

6500 (Human Volunteers)

Pers-A212c-bg

11 OCT 1965

SECOND ENDORSEMENT on NSMC ltr NSMC-45-pr 3960 Ser 1701 of 21 Sep 1965

From: Chief of Naval Personnel *B*

To: Secretary of the Navy

Subj: Authorization to use Human volunteers for "Prediction of susceptibility to auditory fatigue" request for

1. Forwarded, recommending approval.

NAV1.941006.103

Leon L. Smith Jr.

LEON L. SMITH, JR.
BY DIRECTION

Copy to:
CO, NSMC
BUMED

19 OCT 1965

APPROVED _____

ROBERT H. B. BALDWIN
Under Secretary of the Navy

RETURNED TO ORIGINATOR FOR
DISPOSITION THIS DATE 19 OCT 1965

Q.P.

*10/14 JSN-6
8*

113

1121

BUMED-71:ml
5 OCT 1965

FIRST ENDORSEMENT on NSMC ltr NSMC-45-pr 3960 Ser 1701 of 21 Sep 1965

From: Chief, Bureau of Medicine and Surgery
To: Secretary of the Navy
Via: Chief of Naval Personnel

Subj: Authorization to use Human volunteers for "Prediction of susceptibility to auditory fatigue"; request for

1. In accordance with reference (a) permission is requested for use of human volunteers in the study of "Prediction of susceptibility to auditory fatigue" as outlined in enclosure (1) to basic letter.
2. Forwarded, strongly recommending approval.
3. There is a minimum of danger to the health and life of the volunteers and necessary precautions and protective measures will be taken.
4. All subjects will be volunteers.



R. B. BROWN
Surgeon General

Copy to:
CO, NSMC

U. S. NAVAL SUBMARINE MEDICAL CENTER
U. S. NAVAL SUBMARINE BASE NEW LONDON
GROTON, CONNECTICUT 06342

IN REPLY REFER TO:
NSMC-45-pr
3960
Ser: 1701

21 SEP 1965

From: Commanding Officer, U.S. Naval Submarine Medical Center, U.S.
Naval Submarine Base New London, Groton, Connecticut 06342
To: Secretary of the Navy
Via: (1) Chief, Bureau of Medicine and Surgery
(2) Chief of Naval Personnel
Subj: Human subjects in research work unit; request for approval to use
Ref: (a) Article 1-11 MMD
Encl: (1) Experimental design of present phase of work unit MF 022.03.03-9015
entitled "Prediction of susceptibility to auditory fatigue".
(2) Copy of Manager Anti-Submarine Warfare System Project letter
dated 24 August 1965

1. In accordance with reference (a), it is requested that approval be granted to utilize volunteer human subjects as outlined in enclosure (1).
2. The information to be gained from this study is of vital interest to the operating forces. Since enclosure (2) requested a top priority assignment to the AN/SQS-26 phase of the project and the AN/SQS-26BX test barge will be available in mid-October, expedition of this request is respectfully requested.



C. L. WAITE

EXPERIMENTAL DESIGN

TITLE OF WORK UNIT: (u) Prediction of susceptibility to auditory fatigue.

NUMBER OF WORK UNIT: MF 022.03.03-9015

OBJECTIVE:

The objective of this research is to determine the greatest sound level sonar operators, underwater divers and engine room personnel can be exposed to without risking permanent auditory damage.

PREVIOUS RESEARCH EFFORTS:

W. E. Montague and J. F. Strickland of the Navy Electronics Laboratory exposed divers to approximately the same sound pressure levels as the levels to be used in the present phase of this work-unit. Subsequent audiometric examination revealed that this experience had resulted in no auditory impairment. This work was reported under "Sensitivity of the Water-Immersed Ear to High- and Low-Level Tones, Journal of the Acoustical Society of America, Volume 33 (10) 1961. Numerous efforts on behalf of the Navy's Hearing Conservation Program have been undertaken in the past and is a matter of record.

APPROACH:

The present phase and experimental design of this effort is to determine the greatest waterborne sound pressure level to which divers can be exposed without risking damage to the ears and is it possible to provide divers with some type of ear defenders for use while working in intense underwater sound fields. The approach will be to first measure the threshold of hearing of divers prior to exposure and then expose the ears to the particular signal of interest at varying distances and finally, measure the threshold shift over a period of time following the cessation of the signal.

METHOD:

The initial measurement of the threshold of hearings shall be taken under field laboratory conditions to establish individual baselines. Then the divers will be placed in the water at a known safe distance from the transmitter for a predetermined period of time. After exposure the measurement of the threshold is recorded from the moment of signal cessation until the threshold has recovered to pre-exposure levels. The temporary threshold shift existing at two minutes after exposure is then calculated on the basis of the actual shift observed at that instant, the recovery trend

ENCLOSURE (1)

(decibel gain in sensitivity over time), and the total recovery time. Damage risk criteria thus established will be expressed in terms of safe working distances from the transmitters studied.

NUMBER OF PARTICIPANTS:

In view of the fact that human volunteers will be required, it is anticipated a minimum of twelve and a maximum of eighteen will be utilized under the following conditions.

1. Each diver shall be limited to a total of four dives.
2. Each diver shall have a minimum rest time of twenty four hours between dives.
3. Each diver shall be limited to a maximum of 90 minutes duration.
4. A Submarine Medical Officer from this Center shall be on scene for coverage of divers.

TIME FRAME:

This work-unit is a continuing one, therefore studies, investigations and testing must be done whenever new equipment are designed or produced. Therefore, it is requested that approval be granted to use human subjects on a routine basis for this particular work-unit when test and evaluation might cause an undue hazard to personnel as required by reference (a).



DEPARTMENT OF THE NAVY
ANTI-SUBMARINE WARFARE SYSTEMS PROJECT OFFICE
WASHINGTON D C. 20360

IN REPLY REFER TO

ASW 21131C:ARD(399)

24 AUG 1965

From: Manager, Anti-Submarine Warfare Systems Project
To: Commanding Officer, U.S. Naval Submarine Medical Center
Groton, Conn.

Subj: Effect of Sonar Transmission on Underwater Divers;
Research for

Ref: (a) NAVSUBMEDCEN ltr NSMC-4B-de 3900, Ser 661 of 23 Apr 65
(b) BUSHIPS allotment authorization of 6 Aug 65
(c) 18 Aug memo from [redacted] (NAV SUBMEDCEN)
and A. DiTrapani (MGR ASW SYS PROJ ASW21131C)

1. In response to a Bureau of Ships request, reference (a) submitted a research proposal for a study of the effect of sonar transmission on underwater divers. Reference (b) forwarded \$51,150 for Phase I of the proposal, planned for AN/SQS-23 and AN/SQS-26 sonars only.

2. As discussed during reference (c), Manager, Anti-Submarine Warfare Systems Project considers the prime objective of the Phase I study to be the determination of information suitable for fleet use in establishing safe swimmer distances and submersion times. The data promulgated by the U. S. Naval Submarine Medical Center would be most useful in the form of a family of curves which plot safe distances versus submersion times for hooded and unhooded divers, for all combinations of source levels, transmit frequencies, and pulse lengths. Separate curves are desired for the AN/SQS-23 and AN/SQS-26 sonar to permit direct ASW Systems Project distribution of the data to applicable commands upon receipt.

3. Although the Phase I study is expected to provide swimmer safety data for both AN/SQS-23 and AN/SQS-26 sonar, top priority shall be assigned to the AN/SQS-26 portion of the program. Laboratory study of AN/SQS-23 swimmer safety is not desired by MGR ASW SYS PROJ until completion of the AN/SQS-26 effort, unless the availability of AN/SQS-26 and AN/SQS-23 ships is such as to logically warrant application of laboratory effort on the AN/SQS-23 in advance of, or in parallel with, AN/SQS-26 research. It is expected, however, that obtaining AN/SQS-26 services will not be difficult since two AN/SQS-26 systems will be performing full power barge tests in the near future, and can be used for swimmer safety studies if desired. As noted during reference (c), the current barge test schedule is as follows:

ASW 21131C:ARD(399)

Subj: Effect of Sonar Transmission on Underwater Divers;
Research for

a. AN/SQS-26AX (retrofit) barge tests to start approximately
1 October 1965 in Lake Cayuga, New York.

b. AN/SQS-26BX barge tests to start approximately 15 September
1965 in the Hudson River, near Peekskill, New York.

4. Accordingly, you are requested to forward to MGR ASW SYS PROJ, ASW
21131, your planned schedule for accomplishing all Phase I tasks, including
the approximate times barge services may be required. To assure maximum
communication throughout the research program, brief monthly status reports
are requested for ASW 21131 review, with information copies to U. S. Navy
Underwater Sound Laboratory, U. S. Navy Electronics Laboratory, and
Bureau of Ships, Code 636. Reports which include references to AN/SQS-23
or AN/SQS-26 source levels, frequencies, and pulse lengths, or cite sonar
effects on divers, shall be classified CONFIDENTIAL.

Copy to:
COMCRUDESANT
COMCRUDESPAC
USNUSL
NEL
BUSHIPS Code 636
Code 236

W. T. Peale
W. T. FEALE
By direction of Manager,
Anti-Submarine Warfare Systems Project