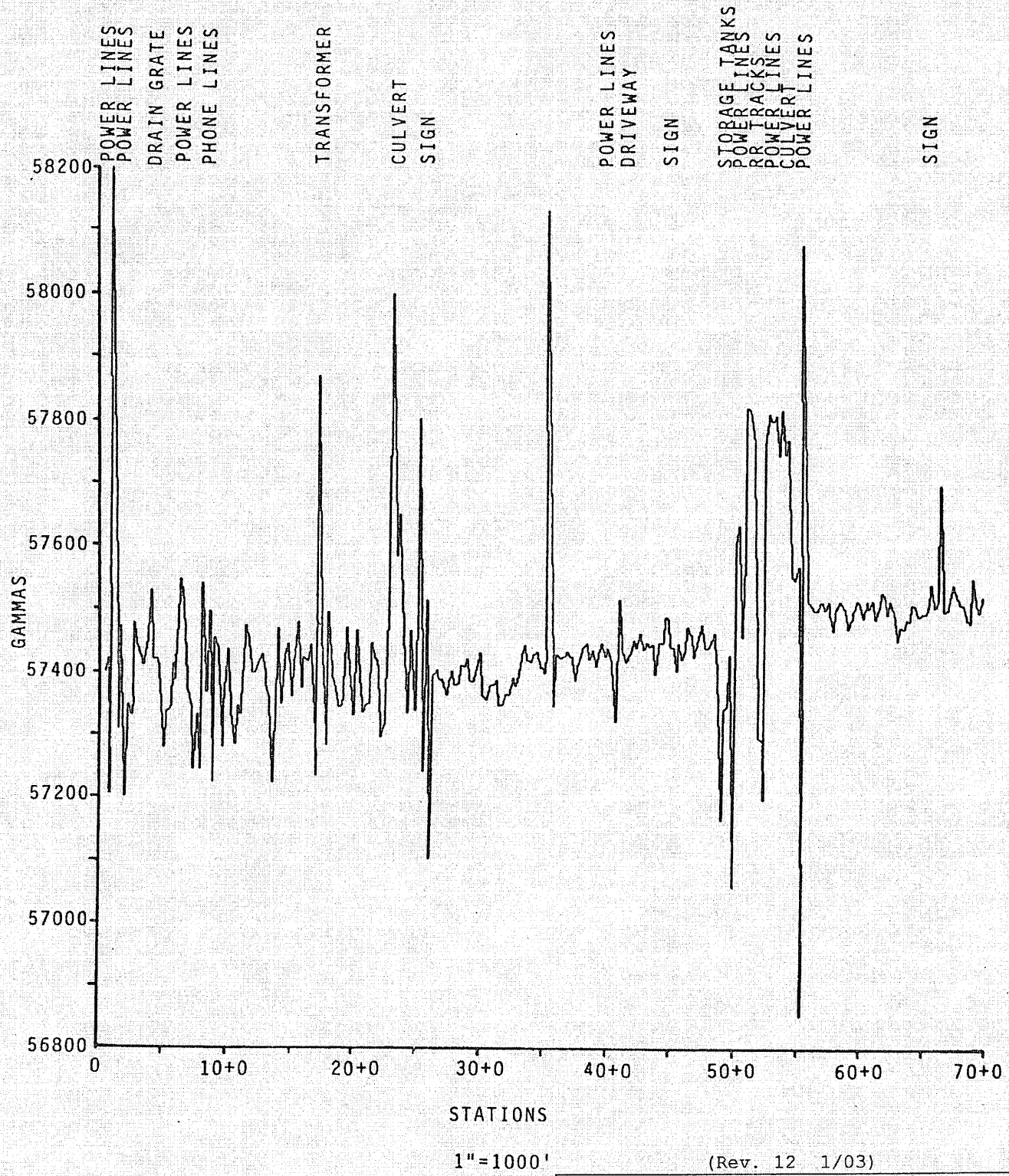
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

1"=1000'

Onshore for Land
Magnetic Profile 1S-A

Figure 2D-43



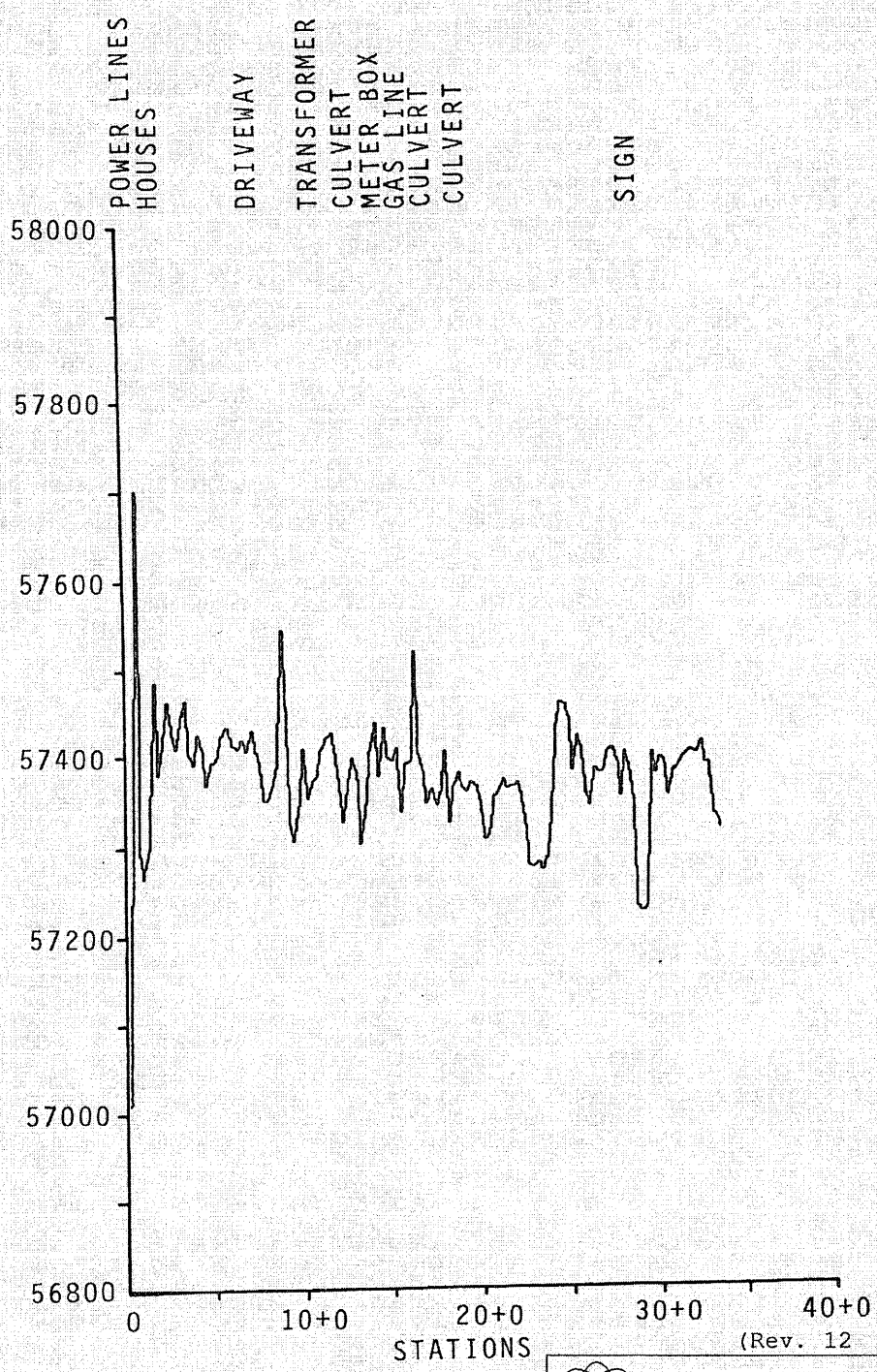
1"=1000'

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Onshore for Land
Magnetic Profile 1S

Figure 2D-44



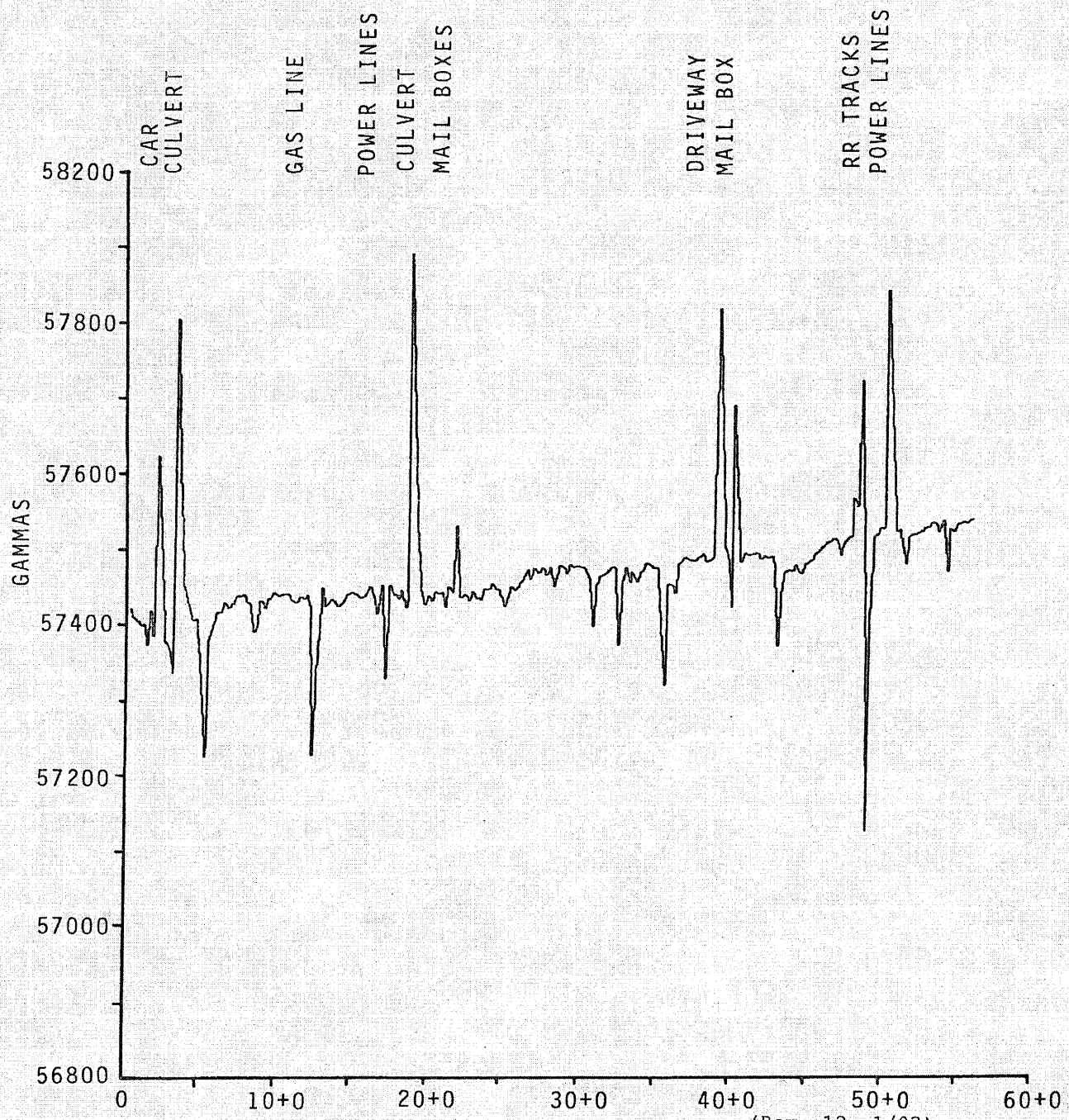
(Rev. 12 1/03)

1"=1000'

PERRY NUCLEAR POWER PLANT

Onshore for Land
Magnetic Profile 1E

Figure 2D-45



(Rev. 12 1/03)

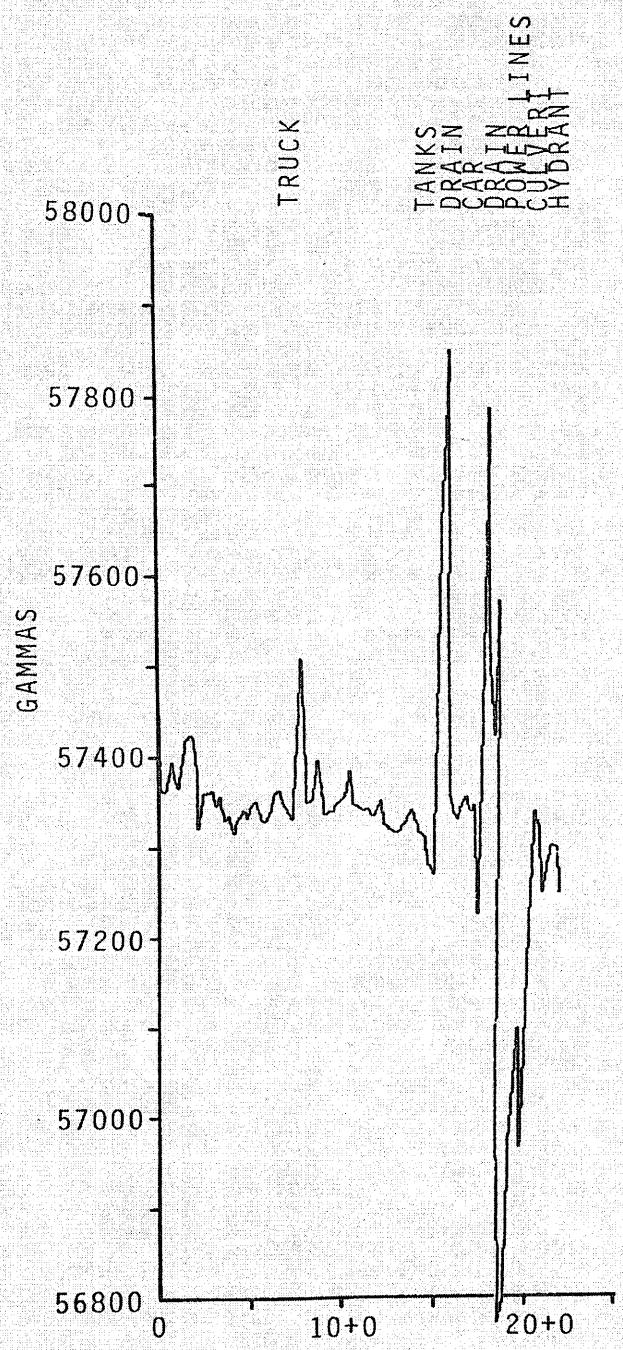
STATIONS

1"=1000'

PERRY NUCLEAR POWER PLANT

Onshore for Land
Magnetic Profile 2S

Figure 2D-46



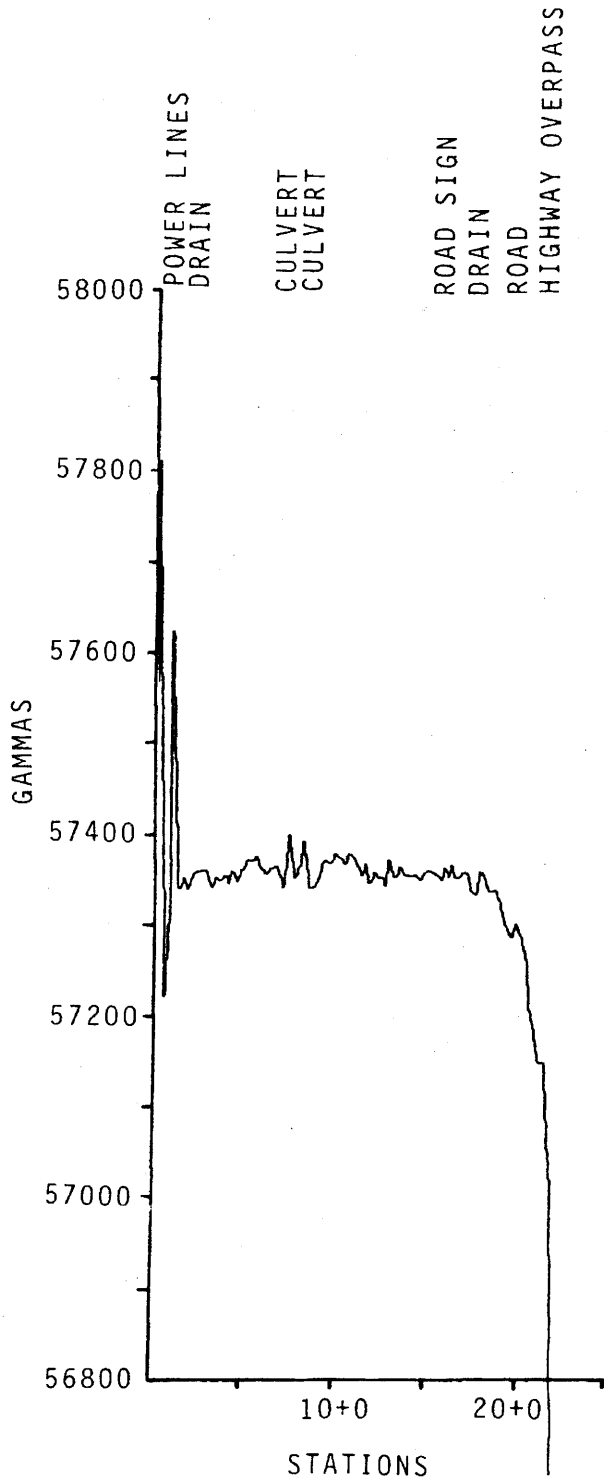
(Rev. 12 1/03)

1"=1000'

PERRY NUCLEAR POWER PLANT

Onshore for Land
Magnetic Profile 3S

Figure 2D-47



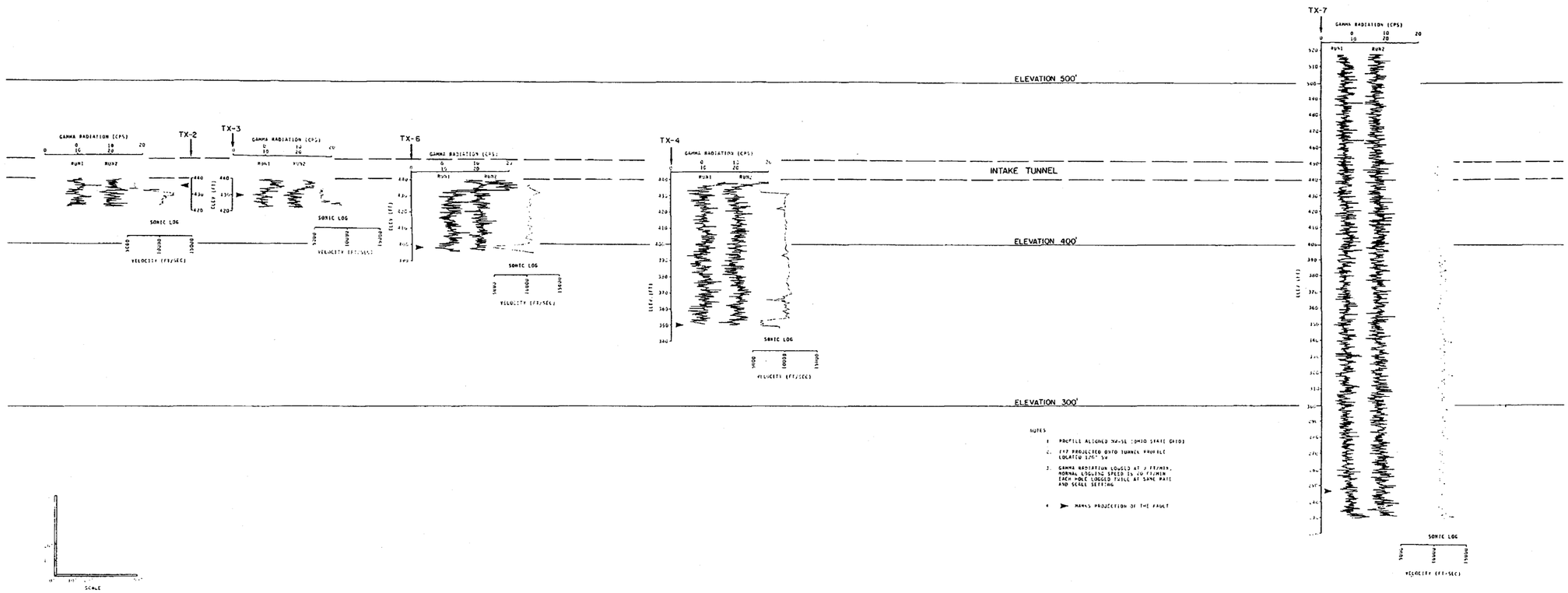
1"=1000'

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Onshore for Land
Magnetic Profile 3S-A

Figure 2D-48

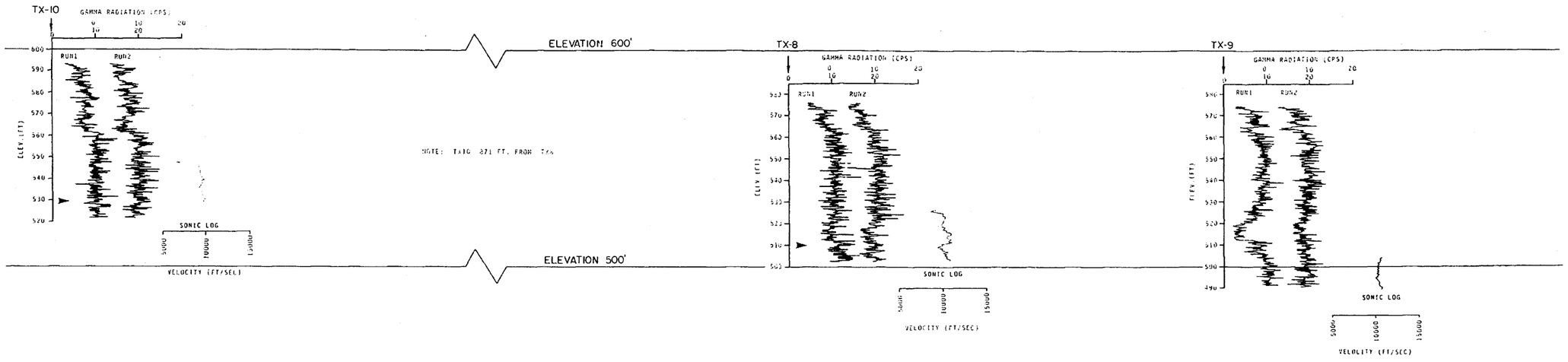


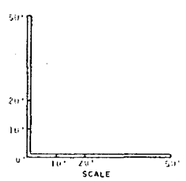
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Borehole Logs - Gamma/Sonic,
TX Borings 2, 3, 4, 5, 6, 7

Figure 2D-49





NOTES:

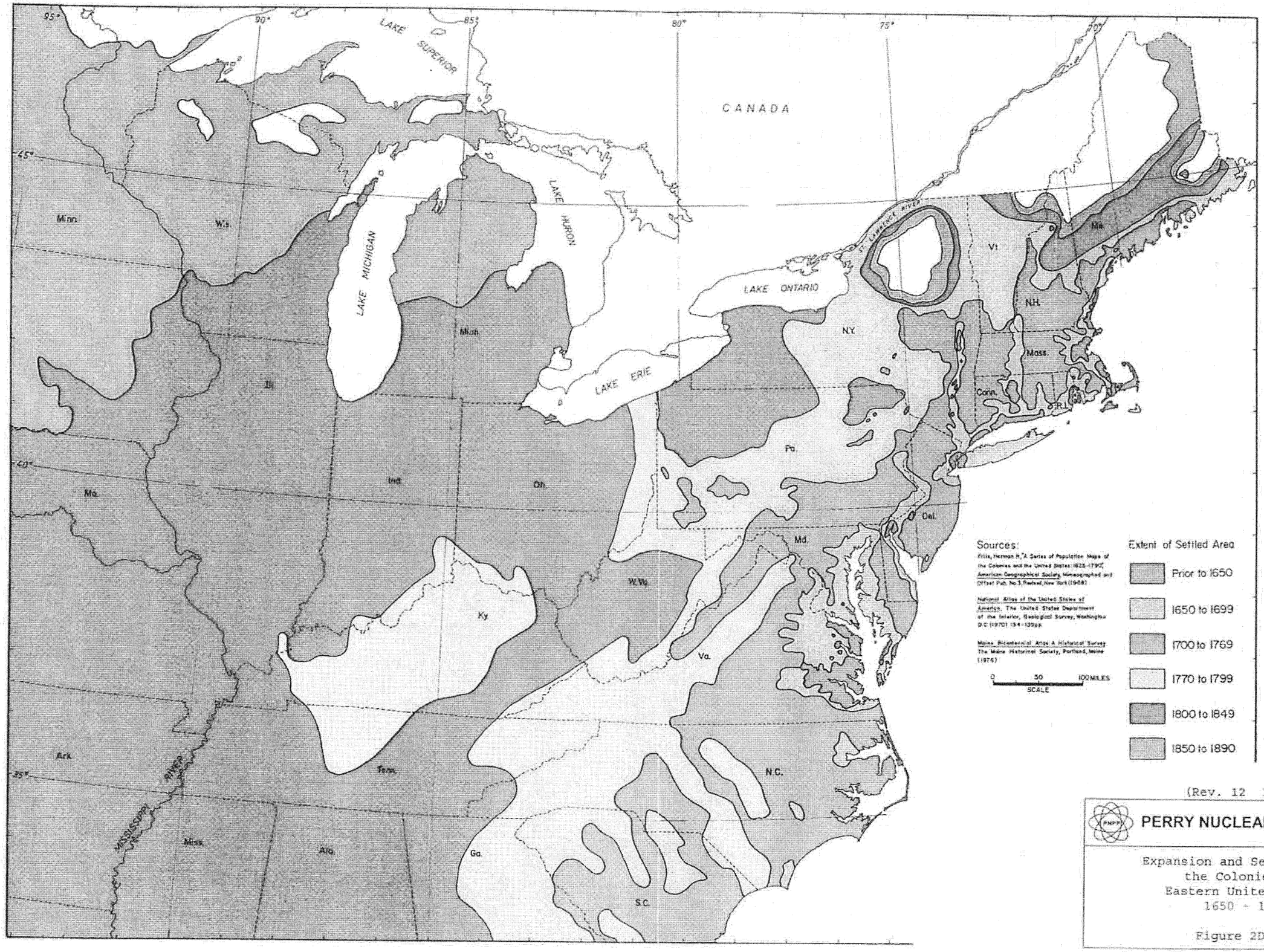
1. PROFILE ALIGNED APPROXIMATELY SW-NE (OHIO STATE GRID)
2. GAMMA RADIATION LOGGED AT 1 FT/MIN; NORMAL LOGGING SPEED IS 20 FT/MIN. EACH HOLE LOGGED TWICE AT SAME RATE AND SCALE SETTING
3. ► MARKS PROJECTION OF THE FAULT

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Borehole Logs - Gamma/Sonic,
TX Borings 8, 9, 10

Figure 2D-50

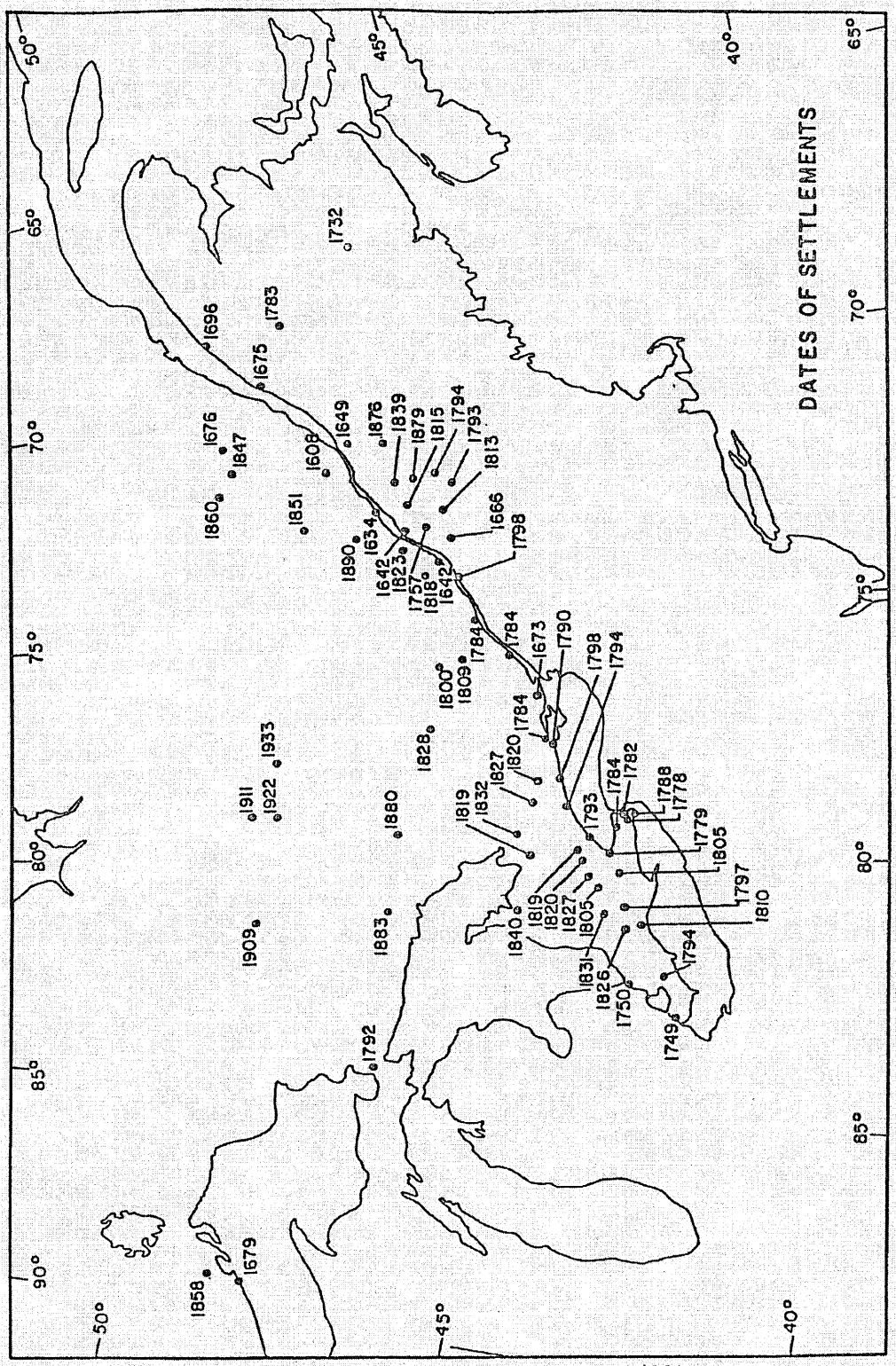


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Expansion and Settlement in the Colonies and Eastern United States 1650 - 1890

Figure 2D D-1



(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Settlement in Canada

Figure 2D D-2

			PAPERS DATE MO DA	Akron Daily Beacon	Akron Beacon Journal	Akron City Times	Akron Columbia	Akron Free Demn. Standard	Akron Sunday Gazette	Akron News & Review	Akron Press	Akron Reporter	Akron Summit Beacon	Akron Summit County Beacon	Akron Daily Democrat	Akron Evening Times	Akron Times Press	Ashtabula Beacon Record	Ashtabula Star Beacon	Elyria Chronicle-Telegram	Lorain Constitution	Elyria Constitution	Elyria Democrat	Elyria Independant	Lorain County Eagle	Elyria Reporter	Elyria Weekly Reporter	Elyria Republican and Advocate	Elyria Republican	Garrettsville Journal	Kent Bulletin	Kent Courier-Tribune	Lorain Daily Democrat	Lorain Evening Herald	Lorain Journal	Lorain Journal & Times Herald	Lorain Journal	Lorain News	Lorain Daily News	Niles Liberty News	Niles Daily Times	Willoughby Independant	Lake County Republican Herald	Willoughby News-Herald	Willoughby Republican	Warren Daily Chronicle	Warren Tribune Chronicle	Warren Weekly Tribune	Trumbull County Whig	Trumbull Democrat	Western Reserve Chronicle	Youngstown Citizen	Youngstown Labor Record	Mahoning Courier	Youngstown Telegram	Youngstown Vindicator	Youngstown Vindicator & Youngstown Telegram	Painesville Telegraph	Cleveland Leader	Cleveland Plain Dealer	Cleveland Herald	Cleveland News/Press	Cleveland Daily True Democrat	Cleveland Gazette	Cleveland Advertisor	Berea Enterprise	Berea Advertisor	Ashtabula Sentinel	Conneaut Reporter
42.5N	81.0W	Shore of L. Erie	1823 May 30	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	▨	▨	▨	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
41.5	81.7	Cleveland, Ohio	1836 July 8	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	○	▨	▨	▨	▨	▨	▨	N/R	▨	●		▨	▨	▨	●	▨	▨	○	▨
41.5	81.7	Cleveland, Ohio	1850 Oct. 1	▨	▨	▨	▨	○	▨	▨	▨	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	N/R	▨	▨	▨	▨	▨	▨	N/R	▨	●	●	▨	●	▨	▨	▨	▨	—	—
41.8	80.6	Northeastern Ohio	1857 Feb. 28	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	○	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	▨	▨	▨	▨	▨	▨	○	N/R	N/R	N/R	▨	▨	▨	▨	▨	▨	●	—
41.67	81.25	Painesville, Ohio	1858 Apr. 10	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	▨	▨	▨	▨	N/R	●	N/R	●	▨	▨	▨	▨	▨	▨	●	●
42.7	80.8	Vienna, Ont.	1869 Apr. 9	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	—	▨	▨	▨	—	—	—	—	▨	▨	▨	▨	▨	▨	—	○
41.4	82.1	Elyria & Lorain, Ohio	1872 July 23	N/R	▨	N/R	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	▨	▨	▨	▨	●	▨	▨	●	▨	▨	▨	▨	▨		○	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	○	▨	▨	▨	N/R	N/R	●	N/R	▨	▨	▨	▨	▨	▨	—	—
41.25	80.50	Sharon, Pennsylvania	1873 Aug. 17	—	▨	—	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	▨	—	▨	▨	—	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	▨	▨	▨	▨	N/R	N/R	N/R	—	▨	▨	▨	▨	▨	▨	N/R	○
41.10	81.45	Akron/Kent, Ohio	1885 Jan. 18	○	▨	N/R	▨	▨	—	▨	▨	▨	▨	●	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	▨	—	N/R	○	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	○	▨	▨	▨	●	▨	●	▨	▨	N/R	▨	▨	▨	▨	▨	▨	●	N/R	N/R	●	▨	▨	▨	▨	▨	—	N/R	—
41.27	81.10	Garrettville, Ohio	1885 Aug. 15	▨	—	▨	▨	▨	▨	▨	—	▨	▨	N/R	—	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	—	—	▨	—	○	○	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	○	▨	▨	▨	N/R	▨	N/R	▨	▨	N/R	▨	▨	▨	—	—	▨	N/R	N/R	N/R	▨	▨	▨	N/R	▨	—	—	N/R	—
41.50	81.70	Cleveland, Ohio	1898 Oct. 29	▨	○	▨	▨	▨	▨	▨	○	▨	▨	N/R	○	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	N/R	○	▨	N/R	○	○	▨	▨	○	▨	▨	▨	▨	▨	▨	▨	○	▨	▨	▨	N/R	▨	N/R	▨	▨	N/R	▨	▨	▨	●	●	▨	N/R	N/R	N/R	▨	▨	▨	N/R	▨	N/R	●	N/R	○
41.37	81.85	Berea, Ohio	1900 Apr. 9	▨	N/R	▨	▨	▨	▨	▨	—	▨	▨	—	N/R	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	●	N/R	▨	—	—	○	▨	—	○	▨	▨	▨	▨	▨	▨	▨	○	▨	▨	▨	N/R	▨	N/R	▨	▨	N/R	▨	▨	▨	N/R	N/R	▨	N/R	●	●	▨	▨	▨	—	▨	N/R	●	N/R	—
41.50	81.75	Cleveland, Ohio	1906 Apr. 20	▨	—	▨	▨	▨	▨	▨	—	▨	▨	—	▨	▨	▨	—	▨	N/R	▨	▨	N/R	▨	▨	N/R	○	▨	N/R	—	—	▨	▨	▨	▨	▨	▨	▨	N/R	▨	▨	—	▨	▨	▨	—	▨	—	▨	▨	—	▨	—	▨	—	—	▨	N/R	N/R	●	▨	N/R	▨	N/R	▨	N/R	N/R	—	▨
41.4	81.6	Fairport, Ohio	1906 June 27	▨	●	▨	▨	▨	▨	▨	N/R	▨	▨	○	▨	▨	▨	—	▨	N/R	▨	▨	N/R	▨	▨	●	○	▨	N/R	○	○	▨	▨	▨	▨	▨	▨	▨	●	▨	▨	○	▨	▨	▨	○	▨	N/R	▨	▨	○	▨	○	▨	N/R	N/R	▨	●	●	N/R	▨	●	▨	N/R	▨	●	N/R	N/R	▨
41.50	81.70	Cleveland, Ohio	1907 Apr. 12	▨	—	▨	▨	▨	▨	▨	—	▨	▨	—	▨	▨	▨	—	▨	—	▨	▨	—	▨	▨	—	▨	▨	—	—	—	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	—	▨	▨	▨	—	▨	—	▨	▨	—	▨	—	▨	—	—	▨	N/R	—	—	▨	N/R	▨	N/R	▨	N/R	N/R	—	▨
42.1	80.2	Erie, Pennsylvania	1921 Sep. 27	▨	—	▨	—	▨	▨	▨	—	▨	▨	▨	▨	—	▨	▨	N/R	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	—	—	▨	—	—	▨	—	▨	—	▨	—	▨	—	▨	—	▨	▨	▨
41.5	82.0	Lorain & Cleveland, Ohio	1928 Sep. 9	▨	—	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	●	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	●	▨	▨	▨	▨	▨	—	▨	○	▨	▨	▨	—	▨	▨	▨	▨	▨	—	▨	—	—	▨	●	▨	●	▨	N/R	▨	—	▨	N/R	▨	▨	▨
41.50	81.55	Euclid, Ohio	1929 Sep. 17	▨	—	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	N/R	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	—	▨	○	▨	▨	▨	—	▨	▨	▨	▨	▨	—	▨	—	—	▨	N/R	▨	N/R	▨	N/R	▨	—	▨	N/R	▨	▨	▨
41.08	81.50	Akron, Ohio	1932 Jan. 21	▨	●	▨	○	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	○	▨	▨	—	▨	▨	—	▨	▨	—	▨	—	▨	▨	▨	—	▨	▨	▨	▨	▨	—	▨	—	—	▨	N/R	▨	●	▨	N/R	▨	—	▨	—	▨	▨	▨
42.0	80.2	Erie, Pennsylvania	1934 Oct. 29	▨	—	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	●	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	—	▨	▨	▨	—	▨	—	▨	▨	●	▨	▨	—	▨	▨	N/R	▨	▨	▨	▨	▨	○	▨	●	●	▨	●	▨	●	▨	N/R	▨	—	▨	N/R	▨	▨	▨
41.88	80.37	Albion, Pennsylvania	1934 Nov. 5	▨	—	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	N/R	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	—	▨	▨	▨	—	▨	—	▨	▨	—	▨	▨	—	▨	▨	—	▨	▨	▨	▨	▨	—	▨	—	—	▨	—	▨	—	▨	—	▨	—	▨	—	▨	▨	▨
41.4	80.4	Greenville, Pennsylvania	1936 Aug. 26	▨	—	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	N/R	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	—	▨	▨	▨	—	▨	—	▨	▨	—	▨	▨	—	▨	▨	N/R	▨	▨	▨	▨	▨	○	▨	▨	▨	—	N/R	▨	N/R	▨	N/R	▨	—	▨	—	▨	▨	▨
41.10	81.52	Akron, Ohio	1940 May 31	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	○	▨	▨	▨	—	▨	—	▨	▨	—	▨	▨	—	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	N/R	▨	N/R	▨	—	▨	—	▨	—	▨	▨	▨
41.61	81.33	Lake Erie	1943 Mar. 9	▨	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	○	▨	○	▨	▨	▨	●	▨	○	▨	▨	○	▨	▨	○	▨	▨	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	●	▨	●	▨	●	▨	—	▨	●	▨	▨	▨
41.65	81.41	Willoughby, Ohio	1951 Dec. 3	▨	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	—	▨	—	▨	▨	—	▨	▨	○	▨	▨	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	●	●	▨	N/R	▨	●	▨	▨	▨	N/R	▨	▨	▨
41.6	81.4	Willoughby, Ohio	1951 Dec. 7	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	—	▨	—	▨	▨	—	▨	▨	○	▨	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	N/R	▨	N/R	▨	N/R	▨	▨	▨	N/R	▨	▨	▨
41.6	81.4	Willoughby, Ohio	1951 Dec. 21	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	—	▨	—	▨	▨	—	▨	▨	○	▨	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	N/R	N/R	▨	N/R	▨	N/R	▨	▨	▨	N/R	▨	▨	▨
41.33	81.40	Aurora, Ohio	1955 May 26	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	N/R	▨	▨	▨	▨	—	▨	▨	—	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	●	▨	●	▨	●	▨	▨	▨	N/R	▨	▨	▨
41.33	81.40	Aurora, Ohio	1955 June 29	▨	N/R	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	●	▨	▨	▨	▨	—	▨	▨	○	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	N/R	▨	●	▨	●	▨	▨	▨	N/R	▨	▨	▨
41.49	81.82	Lakewood, Ohio	1958 May 1	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	●	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	▨	▨	▨	▨	▨	▨	●	▨	▨	▨	—	▨	▨	—	▨	▨	—	▨	▨	▨	▨	▨	▨	▨	▨	▨	—	N/R	▨	●	▨	N/R	▨	▨	▨	▨	▨	▨	▨

EXPLANATION OF SYMBOLS

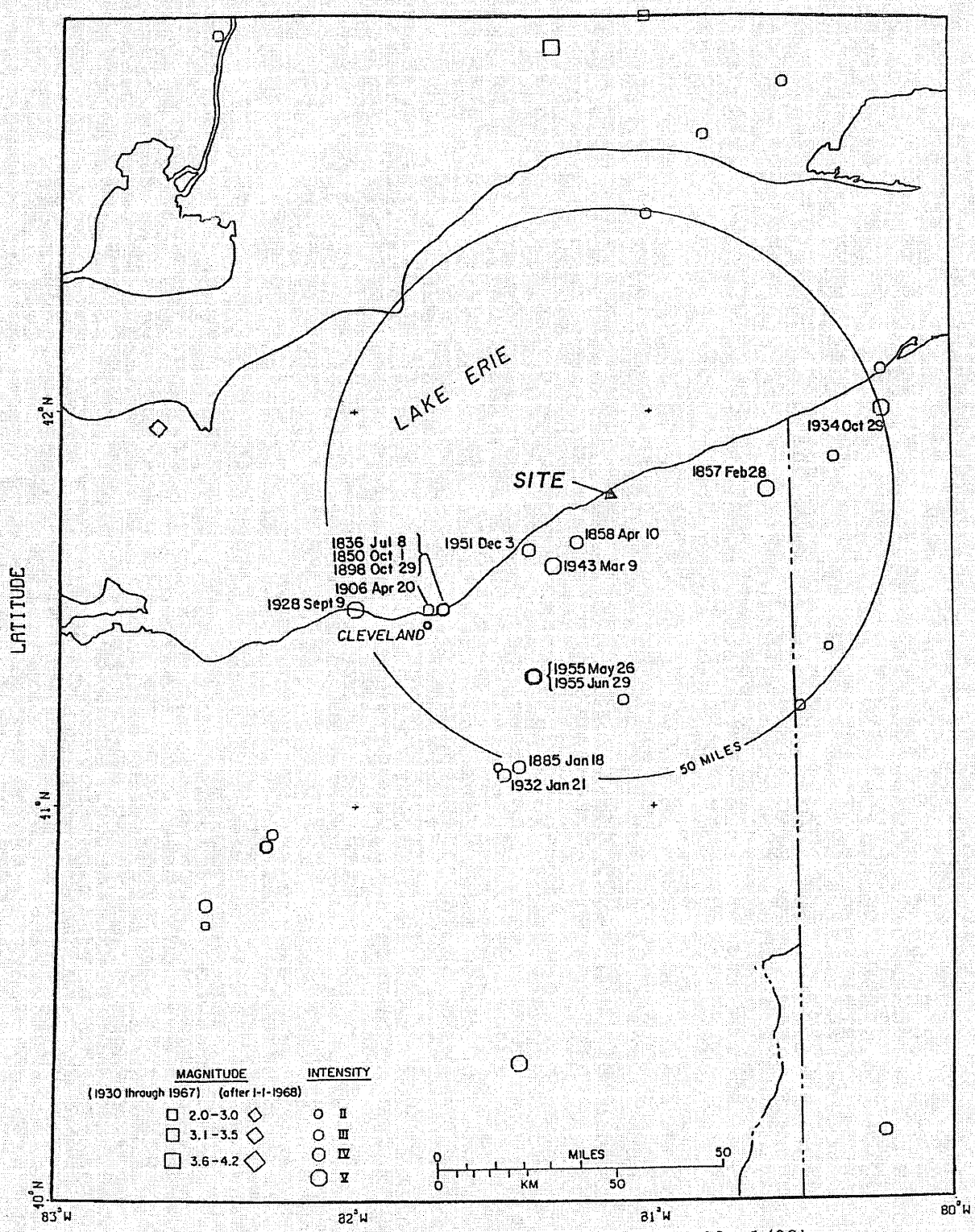
●	Report Found
N/R	No Report Found
○	Paper Not Available
—	Paper Not Examined
▨	Paper Not Published

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Newspaper Research Matrix

Figure 2D D-3

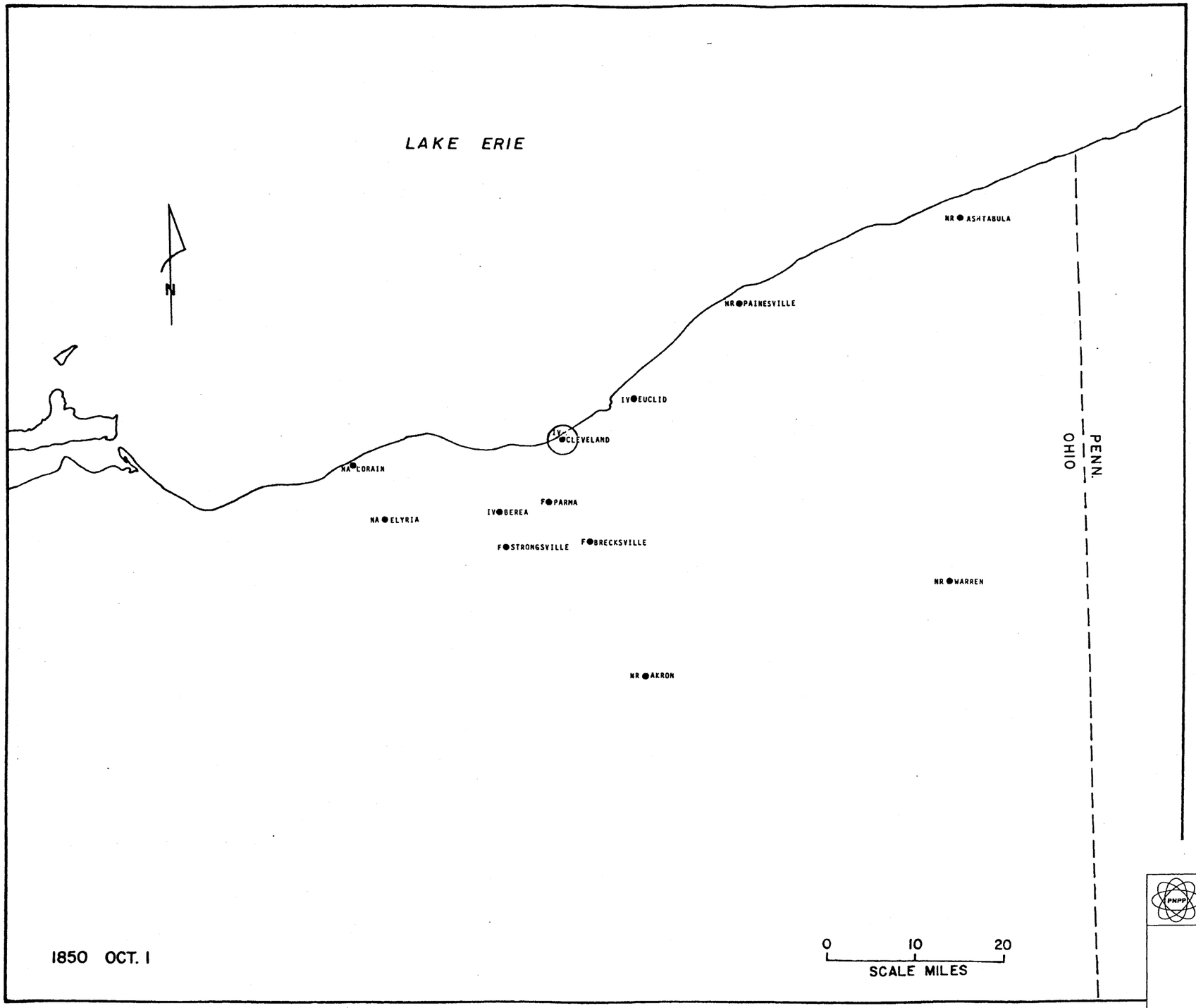


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Seismicity Map

Figure 2D D-4

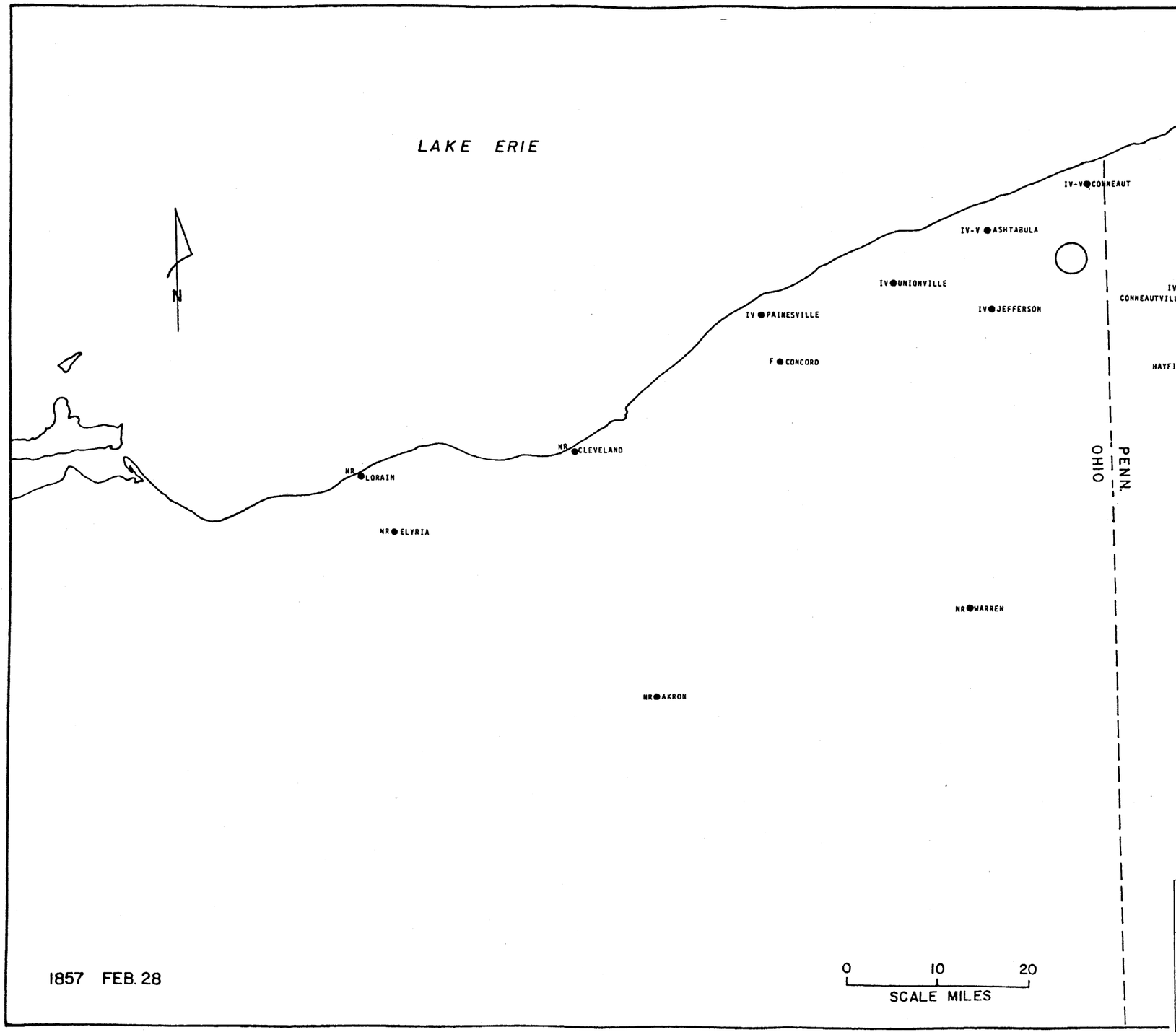


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Felt Report Map:
1850 Oct. 1

Figure 2D D-5

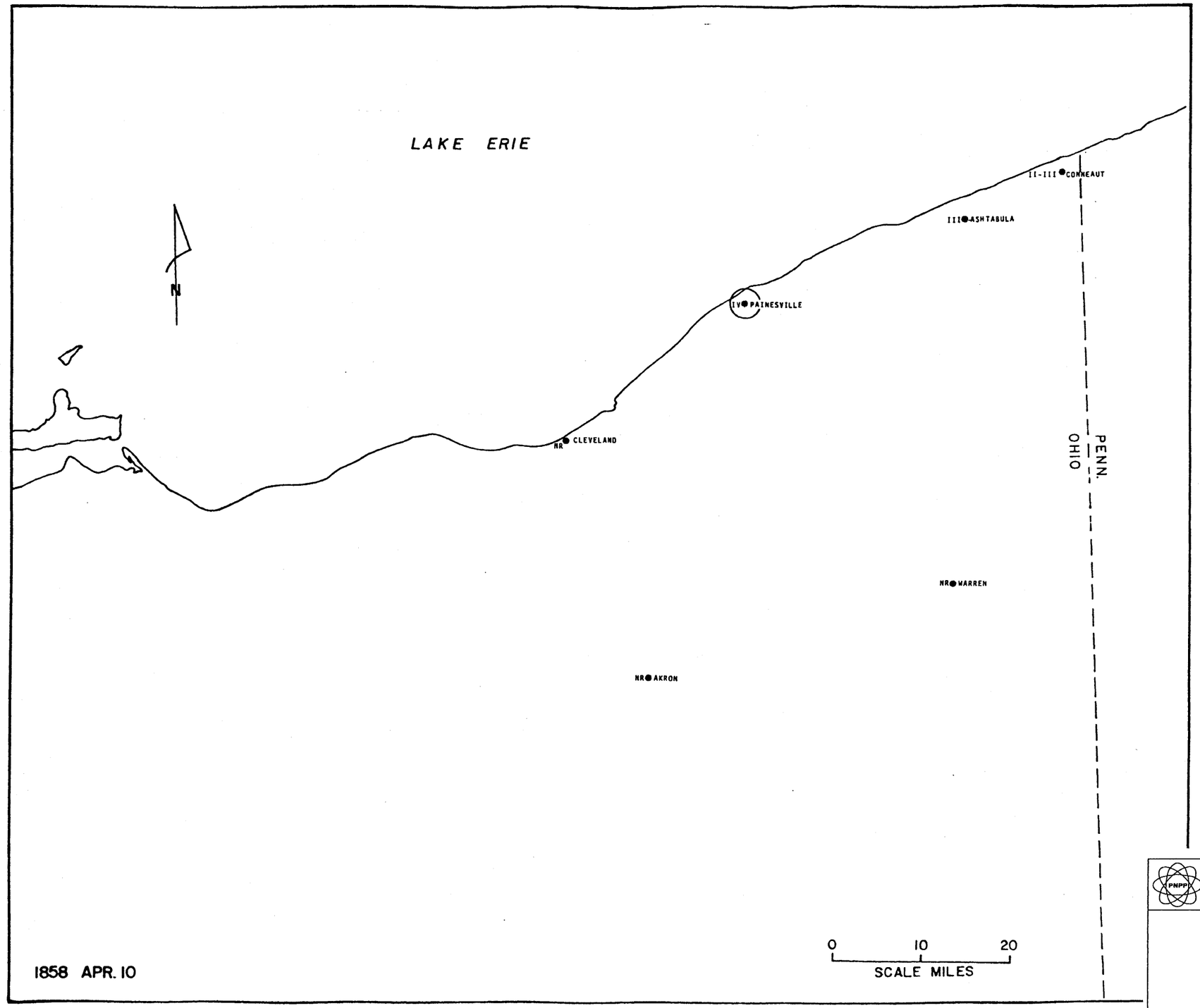


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Felt Report Map:
1857 Feb. 28

Figure 2D D-6

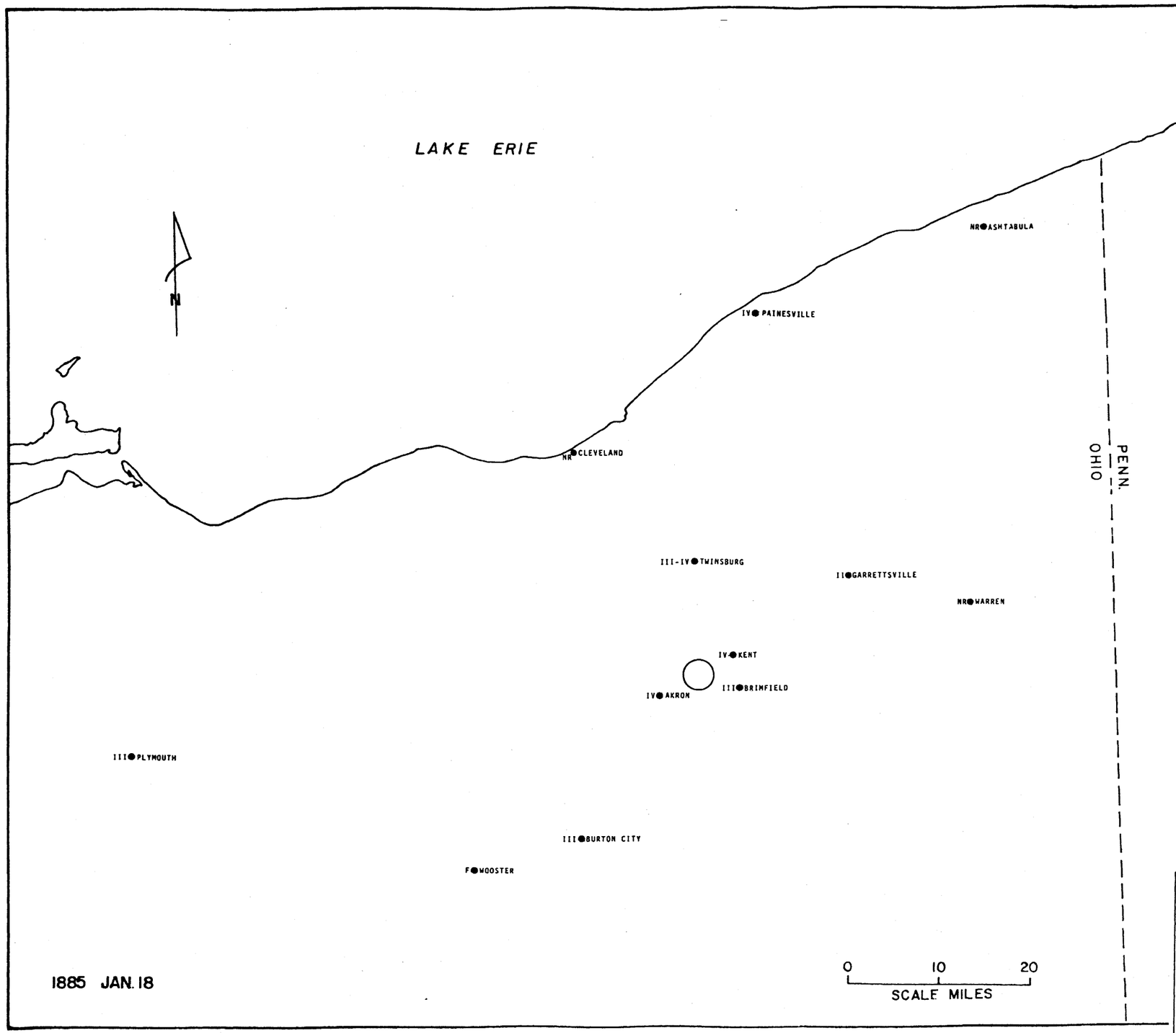


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Felt Report Map:
1858 Apr. 10

Figure 2D D-7

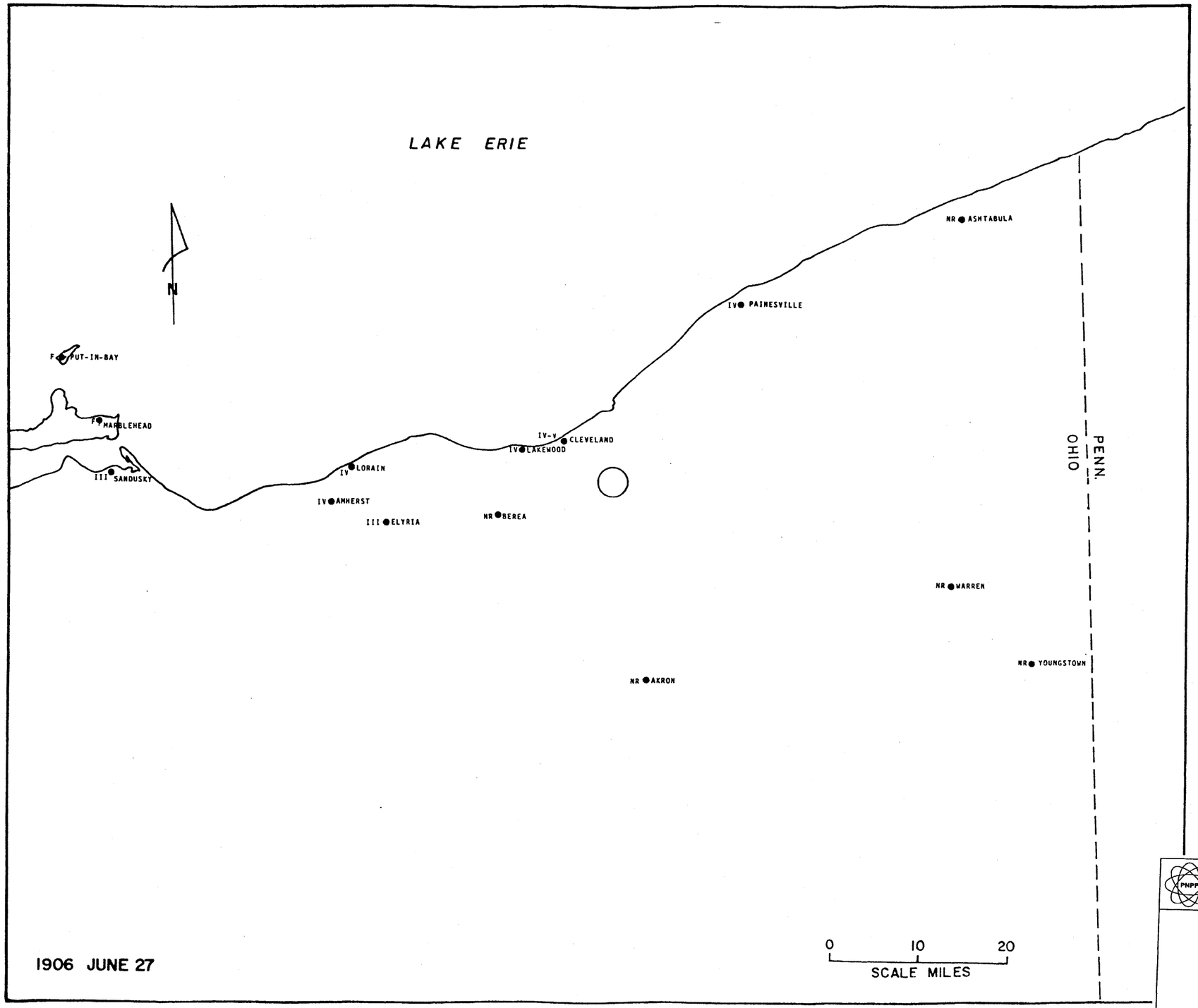


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Felt Report Map:
1885 Jan. 18

Figure 2D D-8

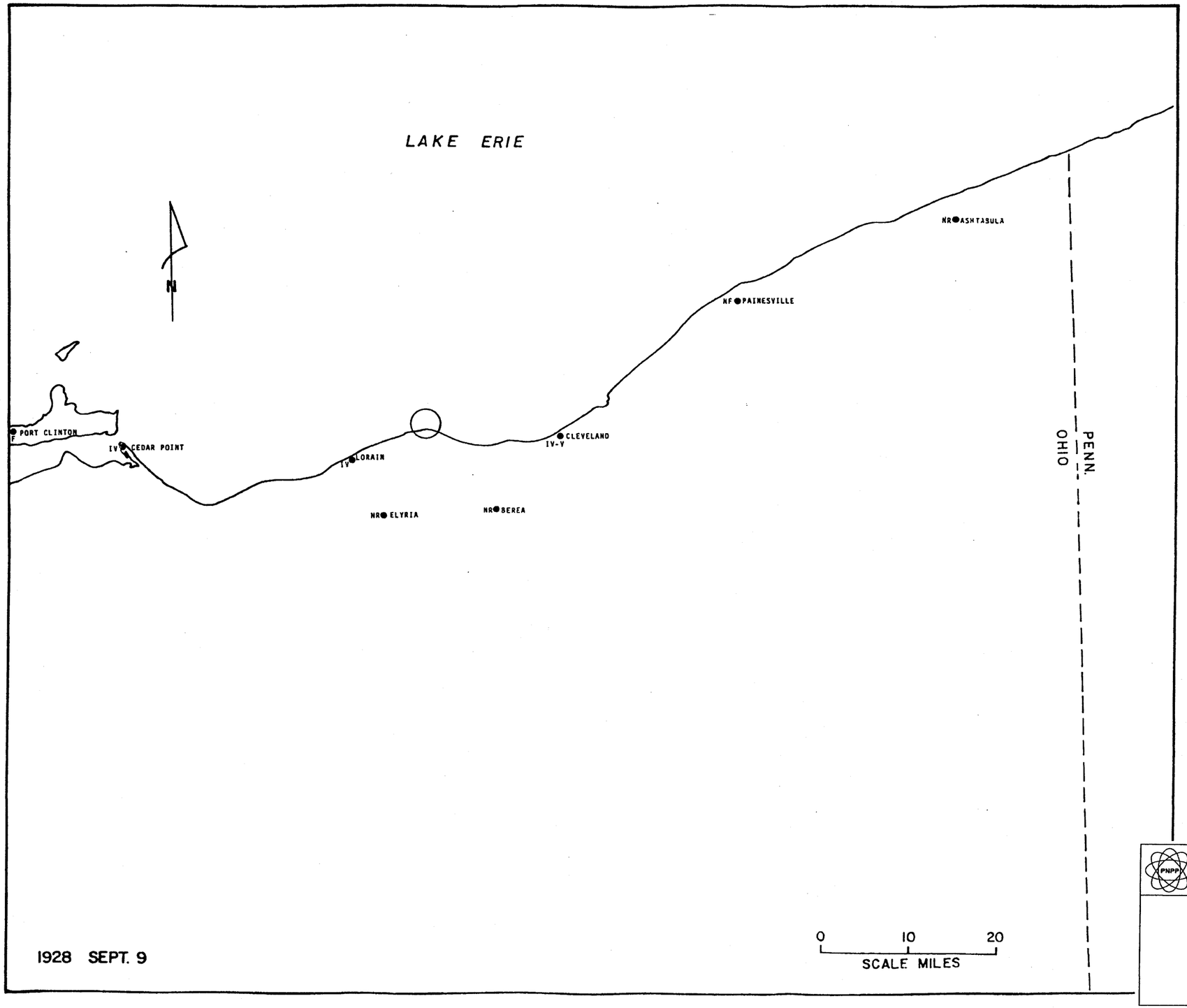


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Felt Report Map:
1906 June 27

Figure 2D D-9

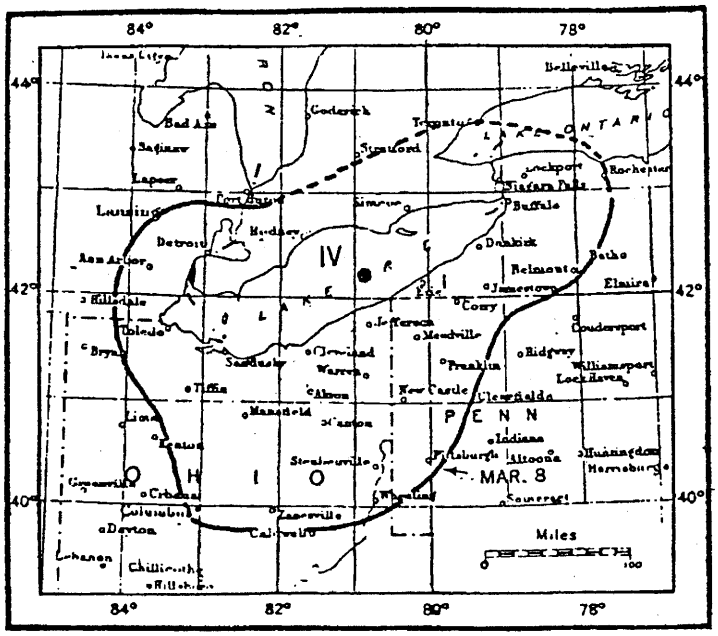


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

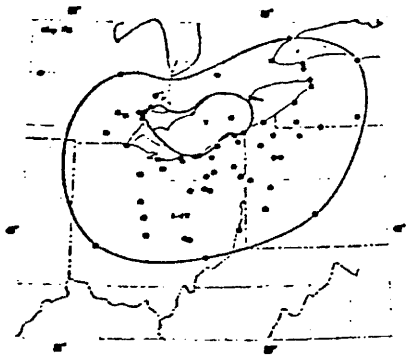
Felt Report Map:
1928 Sept. 09

Figure 2D D-10



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

Bodle, R. R., 1945, United States Earthquakes, 1943, United States Department of Commerce, Coast and Geodetic Survey, Washington, D.C., p. 7.



The Lake Erie Earthquake of March 8, 1943. A modification of Bodle (1947, fig. 4): 85,000 sq. mi.

Docekal, J., 1971, Earthquakes of the Stable Interior with Emphasis on the Midcontinent, Ph.D. thesis, University of Nebraska

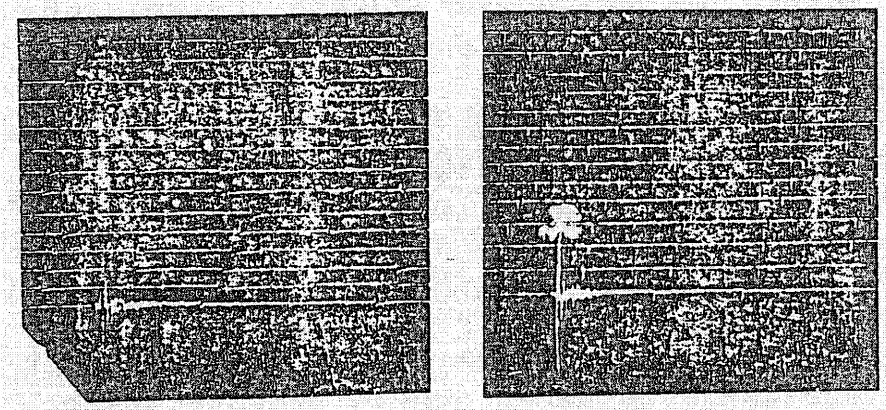
(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Felt Report Map:
1943 Mar. 09

Figure 2D D-11

EVENT: MARCH 9, 1943
STATION: JOHN CARROLL UNIV., CLEVELAND
HORIZONTAL COMPONENTS
ESTIMATED DISTANCE: ≈ 20 MILES



(Rev. 12 1/03)

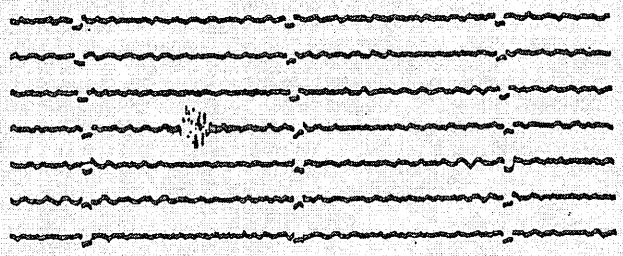
PERRY NUCLEAR POWER PLANT

John Carroll University
Seismogram: 1943 Mar. 09

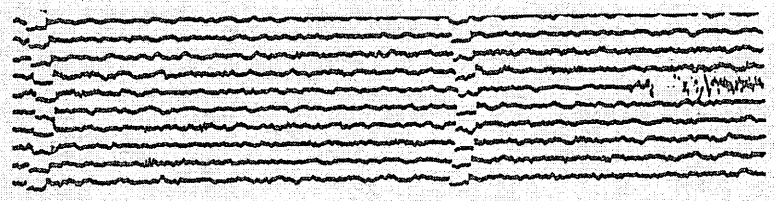
Figure 2D D-12

EVENT: DECEMBER 3, 1951
STATION: JOHN CARROLL UNIV., CLEVELAND
ESTIMATED DISTANCE: ≈ 20 MILES

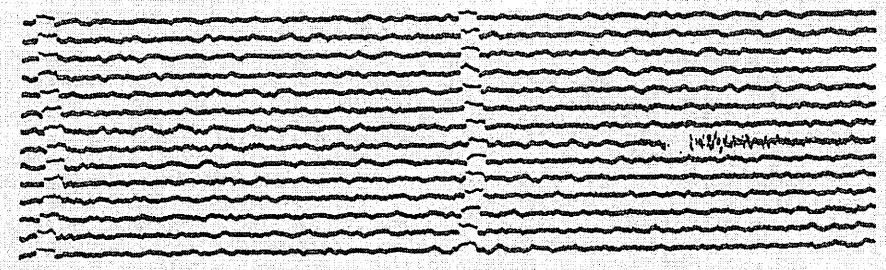
VERTICAL



NORTH-SOUTH



EAST-WEST



(Rev. 12 1/03)

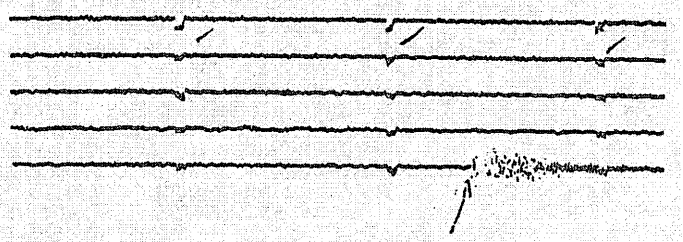
PERRY NUCLEAR POWER PLANT

John Carroll University
Seismograms: 1951 Dec. 03

Figure 2D D-13

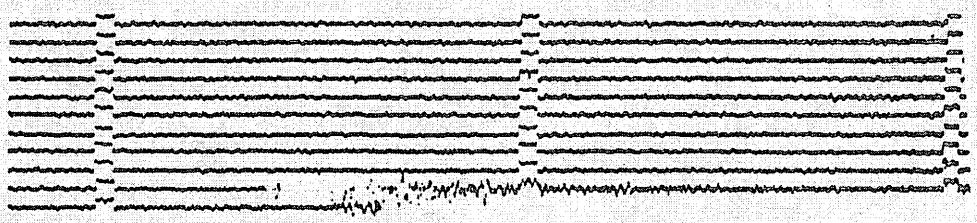
EVENT: MAY 26, 1955
STATION: JOHN CARROLL UNIV., CLEVELAND
ESTIMATED DISTANCE: ≈ 13 MILES (DR. E. WALTER)

VERTICAL



NORTH-SOUTH

EAST-WEST

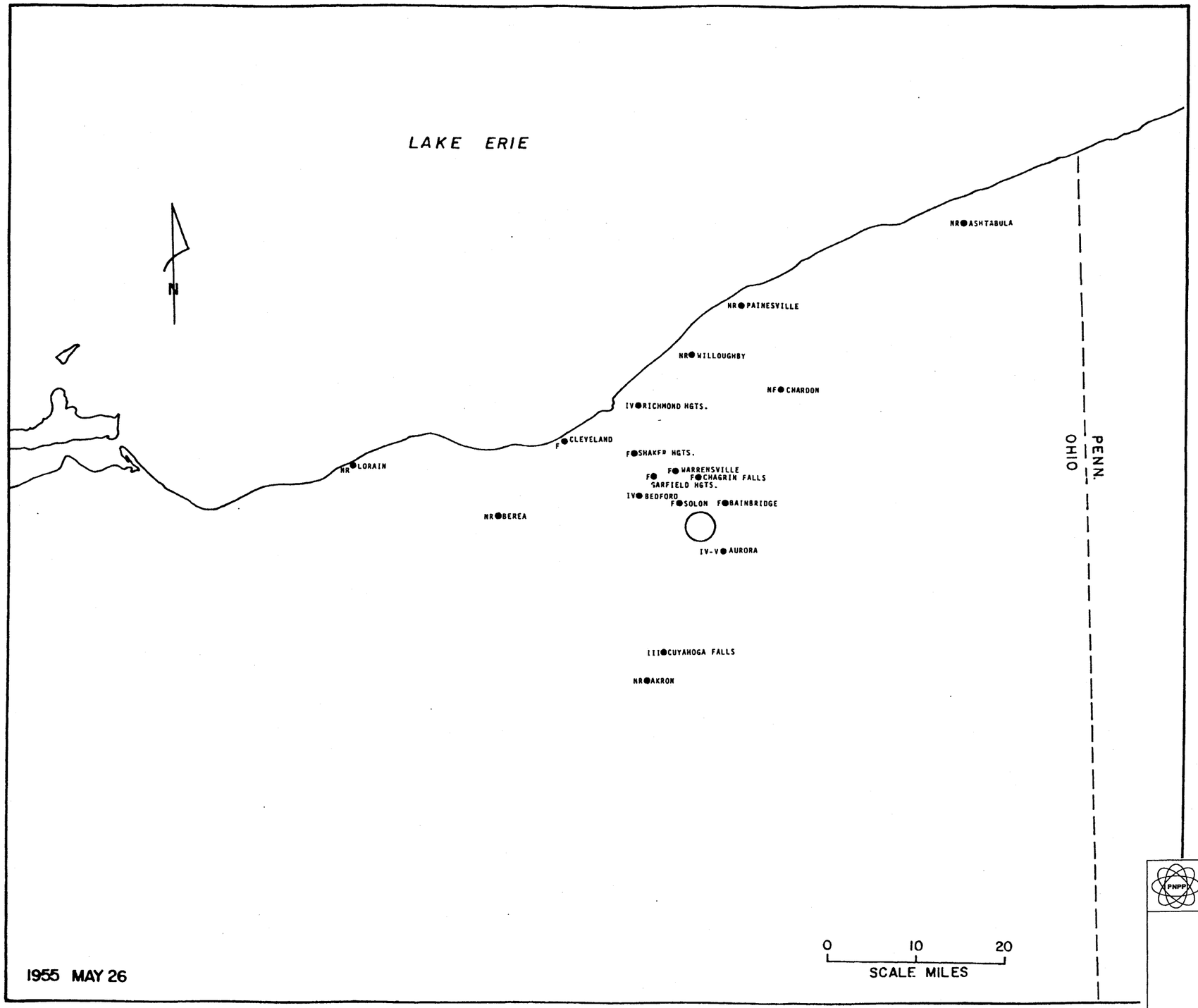


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

John Carroll University
Seismograms: 1955 May 26

Figure 2D D-14

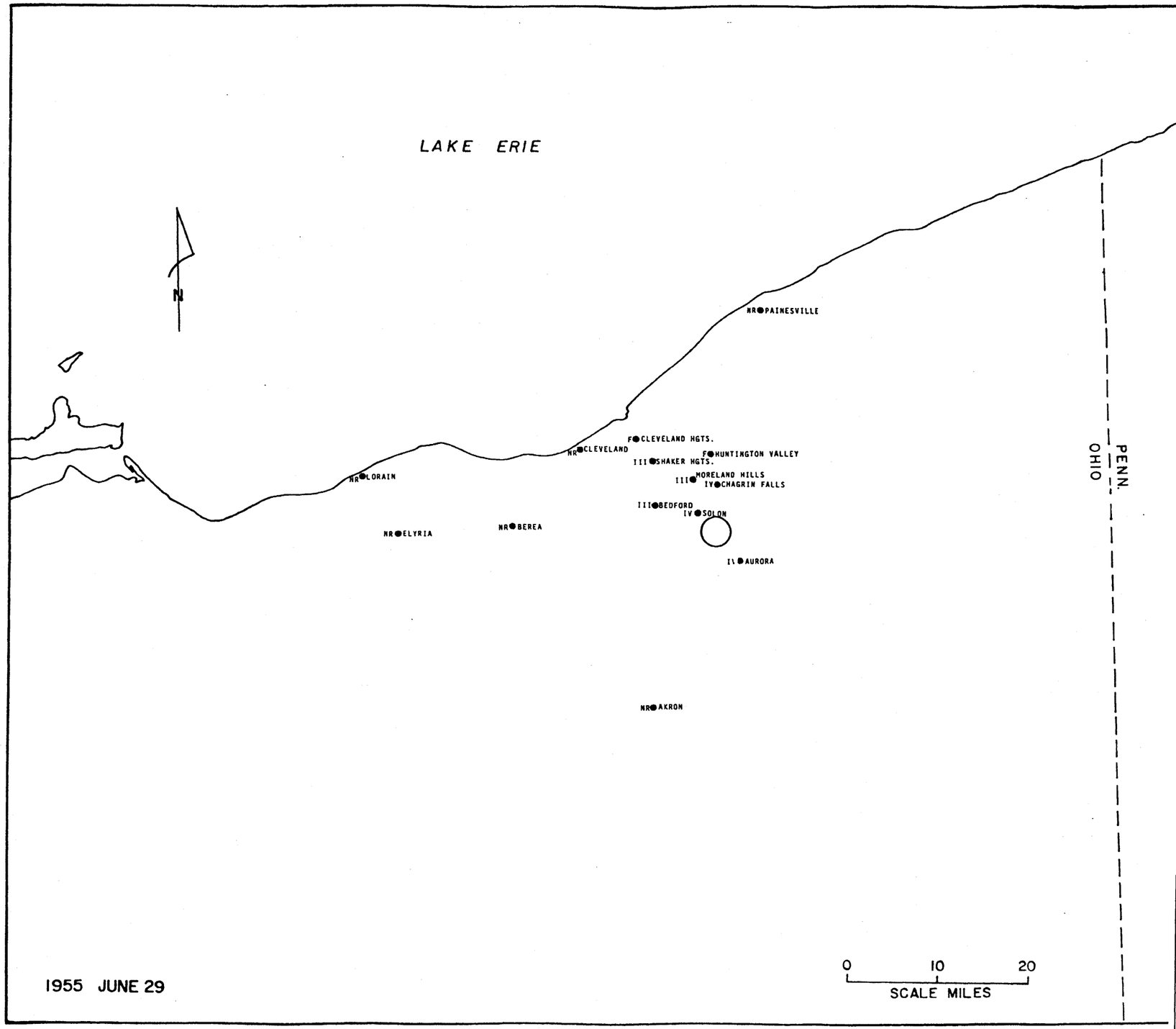


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Felt Report Map:
1955 May 26

Figure 2D D-15



(Rev. 12 1/03)

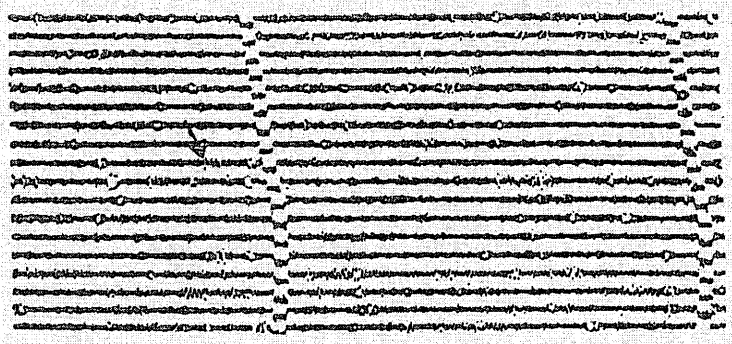
PERRY NUCLEAR POWER PLANT

Felt Report Map:
1955 June 29

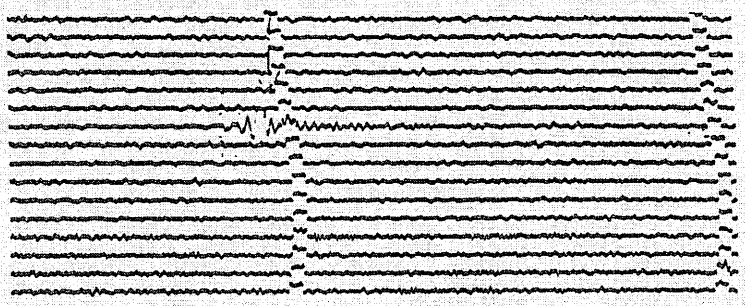
Figure 2D D-16

EVENT: MAY 1, 1958
STATION: JOHN CARROLL UNIV., CLEVELAND
ESTIMATED DISTANCE: 12 MILES (DR. E. WALTER)

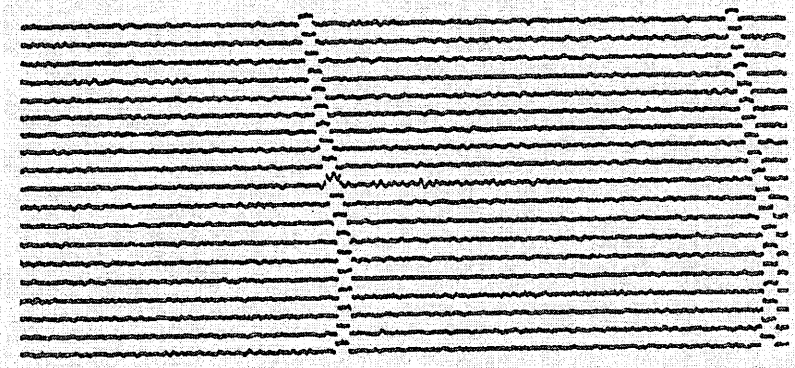
VERTICAL



NORTH-SOUTH



EAST-WEST

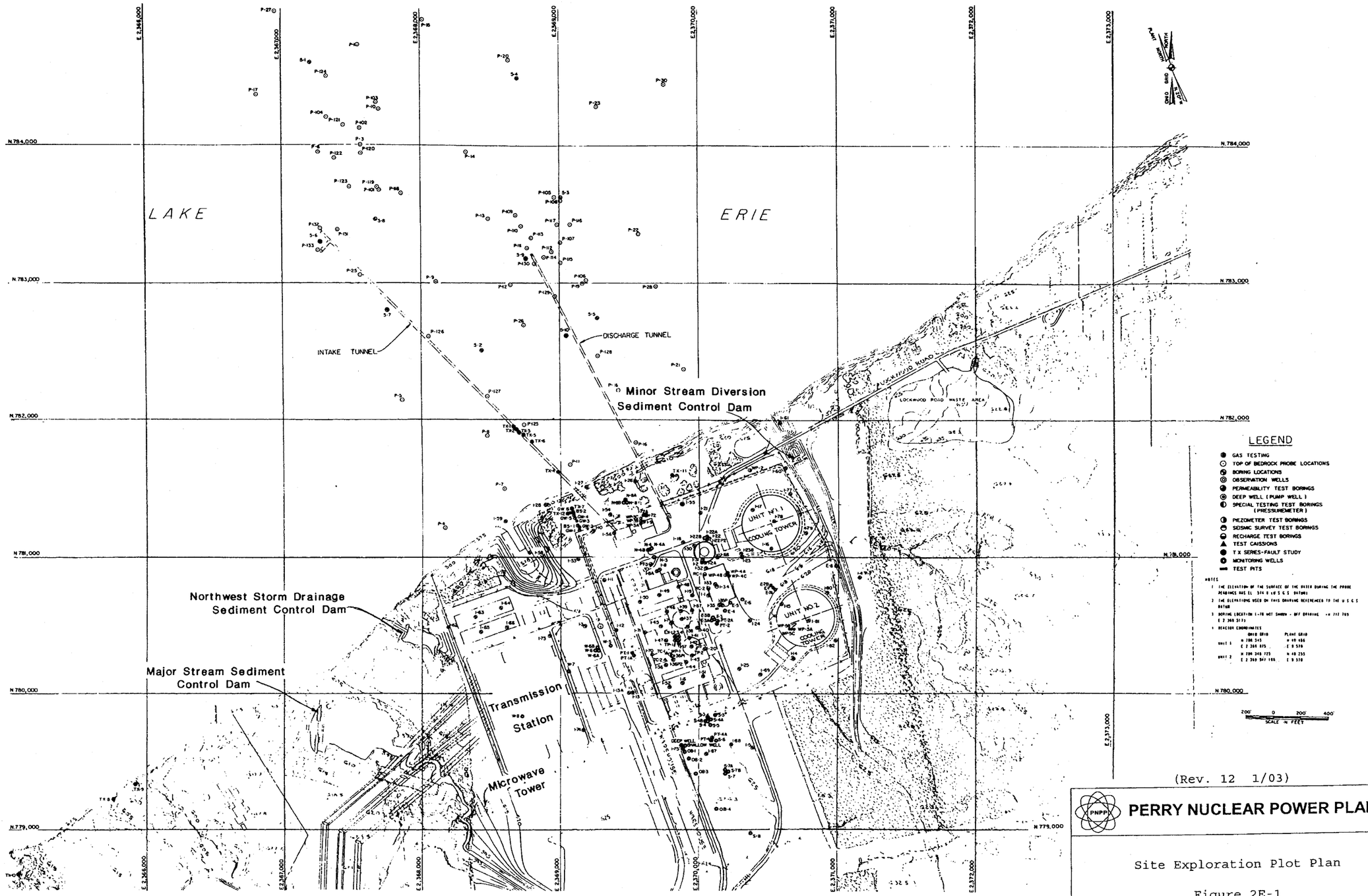


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

John Carroll University
Seismograms: 1958 May 1

Figure 2D D-17



(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Site Exploration Plot Plan

Figure 2E-1