GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, P.O. BOX 460, PLEASANTON, CALIFORNIA 94566

NUCLEAR ENERGY

ENGINEERING

DIVISION

April 17, 1980

Mr. Darrell G. Eisenhut, Director
Division of Project Management
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Proposed GETR Landslide Investigation - License TR-1 - Docket 50-70

Dear Mr. Eisenhut:

Enclosed is the proposed GETR landslide investigation program. This is a field and laboratory investigation to determine the stability of the hillside near the GETR. This program will be performed after NRC Staff concurrence in the content, and a satisfactory resolution of seismic parameters to be used for design purposes.

Very truly yours,

R W Darmitzel

R. W. Darmitzel, Manager
Irradiation Processing Operation
Nuclear Engineering Division

OFFICIAL SEAL
VIRGINIA C. CASQUEIRO
NOTARY PUBLIC - CALIFORNIA
ALAMEDA COUNTY
My comm. expires MAR 8, 1981

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enclosure

AFFIRMATION

The General Electric Company hereby submits the attached Proposed GETR Landslide Investigation.

To the best of my knowledge and belief, the information contained therein is accurate.

R. W. Darmitzel, Manager
Irradiation Processing Operation

OFFICIAL SEAL
VIRGINIA C. CASQUEIRO
NOTARY PUBLIC - CALIFORNIA
ALAMEDA COUNTY
My comm. expires MAR 8, 1981

Submitted and sworn before me this 17th day of April, 1980.

Virginia C Casqueiro, Notary Public in and for the County of Alameda, State of California.

PROPOSED GETR LANDSLIDE INVESTIGATION

Field Investigation -- see accompanying map and section for location of exploratory borings.

RD-1a, b
- One or two borings to ~20-30' depth
- Continuously sample with 3" Pitcher Barrel sampler through sheared zone
- Place piezometer at bottom of each boring

RD-2
- Total depth of boring 100-150'
- Drill, log cuttings to ~50' depth
- Continuously sample with 3" Pitcher Barrel from ~50-100' or until shear zone is encountered; extrude samples in field, log, wrap, jar and seal selected samples for lab testing; possible option: limited SPT's in selected intervals
- Contingency to continue sampling to ~150', if required
- Run electric and gamma logs
- Place piezometer within shear zone and/or at bottom of boring

RD-3
- Total depth of boring 450-500'
- Sample periodically with 3" Pitcher Barrel from ~50'-T.D.; sample interval ~ 50' and/or at lithologic changes; attempt to sample fine-grained units in particular
- Run electric and gamma logs
- Set first piezometer within shear zone or at bottom of boring; set second piezometer within selected coarse-grained unit higher in boring

Contingency In-Situ Sampling
- If necessary, excavate shallow backhoe pit in vicinity of Trench B-3 to obtain block samples of shear zone material

Laboratory Investigation

Index Properties/-Moisture Content - Run Atterberg Limits and grain size analyses for selected representative materials and for splits from strength test samples

Shear Strength Testing - Static Triaxial Testing of Shear Zone and Representative Coarser Materials

- run 3 CU tests with pore-pressure measurements on remolded shear zone material at representative confining pressures
- run 3 CU tests with pore-pressure measurements on selected representative (undisturbed) or remolded samples of Livermore Gravels (particularly less cohesive materials)

- Possible Option: Direct-Shear Testing of Shear Zone Material
  - if feasible, run 1 or 2 tests of undisturbed shear zone material at in-situ moisture and confining pressure with shear foliation oriented parrallel to direction of induced shear strain
  - run 2 slow (drained) tests on remolded samples of shear zone material at representative moisture contents and confining pressures; reverse direction of shear and run "post-failure" tests on remolded samples
- Possible Option: Cyclic Triaxial and Post-Cyclic Static Triaxial Testing of Shear Zone and Representative Coarser Material
  - run 2 cyclic triaxial tests, one on remolded shear zone material and one on representative (undisturbed) or remolded Livermore Gravels (less cohesive material)
  - run 2 post-cyclic static triaxial tests with pore pressure measurements on the above described cyclic test samples

Data Reduction
- Tabulate data on water content, unit weight, and index properties of each test specimen
- Tabulate and plot $(\sigma_1-\sigma_3)$, $\bar{\sigma}_1/\bar{\sigma}_3$, U and A-factor vs. axial strain for each static triaxial test
- Tabulate and/or plot cyclic stress ratio, peak-to-peak axial strain, peak axial strain in extension and compression, excess pore pressure and effective confining ratio versus the number of loading cycles for each cyclic triaxial test
- Tabulate and/or plot shear stress and vertical deformation vs., horizontal deformation for direct shear tests
- Plot appropriate Mohr strength envelopes for each series of strength tests

Analysis and Report

Static Stability Analysis

- Perform static stability analysis utilizing STABL2/Simplified Janbu Method of Slices; effective stress strength parameters from static triaxial (and possibly direct shear) test results, piezometric data from field piezometer installations, field observations and geologic analyses
- Calculate static F.S. on modelled existing shears

Pseudo-Static Stability Analysis

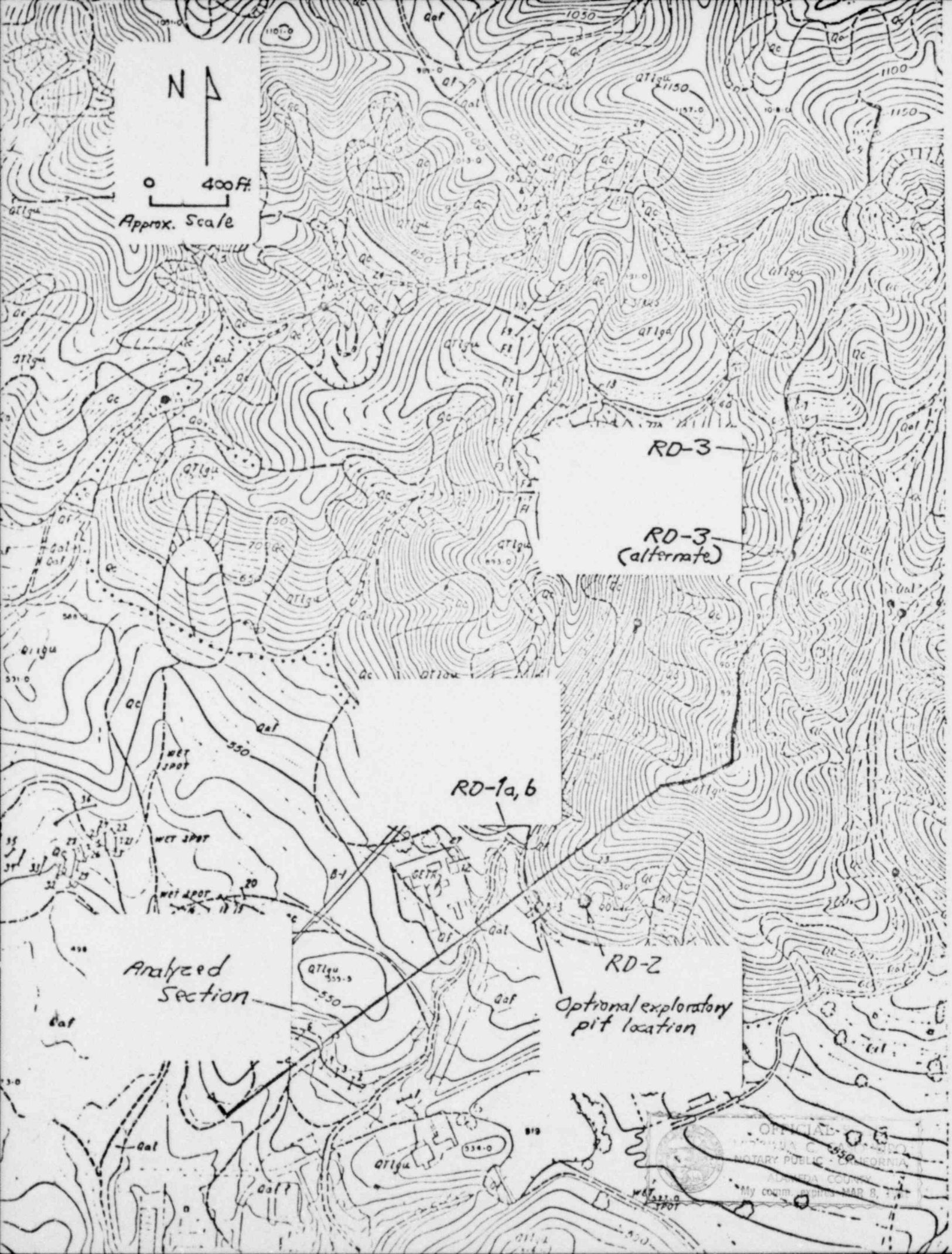
- Perform stability analysis similar to that described above but using total stress strength parameters and with addition of horizontal seismic coefficient (k_h) as static loading
- Estimate "yield acceleration" by trial and error iterations using different k_h values

Simplified Analysis of Earthquake-Induced Slope Deformations

- Select appropriate suite of input ground motion parameters from existing reports, documents; synthesize appropriate data and results from pseudo-static stability analysis
- Estimate deformations, using techniques of Makdisi and Seed, 1978, appropriately modified for natural slope case

Report Preparation

- Describe and document field and laboratory investigations
- Describe various stability analyses procedures and results
- Present conclusions of analyses in terms of design parameters for GETR


N
0 400 ft.
Approx. Scale
RD-3
RD-3 (alternate)
RD-1a, b
RD-2
Analyzed Section
Optional exploratory pit location
Qal
Qc
QTlgu
wet spot
B-1
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