FINAL ENVIRONMENTAL REPORT

GRAND GULF NUCLEAR STATION

UNITS 1 AND 2

MISSISSIPPI POWER & LIGHT COMPANY

MIDDLE SOUTH ENERGY, INC.

MIDDLE SOUTH UTILITIES SYSTEM

1458 316

AMENDMENT 2

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MISSISSIPPI POWER & LIGHT COMPANY
Helping Build Mississippi
P. O. BOX 1640, JACKSON, MISSISSIPPI 39205

NORRIS L. STAMPLEY
VICE PRESIDENT

November 30, 1979

U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Washington, D. C. 20555

Attention: Mr. Harold R. Denton, Director

Dear Sir:

SUBJECT: Grand Gulf Nuclear Station
Units 1 and 2
Docket Nos. 50-416 and 50-417
File 0260/0277/L-860.0/M-900.0
Amendment 2 to the Final
Environmental Report
AECM-79/129

Attached are forty-one copies and three notarized originals of Amendment 2 to the Final Environmental Report for the Grand Gulf Nuclear Station, Units 1 and 2. This amendment consists of information related to our Preoperational Radiological Environmental Monitoring Program and other miscellaneous information.

Sincerely,

Norris L Stampley

PVH/pa
Attachment

cc: Mr. T. B. Conner
Mr. R. B. McGehee

Mr. Victor Stello, Jr., Director
Division of Inspection & Enforcement
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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BEFORE THE

UNITED STATES NUCLEAR REGULATORY COMMISSION

DOCKET NOS. 50-416 AND 50-417

IN THE MATTER OF

MISSISSIPPI POWER & LIGHT COMPANY
and
MIDDLE SOUTH ENERGY, INC.

AMENDMENT NO. 2 TO THE

FINAL ENVIRONMENTAL REPORT

Mississippi Power & Light Company for itself and on behalf of Middle South Energy, Inc. herewith files this Amendment No. 2 to their Final Environmental Report.

Respectfully submitted,

Mississippi Power & Light Company

BY N. L. Stampley
N. L. STAMPLEY
VICE PRESIDENT

STATE OF MISSISSIPPI
COUNTY OF HINDS

N. L. Stampley, being duly sworn, states that he is a Vice President of Mississippi Power & Light Company, and that he is authorized on the part of said Company and of Middle South Energy, Inc. to sign and file with the Nuclear Regulatory Commission this Amendment No. 2 to the Final Environmental Report; that he signed the foregoing Amendment to the Final Environmental Report as Vice President of Mississippi Power & Light Company and as agent for Middle South Energy, Inc., and that the statements made and the matters set forth therein are true and correct to the best of his knowledge, information, and belief.

N. L. Stampley
N. L. STAMPLEY

SUBSCRIBED AND SWORN TO before me, a Notary Public, in and for the County and State above named, this 21 day of November, 1979.

(SEAL)

Bobbie Ferguson
NOTARY PUBLIC

My commission expires:

My Commission Expires July 23, 1983.

AMENDMENT 2

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MISSISSIPPI POWER & LIGHT COMPANY
GRAND GULF NUCLEAR STATION
UNITS 1 AND 2
DOCKET NOS. 50-416 and 417
AMENDMENT NO. 2

INSTRUCTIONS FOR FILING AMENDMENT NO. 2, 11/79

Remove and insert the ER pages, tables, and figures listed below. Dashes (---) in the remove or insert column indicate no action required.

Remove	Insert
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---	Table 6.4.1 (3 sheets)
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---	Table 6.4.17 (2 sheets)
---	Figure 6.4-1
---	Figure 6.4-2
---	Figure 6.4-3

At the end of Volume 4 insert the following in the order shown:

1. Amendment 2 tab
2. Transmittal letter
3. Instructions for filing

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LIST OF TABLES (Cont.)

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LIST OF FIGURES

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. All water supplies

Gamma isotopic analysis will be performed on all water samples regardless of gross beta activity to simplify analysis requirements and for analysis completeness.

6.1.5.2 Sample Collection

Sampling locations, frequencies, and analyses for the different types of environmental samples are discussed below in general. More specific information for each sampling parameter is given in Table 6.1.30.

6.1.5.2.1 Direct Radiation

A gamma radiation survey will be made in the immediate vicinity of the site before plant operation. TLD badges will be used to document long-term integrated dose rates. These measurements will be made quarterly at the Grand Gulf Military Park, Port Gibson, on the site perimeter, at distances 5 to 10 miles, and 10 to 20 miles northeast of the site. Each dose measurement will be based on readings of at least two thermo-luminescent dosimeters. The exact locations of TLD stations are based on meterological data and the gamma radiation survey. A comparison of perimeter and more distant TLD stations will provide a basis for distinguishing changes due to plant operation from changes due to other causes.

6.1.5.2.2 Airborne Particulate

As a part of the atmospheric measurements program, air sampling stations will be established in each quadrant at the site perimeter, at the residence having the highest χ/Q value, at Grand Gulf Military Park, and in the town of Port Gibson (Figure 6.1-6). The site perimeter and the residence having the highest χ/Q value represent the areas of highest potential concentrations. Grand Gulf Military Park and Port Gibson represent potential population exposure areas. Exact locations of the samples were based on onsite meterological data. In addition, two background air sampling stations will be established as a control at a distance of 10 to 20 miles northeast of the site (Figure 6.1-6). Airborne particulate material will be collected continuously on high efficiency filters. Filters will be changed weekly to avoid excessive dust loading and a beta count taken after a 48-hour decay period to permit decay of naturally occurring Radon and Thoron daughter products. Once each quarter, a gamma isotopic analysis will be performed on a composite sample of the filters.

6.1.5.2.3 Airborne Radioiodine

For the first 6 months and the final 6 months of the preoperational environmental radiological monitoring program, each air sampling station will be equipped with charcoal cartridges for the collection of iodine. These cartridges will be removed and analyzed weekly for Iodine-131. This frequency was selected to avoid decay of the Iodine-131 prior to analysis.

6.1.5.2.4 Surface and Drinking Water

Mississippi River water will be sampled monthly upstream between the mouth of the Big Black River and the plant outfall and downstream between the plant outfall and the St. Joseph Ferry. These samples will have a gamma isotopic analysis performed monthly. Tritium analysis will be performed quarterly on a composite from each sampling location. Drinking water from sources most likely to be affected by plant operations (cisterns near the plant) will be collected and analyzed monthly. Iodine-131 and gamma isotopic analyses will be performed. In addition, a quarterly composite will be analyzed for Tritium. One well near the site and wells at Grand Gulf Military Park and Port Gibson will be sampled and analyzed quarterly. Gamma isotopic and tritium analyses will be performed on these samples of untreated well water.

6.1.5.2.5 Milk

Milking animals are not normally present in the site environs. However, should one or more be introduced, samples will be taken from the animal in the higher D/Q sector. Samples will also be taken from milking animals in areas if the dose, due to effluents, is calculated to be greater than 1 mrem/hr (maximum of three samples; if more than three areas are involved, the worst three cases will be selected). A control sample will be collected from the dairy herd at the Alcorn State University. Iodine-131 and gamma isotopic analyses will be performed on each sample.

6.1.5.2.6 Fish and Invertebrates 2

Important sport and commercial fish will be sampled semiannually in the plant discharge outfall area (Hamilton Lake may be sampled if it is not feasible to obtain a sample from the Mississippi River). Specimens collected will have a gamma isotopic analysis performed on the edible portions.

6.1.5.2.7 Beef (or Goat) Meat

Samples of beef (or goat) will be obtained semiannually from farms within 10 miles of the site which may be affected by plant discharges. If such samples prove to be unavailable, feed stuff and forage will be substituted. A background sample will be

taken from farms, preferably 10 to 20 miles northeast of the site. Gamma isotopic analysis will be performed on edible portions of samples. 2

6.1.5.2.8 Deer Meat

Deer will be sampled annually in the general vicinity of the site in areas where hunting is permitted. Gamma isotopic analysis will be performed on edible portions of each sample upon collection.

6.1.5.2.9 Fruits and Vegetables

Vegetables will be sampled at time of harvest except for green leafy vegetables, which will be sampled monthly when available. Samples will be collected from the garden nearest the point of greatest D/Q value. Commercial and private fruit production is rare in the site vicinity. Wild fruit is present, however. Wild fruit will be collected, as available, from the site environs, preferably from high D/Q sectors. Fruit and vegetable background samples will be obtained from an area preferably 10 to 20 miles northeast of the site. Gamma isotopic analysis will be performed on each sample upon collection. 2

6.1.5.2.10 Sediment

Shoreline sediment will be sampled semiannually downstream of the plant outfall. The amount of silt in and the flow of the Mississippi River render midstream sediment sampling impractical. Gamma isotopic analysis will be performed on each sample. 1

6.1.5.2.11 Soil

One set of soil samples will be taken prior to plant operation. Samples will be collected at each air sampling location. Gamma isotopic and Sr-90 analyses will be performed on each sample.

6.1.5.3 Data Analysis and Presentation

A report will be prepared to present and evaluate preoperational environmental radiological monitoring results. Data obtained from the preoperational monitoring program will be used along with meterological data to reestimate the possible dose to man from plant operations. Suitability of sampling media, locations, and frequency will be reevaluated prior to plant operation. Changes to the program may be made as indicated by this reevaluation and applicable guides.

6.1.5.3.1 Direct Radiation

Gamma radiation survey results will be reported in μR/hr. Direct radiation TLD badge results will be reported as a quarterly integrated dose in mR along with the average and standard

deviation for all readings. Quarterly doses at indicator stations will be compared with quarterly doses at background (control) stations.

6.1.5.3.2 Airborne Particulate

All results will be reported in pCi/m^3. A statistical evaluation will be made of station-to-station and week-to-week variations in gross beta results. These variations will be evaluated in terms of seasonal fluctuations, influences of worldwide fallout, and other sources. Gamma isotopic analysis data will be used to identify any radionuclides that may be attributed to reactor operation.

6.1.5.3.3 Airborne Iodine

All results will be reported in pCi/l. If iodine-131 is detected on the charcoal cartridges, the source of the iodine-131 will be evaluated.

6.1.5.3.4 Water

All results will be reported in pCi/l.

6.1.5.3.5 Milk

Results will be reported in pCi/l. Indicator stations, if available, will be compared to data from the dairy herd at Alcorn State University. 2

6.1.5.3.6 Fish and Invertebrates

Results will be reported in pCi/kg wet weight.

6.1.5.3.7 Beef (or Goat), Deer

Results will be reported in pCi/kg wet weight. Radionuclides which could be identified with plant operation will be evaluated in terms of the dose to man.

6.1.5.3.8 Sediment and Soil

Results will be reported in pCi/kg dry weight and will only be used as indicators of buildup of radioactivity in the environment.

6.1.6 Supplementary Programs

6.1.6.1 Baxter Wilson Impingement Study

Systematic sampling of organisms impinged on the traveling screens of the condenser cooling water intake structures of both Units 1 and 2 at MP&L's Baxter Wilson Steam Electric Station was

conducted from March 1973 through February 1974. Samples from operating units were generally collected on a daily basis from March 12 through May 11. Subsequently, samples were collected 2 days per week.

Detailed descriptions of the intake structures and sampling and laboratory analyses methods are presented in the Environmental Field Measurements Programs, Interim Report 2, Section 3.6. Results of the sampling program are presented in the Environmental Field Measurements Programs, Supplementary Report.

6.1.6.2 Environmental Photography

One series of late summer overflights using thermal infrared imagery, color infrared and color aerial photography was made over the site and surrounding area. This remote-sensing survey served to document existing site conditions, assisted in the identification of vegetation assemblages, delineated areas of suspected existing stress or disease in these vegetation assemblages, and provided delineation of existing drainage patterns on and adjacent to the Grand Gulf site. The aerial survey was conducted by the Services Group of Texas Instruments, Inc. on October 2, 1972 before deciduous trees had lost their leaves.

6.1.6.2.1 Flight Schedule

Each remote sensing mission, thermal infrared, color infrared and color photography, was conducted with specialized equipment during separate overfights which utilized various flight traverses and altitudes to ensure complete coverage of the study area.

a. Thermal Infrared. Predawn thermal infrared imagery was collected between the hours of 0630 and 0700 along five traverses flown in a NNE-SSW direction and one traverse in a NW-SE direction at an altitude of 6000 feet. The resulting imagery consisted of an original negative at an approximate scale of 1 inch = 3800 feet along the center track of the imagery, and enlarged prints at an approximate scale of 1 inch = 1900 feet.

b. Color Infrared. Color infrared photography was collected between the hours of 1300 and 1400 along six traverses flown in a NNE-SSW direction at an altitude of 4500 feet. The resulting imagery consisted of color infrared prints at an approximate scale of 1 inch = 1300 feet.

c. Color Photography. Color photography was collected between the hours of 1500 and 1530 along six traverses flown in a NNE-SSW direction at an altitude of

4500 feet. The resulting photography consisted of prints at an approximate scale of 1 inch = 1300 feet.

6.1.6.2.2 Equipment

The aerial remote-sensing survey was conducted from a twin-engine Beechcraft Queen Air which was structurally modified and specially equipped for a variety of airborne remote sensing missions.

6.1.6.3 Noise Surveys

Refer to Section 2.7 for a description of both the ambient background and construction noise surveys.

6.1.6.4 Transmission Line Corridor Survey

Refer to subsection 3.9.4 and Section 4.5 for a description of the transmission line corridor surveys.

6.1.7 References

1. Israel, G. W. and T. J. Overcamp, "Drift Deposition Model for Natural Draft Cooling Towers," in Proceedings of Cooling Tower Environment - 1974, March 4-6, 1974, pp. 614-628, Technical Information Center, Office of Public Affairs, USERDA, 1975.

2. Overcamp, T. J., "A General Gaussian Diffusion Deposition Model for Elevated Point Sources," Journal of Applied Meteorology, 15, 1976, 1167-1171.

3. Hewett, T. A., J. A. Fay, and D. P. Hoult, "Laboratory Experiments of Smokestack Plumes in a Stable Atmosphere," Atmospheric Environment, 5, 1971, 767-789.

4. Briggs, G. A., Some Recent Analyses of Plume Rise Observation, in Proceedings of the Second International Clean Air Congress, Washington, D. C., December 6-11, 1970, pp. 1029-1032, H. M. Englund and W. T. Beery (Eds.), Academic Press, Inc., New York, 1971.

5. Briggs, G. A., Plume Rise, USAEC, 1969.

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Table 6.1.30 (Cont.)

Sample Type	Sampling Frequency	Number and Approximate Location of Samples	Analysis Type & Frequency	MDA or Min. Sensitivity	
Milk	Monthly	1 Alcorn State University 1 Milking animal in the vicinity of GGNS (if available)	Iodine 131, monthly Gamma Isotopic, monthly	1 pCi/l Table 6.1.31	2
Fish and Invertebrates	Semiannually	1 Discharge outfall area (or Hamilton Lake) 1 Control sample from area not influenced by plant discharges	Gamma Isotopic, semiannually	Table 6.1.31	2
Beef (or Goat) Meat	Semiannually, as available	1 Within 10 mi. of the site (if not available, feedstuff and forage may be substituted)	Gamma Isotopic, semiannually	Table 6.1.31	2
Deer	Annually	1 In general vicinity of site in areas where hunting is permitted	Gamma Isotopic, annually	Table 6.1.31	
Fruits & Vegetables	Annually, at harvest	1 Garden preferably from a high D/Q sector 1 Wild fruit collected from site environs (when available and preferably from high D/Q sectors) 1 Control sample from area not influenced by plant effluents	Gamma Isotopic, on collection	Table 6.1.31	2
Green Leafy Vegetables	Monthly (as available)	1 Garden preferably from a high D/Q sector 1 Control sample from area not influenced by plant effluents	Gamma Isotopic, on collection	Table 6.1.31	2
Sediment	Semiannually	1 Shoreline sediment downstream of the plant outfall	Gamma Isotopic, Semiannually	Table 6.1.31	1
Soil	Once prior to plant operation	9 Air Sampling Locations	Gamma Isotopic-on collection Sr90- on collection	Table 6.1.31 50 pCi/kg(dry)	
Gamma Radiation Survey	Once prior to plant operation	30 Same as direct radiation	Gamma Radiation Exposure Rate	Approximately 10 μR/hr	

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6.4 PREOPERATIONAL ENVIRONMENTAL RADIOLOGICAL MONITORING DATA

The various phases of the radiological monitoring program have been discussed in sections 6.1.5 and 6.2. This section summarizes the first six months of data collected from July through December 1978. 2

Tables 6.4.1 through 6.4.14 summarize the analytical data. The collection sites are described in Tables 6.4.15 through 6.4.17. Figures 6.4-1, 6.4-2, and 6.4-3 show locations of these collection sites.

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TABLE 6.4.1

AIRBORNE I-131 AND GROSS BETA CONCENTRATIONS IN AIR PARTICULATE FILTERS
(Weekly Collections)

Collection Date	Collection Site: PG (1) Location: Figure 6.4-2 Volume (m^3)	(10^{-2} pCi/m^3) Gross B	I-131	Collection Site: 61N (2) Location: Figure 6.4-1 Volume (m^3)	(10^{-2} pCi/m^3) Gross B	I-131	Collection Site: 61VA (3) Location: Figure 6.4-1 Volume (m^3)	(10^{-2} pCi/m^3) Gross B	I-131
07-03-78	323	5±1	<7	370	7±1	<7	376	5±1	<7
07-10-78	393	4±1	<7	374	4±1	<7	382	4±1	<7
07-17-78	458	4±1	<7	365	4±1	<7	376	5±1	<7
07-24-78	456	4±1	<7	376	6±1	<7	385	4±1	<7
07-31-78	487	2±1	<7	376	2±1	<7	382	1±1	<7
08-07-78	464	4±1	<7	362	6±1	<7	362	4±1	<7
08-14-78	478	3±1	<7	374	2±1	<7	388	2±1	<7
08-21-78	453	2±1	<7	376	2±1	<7	385	1±1	<7
09-05-78	498	2±1	<7	427	1±1	<7	444	2±1	<7
09-11-78	385	5±1	<7	320	2±1	<7	325	4±1	<7
09-18-78	399	1±1	<7	374	1±1	<7	390	1±1	<7
09-25-78	365	2±1	<7	374	3±1	<7	382	2±1	<7
10-02-78	393	2±1	<7	382	2±1	<7	379	3±1	<7
10-09-78	402	3±1	<7	388	3±1	<7	376	2±1	<7
10-16-78	385	2±1	<7	388	2±1	<7	365	2±1	<7
10-23-78	368	3±1	<7	385	3±1	<7	354	3±1	<7
10-30-78	402	4±1	<7	385	4±1	<7	348	3±1	<7
11-06-78	645	1±1	<7	376	5±1	<7	331	5±1	<7
11-13-78	1129	1±1	<7	679	1±1	<7	673	1±1	<7
11-20-78	458	1±1	<7	475	2±1	<7	526	3±1	<7
11-27-78	430	2±1	<7	348	3±1	<7	328	2±1	<7
12-04-78	566	1±1	<7	498	2±1	<7	518	2±1	<7
12-11-78	631	1±1	<7	572	2±1	<7	501	2±1	<7
12-18-78	625	2±1	<7	521	2±1	<7	495	3±1	<7
12-27-78	790	5±1	<7	657	8±1	<7	623	9±1	<7

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TABLE 6.4.1 (Continued)

AIRBORNE I-131 AND GROSS BETA CONCENTRATIONS IN AIR PARTICULATE FILTERS
(Weekly Collections)

Collection Date	Collection Site: GJOE (4) Location: Figure 6.4-3 Volume (m^3)	(10^{-2} pCi/m^3) Gross B	I-131	Collection Site: HPO (5) Location: Figure 6.4-3 Volume (m^3)	(10^{-2} pCi/m^3) Gross B	I-131	Collection Site: RS (6) Location: Figure 6.4-3 Volume (m^3)	(10^{-2} pCi/m^3) Gross B	I-131
07-03-78	391	6±1	<7	382	6±1	<7	362	6±1	<7
07-10-78	399	5±1	<7	385	4±1	<7	204	8±2	<7
07-17-78	422	5±1	<7	385	4±1	<7	374	4±1	<7
07-24-78	405	5±1	<7	393	5±1	<7	379	13±1	<7
07-31-78	424	2±1	<7	390	2±1	<7	368	2±1	<7
08-07-78	419	6±1	<7	382	6±1	<7	371	6±1	<7
08-14-78	427	3±1	<7	107	7±1	<7	665	2±1	<7
08-21-78	422	3±1	<7	402	2±1	<7	91	6±1	<7
08-28-78	393	6±1	<7	402	6±1	<7	422	5±1	<7
09-05-78	464	3±1	<7	450	1±1	<7	374	3±1	<7
09-11-78	354	5±1	<7	348	4±1	<7	325	4±1	<7
09-18-78	419	2±1	<7	410	1±1	<7	379	1±1	<7
09-25-78	410	3±1	<7	422	3±1	<7	385	3±1	<7
10-02-78	399	6±1	<7	407	3±1	<7	388	3±1	<7
10-09-78	379	3±1	<7	419	2±1	<7	399	4±1	<7
10-16-78	365	3±1	<7	422	3±1	<7	402	2±1	<7
10-23-78	340	2±1	<7	413	3±1	<7	388	3±1	<7
10-30-78	376	3±1	<7	427	3±1	<7	410	4±1	<7
11-06-78	354	4±1	<7	407	5±1	<7	388	6±1	<7
11-13-78	716	2±1	<7	809	1±1	<7	795	1±1	<7
11-20-78	348	4±1	<7	405	2±1	<7	393	3±1	<7
11-27-78	348	3±1	<7	376	2±1	<7	351	3±1	<7
12-04-78	457	3±1	<7	444	2±1	<7	504	2±1	<7
12-11-78	685	2±1	<7	464	2±1	<7	529	2±1	<7
12-18-78	226	6±1	<7	464	2±1	<7	512	3±1	<7
12-27-78	563	9±1	<7	577	7±1	<7	665	8±1	<7

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TABLE 6.4.1 (Continued)

AIRBORNE I-131 AND GROSS BETA CONCENTRATIONS IN AIR PARTICULATE FILTERS
(Weekly Collections)

	Collection Site: MET ⑦ Location: Figure 6.4-3			Collection Site: WR ⑧ Location: Figure 6.4-3			Collection Site: GGMP ⑨ Location: Figure 6.4-3		
		(10-2 pCi/m3)			(10-2 pCi/m3)			(10-2 pCi/m3)	
Collection Date	Volume (m^3)	Gross B	I-131	Volume (m^3)	Gross B	I-131	Volume (m^3)	Gross B	I-131
07-03-78	340	7±1	<7	425	5±1	<7	382	5±1	<7
07-10-78	345	5±1	<7	481	3±1	<7	430	3±1	<7
07-17-78	342	5±1	<7	464	3±1	<7	436	4±1	<7
07-24-78	351	6±1	<7	487	4±1	<7	391	4±1	<7
07-31-78	340	2±1	<7	495	1±1	<7	300	2±1	<7
08-07-78	345	7±1	<7	393	4±1	<7	266	7±1	<7
08-14-78	348	2±1	<7	665	2±1	<7	385	2±1	<7
08-21-78	340	2±1	<7	427	1±1	<7	379	2±1	<7
08-28-78	351	6±1	<7	393	3±1	<7	382	6±1	<7
09-05-78	374	2±1	<7	385	1±1	<7	427	2±1	<7
09-11-78	294	3±1	<7	345	3±1	<7	323	4±1	<7
09-18-78	345	2±1	<7	337	<1	<7	379	1±1	<7
09-25-78	351	2±1	<7	259	2±1	<7	382	2±1	<7
10-02-78	351	2±1	<7	458	1±1	<7	388	2±1	<7
10-09-78	357	3±1	<7	374	2±1	<7	413	2±1	<7
10-16-78	359	2±1	<7	348	2±1	<7	39[illegible]	2±1	<7
10-23-78	345	4±1	<7	354	2±1	<7	390	4±1	<7
10-30-78	354	4±1	<7	402	4±1	<7	399	3±1	<7
11-06-78	34[illegible]	6±1	<7	351	4±1	<7	390	4±1	<7
11-13-78	707	1±1	<7	690	1±1	<7	790	1±1	<7
11-20-78	351	3±1	<7	473	2±1	<7	393	2±1	<7
11-27-78	325	4±1	<7	351	2±1	<7	351	2±1	<7
12-04-78	436	3±1	<7	526	2±1	<7	509	2±1	<7
12-11-78	481	2±1	<7	540	2±1	<7	523	2±1	<7
12-18-78	464	2±1	<7	518	2±1	<7	526	2±1	<7
12-27-78	608	8±1	<7	690	6±1	<7	665	9±1	<7

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TABLE 6.4.2

RADIONUCLIDES IN AIR PARTICULATE SAMPLES
(Quarterly Analysis on Composite of Weekly Collections)

Collection Site	Location	No.	3rd Quarter 1978 (pCi/m^3) Ce-144	3rd Quarter 1978 (pCi/m^3) Other Gamma*	4th Quarter 1978 (pCi/m^3) Ce-144	4th Quarter 1978 (pCi/m^3) Other Gamma*
PG	Figure 6.4-2	1	<.03	<.01	<0.02	<0.01
61N	Figure 6.4-1	2	<.03	<.01	<0.02	<0.01
61VA	Figure 6.4-1	3	.03±.01	<.01	<0.02	<0.01
GJOE	Figure 6.4-3	4	<.03	<.01	<0.02	<0.01
HPO	Figure 6.4-3	5	<.03	<.01	<0.02	<0.01
RS	Figure 6.4-3	6	<.03	<.01	<0.02	<0.01
MET	Figure 6.4-3	7	<.03	<.01	<0.02	<0.01
WR	Figure 6.4-3	8	<.03	<.01	<0.02	<0.01
GGMP	Figure 6.4-3	9	<.03	<.01	<0.02	<0.01

*The spectrum is computer scanned from ~20 to ~2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

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TABLE 6.4.3

RADIONUCLIDES IN SURFACE WATER SAMPLES
(Monthly Collections)

Collection Period		Gamma Emitters* (pCi/1) Collection Site: MRUP Location: Figure 6.4-3 (1)	Collection Site: MRDOWN Location: Figure 6.4-3 (2)
1978	July	<15	<15
	August	<15	<15
	September	<15	<15
	October	<15	<15
	November	<15	<15
	December	<15	<15

*The spectrum is computer scanned from ~20 to ~2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

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TABLE 6.4.4

TRITIUM CONCENTRATIONS IN SURFACE WATER SAMPLES

	Tritium (pCi/l)	
Collection Period	Collection Site: MRUP Location: Figure 6.4-3 (1)	Collection Site: MRDOWN Location: Figure 6.4-3 (2)
09/12/78	250 ± 130	240 ± 140
10/11/78	450 ± 130	410 ± 130
12/16/78	400 ± 100	200 ± 100

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TABLE 6.4.5

RADIONUCLIDES IN WELL WATER SAMPLES
(Quarterly Collections)

Collection Period	Collection Site: ARKWELL Location: Figure 6.4-2 [5] pCi/l		Collection Site: TRIMWELL Location: Figure 6.4-2 [2] pCi/l		Collection Site: PGWELL Location: Figure 6.4-2 [4] pCi/l		Collection Site: MPWELL Location: Figure 6.4-2 [6] pCi/l	
	γEmitters*	Tritium	γEmitters*	Tritium	γEmitters*	Tritium	γEmitters*	Tritium
July, 1978	<15	---	<15	---	New wells beginning August, 1978			
August, 1978	Well deleted August, 1978		<15	1200±400	<15	450±380	<15	---
12/07/78			<15	<330	<15	<330	<15	470±90

*The spectrum is computer scanned from ~20 to ~2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137 Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

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TABLE 6.4.6

RADIOACTIVITY IN CISTERN WATER SAMPLES
(Monthly Collections)

	Collection Period	Collection Site: ARKCIST Location: Figure 6.4-2 [5] pCi/l			Collection Site: TRIMCIST Location: Figure 6.4-2 [2] pCi/l		
		Gross Beta	I-131	Gamma Emitters*	Gross Beta	I-131	Gamma Emitters*
1978	July	2±2	<1	<15	2±2	<1	<15
	August	<3	<1	<15	10±2	<1	<15
	September	5±2	<1	<15	5±2	<1	<15
	October	<2	<1	<15	<2	<1	<15
	November	3±1	<1	<15	2±2	<1	<15
	December	4±1	<1	<15	6±2	<1	<15

*The spectrum is computer scanned from ∿20 to ∿2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

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TABLE 6.4.7

TRITIUM CONCENTRATIONS IN CISTERN WATER SAMPLES
(Quarterly Collections)

Collection Period		Tritium (pCi/l)	
		Collection Site: ARKCIST Location: Figure 6.4-2 [5]	Collection Site: TRIMCIST Location: Figure 6.4-2 [2]
1978	3rd Quarter	<330	<330
	4th Quarter	<320	<330

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TABLE 6.4.8

RADIOACTIVITY IN MILK SAMPLES
(Monthly Collections)

	Collection Period	Collection Site[1]	pCi/l I-131	pCi/l Gamma Emitters[2]
1978	July	ALCONT	<0.5	<15
	August	ALCONT	<0.5	<15
	September	ALCONT	<0.5	<15
	October	ALCONT	<0.5	<15
	November	ALCONT	<1	<15
	December	ALCONT	<1	<15
	December	ALCONT	<1	<15

[1]All samples collected at Alcorn University. See Figure 6.4-2 [5]

[2]The spectrum is computer scanned from ∿20 to ∿2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

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TABLE 6.4.9

GAMMA EMITTERS* IN FRUIT AND VEGETABLE SAMPLES
(Collected at Harvest)

Sample Type	Location	Collection Date	γ Emitters pCi/g wet wt.
Pecans	Figure 6.4-2 [2]	03/18/78	<0.08
Mustard Greens	Figure 6.4-2 [5]	11/22/78	<0.08
Turnip Greens	Figure 6.4-2 [5]	11/22/78	<0.08

*The spectrum is computer scanned from ∿20 to ∿2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

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TABLE 6.4.10

GAMMA EMITTERS IN FISH SAMPLES
(Semiannual Collections)

Collection Site	Location	Collection Date	Species	pCi/g (wet) Gamma Emitters*
Hamilton Lake	Figure 6.4-2 [1]	10/03/78	Buffalo	<0.13
Hamilton Lake	Figure 6.4-2 [1]	10/03/78	White Bass	<0.13
Hamilton Lake	Figure 6.4-2 [1]	10/03/78	Fresh Water Drum	<0.13
Hamilton Lake	Figure 6.4-2 [1]	10/03/78	Catfish	<0.13
Hamilton Lake	Figure 6.4-2 [1]	10/03/78	White Crappie	<0.13

*The spectrum is computer scanned from ~20 to ~2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

TABLE 6.4.11

GAMMA EMITTERS IN MEAT SAMPLES
(Semiannual Collections)

Collection Site	Location	Collection Date	Sample Type	pCi/g (wet) Gamma Emitters*	pCi/g (wet) Fe-59 Zn-65
MET	Figure 6.4-3 (7)	12/12/78	Deer	<0.13	<0.26
MET	Figure 6.4-3 (7)	12/12/78	Rabbit	<0.13	<0.26

*The spectrum is computer scanned from ∿20 to ∿2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

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TABLE 6.4.12

GAMMA EMITTERS* IN SEDIMENT SAMPLES
(Semiannual Collections)

Collection Site	Location	Collection Date	pCi/g dry Gamma Emitters*
MRUP	Figure 6.4-3 (1)	10/26/78	<0.15
MRDOWN	Figure 6.4-3 (2)	10/26/78	<0.15
BRGSLP	Figure 6.4-3 (3)	10/27/78	<0.15

*The spectrum is computer scanned from ∿20 to ∿2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

TABLE 6.4.13

GAMMA EMITTERS[1] IN SOIL SAMPLES
(Collection Once Prior to Plant Operation)

Collection Site[2]		Location	Collection Date	pCi/g dry Cs-137	pCi/g dry Other Gamma[1]
PG	(T)	Figure 6.4-2 (1)	10/26/78	<0.15	<0.15
PG	(M)		10/26/78	<0.15	<0.15
PG	(B)		10/26/78	<0.15	<0.15
HPO	(T)	Figure 6.4-3 (5)	10/31/78	<0.15	<0.15
HPO	(M)		10/31/78	<0.15	<0.15
HPO	(B)		10/31/78	<0.15	<0.15
GJOE	(T)	Figure 6.4-3 (4)	10/29/78	0.43±0.09	<0.15
GJOE	(M)		10/29/78	0.30±0.10	<0.15
GJOE	(B)		10/29/78	0.30±0.10	<0.15
61n	(T)	Figure 6.4-1 (2)	10/26/78	0.99±0.15	<0.15
61n	(M)		10/26/78	0.83±0.12	<0.15
61n	(B)		10/26/78	0.33±0.09	<0.15
61n	(T)	Figure 6.4-1 (3)	10/26/78	0.58±0.09	<0.15
61n	(M)		10/26/78	0.22±0.06	<0.15
61n	(B)		10/26/78	0.31±0.06	<0.15
GGMP	(T)	Figure 6.4-3 (9)	10/27/78	0.26±0.06	<0.15
GGMP	(M)		10/27/78	0.11±0.04	<0.15
GGMP	(B)		10/27/78	<0.15	<0.15
MET	(T)	Figure 6.4-3 (7)	10/30/78	0.66±0.10	<0.15
MET	(M)		10/30/78	0.33±0.08	<0.15
MET	(B)		10/30/78	0.36±0.07	<0.15
WR	(T)	Figure 6.4-3 (8)	10/30/78	0.76±0.14	<0.15
WR	(M)		10/30/78	0.80±0.12	<0.15
WR	(B)		10/30/78	0.43±0.10	<0.15
RS	(T)	Figure 6.4-3 (6)	10/30/78	<0.15	<0.15
RS	(M)		10/30/78	<0.15	<0.15
RS	(B)		10/30/78	<0.15	<0.15

[1]The spectrum is computer scanned from ~20 to ~2000 keV. Specifically included are Ce-144, Ba-La-140, Cs-134, Cs-137, Zr-Nb-95, Co-58, Co-60, Mn-54, Zn-65. Naturally occurring gamma emitters such as K-40 and Ra daughters are frequently detected but not listed here. Data listed as "<" are at the 3σ level; others are 2σ. Unless otherwise noted, listed concentration is for Cs-137 and may be slightly more or less sensitive for other nuclides.

[2](T) = Top soil; detritus, shallow roots.
(M) = Middle soil; undisturbed for past 5 years.
(B) = Bottom soil; never disturbed.

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TABLE 6.4.14

GAMMA RADIATION
AVERAGE mR/QTR. USING THERMOLUMINESCENT DOSIMETERS
1978

			3rd quarter	4th quarter
Date Annealed:			06/20/78	09/21/78
Date Read:			10/11/78	01/11/79
Collection Site	Location	No.	mR/Quarter	
M-00 Control	Figure 6.4-2	0	4.7±0.7	4.4±0.8
M-01	Figure 6.4-2	1	14.3±2.6	16.9±2.6
M-02	Figure 6.4-2	2	missing	16.9±2.6
M-03	Figure 6.4-2	3	11.1±1.4	12.1±1.8
M-04	Figure 6.4-2	4	14.3±1.3	14.3±1.3
M-05	Figure 6.4-2	5	15.7±2.6	16.9±3.9
M-06	Figure 6.4-2	6	13.0±2.6	16.9±2.6
M-07	Figure 6.4-2	7	11.6±2.6	13.0±1.3
M-08	Figure 6.4-2	8	14.3±1.3	15.6±1.3
M-09	Figure 6.4-2	9	14.3±1.3	14.3±2.6
M-10	Figure 6.4-3	10	13.0±2.6	15.6±1.3
M-11	Figure 6.4-1	11	14.3±1.3	14.3±2.6
M-12	Figure 6.4-1	12	13.0±1.3	14.3±1.3
M-13	Figure 6.4-1	13	12.9±1.7	14.3±2.6
M-14	Figure 6.4-1	14	14.3±1.3	14.3±2.6
M-15	Figure 6.4-3	15	9.5±1.7	11.4±1.6
M-16	Figure 6.4-3	16	12.5±1.3	14.3±2.6
M-17	Figure 6.4-3	17	12.2±2.0	14.3±2.6
M-18	Figure 6.4-3	18	missing	12.9±1.3
M-19	Figure 6.4-3	19	13.0±1.3	missing
M-20	Figure 6.4-3	20	13.0±2.6	14.3±2.5
M-21	Figure 6.4-3	21	11.8±2.6	14.3±2.1
M-22	Figure 6.4-3	22	14.3±2.5	14.3±1.3
M-23	Figure 6.4-3	23	12.0±1.4	14.3±1.3
M-24	Figure 6.4-3	24	14.3±1.3	15.6±5.2
M-25	Figure 6.4-3	25	14.3±1.3	14.3±3.9
M-26	Figure 6.4-3	26	15.6±2.6	15.6±2.5
M-27	Figure 6.4-3	27	12.9±2.1	14.3±2.6
M-28	Figure 6.4-3	28	14.3±1.3	14.3±2.6
M-29	Figure 6.4-3	29	14.3±1.3	15.6±2.6
M-30	Figure 6.4-3	30	missing	14.3±3.9

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TABLE 6.4.15

AIR SAMPLER COLLECTION SITES

Collection Sites	Description
PG	Port Gibson City Barn - located inside fence, west side
61N	Hwy 61 North at Yokena Church
61VA	Hwy 61 North at Vicksburg Airport
GJOE	On southwest boundary of Gladjo lot and residence
HPO	Located behind the temporary MP&L Staff Offices
RS	Northeast of site, at roadside across from residences located 100 meters west of Creek Bridge, site perimeter
MET	Located east side of Met Shack within fenced boundary
WR	Located on Waterloo Road at residence nearest site perimeter
GGMP	Located in Grand Gulf Military Park on road leading to cemetery, north side of road

TABLE 6.4.16

MISCELLANEOUS COLLECTION SITES

Collection Site	Description
ARKCIST	Cistern water sample from the ARK, property of Col. S. B. McGruder
ARKWELL	Well water sample from the ARK, property of Col. S. B. McGruder
PGWELL	Ground water sample from Port Gibson well system (composite of all wells operational on the day of sampling)
ALCONT	Milk sample (control) from Alcorn University Dairy Herd
MRUP	Surface water sample from the Mississippi River (control) upstream
MRDOWN	Surface water sample from the Mississippi River downstream
BRGSLP	Grand Gulf Nuclear Station bargeslip; discharge structure empties into the bargeslip
FISH	Fish sample from Lake Hamilton
MPWELL	Ground water sample from Grand Gulf Military Park well
TRIMCIST	Cistern water sample from tenant house at GGNS property line
TRIMWELL	Ground water sample from Ms. M. L. Trimble property near site boundary

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TABLE 6.4.17

TLD LOCATIONS

Collection Site	Description
	SITE AND WARREN COUNTY
M11	Hwy 61 - 5 km north of Big Black River Bridge
M12	Hwy 61 - at 61N location - YOKENA
M13	Hwy 61 - 13 km north of Big Black River Bridge, west side of Hwy
M14	Hwy 61 - at 61VA location - Vicksburg Airport
	SITE PERIMETER AND WITHIN 3 KILOMETERS
M10	South of main gate GRAND GULF MILITARY PARK 25 meters
M15	Northern most point of site perimeter - river's edge
M16	At MET location - Met Shack, site
M17	At RS location - GRAND GULF ROAD
M18	Eastern site boundary
M19	Eastern site boundary
M20	Eastern site boundary
M21	At HPO location - behind Health Physics Offices
M22	South of HP offices 200 meters
M23	Cross roads - heavy haul road and Bucksnort N/C road
M24	Radial well pump switching station, river's edge
M25	Hamilton Lake boat launching area
M26	Bucksnort H/C boundary in woods 100 meters from road
M27	Southern most point of site perimeter - river's edge
M28	At GJOE location - near Gladjo residence
M29	Road to Waterloo Plantation, 2 km from Waterloo Road turnoff
M30	Arnold Acres Trailer Park

TABLE 6.4.17 (Continued)

CLAIBORNE COUNTY

Collection Site	Description
M01	REA pole east of the entry gate to Lake Claiborne approximately 100 meters
M02	At the entrance to Windsor castle or the REA power pole
M03	South of Port Gibson, near the entrance to the Mosswood Country Club, east side of highway on REA power pole
M04	Hwy 547, east of the Natchez Trace Overpass approximately 100 meters, between the twin power lines
M05	Hwy 18, north of the highway approximately 25 meters located on the REA power line
M06	East of the Willows, beyond the MMB church, on the REA power pole, Hwy 462
M07	Port Gibson City Barn
M08	At the south entrance to the Big Black River Bridge
M09	Oak Tree south of the entrance to Warner-Tully YMCA camp

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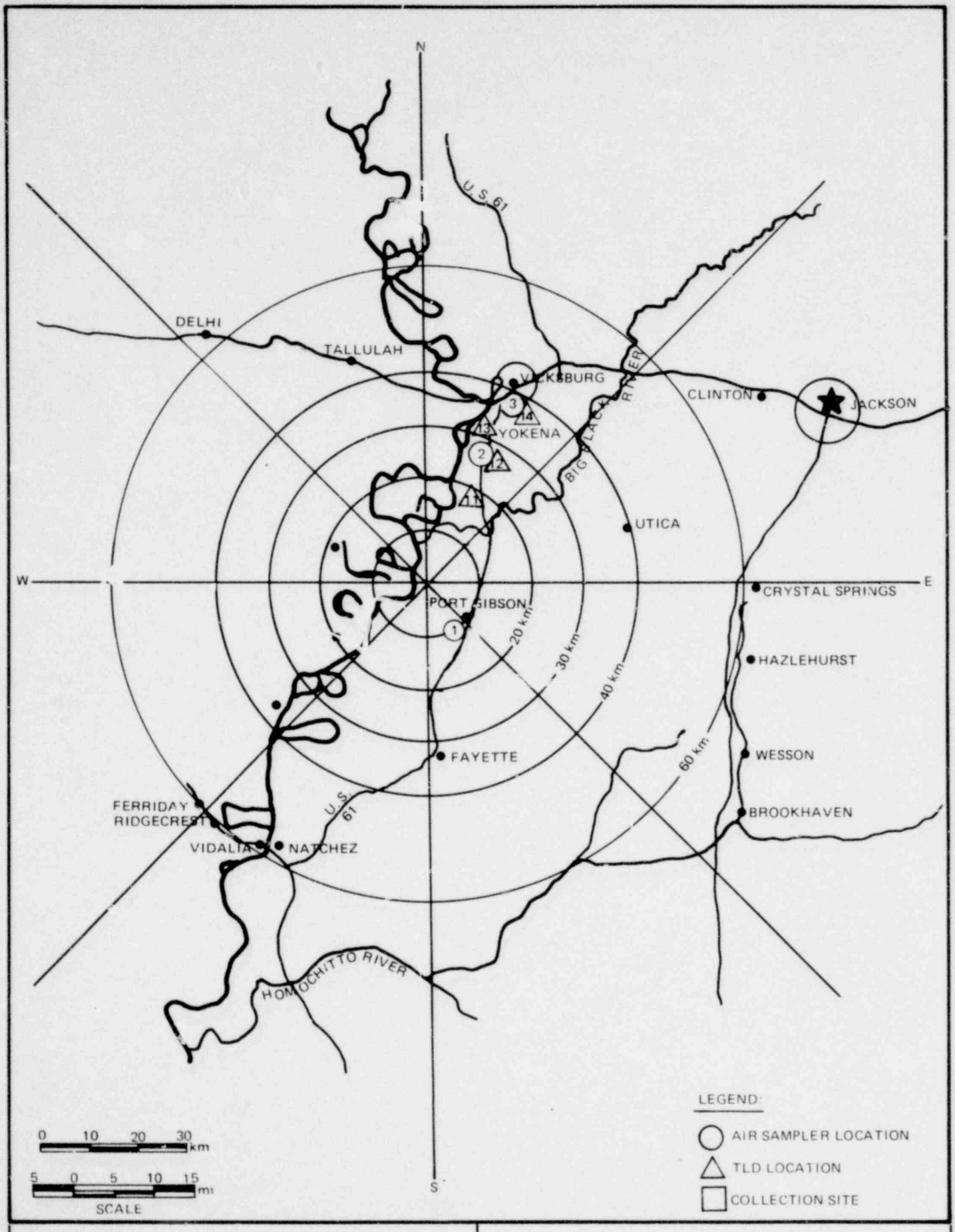

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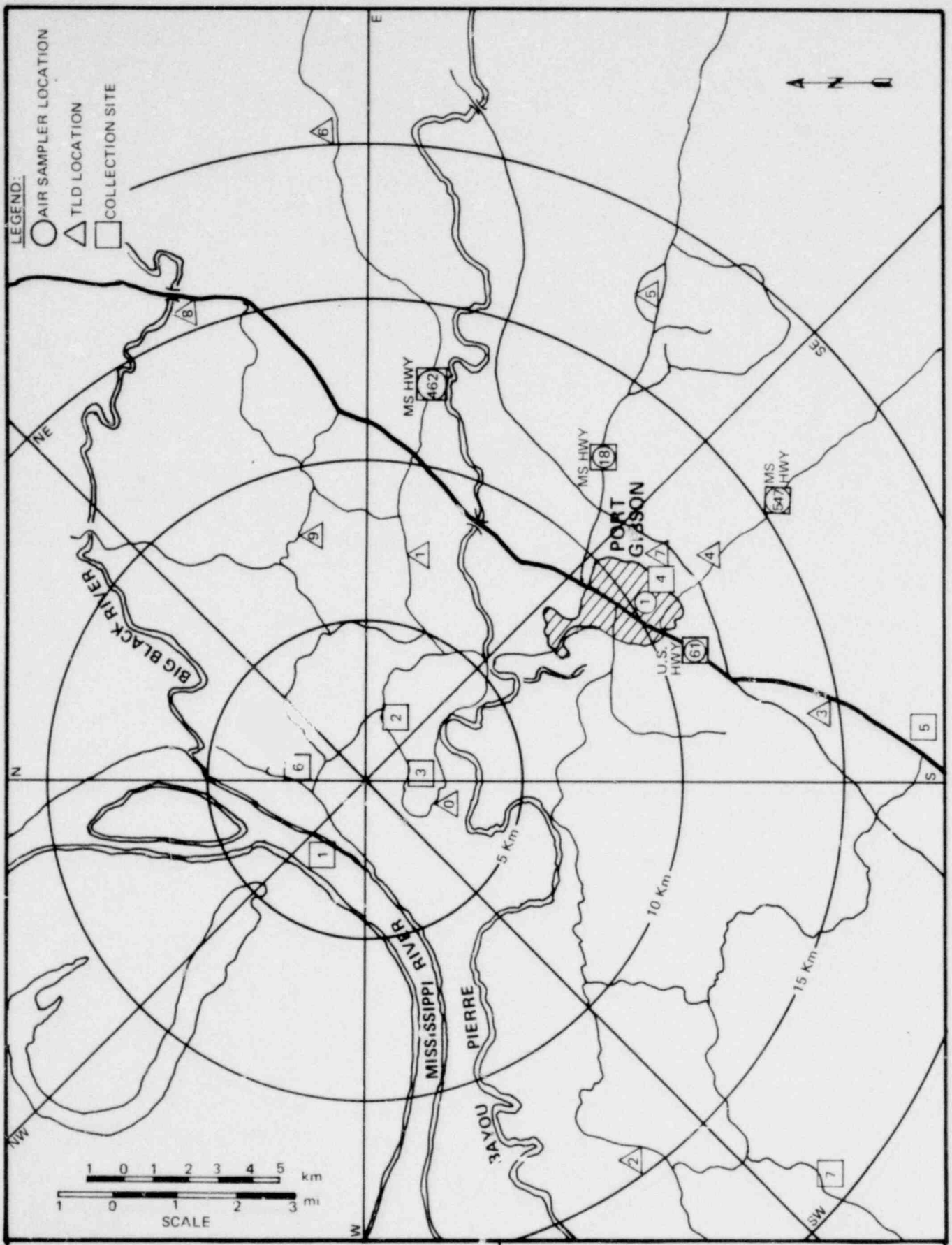
COLLECTION SITE LOCATIONS
GENERAL AREA MAP

FIGURE 6.4-1



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COLLECTION SITE LOCATIONS
CLAIBORNE COUNTY, MISSISSIPPI

FIGURE 6.4-2

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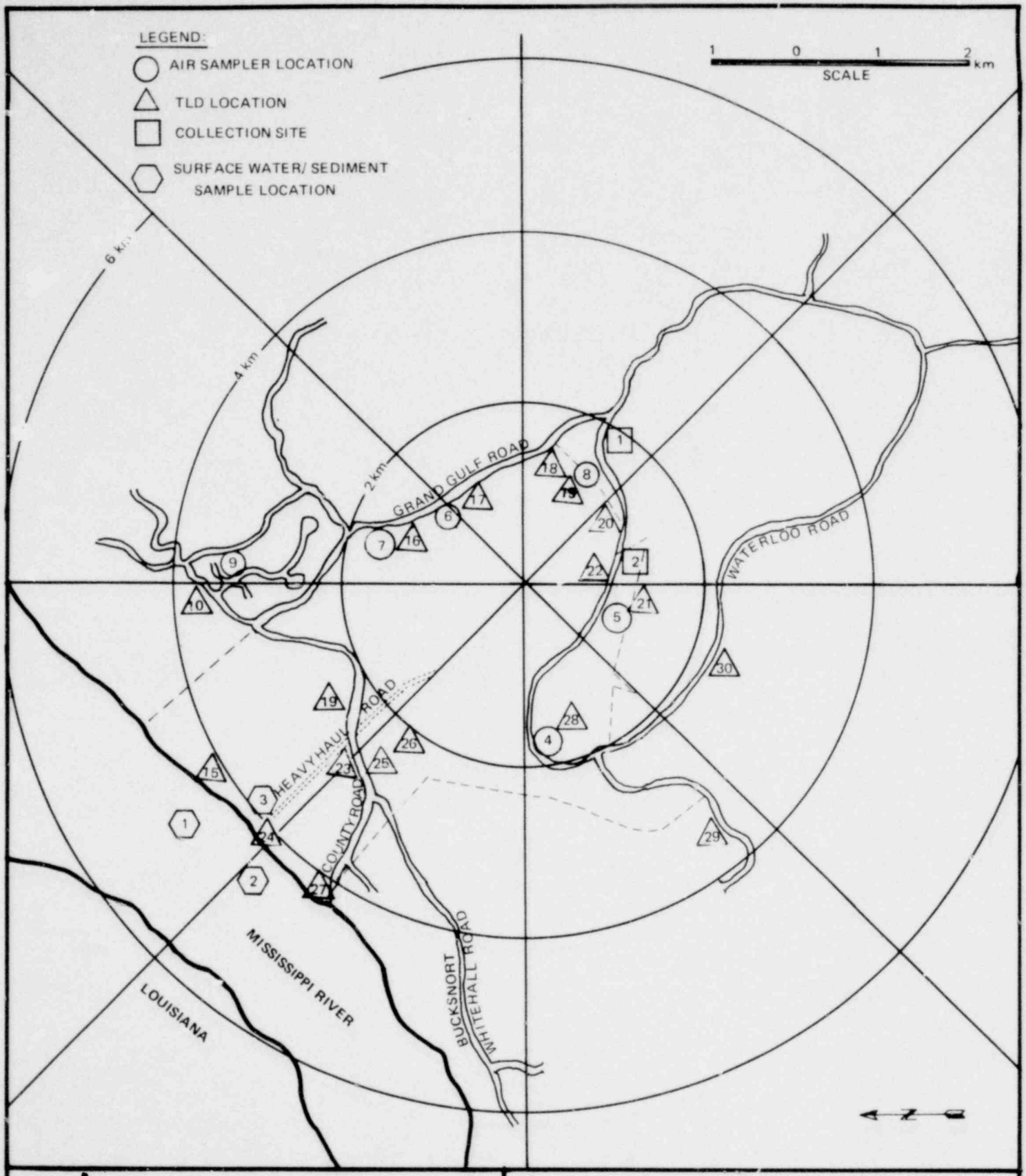

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COLLECTION SITE LOCATIONS
SITE PERIMETER

FIGURE 6.4-3

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