UNITED STATES
NUCLEAR REGULATORY COMMISSION
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MEMORANDUM FOR: J. Carl Stepp, Chief
Geosciences Branch, DSE

FROM: R. Jackson, Leader
Geology and Seismology Section
Geosciences Branch, DSE

J. T. Greeves, Geotechnical Engineer
Geotechnical Engineering Section
Geosciences Branch, DSE

SUBJECT: SITE VISIT - VALLECITOS NUCLEAR CENTER (GETR) - DECEMBER 5 and 6, 1978

On December 5 and 6, 1978 we, our advisors, the USGS, and our consultant, Dr. David Slemmons met with representatives of the General Electric Company (GE) and their consultants to make observations of trench excavations at the site. Also participating in the site visit were staff members of the California Division of Mines and Geology (CDMG), a consultant to the Advisory Committee on Reactor Safeguards, personnel from the NRC Office of Nuclear Material Safety and Safeguards (NMSS) and their consultants, TERA Corporation. A list of attendees is attached. General Electric Company consultants provided a 1 1/2 hour presentation of the work they have accomplished to date with their preliminary interpretation. Numerous questions were raised and discussed during the meeting relating to those interpretations.

The remainder of the two days was spent visiting the trenches with extensive discussion of the interpretation of features observed in those trenches. A great deal of discussion revolved about interpretations of soil horizons, their ages, and offset of these horizons.

Trenches D, G-2, and F-12 and 13 are located across the location of the predicted area of the headscarp based on GE's analysis of aerial photographs. Normal fault features or tension features normally located at a headscarp were not found. These trenches generally contain unbroken units which dip approximately 10-20 degrees to the north. Some thrust fault offsets were also observed in the F trenches.

We examined trenches F-1 through 13, G-1 and subsidiary trenches to it, G-3 through G-9 and trench G-2 in this postulated headscarp area. Several normal fault features and some tension features were observed in some of these trenches. Most of the normal fault features are located in close proximity to known recent surface landslides and the normal offsets in F are probably related to these recent slides based primarily on the direction of dip which is down to the northeast. The feature noted in trenches G-1 and on strike to the northeast in trench G-3, 4, 5 and 7, appears to contain units downthrown to the southeast, although no units can be directly correlated across these breaks.

A number of possible thrust fault offsets were noted in trenches F-6, 7, 8, 11 and 13. The preliminary logging notes a strike of about N70° - 40°E and dips of 15 to 50 degrees to the north for these offsets.

In the site area of GETR we examined trenches B-1, B-2 and its accompany 27 slit trenches and B-3. Trenches H, H-1 and H-2 in the vicinity of building 102 were examined on December 6, 1978. All of the large trenches and most of the slit trenches indicate the presence of substantial thrust fault offsets with total offset possibly in excess of the depth of the trenches. Minimum total offset on these faults would therefore probably be in excess of 25-30 feet. It should be noted, however, that since units cannot be correlated across these offsets no precise estimate of total offset can be given. Different amounts of offset of 3 different age materials was observed.

We examined trench B-1 extensively during our October site visit. During the present visit we concentrated on observing the offset of the soil horizon above the prominent shear zone. Dr. Roy Shlemon, consultant to GE and a specialist in soil

stratigraphy indicated that Holocene age (younger than 10,000 years ago) soils were offset. The estimated ages were based on his view of the extent of soil development and radiocarbon minimum age dates obtained from Teledyne Laboratory studies. The offsets extends into and appears to offset the base of the colluvial unit which had a minimum radiocarbon date (Mean Residence Time) of approximately 4300 years before present.

It appears that several time horizons can be identified within the soils and paleosol. Preliminary viewing indicates that the younger identified soils are not offset as much as the older units.

Trench B-2, an extension of B-1 to the southwest indicates the presence of a large thrust fault offset with apparent Livermore (?) gravel units thrust over alluvial material. The fault offsets displace the base of a modern soil horizon by about 6-10 inches. A minimum radiocarbon age date of 1565 years before present (Mean Residence Time) was obtained for this horizon. A colluvial unit below the modern soil had a minimum age of 2160 years before present. This unit is offset approximately 1-2 feet. These units appear to be underlain by an unconformity. Detailed logging in this area will allow for a more precise determination of the actual amounts of offset of different age materials.

Trench H indicates the presence of a substantial thrust fault offset similar to those observed in trenches B-1, and B-2. This thrust strikes approximately N45°W and dips 24 degrees north. This fault and the one observed in trench B-2 appears to have steeper dip angles than trench B-1. This trench is located along the trace of a road at the base of the hill to the southeast of building 102 facility. Due to excavation of the road, trench H is lacking some of the younger soil horizons. Trench H-1 and H-2 immediately adjacent to trench H indicate the presence of possible offset soils but in these trenches the youngest soils have been modified by agricultural grading. These trenches are probably not deep enough to intersect the main shear zone.

Trench A is located in the power line corridor to the south of highway 84. This trench reveals evidence of a large fault zone. We observed a number of possible thrust fault offset and also evidence for strike slip movement. The faulting in this trench is exceedingly complex in itself and is further complicated by the fact that it may be located in the area of surface landsliding. A strike slip surface with well-developed mullion structures has a vertical dip and strikes about N70°W. Apparent thrust or reverse offsets are also noted in the north end of this trench and dip slip movement is evidenced by slickensides. The deep colluvial weathered material is noted as being to the north of the faulting.

Trench E is located to the northwest of the GETR. No indications of thrust or reverse fault offset were observed in this trench. Several shear zones which dip to the west were observed. These zones are capped by a paleosol which has an estimated date of 70,000 - 125,000 years before present. This trench does indicate that it is near a synclinal fold. Some discussions took place as to the location of this trench. This trench is located on the projected trace of the Verona fault as mapped by Herd (1977). The USGS indicated that another airphoto lineation can be noted several hundred feet west of the end of trench E and trench E may not be properly located to intersect the trace of the thrust fault.

At the end of the visit we asked if anyone had any need to keep trench E open for further inspection since GE has requested that they be allowed to fill this trench. We requested detailed logging of several features prior to allowing filling. Everyone in attendance agreed that the trench could be filled. In adjourning this site visit we indicated that the reviewers would meet soon to evaluate the status of the review of this site.

Robert E. Jackson

Robert E. Jackson, Leader
Geology and Seismology Section
Geosciences Branch

John T. Greeves

John T. Greeves, Geotechnical Engineer
Geotechnical Engineering Section
Geosciences Branch

Attachment:
As stated

See next page

G.E. TEST REACTOR SITE VISIT
December 5 & 6, 1978

List of Attendees

Name	Organization
Chris Nelson	USNRC-NMSS-DOR
David B. Slemmons	Univ. of Nevada (NRC consultant)
Darrell G. Herd	U. S. Geological Survey
Earl Brabb	" "
Robert H. Morris	" "
Robert E. Jackson	USNRC-NRR-GSB
John T. Greeves (Dec. 5 only)	" "
Robert Kratzke	USNRC-NMSS
Winston Burkhardt	" "
Harvey L. Canter	USNRC-Region V
Lew Miller	" "
R. W. Darmitzel	General Electric Company
Dwight Gilliland	" "
Ed Firestone	" "
Norm Fifer	" "
Doug Hoggatt	" "
W. T. Crawford	" "
T. J. Sloser	" "
D. M. Yadon	Earth Sciences Associates
Lester Lubetkin	" "
Dick Willingham	" "
T. D. Hunt	" "
R. H. Wright	" "
Dick Harding	" "
John Baltierra	" "
Ben M. Page	ACRS Consultant
Miles Severy	TERA Corporation
C. Marshall Payne	" "
Nancy Snow	Congressman Dellums office
Glenn Barlow	Friends of the Earth
Andrew Baldwin	" "
Barbar Shockely	" "
R. G. Gray	" "
Michael Manson	Calif. Div. Mines & Geology
Edgar Stephens	" "
Salem Rice	" "
Richard Kilbourne	" "
Roy Shlemon	GE Consultant
John Miller	Oakland Tribune
Dave Martin	Tu-Valley Herald
Roberta Wong	Station KRON (San Francisco)
Jon S. Galehouse	SF State Univ.
Ray Pestrong	" "
David Mustart	" "

cc: w/attachment
R. Denise
D. Muller
R. DeYoung
V. Stello
B. Grimes
T. Carter
D. Eisenhut
D. Ziemann
T. Ippolito
J. Hanchett
R. Kratzke
R. Chek
W. Burkhardt
J. Martin
G. Lanis
G. Knighton
C. Nelson
R. Reid
R. Ingram
IE&E (d)
R. Frale, ACRS (16)
J. Stepp
D. Swanson
R. Jackson
J. Kelleher
J. Greeves
J. Devine, USGS
R. Morris, USGS
D. Herd, USGS
E. Brabb, USGS
J. Davis, CDMG
P. Amimoto, CDMG
L. Wight, TERA
D. Bernreuter, LLL
N. Newmark
PDR
Local PDR