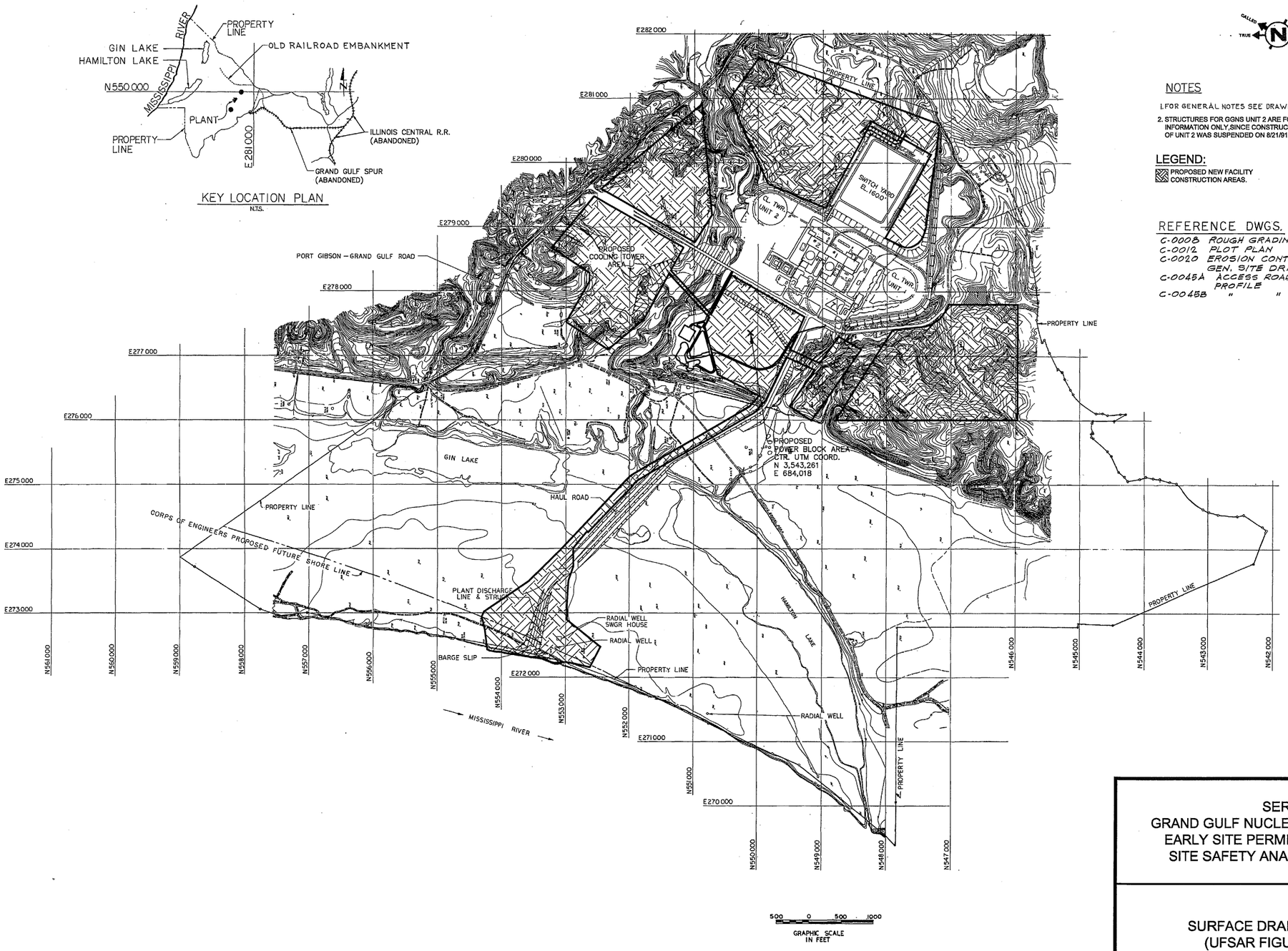

NOTES

1. FOR GENERAL NOTES SEE DRAWING NO. C-0001
2. STRUCTURES FOR GGNS UNIT 2 ARE FOR INFORMATION ONLY, SINCE CONSTRUCTION OF UNIT 2 WAS SUSPENDED ON 8/21/91.

LEGEND:

PROPOSED NEW FACILITY CONSTRUCTION AREAS.

REFERENCE DWGS.

C-0008 ROUGH GRADING PLAN
C-0012 PLOT PLAN
C-0020 EROSION CONTROL & GEN. SITE DRAINAGE
C-0045A ACCESS ROAD PLAN & PROFILE
C-0045B " " "

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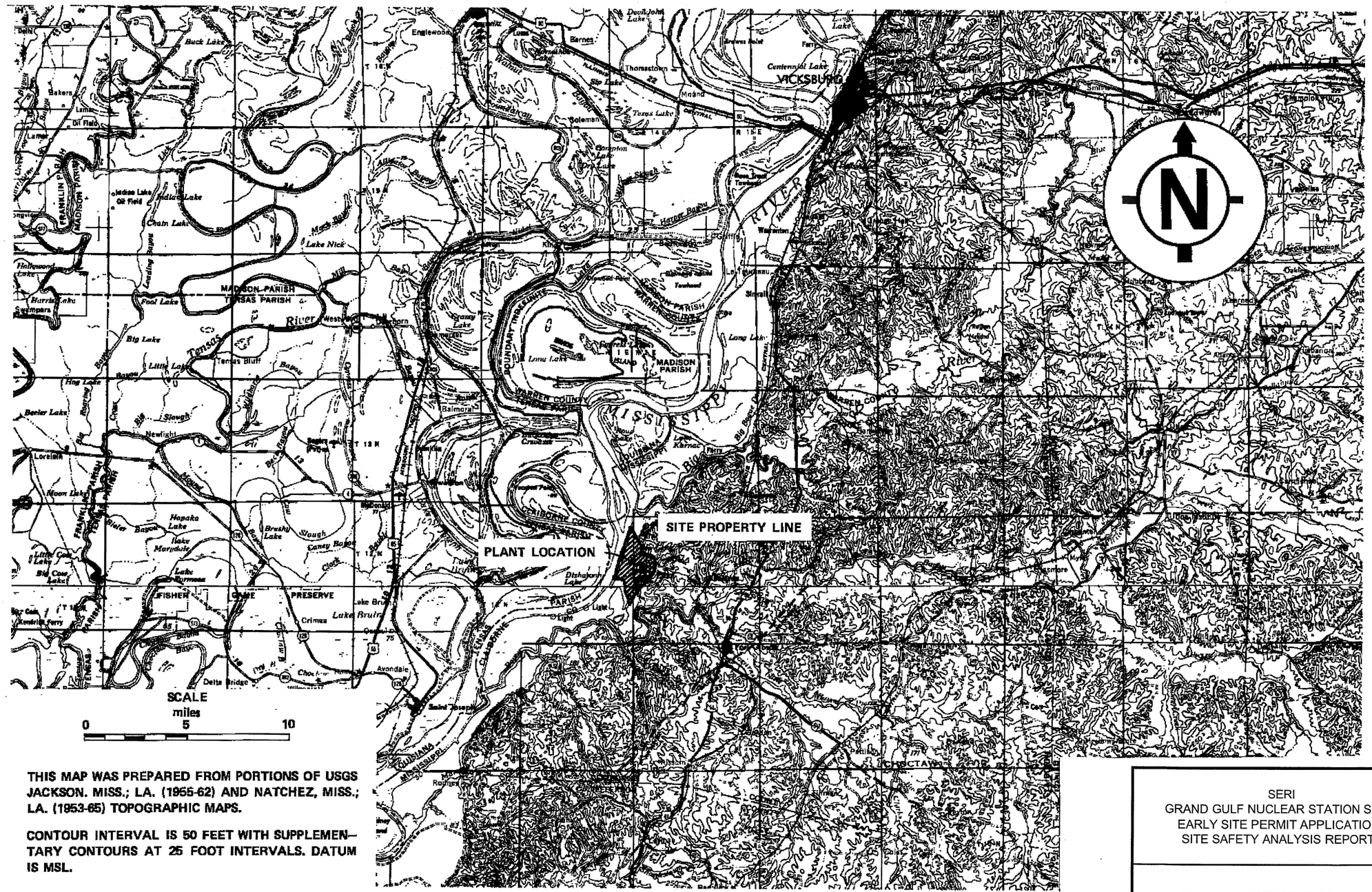
SITE SAFETY ANALYSIS REPORT

SURFACE DRAINAGE PLAN
(UFSAR FIGURE 2.4-1)

FIGURE 2.4-1 REV. 1



THIS MAP WAS PREPARED FROM PORTIONS OF USGS JACKSON. MISS.; LA. (1955-62) AND NATCHEZ, MISS.; LA. (1953-65) TOPOGRAPHIC MAPS.

CONTOUR INTERVAL IS 50 FEET WITH SUPPLEMENTARY CONTOURS AT 25 FOOT INTERVALS. DATUM IS MSL.

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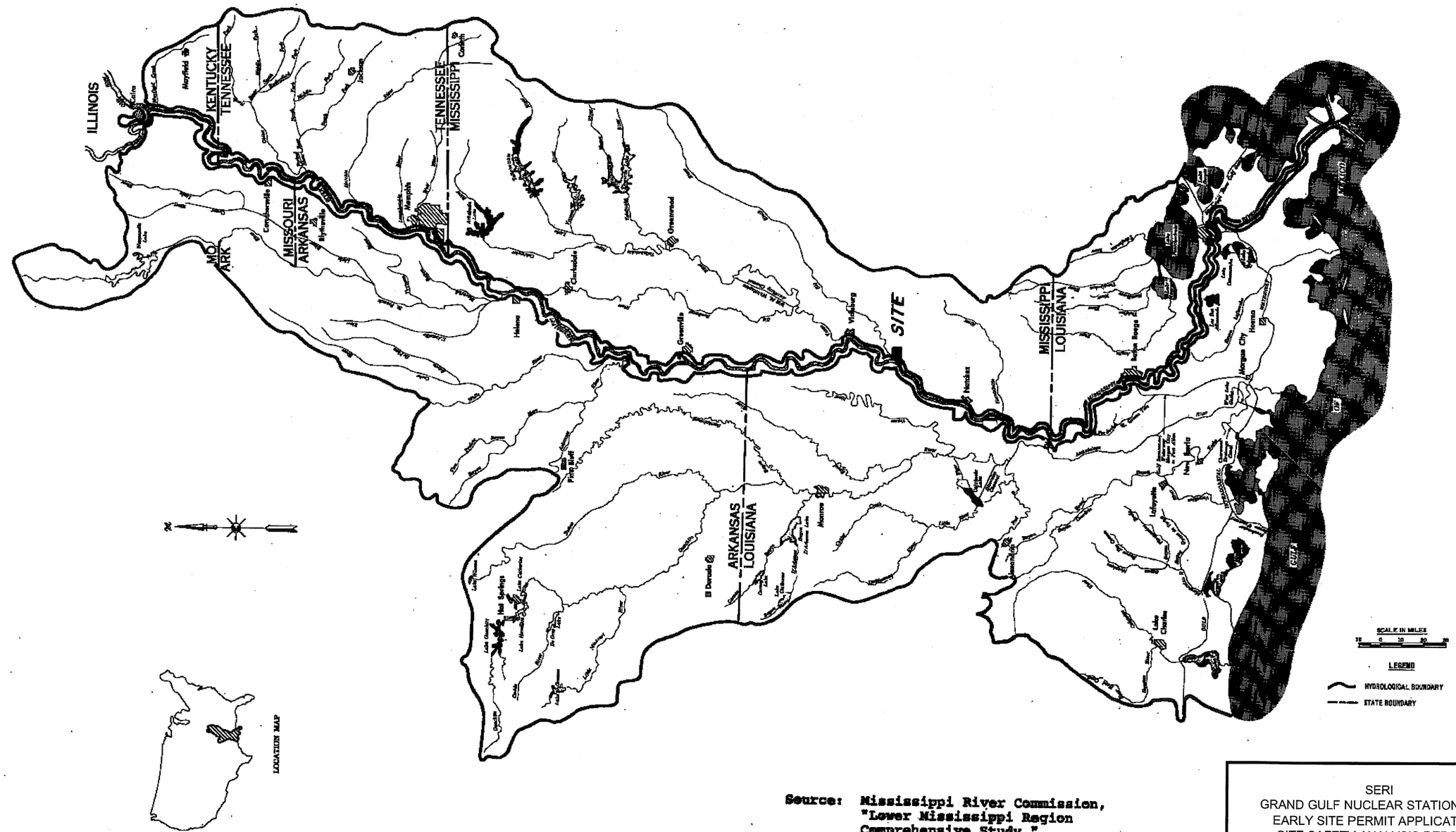
REGIONAL TOPOGRAPHY
(UFSAR FIGURE 2.4-2)

FIGURE 2.4-2 REV. 1



Source: Mississippi River Commission, "Lower Mississippi Region Comprehensive Study," Appendix C, Figure-1, 1974

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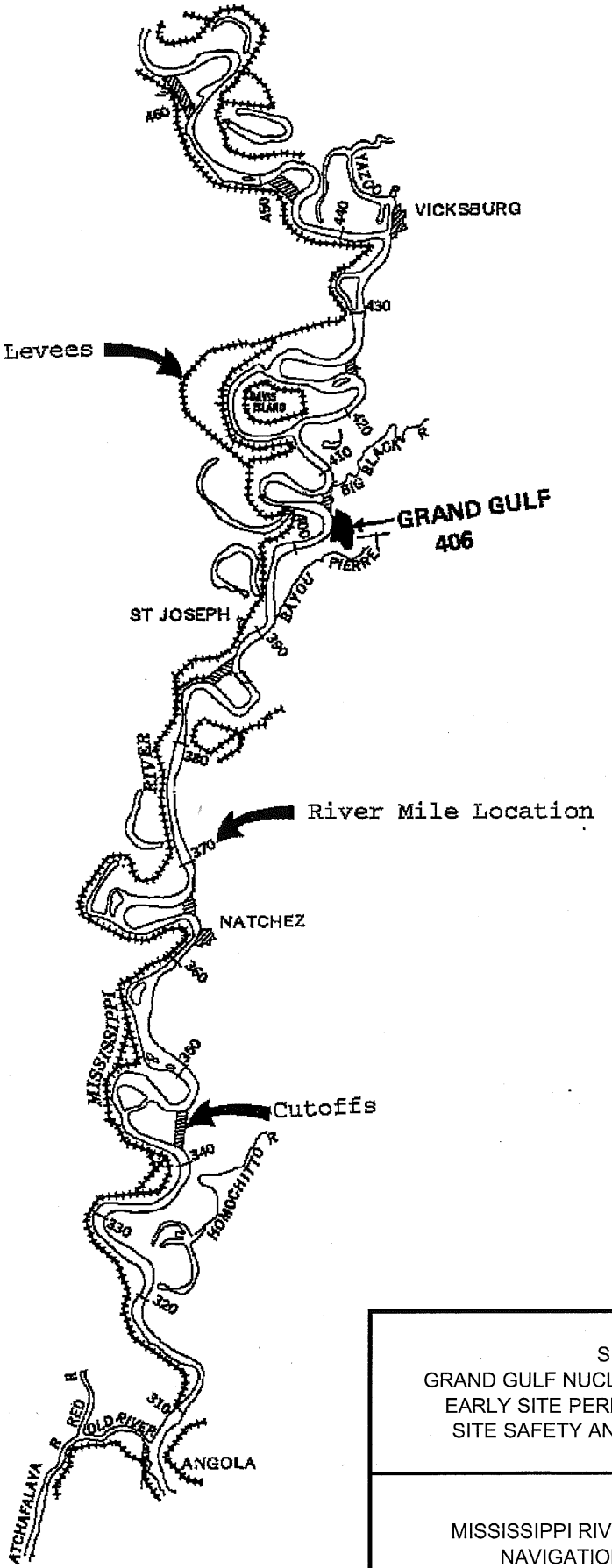
LOWER MISSISSIPPI REGION
HYDROLOGIC BOUNDARY
(UFSAR FIGURE 2.4-3)

FIGURE 2.4-3 REV. 1



SOURCE: ADAPTED FROM U.S. ARMY CORPS OF ENGINEERS

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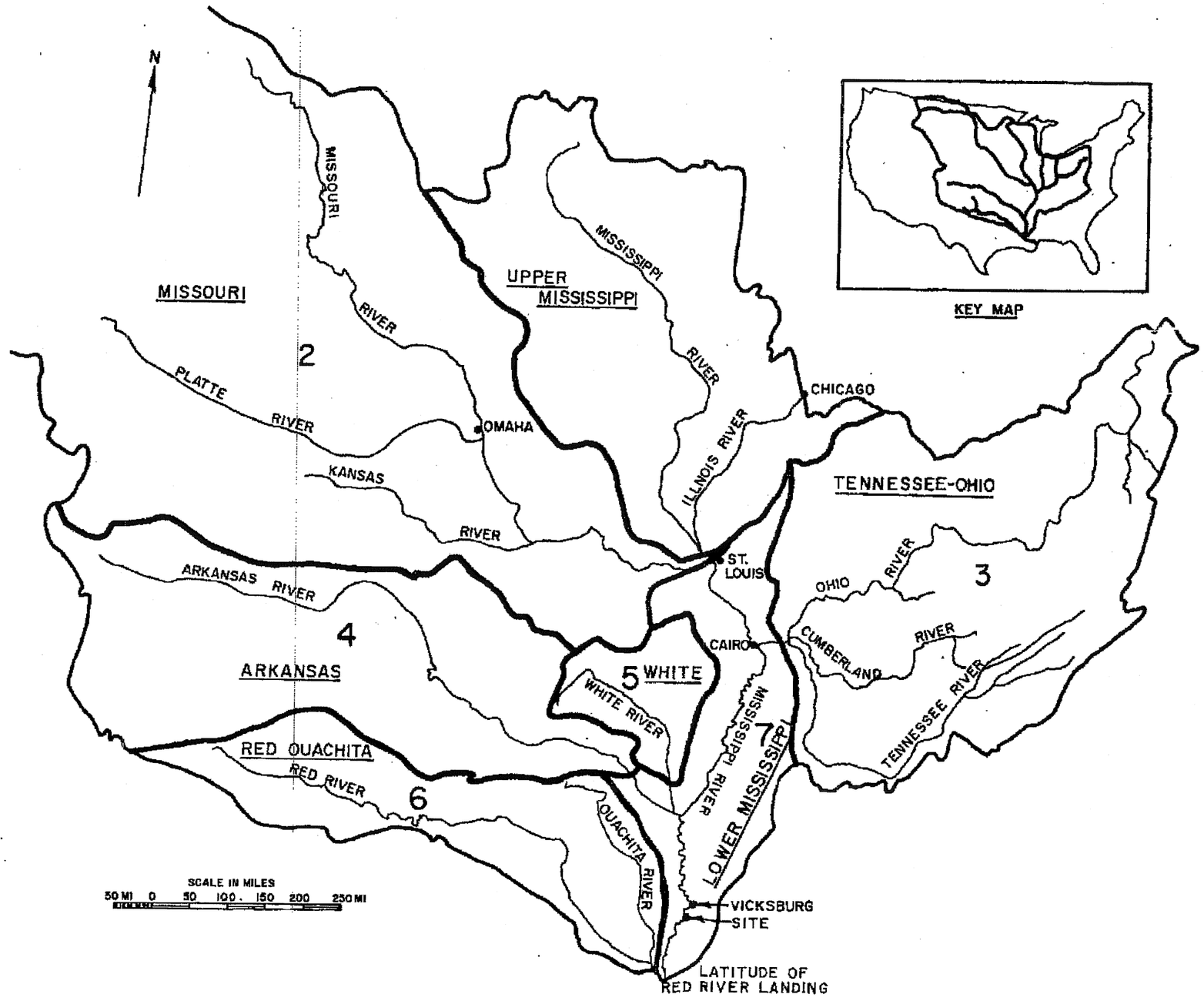
MISSISSIPPI RIVER LEVEES AND
NAVIGATION CUTOFFS

FIGURE 2.4-3a REV. 1



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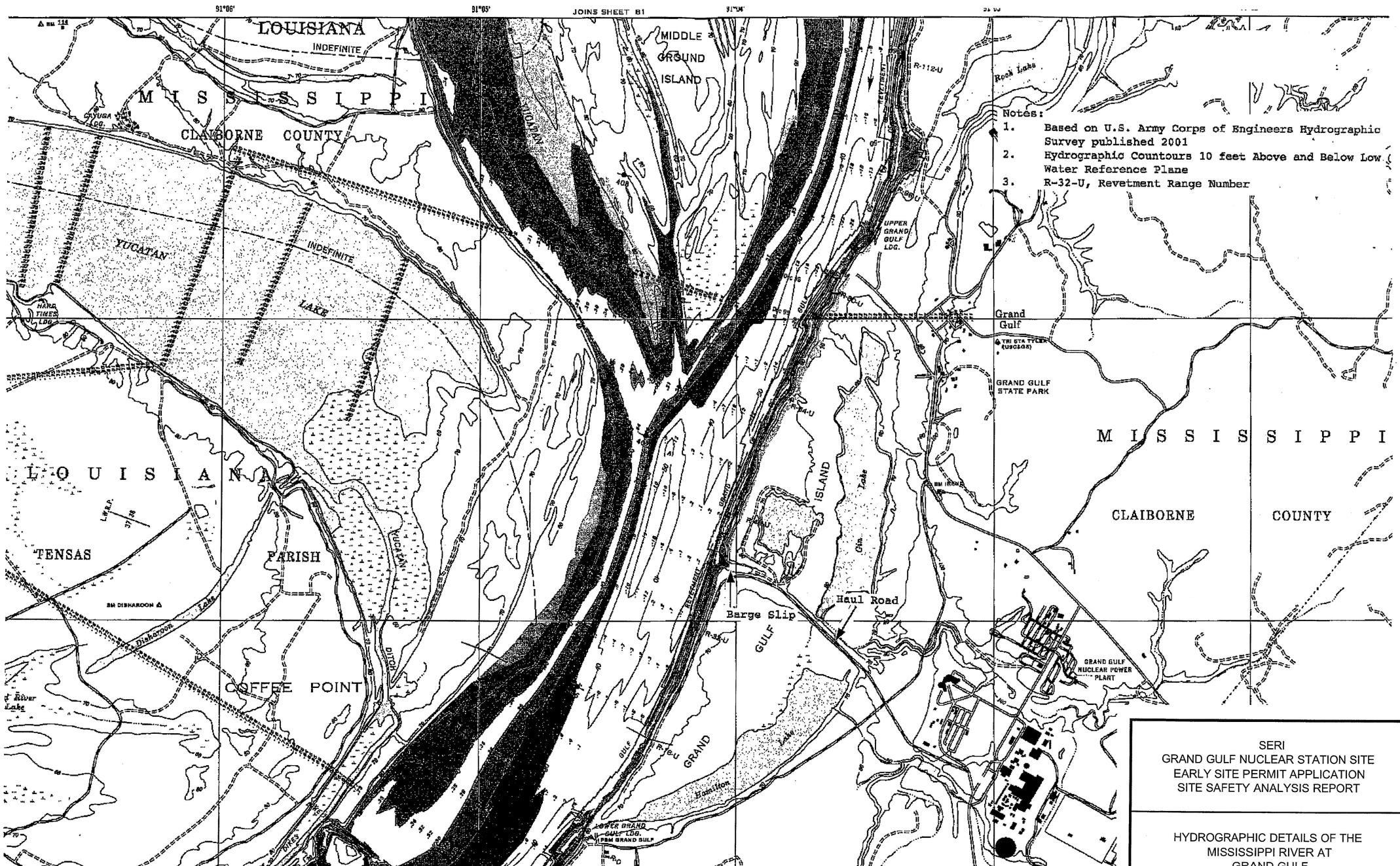
DRAINAGE AREAS OF THE
MISSISSIPPI BASIN
(UFSAR FIGURE 2.4-4)

FIGURE 2.4-4 REV. 1



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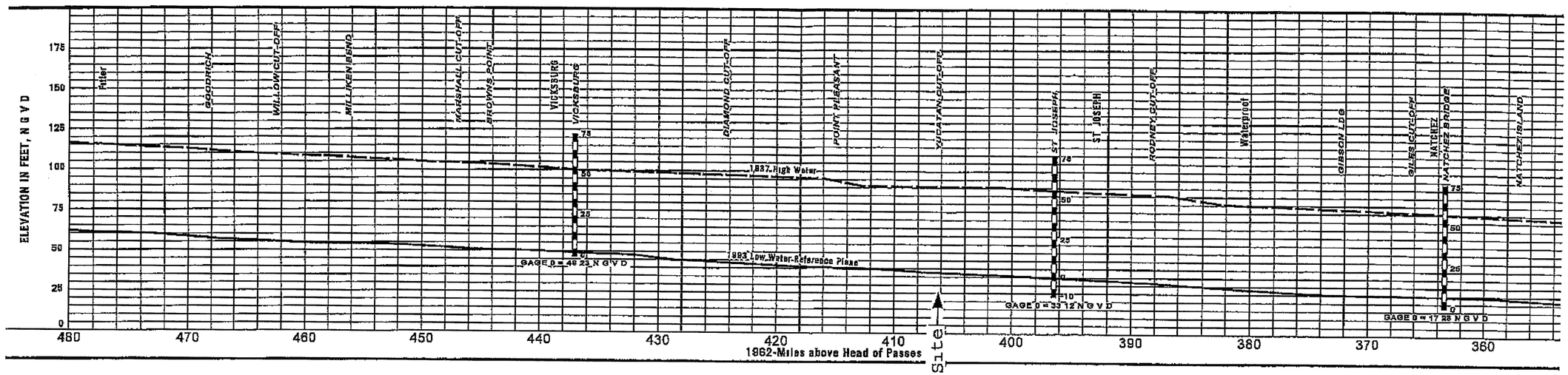
HYDROGRAPHIC DETAILS OF THE MISSISSIPPI RIVER AT GRAND GULF

FIGURE 2.4-5 REV. 1



LEGEND

430 1962 Mileage above Head of Passes

Low Water Reference Plane*

1937 High Water

Source: Adapted from USACE, 2001

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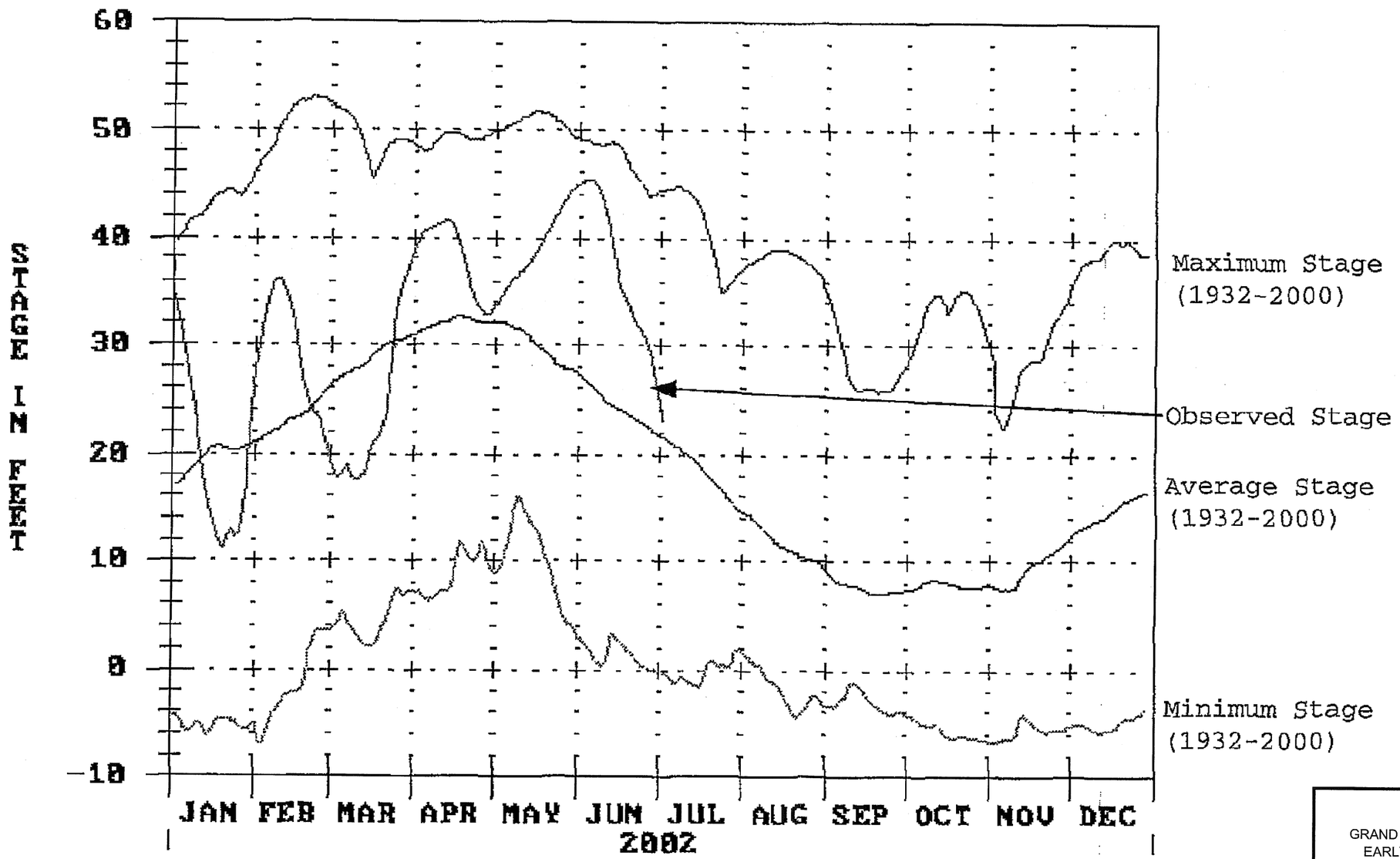
WATER SURFACE PROFILES FOR 1937 HIGH FLOW AND 1993 LOW WATER REFERENCE PLANE

FIGURE 2.4-6 REV. 1



Source: Adapted from U.S. Army Corps of Engineers

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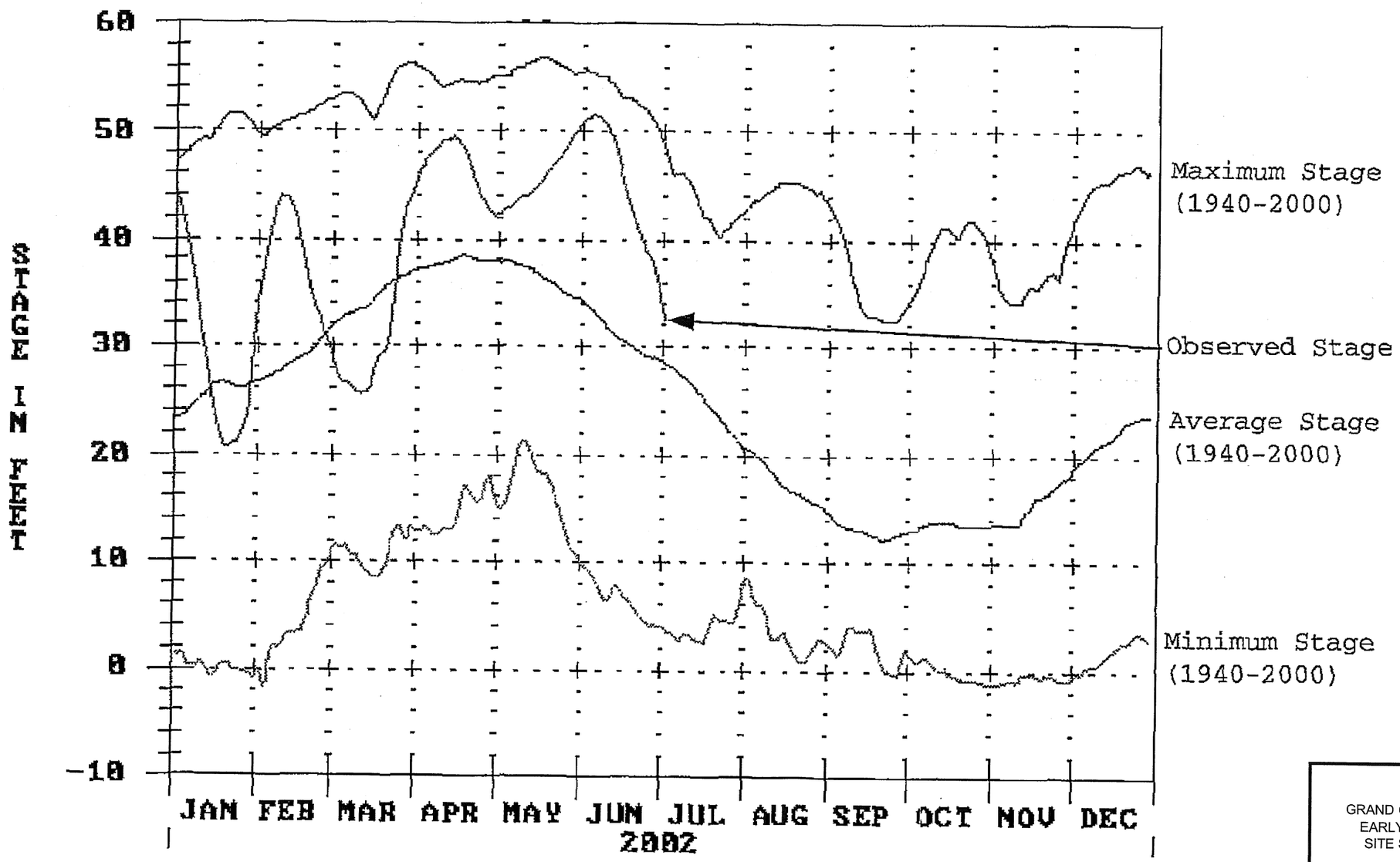
HYDROGRAPH FOR THE MISSISSIPPI RIVER AT VICKSBURG, MS

FIGURE 2.4-7 REV. 1



Source: Adapted from U.S. Army Corps of Engineers

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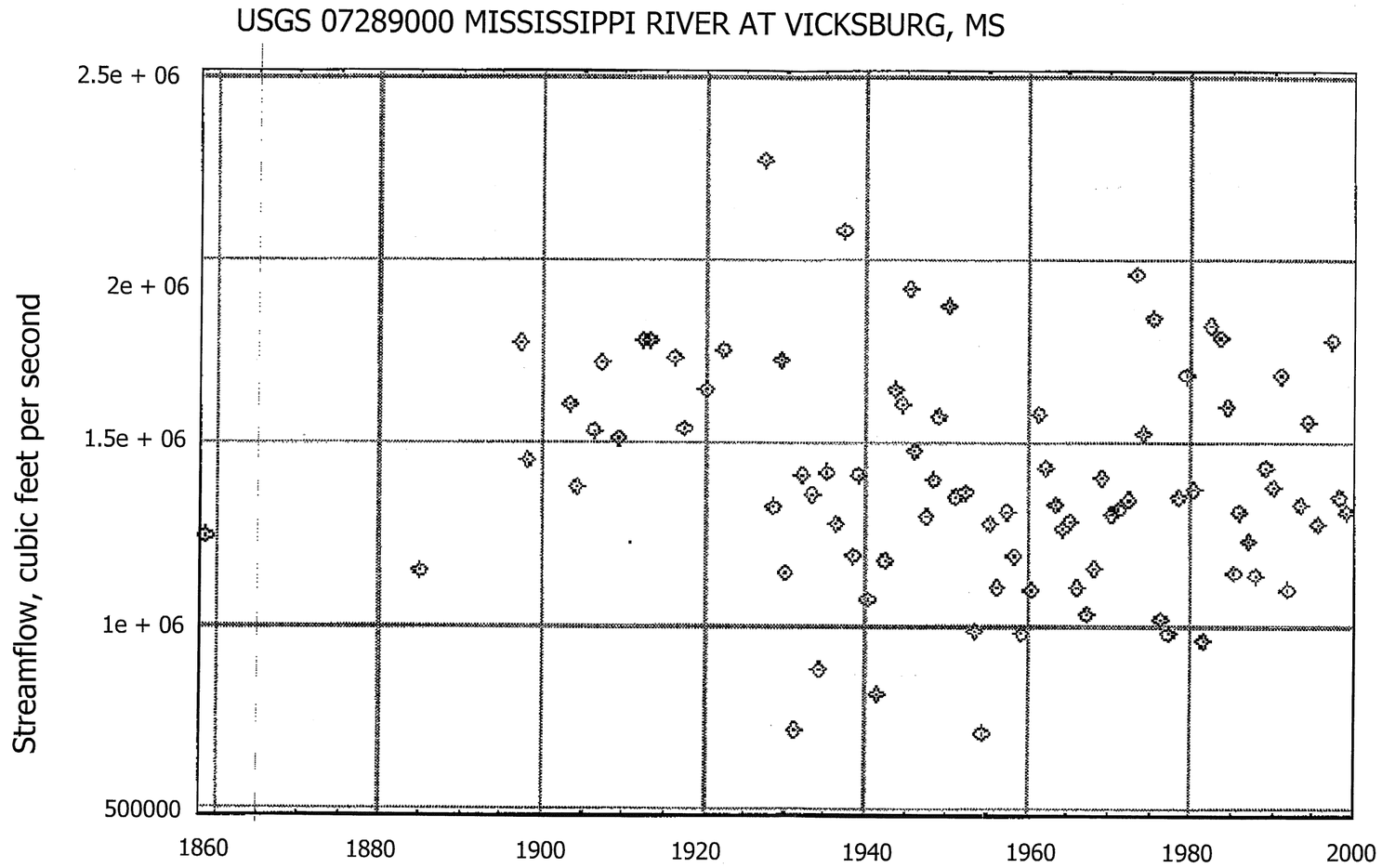
HYDROGRAPH FOR MISSISSIPPI RIVER
AT NATCHEZ, MS

FIGURE 2.4-8 REV. 1



DATES: 06/24/1858 to 02/13/1999

Source: U.S.G.S.

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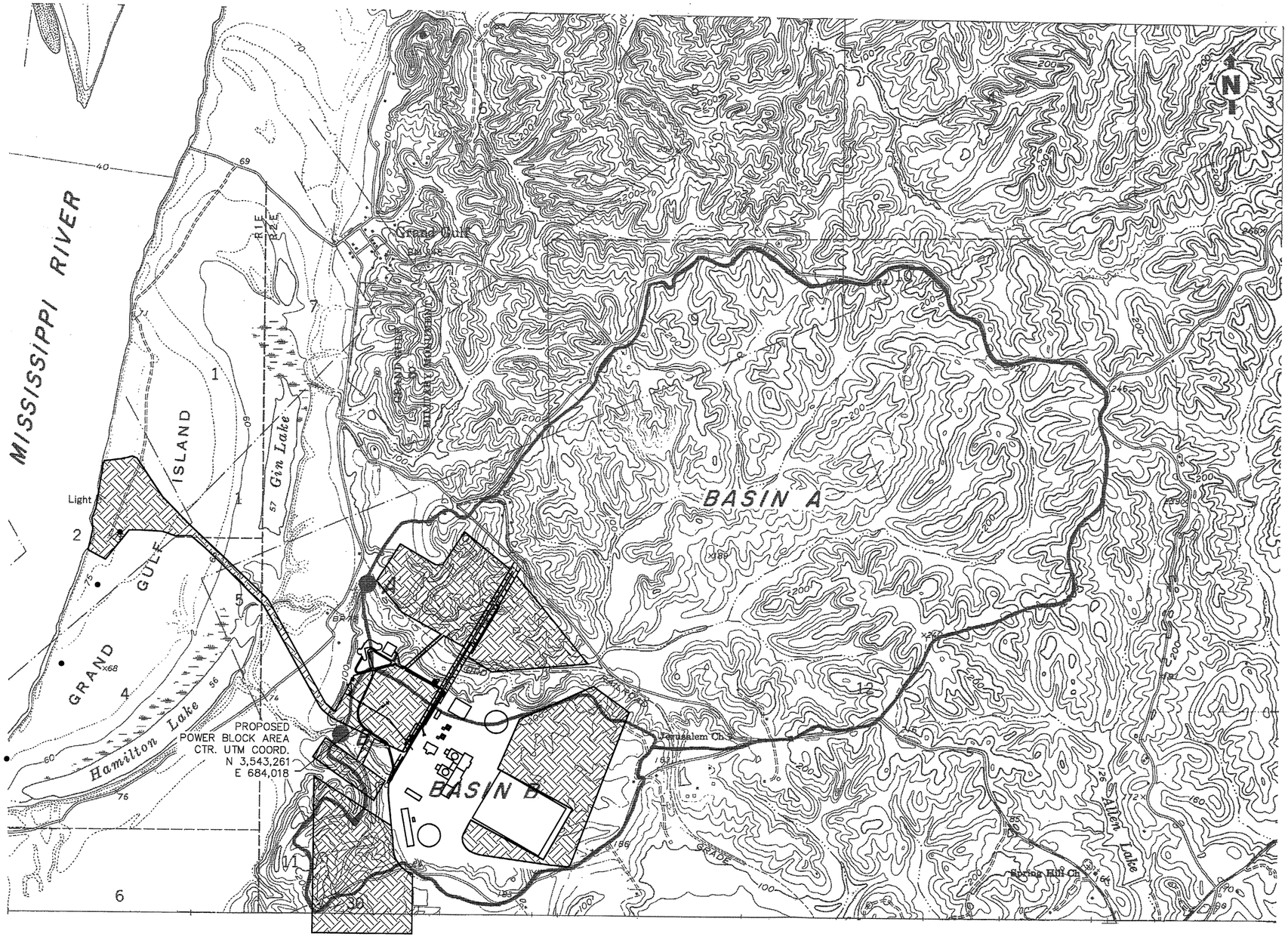
ANNUAL MAXIMUM INSTANTANEOUS PEAK
STREAMFLOW - MISSISSIPPI RIVER
USGS STATION, VICKSBURG, MS

FIGURE 2.4-9 REV. 1



Adapted from U.S.G.S. 7.5 Minute Topographic Sheet 1963 Series

1,000 0 2,000
Scale in Feet

NOTES:

1. GGNS UNIT 1 FACILITIES ADDED FOR REFERENCE.

LEGEND:

PROPOSED NEW FACILITY CONSTRUCTION AREAS

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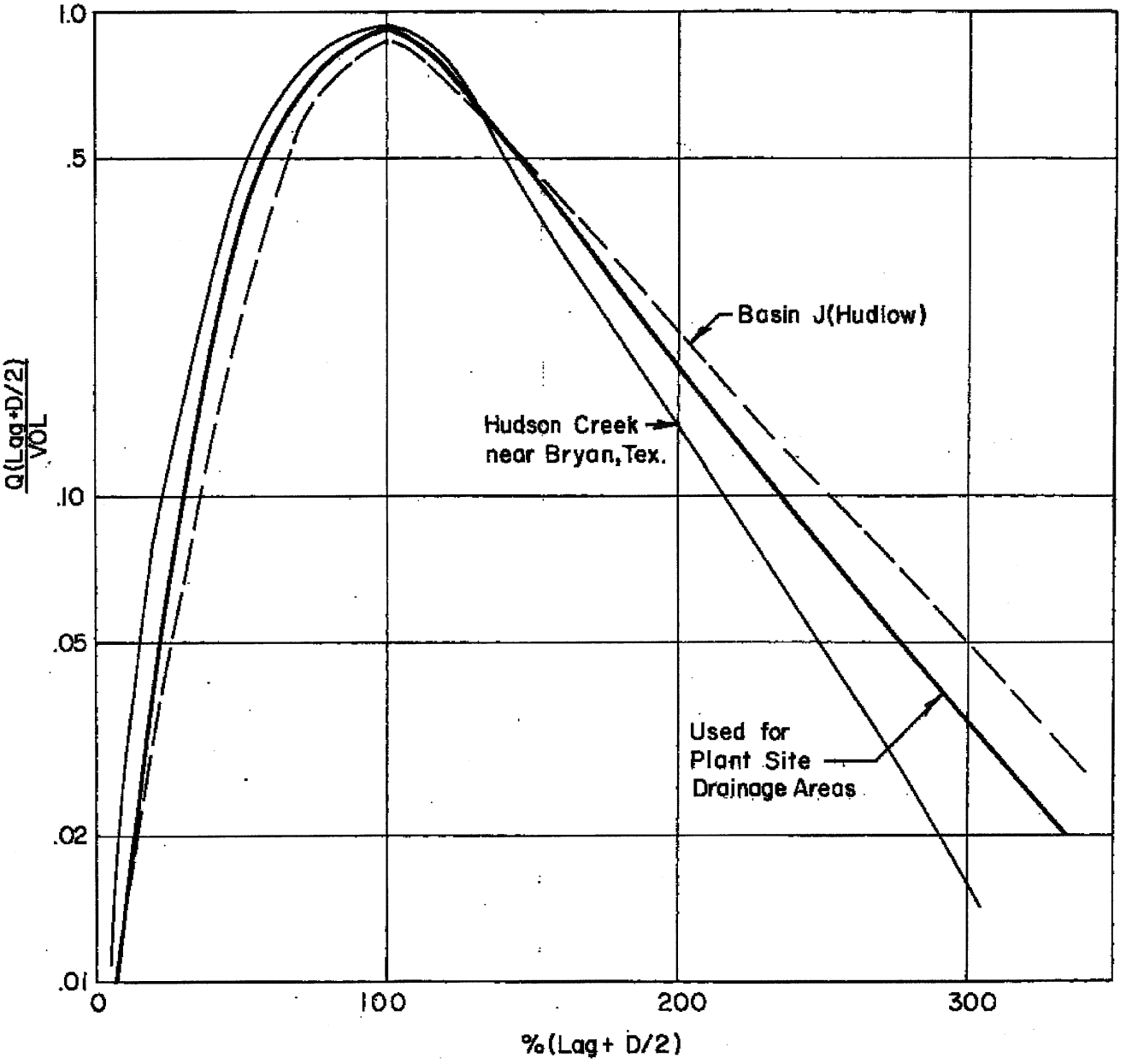
SITE SAFETY ANALYSIS REPORT

LOCAL DRAINAGE BASINS
(UFSAR FIGURE 2.4-8)

FIGURE 2.4-10 REV. 1



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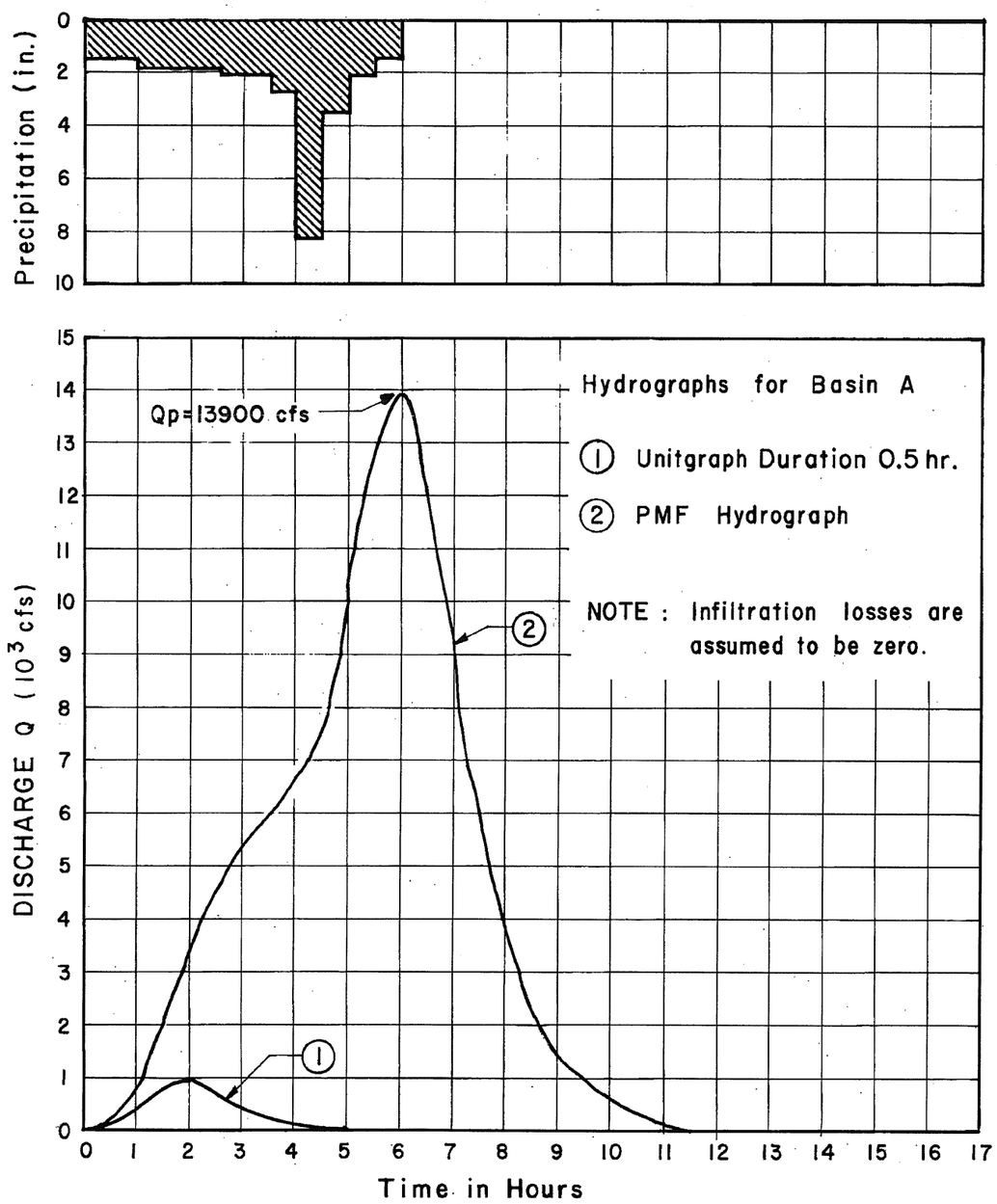
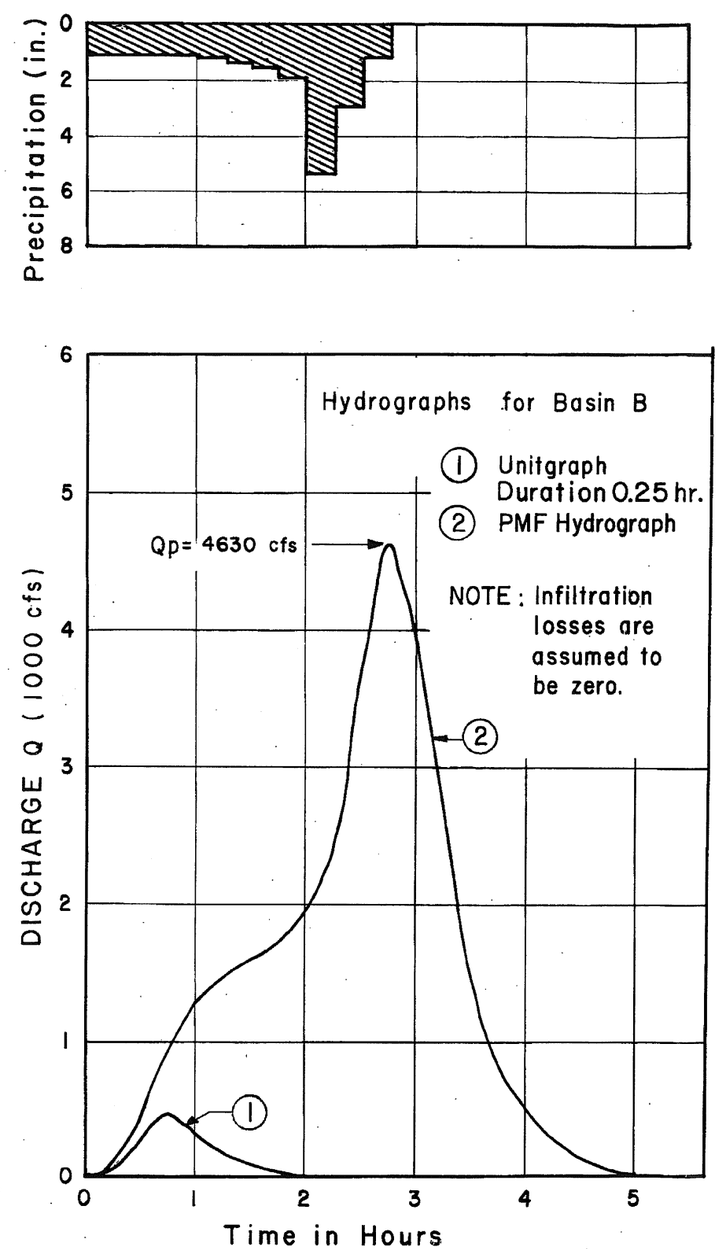
DIMENSIONLESS HYDROGRAPH FOR
THE PLANT SITE DRAINAGE BASINS
(UFSAR FIGURE 2.4-9)

FIGURE 2.4-11 REV. 1





NOTE:
THESE HYDROGRAPHS WERE DEVELOPED FOR GGNS UNIT 1 USING RAINFALL RATES FROM HMR 33 AND USACE EM-1110-2-1411 AND ARE PRESENTED FOR INFORMATION ONLY.

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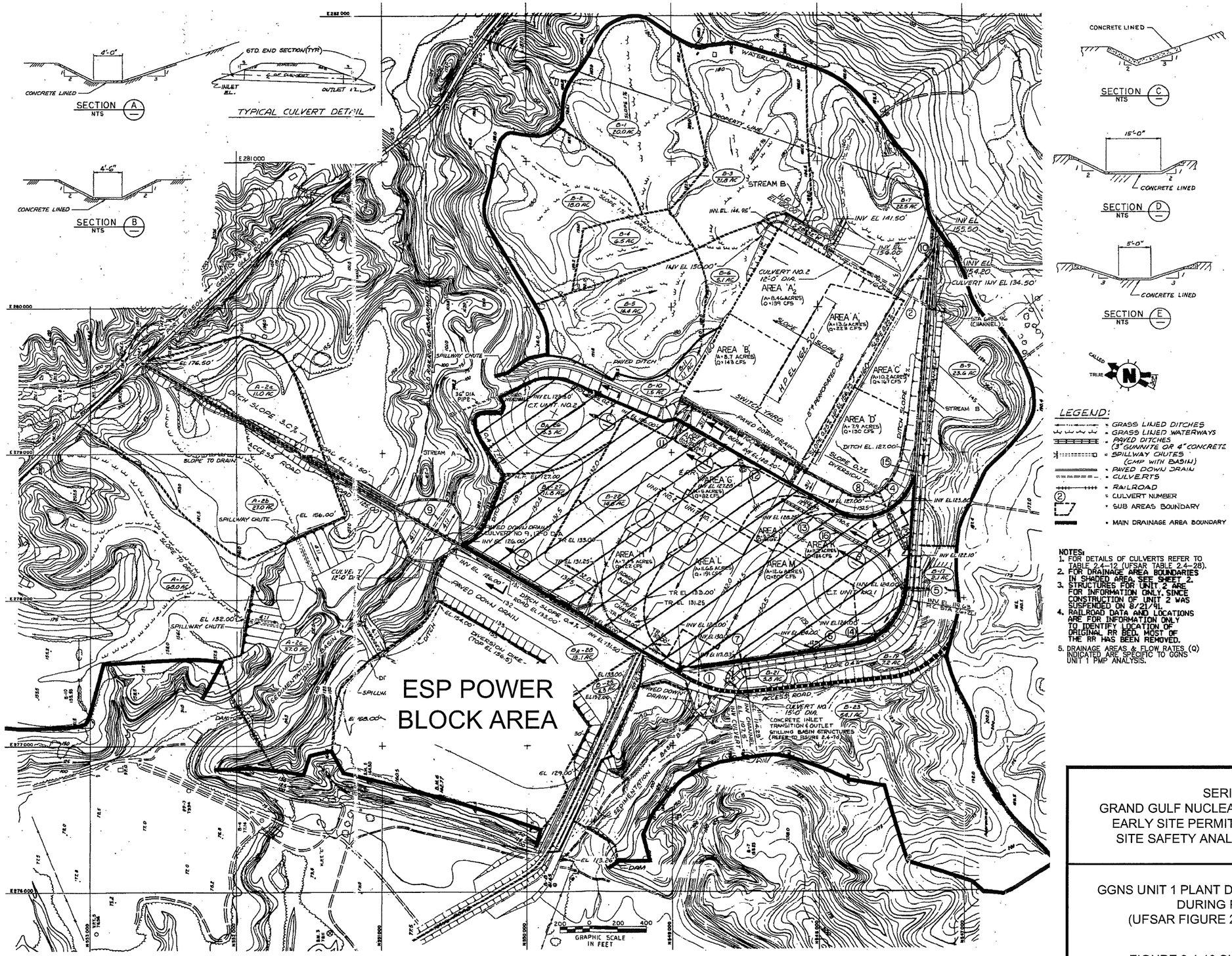
BASIN A & B
HYDROGRAPHS
(UFSAR FIGURE 2.4-10)

FIGURE 2.4-12 REV. 1



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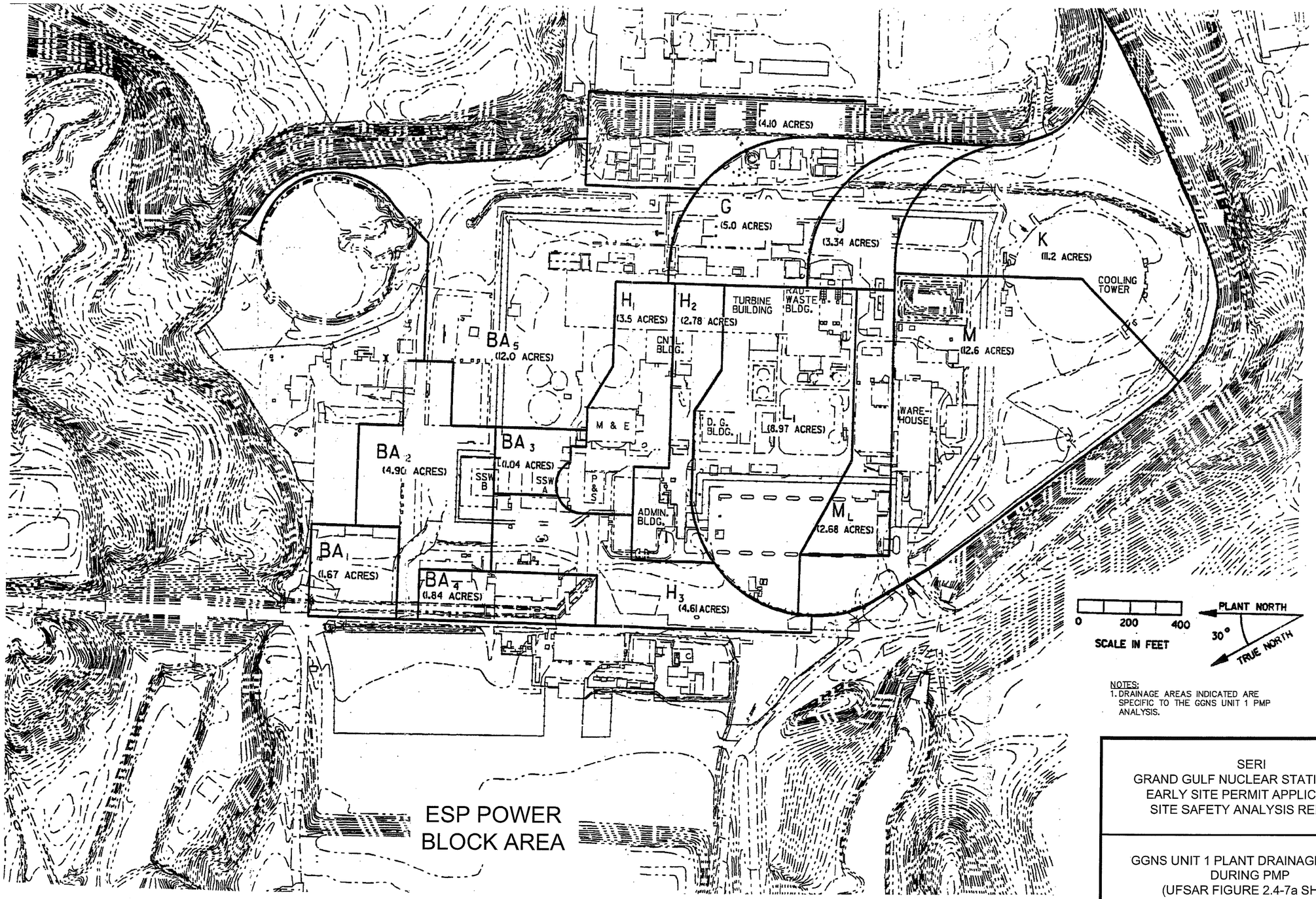
GGNS UNIT 1 PLANT DRAINAGE AREAS DURING PMP
(UFSAR FIGURE 2.4-7a SH. 1)

FIGURE 2.4-13 SHEET 1 OF 2 REV. 1



NOTES:
1. DRAINAGE AREAS INDICATED ARE SPECIFIC TO THE GGNS UNIT 1 PMP ANALYSIS.

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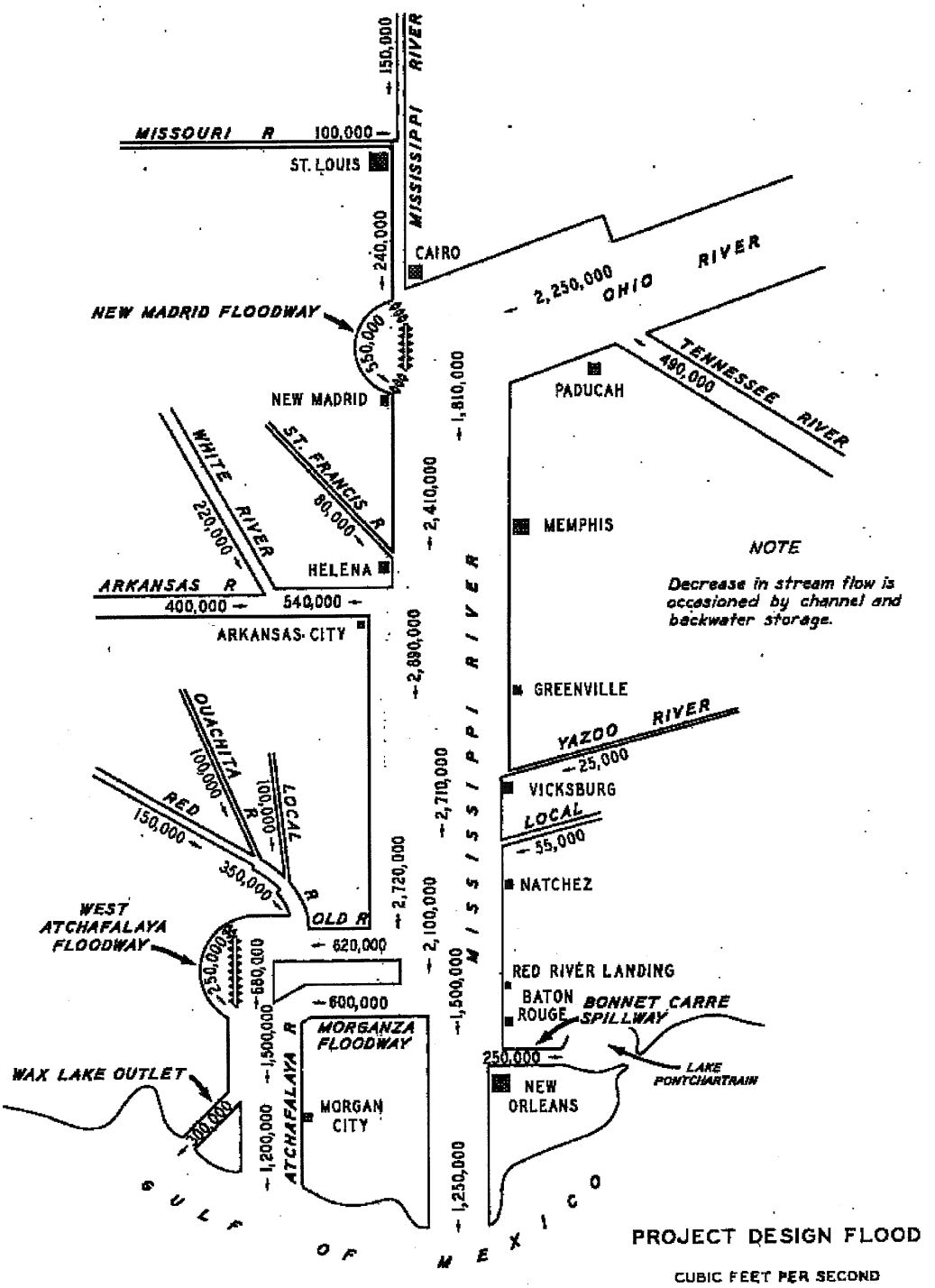
GGNS UNIT 1 PLANT DRAINAGE AREAS DURING PMP
(UFSAR FIGURE 2.4-7a SH. 2)

FIGURE 2.4-13 SHEET 2 OF 2 REV. 1



SOURCE: MISSISSIPPI RIVER COMMISSION, "LOWER MISSISSIPPI REGION COMPREHENSIVE STUDY," APPENDIX C, FIGURE-69, 1974

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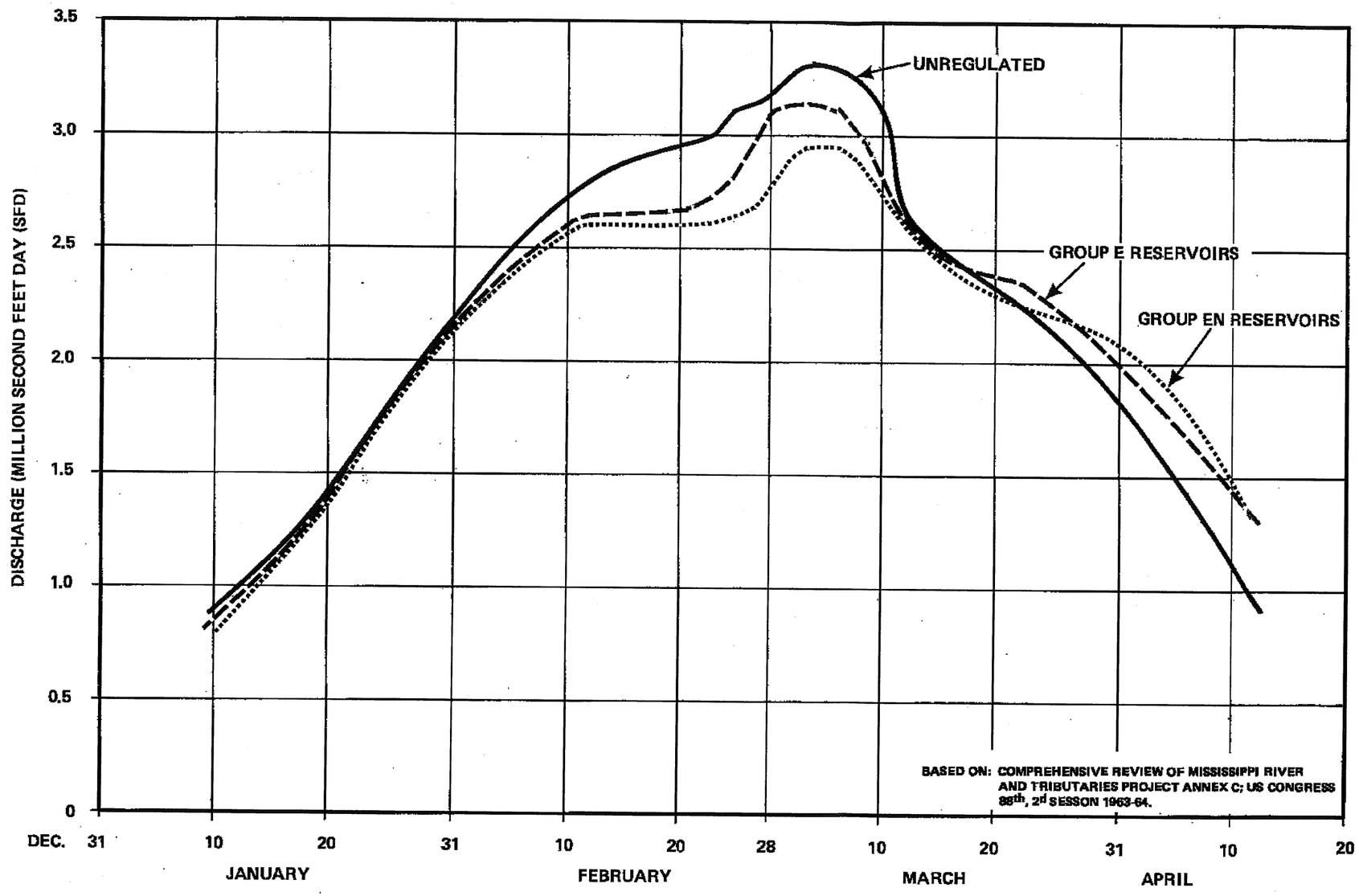
DESIGN-PROJECT FLOOD FOR THE LOWER MISSISSIPPI RIVER
U.S. CORPS OF ENGINEERS 1958
(UFSAR FIGURE 2.4-11)

FIGURE 2.4-14 REV. 1



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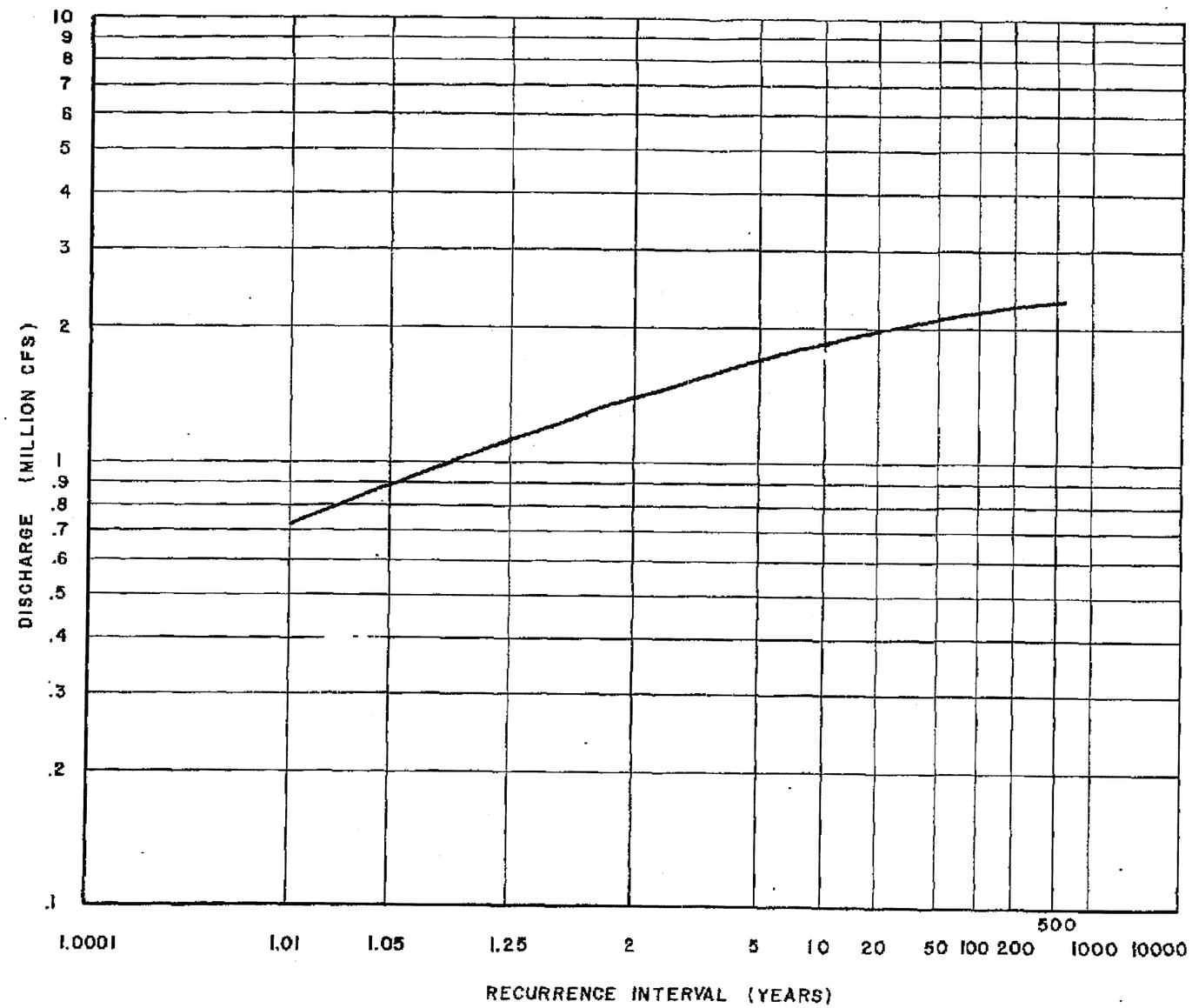
DPF HYDROGRAPHS FOR
MISSISSIPPI RIVER
(UFSAR FIGURE 2.4-12)

FIGURE 2.4-15 REV. 1



SOURCE: U.S.G.S.
PERIOD OF RECORD: 1858 – 1973

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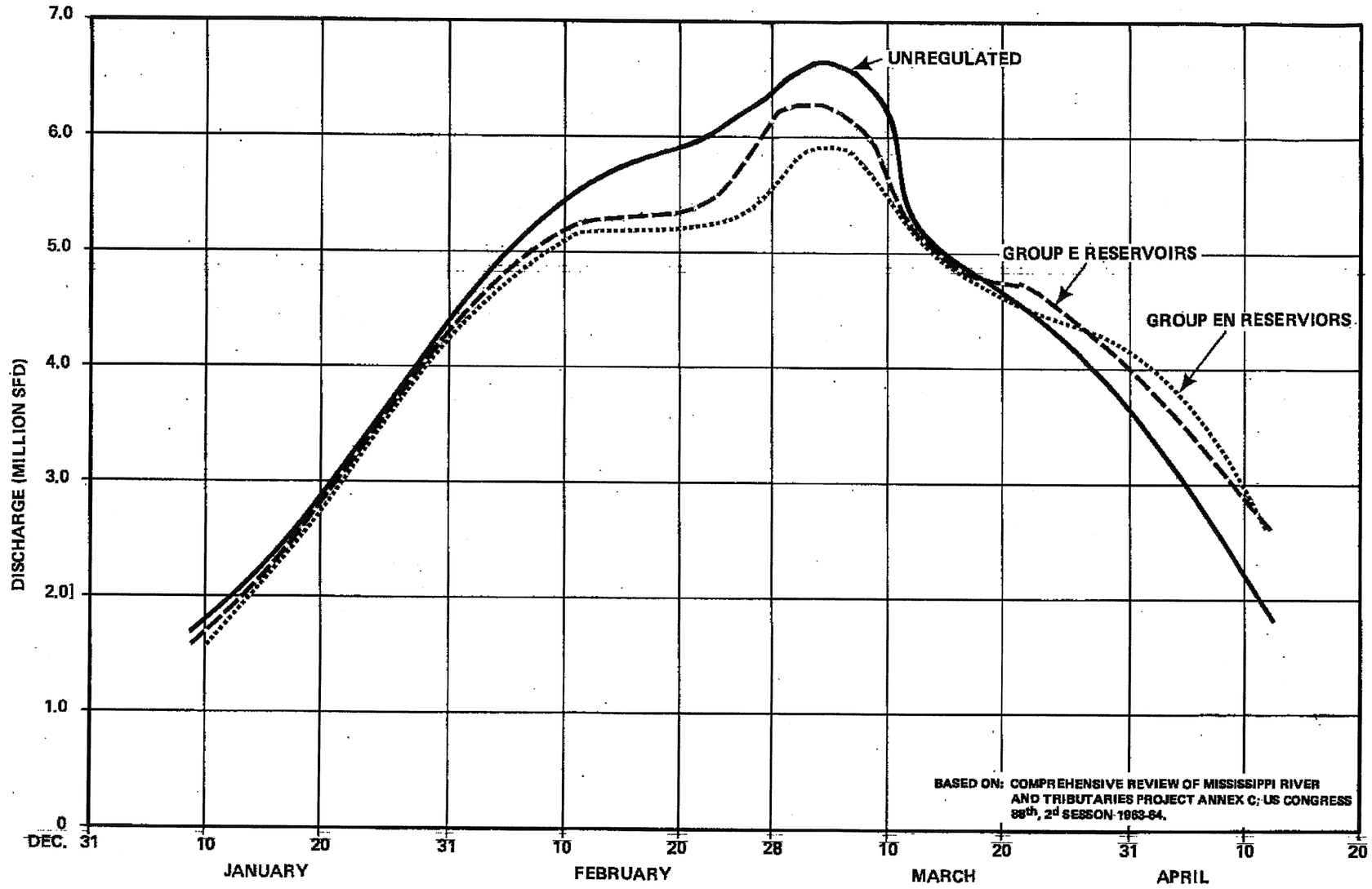
EARLY SITE PERMIT APPLICATION
SITE SAFETY ANALYSIS REPORT

DISCHARGE-FREQUENCY RELATIONSHIP
FOR MISSISSIPPI RIVER FLOODS AT
VICKSBURG
(UFSAR FIGURE 2.4-13)

FIGURE 2.4-16 REV. 1



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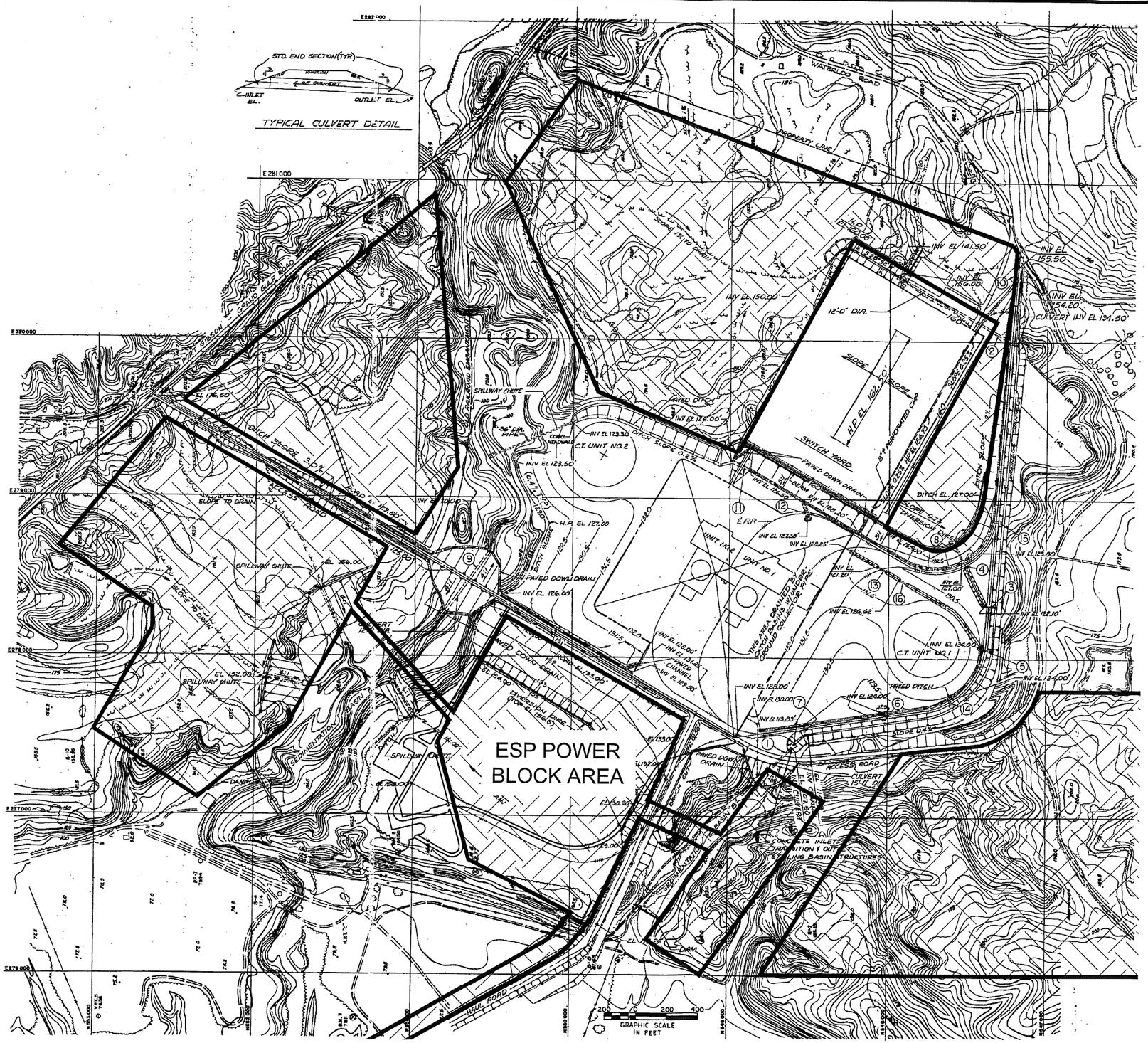
SITE SAFETY ANALYSIS REPORT

PMF HYDROGRAPHS FOR
MISSISSIPPI RIVER
(UFSAR FIGURE 2.4-14)

FIGURE 2.4-17 REV. 1



LEGEND:

- GRASS LINED DITCHES
- GRASS LINED WATERWAYS
- PAVED DITCHES (3" GUNNITE OR 4" CONCRETE
- SPILLWAY CHUTES (CMP WITH BASIN)
- PAVED DOWN DRAIN
- RAILROAD
- CULVERTS
- PROPOSED NEW FACILITY CONSTRUCTION AREAS.

NOTES:

1. STRUCTURES FOR GGNS UNIT 2 ARE FOR INFORMATION ONLY, SINCE CONSTRUCTION OF UNIT 2 WAS SUSPENDED ON 8/21/91.
2. RAILROAD DATA AND LOCATIONS ARE FOR INFORMATION ONLY TO IDENTIFY LOCATION OF ORIGINAL RR BED. MOST OF THE RR HAS BEEN REMOVED.

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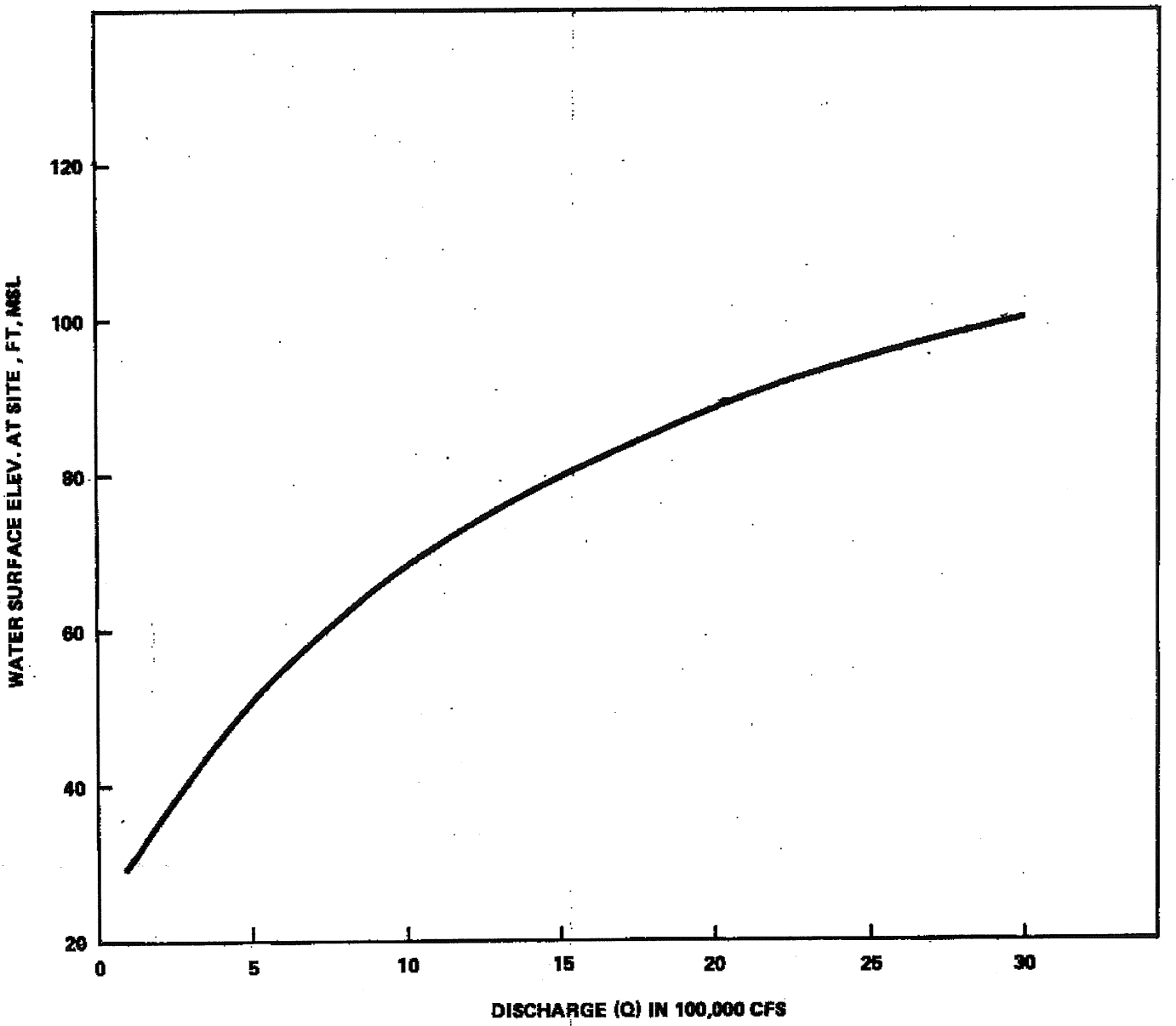
SITE DRAINAGE PLAN
(UFSAR FIGURE 2.4-7)

FIGURE 2.4-18 REV. 1



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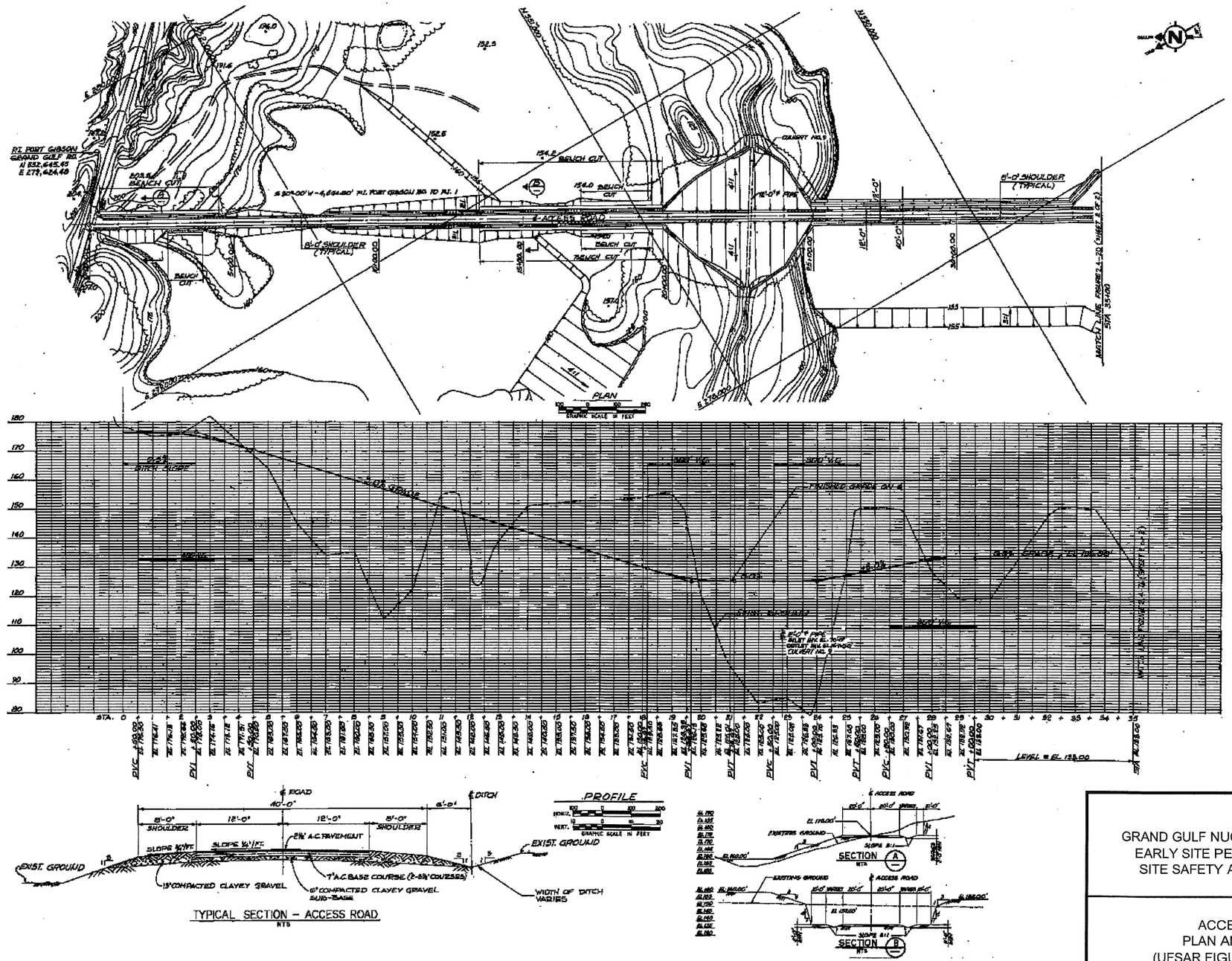
RATING CURVE FOR THE MISSISSIPPI
RIVER AT GRAND GULF SITE
(UFSAR FIGURE 2.4-15)

FIGURE 2.4-19 REV. 1



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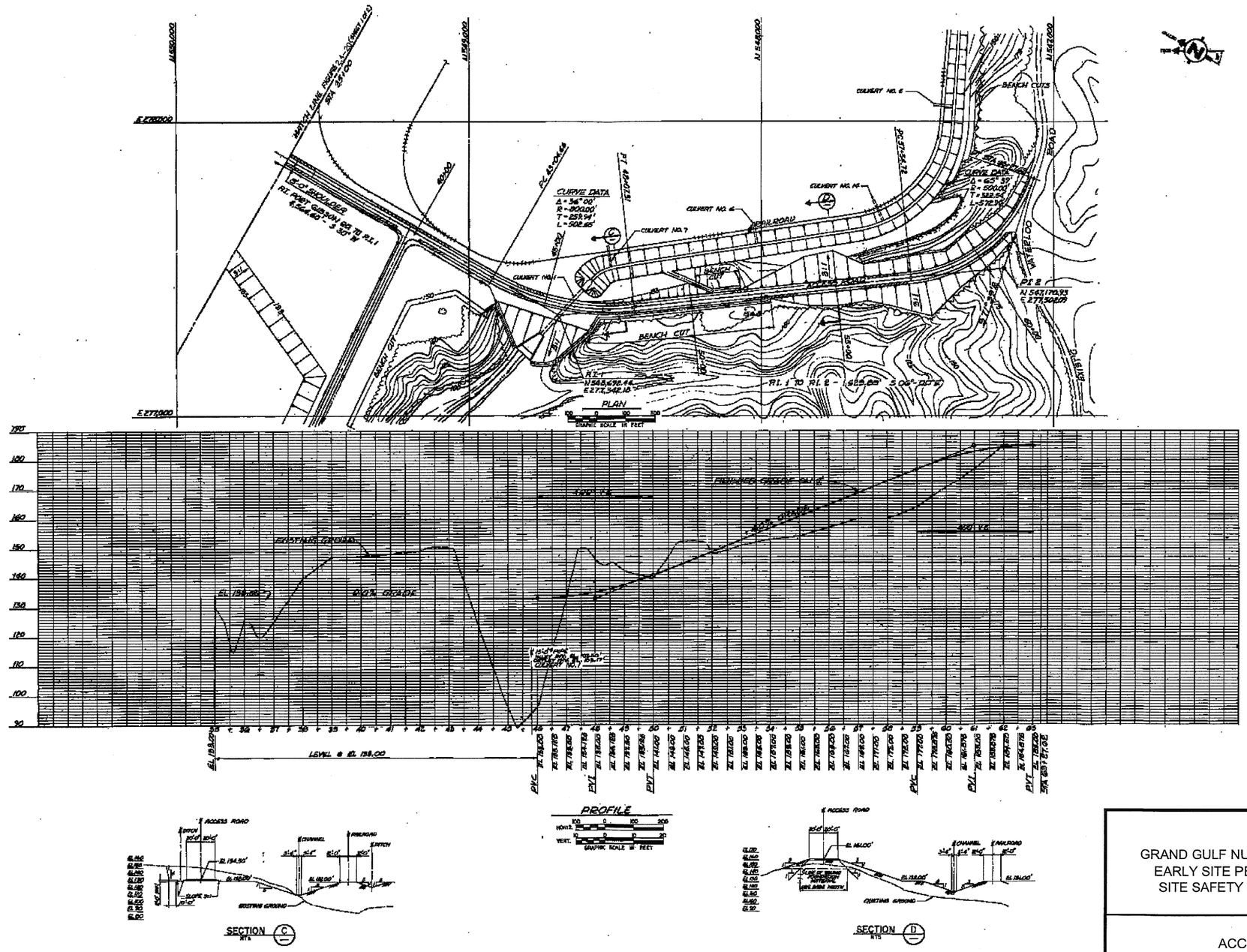
ACCESS ROAD
PLAN AND PROFILE
(UFSAR FIGURE 2.4-7b SH. 1)

FIGURE 2.4-20 SHEET 1 OF 2 REV. 1



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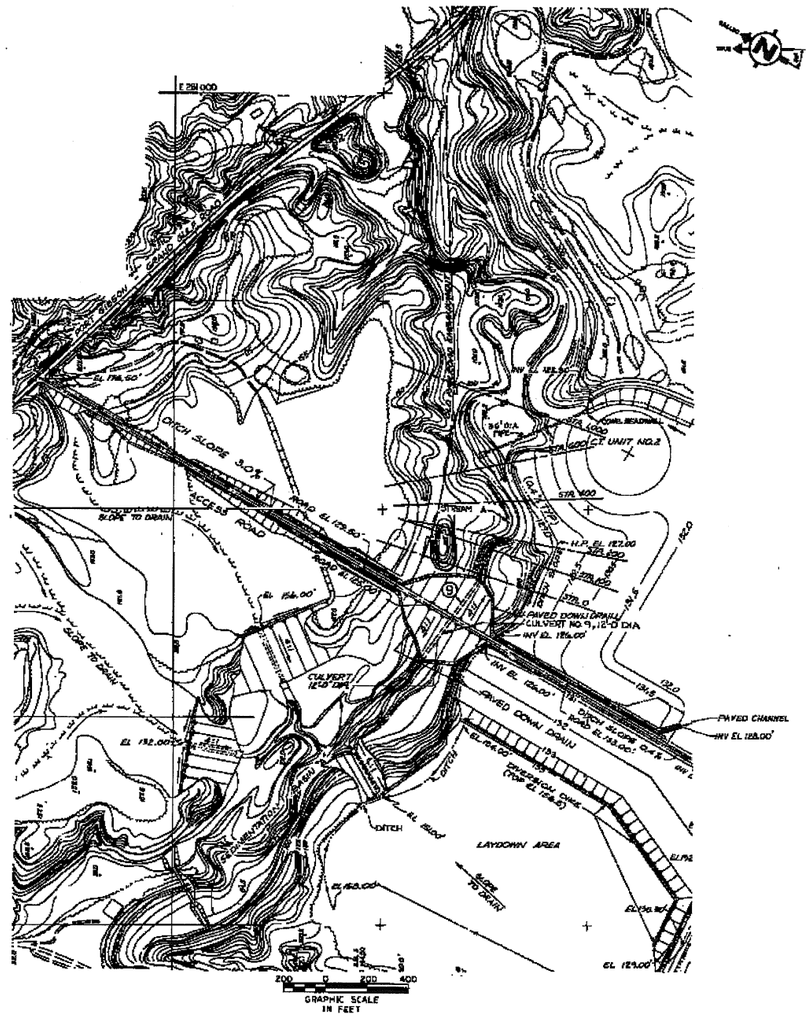
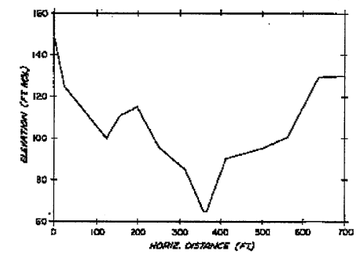
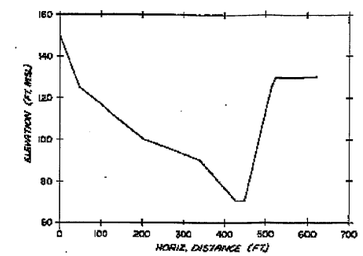
ACCESS ROAD
PLAN AND PROFILE
(UFSAR FIGURE 2.4-7b SH. 2)

FIGURE 2.4-20 SHEET 2 OF 2 REV. 1

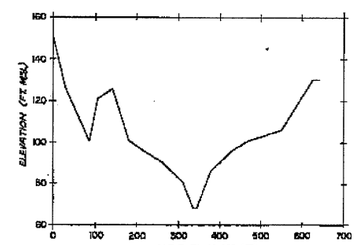




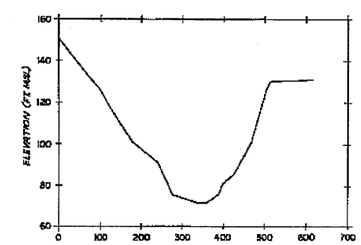
CROSS SECTION @ STA. 0



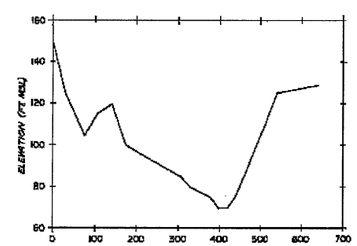
CROSS SECTION @ STA. 400



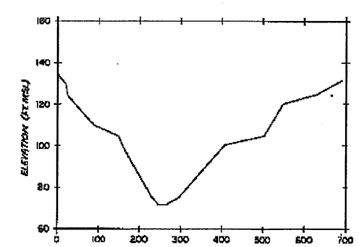
CROSS SECTION @ STA. 100



CROSS SECTION @ STA. 600



CROSS SECTION @ STA. 200



CROSS SECTION @ STA. 1000

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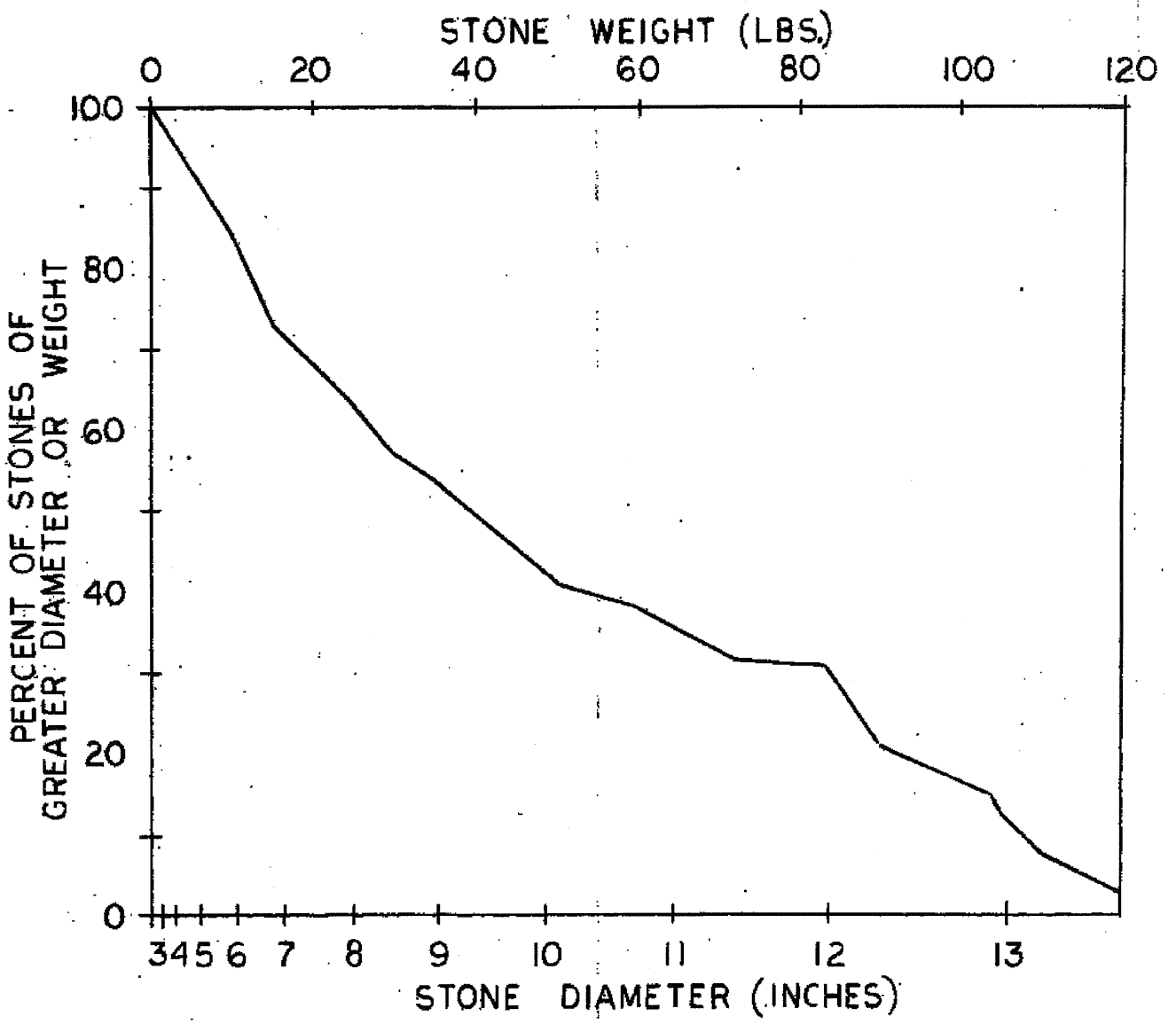
CROSS SECTIONS OF STREAM A
(UFSAR FIGURE 2.4-7c)

FIGURE 2.4-21 REV. 1



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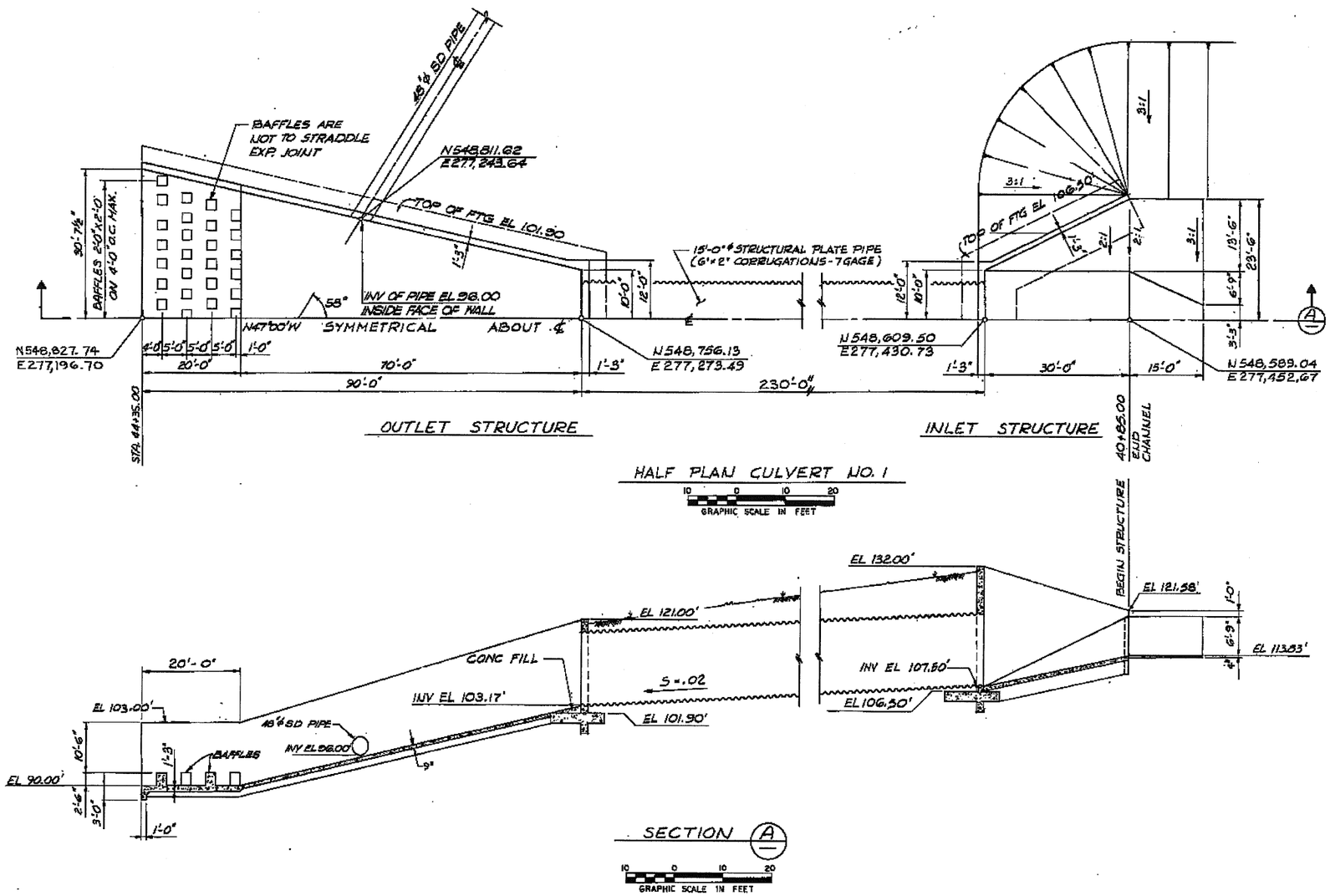
RIPRAP GRADATION CURVE
(USAR FIGURE 2.4-16a)

FIGURE 2.4-22 REV. 1



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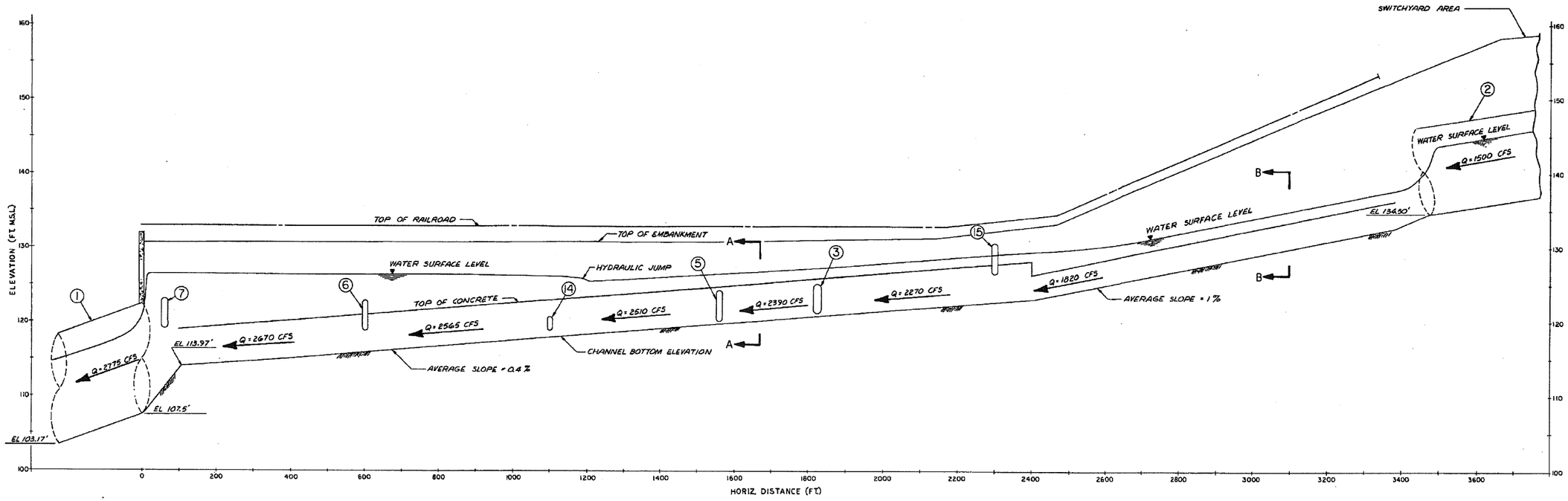
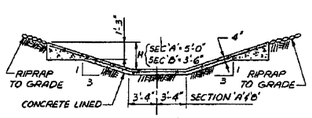
EARLY SITE PERMIT APPLICATION
SITE SAFETY ANALYSIS REPORT

CULVERT NO. 1
PLAN AND SECTIONS
(UFSAR FIGURE 2.4-7d)

FIGURE 2.4-23 REV. 1



DISTANCE UPSTREAM OF CULVERT 1 INLET



SECTION A & B OF CHANNEL
NOT TO SCALE

REPRESENTS CULVERT LOCATION

NOTES:

1. FOR DETAIL OF CULVERTS REFER TO TABLE 2.4-12 (GGNS UFSAR TABLE 2.4-28).
2. FOR PLAN OF PERIPHERAL DRAINAGE DITCH OF BASIN B REFER TO FIGURES 2.4-13 & 2.4-18 (GGNS UFSAR FIGURE 2.4-7 & 2.4-7A).
3. FLOW RATES (Q) SHOWN ARE FOR GGNS UNIT 1 PMP ANALYSIS ONLY.

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EARLY SITE PERMIT APPLICATION
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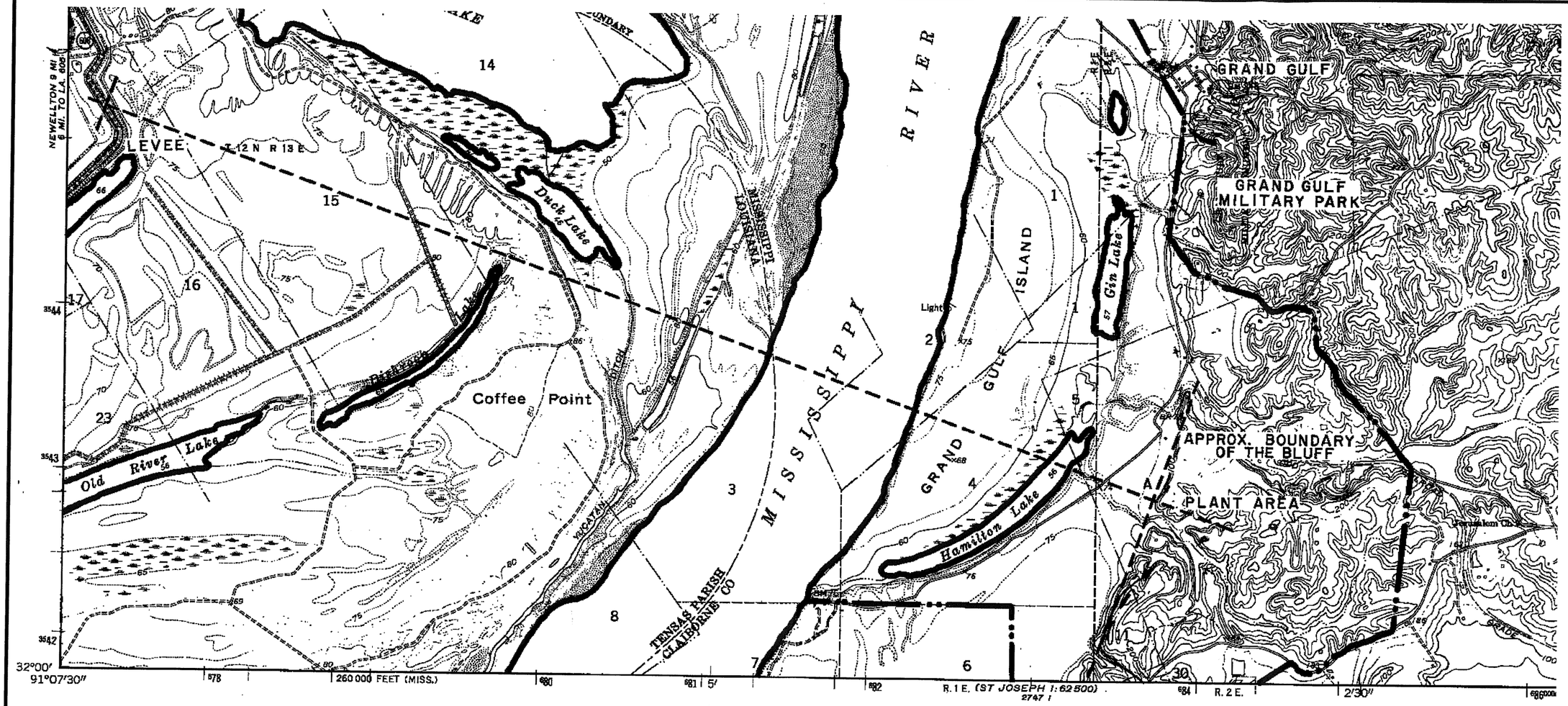
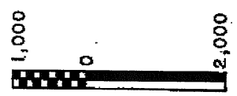
PROFILE AND SECTIONS
OF PERIPHERAL DRAINAGE
FOR BASIN B
(UFSAR FIGURE 2.4-16)

FIGURE 2.4-24 REV. 1





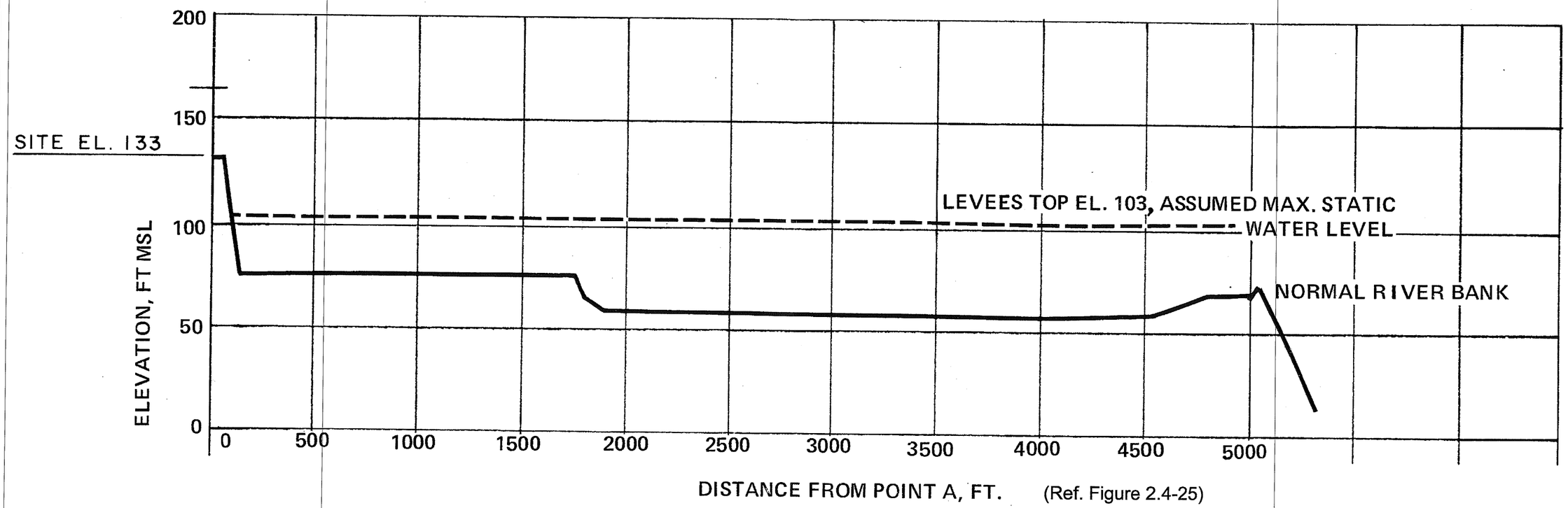
SCALE IN FEET

Adapted from U.S.G.S. 7.5 Minute Topographic Sheet 1963 Series

SERI
GRAND GULF NUCLEAR STATION SITE
EARLY SITE PERMIT APPLICATION
SITE SAFETY ANALYSIS REPORT

BOUNDARIES OF WATER SURFACE AT EL. 103 IN THE SITE REGION
(UFSAR FIGURE 2.4-17)

FIGURE 2.4-25 REV. 1



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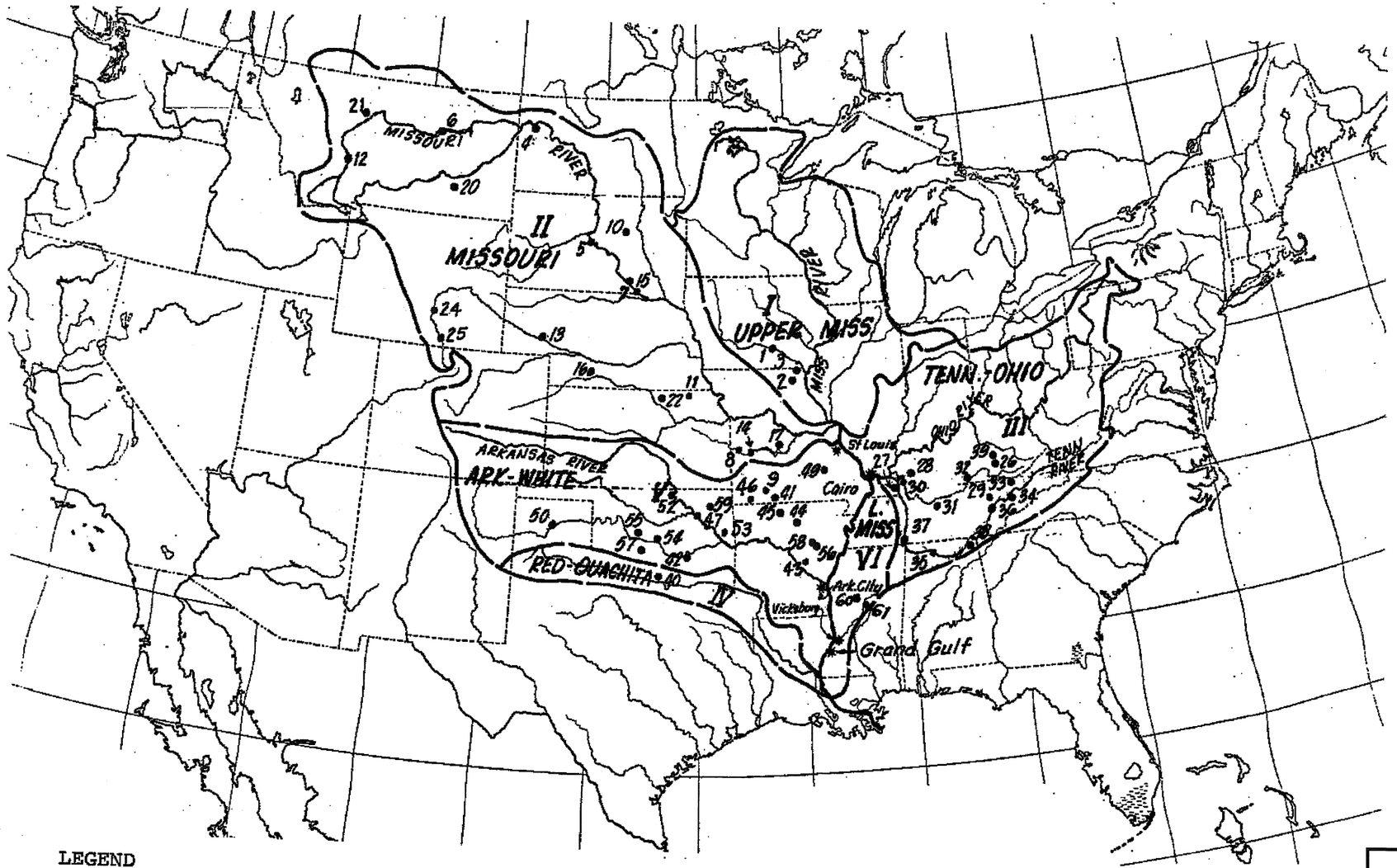
GROUND SURFACE PROFILE OF
MISSISSIPPI RIVER FLOOD PLAIN
(UFSAR FIGURE 2.4-18)

FIGURE 2.4-26 REV. 1



LEGEND

- 20 NUMBERS REFER TO RESERVOIRS LISTED IN TABLE 2.4–15 (UFSAR TABLE 2.4–14)

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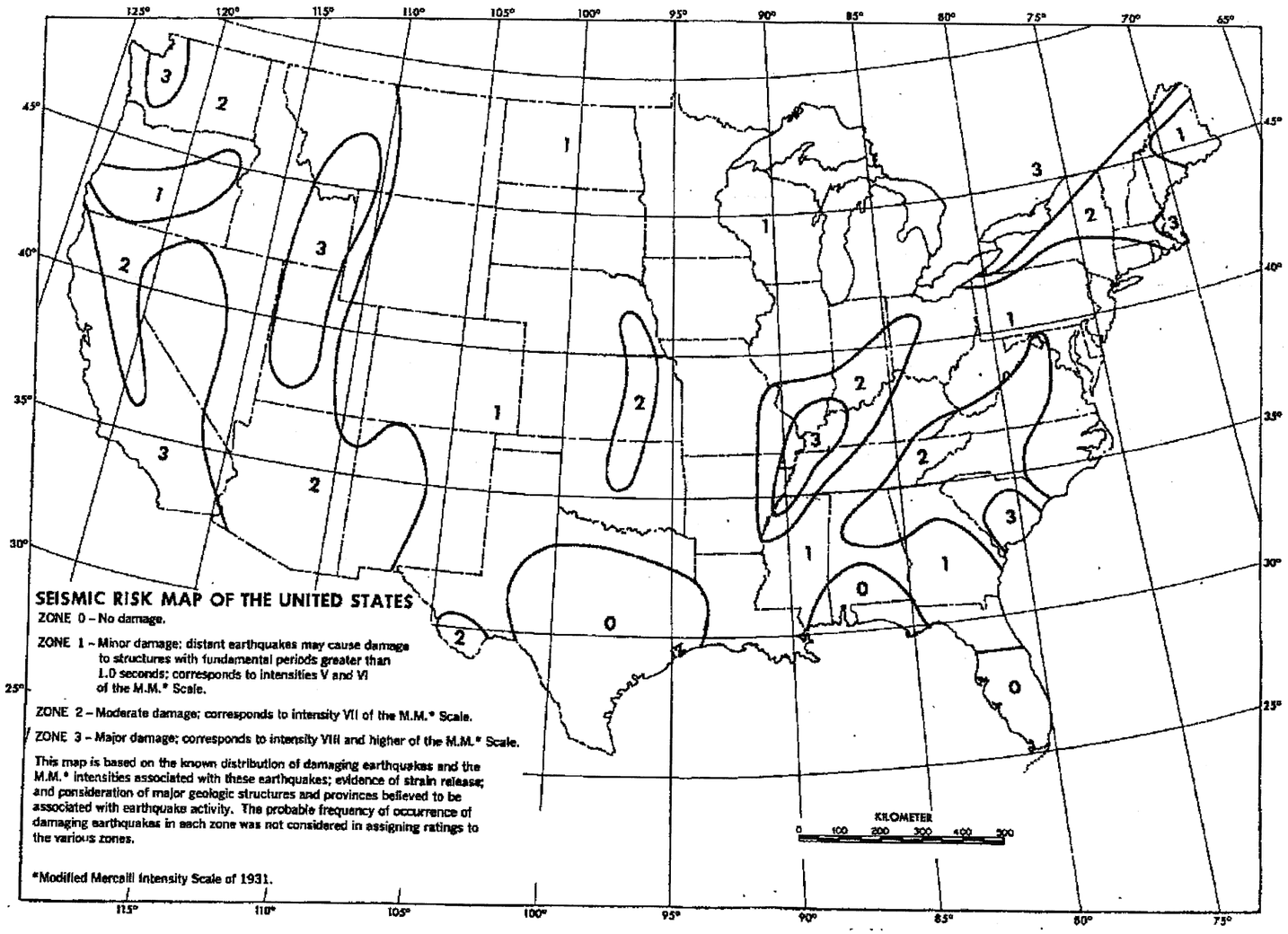
MAJOR RESERVOIRS IN
THE MISSISSIPPI BASIN
(UFSAR FIGURE 2.4-19)

FIGURE 2.4-27 REV. 1



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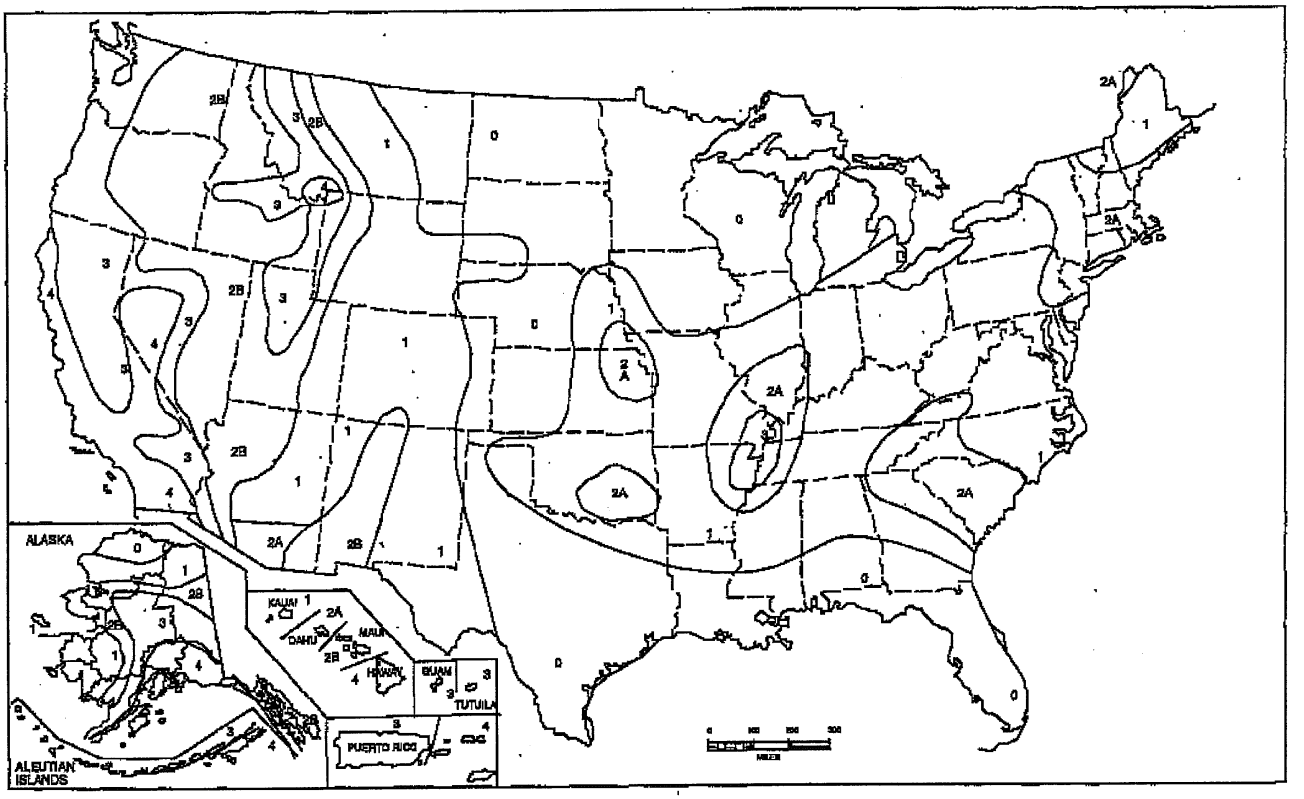
SEISMIC RISK MAP
FOR THE UNITED STATES
(UFSAR FIGURE 2.4-20)

FIGURE 2.4-28 REV. 1



SEISMIC ZONE FACTOR Z

ZONE	1	2A	2B	3	4
Z	0.075	0.15	0.20	0.30	0.40

SOURCE: 1997 UNIFORM BUILDING CODE

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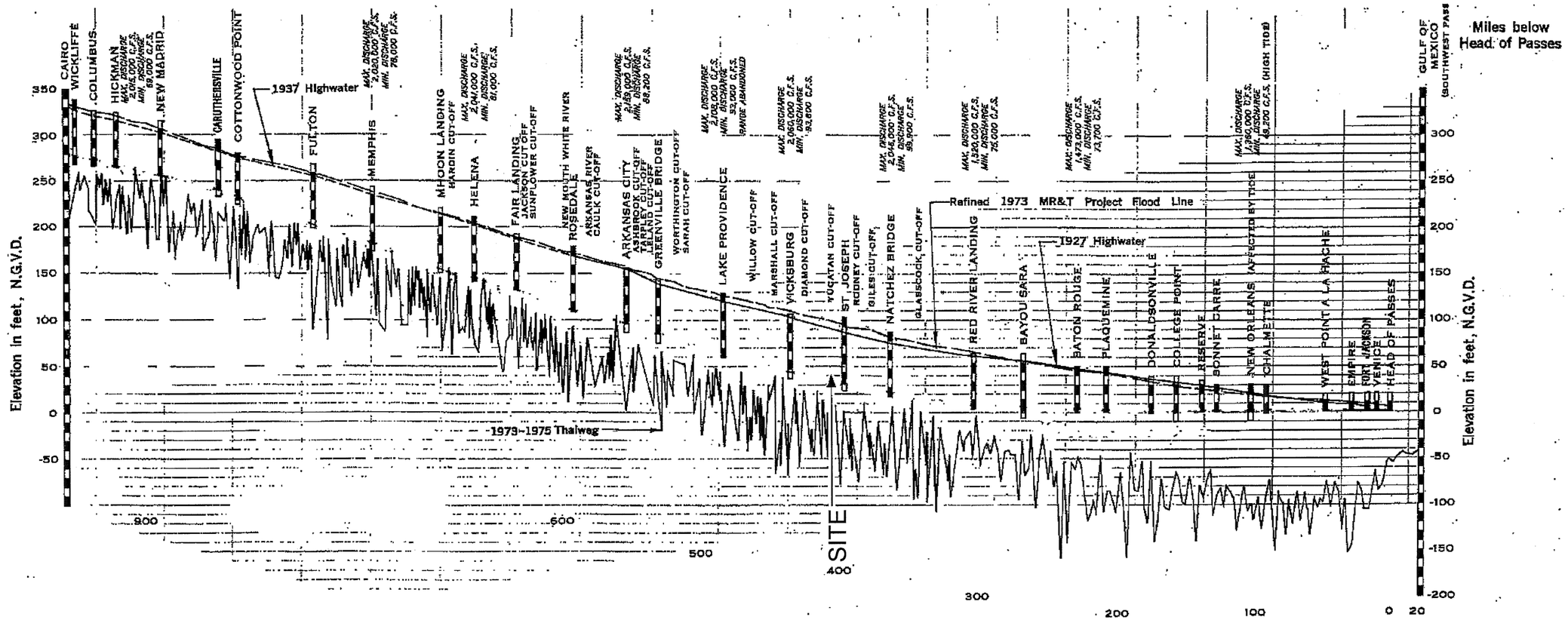
SEISMIC ZONE MAP
OF THE UNITED STATES

FIGURE 2.4-28a REV. 1



Source: Adapted from USACE

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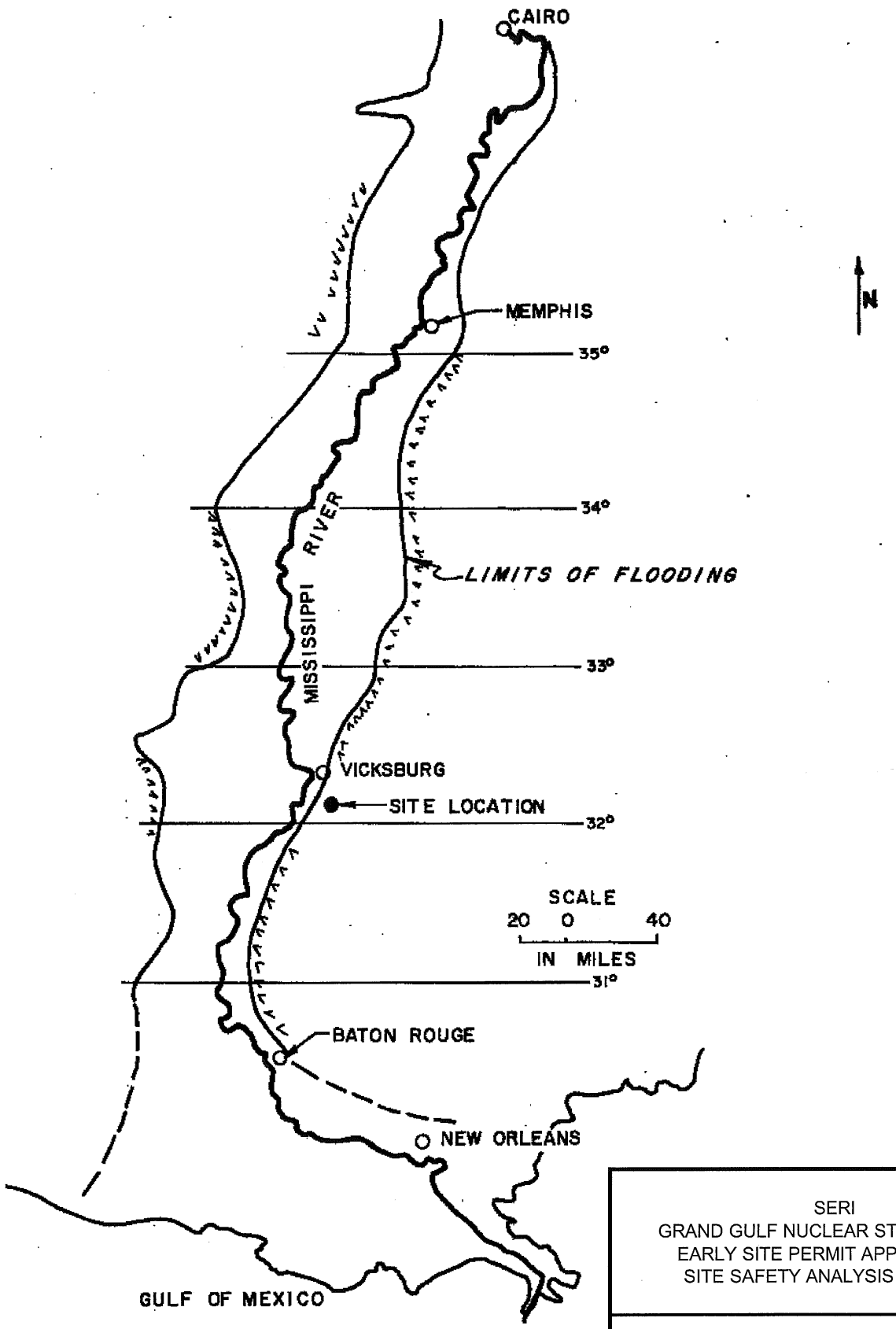
DESIGN PROJECT FLOOD ELEVATIONS FROM CAIRO, ILLINOIS TO HEAD OF PASSES

FIGURE 2.4-29 REV. 1



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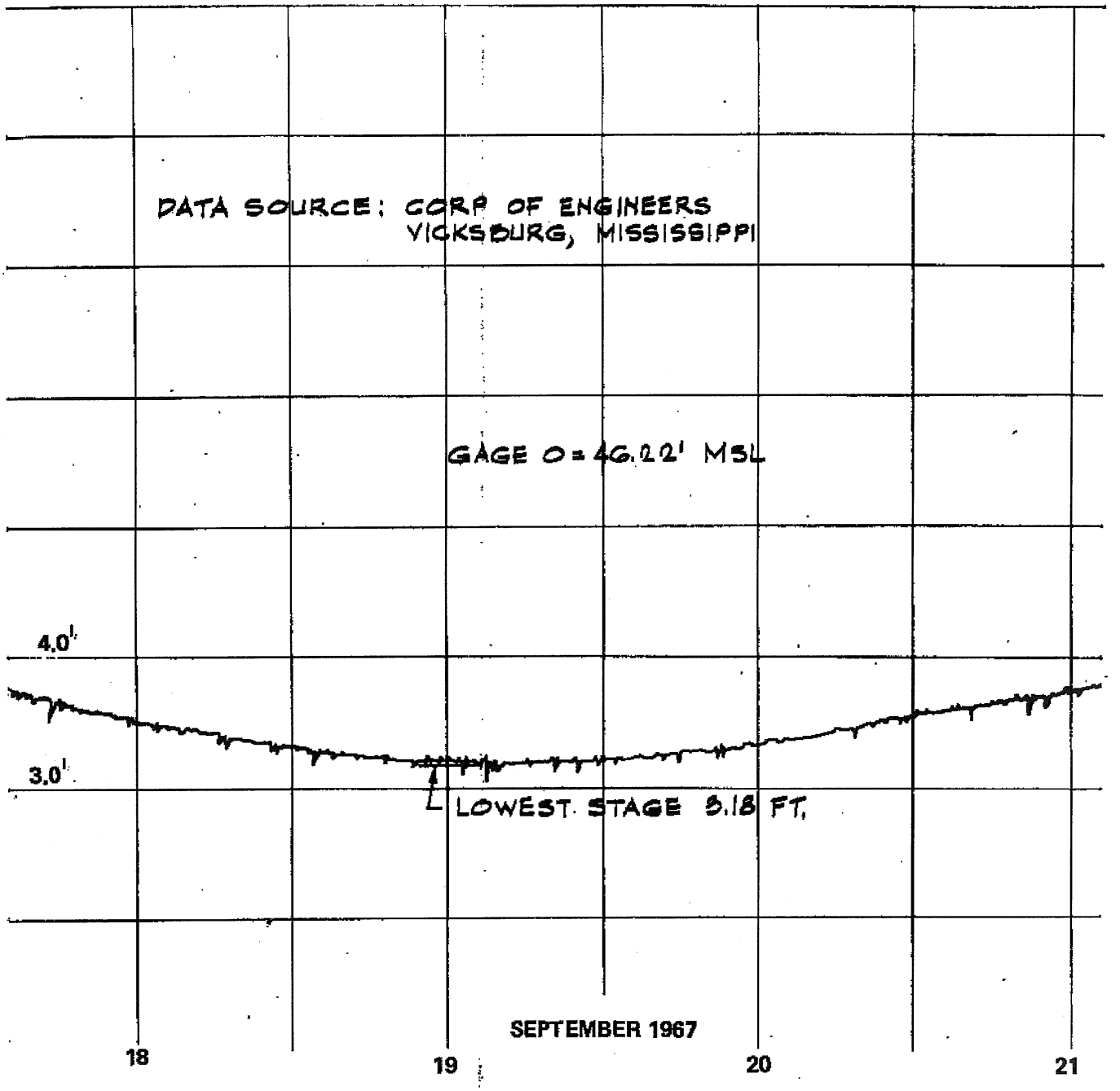
PLAN SHOWING AREAS THAT MAY BE SUBMERGED DUE TO A FLOOD RISING TO EL. 103 MSL AT THE SITE
(UFSAR FIGURE 2.4-22)

FIGURE 2.4-30 REV. 1



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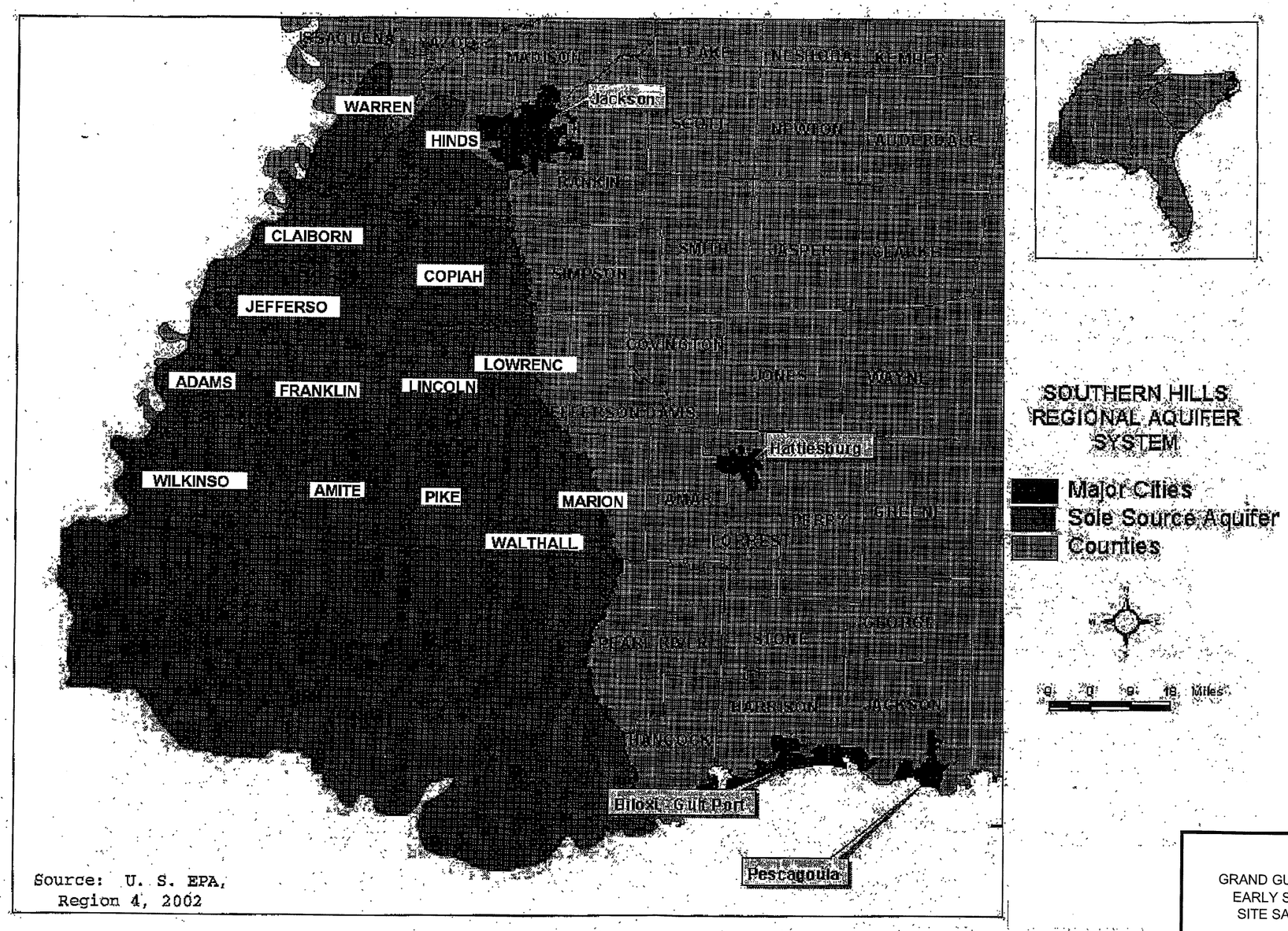
INSTANTANEOUS LOW FLOW IN
MISSISSIPPI RIVER-TYPICAL GAUGE
RECORD AT VICKSBURG, MISS.
SEPTEMBER 18, 19, 20 & 21, 1967
(UFSAR FIGURE 2.4-25)

FIGURE 2.4-31 REV. 1



Source: U. S. EPA, Region 4, 2002

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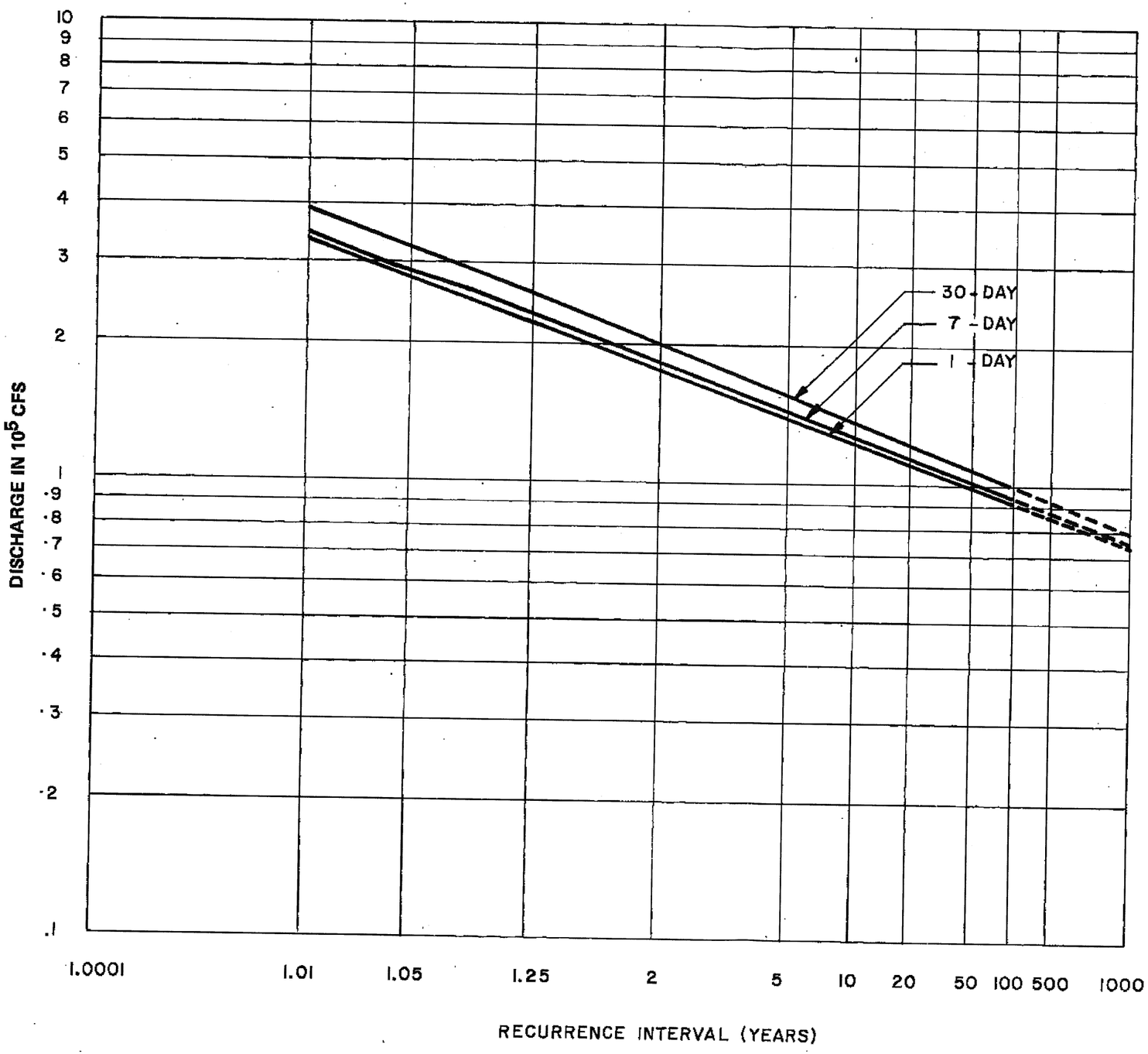
SOLE SOURCE AQUIFER MAP

FIGURE 2.4-31a REV. 1



SOURCE: U.S.G.S.
PERIOD OF RECORD: 1933—79

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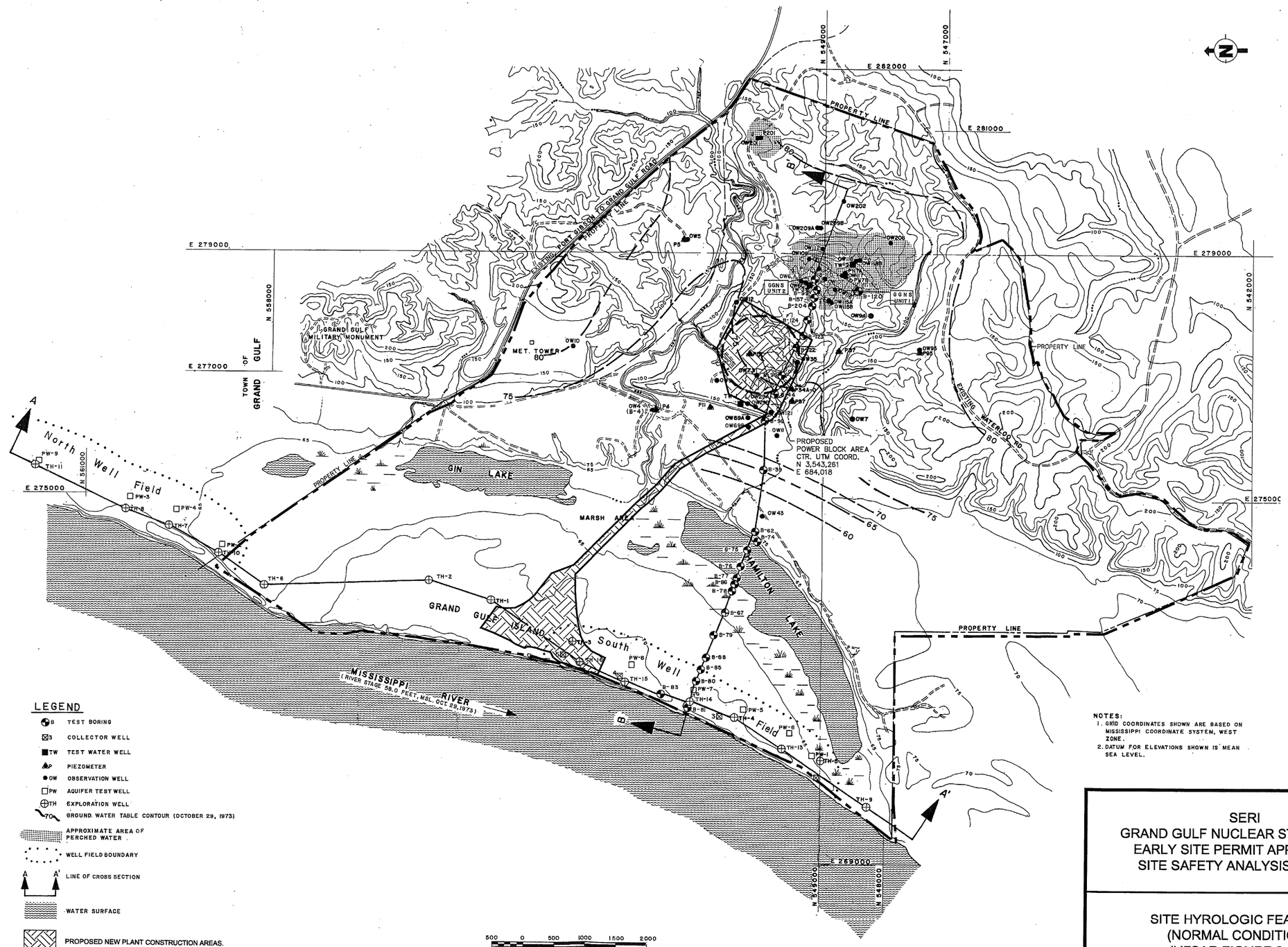
LOW FLOWS IN THE MISSISSIPPI
RIVER AT VICKSBURG
(UFSAR FIGURE 2.4-26)

FIGURE 2.4-32 REV. 1



NOTES:
1. GRID COORDINATES SHOWN ARE BASED ON MISSISSIPPI COORDINATE SYSTEM, WEST ZONE.
2. DATUM FOR ELEVATIONS SHOWN IS MEAN SEA LEVEL.

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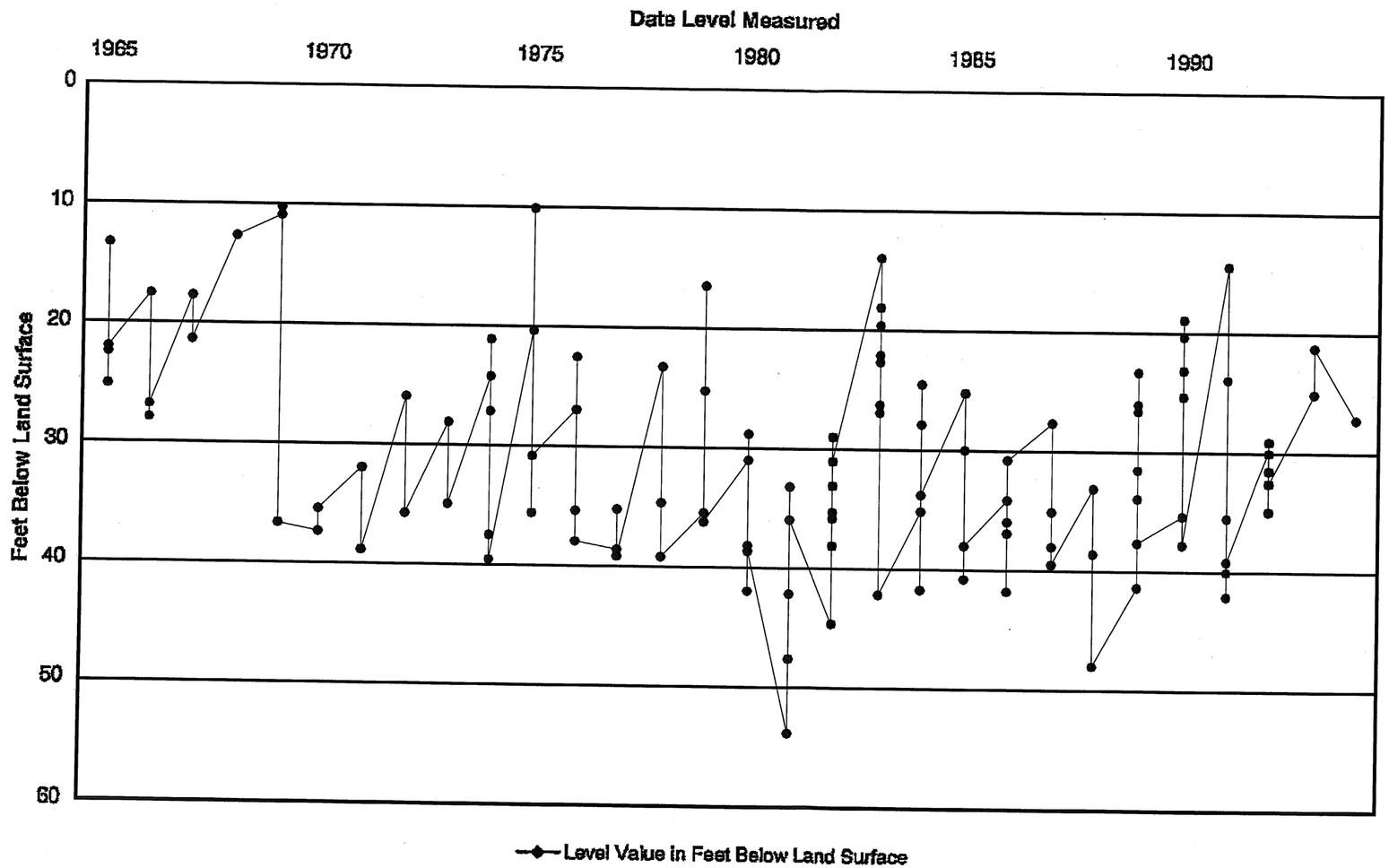
SITE HYROLOGIC FEATURES
(NORMAL CONDITIONS)
(UFSAR FIGURE 2.4-27)

FIGURE 2.4-33 REV. 1



SOURCE: USGS

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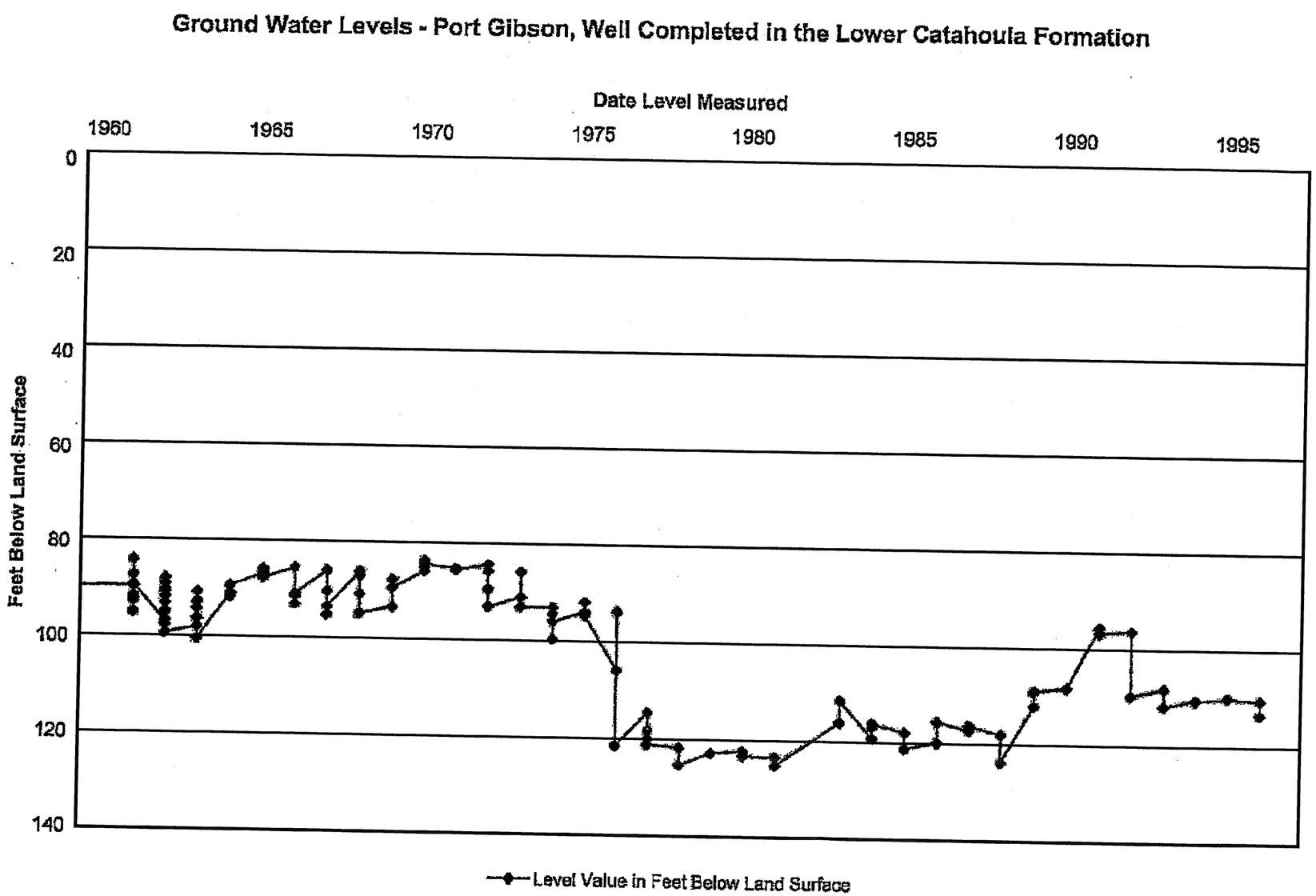
SITE SAFETY ANALYSIS REPORT

HYDROGRAPH OF A WELL COMPLETED IN THE MS RIVER ALLUVIAL AQUIFER, VICKSBURG, MS

FIGURE 2.4-34 REV. 1



SOURCE: USGS

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EARLY SITE PERMIT APPLICATION
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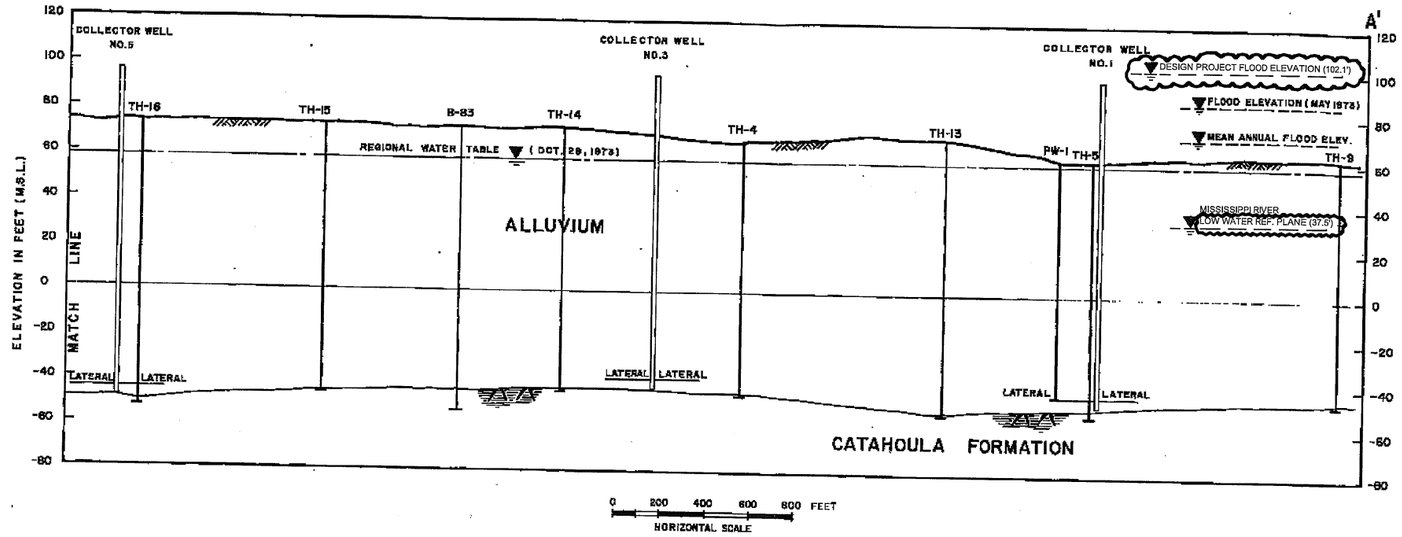
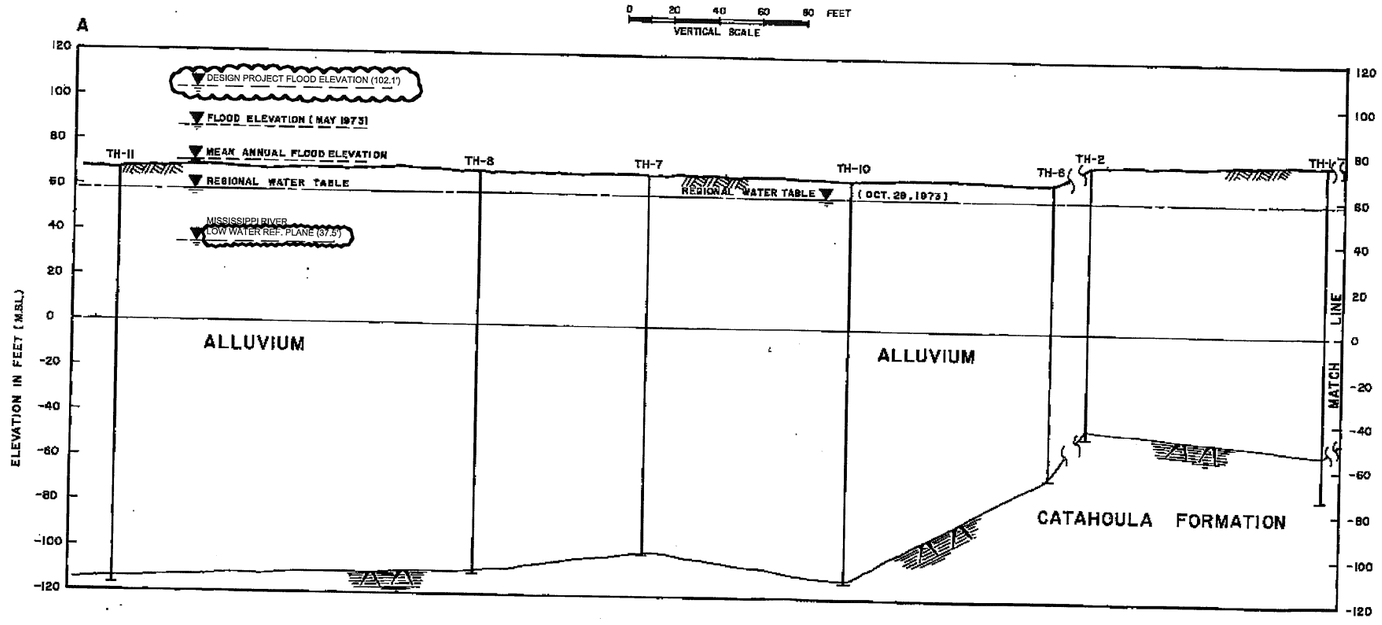
HYDROGRAPH OF A WELL COMPLETED IN THE LOWER CATAHOULA FORMATION, PORT GIBSON, MS

FIGURE 2.4-35 REV. 1





NOTES:
1. SEE REF. 1 AND 8 FOR SOURCE DATA & GGNS UFSAR FIGURE 2.4-28.
2. CLOUDS INDICATE ESP APPLICATION DATA.

SECTION LOCATION IS SHOWN IN (UFSAR FIGURE 2.4-27) FIGURE 2.4-33

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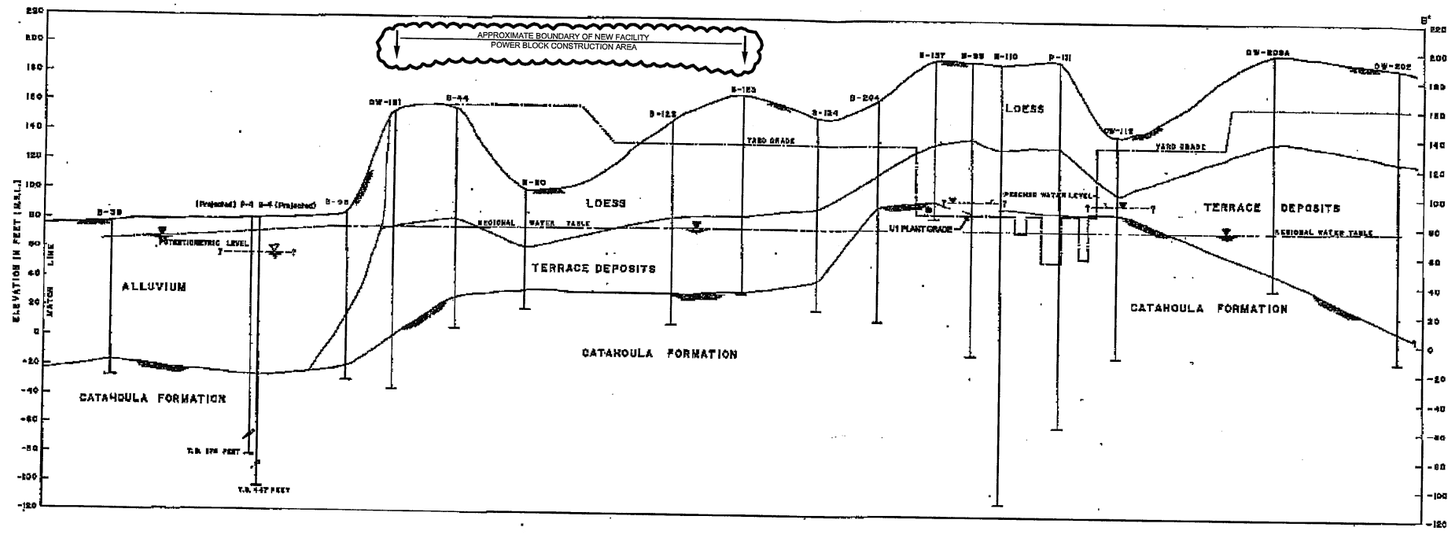
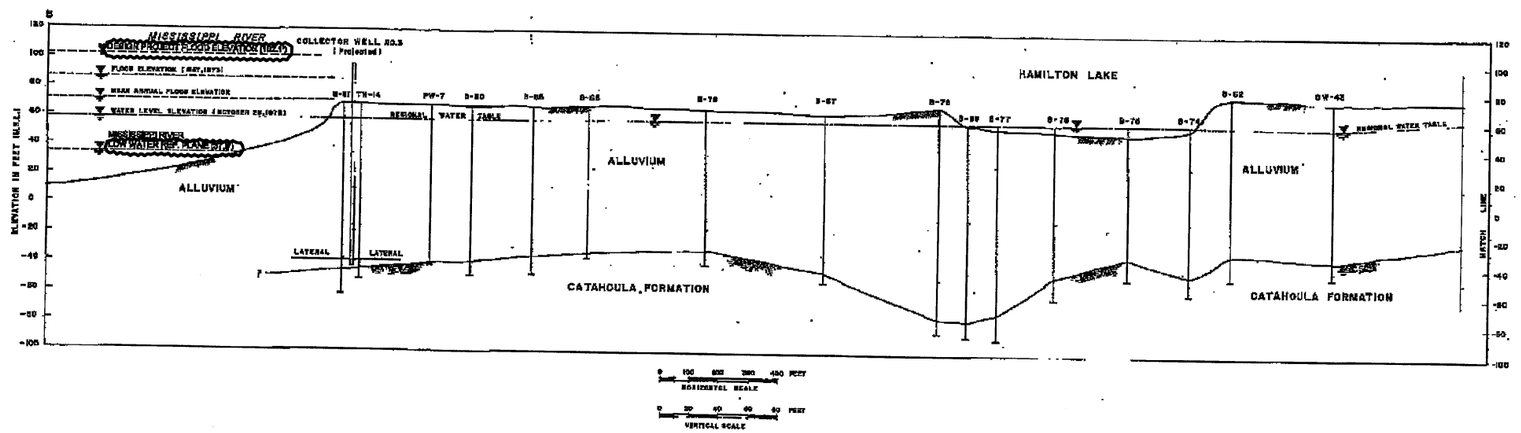
SITE SAFETY ANALYSIS REPORT

HYDROGEOLOGIC
CROSS SECTION A-A'
(UFSAR FIGURE 2.4-28)

FIGURE 2.4-36 REV. 1





NOTES:
1. SEE REF. 1 AND 8 FOR SOURCE DATA.
2. CLOUDS INDICATE ESP APPLICATION CHANGES.

SECTION LOCATION IS SHOWN IN (UFSAR FIGURE 2.4-27) FIGURE 2.4-33

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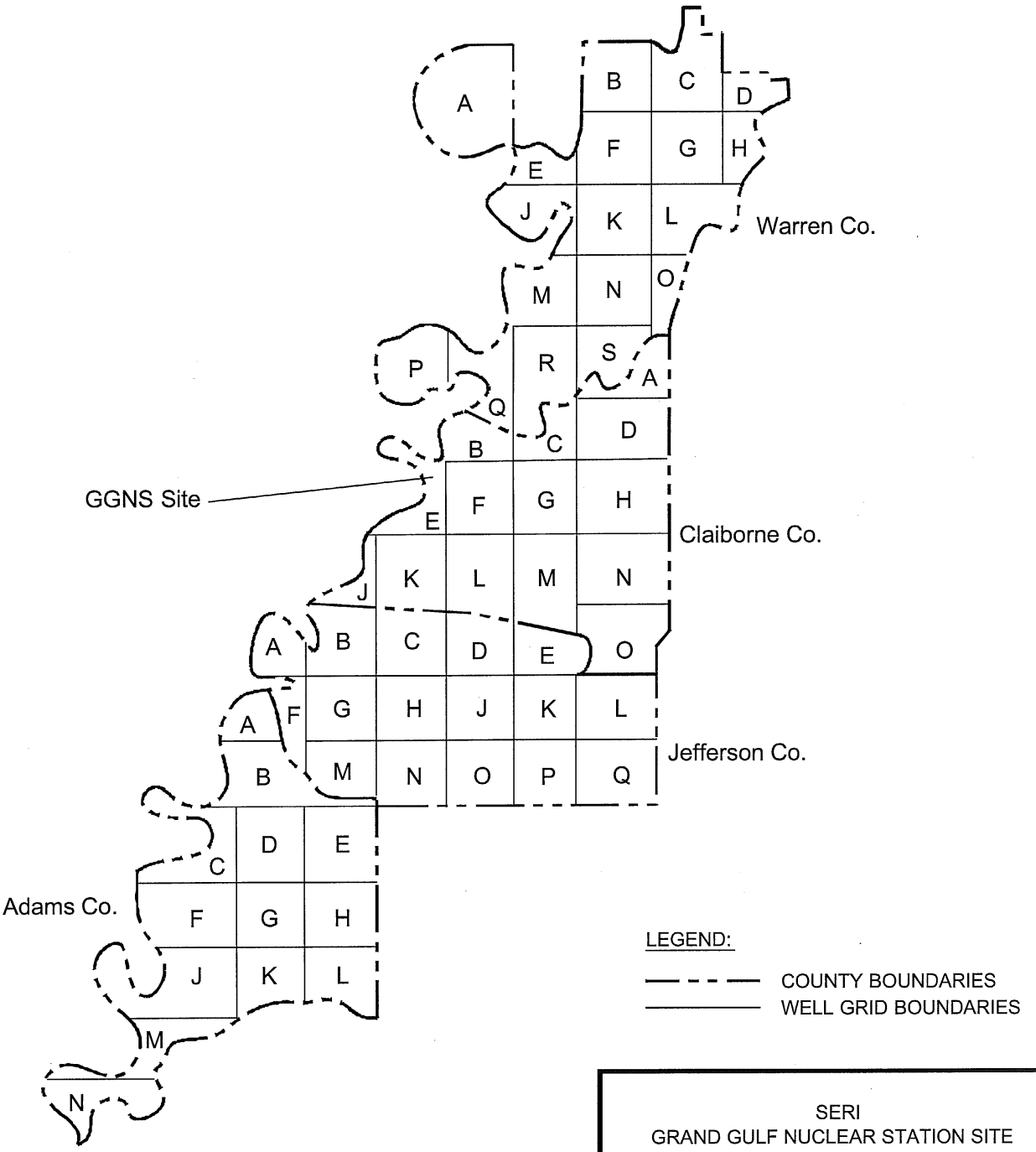
HYDROGEOLOGIC
CROSS SECTION B-B'
(UFSAR FIGURE 2.4-29)

FIGURE 2.4-37 REV. 1



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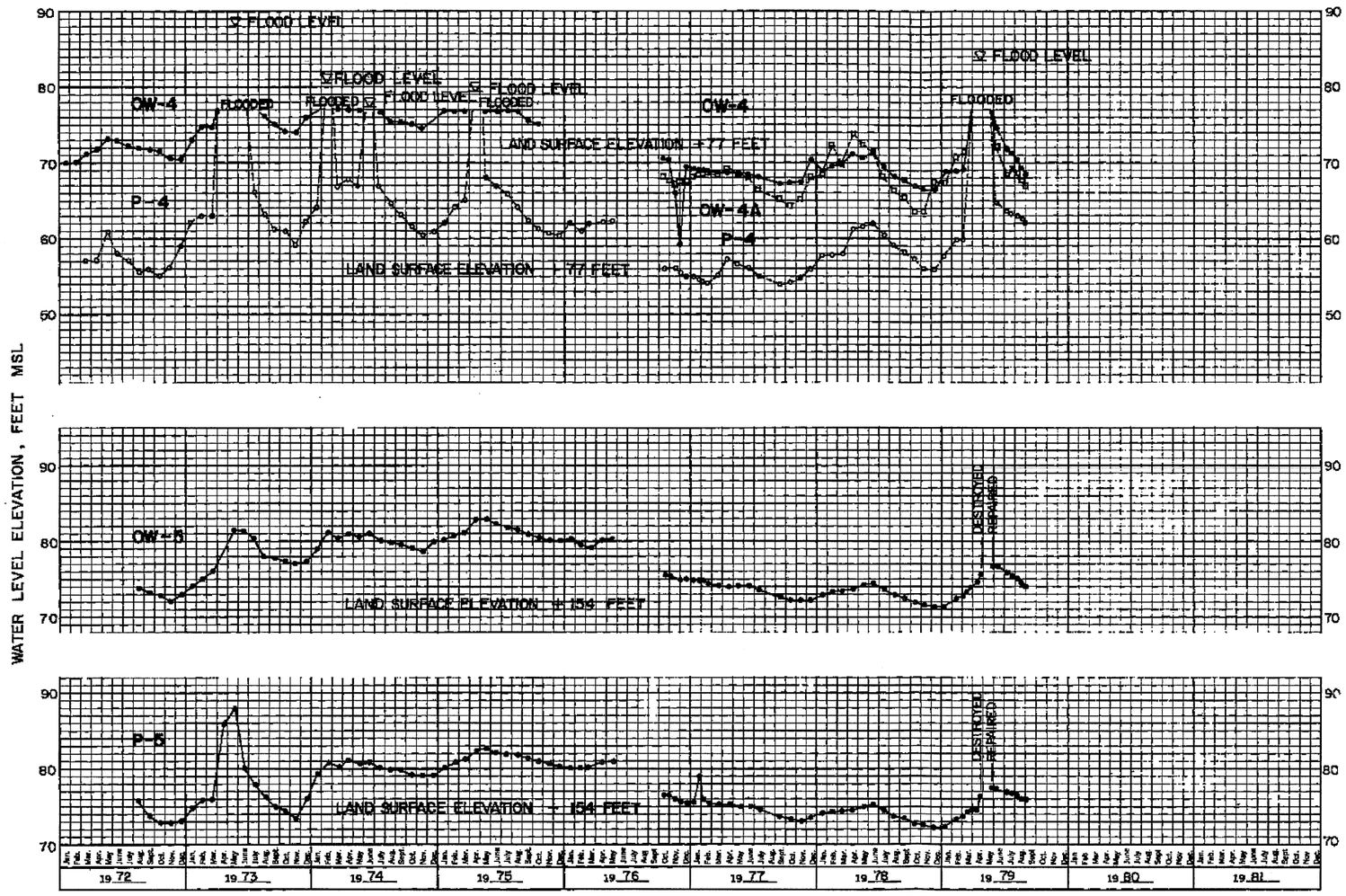
SITE SAFETY ANALYSIS REPORT

COUNTY WELL LOCATION GRID

Source: Adapted from Mississippi Industrial and Technological Research Commission, Water Research Bulletin 63-1

FIGURE 2.4-38 REV. 1



NOTES:
1. OBSERVATION WELL AND PIEZOMETER LOCATIONS ARE SHOWN IN FIGURE 2.4-33 (UFSAR FIGURE 2.4-27).

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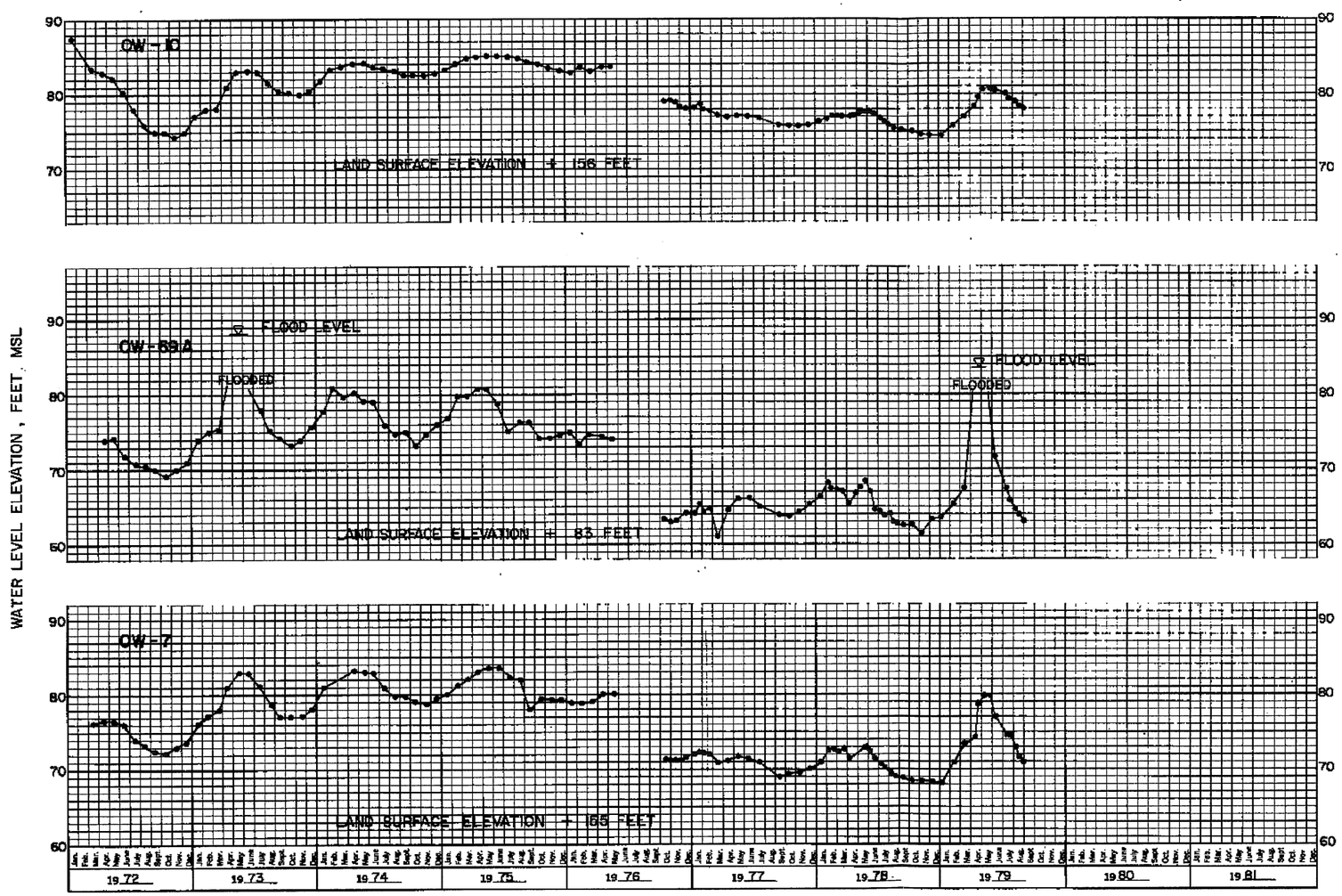
SITE SAFETY ANALYSIS REPORT

HYDROGRAPHS OF WELLS AND PIEZOMETERS
(UFSAR FIGURE 2.4-32, SH.1)

FIGURE 2.4-39 SHEET 1 OF 5 REV. 1



NOTES:
1. OBSERVATION WELL AND PIEZOMETER LOCATIONS ARE SHOWN IN FIGURE 2.4-33 (UFSAR FIGURE 2.4-27).

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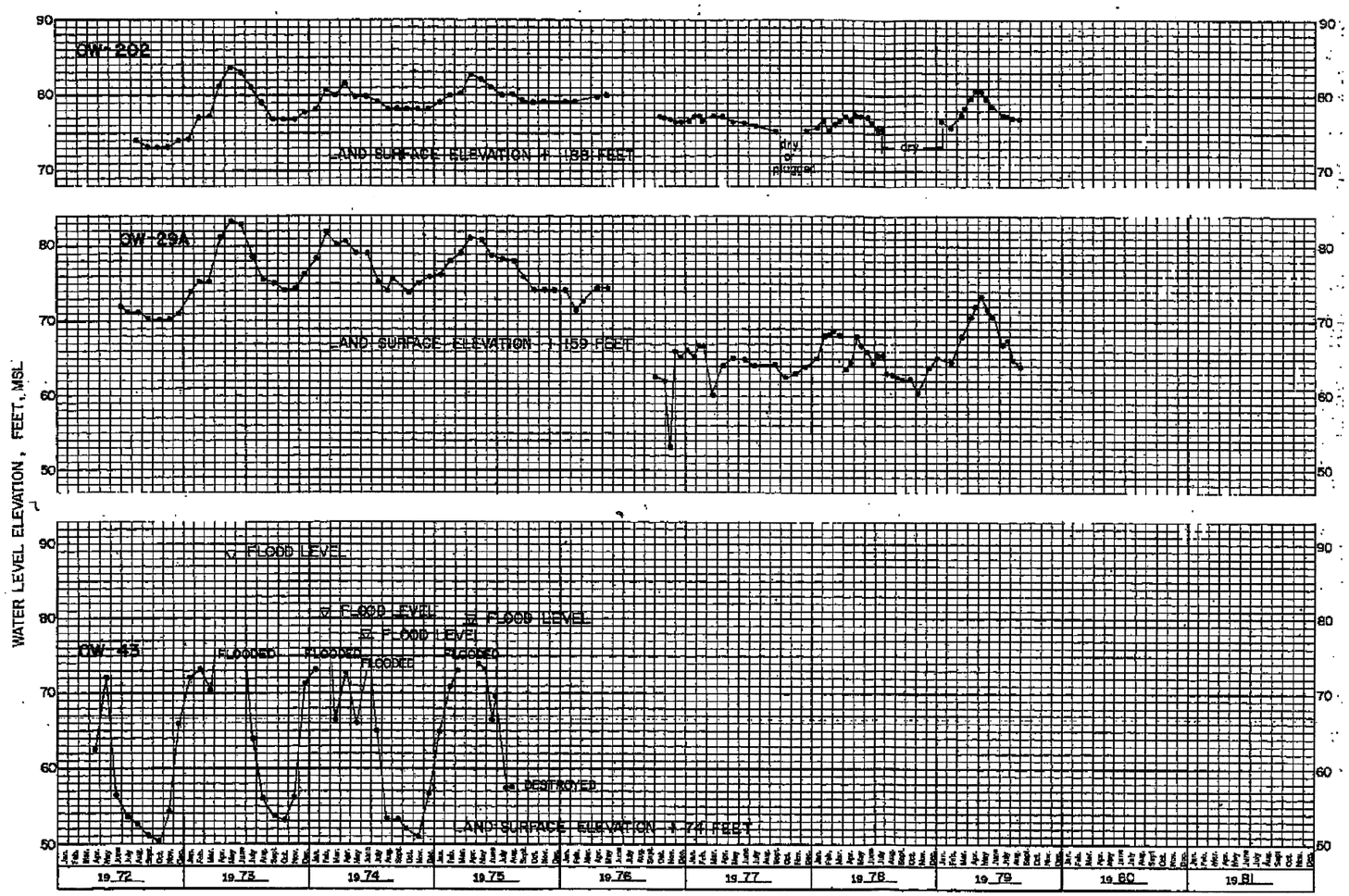
EARLY SITE PERMIT APPLICATION
SITE SAFETY ANALYSIS REPORT

HYDROGRAPHS OF WELLS AND PIEZOMETERS
(UFSAR FIGURE 2.4-32. SH.2)

FIGURE 2.4-39 SHEET 2 OF 5 REV. 1



NOTES:
1. OBSERVATION WELL AND PIEZOMETER LOCATIONS ARE SHOWN IN FIGURE 2.4-33 (UFSAR FIGURE 2.4-27).

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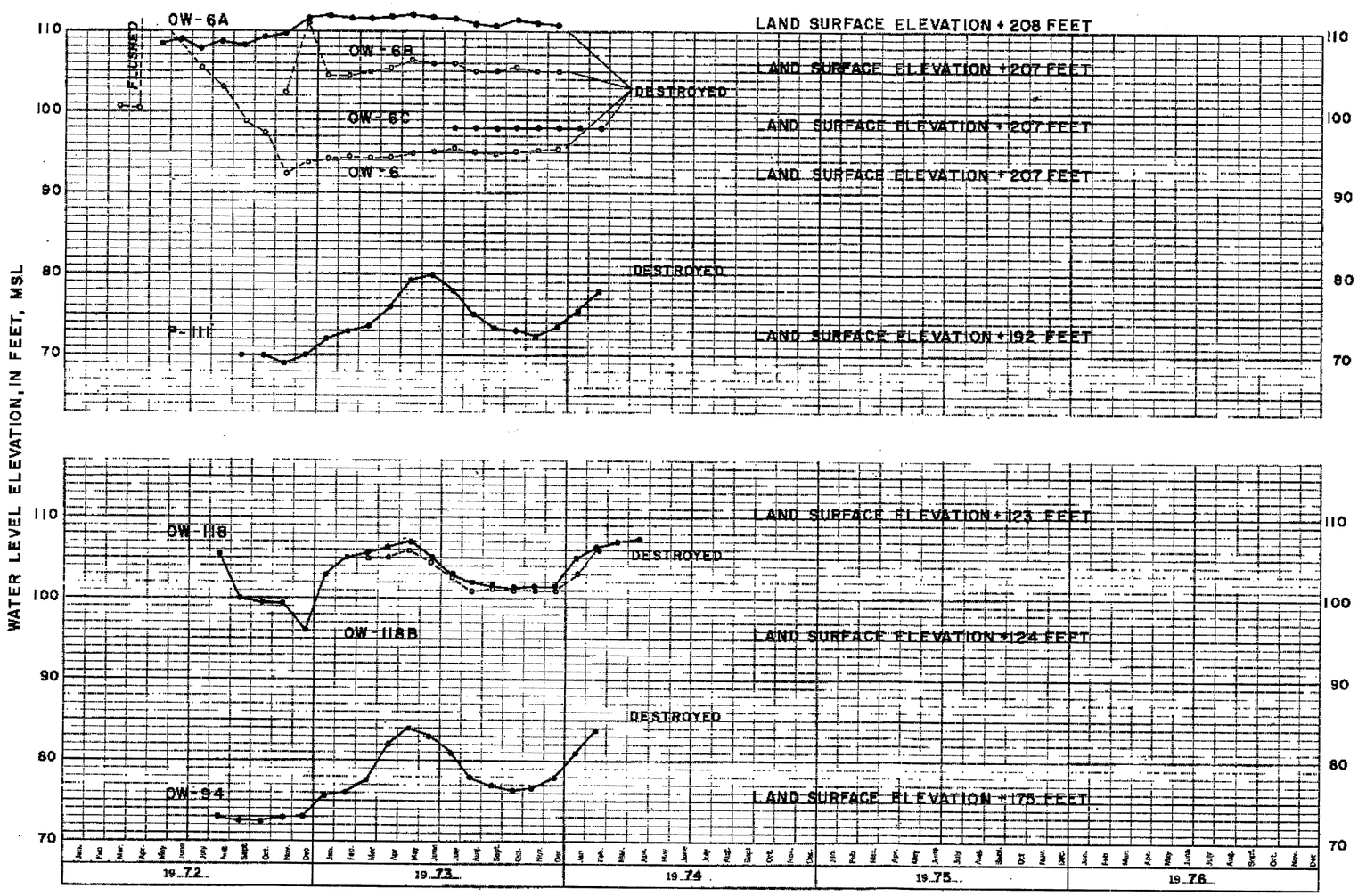
EARLY SITE PERMIT APPLICATION
SITE SAFETY ANALYSIS REPORT

HYDROGRAPHS OF REPLACEMENT PIEZOMETERS
(UFSAR FIGURE 2.4-32, SH.3)

FIGURE 2.4-39 SHEET 3 OF 5 REV. 1



NOTES:
1. OBSERVATION WELL AND PIEZOMETER LOCATIONS ARE SHOWN IN FIGURE 2.4-33 (UFSAR FIGURE 2.4-27).

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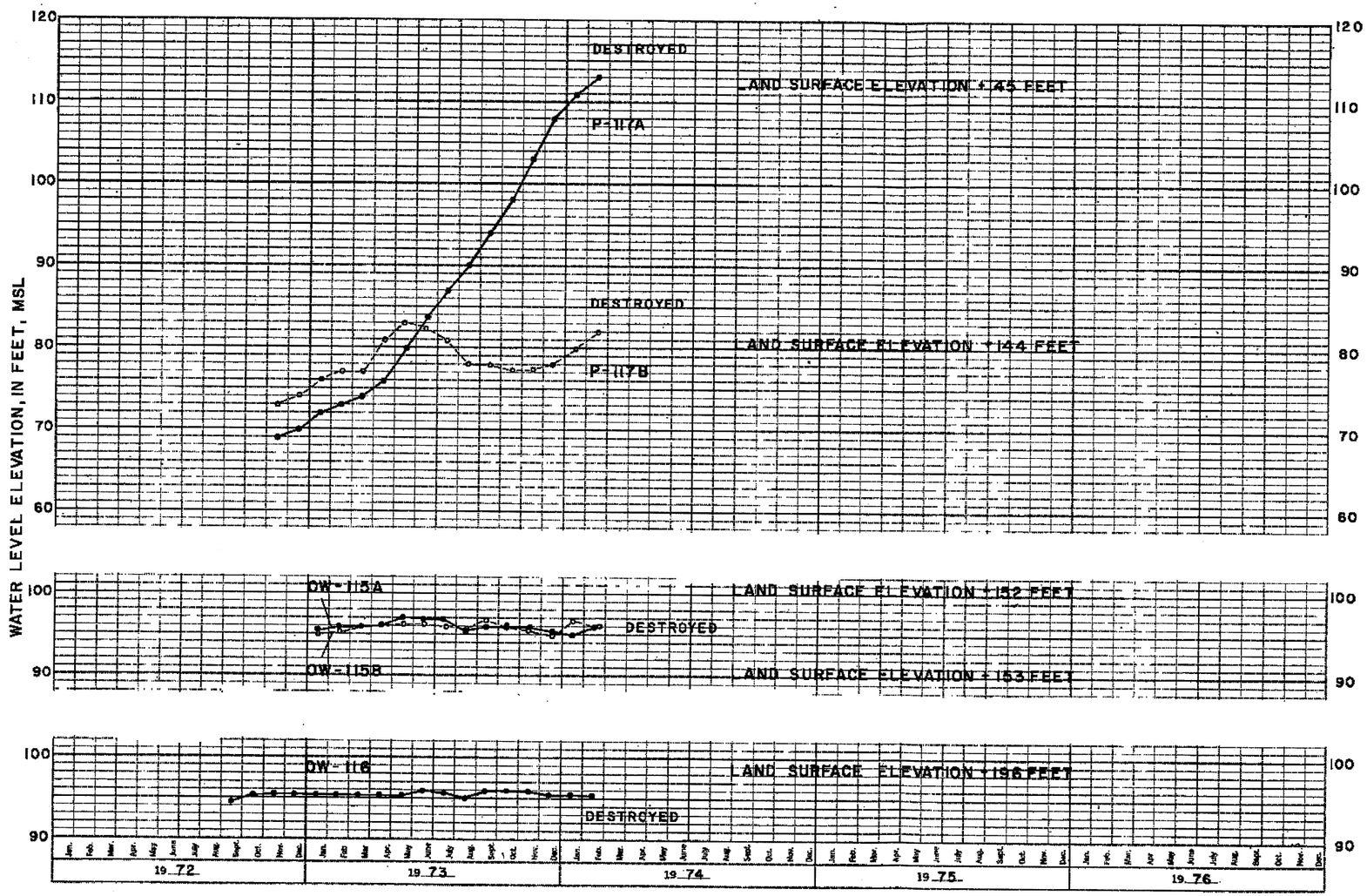
SITE SAFETY ANALYSIS REPORT

HYDROGRAPHS OF WELLS AND PIEZOMETERS
(UFSAR FIGURE 2.4-32, SH.4)

FIGURE 2.4-39 SHEET 4 OF 5 REV. 1



NOTES:
1. OBSERVATION WELL AND PIEZOMETER LOCATIONS ARE SHOWN IN FIGURE 2.4-33 (UFSAR FIGURE 2.4-27).

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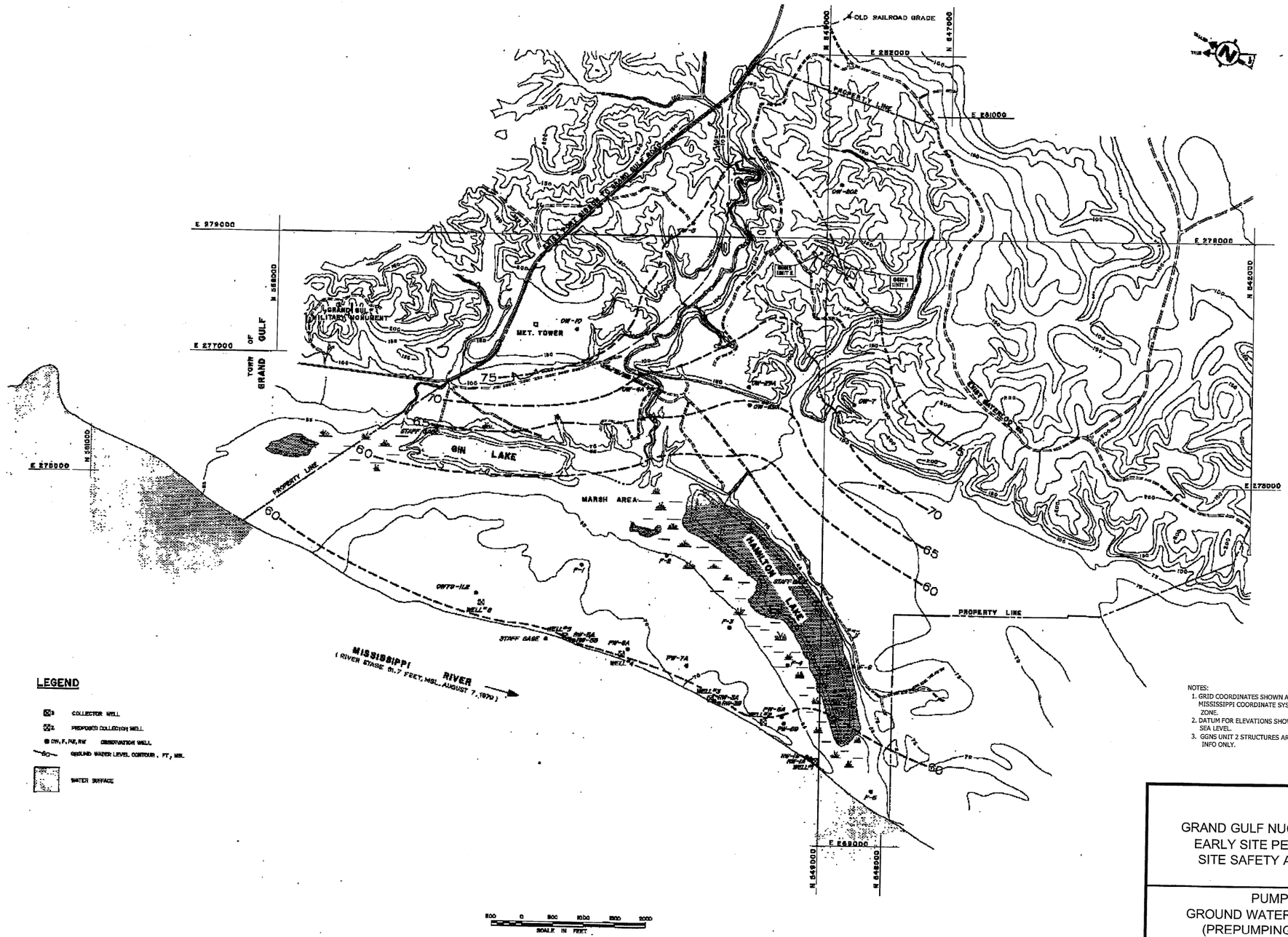
HYDROGRAPHS OF WELLS AND PIEZOMETERS
(UFSAR FIGURE 2.4-32, SH.5)

FIGURE 2.4-39 SHEET 5 OF 5 REV. 1



NOTES:
1. GRID COORDINATES SHOWN ARE BASED ON MISSISSIPPI COORDINATE SYSTEM, WEST ZONE.
2. DATUM FOR ELEVATIONS SHOWN IS MEAN SEA LEVEL.
3. GGNS UNIT 2 STRUCTURES ARE SHOWN FOR INFO ONLY.

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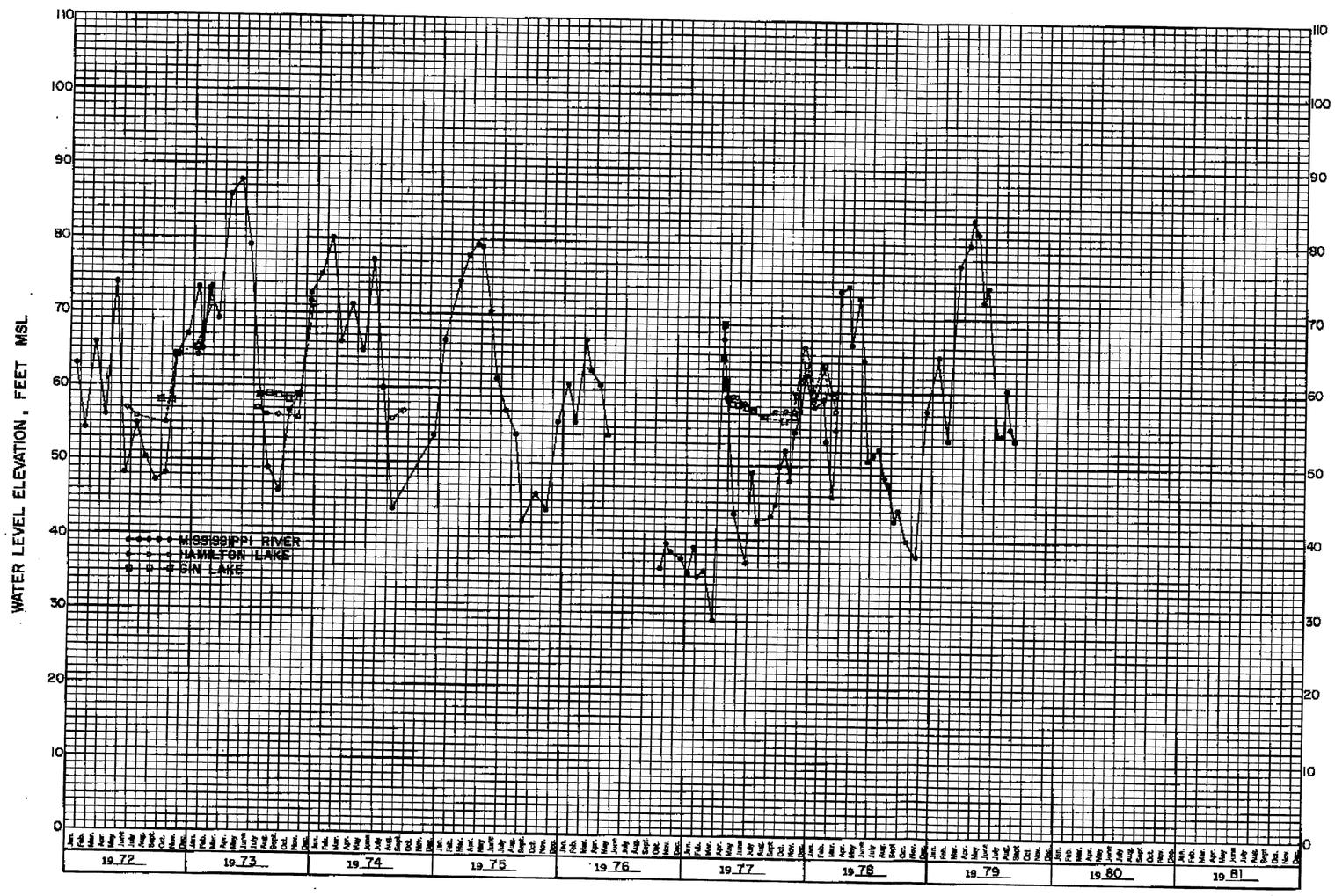
PUMPOUT TEST
GROUND WATER LEVEL CONTOURS
(PREPUMPING STATIC LEVELS)
AUGUST 7, 1979
(UFSAR FIGURE 2.4-38)

FIGURE 2.4-40 REV. 1



NOTES:

1. LOCATIONS OF MISSISSIPPI RIVER, HAMILTON & GIN LAKES ARE SHOWN IN FIGURE 2.4-33 (UFSAR FIGURE 2.4-27).

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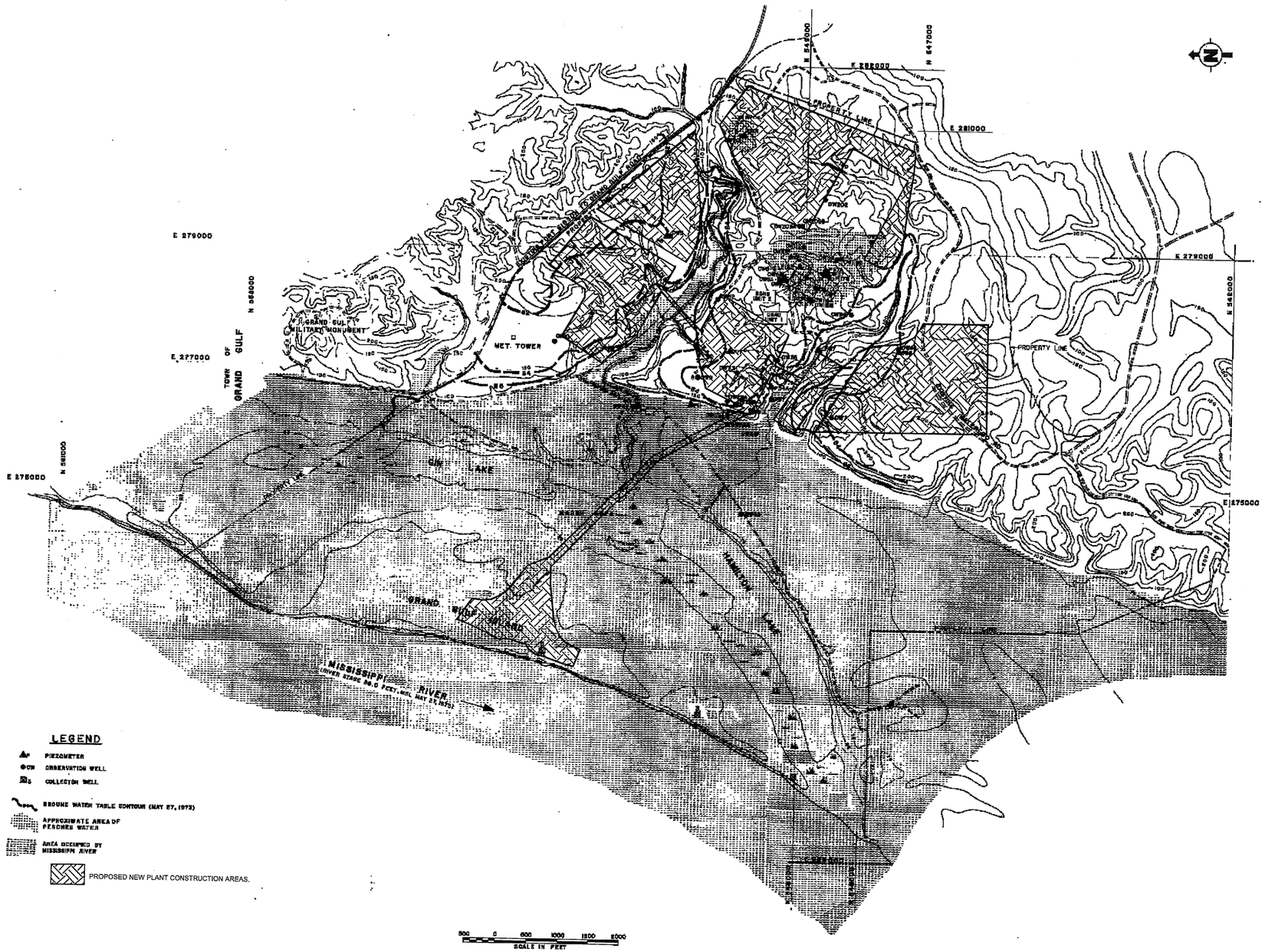
HYDROGRAPHS OF MISSISSIPPI RIVER, GIN LAKE, AND HAMILTON LAKE (UFSAR FIGURE 2.4-33)

FIGURE 2.4-41 REV. 1



NOTES:
1. GRID COORDINATES SHOWN ARE BASED ON MISSISSIPPI COORDINATE SYSTEM, WEST ZONE.
2. DATUM FOR ELEVATIONS SHOWN IS MEAN SEA LEVEL.
3. GGNS UNIT 2 STRUCTURES ARE SHOWN FOR INFO ONLY.

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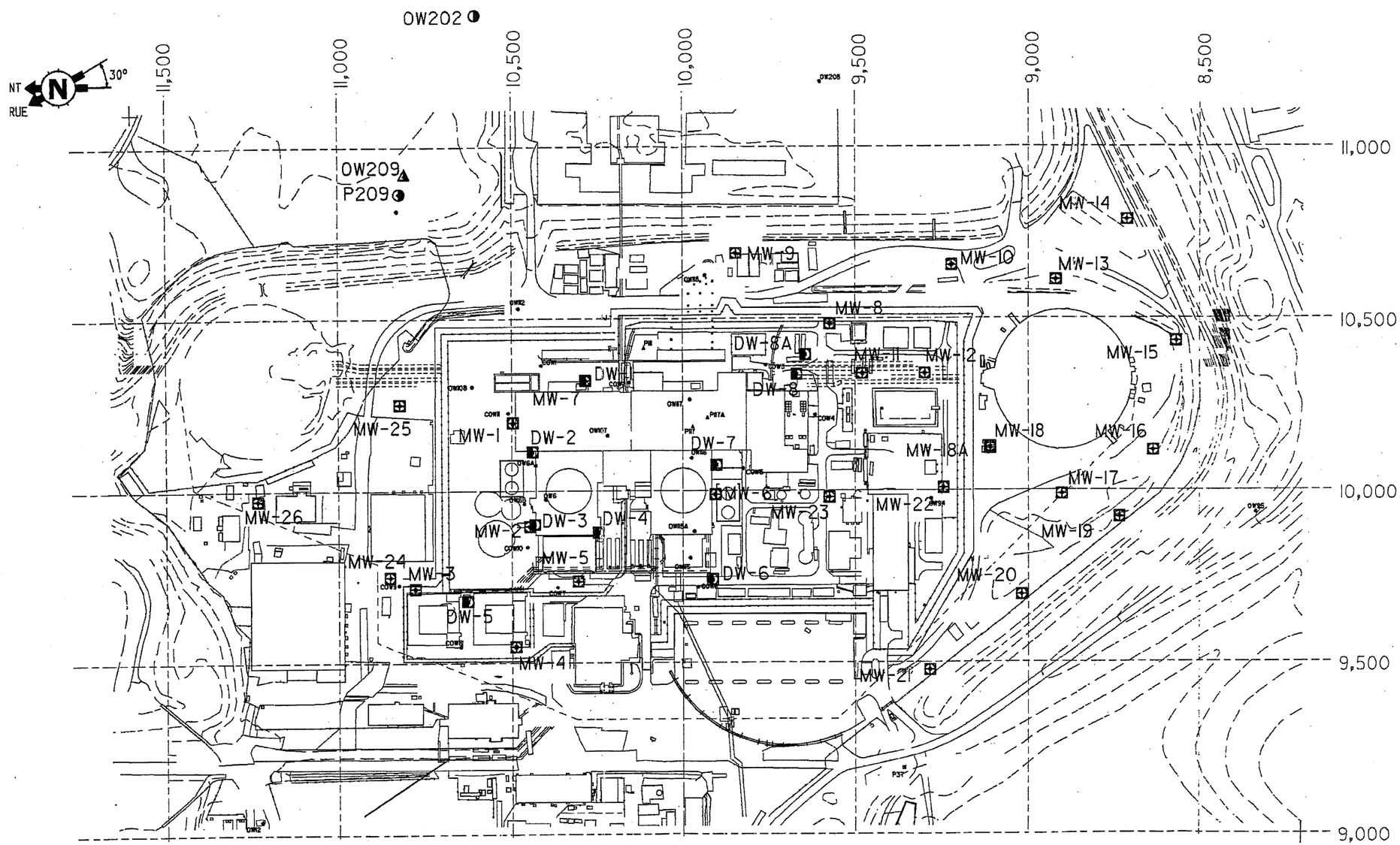
SITE HYDROLOGIC FEATURES
FLOOD CONDITIONS MAY 1973
(UFSAR FIGURE 2.4-34)

FIGURE 2.4-42 REV. 1



LEGEND

- HISTORICAL MONITORING WELL - CATAHOULA FORMATION
- HISTORICAL MONITORING WELL - TERRACE DEPOSITS
- MONITORING WELL
- DEWATERING WELL
- TIE-BACK WALL PROJECTION

0 100 200 300
SCALE IN FEET

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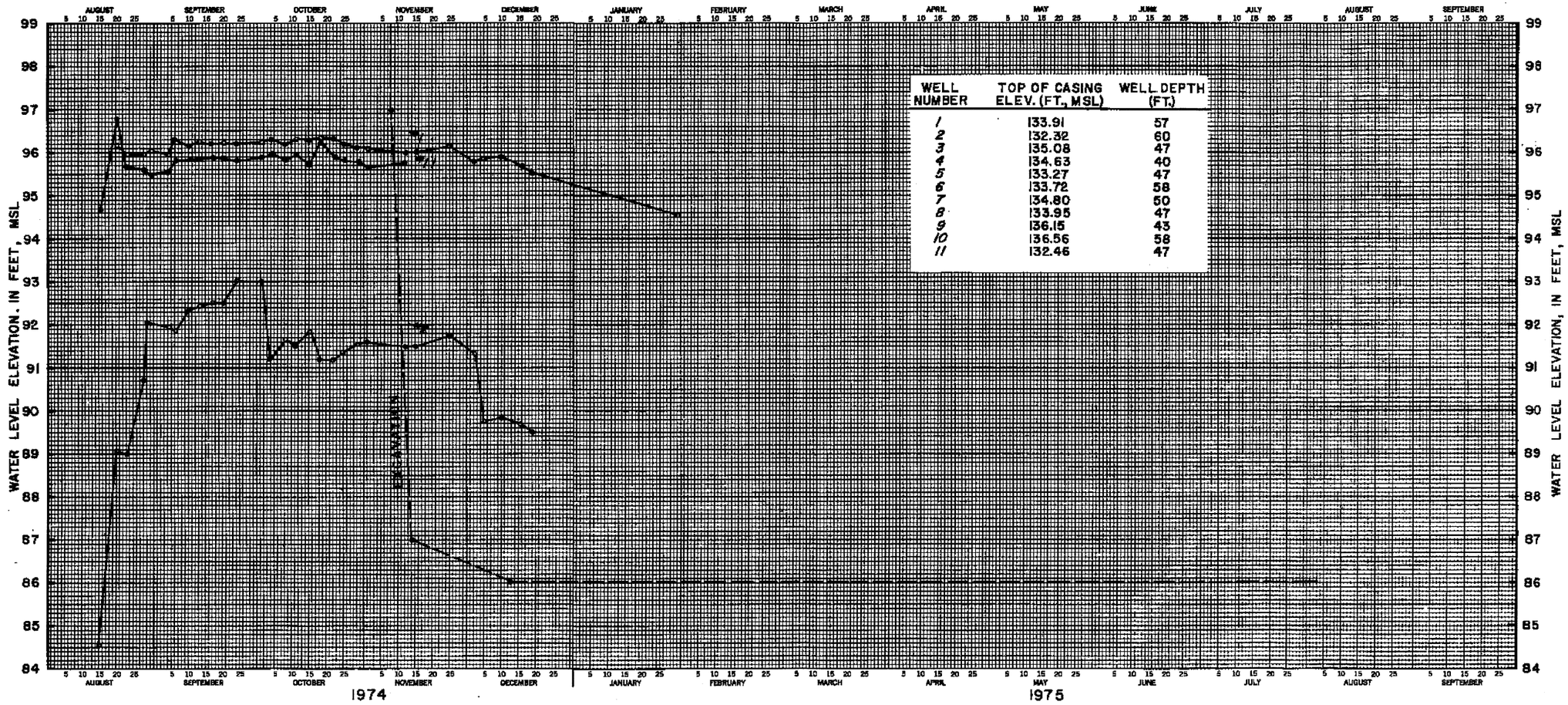
GGNS UNIT 1 PLANT SITE
WELL PLAN
(UFSAR FIGURE 2.4-35c)

FIGURE 2.4-43 REV. 1



WELL NUMBER	TOP OF CASING ELEV. (FT., MSL)	WELL DEPTH (FT.)
1	133.91	57
2	132.32	60
3	135.08	47
4	134.63	40
5	133.27	47
6	133.72	58
7	134.80	50
8	133.95	47
9	136.15	43
10	136.56	58
11	132.46	47

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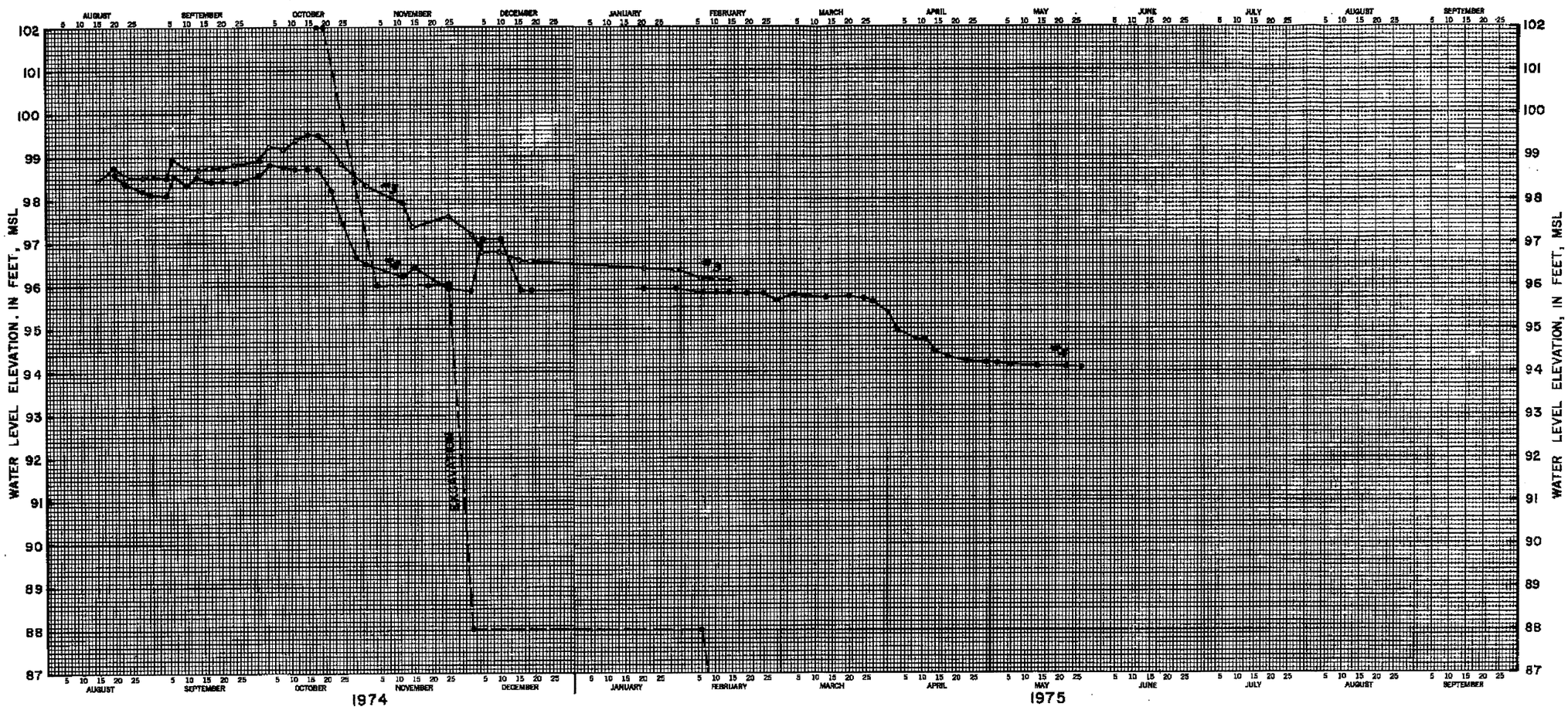
HYDROGRAPHS OF
CONSTRUCTION OBSERVATION WELLS
(UFSAR FIGURE 2.4-36, SH.1)

FIGURE 2.4-44 SHEET 1 OF 5 REV. 1



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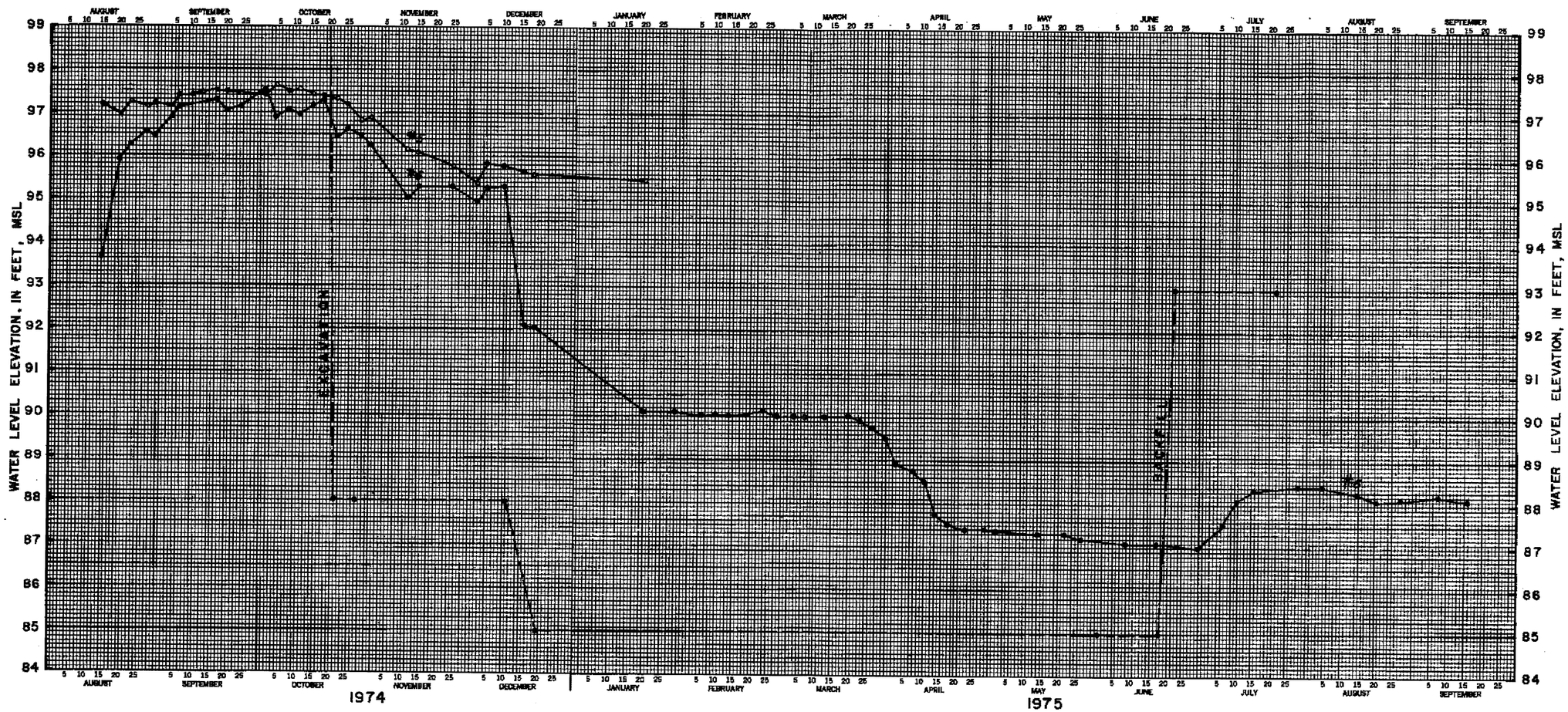
HYDROGRAPHS OF
CONSTRUCTION OBSERVATION WELLS
(UFSAR FIGURE 2.4-36, SH.2)

FIGURE 2.4-44 SHEET 2 OF 5 REV. 1



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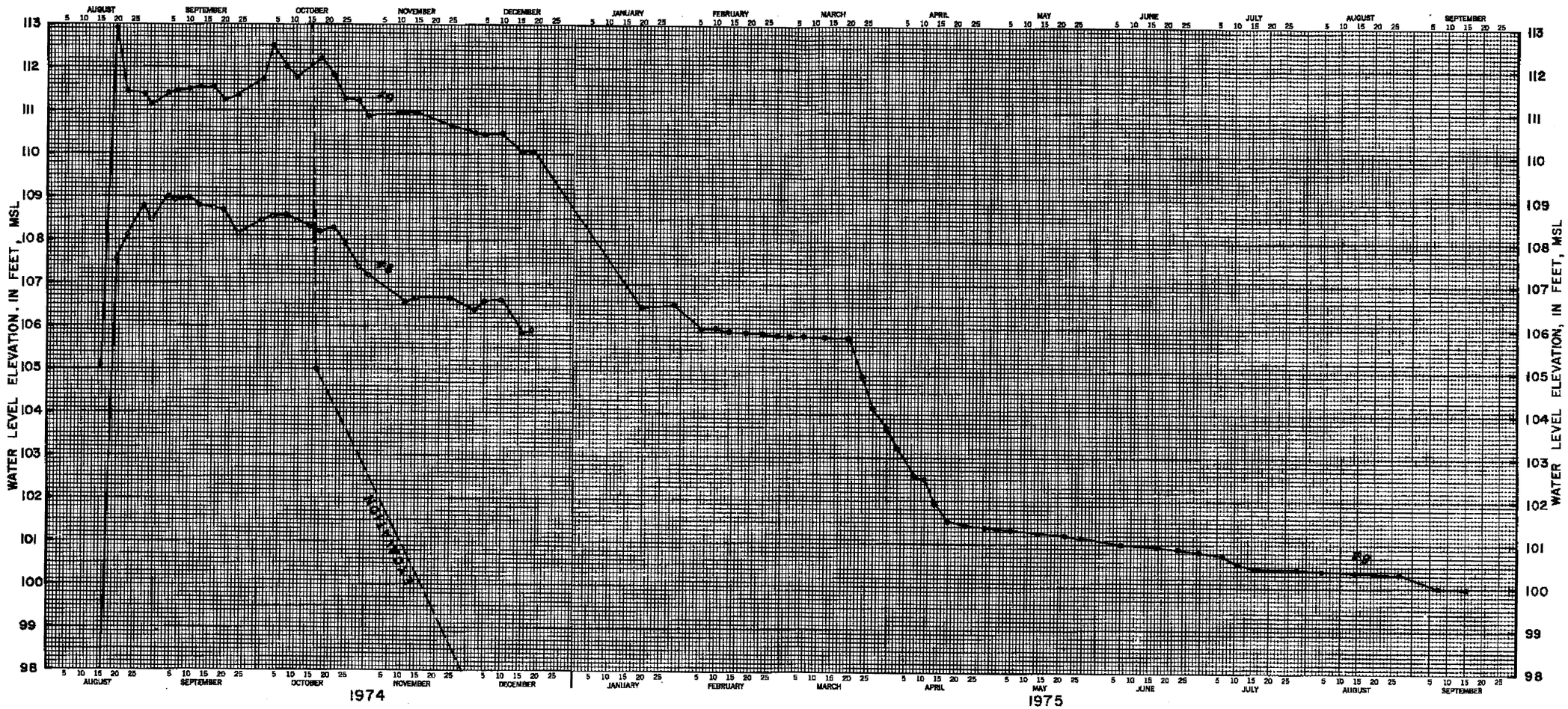
HYDROGRAPHS OF
CONSTRUCTION OBSERVATION WELLS
(UFSAR FIGURE 2.4-36, SH.3)

FIGURE 2.4-44 SHEET 3 OF 5 REV. 1



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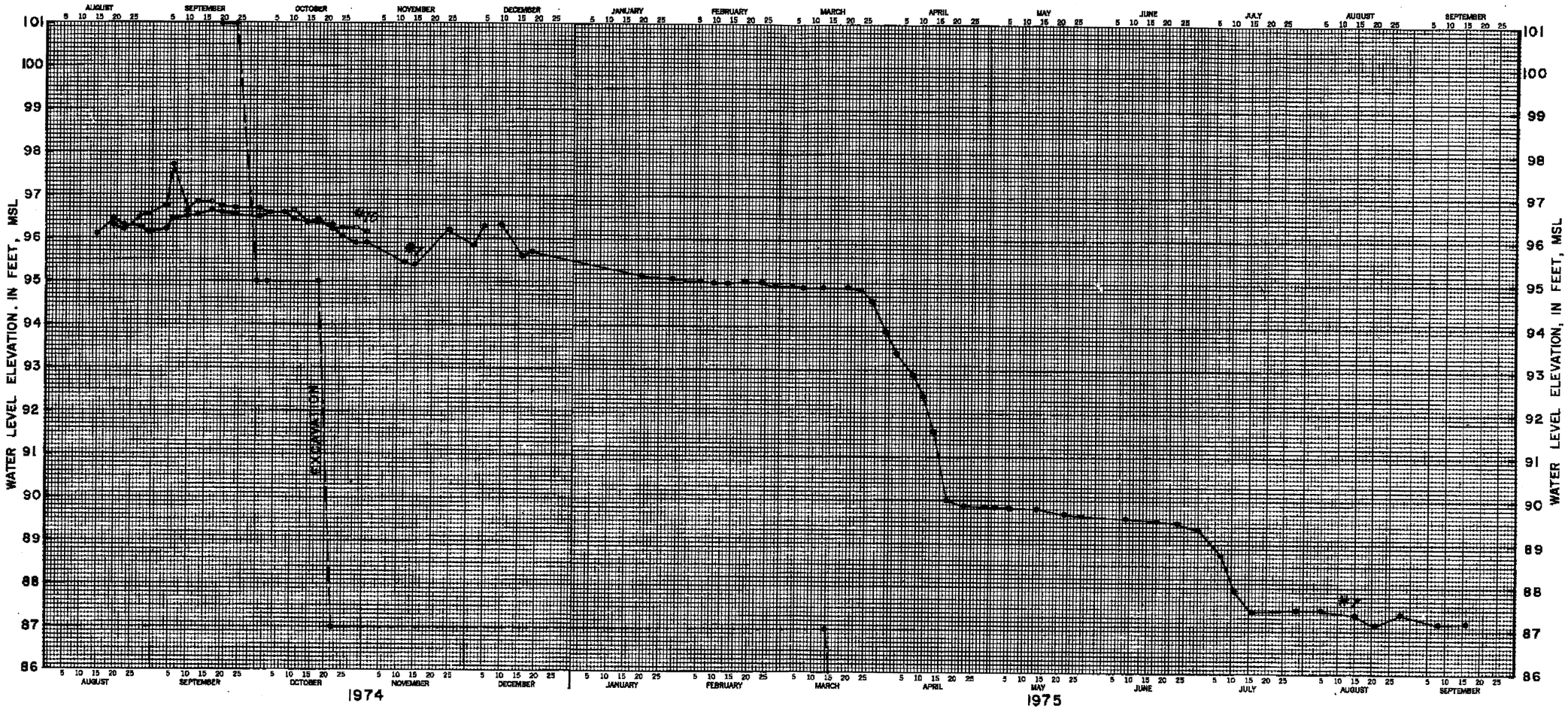
HYDROGRAPHS OF
CONSTRUCTION OBSERVATION WELLS
(UFSAR FIGURE 2.4-36, SH.4)

FIGURE 2.4-44 SHEET 4 OF 5 REV. 1



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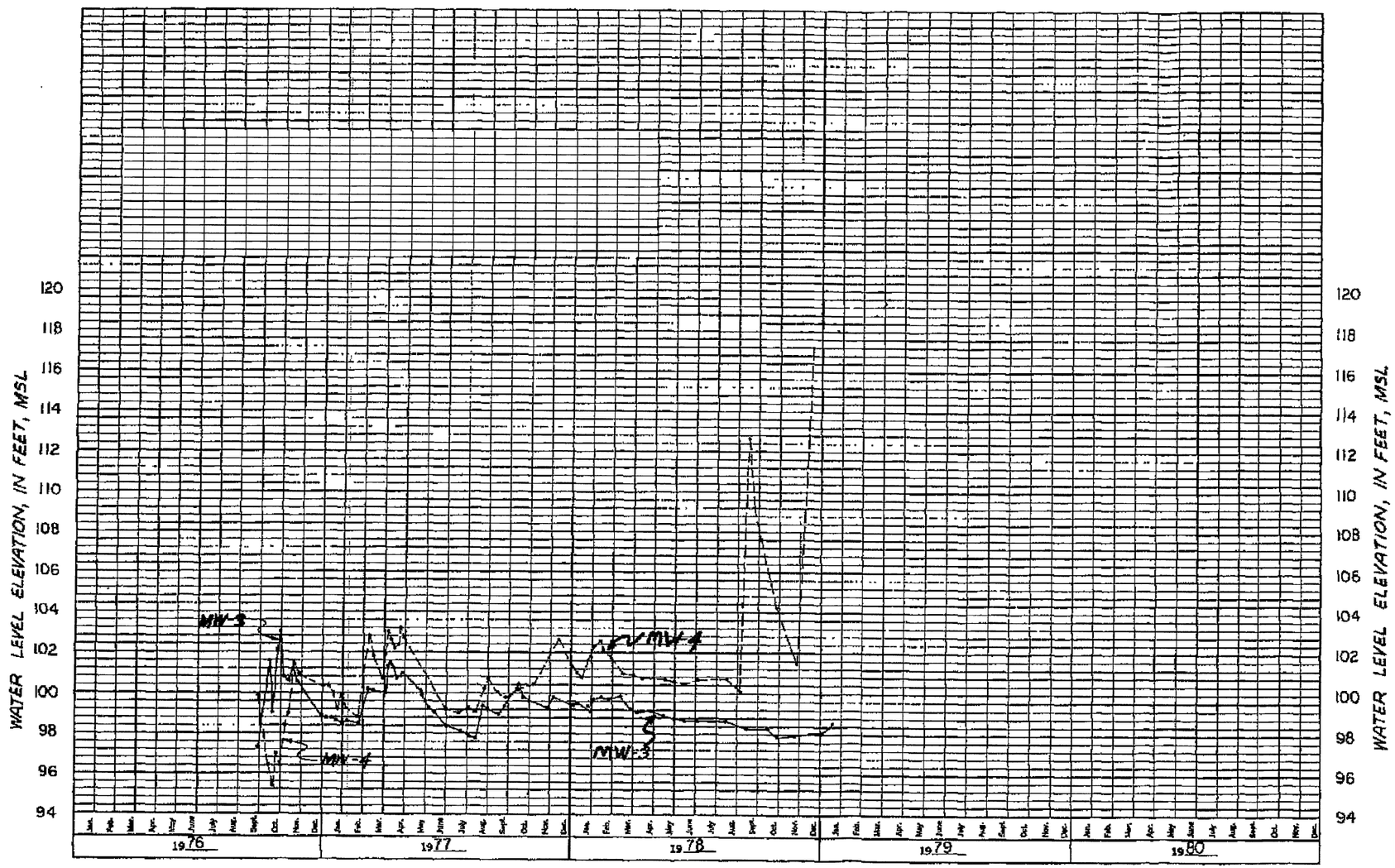
HYDROGRAPHS OF
CONSTRUCTION OBSERVATION WELLS
(UFSAR FIGURE 2.4-36, SH.5)

FIGURE 2.4-44 SHEET 5 OF 5 REV. 1



NOTES:

1. OBSERVATION WELLS MW-1 AND MW-2 WERE DRY FROM SEPT., 1976 TO JAN., 1979.
2. OBSERVATION WELL LOCATIONS SHOWN ON FIGURE 2.4-43 (UFSAR FIGURE 2.4-35c).
3. TEMPORARY SITE DRAINAGE CAUSES RECHARGE INTO FILL NEAR MW-4. AREA TO BE REGRADED NEAR MW-4 FEB., 1979.

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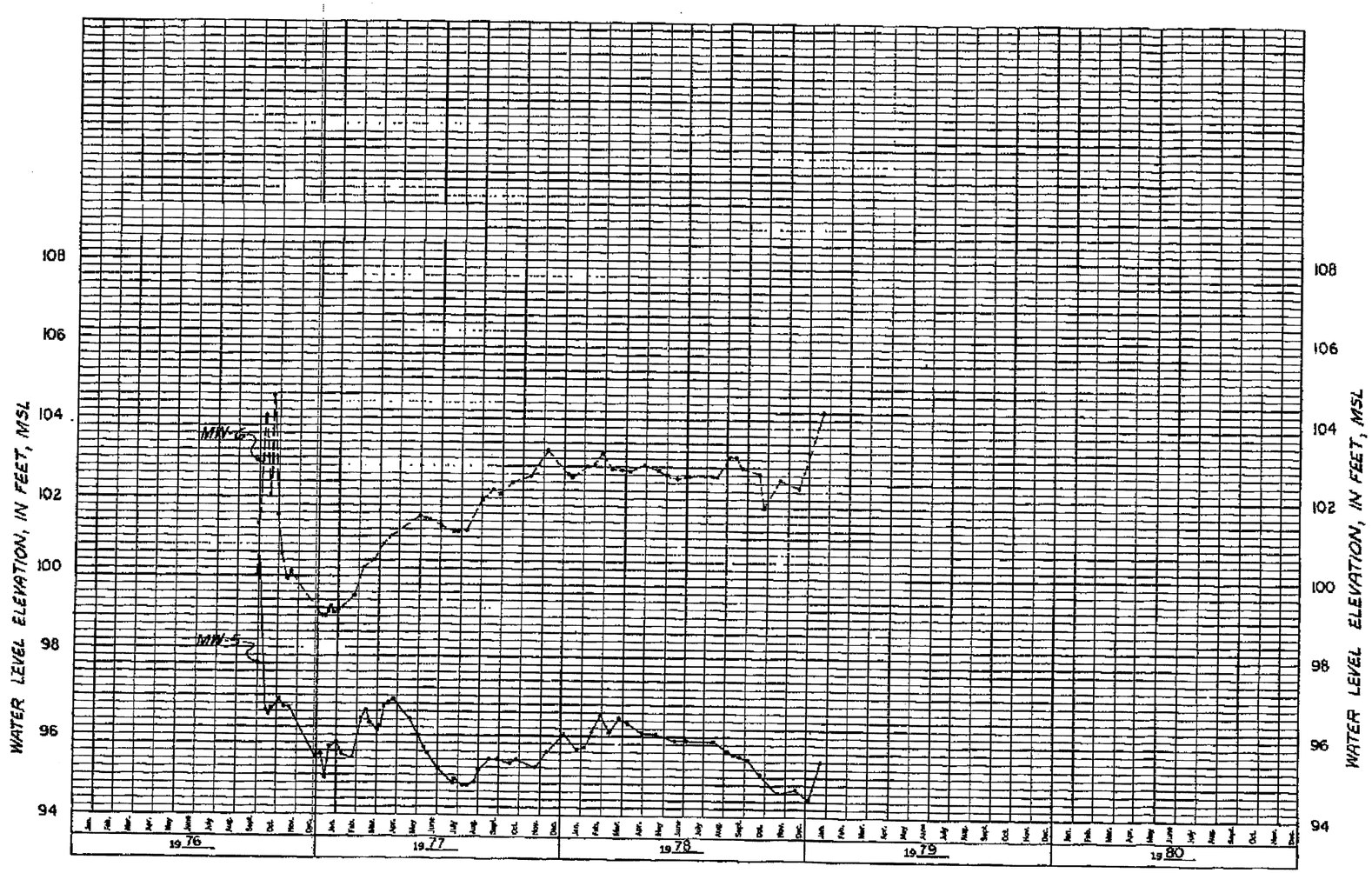
HYDROGRAPHS OF REPLACEMENT OBSERVATION WELLS MW-3 AND MW-4 (UFSAR FIGURE 2.4-36a, SH.1)

FIGURE 2.4-45 SHEET 1 OF 2 REV. 1



NOTES:
1. OBSERVATION WELL LOCATIONS SHOWN ON FIGURE 2.4-43 (UFSAR FIGURE 2.4-35c).

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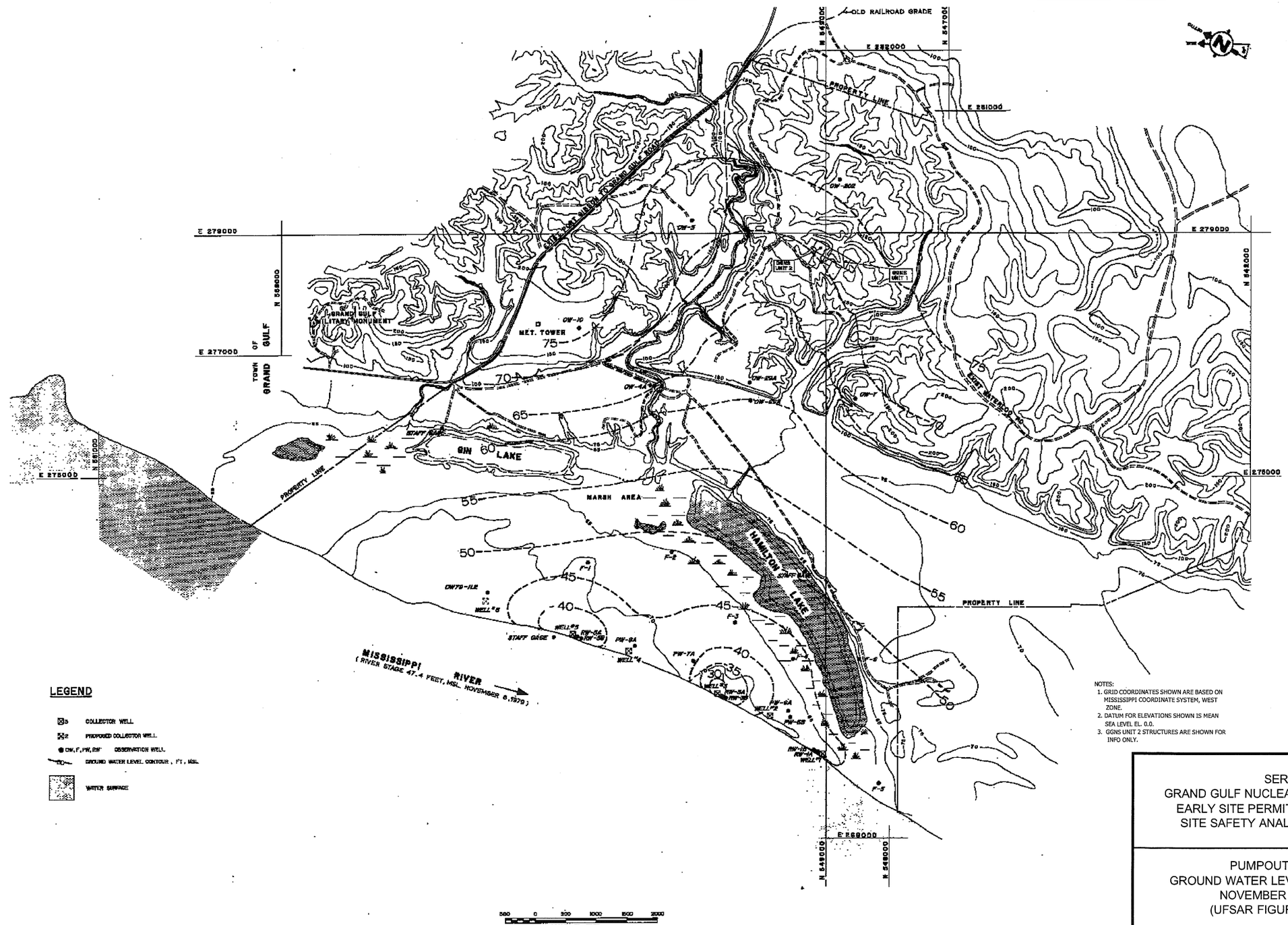
HYDROGRAPHS OF REPLACEMENT OBSERVATION WELLS MW-5 AND MW-6 (UFSAR FIGURE 2.4-36a, SH.2)

FIGURE 2.4-45 SHEET 2 OF 2 REV. 1



NOTES:
1. GRID COORDINATES SHOWN ARE BASED ON MISSISSIPPI COORDINATE SYSTEM, WEST ZONE.
2. DATUM FOR ELEVATIONS SHOWN IS MEAN SEA LEVEL EL. 0.0.
3. GGNS UNIT 2 STRUCTURES ARE SHOWN FOR INFO ONLY.

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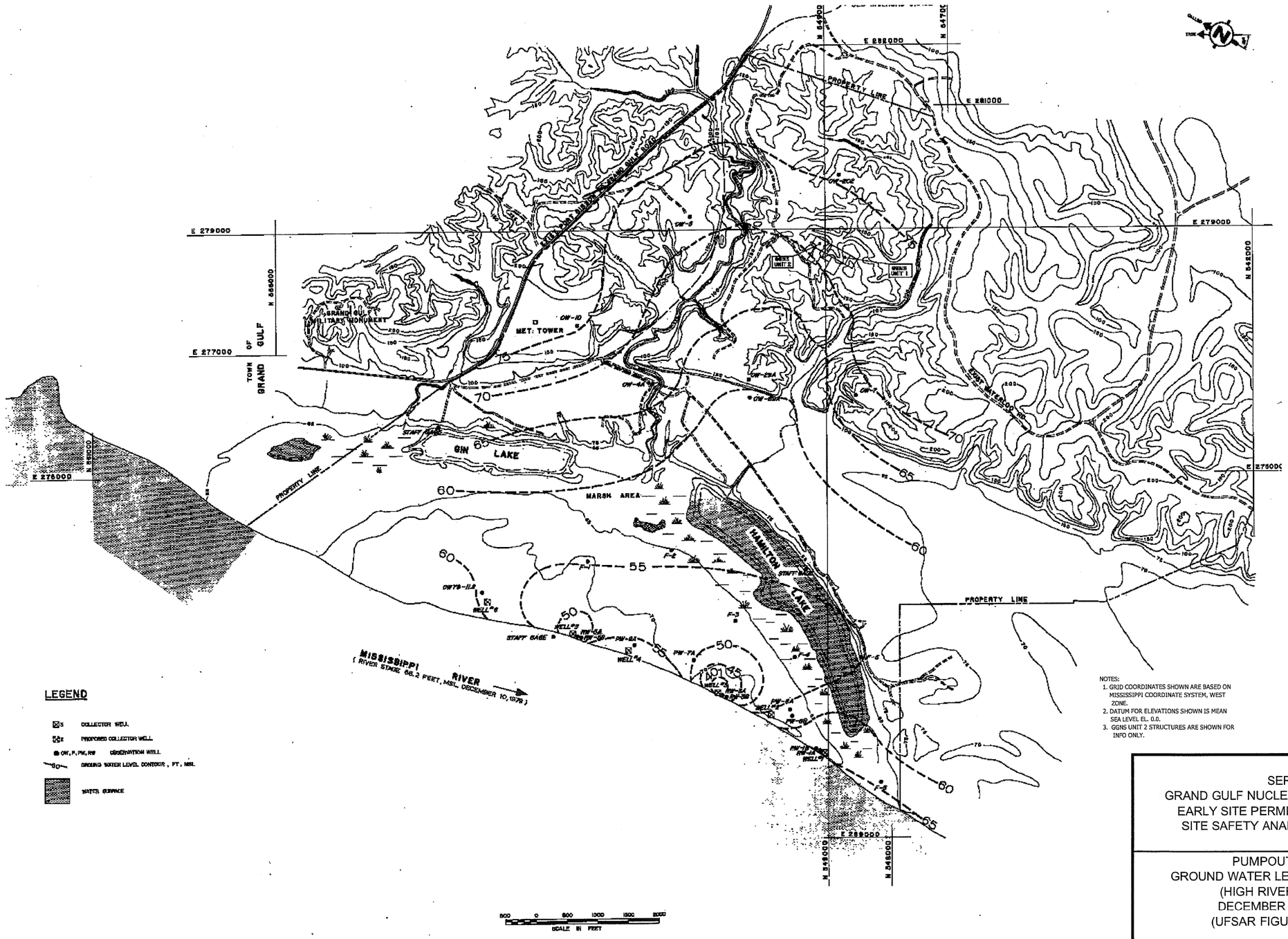
PUMPOUT TEST
GROUND WATER LEVEL CONTOURS
NOVEMBER 6 , 1979
(UFSAR FIGURE 2.4-39)

FIGURE 2.4-46 REV. 1



NOTES:
1. GRID COORDINATES SHOWN ARE BASED ON MISSISSIPPI COORDINATE SYSTEM, WEST ZONE.
2. DATUM FOR ELEVATIONS SHOWN IS MEAN SEA LEVEL EL. 0.0.
3. GGNS UNIT 2 STRUCTURES ARE SHOWN FOR INFO ONLY.

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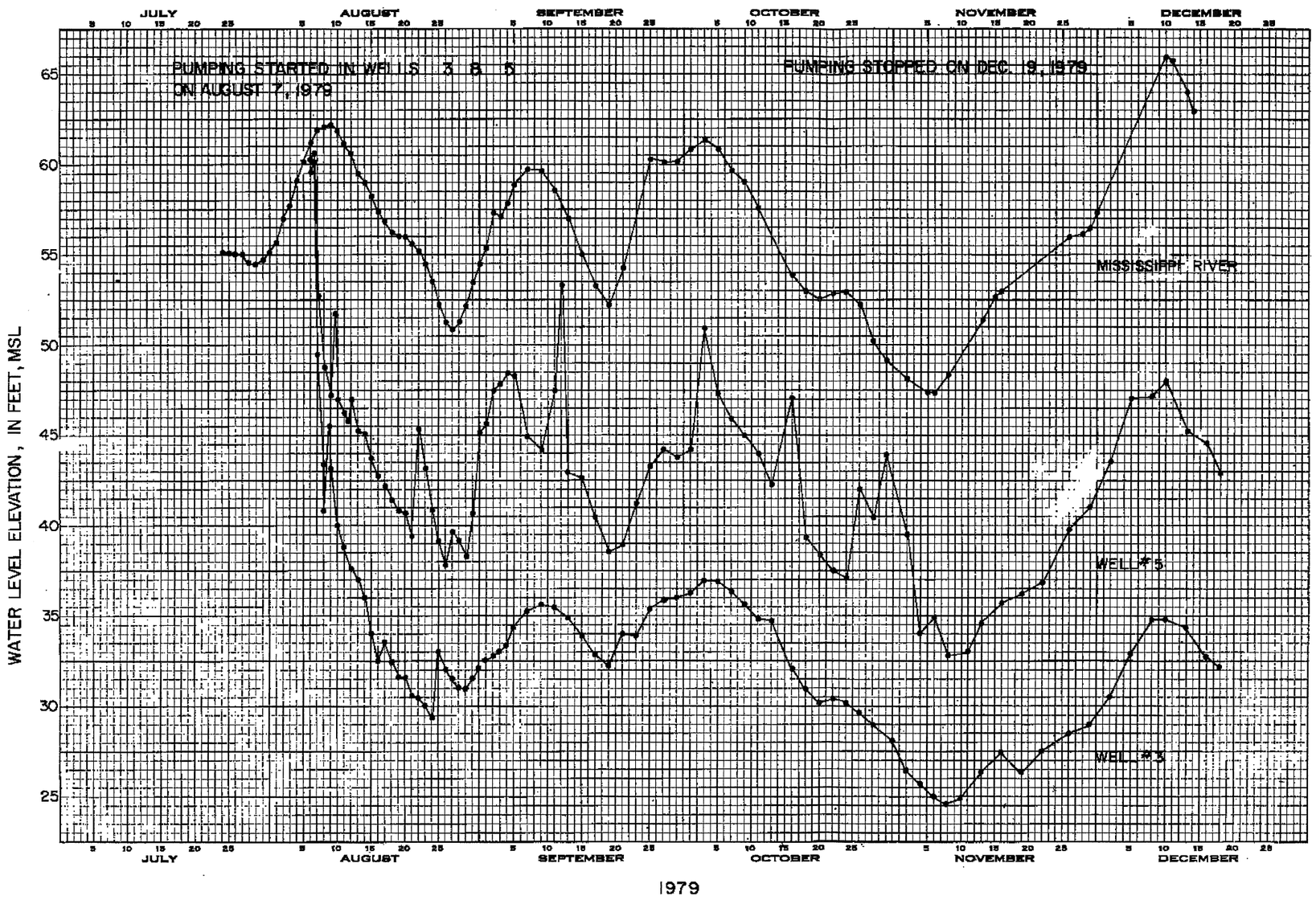
PUMPOUT TEST
GROUND WATER LEVEL CONTOURS
(HIGH RIVER LEVEL)
DECEMBER 10 , 1979
(UFSAR FIGURE 2.4-40)

FIGURE 2.4-47 REV. 1



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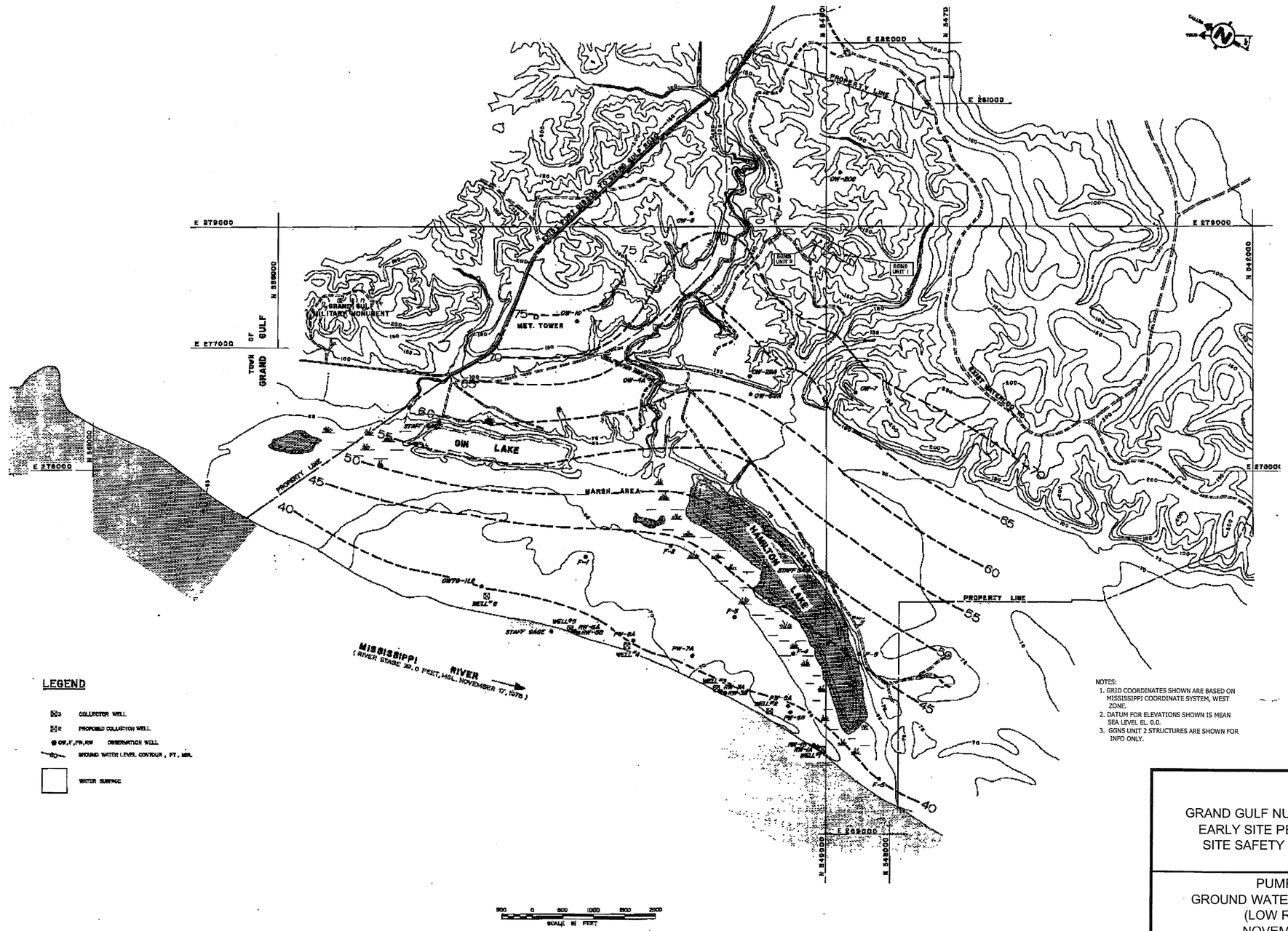
HYDROGRAPHS OF MISSISSIPPI
RIVER WELLS 3 AND 5
DURING PUMP TEST
(UFSAR FIGURE 2.4-41)

FIGURE 2.4-48 REV. 1



LEGEND

- COLLECTOR WELL.
- PROPOSED COLLECTOR WELL.
- OW, F, PW, RW — OBSERVATION WELL.
- GROUND WATER LEVEL CONTOUR, FT, MSL.
- WATER SURFACE

NOTES:
1. GRID COORDINATES SHOWN ARE BASED ON MISSISSIPPI COORDINATE SYSTEM, WEST ZONE.
2. DATUM FOR ELEVATIONS SHOWN IS MEAN SEA LEVEL EL. 0.0.
3. GGNS UNIT 2 STRUCTURES ARE SHOWN FOR INFO ONLY.

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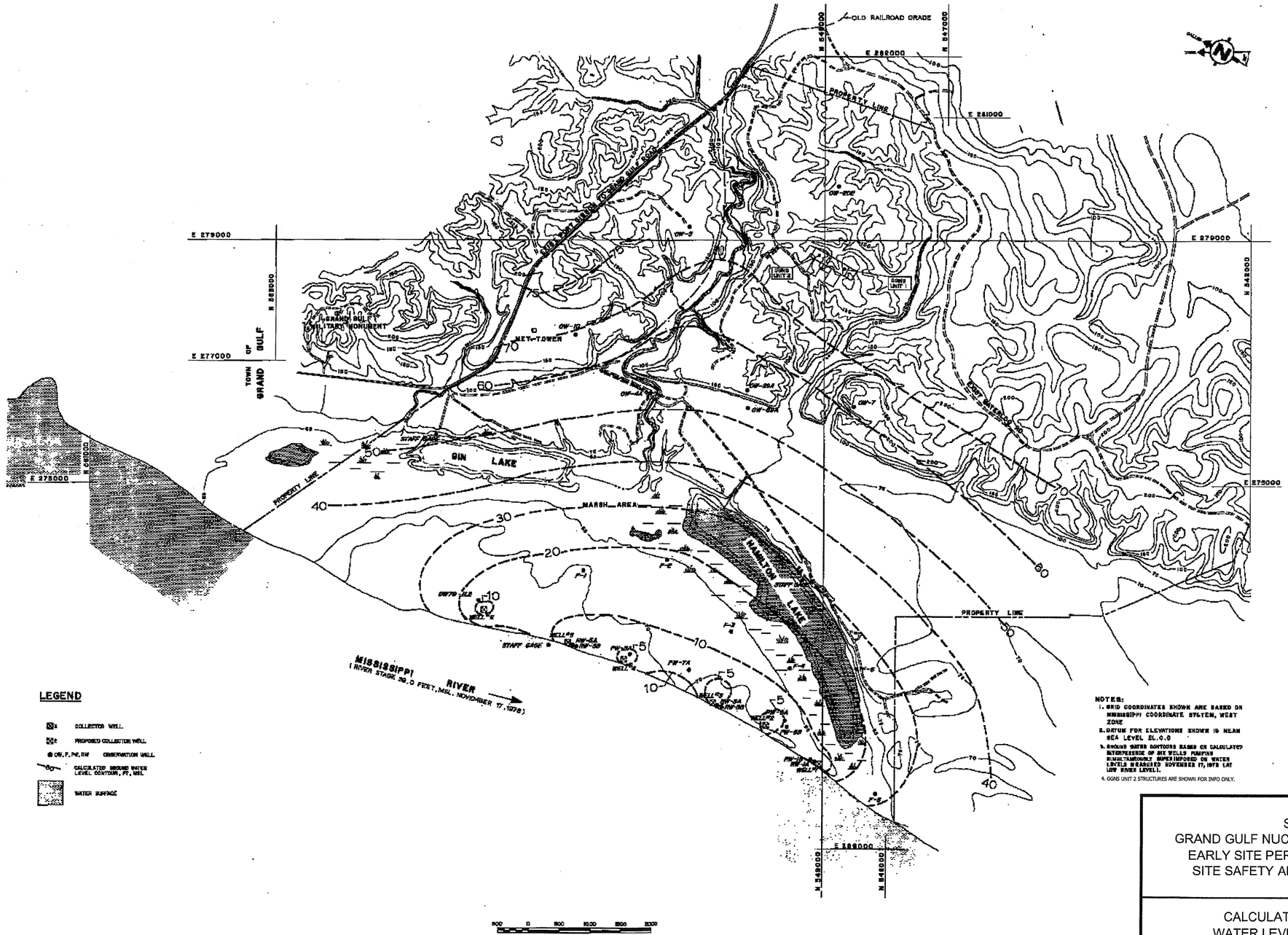
PUMPOUT TEST
GROUND WATER LEVEL CONTOURS
(LOW RIVER LEVEL)
NOVEMBER 17, 1978
(UFSAR FIGURE 2.4-42)

FIGURE 2.4-49 REV. 1



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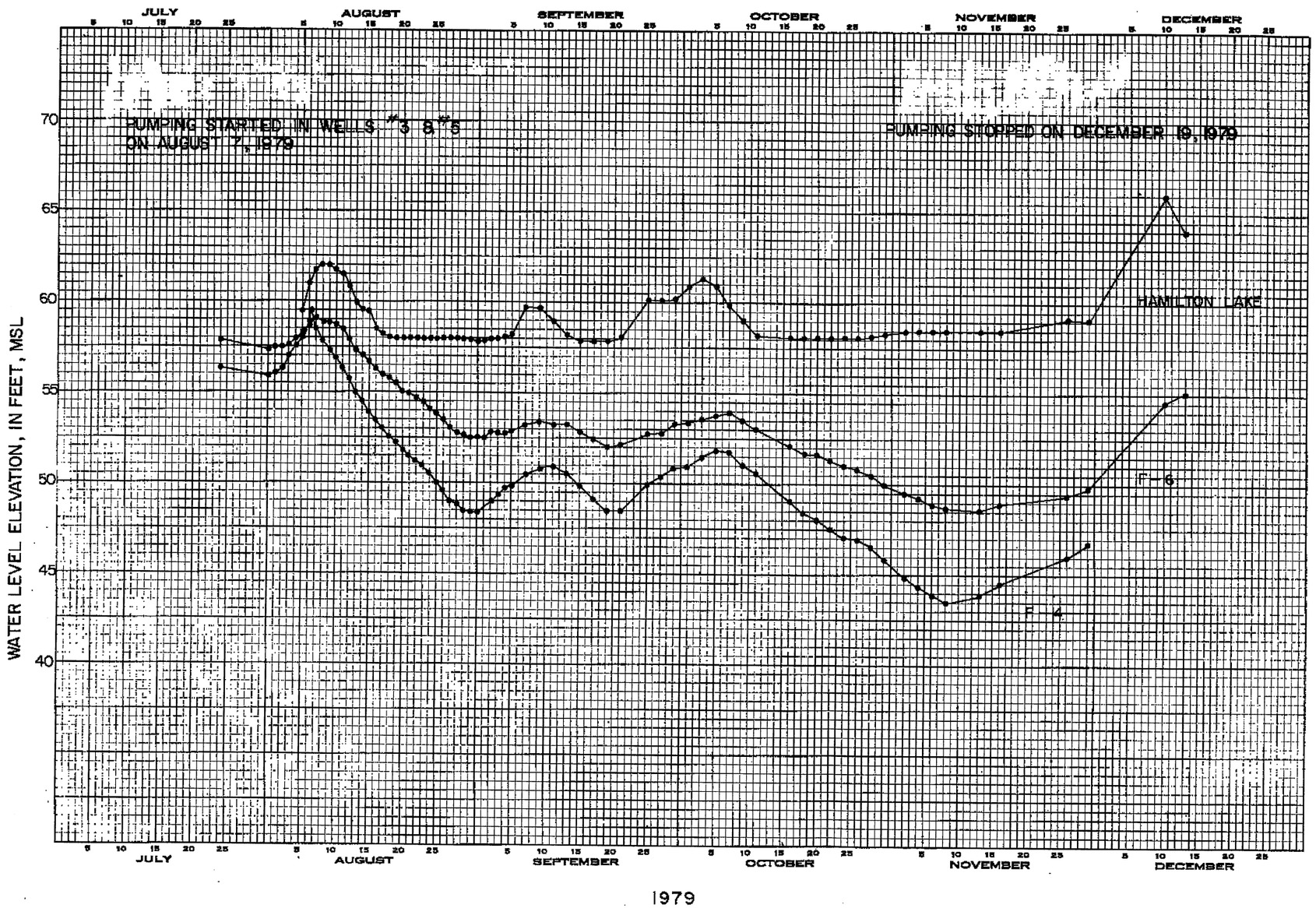
CALCULATED GROUND
WATER LEVEL CONTOURS
(LOW RIVER LEVEL)
(UFSAR FIGURE 2.4-43)

FIGURE 2.4-50 REV. 1



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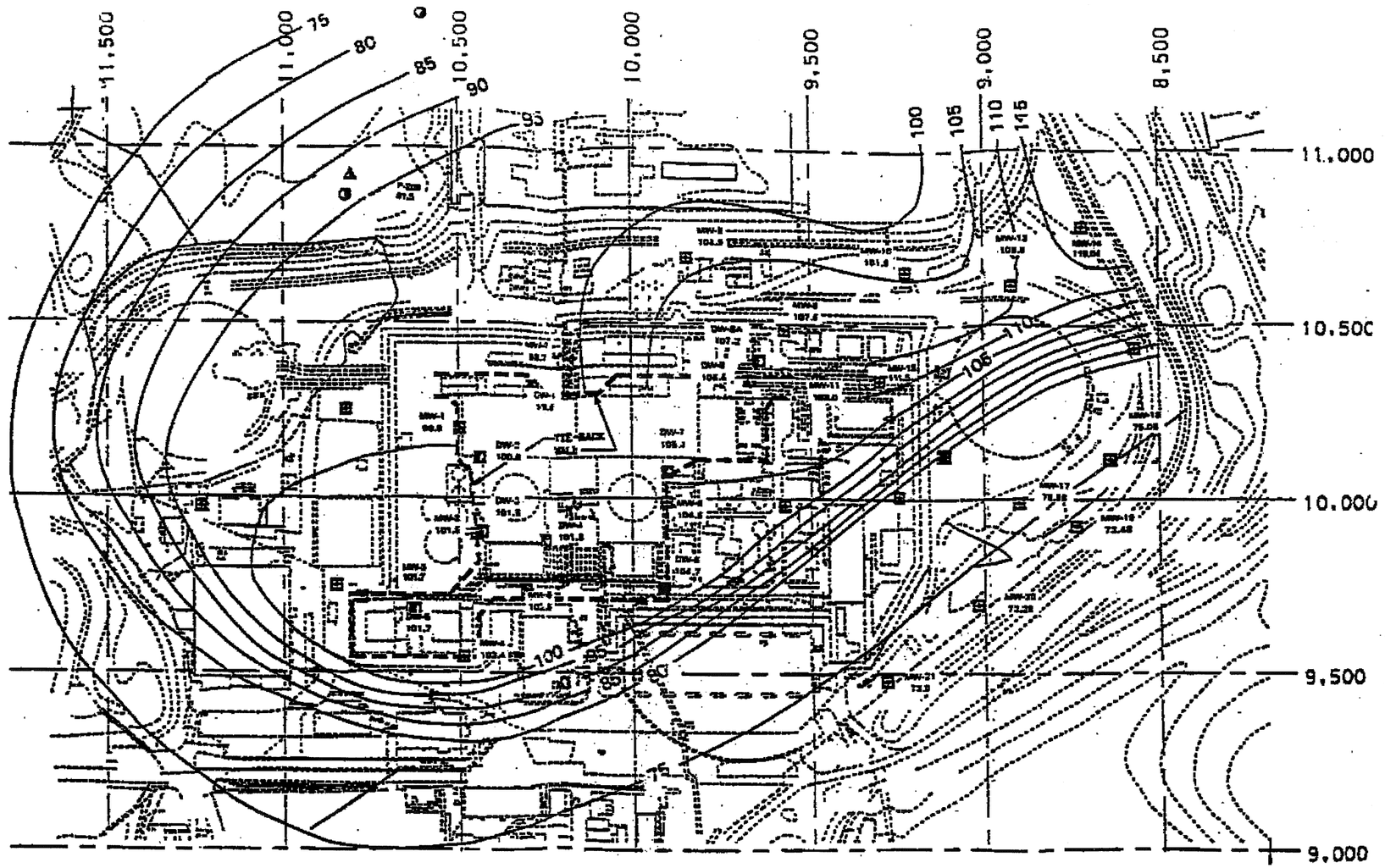
HYDROGRAPHS OF HAMILTON LAKE
AND OBSERVATION WELLS
F-4 AND F-6 DURING PUMP TESTS
(UFSAR FIGURE 2.4-45)

FIGURE 2.4-51 REV. 1



LEGEND:

- Ground water dewatering wells, monitoring wells, observation wells and estimated average post-construction ground water elevations based on measurements taken on 11/08/90
- 115 Ground water elevation contour; contour interval is 5 feet
- Tieback Wall Project

0 100 200 300
SCALE IN FEET

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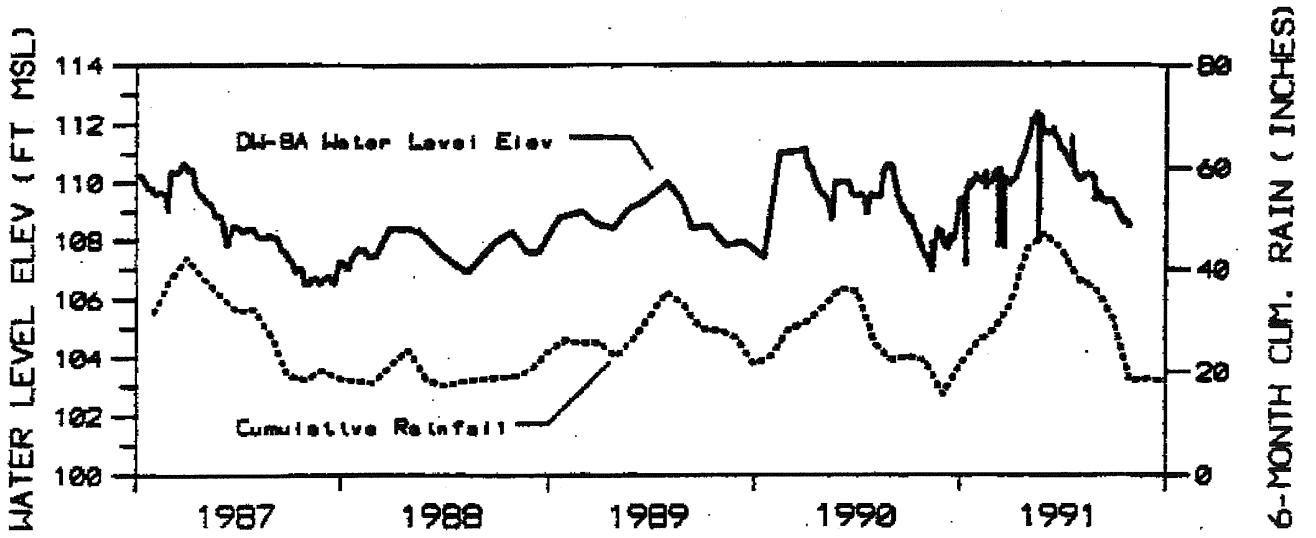
AVERAGE
POST-CONSTRUCTION
GROUND WATER ELEVATIONS
(UFSAR FIGURE 2.4-48)

FIGURE 2.4-52 REV. 1



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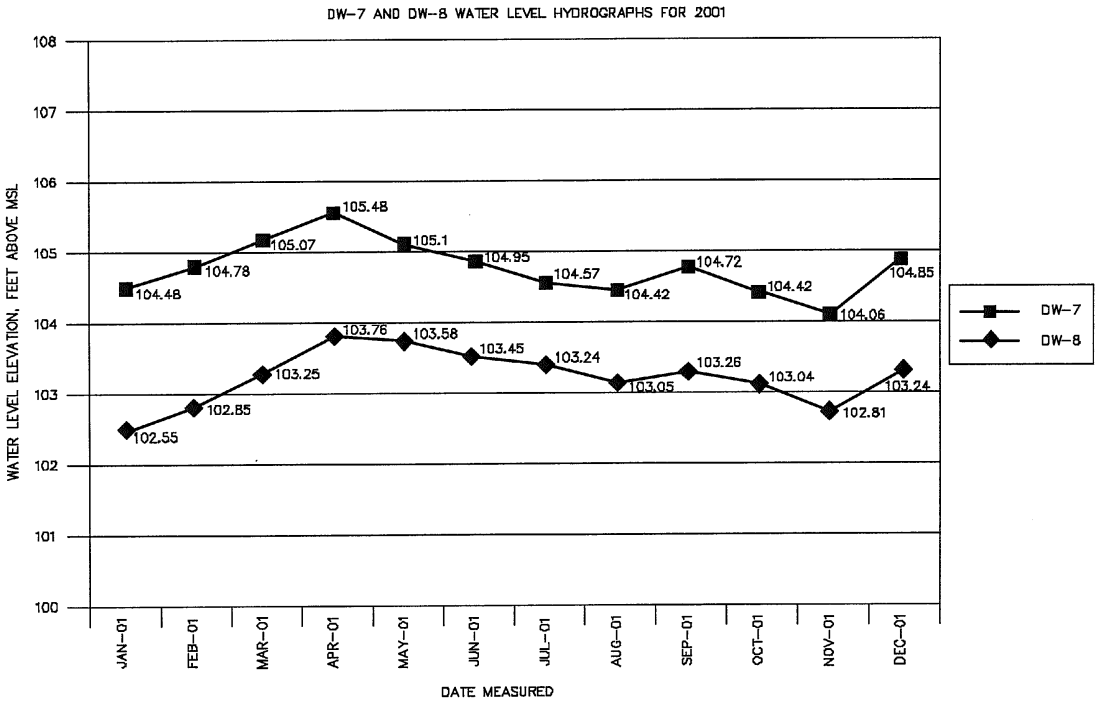
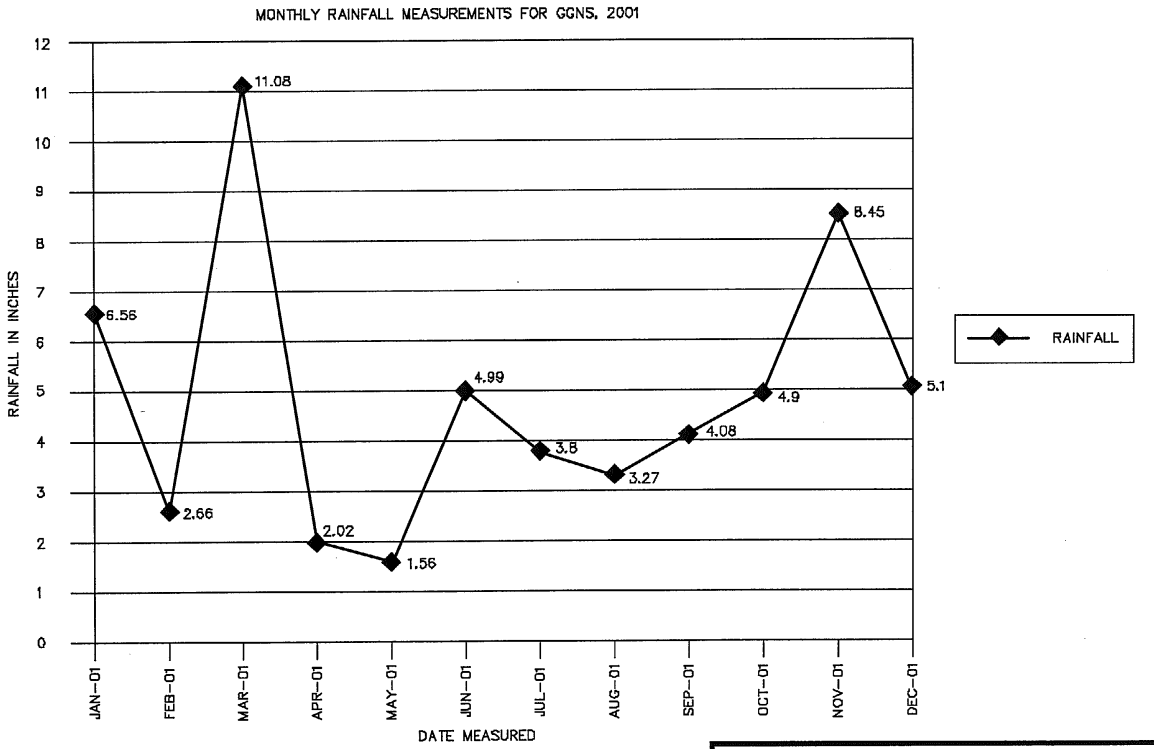
DW-8A WATER-LEVEL HYDROGRAPH
AND 6-MONTH CUMULATIVE PRECIPITATION
1987-1991
(UFSAR FIGURE 2.4-50)

FIGURE 2.4-53 REV. 1





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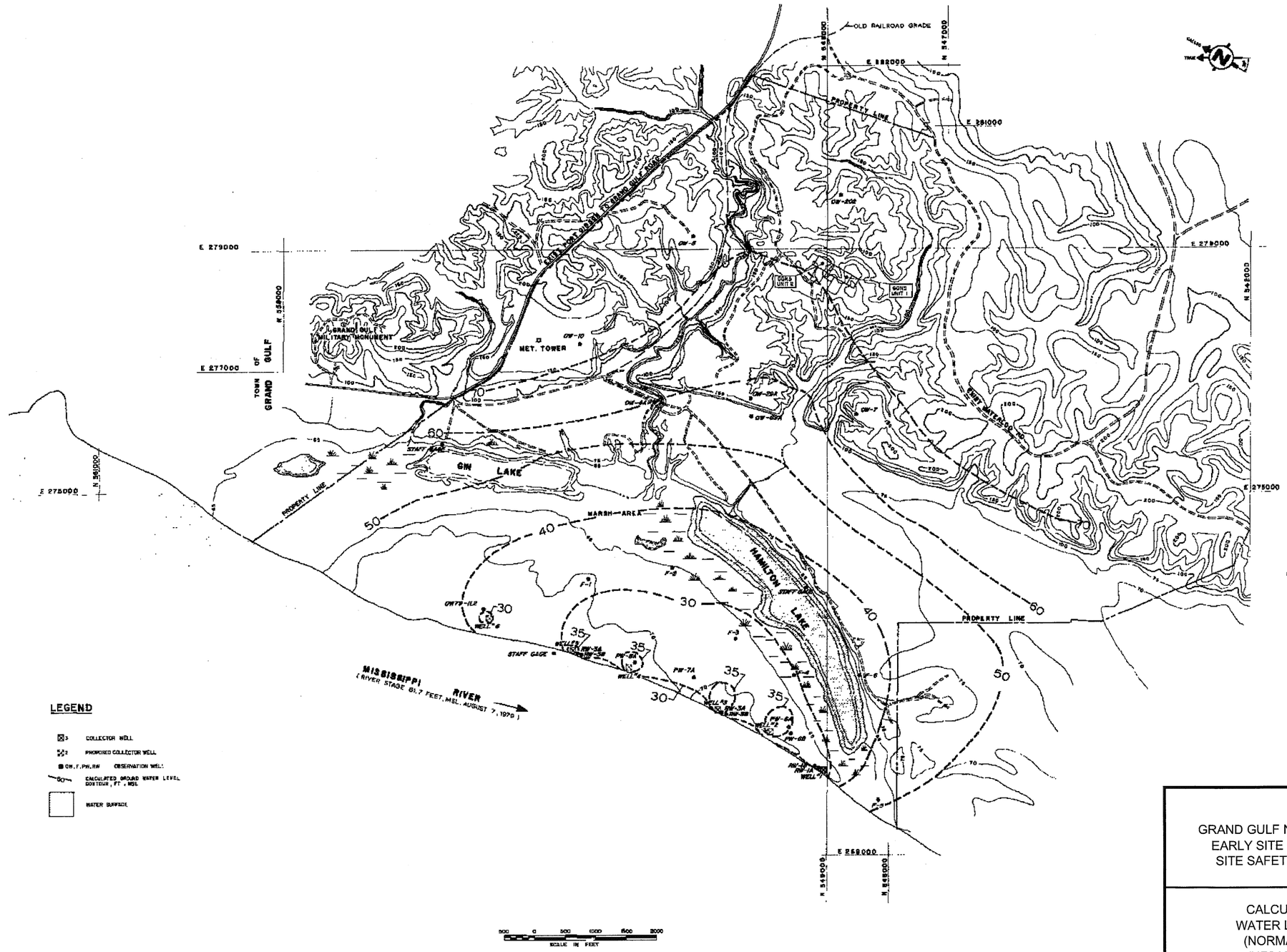
GGNS GROUNDWATER LEVEL AND
RAINFALL HYDROGRAPHS - 2001

FIGURE 2.4-54 REV. 1



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CALCULATED GROUND
WATER LEVEL CONTOURS
(NORMAL RIVER LEVEL)
(UFSAR FIGURE 2.4-44)

FIGURE 2.4-55 REV. 1