ENTERGY

Entergy Operations, Inc.
P.O. Box 756
Port Gibson, MS 39150
Tel 601 437 6409

W. T. Cottle
Vice President
Operations
Grand Gulf Nuclear Station

April 24, 1992

U.S. Nuclear Regulatory Commission
Mail Station P1-137
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Grand Gulf Nuclear Station
Unit 1
Docket No. 50-416
License No. NPF-29
Annual Environmental Operating Report for 1991

GNRO-92/00048

Gentlemen:

In accordance with the Grand Gulf Nuclear Station Facility License NPF-29, Appendix B (Environmental Protection Plan), attached is the Annual Environmental Operating Report for the period January 1, 1991 through December 31, 1991.

If you need additional information, please contact this office.

Yours truly,

WTC/GWR/mtc
attachment: Annual Environmental Operating Report
cc: Mr. D. C. Hintz (w/a)
Mr. J. L. Mathis (w/a)
Mr. R. B. McGehee (w/a)
Mr. N. S. Reynolds (w/a)
Mr. H. L. Thomas (w/o)

Mr. Stewart D. Ebneter (w/a)
Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
101 Marietta St., N.W., Suite 2900
Atlanta, Georgia 30323

Mr. P. W. O'Connor, Project Manager (w/2)
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Stop 13H3
Washington, D.C. 20555

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1/1

GRAND GULF NUCLEAR STATION

1991

ANNUAL ENVIRONMENTAL OPERATING

REPORT

AEOR.RPT/SRREVFLR

PREFACE

The Annual Environmental Operating Report (AEOR) presents information and data obtained from implementation of Grand Gulf Nuclear Station's (GGNS) Environmental Protection Plan (EPP), Appendix B to the GGNS Operating License (NPF-29), for the period January 1 through December 31, 1991. Historical information has been included, where applicable, for comparison purposes.

The GGNS EPP requires monitoring for potential erosion along transmission line corridors and impact of cooling tower drift on vegetation. These are the only terrestrial issues required to be addressed by the GGNS EPP.

No aquatic issues were identified in the GGNS Final Environmental Statement. Consequently, none are addressed by the GGNS EPP. Effluent limitations and monitoring requirements for aquatic matters are contained in the GGNS National Pollutant Discharge Elimination System Permit issued by the Mississippi Department of Environmental Quality (MDEQ). The MDEQ regulates matters involving water quality and aquatic biota.

In addition to the required terrestrial issues, activities associated with the Construction Permit are also discussed. However, the Nuclear Regulatory Commission approved cancellation of Construction Permit CPPR-119 for Unit 2 on August 21, 1991 (GNRI-91/00176); therefore, monitoring and reporting activities associated with the construction permit were terminated at the end of September.

The AEOR also addresses environmental issues which are not within the scope of the EPP. This provides a more comprehensive report for the Environmental Surveillance Program and informs the Nuclear Regulatory Commission of environmental activities at GGNS.

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INTRODUCTION

INTRODUCTION

Grand Gulf Nuclear Station consists of one operating boiling water reactor with a current net maximum dependable capacity rating of 1142 MWe. A second unit, on which construction had been previously suspended, was cancelled during September, 1989. An application for termination of the Unit 2 Construction Permit was submitted to the Nuclear Regulatory Commission on December 27, 1990 and approved on August 21, 1991 (GNRI-91/00176). This resulted in termination of monitoring and reporting of most activites associated with the permit. Any continuing Unit 2 activities were absorbed under the Unit 1 permit.

1.1 IMPACT ASSESSMENT AND SUMMARY

Environmental Surveillance Program (ESP) personnel monitored the environmental impact of GGNS operational activities between January 1 and December 31, 1991. The ESP monitoring results contained in the following sections indicate the environment was not adversely impacted in 1991 by the operation of GGNS. In addition, ESP personnel have not observed any harmful effects or evidence of trends toward irreversible damage to the surrounding environment at GGNS.

Overall, 1991 results were comparable to those of previous years and remained within anticipated ranges.

1.2 GGNS SITE CHARACTERISTICS

Grand Gulf Nuclear Station is located in Claiborne County, Mississippi, on the east bank of the Mississippi River, approximately 25 miles south of Vicksburg and 37 miles north-northeast of Natchez. Grand Gulf Military Park borders a portion of the north side of the property, and the small community of Grand Gulf is approximately one and one-half miles to the north. The town of Port Gibson is about six miles southeast of the site. Two lakes, Gin Lake and

Hamilton Lake, are located in the western portion of the site. These lakes were once the channel of the Mississippi River and average about eight to ten feet in depth. An area map showing geographical location of GGNS is provided in Figure 1-1.

Site and Its Environs

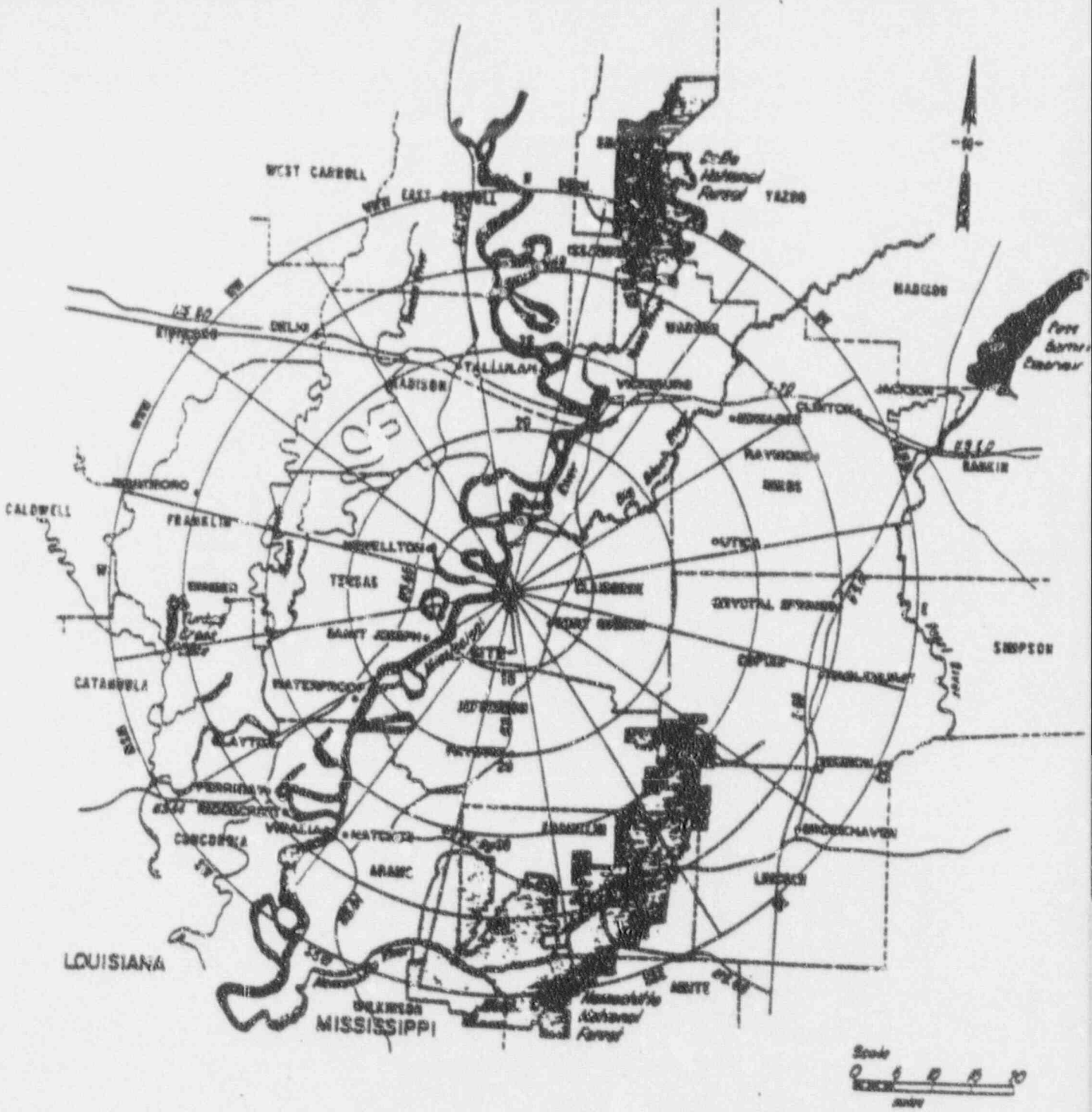
The site and its environs consist primarily of woodlands divided between two physiographic regions. The western half of the site is in the alluvial plain of the Mississippi River; the eastern half is in the Loess or Bluff Hills.

The property line shown in Figure 1-2 encompasses the 2300 acres originally purchased. However, due to erosion activity of the Mississippi River along the western boundary of the site, this acreage figure continually decreased until the river bank from the barge slip to the north boundary of the site was stabilized through the U. S. Army Corps of Engineers shoreline modification program. Based on the GGNS Updated Final Safety Analysis Report, the current acreage figure for the site is approximately 2100 acres.

The site boundary is the same as the property line except in southwest and west-southwest sectors as shown in Figure 1-2. A 2-acre residential property within the southwest sector is privately owned.

Access

The site area is accessible by two major highways: U. S. Highway 61 and State Highway 18, which connect Port Gibson (6 miles southeast of the site) with Natchez, Jackson and Vicksburg.



SOURCE: Official highway map - Louisiana (1970)
Official highway map - Mississippi (1971)

GRAND GULF NUCLEAR STATION

FIGURE 1-1
GENERAL AREA MAP

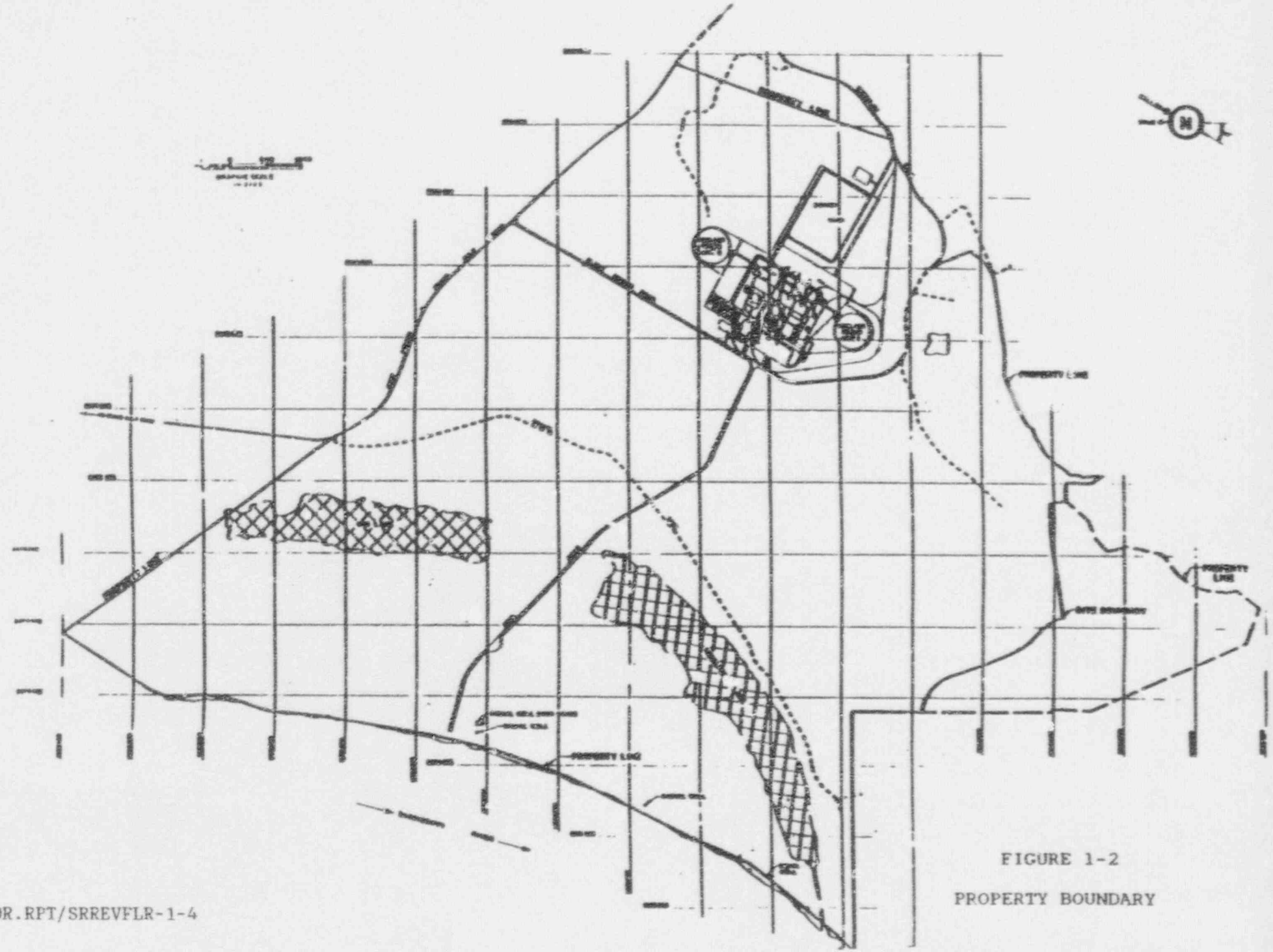


FIGURE 1-2

PROPERTY BOUNDARY

SECTION 2.0

ENVIRONMENTAL SURVEILLANCE ACTIVITIES

2.1 SMOKE CONTROL

The GGNS Burn Pit, which was officially closed on February 22, 1990, was filled with dirt during the week of June 11, 1990, thus prohibiting any future use.

2.2 EROSION CONTROL

Erosion control at GGNS is a priority because of proximity of GGNS to the Mississippi River, hilly terrain, average annual rainfall of approximately 50 inches and loess soils which are extremely susceptible to erosion. The methods which have been successfully utilized to control erosion are:

- Revegetation of disturbed areas
- Utilization of concrete chutes and flumes which channel runoff into two sediment basins, A and B (Figure 2-1).

Sedimentation basins help minimize ecological effect on Hamilton Lake and the Mississippi River.

As a result of Amendment 7 to GGNS Construction Permit Numbers CPPR-118 and 119, dated December 23, 1981, monitoring and capacity requirements for the sedimentation basins were transferred to the GGNS NPDES Permit. Environmental Surveillance Program personnel elected to continue runoff sample collection on a voluntary basis for an additional period of time to gather supplemental data on basin sediment removal. Runoff sample collection, which was required prior to amending the Construction Permits, was discontinued on January 31, 1985. Monitoring of sedimentation basins since January 31, 1985 has been conducted according to parameters established by the GGNS NPDES Permit.

2.3 TRANSMISSION LINE SURVEYS

The aerial surveys in previous years have confirmed that soil and vegetation have stabilized along the GGNS transmission lines. Therefore, as permitted by Section 4.2.1, Paragraph 2, of the EPP, the Erosion Control Inspection Program was discontinued in 1988.

2.4 LIQUID AND SOLID WASTE MANAGEMENT

Liquid wastes, such as chemicals, fuels and lubricants which could not be discharged as wastewater, were deposited or discharged into tanks and/or containers. These materials, excluding borated water, were salvaged or removed to appropriate offsite treatment and/or disposal facilities. Borated water was placed in the onsite resin pond and in the treated low volume wastewater pond. Care was taken to avoid handling or storing of liquids in close proximity of major drainage areas to avoid potentially damaging spills to site streams.

Construction scrap and debris were collected in designated onsite areas for salvage or burial. Noncombustible solid wastes were buried in designated landfill areas.

A contractor began collection and disposal of Unit 1 and Energy Service Center waste in 1988. Prior to this arrangement, Unit 2 construction personnel disposed of this waste onsite.

2.5 LAND MANAGEMENT AND WILDLIFE

Approximately 2100 acres make up the GGNS site; 94 acres are fenced in the immediate plant area, with an additional 37 acres set aside for permanent structures. The remaining acreage provides excellent habitat for Mississippi wildlife.

Fringe areas and open fields were normally mowed two times during each growing season to keep open areas from being overtaken by scrub vegetation. After the growing season, a series of small food plots were planted in these open fields to help sustain wildlife populations through the winter and early spring. A small fruit orchard and two gardens were also maintained on site by ESP personnel.

Two lakes located on the site, Gin and Hamilton, were used for sport and commercial fishing by area residents. Use of the lakes and surrounding local lands by water dependent species (waterfowl) was seasonal, with most activity occurring during fall and winter migrations.

Hunting on site was limited to bow hunting for in-season animals, pursuant to the requirements of Mississippi hunting laws. Other hunting activities were prohibited on the GGNS site.

2.6 GROUNDWATER MONITORING

The groundwater monitoring program was continued during 1991 at GGNS to:

- Provide data on seasonal fluctuation of the regional groundwater table
- Monitor level of the perched groundwater table around Power Block areas.

Location of Monitoring Wells

Twenty-seven wells were used to monitor the regional and perched groundwater underlying GGNS:

- Twelve wells for regional groundwater levels on site area
- Fifteen wells for perched groundwater levels around Power Block areas.

Locations of monitoring wells are shown in Figures 2-2 and 2-3 and listed in Tables 2-1 and 2-2.

Regional Groundwater

Wells used to monitor regional groundwater levels (Figure 2-2 and Table 2-1) were normally measured at least twice a month. However, cancellation of the GGNS Unit 2 Construction Permit in 1991 reduced monitoring frequency to twice per year (April and September).

Perched Groundwater

GGNS has a monitoring and dewatering system (Figure 2-3 and Table 2-2) located around the Power Block and Standby Service Water Basins to monitor and dewater the underlying perched aquifer. Seven monitoring wells (MW-1 through MW-7) were used to monitor water levels in the perched aquifer. Eight dewatering wells (DW-1 through DW-8) were in place to dewater the aquifer if water levels approached or exceeded the GGNS design basis elevation of 109 feet mean sea level (MSL). Water levels in perched aquifer wells were observed and recorded once a month.

2.7 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT

National Pollutant Discharge Elimination System (NPDES) Permit No. MS0029521 was amended and reissued to GGNS on October 9, 1990. The permit as issued in October 1990 consisted of 13 outfalls.

The permit allows GGNS to discharge wastewater, in accordance with NPDES regulations, into Hamilton Lake and the Mississippi River. NPDES reporting requirements are established by the State of Mississippi. Monthly Discharge Monitoring Reports (DMRs) for each outfall were prepared and sent to the Mississippi Department of Environmental Quality and U. S. Nuclear Regulatory Commission via NPDES Monthly Reports.

2.8 THERMAL MONITORING PROGRAM

Grand Gulf Nuclear Station's NPDES Permit requires that GGNS effluents and the Mississippi River mixing area be monitored to determine what effects, if any, will result from GGNS's heated discharge into the river. The NPDES Permit states:

> The receiving water shall not exceed a maximum water temperature change of 2.8°C (5.0°F) relative to the upriver temperature, outside a mixing zone not exceeding a maximum width of 60 feet from the river edge and a maximum length of 6000 feet downstream from the point of discharge, as measured at a depth of 5 feet. The maximum water temperature shall not exceed 32.2°C (90°F) outside the same mixing zone, except when ambient temperatures approach or exceed this value.

The amended permit as issued in October 1990, only requires monitoring when river stage is less than 15.4 feet during winter months (November-April) or, is less than minus 1.2 feet during summer months (May - October). In addition, once monitoring has been performed at river stages less than the 15.4 and minus 1.2 feet limits, the river stage which existed at time of monitoring will become the new limit.

Initially, the thermal monitoring program had 72 reference points 100 feet apart along the river bank. However, as a result of the amended permit, thermal monitoring was required near the shoreline only at Points 1 and 7 and in the barge slip outlet.

Calibrated digital thermometers were used to obtain temperatures at a depth of five feet and at the surface.

2.9 COOLING TOWER DRIFT PROGRAM

The Environmental Protection Plan requires a study to determine environmental effects of salt deposition from cooling tower drift. After reviewing suitable study methods, GGNS personnel elected to conduct a quantitative and qualitative cooling tower drift study which would identify salts deposited on vegetation in the surrounding environment and determine the quantity of each salt.

Salt Deposition Station Locations

Eight sampling sites were utilized to measure cooling tower drift deposition. Six of the eight sampling sites were located in areas where maximum salt deposition is predicted. These areas were extrapolated from the Bechtel Salt Deposition Model developed for the GGNS Final Environmental Report. The remaining two sampling sites are control sites. The first is located south of Raymond, Mississippi. An additional control site was added at Port Gibson, Mississippi, in 1985. Four of these sampling sites were equipped with replicate sampling devices. The Heavy Haul Road and Glodjo locations had duplicate sampling devices which were not installed until 1985. The 1985 duplicates were established to strengthen the program's statistical trend analysis and to improve sampling and analysis quality assurance. The location of salt deposition sites are identified in Figures 2-4 and 2-5 and listed in Table 2-3.

Fallout samples were collected in plastic buckets on a quarterly basis. The buckets were located four to six feet above ground, fitted with bird rings and covered with fine mesh screens to exclude leaves and insects.

Sample Analysis and Collection

Samples were collected quarterly and analyzed for ten constituents:

- o Calcium
- o Sodium
- o Phosphate
- o Chloride
- o Sulfate
- o Magnesium
- o Iron
- o Nitrate
- o Fluoride
- o Total dissolved solids.

These parameters were selected because past analyses have shown them to be prevalent in the Plant Service Water System. Salt constituents were also determined for the demineralized water used in initial setup of collection buckets. Rainfall data was recorded for each sampling site.

Screens were washed with deionized water, and the wash water volume measured and deposited in the collector, on a quarterly basis. The volume of water in the collector was then measured, and a composite sample of collector's contents was placed in a clean cubitainer, sealed and labelled. The date of removal, total collector volume, total rainfall and location of site were recorded on the appropriate data sheets.

Salt Deposition Rate Calculation

Salt deposition rates (SDR) were calculated on a constituent-by-constituent basis from:

- o Total volume of water contained in sampling bucket
- o Concentration of a constituent in this water
- o Volume of demineralized water placed in sampler initially
- o Concentration of constituent in demineralized water
- o Sampling area of bucket.

Therefore, for a particular constituent,

$$SDR = \frac{(V_T C_T) - (V_D C_D)}{A}$$

where:

SDR = Salt Deposition Rate (mg/m^2)

V_T = final sample volume (l)

C_T = final sample constituent concentration (mg/l)

V_D = seeded volume of demineralized water (l)

C_D = demineralized water constituent concentration (mg/l)

A = collector area (m^2).

2.10 METEOROLOGICAL SYSTEM

The GGNS meteorological tower, with a base elevation of 156 feet above MSL, is approximately 5000 feet north-northwest of the GGNS Unit 1 reactor building, which has a finished grade of 132 feet above MSL. The location of the meteorological tower is shown in Figure 2-6.

The area around the meteorological tower is flat and covered by grass. The nearest bluffs are approximately 362 feet west of the tower, with trees approximately 35 feet high along the bluffs. Approximately 400 feet east are trees greater than 50 feet high. The nearest trees south greater than 50 feet high are approximately 690 feet from the tower. A county road passes the meteorological tower approximately 400 feet to the north. The tallest structure, GGNS Unit 1 natural draft cooling tower, is 522 feet high and is situated approximately 6000 feet south-southeast of meteorological tower.

Due to its location in a relatively open area and its proximity to GGNS, the tower site is expected to accurately represent the same meteorological characteristics as the region into which airborne material could be released from GGNS.

The meteorological system consists of duplicate sensors (Channels A & B). Data recorded by meteorological instruments are stored in digital and analog forms via magnetic tape and strip charts. The following meteorological parameters are monitored by the system:

- o Wind Direction
- o Wind Speed
- o Temperature
- o Change in Temperature (delta T)
- o Dew Point
- o Surface Precipitation.

Meteorological data was included in the Semiannual Radioactive Effluent Release Reports submitted to the U. S. Nuclear Regulatory Commission.

2.11 ENVIRONMENTAL EVALUATIONS

The Environmental Protection Plan (EPP) for GGNS permits changes in GGNS design or operation and performance of tests or experiments that affect the environment, provided they do not involve a change in the EPP or an unreviewed environmental question. This means that changes, tests or experiments which do not affect the environment are not subject to requirements of the EPP. Also, requirements of the EPP do not relieve GGNS of requirements in 10 CFR 50.59, "Changes, Tests and Experiments," which address the question of safety associated with proposed changes, tests and experiments.

Changes in plant design or operation and performance of tests and experiments were reviewed by GGNS personnel for possible effects they might have on the environment. When review determined change, test or experiment could affect the environment, an environmental evaluation was prepared and recorded before additional construction or operational activities associated with the change, test or experiment were begun. However, the EPP excluded changes, tests or experiments from the evaluation:

- o If all measurable environmental effects were confined to onsite areas previously disturbed during site preparation and plant construction, or
- o If they were required to achieve compliance with other federal, state, or local requirements.

One of three groups reviews changes, tests and experiments at GGNS:

- Nuclear Plant Engineering
- Nuclear Operations
- Nuclear Support.

The originating organization performs an applicability determination on each proposed change, test or experiment to ascertain if activity might affect the environment. Only those which have potential to affect the environment are required to receive environmental evaluations.

The originator of a proposed change, test or experiment completes an environmental evaluation or documents that one is not required. Completed environmental evaluations are forwarded to Nuclear Support for an independent review. After providing independent review, Nuclear Support reports results of environmental evaluations to the NRC in the GGNS Annual Environmental Operating Report.

TABLE 2-1

REGIONAL GROUNDWATER WELL LOCATIONS

IN FIGURE 2-2

LEGEND	WELL NUMBER	SECTOR	LOCATION DESCRIPTION
1	P5, OW5	B	NE Lay down Area - Unit 2
2	OW209A, P209	D(E)	Bluff behind Unit 2 Cooling Tower
3	OW202	E	Bluff north of Switchyard
4	OW10	A	West end Met. Tower field
5	OW4, OW4A, P4	R	Former County Road - Adjacent to Stream A
6	OW29A	Q	West Lay down Area - Unit 2
7	OW69A	P	Field - North side Haul Road
8	OW7	N	Across the south Plant Access Road and south of Basin B

TABLE 2-2

PERCHED GROUNDWATER WELL LOCATIONS

IN FIGURE 2-3

WELL NO.	UNIT NO.	LOCATION DESCRIPTION
MW1	2	North end of Unit 2 Turbine Bldg
MW2	2	Northwest corner of Unit 2 Auxiliary Bldg
MW3	1	Northeast of SSW B Basin (between fences)
MW4	1	Southwest side SSW A Basin
MW5	2	Northeast GGNS Maintenance Shop
MW6	1	North of Condensate Storage Tank
MW7	2	East of Unit 2 Turbine Bldg
DW1	2	East of Unit 2 Turbine Bldg
DW2	2	Corner Auxiliary Bldg - Turbine Bldg Unit 2
DW3	2	Northwest corner of Unit 2 Auxiliary Bldg by electric panels
DW4	2	Southwest corner of Unit 2 Auxiliary Bldg
DW5	1	Between SSW A and SSW B Basins
DW6	1	In front of Diesel Generator Bldg (under manhole)
DW7	1	Corner Unit 1 Turbine Bldg - Auxiliary Bldg
DW8	1	Behind Radwaste Bldg - Unit 1

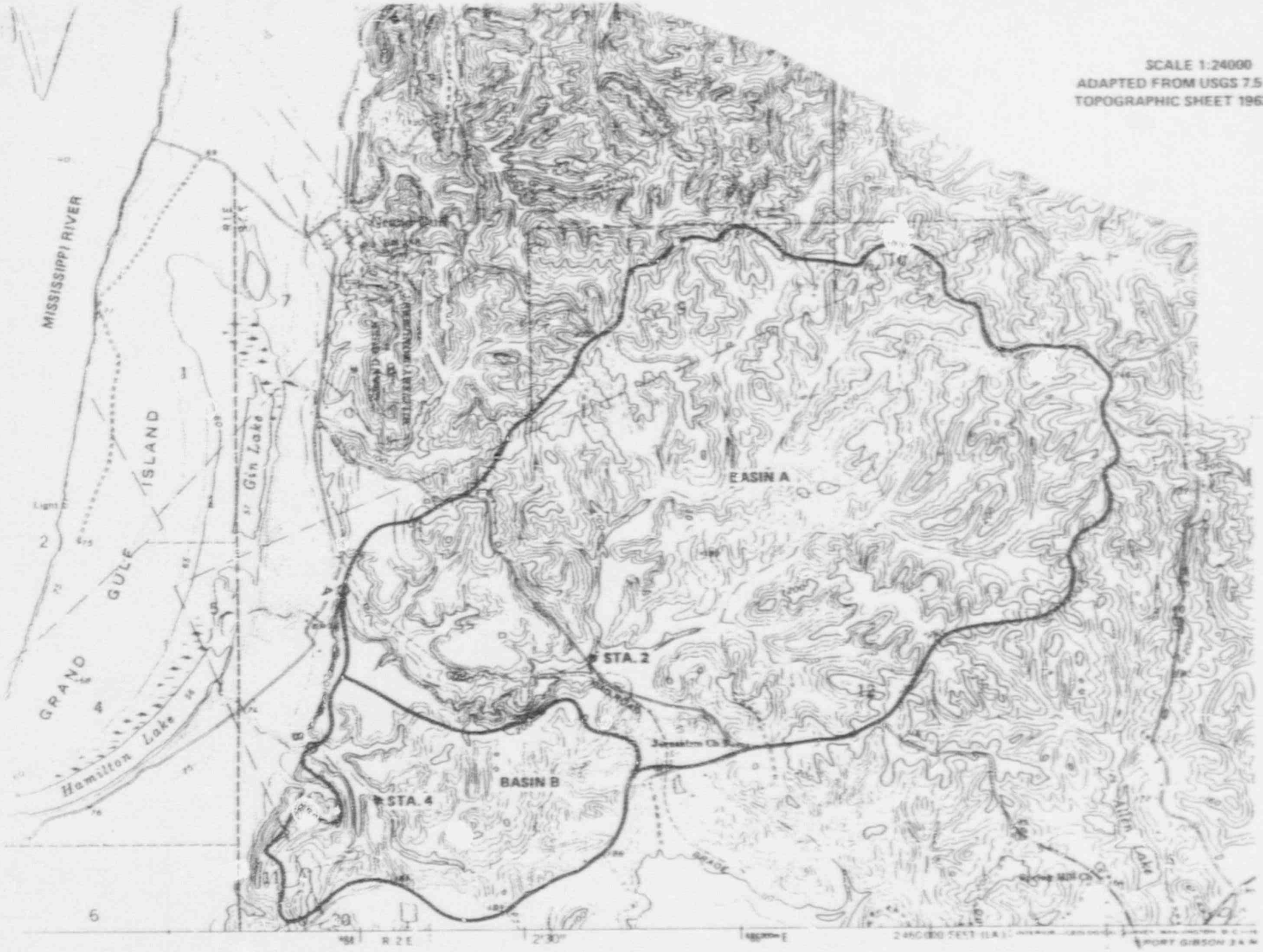
TABLE 2-3

SALT DEPOSITION STATION LOCATIONS

IN FIGURES 2-4 AND 2-5

LEGEND	ID NUMBER	SECTOR	LOCATION DESCRIPTION
1	SDS 1, 1A	P	Heavy Haul Road - adjacent to Basin B
2	SDS 2, 2A, 2B	A	Fenced storage area by Met. Tower
3	SDS 3	C	Catwalk on truck bypass road
4	SDS 4	E	Former location of Maggie Jackson Residence - Bald Hill Road
5	SDS 5, 5A, 5B	J	Support Services Center (Old Training Center) - Bald Hill Road
6	SDS 6, 6A	L	Glodjo Residence - Bald Hill Road
7	SDS 7	D	Hinds County Vocational School - Raymond, MS (control)
9	SDS 9	G	City Barn - Port Gibson, MS (control)

Note: Identification number 8 is assigned as a deionized water control sample



GRAND GULF NUCLEAR STATION

FIGURE 2-1
LOCAL DRAINAGE BASINS

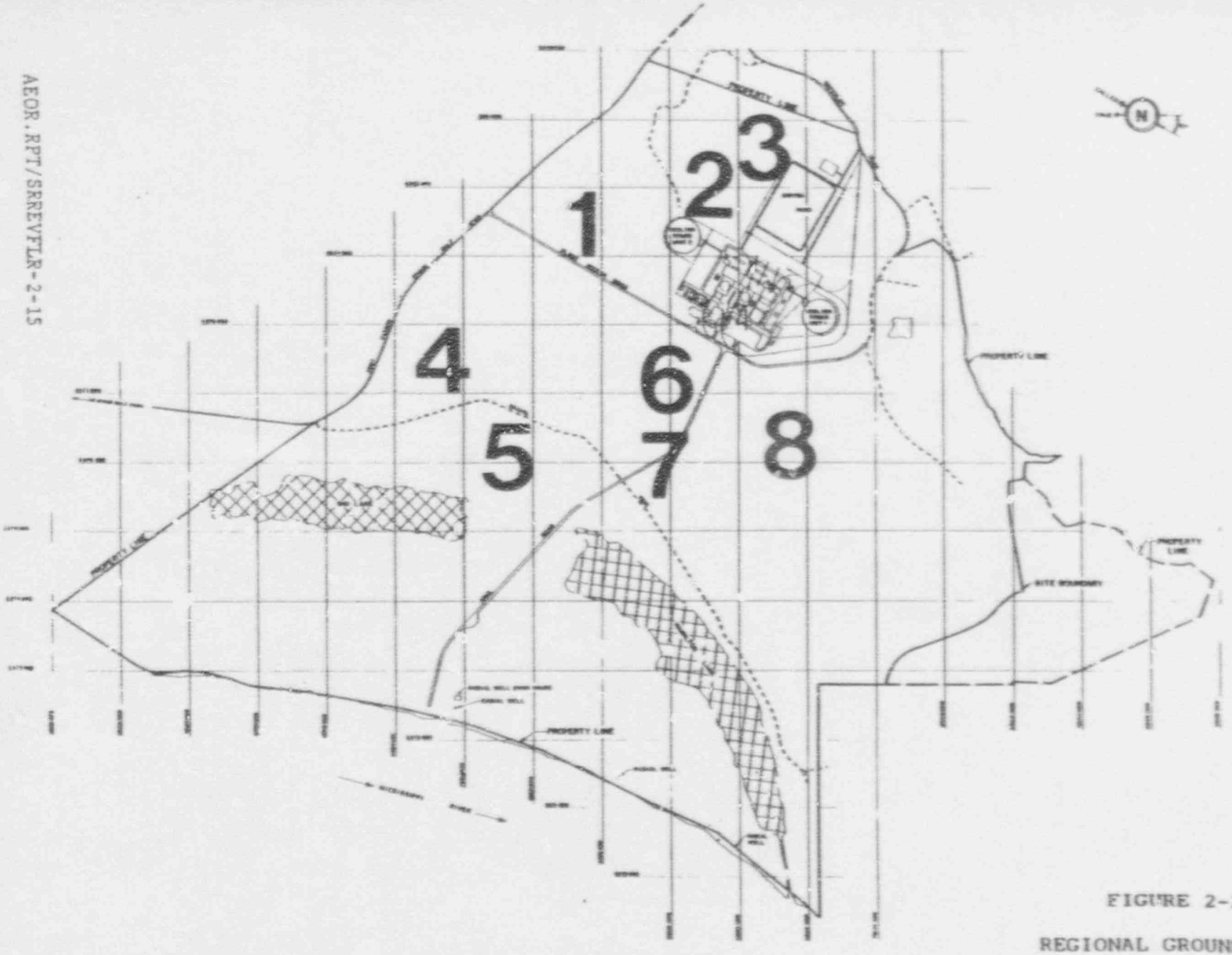
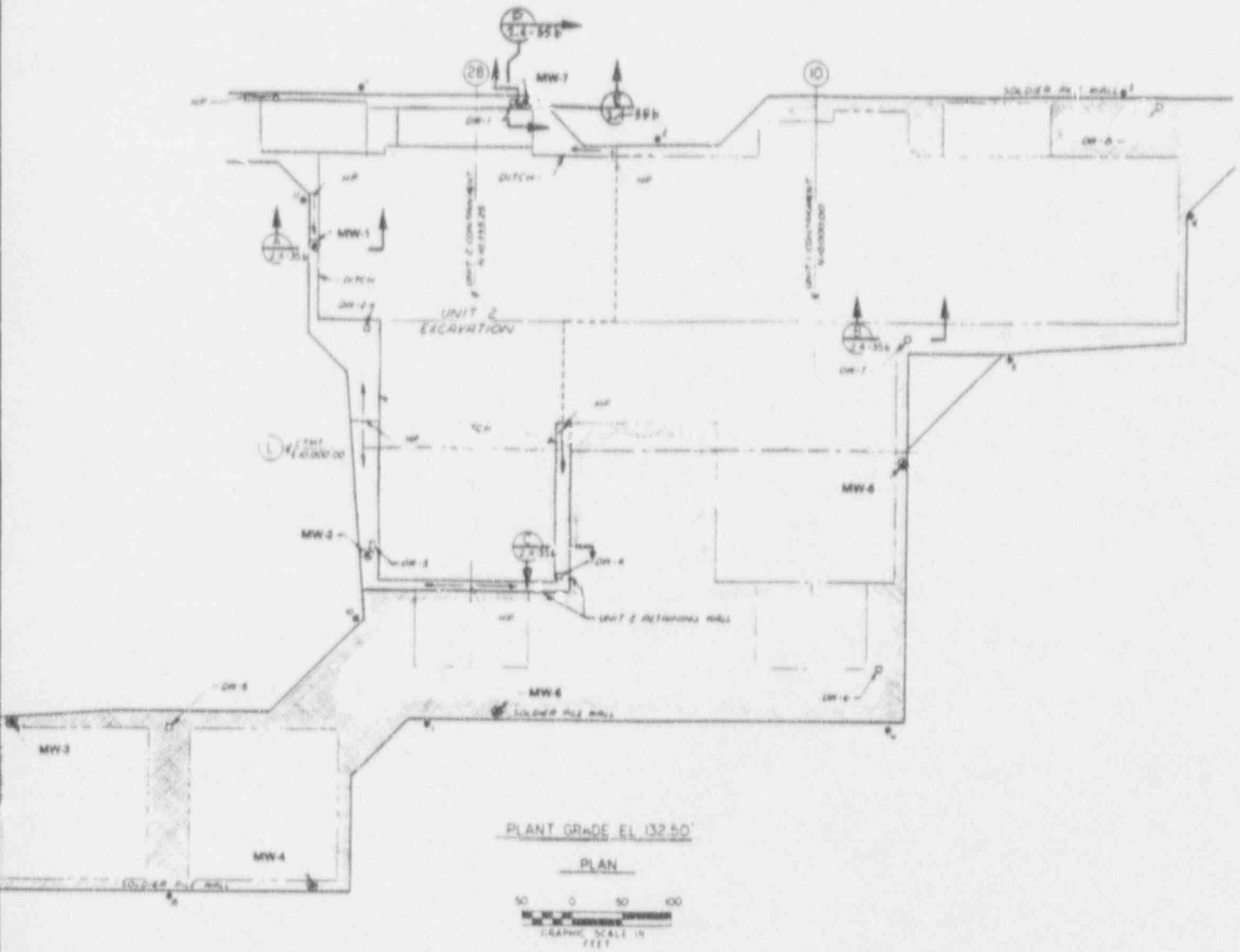


FIGURE 2-2

REGIONAL GROUNDWATER
WELL LOCATIONS



GRAND GULF NUCLEAR STATION

FIGURE 2-3
LOCATION OF CONSTRUCTION DEWATERING AND OBSERVATION WELLS (PERCHED)

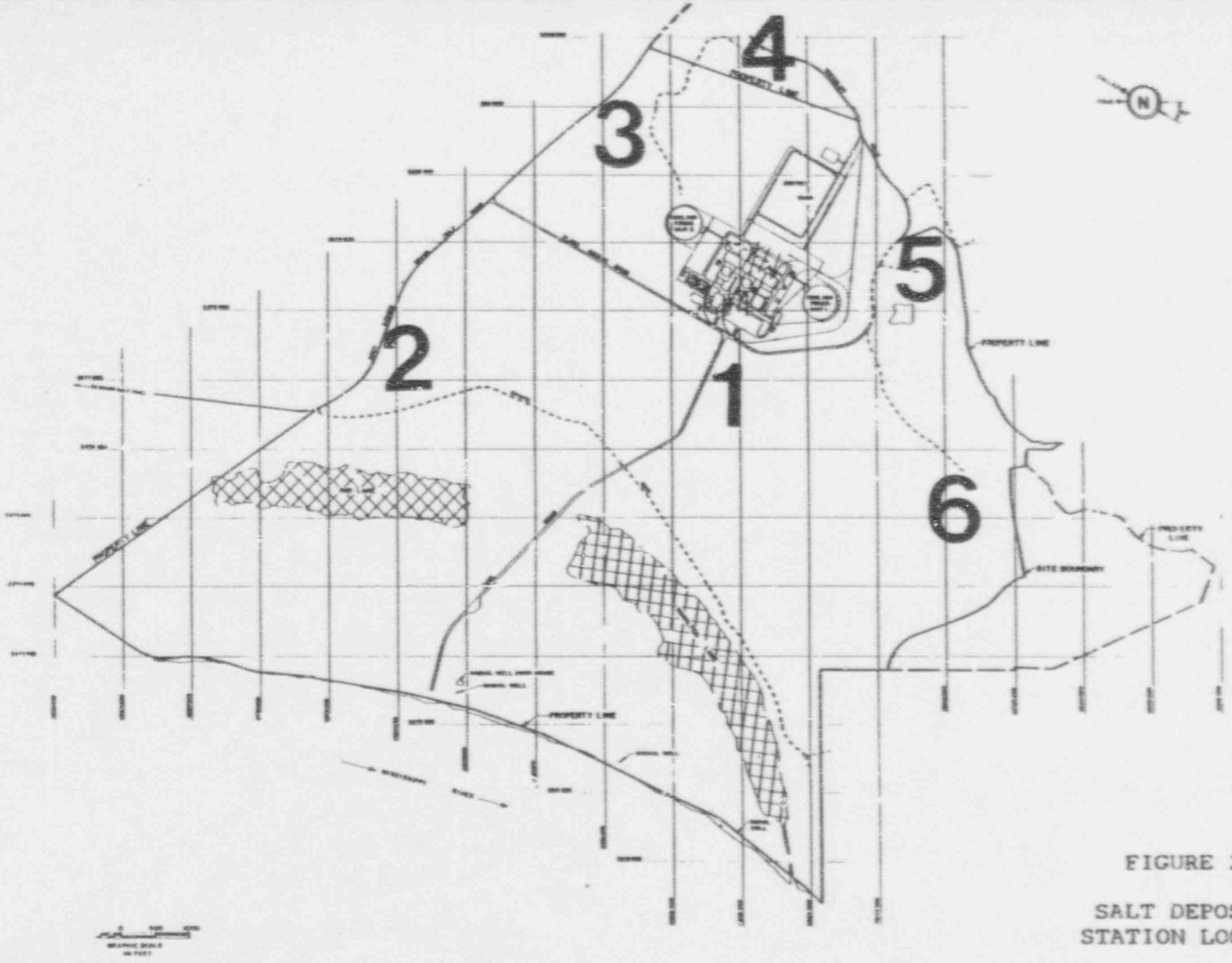
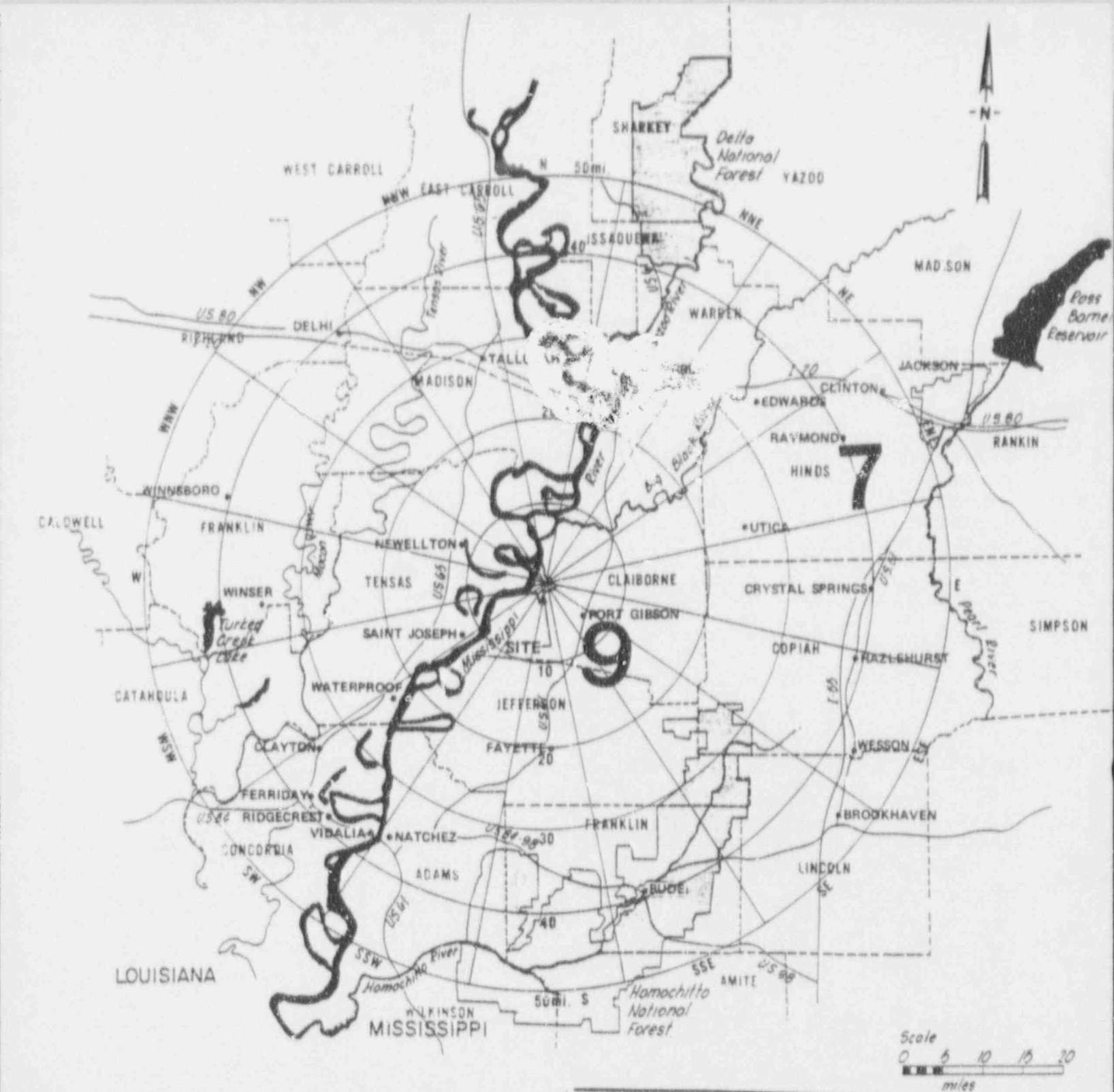


FIGURE 2-4

SALT DEPOSITION
STATION LOCATIONS



GRAND GULF NUCLEAR STATION

FIGURE 2-5

SALT DEPOSITION CONTROL LOCATIONS

SOURCE: Official highway map - Louisiana (1970)
Official highway map - Mississippi (1971)

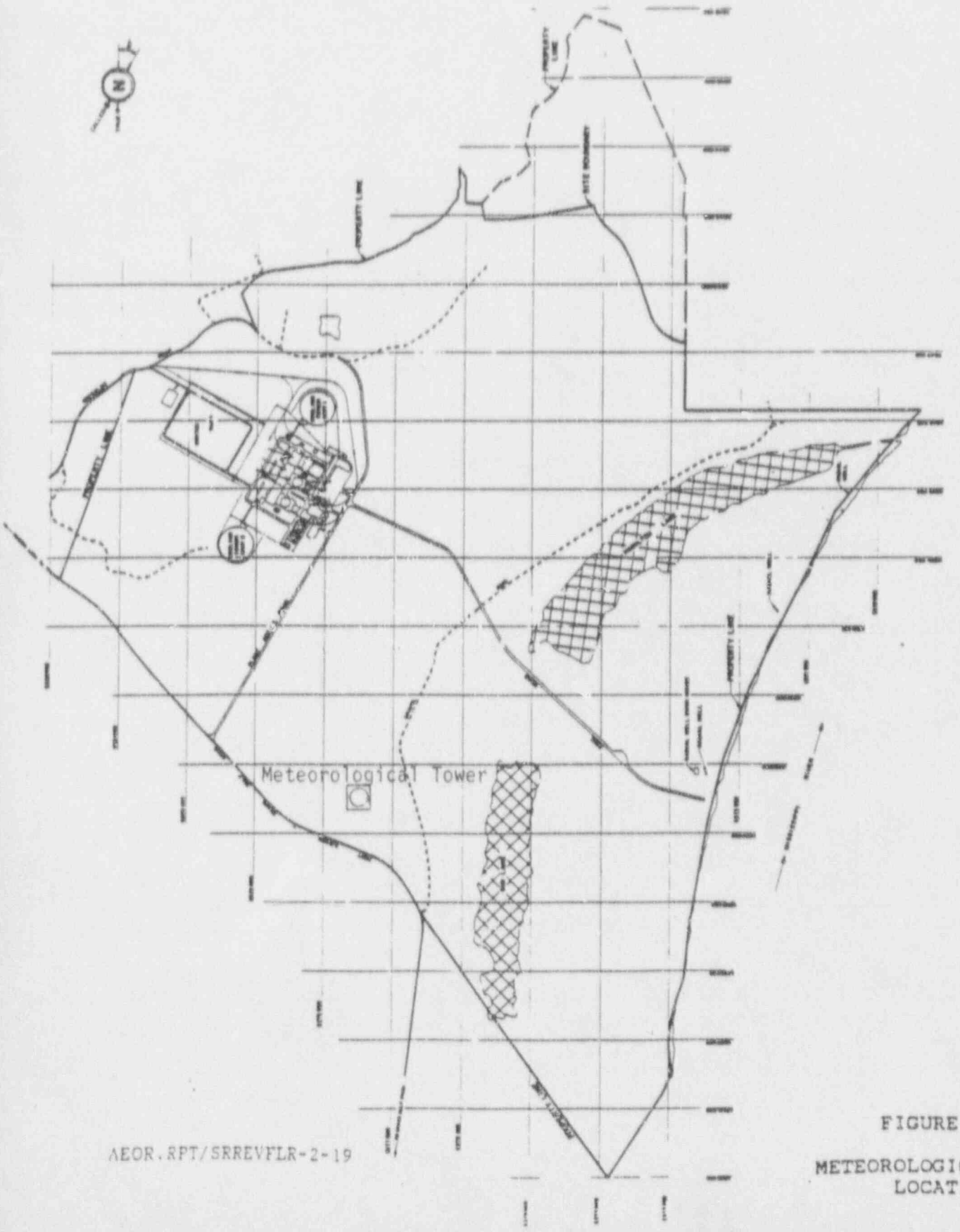


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FIGURE 2-6

METEOROLOGICAL SYSTEM
LOCATION

SECTION 3.0

OBSERVATIONS AND DISCUSSIONS

3.1 SMOKE CONTROL

The GGNS Burn Pit, which was officially closed February 22, 1990, was filled with dirt during the week of June 11, 1990, thus prohibiting any future use.

3.2 EROSION CONTROL

The GGNS NPDES Permit requires grab samples collected from the outfalls of Sediment Basins A & B for total suspended solids (TSS) analysis. Normally, samples were not collected if prevailing meteorological conditions (such as heavy rain) could skew analysis results.

Analytical results are presented in Table 3-1. As shown in Figure 3-1, results indicate that, overall, the basins function at similar efficiencies and that minimal erosion is occurring on the GGNS site.

3.3 TRANSMISSION LINE SURVEYS

The aerial surveys in previous years have confirmed that soil and vegetation have stabilized along GGNS transmission lines. Therefore, as permitted by Section 4.2.1, paragraph 2, of the EPP, the Erosion Control Inspection Program was discontinued in 1988.

3.4 LIQUID AND SOLID WASTE MANAGEMENT

Liquid Waste

GGNS did not incur any serious problems or incidents with liquid waste control in 1991. Liquids which were suitable for reuse were recycled through local contractors and nonprofit organizations. Nonhazardous liquid wastes (borated water and cooling waters) were disposed of through National Pollutant Discharge Elimination System outfalls.

Solid Waste

Solid waste generated at GGNS during 1991 did not present any unanticipated problems or adversely affect the environment. Solid waste which was not salvageable was buried at an approved landfill.

Waste Management, Inc. has been contracted since 1988 for collection and disposal of solid waste from GGNS Unit 1 and the Energy Services Center. These consisted of office, warehouse, cafeteria and maintenance wastes. Final disposal was at the Vicksburg landfill.

Hazardous Waste

The Mississippi Department of Environmental Quality (MDEQ) inspected the Hazardous Waste Storage Area and related activities on April 11, 1991. The purpose of the inspection was to confirm regulatory compliance with the GGNS Hazardous Waste Management Permit. No violations were noted.

Polychlorinated Biphenyl's (PCBs)

No known exposure or offsite release of PCBs occurred in 1991.

3.5 LAND MANAGEMENT AND WILDLIFE

Based on field observations by ESP personnel, the 1991 operation of GGNS had no apparent ecological effect on the GGNS wildlife population. Common wildlife, such as deer, turkey and fish continue to be abundant based on hunting and sport fishing activities. Also, no adverse impact was observed on threatened or endangered species known or suspected to inhabit the GGNS site.

Land management practices continued as in past years. Fields near the meteorological tower were used for agricultural production and mowing machines were used to maintain other cleared areas. The majority of the site can still be classified as predominantly hardwood forest. Thus, diverse habitats were maintained to promote the wildlife population.

3.6 GROUNDWATER

Regional Groundwater

Regional groundwater monitoring data is presented in Tables 3-2 and 3-3. Water levels recorded in 1991 were generally consistent with preoperational and operational data. This indicates the radial well pumping operation is not affecting the regional water table.

A hydrograph for each regional well is provided in Figure 3-2.

Perched Aquifer

Perched groundwater data is presented in Table 3-4. A hydrograph for each perched aquifer well is provided in Figure 3-3. Dewatering Well DW-8, Page 8 of Figure 3-3 exceeded the 109.0 feet MSL during routine Environmental Surveillance Program monitoring in August due to mechanical problems, which was reported to the NRC in GNRO-92/0001, dated 02/07/92. In addition, Nuclear Plant Engineering observed elevated levels above the 109.0 feet MSL in Dewatering Wells MW-6 and DW-8 during non-routine monitoring activities in May and October, respectively which are not shown on Page 8 of Figure 3-3. The MW-6 and DW-8 well problems were reported to the NRC in GNRO-91/0138 dated 09/06/91 and GNRO-92/0001 dated 02/07/92, respectively. However, all problems were corrected and elevations returned below the 109.0 feet MSL. Well measurements taken during 1991 are included as Appendix I.

Rainfall data for 1991 is presented in Table 3-5. Figures 3-4 and 3-5 show rainfall data from 1985 through 1991 and 1991 cumulative rainfall data, respectively.

3.7 NPDES

The 1991 monitoring results for all permitted outfalls were reported in the National Pollutant Discharge Elimination System (NPDES) reports. The Mississippi Department of Environmental Quality (MDEQ) and the U. S. Nuclear Regulatory Commission received copies of these reports.

Several items noted during 1991 and included in the NPDES reports are summarized in the following:

- The following were routine discharges that occurred during the year.

Date	Quantity	Source
07-06-91	300,000 Gallons	Fire Water Storage Tank "A"
08-10-91	2,000 Gallons	Div 3 D/G Oil Collection Sump

Discharges were within NPDES limits or limits imposed by the MDEQ.

- The following NPDES noncompliance notifications occurred during the year.

Date	Outfall	Description	Action Taken	Preventive Action
March	010	High F/C count & low chlorine level at new sewage treatment facility	Adjusted chlorine levels	Checked chlorine levels frequently
March	014	High pH reading in "B" due to algae	* None	None
July	016	High pH reading due to algae	* None	None
Oct	010	High chlorine level at sewage treatment facility	Adjusted chlorine feed	Replaced injection system
Dec	013	High TSS in "A" Basin caused by heavy erosion	**None	None

* Rainfall flushed Basin "B" returning pH values within NPDES limits.

**Heavy rainfall ceased allowing Basin "A" to return within NPDES limits.

Noncompliances were reported to the MDEQ and corrective action taken to return outfalls to within NPDES limits.

3.8 THERMAL MONITORING

Thermal monitoring (Section 2.8) was conducted on November 5, 1991 by ESP personnel. No limit imposed by the NPDES Permit was exceeded. A summary of thermal monitoring conducted in 1991 is provided as Appendix II.

3.9 COOLING TOWER DRIFT

During 1991, cumulative salt deposition samples were collected for four quarterly periods. Replicate samples were taken at four locations (Stations 1, 2, 5 and 6) as described in Section 2.9.

Table 3-6 presents the calculated salt deposition rates (SDRs) for eight monitoring sites in the GGNS Cooling Tower Drift Program. These SDRs form bases for statistical analysis required by Section 4.2.2 of the EPP.

Section 4.2.2 of the EPP required the Cooling Tower Drift Program to begin at least 3 months prior to operation of Unit 1 above 5% power and continued for three years of operation. Section 4.2.2 further states that if no statistically significant amounts of analyzed components are detected during this time period, then a proposal can be made to the NRC to terminate the program.

In 1989 Nuclear Plant Engineering conducted an analysis of variance comparison between preoperational and operational data. Results of this comparison revealed no statistically significant amounts of salt were detected between preoperational and operational samples. On February 19, 1991, GGNS submitted a proposal (GNRO-91/00029) to terminate the Cooling Tower Drift Program based on results of the 1989 analysis without revising the EPP.

However, the NRC recommended that the EPP be revised to reflect deletion of this requirement. Therefore, a formal request to discontinue the Cooling Tower Drift Program was submitted to the NRC (GNRO-92/00017) in February, 1992. A statistical analysis for 1991 data shown in Table 3-6 has not been performed pending outcome of the termination proposal. Rainfall data collected at each sampling site is provided as Table 3-7.

3.10 METEOROLOGICAL DATA

Meteorological data for the 1991 reporting period was included in the Semiannual Radioactive Effluent Release Reports submitted to the U. S. Nuclear Regulatory Commission. Data contained in these reports is summarized in the following tables:

- Joint Frequency Distribution, 50 Meter Level (Table 3-8)
- Joint Frequency Distribution, 10 Meter Level (Table 3-9)
- Percent Bad Data Report (Table 3-10).

Table 3-11 shows the percent meteorological data recovery since 1986. This table indicates the meteorological system is performing satisfactorily, as well as providing consistent data.

3.11 ENVIRONMENTAL EVALUATIONS

During 1991, no unreviewed environmental questions were found. Environmental evaluations reviewed by Nuclear Support personnel were routine matters within the scope of expected activities. No environmental consequences have been observed as a result of conduct of the activities evaluated.

TABLE 3-1

1991 TSS ANALYSIS RESULTS[1]

SEDIMENTATION BASINS A & B

Collection	Sedimentation Basin A (Outfall 013)	Sedimentation Basin B (Outfall 014)
JAN	(2)	27.8
FEB	39.4	13.0
MAR	48.7	15.1
APR	(2)	26.8
MAY	(2)	21.2
JUN	51.5	33.0
JUL	31.8	29.4
AUG	32.9	16.7
SEP	79.0	16.0
OCT	15.6	9.5
NOV	15.0	4.4
DEC	258.9[3]	10.8
Yearly Average	63.6	18.6

[1] Analysis results expressed as mg/l. Data obtained from NPDES data sheets.

[2] Unable to sample due to flooding.

[3] Value high due to heavy rainfall, low basin retention capacity and shortened retention time.

TABLE 3-2

1991 REGIONAL GROUNDWATER MONITORING DATA[1]

DATE	OW-4	OW-4A	OW-29A	OW-209A	P-5	OW-7	P-4	OW-69A	OW-202	OW-5	OW-10	P-209
01-03-91	69.7	70.4	68.7	80.7	66.2	73.5	60.7	68.6	77.0	74.6	77.4	90.5
01-14-91	(2)	(2)	69.1	91.2	76.3	75.4	(2)	71.3	79.1	75.6	78.4	91.1
01-31-91	(2)	(2)	73.1	91.4	77.0	77.0	(2)	73.2	80.2	76.3	79.0	91.2
02-14-91	75.0	74.1	74.6	92.1	77.5	78.2	62.5	74.0	79.7	77.2	80.2	91.2
02-27-91	75.2	75.2	75.1	92.0	78.1	78.7	63.6	74.8	79.8	77.7	80.4	91.8
03-14-91	75.7	76.5	75.9	91.9	77.8	78.7	64.6	73.1	79.9	77.4	80.9	91.5
03-29-91	75.8	75.7	74.1	91.4	79.0	79.4	64.0	75.3	80.1	78.8	81.5	91.7
04-11-91	76.2	76.6	74.0	92.2	79.1	80.2	65.1	76.2	80.4	78.7	81.3	92.0
04-26-91	77.3	78.3	77.7	92.4	80.2	81.6	66.4	77.8	81.4	80.1	82.0	92.1
05-10-91	(2)	(2)	78.8	91.9	80.9	82.6	(2)	78.5	82.6	80.6	82.5	92.0
05-22-91	(2)	(2)	79.2	92.7	81.3	82.5	(2)	78.6	81.8	81.1	82.9	92.4
06-07-91	77.2	78.2	78.2	92.7	81.1	82.6	66.8	77.5	81.4	81.0	83.0	92.3
06-19-91	77.6	76.5	77.2	92.9	81.0	82.1	65.8	73.5	81.0	80.5	83.2	92.8
07-01-91	76.0	75.2	75.8	93.2	80.5	81.4	65.1	75.0	80.2	80.2	83.0	93.0
07-17-91	74.1	74.3	74.8	93.2	80.6	80.6	65.0	73.7	79.9	78.6	79.8	92.6
08-02-91	74.0	73.2	73.7	93.4	79.6	79.3	62.7	72.3	80.1	79.0	82.6	93.3
08-15-91	73.5	72.7	70.6	93.4	79.5	78.6	62.9	69.8	78.9	79.0	82.6	93.2
08-28-91	72.6	71.9	72.0	93.6	78.9	78.0	62.1	70.9	78.9	78.2	82.0	93.4
09-12-91	72.4	71.5	70.9	92.9	77.9	77.3	61.3	70.6	78.5	77.8	81.5	93.0
09-26-91	71.7	71.0	69.5	93.3	77.9	76.6	60.7	70.0	78.3	77.4	81.3	93.3
10-11-91	71.2	70.5	69.9	93.5	77.8	76.1	59.9	69.1	77.9	77.2	80.9	93.4

(1) Water level expressed at Mean Sea Level (MSL)
(2) No reading due to river flooding

TABLE 3-3

1991 REGIONAL GROUNDWATER MONITORING SUMMARY

WELL NO.	YEAR	FORMATION[1]	MIN[2]	MONTH	MAX[2]	MONTH	AVERAGE[3]
OW4	1991	A	69.7	JAN	77.6	JUN	74.4
OW4A	1991	A	70.4	JAN	78.3	APR	74.2
OW29A	1991	T	68.7	JAN	79.2	MAY	73.9
OW203A	1991	T	80.7	JAN	93.6	AUG	92.0
P5	1991	C	66.2	JAN	81.3	MAY	78.5
OW7	1991	T	73.5	OCT	82.6	MAY	79.1
P4	1991	C	59.9	OCT	66.8	JUN	63.5
OW69A	1991	A	68.6	JAN	78.6	MAY	73.5
OW202	1991	T	77.0	JAN	82.6	MAY	79.9
OW5	1991	T	74.6	JAN	81.1	MAY	78.4
OW10	1991	C	77.4	JAN	83.2	JUN	81.3
P209	1991	C	90.5	JAN	93.4	AUG, OCT	92.3

1 A = Alluvium; C = Catahoula; T = Terrace Deposits
2 Water Level Elevation (Feet above MSL)
3 Average Elevation for Non-Dry Readings (Feet above MSL)

TABLE 3-4

1991 PERCHED GROUNDWATER MONITORING DATA[1]

MONTH	DATE	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	DW-1	DW-2	DW-3	DW-4	DW-5	DW-6	DW-7	DW-8
Jan	01-07-91	100.6	101.8	102.0	104.7	102.7	105.6	98.7	98.7	100.7	101.9	101.9	102.2	105.6	106.7	107.8
Feb	02-07-91	100.8	102.3	102.7	104.9	103.3	106.7	99.1	99.1	101.1	102.3	102.4	102.8	106.6	107.8	107.8
Mar	03-06-91	100.9	102.3	103.2	105.6	103.7	107.6	99.5	99.5	101.2	102.6	102.6	103.3	107.2	108.5	107.7
Apr	04-03-91	102.8	102.3	103.1	105.5	103.7	107.3	99.5	99.5	103.0	102.7	102.8	103.0	107.1	95.3	106.7
May	05-23-91	104.1	104.1	104.4	106.5	105.3	108.9	100.6	100.6	104.3	104.2	104.4	104.3	104.6	106.2	107.2
Jun	06-14-91	101.9	104.0	104.0	106.8	105.2	108.9	100.6	100.5	102.2	104.0	104.3	104.2	108.2	104.3	108.0
Jul	07-18-91	102.4	104.1	104.1	106.0	105.2	107.9	100.3	100.3	102.3	105.0	104.3	104.7	108.2	99.0	107.4
Aug	08-29-91	101.9	103.4	103.6	105.7	105.0	107.2	100.0	99.9	102.3	103.9	104.0	103.7	107.3	108.4	109.9
Sep	09-18-91	101.9	103.3	103.5	105.5	104.8	106.8	100.0	99.7	101.8	103.2	103.9	103.6	107.1	107.8	106.4
Oct	10-17-91	101.7	103.3	103.4	105.2	104.6	106.6	99.7	99.7	101.8	103.6	103.6	103.2	106.9	107.5	106.1
Nov	11-22-91	101.3	103.0	103.2	106.2	104.0	106.2	99.7	99.3	101.6	103.3	103.5	103.2	106.3	107.0	107.0
Dec	12-18-91	101.3	102.9	103.2	105.9	104.0	106.1	99.3	99.3	101.5	102.9	103.1	103.5	106.5	107.1	108.0

[1] Water Level Expressed at Mean Sea Level (MSL)

TABLZ 3-5

1991 PRECIPITATION MEASUREMENT

GRAND GULF NUCLEAR STATION

MONTH	OBSERVED AT SITE[1] INCHES
JANUARY	7.48
FE@RUARY	4.34
MARCH	8.10
APRIL	17.20
MAY	4.71
JUNE	5.84
JULY	1.67
AUGUST	2.27
SEPTEMBER	2.58
OCTOBER	1.16
NOVEMBER	5.25
DECEMBER	6.12
TOTAL	66.72

(1) Rainfall measured adjacent to the GGNS Meteorological System

TABLE 3-6

SALT DEPOSITION (1991)

SDCa91
CALCIUM (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	144.60	404.13	279.37	571.43
SDS1A	141.90	476.83	287.30	634.76
SDS2	74.29	167.94	65.08	272.86
SDS2A	77.30	153.33	76.51	203.49
SDS2B	71.27	147.78	70.63	150.00
SCS3	44.13	110.16	12.37	64.13
SDS4	62.38	151.43	55.56	106.98
SDS5	70.00	311.43	84.92	167.30
SDS5A	75.08	285.71	85.71	167.30
SDS5B	45.08	232.54	116.67	124.92
SDS6	123.02	225.40	84.13	158.41
SDS6A	107.46	210.59	74.60	86.98
SDS7	32.22	159.05	15.56	46.03
SDS9	70.32	398.41	84.13	141.43

SDCl91
CHLORIDE (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	-370.00	-843.33	320.79	161.90
SDS1A	-316.03	-728.73	166.83	213.17
SDS2	63.33	-856.67	30.16	131.75
SDS2A	196.67	-887.94	52.06	122.70
SDS2B	-55.56	348.41	156.67	135.56
SCS3	-16.03	-1016.03	50.16	67.30
SDS4	164.92	-819.21	22.38	86.51
SDS5	-38.25	-790.00	20.00	137.78
SDS5A	-12.86	-858.41	34.29	125.71
SDS5B	-87.30	393.17	30.48	119.84
SDS6	-1052.70	-819.52	24.44	133.02
SDS6A	-956.19	-787.46	24.44	75.87
SDS7	150.63	-273.17	54.44	137.78
SDS9	507.78	-807.14	27.14	106.35

TABLE 3-6

SALT DEPOSITION (1991)

SDNo391
NITRATE (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	228.10	764.29	0.16	106.38
SDS1A	225.40	813.08	2.25	61.75
SDS2	186.51	1142.06	85.87	22.54
SDS2A	317.94	538.89	3.97	22.54
SDS2B	267.30	1027.14	122.22	179.52
SCS3	198.41	218.25	163.97	138.25
SDS4	300.79	630.95	167.62	194.44
SDS5	300.79	872.22	155.71	164.29
SDS5A	351.79	678.57	123.17	200.48
SDS5B	283.17	585.24	158.73	207.14
SDS6	255.08	696.98	71.59	178.25
SDS6A	291.59	694.44	109.68	169.68
SDS7	305.56	796.03	266.83	176.35
SDS9	238.89	536.35	30.32	143.81

SDPo491
PHOSPHATE (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-25-91	1-3-92
SDS1	16.98	39.52	3.02	16.83
SDS1A	14.29	216.03	3.02	16.83
SDS2	21.90	94.13	3.97	16.83
SDS2A	22.86	31.90	3.97	16.83
SDS2B	22.86	112.86	4.44	17.14
SCS3	12.38	21.43	3.97	15.87
SDS4	43.81	73.81	3.02	16.83
SDS5	13.33	36.67	3.02	16.83
SDS5A	13.33	38.57	3.02	16.83
SDS5B	13.33	145.24	51.27	16.19
SDS6	14.29	129.05	3.97	15.87
SDS6A	329.84	151.27	3.97	15.87
SDS7	12.38	77.62	25.40	10.16
SDS9	15.24	73.97	2.22	14.92

TABLE 3-6

SALT DEPOSITION (1991)

SDMg91

MAGNESIUM (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-91
SDS1	55.08	89.84	53.02	64.76
SDS1A	49.68	108.25	58.57	73.81
SDS2	22.22	41.27	21.90	16.51
SDS2A	19.05	38.05	23.81	19.52
SDS2B	19.05	39.84	20.63	14.29
SCS3	12.70	26.83	20.00	12.70
SDS4	13.65	43.49	17.30	13.49
SDS5	11.11	44.60	18.89	16.51
SDS5A	13.65	46.83	16.51	13.49
SDS5B	23.02	39.84	18.25	13.49
SDS6	22.70	50.16	19.05	12.70
SDS6A	28.57	47.94	19.05	12.70
SDS7	17.46	39.05	20.48	7.94
SDS9	24.13	57.78	29.21	11.90

SDNa91

SODIUM (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	-18.57	-257.30	41.43	196.19
SDS1A	-140.00	-283.65	50.95	356.03
SDS2	88.10	-226.19	52.22	328.89
SDS2A	165.87	-287.14	39.84	172.06
SDS2B	61.11	192.86	38.10	207.30
SCS3	-174.60	-384.76	56.98	108.10
SDS4	190.95	-255.40	49.37	150.95
SDS5	122.38	-248.89	55.71	169.05
SDS5A	178.25	-256.35	55.71	160.00
SDS5B	16.67	291.90	77.78	196.35
SDS6	-212.86	-106.83	49.37	133.81
SDS6A	-240.63	-243.33	42.70	125.24
SDS7	20.63	-82.38	128.89	161.43
SDS9	107.78	-245.56	59.68	123.02

TABLE 3-6

SALT DEPOSITION (1991)
PAGE 4 OF 5
SDSo491
SULFATE (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	513.65	1091.43	425.56	360.48
SDS1A	486.67	1202.54	254.92	381.59
SDS2	489.84	939.05	168.25	342.33
SDS2A	551.75	831.11	336.83	342.38
SDS2B	530.16	913.65	193.65	355.24
SCS3	378.73	410.48	264.44	232.06
SDS4	507.30	926.35	285.08	309.21
SDS5	481.90	1145.40	276.35	324.29
SDS5A	507.30	997.78	266.83	327.30
SDS5B	474.60	1066.03	315.08	313.65
SDS6	486.67	996.19	239.68	292.06
SDS6A	546.98	1021.59	254.92	266.35
SDS7	497.78	1173.97	126.35	370.16
SDS9	459.68	854.92	332.70	334.29

SDTDS91
TOTAL DISSOLVED SOLIDS (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	507.84	873.02	1460.32	3063.49
SDS1A	-31.75	793.65	1698.41	3666.67
SDS2	2825.40	396.83	714.29	952.38
SDS2A	3047.62	-333.33	809.52	1857.14
SDS2B	*********	1698.41	285.71	1888.89
SCS3	-2492.06	-1428.57	1000.00	31.75
SDS4	*********	4365.08	1142.86	47.62
SDS5	1333.33	634.92	507.94	650.79
SDS5A	2349.21	-571.43	666.67	650.79
SDS5B	-698.41	3984.13	603.17	349.21
SDS6	-2190.48	3952.38	238.10	2317.46
SDS6A	-2126.98	2269.84	333.33	1746.03
SDS7	-1777.78	714.29	1666.67	888.89
SDS9	1269.84	-857.14	746.03	15.87

****** Data Not Available

TABLE 3-6

SALT DEPOSITION (1991)

SDFe91
IRON (mg/m sq.)

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	14.60	33.33	12.70	25.56
SDS1A	25.40	32.54	33.33	19.52
SDS2	18.25	28.57	6.98	16.51
SDS2A	19.05	26.98	6.98	13.49
SDS2B	19.05	27.78	3.17	14.29
SCS3	10.32	18.25	7.94	12.70
SDS4	11.11	30.16	5.56	16.51
SDS5	11.11	30.95	10.32	13.49
SDS5A	11.11	32.54	11.11	16.51
SDS5B	11.11	52.54	11.90	13.49
SDS6	11.90	56.83	16.51	12.70
SDS6A	19.52	33.33	14.60	15.56
SDS7	10.32	78.41	6.98	7.94
SDS9	15.56	80.63	19.05	28.10

SDF91
FLOURIDE

PERIOD ENDING	3-28-91	6-28-91	9-26-91	1-3-92
SDS1	96.51	5.71	65.71	41.27
SDS1A	158.57	-1.43	30.00	53.33
SDS2	204.13	-2.22	16.35	119.68
SDS2A	183.97	-2.54	28.73	44.29
SDS2B	214.13	28.41	68.25	33.81
SCS3	109.68	-4.29	18.25	81.75
SDS4	128.10	-1.90	13.33	62.38
SDS5	143.33	-1.75	10.16	77.46
SDS5A	138.25	-1.43	12.54	53.33
SDS5B	96.67	6.51	7.14	111.90
SDS6	80.32	-0.95	13.49	38.89
SDSCA	142.70	-1.27	25.87	56.03
SDS7	135.87	-1.59	12.54	32.22
SDS9	160.16	-2.38	6.19	63.49

TABLE 3-7

1991 SALT DEPOSITION

RAINFALL DATA

FIRST QUARTER

Station No.	Date	Inches
SDS #1	03-28-91	14.30
SDS #2	03-28-91	12.20
SDS #3	03-28-91	17.50
SDS #4	03-28-91	15.00
SDS #5	03-28-91	14.10
SDS #6	03-28-91	13.20
SDS #7	03-28-91	13.10
SDS #9	03-28-91	13.05

1991 SALT DEPOSITION

RAINFALL DATA

SECOND QUARTER

Station No.	Date	Inches
SDS #1	06-28-91	35.30
SDS #2	06-28-91	32.70
SDS #3	06-28-91	34.20
SDS #4	06-28-91	32.40
SDS #5	06-28-91	33.30
SDS #6	06-28-91	17.35*
SDS #7	06-28-91	26.35
SDS #9	06-28-91	26.55

*Only partial data available.

TABLE 3-7

1991 SALT DEPOSITION

RAINFALL DATA

THIRD QUARTER

Station No.	Date	Inches
SDS #1	09-26-91	7.15
SDS #2	09-26-91	7.70
SDS #3	09-26-91	8.55
SDS #4	09-26-91	8.65
SDS #5	09-26-91	8.25
SDS #6	09-26-91	6.50
SDS #7	09-26-91	10.70
SDS #9	09-26-91	7.75

1991 SALT DEPOSITION

RAINFALL DATA

FOURTH QUARTER

Station No.	Date	Inches
SDS #1	01-03-92	12.20
SDS #2	01-03-92	12.60
SDS #3	01-03-92	11.65
SDS #4	01-03-92	12.95
SDS #5	01-03-92	12.75
SDS #6	01-03-92	8.05
SDS #7	01-03-92	11.05
SDS #9	01-03-92	11.40

TABLE 3-8

1991 JOINT FREQUENCY DISTRIBUTION;

TOTAL FREQUENCY DISTRIBUTION
PERIOD OF RECORD: 1/1/91, 000 -- 12/31/91, 2300

WIND SPEED (M/S) AT 50-M LEVEL

TOTAL FREQUENCY DISTRUBUTION
PERIOD OF RECORD: 1/ 1/91, 000 -- 1/ 1/92, 000

WIND SPEED (M/S) AT 50-M LEVEL

WIND DIRECTION	0-2	3-5	6-8	9-11	12-14	15-17	18 AND UP	TOTAL	AVG SPEED
N	2.7	2.6	.1	.0	.0	.0	.0	5.5	.2
NNE	2.6	1.7	.1	.0	.0	.0	.0	4.4	.1
NE	2.3	1.9	.1	.0	.0	.0	.0	4.9	.2
ENE	2.7	2.6	.2	.0	.0	.0	.0	5.4	.2
E	2.8	4.4	.3	.0	.0	.0	.0	7.6	.3
ESE	4.5	6.3	.5	.0	.0	.0	.0	11.3	.4
SE	4.2	4.9	.3	.0	.0	.0	.0	10.0	.4
SSE	3.4	3.1	.9	.0	.0	.0	.0	7.5	.3
S	3.4	2.1	.5	.0	.0	.0	.0	6.0	.2
SSW	3.6	1.9	.4	.0	.0	.0	.0	5.6	.2
SW	3.4	1.9	.3	.0	.0	.0	.0	5.3	.1
WSW	2.6	.9	.2	.0	.0	.0	.0	3.8	.1
W	2.5	.9	.1	.0	.0	.0	.0	3.5	.1
WNW	2.3	1.3	.2	.0	.0	.0	.0	4.3	.1
NW	2.6	2.8	.5	.0	.0	.0	.0	6.0	.2
NNW	3.7	3.9	.5	.0	.0	.0	.0	7.8	.3
CALM	2.7							.7	
TOTAL	51.6	42.6	5.4	.2	.0	.0	.1	100.0	.2

78. HOURS OF BAD OR MISSING DATA OR .9 PERCENT FOR 8760 HOURS

1 Met Data obtained from Semiannual Radiological Effluent Release Report.

TABLE 3-9

1991 JOINT FREQUENCY DISTRIBUTION,

TOTAL FREQUENCY DISTRIBUTION
PERIOD OF RECORD: 1/1/91, 000 -- 12/31/91, 2300

WIND SPEED (M/S) AT 10-M LEVEL

TOTAL FREQUENCY DISTRUBUTION
PERIOD OF RECORD: 1/ 1/91, 000 -- 1/ 1/92, 000

WIND SPEED (M/S) AT 10-M LEVEL

WIND DIRECTION	0-2	3-5	6-8	9-11	12-14	15-17	18 AND UP	TOTAL	AVG SPEED
N	5.5	.5	.0	.0	.0	.0	.0	6.1	.1
NNE	6.1	.2	.0	.0	.0	.0	.0	6.3	.1
NE	8.6	.2	.0	.0	.0	.0	.0	8.8	.1
ENE	6.5	.1	.0	.0	.0	.0	.0	6.6	.1
E	4.5	.1	.0	.0	.0	.0	.0	4.5	.1
ESE	4.1	.1	.0	.0	.0	.0	.0	4.2	.0
SE	4.6	.1	.0	.0	.0	.0	.0	4.7	.1
SSE	5.8	.2	.0	.0	.0	.0	.0	6.0	.1
S	4.9	1.3	.0	.0	.0	.0	.0	6.3	.1
SSW	4.6	.6	.0	.0	.0	.0	.0	5.2	.1
SW	3.2	.4	.0	.0	.0	.0	.0	3.6	.1
WSW	3.2	.4	.0	.0	.0	.0	.0	3.6	.1
W	2.9	.1	.0	.0	.0	.0	.0	3.0	.0
WNW	3.2	.0	.0	.0	.0	.0	.0	3.3	.0
NW	4.3	.4	.0	.0	.0	.0	.0	4.8	.1
NNW	5.9	1.2	.1	.0	.0	.0	.0	7.2	.1
CALM	5.9							15.3	
TOTAL	92.2	7.5	.3	.0	.0	.0	.0	100.0	.1

82. HOURS OF BAD OR MISSING DATA OR .9 PERCENT FOR 8760 HOURS

1 Met Data obtained from Semiannual Radiological Effluent Release Report.

TABLE 3-1C

1991 PERCENT BAD DATA REPORT[1]

PERCENT BAD DATA REPORT
REPORT COVERS 8760 HOURS
PERIOD OF RECORD: 1/1/91, 000 -- 12/31/91, 2300

PERCENT BAD DATA REPORT
REPORT COVERS 8760HOURS

	HOURS	PERCENT
30M DIRECTION	26.	.30
30M WIND SPEED	27.	.31
10M DIRECTION	31.	.35
10M WIND SPEED	30.	.34
TEMPERATURE	8.	.09
DEW POINT	465.	5.31
DELTA T	59.	.67
PRECIPITATION	44.	.50

[1] Met Data obtained from Semiannual Radiological Effluent Release Report.

TABLE 3-11

METEOROLOGICAL DATA RECOVERY[1]

PARAMETER	1986 % RECOVERY	1987 % RECOVERY	1988 % RECOVERY	1989 % RECOVERY	1990 % RECOVERY	1991 % RECOVERY
50 Meter WD	99.90	100	99.27	98.98	100	99.70
50 Meter WS	99.38	100	98.0	98.90	100	99.69
10 Meter WD	99.90	100	99.26	98.85	99.77	99.65
10 Meter WS	99.38	100	98.14	98.72	100	99.66
Temperature	99.85	100	98.67	97.59	100	99.91
Dew Point	89.20	99.28	87.92	92.74	98.0	94.69
Delta T	98.05	99.82	99.03	97.10	100	99.33
Precipitation	99.74	99.69	99.35	99.18	100	99.50

[1] Met Data obtained from Semiannual Radiological Effluent Release Report.

TABLE 3-12

1991 ENVIRONMENTAL EVALUATION SUMMARY

Identifying Number	Description
009/91	Replacement of Betz 3641A at PSW with 12% NaOCl
014/91	Addition of hydrogen peroxide to the circulating water system to clean the filter medium

FIGURE 3-1

SEDIMENT BASINS A & B

1985-1991 TSS RESULTS

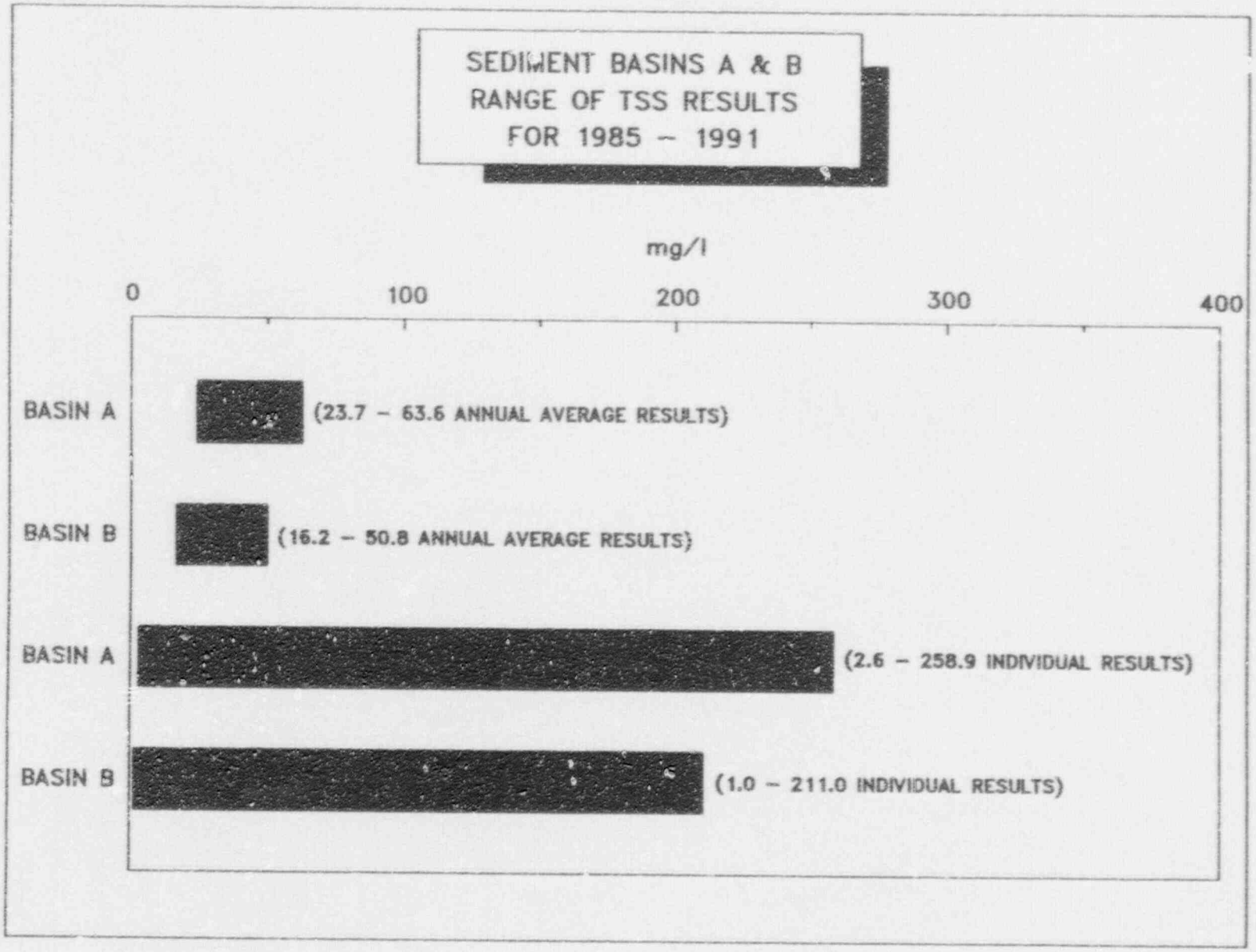


FIGURE 3-2

REGIONAL WELL HYDROGRAPHS

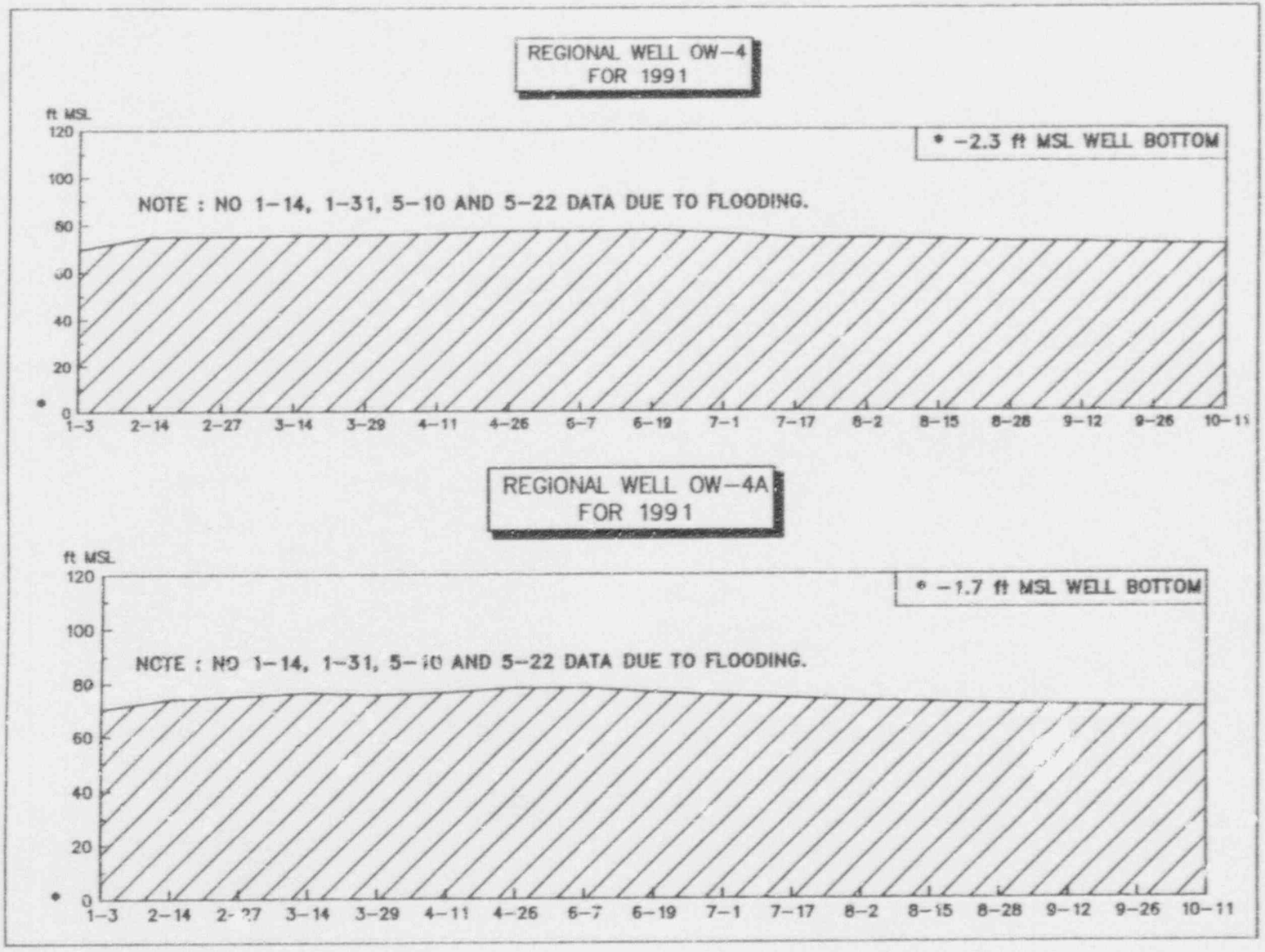


FIGURE 3-2

REGIONAL WELL HYDROGRAPHS

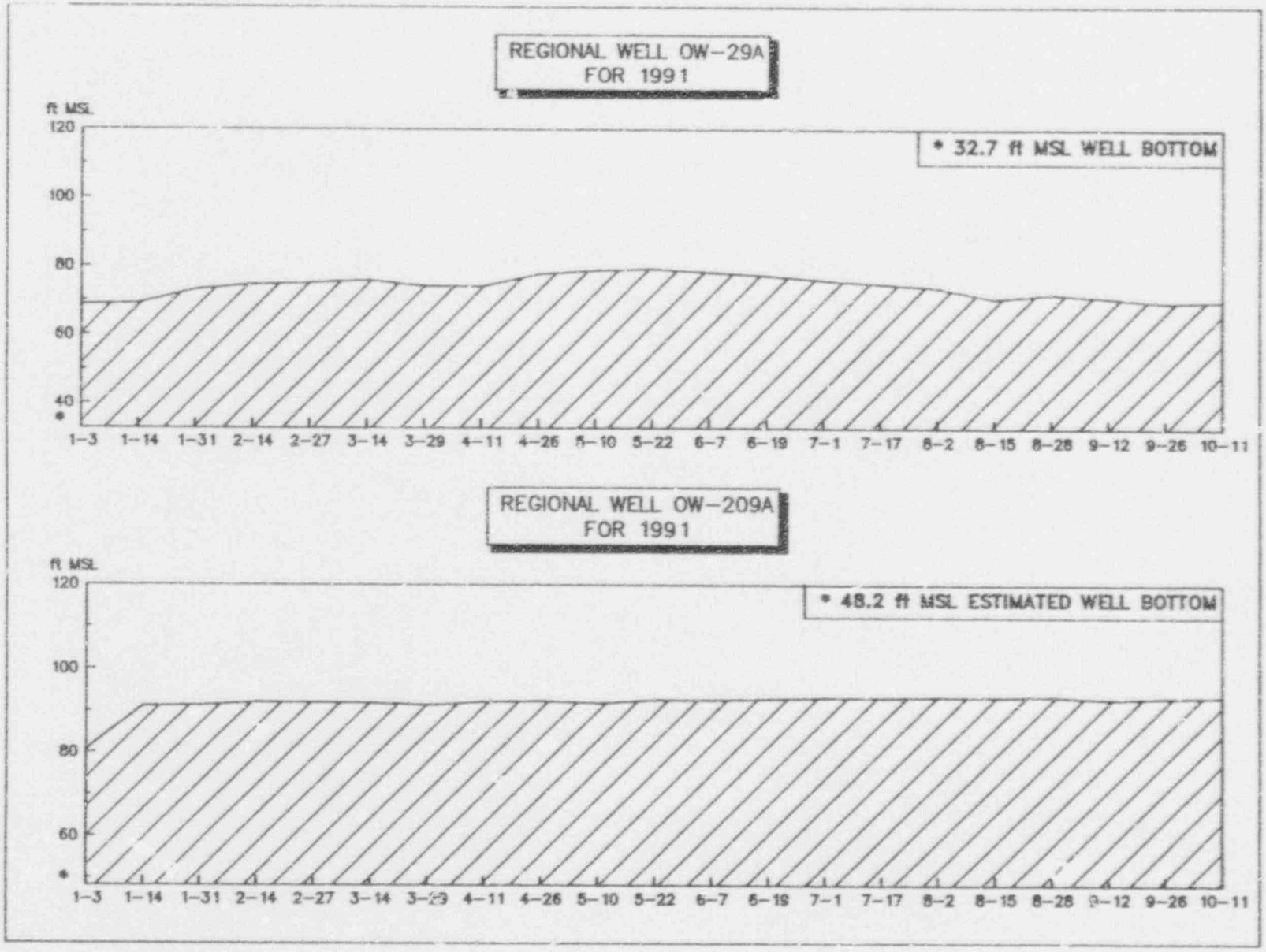


FIGURE 3-2

REGIONAL WELL HYDROGRAPHS

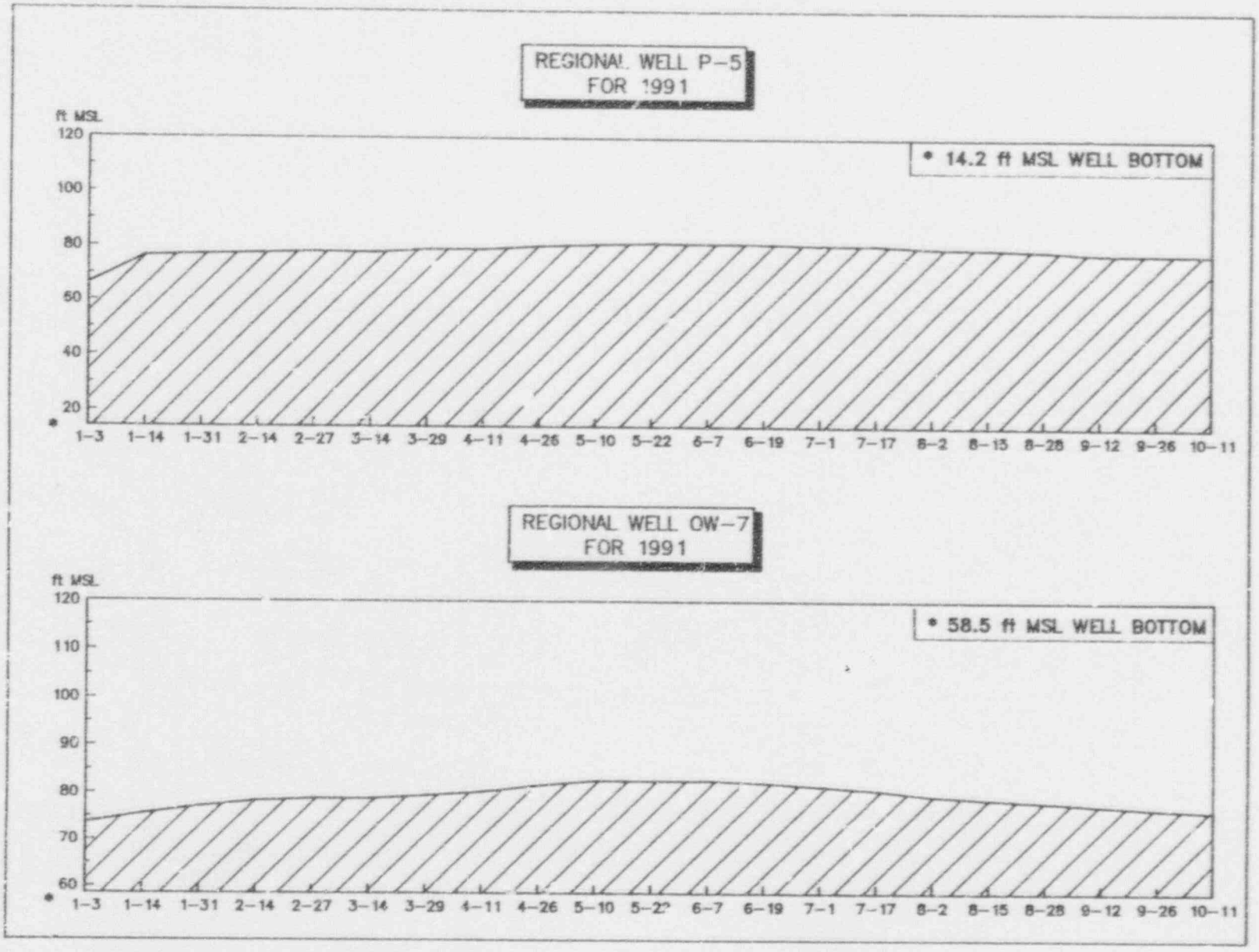


FIGURE 3-2

REGIONAL WELL HYDROGRAPHS

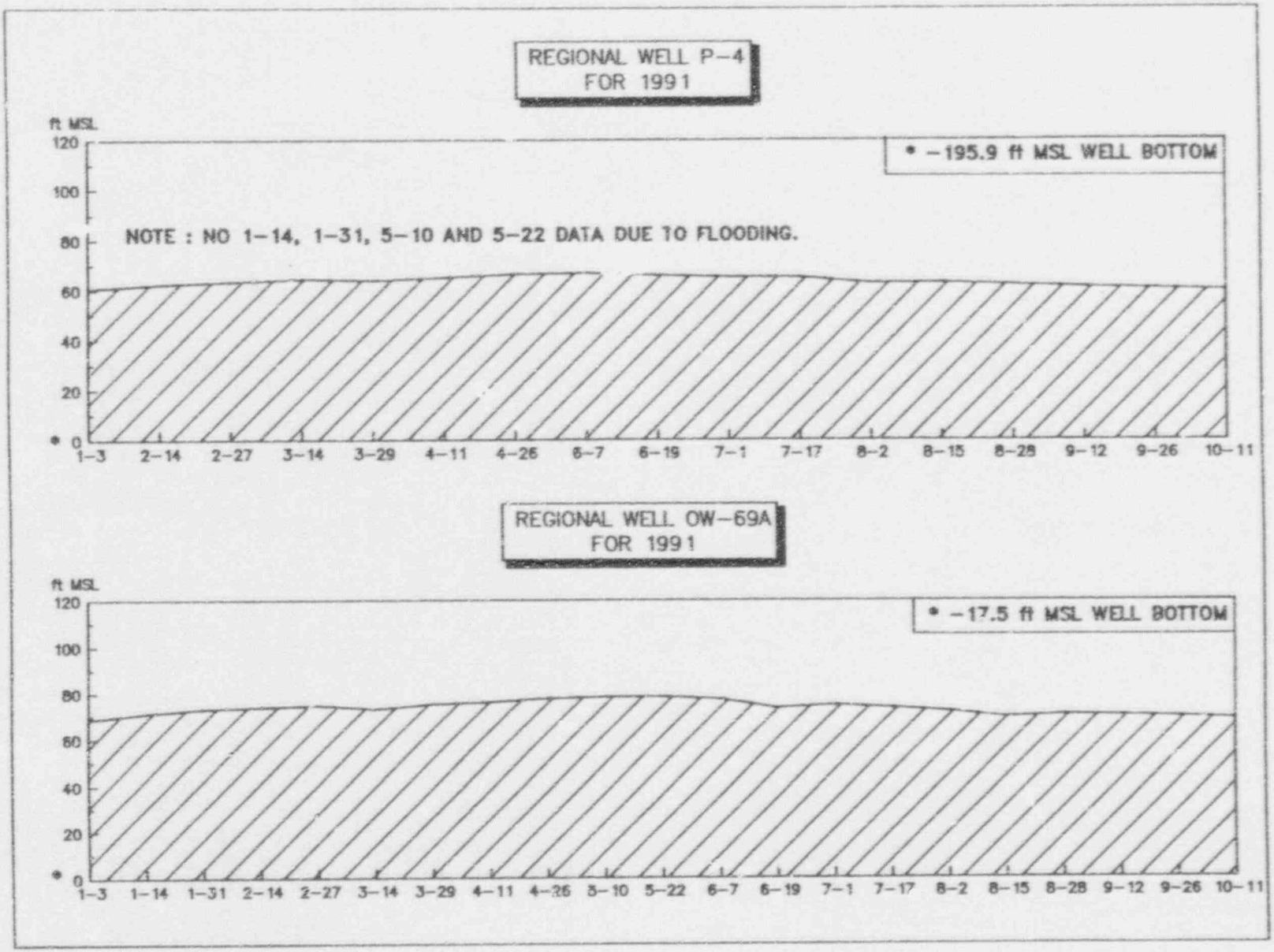


FIGURE 3-2

REGIONAL WELL HYDROGRAPHS

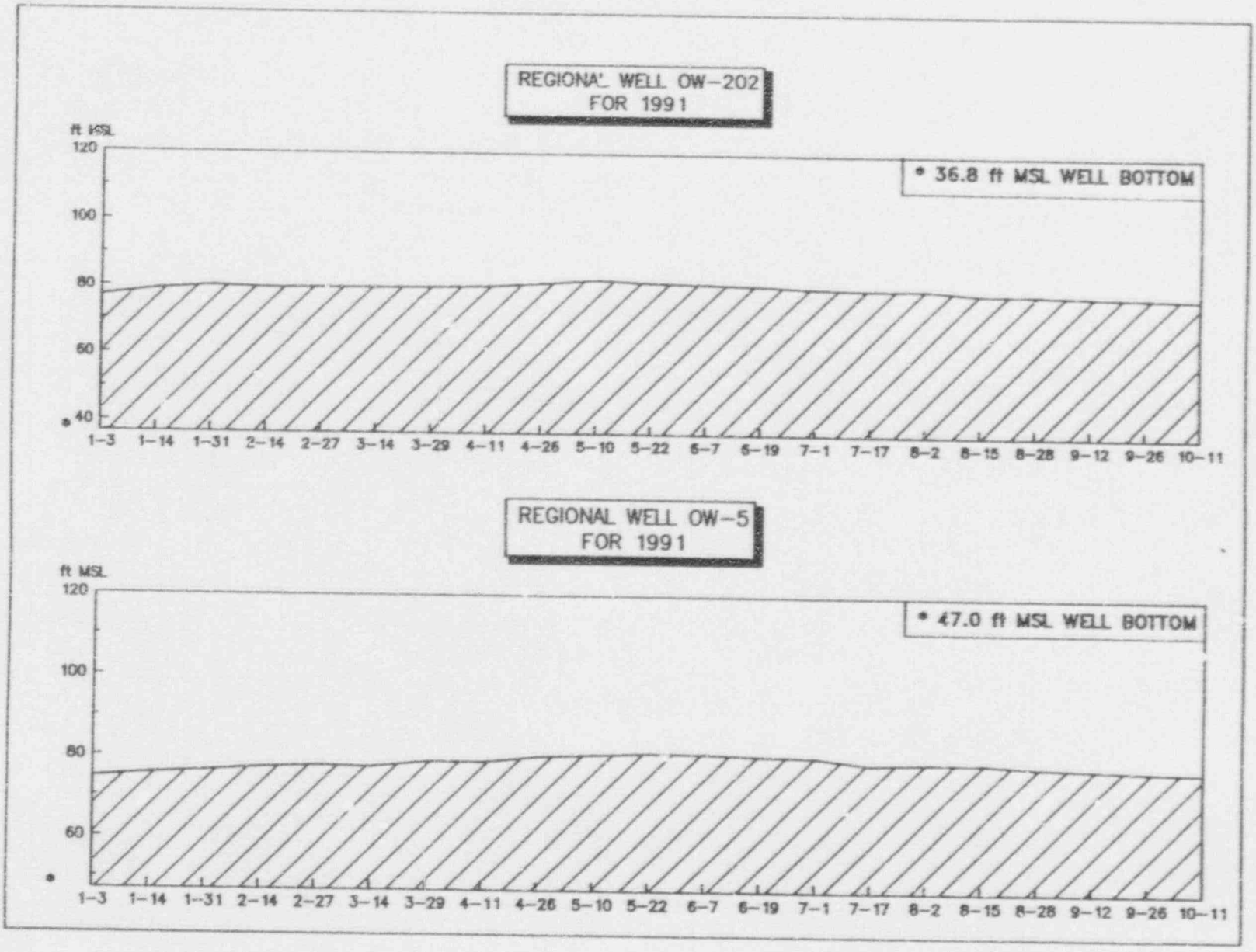


FIGURE 3-2

REGIONAL WELL HYDROGRAPHS

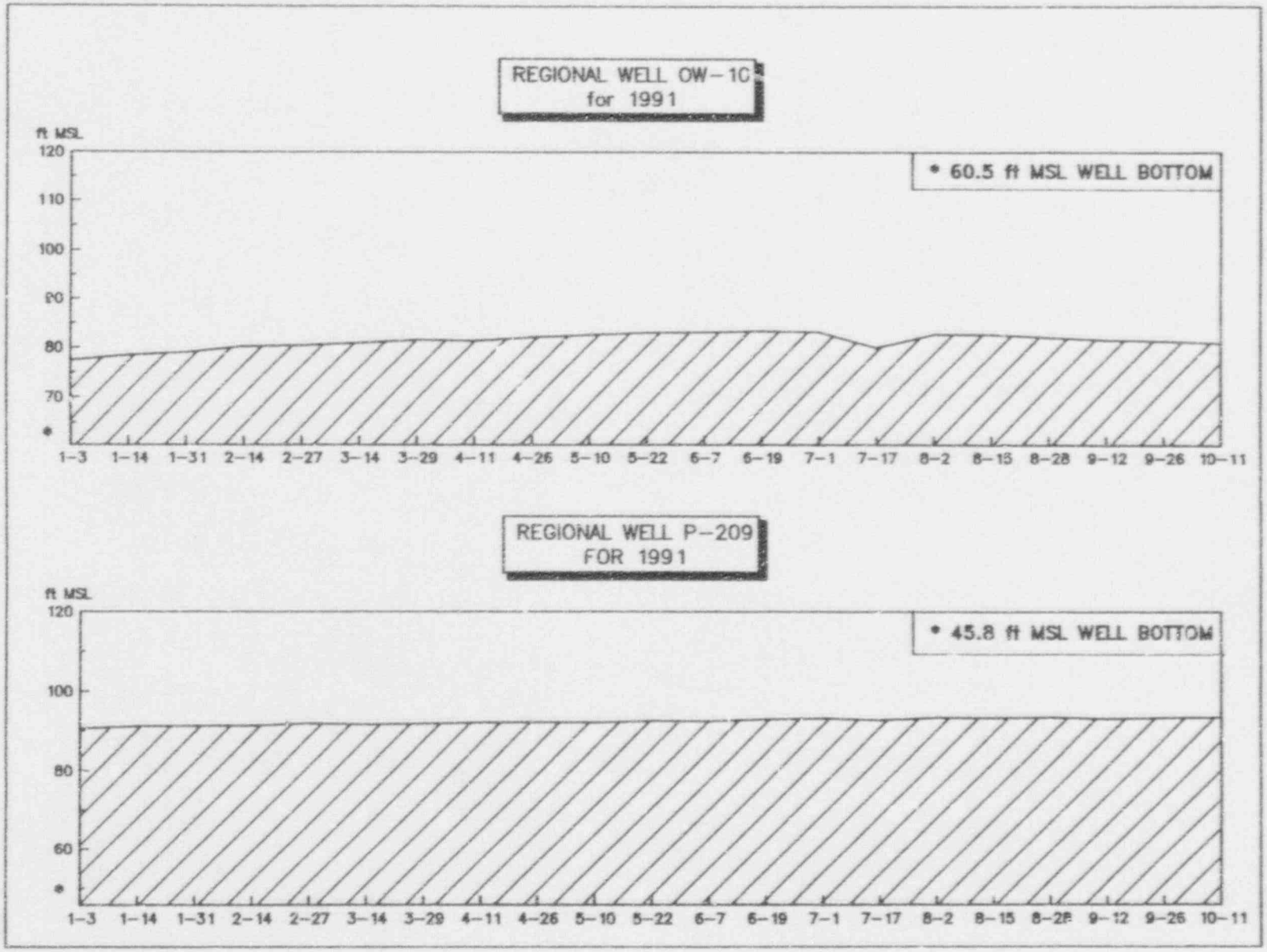


FIGURE 3-3

PERCHED WELL HYDROGRAPHS

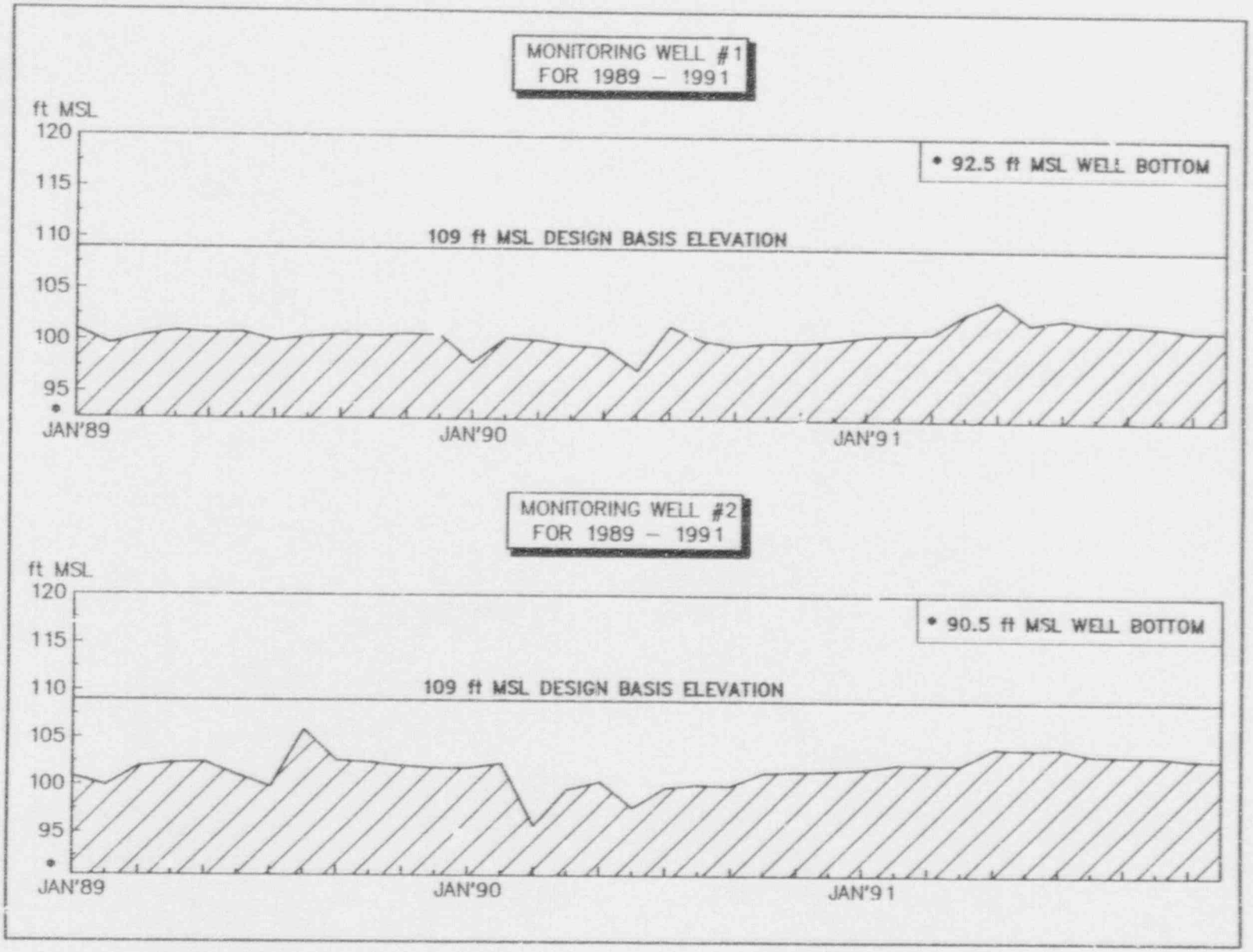


FIGURE 3-3

Page 2 of 8

PERCHED WELL HYDROGRAPHS

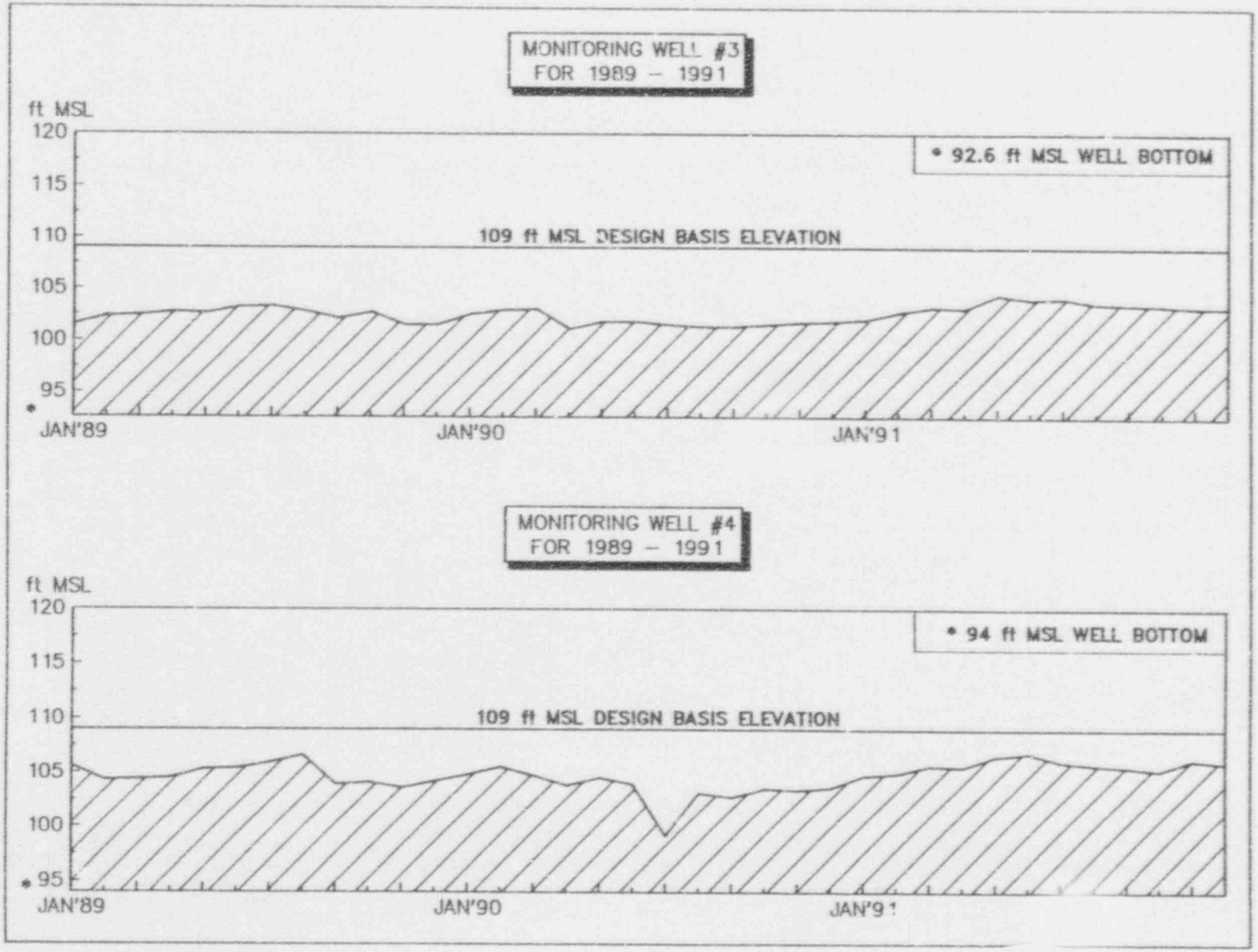


FIGURE 3-3

PERCHED WELL HYDROGRAPHS

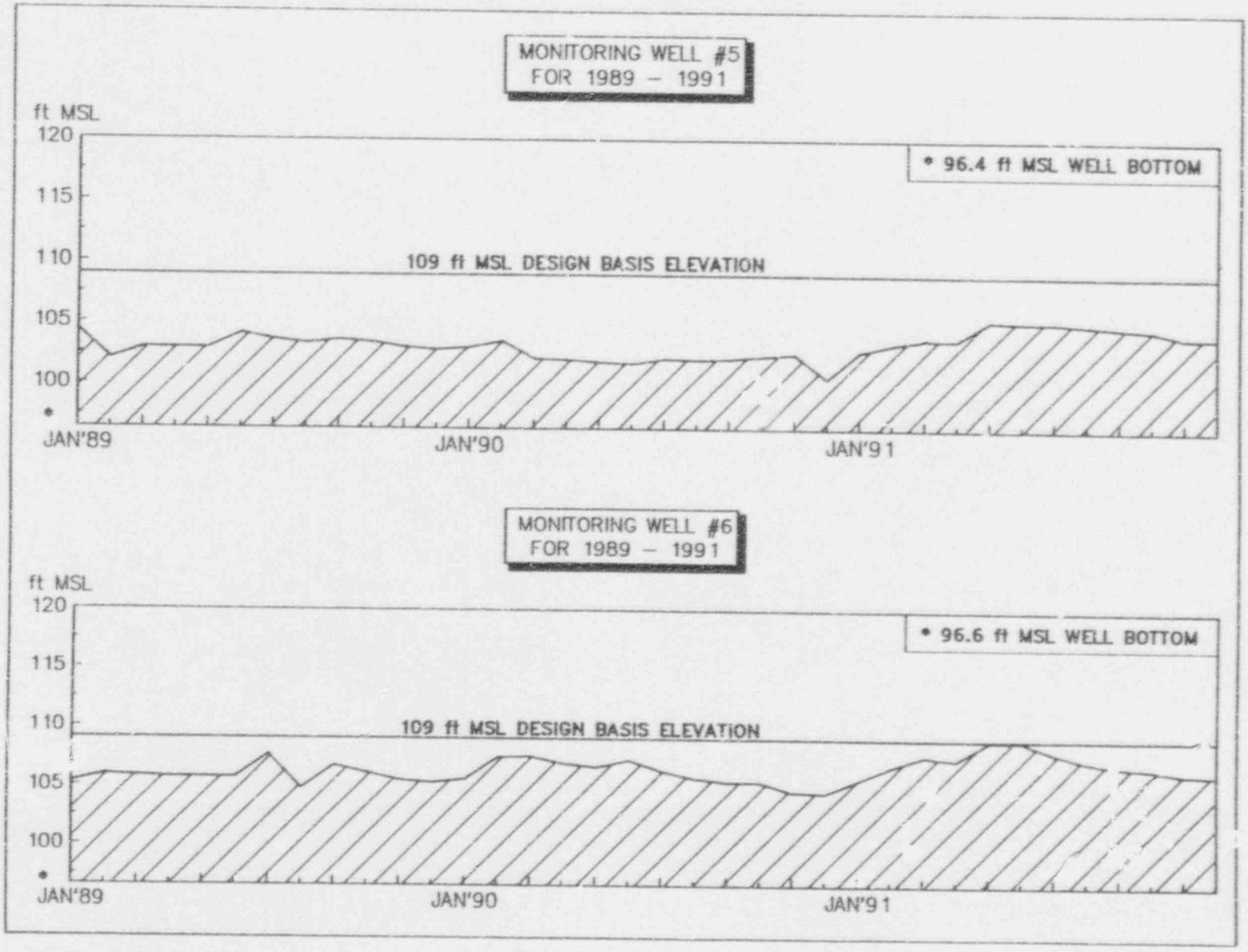


FIGURE 3-3

PERCHED WELL HYDROGRAPHS

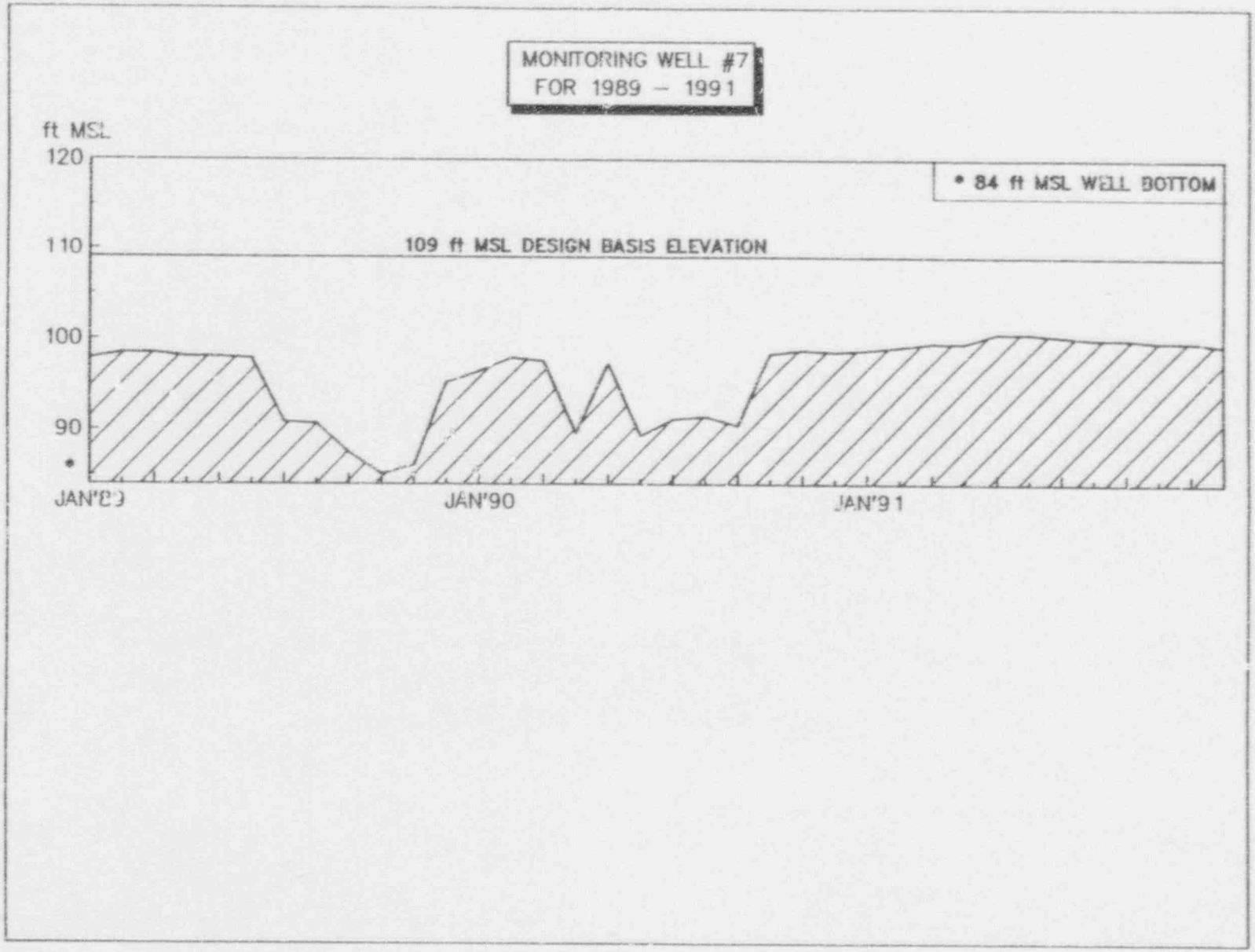


FIGURE 3-3

Page 5 of 8

PERCHED WELL HYDROGRAPHS

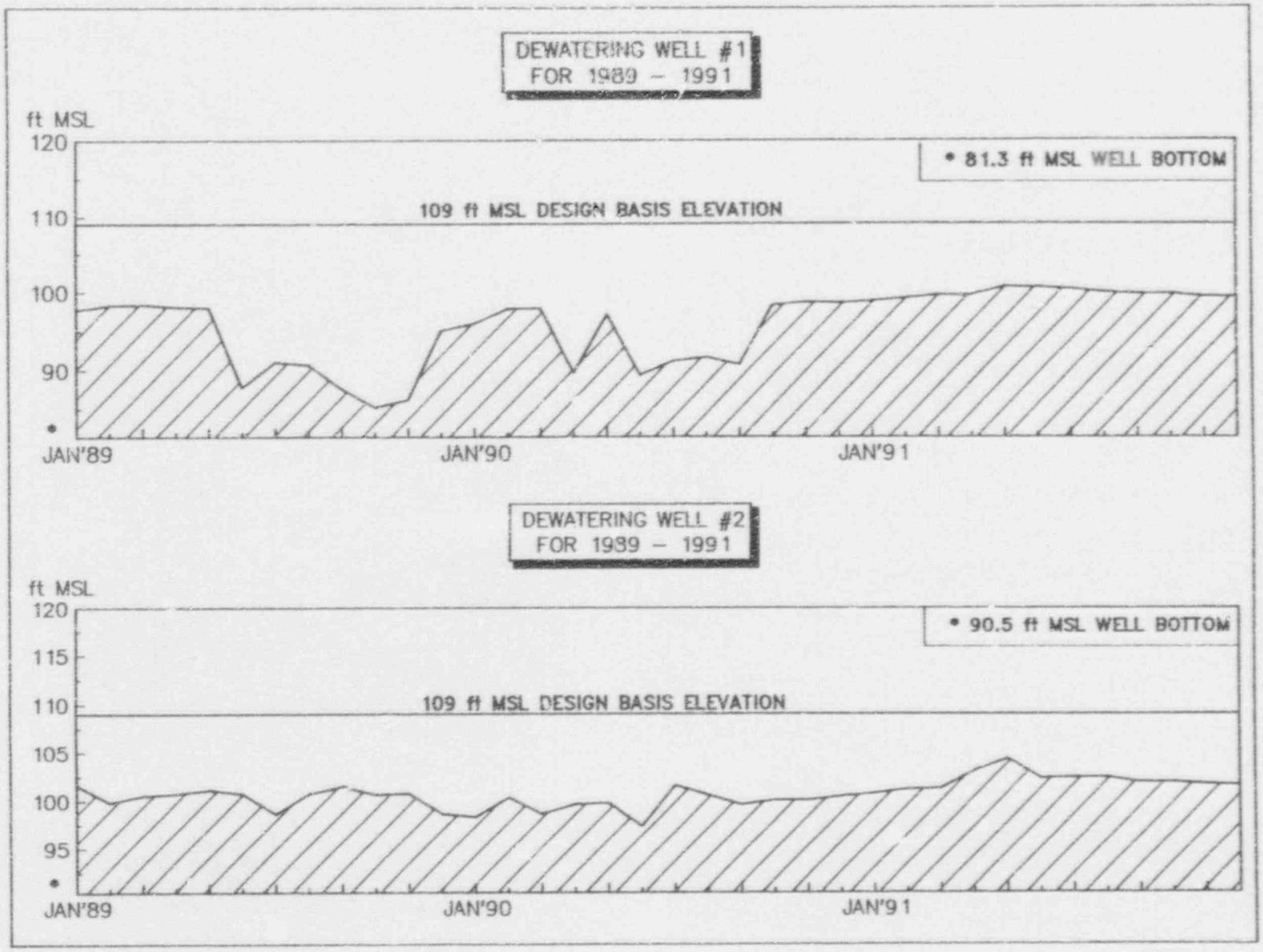


FIGURE 3-3

PERCHED WELL HYDROGRAPHS

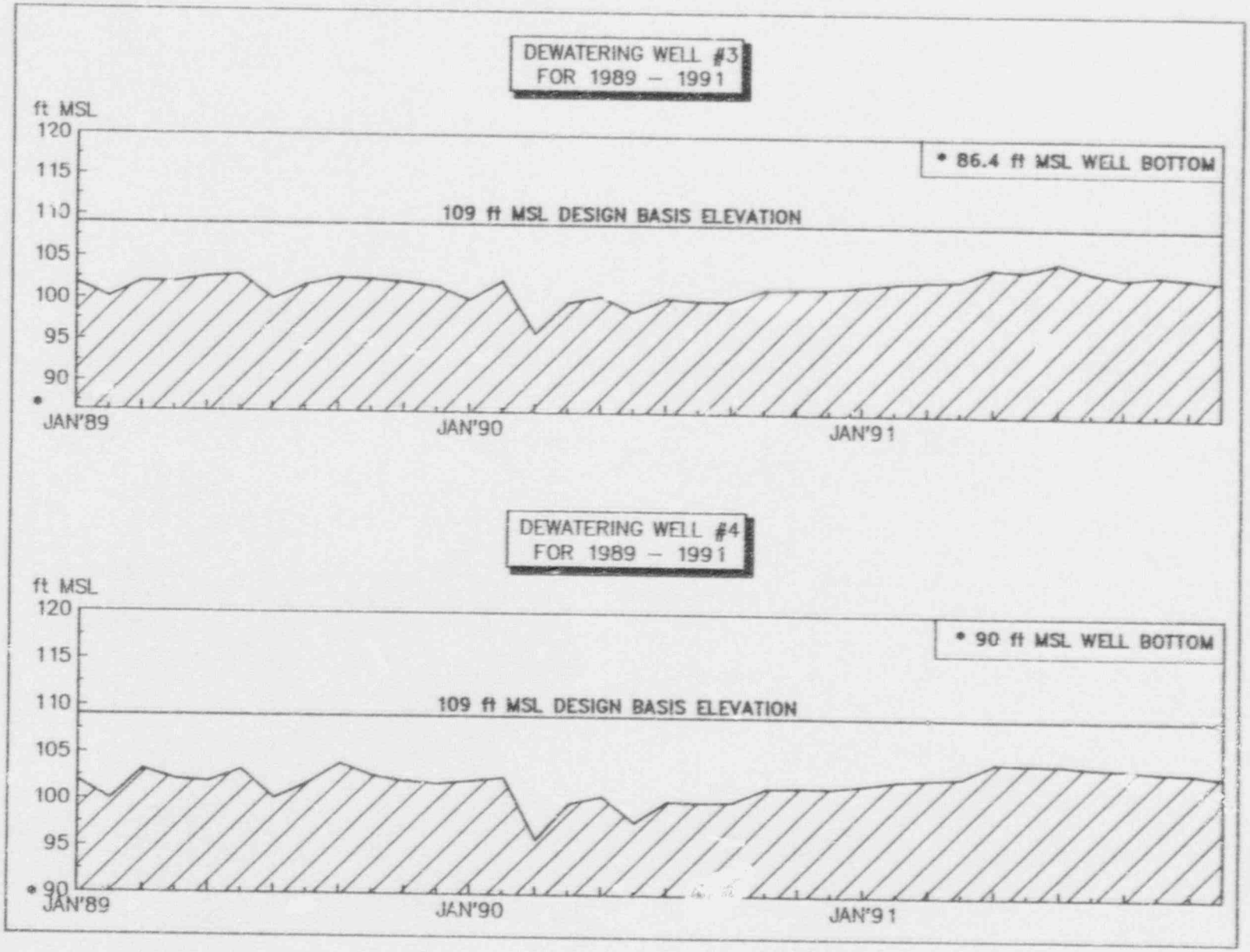


FIGURE 3-3

PERCHED WELL HYDROGRAPHS

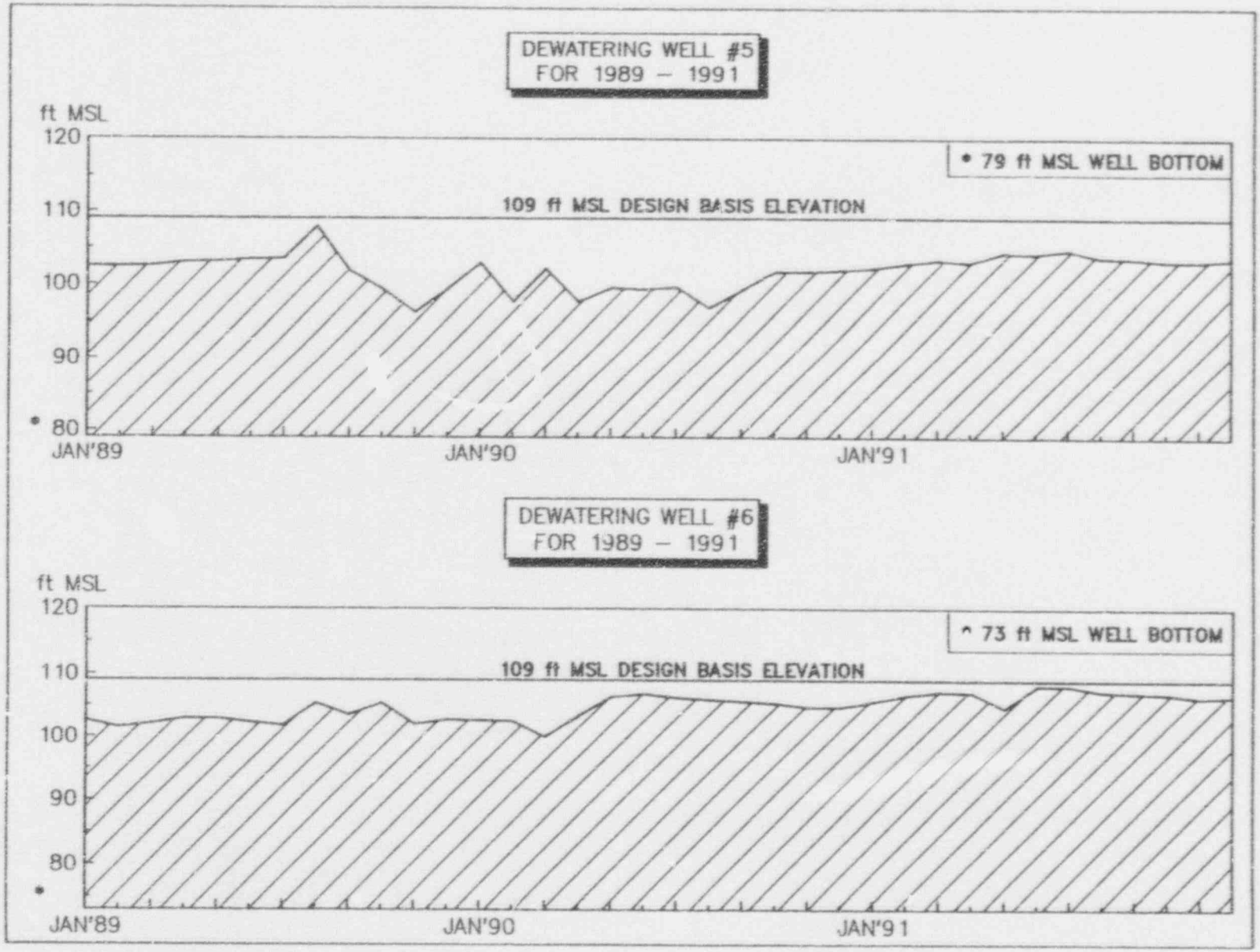


FIGURE 3-3

PERCHED WELL HYDROGRAPHS

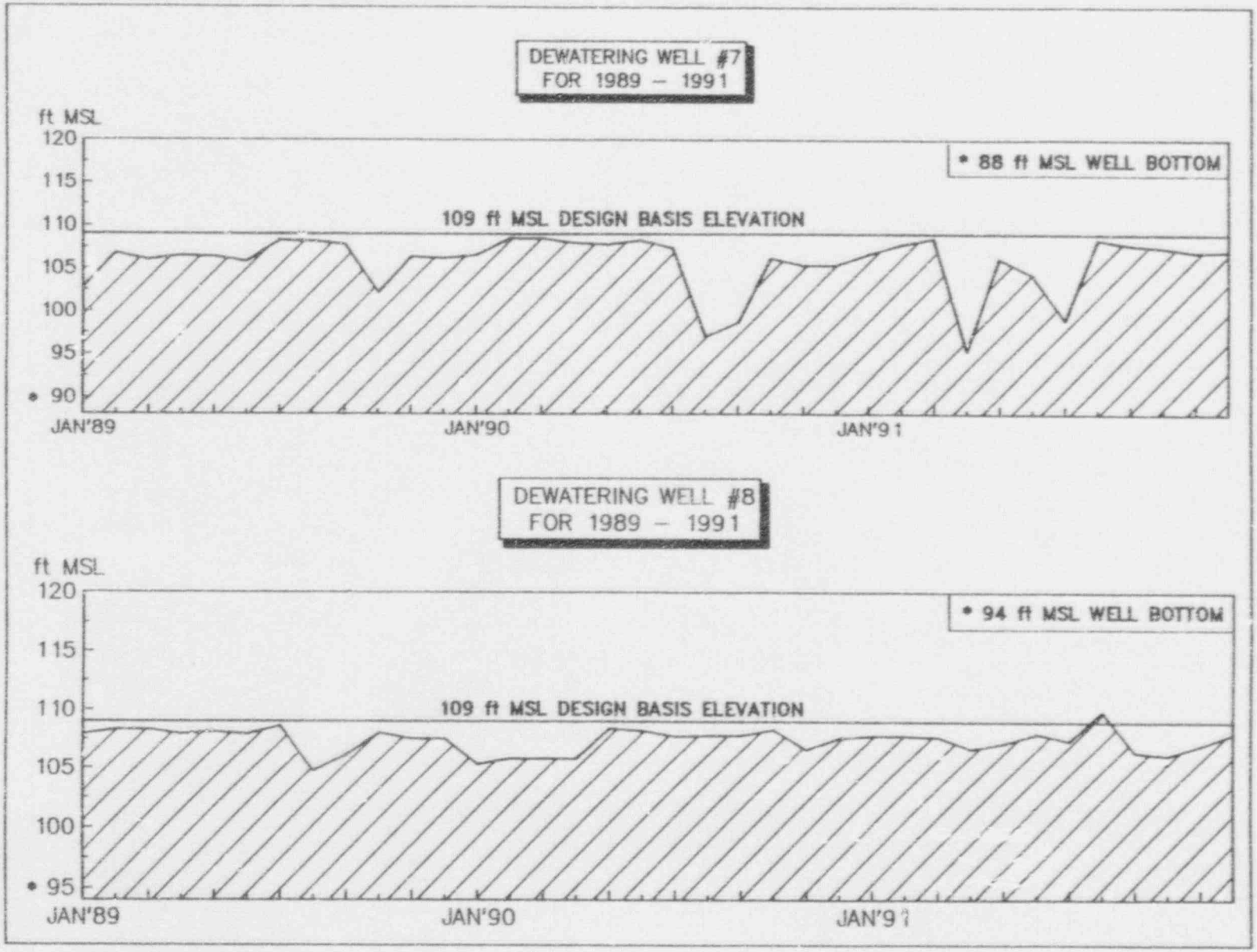


FIGURE 3-4

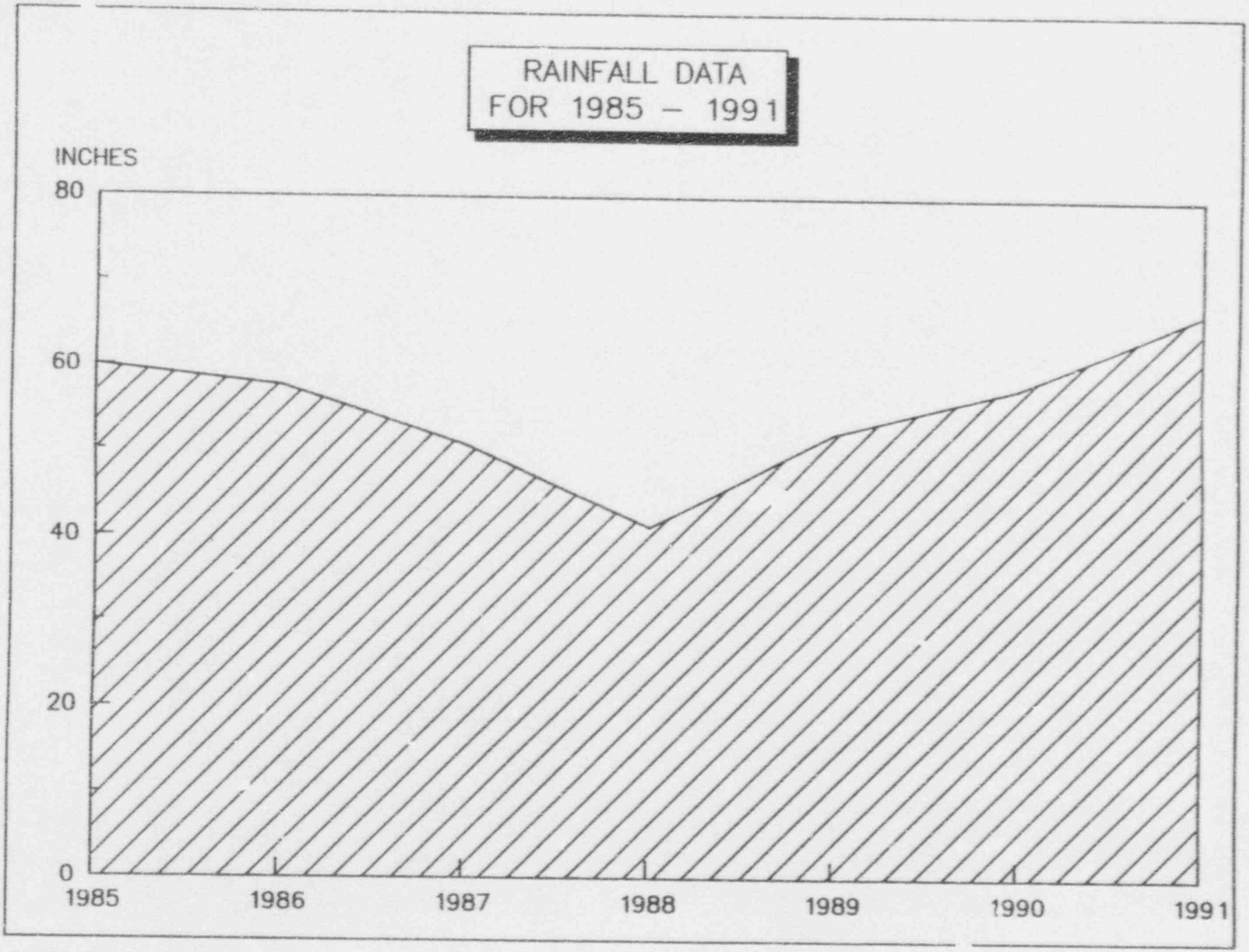
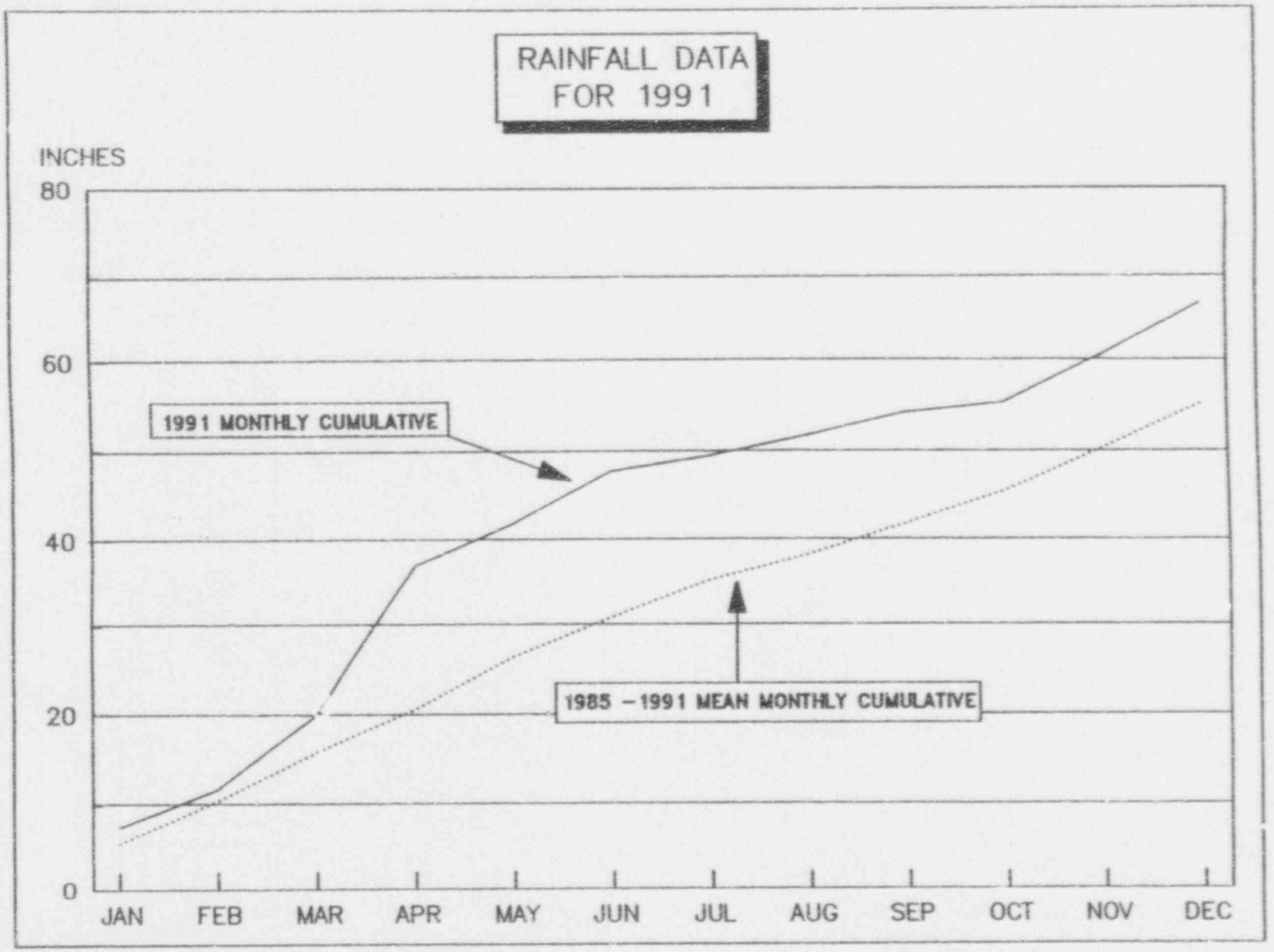

RAINFALL DATA
FOR 1985 – 1991
INCHES
80
60
40
20
0
1985
1986
1987
1988
1989
1990
1991

FIGURE 3-5


RAINFALL DATA
FOR 1991
INCHES
80
60
40
20
0
1991 MONTHLY CUMULATIVE
1985 – 1991 MEAN MONTHLY CUMULATIVE
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC

SECTION 4.0

ADMINISTRATIVE REQUIREMENTS

4.1 EPP CHANGES

The GGNS Environmental Protection Plan (EPP) had no changes during 1991 and was implemented as written. Section 4.2.2 of the EPP requiring the Cooling Tower Drift Program will be deleted pending approval by the NRC staff as discussed in Section 3.9 of this report.

The erosion control inspection monitoring requirements were discontinued in 1988.

4.2 EPP NONCOMPLIANCES

There were no EPP noncompliances during 1991. Environmental Surveillance Program personnel successfully conducted sampling and surveillance activities according to the EPP schedule without a reportable deviation.

4.3 NONROUTINE REPORTS

There were no nonroutine reports in 1991.

4.4 POTENTIALLY SIGNIFICANT UNREVIEWED ENVIRONMENTAL ISSUES

There were no potentially significant unreviewed environmental issues encountered in 1991. Changes in station design and operation, tests and experiments, of which none resulted in an unreviewed environmental question, were made in accordance with the EPP, paragraph 3.1, Plant Design and Operation.

Section 2.1 provides a discussion of how the EPP, paragraph 3.1, is implemented. Activities at GGNS during 1991 which were related to the EPP, paragraph 3.1, are discussed in Section 3.11 of this report. Completed 1991 environmental evaluations are included as Appendix III.

APPENDIX I

PERCHED GROUNDWATER LEVEL MEASUREMENTS

COMPOSITE REPORT
FOR
PERCHED GROUNDWATER LEVEL MEASUREMENT

DATE	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	DW-1	DW-2	DW-3	DW-4	DW-5	DW-6	DW-7	DW-8
01/07/91	100.6	101.8	102.0	104.7	102.7	105.6	98.7	98.7	100.7	101.9	101.9	102.2	105.6	106.7	107.8
01/14/91	101.0	101.8	102.4	105.5	102.9	106.1	99.1	99.0	101.1	101.9	102.0	102.6	106.1	107.3	108.0
01/22/91	100.5	102.9	102.8	105.1	103.0	106.7	99.2	99.1	100.8	102.1	102.4	102.7	106.4	107.7	107.5
01/28/91	100.7	102.2	102.7	105.1	103.1	106.7	99.1	99.1	100.9	102.2	102.3	102.6	106.6	107.7	107.3
02/07/91	100.8	102.3	102.7	104.9	103.3	106.7	99.1	99.1	101.1	102.3	102.4	102.8	106.6	107.8	107.8
02/13/91	100.7	102.4	102.8	105.1	103.3	107.1	99.4	99.3	101.0	102.5	102.6	103.1	106.8	107.6	107.1
02/18/91	100.9	102.4	102.9	104.9	103.5	107.0	99.3	99.4	101.1	102.5	102.5	103.0	106.8	108.0	106.4
02/27/91	100.8	102.2	103.0	105.4	103.3	107.3	99.4	99.3	100.8	102.4	102.5	103.1	107.0	108.2	106.4
03/06/91	100.9	102.3	103.2	105.6	103.7	107.6	99.5	99.5	101.2	102.6	102.6	103.3	107.2	108.5	107.7
03/11/91	100.9	102.5	103.2	105.4	103.6	107.4	99.6	99.5	100.9	102.7	102.8	103.3	107.3	108.3	108.1
03/20/91	102.2	102.3	103.1	104.9	103.8	107.2	99.4	99.5	102.5	102.4	102.7	102.8	106.6	108.4	107.3
03/27/91	101.9	102.6	103.1	105.0	103.9	107.2	99.5	99.3	102.2	102.7	103.0	103.1	107.4	108.4	107.6
04/03/91	102.8	102.3	103.1	105.5	103.7	107.3	99.5	99.5	103.0	102.7	102.8	103.0	107.1	95.3	106.7
06/23/91	104.1	104.1	104.4	106.5	105.3	108.9	100.6	100.6	104.3	104.2	104.4	104.3	104.6	106.2	107.2
06/14/91	101.9	104.0	104.0	106.8	105.2	108.9	100.6	100.5	102.2	104.0	104.3	104.2	108.2	104.3	108.0
07/18/91	102.4	104.1	104.1	106.0	105.2	107.9	100.3	100.3	102.3	105.0	104.3	104.7	108.2	99.0	107.4
08/29/91	101.9	103.4	103.6	105.7	105.0	107.2	100.0	99.9	102.3	103.9	104.0	103.7	107.3	108.4	108.9
09/18/91	101.9	103.3	103.5	105.5	104.8	106.8	100.0	99.7	101.8	103.2	103.9	103.6	107.1	107.8	106.4
10/02/91	102.2	103.5	103.7	105.8	104.9	106.8	100.2	100.0	102.1	103.8	103.9	104.1	107.3	108.1	108.1
10/17/91	101.7	103.3	103.4	105.2	104.6	106.6	99.7	99.7	101.8	103.6	103.8	103.2	106.9	107.5	106.1
11/22/91	101.3	103.0	103.2	106.2	104.0	106.2	99.7	99.3	101.6	103.3	103.5	103.2	106.3	107.0	107.6
12/18/91	101.3	102.9	103.2	105.9	104.0	106.1	99.3	99.3	101.5	102.9	103.1	103.5	106.5	107.1	108.0

APPENDIX II

THERMAL MONITORING SUMMARY

GRAND GULF NUCLEAR STATION

THERMAL MONITORING

1982 - 1991

THERMAL MONITORING REPORT

SUMMARY

Radiological & Environmental Services (R&ES) personnel established a program to monitor Grand Gulf Nuclear Station's (GGNS) liquid affluent temperature according to the National Pollutant Discharge Elimination System (NPDES). The 2.8 °C temperature change limit for water surrounding the mixing zone (Attachment I) was not exceeded.

METHOD

Nuclear Plant Engineering (NPE) personnel surveyed the river bank to mark 72 reference points 100 feet apart (66 downstream and six upstream of the barge slip, Attachment I).

R&ES personnel conducted monitoring once in winter and once in summer when operating at ≥ 25% power. They used calibrated digital thermometers to obtain temperatures at a depth of five feet and at the surface. At each reference point, measurements were taken 100 feet from the river bank, then at ten-feet intervals until reaching the bank.

BACKGROUND

Monitoring has been conducted 16 times, beginning in September 1982. Four background measurements were made before GGNS was operational; five were made during winter operating conditions; and seven were made during summer operating conditions.

Survey reference points that were monitored for each summer and winter period are shown in Attachment II. Temperature, river and plant operating data are summarized in Attachments III and IV. Discharge temperature, upriver temperature and percent power are shown graphically in Attachment V. Ambient and Outfall 001 temperatures are shown in Attachment VI. Mississippi River stages are plotted in Attachment VII.

RESULTS

Since June 1986 (summer) the number of survey reference points monitored has been reduced as shown in Attachment II. This reduction occurred based on the fact that there were no significant temperature changes observed in the water surrounding the mixing zone.

The monitoring results (Attachments III and IV) show under normal summer flow and temperature conditions, the thermal plume rarely extended into the river and was usually confined to the barge slip and mixing zone. Under normal winter conditions, the thermal plume usually extended a few feet downstream.

Radiological & Environmental Services personnel did observe that discharge outlet temperature readings recorded during the winter monitoring periods of 1986 and 1987 were the highest. However, upon investigation of the cause(s), we concluded it was a combination of river stage, ambient temperature, blowdown flow and percent plant power, with river stage being the most dominant factor. The dominant effect of river stage on the discharge outlet temperature is further substantiated by the fact that the discharge pipe becomes uncovered at a river stage of approximately 20 feet (Vicksburg gauge).

Maximum temperature changes (delta Ts) relative to the upriver temperature are provided in Attachments III and IV for the discharge outlet, barge slip outlet and surrounding water. Discharge and barge slip outlet delta Ts are shown in Attachment VIII. The 2.8 °C delta T limit for water surrounding the mixing zone was not exceeded as shown in Attachments IX and X.

Delta Ts for the discharge outlet were obtained by subtracting the upstream river surface or 5 feet temperature reading, whichever gave the highest value, from the reading recorded in the discharge outlet. Delta Ts for the barge slip outlet were obtained by subtracting the upstream river surface or 5 feet temperature reading, whichever gave the highest value, from the reading recorded in the barge slip outlet. Delta Ts for the surrounding water were obtained by subtracting the upstream river surface and 5 feet temperature readings from the maximum surrounding water surface and 5 feet readings, respectively. The delta Ts shown in Attachments III and IV are shown as absolute values, therefore there were no negative numbers.

CONCLUSION

A review of the thermal monitoring data shows the Mississippi River supplies a volume of water sufficient for dissipating the heated discharge from GGNS within the required mixing zone. Summer and winter thermal monitoring data show the turbulance and volume of the Mississippi River mix the heated discharge and cause little temperature difference. The only area influenced by GGNS heated discharge is the barge slip and the associated entry into the Mississippi River.

ATTACHMENT II

SUMMER AND WINTER SURVEY POINTS

SUMMER PERIOD	POINTS MONITORED	WINTER PERIOD	POINTS MONITORED
Sept 1982	1-70	Feb 1983[1]	1-51 and 64-70
July 1983	1-70	Feb 1986	1-40 and surfaces/5 ft reading 30 ft from shoreline at points 41 - 49
June 1984	1-71		
June 1985	1-71		
June 1986	1-34, 36, 41, 46, 51, 59, 62, 65, 68, 71	Feb 1987	1-39
		Feb 1988	1-48
Sept 1986	1-39	Mar 1989[1]	6-10
July 1987	1-33	Feb 1990	1-11
Aug 1988	1-38	Nov 1991	1 and 7 plus barge slip
Aug 1989	1-11		
Aug 1990	0-11		
1991[2]			

[1] Points monitored were limited due to high river level and flow.

[2] Summer river stage did not go below minus 1.2 feet (May - October).

DATA SHEET 1

THERMAL MONITORING

I.	Date Performed		11-5-91
II.	Ambient Air Temperature		9.5 °C
III.	Outfall 001 Recorder Temperature		31.7 °C
IV.	River Level at Vicksburg		12.7 ft
V.	Discharge Outlet Temperature	Surface	26.0 °C
		-5 ft	26.5 °C
VI.	Barge Slip Outlet Temperature	Surface	22.0 °C
		-5 ft	16.0 °C
VII.	Upriver Temperature (Pt. 1)	Surface	15.0 °C
		-5 ft	15.2 °C
VIII.	Downriver Temperature (Pt. 7)	Surface	15.1 °C
		-5 ft	15.4 °C

Prepared By [signature] 11-05-91
Signature/Date

Reviewed By [signature] 11-11-91
Supervisor, Environmental Services/Date

APPENDIX III

ENVIRONMENTAL EVALUATIONS

ENVIRONMENTAL EVALUATION 009/91 AND 014/91

This evaluation 009/91	Installs valves, pumps, and piping to allow injection of sodium hypochlorite and additional dispersant to PSW for the control of biological fouling.
This evaluation 014/91	Addresses chemical cleaning of the Circulating Water System cooling tower fill medium.

	QA RECORD	INITIALS
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MTITLE | SAFETY/ENVIRONMENTAL EVALUATION FORM*

TSTX 1P47-91-007-0-NJ

PART I | MXREF | DOC EVALUATED: p 44 9100/3 | MDOCNO | EVALUATION NO. 009/91

| MXREF | REFERENCES see attached | MSYSNO | SYSTEM AFFECTED P47, P44

DESCRIPTION see attached

Requires an environmental evaluation X Yes ___ No If Yes, Complete Part III

Requires a change to the FSAR ___ Yes X No If Yes, C/R No. ____

SAFETY EVALUATION

PART II A basis supporting each conclusion must be attached.

YES NO IMPLEMENTATION OR PERFORMANCE OF THE ACTIVITY DESCRIBED ABOVE:

___ X (a) Will require a change to the GGNS Technical Specifications.

___ X (b) May increase the probability of occurrence of an accident previously evaluated in the SAR.

___ X (c) May increase the consequences of an accident previously evaluated in the SAR.

___ X (d) May create the possibility of an accident of a different type than any evaluated in the SAR.

___ X (e) May increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the SAR.

___ X (f) May increase the consequences of a malfunction of equipment important to safety previously evaluated in the SAR.

___ X (g) May create the possibility of a malfunction on a different type than any evaluated previously in the SAR.

___ X (h) Will reduce the margin of safety as defined in the basis for any Technical Specifications.

Jane Antoine	Chem. Engr. Tech Support	6/17/91	
MORIO ORIGINATOR	JOB TITLE	DATE	
E. Williamson	Chem. Supt.	6/17/91	
APPROVED	JOB TITLE	DATE	
Wm Ray Hall	6/17/91		
PSRC	DATE		

FSAR 2.2.2.2; Tables 2.2-6,7
FSAR 2.2.3.1.2 (AECM-81/0316)
FSAR Table 3.9-3c
FSAR 9.2.8.2; Table 9.3-3
FSAR 9.2.10
FSAR 10.4.5.2.,3
FSAR 10.4.8;
NUREG 1.78
NUREG 18.1
40 CFR 423
TECH SPECS 3/4.3.7.8, 3/4:6.4, 3/4.6.6.2
FES 4.2.6,7
FES 5.6.3
FES 5.9
FER 3.6
FER 5.3
FER 10.5
NPDES Permit No. MS0029521
Environmental Protection Plan (EPP)

This activity installs valves, pumps, and piping to allow injection of sodium hypochlorite and additional dispersant to PSW for the control of biological fouling. The use of sodium hypochlorite at a residual chlorine level of 0.5 ppm was included as a part of the original plant design. This activity increases the residual to 1.0-1.5 ppm.

On site testing has demonstrated the effectiveness of this program for biological control and the effect of the residual chlorine levels on system metallurgy (Reference Conco Consulting Corporation Report of 1/3/91 and Calgon Corporation Reports of 4/16/90, 5/14/90, 6/26/90 and 11/19/90). The only metal not tested was Copper alloy 122, the tube material in the Drywell Chiller exchangers. Based on a review of the ASM International Metals Handbook, Volumes 2 and 13, no adverse affect from this higher residual chlorine level is expected. Copper alloy 122 corrosion coupons will be used in PSW during this activity to monitor corrosion rates.

Although PSW provides makeup to Circulating Water (CW), CW Chemistry will not be affected by this activity. Due to dilution alone, if Plant Service Water (PSW) chlorine residuals were at the maximum of 1.5 ppm, CW residual chlorine would be less than 0.1 ppm, the regulatory detection limit. In addition, demand within the CW system from biological fouling/aeration will consume any residual chlorine. No increase in chloride concentration will occur which could adversely affect condensate or reactor water in the event of a tube failure.

Makeup to the P21 system (Ionics Trailer) will be chlorinated during performance of the TSTI. The existing plant charcoal filters will remove any residual chlorine. Plant makeup water quality will not be affected.

In original plant design the cooling tower bypass valve (P44F502) was interlocked with a continuous chlorine analyzer to ensure no chlorine was discharged from the plant. This interlock is not functioning because the chlorine analyzer is not functioning. To ensure plant NPDES limits are met, the TSTI controlling this activity requires monitoring of the plant outfall for chlorine residuals. The P44F502 valve will be manually closed during the test to ensure chlorinated PSW is sent to the CW system rather than directly to the discharge basin. Cooling tower level for the 2 hour daily test will be controlled by adjusting blowdown flow, as required.

A. Valves used to inject hypochlorite are not a part of the primary or secondary containment boundary. Based on site corrosion testing, the higher chlorine residual will have no affect on the P44 valves which function as a part of secondary containment boundary, or valves which function as PSW and Standby Service Water (SSW) isolations. No change to the Environment Protection Plan is caused by this activity. The chemical used, sodium hypochlorite does not produce chlorine gas; no revision to include chlorine detection is required. This activity will not affect the ability to maintain reactor coolant chemistry within Tech. Spec. limits, even in the event of a catastrophic tube failure. The ability to process liquid and solid radwaste will not be affected by this treatment program.

B. Chlorination of PSW/Ranney Wells is addressed as a part of original plant design at a chlorine residual of 0.5 ppm; this activity raises the residual level to 1.5 ppm. On-site testing using PSW and test heat exchangers determined corrosion rates for carbon steel, stainless steel, and 90/10 Copper/Nickel piping. The use of sodium hypochlorite did not increase corrosion rates for the three metallurgies above the rates for untreated PSW. Based on a review of literature Copper alloy 122 (Drywell Chiller exchanger tubes) is not expected to show any adverse affects from these residuals. Copper alloy 122 test coupons will be used during this activity to monitor corrosion rates. This activity does not change the control or response of the PSW system except for cooling tower makeup/level control, which will be controlled using blowdown. These systems and their operation are not involved in any accident cause evaluations in the SAR. This activity will not increase the probability of an accident previously evaluated in the SAR.

C. The PSW/Ranney Well Systems have no safety related function to mitigate the consequences of an accident (Section 9.2.10.3, 9.2.8.3). However, some PSW valves serve as part of the secondary containment boundary and as PSW/SSW crosstie isolations. The onsite testing demonstrated these valves would not be adversely affected by these residuals. Valves listed in table 3.9-3c of the FSAR as ASME Section III Code class 2 and 3 which may be exposed to the chlorine residual will not be adversely affected by the higher residual. These components will continue to perform their designated functions. The addition of chlorinated PSW to SSW will not adversely affect SSW water quality which is routinely chlorinated to a higher residual chlorine level. The addition of chlorinated water to the P64 storage tanks or use in the fire protection system will have no adverse affect on system operation. No increase in the consequences of an accident previously evaluated in the SAR will occur.

D. Chlorination was addressed in original plant design using liquid sodium hypochlorite. No chlorine gas will be generated during this activity even in the event of a sodium hypochlorite spill. Sodium hypochlorite will be fed from 55 gallon drums at the rate of approximately one drum per day. Approximately a one week supply will be stored at the warehouse and reordered as necessary. No new hazard to control room habitability is introduced by the use of

sodium hypochlorite on site as documented in Bechtel Calculation M3.6.36 which states that sodium hypochlorite has no OSHA established TLV. Sodium hypochlorite is non-flammable. Operation of the PSW/Ranney Well system is unaffected except for tower level control which will be controlled using blowdown. Level perturbations in the tower basin would not affect the ability to safely shutdown the plant. Affected components will function as designed. This activity does not create the possibility of an accident of a different type than any evaluated in the SAR.

E. Based on corrosion testing, the system components which will be exposed to the higher chlorine residuals will not be degraded. This includes secondary containment isolation valves and PSW/SSW crosstie isolation valves. SSW water quality and its ability to remove heat will not be affected. PSW cooling ability of its assigned heat loads such as ESF room coolers will not be degraded by this activity as demonstrated by on site testing. The probability of occurrence of a malfunction of equipment important to safety previously evaluated in the SAR will not be increased.

F. The PSW/Ranney Well System is not designed to mitigate the consequences of a malfunction of any equipment important to safety. This activity does not prevent the designed responses of the affected systems including PSW, SSW, and the Fire Protection System. The valves used to feed sodium hypochlorite are located in the plant yard, outside the secondary containment boundary; leakage would not affect any safety-related components or their responses as designed. The consequences of a malfunction of equipment important to safety previously evaluated in the SAR will not be increased.

G. The chemical being fed was evaluated for use in PSW including makeup to SSW, and firewater as part of original plant design. The higher residual will have no adverse affects on system response. The structural integrity of components exposed to this treatment program will not be degraded. No new hazard is introduced that could effect control room habitability or operator response to plant transients. System leakage has been previously addressed in the FSAR; the only new leak paths created by this alteration are in the plant yard and would not affect the safe shutdown of the plant. The possibility of a malfunction of a different type than any previously evaluated in the SAR is not created.

H. Sodium hypochlorite will not produce chlorine gas; no change to the basis concerning chlorine detection is required. Reactor Water Chemistry including chlorides will not be affected by this activity. No significant increase in chlorine levels in CW which might affect the hotwell in the event of a tube leak will occur as a result of PSW chlorination. Structural integrity and response times of valves which are a part of the secondary containment boundary will not be affected. The ability of the SSW system to remove heat and system makeup will not be altered. This activity does not affect the operability or availability of the fire suppression system. This activity does not reduce the margin of safety as defined in the bases for any Technical Specification.

SAFETY/ENVIRONMENTAL EVALUATION FORM (Continued)

PART III

YES NO IMPLEMENTATION OR PERFORMANCE OF THE ACTIVITY DESCRIBED ABOVE:

___ X (a) Requires a change in the Environmental Protection Plan.
BASIS* See attached.

___ X (b) Concerns a matter which may result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by the staff's testimony to the Atomic Safety and Licensing Board (ASLB), supplements to the FES, environmental impact appraisal, or in any decision of the ASLB.
BASIS* See attached.

___ X (c) Concerns a significant change in effluents or power level.
BASIS* See attached.

___ X (d) Concerns a matter not previously reviewed and evaluated in documents specified in (b) above, which may have a significant adverse environmental impact.
BASIS* See attached

MORIG	W Poe	Environ. Spec.	6-14-91
	ORIGINATOR	JOB TITLE	DATE
	J. Williams	Chem. Supt.	6/17/91
	APPROVED	JOB TITLE	DATE
	Wm Roy Pitt	6/25/91	
	PSRC	DATE	

*Additional sheets may be used and attached as necessary.

GRAND GULF NUCLEAR STATION

SAFETY/ENVIRONMENTAL EVALUATION FORM (Continued)

PART III

YES NO IMPLEMENTATION OR PERFORMANCE OF THE ACTIVITY DESCRIBED ABOVE:

___ X (a) will require a change in the Environmental Protection Plan.

BASIS: Environmental concerns identified in the EPP which relate to water quality and aquatic biota are contained in the GGNS NPDES Permit issued by the Mississippi Department of Environmental Quality (MDEQ), and the NRC relies on MDEQ for regulation. The NPDES Permit regulations will be strictly adhered to, and since the use of sodium hypochlorite solution does not involve an unreviewed environmental question or change the objectives of the EPP, there will be no change in the Environmental Protection Plan (EPP).

___ X (b) concerns a matter which may result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by the NRC staff's testimony to the Atomic Safety and Licensing Board (ASLB), supplements to the FES, environmental impact appraisal, or in any decisions of the ASLB.

BASIS: Environmental concerns identified in the FES which relate to sodium hypochlorite solution were identified in association with PSW and CWS. The FES stated that sodium hypochlorite will be added to PSW intermittently, and a surfactant may be added to enhance the effect. The NPDES Permit limits concentration of cooling tower blowdown discharge at the discharge structure to an average of 0.2 mg/l and a maximum of 0.5 mg/l for free available chlorine and total residual chlorine, and further states that neither free available chlorine nor total residual chlorine may be discharged for more than two (2) hours in any one day. Free available chlorine in the CWS is allowed to dissipate before discharge; PSW, when chlorinated, is discharged to CWS to promote dissipation, and low concentrations of free available chlorine that are discharged are further reduced quickly by the chlorine demand of the Mississippi River water. On the basis of expected composition of makeup water, combined chlorine in blowdown discharge is expected to be negligible. The discharge concentrations resulting from the proposed injection of sodium hypochlorite into PSW will not change from previous evaluations and the discharge is not expected to result in adverse impact to the river biota.

___ X (c) concerns a significant change in effluents or power level.

BASIS: Water treatment chemicals have no effect on power level. Based on this evaluation of physical and chemical aspects of injection of sodium hypochlorite solution, no significant changes in effluents is anticipated, and therefore no effect on the Mississippi River is expected.

SAFETY/ENVIRONMENTAL EVALUATION FORM (Continued)

___ X (d) concerns a matter not previously reviewed and evaluated in documents specified in (b) above, which may have a significant adverse environmental impact.

BASIS: Sodium hypochlorite solution, which was previously reviewed and evaluated in the Final Environmental Statement (FES), will be injected into PSW and will be discharged into the Discharge Basin through Cooling Tower Blowdown. The FES has been evaluated and approved by Mississippi Department of Environmental Quality (MDEQ), the FES dictates regulation by the NPDES Permit , and since all the same guidelines that were previously evaluated will be followed, no significant adverse environmental impact is expected.

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MTITLE | SAFETY/ENVIRONMENTAL EVALUATION FORM*

TSTI 1W20-91

PART I | MXREF | DOC EVALUATED 001-0-N | MDOCNO | EVALUATION NO. 014/91

| MXREF | REFERENCES SEE ATTACHMENT I | MSYSNO | SYSTEM AFFECTED W20, N71

DESCRIPTION SEE ATTACHMENT I

Requires an environmental evaluation X Yes ___ No If Yes, Complete Part III

Requires a change to the FSAR ___ Yes X No If Yes, C/R No. ___

SAFETY EVALUATION

PART II A basis supporting each conclusion must be attached.

YES	NO	IMPLEMENTATION OR PERFORMANCE OF THE ACTIVITY DESCRIBED ABOVE:
___	X	(a) Will require a change to the GGNS Technical Specifications.
___	X	(b) May increase the probability of occurrence of an accident previously evaluated in the SAR.
___	X	(c) May increase the consequences of an accident previously evaluated in the SAR.
___	X	(d) May create the possibility of an accident of a different type than any evaluated in the SAR.
___	X	(e) May increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the SAR.
___	X	(f) May increase the consequences of a malfunction of equipment important to safety previously evaluated in the SAR.
___	X	(g) May create the possibility of a malfunction on a different type than any evaluated previously in the SAR.
___	X	(h) Will reduce the margin of safety as defined in the basis for any Technical Specifications.

Randy E. Sowa | System Engineer | 7-22-91
MORIG | ORIGINATOR | JOB TITLE | DATE

Oby Thomas Dean | Sys. Eng Supv. | 7-24-91
APPROVED | JOB TITLE | DATE

Wm Ray Hill | 7/25/91
PSRC | DATE

REFERENCES

EER 91/6197
FSAR 2.2.3.1.2; FIG 2.2-5 Tables 2.2-5,2.2-6,2.2-7
FSAR 10.4.5.2,3
FSAR 10.4.6.3
FSAR 10.4.8
FSAR 15.2.5 ; Tables 15.2-7,15.2-8,15.2-9
FSAR 15.2.5.5
REG GUIDE 1.56
TECH SPECS 3/4.3.7.11; Table 3.3.7.11-1.2.b
MSDS Genium Publishing Corp No. 44B, Rev. A
FES 4.2.6
FES 4.3.2
FES Table 4.1
FES Table 4.2
FER 3.6
FER 5.3
FER 10.4
FER 10.5
NPDES Permit No. MS0029521
Environmental Protection Plan (EPP)
CEXO-91/00345
CTC-91/00085

DESCRIPTION

This Safety Evaluation addresses chemical cleaning of the Circulating Water System Cooling Tower fill medium per TSTI 1W20-91-001-0-N.

The Cooling Tower fill medium has become partially plugged due to biological fouling. Plugging of the fill prevents proper heat transfer across the Cooling Tower and is degrading plant efficiency. Chemical Cleaning will help eliminate this plugging and improve plant efficiency.

Cleaning will be accomplished per the TSTI using Hydrogen Peroxide (H_2O_2) at 50% concentration. Hydrogen Peroxide will be injected into each Cooling Tower flume, where it will be equally dispersed across the fill medium by the normal Circulating Water flow.

The Hydrogen Peroxide cleaning will be performed in a minimum of 6 phases. Results of the first phase will be evaluated to determine effects and effectiveness of the cleaning prior to proceeding to the next phase . The cleaning process will be controlled (per the TSTI) to minimize the impact of solids released from the Cooling Tower to the Circulating Water System.

This cleaning will be performed with both Circulating Water Pumps in service and can be done in Operational Modes 1,2,3,4 and 5.

No change is required to the normal operation of the Circulating Water System to perform this cleaning. However, additional precautions will be implemented to ensure there is no adverse affects due to the solids released from the fill.

The Hydrogen Peroxide has been evaluated for compatibility with materials of construction in the Circulating Water System per EER 91/6197. This evaluation concluded no adverse effects would be incurred to the materials or components of the Circulating Water System at the specified maximum feed rates and concentrations.

No unreviewed safety or environmental questions were identified as a result of this safety evaluation.

a) Addition of the Hydrogen Peroxide to the Circulating Water System to clean the fill medium does not affect or alter any Technical Specification.

The Hydrogen Peroxide has been evaluated for compatibility with the materials of construction in the Circulating Water System. This evaluation concluded that no adverse effects would be incurred to the materials or components of the Circulating Water System at the specified maximum feed rates and concentrations. Tech Specs does not address water chemistry makeup of the Circulating Water System.

This activity will not affect the ability to maintain the reactor coolant chemistry within Tech Spec limits, even in the event of a catastrophic Condenser tube failure because the addition of Hydrogen Peroxide will not increase the ion concentration of the Circulating Water System. Cooling Tower blowdown will be increased during the cleaning process to remove solids that will be released from the tower fill and thus reduce ion concentration in the Circulating Water System. Dissolved Solids concentration will remain at or below the normal concentrations. Ionic loading and ion exchanger capacity margins in the Condensate Cleanup System required by Reg Guide 1.56 will therefore not be affected.

No change to Technical Specifications is needed nor is any new Technical Specification required.

b) The implementation of TSTI 1W20-91-001-0-N will not increase the probability of occurrence of an accident previously evaluated in the UFSAR.

Cleaning of the Circulating Water System Cooling Tower fill medium will help restore the system to original design efficiency.

No change is required to the normal operation of the Circulating Water System to perform this cleaning.Collection of debree is the design function of the Circulating Water Pump suction screens and on-line cleaning of the suction screens is a normal maintenance practice. Solids released from the fill during the cleaning are not expected to increase plugging of the suction screens above the normal rate.

The TSTI will provide controls to ensure the Circulating Water Pump suction screens are monitored and cleaned as required during the Cooling Tower cleaning.

Loss of the Circulating Water Pumps during plant operation has been evaluated in UFSAR section 15.2.5.

Evaluation has determined that no adverse effects will be incurred to materials or components of the Circulating Water System by the Hydrogen Peroxide at the specified maximum feed rates and concentrations.

The Hydrogen Peroxide feed rate to the Cooling Tower flumes is inherently limited below the maximum acceptable feed rate due to the capacity of the tanker truck feed pump (Approx. 43 ft of head from ground elev. to injection point). In the unlikely event that a full tanker truck load of Hydrogen Peroxide (approx. 4300 gals) is inadvertently dumped into the Cooling Tower basin due to a hose break, the maximum acceptable H2O2 to Circulating Water concentration (5000 PPM) as evaluated by EER 91/6197 would not be exceeded.

Circulating Water System leakage has been addressed in FSAR section 10.4.5.3. Injection of the Hydrogen Peroxide will be located in the plant yard at the Cooling Tower and leakage from the injection hoses would not affect any safety related components or the safe shutdown of this plant. The structural integrity of components exposed to the Hydrogen Peroxide will not be degraded and no new leakage paths for Circulating Water inventory are created.

c) The implementation of TSTI 1W20-91-001-0-N will not increase the consequences of an accident previously evaluated in the UFSAR.

Per UFSAR section 10.4.5.3, the Circulating Water System serves no safety function. System analysis has shown that a failure of the Circulating Water System will not compromise any safety-related systems or prevent safe shutdown.

The radiological consequences remain the same as the consequences of a loss of Condenser vacuum as discussed in UFSAR section 15.2.5.5.

d) The mplementation of TSTI 1W20-91-001-0-N will not create the possibility of an accident of a different type than evaluated in the UFSAR.

No change is required to the normal operation of the Circulating Water System to perform this cleaning. The TSTI will provide controls to minimize the impact to the solids released from the Cooling Tower fill to the Circulating Water System during cleaning. A trip of the Circulating Water Pumps affects only the plants ability to condense steam and maintain a suitable vacuum in the Condenser and is bounded by existing analysis.

Evaluation has determined that no adverse effects will be incurred to materials or components of the Circulating Water System by the Hydrogen Peroxide at the specified feed rates and concentrations.

Circulating Water System leakage has been addressed in FSAR section 10.4.5.3. Injection of the Hydrogen Peroxide will be located in the plant yard at the Cooling Tower and leakage from the injection hoses would not effect any safety related components or prevent safe shutdown of this plant. The structural integrity of components exposed to the Hydrogen Peroxide will not be degraded and no new leakage paths are created for Circulating Water inventory.

No hazard is introduced that could effect Control Room habitability or operator response to a plant transients. The Hydrogen Peroxide will not produce a toxic gas in the event of a spill, is non flammable, is noncombustible and readily decomposes into water and oxygen.

e) The implementation of TSTI 1W20-91-001-0-N will not increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the FSAR.

Per UFSAR section 10.4.5.3, the Circulating Water System serves no safety function. Evaluation has determined that no adverse effects will be incurred materials or components of the Circulating Water System by the Hydrogen Peroxide at the specified feed rates and concentrations.The injection of Hydrogen Peroxide into the Circulating Water System will not compromise any safety-related systems or prevent safe shutdown.

Injection of the Hydrogen Peroxide will be located in the plant yard at the Cooling Tower and leakage from the hoses would not effect any safety related components or prevent safe shutdown of this plant. No new leakage paths for Circulating Water inventory will be created. The Hydrogen Peroxide is non flammable and noncombustible and thus no new fire hazards are created.

f. The implementation of TSTI 1W20-91-001-0-N will not increase the consequences of a malfunction of equipment important to safety previously evaluated in the UFSAR.

Cleaning of the Cooling Tower fill affects only the Circulating Water System. A trip of the Circulating Water Pumps during plant operation is bounded by existing analysis as discussed in FSAR section 15.2.5.

Per UFSAR section 10.4.5.3, the Circulating Water System serves no safety function. Evaluation has determined that no adverse effects will be incurred to the materials or components of the Circulating Water System by the Hydrogen Peroxide at the specified feed rates and concentrations.The injection of Hydrogen Peroxide into the Circulating Water System will not compromise any safety-related systems or prevent safe shutdown.

A Circulating Water Pump trip will not increase the consequences of a malfunction of equipment important to safety.

g. The implementation of TSTI 1W20-91-001-0-N will not create the possibility of a malfunction of a different type than any evaluated previously in the UFSAR.

No change is required to the normal operation of the Circulating Water System to perform this cleaning. Collection of debree is the design function of the Circulating Water Pump suction screens and on-line cleaning of the suction screens is a normal maintenance practice. Loss of the Circulating Water Pumps during plant operation has been evaluated in UFSAR section 15.2.5.

Evaluation has determined that no adverse effects will be incurred to the materials or components of the Circulating Water System by the Hydrogen Peroxide at the specified feed rates and concentrations. This treatment will not degrade the structural integrity of the components.

Circulating Water System leakage has been addressed in FSAR section 10.4.5.3. No new leakage paths are created for Circulating Water inventory and leakage from the Hydrogen Peroxide injection hoses would not effect any safety related components or prevent safe shutdown of this plant.

Hydrogen Peroxide is non flammable and noncombustible and thus no new fire hazards exist.

h) The implementation of TSTI 1W20-91-001-0-N will not reduce the margin of safety as defined in the Basis for any Tech Specs.

Per UFSAR section 10.4.5.3, the Circulating Water System serves no safety function. Evaluation has determined that no adverse effects will be incurred to materials or components of the Circulating Water System by the Hydrogen Peroxide at the specified feed rates and concentrations. The injection of Hydrogen Peroxide into the Circulating Water System will not compromise any safety-related systems or prevent safe shutdown.

This activity will not affect the ability to maintain the reactor coolant chemistry within Tech Spec limit, even in the event of a catrostrophic Condenser tube failure.

Since no Technical Specifications are affected, implementation of this TSTI will not reduce the margin of safety specified in the Tech Specs.

PART III

YES NO IMPLEMENTATION OR PERFORMANCE OF THE ACTIVITY DESCRIBED ABOVE:

[ ] [√] (a) Requires a change in the Environmental Protection Plan.
BASIS: See Attached

[ ] [√] (b) Concerns a matter which may result in a significant increase in any adverse environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by the staff's testimony to the Atomic Safety and Licensing Board (ASLB), supplements to the FES, environmental impact appraisal, or in any decision of the ASLB.
BASIS: See Attached

[ ] [√] (c) Concerns a significant change in effluents or power level.
BASIS: See Attached

[ ] [√] (d) Concerns a matter not previously reviewed and evaluated in documents specified in II(b), which may have a significant adverse environmental impact.
BASIS: See Attached

Will Poe	Environ. Spec.	7-24-91
MORIG | ORIGINATOR	JOB TITLE	DATE
[signature]	Chem. Supt	7/24/91
APPROVED	JOB TITLE	DATE
[signature] PSRC	7/25/91 DATE	

PART III

YES NO IMPLEMENTATION OR PERFORMANCE OF THE ACTIVITY DESCRIBED ABOVE:

[ ] [√] (a) Will require a change in the Environmental Protection Plan.

BASIS: Environmental concerns identified in the EPP which relate to water quality and aquatic biota are contained in the GGNS NPDES Permit issued by the Mississippi Department of Environmental Quality (MDEQ), and the NRC relies on MDEQ for regulation. Although the NPDES Permit does not directly address the use of hydrogen peroxide, MDEQ has approved its use. Since 50% hydrogen peroxide at the specified feed rates and concentrations will not adversely affect the environment, there will be no change in the Environmental Protection Plan (EPP).

[ ] [√] (b) Concerns a matter which may result in a significant increase in any environmental impact previously evaluated in the Final Environmental Statement (FES) as modified by the NRC staff's testimony to the Atomic Safety and Licensing Board (ASLB), supplements to the FES, environmental impact appraisal, or in any decision of ASLB.

BASIS: The growth of microorganisms in the cooling tower, promoted by recycling and heating of cooling water in the Circulating Water System (CWS), are minimized by intermittent additions of non-oxidizing biocides. Biocides have been evaluated in the FES and approved by the MDEQ. The primary environmental concern is in the use of chlorine, and the NPDES Permit limits cooling tower blowdown discharge for free available and total residual chlorine.

The use of 50% hydrogen peroxide will not affect any existing NPDES limits; however, an increase in solids will be seen initially during the cleaning process. Blowdown will be controlled during the hydrogen peroxide cleaning at approximately 2.5 cycles concentration instead of 3 cycles to help reduce the expected increase in solids at the peak of the cleaning. Solids concentration will decrease gradually through the make-up/blowdown process, therefore solids will not significantly increase impact on the environment.

The FES does not directly cover the use of hydrogen peroxide, but the proposed injection of 50% hydrogen peroxide solution into Cooling Tower fill is not expected to result in adverse impact to the river biota.

[ ] [√] (c) Concerns a significant change in effluents or power level.

BASIS: 50% hydrogen peroxide solution used as a cleaning process to remove the negative effects of bacterial growth (which has a negative effect on cooling tower efficiency) is anticipated to have a positive influence on thermal performance by increasing air flow through cooling tower fill. At the specified temperature, feed rates, and concentration, this chemical has no significant change in effluents because it will quickly decompose and dissipate. Based on this evaluation of physical and chemical aspects of injection of 50% hydrogen peroxide solution, no significant changes in effluents is anticipated, and therefore no effect on the Mississippi River is expected.

PART III (Cont'D)

YES NO IMPLEMENTATION OR PERFORMANCE OF THE ACTIVITY DESCRIBED ABOVE:

[ ] [√] (d) Concerns a matter not previously reviewed and evaluated documents specified in II(b) above, which may have a significant adverse environmental impact.

BASIS: 50% hydrogen peroxide solution, which was not previously reviewed and evaluated in the FES will be fed over a period of one hour into no more than two flumes of the Cooling Tower fill at a time and will be diluted and circulated through Circ Water System at 2.5 cycles concentration. The remaining solution after diluting and dissipating will be discharged through Cooling Tower Blowdown. Although the FES, which dictates regulation by the NPDES Permit, was evaluated and approved by MDEQ, it does not directly discuss hydrogen peroxide; however, since no significant adverse environmental impact is expected, the MDEQ has approved its use (CTC-91/00085).