

2. I have served on and have been chairmen of committees and working groups of the National Academy of Science, the American and International Standards Organizations, the U.S. Environmental Protection Agency and the World Health Organization. These groups and committees have been concerned with specifying guidelines and standards for the protection of hearing and exposure to intense sound and noise. I have conducted and published a number of research studies on temporary and permanent hearing loss from exposure to sounds and noise. I am author of the books: "The Effects of Noise on Man", 1st Edition, 1970, 2nd Edition, 1985, Academic Press, (New York and London). These books were sponsored by the Office of Naval Research, Surgeon General of the Army, National Aeronautics and Space Administration and the Department of Transportation.

3. The purpose of this affidavit is to address allegations in Contention A.7 regarding hearing damage from siren operation.

4. The effects of noise on hearing may be measured in terms of temporary or permanent changes in hearing sensitivity.

5. Temporary auditory fatigue, or threshold shift in hearing sensitivity, from exposure to sound is evidenced by the increase in intensity (volume) required to make audiometer test tones barely audible in the absolute quiet after, as compared to before, exposure to the intense sound. It is standard practice to measure the required decibel, dB, increase, if any, 2 minutes after cessation of the exposure. The result is called TTS2 and is a standard method of expressing temporary threshold shift in hearing.

6. The second measured effect of noise on hearing is the noise induced permanent threshold shift, NIPTS, that occurs to pure-tone hearing sensitivity in the quiet as the result of long-term exposure to intense sound and noises. The basis for these results come from threshold measurements made, for the most part, on men who have been exposed to noise in industrial environments and the military services. Technical standards and guidelines have been developed on the basis of NIPTS data that specify the apparent risks to hearing from exposure to occupational noises. In general, NIPTS is the result of chronic, i.e., long term, exposures.

7. I have been requested to compare, in terms of TTS2 and NIPTS, two siren systems with the following characteristics:

Siren System I

Maximum sound
level received:
123 dB

1000 Hz

Non-rotating

Duration of sound 3/1.5
Minutes (1)

Siren System II

134 dB at 100 ft. (2)

550 Hz

Rotating 2.5 times per minute

Siren 20 feet above listener (?)

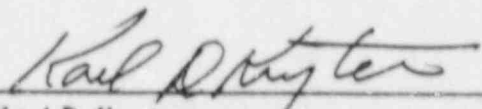
Three minutes duration of sound

- (1) Three minute duration per NUREG-0654. One and a half minute duration per BBN 4100.
- (2) This system will result in a maximum sound level received of 131 dB per Louis Sutherland's affidavit.

8. An exposure to either siren system would not be expected to cause any permanent hearing damage (NIPTS).

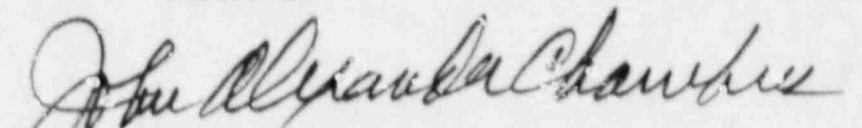
9. The temporary threshold shift (TTS2) for the average listener from an exposure to Siren System I would be about 18 dB/12 dB. This temporary hearing loss would be perceived as minor and last only for a

short time. There would be no TTS2 effect expected from exposure to Siren System II.

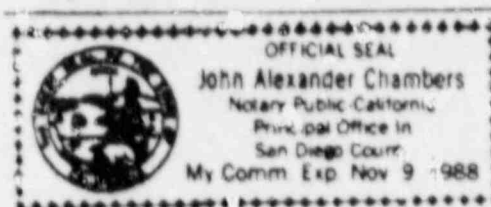

Karl D. Kryter

The above subscribed Karl D. Kryter appeared before me and made oath that he had read the foregoing affidavit and that the statements set forth therein are true to the best of his knowledge.

Before me.


JOHN ALEXANDER CHAMBERS
Notary Public

My Commission Expires:



L/828555

Karl D. Kryter

Staff Scientist, 1979-
Bio-engineering Division
SRI International
Menlo Park, CA 94025

SPECIALIZED PROFESSIONAL COMPETENCE

Psychological-physiological effects of noise on humans;
physical methods for measurement and evaluation of
noise; basis research on audition and speech
communication

PROFESSIONAL EXPERIENCE

Director, Sensory Sciences Research Center, SRI
Head, Psychoacoustics Department, Bolt, Beranek and
Newman, Inc.
Director, Human Resources Laboratories, U.S. Air Force
Assistant professor of psychology, Washington University
Research and teaching fellow, Harvard University

TECHNICAL COMMITTEES

President's Office of Science and Technology: Panel on
Aviation
U.S. Environmental Protection Agency (EPA): preparation
of levels document
World Health Organization (WHO): participant in
conference on aviation and other environmental
noises; documents on noise criteria
Committee on Hearing and Bioacoustics of the National
Academy of Sciences (member; past chairman,
Executive Council): Working Groups on Aircraft
and Community Noise and on Hearing Loss
American National Standards Institute (Chairman,
Committee on Bio-acoustics)
International Standards Organization: standards on
aviation noise and on speech communication
Committee A-21, Aircraft Noise, Society of
Automotive Engineers
Organization and participant in Scientific Congress
on Noise and Public Health: Washington, D.C.;
Dubronik, Yugoslavia; Turin, Italy; Freiburg,
Germany

ACADEMIC BACKGROUND

B.A. (1937), Psychology, Butler University; Ph.D.
(1942), Psychology and Physiology, University of
Rochester

PUBLICATIONS

Numerous research papers in scientific and technical journals and government reports; The Effects of Noise on Man (Academic Press, 2nd. Ed. 1985)

PROFESSIONAL ASSOCIATIONS AND HONORS

Acoustical Society of America (fellow; former president); American Association for the Advancement of Science (fellow); American Psychological Association (fellow; Council of Representatives); British Acoustical Society; Human Factors Society of America (fellow); Society of Engineering Psychologists (fellow; former president); Franklin V. Taylor Award, Engineering Psychology (1973); Medal of the University of Leige, Belgium (1974); Distinguished Service Award in Science, American Speech and Hearing Association (1975)

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(SEPTEMBER 1, 1988)

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