

ORD 2297-72

1 MAY 1972

## MEMORANDUM FOR THE RECORD

SUBJECT: Processing of Audio Tape for Bureau of Narcotics  
Dangerous Drug Division

1. On 13 April 1972 Mr. Charles Gaskins of the Bureau of Narcotics and Dangerous Drugs requested SAW/An/ORD assistance to improve the intelligibility of an audio tape that had been acquired by BNDD agents.
2. A preliminary assessment indicated that most of the signal (voice) degradation was the result of distortion of the waveform rather than additive noise. A detailed analysis showed that the preliminary assessment was correct in that the signal had been clipped (peak limited) somewhere in the collection process. Long term averaging of the recording also indicated that an undetermined source had caused some unusual shaping of the spectrum. I explained to Mr. Gaskins that the clipping is a nonlinear process and is not reversible by any known means. (Clipped speech communication systems have been under investigation for several decades.)
3. The particular recording was taken via a radio telephone link, so that distortion from an improperly tuned receiver also needed to be considered. Several spectra with well defined voice harmonics were examined by extrapolating the voice harmonics to zero frequency. In all cases the spectra showed a proper relationship to zero Hertz. We concluded that improper demodulation had not occurred.

00250

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4. In summary, little or no improvement in intelligibility was apparent in any of the processing attempted. Mr. Gaskins and I agreed that the most probable cause of the distortion was improper adjustment of the collection equipment by the operator.

Donald A. Glace  
SAW Branch  
An/ORD/DD/S&T

Distribution:

Orig. - C/An/ORD  
1 - DG  
1 - DC/MBSD  
1 - An Chrono  
1 - ORD Chrono  
An/ORD/DD/S&T:DAGlace:df:2143  
X- SAW Chrono

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