RIVER BEND STATION ENVIRONMENTAL REPORT

OPERATING LICENSE STAGE

SUPPLEMENT 9

2.9 AMBIENT NOISE

Two ambient surveys have been conducted in the vicinity of the River Bend site. The first survey was performed in June 1972 prior to construction and the latter in January 1980 during Unit 1 construction. Refer to Section 6.7 for the noise survey methodology and Section 5.8.1.2 for the assessment of the effects produced by the operational sound levels.

Noise Sampling Area

The noise sampling area is shown in Fig. 2.9-1. In general, the terrain surrounding the site is mostly wooded except for the Mississippi River, some open fields, and farmland. Eight measurement locations were selected to represent the acoustical environment in the vicinity of the site. Measurement location 1 is situated on the southeast edge of St. Francisville, approximately 2 km (1.25 mi) west-northwest of the site. This is the only population center within a 4.8-km (3-mi) radius of the site. Measurement locations 2, 3, 4, 5, and 7 were selected as typical of the rural-farm areas. Location 6 was selected at the intersection of Route 61, Route 966, and Police Jury Road to measure representative traffic noise in the vicinity of roads near the site. Location 8 is in the general proximity of the Crown Zellerbach Papermill on Route 964, which is one of the major industrial areas surrounding the site. The exact locations of the measurement positions are described in Table 2.9-1.

1972 Survey

This survey was conducted during June 15-16, 1972, prior to any construction at the River Bend site. The dominant noise source for the majority of the locations was insect noise, which masked all other sources with the exception of the papermill, the dominant noise source at location 8. With the insect noise, the minimum sound levels at all locations ranged from 49 to 56 dBA, which is equivalent to those found in a "Normal Suburban Residential" area(1). However, when the sound levels were adjusted to eliminate insect noise, the minimum calculated sound levels ranged from 31 to 39 dBA and are typical of a "Rural Community," with the exceptions of measurement locations 3, 4, and 8, which have generally higher sound levels due to their proximity to the papermill(1). The residual minimum A-weighted sound levels measured during the daytime and nighttime hours at the eight locations are presented in Table 2.9-2.

1980 Survey

During January 9-10, 1980, a second ambient noise survey was conducted. There was little construction activity ongoing at that time. The reactor mat was poured January 15 through 17, 1980. Accordingly, no significant contributing noise-producing construction activity was in progress at that time. Also, approximately two-thirds of the noise measurements were obtained during nonworking hours. The principal contributors to the noise environment remained basically the same as for the 1972 survey. Big Cajun No. 2 - Units 1, 2, and 3, a coal-fired power plant located across the Mississippi River approximately 2 km (1.25 mi) from the River Bend site, was not yet on-line at the time of this survey. These units are scheduled for startup in the early 1980s. The 1972 measurement locations remained the same with the exception of the following three adjustments. Location 2 was relocated approximately 900 m (3,000 ft) north of the radio tower on the perimeter of the new site boundary. Measurement location 3, inaccessible due to muddy roads, was relocated on the River Access Road, approximately 30 m (100 ft) west-southwest from a 69-kV transmission line onsite. Measurement location 8 had to be abandoned because of current inaccessibility to private property on which the papermill is located.

The significant noise sources of this survey were a papermill and highway traffic. The insect noise was absent due to the winter season. A comparison of the insect-corrected levels for the 1972 survey with the measured levels of the 1980 survey is presented in Table 2.9-2 and shows good agreement, with the exception of locations 2 and 6 which are 5-8 dBA higher. Highway traffic and the papermill noise contributed to the ambient sound levels at locations 2 and 6 being slightly higher than was anticipated in the 1972 survey estimate. The minimum ambient sound levels at all seven locations ranged from 34 to 41 dBA and are typical of a "Rural Community"[1]. The sound level data from the 1980 survey is reported in Table 2.9-2.

Table 2.9-3 presents the measured equivalent sound level data for the seven measurement locations which was used in the determination of outdoor day-night sound levels (Ldn). The day-night sound level is the A-weighted equivalent sound level with a 10 dB penalty applied to sound occurring at nighttime and was developed by the EPA in 1974 as a descriptor for assessing community noise[2]. Since the 1972 survey was conducted prior to the development of Ldn, only residual sound levels were acquired. The 1980 survey was designed to obtain both residual data for comparison with

the 1972 results and statistical data for the Ldn impact assessment. Whereas the residual sound levels only describe the background sound, the day-night sound level takes into account intrusive noise events as well as background sound.

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in the range of 47 to 59 dBA, with the exception of location 6 where there was an Ldn of 70 dBA because of Route 964 traffic noise. Section 6.7 describes the survey methodology in detail.

Since the measured residual sound levels in the 1980 survey were essentially the same as the corrected residual levels of the 1972 survey, it can be concluded that the ambient noise levels in the area have not changed since 1972 and that there are no new major sources in the proximity of the plant, with the exception of the Big Cajun power plant.

TABLE 2.9-1

AMBIENT SOUND LEVEL
MEASUREMENT LOCATIONS

Location	1972 Survey Location Description	1980 Survey Location Description
1	Pecan Grove Drive St. Francisville	Pecan Grove Drive St. Francisville
2	Route 965, near radio tower, GSU property	Route 965, 900 m (3,000 ft) north of radio tower off GSU property
3	On levee at dirt road, GSU property	River Access Road, 30 m (100 ft) west-southwest of 69-kV transmission line
4	Police Jury Road, Powell Forest Plantation The Broadbents	Police Jury Road, Powell Forest Plantation The Broadbents
5	Police Jury Road Starhill Church and Cemetery	Police Jury Road Starhill Church and Cemetery
6	Intersection of Route 61, Police Jury Road, and Route 966	Intersection of Route 61, Police Jury Road, and Route 966
7	Route 964, 1.3 km (0.8 mi) north of Illinois Central Gulf Railroad, 1.6 km (1 mi) south of Route 61	Route 964, 1.3 km (0.8 mi) north of Illinois Central Gulf Railroad, 1.6 km (1 mi) south of Route 61
8	Route 964 Papermill	None

TABLE 2.9-2

AMBIENT SOUND LEVELS

Location	Average Minimum Sound Levels 1972 Survey (dBA)	Corrected Sound Levels 1972 Survey(1) (dBA)	Average Minimum Sound Levels 1980 Survey(2) (dBA)
1	54	33	34
2	54	31	39(3)
3	52	44	41(3)
4	53	45	40
5	53	37	39
6	50	36	41
7	49	39	40
8	56	54	No Data

(1)Corrected to remove cricket noise
(2)Without presence of insect noise
(3)Different locations than 1972 survey

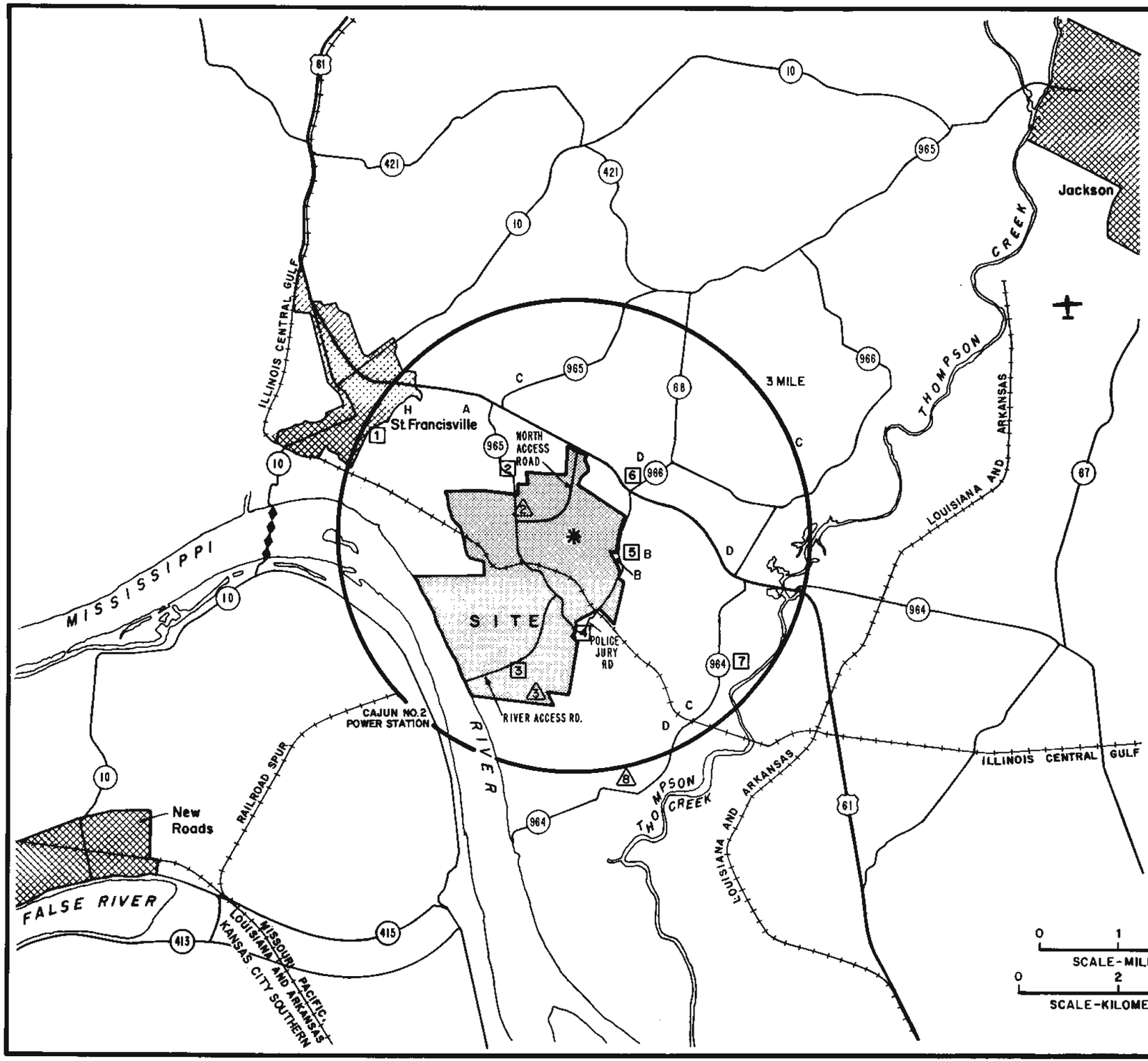
TABLE 2.9-3

STATISTICAL SUMMARY DATA
1980 SURVEY

Location	Measurement Period	Date	Time (Hr)	Leq (dBA)	Ldn (dBA)
1	Night	Jan 10	0:15	51	
	Night	Jan 10	3:20	45	51
	Day	Jan 9	10:39	45	
2	Night	Jan 10	0:45	42	
	Night	Jan 10	3:00	41	47
	Day	Jan 9	11:15	41(1)	
3	Night	Jan 10	2:30	53	
	Day	Jan 9	14:37	42(1)	59
4	Night	Jan 10	1:00	74(2)	
	Night	Jan 10	4:45	52	58
	Day	Jan 9	15:06	40(1)	
5	Night	Jan 10	1:30	41	
	Night	Jan 10	4:25	No Data	47
	Day	Jan 10	13:25	40(1)	
6	Night	Jan 10	1:45	73	
	Night	Jan 10	4:00	64	70
	Day	Jan 10	13:35	63(1)	
7	Night	Jan 10	2:00	42	
	Night	Jan 10	3:45	41	47
	Day	Jan 9	15:48	40(1)	

(1) Computed
(2) Traffic passby frequent

2



POSITION NUMBER	DESCRIPTION
1.	PECAN GROVE DRIVE, ST. FRANCISVILLE
2.	ROUTE 965, 900M (3000FT.) NORTH OF RADIO TOWER
3.	RIVER ACCESS ROAD, 30M (100 FT.) WSW OF 69KV TRANSMISSION LINE
4.	POLICE JURY ROAD, POWELL FOREST PLANTATION, THE BROADBENTS
5.	POLICE JURY ROAD, STAR HILL CHURCH
6.	INTERSECTION OF ROUTE 61, POLICE JURY ROAD & ROUTE 966
7.	ROUTE 964, 1.3Km. (0.8Mi.) NORTH OF ILLINOIS CENTRAL GULF RR
△	1972 SURVEY POSITIONS 2,3 & 8
+++++	RAILROAD
H	HOSPITAL
D	CEMETARY
C	CHURCH
B	CHURCH AND CEMETARY
A	AUDIBON LAKES CAMP RESORT
✱	RIVER BEND STATION

FIGURE 2.9-1

AMBIENT SOUND LEVEL MEASUREMENT LOCATIONS

RIVER BEND STATION
ENVIRONMENTAL REPORT – OLS

5.8 SOCIOECONOMIC IMPACTS

5.8.1 Physical

5.8.1.1 Nonradioactive Gaseous Emissions

Economic and social effects of nonradioactive gaseous emissions from plant operation will be negligible since the auxiliary boilers will be electrically operated (i.e., no emissions), and the fossil-fired diesel generators and diesel fire pumps will be infrequently operated.

Offsite deposition of salt from operation of the cooling towers will be below that which is known to cause injury to plants (Section 5.3.3.2), and socioeconomic impacts are expected to be insignificant.

Plant operation is not expected to create any meteorological conditions outside the plant boundary that would cause economic or financial loss to the area.

Visual impacts of the station will not be significant, as discussed in Section 3.1.

5.8.1.2 Noise

This section identifies the major external noise sources at River Bend Station used to estimate plant operational sound levels at the plant property line and at the 1980 ambient survey locations (Section 2.9). Plant and ambient sound levels are combined and presented in Tables 5.8-1 and 5.8-2.

The major external sources of noise from the station are multicell mechanical draft cooling towers, circulating water and service water pump motors, and equipment noise in the turbine hall. Also considered but determined not to be major contributors were exhaust fans for the turbine building, atmospheric dump valves and vents, and steam generator relief valves and vents. The sound power levels for each major noise source are given in Table 5.8-3. These levels are based on a field survey and a utility-sponsored study for the Edison Electric Institute[1]. 2

The sound levels due to plant operation were predicted for the vicinity of the station using a computerized mathematical model[2]. The model determines the distance from each major source to a series of reference points on a grid system and, using the octave band sound power levels of each reference grid point and assuming hemispherical radiation and atmospheric absorption at standard conditions, 2

calculates the sound pressure level at each reference point. The attenuating effects of trees, topography, and

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meteorological conditions are not included in the model. Barrier effect provided by onsite buildings to individual noise sources is included for minor noise sources only. There were no barriers assumed for the major noise sources.

The EPA-identified level of Ldn = 55 dB has been selected for evaluating the community and plant property line noise impacts. The day-night sound level is the 24-hr A-weighted equivalent sound level with a 10 dB penalty applied to sound occurring at night. This descriptor was developed by the
2 EPA in 1974 as a method for assessing community noise[3].

The octave band content of the total sound level at the nearest residence (1.2 km/4,000 ft southeast of the plant) and the contribution of each major noise source is given in Table 5.8-4. The cooling towers are the major contributors to the plant noise, since the turbine halls, circulating water pump motors, and service water pump motors do not contribute to the total level at this position.

The projected sound levels during plant operation can be obtained by adding +6 dB to the Leq-values of Fig. 5.8-1, which gives the Ldn values. A comparison of the EPA criteria and Fig. 5.8-1 shows that the north to south-southeast quadrants (plant grid North) exceed the EPA-identified level of 49 dBA (55 Ldn) at the property line.

Calculated sound levels in the vicinity of the station are presented in Table 5.8-1 and Fig. 5.8-1. These levels represent the worst case conditions when the noise is flanking over the trees. When the calculated levels in several directions along the property line and at measurement locations 5 and 6 are compared to the EPA-identified level of 49 dBA (55 Ldn), the identified level is exceeded.

Corrections to plant noise levels for attenuation of sound through absorptive growth were not included in computer model estimations because of the considerable variability in the published values of tree attenuation and in propagation conditions. During certain meteorological conditions, the noise may flank over the trees. When the leaves are off the trees during December and January, attenuation may be negligible. Nevertheless, it is expected that during much of the time a significant amount of noise absorption will
2 result from the trees[4-11]. The predicted sound levels using a conservatively small amount of tree attenuation are presented in Table 5.8-1.

Tables 5.8-1 and 5.8-2 represent the calculated sound levels from the major noise sources only. The winter condition represents the worst case when the ambient sound levels are at their lowest and plant noise is more noticeable. The calculated level without tree attenuation represents the intruding noise level from the plant and does not include ambient noise.

The maximum expected increase in the ambient levels is 12 dB or less during the winter months when the noise flanks over the trees. When the noise does not flank over the trees but is attenuated through the trees, there should be no significant noise increase at the ambient survey locations.

Sound level measurements will be made when Unit 1 is in operation, to confirm estimated sound levels at the property line and at the measurement locations. The data acquisition will be similar to the two previous site noise surveys (Section 6.7).

5.8.2 Social and Economic

5.8.2.1 Direct Impact of Station Operation

The state of Louisiana exempts industrial plant structures from ad valorem taxes for a period of 10 yr after the plant is placed in service when the exemption is applied for and approved by the Louisiana Board of Commerce and Industry and the governor. An exemption has been approved for River Bend Station. This exemption does not include the property on which the plant is situated. In order to obtain this exemption, GSU agreed to give preference to material, equipment, and labor obtained in Louisiana or from Louisiana vendors, as discussed in Section 4.4.

Ad valorem taxes for River Bend Station - Unit 1, which become available to the parish after the exemption period expires, have been estimated for the first 5 yr following the exemption period. The estimated payments appear in Table 5.8-5 and apply only to River Bend Station and do not include taxes on other facilities or property, such as a substation or 500-kV line. 2

Estimated tax payments range from $11.968 million in the eleventh year of station operation to $7.204 million in the fifteenth year. These estimates are based on an estimated tax rate and a GSU assessment of 25 percent of fair market value while Cajun Electric Power Cooperative is assessed on 15 percent of fair market value. The tax rate will be determined by the parish. For the purpose of 2

TABLE 5.8-1

ESTIMATED SOUND LEVELS AT PROPERTY LINE
AND AT AMBIENT MEASUREMENT LOCATIONS

Property Line Direction[1]	Calculated Levels Without Trees (dBA Leq)	Calculated Levels With Tree Attenuation (dBA Leq)
N	49	38
NNE	52	39
NE	56	42
ENE	59	44
E	59	44
ESE	55	42
SE	55	42
SSE	53	40
S	46	34
SSW	44	33
SW	43	32
WSW[1]		
W[1]		
WNW	43	32
NW	41	30
NNW	48	36
Ambient Measurement Locations[2]		
1	28	19
2	47	35
3	34	24
4	42	31
5	53	40
6	49	36
7	29	20

---

[1] Plant boundaries taken with Plant Grid North (36° 15'-30" west of True North) and are the closest distance within that sector. WSW and W were not calculated due to the proximity of Big Cajun No. 2, Units 1 and 2, two coal-fired power units due to commence operation in the early 1980s.

[2] Ambient measurement locations shown in Fig. 2.9-1.

TABLE 5.8-2

MEASURED AND ESTIMATED SOUND LEVELS
IN THE VICINITY OF RIVER BEND STATION

Measurement Location[1]	Measured Residual Ambient Level		Calculated Level without Tree Attenuation	Maximum Expected Increase in Ambient Level (dBA)
	Summer 1972	Winter 1980		
1	54	34	28	1
2	54	39	47	9
3	52	41	34	1
4	53	40	42	4
5	53	39	53	12
6	50	41	49	9
7	49	40	29	0

[1] See Fig. 2.9-1.

TABLE 5.8-3

UNSILENCED SOUND POWER LEVELS OF MAJOR
OPERATIONAL NOISE SOURCES FOR RIVER BEND STATION(1)

Equipment (No.)	Octave Band Center Frequency (Hz)									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Multicell mechanical draft cooling towers (8)	118	121	121	118	115	111	108	105	97	117
Turbine halls (2) (turbine-generator-exciter assembly)	116	122	120	115	111	107	104	96	90	113
Circulating water pump motors (8)	86	87	88	88	88	98	88	78	68	99
Service water pump drive motors (4)	88	90	92	93	93	98	92	83	75	100

2

(1)dB reference to 10^{-12} Watts

TABLE 5.8-4

CALCULATED SOUND PRESSURE LEVELS OF MAJOR
OPERATIONAL NOISE SOURCES AT THE NEAREST RESIDENCE(1,2)

Equipment (No.)	Octave Band Center Frequency (Hz)									
	31.5	63	125	250	500	1000	2000	4000	8000	dBA
Multicell mechanical draft cooling towers (8)	60	60	60	57	51	45	35	17	(3)	53
Turbine halls (2)	(3)	54	53	44	31	18	(3)	(3)	(3)	40
Circulating water pump motors (8)	28	28	28	28	26	34	17	(3)	(3)	34
Service water pump drive motors (4)	27	28	29	30	28	31	18	(3)	(3)	33
Total	60	61	61	57	51	45	35	17	(3)	53

(1) dB reference to 0.0002 dynes/cm²
(2) 4,000 ft SE of the plant, see Fig. 5.8-1
(3) Sound pressure less than 0

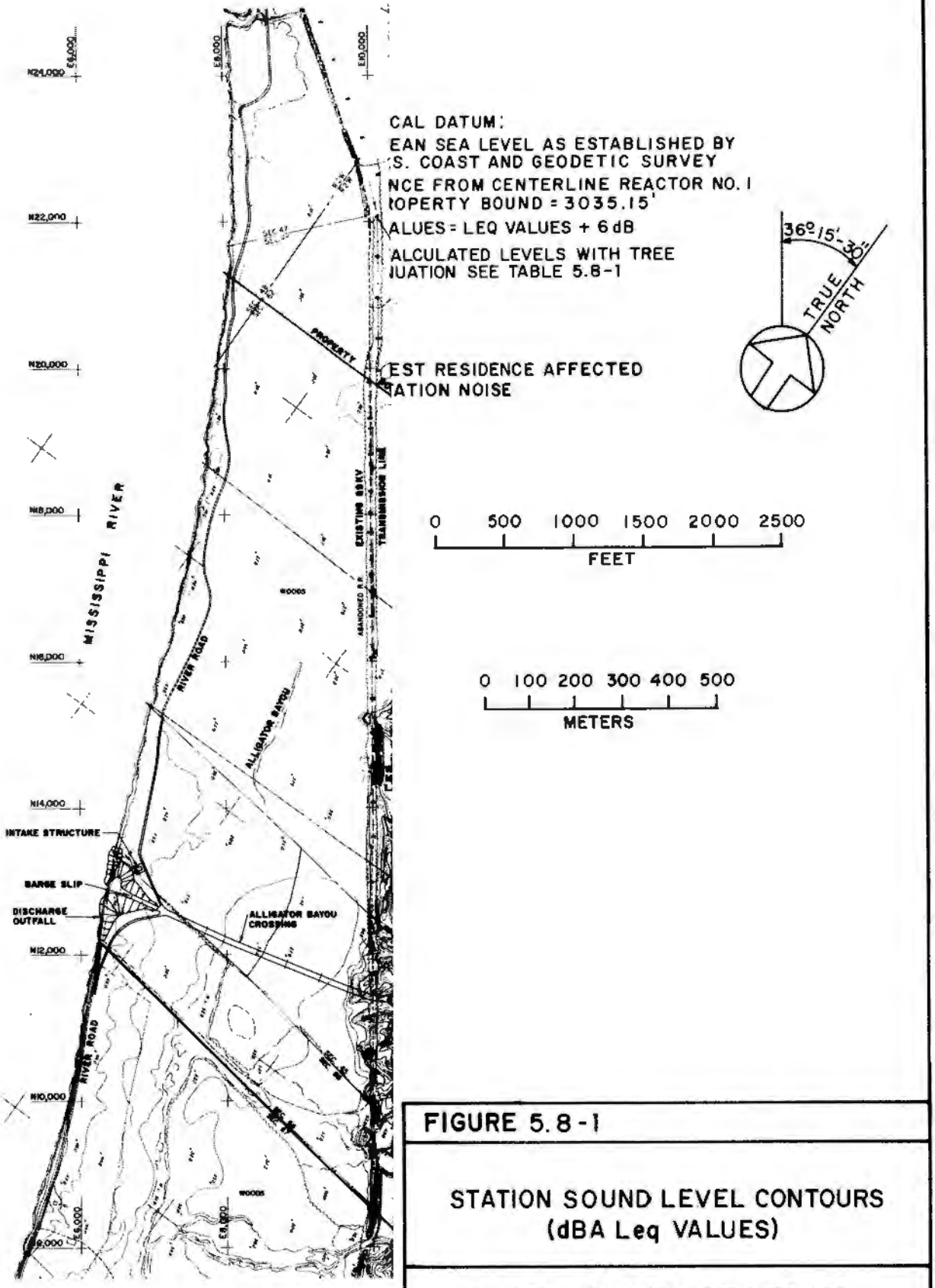

FIGURE 5.8-1

STATION SOUND LEVEL CONTOURS
(dBA Leq VALUES)

RIVER BEND STATION
ENVIRONMENTAL REPORT - OLS

6.7 OTHER MONITORING PROGRAMS

6.7.1 Noise

6.7.1.1 Preoperational Monitoring Program

Ambient sound surveys were conducted in the vicinity of the River Bend site during June 1972 and January 1980. The purposes of the surveys were to measure the existing ambient sound levels, to determine local sources of noise, and to identify noise-sensitive areas. The surveys were conducted during different seasons to include possible seasonal changes in sound propagation characteristics and insect noise. The ambient sound level data are compared with predicted station sound levels to evaluate the station noise impact (Section 5.8.1.2).

The first survey was conducted on June 15-16, 1972. Octave band sound pressure levels and A-weighted sound level measurements were taken between 1:00 am and 4:30 am. Readings were taken with a precision sound level meter and octave band filter set, and the instrumentation system was calibrated before each measurement. The ambient A-weighted and octave band sound pressure levels were obtained during lulls in identifiable transient noises. These data are presented in Section 2.9.

The 1980 ambient survey was conducted on January 9-10 while Unit 1 was under construction. The purposes of the second survey were to confirm that there had been no major changes in the ambient sound levels, to identify any new noise sources in the vicinity of the site, and to measure the ambient sound levels for use in determining impact.

The noise measurement locations used in the 1972 noise survey were reviewed and modified, as explained in Section 2.9. Octave band sound pressure level and A-weighted sound level measurements were made between 10:40 am and 3:48 pm on January 9, and between 1:00 am and 5:00 am, and 12:00 pm and 5:00 pm on January 10 at each noise measurement location. The statistical data were collected to determine the residual (L_{90}), mean (L_{50}), intrusive (L_{10}), and equivalent (L_{eq}) sound levels (Section 2.9) at all locations between 12:00 am and 5:00 am on January 10 only.

The data acquisition system used a Bruel & Kjaer (B&K) Type 4165 1/2-in microphone with a 4-in windscreen mounted on a tripod at least 10 ft from all reflecting surfaces. The microphone was connected to a B&K Battery Driven Power

Supply Type 2804 with a preamplifier. See Fig. 6.7-1 for the data acquisition system. This system was calibrated prior to collecting data at each measurement location using a B&K Calibrator Type 4230. The battery-driven power supply provided the ambient sound signal simultaneously to a B&K Precision Sound Level Meter, Octave Band Analyzer Type 2215, B&K Noise Level Analyzer Type 4426, and NAGRA SJ instrumentation quality tape recorder. A-weighted sound levels and octave band levels were read directly from the sound level meter; simultaneously, statistical data were being recorded with a noise level analyzer, and the results were automatically printed out on the B&K Alphanumeric Printer Type 2312. While handheld and statistical data were being obtained, a tape recording of the ambient sound was made simultaneously for further analysis, if required.

All manual sound level readings were taken in the absence of transient noise, such as from vehicles and aircraft, and are considered residual levels. A summary of the residual sound level data and statistical ambient sound level data taken during this survey is presented in Section 2.9.

Throughout the survey, observations were made of the meteorological conditions, including wind speed and direction, wet bulb and dry bulb ambient air temperatures, and general weather conditions. Weather conditions were favorable for noise measurements; wind was calm, 0-3 mph, occasionally gusting to 8 mph on both days. The temperatures ranged from 55 °F to 69 °F, the relative humidity was about 95 percent, and the skies were overcast.

6.7.1.2 Operational Monitoring Program

Sound level measurements will be made when River Bend Station - Unit 1 is in operation. The program will be similar to the two previous site noise surveys.

6.7.2 Air Quality

No air quality monitoring is planned for the operational phase of the plant. There are no systems at the River Bend site which have a significant impact on air quality. Impacts to air quality are discussed in Sections 2.8, 3.6, and 5.5.