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Yucca Mountain Site Characterization
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STATE OF NEVADA TESTING PROPOSALS AND ISSUES RELATED TO YUCCA MOUNTAIN PROJECT (YMP) PARTICIPATION IN GEOPHYSICAL TESTING TO BE CONDUCTED IN ASSOCIATION WITH THE DEFENSE NUCLEAR AGENCY'S CHEMICAL KILOTON EXPERIMENT (SCP: N/A)

Reference: Ltr, Loux to Gertz, dtd 7/6/93

The Yucca Mountain Site Characterization Project Office (YMPO) has been fully aware of the Defense Nuclear Agency and Lawrence Livermore National Laboratory's (LLNL) planned Chemical Kiloton Experiment (CKE) at the Nevada Test Site (NTS), currently scheduled for late September 1993. It is anticipated that this chemical explosion experiment will be the first of several such tests to be carried out at the NTS during the coming years. The CKE test was originally scheduled for last January and has been postponed several times for a variety of reasons. Considerable doubt still remains regarding the actual test date, and it is likely that the proposed schedule for the activity will continue to slip.

Several YMP participant organizations (Los Alamos National Laboratory, U.S. Geological Survey [USGS], University of Arizona, Lawrence Berkeley Laboratory (LBL), University of Nevada, Reno [UNR], and LLNL) are directly or indirectly participating in the experiment and associated testing program (enclosure 1). Most of the planned surface-based testing activities are being fielded in locations quite a distance from Yucca Mountain; these activities are not funded directly by YMPO, but the project will benefit from information collected by the various field studies.

ADD: B.J. Youngblood

Ltr. Encl. 102.3 WM-11 NH03

UNR is currently operating the YMPO funded Southern Great Basin Seismic Network under Study Plan 8.3.1.17.4.1, Historical and Current Seismicity. The network has 55 analog and 6 digital stations and, to the extent individual stations are operational during the proposed CKE testing, data will be collected, analyzed, and interpreted under the YMP Quality Assurance Program. Furthermore, the UNR group (with the USGS) is planning a "modest" reversed refraction profile using the CKE shot source and an 800 pound shot in Amargosa Valley. Portable seismic stations will be deployed in the area of the CKE, and Amargosa Valley.

Scientists from the USGS and LBL will be conducting seismic (tomographic) studies in N-Tunnel prior to the CKE. The purpose of the testing is to determine the applicability of the method in volcanic tuffs. Information derived from the testing will be used to develop the methodology for the following:

1. Analysis and modeling of seismic data collection during the CKE.

2. Use in similar lithologies at Yucca Mountain as part of YMPO Exploratory Studies Facility testing program. This high resolution seismic tomography feasibility testing at the NTS will serve as the prototype for proposed work at Yucca Mountain.

LLNL, in association with several major universities and the USGS, will be surveying in the southern Sierra Nevada area prior to the CKE (enclosure 2). Two refraction profiles will be acquired in the region west of Yucca Mountain. One line extends from near Coalinga, California to the Death Valley area. A second refraction line (oriented north/south) through Owens Valley will be acquired. If the CKE remains on schedule, these lines will be used to record the explosion experiment source. If a CKE schedule delay is experienced, these lines will not be recorded again. Other smaller scale refraction experiments are planned by university groups; none are funded by YMP.

At the U.S. Department of Energy/U.S. Nuclear Regulatory Commission Technical Exchange on June 8, 1993, scientists from the USGS presented our plans for acquisition of 50 kilometers of reflection and refraction profiles in the area of Yucca Mountain. Given this upcoming reflection/refraction field program, and the existing crustal structure and velocity information from previous testing at Yucca Mountain and on the NTS, YMP participant scientists did not consider additional testing to be warranted in association with the CKE.

Information collected by other groups during the CKE will be used by YMP. The above described testing programs are believed to be adequate for purposes of characterizing subsurface structure and crustal velocities in the Yucca Mountain area.

DOE Chemical Kiloton Explosion (CKE)

Primary Contact Point: Jay Zucca LLNL
Tele. 510-422-4895

Estimated Date: September 20th, 1993

This large shot will be recorded by a very large group of Government and university research groups, including:

The Southern Sierra Nevada Continental Dynamics Group
(See attached map: CKE will be recorded on the East-West profile of this figure.)
Duke University (Peter Malin 919-681-8889)
(Coordinating Institution; fax 919-684-5833)
Caltech (Robert Clayton 818-798-8365)
UC Riverside (Steve Park 909-787-3438)
Univ. Texas El Paso (Randy Keller 915-747-5501)
Princeton University (Robert Phinney 609-924-7428)
Univ. of Nevada Reno (Craig Jones)
Stanford University (Simon Klemperer 415-723-8214)
USGS (Walter Mooney 415-329-4764)

USGS Calnet seismographic stations (800 stations)
Contact: Jerry Eaton 415-329-4790

Southern Basin and Range Network
Contact: James Brune, UNR

University of Nevada-Reno Seismological Lab.
Adjunct Prof. Keith Priestly

Philips Airforce Lab, Hanscomb Field, MA.
Contact: John Cipar, 617-377-3767

University of South Carolina
Contact: Tom Owens, 803-777-4530

National Laboratories:
LLNL (Jay Zucca, 510-422-4895)
Los Amalos
Sandia

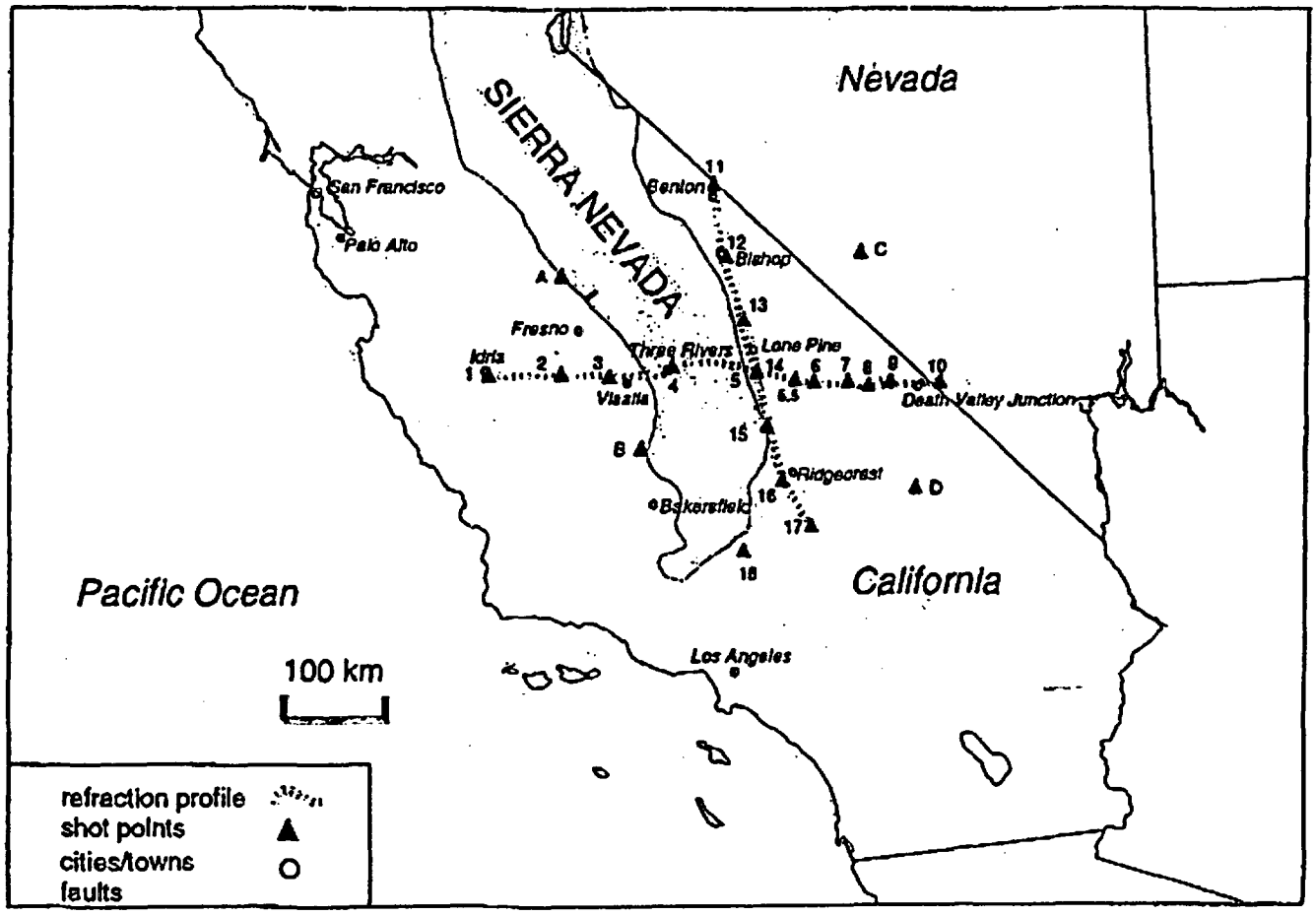
Lawrence Livermore Lab, Berkeley CA.
Contact Tom McEvilly, 510-642-4494

ENCLOSURE 1

Southern Sierra Nevada Continental Dynamics Study

a program to study the crust and upper mantle beneath the Sierra Nevada Mountains and Death Valley.

In the summer and Fall of 1993, Duke University, University of Nevada at Reno, University of California at Riverside, LLNL, Caltech, San Diego State and Princeton Universities together with the U.S. Geological Survey will conduct a joint multidisiplinary program to study the structure of the Earth's crust beneath the Sierra Nevada Mountains and Death Valley region. Magnetotelluric, Teleseismic Refraction, and Xenolith data will be collected over a several month period. The seismic refraction portion of this project will take place from Sept 9 - Sept 24, 1993 along North-South and East-West profiles.



Ever notice that Mt. Whitney, the highest point in the contiguous USA, and Death Valley, the lowest, are only 50 miles apart? Since the crust of the earth floats on the mantle, are Mt. Whitney and Death Valley only the upper "tip of the iceburg", with a much thicker crust beneath the mountains than the valleys to their east? This is one of the main questions addressed by the SSCD project. The rocks found in Death Valley show that this area is geologically much younger than that of the Mt. Whitney area, adding the questions: How did the high mountains influence the development of such a deep valley? Are the rocks below Death Valley in some way related to those under Mt. Whitney, or have entirely new rocks filled the enormous hole created when Death Valley opened? These questions can be answered, since it is possible to distinguish between different kinds of rocks by the way sound travels through them. A major part of the SSCD project is aimed a making such observations, along measuring points that are called refraction profiles, a method long used by geologists to study the earth's interior. The SSCD project, funded by the National Science Foundations, seeks your help and cooperations in order to successfully complete these observations.

For further information, contact: Peter Malin, Duke University, (919) 681-8163 or Stan Ruppert, LLNL, (510)-423-7552

ENCLOSURE 2

We appreciate receiving your suggested CKE-associated testing program, and have considered the relative merit for the site characterization program. In light of the above described CKE and YMP testing programs, our scientists believe that the planned studies will provide sufficient information related to the characterization of crustal features in the Yucca Mountain area. Uncertainties in scheduling (due to CKE test date schedule slippage) and budget have impacted our ability and willingness to plan additional testing in association with the CKE.

Therefore, the YMPO has no current plans to expand the scope of our existing studies (beyond those described in previous paragraphs) in order to schedule testing in association with the CKE. Our existing program and level of involvement and participation in the CKE are adequate to meet the technical objectives of the site characterization process. We will inform your office should the YMPO geophysical community develop an enhanced CKE-associated testing proposal. We hope that your proposals for additional testing have been addressed by this communication and offer to discuss any remaining questions that you may have on this subject. If you have any questions, please contact Mark C. Tynan at (702) 794-7940.

Carl P. Gertz
Project Manager

RSED:MCT-5166

Enclosures:
1. CKE Information
2. Southern Sierra Nevada Continental Dynamics Study

cc w/encls:
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