ADDENDUM
TO THE
ENVIRONMENTAL REPORT
IN SUPPORT OF
APPLICATION FOR SITE CERTIFICATION
FOR
EXPANSION OF EXISTING PALATKA POWER PLANT

A STUDY OF EXISTING AND PROJECTED AMBIENT NOISE LEVELS RELATED TO THE EXPANSION

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A STUDY OF EXISTING AND PROJECTED AMBIENT NOISE LEVELS RELATED TO THE EXPANSION

INTRODUCTION

This addendum to the Environmental Report in support of application for site certification for expansion of the existing Palatka Power Plant consists of an investigation of the existing noise environment. It also includes estimations of the noise climate and the community response that can be expected during operation of the facility.

EXISTING ENVIRONMENT

Noise Sources

Natural Sources

Natural noise sources in the vicinity of the proposed peaking station are birds, insects, and air turbulence generated by winds. Other atmospherically induced natural sources of noise are thunderstorms and rain. All of these sounds may vary slightly in character and rate of occurrence through seasonal changes. Insect noises are of importance during nighttime with the familiar "chirping: of crickets present. During daylight hours the most significant natural source is birds. There is a large number of birds because of relatively favorable conditions existing for wildlife.

Man-Made Noise

Man introduces additional noise into his environment during his routine functions of life. The result of the performance of these functions is noise produced by transportation, industrialization, construction,

agricultural, and recreational activities. Examples of transportation noise observed in the Palatka area include automobiles, motorcycles, buses, airplanes, and trains. The predominant agricultural noises result from sounds produced by farm animals such as cattle and chickens. Familiar sounds of industrial noise in the Palatka area include the existing power generating plant and the paper processing plant. The sounds from the power generating plant can be heard only at times of extreme quiet and the predominant frequencies are in the 250 and 500 Hz octave bands. The paper plant located in Palatka is far enough from the area of interest (East Palatka) that it is not of concern. Construction noise sources are also present and were observed in the general area,--hammering, sawing, and some earthmoving noises, for example. These noises are typical of any rapidly developing area such as Florida. Recreational activities that were observed and found to be sources of community noise included pleasure boating, motorcycle riding, and flying of pleasure type aircraft. Traffic associated with a drive-in theater was also observed.

Noise Survey

Figure 1 shows the locations chosen for measurement in the vicinity of the proposed power plant expansion. Location 1 is approximately 1200 feet southeast of the proposed station's cooling tower. Location 2 is 3800 feet north of the proposed generating units, and Location 3 is about 1200 feet northwest of the proposed generating units. Location 1 was chosen on the basis of having no close residences and its proximity to the proposed facility. This location presents a clear view of Old Brick Road which experienced light traffic during the survey period (approximately 5-10 cars per hour during the day). Location 2 was chosen to be representative of a suburban environment, complete with dogs, children, and heavier traffic patterns. Location 3 was chosen because it is representative of a suburban environment close to the existing power plant.

Three types of noise data were obtained at each location during a survey period on April 18, 19, 20, and 21, 1974: (1) A-weighted sound levels, (2) octave-band sound levels, and (3) tape recordings of the time varying

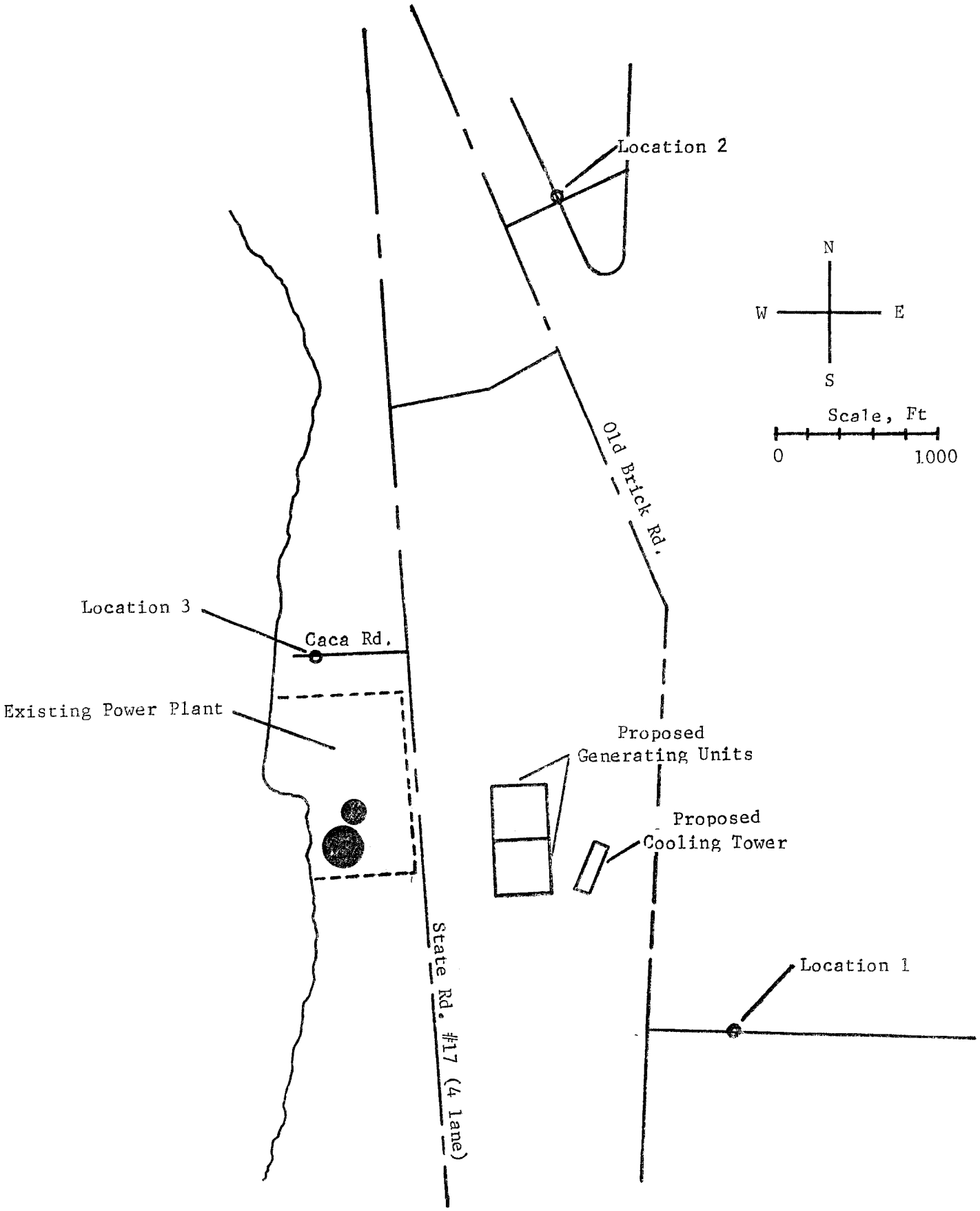

FIGURE 1. LOCATION OF MEASUREMENT SITES

sound environment. Measurements were made early in the day, at midday, and during evening hours to encompass the range of noise levels characteristic of the area.

The tape-recorded sound was later processed to obtain statistical analyses of noise-level distribution. These analyses provide information on the maximum noise level, minimum noise level, and the general distribution of noise levels for the period sampled. This type of analysis is appropriate because it fits in well with the analysis used for community noise.

The statistical distribution for the one-half-hour sampling period alone does not provide information on the temporal distribution of noise levels. However, since the degree to which people are disturbed by noise is highly dependent on their activity at the time the noise occurs, three separate time periods are considered for this analysis--daytime, evening, and nighttime. The daytime period encompasses the hours when the majority of people are awake and engaged in their normal daily activities. People generally tolerate a higher noise level in their environment at this time than they do during other functional periods. The evening period is related to public recreation or activity at home, such as yard work, watching television, etc. The third functional period occurs when the majority of people sleep. This period has more stringent requirements for noise level than either of the others. The functional periods are given in Table 1.

TABLE 1. FUNCTIONAL TIME PERIODS USED FOR NOISE ANALYSIS

Functional Time Period	Time	Time (24-hour clock)
Daytime	7 a.m. - 7 p.m.	0700-1900
Evening	7 p.m. - 10 p.m.	1900-2200
Nighttime	10 p/m. - 7 a.m.	2200-0700

Survey Results

The results of the A-weighted and octave band sound level measurements are shown in Tables 2, 3, and 4. Also shown in these tables are the L_{90}*, L_{50}**, and L_{10}*** values determined from the statistical analysis of the tape recorded data. These values are plotted as a function of time in Figures 2 - 7. In these plots, it is possible to see the extent to which the noise level varies. These variations are caused, at least in part, by changes in the activity of people and wildlife. Some of the change is caused by the variable wind conditions which prevail.

Sample plots showing the cumulative distribution of noise levels for some of the one-half hour measurement periods for the three locations are presented in Appendix A. Sixteen values of A-weighted noise level, obtained over a 48-hour period and determined by statistical analysis to be within 1.6 dB of the L_{50} level, were combined to arrive at the arithmetic average ambient level. The average ambient noise level for Location 1, 1200 feet southeast of the proposed cooling tower location, was 40 dBA.

At Location 2, 3800 feet north of the generating units, the average ambient for a 48-hour period was 41 dBA. The average ambient of 45 dBA was observed for Location 3, 1200 feet northwest of the generating units. The range in ambients observed for the three locations was from a low of 33 dBA at Location 1 (observed at 10:45 p.m., 4/18/74) to a high ambient of 52 dBA at Location 3, (observed at 2:23 p.m., 4/20/74). These variations in ambient sound levels are due to changes in activities occurring from weekday to weekend and time of day. Transportation and recreational noise were found to be significant factors in the ambient noise levels measured at all locations.

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* L_{90} is the noise level, in dBA, exceeded 90 percent of the time.

** L_{50} is the noise level, in dBA, exceeded 50 percent of the time.

*** L_{10} is the noise level, in dBA, exceeded 10 percent of the time.

TABLE 2. SUMMARY OF OCTAVE BAND DATA, STATISTICAL MEASUREMENTS OF AMBIENT NOISE AND A-WEIGHTED SOUND LEVELS FOR LOCATION 1

Date	Time	Octave Band Sound Levels, dB* Hz									Statistical Measurements of Ambient Noise, dBA*			A-Weighted Sound Level dBA*
		32	63	125	250	500	1000	2000	4000	8000	L_{90}	L_{50}	L_{10}	
4/18/74	1:15 PM	55	58	49	39	36	32	27	19	18	38	41	44	40
4/18/74	4:08 PM	53	49	41	37	33	30	28	24	26	35	38	44	38
4/18/74	7:35 PM	49	50	37	30	29	26	23	24	18	31	33	39	35
4/18/74	10:45 PM	56	54	38	42	39	38	27	23	15	36	38	40	33
4/19/74	1:20 AM	56	48	35	40	40	33	25	19	16	37	39	40	39
4/19/74	3:40 AM	55	51	42	46	42	38	29	19	14	37	39	41	42
4/19/74	9:50 AM	54	54	38	39	39	32	26	31	23	40	42	45	42
4/20/74	12:30 PM	61	50	40	37	38	36	34	35	31	39	47	57	46
4/20/74	3:10 PM	65	42	43	42	44	41	32	27	26	42	46	51	42
4/20/74	6:30 PM	50	44	35	36	34	32	26	22	23	34	39	45	38
4/20/74	9:10 PM	52	49	35	35	35	29	24	35	25	38	39	48	41
4/21/74	12:21 AM	47	43	31	25	25	23	16	40	30	40	40	41	40
4/21/74	4:30 AM	47	42	27	27	23	20	19	40	27	41	42	43	42
4/21/74	8:35 AM	46	42	31	33	32	24	25	31	22	36	38	41	35
4/21/74	10:53 AM	50	45	37	33	34	29	25	26	18	38	42	48	38
Arithmetic Mean		53.1	48.2	37.8	36.8	35.2	31.4	26.4	27.8	21.9	36.7	39.4	43.5	39.8

* Referenced to 20 micropascals (.0002 microbar).

TABLE 3. SUMMARY OF OCTAVE BAND DATA, STATISTICAL MEASUREMENTS OF AMBIENT NOISE AND A-WEIGHTED SOUND LEVELS FOR LOCATION 2

Date	Time	Octave Band Sound Levels, dB* Hz 32	63	125	250	500	1000	2000	4000	8000	Statistical Measurements of Ambient Noise, dBA* L_{90}	L_{50}	L_{10}	A-Weighted Sound Level dBA*
4/18/74	2:28 PM	49	51	45	36	35	32	29	24	23	37	41	46	35
4/18/74	4:49 PM	53	54	43	35	35	37	32	25	32	37	40	47	41
4/18/74	8:32 PM	54	54	42	40	37	34	31	34	27	37	41	52	47
4/18/74	11:25 PM	56	49	42	44	42	41	36	23	16	40	45	53	40
4/19/74	2:04 AM	46	41	36	38	32	31	26	24	16	34	39	54	34
4/19/74	4:28 AM	47	41	42	40	33	30	26	15	14	34	37	42	38
4/19/74	8:15 AM	62	55	47	47	47	43	39	30	18	49	53	57	49
4/19/74	10:35 AM	54	53	44	34	32	30	26	25	30	36	40	46	42
4/20/74	1:40 PM	46	46	43	43	43	41	33	28	23	44	48	51	44
4/20/74	3:55 PM	55	53	50	48	45	42	36	29	28	43	47	52	44
4/20/74	7:03 PM	51	50	39	34	37	33	29	20	22	38	40	44	40
4/20/74	9:52 PM	52	46	34	35	35	32	28	30	26	37	39	43	38
4/21/74	1:14 AM	47	47	32	31	27	23	22	38	34	39	40	41	41
4/21/74	5:32 AM	45	42	35	28	28	28	24	38	30	40	41	44	39
4/21/74	9:05 AM	47	45	37	35	36	30	29	36	33	39	41	45	41
4/21/74	10:48 AM	48	44	42	40	43	41	37	28	33	43	45	48	44
Arithmetic Mean		50.8	48.2	40.8	38	36.7	34.3	30.2	27.9	25.3	39.2	42.3	47.8	41

* Referenced to 20 micropascals (.0002 microbar).

TABLE 4. SUMMARY OF OCTAVE BAND DATA, STATISTICAL MEASUREMENTS OF AMBIENT NOISE, AND A-WEIGHTED SOUND LEVELS FOR LOCATION 3

Date	Time	Octave Band Sound Levels, dB* Hz									Statistical Measurements of Ambient Noise, dBA*			A-Weighted Sound Level
		32	63	125	250	500	1000	2000	4000	8000	L_{90}	L_{50}	L_{10}	dBA*
4/18/74	3:12 PM	60	60	61	46	43	47	33	27	29	43	46	51	43
4/18/74	5:31 PM	60	61	61	52	44	41	40	32	29	46	48	55	44
4/18/74	9:25 PM	56	61	47	46	42	37	33	37	17	41	43	47	43
4/18/74	12:00 PM	55	61	52	46	43	43	34	23	15	45	47	50	45
4/19/74	2:43 AM	57	64	52	45	40	37	32	26	15	43	44	45	43
4/19/74	5:10 AM	55	59	50	44	41	35	31	25	15	42	44	48	41
4/19/74	9:00 AM	51	62	48	45	39	41	40	39	30	43	46	55	43
4/19/74	11:25 AM	57	60	53	43	45	40	35	28	26	44	47	52	45
4/20/74	2:23 PM	70	62	55	49	48	45	45	40	41	48	50	54	52
4/20/74	4:40 PM	62	64	57	47	45	43	40	37	33	47	50	53	50
4/20/74	7:50 PM	53	57	49	41	40	39	39	33	33	45	49	58	45
4/20/74	10:33 PM	55	59	46	37	37	35	32	40	30	44	46	48	43
4/21/74	2:05 AM	55	60	47	38	39	35	33	40	34	44	45	49	44
4/21/74	6:42 AM	55	59	43	39	37	34	32	25	16	39	44	50	40
4/21/74	9:37 AM	57	59	50	44	42	38	38	38	28	44	46	50	47
4/21/74	11:19 AM	57	58	55	54	46	45	45	38	30	47	50	53	48
Arithmetic Mean		57.2	60.4	51.6	44.8	41.9	39.7	36.4	33	26.3	44	46.6	51.1	45

* Referenced to 20 micropascals (.0002 microbar).

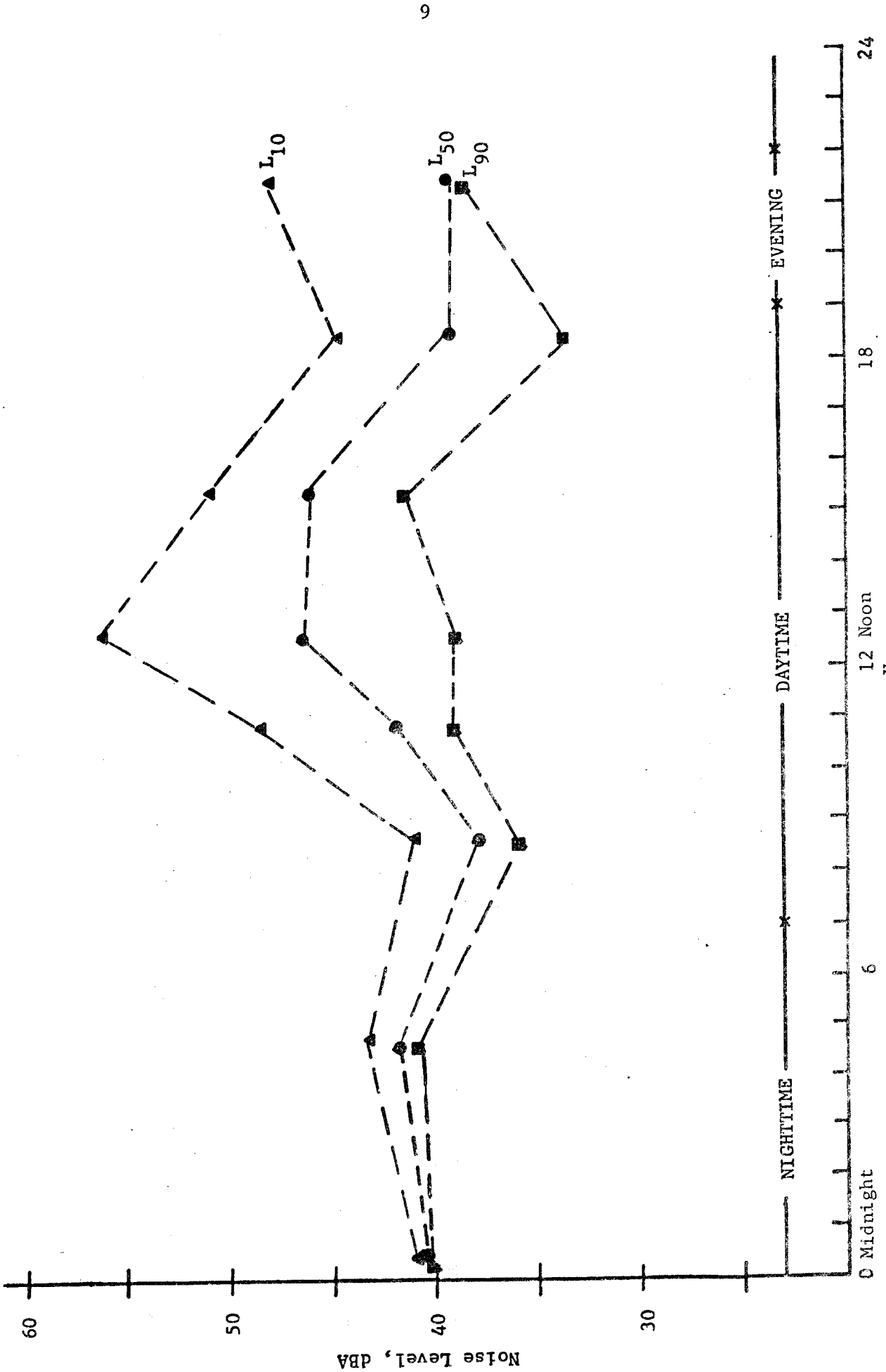

FIGURE 2. TIME HISTORY OF THE L_{90}, L_{50}, AND L_{10} EXISTING AMBIENTS FOR LOCATION 1, WEEKEND PERIOD

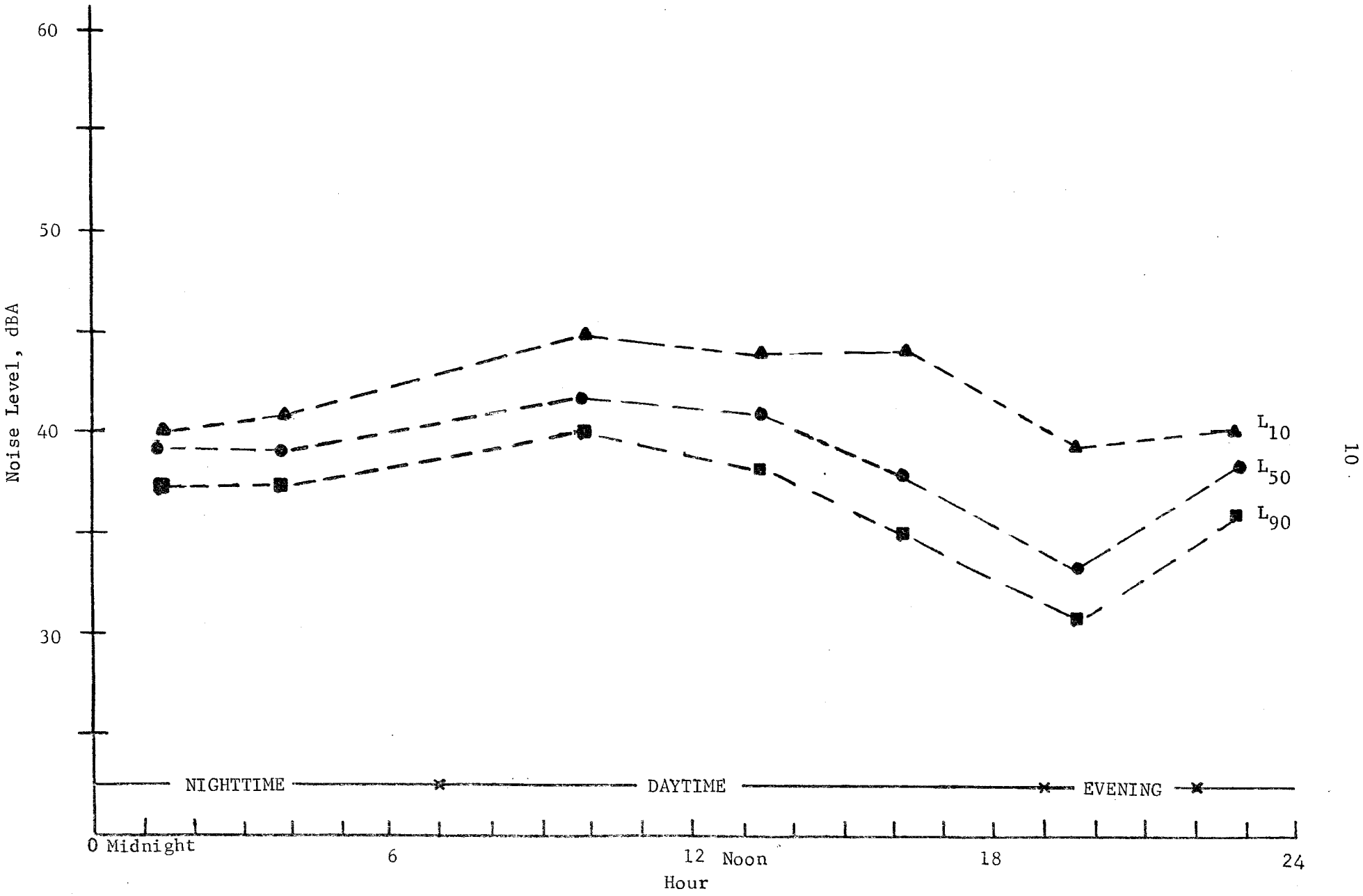

FIGURE 3. TIME HISTORY OF THE L_{90}, L_{50}, AND L_{10} EXISTING AMBIENTS FOR LOCATION 1, WEEKDAY PERIOD

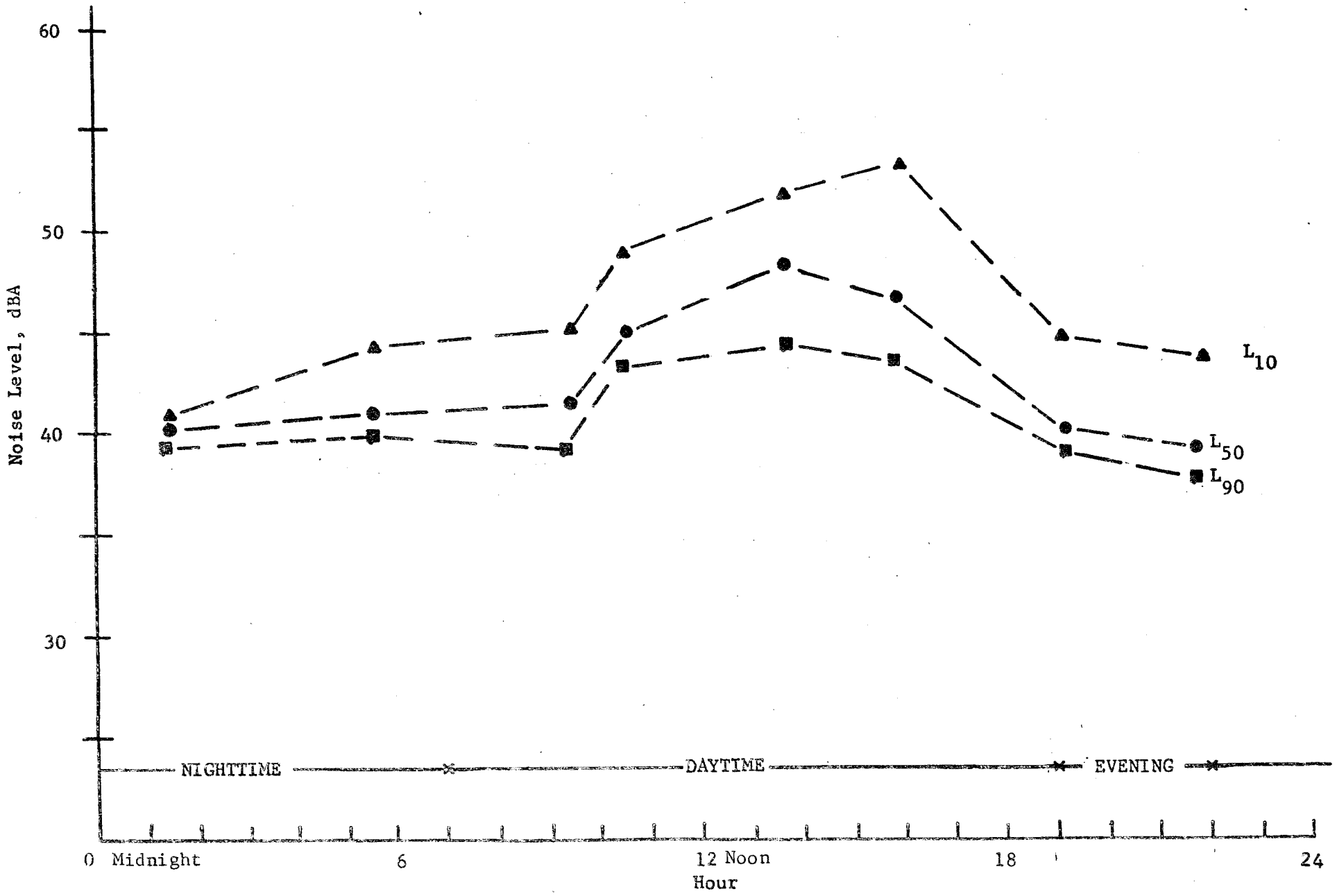

FIGURE 4. TIME HISTORY OF THE L_{90}, L_{50}, AND L_{10} EXISTING AMBIENTS FOR LOCATION 2, WEEKEND PERIOD

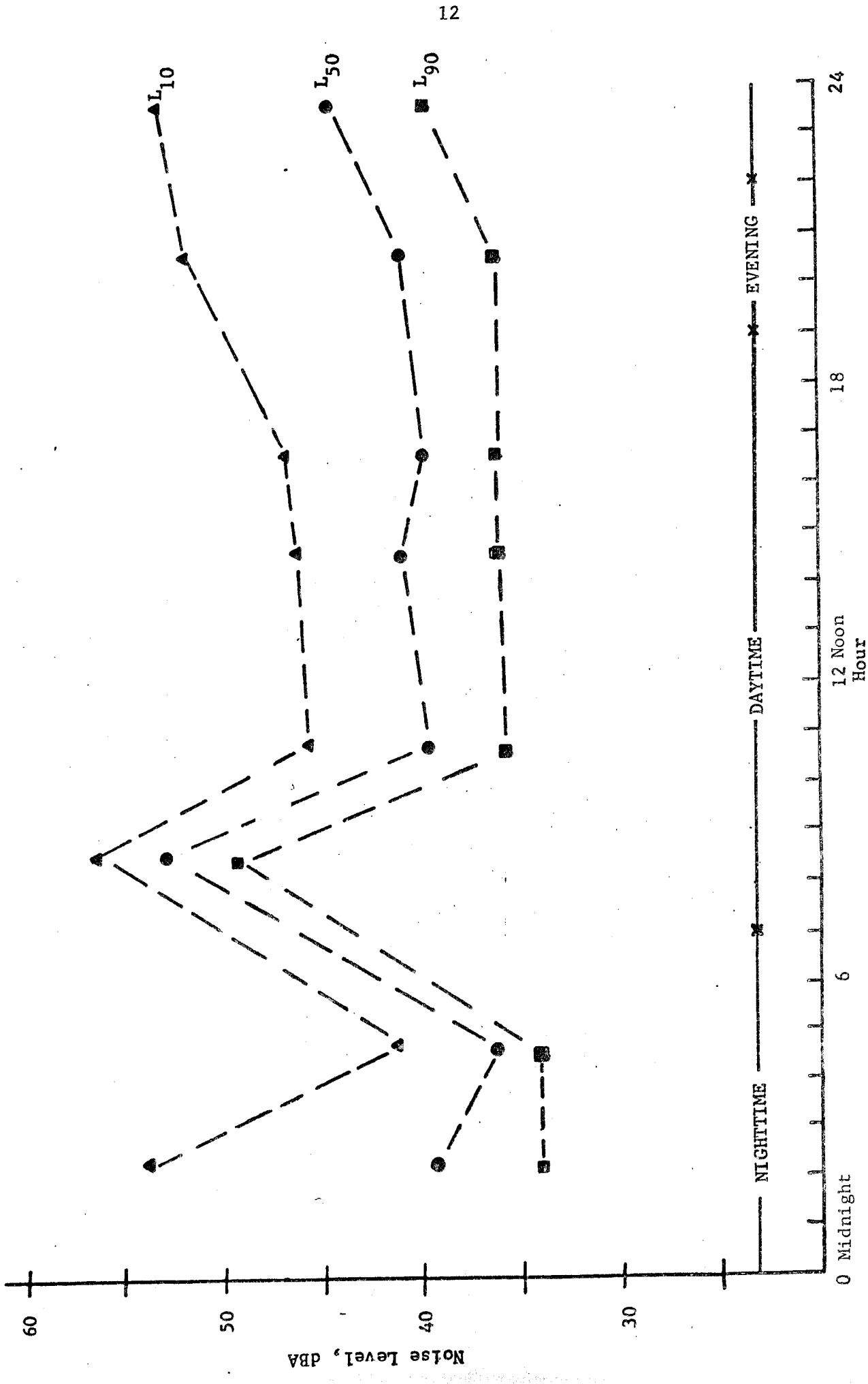

FIGURE 5. TIME HISTORY OF THE L_{90}, L_{50}, AND L_{10} EXISTING AMBIENTS FOR LOCATION 2, WEEKDAY PERIOD

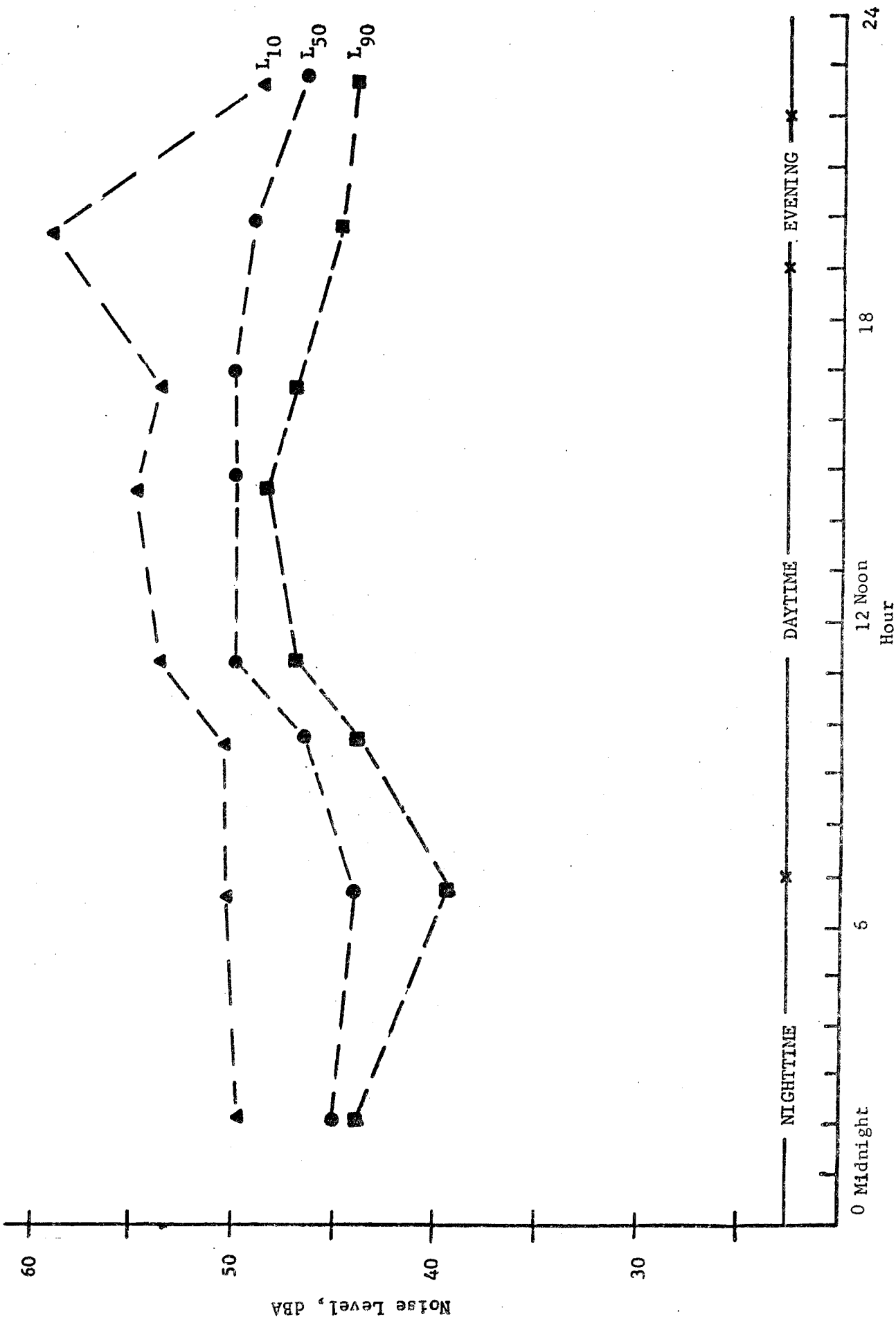

FIGURE 6. TIME HISTORY OF THE L_{90}, L_{50}, AND L_{10} EXISTING AMBIENTS FOR LOCATION 3, WEEKEND PERIOD

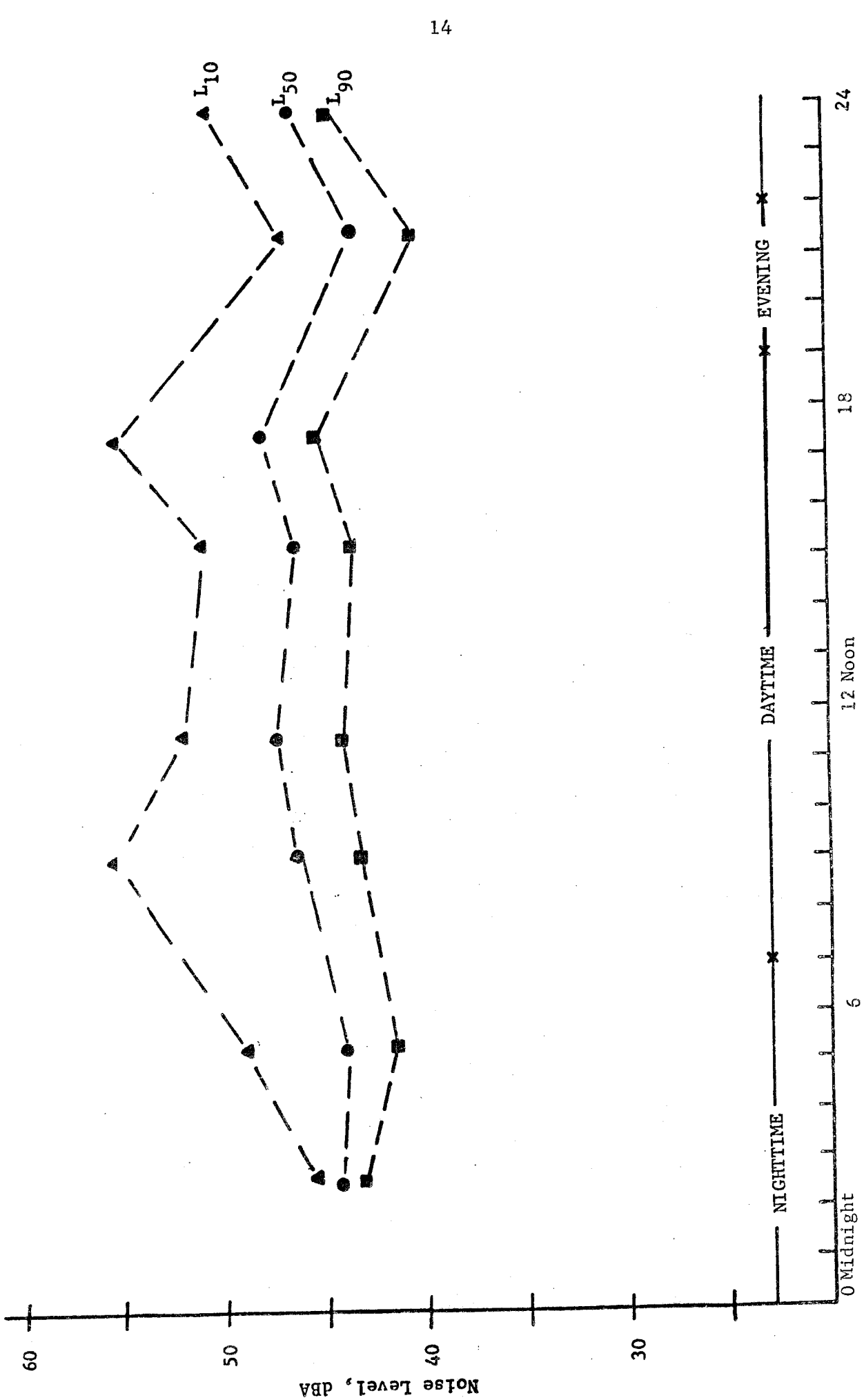

FIGURE 7. TIME HISTORY OF THE L_{90}, L_{50}, AND L_{10} EXISTING AMBIENTS FOR LOCATION 3, WEEKDAY PERIOD

NOISE IMPACT OF PROPOSED ACTION

Human Environment

Basis of Evaluation

The analysis of the effects of the proposed power generating plant expansion on the human environment is based on the predicted increase in average ambient noise level, and on the community response predicted by the normalized CNEL (Community Noise Equivalent Level).[1] Briefly, the CNEL provides a method for quantifying the many factors involved in the evaluation of community noise. These factors are given in Figure 8. (For a more detailed discussion, refer to Appendix B or References 1 or 2.). Once the CNEL is calculated, various corrections for seasonal variations and community attitudes are added to it to arrive at the normalized CNEL. These normalized CNEL's are then evaluated to determine the community's response to the proposed action.

Results of Proposed Action

The noise levels occurring with the plant in operation were predicted on the basis of power plant equipment sound levels supplied by Westinghouse. These data were used to calculate the sound power levels for the proposed power plant expansion. The outdoor noise control computer program PREDICT* was then used to calculate the sound levels at locations 1, 2, and 3. The noise levels occurring both before and after plant operation are given in Table 5.

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(1) "Community Noise", U. S. Environmental Protection Agency, December 31, 1971.

(2) "Supporting Information for the Adopted Noise Regulation for California Airports", Wyle Laboratories Report WCR 70-3 (R), January 29, 1971.

* A description of the PREDICT computer program is given in Appendix C.

FACTOR	MEASURE
Basic measure of noise magnitude	A-weighted noise level
Measure of duration of noise	Energy integration
Time periods during day	Daytime (7AM-7PM) Evening (7PM-10PM) Nighttime (10PM-7AM)
Approximate weighting added to noise to account for time of day	Daytime 0 dB Evening 5 dB Nighttime 10 dB
Number (N) of identical events in time period	10 log N
Summation of contributions	Logarithmic

FIGURE 8. FACTORS USED TO CALCULATE COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)

TABLE 5. SUMMARY OF MEASURED AND PREDICTED AVERAGE AMBIENT NOISE LEVELS AT LOCATIONS 1, 2, AND 3 (All values in dBA)

Location	Measured Existing Levels		Predicted Level *
	Weekday	Weekend	
1	38	40	57
2	41	41	47
3	43	46	54

* Based on 24-hour per day operation of proposed peaking plant with noise control option A. Option B is no different at Location 1, but is 1 dB quieter at Locations 2 and 3.

At Location 1, the greatest changes in ambient will occur; this is because the existing ambients are relatively low and the location is in close proximity to the proposed plant. Since this change was expected, this location was chosen for study in order to quantify the situation there. At Locations 2 and 3, the ambient is affected less than at Location 1.

Using the CNEL calculation, the noise impact of the proposed power plant operation is predicted to be minimal, with the majority of the surrounding community having no reaction to the new source of noise that has been added to the environment.

Summarized in Table 6 are the CNEL, normalized CNEL, and expected community response at each selected location for weekday and weekend ambients. Again, Location 1, which is only 1200 feet from the proposed power plant expansion, has the potential for the most significant impact. Here the expected response implies that sporadic complaints could be experienced if housing development occurred. At the other locations, 2, and 3, no reaction would be expected from the surrounding community, although the noise would be termed "generally noticeable".

TABLE 6. SUMMARY OF NOISE IMPACT AND EXPECTED RESPONSE FROM THE COMMUNITY

Location	Weekend or Weekday	CNEL	Normalized CNEL	Expected Community Response*
1	Weekday	62	62	1
1	Weekend	62	62	1
2	Weekday	53	58	2
2	Weekend	52	57	2
3	Weekday	59	49	2
3	Weekend	59	49	2

(*) Numbers refer to the following description of expected Community Response:

1. Sporadic complaints
2. No reaction, although the noise is generally noticeable.

Construction Noise

The construction process for the proposed expansion to the power plant will not involve significant amounts of the noisiest aspects of the construction--land clearing and excavation. The plant will mainly consist of concrete slabs on which the plant generating facilities will be fixed. The machines involved in constructing these slabs which could be potential noise problems would be the ready-mix concrete trucks delivering to the site. Other potentially noisy aspects of construction will be the construction of the fuel-holding tanks. However, because there are relatively high ambient noise levels existing in this area at present, and since this portion of the construction is relatively short-lived, no significant noise impact from construction is expected.

Natural Environment

No adverse environmental effects due to noise are expected.

REFERENCES CITED

(1) "Community Noise", U. S. Environmental Protection Agency, December 31, 1971.

(2) "Supporting Information for the Adopted Noise Regulation for California Airports", Wyle Laboratories Report WCR 70-3 (R), January 29, 1971.

APPENDIX A

STATISTICAL DISTRIBUTION OF NOISE LEVELS

APPENDIX A

STATISTICAL DISTRIBUTION OF NOISE LEVELS

Introduction

One of the requisites of a community noise survey is a measuring technique which yields information which is comprehensive but not so voluminous as to be unwieldy. One such measure is the cumulative distribution plot which presents, in a single plot, a description of the noise environment for the period covered. The L_{90} value (the level exceeded 90 percent of the time) shown in the plot indicates the ambient noise level exclusive of discrete local events. The L_{50} value in the distribution plot shows the median level, and the L_{10} value indicates the level of intrusive sounds. The shape of the cumulative distribution curve reflects the general nature of the noise environment. .

Representative Data

Included in this appendix are three examples of the distribution plots used as part of the data base for this report.

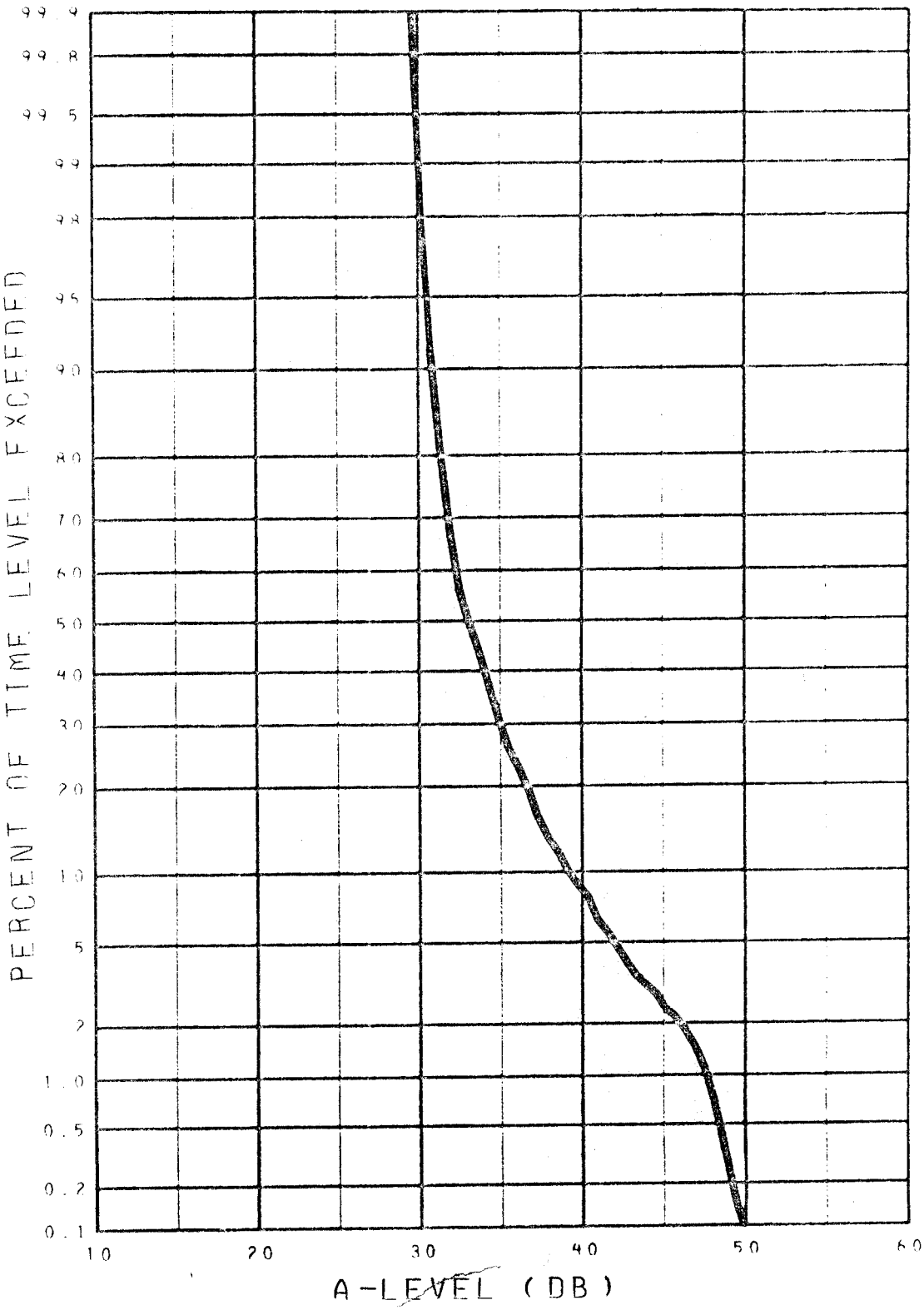

FIGURE A-1. STATISTICAL DISTRIBUTION OF NOISE AT LOCATION 1 FROM 7:00 PM TO 7:35 PM ON 4/17/74 (Run 8)

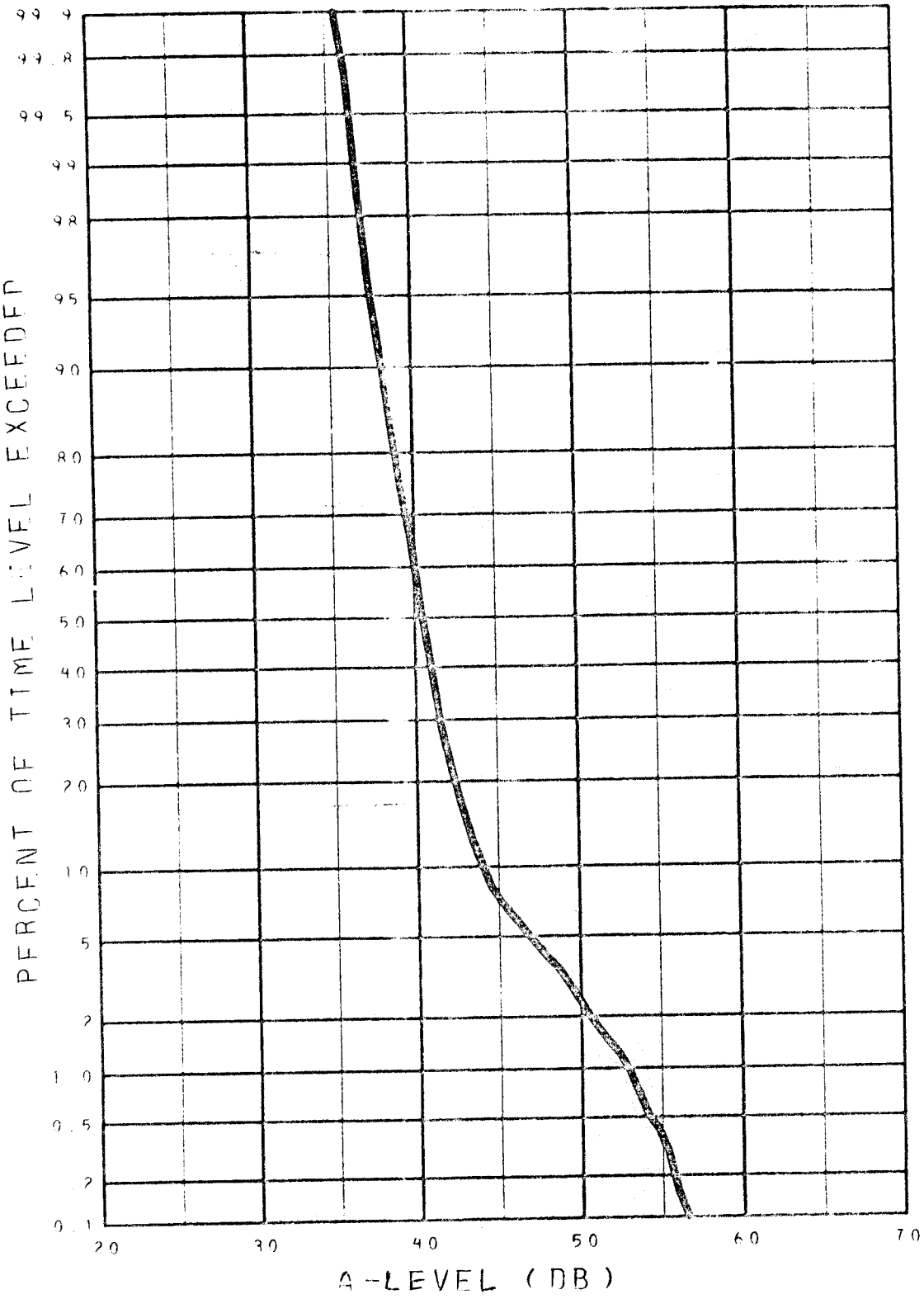

FIGURE A-2. STATISTICAL DISTRIBUTION OF NOISE AT LOCATION 2 FROM 6:33 PM TO 7:03 PM ON 4/20/74 (Run 39)

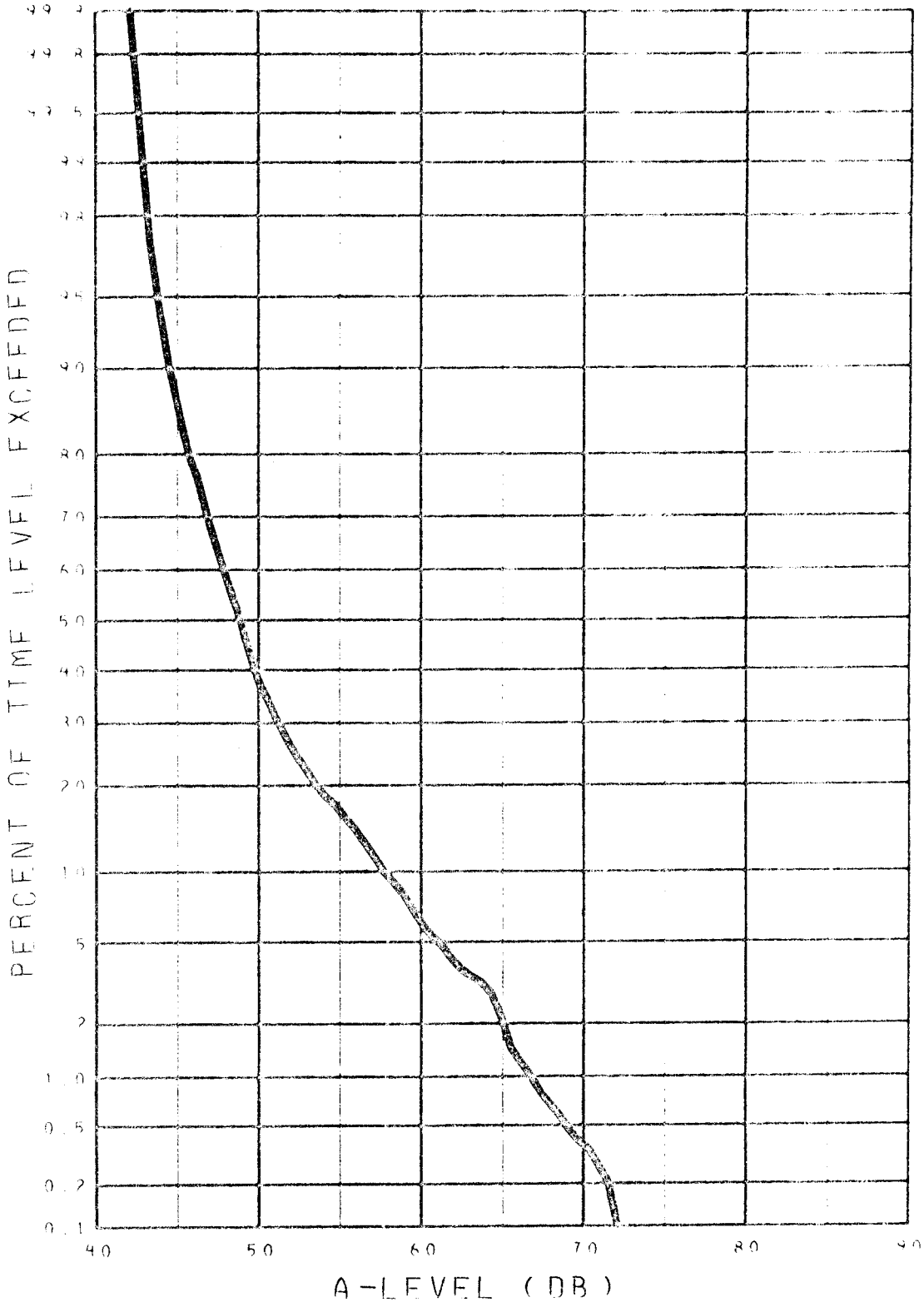

FIGURE A-3. STATISTICAL DISTRIBUTION OF NOISE AT LOCATION 3 FROM 7:20 PM TO 7:50 PM ON 4/20/74 (Run 40)

APPENDIX B

TECHNICAL NOTE ON CALCULATION OF CNEL

APPENDIX B

TECHNICAL NOTE ON $\overline{\text{CNEL}}$ CALCULATION*

Normalized Community Noise Equivalent Level ($\overline{\text{CNEL}}$) and the difference between $\overline{\text{CNEL}}$ and the present daytime ambient sound level (CNEL-L_{90}) are measures of a community's response to a new noise source. Figure B-1 shows the factors that are considered in determining $\overline{\text{CNEL}}$. The primary element in the $\overline{\text{CNEL}}$ calculation is the description of the variations in the sound level of the community. The Energy Equivalent Noise Level (L_{EQ}) is calculated from the time history of the sound level or from a statistical description of the sound level variation. If the sound pressure level (SPL) variation has a Gaussian distribution, then the calculation of L_{EQ} can be simplified from a time averaging process to a simple statistical operation

$$L_{EQ} = 10 \log_{10} \left[\frac{1}{T} \int_0^T 10^{\frac{SPL}{10}} \, dt \right] = L_{50} + \frac{(L_{10} - L_{90})^2}{60} .$$

The L_{EQ} calculated for daytime, evening, and nighttime are adjusted to give more importance to the nighttime noise. Typically, the three time periods are 7 a.m. to 7 p.m., 7 p.m. to 10 p.m., and 10 p.m. to 7 a.m. The appropriate corrections for the lengths of these periods, combined with time of day corrections are -3 dB, -4 dB, and +6 dB, respectively. The adjusted L_{EQ} for the three periods of the day are logarithmically added to calculate CNEL. CNEL values for rural and urban areas cannot be directly compared. Adjustments have to be made to account for the different attitudes and backgrounds of the people involved. Correction factors for seasonal operation, present

* For a more detailed explanation, see Wyle Laboratories, supporting information for the Adopted Noise Regulation for California Airports, WCR, 70-3 (R), January, 1971.

FACTOR	MEASURE
Basic measure of noise magnitude	A-weighted noise level
Measure of duration of noise	Energy integration
Time periods during day	Daytime (7AM-7PM) Evening (7PM-10PM) Nighttime (10PM-7AM)
Approximate weighting added to noise to account for time of day	Daytime 0 dB Evening 5 dB Nighttime 10 dB
Number (N) of identical events in time period	10 log N
Summation of contributions	Logarithmic

FIGURE B-1. FACTORS USED TO CALCULATE COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)

ambient, community attitude, and pure tone or impulsive sounds are used to determine the normalization factor. The values for various correction factors are given in Table B-1. The arithmetic sum of CNEL and the correction factors is $\overline{\text{CNEL}}$ (Step 5). The community's response versus $\overline{\text{CNEL}}$ is plotted in Figure B-2. Table B-2 lists the community response and the percent of people annoyed as a function of the difference between CNEL and the present daytime ambient.

A CNEL calculation was made for the Palatka area. The present ambient sound level and the predicted sound level distribution for Palatka with the proposed plant operating were obtained from field data and the PREDICT computer program. The noise distribution was assumed gaussian and constant from daytime to nighttime. The sample CNEL calculation was based on these data and assumptions.

TABLE B-1. CORRECTIONS TO BE ADDED TO THE MEASURED COMMUNITY NOISE EQUIVALENT LEVEL (CNEL) TO OBTAIN $\overline{\text{CNEL}}$

Correction	Description	Amount of Correction to be Added to Measured CNEL in dB
Seasonal	Summer (or year-round operation)	0
	Winter only (or windows always closed)	-5
Correction for Outdoor Residual Noise Level	Quiet suburban or rural community (remote from large cities and from industrial activity and trucking)	+10
	Normal suburban community (not located near industrial activity)	+5
	Urban residential community (not immediately adjacent to heavily traveled roads and industrial areas)	0
	Noisy urban residential community (near relatively busy roads or industrial areas)	-5
	Very noisy urban residential community	-10
Correction for Previous Exposure & Community Attitudes	No prior experience with the intruding noise	+5
	Community has had some previous exposure to intruding noise but little effort is being made to control the noise. This correction may also be applied in a situation where the community has not been exposed to the noise previously, but the people are aware that bona fide efforts are being made to control the noise.	0
	Community has had considerable previous exposure to the intruding noise and the noise maker's relations with the community are good	-5
	Community aware that operation causing noise is very necessary and it will not continue indefinitely. This correction can be applied for an operation of limited duration and under emergency circumstances	-10
Pure Tone or Impulse	No pure tone or impulsive character	0
	Pure tone or impulsive character present	+5

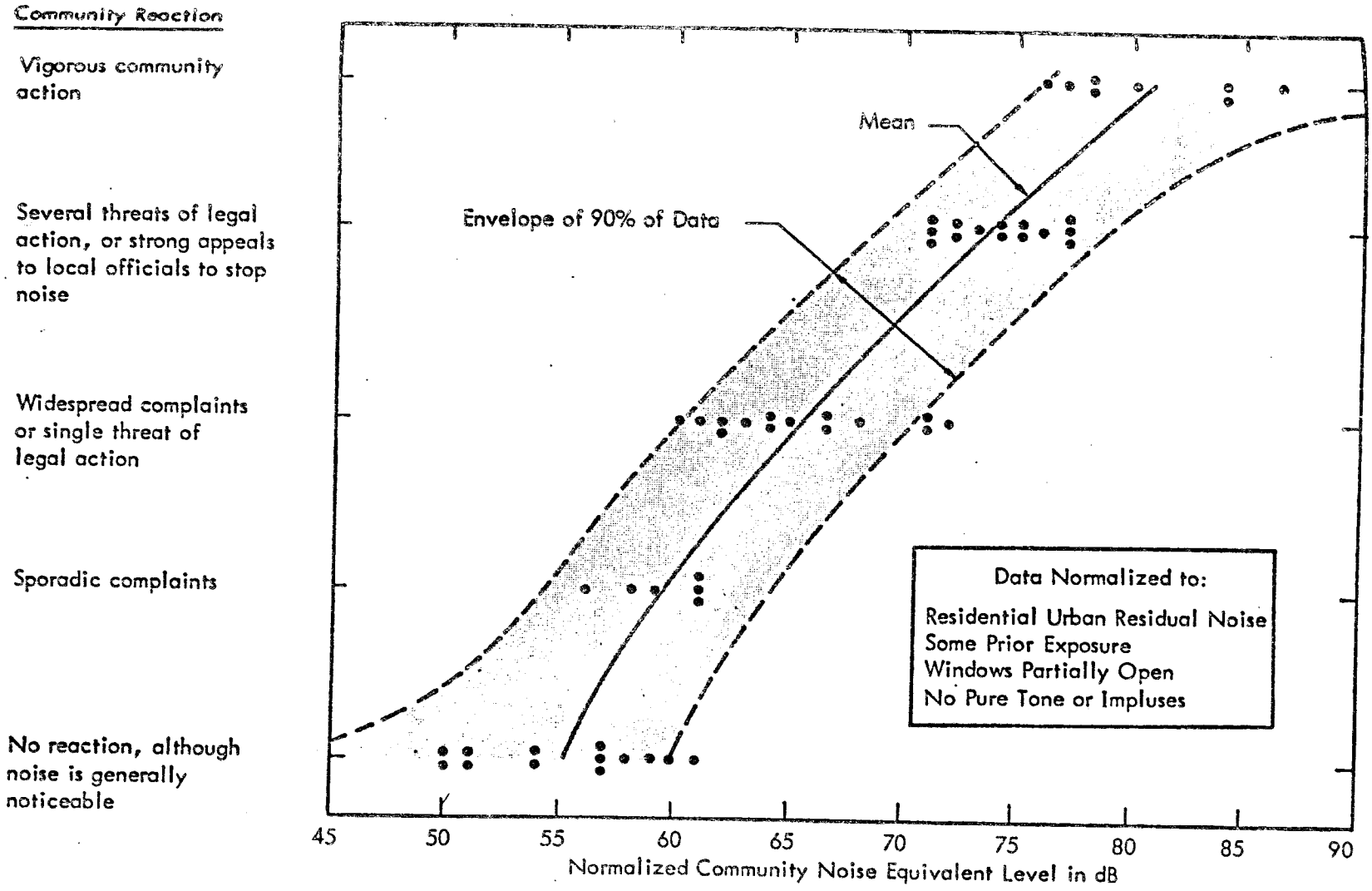

FIGURE B-2. $\overline{\text{CNEL}}$ U. S. COMMUNITY REACTION TO A NEW NOISE SOURCE*

* Wyle Labs, Community Noise, for the U. S. Environmental Protection Agency, Office of Noise Abatement and Control, Washington, D. C. 20460, December 31, 1971.

TABLE B-2. SUMMARY OF EXPECTED COMMUNITY REACTION AND APPROXIMATE ANNOYANCE AS A FUNCTION OF NORMALIZED COMMUNITY NOISE EQUIVALENT LEVEL *

Expected Community Reaction	Approximate Difference Between Normalized CNEL and Average Daytime Residual Noise Level (L_{90}) in dB		Very Much Annoyed	Approximate Percent Little or Not Annoyed
	Mean	Range of Data		
No reaction	7	2 to 13	20	45
Sporadic complaints	11	8 to 13	26	37
Widespread complaints	17	12 to 24	37	26
Threats of legal action	26	23 to 29	60	14
Vigorous action	33	28 to 39	87	7

* Wyle Labs, Loc Cit

SAMPLE CALCULATIONS OF NORMALIZED CNEL

Location 2

CNEL Before Proposed Action

	Day	Evening	Nighttime
L_{90}	50	44	43
L_{50}	46	40	41
L_{10}	42	38	40
L_{EQ}	47	41	41

SNEL = 49

Corrections:

Seasonal	0
Outdoor Residual	+5
Previous exposure or Community attitudes	0
Pure tones or impulses	0

Normalized CNEL = 53 Expected Community Reaction of No reaction

AFTER PROPOSED ACTION

	Day	Evening	Nighttime
L_{90}	51	47	47
L_{50}	47	47	47
L_{10}	47	47	47
L_{EQ}	47	47	47

CNEL = 52

Corrections:

Seasonal	0
Outdoor Residual	+5
Previous exposure or Comm. attitude	0
Pure tones or impulse noise	0

Normalized CNEL = 57 Expected Community Reaction of No reaction but noise is generally noticeable.

APPENDIX C

DESCRIPTION OF PROGRAM "PREDICT"

APPENDIX C

DESCRIPTION OF PROGRAM "PREDICT"

Program PREDICT is a Battelle-developed Fortran IV computer program used to predict the sound pressure levels in octave bands, linear, and dB(A) that would exist at a given outdoor location using multiple sound sources at various locations from the source locations. The program in its present configuration allows for up to 50 different sound sources and 15 different locations in which a prediction could be made. It could easily be expanded, however, to allow either more sound sources or more locations by increasing the sizes of the program storage.

In addition to predicting the sound pressure levels that would exist at any given location, the program will also apply "noise reduction" as required to satisfy a given criteria at a location. If several locations with criteria are specified, the program will retain the maximum noise reduction required to satisfy the criteria of all of the locations.

With these two features, the program can be used both as a tool to obtain the expected noise levels that would result with any given configuration and also as a guide to the amount of noise reduction required of each piece of equipment to satisfy a given criteria. The noise reduction analysis portion of the program can either be selected or declined as a user input option.

If the noise reduction analysis option has been chosen, the program also prints the criteria used, the noise reduction required of each sound source to meet the criteria at all of the locations, and the resultant sound pressure levels at each location that would exist if the calculated noise reduction was implemented.