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ELF EFFECTIVE NOISE MEASUREMENTS TAKEN IN CONNECTICUT DURING 19--ETC(U)
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ELF Effective Noise Measurements Taken in Connecticut During 1976

Peter R. Bannister
Submarine Electromagnetic Systems Department

5 August 1977

NUSC

NAVAL UNDERWATER SYSTEMS CENTER
Newport, Rhode Island • New London, Connecticut

PREFACE

The work described in this report was performed under NUSC Project No. A-590-07, "Project SEAFARER ELF Propagation Studies" (U), Principal Investigator, P. R. Bannister (Code 341); Navy Program Element No. 11401 and Project No. X0792, Naval Electronic Systems Command, Special Communications Project Office, CAPT C. D. Pollak (Code PME-117) Program Manager, ELF Communications Division, Dr. B. Kruger (Code PME-117-21), Director

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Extremely Low Frequency (ELF) Band
Extremely Low Frequency (ELF) Effective Noise Levels

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Starting in August 1976, 76 Hz effective noise measurements have been taken in Connecticut. Based upon these measurements, it appears that there are definite mid-latitude seasonal and diurnal variations in extremely low frequency (ELF) effective noise levels. A comparison of the Connecticut data with that taken in Norway indicates that ELF effective noise is also latitude dependent.

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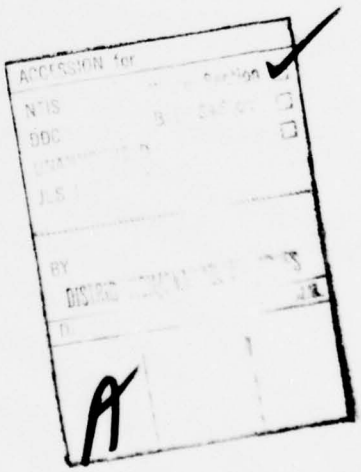

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INTRODUCTION

Under most operating conditions in the extremely low frequency (ELF) band, atmospheric noise is the limiting factor in receiver performance. The dominant source of atmospheric noise is attributed to radiation induced by lightning. Because of the low attenuation rate of ELF radio waves, which makes long range communications possible in this band, noise characteristics are affected not only by local thunderstorms but also by storms megameters away. Local thunderstorms tend to produce large spikes, while distant storms produce a background noise with occasional spikes.

Because of the wide variation in world-wide thunderstorm activity, one would expect the characteristics of ELF atmospheric noise to vary considerably in different parts of the world. However, world-wide measurements indicate a similar "spikiness" in all the observed data. Even in relatively "quiet" parts of the world, spikes attributed to individual lightning flashes are evident, making the noise process distinctly non-Gaussian.[1]

The non-Gaussian nature of the atmospheric noise has an important effect on receiver design and on system performance. With Gaussian noise, the optimum receiver is a linear processor whose performance can be determined by measuring the atmospheric noise spectra. However, with non-Gaussian noise, the performance with a linear processor can be much worse than is suggested by the noise spectra. Furthermore, with an appropriate (nonlinear) processor, the performance can be much better than in Gaussian noise of the same spectral level.[1]

To optimize a communications receiver for operation in a non-Gaussian noise environment, it is advisable to place a controlled nonlinearity in the receiver at a stage of wide signal-plus-noise bandwidth to remove the high amplitude spikes. Evans and Griffiths[1] conducted experiments with recorded ELF noise in an attempt to design and evaluate operationally feasible approximations to the optimum nonlinearity. They concluded that a simple clipper, adjusted adaptively to clip between 10 and 40 percent of the time, provides near optimum performance.

By comparing the 1 percent exceedance level (i.e., the amplitude exceeded by fewer than 1 percent of the samples) atmospheric noise data from periods when local thunderstorms were known to be absent with those taken when thunderstorms were present, Ginsberg[2] suggested that a 10 dB improvement in signal to noise ratio (SNR) could be attained by employing the nonlinear noise processing schemes proposed by Evans and Griffiths.[1]

Recent effective noise measurements* have been made in Norway, Greece, and Saipan.[3,4] These measurements indicated that at least a 10 dB improvement could be obtained by employing nonlinear noise processing techniques.

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*The effective noise spectrum level, N_{eff}, is defined as the spectrum level of ELF noise at the signal frequency, N_o, divided by the improvement, in SNR, using nonlinear processing.[1]

In this report, we will discuss the results of 76 Hz effective noise measurements taken in Connecticut during the summer and fall of 1976.

76 Hz CONNECTICUT EFFECTIVE NOISE MEASUREMENTS

For the Connecticut measurements, the SEAFARER* ELF receiver (AN/BSR-1) is located at NUSC, New London, Connecticut. The loop receiving antenna is located at Fishers Island, New York (about 6.2 miles (10 km) from New London). The receiver and receiving antenna are connected via a microwave link from Fishers Island to NUSC/NL. The receiving antenna is located approximately 170 ft (50 m) from a NUSC building at Fishers Island, which houses the ELF preamplifier and associated circuitry.

Daily 76 Hz field strength and effective noise measurements have been taken in Connecticut (via the Fishers Island microwave link) since August 1976. The main purpose of these measurements is to further investigate sunrise, daytime, sunset, nighttime, and seasonal ELF propagation variations. A secondary purpose is to establish a midlatitude effective noise data base. The results of the 76 Hz effective noise measurements will be discussed here; the field strength measurement results will be discussed in a separate report.

Plotted in figure 1 are the August 1976 Connecticut 76 Hz average effective noise levels versus Greenwich Mean Time (GMT); the individual daily 30 minute samples are listed in table 1. Altogether, 16 days of data were obtained. The average diurnal variation was 6 dB (-130 to -136 dBH†), with the minimum occurring around local sunrise and the maximum occurring 1 to 2 hours before local sunset.

Plotted in figure 2 are the 76 Hz average effective noise levels for the four highest N_{eff} days in August (13-15 and 26 August) versus GMT. Note that the minimum values were about the same as the monthly average, whereas the maximum values were approximately 5 dB higher than the monthly average (see figure 1).

The 76 Hz effective noise levels measured during 15-16 July versus GMT are plotted in figure 3. Here we see that the diurnal variation is ~ 17 dB, which is the second largest diurnal variation measured to date in Connecticut! The peak level (~ -124 dBH) was about the same as was measured during the four highest days in August (figure 2); the minimum level (~ -141 dBH) was ~ 5 dB lower than the average August minimum level (figure 1) and also lower than any 30 minute sample measured during the whole 16 days in August (see table 1).

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*SEAFARER (formerly called SANGUINE) is an arbitrary designation applied to ongoing ELF research by the U.S. Navy. The term designates work directed toward the implementation of an ELF shore-to-ship radio communication system.

†dBH = dB relative to 1 A/m $\cdot\sqrt{\text{Hz}}$.

Table 1. August 1976 Connecticut 76 Hz Effective Noise Levels (dBH)

GMT	8/4	8/5	8/6	8/14	8/15	8/16	8/17	8/18	8/20	8/21	8/22	8/23	8/24	8/25
0000	-135.8	-131.7	-128.1	-126.8	-127.7	-129.9	-132.4	-133.8	-131.0	-133.7	-135.0	-133.4	-132.1	-130.8
0030	-134.8	-132.7	-129.9	-127.2	-128.6	-132.1	-133.0	-133.6	-130.2	-134.4	-136.0	-132.6	-133.6	-131.2
0100	-135.0	-133.5	-130.9	-128.4	-130.0	-131.8	-133.1	-134.6	-130.6	-134.3	-135.9	-134.1	-133.5	-132.7
0130	-135.6	-133.1	-132.5	-129.2	-130.1	-130.5	-132.4	-135.3	-130.2	-133.9	-136.2	-134.5	-134.3	-133.8
0200	-136.1	-132.6	-134.1	-129.4	-130.5	-132.2	-133.6	-135.5	-131.0	-134.6	-137.6	-135.1	-135.1	-133.4
0230	-136.6	-133.0	-134.3	-129.8	-130.0	-132.0	-134.5	-136.9	-132.4	-133.9	-135.7	-136.9	-135.0	-133.5
0300	-137.2	-134.3	-134.0	-128.8	-130.8	-132.9	-134.6	-136.6	-133.6	-135.6	-138.1	-136.6	-135.4	-134.5
0330	-137.6	-135.1	-134.2	-129.4	-131.2	-133.7	-134.6	-137.1	-134.7	-136.7	-137.8	-136.5	-134.4	-134.4
0400	-137.8	-135.4	-135.3	-130.8	-130.8	-134.4	-134.8	-136.9	-134.0	-136.5	-138.3	-136.9	-135.4	-134.9
0430	-138.0	-135.5	-135.4	-131.2	-129.7	-134.0	-135.1	-137.3	-134.9	-137.5	-138.6	-137.2	-134.9	-135.1
0500	-138.4	-135.8	-135.4	-131.5	-130.2	-133.9	-135.6	-137.7	-134.6	-136.8	-139.0	-138.1	-135.6	-135.0
0530	-137.1	-135.9	-136.7	-131.4	-129.6	-134.0	-134.0	-137.2	-135.0	-137.3	-140.2	-136.7	-135.3	-135.5
0600	-137.2	-135.4	-137.5	-132.1	-128.8	-134.8	-134.4	-137.9	-133.8	-136.8	-138.7	-137.7	-136.0	-135.6
0630	-137.6	-135.4	-137.2	-132.5	-128.3	-134.2	-135.2	-137.0	-132.9	-137.1	-139.8	-136.0	-135.9	-136.5
0700	-138.1	-134.3	-137.1	-133.1	-127.6	-134.5	-134.7	-136.5	-132.7	-136.7	-138.2	-137.7	-135.0	-136.8
0730	-138.0	-134.3	-136.3	-132.7	--	-134.5	-136.1	-136.6	-132.3	-136.4	-138.6	-136.9	-135.3	-136.5
0800	-139.1	-135.1	-135.6	-132.3	--	-134.8	-137.3	-136.0	-131.8	-136.3	-138.2	-137.7	-136.0	-137.2
0830	-139.5	-135.7	-136.1	-132.7	--	-134.9	-137.3	-137.1	-132.4	-136.7	-138.7	-136.6	-135.4	-137.4
0900	-139.6	-135.5	-136.3	-132.9	--	-134.7	-136.2	-136.6	-133.3	-136.3	-138.0	-137.8	-133.5	-136.6
0930	-139.7	-135.9	-136.0	-132.8	--	-134.4	-136.6	-137.4	-133.4	-136.6	-138.0	-136.4	-133.4	-137.3
1000	-139.7	-135.9	-136.6	-132.7	--	-133.6	-135.4	-136.3	-133.8	-135.6	-137.7	-136.6	--	-136.3
1030	-137.8	-135.3	-136.1	-132.8	--	-133.5	-136.3	-136.7	-133.4	-135.9	-136.8	-137.2	--	-135.2
1100	-136.5	-133.7	-133.6	-131.9	--	-133.7	-134.0	-137.3	-133.7	-135.7	-137.6	-136.4	--	-135.7
1130	--	-132.8	-136.2	-132.4	-134.0	-134.2	-132.7	-136.8	--	-136.7	-136.5	-136.7	--	-135.6

GMT	8/3	8/4	8/5	8/13	8/14	8/15	8/17	8/18	8/19	8/20	8/21	8/22	8/23	8/24
1200	———	-136.4	———	———	-133.4	-134.2	-134.0	-136.3	———	-132.8	-135.2	-136.4	-135.4	———
1230	———	-137.7	———	———	-133.1	-134.8	-133.8	-135.7	———	-130.6	-136.5	-136.3	-135.7	———
1300	———	-138.0	———	-134.2	-133.8	-134.8	-133.3	-134.3	———	-133.8	-135.3	-136.4	-134.5	———
1330	———	-137.2	-137.5	-135.1	-134.3	-134.0	-133.9	-135.9	———	-134.3	-137.0	-137.0	-135.4	-130.8
1400	———	-138.4	-136.7	-135.2	-133.7	-134.1	-132.7	-136.9	———	-134.6	-135.5	-136.8	-135.4	-129.4
1430	———	-137.6	-136.9	-134.8	-134.4	-133.7	-134.2	-135.1	-134.9	-135.3	-135.1	-136.5	-136.0	-130.3
1500	———	-136.8	-137.2	-133.6	-133.4	-133.2	-134.0	-132.1	-135.9	-135.1	-135.7	-134.6	-135.7	-132.5
1530	———	-137.0	-136.4	-133.7	-133.2	-133.7	-134.6	-134.9	-136.7	-134.4	-135.0	-136.2	-137.1	-133.4
1600	———	-136.6	-137.0	-135.5	-134.1	-132.8	-135.4	-133.1	-135.7	-135.0	-136.1	-136.3	-136.9	-134.4
1630	———	-136.8	-135.8	-134.2	-133.2	-131.9	-135.5	-135.5	-136.6	-135.6	-136.0	-136.3	-137.1	-134.6
1700	-136.9	-137.6	-137.0	-132.2	-132.9	-131.8	-135.5	-134.1	-136.1	-135.6	-135.5	-136.0	-137.3	-135.0
1730	-136.6	-137.4	-137.0	-129.6	-133.2	-130.1	-133.7	-130.8	-135.6	-136.1	-135.9	-135.3	-136.4	-133.3
1800	-136.2	-137.5	-135.2	-128.3	-131.5	-128.8	-134.9	-132.6	-135.7	-134.6	--	-135.2	-136.3	-133.2
1830	-136.0	-137.0	-133.7	-127.6	-129.4	-128.4	-134.1	-133.9	-136.2	-134.7	-135.2	-134.5	-134.2	-133.8
1900	-135.4	-136.0	-133.9	-126.6	-129.0	-127.1	-133.9	-133.5	--	--	-135.7	-134.6	-134.0	-133.5
1930	-135.2	-132.2	-130.9	-126.2	-127.9	-128.8	-133.8	-130.6	-134.2	--	-135.3	-134.4	-133.7	-132.2
2000	-135.3	-132.5	-132.2	-124.0	-128.1	-127.6	-134.2	-134.1	-134.6	--	-134.5	-133.9	--	-131.3
2030	-135.1	-133.0	-133.5	-124.4	-127.6	-127.7	-133.4	-133.9	-134.5	--	-135.3	-133.9	-131.8	-132.2
2100	-134.7	-134.6	-133.8	-125.2	-127.9	-126.3	-133.5	-135.5	-133.1	--	-134.9	-132.5	-132.4	-132.5
2130	-134.7	-134.4	-132.7	-124.5	-125.8	-125.9	-133.4	-134.2	-132.6	--	-133.9	-132.5	-132.2	-130.3
2200	-134.6	-133.9	-131.5	-124.2	-124.8	-126.3	-133.7	-134.7	-131.5	--	-133.0	-132.9	-131.5	-129.5
2230	-134.9	-134.1	-129.5	-124.6	-124.9	-127.7	-133.1	-134.8	-131.3	--	-132.9	-132.5	-131.0	-130.4
2300	-134.6	-133.8	-130.8	-125.2	-124.7	-128.3	-133.3	-135.0	-131.6	--	-133.1	-132.8	-131.4	-129.7
2330	-134.9	-133.9	-129.8	-125.4	-125.2	-128.6	-133.2	-135.6	-131.1	--	-134.0	-133.0	-132.3	-130.0

le 1. August 1976 Connecticut 76 Hz Effective Noise Levels (dBH)

8/15	8/16	8/17	8/18	8/20	8/21	8/22	8/23	8/24	8/25	8/27			MONTHLY AVERAGE
-127.7	-129.9	-132.4	-133.8	-131.0	-133.7	-135.0	-133.4	-132.1	-130.8	-130.5			-131.3
-128.6	-132.1	-133.0	-133.6	-130.2	-134.4	-136.0	-132.6	-133.6	-131.8	-131.8			-132.0
-130.0	-131.8	-133.1	-134.6	-130.6	-134.3	-135.9	-134.1	-133.5	-132.7	-132.9			-132.6
-130.1	-130.5	-132.4	-135.3	-130.2	-133.9	-136.2	-134.5	-134.3	-133.8	-133.1			-132.8
-130.5	-132.2	-133.6	-135.5	-131.0	-134.6	-137.6	-135.1	-135.1	-133.4	-133.2			-133.4
-130.0	-132.0	-130.5	-130.9	-132.4	-133.9	-135.7	-136.9	-135.0	-133.5	-134.0			-133.7
-130.8	-132.9	-134.6	-136.6	-133.6	-135.6	-138.1	-136.6	-135.4	-134.5	-135.1			-134.4
-131.2	-133.7	-130.6	-137.1	-134.7	-136.7	-137.8	-136.5	-134.4	-134.4	-135.3			-134.7
-130.8	-130.4	-134.8	-136.9	-130.0	-136.5	-138.3	-136.9	-135.4	-134.9	-135.6			-135.0
-129.7	-130.0	-135.1	-137.3	-134.9	-137.5	-138.6	-137.2	-134.9	-135.1	-134.9			-135.1
-130.2	-133.9	-135.6	-137.7	-134.6	-136.8	-139.0	-138.1	-135.6	-135.0	-134.9			-135.3
-129.6	-130.0	-134.0	-137.2	-135.0	-137.3	-140.2	-136.7	-135.3	-135.5	-136.3			-135.3
-128.8	-130.8	-130.4	-137.9	-133.8	-136.8	-138.7	-137.7	-136.0	-135.6	--			-135.3
-128.3	-130.2	-135.2	-137.0	-132.9	-137.1	-139.8	-136.0	-135.9	-136.5	--			-135.2
-127.6	-130.5	-130.7	-136.5	-132.7	-136.7	-138.2	-137.7	-135.0	-136.8	--			-135.1
--	-130.5	-136.1	-136.6	-132.3	-136.4	-138.6	-136.9	-135.9	-136.5	--			-135.5
--	-130.4	-137.3	-136.0	-131.8	-136.3	-138.2	-137.7	-136.0	-137.2	--			-135.7
--	-130.3	-137.3	-137.1	-132.4	-136.7	-138.7	-136.6	-135.4	-137.4	--			-136.0
--	-130.7	-136.2	-136.6	-133.3	-136.3	-138.0	-137.8	-133.5	-136.6	--			-135.8
--	-130.4	-136.6	-137.4	-133.4	-136.6	-138.0	-136.4	-133.4	-137.3	--			-135.8
--	-133.6	-135.4	-136.3	-133.8	-135.6	-137.7	-136.6	--	-136.3	--			-135.6
--	-133.5	-130.3	-136.7	-133.4	-135.9	-136.8	-137.2	--	-135.2	--			-135.2
--	-133.7	-130.0	-137.3	-133.7	-135.7	-137.6	-136.4	--	-135.7	--			-134.8
-130.0	-130.2	-132.7	-136.8	--	-136.7	-136.5	-136.7	--	-135.6	--			-134.8

8/14	8/15	8/17	8/18	8/19	8/20	8/21	8/22	8/23	8/24	8/25	8/26	8/27	MONTHLY AVERAGE
-133.4	-130.2	-130.0	-136.3	———	-132.8	-135.2	-136.4	-135.4	———	-130.9	-134.2	-135.8	-134.7
-133.1	-130.8	-133.8	-135.7	———	-130.6	-136.5	-136.3	-135.7	———	-133.2	-132.9	-135.5	-134.5
-133.8	-130.8	-133.3	-130.3	———	-133.8	-135.3	-136.4	-134.5	———	-130.5	-133.4	-130.9	-134.5
-130.3	-130.0	-133.9	-135.9	———	-134.3	-137.0	-137.0	-135.4	-130.8	-133.9	-134.5	-135.4	-134.8
-133.7	-130.1	-132.7	-136.9	———	-134.6	-135.5	-136.8	-135.4	-129.9	-133.4	-132.8	-134.3	-134.5
-130.9	-133.7	-130.2	-135.1	-134.9	-135.3	-135.1	-136.5	-136.0	-130.8	--	-134.7	-132.5	-134.7
-133.4	-133.2	-130.0	-132.1	-135.9	-135.1	-135.7	-134.6	-135.7	-132.5	--	-135.6	-135.2	-134.6
-133.2	-133.7	-130.6	-130.9	-136.7	-134.4	-135.0	-136.2	-137.1	-133.4	-134.5	-136.4	-134.5	-134.9
-130.1	-132.8	-135.4	-133.1	-135.7	-135.0	-136.1	-136.3	-136.9	-134.4	-133.9	-135.2	-132.5	-134.8
-133.2	-131.9	-135.5	-135.5	-136.6	-135.6	-136.0	-136.3	-137.1	-134.6	-133.5	-135.3	-133.2	-134.9
-132.9	-131.8	-135.5	-134.1	-136.1	-135.6	-135.5	-136.0	-137.3	-135.0	-134.3	-134.0	-134.1	-134.8
-133.2	-130.1	-133.7	-130.8	-135.6	-136.1	-135.9	-135.3	-136.4	-133.3	-133.3	-132.9	-132.8	-134.2
-131.5	-128.8	-134.9	-132.6	-135.7	-134.6	--	-135.2	-136.3	-133.2	-132.5	-132.4	-132.2	-133.3
-129.4	-128.4	-134.1	-133.9	-136.2	-134.7	-135.2	-134.5	-134.2	-133.8	-131.3	-131.0	-130.8	-132.7
-129.0	-127.1	-133.9	-133.5	--	--	-135.7	-134.6	-134.0	-133.5	-130.7	-130.5	-130.9	-132.0
-127.9	-128.8	-133.8	-130.0	-134.2	--	-135.3	-134.4	-133.7	-132.2	-129.8	-129.2	-130.7	-131.7
-128.1	-127.6	-134.2	-134.1	-134.6	--	-134.5	-133.9	--	-131.3	-129.6	-127.5	--	-131.2
-127.6	-127.7	-133.4	-133.9	-134.5	--	-135.3	-133.9	-131.8	-132.2	-129.7	-126.1	--	-131.1
-127.9	-126.3	-133.5	-135.5	-133.1	--	-130.9	-132.5	-132.4	-132.5	-129.3	-125.9	--	-131.1
-125.8	-125.9	-133.4	-134.2	-132.6	--	-133.9	-132.5	-132.2	-130.3	-128.6	-126.3	--	-130.5
-124.8	-126.3	-133.7	-134.7	-131.5	--	-133.0	-132.9	-131.5	-129.5	-128.5	-125.6	--	-130.0
-124.9	-127.7	-133.1	-134.8	-131.3	--	-132.9	-132.5	-131.0	-130.4	-128.3	-125.8	--	-130.0
-124.7	-128.3	-133.3	-135.0	-131.6	--	-133.1	-132.8	-131.4	-129.7	--	-127.4	--	-130.5
-125.2	-128.6	-133.2	-135.6	-131.1	--	-134.0	-133.0	-132.3	-130.0	--	-128.4	--	-130.8

The 76 Hz average effective noise levels measured September versus GMT are presented in figure 4, and the individual daily 30 minute samples are listed in table 2. Altogether, 22 days of data were obtained. The average diurnal variation was 5 dB (-135 to -140 dBH), with the minimum occurring around local sunrise and the maximum occurring 1 to 2 hours before local sunset. Note that the maximum average levels measured during September were approximately the same as the minimum average levels measured in August (see figure 1).

Plotted in figure 5 are the 76 Hz effective noise levels measured during 26 September versus GMT. Here we see that the diurnal variation is of the order of 13 dB, with variations from -131 dBH (the highest level measured in September) to -144 dBH (the lowest level measured in September).

The 76 Hz average effective noise levels measured during October versus GMT are presented in figure 6, and the individual 30 minute samples are listed in table 3. Altogether, 28 days of data were obtained. The average diurnal variation was 5 dB (-136 to -141 dBH). Again the minimum and maximum occurred, respectively, around local sunrise and just before local sunset. Note that the October N_{eff} levels were very similar to those measured during September (figure 4).

Figure 7 presents the 76 Hz effective noise levels measured versus GMT during 14 October. The diurnal variation is of the order of 10 dB, with variations from -132 to -142 dBH.

The 76 Hz effective noise levels measured during 9-10 October versus GMT are presented in figure 8. It should be noted that there were severe thunderstorm warnings, as well as a tornado watch for the local area during that time. The effective noise measured from 0000 to 1200 GMT was very near the monthly average. However, from 1200 to 1900, the effective noise increased 20 dB! The diurnal variation was 23 dB (-118 to -141 dBH), which is the largest diurnal variation measured to date at any receiving location! The peak level (-118 dBH) was 7 dB higher than that measured during the four highest N_{eff} days in August (see figure 2). Perhaps the abnormally high levels measured from 1600 to 2100 are related to tornado activity.

Plotted in figure 9 are the 76 Hz average effective noise levels measured during November versus GMT; the individual 30 minute samples are listed in table 4. Altogether 22 days of data were obtained. The average diurnal variation was only 3 dB (-138 to -141 dBH), which is 2 to 3 dB less than that measured during August, September, and October. However, the maximum and minimum levels occurred at the same time as in previous months (i.e., around local sunrise and sunset).

The 76 Hz average effective noise levels measured during the fall of 1976 (i.e., September, October, and November) versus GMT are plotted in figure 10. Each data point is the average of 74 days worth of measurements. The average diurnal variation is approximately 5 dB (-136 to -141 dBH), with the minimum levels occurring around local sunrise and the maximum levels occurring 1 to 2 hours before local sunset.

It should be noted that from late November to mid January, a faulty heater motor bearing (located in the NUSC building at Fishers Island, which houses the ELF

Reverse Blank

Table 2. September 1976 Connecticut 76 Hz Ef

GMT	9/8	9/10	9/11	9/12	9/13	9/14	9/15	9/16	9/17	9/18	9/19	9/20	9/21	9/
0000	-137.2	-135.6	-138.3	-138.7	-134.0	-135.5	-134.2	-136.8	-135.6	-135.4	-137.7	-136.8	-135.0	-1
0030	-137.0	-136.1	-139.6	-139.1	-134.8	-136.4	-134.5	-136.2	-136.1	-135.0	-137.1	-136.6	-134.6	-1
0100	-137.5	-136.4	-139.8	-138.4	-135.5	-137.3	-134.6	-135.0	-138.5	-135.1	-137.0	-138.0	-135.3	-1
0130	-137.4	-136.6	-138.5	-140.1	-135.3	-137.8	-134.6	-137.9	-139.0	-136.2	-137.1	-138.4	-135.2	-1
0200	-137.7	-136.9	-137.9	-140.3	-135.0	-138.0	-133.8	-138.1	-138.4	-136.9	-136.7	-137.8	-134.6	-1
0230	-138.1	-137.2	-139.0	-139.5	-134.8	-139.0	-134.8	-137.6	-138.3	-136.6	-136.2	-137.6	-135.6	-1
0300	-138.1	-137.7	-139.5	-140.0	-135.4	-138.2	-134.9	-137.0	-139.9	-137.2	-136.6	-138.5	-136.3	-1
0330	-138.2	-138.0	-140.3	-139.9	-134.7	-139.0	-136.3	-139.1	-139.4	-137.1	-138.2	-138.1	-135.6	-1
0400	-137.4	-137.9	-140.0	-139.6	-134.7	-138.5	-135.7	-139.5	-139.1	-137.8	-137.6	-138.7	-136.4	-1
0430	-138.7	-138.0	-140.3	-139.2	-135.0	-139.1	-136.9	-139.4	-139.3	-138.7	-137.0	-138.8	-137.6	-1
0500	-139.6	-138.8	-140.2	-139.8	-136.8	-137.9	-137.2	-139.7	-139.3	-138.7	-136.6	-140.6	-138.1	-1
0530	-138.7	-138.7	-140.7	-139.6	-136.7	-138.5	-138.0	-140.1	-139.3	-139.1	-136.4	-138.4	-138.2	-1
0600	-139.0	-137.7	-141.0	-139.0	-136.3	-139.6	-138.0	-140.2	-138.7	-138.5	-136.5	-140.6	-139.3	-1
0630	-139.5	-137.0	-142.2	-141.0	-137.4	-140.3	-138.6	-139.6	-139.7	-139.9	-135.7	-140.1	-140.6	-1
0700	-139.3	-138.0	-141.9	-140.6	-137.5	-139.5	-140.4	-138.7	-140.4	-139.3	-134.4	-141.4	-140.7	-1
0730	-139.3	-138.1	-141.3	-140.0	-137.8	-140.5	-140.2	-139.7	-139.8	-139.3	-133.9	-142.5	-140.6	-1
0800	-140.5	-137.7	-141.7	-140.1	-138.6	-140.2	-140.2	-140.3	-139.3	-139.4	-132.1	-141.9	-139.8	-1
0830	-139.6	-137.2	-142.0	-140.3	-139.4	-139.3	-139.7	-139.7	-140.0	-139.1	-132.5	-140.6	-140.4	-1
0900	-139.3	-137.4	-141.3	-140.7	-139.4	-138.4	-139.5	-139.2	-139.1	-138.3	-134.2	-141.3	-140.5	-1
0930	-140.3	-136.3	-140.9	-139.9	-139.2	-140.2	-139.2	-140.1	-138.4	-139.1	-135.6	-142.2	-140.7	-1
1000	-140.1	-135.7	-140.9	-139.9	-139.6	-140.5	-139.5	-140.2	-138.8	-139.6	-134.8	-141.9	-140.2	-1
1030	-139.5	-135.2	-141.2	-138.8	-139.1	-139.2	-139.9	-138.7	-138.6	-139.4	-133.7	-140.5	-140.4	-1
1100	-138.2	-135.7	-141.1	-138.3	-138.9	-138.6	-140.2	-138.9	-139.0	-139.2	-134.7	-141.9	-139.8	-1
1130	-138.9	-136.2	-139.5	-139.4	-138.0	-139.0	-140.1	-140.4	-138.7	-139.5	-134.7	-141.8	-139.4	-1

GMT	9/7	9/10	9/11	9/12	9/13	9/14	9/15	9/16	9/17	9/18	9/19	9/20	9/21	9/
1200	———	-135.6	-138.0	-137.4	-137.5	-138.6	-139.2	-140.6	-138.3	-139.0	-134.4	-141.0	-138.6	-1
1230	———	-135.7	-138.8	-137.8	-136.5	-138.7	———	-139.4	-137.9	-139.3	-135.0	-140.5	-139.5	-1
1300	———	———	-136.8	-136.4	-134.6	-137.0	———	-138.8	-137.2	-139.1	-135.7	-138.6	-138.7	-1
1330	———	———	-136.0	-136.9	-135.8	-138.6	-139.0	-139.3	-138.0	-138.8	-136.1	-140.4	-139.1	-1
1400	———	-135.5	-138.0	-136.2	-136.9	-139.1	-139.1	-139.4	-136.8	-138.7	-136.2	-140.3	-139.0	-1
1430	———	-136.5	-137.6	-136.4	-137.0	-137.3	-139.0	-138.0	-136.1	-138.5	-137.1	-139.7	-138.9	-1
1500	———	-135.8	-137.3	-136.6	-136.3	-134.7	-138.3	-137.1	-135.6	-138.9	-137.4	-134.8	-138.4	-1
1530	———	-136.3	-137.0	-136.3	-135.9	-136.2	-137.8	-138.0	-136.1	-138.5	-137.0	-135.3	-136.4	-1
1600	-135.6	-134.7	-135.7	-135.7	-136.1	-138.2	-138.8	-138.2	-135.5	-138.1	-136.7	-135.7	-137.7	-1
1630	-135.7	--	-136.4	-135.2	-136.3	-138.4	-138.5	-137.7	-136.5	-138.7	-136.3	-134.8	-138.9	-1
1700	-135.9	-135.8	-136.4	-135.8	-137.1	-137.0	-137.6	-138.2	-135.8	-138.5	-137.2	-135.0	-138.9	-1
1730	-135.6	-133.9	-136.9	-136.0	-137.1	-138.3	-138.1	-138.1	-136.0	-137.4	-137.4	-133.8	-138.0	-1
1800	-135.0	-133.2	-136.8	-135.9	-136.5	-137.6	-139.0	-137.6	-133.8	-136.8	-136.6	-133.5	-138.0	-1
1830	-135.4	-130.5	-136.6	-135.4	-133.3	-136.8	-137.5	-136.6	-133.9	-135.3	-135.8	-132.1	-138.2	-1
1900	-135.5	-130.1	-137.0	-136.9	-132.7	-137.3	-136.2	-134.8	-134.1	-135.7	-135.7	-132.7	-138.0	-1
1930	-135.3	-132.8	-137.2	-135.6	-137.7	-136.6	-136.0	-136.3	-134.0	-135.6	-134.2	-133.1	-137.1	-1
2000	-134.6	-134.7	-136.0	-135.8	-136.8	-135.8	-136.5	-135.3	-133.7	-134.7	-134.8	-132.3	-137.2	-1
2030	-135.0	-135.5	-135.9	-136.1	-136.1	-136.0	-137.1	-135.2	-133.1	-135.0	-134.3	-132.2	-137.8	-1
2100	-134.4	-135.9	-137.3	-135.8	-136.2	-136.2	-136.2	-135.3	-132.7	-134.0	-134.2	-132.6	-137.7	-1
2130	-134.6	-136.4	-136.5	-134.6	-135.4	-136.0	-136.4	-133.6	-133.5	-134.7	-134.1	-134.8	-137.3	-1
2200	-136.1	-135.1	-136.3	-133.6	-134.5	-134.3	-136.5	-133.9	-133.2	-135.3	-134.9	-134.3	-136.4	-1
2230	-135.9	-137.0	-137.0	-134.3	-135.0	-134.4	-135.2	-133.2	-133.7	-135.1	-135.2	-134.7	-137.2	-1
2300	-135.5	-137.3	-137.1	-134.2	-134.7	-134.8	-135.2	-134.6	-134.3	-136.0	-135.8	-134.8	-138.0	-1
2330	-136.1	-138.6	-136.6	-133.9	-134.2	-134.8	-135.7	-135.5	-135.9	-136.9	-136.2	-134.4	-137.2	-1

September 1976 Connecticut 76 Hz Effective Noise Levels (dBH)

9/17	9/18	9/19	9/20	9/21	9/22	9/23	9/24	9/25	9/26	9/27	9/28	9/29	9/30	MONTHLY AVERAGE
-135.6	-135.4	-137.7	-136.8	-135.0	-137.6	-137.5	-136.2	-137.8	-137.7	-131.8	-136.4	-138.1	-136.1	-136.3
-136.1	-135.0	-137.1	-136.6	-134.6	-138.3	-137.4	-135.7	-137.9	-136.9	-131.2	-136.4	-138.5	-136.3	-136.4
-138.5	-135.1	-137.0	-138.0	-135.3	-138.5	-138.1	-135.9	-137.6	-138.3	-132.6	-137.7	-137.9	-136.8	-136.8
-139.0	-136.2	-137.1	-138.4	-135.2	-138.8	-138.7	-136.5	-138.3	-138.0	-134.3	-138.9	-138.6	-137.5	-137.4
-138.4	-136.9	-136.7	-137.8	-134.6	-139.0	-138.3	-137.3	-140.0	-138.6	-135.6	-138.4	-139.6	-139.1	-137.6
-138.3	-136.6	-136.2	-137.6	-135.6	-140.7	-139.0	-137.3	-139.9	-138.2	--	-138.0	-140.7	-139.0	-137.9
-139.9	-137.2	-136.6	-138.5	-136.3	-140.9	-140.2	-137.4	-139.5	-139.2	--	-138.0	-139.8	-138.6	-138.2
-139.4	-137.1	-138.2	-138.1	-135.6	-140.1	-140.1	-138.1	-139.0	-140.6	--	-138.0	-139.1	-138.4	-138.4
-139.1	-137.8	-137.6	-138.7	-136.4	-140.4	-140.2	-139.4	-139.6	-141.1	--	-137.3	-140.1	-138.9	-138.5
-139.3	-138.7	-137.0	-138.8	-137.6	-141.7	-139.9	-139.8	-139.5	-140.5	--	-137.2	-140.4	-139.2	-138.8
-139.3	-138.7	-136.6	-140.6	-138.1	-141.8	-140.1	-139.1	-139.9	-141.0	--	-137.6	-139.9	-139.4	-139.1
-139.3	-139.1	-136.4	-138.4	-138.2	-140.9	-140.3	-140.1	-139.1	-141.6	--	-138.8	-139.7	-138.8	-139.1
-138.7	-138.5	-136.5	-140.6	-139.3	-140.4	-139.8	-141.6	-139.5	-141.8	--	-139.5	-141.2	-139.4	-139.4
-139.7	-139.9	-135.7	-140.1	-140.6	-140.9	-140.0	-142.4	-139.7	-142.0	--	-139.4	-141.9	-138.7	-139.8
-140.4	-139.3	-134.4	-141.4	-140.7	-142.0	-141.2	-140.8	-140.2	-141.3	--	-138.3	-140.6	-138.6	-139.7
-139.8	-139.3	-133.9	-142.5	-140.6	-141.9	-140.9	-140.4	-139.6	-142.6	--	-138.9	-140.4	-138.0	-139.9
-139.3	-139.4	-132.1	-141.9	-139.8	-140.7	-140.7	-140.9	-139.5	-142.2	--	-139.6	-140.9	-138.2	-139.9
-140.0	-139.1	-132.5	-140.6	-140.4	-141.6	-140.6	-141.4	-141.5	-141.3	--	-139.5	-141.3	-139.3	-139.9
-139.1	-138.3	-134.2	-141.3	-140.5	-142.1	-141.7	-140.9	-141.9	-142.2	--	-138.0	-141.4	-139.9	-139.8
-138.4	-139.1	-135.6	-142.2	-140.7	-141.9	-141.9	-140.5	-142.3	-142.7	--	-138.4	-140.4	-139.8	-140.0
-138.8	-139.6	-134.8	-141.9	-140.2	-139.8	-141.2	-139.8	-140.8	-143.7	--	-139.0	-139.7	-138.5	-139.7
-138.6	-139.4	-133.7	-140.5	-140.4	-140.1	-139.4	-140.1	-140.8	-143.3	--	-139.1	-140.7	-138.4	-139.4
-139.0	-139.2	-134.7	-141.9	-139.8	-140.2	-140.0	-139.9	-140.3	-141.0	--	-139.5	-140.6	-139.0	-139.3
-138.7	-139.5	-134.7	-141.8	-139.4	-139.5	-140.6	-138.3	-139.9	-139.3	-139.0	-138.6	-139.8	-139.1	-139.1

9/17	9/18	9/19	9/20	9/21	9/22	9/23	9/24	9/25	9/26	9/27	9/28	9/29	9/30	MONTHLY AVERAGE
-138.3	-139.0	-134.4	-141.0	-138.6	-138.8	-139.7	-138.8	-139.1	-141.0	-138.6	-138.8	-138.4	-138.6	-138.6
-137.9	-139.3	-135.0	-140.5	-139.5	-139.3	-138.8	-139.1	-138.7	-140.0	-138.8	-138.8	-138.5	-138.0	-138.4
-137.2	-139.1	-135.7	-138.6	-138.7	-137.6	-140.1	-139.2	-138.5	-138.9	-138.3	-136.8	-138.5	-137.6	-137.8
-138.0	-138.8	-136.1	-140.4	-139.1	-138.6	-137.3	-139.1	-138.8	-138.8	-137.9	-137.4	-138.3	-135.3	-137.9
-136.8	-138.7	-136.2	-140.3	-139.0	-137.6	-138.9	-137.2	-138.6	-138.3	-137.7	-137.6	-137.7	--	-137.9
-136.1	-138.5	-137.1	-139.7	-138.9	-138.0	-137.4	-137.6	-137.9	-136.5	-136.9	-137.8	-137.1	-137.4	-137.5
-135.6	-138.9	-137.4	-134.8	-138.4	-137.9	-138.1	-139.1	-136.8	-136.6	-137.0	-138.3	-136.5	-137.0	-137.0
-136.1	-138.5	-137.0	-135.3	-136.4	-138.1	-137.7	-138.3	-136.9	-135.4	-136.9	-138.3	-137.3	-136.5	-136.9
-135.5	-138.1	-136.7	-135.7	-137.7	-137.3	-136.7	-137.9	-136.8	-136.6	-136.8	-137.7	-137.5	-135.5	-136.7
-136.5	-138.7	-136.3	-134.8	-138.9	-136.7	-136.9	-138.5	-137.4	-136.6	-136.2	-137.7	-136.7	-135.3	-136.8
-135.8	-138.5	-137.2	-135.0	-138.9	-136.7	-136.8	-138.7	-136.6	-135.6	-135.6	-136.9	-136.5	-134.8	-136.4
-136.0	-137.4	-137.4	-133.8	-138.0	-136.4	-136.4	-137.8	-135.0	-135.9	-133.9	-136.2	-135.2	-133.5	-136.2
-133.8	-136.8	-136.6	-133.5	-138.0	-136.5	-136.1	-137.0	-135.3	-135.5	-134.5	--	-134.7	-132.5	-135.8
-133.9	-135.3	-135.8	-132.1	-138.2	-136.2	-135.9	-137.2	-134.6	-134.7	-134.6	-136.1	-133.5	-132.2	-135.3
-134.1	-135.7	-135.7	-132.7	-138.0	-136.8	-135.3	-137.1	-135.2	-133.3	-134.5	-135.7	-133.6	--	-135.1
-134.0	-135.6	-134.2	-133.1	-137.1	-136.3	-135.5	-136.8	-135.8	-133.0	-134.4	-136.1	-134.0	--	-135.3
-133.7	-134.7	-134.8	-132.3	-137.2	-136.6	-135.0	-136.0	-136.0	-133.1	-135.0	-136.5	-134.1	--	-135.2
-133.1	-135.0	-134.3	-132.2	-137.8	-136.1	-134.6	-135.6	-134.5	-133.4	-134.9	-134.7	-133.3	-132.1	-134.9
-132.7	-134.0	-134.2	-132.6	-137.7	-136.2	-133.0	-135.5	-135.1	-132.9	-134.7	-135.1	-133.7	-133.9	-134.8
-133.5	-134.7	-134.1	-134.8	-137.3	-136.4	-133.9	-135.3	-135.4	-132.6	-133.6	-136.3	-134.7	-133.9	-134.9
-133.2	-135.3	-134.9	-134.3	-136.4	-135.9	-134.2	-136.2	-135.1	-132.7	-133.1	-137.0	-134.6	-134.2	-134.8
-133.7	-135.1	-135.2	-134.7	-137.2	-135.7	-134.4	-136.5	-135.2	-130.8	-133.8	-137.2	-135.5	-134.4	-135.1
-134.3	-136.0	-135.8	-134.8	-138.0	-136.7	-134.9	-136.6	-136.3	-131.5	-135.3	-136.2	-135.1	-135.8	-135.5
-135.9	-136.9	-136.2	-134.4	-137.2	-137.3	-135.4	-137.0	-136.6	-131.9	-136.8	-137.0	-136.1	-137.4	-136.0

Reverse Blank

Table 3. October 1976 Connecticut 76 H

GMT	10/1	10/2	10/3	10/5	10/6	10/8	10/9	10/10	10/11	10/12	10/14	10/15	10/16	10/17	10/18	
0000	-137.2	-137.1	-139.2	-136.0	-136.7	-138.6	-137.7	-133.7	-139.9	-138.2	-140.0	-138.4	-137.3	-137.4	-140.2	
0030	-137.1	-137.6	-139.6	-135.6	-136.6	-138.7	-138.5	-132.3	-139.0	-139.5	-140.1	-136.9	-137.8	-137.8	-141.1	
0100	-137.6	-137.8	-140.9	-134.7	-137.2	-138.2	-139.1	-130.5	-138.4	-140.4	-139.8	-137.4	-139.1	-138.0	-141.6	
0130	-138.0	-139.0	-140.5	-135.4	-137.1	-138.8	-138.9	-130.8	-139.6	-140.6	-139.8	-137.2	-139.1	-138.6	-141.5	
0200	-139.1	-139.6	-140.9	-136.7	-138.6	-139.2	-137.9	-132.6	-139.4	-140.0	-140.3	-137.1	-139.3	-139.5	-141.0	
0230	-138.9	-140.6	-141.0	-137.1	-140.3	-139.7	-138.0	-134.3	-139.1	-140.5	-139.1	-137.8	-138.6	-139.2	-140.1	
0300	-138.3	-139.9	-140.0	-137.5	-137.5	-139.4	-139.1	-134.6	-138.8	-141.7	-136.4	-139.5	-139.0	-139.3	-140.6	
0330	-139.4	-140.8	-141.4	-138.7	-139.1	-139.1	-139.3	-135.3	-138.9	-141.6	-139.0	-139.8	-139.3	-139.3	-141.4	
0400	-140.4	-141.4	-141.4	-139.5	-138.3	-140.0	-139.5	-135.6	-139.3	-141.4	-140.1	-138.8	-137.4	-139.3	-141.8	
0430	-140.7	-142.1	-141.5	-139.5	-139.4	-140.1	-139.4	-136.3	-139.7	-140.5	-140.4	-138.2	-136.0	-140.4	-142.3	
0500	-139.4	-141.6	-140.6	-139.6	-139.6	-140.1	-139.1	-136.7	-140.0	-140.8	-140.1	-139.4	-136.1	-140.6	-141.2	
0530	-140.1	-140.9	-140.7	-138.3	-139.9	-138.9	-140.0	-136.0	-138.9	-141.5	-139.6	-139.3	-137.4	-140.8	-141.5	
0600	-140.7	-141.9	-142.2	-139.3	-140.6	-139.6	-140.8	-137.0	-139.4	-141.0	-137.1	-139.3	-138.1	-140.6	-141.5	
0630	-139.9	-141.7	-141.8	-139.9	-140.2	-140.9	-139.8	-137.3	-140.0	-141.0	-136.5	-139.2	-138.0	-140.1	-140.0	
0700	-138.6	-141.1	-140.2	-139.5	-141.2	-140.7	-140.3	-137.0	-140.1	-139.6	-140.5	-138.7	-138.3	-141.2	-141.7	
0730	-138.4	-139.9	-140.5	-139.4	-140.6	-139.8	-140.9	-137.1	-139.8	-140.5	-141.5	-140.6	-136.9	-141.4	-141.0	
0800	-139.3	-139.0	-140.1	-138.1	-140.5	-138.8	-140.3	-136.6	-139.2	-141.0	-140.7	-141.1	-135.4	-141.8	-141.1	
0830	-139.4	-139.3	-141.3	-139.4	-140.3	-138.9	-140.3	-137.1	-140.0	-141.1	-140.0	-141.5	-138.3	-141.8	-141.6	
0900	-139.6	-138.5	-141.1	-140.1	-139.5	-139.8	-140.0	-137.0	-140.6	-141.0	-141.0	-140.0	-138.9	-141.9	-141.8	
0930	-139.4	-140.1	-141.0	-140.1	-140.7	-140.6	-140.6	-137.5	-140.9	-140.7	-141.6	-139.5	-139.5	-143.1	-141.9	
1000	-140.2	-139.4	-140.5	-139.2	-140.9	-140.1	-139.3	-137.3	-139.8	-141.4	-140.6	-141.2	-139.4	-143.7	-142.2	
1030	-139.9	-140.0	-140.1	-137.2	-140.4	-139.2	-138.9	-136.8	-139.7	-141.1	-140.0	-141.2	-138.8	-143.8	-140.7	
1100	-139.0	-139.8	-140.5	-137.4	-139.6	-139.0	-135.6	-137.5	-140.1	-141.2	-140.1	-140.9	-138.2	-142.0	-142.2	
1130	-138.2	-140.0	-140.6	-137.4	-138.8	-139.1	-136.6	-137.9	-139.7	-140.3	-139.9	-140.0	-138.6	-141.2	-142.0	
GMT	10/1	10/2	10/3	10/5	10/6	10/8	10/9	10/10	10/11	10/12	10/14	10/15	10/16	10/17	10/18	G
1200	-138.4	-140.1	-140.6	——	-139.3	-139.4	-138.1	-136.9	-139.8	-139.1	-138.6	-137.6	-138.9	-141.1	-141.7	12
1230	-138.6	-139.1	-139.2	——	-139.5	-138.6	-137.5	-137.0	-138.6	-140.0	-138.4	-137.7	-138.6	-141.6	-141.0	12
1300	-137.4	-138.6	-139.1	——	-138.6	-139.3	-133.0	-136.4	-137.8	-137.5	-137.0	-137.6	-138.4	-141.3	-140.7	13
1330	-137.7	-138.8	-137.7	——	-139.0	-140.1	-134.1	-136.6	-138.6	-138.9	-137.0		-138.6	-140.5	-141.3	13
1400	-137.1	-138.5	-140.1	——	-137.9	-139.6	-135.0	-136.7	-137.9	-138.6	-137.1	-137.5	-138.6	-139.4	-141.2	14
1430	-135.4	-138.6	-140.4	——	-137.8	-139.0	-136.1	-134.8	-137.0	-136.4	-136.3	-137.6	-139.9	-140.9	-141.2	14
1500	-137.1	-137.5	-139.1	——	-137.7	-135.3	-134.1	-136.4	-136.5	-138.3	-136.6	-137.7	-138.5	-140.8	-140.0	15
1530	-136.8	-137.7	-139.6	——	10/7	-137.4	-131.1	-135.8	-136.1	-136.7	-136.4	-136.0	-137.5	-140.9	-139.6	15
1600	-136.0	-137.8	-139.4	——	-134.5	-136.8	-131.7	-136.1	-137.6	-134.0	-136.1	-136.4	-138.0	-140.6	-139.8	16
1630	-135.9	-138.2	-139.7	——	-136.5	-136.8	-128.6	-136.3	-135.6	-134.0	-135.5	-135.6	-138.4	-138.7	-140.0	16
1700	-135.3	-137.5	-138.7	——	-136.5	-136.2	-126.5	-136.5	-136.8	-133.5	-134.2	-134.2	-138.6	-139.3	-139.9	17
1730	-134.7	-137.1	-138.5	-136.3	-136.7	-135.8	-123.6	-136.1	-136.4	-133.6	-133.9	-135.3	-137.2	-138.3	-139.6	17
1800	-134.1	-137.7	-138.8	-135.2	-136.3	-136.5	-122.2	-135.7	-136.2	-133.8	-133.0	-135.6	-136.7	-139.1	-140.3	18
1830	-133.0	-137.6	-138.5	-135.1	-135.4	-135.7	-120.0	-136.2	-137.0	——	-132.4	-135.1	-137.2	-138.6	——	18
1900	-133.9	-137.3	-138.2	-134.9	-135.5	-135.5	-118.2	-135.6	-137.4	——	-133.4	-134.8	-137.6	-138.0	——	19
1930	-133.4	-136.5	-137.0	-134.1	-135.8	-135.6	-121.1	-136.0	-135.9	——	-133.1	-133.1	-137.5	-137.4	——	19
2000	-133.1	-135.8	-136.2	-134.2	-135.5	——	-128.4	-136.5	-135.7	——	-132.8	——	-137.4	-136.6	——	20
2030	-133.2	-135.9	-136.8	-134.3	-135.2	-137.2	-125.9	-136.4	-135.6	10/13	-131.9	——	-137.3	-137.1	——	20
2100	-134.0	-136.2	-135.5	-134.1	-134.7	-136.8	-126.5	-136.6	-135.7	-137.0	-132.6	-134.6	-137.0	-137.1	——	21
2130	-133.6	-137.1	-135.7	-133.6	-135.1	-135.8	-130.7	-136.4	-134.4	-137.0	-132.5	-134.1	-136.3	-135.4	——	21
2200	-133.8	-137.0	-136.3	-133.4	-135.5	-136.0	-131.0	-136.2	-135.7	-137.6	-133.5	-135.0	-136.2	-136.7	——	22
2230	-133.6	-138.2	-137.1	-134.5	-135.7	-137.2	-131.5	-136.6	-137.0	-138.0	-135.4	-136.0	-136.5	-139.3	——	22
2300	-134.5	-138.5	-138.2	-135.1	-135.8	-138.3	-132.2	-138.2	-138.8	-138.1	-135.6	-136.5	-137.0	-137.8	——	23
2330	-136.0	-138.7	-139.0	-136.3	-137.7	-138.4	-132.5	-139.2	-139.3	-139.6	-137.1	-136.3	-137.7	-139.6	——	23

ut 76 Hz Effective Noise Levels (dBH)

10/18	GMT	10/20	10/23	10/24	10/25	10/26	10/27	10/28	10/29	10/30	10/31	MONTHLY AVERAGE
140.2	0000	-139.0	-140.3	-140.4	-135.7	-139.5	-138.6	-139.3	-139.0	-139.7	-138.4	-138.4
141.1	0030	-139.3	-139.9	-141.0	-135.1	-140.2	-138.0	-140.3	-139.3	-139.4	-139.0	-138.6
141.6	0100	-139.1	-139.5	-139.4	-136.6	-140.4	-138.4	-141.1	-140.5	-139.7	-139.4	-138.8
141.5	0130	-140.1	-140.6	-139.5	-134.8	-138.1	-139.6	-141.2	-139.4	-140.8	-139.5	-139.0
141.0	0200	-140.5	-140.9	-140.2	-132.6	-139.3	-139.6	-140.7	-140.1	-141.0	-139.2	-139.2
140.1	0230	-138.4	-141.1	-140.7	-132.3	-139.7	-139.6	-140.4	-140.9	-140.8	-139.1	-139.1
140.6	0300	-139.0	-140.1	-141.1	-132.2	-139.9	-138.9	-141.0	-141.2	-140.5	-140.5	-139.2
141.4	0330	-138.7	-140.2	-140.1	-135.1	-139.7	-138.4	-140.9	-141.0	-140.3	-140.7	-139.4
141.8	0400	-139.3	-139.6	-140.1	-137.7	-138.1	-138.9	-140.3	-139.3	-141.9	-140.5	-139.5
142.3	0430	-142.1	-140.3	-141.5	-134.8	-138.3	-139.0	-140.6	-140.0	-141.8	-140.3	-139.7
141.2	0500	-142.3	-139.7	-141.4	-137.2	-139.1	-139.5	-139.9	-140.6	-141.3	-139.7	-139.7
141.5	0530	-142.8	-139.8	-141.0	-138.4	-139.4	-139.3	-140.5	-140.5	-140.5	-140.3	-139.8
141.5	0600	-140.8	-139.7	-140.6	-139.3	-139.5	-138.3	-140.8	-140.4	-139.8	-140.4	-139.9
140.0	0630	-140.0	-139.3	-140.4	-139.9	-138.6	-139.4	-140.6	-139.7	-141.2	-140.7	-139.8
141.7	0700	-141.3	-139.4	-141.2	-140.2	-138.5	-139.4	-140.9	-139.7	-141.4	-140.3	-139.9
141.0	0730	-143.9	-139.5	-141.5	-139.7	-139.6	-139.6	-140.1	-141.3	-141.1	-139.0	-140.0
141.1	0800	-143.3	-139.8	-142.4	-139.2	-139.3	-139.3	-140.8	-141.4	-141.4	-139.8	-140.0
141.6	0830	-143.2	-140.7	-141.1	-140.8	-139.2	-138.6	-141.1	-141.4	-140.3	-140.0	-140.2
141.8	0900	-141.8	-140.3	-140.9	-140.7	-139.2	-139.1	-141.6	-141.5	-141.7	-140.1	-140.3
141.9	0930	-142.4	-141.3	-143.0	-141.2	-138.8	-140.3	-141.9	-140.6	-142.5	-140.6	-140.7
142.2	1000	-143.8	-142.1	-143.3	-140.5	-140.4	-140.6	-141.2	-141.9	-142.8	-140.1	-140.8
140.7	1030	-143.3	-142.2	-143.3	-139.2	-140.0	-141.1	-141.1	-142.7	-142.7	-140.4	-140.4
142.2	1100	-142.4	-140.6	-142.2	-138.8	-138.7	-139.6	-141.1	-141.0	-140.1	-140.7	-139.9
142.0	1130	-140.4	-140.9	-141.2	-138.6	-137.5	-139.7	-141.6	-140.8	-141.1	-140.2	-139.6

10/18	GMT	10/19	10/20	10/21	10/22	10/23	10/24	10/25	10/26	10/27	10/28	10/29	10/30	10/31	MONTHLY AVERAGE
141.7	1200	——	-140.9			-139.6	-141.4	-138.5	-137.0	-138.8	-141.3	-139.2	-140.9	-139.8	-139.4
141.0	1230	——	-141.3	-133.7	-139.2	-139.3	-140.8	-138.3	-137.8	-139.9	-140.8	-139.7	-141.2	-138.7	-139.0
140.7	1300	——	-141.2	-133.8	-138.4	-138.1	-140.4	-137.6	-137.6	-139.7	-140.4	-139.6	-140.9	-138.5	-138.4
141.3	1330	——	-140.0	-134.2	-138.0	-137.6	-138.6	-137.9	-136.7	——	-140.3	-139.8	-139.2	-139.3	-138.3
141.2	1400	——	-138.1	-134.9	-138.2	-137.3	-136.1	-138.0	-136.1	——	-139.3	-139.4	-139.1	——	-137.9
141.2	1430	——	-137.0	-134.9	-138.6	-136.7	-136.8	-137.5	-135.7	-137.7	-138.9	-137.8	-139.5	——	-137.6
140.0	1500	-136.8	-136.9	-135.0	-138.6	-136.8	-137.2	-136.7	-136.0	-138.2	-138.5	-137.7	-139.0	——	-137.3
139.6	1530	-136.1	-138.8	-133.9	-138.6	-138.0	-137.1	-134.6	-135.7	-136.7	-137.3	——	-138.6	——	-137.1
139.8	1600	-137.4	-138.9	-135.0	-138.2	-138.0	-137.6	-136.0	-135.2	-136.6	-138.0	-136.8	-136.8	——	-137.0
140.0	1630	-136.7	-138.3	-134.9	-137.9	-137.6	-137.5	-136.0	-135.1	-136.9	-137.8	-136.1	-136.8	——	-136.8
139.9	1700	-136.3	-138.1	-134.3	-136.2	-137.5	-137.5	-136.7	-134.6	-137.3	-137.3	-135.2	-137.5	-137.7	-136.6
139.6	1730	-136.1	-138.7	-134.5	-136.1	-137.1	-137.7	-136.9	-134.7	-137.4	——	-135.3	-136.9	-136.3	-136.3
140.3	1800	-136.3	-139.3	-136.6	-136.0	-137.4	-138.4	-136.6	-135.4	-137.4	——	-135.1	-136.5	-136.3	-136.5
——	1830	-136.4	-139.2	-136.0	-136.7	-137.6	-138.0	-136.9	-135.7	-136.8	-138.4	-134.9	-135.0	-136.9	-136.3
——	1900	-137.3	-138.3	-134.6	-138.7	-137.1	-136.5	-136.7	-136.1	-135.8	-135.6	-134.8	-135.0	-136.0	-136.1
——	1930	-137.1	-137.9	——	-138.7	-137.7	-137.2	-136.7	-135.5	-136.7	-135.9	-133.9	-134.7	-136.0	-135.9
——	2000	-136.4	-138.7	——	-138.4	-136.9	-137.8	-137.1	-135.6	-136.7	-135.6	-133.8	-134.7	-134.8	-135.8
——	2030	-136.9	-137.9	——	-139.2	-136.6	-137.7	-135.9	-135.4	-136.6	-134.2	-134.3	-135.1	-134.5	-135.8
——	2100	-137.1	-137.9	——	-140.0	-137.0	-136.2	-135.7	-135.5	-136.5	-134.0	-134.0	-134.2	-134.1	-135.7
——	2130	-136.8	-136.8	——	-139.9	-137.1	-136.3	-137.0	-135.1	-136.6	-136.0	-135.0	-134.4	-134.1	-135.6
——	2200	-137.1	-135.6	——	-139.9	-137.0	-136.8	-138.6	-135.5	-136.8	-136.7	-136.2	-135.5	-135.3	-136.1
——	2230	-137.0	-137.9	——	-138.9	-137.4	-137.6	-139.1	-135.8	-138.7	-137.4	-137.2	-136.1	-136.6	-136.7
——	2300	-138.6	-138.1	——	-139.6	-138.5	-136.1	-138.6	-138.3	-139.1	-137.5	-137.9	-138.2	-136.8	-137.5
——	2330	-137.7	-138.6	——	-140.3	-139.7	-134.4	-138.9	-138.6	-139.4	-138.5	-140.0	-137.9	-137.7	-138.2

Reverse Blank

Table 4. November 1976 Connecticut 76 Hz Effective

GMT	11/1	11/2	11/3	11/4	11/5	11/6	11/7	11/8	11/9	11/18	11/19	11/20	11/21	11/22
0000	-138.1	-140.1	-141.3	-141.5	-139.6	-137.5	-135.1	-141.1	-139.0	-138.9	-141.7	-139.5	-140.3	-142.1
0030	-138.9	-140.4	-141.5	-141.0	-138.8	-138.2	-134.7	-140.8	-139.4	-139.2	-141.1	-139.0	-140.5	-142.0
0100	-139.2	-140.0	-141.6	-140.8	-139.1	-138.2	-137.0	-140.9	-140.1	-140.1	-141.2	-139.2	-140.2	-141.6
0130	-138.7	-140.0	-140.9	-141.3	-139.5	-139.0	-134.3	-140.1	-139.7	-140.9	-141.9	-139.6	-140.6	-142.8
0200	-139.8	-141.4	-141.0	-142.0	-139.7	-138.4	-132.2	-140.3	-140.5	-141.0	-141.8	-139.7	-139.9	-142.8
0230	-140.7	-141.8	-142.2	-142.1	-140.6	-139.1	-135.2	-141.4	-141.1	-140.8	-141.7	-139.4	-141.5	-142.7
0300	-140.3	-142.0	-140.7	-141.9	-139.2	-139.8	-138.0	-141.7	-141.2	-140.9	-140.7	-136.8	-141.2	-143.4
0330	-140.6	-141.0	-141.0	-140.9	-140.0	-139.9	-138.9	-140.9	-141.0	-141.0	-140.6	-137.8	-141.6	-143.6
0400	-139.3	-140.0	-140.5	-140.1	-140.6	-139.6	-138.7	-140.8	-140.7	-140.6	-140.0	-138.1	-141.7	-143.3
0430	-139.6	-140.6	-140.3	-141.0	-140.7	-138.7	-137.5	-140.2	-140.2	-141.1	-140.1	-138.2	-141.8	-143.7
0500	-139.8	-140.1	-141.2	-141.4	-139.7	-139.2	-137.8	-140.8	-140.6	-140.3	-140.2	-137.3	-140.8	-143.3
0530	-139.8	-139.1	-139.7	-140.9	-138.6	-140.2	-138.7	-140.8	-141.0	-140.9	-140.2	-137.3	-141.7	-144.1
0600	-139.0	-139.0	-139.2	-140.8	-139.1	-139.9	-138.8	-140.5	-140.6	-140.5	-140.0	-137.5	-141.6	-143.7
0630	-138.6	-138.3	-138.7	-139.2	-139.8	-139.0	-139.1	-140.7	-140.4	-140.3	-140.0	-137.6	-141.3	-144.3
0700	-139.4	-138.4	-137.1	-139.8	-139.1	-139.5	-139.4	-139.7	-140.1	-140.1	-140.5	-137.5	-141.5	-144.4
0730	-139.9	-139.6	-137.6	-139.8	-138.6	-139.0	-139.8	-139.7	-139.5	-140.1	-140.3	-138.0	-141.3	-144.6
0800	-139.3	-139.7	-138.7	-139.6	-138.2	-139.9	-140.8	-141.0	-140.6	-139.9	-140.4	-138.3	-140.9	-144.1
0830	-139.5	-140.7	-139.7	-139.8	-138.6	-139.8	-140.4	-140.9	-141.9	-140.2	-140.4	-138.8	-141.5	-143.7
0900	-139.1	-141.7	-140.7	-139.2	-139.8	-140.4	-139.2	-140.7	-142.0	-139.3	-140.0	-138.8	-141.7	-143.5
0930	-140.3	-140.5	-139.7	-138.9	-140.4	-141.0	-138.9	-139.9	-141.7	-141.3	-141.1	-139.7	-141.0	-143.3
1000	-141.1	-141.3	-139.9	-140.5	-141.0	-140.1	-137.9	-139.6	-142.0	-142.1	-141.1	-140.4	-141.1	-143.5
1030	-140.0	-141.6	-140.4	-140.6	-140.1	-140.3	-139.2	-140.4	-141.2	-142.3	-141.4	-140.4	-140.8	-143.6
1100	-140.0	-141.0	-140.0	-140.8	-138.7	-141.0	-139.5	-140.4	-141.5	-141.9	-140.7	-139.6	-141.3	-143.3
1130	-139.1	-140.9	-139.8	-140.2	-138.8	-140.4	-139.2	-140.2	-141.9	-141.8	-140.8	-138.8	-141.6	-142.6
1200	-138.8	-140.1	-139.1	-139.2	-139.1	-140.1	-139.1	-139.4	-142.1	-141.0	-139.8	-136.5	-140.2	-142.3
1230	-139.2	-139.9	-139.2	-139.0	-138.8	-139.8	-138.3	-139.0	-140.2	-141.0	-139.2	-137.9	-140.7	-141.7
1300	-138.9	-139.5	-140.4	-140.4	-138.6	-139.0	-138.1	-139.3	-141.2	-140.7	-139.3	-137.1	-139.8	-139.6
1330	--	--	-139.8	-138.8	-137.7	-139.1	-138.4	-138.6	-141.0	-139.5	-140.2	-138.2	-139.0	-141.5
1400	-138.3	--	-139.6	-139.6	-137.2	-138.8	-137.9	-139.0	-140.9	-139.9	-140.0	-137.3	-140.2	-141.4
1430	-137.8	--	-138.3	-139.0	-137.4	-137.7	-137.7	-138.1	-141.0	-140.1	-139.8	-137.9	-140.4	-141.1
1500	-137.4	--	-135.7	-137.5	-137.0	-137.4	-137.8	-137.8	-139.8	-140.0	-139.8	-138.2	-140.0	--
1530	-137.9	--	-136.4	-136.0	--	-137.1	-137.3	-137.2	-139.7	-139.7	-139.5	-138.1	-140.1	--
1600	-137.1	--	-135.9	-136.5	--	-137.8	-137.2	-136.4	-138.6	-139.7	-139.6	-138.4	-139.7	-141.5
1630	-135.7	--	-136.3	-136.6	--	-137.5	-137.5	-136.9	-138.6	-139.3	-139.1	-137.6	-139.7	-140.9
1700	-135.7	--	-135.3	-138.3	-135.1	-136.8	-137.8	-136.7	-139.1	-138.5	-138.6	-137.6	-137.1	-140.3
1730	-135.1	--	-135.0	-137.3	-135.8	-136.9	-137.2	-136.3	-138.5	-138.4	-138.2	-135.8	-139.0	-140.8
1800	-135.7	--	-135.2	-137.7	-135.5	-135.4	-136.8	-135.4	-138.0	-138.1	-137.8	-136.5	-139.0	-140.8
1830	-135.8	--	-136.6	-138.4	-135.3	-135.0	-137.4	-136.0	-137.9	-137.6	-137.0	-135.7	-139.6	-141.2
1900	-135.9	--	-136.5	-138.1	-135.2	-134.5	-137.5	-136.7	-136.8	-137.3	-136.5	-136.7	-139.7	-141.2
1930	-135.9	--	-135.5	-136.0	-135.5	-134.4	-137.8	-136.7	-135.8	-136.8	-136.5	-135.4	-139.2	-140.7
2000	-134.8	--	-135.0	-135.4	-135.4	-133.5	-137.7	-135.9	-138.0	-137.3	-137.1	-136.9	-139.7	-140.9
2030	-135.4	--	-136.2	-136.3	-135.2	-133.2	-137.0	-135.2	-138.2	-137.2	-136.7	-137.2	-139.5	-141.0
2100	-134.9	--	--	-135.8	-134.1	-132.5	137.8	-136.5	-137.7	-137.1	-136.4	-137.5	-139.8	-141.6
2130	-134.3	-136.1	--	-136.8	-134.0	-134.3	-138.3	-137.4	-137.4	-138.0	-137.0	-138.0	-140.1	-142.0
2200	-136.0	-136.8	-138.0	-135.0	-135.4	-135.7	-139.0	-137.9	-138.6	-139.2	-137.8	-138.7	-141.3	-141.5
2230	-136.4	-139.1	-138.0	-136.8	-136.8	-136.7	-139.3	-138.8	-138.9	-140.2	-138.3	-138.6	-141.9	-141.6
2300	-137.9	-138.7	-138.9	-138.5	-137.4	-135.9	-138.9	-138.4	-139.8	-140.6	-139.0	-139.6	-140.9	-142.4
2330	-139.2	-139.6	-140.0	-139.2	-136.8	-135.2	-139.5	-138.8	-141.1	-140.8	-139.5	-140.6	-142.2	-142.6

ember 1976 Connecticut 76 Hz Effective Noise Levels (dBH)

11/9	11/18	11/19	11/20	11/21	11/22	11/23	11/24	11/25	11/26	11/27	11/28	11/29	11/30	MONTHLY AVERAGE
-139.0	-138.9	-141.7	-139.5	-140.3	-142.3	-142.7	-142.1	-140.5	-139.6	-142.6	-143.1	-141.5	-141.1	-140.3
-139.4	-139.2	-141.1	-139.0	-140.5	-142.0	-142.0	-142.5	-140.6	-139.4	-142.8	-143.0	-141.9	-141.8	-140.3
-140.1	-140.1	-141.2	-139.2	-140.2	-141.6	-141.5	-142.4	-140.9	-139.6	-142.7	-142.9	-142.6	-142.1	-140.5
-139.7	-140.9	-141.9	-139.6	-140.6	-142.8	-141.8	-141.4	-140.5	-140.6	-143.0	-143.1	-143.0	-142.4	-140.6
-140.5	-141.0	-141.8	-139.7	-139.9	-142.8	-142.0	-141.6	-140.3	-141.2	-143.0	-143.4	-142.0	-141.4	-140.6
-141.1	-140.8	-141.7	-139.4	-141.5	-142.7	-142.1	-140.8	-140.5	-141.2	-142.8	-143.9	-141.9	-141.3	-141.0
-141.2	-140.9	-140.7	-136.8	-141.2	-143.4	-142.0	-140.5	-140.3	-141.3	-142.7	-142.9	-143.6	-140.9	-140.9
-141.0	-141.0	-140.6	-137.8	-141.6	-143.6	-141.9	-140.9	-140.6	-141.0	-142.3	-142.8	-144.2	-140.6	-141.0
-140.7	-140.6	-140.0	-138.1	-141.7	-143.3	-142.2	-140.7	-140.9	-140.8	-140.8	-142.1	-144.0	-139.9	-140.7
-140.2	-141.1	-140.1	-138.2	-141.8	-143.7	-142.4	-141.5	-140.7	-140.3	-141.4	-141.2	-143.2	-140.2	-140.6
-140.6	-140.3	-140.2	-137.3	-140.8	-143.3	-142.2	-141.7	-140.0	-140.3	-141.1	-140.3	-143.6	-139.7	-140.5
-141.0	-140.9	-140.2	-137.3	-141.7	-144.1	-141.8	-141.1	-140.9	-139.8	-140.6	-140.8	-142.6	-138.4	-140.3
-140.6	-140.5	-140.0	-137.5	-141.6	-143.7	-141.9	-141.3	-141.2	-139.8	-140.6	-141.0	-141.9	-138.6	-140.2
-140.4	-140.3	-140.0	-137.6	-141.3	-144.3	-142.0	-141.5	-141.7	-140.2	-140.2	-141.3	-141.2	-139.3	-140.1
-140.1	-140.1	-140.5	-137.5	-141.5	-144.4	-142.5	-141.7	-141.4	-140.2	-140.3	-140.5	-141.4	-138.5	-140.1
-139.5	-140.1	-140.3	-138.0	-141.3	-144.6	-142.7	-141.0	-141.6	-140.0	-140.0	-140.7	-141.8	-137.6	-140.1
-140.6	-139.9	-140.4	-138.3	-140.9	-144.1	-142.2	-142.0	-141.6	-139.9	-139.4	-139.8	-142.0	-137.9	-140.2
-141.9	-140.2	-140.4	-138.8	-141.5	-143.7	-142.1	-142.2	-141.9	-140.0	-139.4	-141.3	-142.5	-138.5	-140.5
-142.0	-139.3	-140.0	-138.8	-141.7	-143.5	-142.8	-143.1	-142.0	-140.2	-140.6	-141.8	-141.9	-139.7	-140.7
-141.7	-141.3	-141.1	-139.7	-141.0	-143.3	-142.7	-143.5	-140.8	-139.8	-140.9	-143.2	-141.1	-139.5	-140.8
-142.0	-142.1	-141.1	-140.4	-141.1	-143.6	-142.3	-143.7	-140.8	-140.9	-141.5	-143.7	-143.4	-139.8	-141.2
-141.2	-142.3	-141.4	-140.4	-140.8	-143.6	-142.5	-143.7	-140.0	-141.1	-141.3	-143.9	-143.0	-141.4	-141.3
-141.5	-141.9	-140.7	-139.6	-141.3	-143.3	-141.7	-143.5	-139.4	-140.8	-141.1	-143.2	-142.8	-141.3	-141.0
-141.9	-141.8	-140.8	-138.8	-141.6	-142.6	-141.4	-143.5	-138.9	-141.0	-141.7	-143.8	-142.0	-141.0	-140.8
-142.1	-141.0	-139.8	-136.5	-140.2	-142.3	-140.5	-143.1	-138.4	-139.2	-141.5	-143.5	-140.6	-140.6	-140.3
-140.2	-141.0	-139.2	-137.9	-140.7	-141.7	-141.2	-142.1	-138.1	-139.5	-142.0	-143.4	-140.1	-140.8	-139.9
-141.2	-140.7	-139.3	-137.1	-139.8	-139.6	-140.7	-142.5	-139.3	-141.2	-141.5	-142.9	-140.4	-141.0	-139.9
-141.0	-139.5	-140.2	-138.2	-139.0	-141.5	-140.9	-142.1	-139.1	-140.9	-141.6	-143.2	-140.2	-141.1	-139.9
-140.9	-139.9	-140.0	-137.3	-140.2	-141.4	-141.0	-142.0	-138.7	-140.9	-142.4	-143.9	-140.3	-141.2	-139.8
-141.0	-140.1	-139.8	-137.9	-140.4	-141.1	-141.1	-141.1	-139.2	-140.9	-143.6	-142.8	-141.1	-141.6	-139.8
-139.8	-140.0	-139.8	-138.2	-140.0	--	-139.2	-141.3	-139.5	-140.9	-143.6	-141.1	-141.1	-141.7	-139.4
-139.7	-139.7	-139.5	-138.1	-140.1	--	-138.9	-141.3	-139.4	-140.8	-142.7	-142.2	-141.5	-141.8	-139.3
-138.6	-139.7	-139.6	-138.4	-139.7	-141.5	-139.4	-141.0	-139.4	-141.0	-141.0	-140.3	-141.7	-141.7	-139.1
-138.6	-139.3	-139.1	-137.6	-139.7	-140.9	-138.8	-141.0	-138.0	-140.3	-140.5	-140.9	-140.8	-142.8	-138.8
-139.1	-138.5	-138.6	-137.6	-137.1	-140.3	-140.8	-139.9	-137.7	-139.8	-141.6	-141.9	-140.7	-142.9	-138.6
-138.5	-138.4	-138.2	-135.8	-139.0	-140.8	-141.2	-141.1	-139.1	-140.3	-139.2	-141.1	-141.1	-142.6	-138.5
-138.0	-138.1	-137.8	-136.5	-139.0	-140.8	-140.9	-140.2	-139.6	-139.8	-141.5	-140.8	--	-142.0	-138.3
-137.9	-137.6	-137.0	-135.7	-139.6	-141.2	-140.0	-140.7	-139.9	-140.6	-141.6	-141.2	--	-141.0	-138.2
-136.8	-137.3	-136.5	-136.7	-139.7	-141.2	-141.0	-140.7	-139.5	-140.5	-138.3	-141.2	-140.9	-142.5	-138.4
-135.8	-136.8	-136.5	-135.4	-139.2	-140.7	-141.7	-140.4	-139.3	-140.0	-138.8	-139.3	-141.2	-142.2	-138.0
-138.0	-137.3	-137.1	-136.9	-139.7	-140.9	-141.8	-140.3	-139.1	-139.8	-140.4	-139.7	-141.2	-141.8	-138.1
-138.2	-137.2	-136.7	-137.2	-139.5	-141.0	-142.8	-140.1	-138.6	-139.6	-141.7	-140.2	-141.0	-141.2	-138.2
-137.7	-137.1	-136.4	-137.5	-139.8	-141.6	-142.3	-138.5	-138.6	-140.5	-141.1	-140.7	-140.0	-140.7	-138.1
-137.4	-138.0	-137.0	-138.0	-140.1	-142.0	-142.6	-138.7	-138.8	-140.3	-141.1	-140.7	-141.0	-141.3	-138.4
-138.6	-139.2	-137.8	-138.7	-141.3	-141.5	-142.4	-139.0	-139.6	-140.8	-141.6	-141.5	-141.8	-142.6	-139.0
-138.9	-140.2	-138.3	-138.6	-141.9	-141.6	-142.8	-139.5	-140.7	-141.2	-142.6	-141.8	-140.8	-142.7	-139.6
-139.8	-140.6	-139.0	-139.6	-140.9	-142.4	-142.4	-139.6	-140.6	-142.3	-142.9	-142.0	-141.6	-143.1	-140.0
-141.1	-140.8	-139.5	-140.6	-142.2	-142.6	-142.4	-140.2	-140.9	-142.2	-143.6	-141.3	-142.4	-143.6	-140.4

2

11/12
Reverse Blank

preamplifier and associated circuitry) was a strong source of 40 and 71 Hz interference (i.e., 60 Hz ± 11 Hz). Thus, during that period the effective noise measurements were contaminated by industrial noise. The measured (contaminated) effective noise from late November to mid-January was -138 to -140 dBH, with little or no diurnal variation.

However, from 17 to 27 January 1977, the 49 and 71 Hz interference levels decreased considerably. The 76 average effective noise levels measured during this period versus GMT are plotted in figure 11. As expected, the minimum levels occurred around local sunrise. However, the maximum levels occurred during most of the total daytime period (i.e., from 1300 to 2200, N_{eff} ~ -144.5 ± 0.5 dBH). Furthermore, the average diurnal variation was only 2.5 dB (-144 to -146.5 dBH) as compared with the 5 dB measured during the fall of 1976 (see figure 10).

DISCUSSION

The median level of 76 Hz effective noise level measured in Greece (which is about the same latitude as Connecticut) and Saipan (which is at a lower latitude) during 10 days in May 1972 was ~ -142 dBH.[3] Referring to figure 10, we see that the median level of N_{eff} measured in Connecticut during the fall of 1976 was ~ -139 dBH. Previous measurements of N_o in Malta and Guam[2] indicated that the median level of N_o was ~ 3 dB lower in the spring than in the fall. Recent measurements in Connecticut indicate that N_{eff} is also ~ 3 dB lower in the spring than in the fall. Thus, it appears that the fall Connecticut N_{eff} measurements are in good agreement with the spring Saipan and Greece measurements.

The median level of N_{eff} measured in Connecticut during 16 days in August was ~ -134 dBH (see figure 1), which is 5 dB higher than the median level measured in the fall. This is consistent with the 1975 data taken in Norway by Davis and Meyers.[4] Their results indicate that the summertime effective noise was 6 to 10 dB higher than at other times of the year.

During 11 days in January 1977, the (possibly contaminated) median level of the Connecticut N_{eff} was ~ -145 dBH, which is ~ 11 dB lower than the median level of N_{eff} measured during the summer. This is also consistent with the Davis and Meyer Norway results,[4] where the difference between the summer and winter N_{eff} levels was ~ 10 dB.

As an example of the latitude dependence of ELF effective noise, the difference between the median levels of effective noise measured in Connecticut (midlatitude) and Norway (northern latitude) was 5 to 6 dB in both the summer and winter and approximately 10 dB in the fall.

CONCLUSIONS

Since August 1976, 76 Hz effective noise measurements have been taken in Connecticut. The ELF nonlinear processing receiver, located in New London, Connecticut, is connected to the receiving loop antenna, located at Fishers Island, New York, via a microwave link.

The median level of the measured effective noise was ~ -134 dBH during the summer, ~ -139 dBH in the fall, and ~ -145 dBH in the winter. The average

diurnal variation was 3 to 6 dB, although diurnal variations of 13 to 23 dB were observed on three separate occasions. The minimum values of N_{eff} were measured around local sunrise, and the maximum values were measured 1 to 2 hours before local sunset.

The highest levels of N_{eff} measured were -118 dBH (on 9 October) and -124 to -126 dBH (on 15 July and 13-15 and 26 August); the lowest level of N_{eff} measured was -148 dBH (on 25 January 1977).

Based on the limited amount of N_{eff} measurements taken in Connecticut to date, it appears that there are definite midlatitude seasonal and diurnal variations in ELF effective noise levels. Comparing the Connecticut data with data taken in Norway indicates that ELF effective noise is also latitude dependent.

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2. L. H. Ginsberg, "Extremely Low Frequency (ELF) Atmospheric Noise Level Statistics for Project Sanguine," IEEE Transactions on Communications, vol. COM-22, no. 4, 1974, pp. 555-561.

3. A. S. Griffiths, "Measurements of ELF Noise Processing," MIT Lincoln Laboratory Technical Note 1975-33, 2 September 1975.

4. J. R. Davis and W. D. Meyers, "ELF Atmospheric Noise Excision by Wideband Clipping," Radio Science, vol. 11, no. 12, 1976, pp. 991-999.

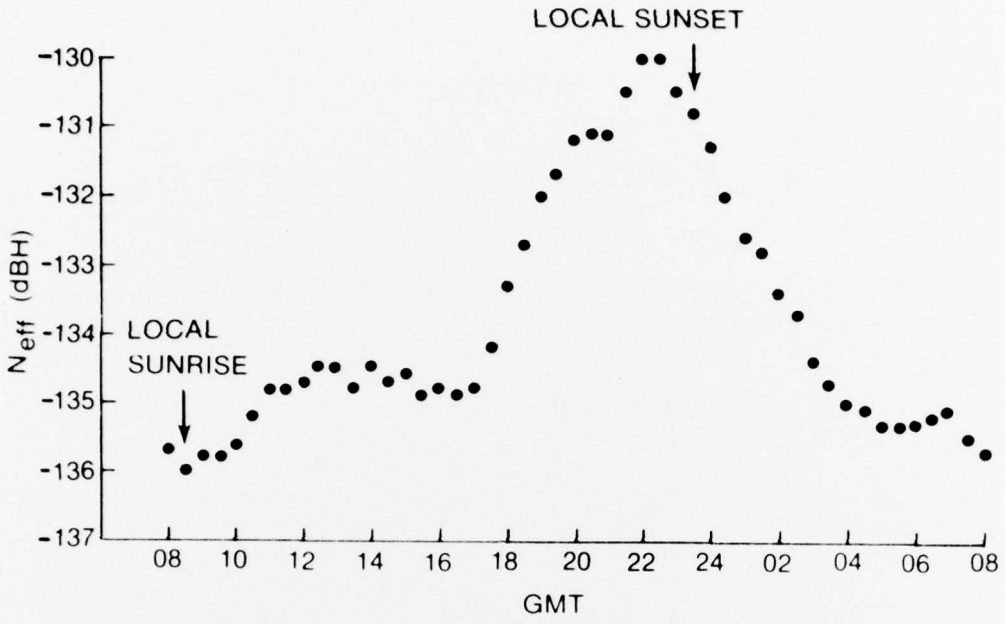

Figure 1. August 1976 Connecticut 76 Hz Average Effective Noise Levels Versus GMT

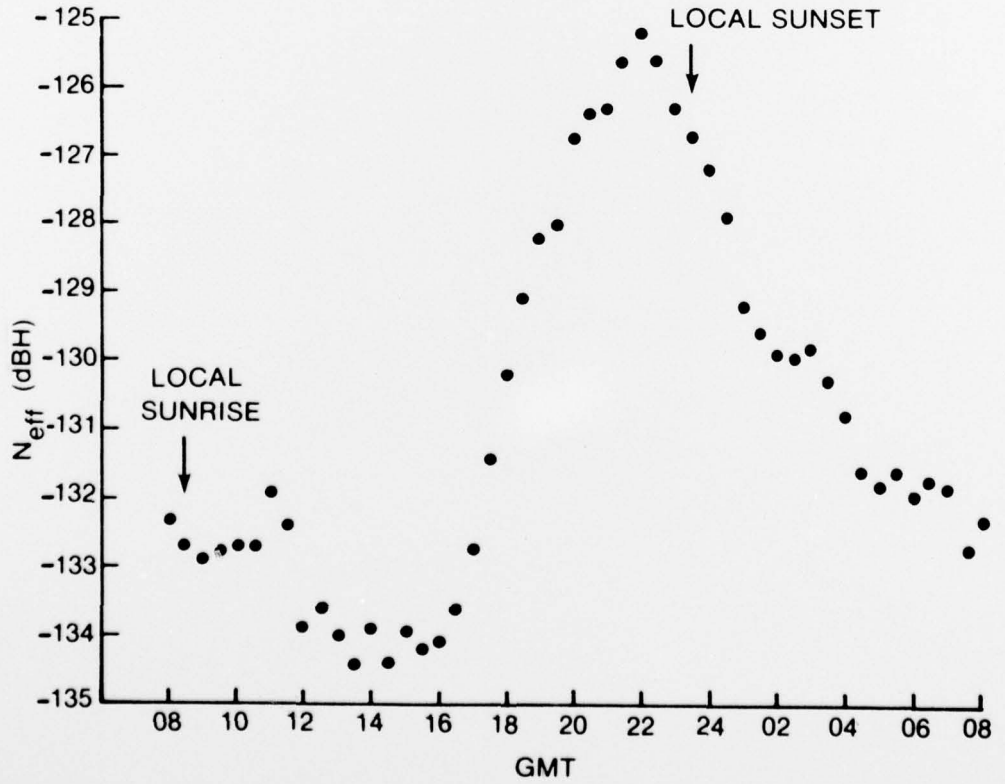

Figure 2. Average of Four Highest August 1976 Connecticut 76 Hz Effective Noise Days Versus GMT

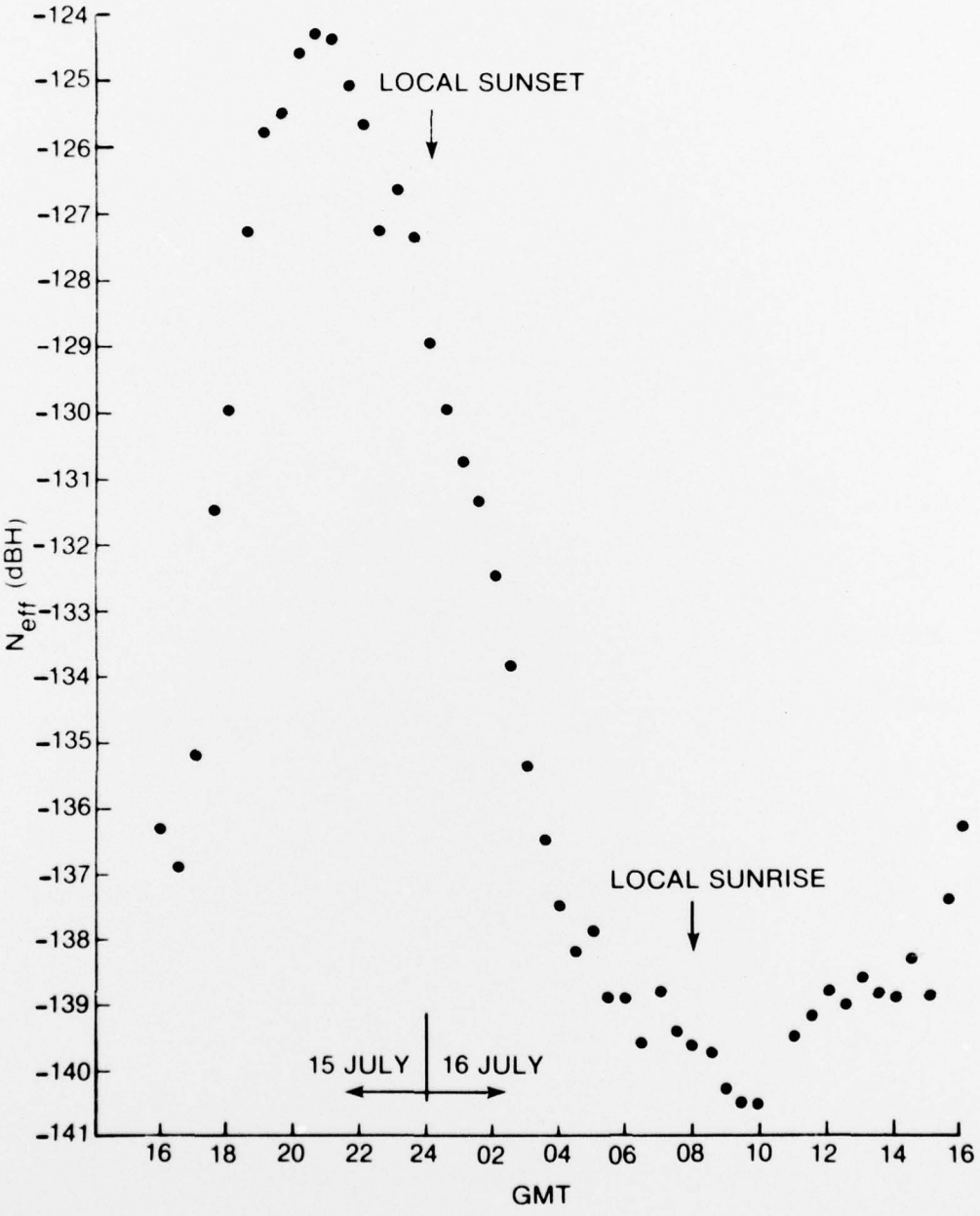

Figure 3. 15-16 July 1976 Connecticut 76 Hz Effective Noise Levels Versus GMT

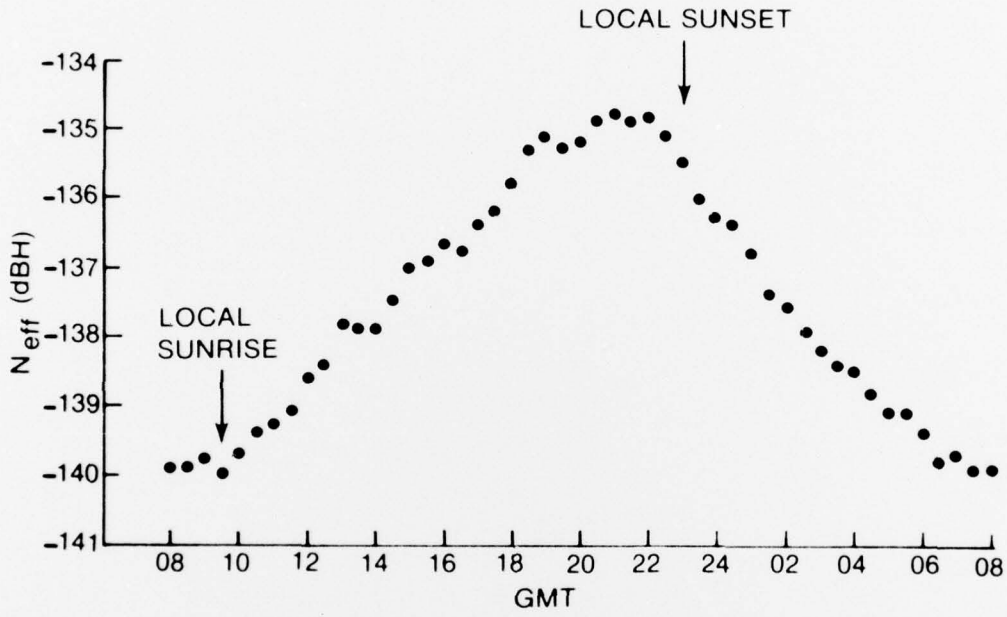

Figure 4. September 1976 Connecticut 76 Hz Average Effective Noise Levels Versus GMT

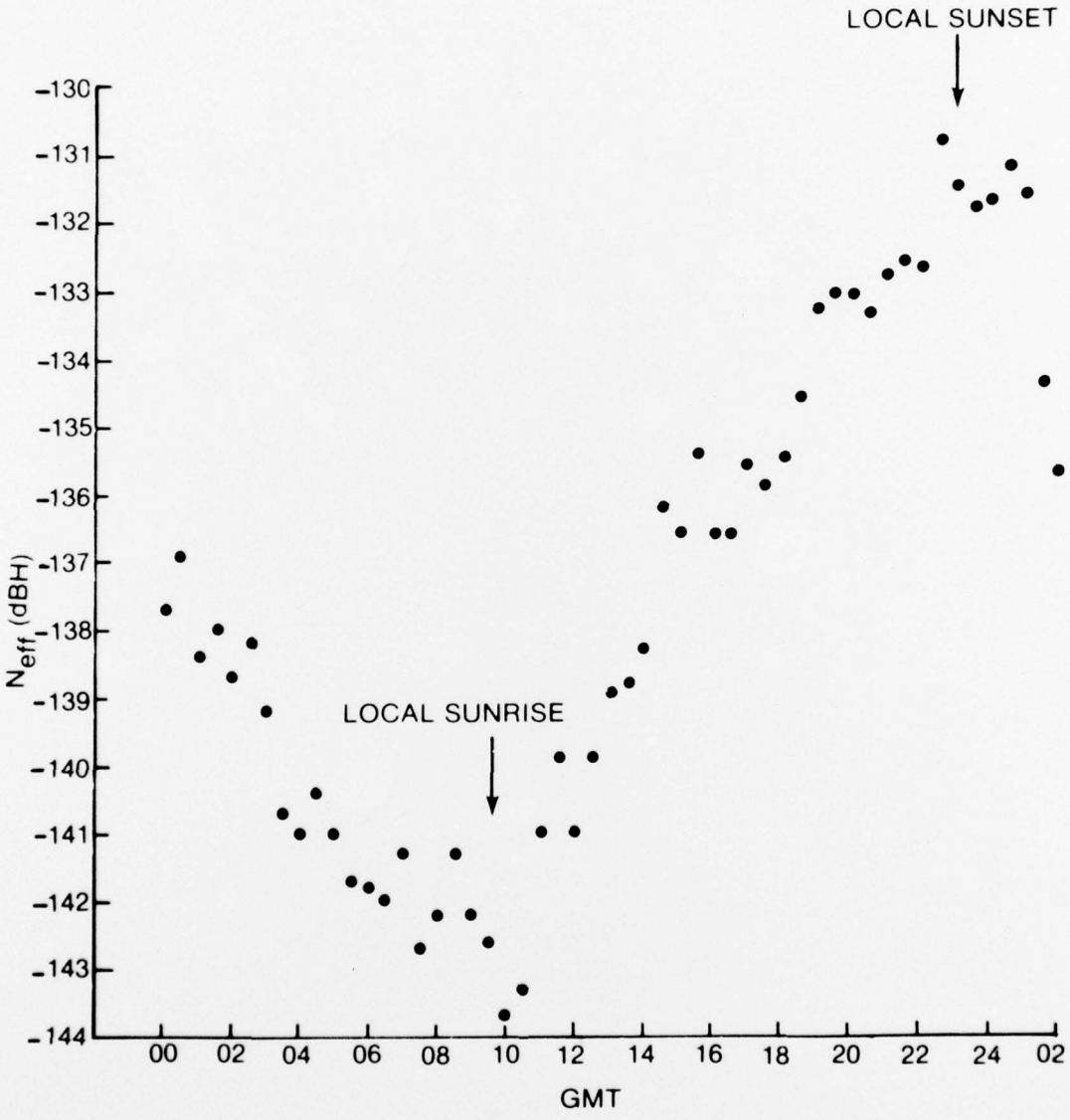

Figure 5. 26 September 1976 Connecticut 76 Hz Effective Noise Levels Versus GMT

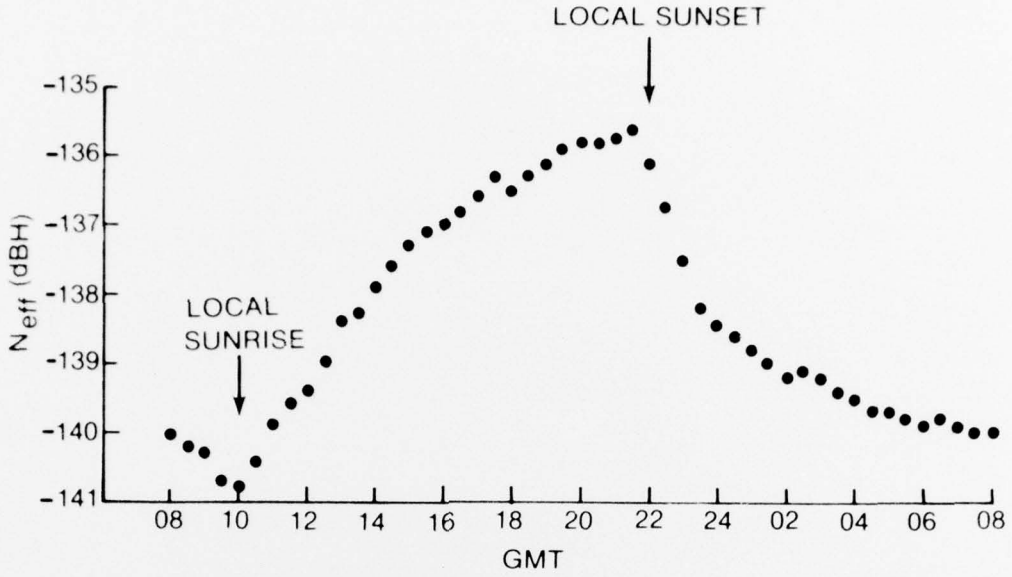

Figure 6. October 1976 Connecticut 76 Hz Average Effective Noise Levels Versus GMT

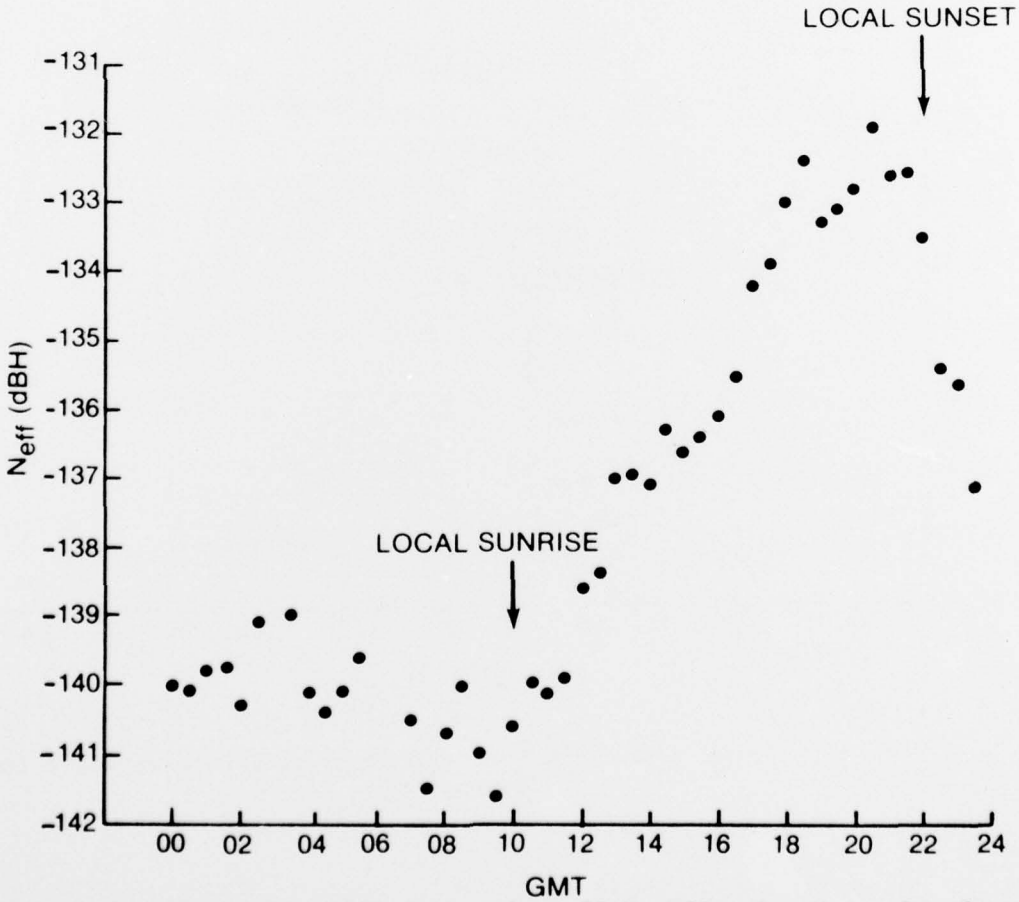

Figure 7. 14 October 1976 Connecticut 76 Hz Effective Noise Levels Versus GMT

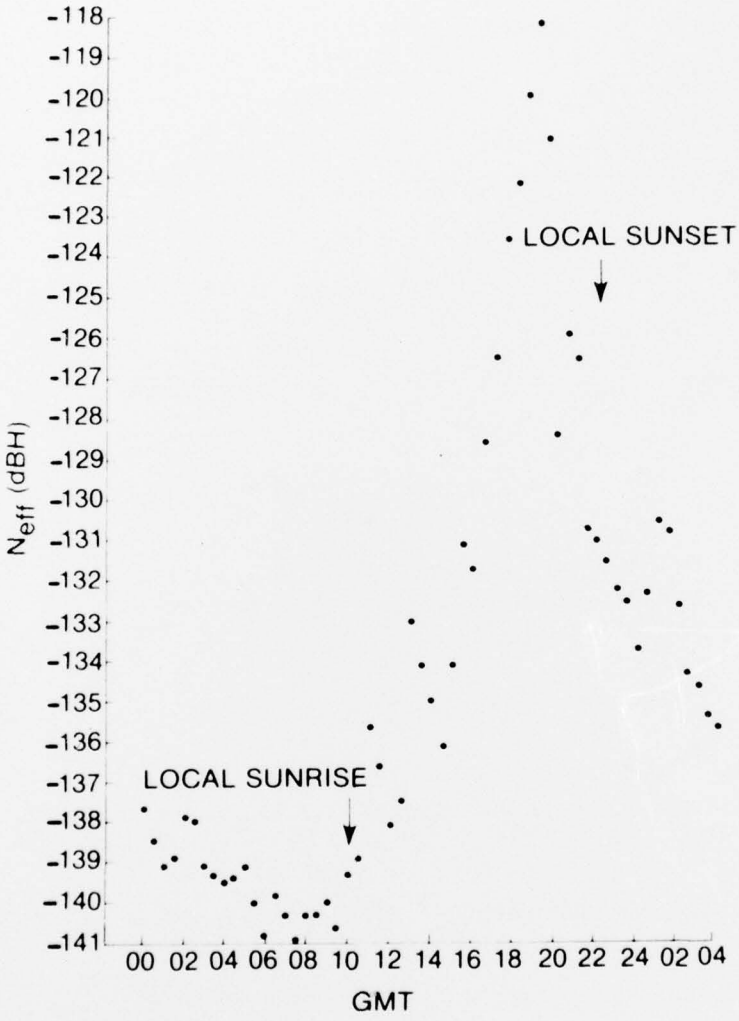

Figure 8. 9-10 October 1976 Connecticut 76 Hz Effective Noise Levels Versus GMT

TR 5681

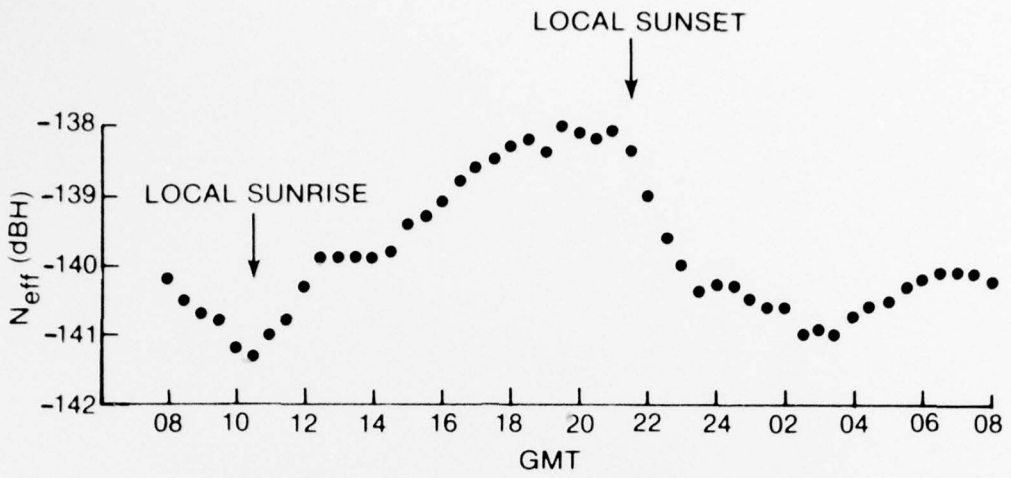

Figure 9. November 1976 Connecticut 76 Hz Average Effective Noise Levels Versus GMT

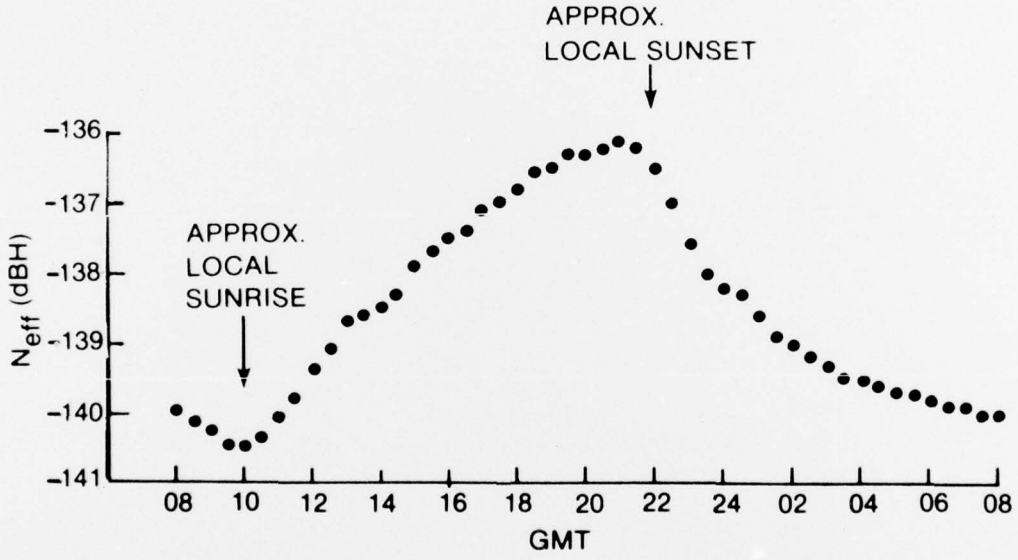

Figure 10. Fall 1976 Connecticut 76 Hz Average Effective Noise Levels Versus GMT

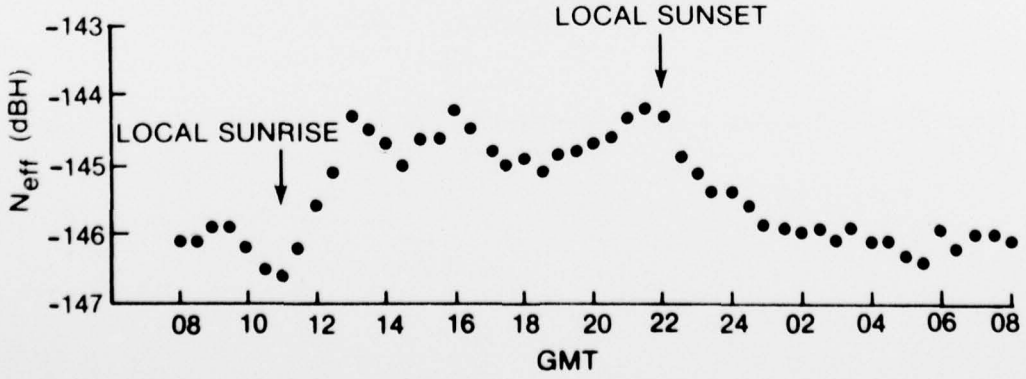

Figure 11. 17-27 January 1977 Connecticut 76 Hz Average Effective Noise Levels Versus GMT

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