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April 16, 1991

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 1990

GNRO-91/00069

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, 1990 through December 31, 1990.

If you need additional information, please contact this office.

Yours truly,

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GRAND GULF NUCLEAR STATION

1990 ANNUAL ENVIRONMENTAL OPERATING

REPORT

RPT7224/SRESELR

PREFACE

The Annual Environmental Operating Report (AEOR) presents the information and data obtained from the 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, 1990. Historical information has also 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, 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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SECTION 1.0

INTRODUCTION

INTRODUCTION

Effective June 6, 1990, the Securities and Exchange Commission approved the consolidation of all Entergy Corporation nuclear operating and management functions into a new nuclear service company subsidiary, Entergy Operations, Inc. Entergy Operations acts as agent for the nuclear plant owners under separate operating agreements with each plant owner. One of these operating agreements is between Entergy Operations and System Energy Resources, Inc. This agreement transferred the management and operating responsibility of the Grand Gulf Nuclear Station to Entergy Operations as agent for System Energy. System Energy holds a ninety percent (90%) undivided ownership and/or leasehold interest in Grand Gulf, and South Mississippi Electric Power Association holds a ten percent (10%) undivided interest in Grand Gulf.

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 construction permit was submitted to the Nuclear Regulatory Commission on December 27, 1990.

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, 1990. The monitoring results of the ESP contained in the following

sections indicate the environment was not adversely impacted in 1990 by the operation of GGNS. Environmental Surveillance Program personnel have not observed any harmful effects or evidence of trends toward irreversible damage to the surrounding environment at GGNS.

The only unusual environmental events occurring in 1990 were fish kills near the discharge point of Outfall 001 and onsite Sediment Basin A in August and October, respectively. The fish kills were natural occurrences caused by dissolved oxygen depletion and not related to station operation. Acute effects were confined to the general area and no chronic effects have been observed.

Overall, surveillance results for 1990 were comparable to those of previous years. Results remained within anticipated ranges and no adverse environmental impact was observed by ESP personnel.

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 the 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 elevation of the site varies between 60 and 80 feet above Mean Sea Level (MSL) in the alluvial plain region, while the Loess Hills portion varies from 80 to more than 200 feet above MSL.

Based on the GGNS Updated Final Safety Analysis Report, the current acreage figure for the site is approximately 2100 acres.

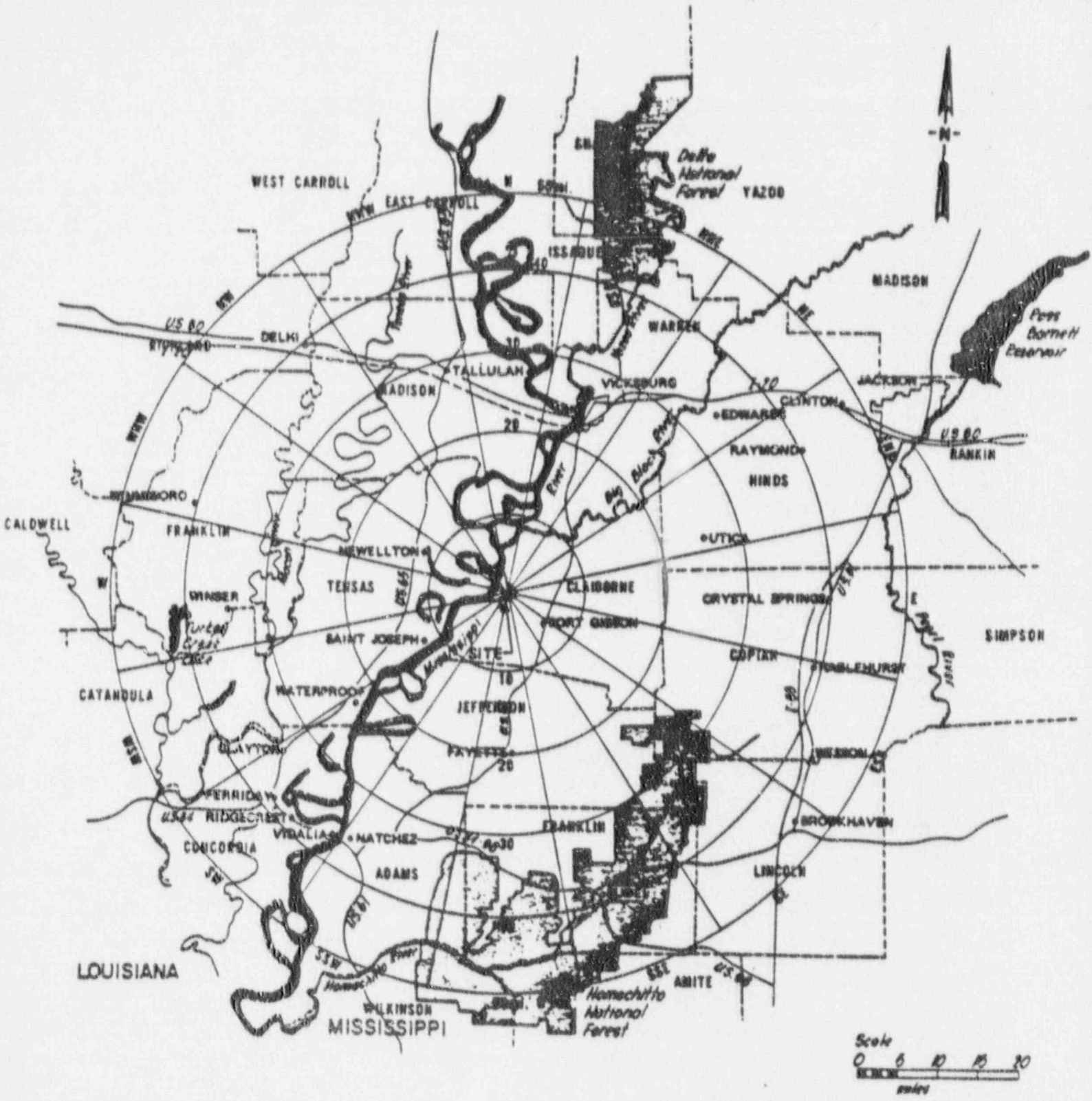
The site boundary is the same as the property line except in the southwest and west-southwest sectors as shown in Figure 1-2. A 2-acre residential property within the southwest sector is privately owned.

There are no industrial, commercial, institutional or residential structures within the site boundary. No railroads or navigable waterways traverse the site. Bald Hill Road, formerly Waterloo Road, runs through the GGNS site property. Bald Hill Road cuts through the south-southeast, south, south-southwest, and southwest sectors of the site. Hamilton Lake Road, formerly a county

road, was closed to public traffic in 1986. Hamilton Lake Road traverses the site property in the north, north-northwest, northwest, west-northwest, and west sectors.

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

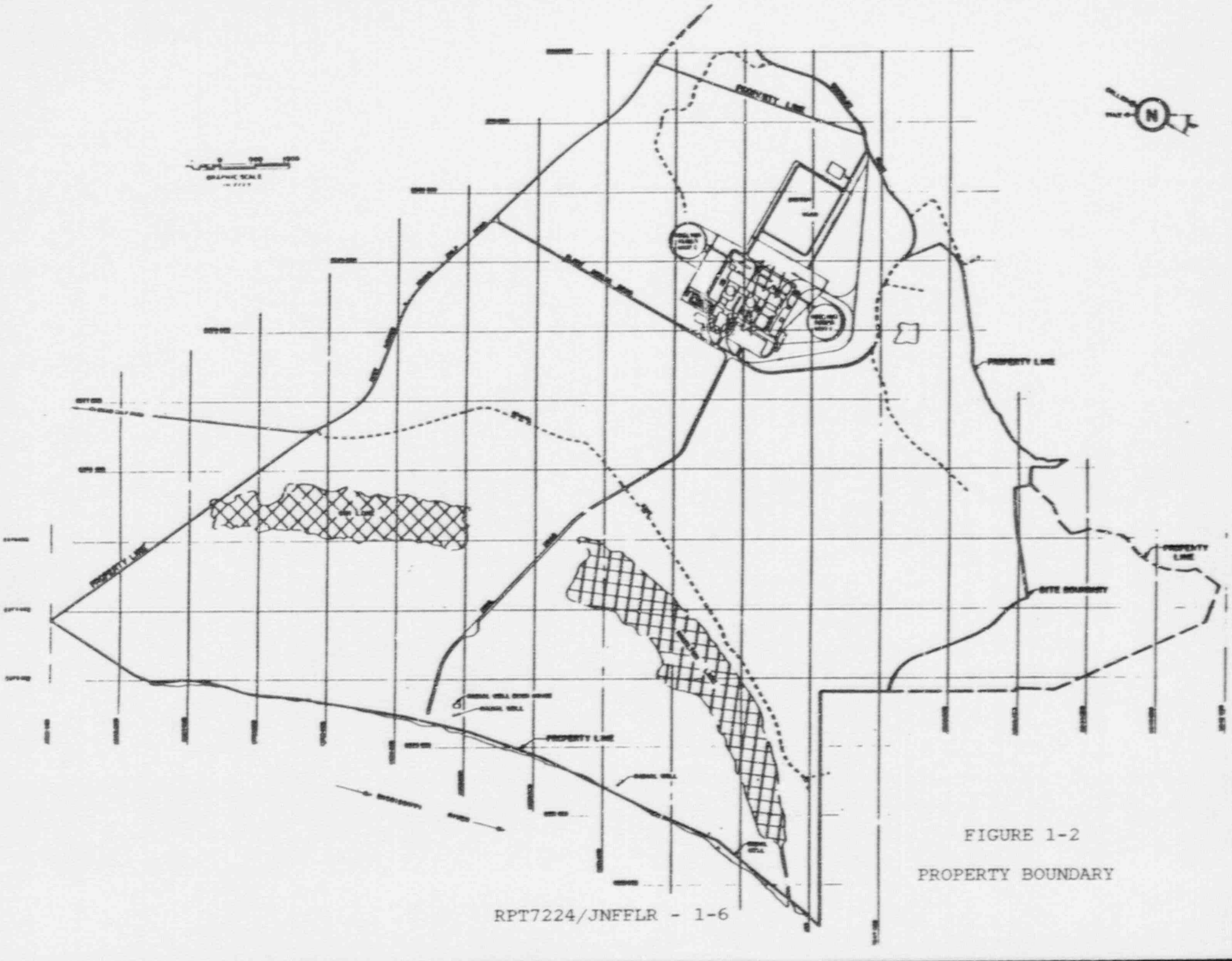


FIGURE 1-2

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 the proximity of GGNS to the Mississippi River, the hilly terrain, the average annual rainfall of approximately 50 inches and the 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 occurs in the basins, which helps to minimize the 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. 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 the 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 the 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 1990 at GGNS to:

- Provide data on the seasonal fluctuation of the regional groundwater table
- Monitor the level of the perched groundwater table around the 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 in the site area
- Fifteen wells for perched groundwater levels around the 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 the regional groundwater levels (Figure 2-2 and Table 2-1) were normally measured at least twice a month.

Perched Groundwater

GGNS has a monitoring and dewatering system (Figure 2-3 and Table 2-2) located around the Power Block and the Standby Service Water Basins to monitor and dewater the underlying perched aquifer. Seven monitoring wells (MW-1 through MW-7) were used to monitor the 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 the 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.

Prior to issuance of the amended October 1990 NPDES Permit, monitoring was conducted semiannually (once in winter and once in summer) when Unit 1 was operating at a minimum of 25% power.

The amended permit as issued in October 1990, only requires monitoring when the 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 the time of monitoring will become the new limit.

To initiate the thermal monitoring program and obtain baseline data, the river bank was surveyed to establish and permanently mark 72 reference points 100 feet apart. Sixty-six of the reference points were located downstream of GGNS's discharge into the river, and the remaining six were located upstream of the discharge.

Calibrated digital thermometers were used to obtain temperatures at a depth of five feet and at the surface. At each selected reference point, measurements were taken 100 feet from the river bank, then at 10 foot intervals until reaching the bank. This provided 20 temperature data points for each reference point.

2.9 COOLING TOWER DRIFT PROGRAM

The Environmental Protection Plan requires a study to determine the 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 the 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 the 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 the initial setup of the 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 the collector's contents was placed in a clean cubitainer, sealed and labelled. The date of removal, total volume in the collector, total rainfall and location of the 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:

- The total volume of water contained in the sampling bucket
- The concentration of a constituent in this water
- The volume of demineralized water placed in the sampler initially
- The concentration of the constituent in the demineralized water
- The sampling area of the bucket.

Therefore, for a particular constituent,

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

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

where:

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. A county road passes the meteorological

tower approximately 400 feet to the north. The tallest structure, the GGNS Unit 1 natural draft cooling tower, is 522 feet high and is situated approximately 6000 feet south-southeast of the 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 the 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 the requirements of the EPP. Also, the requirements of the EPP do not relieve GGNS of the 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 the performance of tests and experiments were reviewed by GGNS personnel for the possible effects they might have on the environment. When the review determined the 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:

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

Review of changes, tests and experiments at GGNS was conducted by one of three groups:

- Nuclear Plant Engineering
- Nuclear Operations
- Nuclear Support.

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

The originator of a proposed change, test or experiment completed an environmental evaluation or documented that one was not required. Completed environmental evaluations were forwarded to the Radiological & Environmental Services (R&ES) Section in the Nuclear Support Department for an independent review. After providing independent review, the R&ES staff reported the 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 I Turbine Bldg. - Auxiliary Bldg.
DW8	1	Behind Radwaste Bldg. - Unit 1

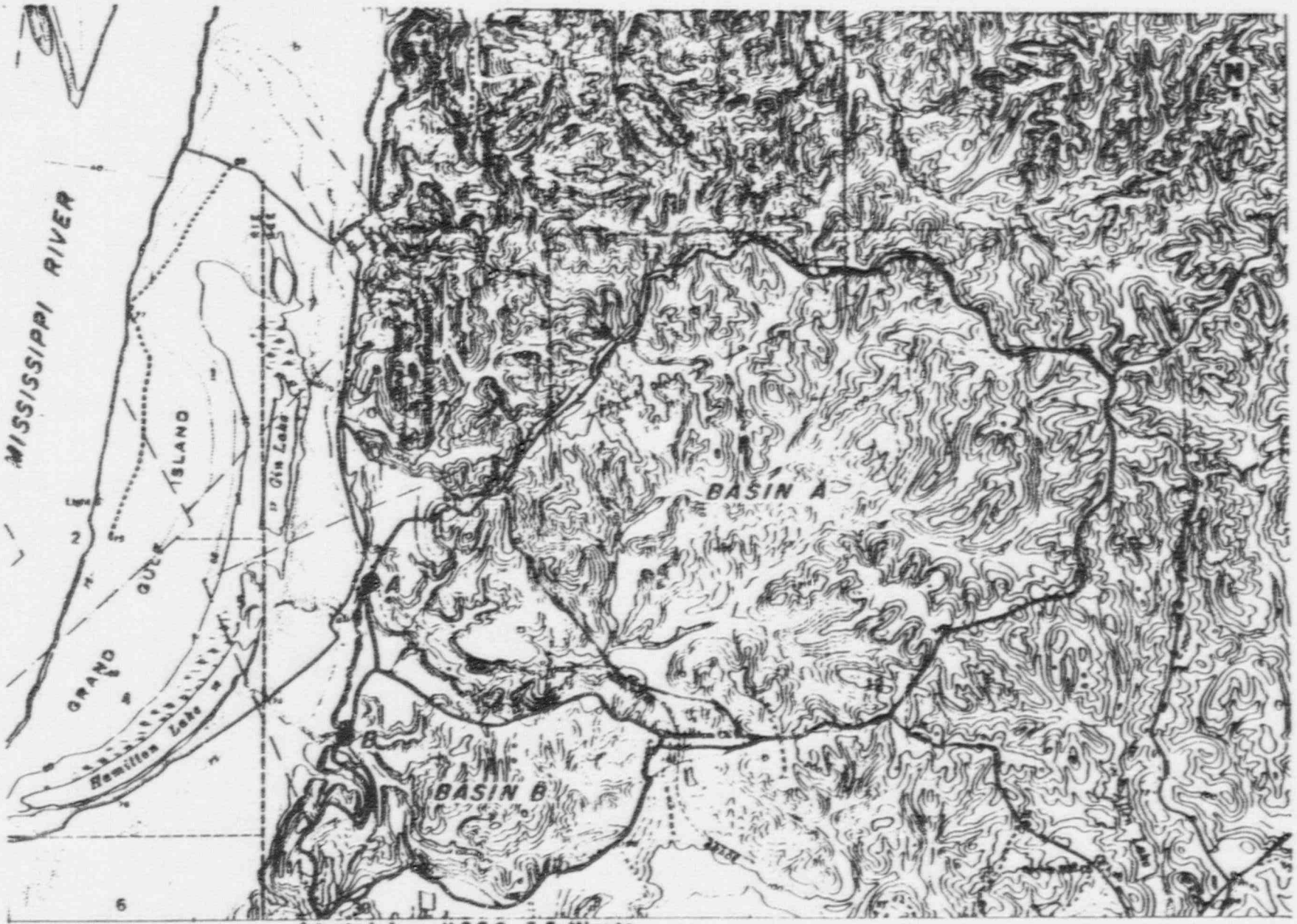
TABLE 2-3

SALT DEPOSITION STATION LOCATIONS

IN FIGURES 2-4 AND 2-5

LEGEND	ID NO.	SECTOR	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 numbers 8 and 10 are assigned to a deionized water control sample



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

GRAND GULF NUCLEAR STATION

FIGURE 2-1
LOCAL DRAINAGE BASINS

-1,000 0 2,000
Scale in Feet

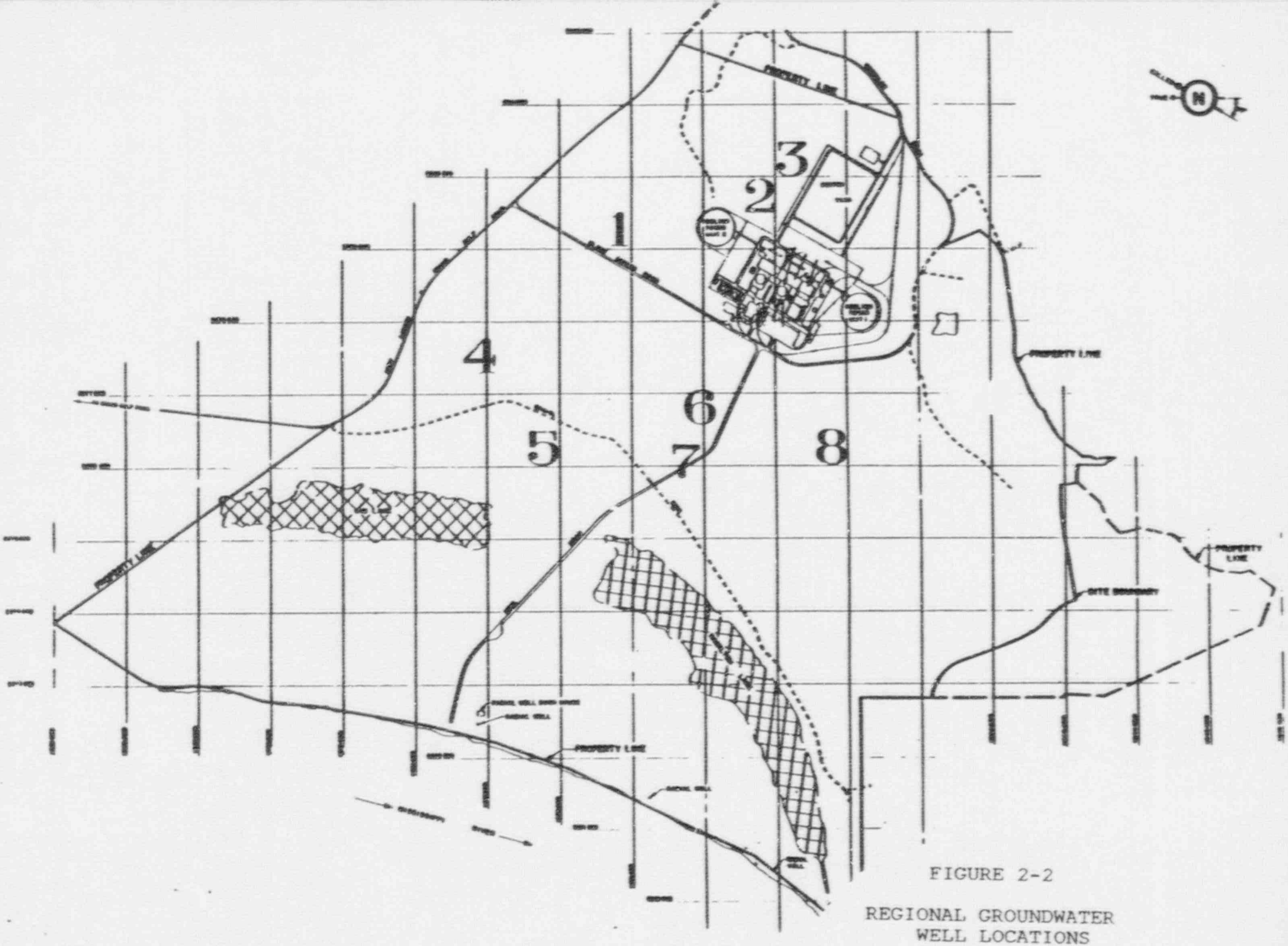
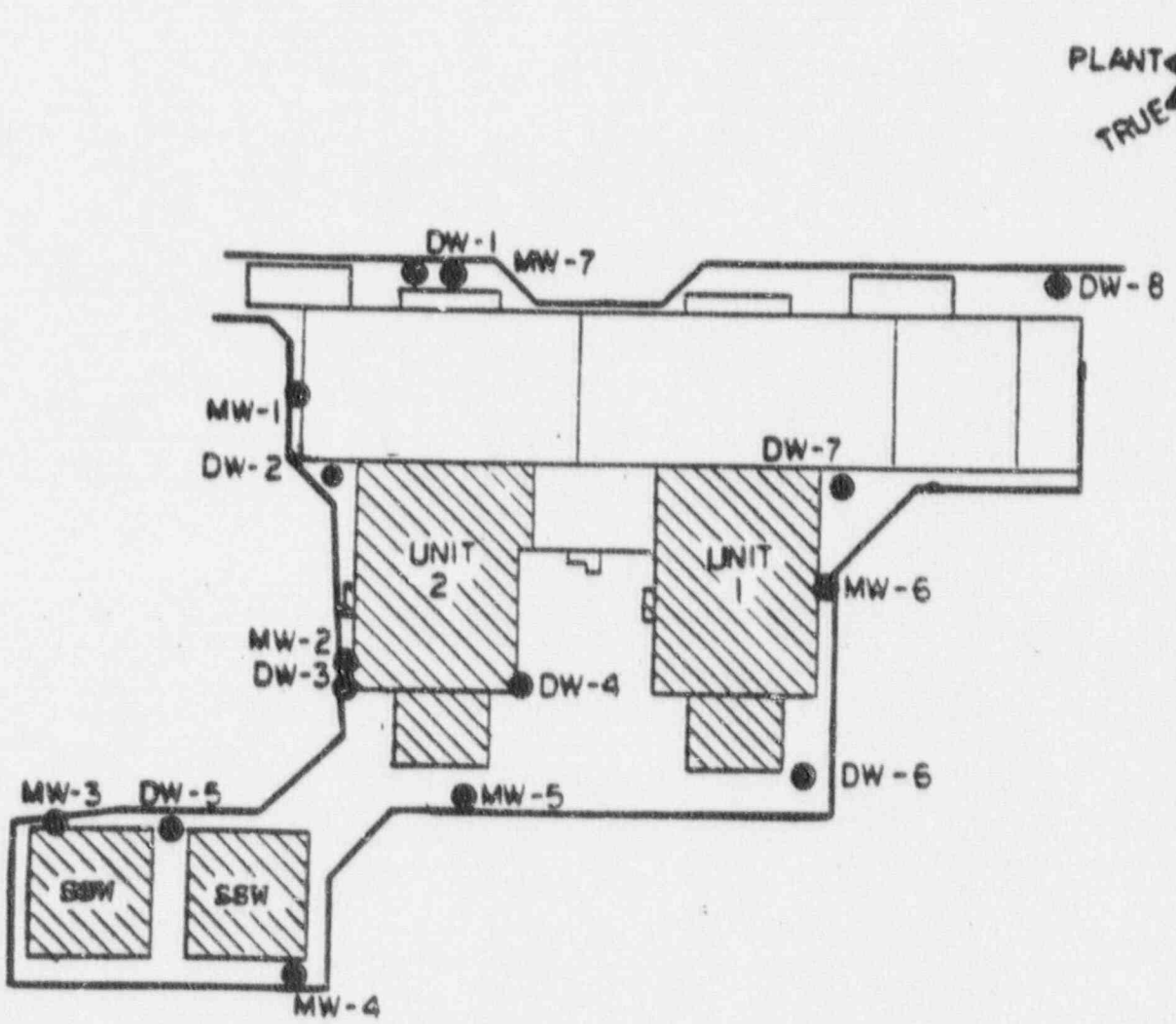


FIGURE 2-2

REGIONAL GROUNDWATER
WELL LOCATIONS



GRAND GULF NUCLEAR STATION

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

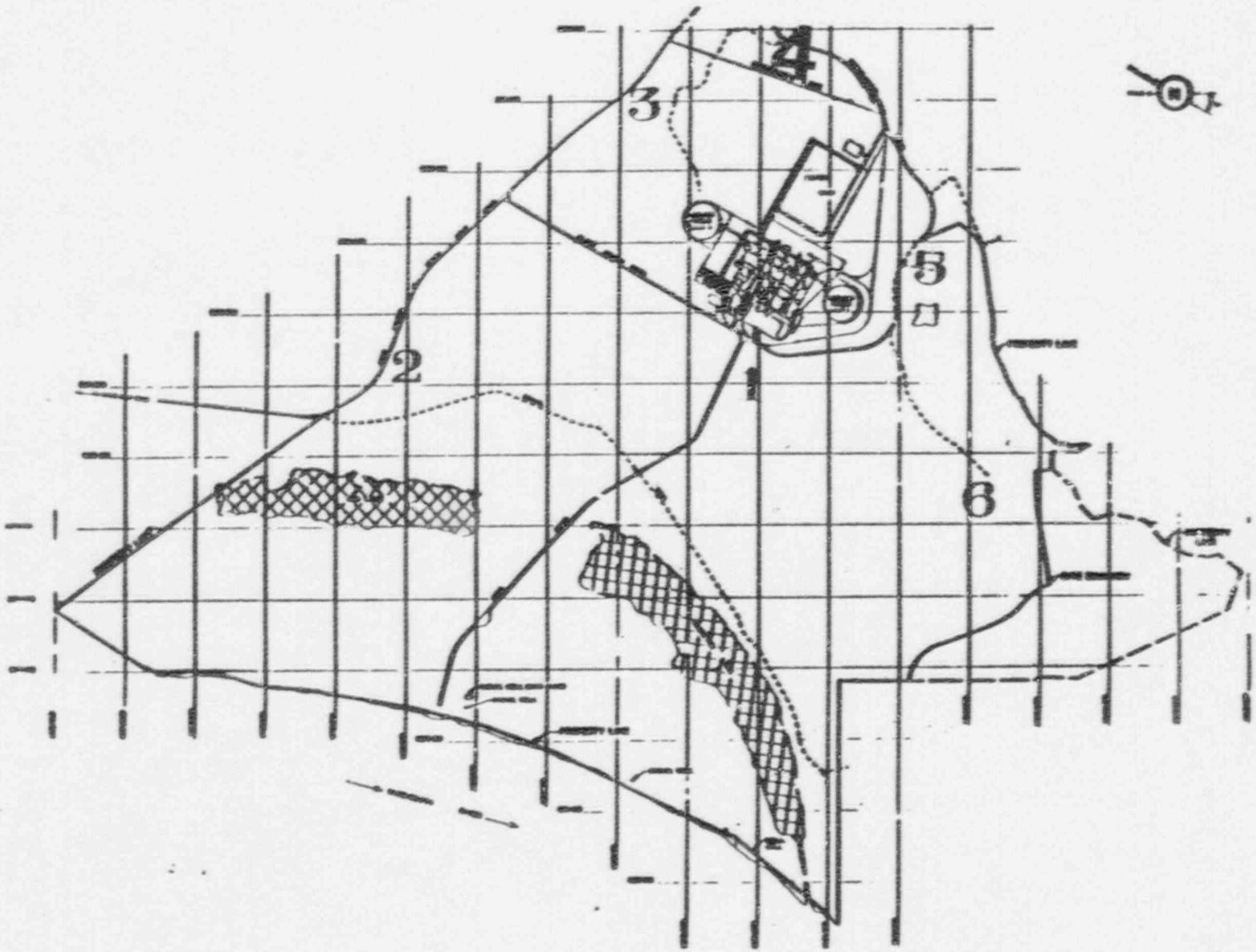
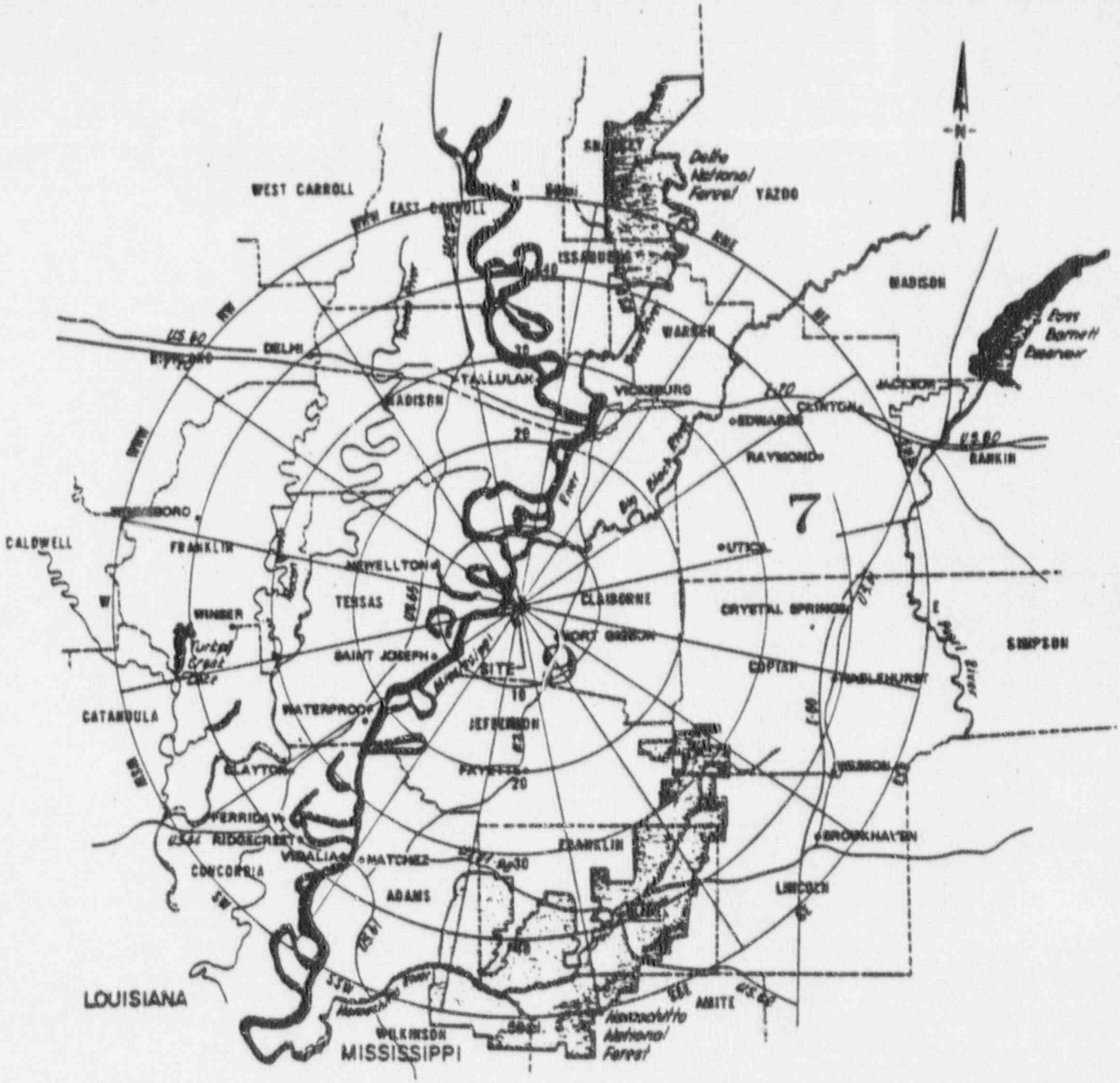


FIGURE 2-4

SALT DEPOSITION
STATION LOCATIONS



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

GRAND GULF NUCLEAR STATION

FIGURE 2-5

SALT DEPOSITION CONTROL LOCATIONS

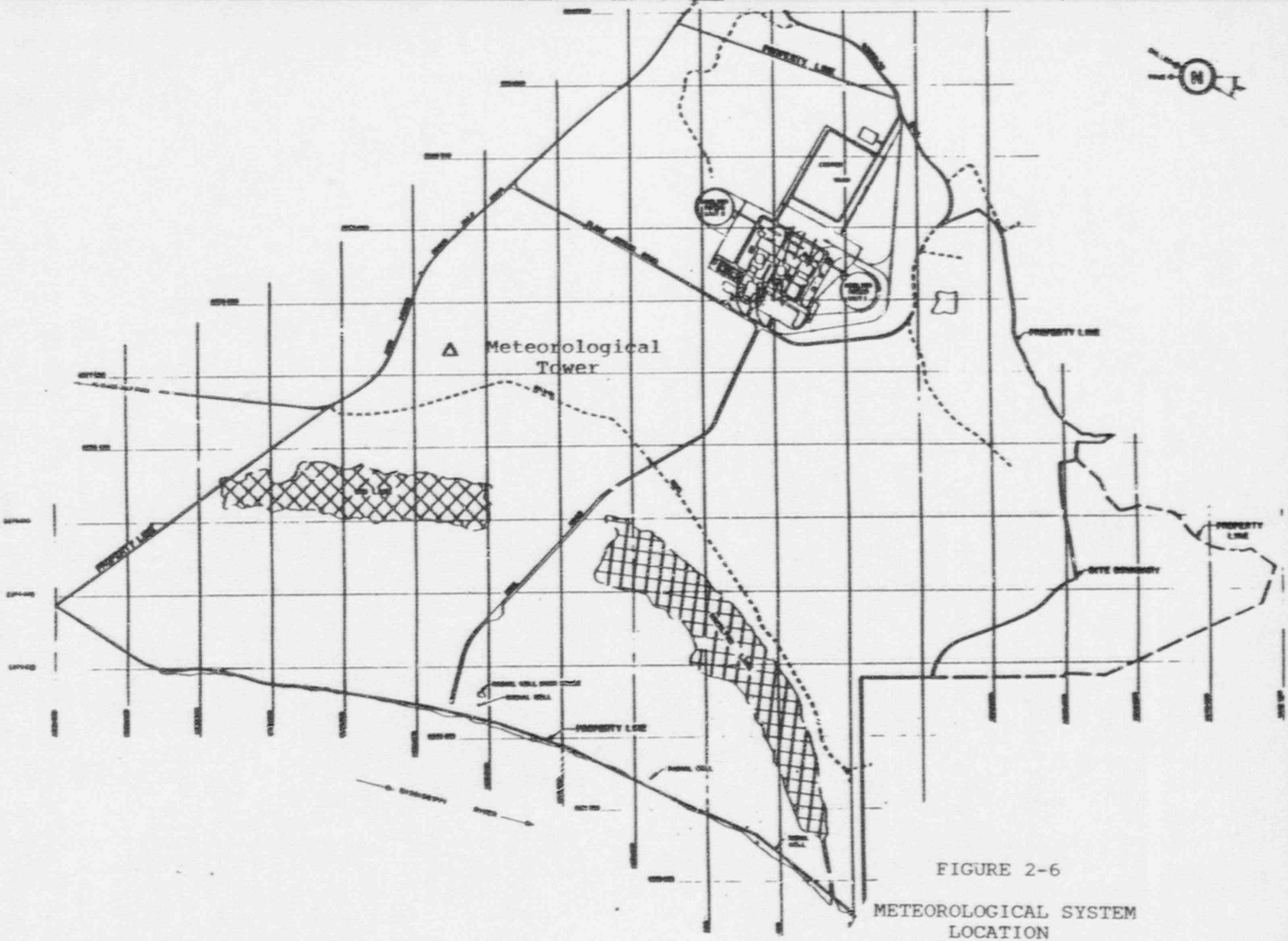


FIGURE 2-6

METEOROLOGICAL SYSTEM
LOCATION

SECTION 3.0

OBSERVATIONS AND DISCUSSIONS

3.1 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.

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. Results from 1990 samples were consistent with TSS results from previous operational years as shown in Figure 3-1. This six year trend indicates 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 1990. Liquids which were suitable for reuse were recycled through local contractors and nonprofit organizations. Nonhazardous liquid wastes

(borated water, glycol and cooling water) were disposed of in the GGNS Resin Pond or discharged through National Pollutant Discharge Elimination System outfalls.

Solid Waste

Solid waste generated at GGNS during 1990 did not present any unanticipated problems or adversely affect the environment. Solid waste which was not salvageable was buried on site or at a local 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 March 29, 1990. The purpose of the inspection was to confirm regulatory compliance with the GGNS Hazardous Waste Management Permit. Each shipment was properly manifested and signed copies acknowledging shipment receipt were returned by the disposal facilities.

Polychlorinated Biphenyls (PCBs)

No known exposure or offsite release of PCBs occurred in 1990.

3.5 LAND MANAGEMENT AND WILDLIFE

Based on field observations by ESP personnel, the 1990 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 1990 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. As indicated in Table 3-4, no water level exceeded 109.0 feet MSL during the 12 scheduled surveillances.

In addition to the 12 scheduled surveillances, ESP personnel made additional well measurements in support of Geotech's study of the DW-8 well. During this study, DW-8 and DW-6 exceeded the 109.0 feet MSL due to mechanical problems. DW-8's mechanical problems were reported in AECM-90/0062, dated April 16, 1990, and AECM-90/0083, dated May 8, 1990. DW-6's mechanical problem was reported in AECM-90/0183, dated October 10, 1990. However, the problems were corrected and elevations returned below the 109.0 feet MSL. Well measurements taken during this study are included as Appendix I.

Rainfall data for 1990 is presented in Table 3-5. Figures 3-4 and 3-5 show yearly rainfall data from 1975 through 1990 and seasonal rainfall data from 1975 through 1990, respectively.

3.7 NPDES

The 1990 monitoring results for all permitted outfalls were reported in the National Pollutant Discharge Elimination System (NPDES) reports. The upriver temperature data required by the permit was also included

in each report. The Mississippi Department of Environmental Quality (MDEQ) and the U. S. Nuclear Regulatory Commission received copies of these reports.

Several items noted during 1990 and included in the NPDES reports are summarized in the following:

- The following were routine discharges that occurred during the year. October discharges were to support activities during Refueling Outage No. 4:

Date	Quantity	Source
01/25	50 gal.	Div. III-A Diesel Jacket Cooling Water
01/25	50 gal.	Div. III-B Diesel Jacket Cooling Water
03/22	100 gal.	Div. III Diesel Jacket Cooling Water
03/23	360 gal.	Div. III Diesel Jacket Cooling Water
04/09	300,000 gal.	Firewater Storage Tank B
05/23	320 gal.	Div. II Diesel Jacket Cooling Water
05/24	820 gal.	Div. II Diesel Jacket Cooling Water
09/29	1200 gal.	Div. I Diesel Jacket Cooling Water
09/29	360 gal.	Div. III-A Diesel Jacket Cooling Water
09/29	360 gal.	Div. III-B Diesel Jacket Cooling Water
10/02	7,721,192 gal.	Unit I Cooling Tower Basin

Date	Quantity	Source
10/02-10/06	2,192,508 gal.	Circulating Water System Pump Pit
10/06-10/07	7,500,000 gal.	Standby Service Water A
10/25	1,250 gal.	Div. I Diesel Jacket Cooling Water
10/29-10/30	7,500,000 gal.	Standby Service Water B
10/31	1,750 gal.	Div. II Diesel Jacket Cooling Water
11/12	513 gal.	Div. I Diesel Jacket Cooling Water

All discharges were within NPDES limits or limits imposed by the Mississippi Department of Environmental Quality.

- A fish kill occurred on August 16 and 17 near the discharge point of Outfall 001. Investigation by ESP personnel concluded that probable cause was dissolved oxygen depletion. A written report (APO-90/0802) of the investigation by ESP personnel was sent to the MDEQ. A copy of this report is included in Appendix IV.

- A fish kill occurred on October 4 in Sediment Basin A. A written report (APO-90/0966) of the investigation by ESP personnel was sent to the MDEQ, who concurred (API-90/1014) with probable cause of fish kill as being dissolved oxygen depletion. A copy of this report is included in Appendix IV.

3.8 THERMAL MONITORING

Thermal monitoring (Section 2.8) was conducted in February, August and December 1990 by ESP personnel. The results were organized so that temperature changes could be noted at specific distances from the river bank. No limit imposed by the NPDES Permit was exceeded. A summary of thermal monitoring conducted through 1990 is provided as Appendix II.

3.9 COOLING TOWER DRIFT

During 1990, 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 the eight monitoring sites in the GGNS Cooling Tower Drift Program. These SDRs form the bases for the 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 the 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 the 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. The results of this comparison revealed that 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 the results of the 1989 analysis.

A statistical analysis for 1990 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 1990 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 that the meteorological system is performing satisfactorily, as well as providing consistent data.

3.11 ENVIRONMENTAL EVALUATIONS

During 1990, no unreviewed environmental questions were found. Environmental evaluations reviewed by Radiological & Environmental Services 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.

A completed copy of each 1990 environmental evaluation recorded by R&ES is included in Appendix III. An analysis, interpretation and evaluation of the environmental impact of each change, test or experiment is made in each environmental evaluation. Table 3-12 summarizes the evaluated items.

TABLE 3-1

1990 TSS ANALYSIS RESULTS (1)

SEDIMENTATION BASINS A & B

Collection	Sedimentation Basin A (Outfall 013)	Sedimentation Basin B (Outfall 014)
JAN	8.3	29.4
FEB	42.0	32.1
MAR	27.5	22.6
APR	44.5	34.3
MAY	36.0	22.2
JUN	27.6	14.8
JUL	45.0	19.7
AUG	29.7	18.4
SEP	37.9	10.0
OCT	30.0	9.5
NOV (2)	42.7	5.7
DEC (2)	27.2	18.7
Yearly Average	33.2	19.8

(1)-Analysis results expressed as mg/l. Data obtained from NPDES data sheets.

(2)-TSS values are a two sample average

TABLE 3-2

1990 REGIONAL GROUNDWATER MONITORING DATA

REGIONAL WELL NO. - WATER LEVEL(ft)[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
01-04-90	(2)	65.7	65.4	85.4	71.2	70.9	57.0	66.4	(3)	68.2	100.2	(3)
01-22-90	71.2	67.4	65.4	86.8	73.4	72.3	57.8	65.8	76.8	72.7	149.6	90.1
02-02-90	71.4	67.9	67.0	90.4	73.7	73.5	57.7	66.3	77.3	73.2	143.0	90.8
02-14-90	68.5	69.7	67.3	90.7	73.7	74.3	59.9	67.9	77.8	73.7	137.2	90.5
03-06-90	(4)	72.2	67.5	90.9	74.7	74.9	62.1	69.4	78.5	74.2	125.5	90.7
03-16-90	74.7	69.0	70.2	90.2	74.8	75.8	61.8	70.2	78.6	74.3	122.3	86.6
03-29-90	73.9	73.4	71.1	90.9	71.7	75.9	62.8	72.0	78.7	73.6	125.3	89.7
04-12-90	73.2	72.9	68.6	91.1	75.7	75.8	62.4	71.8	78.6	75.4	116.7	90.8
04-25-90	73.0	72.8	71.8	91.3	76.0	76.3	62.6	72.3	78.6	75.7	114.8	91.0
05-09-90	72.9	73.2	72.3	91.6	76.0	76.7	63.0	72.5	78.8	74.9	113.2	91.7
05-25-90	73.7	74.3	71.5	91.5	75.6	78.2	64.3	73.2	79.7	74.7	151.2	91.4
06-07-90	(4)	(4)	74.4	91.0	77.7	78.7	(4)	74.5	80.3	77.1	151.1	91.2
06-19-90	77.4	76.3	73.8	91.4	78.2	78.9	67.2	75.1	80.2	77.7	144.7	90.4
07-06-90	75.0	74.4	73.8	91.4	77.9	78.0	64.7	73.8	78.9	77.7	140.6	91.3
07-17-90	73.7	73.3	69.8	91.5	77.4	76.7	63.6	72.5	78.8	76.5	137.7	91.8
08-01-90	73.7	71.8	70.0	91.4	77.3	76.2	62.8	71.0	77.5	76.8	83.9(5)	91.2
08-17-90	72.0	71.8	71.6	92.0	76.3	76.4	62.6	70.7	78.0	76.9	80.0	91.7
08-28-90	71.9	71.3	70.8	92.1	77.2	75.8	62.2	70.0	77.8	76.6	79.7	91.8
09-14-90	72.5	70.2	70.0	91.8	76.3	74.9	61.7	67.3	77.2	76.1	80.5	91.8
09-26-90	70.7	69.8	69.7	91.9	76.4	74.5	61.1	68.5	77.1	75.9	78.9	91.8
10-12-90	69.8	69.4	69.0	92.0	76.1	73.8	60.4	68.1	76.8	75.5	78.5	91.7
10-24-90	69.7	69.3	69.0	91.7	75.8	73.5	60.3	68.0	76.7	74.8	78.4	91.3
11-08-90	69.4	69.3	69.0	91.7	75.6	73.4	59.8	67.8	76.6	75.1	78.0	91.5
11-29-90	69.5	69.1	68.9	91.7	75.1	73.1	59.3	67.8	76.7	75.0	77.8	91.6
12-07-90	69.3	68.9	68.5	91.7	75.6	73.3	59.3	67.5	76.8	75.0	77.8	91.6
12-20-90	69.0	68.8	66.9	91.7	75.5	73.0	59.3	67.5	76.8	75.0	77.5	91.6

(1) Water level expressed at Mean Sea Level (MSL)
(2) Unable to measure due to blockage
(3) No measurement because of dry reading
(4) Unable to measure due to river flooding
(5) This well was cleaned and an apparent blockage was displaced.

TABLE 3-3

1990 REGIONAL GROUNDWATER MONITORING SUMMARY

Well No.	Year	Formation[1]	Min[2]	(Month)	Max[2]	(Month)	Average[3]
OW4	1990	A	68.5	FEB	77.4	JUN	72.0
OW4A	1990	A	65.7	JAN	76.3	JUN	70.9
OW29A	1990	T	65.4	JAN	74.4	JUN	69.8
OW209A	1990	T	85.4	JAN	92.1	AUG	91.0
P5	1990	C	71.2	JAN	78.2	JUN	75.6
OW7	1990	T	70.9	JAN	78.9	JUN	75.2
P4	1990	C	57.0	JAN	67.2	JUN	61.4
OW69A	1990	A	65.8	JAN	75.1	JUN	69.9
OW202	1990	T	76.6	NOV	80.3	JUN	78.0
OW5	1990	T	68.2	JAN	77.7	JUN/JUL	75.1
OW10	1990	C	77.5	DEC	151.2	MAY	109.4
P209	1990	C	86.6	MAR	91.8	JUL/AUG/SEP	91.0

[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

1990 PERCHED GROUNDWATER MONITORING DATA[1]

		MONITORING WELL-WATER LEVEL (ft)							DEWATERING WELL-WATER LEVEL (ft)							
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
January	01-17-90	97.9	101.8	102.5	104.8	103.0	105.6	96.3	95.9	98.3	100.0	102.1	102.9	102.5	106.6	105.3
February	02-12-90	100.3	102.3	102.9	105.5	103.5	107.4	97.9	97.8	100.3	102.3	102.5	97.6	102.4	108.5	105.8
March	03-07-90	100.1	95.8	103.0	104.7	102.1	107.5	97.5	97.9	98.6	95.9	95.8	102.1	99.9	108.5	105.8
April	04-04-90	99.6	99.6	101.1	103.8	102.0	106.9	89.6	89.5	99.6	99.7	99.7	97.6	103.2	108.0	105.8
May	05-14-90	99.4	100.4	101.8	104.5	101.8	106.6	97.2	97.1	99.7	100.5	100.5	99.5	106.3	107.8	108.4
June	06-06-90	97.2	97.7	101.8	103.9	101.7	107.2	89.3	89.2	97.3	98.6	97.7	99.3	106.8	108.3	108.2
July	07-11-90	101.5	99.8	101.5	99.1	102.1	106.3	91.1	91.0	101.5	100.3	100.0	99.6	106.2	107.4	107.7
August	08-09-90	100.1	100.1	101.3	103.1	102.0	105.7	91.4	91.5	100.5	100.0	99.9	96.8	105.9	97.0	107.8
September	09-05-90	99.6	100.0	101.3	102.7	102.1	105.4	90.4	90.5	99.5	100.0	100.0	99.2	105.6	98.7	107.8
October	10-03-90	99.9	101.4	101.5	103.5	102.3	105.4	98.3	98.2	100.0	101.4	101.5	101.7	105.3	106.2	108.3
November	11-08-90	99.9	101.5	101.7	103.4	102.5	104.6	98.7	98.6	100.0	101.5	101.6	101.7	104.7	105.4	106.6
December	12-03-90	100.2	101.6	101.8	103.6	100.5	104.5	98.5	98.5	100.4	101.6	101.6	101.9	104.7	105.4	107.6

[1] Water Level Mean Sea Level (M.S.L.)

TABLE 3-5

1990 PRECIPITATION MEASUREMENT

GRAND GULF NUCLEAR STATION

MONTH	OBSERVED AT SITE (1) INCHES
JANUARY	13.41
FEBRUARY	5.24
MARCH	2.16
APRIL	3.89
MAY	8.52
JUNE	2.74
JULY	3.21
AUGUST	2.15
SEPTEMBER	3.10
OCTOBER	2.73
NOVEMBER	1.79
DECEMBER	8.73
TOTAL	57.67

(1) - Rainfall measured adjacent to the GGNS Meteorological System

TABLE 3-6

SALT DEPOSITION (1990)
PAGE 1 OF 5
SDCa90
CALCIUM (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	53.17	109.92	77.94	347.14
SDS1A	53.17	166.35	75.56	271.59
SDS2	130.79	53.17	62.70	13.33
SDS2A	136.35	47.30	75.08	12.54
SDS2B	133.17	67.94	73.49	14.52
SCS3	116.19	78.25	77.94	12.54
SDS4	164.13	67.14	72.38	10.16
SDS5	112.06	117.94	73.10	10.16
SDS5A	114.92	56.03	67.54	9.37
SDS5B	94.76	114.92	61.59	12.14
SDS6	95.87	120.48	19.21	11.75
SDS6A	118.10	74.76	15.24	10.95
SDS7	84.76	64.13	22.70	11.35
SDS9	154.44	154.84	61.27	13.49

SDC190
CHLORIDE (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	40.63	116.11	192.86	53.02
SDS1A	36.51	152.30	83.02	33.02
SDS2	86.67	174.44	52.06	44.92
SDS2A	126.19	80.32	60.63	25.40
SDS2B	100.00	99.68	91.27	92.70
SCS3	86.03	134.68	73.02	51.11
SDS4	68.57	62.70	54.44	63.97
SDS5	127.94	136.35	34.68	37.78
SDS5A	125.40	70.95	83.02	39.68
SDS5B	165.71	114.13	30.32	31.27
SDS6	147.62	32.22	35.87	29.37
SDS6A	139.10	18.81	26.67	40.32
SDS7	222.22	36.90	56.83	78.25
SDS9	283.85	24.29	45.87	37.78

TABLE 3-6 (CONT'D)

SALT DEPOSITION (1990)
PAGE 2 OF 5
SDNo390
NITRATE (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	85.40	157.30	0.71	86.03
SDS1A	75.08	28.81	0.71	54.92
SDS2	299.05	306.10	5.71	169.05
SDS2A	240.48	95.87	5.71	185.71
SDS2B	301.59	22.86	7.14	82.14
SCS3	234.92	155.08	5.71	245.71
SDS4	187.14	188.73	65.40	244.76
SDS5	276.98	153.17	2.14	247.14
SDS5A	304.76	210.63	130.48	221.59
SDS5B	302.70	224.29	155.71	276.19
SDS6	276.19	90.63	2.86	213.02
SDS6A	279.37	76.75	18.57	213.02
SDS7	193.02	80.40	149.52	240.71
SDS9	326.35	11.35	1.43	187.62

SDPo490
PHOSPHATE (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	92.06	39.33	0.48	11.43
SDS1A	92.06	135.00	0.48	11.43
SDS2	179.37	222.86	3.81	16.19
SDS2A	187.30	23.49	3.81	15.24
SDS2B	190.48	61.11	4.76	17.62
SCS3	163.49	8.73	3.81	15.24
SDS4	155.56	62.22	2.86	12.38
SDS5	139.68	6.35	1.43	52.86
SDS5A	147.62	22.54	1.43	11.43
SDS5B	142.86	44.76	1.90	14.76
SDS6	147.62	4.44	1.90	14.29
SDS6A	147.62	5.87	2.86	13.33
SDS7	163.49	9.68	3.81	13.81
SDS9	171.43	4.92	0.95	13.33

TABLE 3-6 (CONT'D)

SALT DEPOSITION (1990)
PAGE 3 OF 5
SDMg90
MAGNESIUM (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	11.43	73.97	29.29	53.97
SDS1A	15.56	122.46	28.89	56.19
SDS2	52.38	66.03	14.60	25.56
SDS2A	38.73	44.76	34.60	26.98
SDS2B	43.48	55.71	36.35	20.87
SCS3	30.48	72.54	19.37	18.41
SDS4	42.38	67.30	13.51	15.08
SDS5	26.19	62.22	8.8b	22.22
SDS5A	27.62	47.62	8.33	20.63
SDS5B	23.97	93.49	12.54	30.63
SDS6	24.44	73.97	4.44	25.40
SDS6A	27.62	84.76	9.84	26.35
SDS7	20.00	89.05	2.22	27.22
SDS9	35.56	69.84	23.17	31.43

SDNa90
SODIUM (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	75.87	141.98	15.'9	85.08
SDS1A	73.81	194.76	14.2:	76.19
SDS2	219.84	144.76	15.40	97.94
SDS2A	233.33	194.29	21.11	95.56
SDS2B	250.79	194.76	34.44	107.54
SCS3	218.25	177.14	25.87	78.41
SDS4	247.94	154.29	30.48	81.75
SDS5	196.35	192.38	18.81	69.84
SDS5A	216.67	169.21	23.25	51.75
SDS5B	189.84	149.52	24.92	109.21
SDS6	172.22	144.76	4.29	100.95
SDS6A	203.97	131.90	3.48	89.84
SDS7	242.70	187.30	15.40	131.98
SDS9	206.67	148.02	28.25	89.84

TABLE 3-6 (CONT'D)

SALT DEPOSITION (1990)
PAGE 4 OF 5
SDSo490
SULFATE (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	225.71	546.98	399.52	467.62
SDS1A	176.19	549.37	538.41	409.84
SDS2	561.30	689.84	417.78	411.90
SDS2A	601.59	450.16	541.59	398.73
SDS2B	535.71	485.08	513.65	469.84
SDS3	503.81	549.27	532.96	404.44
SDS4	313.81	448.57	760.63	398.73
SDS5	503.17	473.97	648.73	389.21
SDS5A	530.16	391.43	587.62	376.51
SDS5B	501.75	485.08	523.17	465.56
SDS6	479.37	324.76	233.65	427.78
SDS6A	533.33	286.67	260.63	377.14
SDS7	350.16	455.71	503.49	407.30
SDS9	560.00	336.67	470.16	377.14

SDTDS90
TOTAL DISSOLVED SOLIDS (mg/m sq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	746.03	6730.16	1308.52	1603.17
SDS1A	126.98	6555.56	1706.35	4714.29
SDS2	1793.65	3952.38	1539.68	12492.06
SDS2A	1888.89	1126.98	1920.63	4396.83
SDS2B	1523.81	3206.35	2142.86	2968.25
SDS3	3349.21	3619.05	1825.40	1539.68
SDS4	3841.27	1031.75	1746.03	2206.35
SDS5	1619.05	1031.75	1587.30	873.02
SDS5A	1095.24	650.79	1253.97	1158.73
SDS5B	1340.21	2825.40	1047.62	920.63
SDS6	777.78	3063.49	555.56	1444.44
SDS6A	11571.43	2460.32	634.92	1349.21
SDS7	19126.98	4460.32	873.02	2444.44
SDS9	9730.16	1809.52	1444.44	841.27

TABLE 3-6 (CONT'D)

SALT DEPOSITION (1990)
PAGE 5 OF 5
SDFe90
IRON (ug/L eq.)

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	25.08	34.92	5.48	18.41
SDS1A	45.71	104.68	8.87	22.86
SDS2	49.52	65.87	7.62	13.49
SDS2A	55.71	38.21	5.71	12.70
SDS2B	45.71	57.30	10.63	14.68
SCS3	59.05	75.32	7.62	12.70
SDS4	56.19	44.29	12.22	10.32
SDS5	62.54	62.06	8.81	12.70
SDS5A	50.16	41.75	7.14	9.52
SDS5B	76.51	35.08	13.02	14.92
SDS6	81.90	38.25	9.84	14.60
SDS6A	91.43	45.24	12.22	13.65
SDS7	45.08	51.75	5.71	11.51
SDS9	83.81	48.97	24.29	21.27

SDF90
FLOURIDE

PERIOD ENDING	3-30-90	6-27-90	9-28-90	12-28-90
SDS1	29.05	-5.79	14.05	5.24
SDS1A	37.30	-5.63	7.30	0.02
SDS2	72.22	-5.40	-4.60	51.59
SDS2A	75.40	21.11	6.83	10.95
SDS2B	76.19	24.29	19.84	31.11
SCS3	65.87	-5.63	5.87	8.10
SDS4	69.37	26.98	4.92	9.05
SDS5	56.35	-6.03	5.32	44.76
SDS5A	59.52	-5.71	16.43	38.57
SDS5B	57.14	111.75	7.94	12.30
SDS6	59.52	-6.35	10.00	9.52
SDS6A	59.52	82.46	34.29	48.72
SDS7	83.81	-5.40	45.87	14.05
SDS9	123.81	23.65	0.16	69.05

TABLE 3-7

1990 SALT DEPOSITION

RAINFALL DATA

Station No.	Date	Inches	
SDS #1	03-30-90	19.35	
SDS #2	03-30-90	19.20	
SDS #3	03-30-90	16.10	
SDS #4	03-30-90	18.25	
SDS #5	03-30-90	17.10	
SDS #6	03-30-90	20.05	
SDS #7	03-30-90	*	(1)
SDS #9	03-30-90	17.80	
SDS #1	06-27-90	14.25	
SDS #2	06-27-90	17.20	
SDS #3	06-27-90	*	(1)
SDS #4	06-27-90	16.40	
SDS #5	06-27-90	15.55	
SDS #6	06-27-90	*	(1)
SDS #7	06-27-90	16.65	
SDS #9	06-27-90	15.70	
SDS #1	09-28-90	7.85	
SDS #2	09-28-90	9.20	
SDS #3	09-28-90	8.65	
SDS #4	09-28-90	8.95	
SDS #5	09-28-90	7.85	
SDS #6	09-28-90	8.15	
SDS #7	09-28-90	8.75	
SDS #9	09-28-90	5.65	
SDS #1	12-28-90	13.65	
SDS #2	12-28-90	14.35	
SDS #3	12-28-90	13.95	
SDS #4	12-28-90	14.05	
SDS #5	12-28-90	13.65	
SDS #6	12-28-90	13.20	
SDS #7	12-28-90	11.30	
SDS #9	12-28-90	13.85	

(1) Only partial data available

TABLE 3-8

1990 JOINT FREQUENCY DISTRIBUTION

TOTAL FREQUENCY DISTRIBUTION
PERIOD OF RECORD: 1/ 1/90, 000 -- 12/31/90, 2300

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

TOTAL FREQUENCY DISTRUBUTION
PERIOD OF RECORD: 1/ 1/90, 000 -- 1/ 1/91, 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	3.0	3.3	.1	.0	.0	.0	.0	6.4	.2
NNE	2.4	1.6	.0	.0	.0	.0	.0	4.0	.1
NE	2.0	1.5	.0	.0	.0	.0	.0	3.4	.1
ENE	1.8	1.5	.0	.0	.0	.0	.0	3.3	.1
E	2.7	3.4	.0	.0	.0	.0	.0	6.1	.2
ESE	3.3	6.7	.4	.0	.0	.0	.0	10.4	.4
SE	3.1	6.7	.8	.0	.0	.0	.0	10.6	.4
SSE	3.3	4.8	.8	.1	.0	.0	.0	8.9	.3
S	3.4	3.6	.6	.0	.0	.0	.0	7.6	.3
SSW	4.0	1.9	.2	.0	.0	.0	.0	6.1	.2
SW	3.7	1.8	.1	.0	.0	.0	.0	5.7	.1
WSW	3.4	.8	.1	.0	.0	.0	.0	4.2	.1
W	3.6	.6	.1	.0	.0	.0	.0	4.4	.1
WNW	3.4	.9	.1	.0	.0	.0	.0	4.4	.1
NW	3.3	2.6	.2	.0	.0	.0	.0	6.1	.2
NNW	2.8	2.9	.2	.0	.0	.0	.0	5.9	.2
CALM	2.8							2.1	
TOTAL	51.3	44.7	3.8	.1	.0	.0	.0	100.0	.2

0. HOURS OF BAD OR MISSING DATA OR .0 PERCENT FOR 8760 HOURS

TABLE 3-9

1990 JOINT FREQUENCY DISTRIBUTION

TOTAL FREQUENCY DISTRIBUTION
PERIOD OF RECORD: 1/ 1/90, 000 -- 12/31/90, 2300

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

TOTAL FREQUENCY DISTRUBUTION
PERIOD OF RECORD: 1/ 1/90, 000 -- 1/ 1/91, 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	A/G SPEED
N	5.4	.8	.0	.0	.0	.0	.0	6.1	.1
NNE	5.1	.1	.0	.0	.0	.0	.0	5.3	.1
NE	4.6	.0	.0	.0	.0	.0	.0	4.6	.1
ENE	6.5	.0	.0	.0	.0	.0	.0	6.5	.1
E	5.6	.0	.0	.0	.0	.0	.0	5.6	.1
ESE	4.0	.1	.0	.0	.0	.0	.0	4.1	.0
SE	3.7	.1	.0	.0	.0	.0	.0	3.8	.0
SSE	5.9	1.1	.0	.0	.0	.0	.0	7.0	.1
S	6.5	3.0	.0	.0	.0	.0	.0	9.6	.2
SSW	4.7	1.1	.0	.0	.0	.0	.0	5.8	.1
SW	4.0	.3	.0	.0	.0	.0	.0	4.3	.1
WSW	4.3	.4	.0	.0	.0	.0	.0	4.8	.1
W	2.6	.0	.0	.0	.0	.0	.0	2.6	.0
WNW	4.1	.0	.0	.0	.0	.0	.0	4.2	.0
NW	3.8	.1	.0	.0	.0	.0	.0	3.9	.1
NNW	5.3	.3	.0	.0	.0	.0	.0	6.2	.1
CALM	5.3							15.7	
TOTAL	91.9	8.0	.1	.0	.0	.0	.0	100.0	.1

20. HOURS OF BAD OR MISSING DATA OR .2 PERCENT FOR 8760 HOURS

TABLE 3-10

1990 PERCENT BAD DATA REPORT

PERCENT BAD DATA REPORT
REPORT COVERS 8760 HOURS
PERIOD OF RECORD: 1/1/90, 000 -- 12/31/90, 2300

	HOURS	PERCENT
50M DIRECTION	0.	.00
50M WIND SPEED	0.	.00
10M DIRECTION	20.	.23
10M WIND SPEED	0.	.00
TEMPERATURE	0.	.00
DEW POINT	175.	2.00
DELTA T	0.	.00
PRECIPITATION	0.	.00

TABLE 3-11

METEOROLOGICAL DATA RECOVERY

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

TABLE 3-12

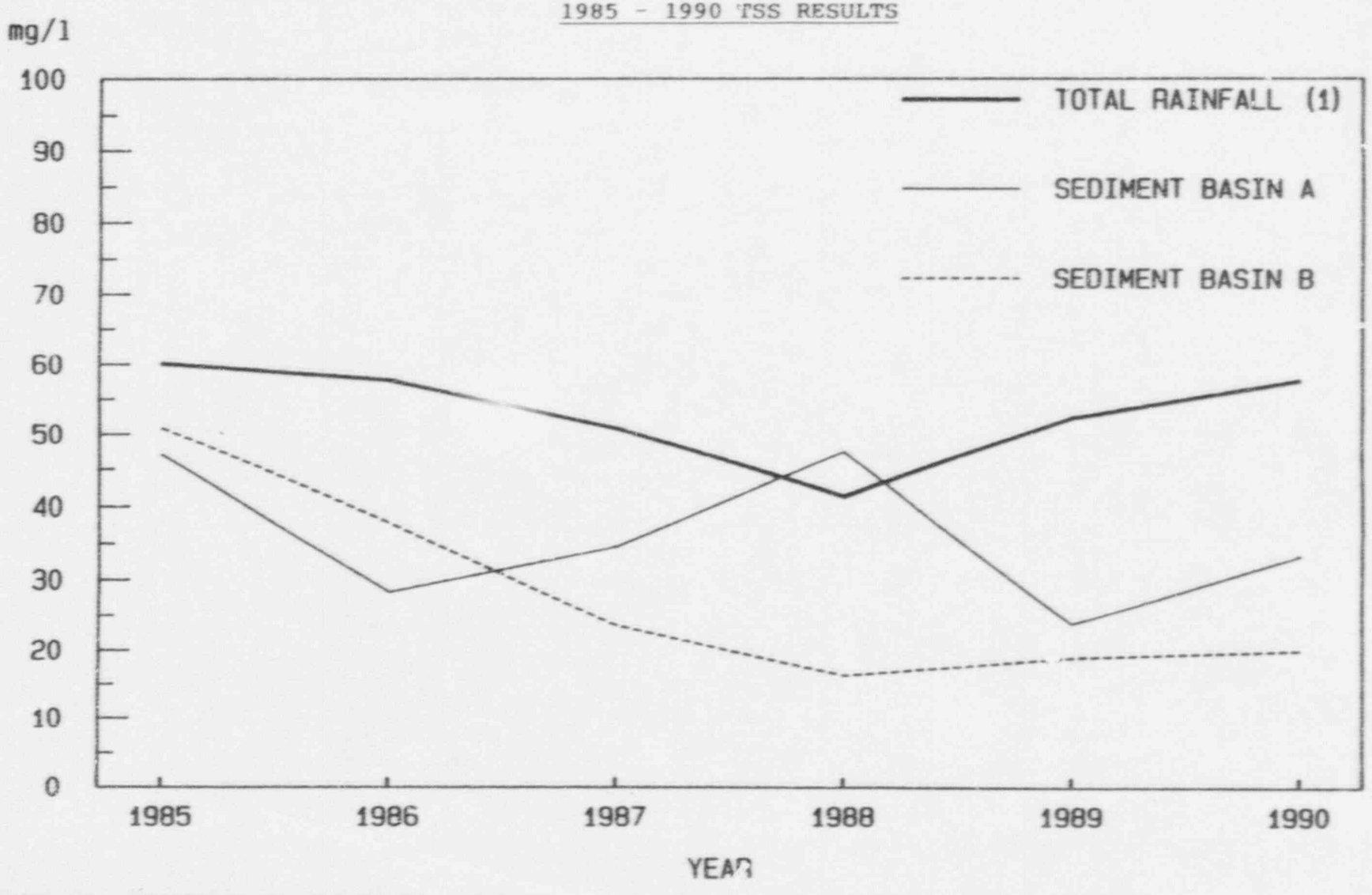
1990 ENVIRONMENTAL EVALUATION SUMMARY

Identifying Number	Description
NSSE-90/005	Tie-in to new 100,000 gpd sewage treatment plant, replacing two existing 30,000 gpd sewage treatment plants.

FIGURE 3-1

SEDIMENT BASINS A&B

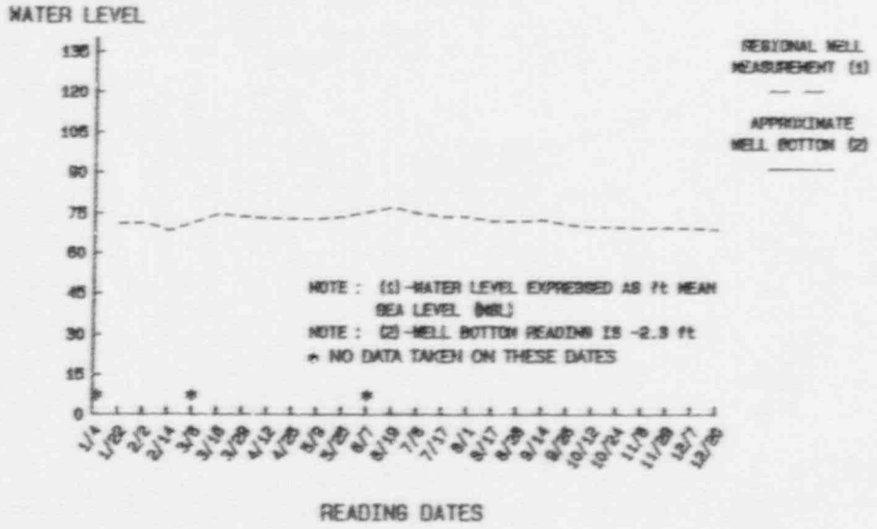
1985 - 1990 TSS RESULTS



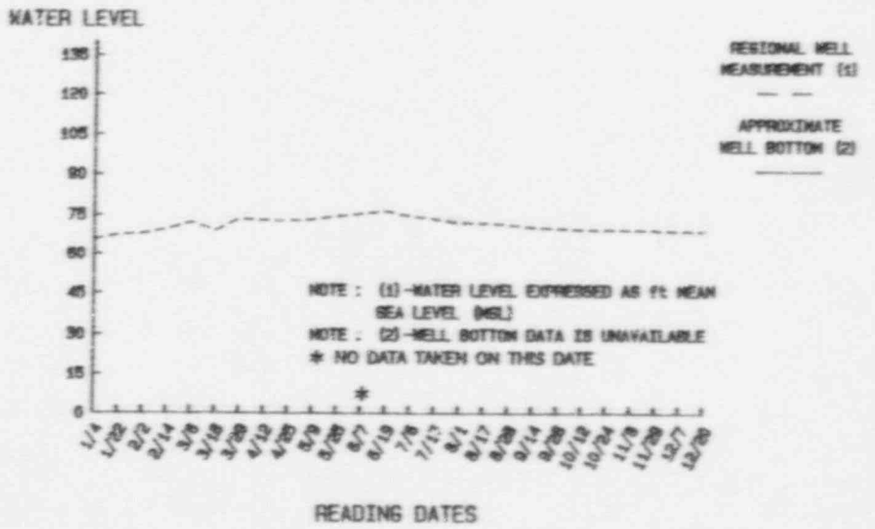
NOTE (1): EXPRESSED IN INCHES PER YEAR

FIGURE 3-2
Page 1 of 3
REGIONAL WELL HYDROGRAPHS

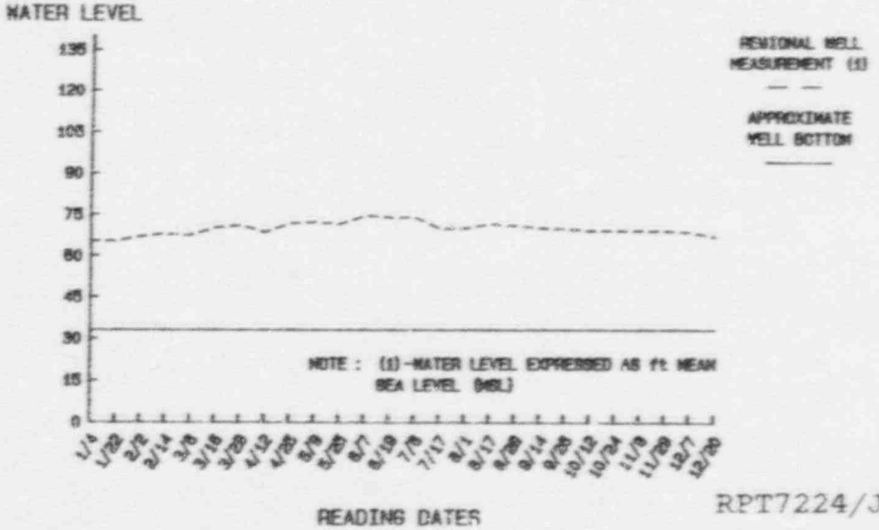
1990 REGIONAL GROUNDWATER
REGIONAL WELL OW-4



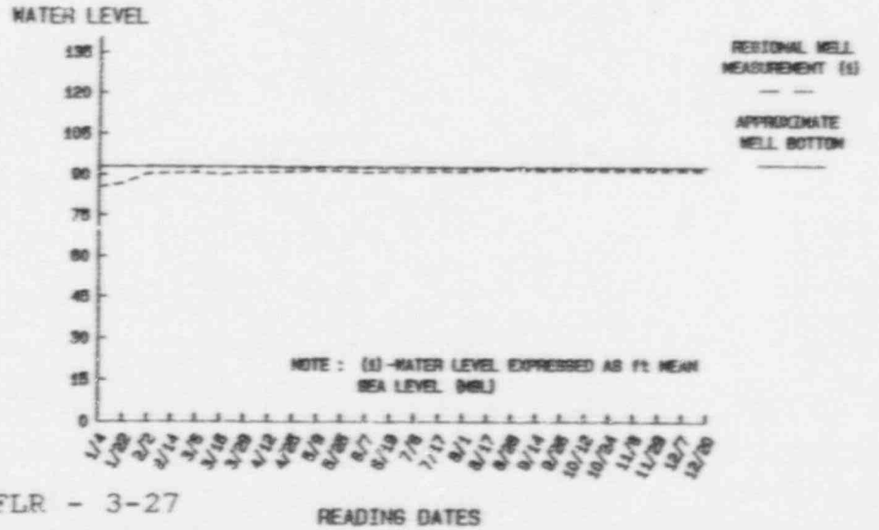
1990 REGIONAL GROUNDWATER
REGIONAL WELL OW-4A



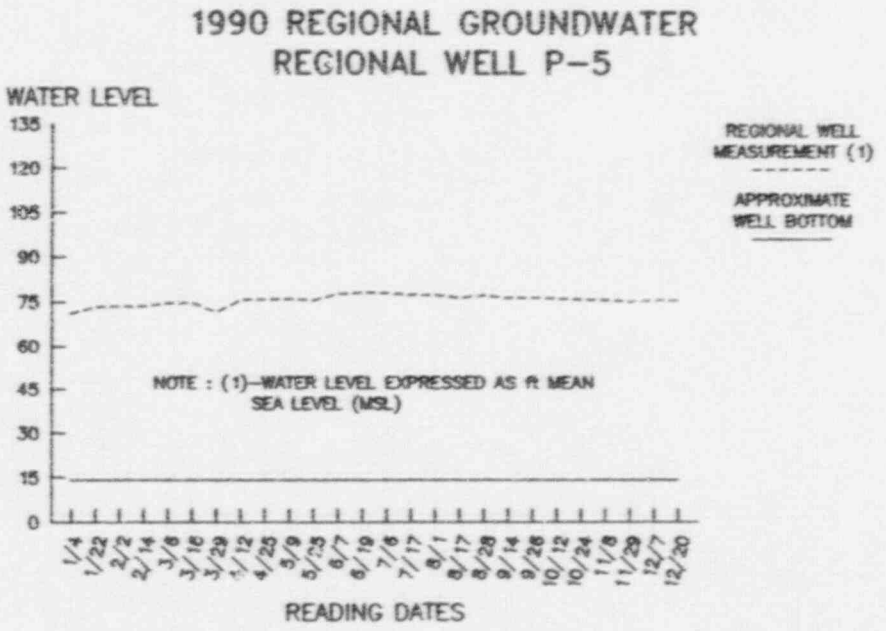
1990 REGIONAL GROUNDWATER
REGIONAL WELL OW-29A

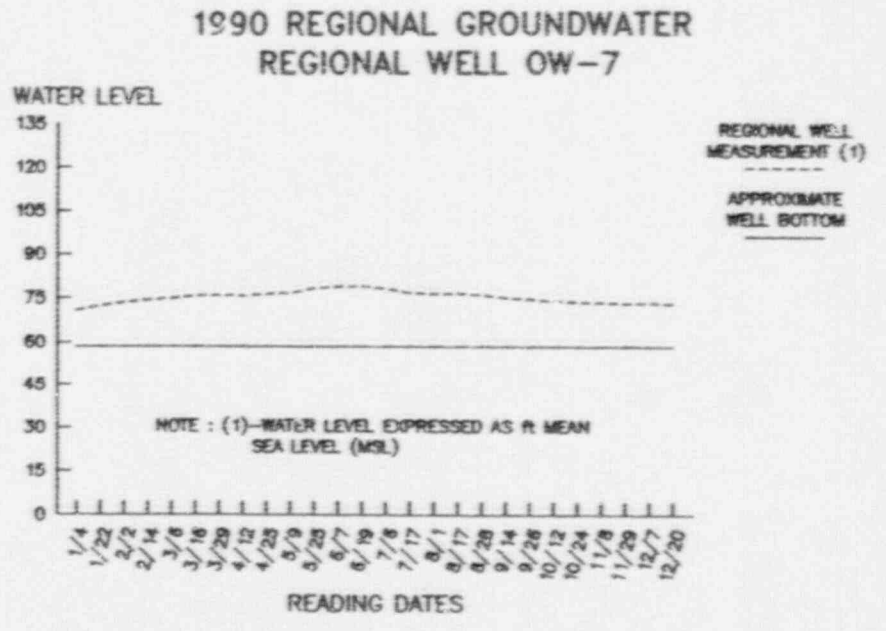


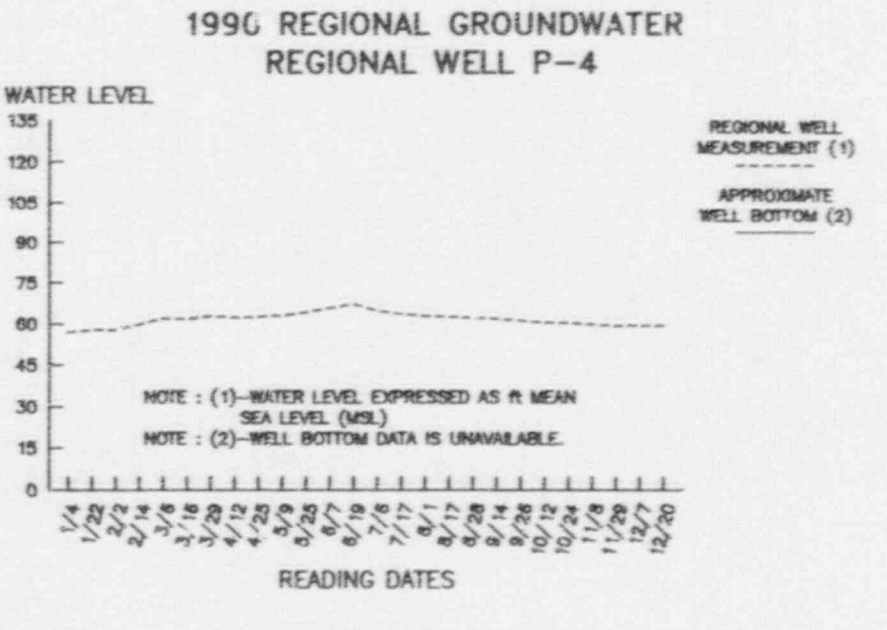
1990 REGIONAL GROUNDWATER
REGIONAL WELL OW-209A



REGIONAL WELL HYDROGRAPHS







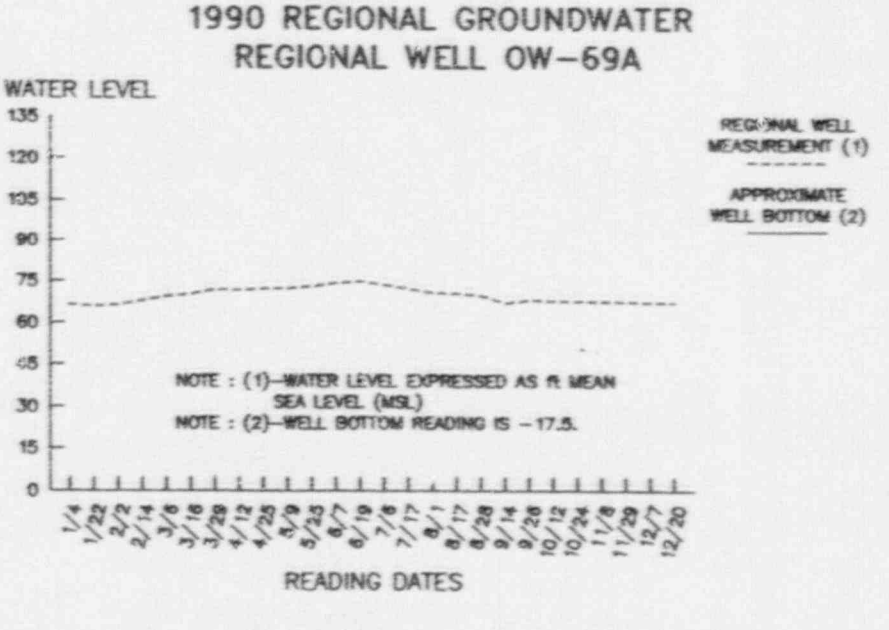
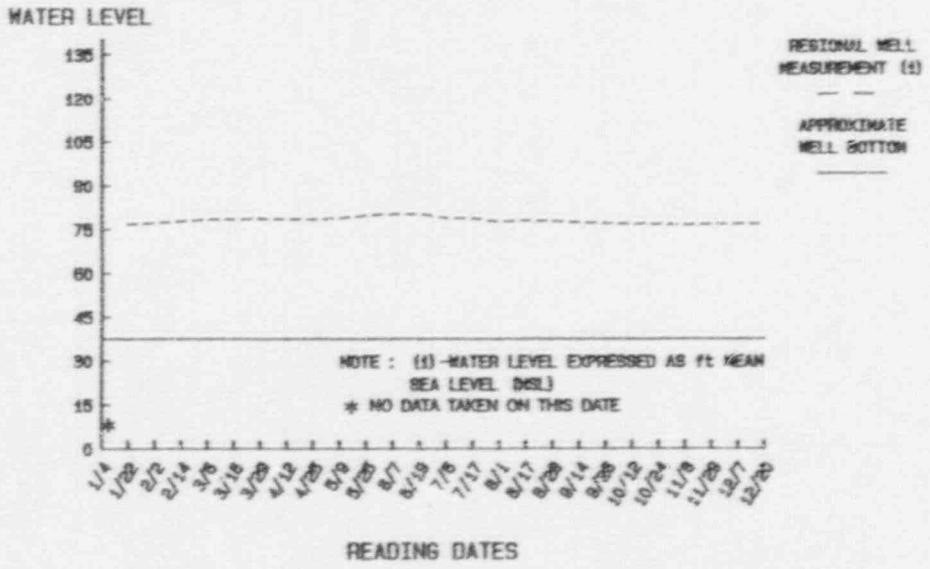
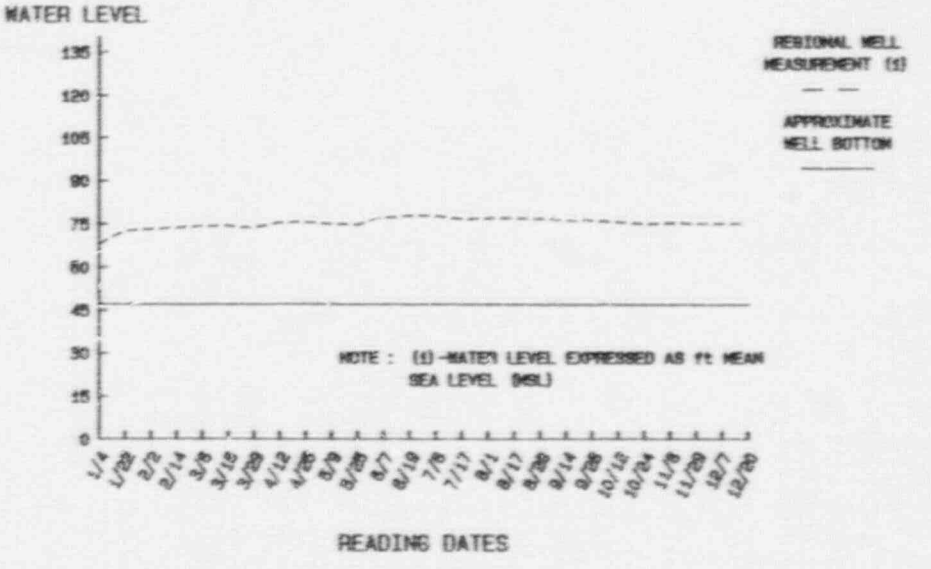


FIGURE 3-2 (CONT'D)
Page 3 of 3
REGIONAL WELL HYDROGRAPHS

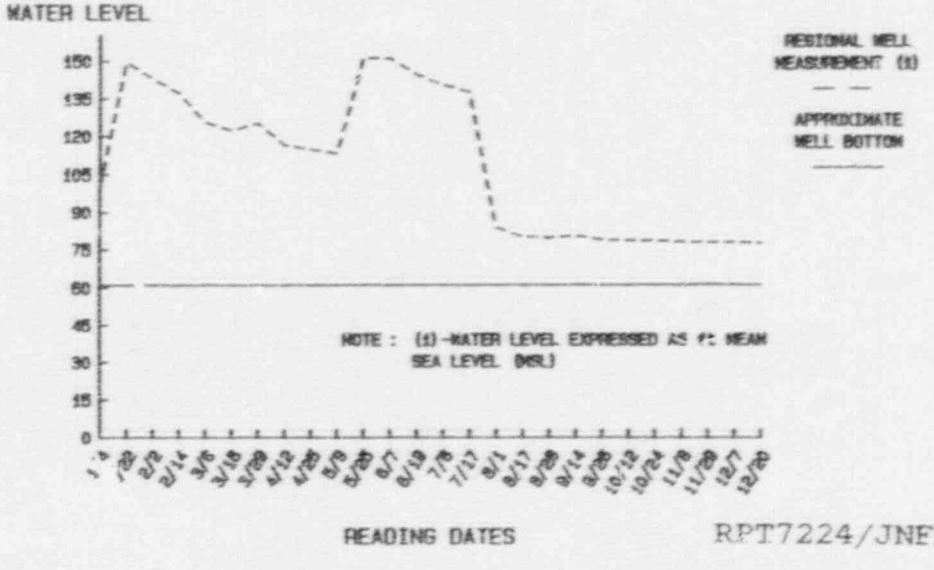
1990 REGIONAL GROUNDWATER
REGIONAL WELL OW-202



1990 REGIONAL GROUNDWATER
REGIONAL WELL OW-5



1990 REGIONAL GROUNDWATER
REGIONAL WELL OW-10



1990 REGIONAL GROUNDWATER
REGIONAL WELL P-209

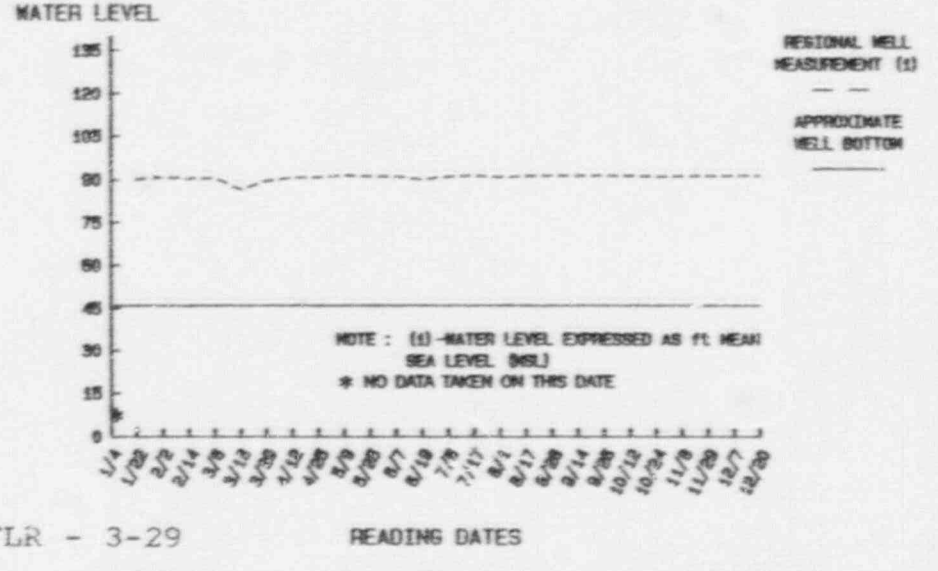
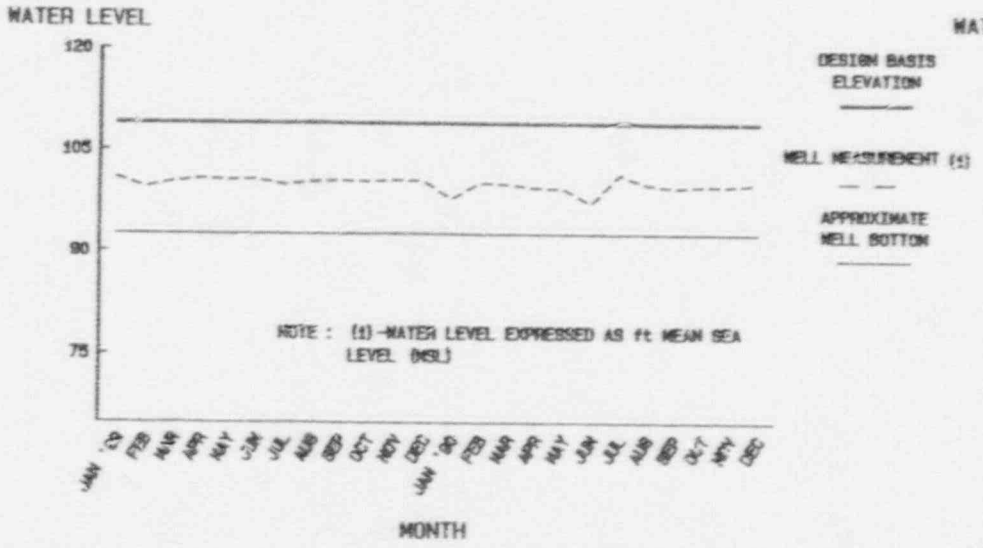
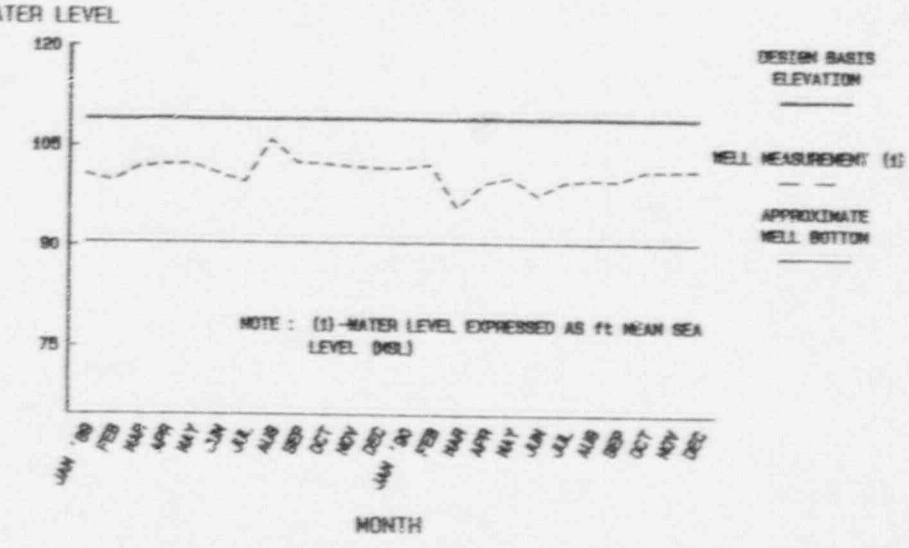


FIGURE 3-3
Page 1 of 4
PERCHED WELL HYDROGRAPHS

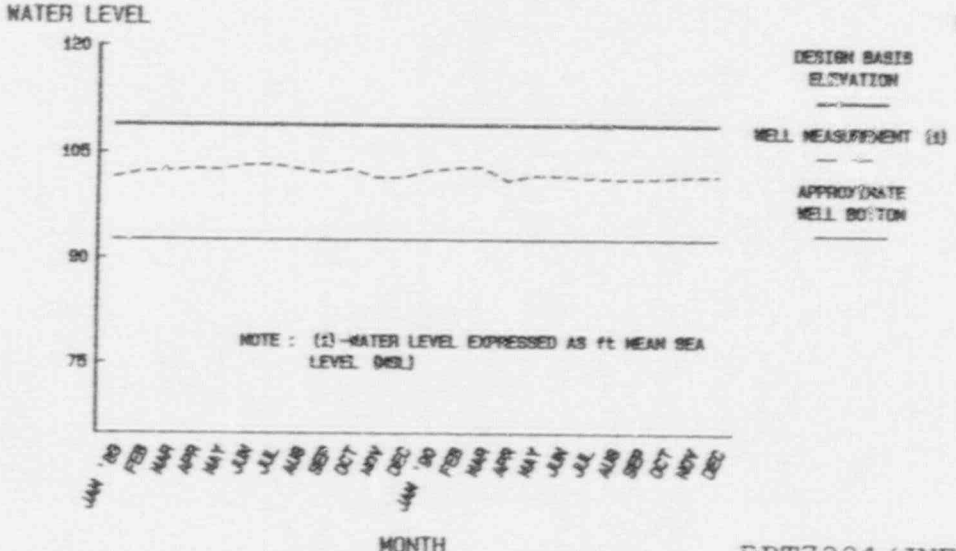
1989-1990 PERCHED GROUNDWATER
MONITORING WELL MW-1



1989-1990 PERCHED GROUNDWATER
MONITORING WELL MW-2



1989-1990 PERCHED GROUNDWATER
MONITORING WELL MW-3



1989-1990 PERCHED GROUNDWATER
MONITORING WELL MW-4

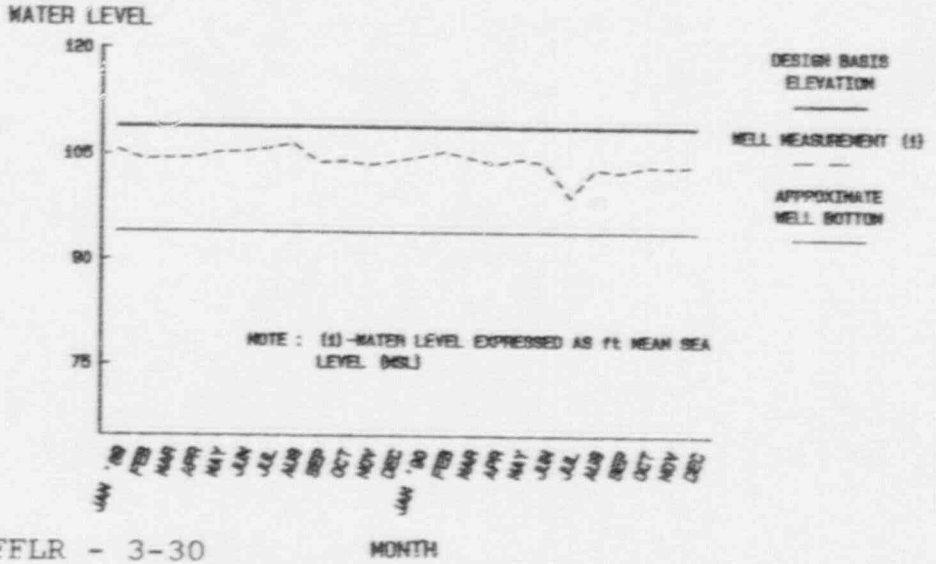
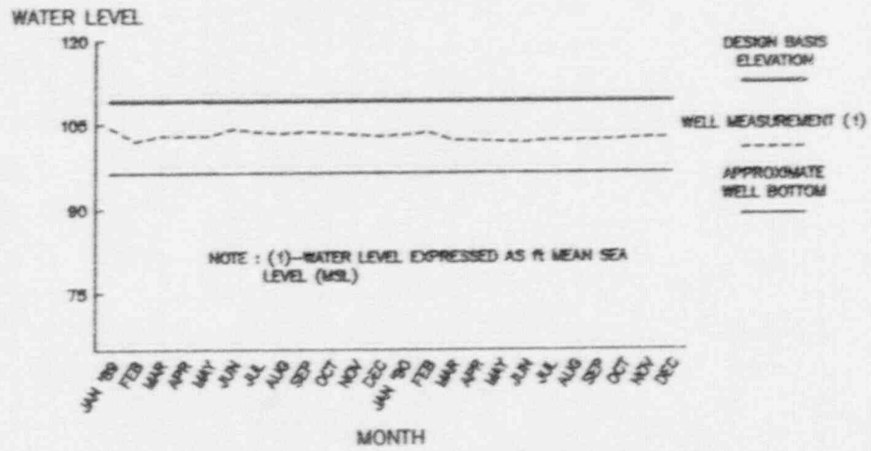
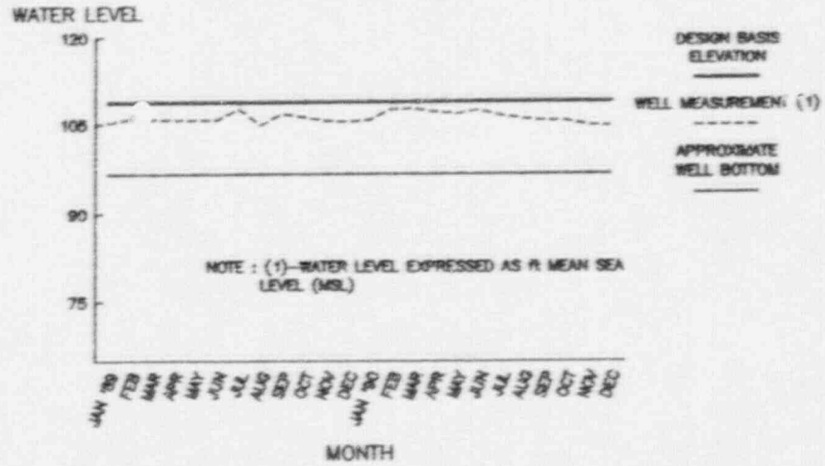


FIGURE 3-3 (CONT'D)
Page 2 of 4
PERCHED WELL HYDROGRAPHS

1989–1990 PERCHED GROUNDWATER
MONITORING WELL MW–5



1989–1990 PERCHED GROUNDWATER
MONITORING WELL MW–6



1989–1990 PERCHED GROUNDWATER
MONITORING WELL MW–7

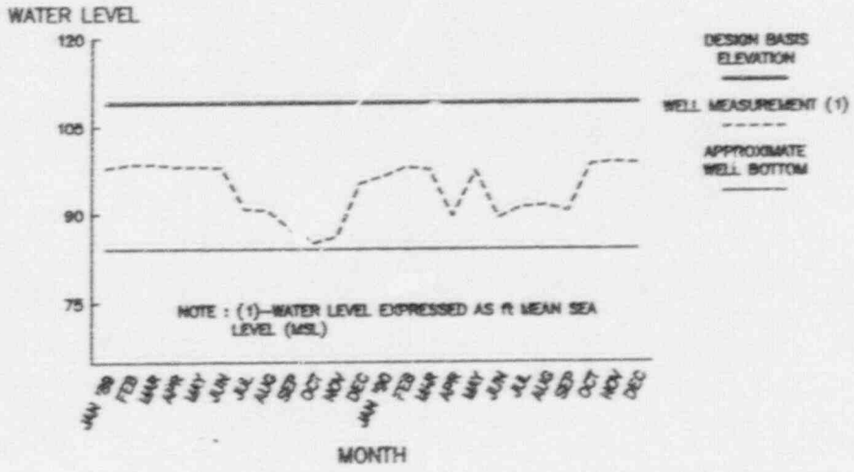
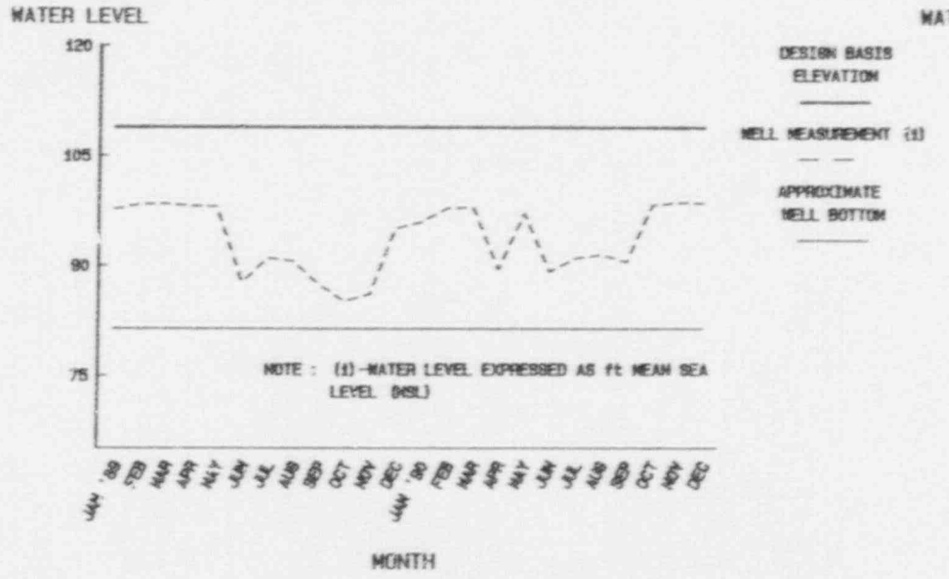
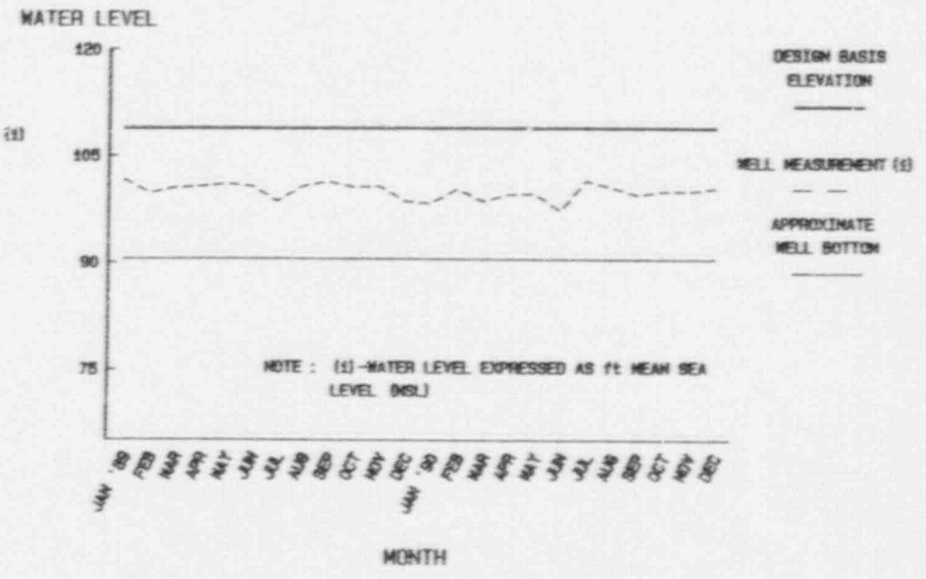


FIGURE 3-3 (CONT'D)
Page 3 of 4
PERCHED WELL HYDROGRAPHS

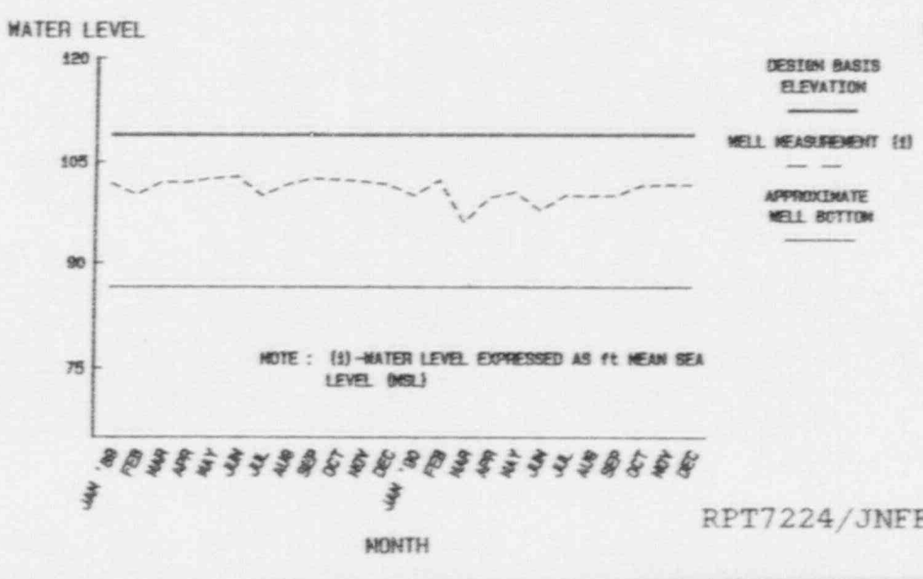
1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-1



1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-2



1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-3



1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-4

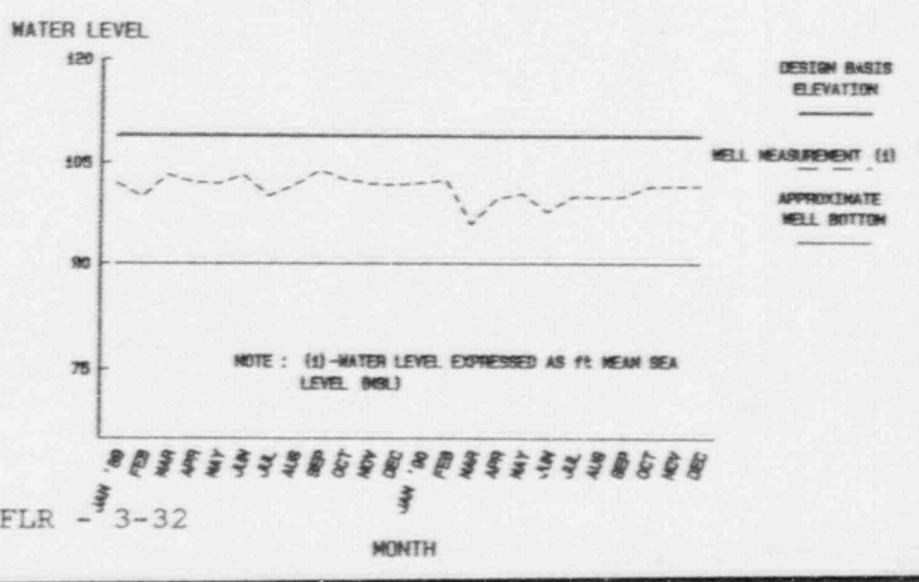
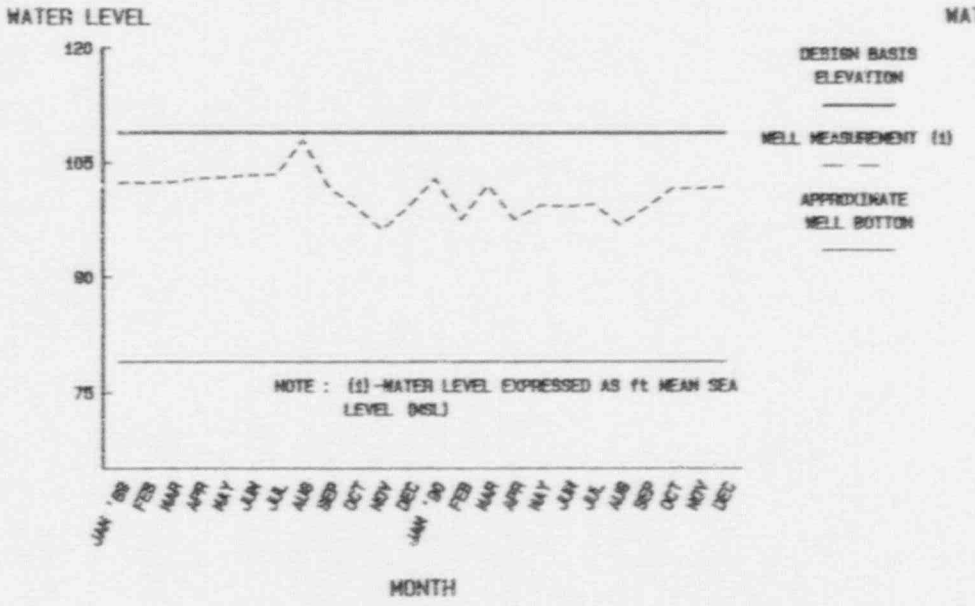
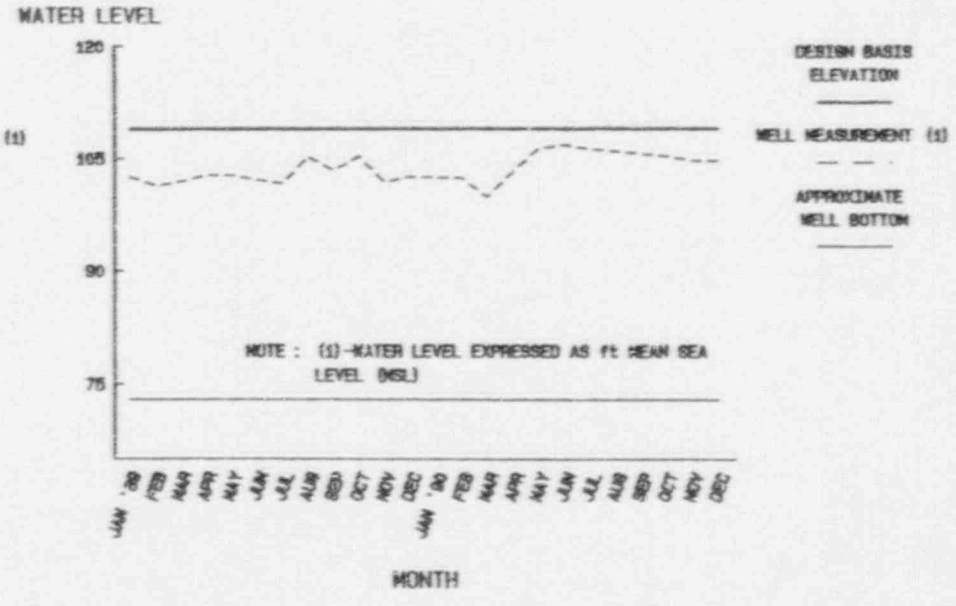


FIGURE 3-3 (CONT'D)
Page 4 of 4
PERCHED WELL HYDROGRAPHS

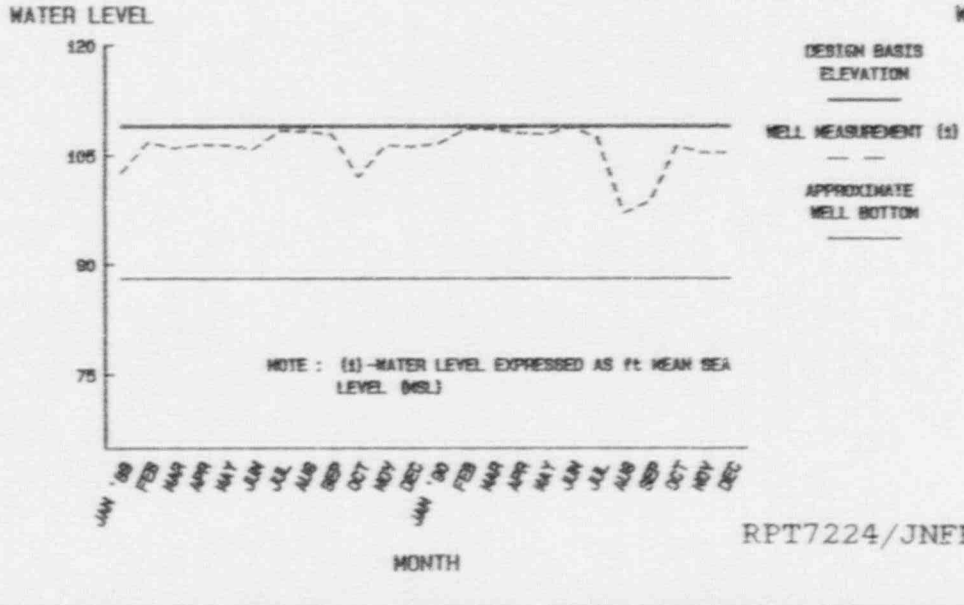
1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-5



1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-6



1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-7



1989-1990 PERCHED GROUNDWATER
DEWATERING WELL DW-8

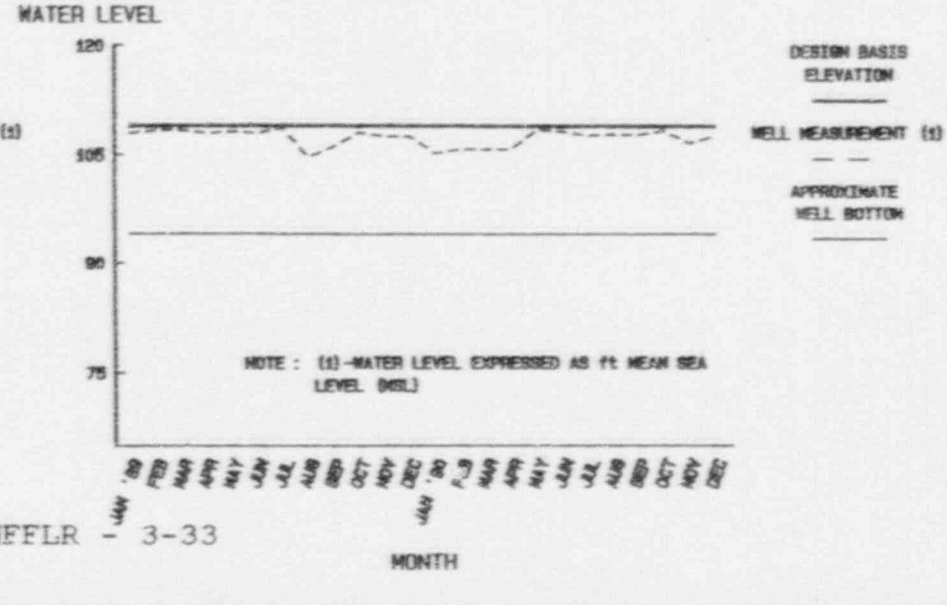
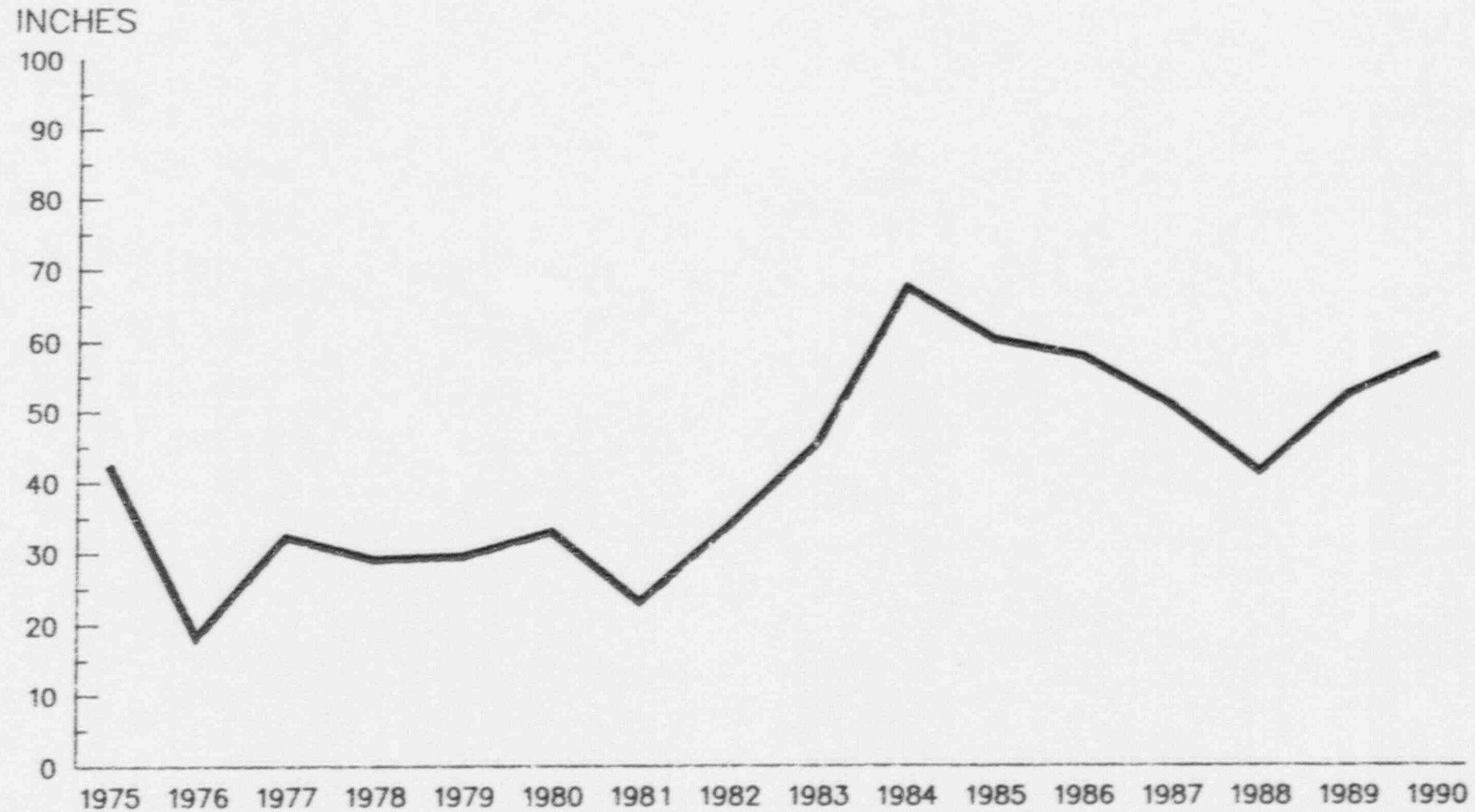


FIGURE 3-4

YEARLY RAINFALL DATA

1975-1990

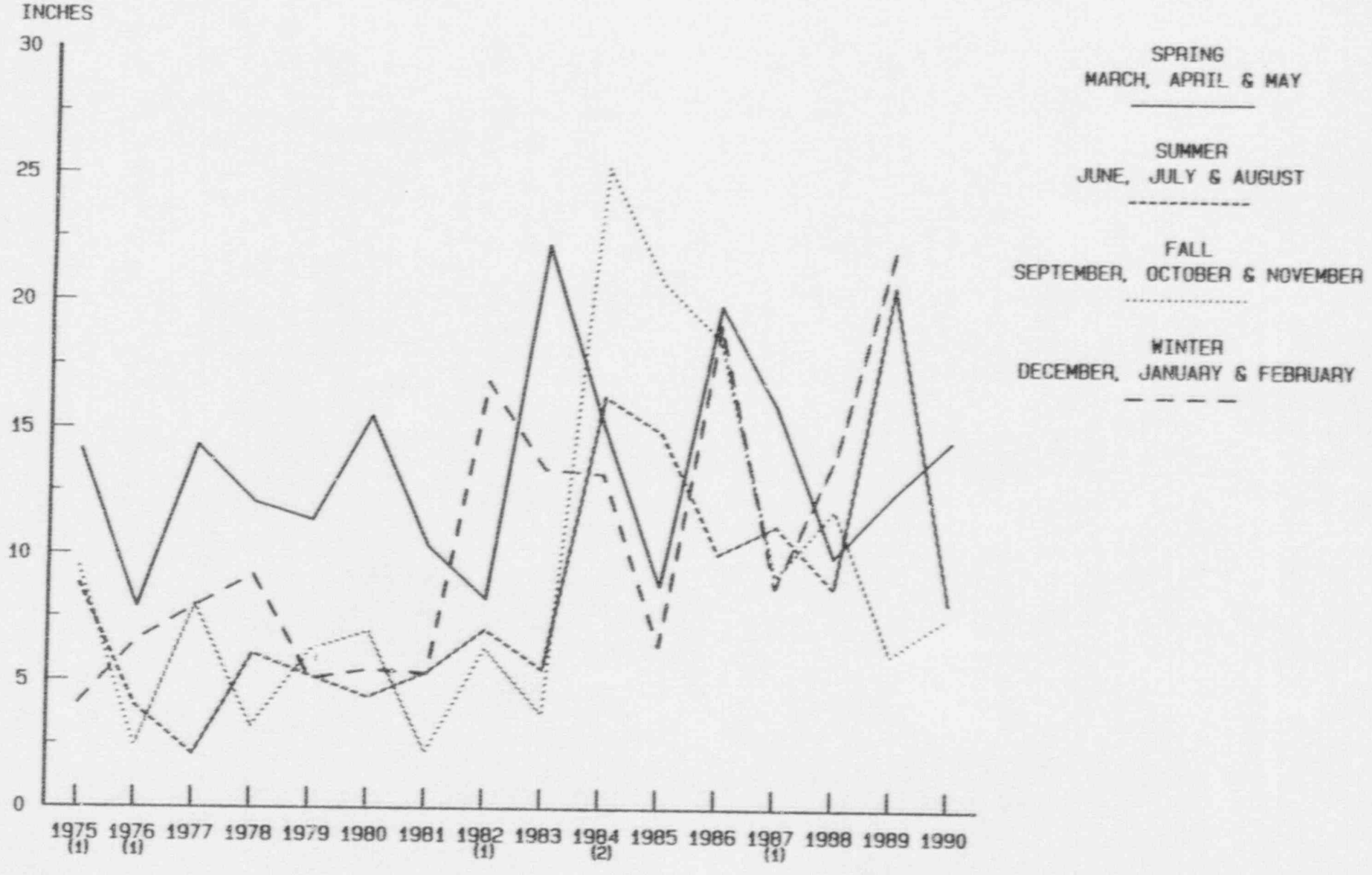


NOTE : 1975, 1976, 1982 & 1987 MISSING DATA.
NOTE : 1984 FIRST FULL YEAR OF MONITORING AT THE MET TOWER.

FIGURE 3-5

SEASONAL RAINFALL DATA

1975-1990



NOTE (1): DATA MISSING
NOTE (2): FIRST FULL YEAR OF MONITORING RAINFALL AT THE MET TOWER

SECTION 4.0

ADMINISTRATIVE REQUIREMENTS

4.1 EPP CHANGES

The GGNS Environmental Program Plan (EPP) had no changes or requests for changes during 1990. The 1989 pending EPP amendment request (PMI-89/04172) previously submitted to Licensing, was not transmitted to the NRC. However, Licensing used this request as justification to the NRC in correspondence (GNRO-91/00029) dated February 19, 1991, for discontinuing the cooling tower drift monitoring requirements. The erosion control inspection monitoring requirements were discontinued in 1988.

However, in 1990 the EPP was implemented as written.

4.2 EPP NONCOMPLIANCES

There were no EPP noncompliances during 1990. Environmental Surveillance Program personnel successfully conducted sampling and surveillance activities according to the EPP schedule. The required monitoring program was conducted without a reportable deviation.

4.3 NONROUTINE REPORTS

Two unusual or important events occurred during 1990. Fish kills occurred near the discharge point of Outfall 001 on August 16-17, 1990 and onsite Sediment Basin A on October 4, 1990. Investigation by ESP personnel showed probable cause as dissolved oxygen depletion in both instances. However, the dissolved oxygen depletion was a natural occurrence and not related to station operation.

Assessment of these incidents by ESP personnel confirmed the aquatic effects were acute and confined to the general area. No environmental impact was observed outside of the affected area.

A summary report of these events was provided to the MDEQ and the U.S. Nuclear Regulatory Commission and is included as Appendix IV.

4.4 POTENTIALLY SIGNIFICANT UNREVIEWED ENVIRONMENTAL ISSUES

There were no potentially significant unreviewed environmental issues encountered in 1990. Changes in station design and operation, tests and experiments did not result in an unreviewed environmental question. Grand Gulf Nuclear Station personnel made changes, tests and experiments in accordance with the EPP, paragraph 3.1, Plant Design and Operation.

Section 2.11 provides a discussion of how the EPP, paragraph 3.1, is implemented. Activities at GGNS during 1990 which were related to the EPP, paragraph 3.1, are discussed in Section 3.11 of this report. Completed 1990 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
01/17/90	97.9	101.8	102.5	104.8	103.0	105.6	96.3	95.9	98.3	100.0	102.1	102.9	102.5	106.6	105.3
02/12/90	100.3	102.3	102.9	105.5	103.5	107.4	97.9	97.8	100.3	102.3	102.5	97.6	102.4	108.5	105.8
03/07/90	100.1	95.8	103.0	104.7	102.1	107.5	97.5	97.9	98.6	95.9	95.8	102.1	99.9	108.5	105.8
03/23/90	98.4	97.3	102.8	104.3	101.5	116.4	98.0	98.2	98.8	97.3	97.2	102.0	105.0	108.1	105.5
03/26/90	98.0	96.3	102.7	100.6	101.7	107.0	97.9	95.9	98.1	96.4	97.7	101.8	100.9	108.1	106.0
04/04/90	99.6	99.6	101.1	103.8	102.0	106.9	89.6	89.5	99.6	99.7	99.7	97.6	103.2	108.0	105.8
04/09/90	99.5	99.6	102.4	103.6	102.1	106.7	89.1	89.6	99.1	99.4	98.6	98.6	104.8	107.4	106.5
04/16/90	99.8	99.8	105.2	103.6	99.3	106.7	88.9	89.0	98.8	99.9	98.6	96.9	106.4	107.6	106.3
04/23/90	98.8	95.5	102.2	103.5	101.8	106.5	89.0	88.6	98.7	95.6	95.2	99.3	106.4	107.4	106.5
05/03/90	99.6	100.2	101.9	103.5	101.7	106.3	92.3	92.2	99.7	100.3	100.4	95.2	106.1	107.3	108.0
05/07/90	98.6	93.0	102.1	103.1	101.6	106.3	95.5	95.5	98.3	92.8	94.8	98.7	106.1	106.8	108.1
05/14/90	99.4	100.4	101.8	104.5	101.8	106.6	97.2	97.1	99.7	100.5	100.5	99.5	106.3	107.8	108.4
05/21/90	100.8	99.7	101.8	104.0	102.0	107.0	97.9	97.8	100.8	99.7	98.1	96.8	106.6	108.2	108.0
05/30/90	97.7	99.1	101.7	103.3	101.9	107.0	98.1	97.9	97.9	99.0	98.8	99.6	106.6	107.9	108.3
06/06/90	97.2	97.7	101.8	103.9	101.7	107.2	89.3	89.2	97.3	98.6	97.7	99.3	106.8	108.3	108.2
06/13/90	98.1	100.0	101.7	103.5	101.9	107.1	89.2	89.2	98.4	100.0	100.0	98.7	106.8	108.2	108.3
06/19/90	98.6	99.8	101.6	103.4	102.0	106.9	88.8	89.1	98.6	99.9	100.1	99.2	106.7	108.0	106.5
06/27/90	101.3	100.2	101.7	103.2	102.1	106.7	91.9	91.7	101.3	100.0	100.0	107.8	106.5	107.7	108.2
07/05/90	101.6	100.0	101.7	98.1	102.1	106.4	91.7	91.6	98.3	99.6	99.9	99.1	106.3	107.5	108.1
07/11/90	101.5	99.8	101.5	99.1	102.1	106.3	91.1	91.0	101.5	100.3	100.0	99.6	106.2	107.4	107.7
07/16/90	102.0	100.4	101.5	102.9	102.0	106.9	90.6	91.4	101.5	100.3	100.2	101.7	105.3	107.1	107.3
07/23/90	101.1	100.1	101.4	103.1	102.1	106.0	91.3	91.3	101.3	100.3	99.6	97.4	101.5	107.1	107.7
08/03/90	99.8	99.0	100.3	102.4	99.9	105.3	89.9	91.5	100.4	98.7	97.4	99.9	101.1	95.6	106.0
08/09/90	100.1	100.1	101.3	103.1	102.0	105.7	91.4	91.5	100.5	100.0	99.9	96.8	105.9	97.0	107.8
08/15/90	101.0	100.1	101.4	102.9	102.0	105.5	90.2	90.2	100.9	100.2	99.6	98.6	105.4	96.2	106.8
08/21/90	100.2	100.1	101.2	102.8	101.6	105.1	90.0	90.0	100.1	100.3	99.9	98.2	105.6	96.1	107.4
08/28/90	99.8	100.1	101.3	102.7	102.1	105.5	91.8	91.6	100.2	100.3	100.0	99.3	105.7	96.0	106.7
09/05/90	99.6	100.0	101.3	102.7	102.1	105.4	90.4	90.5	99.5	100.0	100.0	99.2	105.6	98.7	107.8
09/13/90	100.2	101.0	100.8	103.1	102.1	105.6	96.7	96.5	100.0	101.0	100.6	101.3	100.2	106.3	108.4
09/18/90	99.9	101.3	101.4	103.2	102.2	105.5	98.0	97.4	100.2	101.3	101.5	101.4	105.4	106.5	108.3
09/25/90	99.8	101.3	101.4	103.5	102.3	105.5	97.8	97.8	99.9	101.3	101.3	101.5	105.5	106.4	108.3
10/03/90	99.9	101.4	101.5	103.5	102.3	105.4	98.3	98.2	100.0	101.4	101.5	101.7	105.3	106.2	108.3
10/08/90	100.1	101.4	101.6	103.3	102.4	105.4	98.4	98.3	100.1	101.5	101.5	101.6	105.2	106.1	108.0
10/16/90	99.9	101.4	101.6	103.3	102.4	105.1	98.7	98.7	100.0	101.6	101.6	101.8	105.2	106.3	107.7
10/24/90	100.1	101.4	101.6	103.5	102.5	105.1	98.7	98.8	100.2	101.6	101.6	101.8	105.2	106.0	107.4
10/29/90	99.8	101.3	101.6	103.6	102.5	104.8	98.4	98.3	99.9	101.5	101.5	102.8	104.8	105.6	106.9
11/08/90	99.9	101.5	101.7	103.4	102.5	104.6	98.7	98.6	100.0	101.5	101.6	101.7	104.7	105.4	106.6
11/15/90	100.1	101.5	101.7	103.7	102.5	104.5	98.6	98.6	100.2	101.5	101.5	105.5	104.7	105.4	107.9
11/20/90	100.1	101.6	101.2	103.6	102.4	104.5	98.5	98.7	100.0	101.5	101.4	102.2	104.8	105.5	108.2
11/28/90	99.9	101.5	101.5	103.1	102.0	104.4	98.2	98.4	100.3	101.2	101.7	101.6	104.3	105.2	107.4
12/03/90	100.2	101.6	101.8	103.6	100.5	104.5	98.5	98.5	100.4	101.6	101.6	101.9	104.7	105.4	107.6
12/12/90	100.2	101.8	102.0	103.9	102.7	104.5	98.6	98.6	100.4	101.8	101.5	102.2	104.6	105.3	107.9
12/21/90	100.7	101.7	101.9	103.8	102.7	104.5	95.1	98.7	101.2	101.8	101.8	102.9	104.2	105.5	108.0
12/28/90	100.7	101.2	101.9	104.7	102.5	105.0	98.3	98.3	100.7	101.4	101.5	102.0	104.7	106.0	108.9

APPENDIX II

THERMAL MONITORING SUMMARY

GRAND GULF NUCLEAR STATION

THERMAL MONITORING

1982 - 1990

THERMAL MONITORING REPORT

SUMMARY

Radiological & Environmental Services (R&ES) personnel established a program to monitor Grand Gulf Nuclear Station's (GGNS) liquid effluent 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).

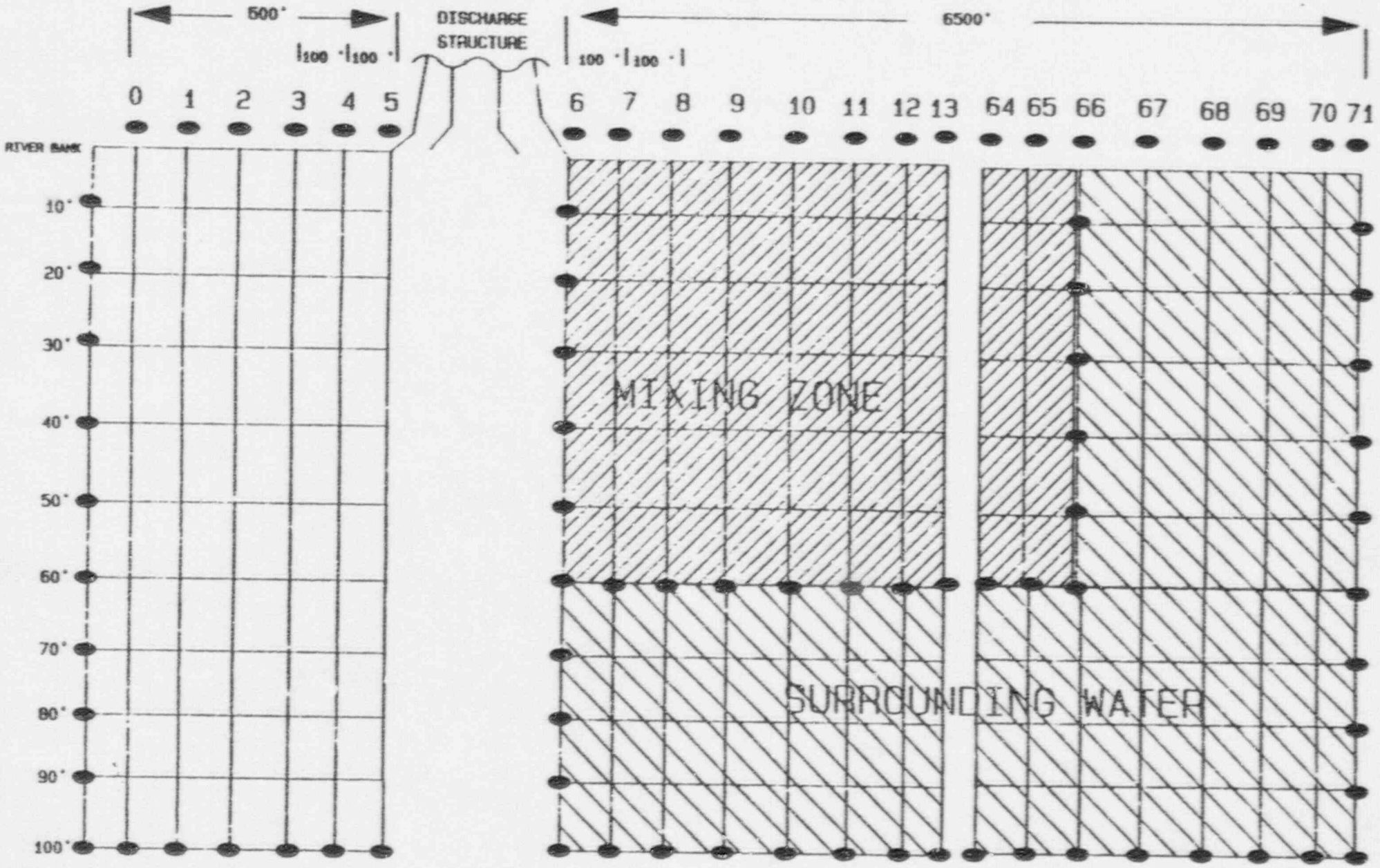
Maximum temperature changes (delta Ts) relative to the upriver temperature are provided in Attachments III and IV for the discharge outlet, barge slip outlet and surrounding water. Discharge and barge slip outlet delta Ts are shown in Attachment VIII. The 2.8 °C delta T limit for water surrounding the 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 turbulence 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.

GGNS THERMAL MONITORING SURVEY POINTS



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 surface/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		
Aug 1989	1-11		
Aug 1990	0-11		

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

ATTACHMENT III

SUMMER THERMAL MONITORING SUMMARY

PARAMETERS	Preoperational			Operational				
	SEPT 1982	JULY 1983	JUNE 1984	JUNE 1985	JUNE 1986	SEPT 1986	JULY 1987	AUG 1988
Upriver Temperature (°C) (Surface/5 ft)[1]	27.3/26.0	30.9/30.5[2]	27.2/27.0	26.4/26.1	28.5/28.6	26.3/26.3	28.9/28.6	30.3/30.3
Discharge Outlet Temperature (°C)[1]	24.8	23.3	27.1[3]	31.0	35.0	35.0[4]	32.2	29.9
Barge Slip Outlet to the Miss. River Temperature (°C)[1]	25.4	31.0	26.9	29.7	28.6	35.0	31.2	30.3
Maximum Surrounding Water Temperature (°C) (Surface/5 ft)	27.4/26.3	31.9/30.8	27.4/27.3	26.4/26.3	28.7/28.8	26.2/26.2	29.1/28.6	30.5/30.6
Discharge Outlet Max. Delta T (°C)[5]	2.5	7.9	0.1	4.9	6.5	8.7	3.6	0.4
Barge Slip Outlet Max. Delta T (°C)[5]	1.9	0.2	0.3	3.6	0.1	8.7	2.6	-0-
Maximum Surrounding Water Delta T (°C) (Surface/5 ft)[5]	0.1/0.3	1.0/0.3	0.2/0.3	-0-/0.2	0.2/0.2	0.1/0.1	0.2/-0-	0.2/0.3
Average 001 (°C) Temperature	23.5	18.9	27.1	29.9	36.7	34.4	31.1	29.4
Average Ambient Temperature (°C)	28.3	30.6	19.2	23.3	29.0	26.1	26.4	29.4
Average Cooling Tower Blowdown (gpm)	UNAVAILABLE	UNAVAILABLE	3,820	3,910	9,690	5,792	6,460	6,090
Flow to River (gpm)	UNAVAILABLE	11,125	13,350	4,374	10,500	9,375	6,460	6,250
River Flow (ft3/s)	468,000	485,000	800,000	577,000	637,000	275,000	450,000	186,000
River Stage (ft)	16.5	17.2	25.85	20.6	22.5	7.2	16.3	1.7
Plant Power (%)	-0-	-0-	-0-	80.9	88.0	87.0	100	100

[1] These locations are not fixed reference points. Points may vary due to river elevation or outfall flow.
[2] Values obtained from survey reference point 0 at 100 feet (PMI-83/8699). Previous value (31.2) was deleted since it showed only surface temperature.
[3] 001 Temperature Recorder.
[4] Barge Slip Temperature.
[5] Delta Ts provided are absolute value.

ATTACHMENT III (CONT'D)

SUMMER THERMAL MONITORING SUMMARY

PARAMETERS	Operational							
	AUG 1989	AUG 1990						
Upriver Temperature (°C) (Surface/5 ft) [1]	27.3/28.8	26.4/27.0						
Discharge Outlet Temperature (°C)[1]	33.5	35.0						
Barge Slip Outlet to the Miss. River Temperature (°C)[1]	32.7	33.3						
Maximum Surrounding Water Temperature (°C) (Surface/5 ft)	29.1/28.9	26.6/27.0						
Discharge Outlet Max. Delta T (°C)[5]	6.2	8.6						
Barge Slip Outlet Max. Delta T (°C)[5]	5.4	6.9						
Maximum Surrounding Water Delta T (°C) (Surface/5 ft)[5]	1.8/0.1	0.2/-0-						
Average 001 (°C) Temperature	35.0	36.0						
Average Ambient Temperature (°C)	26.0	29.0						
Average Cooling Tower Blowdown (gpm)	9,000	6,840						
Flow to River (gpm)	9,000	11,391						
River Flow (ft3/s)	440,000	488,100						
River Stage (ft)	14.4	16.3						
Plant Power (%)	100	100						

These locations are not fixed reference points. Points may vary due to river elevation or outfall flow.
Delta Ts provided are absolute value.

ATTACHMENT IV

WINTER THERMAL MONITORING SUMMARY

PARAMETER	Preop.	Operational				
	FEB 1983	FEB 1986	FEB 1987	FEB 1988	MAR 1989	FEB 1990
Upriver Temperature (°C) (Surface/5 ft)[1]	7.5/6.3	6.0/6.0	6.0/5.9	5.5/5.8	6.6/6.6	10.3/10.2
Discharge Outlet Temperature (°C)[1]	6.9	22.8	27.5	18.4	10.8	14.6
Barge Slip Outlet to the Miss. River Temperature (°C)[1]	6.4	6.1	12.6[2]	9.5	6.2	10.3
Maximum Surrounding Water Temperature (°C) (Surface/5 ft)	8.6/6.8	6.3/6.2	6.1/6.2	5.7/5.8	6.5/6.6	10.5/10.4
Discharge Outlet Max. Delta T (°C)[3]	0.6	16.8	21.6	12.9	4.2	4.4
Barge Slip Outlet Max. Delta T (°C)[3]	1.1	0.1	6.7	4.0	0.4	0.1
Maximum Surrounding Water Delta T (°C) (Surface/5 ft)[3]	1.1/0.5	0.3/0.2	0.1/0.3	0.2/-0-	0.1/-0-	0.2/0.2
Average 001 Temperature (°C)	14.4	26.1	22.8	22.4	20.0	26.0
Average Ambient Temperature (°C)	11.5	20.0	14.8	11.7	11.7	27.0
Average Cooling Tower Blowdown (gpm)	UNAVAILABLE	5,550	7,360	6,000	8,040	5,400
Flow to River (gpm)	UNAVAILABLE	8,749	7,839	8,000	8,240	8,400
River Flow (ft3/s)	805,000	412,000	510,000	703,000	1.35E+6	1.15E+6
River Stage (ft)	29.4	15.5	18.9	24.4	41.0	36.6
Plant Power (%)	-0-	61.0	100	100	94.9	100

[1] These locations are not fixed reference points. Points may vary due to river elevation or outfall flow.

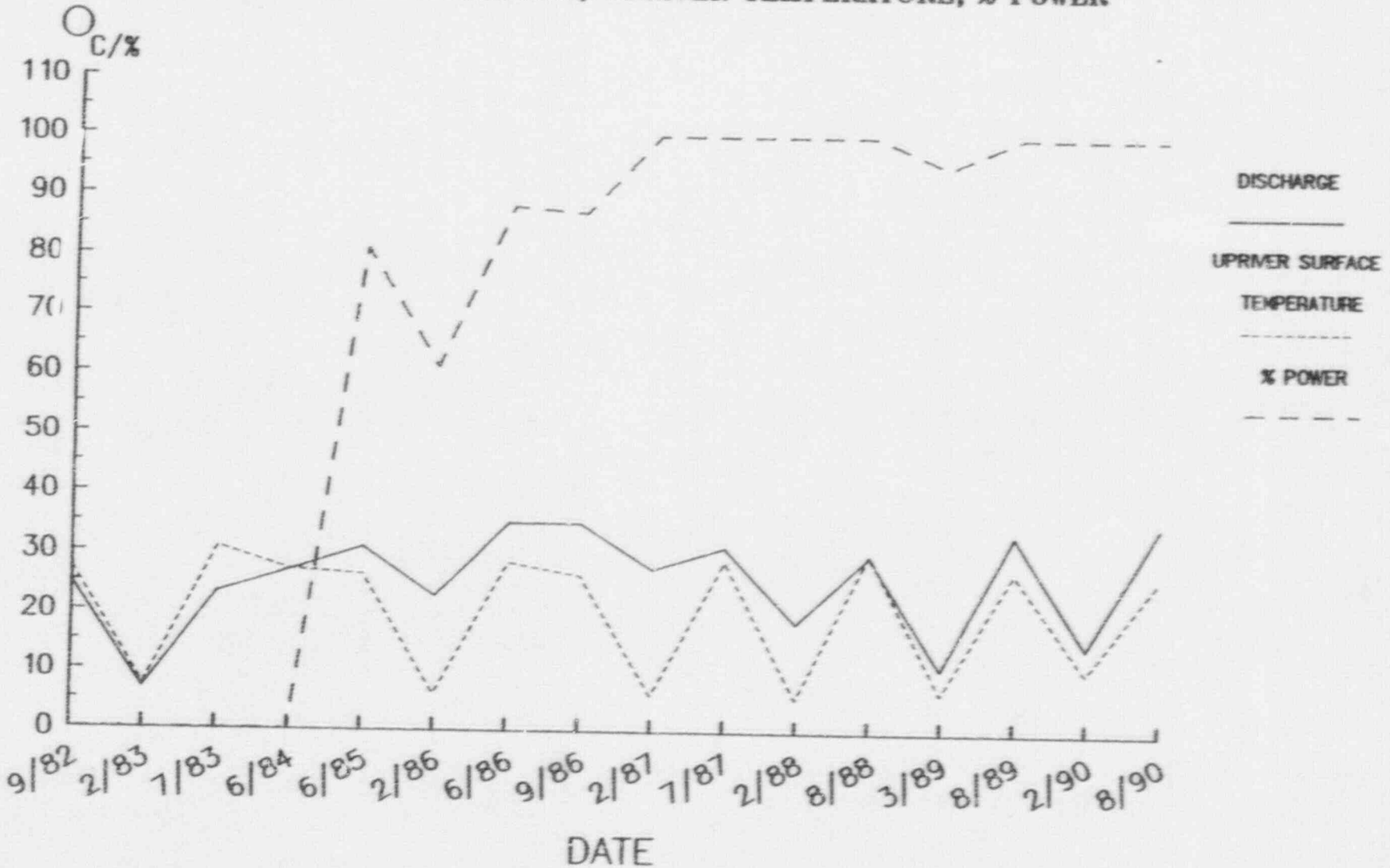
[2] Previous values of 21.3/8.9 were incorrect. Corrected value on 4/23/90 based on memo to file (NSIM-87/0231).

[3] Delta T's provided are absolute value.

MISSISSIPPI RIVER

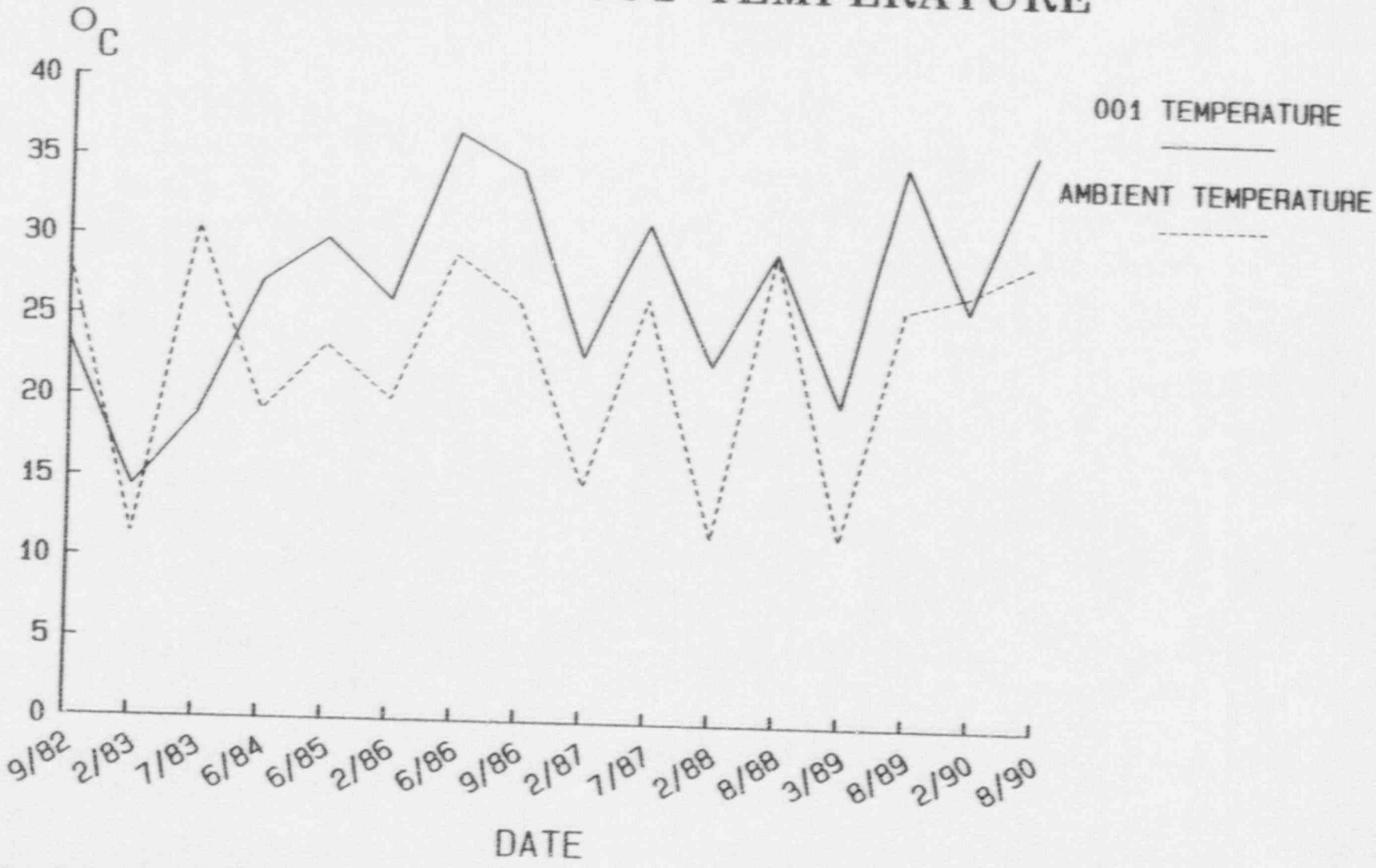
THERMAL MONITORING

DISCHARGE TEMPERATURE, UPRIVER TEMPERATURE, % POWER



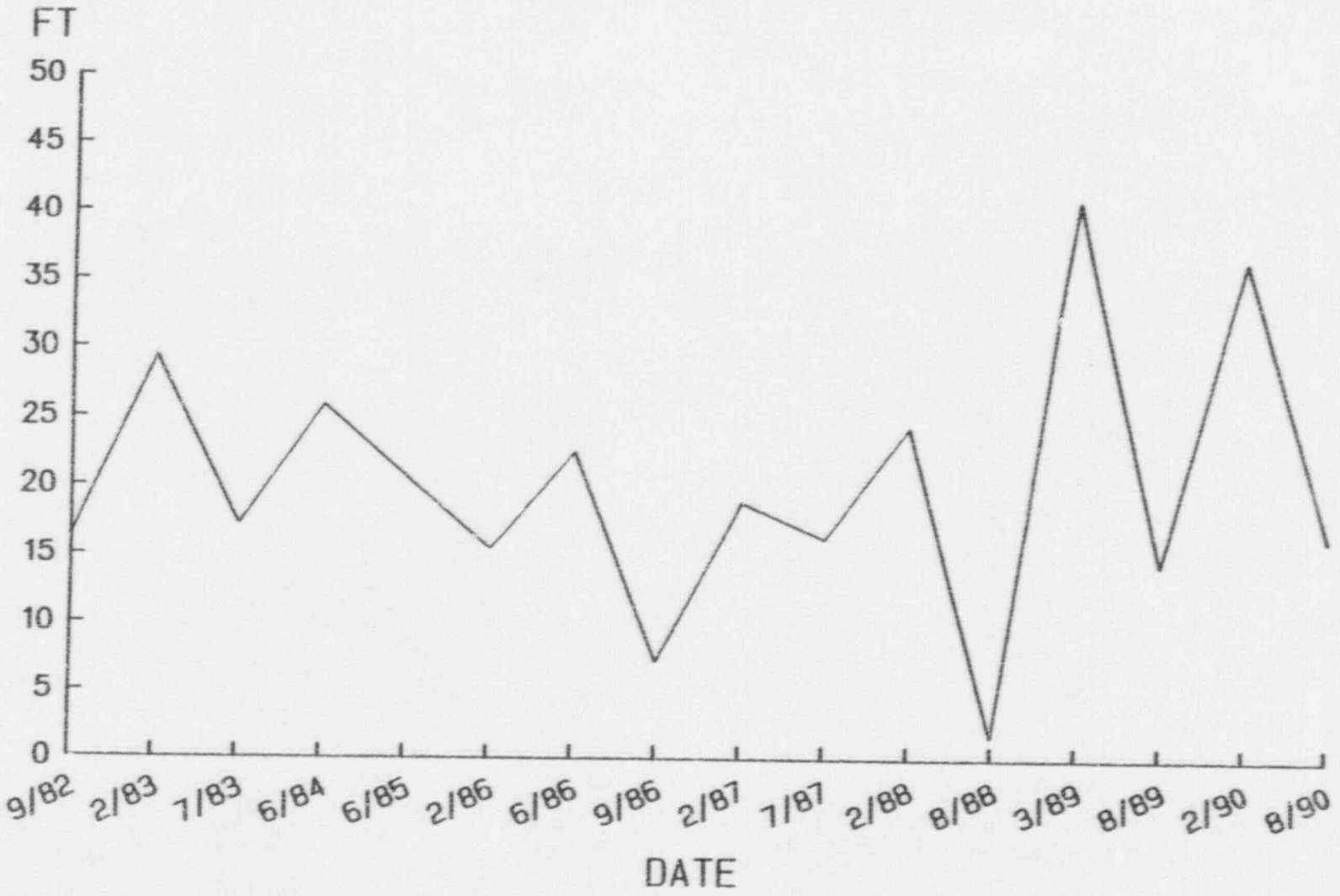
NOTE : DATA POINTS ARE SHOWN IN ATTACHMENTS III & IV.

MISSISSIPPI RIVER
THERMAL MONITORING
AMBIENT AND 001 TEMPERATURE



NOTE: DATA POINTS ARE SHOWN IN ATTACHMENTS III & IV.

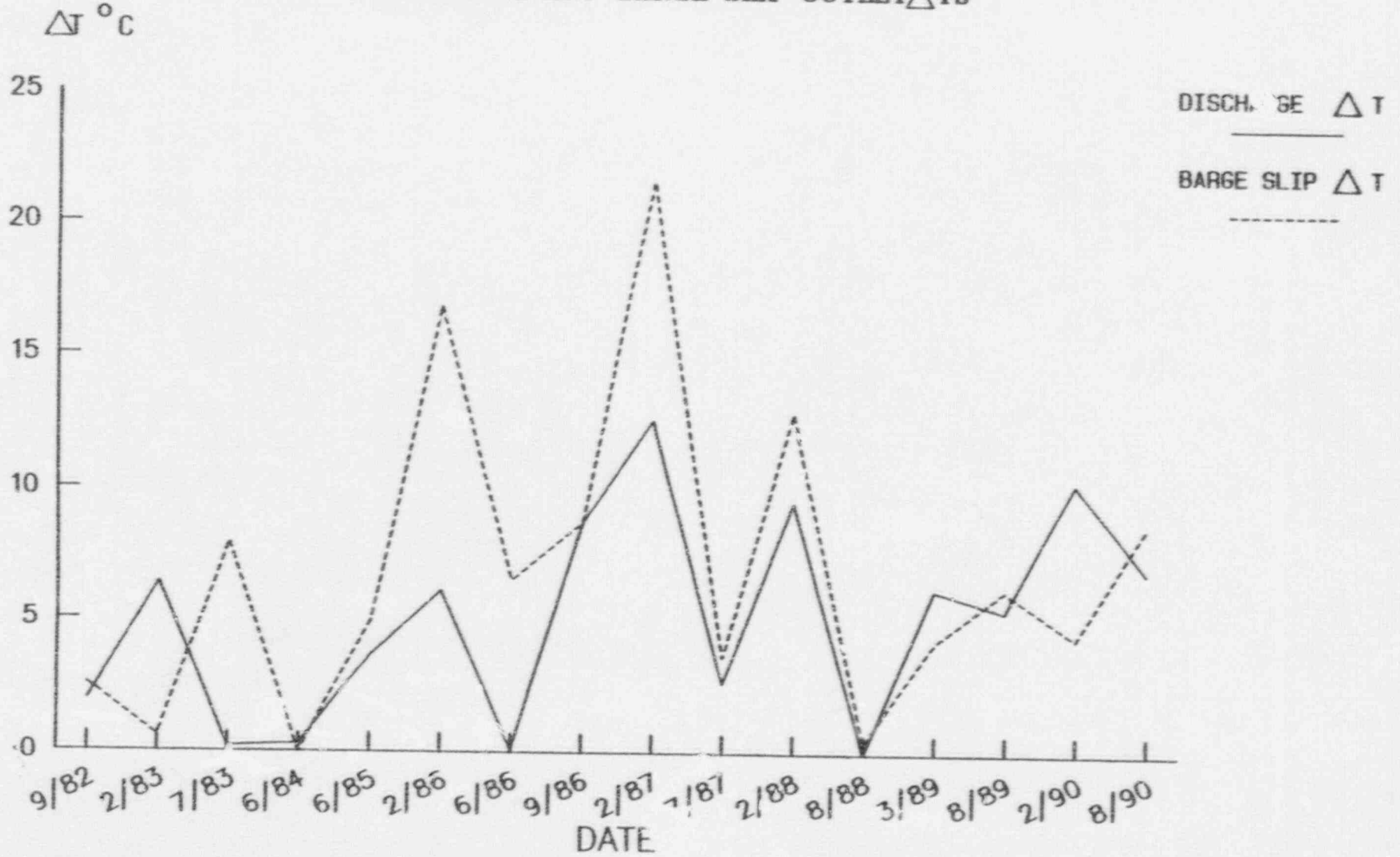
MISSISSIPPI RIVER
THERMAL MONITORING
MISSISSIPPI RIVER STAGE



NOTE: DATA POINTS ARE SHOWN IN ATTACHMENTS III & IV.

MISSISSIPPI RIVER

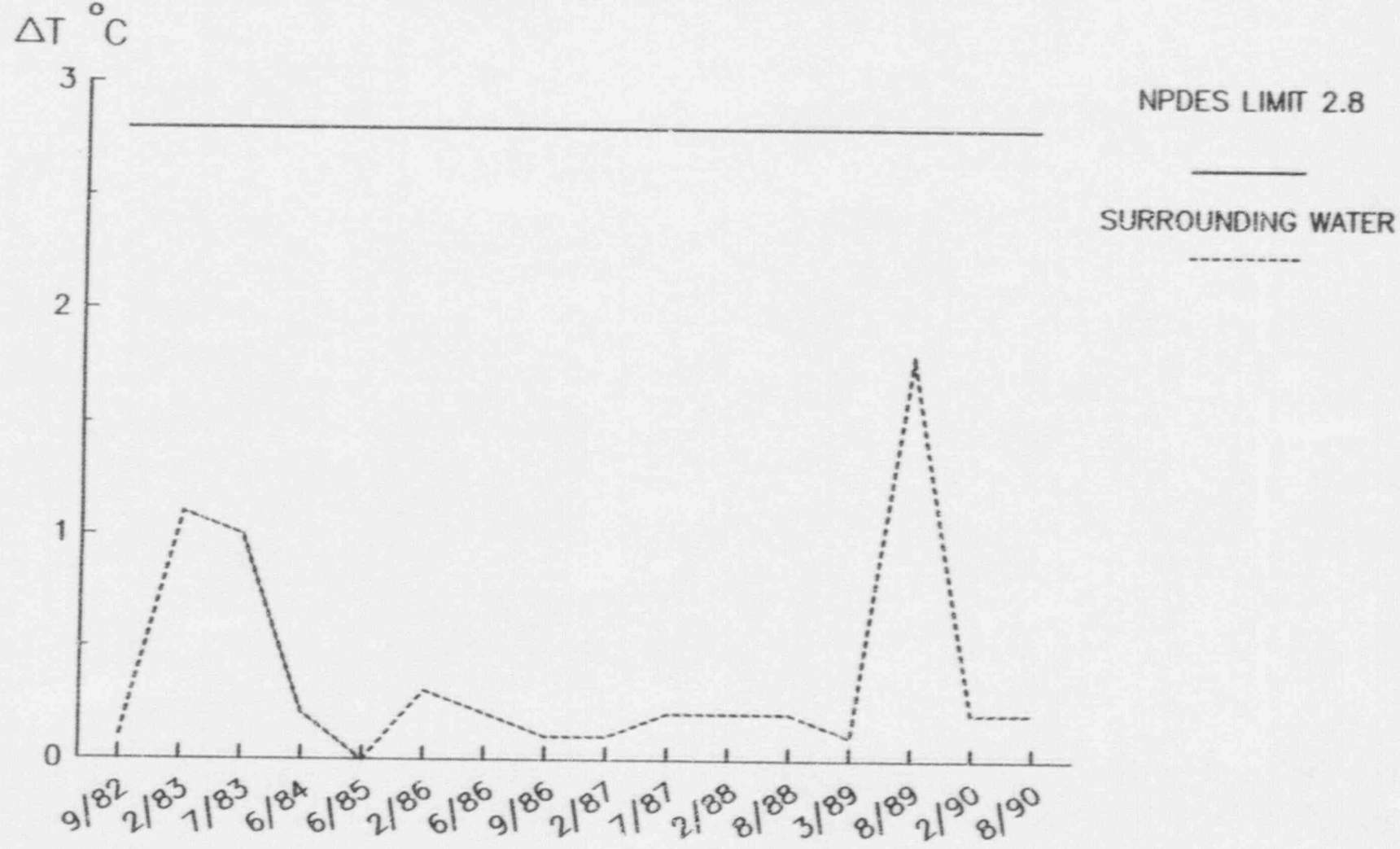
THERMAL MONITORING
DISCHARGE AND BARGE SLIP OUTLET△Ts



NOTE : DATA POINTS ARE SHOWN IN ATTACHMENTS III & IV.

ATTACHMENT IX

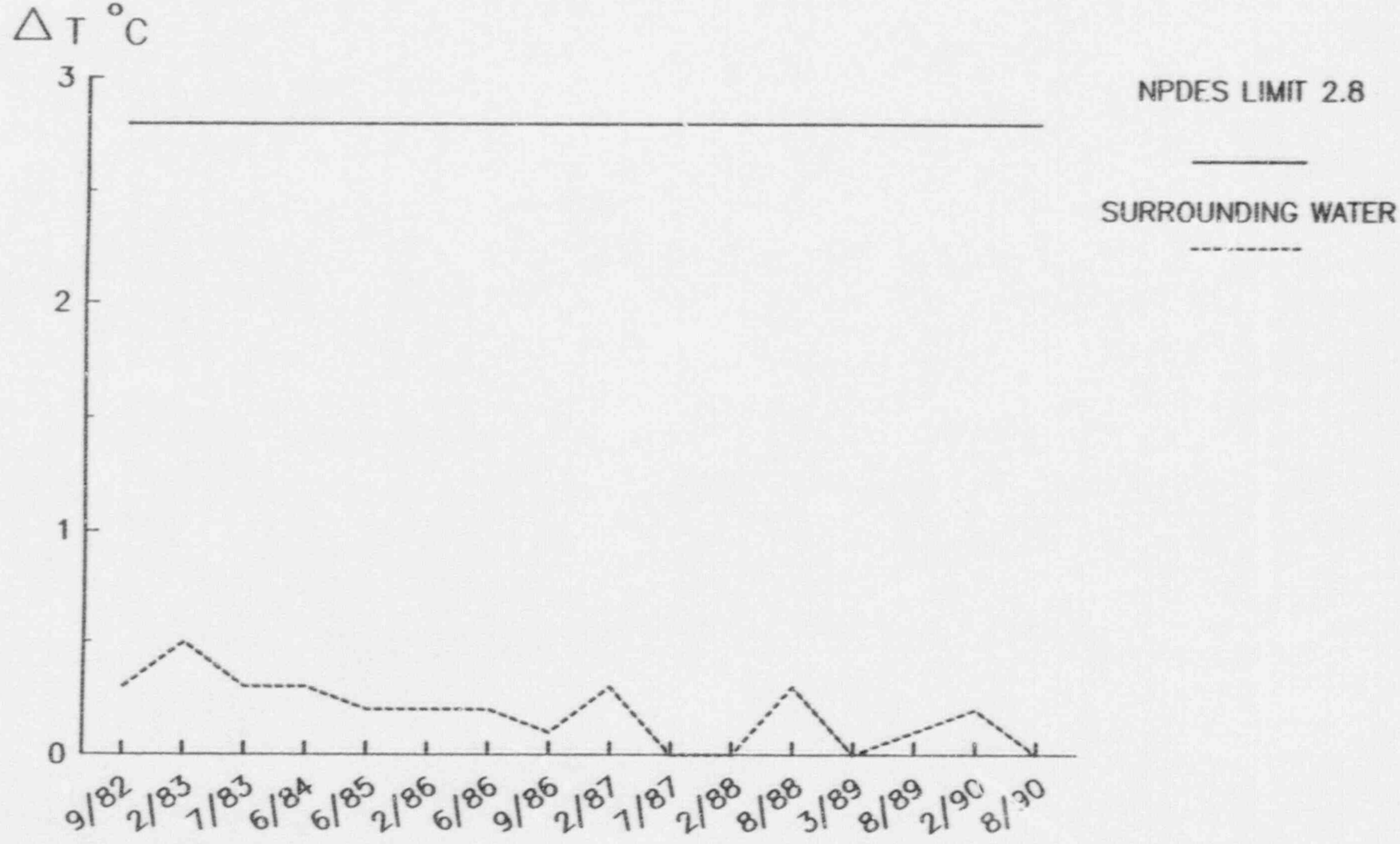
MISSISSIPPI RIVER
THERMAL MONITORING
MAXIMUM SURROUNDING SURFACE WATER ΔT_s



NOTE : DATA POINTS ARE SHOWN IN ATTACHMENTS III & IV.

ATTACHMENT X

MISSISSIPPI RIVER
THERMAL MONITORING
MAXIMUM SURROUNDING 5 FEET WATER $\triangle Ts$



NOTE : DATA POINTS ARE SHOWN IN ATTACHMENTS III & IV.

GRAND GULF NUCLEAR STATION

THERMAL MONITORING

DECEMBER 1990*

* First monitoring performed after NPDES permit was reissued in October 1990.

Entergy Operations	SECTION PROCEDURE VOLUME III	PROCEDURE NO. SP-N-7 REV. NO. 5 DATA SHEET 1 PAGE 1 OF 1

DATA SHEET 1

THERMAL MONITORING

I.	Date Performed		12-4-90
II.	Ambient Air Temperature		5.7 °C
III.	Outfall 001 Recorder Temperature		26.4 °C
IV.	River Level at Vicksburg		11.4 ft
V.	Discharge Outlet Temperature		25.7 °C
VI.	Barge Slip Outlet Temperature		13.5 °C
VII.	Upriver Temperature (Pt. 1)	Surface	13.3 °C
		-5 ft	13.3 °C
VIII.	Downriver Temperature (Pt. 7)	Surface	13.3 °C
		-5 ft	13.3 °C

Prepared By W Poe 1-9-91
Signature/Date

Reviewed By [signature] 1-14-91
Supervisor, Environmental Services/Date

APPENDIX III

ENVIRONMENTAL EVALUATIONS

ENVIRONMENTAL EVALUATION NSSE-90/005

Tie-in to new 100,000 gpd sewage treatment plant, replacing two existing 30,000 gpd sewage treatment plants.

MEMO TO: Mr. L. B. Moulder, Chairman, Plant Safety Review Committee

FROM: T. E. Reaves, Director, Nuclear Support RRJ for

SUBJECT: Safety and Environmental Evaluation Tracking No. NSSE-90/005

REFERENCES: a) Nuclear Support Administrative Procedure 1.12, Safety and Environmental Evaluations
b) Plant Administrative Procedure 01-S-01-3, Plant Safety Review Committee
c) Entergy Operations Manual (EOM) Directive G4.110, Safety and Environmental Review and Evaluation
d) DCP 89/0004, Rev. 0, Safety Evaluation No. CFR89/0004 R00

PMI-90/03985

DATE: October 23, 1990

Attached is an environmental evaluation for construction of a new sewage treatment plant. Radiological & Environmental Services has reviewed and evaluated the proposed activity in accordance with reference a) and assigned Safety and Environmental Tracking No. NSSE-90/005. Nuclear Plant Engineering considered the requirements of 10CFR50.59 as shown in reference d).

Evaluation indicates that the proposed activity constitutes:

[ ] a change to the Technical Specifications
[ ] an unreviewed safety question
[ ] neither a change to the Technical Specifications nor an unreviewed safety question
[ ] a change to the EPP
[ ] an unreviewed environmental question
[√] neither a change to the EPP nor an unreviewed environmental question

You are requested to indicate completion of PSRC review and approval of the environmental evaluation by signing and dating the attached Safety and Environmental Evaluation Form and forwarding it to Ms. Rita R. Jackson. If you have questions, contact Ms. Jackson at 984-9366.

WLP/JBE/RRJ:bcb

Attachment

cc: R. W. Byrd w/o
File (Central) [6] w/a
File (ENV) w/a
File (R&ES) w/a
File (Entergy Ops.) w/a

PSRCREQ/SRESNPDE.FLR

SAFETY AND ENVIRONMENTAL EVALUATION APPLICABILITY REVIEW FORM

PROCEDURE/DOC. NO. DCP/89-0004

Tie-In To New Sewage Treatment Plant, Replacing Two Existing Sewage Plants

REVISION NO. 0 ACN NO. N/A

SAFETY EVALUATION APPLICABILITY REVIEW

N/A (REFERENCE CFR 89/0004 R00)

	Yes	No
(1) Change to Facility as Described in FSAR	___	___
(2) Change to Procedure as Described in FSAR	___	___
(3) Test or Experiment not Described in FSAR	___	___
(4) Change to Tech. Specs.	___	___

(If yes, perform 10CFR50.59 safety eval.)

(1) Change to Environmental Protection Plan (If yes, perform environmental eval.)	___	√
(2) Will or may affect environment (If yes, perform environmental eval.)	√	___

Signature W Pax Performer Date 10-12-90

Signature [illegible] Reviewer Date 10-15-90

GRAND GULF NUCLEAR STATION UNIT 1
CHANGES, TESTS OR EXPERIMENTS
SAFETY AND ENVIRONMENTAL EVALUATION FORM

Originator W. L. Poe Dept/Section Nuc. Support/R&ES Eval. No. NSSE-90/005
Document Evaluated DCP 89-0004, R/0
Description: Tie-in to new 100,000 gpd sewage treatment plant, replacing two existing 30,000 gpd sewage treatment plants.

References
FSAR 2.4.1
FSAR 1.2.2.8.7
FSAR 9.2.4
FSAR 9.3.3.1.2.b
FES 5.6.3
FES Appendix A
FSAR 9.3.3.2
FSAR 9.3.3.2.3f
FSAR Table 9.2-9
FES 4.2.8
FES Figure 4.1
APO-90/0606

Attachments

N/A (REFERENCE DCP 89-0004, R/0, CFR 89/0004 R00)
FSAR Change Required? [ ] Yes [ ] No CR # _____ (If Yes)

Tech. Spec. Change Required? [ ] Yes [ ] No CR # _____ (If Yes)

N/A (REFERENCE DCP 89-0004, R/0, CFR 89/0004 R00)

I. SAFETY EVALUATION [ ] Not Applicable per Safety Evaluation Applicability Review

A. Technical Specifications

[ ] Yes [ ] No 1. Implementation or performance of the action described in the evaluated document will require a change to the GGNS Unit 1 Tech. Specs.
Basis:

B. Unreviewed Safety Question

Implementation or performance of the action described in the evaluated document:

[ ] Yes [ ] No 1. may increase the probability of occurrence of an accident previously evaluated in the SAR.
Basis:

[ ] Yes [ ] No 2. may increase the consequences of an accident of an accident previously evaluated in the SAR.
Basis:

[ ] Yes [ ] No 3. may increase the probability of occurrence of a malfunction of equipment important to safety previously evaluated in the SAR.
Basis:

GRAND GULF NUCLEAR STATION UNIT 1
CHANGES, TESTS OR EXPERIMENTS
SAFETY AND ENVIRONMENTAL EVALUATION FORM

[ ] Yes [ ] No 4. may increase the consequences of a malfunction of equipment important to safety previously evaluated in the SAR.
Basis:

[ ] Yes [ ] No 5. may create the possibility for an accident of a different type than any previously evaluated in the SAR.
Basis:

[ ] Yes [ ] No 6. may create the possibility for a malfunction of equipment important to safety of a different type than any previously evaluated in the SAR.
Basis:

[ ] Yes [ ] No 7. will reduce the margin of safety as defined in the basis for any technical specification.
Basis:

II. ENVIRONMENTAL EVALUATION [ ] Not Applicable per Environmental Evaluation Applicability Review

A. Environmental Protection Plan

[ ] Yes [√] No 1. Will require a change in the Environmental Protection Plan.
Basis: The Environmental Protection Plan (EPP) states that effluent limitation and monitoring requirements are contained in effective NPDES permit issued by the Mississippi Department of Environmental Quality (MDEQ) and the NRC relies on MDEQ for regulation of these matters involving water quality and aquatic biota. The 100,000 gpd sewage plant that is replacing the two existing sewage plants (30,000 gpd each unit) will remain under the regulation of the MDEQ. Since MDEQ has indicated no plans to change effluent limits on existing parameters in the new NPDES Permit for the new sewage plant, there will be no change in the EPP.

GRAND GULF NUCLEAR STATION UNIT 1
CHANGES, TESTS OR EXPERIMENTS
SAFETY AND ENVIRONMENTAL EVALUATION FORM

B. Unreviewed Environmental Question

[ ] Yes [√] No 1. 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 water quality matters are regulated by the GGNS NPDES Permit. FES 5.6.3 states that "treated sanitary waste effluent from the station contains less than 20 mg/l of suspended solids and the 5-day biological oxygen demand (BOD5). The NPDES Permit limits total suspended solids (TSS) and BOD5 to a daily average of less than 30 mg/l and to a daily maximum of 45 mg/l. The residual chlorine concentration of the sanitary effluent is between 0.1 mg/l and 0.5 mg/l." These NPDES limits will not change in the new NPDES Permit, and therefore no localized effects in Basin A, Hamilton Lake or the Mississippi River are expected.

[ ] Yes [√] No 2. concerns a significant change in effluents or power level.

Basis: Sanitary wastes have no affect on power level. Sewage effluents have been combined from Outfall 010 (ESC & Construction Sewage Plant) and Outfall 015 (Unit 1 Sewage Plant). The new Sewage Treatment Plant will be labeled as Outfall 010, and it will be routed into Basin A. The existing effluent from Outfall 010 will be increased to include the comparable flow from Outfall 015 which currently empties into Outfall 001. Engineering estimates were provided to the Department of Environmental Quality. (Ref. copy of permit application APO-90/0606.) Based on this evaluation of physical and chemical aspects, no significant changes in effluents is anticipated, and therefore no affect on Sediment Basin A, Hamilton Lake or the Mississippi River is expected.

GRAND GULF NUCLEAR STATION UNIT 1
CHANGES, TESTS OR EXPERIMENTS
SAFETY AND ENVIRONMENTAL EVALUATION FORM

[ ] Yes [√] No 3. concerns a matter not previously reviewed and evaluated in the documents specified in II.B.1. above, which may have a significant adverse environmental impact. Basis: The new sewage treatment plant will discharge into Sediment Basin A, which was previously reviewed and evaluated for domestic sewage in the YES. Although the larger sewage plant will handle all the flow from each smaller sewage plant, including that portion discharged into Outfall 001, the increased capacity has been evaluated and approved by MDEQ and no significant adverse environmental impact is expected.

Evaluated: W Poe 10-12-90
Originator/Date

Reviewed/Approved: J Barber 10-25-90
Reviewer/Date

PLANT SAFETY REVIEW COMMITTEE REVIEW

Peviewed/Approved: Moulder 10-30-90
Chairman, PSRC/Date

MANAGER, R&ES

(For Environmental Evaluations Only)

Reviewed/Approved: Rita R Jackson 10-20-90
Manager, R&ES/Date

INSPEV/SRESNPDE.FLR5

APPENDIX IV

NONROUTINE REPORTS

Entergy Operations

Entergy Operations, Inc.
P O Box 31995
Jackson MS 39286-1995
Tel 601-984-9360

Thomas E. Reaves, Jr.

August 24, 1990

Mr. Jerry Cain, Coordinator
Industrial Wastewater Section
Department of Environmental Quality
Bureau of Pollution Control
Post Office Box 10385
Jackson, Mississippi 39289

4327

SUBJECT: Grand Gulf Nuclear Station
Environmental Incident Report
APO-90/ 0802

Dear Mr. Cain:

I have attached a report for the aquatic incident which occurred on August 16 and 17, 1990 near Grand Gulf Nuclear Station's (GGNS) NPDES Outfall 001. Environmental Surveillance Program (ESP) personnel notified Mr. Louis Lavallee of this incident at 3:10 p.m., Friday, August 17, 1990.

ESP and Plant personnel's investigation of this incident has proven it was not caused by the operation of GGNS.

To comply with the reporting requirements of Section 5.4.2 of the GGNS Environmental Protection Plan, the Nuclear Regulatory Commission is notified by copy to the Regional Administrator. If you need additional information concerning this incident, contact Ms. Rita R. Jackson, Manager, Radiological & Environmental Services, at (601) 984-9366.

Sincerely,

DKC/JDB/RRJ:bcb
Attachments

cc: Mr. C. W. Angle (w/a)
Mr. M. J. Meisner (w/o)
Mr. W. C. Finch (w/o)
Mr. Larry Hamil (MDNR) (w/a)
Mr. C. R. Hutchinson (w/o)
Mr. Louis Lavallee (MDNR) (w/a)
Mr. G. D. Williams (w/o)
File (Central) (w/a) [5]
File (ENV) (w/a)
File (R&ES) (w/a)
File (Entergy Operations) (w/a)

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

DK2N5752.26/JRSFLR- 1

ENVIRONMENTAL INCIDENT REPORT

BACKGROUND

At approximately 0800 hours on August 17, 1990, Chemistry personnel notified Environmental Surveillance Program personnel of a fish kill near NPDES Outfall 001. Cooling tower blowdown (Outfall 002), liquid radwaste (Outfall 011) and plant service water (PSW) return flow enter the Mississippi River via a barge slip at Outfall 001. Figure 1 depicts the fish kill area and the discharge pathway.

An area of ponded backwater, as indicated on Figure 1, above Outfall 001 contained the dead fish. A three to five ft channel connected the ponded area to the rest of the barge slip. As Figure 1 indicates, the ponded area was isolated from the direct flow of Outfall 001. The depth of the ponded area, when the fish kill was discovered, was approximately three feet at its deepest point. Due to the receding Mississippi River, the ponded area is now empty.

INCIDENT INVESTIGATION

ESP personnel conducted a survey of the area to determine the extent of the fish kill. Of the 77 dead fish ESP personnel collected, approximately 10 were collected in the channel of the barge slip with the remaining 67 collected in the ponded area. ESP personnel did not find any dead fish during their upstream and downstream Mississippi River surveys. The total weight of the collected fish, which are described in Table 1, was less than three pounds.

Figure 1 also depicts the water sample locations and Table 2 provides the analytical results. The following summarizes the analytical results.

Dissolved Oxygen	4.6 mg/l
pH	7.25 - 8.02
Temperature	27.6 - 35.4°C
Chemical Oxygen Demand	30 - 70 mg/l

The analytical results were within expected values and not conducive to a fish kill.

Chemistry personnel's investigation of water treatment chemical additions revealed the following:

- PSW biocide additions were secured from 1800 8-16-90 to 1200 8-17-90.
- The biocide addition to the cooling tower at 2100 on 8-16-90, which was the suspected cause, was not responsible for the fish kill. Proper chemical addition and confirmation of blowdown being secured before, during and following biocide addition was verified with plant logbooks, chart recorders and personnel interviews.
- Other chemical additions were accurate and within recommended guidelines.

ENVIRONMENTAL INCIDENT REPORT (CONT'D)

CAUSE

Based on our investigation and the fact that previous discharges and chemical additions similar to those occurring during the August 16 and 17 period have been without incident, ESP personnel have concluded the fish kill was not caused by the operation of GGNS. We believe the fish kill was caused by the receding Mississippi River which led to unfavorable environmental conditions in the shallow ponded area where the largest concentration of dead fish was located.

ACTIONS TO PREVENT RECURRENCE

Since the incident was not caused by plant activities but was caused by the receding Mississippi River, actions to prevent a recurrence are not necessary or planned.

Figure 1

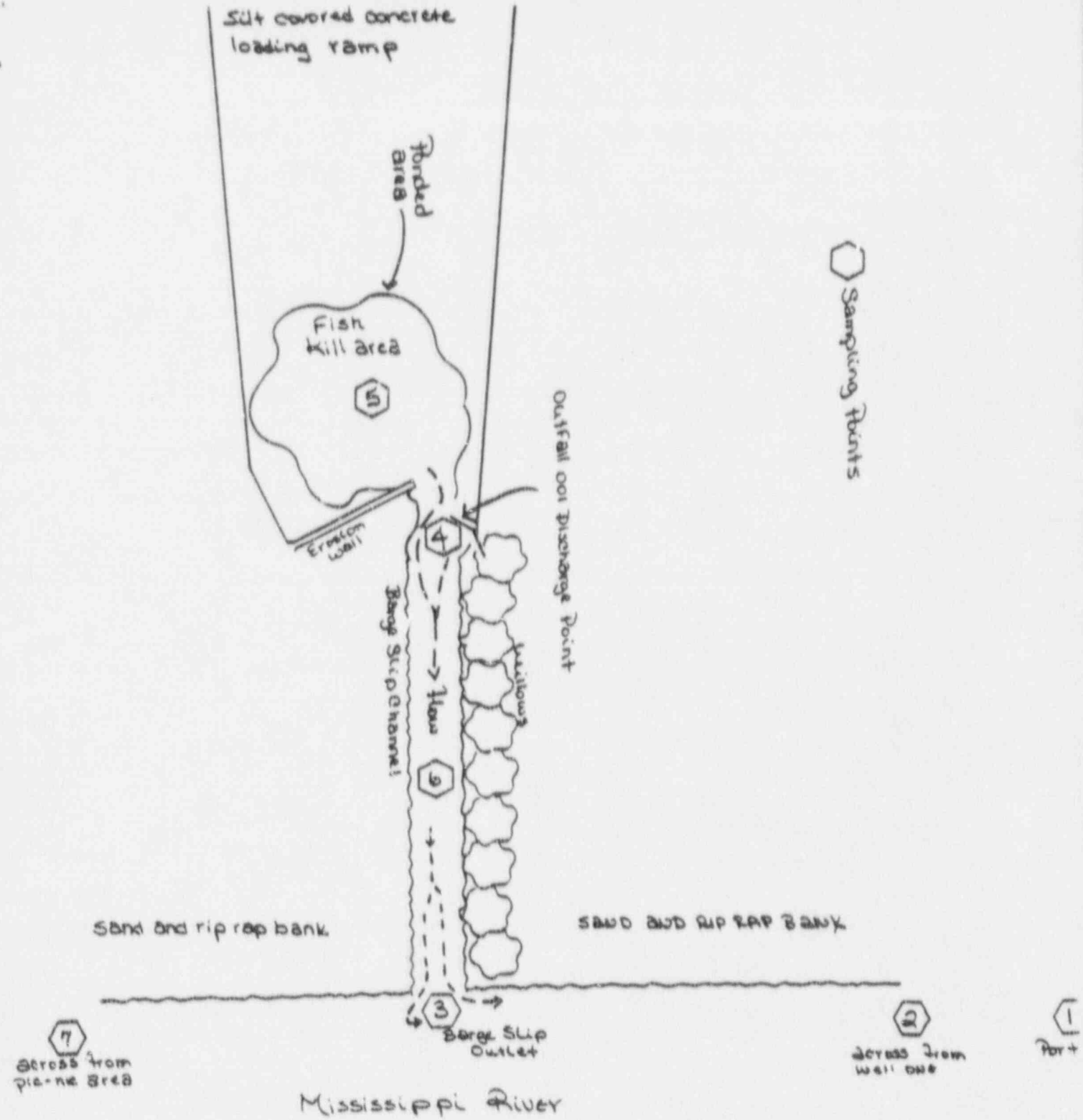

Silt covered concrete loading ramp
Forked area
Fish kill area
5
Sampling Points
Outfall 001 Discharge Point
Erosion wall
4
Barge Slip Channel
Flow
6
Willows
sand and rip rap bank
sand and rip rap bank
3
Barge Slip Outlet
7
across from pie-ne area
2
across from well one
1
Port
Mississippi River
N

Table 1
FISH STATISTICS

SPECIES	AVERAGE BODY LENGTH	AVERAGE WEIGHT	NO.*
Drum (Aplodinotus grunniens)	7.04 cm	20.67g	64
Sunfish (lepomis ssp)	3.56 cm	2.01g	06
Minnows (Notropis ssp)	4.47 cm	2.36g	05
Catfish (Ictaluris ssp)	3.68 cm	3.13g	02

Total wt. fish collected = 1353.09g (2.98 lbs.)

*All collected individuals were immediately frozen and retained for future analyses, if necessary.

Table 2
ANALYTICAL RESULTS

SAMPLE STATION	pH	TEMP (°C)	DO (mg/l)	COD (mg/l)
1) Centerline of entrance to Port of Port Gibson	7.94	27.6	Not Taken	30
2) 50 feet from shoreline at well number 1.	7.98	27.6	Not Taken	40
3) Mississippi River at the barge slip outlet.	8.01	28.7	4.6	45
4) 001 outfall discharge point.	8.02	35.4	4.6	30
5) Centerline of ponded area.	7.25	33.5	4.6	30
6) Bargeslip conterline half way down.	7.96	28.9	4.6	50
7) Mississippi River across from picnic area.	8.01	27.6	4.6	70

Attachment 1

Species Identified in Sediment Basin A
Fish Kill
October 4, 1990

SPECIES	NUMBER RECOVERED	WT/LBS
Shad	93	21.0
Bluegill	50	2.0
Suckerfish	1	0.5
Minnows	1	N/A
Bass	1	1.5
TOTAL	146	25.0

Chemical Tests Performed - Sediment Basin A
Fish Kill
October 5, 1990

LOCATION NO.*	(mg/l) DISSOLVED OXYGEN	pH	(°C) TEMP.	(mg/l) CHLORINE
1	3.9	8.07	23.7	<0.1
2	6.6	8.20	24.4	<0.1
3	4.5	8.21	21.2	--
4	2.4	8.11	24.0	--
5	2.0	8.16	24.6	--
6	1.8	8.43	24.6	--
7	2.4	8.24	24.6	--
8	3.0	8.20	24.5	--
9	4.2	8.10	24.5	--

*Locations are shown on Attachment 2.

Entergy Operations

Entergy Operations, Inc.

Thomas E. Reaves, Jr.

October 12, 1990

Mr. Jerry Cain, Coordinator
Industrial Wastewater Section
Department of Environmental Quality
Bureau of Pollution Control
Post Office Box 10385
Jackson, Mississippi 39289-0385

8

SUBJECT: Grand Gulf Nuclear Station
Environmental Incident Report
of Fish Kill in Sediment
Basin A
APO-90/0966

Dear Mr. Cain:

On Thursday, October 4, 1990 Radiological & Environmental Services (R&ES) was notified that dead fish were observed in Sediment Basin A. An investigation began immediately.

The attached list (Attachment 1) details the type and quantity of dead species recovered and summarizes test results. The probable cause, as determined by R&ES personnel, for this kill was dissolved oxygen depletion. Attachment 2 shows the affected area of the east end of Sediment Basin A.

To comply with the reporting requirements of Section 5.4.2 of the GGNS Environmental Protection Plan, the Nuclear Regulatory Commission is notified by copy to the Regional Administrator. If you need additional information concerning this incident, contact Ms. Rita R. Jackson, Manager, Radiological & Environmental Services, at (601) 984-9366.

Sincerely,

WLP/JDB/RRJ/bcb
Attachments

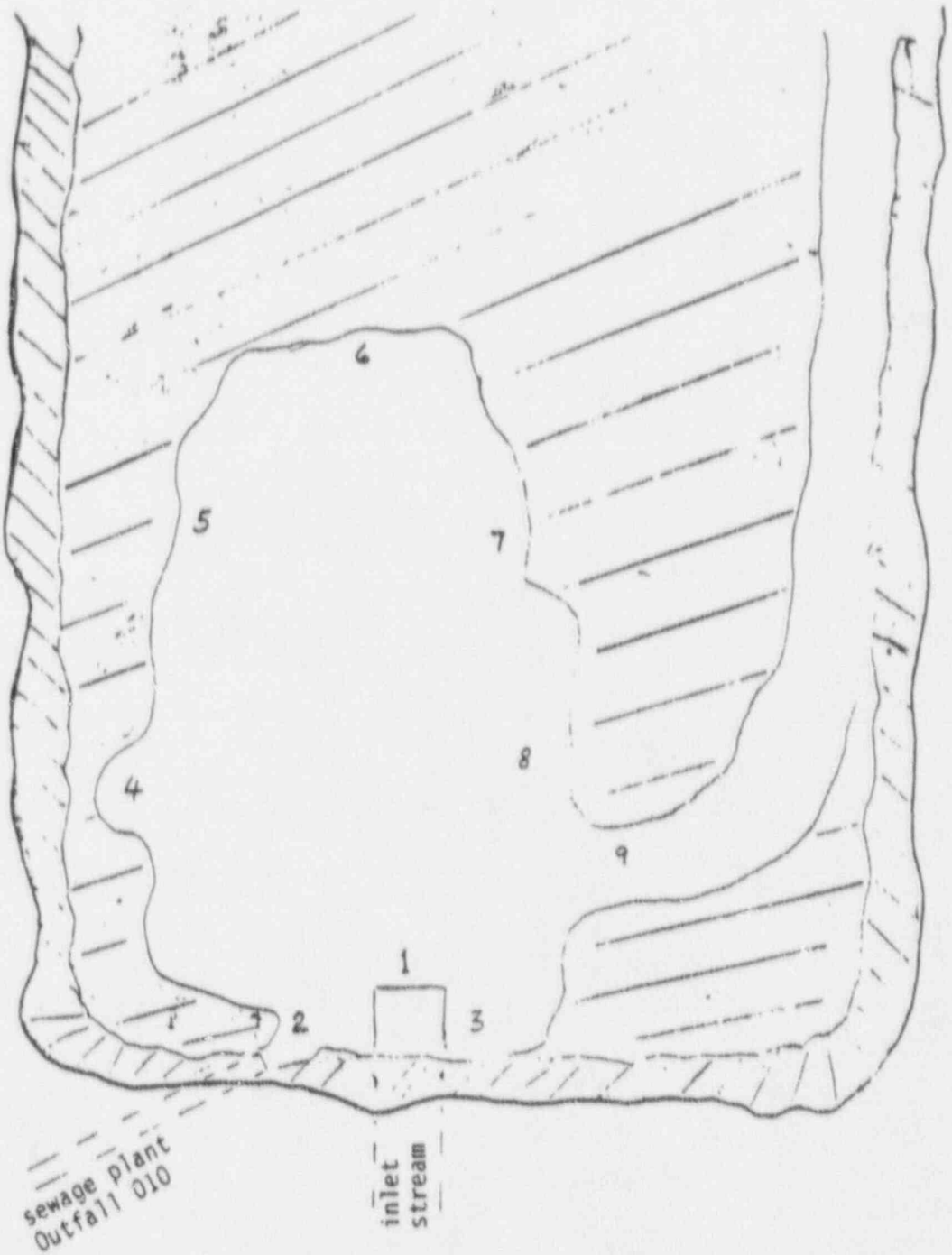
cc: Mr. C. W. Angle (w/a)
Mr. M. J. Meisner (w/o)
Mr. W. C. Finch (w/o)
Mr. Larry Hamil (MDNR) (w/a)
Mr. C. R. Hutchinson (w/o)
Mr. Louis Lavallee (MDNR) (w/a)
Mr. R. Ruffin (w/a)
Mr. G. D. Williams (w/o)
File (Central) (w/a) [3]
File (ENV) (w/a)
File (R&ES) (w/a)
File (Entergy Operations) (w/a)

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

FK901004/SRESFLR- 1

Attachment 2

Sediment Basin A - Sketch*



* Sketch not to scale

API-90/1014

STATE OF MISSISSIPPI

DEPARTMENT OF ENVIRONMENTAL QUALITY

RAY MABUS
GOVERNOR

OCT 24 1990

October 22, 1990

Ms. Rita Jackson, Manager
Radiological and Environmental Services
Entergy Operations, Inc.
P. O. Box 31995
Jackson, Mississippi 39286-1995

Dear Ms. Jackson:

Re: NPDES Permit No. MS0029521
Investigation Summary
of Fish Kill in Sediment Basin A

Our office has received and reviewed the report of the referenced matter as submitted by Entergy Operations on October 12, 1990. Based upon our review, we have no reasons to not concur with the conclusion that the probable cause of this incident was due to dissolved oxygen depletion, which may have resulted from a natural occurrence.

However, we do request if there are any future occurrences of this nature in either Basin A or B, that samples be collected and analyzed for Total Organic Carbon and Chemical Oxygen Demand. For future reference and comparative purposes, we suggest the Basins be representatively tested for these parameters in the near future during normal, uneventful operating conditions.

Also, we acknowledge receipt of the Material Safety Data Sheets for the products used in Bechtel Shop Area. Your assistance in providing this information to us is appreciated.

Please advise if there are any questions.

Sincerely,

Larry Hamil

Larry Hamil
Industrial Wastewater Control Branch

LH:els

E P S Analytical Services
5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2165

LABORATORY REPORT

CLIENT: ENTERGY OPERATIONS
LOCATION: JACKSON, MS 39286-1995
DATE: 11/06/90
PROJECT LOCATION: PORT GIBSON, MS
COLLECTED BY: CLT-MP
RECEIPT DATE: 10/30/90
REPORT NO.: 16496
PROJECT NO.:
PAGE NO.: 1

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION			BATCH QUALITY CONTROL		
						ANALYST	DATE	TIME	SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		21409.00									
COD, Total	mg/l	87				JRB	11/05/90	08:30	360	96	7.4
Organic Carbon, Total	mg/l	4				IKE	11/01/90	09:00	25	101	0
TEST RESULTS FOR SAMPLE LOG NUMBER:			21410.00								
COD, Total	mg/l		6			JRB	11/05/90	08:30	360	96	7.4
Organic Carbon, Total	mg/l		4			IKE	11/01/90	09:00	25	101	0
TEST RESULTS FOR SAMPLE LOG NUMBER:				21411.00							
COD, Total	mg/l			16		JRB	11/05/90	08:30	360	96	7.4
Organic Carbon, Total	mg/l			6		IKE	11/01/90	09:00	25	101	0

NOV 12 1990

SUPPLEMENTARY INFORMATION:
Analysis conducted in accordance with 40 CFR Part 136,1986 "Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act."

SAMPLE DESCRIPTION:	COLLECTION DATE/TIME:
21409.00 STREAM A WATER SAMPLE	10/29/90 10/29/90 13:50
21410.00 SEDIMENT BASIN A INFLUENT WATER SAMPLE	10/29/90 10/29/90 14:00
21411.00 SEDIMENT BASIN A EFFLUENT WATER SAMPLE	10/29/90 10/29/90 14:05

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert A. Johnston
Analytical Services

This report applies only to the sample(s) analyzed. The liability of the laboratory is limited to the amount paid for the report by the client. The client assumes all liability for the further distribution of this report or its content and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.

Analytical Services
5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2365

LABORATORY REPORT

CLIENT: ENTERGY OPERATIONS
LOCATION: JACKSON, MS 39286-1995
DATE: 11/06/90
PROJECT LOCATION: PORT GIBSON, MS
COLLECTED BY: CLT-WF
RECEIPT DATE: 10/30/90
REPORT NO.: 16497
PROJECT NO.:
PAGE NO.: 1

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT				ANALYSIS INFORMATION: ANALYST	DATE	TIME	BATCH QUALITY CONTROL: SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		21412.00									
COD, Total	mg/l	10				JRB	11/05/90	08:30	360	96	3.4
Organic Carbon, Total	mg/l	1				IKE	11/01/90	09:00	25	101	0
TEST RESULTS FOR SAMPLE LOG NUMBER:			21413.00								
COD, Total	mg/l		66			JRB	11/05/90	08:30	360	96	3.4
Organic Carbon, Total	mg/l		6			IKE	11/01/90	09:00	25	101	0
TEST RESULTS FOR SAMPLE LOG NUMBER:				21414.00							
COD, Total	mg/l			73		JRB	11/05/90	08:30	360	96	3.4
Organic Carbon, Total	mg/l			11		IKE	11/01/90	09:00	25	101	0

NOV 12 1990

SUPPLEMENTARY INFORMATION:
Analysis conducted in accordance with 40 CFR Part 136,1986 "Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act."

SAMPLE DESCRIPTION:		COLLECTION DATE/TIME:
21412.00	SEDIMENT BASIN B INFLUENT WATER SAMPLE	10/29/90 10/29/90 14:35
21413.00	SEDIMENT BASIN B EFFLUENT WATER SAMPLE	10/29/90 10/29/90 14:25
21414.00	HAMILTON LAKE WATER SAMPLE	10/29/90 10/29/90 14:20

CERTIFICATION:

Ray Hudnall
Quality Assurance and Quality Control

Herbert A. Johnston
Analytical Services

This report applies only to the sample(s) analyzed. The liability of the laboratory is limited to the amount paid for the report by the client. The client assumes all liability for the further distribution of this report or its content and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.

Analytical Services
5360 I-55 North • Jackson, MS 39211 • Telephone (601) 956-1400 • FAX (601) 956-2365

LABORATORY REPORT

CLIENT: ENTERGY OPERATIONS
LOCATION: JACKSON, MS 39286-1995
DATE: 11/06/90
PROJECT LOCATION: PORT GIBSON, MS
COLLECTED BY: CLT-MP
RECEIPT DATE: 10/30/90
REPORT NO.: 16498
PROJECT NO.:
PAGE NO.: 1

ANALYTE	UNITS	LABORATORY RESULTS / REGULATORY LIMIT	ANALYSIS INFORMATION: ANALYST	DATE	TIME	BATCH QUALITY CONTROL: SPIKE VALUE	% RECOVERY	RELATIVE % DEVIATION
TEST RESULTS FOR SAMPLE LOG NUMBER:		21415.00						
COD, Total	mg/l	105	JRB	11/05/90	08:30	360	96	3.4
Organic Carbon, Total	mg/l	13	IKE	11/01/90	09:00	25	101	0

SUPPLEMENTARY INFORMATION:
Analysis conducted in accordance with 40 CFR Part 136,1986 "Guidelines Establishing Test Procedures for the Analysis of Pollutants under the Clean Water Act."

SAMPLE DESCRIPTION: 21415.00 TRAINING CENTER POND WATER SAMPLE
COLLECTION DATE/TIME: 10/29/90 10/29/90 14:45

CERTIFICATION:
Ray Hudnall
Quality Assurance and Quality Control
Herbert A. Johnston
Analytical Services

This report applies only to the sample(s) analyzed. The liability of the laboratory is limited to the amount paid for the report by the client. The client assumes all liability for the further distribution of this report or its content and by making such distribution agrees to hold the laboratory harmless against all claims of persons so informed of the contents hereof.