

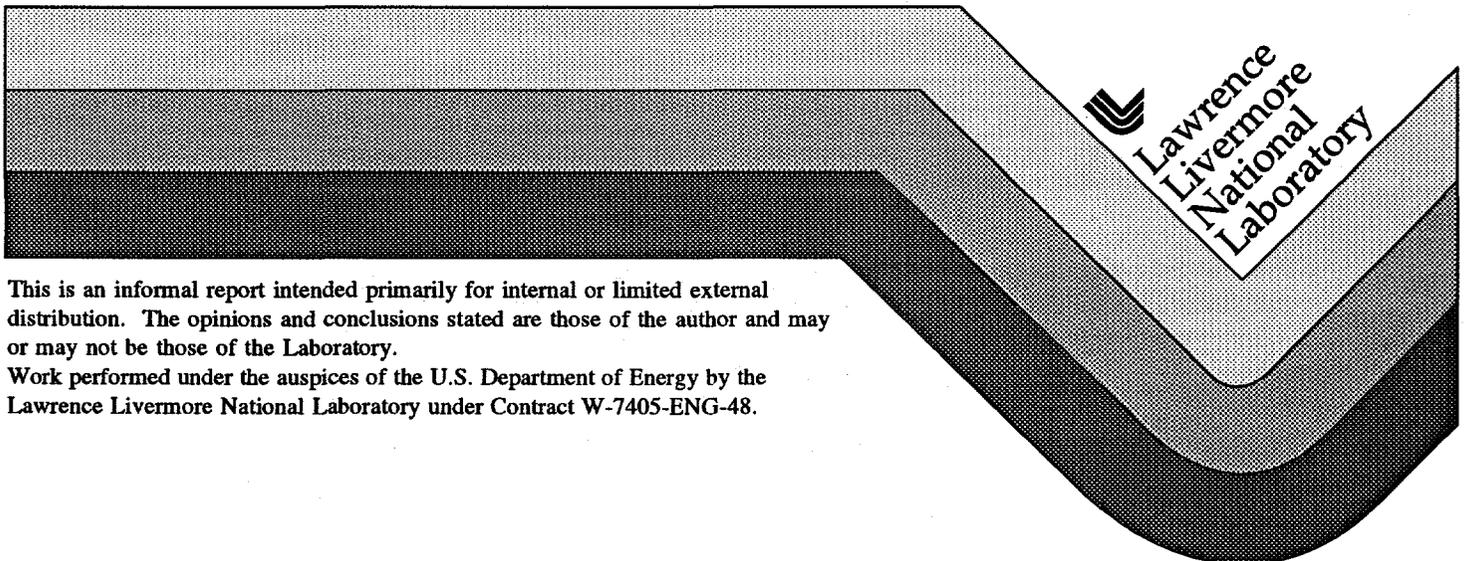
# Conference to Discuss and Develop Seismic Detection Programs at Large-Scale Explosive Tests

C. E. Violet

RECEIVED  
APR 14 1997  
OSTI

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

June 4, 1959



  
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.**



Classification (Declassification/Review Date) Changed to:  
**UNCLASSIFIED**  
(Insert appropriate classification level or indicate Unclassified)

by authority of R202-COPAB-59-8 6/29/96 (date)  
(Authority for change in classification, e.g., the memorandum number.)

by [Signature] 10/1/96 (date)  
(Signature of person making the change)

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

University of California  
Lawrence Radiation Laboratory  
Livermore, California

June 4, 1959

MEMORANDUM

TO: Distribution

FROM: C. E. Violet

SUBJ: Conference to Discuss and Develop Seismic Detection Programs  
at Large-Scale Explosive Tests

A conference to discuss and develop technical programs for conduct at three, planned, large-scale, underground explosive tests will be convened at the Lawrence Radiation Laboratory on Thursday, June 18, 1959, at 0930 hours in the conference room, Building 112. These tests comprise a part of a research program directed toward improving methods for detection and identification, by seismological techniques, of underground nuclear detonations. For consideration by conferees, this Laboratory proposes a program of close-in shock effects studies at these tests similar in scope to that developed at our March 30, 1959 conference at Stanford Research Institute (outlined in our letter, cite number COPAA 59-7 dated April 3, 1959 and furnished addressees of this letter). Addressees or their representatives are invited to attend subject conference.

Since February 1959, this Laboratory has been planning, at the request of the Atomic Energy Commission, a technical program for investigating and evaluating close-in shock phenomena involved in detonation of a 5-kt nuclear device underground in a granite formation. This technical program is being forwarded to the AEC with a recommendation that it be approved and with a further recommendation that a similar test detonation, fully instrumented, be conducted in a carbonate rock formation. The AEC has recently requested that we develop an overall plan including technical programs for three additional explosive tests underground: A 5-kt nuclear detonation 2000 to 3000 feet deep in volcanic tuff, a 5-kt nuclear detonation 10,000 feet deep, and a 1-kt HE detonation in the Rainier tunnel. All five of these tests are planned for conduct at the Nevada Test Site. Impetus for this immediate program in seismic detection studies has originated from activities of the Panel on Seismic Improvement appointed by the President's Science Advisory Committee.

This Panel has reported on the need for fundamental research in seismology in the field of detection of underground explosions and differentiation of seismic effects of these explosions from those of earthquakes. The Panel has indicated a need for more knowledge of the mechanisms in generation

June 4, 1959

of seismic waves from nuclear, chemical, and natural (i.e. earthquake) sources. It has said that the parameters which require study are (a) dependence of spectra of body and surface waves on yield of the explosion, (b) dependence of seismic wave excitation on the medium surrounding the shot, (c) effect of depth of burial, (d) effect of local environment, such as shot-cavity size, shape, etc., and (e) effect of local geology and topography. It has said that present techniques for assigning magnitudes to seismic disturbances, especially for improving the relationship between magnitude and energy release, are distressingly poor.

The scope of subject conference, planned for June 18, 1959 at LRL, will be limited to discussing and developing a technical program for close-in shock instrumentation (less than about 100 km range) of the three large-scale explosive tests. Investigations which may seem desirable for improving capabilities of detection and identification of underground explosions may be discussed, even though not a part of the conference agenda. Monitoring of the long-range seismic effects is a responsibility of Deputy Chief of Staff, Operations, U. S. Air Force (AFOAT-1). In case individuals are interested in detailed information concerning activities of the Panel on Seismic Improvement, it is suggested they write to the Executive Office of the President for "A Report on the Need for Fundamental Research in Seismology".

*R.G. Preston*  
for C. E. Violet  
Test Division Leader  
LAWRENCE RADIATION LABORATORY

CEV:RGP:ls

## Distribution:

1A - J. Rosen, DMA	13A - R. B. Vaile, Jr., SRI
2A - I. D. Brent, II, CIA	14A - G. W. Johnson, LRL
3A - C. F. Romney, AFOAT-1	15A - C. E. Violet, LRL
4A - J. G. Lewis, DASA	16A - F. L. Adelman, LRL
5A - J. E. Reeves, ALOO	17A - R. F. Herbst, LRL
6A - E. C. Shute, SFOO	18A - A. V. Shelton, Jr., LRL
7A - R. M. Foose, SRI	19A - W. M. Adams, LRL
8A - L. M. Murphy, USC&GS	20A - R. G. Preston, LRL
9A - W. K. Cloud, USC&GS	21A - W. Heckrotte, LRL
10A - F. Press, CIT	22A - W. D. Gibbins, LRL
11A - A. L. Latter, RAND	23-30A - File
12A - M. L. Merritt, SC	