

UCRL-ID-124771

# Comments on Meeting of 15 June 1960 in Washington

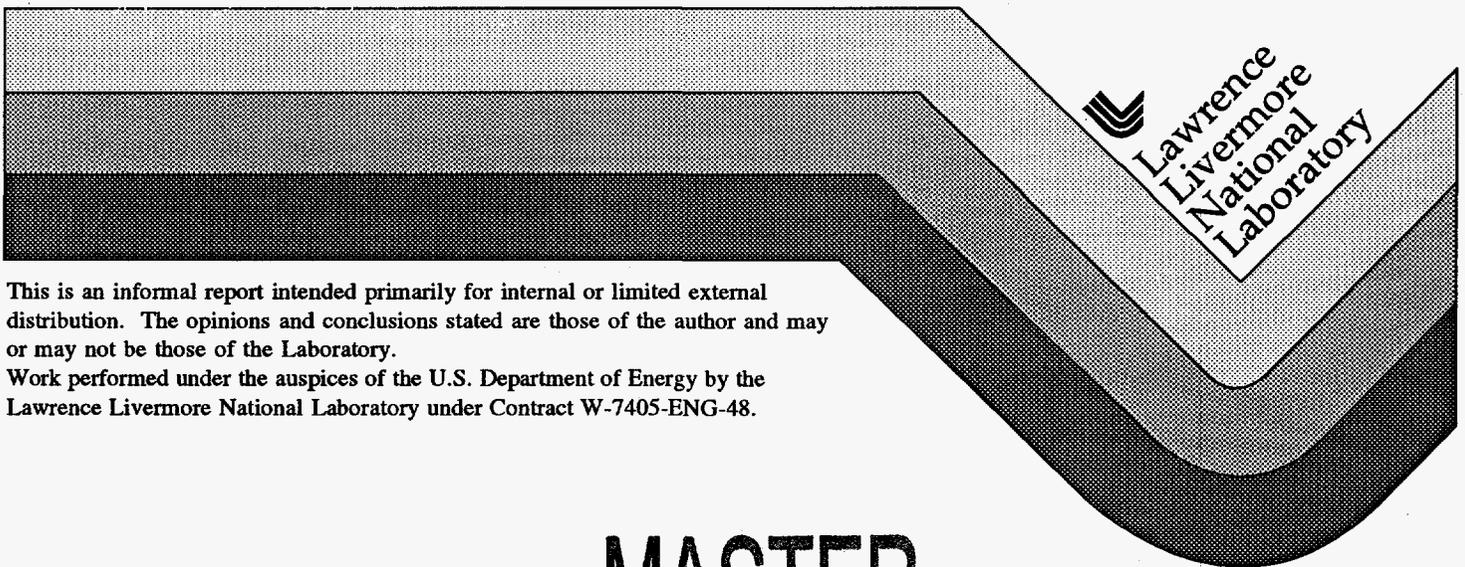
William M. Adams

**RECEIVED**  
**APR 14 1997**  
OSTI

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED



June 29, 1960



  
Lawrence  
Livermore  
National  
Laboratory

This is an informal report intended primarily for internal or limited external distribution. The opinions and conclusions stated are those of the author and may or may not be those of the Laboratory.  
Work performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract W-7405-ENG-48.

# MASTER

#### DISCLAIMER

This document was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor the University of California nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or the University of California, and shall not be used for advertising or product endorsement purposes.

This report has been reproduced  
directly from the best available copy.

Available to DOE and DOE contractors from the  
Office of Scientific and Technical Information  
P.O. Box 62, Oak Ridge, TN 37831  
Prices available from (615) 576-8401, FTS 626-8401

Available to the public from the  
National Technical Information Service  
U.S. Department of Commerce  
5285 Port Royal Rd.,  
Springfield, VA 22161

**DISCLAIMER**

**Portions of this document may be illegible  
in electronic image products. Images are  
produced from the best available original  
document.**

## **DISCLAIMER**

**This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, make any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.**

[REDACTED]

UNIVERSITY OF CALIFORNIA  
LAWRENCE RADIATION LABORATORY  
LIVERMORE, CALIFORNIA

*W. Heckrotte*  
June 29, 1960

**DECLASSIFICATION  
STAMP ON REVERSE.**

[REDACTED]

MEMORANDUM

TO: MEMBERS OF SEISMIC WORKING GROUP ON EXPLOSIONS

FROM: WM. M. ADAMS

SUBJECT: COMMENTS ON MEETING OF 15 JUNE 1960 IN WASHINGTON

After deliberation on the distant seismic measurement program for LOLLIPOP and other explosions contemplated for the Seismic Improvement Program, as presented to the Seismic Working Group on Explosions on 15 June 1960 at AFTAC, I wish to make the following comments. These are in order of importance. Magnetic tape recording will be considered separately.

Distant Measurement

1. It is absolutely essential in the development of an experimental design that the disposition of the data and the type of analysis intended by each data processing group be known. Only then can the operation be designed so as to obtain the maximum value from the data. To my knowledge, this has not been specified for the data that are to evolve from the experimental program of the seismic improvement effort.
  2. More of the sites used during HARDTACK should be duplicated. It is important to learn the extent of the effect of moving the source about 12.5 kilometers (I assume that the medium effect can be learned from close-in measurements and corrected for on the distant measurements, leaving the effect of moving the shot point). The benefits of instrumenting the line between NTS and the GNOME site clearly are not seismic improvement. The reversed profile would be informative about crustal structures, possibly.
  3. The "Geneva type" station should not be selected at relatively the lowest signal level distance from the test site, about 1600 km. It should be inside 1000 km. The U.K. station may prevent this omission and supply the necessary information.
- [REDACTED] [REDACTED]

Classification (Date) (Review Date) Changed to:

**UNCLASSIFIED**

(Insert appropriate classification level or indicate Unclassified)

by authority of R2D2-UOPAC-60-219 8/22/96 (date)  
(Authority to change classification, e.g., the memorandum number.)

by [Signature] 10/4/96 (date)  
(Signature of person making the change)

verified by [Signature] 10/4/96 (date)  
(Signature of person verifying this is the correct document or model)

4. There is no need for more than one radial line for NTS shots. The line used for the HARDTACK series was an excellent compromise between background noise level and operational difficulties. It also permitted reasonable assumptions about the crustal structure for those stations in the Mississippi Valley or Great Plains. It should be recalled that less than 50% of the shots now being considered are to be at NTS; and several of those, such as ORCHID and COTTONTAIL, are of questionable value--especially since the type of analysis intended for the records to be obtained is not definite.
5. To study azimuthal variation, possibly the purpose of the several lines radiating from NTS in the proposed plan, instrumentation should be placed on various azimuths at one, possibly two, and no more than three epicentral distances. Suggested distances, in the order of their importance, are 300 to 500 kilometers, 100 to 150 kilometers, and 1900 to 2200 kilometers. The epicentral distance should be very similar for the several azimuths selected.
6. It is desirable to know the variation that may be expected due to a small change in the location of the recording station. Such information is available for shot-period recording but is unknown for long-period recording--or broad-band recording such as considered desirable by the Russians. This need be done at only one station. A spread of three or four long-period instruments transverse to a line from the epicenter would give the information. See Figure 1.

#### Magnetic Tape Recording

1. Whether or not recording on magnetic tape should be added will now be discussed. Such tape recording should be used because, in practice, it usually permits a more refined and varied analysis of the data.
2. It is imperative that instrumentation-type, NOT modified audio-equipment-type, transports be used everywhere.
3. For tape recording in remote field stations to be successful, it is necessary that the tape instrumentation be specifically designed for field recording of explosions; that is, short-term recording of

[REDACTED]

an event occurring at a predictable time. Any attempt to broaden the scope of such tape instrumentation, especially for long-duration recording of events occurring in unknown random-time sequence, will so severely hamper the success of the tape recording effort as to delay its acceptance as the best present-day method of data gathering for short-term recording.

- 4. The following costs have been obtained as estimates for adding tape recording to forty stations, bringing present facilities up to forty stations' capability and conducting one field operation, presumably for one-month duration.

photographic recording . . . . .	\$2,200,000
audio-type magnetic tape recording plus photographic recording . . . . .	3,500,000
instrumentation-type magnetic tape recording plus photographic recording . . . . .	4,200,000

I wish to recommend that in costing the magnetic tape field or any other type recording units, it be assured that analysis facilities are either available or else are costed in as part of the inclusion of tape recording. Probably the minimum reduction center that could be visualized would be an analog-to-digital conversion center. The analysis effort would then plan on utilizing electronic digital computers to which nearly everyone now has access.

- 5. The extensive use of magnetic tape recording of seismic data, as strongly recommended herein, will be a significant advance in seismology. Therefore, it is suggested that a prototype field system be used in the field on the next operation. The experience obtained should prove extremely valuable in directing the expenditure of the additional two million dollars that the addition of instrument-type tape recording will cost. Tryouts at leisure on chemical explosive sources are not considered equivalent. The stigma of lost data is not nearly as severe.

Wm. M. Adams  
Wm. M. Adams