

OCT 8 1985

Docket Nos.: 50-275
and 50-323

MEMORANDUM FOR: George W. Knighton, Chief
Licensing Branch No. 3
Division of Licensing

FROM: Hans Schierling, Project Manager
Licensing Branch No. 3
Division of Licensing

SUBJECT: DIABLO CANYON - SEISMIC REEVALUATION MEETING WITH
PG&E AND NRC ADVISORY BOARD

DATE & TIME: October 21, 1985
10:00 am - 5:00 pm

LOCATION: Room P-118
Phillips Building
7920 Norfolk Avenue
Bethesda, Maryland

PURPOSE: PG&E will discuss the soil-structure interaction (SSI) portion
of its Long Term Seismic Program with the NRC Advisory Board
on SSI.

PARTICIPANTS:

NRC

S. Brocoum
G. Giese-Koch
P. T. Kuo
L. Reiter
R. Rothman
G. Knighton

PG&E

D. Brand
L. Cluff
W. White, et al.

NRC Advisory Board

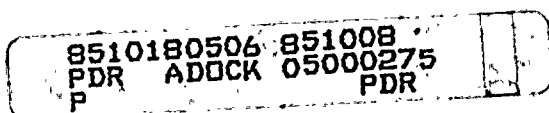
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A. S. Valetsos (Rice)
C. J. Costantino (CCNY)
G. Gazetas (RPI)
R. V. Whitman (MIT)

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10/8/85

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Diablo Canyon

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- 2 - Diablo Canyon

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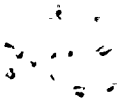
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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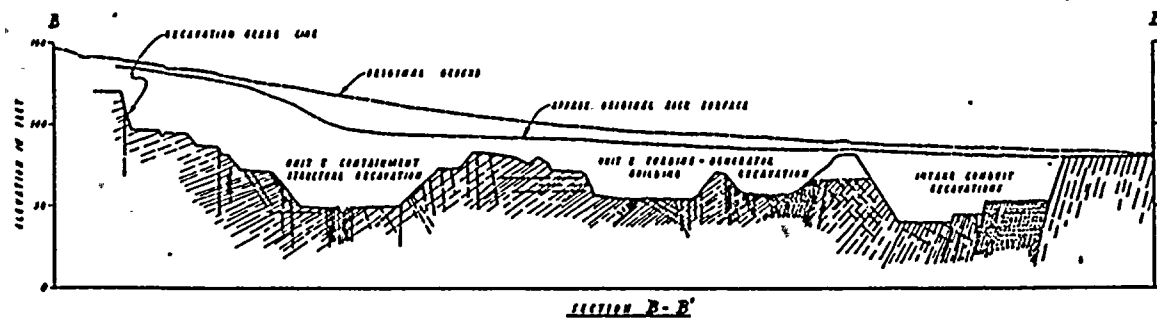
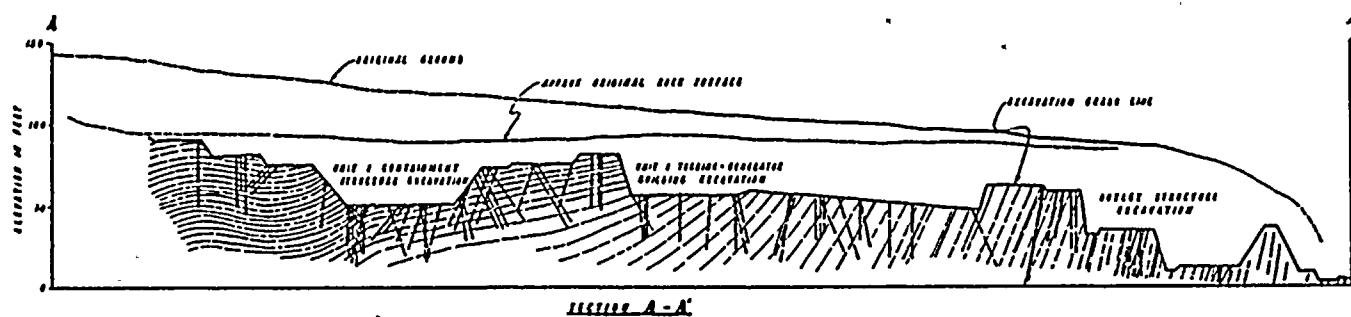
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Hans Schierling, Project Manager
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cc: See next page

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18 pp.



EXPLANATION

ROCK TYPES

- ☐ ROCK OF THE MOUNTAIN FORMATION, UNFOLDED, PREDOMINANTLY TAN TO THICK BEDDED SANDY MUDSTONE AND FINE GRAINED SANDSTONE.
- ☒ CLAYSTONE AND SLATE, OCCASIONALLY TOPPED, MAINLY IN CONCAVITY AREAS.
- ☒ TOPS AND TOPS SUCCESSIVE IN INTERSECTED SERIES THAT ARE AT LEAST PARTIALLY DISCONTINUOUS.

SYMBOLS

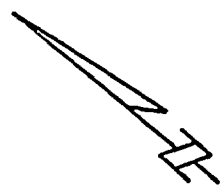
- BOTTOM OF BEARING TRACES, PROJECTED FROM APPEARANCE IN EXCAVATION.
- PRINCIPAL JOINTS AND FRACTURES
- ZONE OF DIRECT FRACTURING
- FAULT OR SHEAR PLANE.

FOR LOCATION OF GEOLOGIC CROSS SECTIONS SEE GEOLOGIC MAP OF EXCAVATIONS FOR POWER PLANT FACILITIES, FIGURES 2.5 - 4.5.

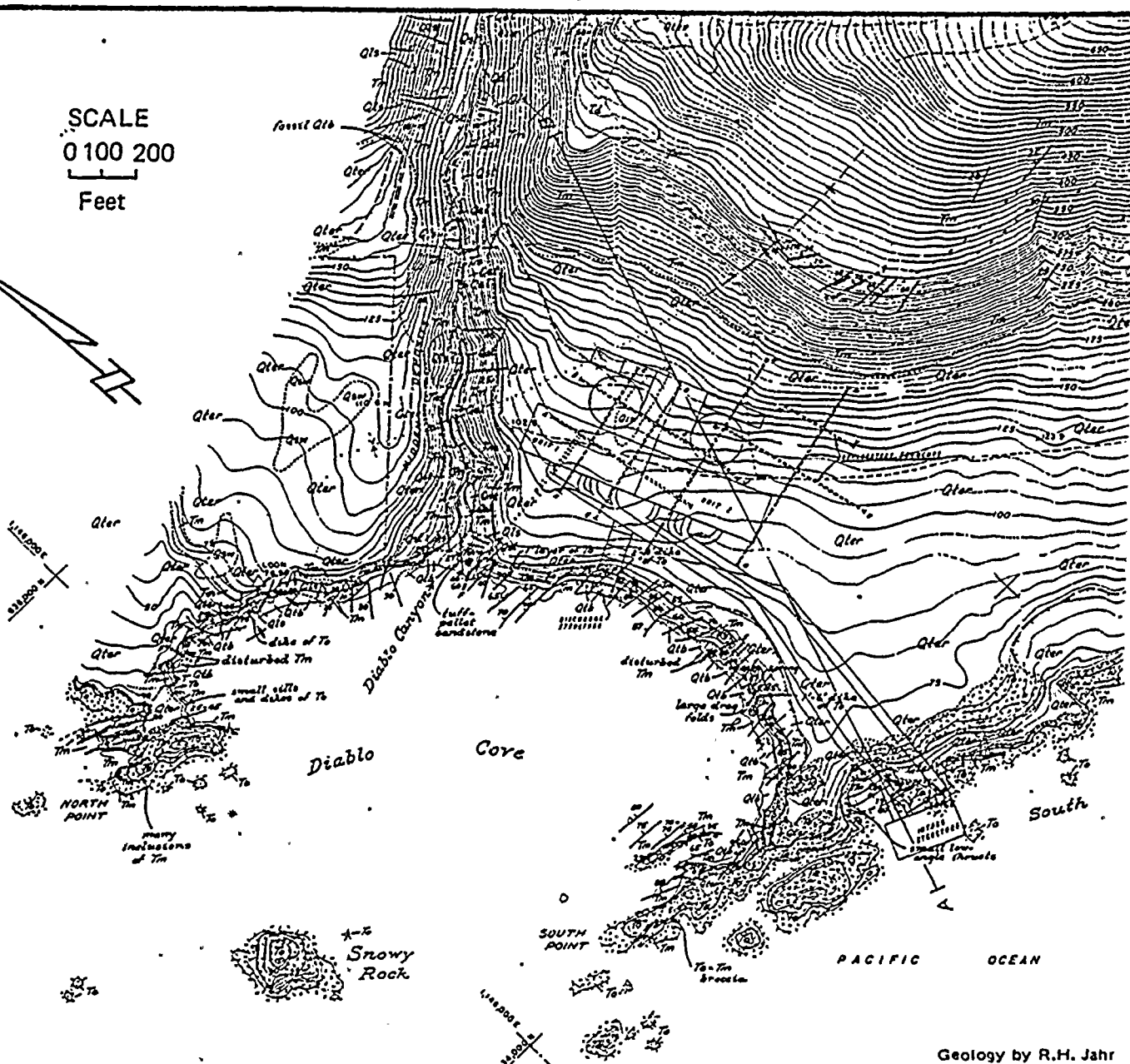


FSAR UPDATE
UNITS 1 AND 2
DIABLO CANYON SITE
FIGURE 2.5-16
GEOLOGIC SECTIONS THROUGH
EXCAVATIONS FOR PLANT FACILITIES

SCALE
0 100 200
Feet



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1142000

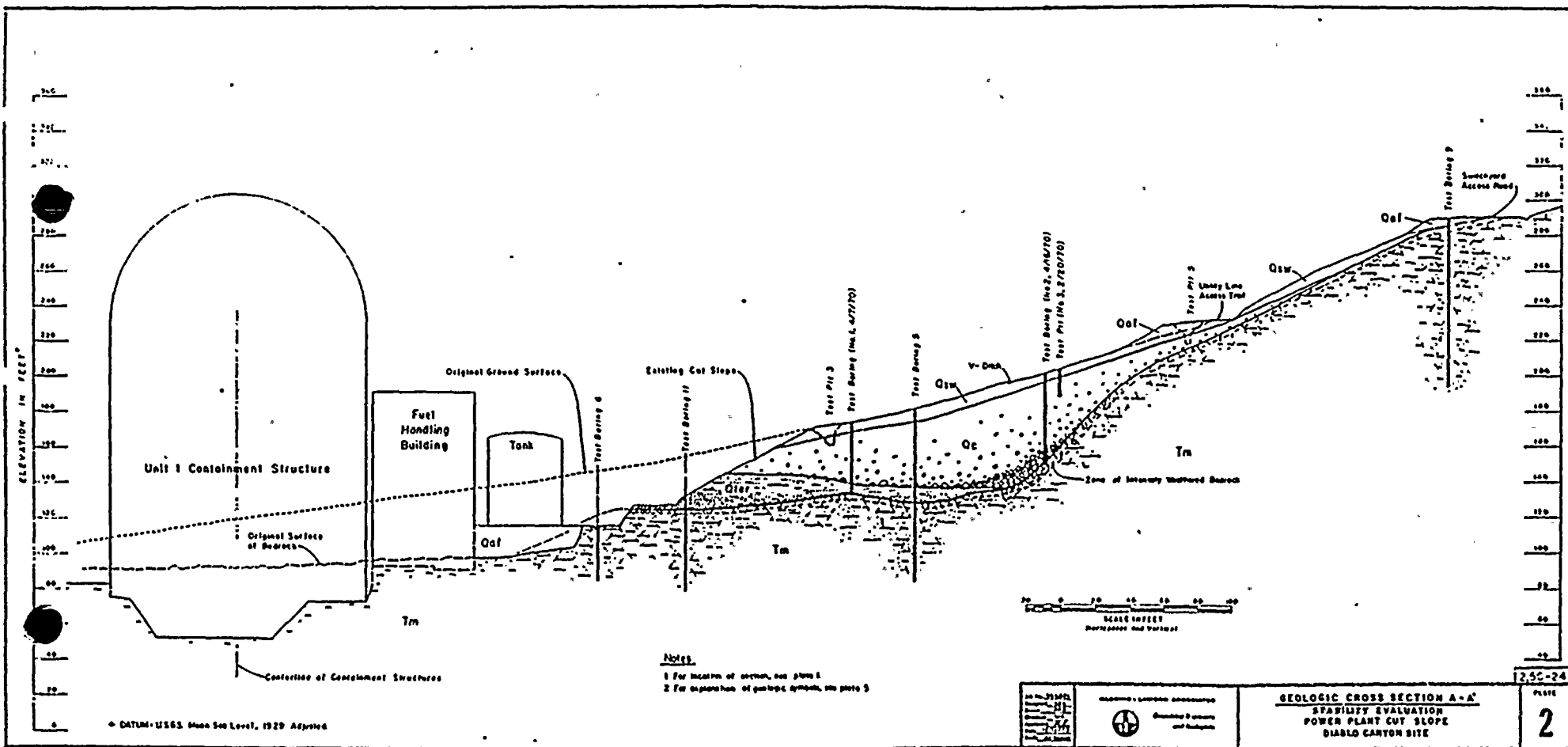


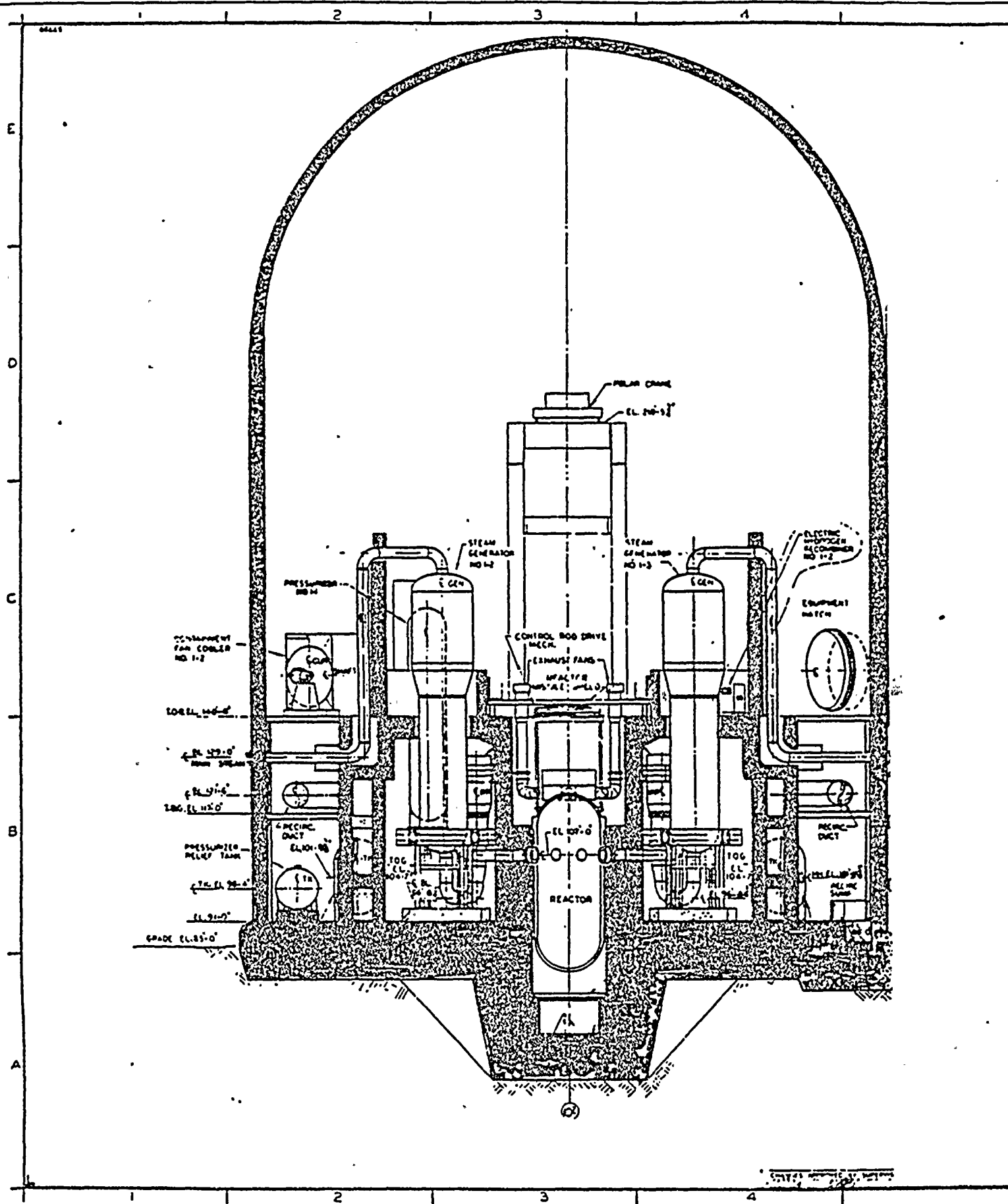
Geology by R.H. Jahr

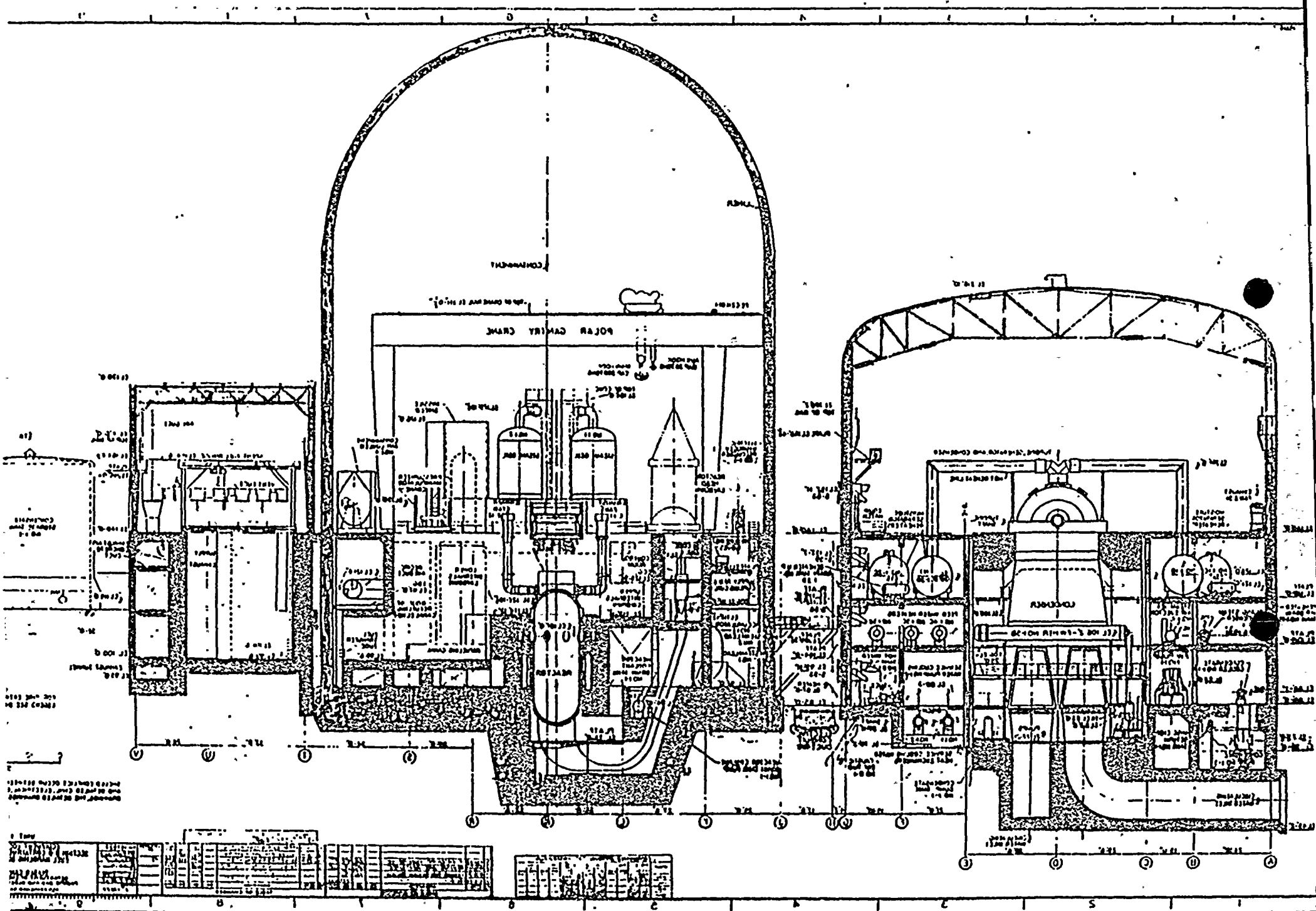
EXPLANATION

Pleistocene - Recent	Qal	Stream-laid alluvium	—	Contact involving surficial deposits
	Qtb	Talus and beach deposits	---	Contact between bedrock units } dashed where approximately located, dotted where concealed by Qter.
	Qsw	Slump, creep, and slope-wash deposits	— F —	Fault, showing dip
	Qls	Landslide deposits	75°	Strike and dip of beds
	Qst	Stream-terrace deposits	75°	Strike and dip of overturned beds
	Qf	Alluvial-fan deposits	⊙	Highly contorted beds
	Qft	Older fan-terrace deposits	+	Axis of syncline
	Qter	Deposits on marine wave-cut terraces	—	Boundary between different generations of Qter
	Qlb	Lake-bottom (?) deposits	~~~~~	Trend and range in dip of beds folded or warped as on a small scale
	Td	Diabasic intrusive rock	-----	Surface trace of resistant horizon in Tm
Miocene	Tm	Monterey Formation		
	To	Obispo tuff		

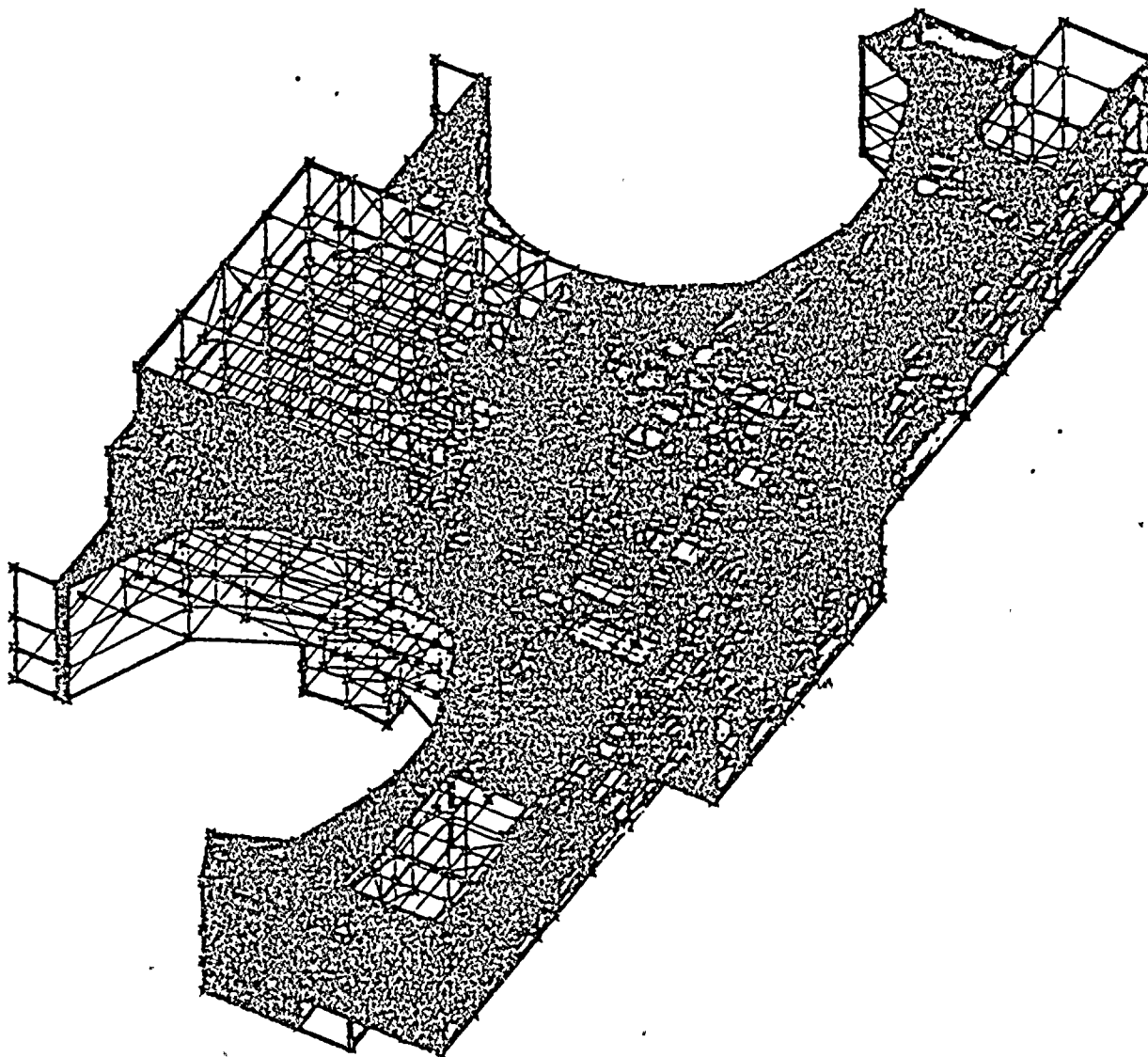
SITE GEOLOGY MAP







AUXILIARY BUILDING 3-D MODEL 8 ENTIRE STRUCTURE WITHOUT FOUNDATION



SEEROVER, FULTON, FLEMING, MOORE, ADDITION ON X2 X3 PLANE CASE NO. 1



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EXCERPT FROM NRC SER, SUPPLEMENT 27

SER SUPPLEMENT NO. 27 STATES, IN PART, THE FOLLOWING:

"IN ITS JUNE 20, 1984 LETTER, THE ACRS RECOMMENDED
CONSIDERATION OF ITS CONSULTANT'S ADVICE ...

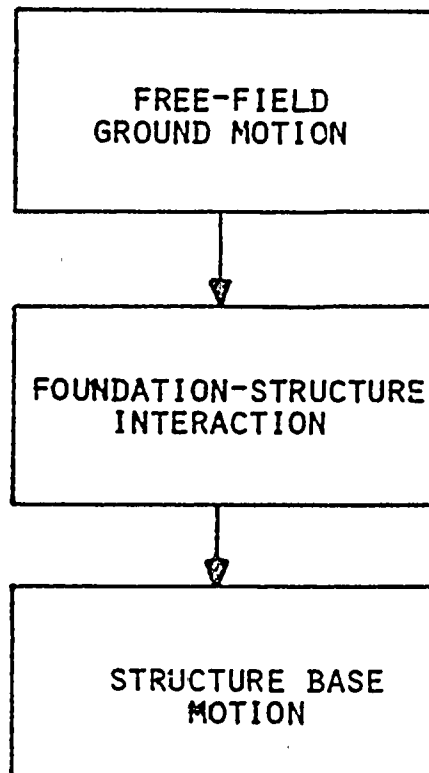
THREE DIMENSIONAL SOIL STRUCTURE INTERACTION
SHOULD BE EMPLOYED TO PROVIDE ESTIMATES OF
STRUCTURAL RESPONSE".

PACIFIC GAS AND ELECTRIC COMPANY

DIABLO CANYON

LONG TERM SEISMIC PROGRAM

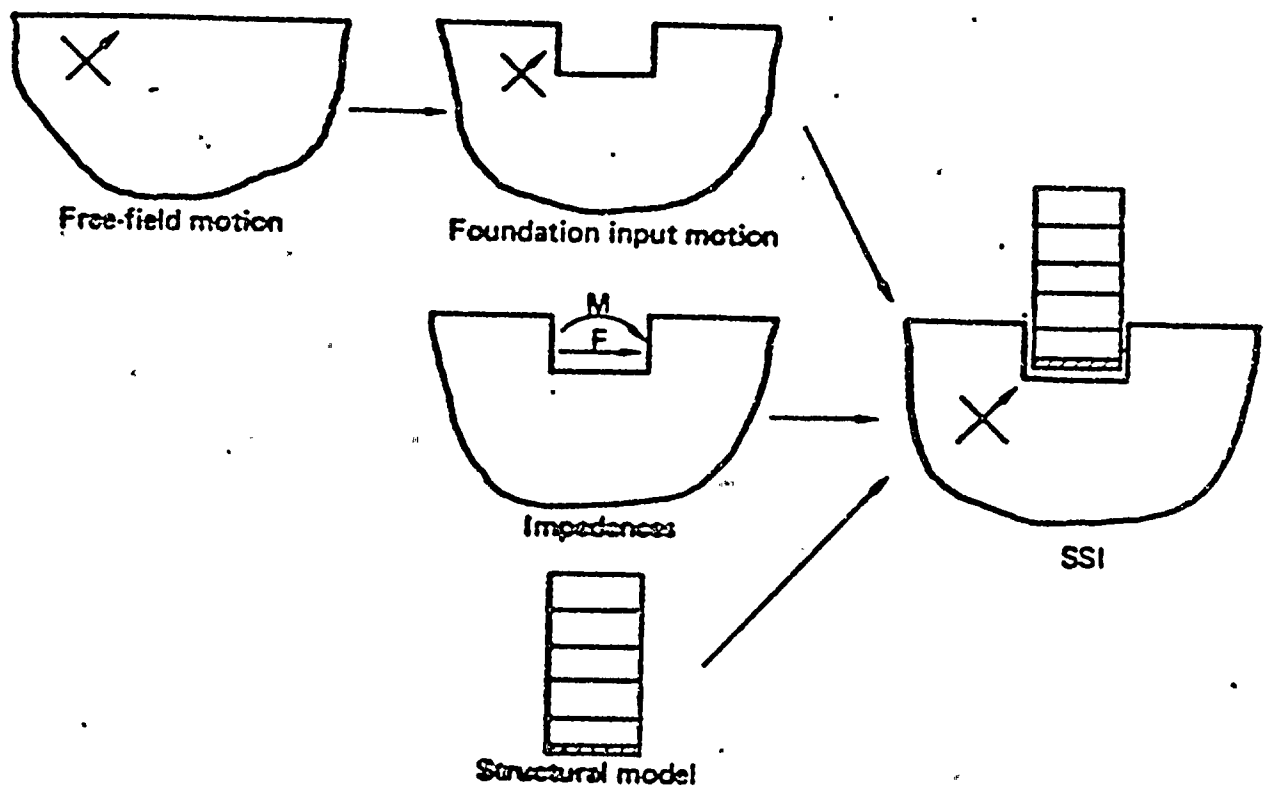
EVALUATION OF FOUNDATION-STRUCTURE INTERACTION EFFECTS



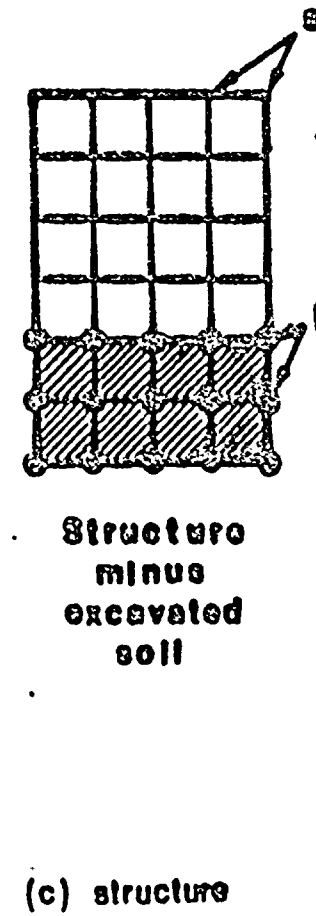
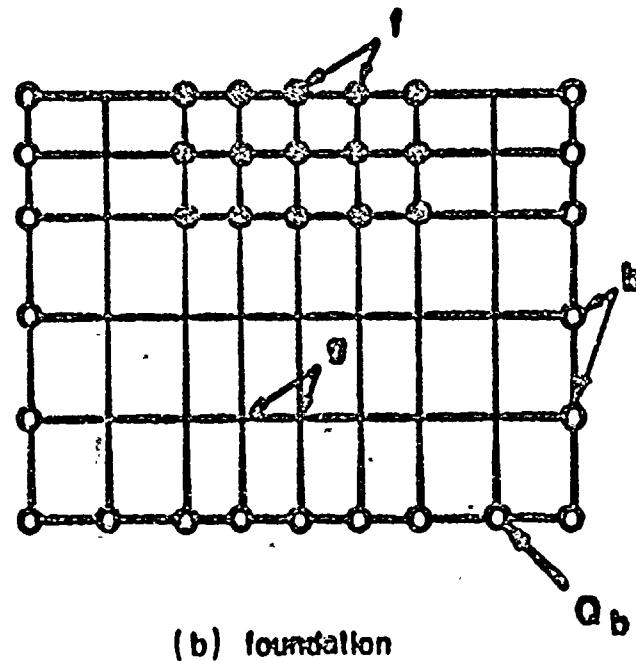
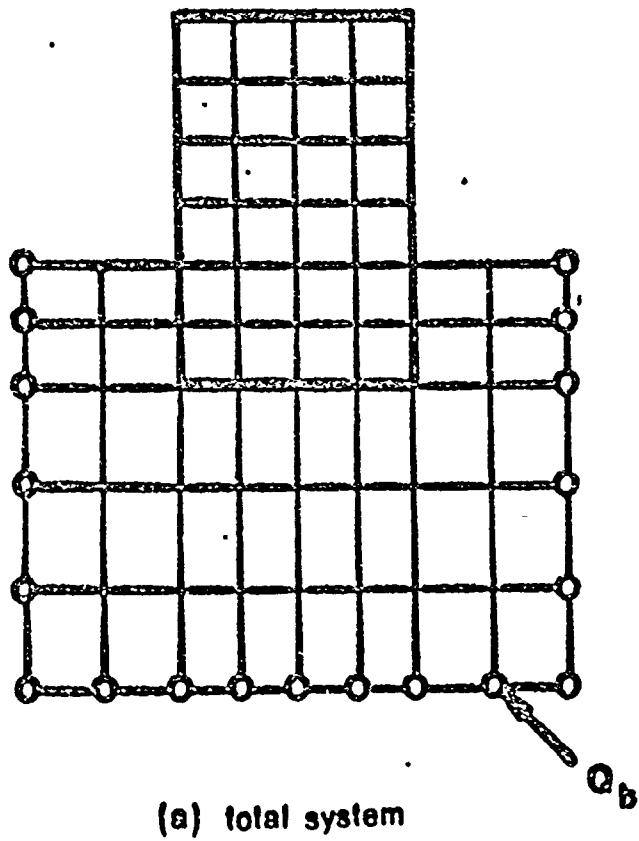
OUTLINE OF ANALYTICAL APPROACH

- 0 THREE-DIMENSIONAL (3-D) FOUNDATION-STRUCTURE INTERACTION ANALYSIS METHODS WILL BE EMPLOYED.
- 0 ALL COMPONENTS OF NEAR-FIELD STRONG GROUND MOTION WILL BE INCLUDED IN THE ANALYSIS SIMULTANEOUSLY.
- 0 ANALYSES WILL CONSIDER SEISMIC WAVE INCIDENCE CHARACTERISTICS INCLUDING INCLINED BODY WAVES AND SURFACE WAVES.
- 0 AVAILABLE RECORDED EARTHQUAKE DATA AT THE DIABLO CANYON PLANT SITE WILL BE USED TO THE EXTENT POSSIBLE TO PROVIDE INSIGHT INTO THE STUDY OF THE LOW AMPLITUDE DYNAMIC CHARACTERISTICS OF THE FOUNDATION-STRUCTURE DYNAMIC MODEL.

"CLASSI" METHODOLOGY



"SASSI" METHODOLOGY



Substructuring of interaction model.



PROPOSED PLAN

- ITEM 1: REVIEW OF THE EXISTING DATA ON SITE FOUNDATION MATERIAL CONFIGURATION AND PROPERTIES.
- ITEM 2: REVIEW OF THE GROUND MOTION STUDY RESULTS AND DEVELOPMENT OF FREE-FIELD INPUT MOTIONS FOR SSI ANALYSES.
- ITEM 3: DEVELOPMENT OF 3-D FOUNDATION-STRUCTURE INTERACTION ANALYTICAL MODELS.
- ITEM 4: FOUNDATION-STRUCTURE INTERACTION ANALYSES AND PARAMETRIC STUDIES.
- ITEM 5: COMPARISON OF ANALYTICAL RESULTS WITH RECORDED EARTHQUAKE ACCELEROGROMS.

ITEM 1: REVIEW OF THE EXISTING DATA ON SITE FOUNDATION
MATERIAL CONFIGURATION AND PROPERTIES

- A. GROUND SURFACE TOPOGRAPHY.
- B. GEOPHYSICAL DATA SUCH AS FIELD MEASURED SHEAR AND
COMPRESSION WAVE VELOCITIES AND ASSOCIATED STRAINS.
- C. GEOTECHNICAL DATA SUCH AS DYNAMIC FOUNDATION MATERIAL
SHEAR MODULI, POISSON'S RATIOS, DENSITIES AND DAMPING, AND
THE VARIATION OF THESE PROPERTIES WITH STRAINS AND THEIR
UNCERTAINTIES.

ITEM 2: REVIEW OF THE GROUND MOTION STUDY RESULTS AND
DEVELOPMENT OF FREE-FIELD INPUT MOTIONS FOR SSI
ANALYSIS.

- A. SITE-SPECIFIC FREE-FIELD GROUND RESPONSE SPECTRA AND
THE LOCATION OF THE MOTION DEFINITION.
- B. ENSEMBLE OF REAL AND/OR SYNTHETIC GROUND MOTION TIME
HISTORIES ASSOCIATED WITH THE SITE-SPECIFIC SPECTRA.
- C. FREE-FIELD SEISMIC WAVE INCIDENCE CHARACTERISTICS
AND THEIR RELATIONSHIP WITH SEISMIC SOURCE LOCATIONS.



ITEM 3: DEVELOPMENT OF 3-D FOUNDATION-STRUCTURE
INTERACTION ANALYTICAL MODELS

- A. REVIEW THE EXISTING POWER BLOCK STRUCTURAL MODELS AND SELECT/DEVELOP APPROPRIATE 3-D STRUCTURAL DYNAMIC MODELS TO BE USED FOR SSI ANALYSES.
- B. DEVELOP 3-D FOUNDATION MODEL USING BOTH THE FINITE ELEMENT APPROACH (E.G., SASSI COMPUTER CODE) AND THE HALF-SPACE APPROACH (E.G., CLASSI COMPUTER CODE).

ITEM 4: FOUNDATION-STRUCTURE INTERACTION ANALYSES
AND PARAMETRIC STUDIES

- A. BENCHMARK SOLUTIONS WILL BE PERFORMED USING BOTH THE
FINITE ELEMENT APPROACH AND THE HALF-SPACE APPROACH.
- B. SSI ANALYSES WILL BE PERFORMED CONSIDERING ALL
COMPONENTS OF FREE-FIELD MOTION SIMULTANEOUSLY.
- C. PARAMETRIC STUDIES WILL BE PERFORMED CONSIDERING
VARIATIONS OF INPUT MOTION PARAMETERS, VARIATION OF
FOUNDATION AND STRUCTURE PROPERTIES.

ITEM 5: COMPARISON OF ANALYTICAL RESULTS WITH
RECORDED EARTHQUAKE DATA

PERFORM DATA ANALYSES OF AVAILABLE
RECORDED EARTHQUAKE ACCELEROGRAMS AT THE SITE
AND IN THE PLANT STRUCTURES TO EVALUATE THEIR
USEFULNESS.

NOV 7 1985

MEETING SUMMARY DISTRIBUTION

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