#SN-2 Background
Noise
T. Miller

Fermilab

August 29, 1983

TO: Phil Livdahl

FROM: Tim Miller Tim

SUBJECT: Background Noise

On August 24 I measured the ambient noise levels in Lab C and the Meson Detector Building. The results are 66-68 and 60-63 dBA, respectively. The major noise sources appear to be the air-handling systems. (The Transrex's were not running in the Meson Detector Building.)

I have attached further information to place these results into perspective.

TM/jr

Att.

cc: L. Coulson, w/att.
G. Fisk, w/att.
W. Freeman, w/att.
R. Huson, w/att.
Q. Kerns, w/att.
R. Trendler, w/att.

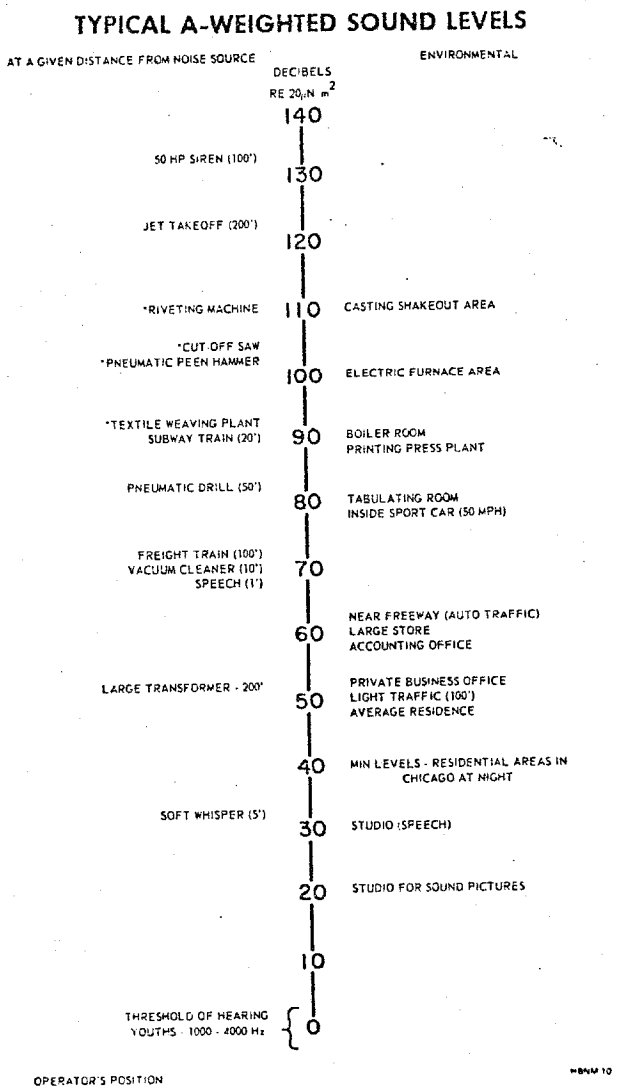


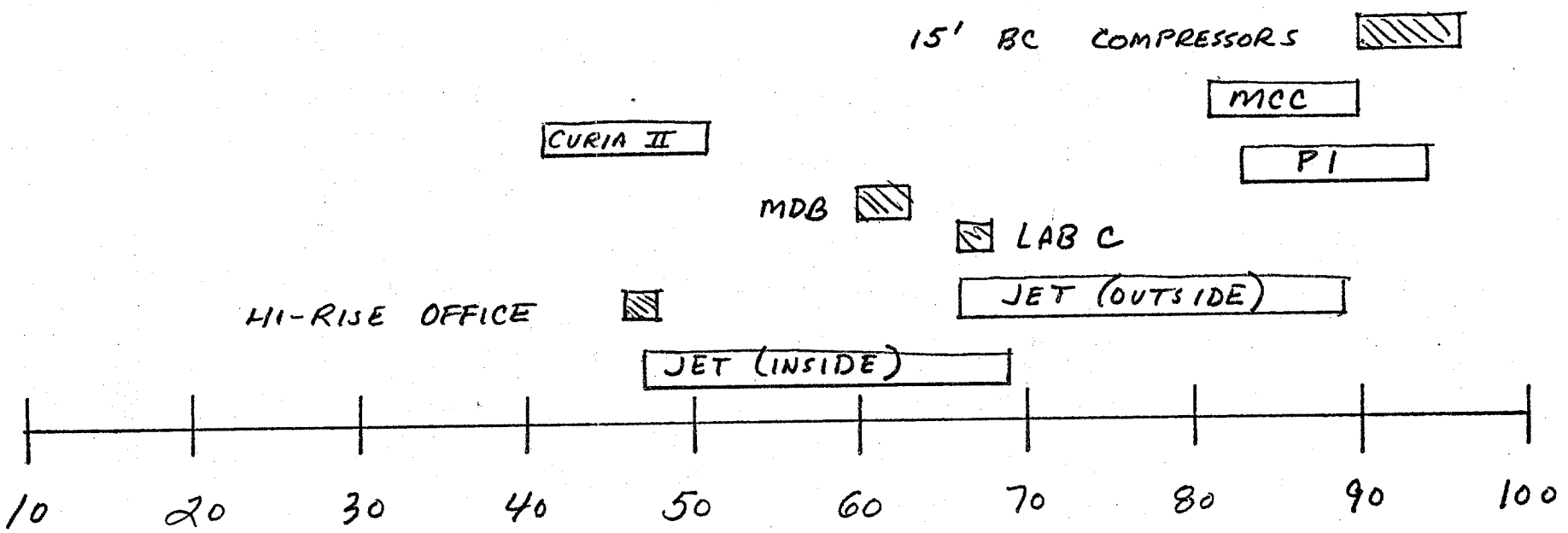
Figure 2-1. Typical A-weighted sound levels measured with a sound-level meter. These values are taken from the literature. Sound-level measurements give only part of the information usually necessary to handle noise problems, and are often supplemented by analysis of the noise spectra.

SOUND LEVEL MEASUREMENTS AT FERMILAB

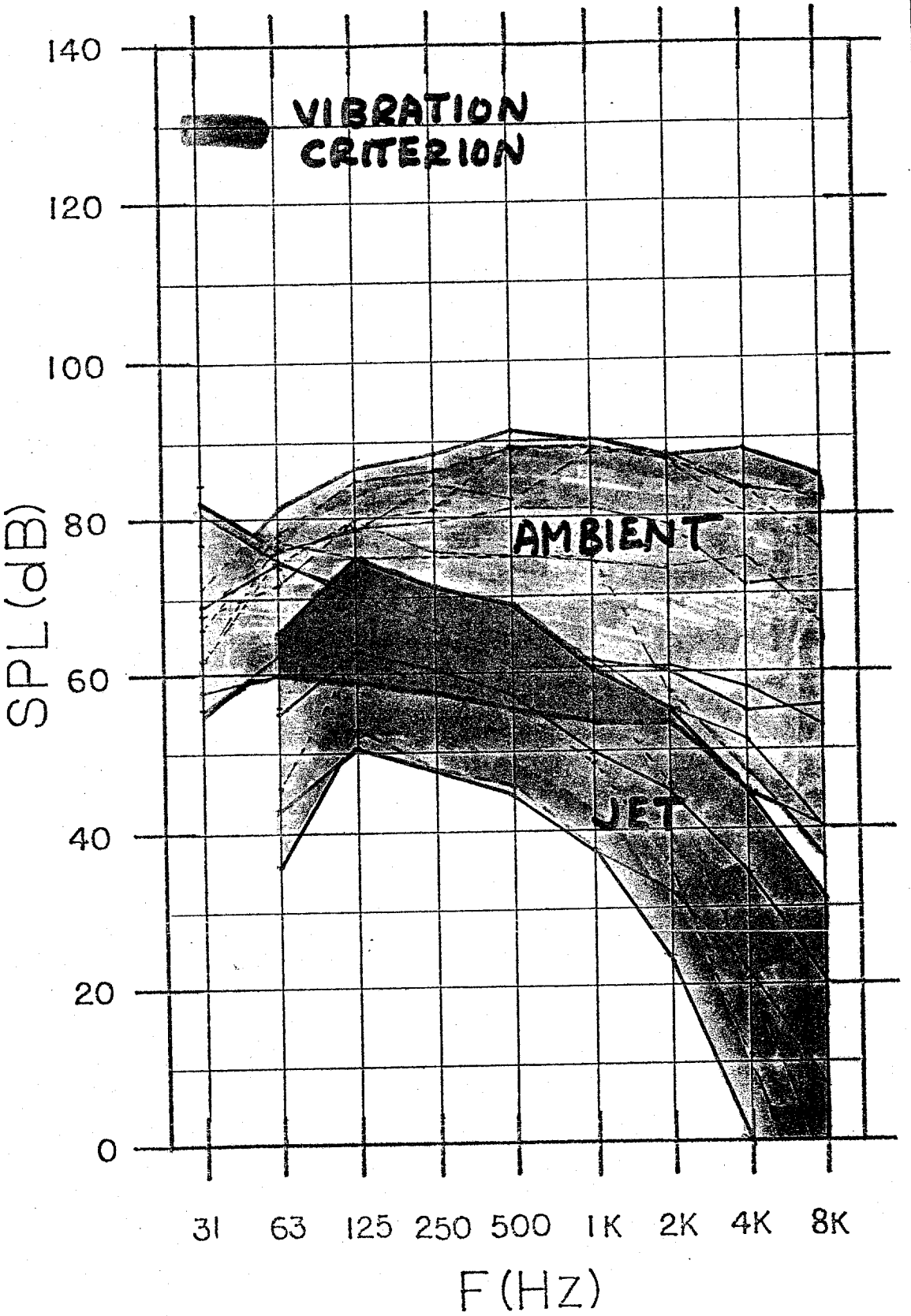
SOUND PRESSURE LEVEL (dBA)	LOCATION
47	WILSON HALL OFFICE (T. MILLER)
41-51	CURIA II
60-63	MESON DETECTOR BUILDING
47-69	JET NOISE INSIDE ENCLOSURES (ESTIMATE)*
66-68	LAB C
66-89	JET NOISE OUTSIDE (ESTIMATE)*
81-90	MESON CRYO CENTRAL
83-94	P1
90-96	15' BC WORTHINGTON COMPRESSORS

* MAXIMUM DURING PASSAGE

SOUND LEVEL MEASUREMENTS AT FERMILAB



SPL (dBA)



— Landing
---- Takeoff

— Experimental Enclosures
--- Noisy Experimental Areas

SPL'S INSIDE ABOVE-GROUND ENCLOSURES

Octave Band Identification	dBA	31	63	125	250	500	1K	2K	4K	8K
A-Weighting Correction	N/A	−39.5	−26	−16	−8.5	−3	0	+1	+1	−1
Lab C Northwest Corner 8/24/83 @ 11:24 (A/C Running)	67-68	77-84	74-76	70	65-67	61	61	61	58	53
Lab C Southwest Corner 8/24/83 @ 11:28 (A/C Running)	66	69	72-77	71	66-67	62-63	61-62	60	55	55-56
ME 2m west of Cerenkov Counter 8/24/83 @ 11:34 (A/C Running)	60-61	56-60	58-62	58-60	57-58	56	54	54	45	40
MDB Center on catwalk 8/24/83 @ 11:45	62-63	54-58	61-64	63-65	63-66	61-63	57-67	54-56	50-53	40
P-1 (In front of Compressor) 8/11/83	93.5	62	75	80	81	89	89	87	83	82
P-1 1m west of compressor 4/29/82 @ 11:00	93	66	76-80	83-85	85-87	88-90	88-90	87	80	80
P-1 room center 4/29/82 @ 11:00	83	69	76	78	79	81	81	78	71	72
Meson Cryo Central Compressor room 5/11/82 @ 9:30	90	72	81	86	88	91	90	87	88	84
Meson Cryo Central Main room 5/11/82 @ 9:30	81	68	72	80	75.5	74.5	73.5	72.5	74	66.5
30" BC 0.3 m from Stokes Pump 5/1/81	92	82	76	78.5	84	82.5	88.5	88	83	76
NC9 Exp Magnetic Device 10/1/80 @ 16:00 (1200 amps)	80	62	77	75	75	75	75	58	47	37

$$L_{total} = 10 \log \left[\sum_i \text{antilog} \left(\frac{dB_i}{10} \right) \right]$$

OUTSIDE

Octave Band Identification	dBA	31	63	125	250	500	1K	2K	4K	8K
A-Weighting Correction	N/A	−39.5	−26	−16	−8.5	−3	0	+1	+1	−1
Gates Learjet K-20 @ takeoff (Worst case takeoff) Arbitrary Location	91.1	\	67.3	87.5	86.7	90.2	87.4	79.9	60.4	43.7
Approach Thrust (typical) Figure 2 Arbitrary Location	88.5	\	71	82.6	84	84.5	83.8	81.6	78.5	70.9
Cutback Thrust (typical) Figure 1 Arbitrary Location	98.8	\	79.1	91.6	93.2	96.5	91.5	93.8	86	77.5
Landing Spectrum Fermilab typical Average (−10 from approach and −20 3 from cutback)	78.5	\	59.9	72	73.5	75.4	72.5	72.6	67.2	59
Landing Spectrum Fermilab max Above + 11	89.5	\	70.9	83	84.5	86.4	83.5	83.6	78.2	70
Takeoff Spectrum Fermilab typical Learjet −16.1	75	\	51.2	71.4	70.6	74.1	71.3	63.8	44.3	37.6
Takeoff Spectrum Fermilab max Learjet −6.4	84.7	\	60.9	81.1	80.3	83.8	81	73.5	54	37.3

$$L_{total} = 10 \log \left[\sum_i \text{antilog} \left(\frac{dB_i}{10} \right) \right]$$

Takeoff 75 dBA (max = 84.7 dBA)

Landing 78.5 dBA (max = 89.5 dBA)

INSIDE

Octave Band Identification	dBA	31	63	125	250	500	1K	2K	4K	8K
A-Weighting Correction	N/A	−39.5	−26	−16	−8.5	−3	0	+1	+1	−1
Transmission Loss 16ga Al + 1" fiberglass Random incidence mass law	N/A	2.0	4.7	8.5	12.9	17.7	22.8	28.1	33.4	38.9
Landing Spectrum Inside enclosures Fermilab typical	58.1	\	55.2	63.5	60.6	57.7	49.7	44.5	33.8	20.1
Landing Spectrum Inside enclosures Fermilab max	69.1	\	66.2	74.5	71.6	68.7	60.7	55.5	44.8	31.1
Takeoff Spectrum Inside enclosures Fermilab typical	56.3	\	46.5	62.9	57.7	56.4	48.5	35.7	10.9	−11.3
Takeoff Spectrum Inside enclosures Fermilab max	65.5	\	56.2	72.6	67.4	66.1	58.2	45.4	20.6	−1.6

$$L_{total} = 10 \log \left[\sum_i \text{antilog} \left(\frac{dB_i}{10} \right) \right]$$