

**LaSalle Environmental Audit
Response to Request for Additional Information**

Index #: 010 **RAI #:** MA-10 **Category:** Meteorology, Air Quality & Noise

Statement of Question:

The ER states that Illinois does not have regulations or guidelines for environmental noise. However, Illinois has a noise regulation with allowable octave band sound levels according to emitting and receiving land-use classification and time of day (IAC, Title 35: Environmental Protection, Subtitle H: Noise). Please clarify if LSCS is subject to Illinois' noise regulation and if LSCS is in compliance with these regulations.

Response:

Section 5.6 in the 1977 LSCS operating license stage ER confirms the applicability of Illinois Noise Pollution Control Regulations (Title 35, Subtitle H, of the Illinois Code) to LSCS and discusses compliance. It concludes as follows:

Although predictions indicate that existing ambient noise levels near the [LSCS] plant boundary will be increased because of plant operation, the predicted levels are well within the federal guidelines and the applicable environmental regulations of the State of Illinois.

Since 1977, no equipment changes have occurred at LSCS that would change this conclusion. An excerpt of Section 5.6 in the 1977 LSCS operating license stage ER is attached.

List of Attachments

1. Excerpt of Section 5.6, Other Effects, from Commonwealth Edison Company (1977). LaSalle County Station Environmental Report - Operating License Stage. Volume 2. May 10, 1977.

RAI # MA-10
ATTACHMENT 1

5.6 Other Effects

5.6.1 Introduction

This section describes the predicted noise effects of the La Salle County Station - Units 1 & 2 (LSCS) during operation. All other effects of operation have been considered in other sections of Chapter 5.

5.6.2 Noise Effects

The impact of noise due to the operation of the LSCS has been predicted at six locations, identified in Figure 5.6-1 as Points A, B, C, D, E, and F. The first five locations were selected because the noise levels they will experience due to plant operations will be relative maximums for offsite areas: Point A is the nearest property line point to the east; Point B is the nearest property line point to the south and is within 100 feet of the nearest residence in this direction; Point C is the nearest property line point to the west; Point D is adjacent to the nearest residence (4500 feet west of the center of Unit 1 reactor and 2500 feet west of the property line); and Point E nearest property line point to the north. Point F, located at the recreational area boundary, was selected to predict noise levels for the recreational area. The remainder of the site boundary is sufficiently far from noise-producing plant equipment that the impact of plant noise emissions will be negligible.

The noise sources (equipment) that were considered in these calculations were the main transformers, system auxiliary transformers, unit auxiliary transformers, turbine building supply and exhaust fans, and reactor building supply and exhaust fans. Experience has shown that these are the major noise sources for this type of plant.

The source of the noise level data for transformers was the NEMA Standards for Transformers, TR1-1972, Section 0.06, of the National Electrical Manufacturing Association located in New York City. For the turbine and reactor building supply and exhaust fans, the highest levels submitted by the manufacturers (worst case conditions) were used.

5.6.2.1 Procedures

The noise levels for each source were extrapolated to the various prediction points using standard techniques that accounted for any directivity, atmospheric attenuation, wave divergence, and shielding. The resulting octave band sound pressure levels from each source were then combined to give the resultant plant noise impact at each location. Table 5.6-1 summarizes the predicted noise levels at the various locations.

A comparison was then made of the predicted noise levels to the applicable State of Illinois Noise Pollution Control Regulations. Points A, C, and E represent Class C land (agricultural) located at the plant property line and are therefore regulated by Rule 205. Points B and D represent Class A land (residential) and are therefore regulated by Rule 203. Point F represents Class B land (recreational) and is regulated by Rule 204. This comparison is shown in Figures 5.6-2 through 5.6-7.

In order to compare the predicted noise levels with existing conditions, continuous 20-minute samples of ambient (preoperational) noise were tape recorded during the day and night at each location except at Point F where levels were only predicted at the NRC request (see NRC Question 350.08). The sound level measurements were made in accordance with the standards and recommended practices established by the American National Standards Institute, Inc. (1971). Care was taken during the recording period to ensure that the recorded sample would be representative of the existing ambient noise levels at the site. It should be noted that since construction at the LSCS site was in progress at the time of the measurements, they were taken during periods of no construction activity in order to be representative of preconstruction ambient noise levels.

The tape-recorded data were then analyzed by Kamperman Associates, Inc., in their laboratory to yield both the complete cumulative distribution of A-weighted ambient noise levels (see Figures 5.6-8 and 5.6-9) and the "Leq," which is the A-weighted Equivalent Sound Level over a 24-hour period as defined by the United States Environmental Protection Agency (1974). The day-night sound level (L_{dn}) represents the Leq with a 10-dB nighttime penalty and may be calculated from daytime and nighttime Leq levels using the relationship shown below:

$$L_{dn} = 10 \log_{10} \frac{1}{24} \left[(15) 10^{\frac{L_d}{10}} + (9) 10^{\frac{L_n + 10}{10}} \right] \quad [\text{dB}]$$

where:

L_d = Leq for daytime and
 L_n = Leq for nighttime.

5.6.2.2 Applicable Guidelines

The U.S. EPA has identified a 24-hour Leq \leq 70 dB as the level of environmental noise that will prevent any measurable hearing loss over a lifetime for all areas. Similarly, undue interference with activity and annoyance will not occur if outdoor levels in residential areas are maintained at $L_{dn} \leq$ 55 dB. Points A, C, E, and F are therefore compared to the guideline of Leq \leq 70 dB, while Points B and D are compared to the guideline of $L_{dn} \leq$ 55 dB. A comparison of the predicted levels, measured ambient levels, and EPA's guidelines is shown in Table 5.6-2.

LSCS-ER(OI-S)

On August 4, 1974, the United States Department of Housing and Urban Development (HUD) published "Noise Abatement and Control Standards" (1971) to encourage land utilization patterns for housing and other municipal needs. HUD criteria state that noise levels for residential developments are normally acceptable if they do not exceed 65 dBA more than 8 hours per 24 hours; i.e., $L_{33.3} \leq 65$ is normally acceptable. Cumulative distributions of measured A-weighted ambient noise levels are shown in Figures 5.6-8 and 5.6-9. $L_{33.3}$ values may be obtained from these figures. A comparison of the predicted levels, measured ambient levels, and HUD's recommendations are shown in Table 5.6-3.

5.6.3 Conclusion

Although predictions indicate that existing ambient noise levels near the plant boundary will be increased because of plant operation, the predicted levels are well within the federal guidelines and the applicable environmental regulations of the State of Illinois. Predicted noise levels at the recreational area are also well within the federal guidelines and the applicable environmental regulations of the State of Illinois. Considering the levels of the predicted noise levels around the plant site and the recreational area, the noise impact is expected to be negligible.

LSCS-ER(OLS)

TABLE 5.6-1

PREDICTED NOISE LEVELS

<u>LOCATION</u>	<u>dBA</u>	<u>OCTAVE BAND CENTER FREQUENCY - Hz</u>							
		<u>63</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1K</u>	<u>2K</u>	<u>4K</u>	<u>8K</u>
A	49	50	55	52	48	42	34	17	-
B	48	50	55	52	47	38	30	15	-
C	52	-	48	52	51	48	42	31	-
D	42	-	40	45	42	34	26	-	-
E	45	47	52	50	44	35	26	5	-
F	49	52	57	53	48	41	32	16	-

TABLE 5.6-2

COMPARISON OF PREDICTED AND MEASURED NOISE LEVELS
WITH THE U.S.EPA GUIDELINES

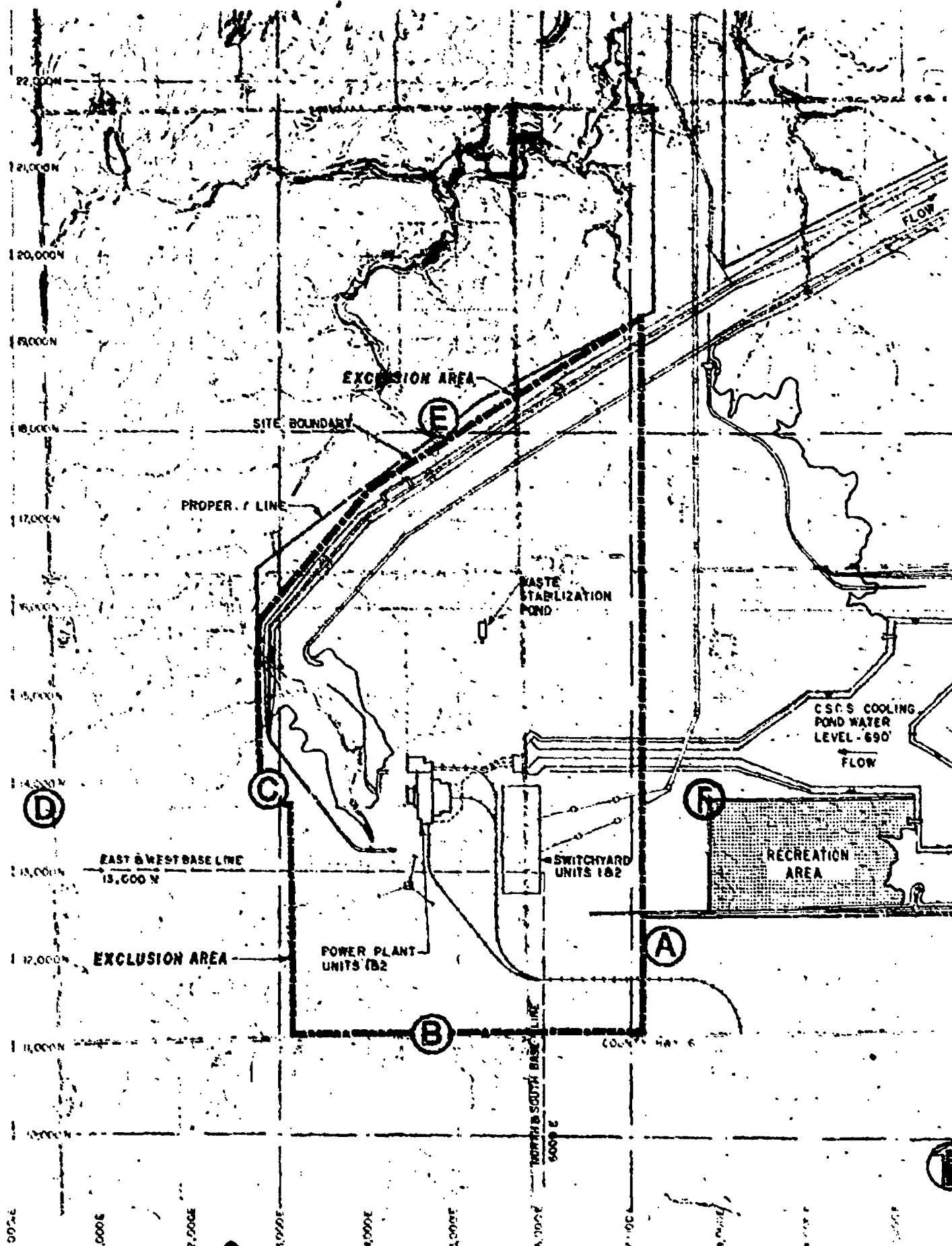
	<u>LOCATION</u>					
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
Predicted Level	Leq=49	L _{dn} =54	Leq=52	L _{dn} =48	Leq=45	Leq=49
Measured Level	Leq=44	L _{dn} =44	Leq=39	L _{dn} =40	Leq=39	--
U.S.EPA Guideline	Leq≤70	L _{dn} ≤55	Leq≤70	L _{dn} ≤55	Leq≤70	Leq≤70

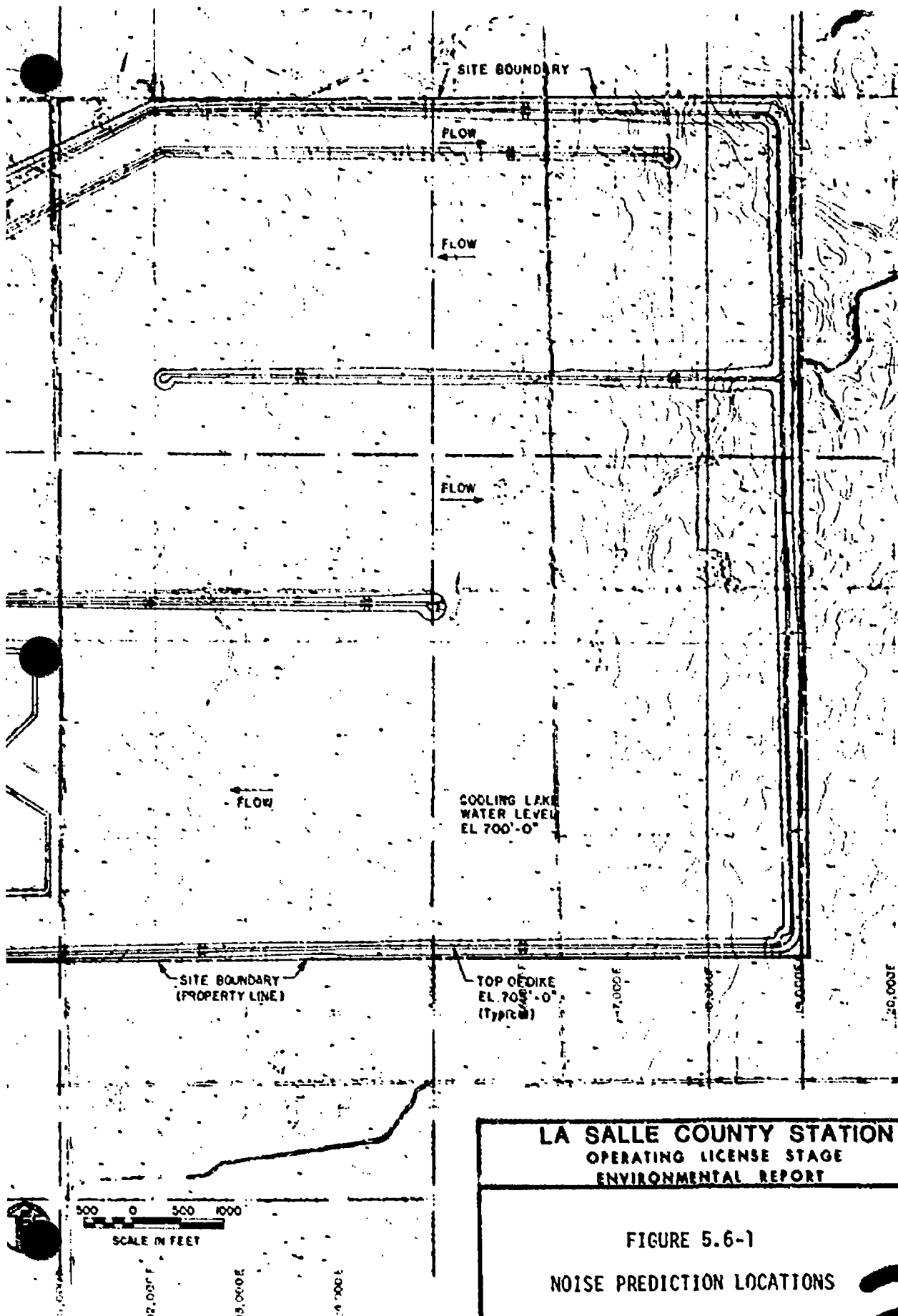
LSCS-ER(OLS)

TABLE 5.6-3

COMPARISON OF PREDICTED AND MEASURED NOISE LEVELS
WITH THE HUD GUIDELINES

		<u>LOCATION</u>					
		<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>E</u>	<u>F</u>
Predicted Noise Level (dBA)		49	48	52	42	45	49
Measured Ambient	Day	39	44	33	30	41	--
L33.3 Level	Night	38	29	41	31	31	--
HUD Guideline (Maximum dBA)		65	65	65	65	65	65



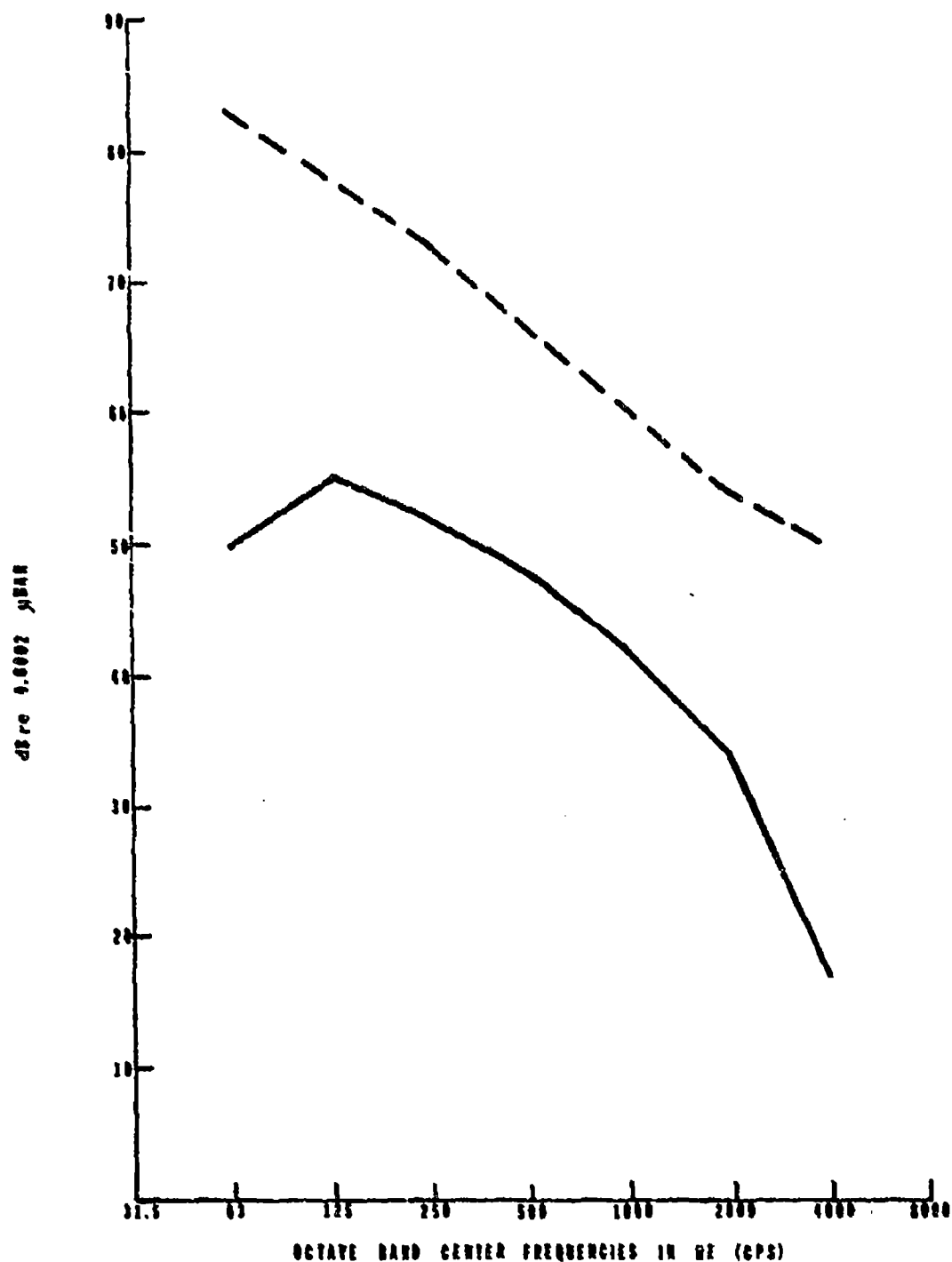


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FIGURE 5.6-1

NOISE PREDICTION LOCATIONS

2



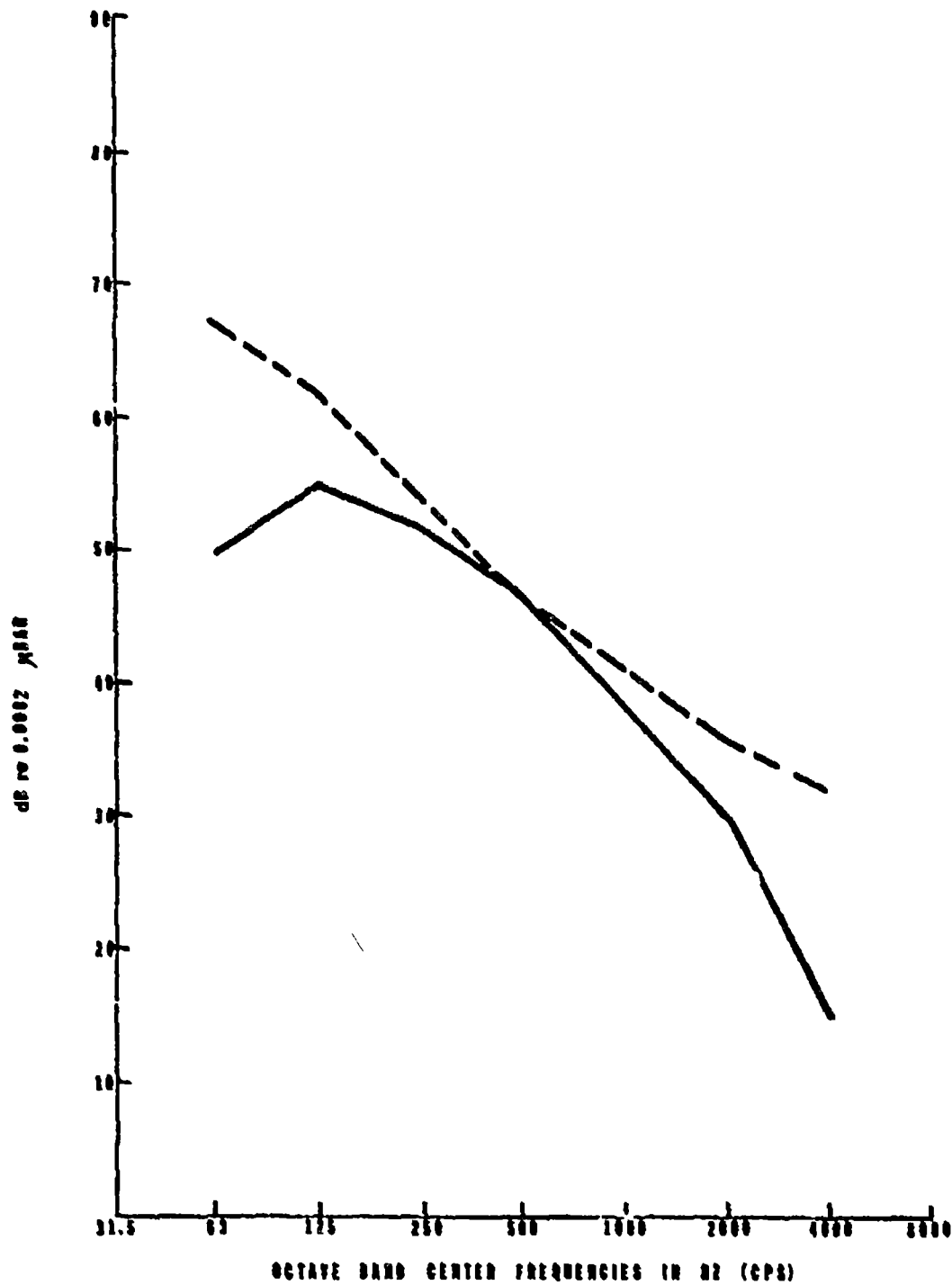
--- ILLINOIS RULE 205 ALLOWABLE
UTILITY NOISE EMISSIONS TO AGRICULTURAL
LAND (C'-C')

— PREDICTED NOISE LEVELS

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FIGURE 5.6-2

NOISE LEVELS: POINT A

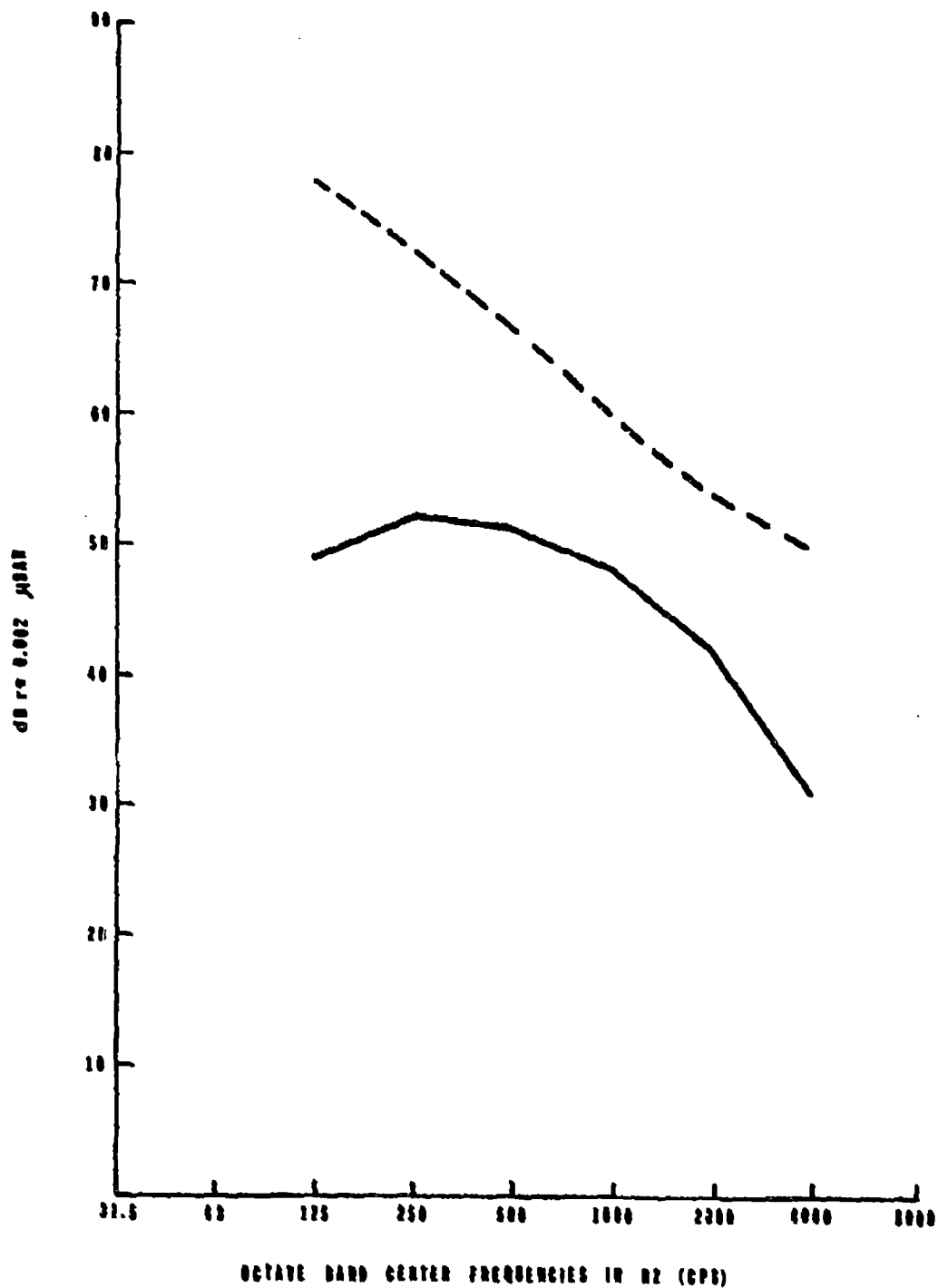


- - - - - ILLINOIS RULE 203 ALLOWABLE
 UTILITY NOISE EMISSIONS TO RESIDENTIAL
 PROPERTY - NIGHT TIME (C' TO 'A')
 ————— PREDICTED NOISE LEVELS

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FIGURE E.6-3

NOISE LEVELS: POINT B

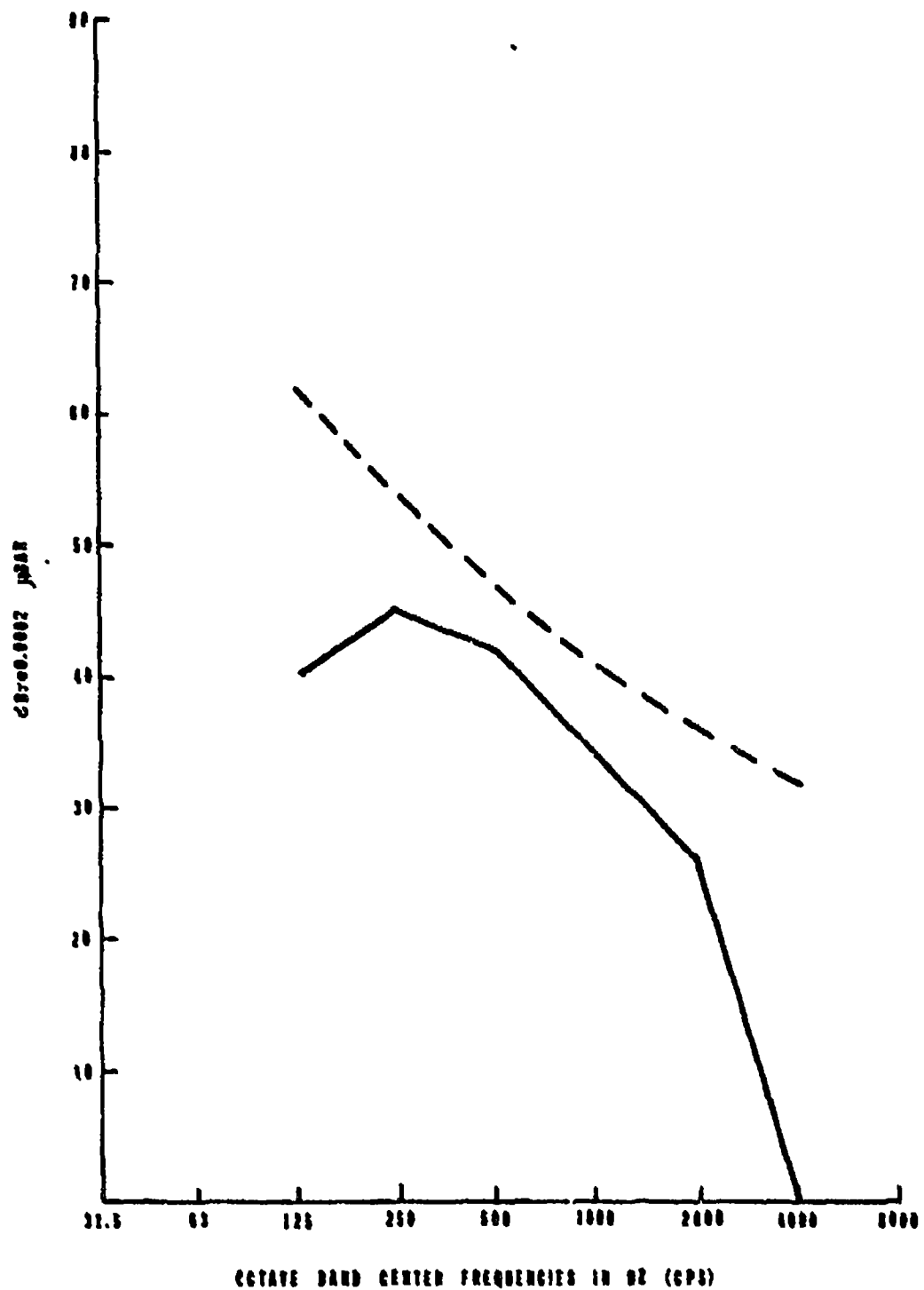


----- ILLINOIS RULE 205 ALLOWABLE
UTILITY NOISE EMISSIONS TO AGRICULTURAL
LAND (C-205)

————— PREDICTED NOISE LEVELS

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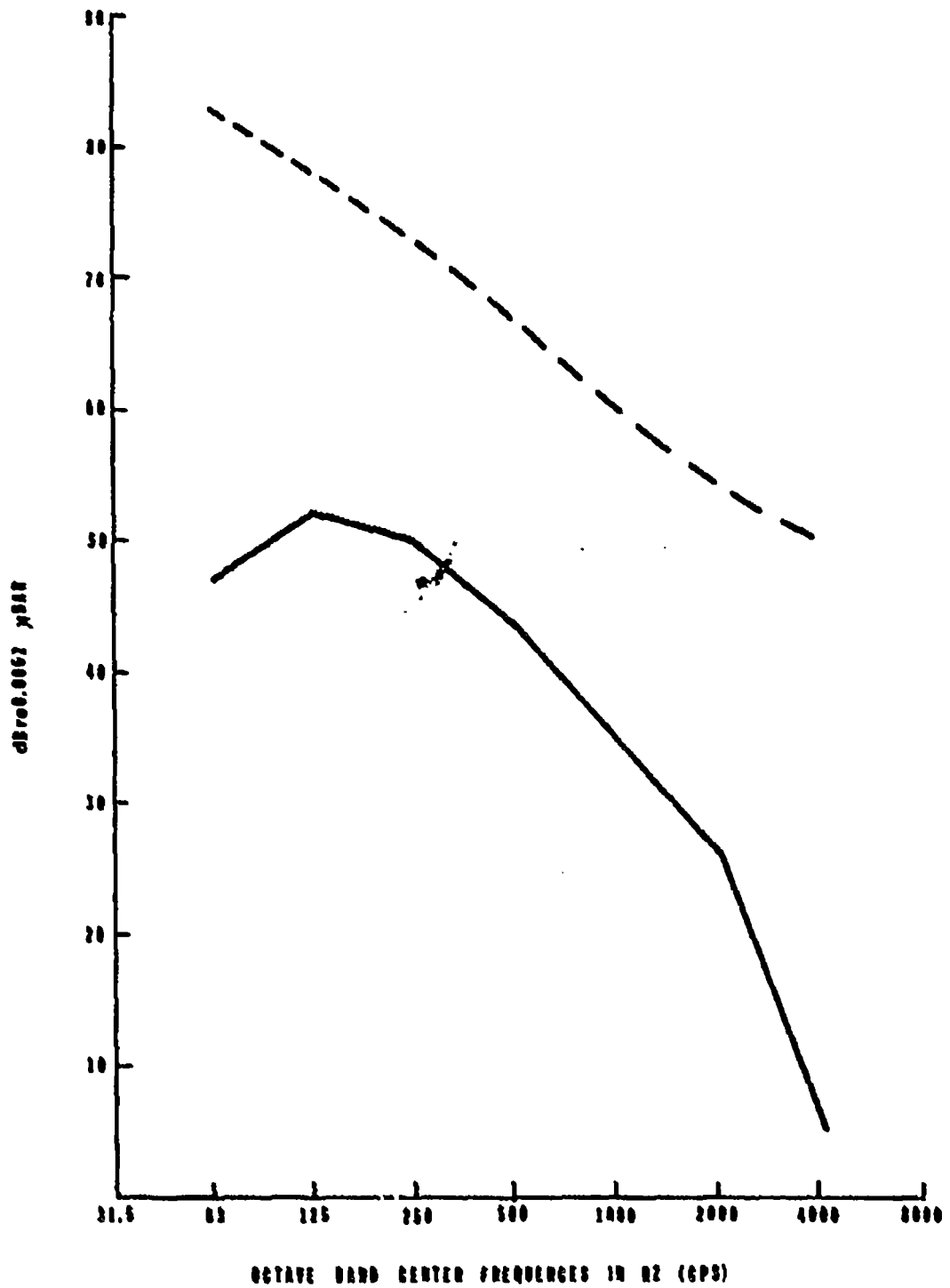
FIGURE 5.6-4
NOISE LEVELS: POINT C



- - - - - ILLINOIS RULE 203 ALLOWABLE
 UTILITY NOISE EMISSIONS TO RESIDENTIAL
 PROPERTY - NIGHT TIME (10' TO 'A')
 - - - - - PREDICTED NOISE LEVELS

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FIGURE 5.6-5
 NOISE LEVELS: POINT D

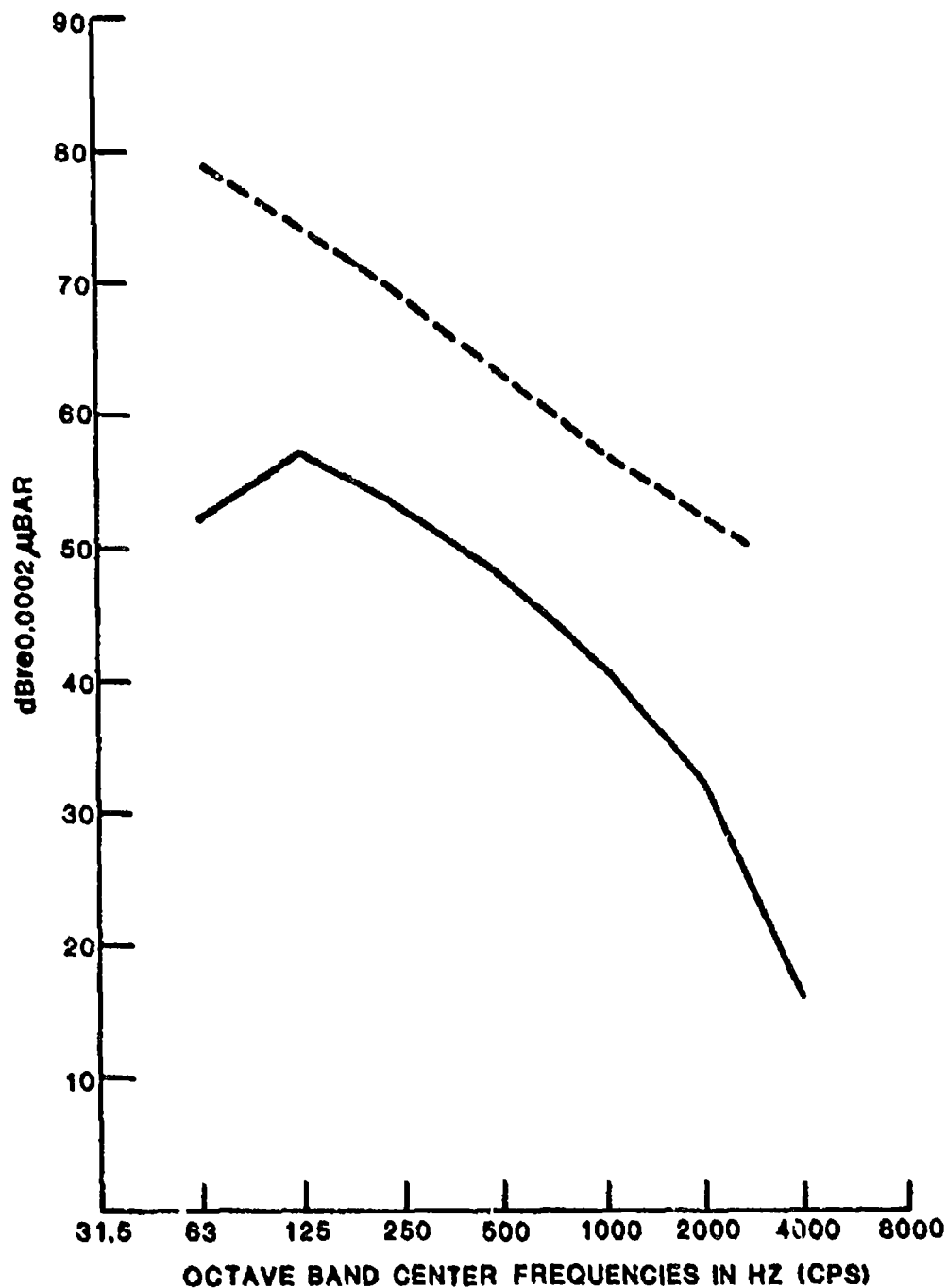


--- ILLINOIS RULE 205 ALLOWABLE
UTILITY NOISE EMISSIONS TO AGRICULTURAL
LAND (6'-6')

— PREDICTED NOISE LEVELS

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FIGURE 5.6-6
NOISE LEVELS: POINT E



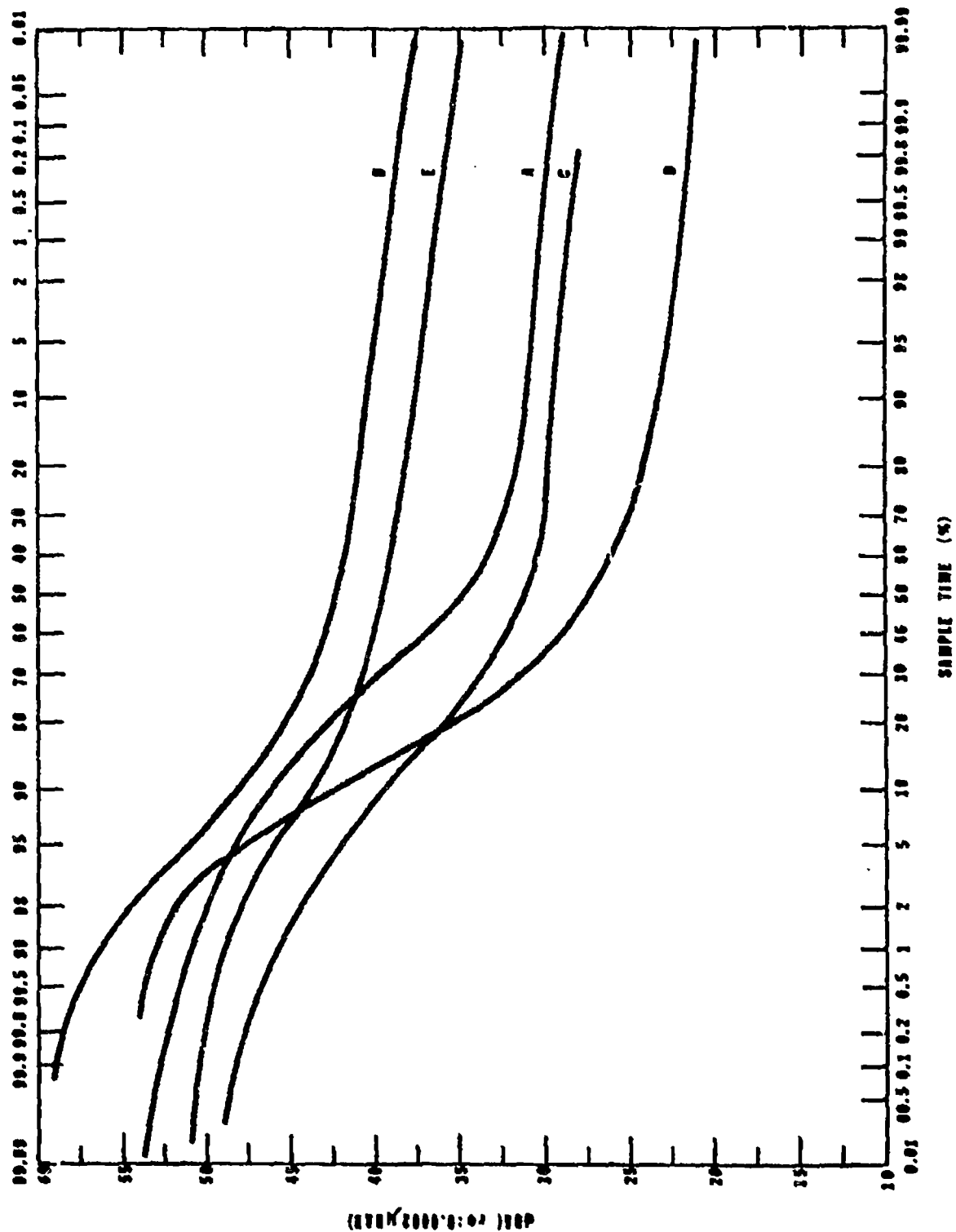
----- ILLINOIS RULE 204 ALLOWABLE
UTILITY NOISE EMISSIONS TO
RECREATIONAL LAND ('C'-'B')

———— PREDICTED NOISE LEVELS

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FIGURE 5.6-7

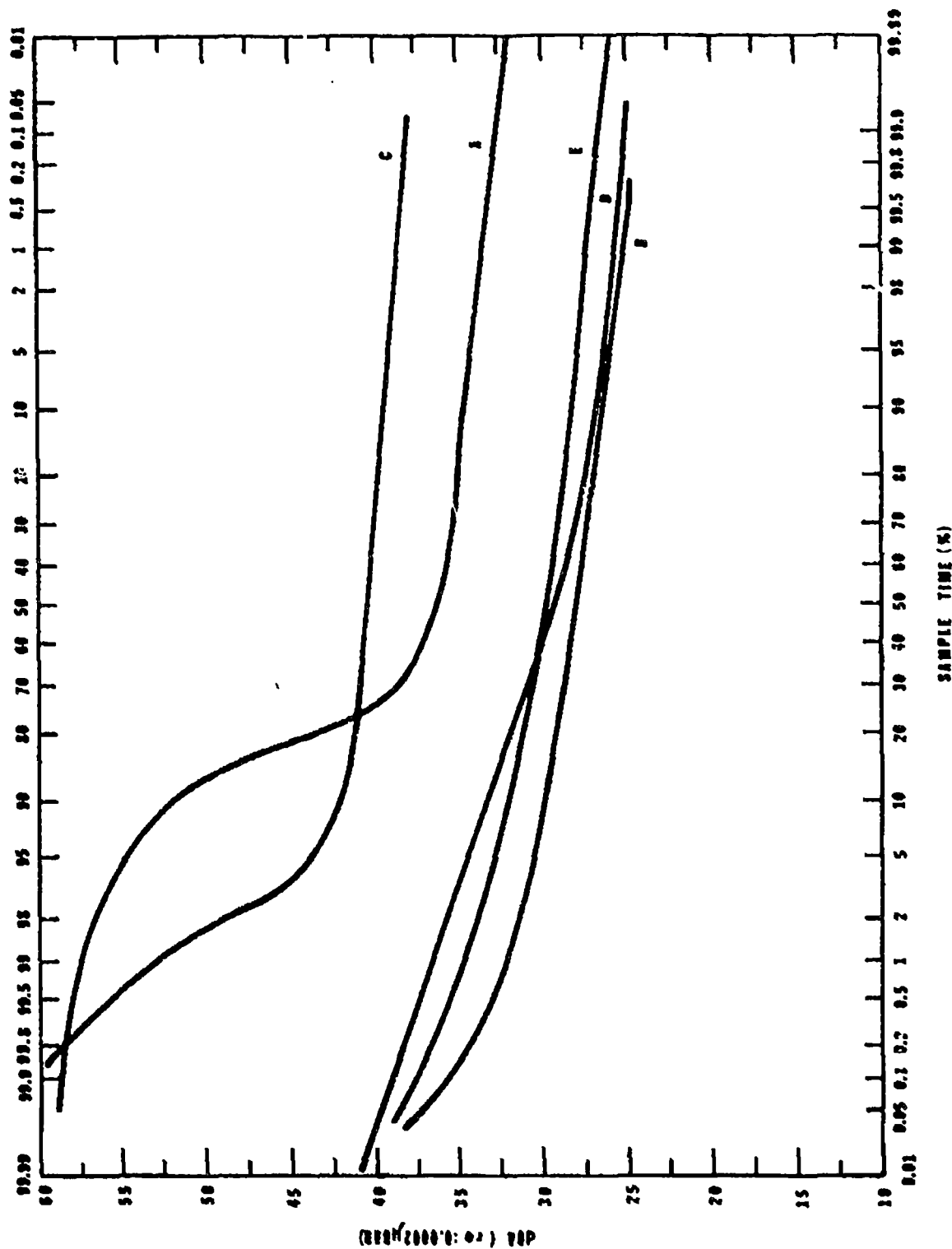
NOISE LEVELS: POINT F



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FIGURE 5.6-8

CUMULATIVE A-WEIGHTED DAYTIME
AMBIENT NOISE LEVELS



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FIGURE 5.6-9
 CUMULATIVE A-WEIGHTED NIGHTTIME
 AMBIENT NOISE LEVELS