

86/86

RECORD OF TELEPHONE CONVERSATION

DATE: Oct. 3, 1980 PROJECT: Midland  
RECORDED BY: J. Kane CLIENT: \_\_\_\_\_  
TALKED WITH: Ms. Jean Linsley OF Bay City Times 517-895-8551

ROUTE TO: INFORMATION ACTION  
L. Heller \_\_\_\_\_  
G. Lear \_\_\_\_\_  
D. Hood \_\_\_\_\_

MAIN SUBJECT OF CALL: Respond to reporter's inquiries

ITEMS DISCUSSED: Ms. Linsley called J. Kane to inquire about R. Vollmer's decision on OGC Appeal. Ms. Linsley already knew of internal meeting between COE & NRC which she understood had been held in Bethesda on Thursday (was actually Wednesday 10/1/80). She had apparently been informed of the meeting by the COE Detroit Office and was under the impression that R. Vollmer has made a decision to fully support the COE request for additional borings & testing. I indicated that recent information provided by CPCo (100 + add'l. borings) would likely permit some relief from the original 18 borings. I indicated possibly 6 SPT borings would be eliminated but undist. sampling would still be required. To answer her questions on what NRC might modify of the original request it was necessary to discuss SPT & undist. sampling. I explained that NRC had not sent a letter to CPCo on the final decision. She indicated her desire to call R. Vollmer's office (his number she already knew) and determine the contents of the final decision. In response to her question as to whether I was "in charge" of the Midland project for NRC, I indicated my involvement was limited to the geotechnical engineering review.

On 10/6/80 (approx. 9:55) Ms. Linsley again called on the same subject. I directed her inquiries to Darl Hood @ 492-8402



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

J. Kane  
Rec'd 2/11/82  
27/BC

FEB 4 1982

Docket Nos: 50-329  
and 50-330

APPLICANT: Consumers Power Company  
FACILITY: Midland Plant, Units 1 and 2  
SUBJECT: SUMMARY OF MEETING HELD WITH CONSUMERS POWER ON  
GEOLOGY - DECEMBER 2, 1982

On December 2, 1982, the NRC staff met in Bethesda, Maryland with Consumers Power Company, Weston Geophysical and Dow Chemical to discuss geology issues which must be addressed as part of the Midland OL safety evaluation. This subject relates to section 2.5 of the Midland SER. A list of meeting attendees is attached as Enclosure 1. Enclosure 2 is a compilation of the handouts and visual aids used in the course of the meeting. Enclosure 3 is a listing of questions that the staff raised during the course of the meeting.

SUMMARY

On behalf of the applicant, Weston summarized the results of their investigation dealing with recent geologic investigations relating to the Midland Plant site. This information is to be ultimately incorporated into the FSAR by amendment. A formal report will also be issued to the NRC early in 1982 to document the details and methodology of the investigation. The investigation utilized information developed by various other companies and government agencies involved in dry or abandoned oil wells, coal test holes and water wells. The investigation, however, did not address all of the staff's concerns to the depth required and the applicant was given several questions to address prior to issuance of a revised FSAR section on geology (see Enclosure 3).

A presentation was made by Dow Chemical Company (whose Midland Plant is adjacent to the Consumers Nuclear Plant site) regarding past Dow subsurface mineral recovery operations in the general area. No open questions resulted from this presentation.

The meeting concluded with a presentation and discussion of the applicant's proposed subsidence monitoring program.

*Ronald W. Hernan*

Ronald W. Hernan, Project Manager  
Licensing Branch No. 4  
Division of Licensing

Enclosure:  
As stated

cc:  
See next page

~~8202170498~~  
40M

MIDLAND

Mr. J. W. Cook  
Vice President  
Consumers Power Company  
1945 West Parnall Road  
Jackson, Michigan 49201

cc: Michael I. Miller, Esq.  
Ronald G. Zamarin, Esq.  
Alan S. Farnell, Esq.  
Isham, Lincoln & Beale  
Suite 4200  
1 First National Plaza  
Chicago, Illinois 60603

James E. Brunner, Esq.  
Consumers Power Company  
212 West Michigan Avenue  
Jackson, Michigan 49201

Myron M. Cherry, Esq.  
1 IBM Plaza  
Chicago, Illinois 60611

Ms. Mary Sinclair  
5711 Summerset Drive  
Midland, Michigan 48640

Stewart H. Freeman  
Assistant Attorney General  
State of Michigan Environmental  
Protection Division  
720 Law Building  
Lansing, Michigan 48913

Mr. Wendell Marshall  
Route 10  
Midland, Michigan 48640

Mr. Roger W. Huston  
Suite 220  
7910 Woodmont Avenue  
Bethesda, Maryland 20814

Mr. R. B. Borsum  
Nuclear Power Generation Division  
Babcock & Wilcox  
7910 Woodmont Avenue, Suite 220  
Bethesda, Maryland 20814

Mr. Don van Farrowe, Chief  
Division of Radiological Health  
Department of Public Health  
P.O. Box 33035  
Lansing, Michigan 48909

William J. Scanlon, Esq.  
2034 Pauline Boulevard  
Ann Arbor, Michigan 48103

U.S. Nuclear Regulatory Commission  
Resident Inspectors Office  
Route 7  
Midland, Michigan 48640

Ms. Barbara Stamiris  
5795 N. River  
Freeland, Michigan 48623

Mr. Paul A. Perry, Secretary  
Consumers Power Company  
212 W. Michigan Avenue  
Jackson, Michigan 49201

Mr. Walt Apley  
c/o Mr. Max Clausen  
Battelle Pacific North West Labs (PNWL)  
Battelle Blvd.  
SIGMA IV Building  
Richland, Washington 99352

Mr. I. Charak, Manager  
NRC Assistance Project  
Argonne National Laboratory  
9700 South Cass Avenue  
Argonne, Illinois 60439

James G. Keppler, Regional Administrator  
U.S. Nuclear Regulatory Commission,  
Region III  
799 Roosevelt Road  
Glen Ellyn, Illinois 60137

ENCLOSURE 1

LIST OF ATTENDEES

NRC

A. Cardone  
H. Planner (LASL)  
S. Brocoum  
J. Kimball  
R. Hernan

Weston Geophysical

L. Schultz  
S. Tedesco  
P. Turner  
R. Teifke  
R. Holt

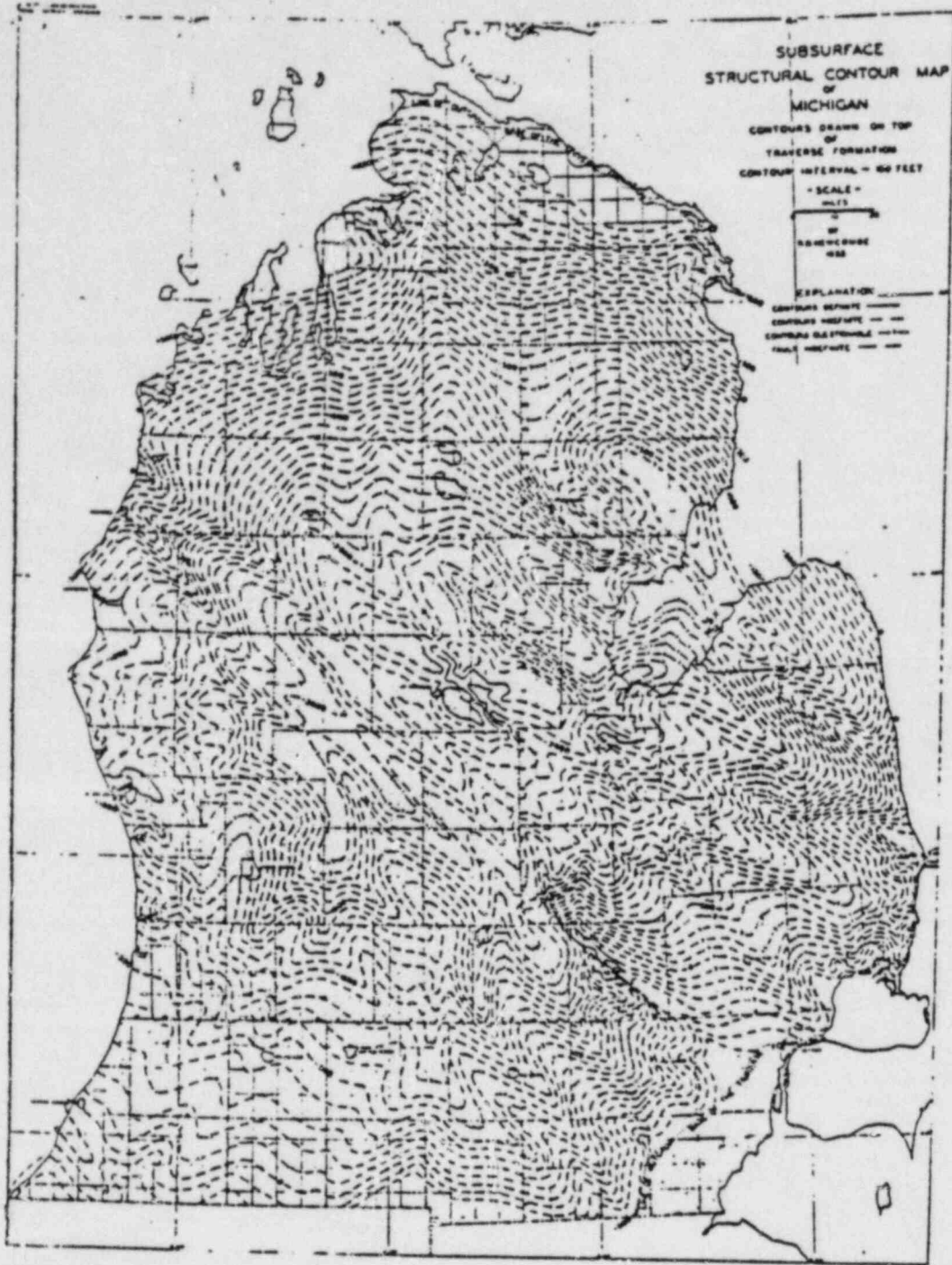
Consumers Power

D. Budzik  
T. Thiruvengadam  
R. Oliver

Dow Chemical

R. Nagel



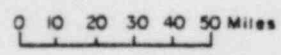
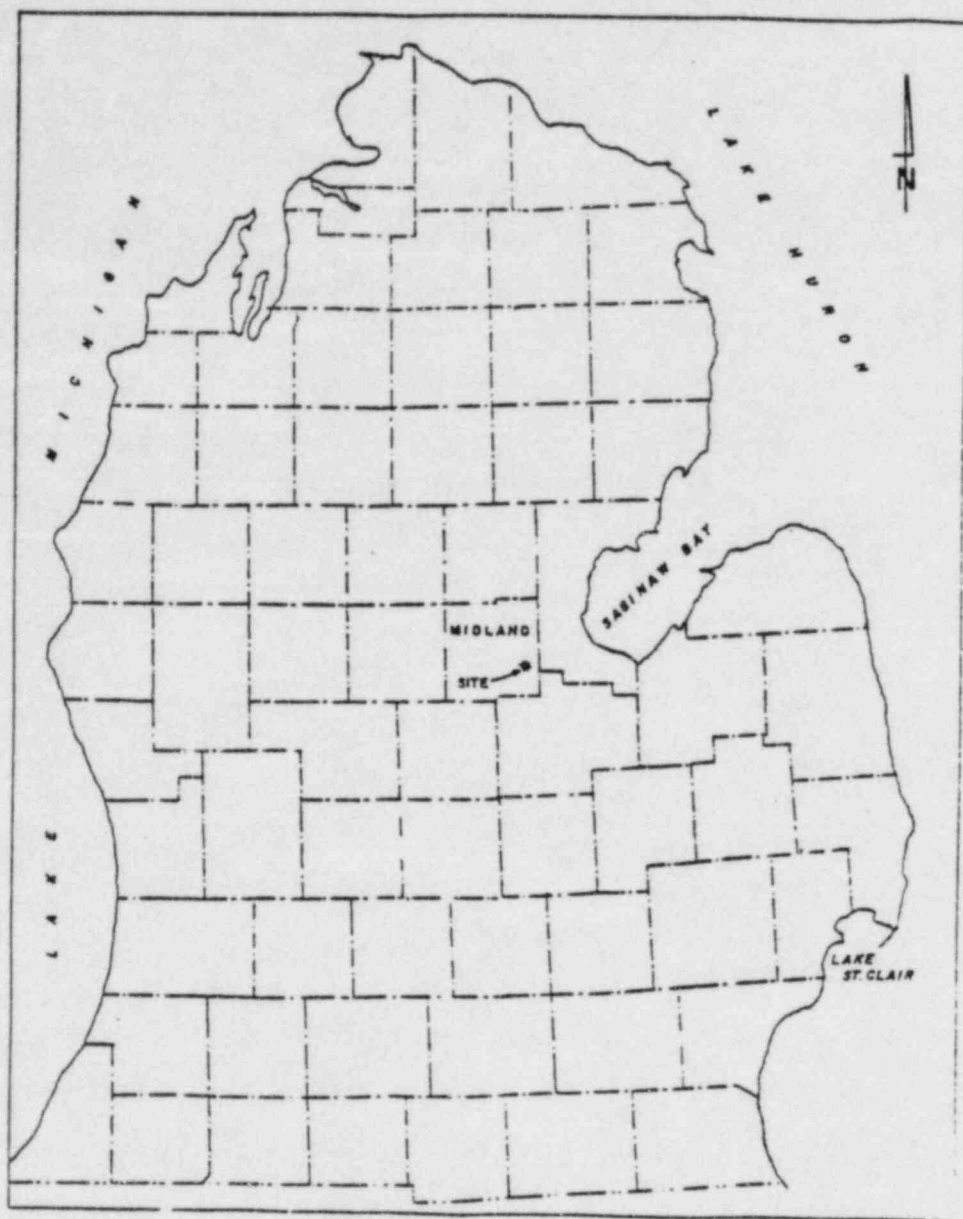


DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 MIDLAND PLANT - UNITS 1 & 2  
 for  
 CONSUMERS POWER COMPANY

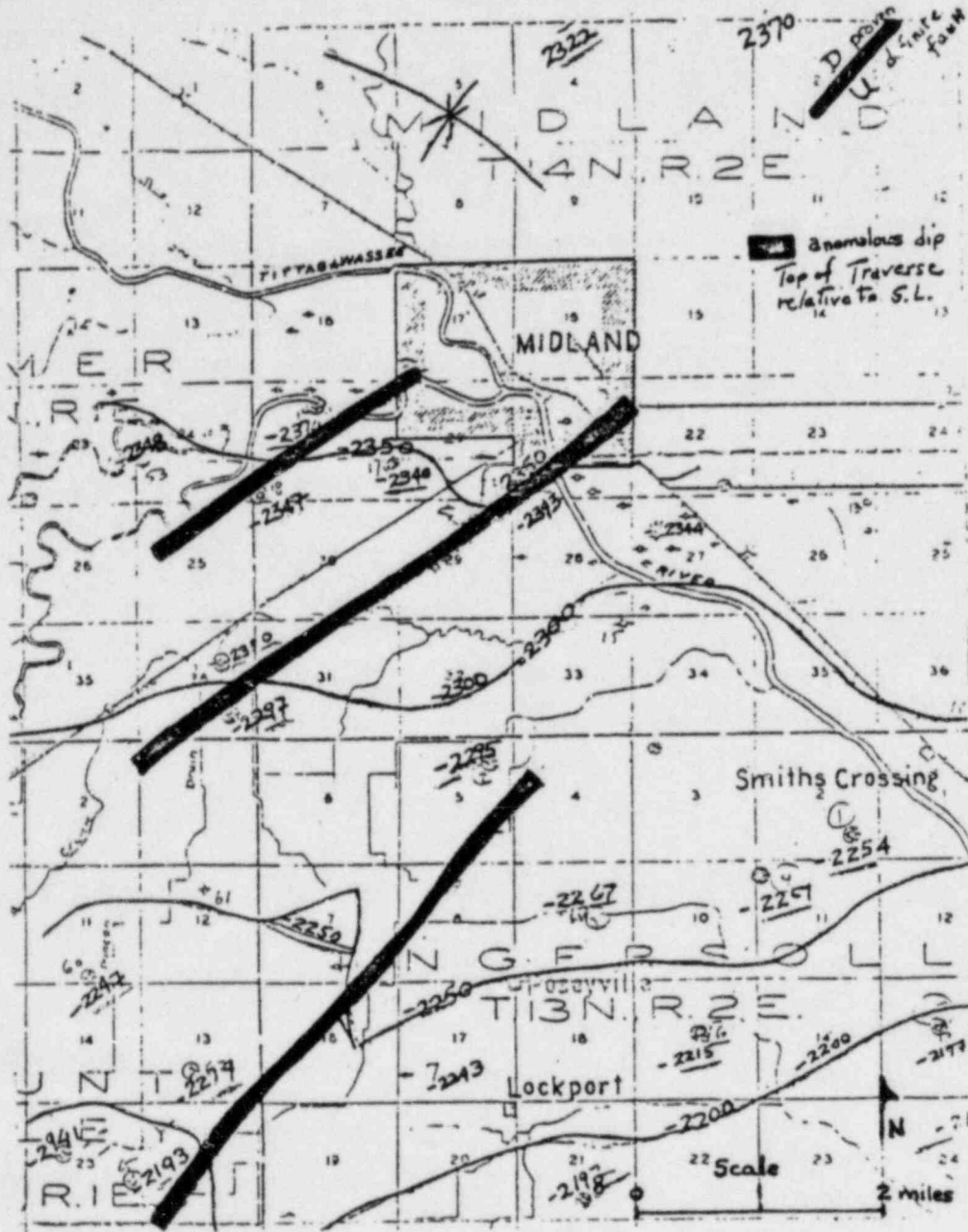
STRUCTURE CONTOUR MAP OF  
 MICHIGAN - TOP OF TRAVERSE

WESTON GEOPHYSICAL CORP

FIGURE 6

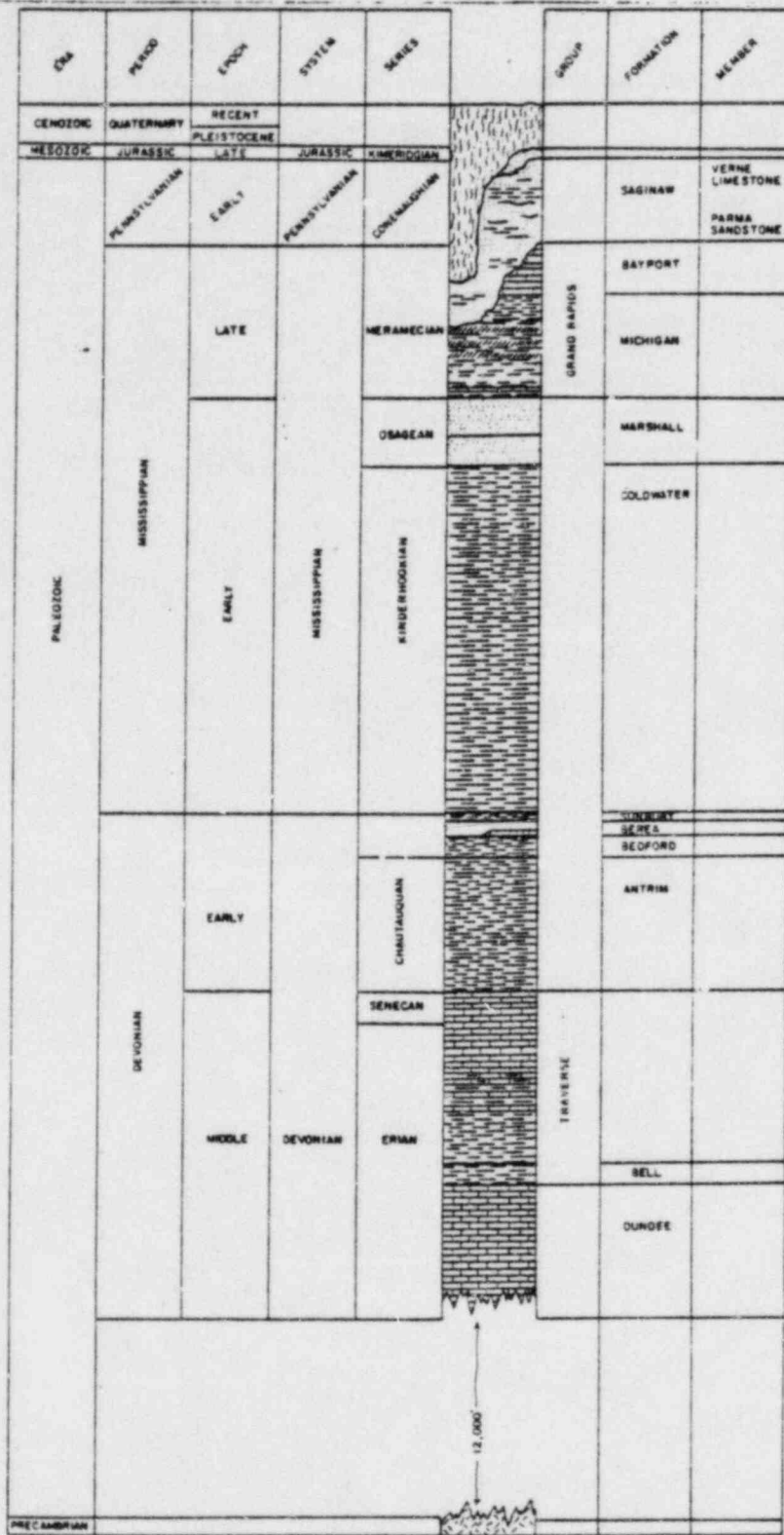


DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE MIDLAND PLANT - UNITS 1 & 2 for CONSUMERS POWER COMPANY	MIDLAND SITE LOCATION	
	WESTON GEOPHYSICAL CORP	FIGURE 1



NOTE: Submitted by Geospectra Consultants to Consumers Power Company, 1981.

DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE MIDLAND PLANT - UNITS 1&2 for CONSUMERS POWER COMPANY	STRUCTURE CONTOUR MAP - TOP OF TRAVERSE	
	WESTON GEOPHYSICAL CORP	FIGURE 2



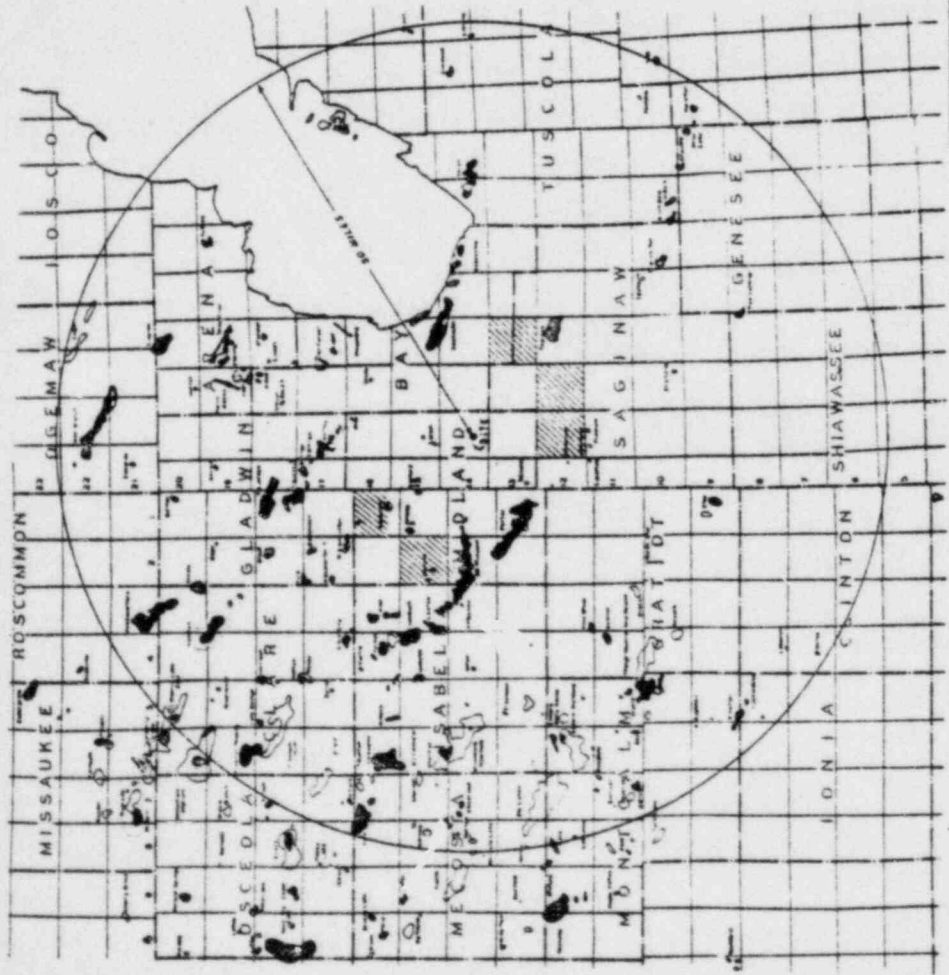
0 250 FT  
VERTICAL SCALE

DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
MIDLAND PLANT - UNITS 1 & 2  
FOR  
CONSUMERS POWER COMPANY

STRATIGRAPHIC COLUMN

WESTON GEOLOGICAL CORP. FIGURE 3





**EXPLANATION**

- OIL FIELDS
- GAS FIELDS
- Reservoirs
- 2 to 50 Acres Ponds
- 2 to 50 Acres Oil and Gas Ponds
- Developed Gas Storage Area
- Areas under investigation
- Areas covered by plates 1, 2, 3, and 4

**REFERENCE**  
 U.S. Geol. Surv., Michigan. Oil and Gas Fields, 1975  
 Annual Report of Survey 24 (1974). Michigan  
 Geological Survey, Lansing, Michigan  
 State of Michigan, Michigan State University  
 Michigan State University, East Lansing, Michigan  
 MSU State Bulletin, Michigan State University, East Lansing, Michigan  
 28 14, (December, 1977).

**NOTE**  
 Shape and nature of oil fields are general in  
 kind, names are those which were published,  
 include standard 1/4th

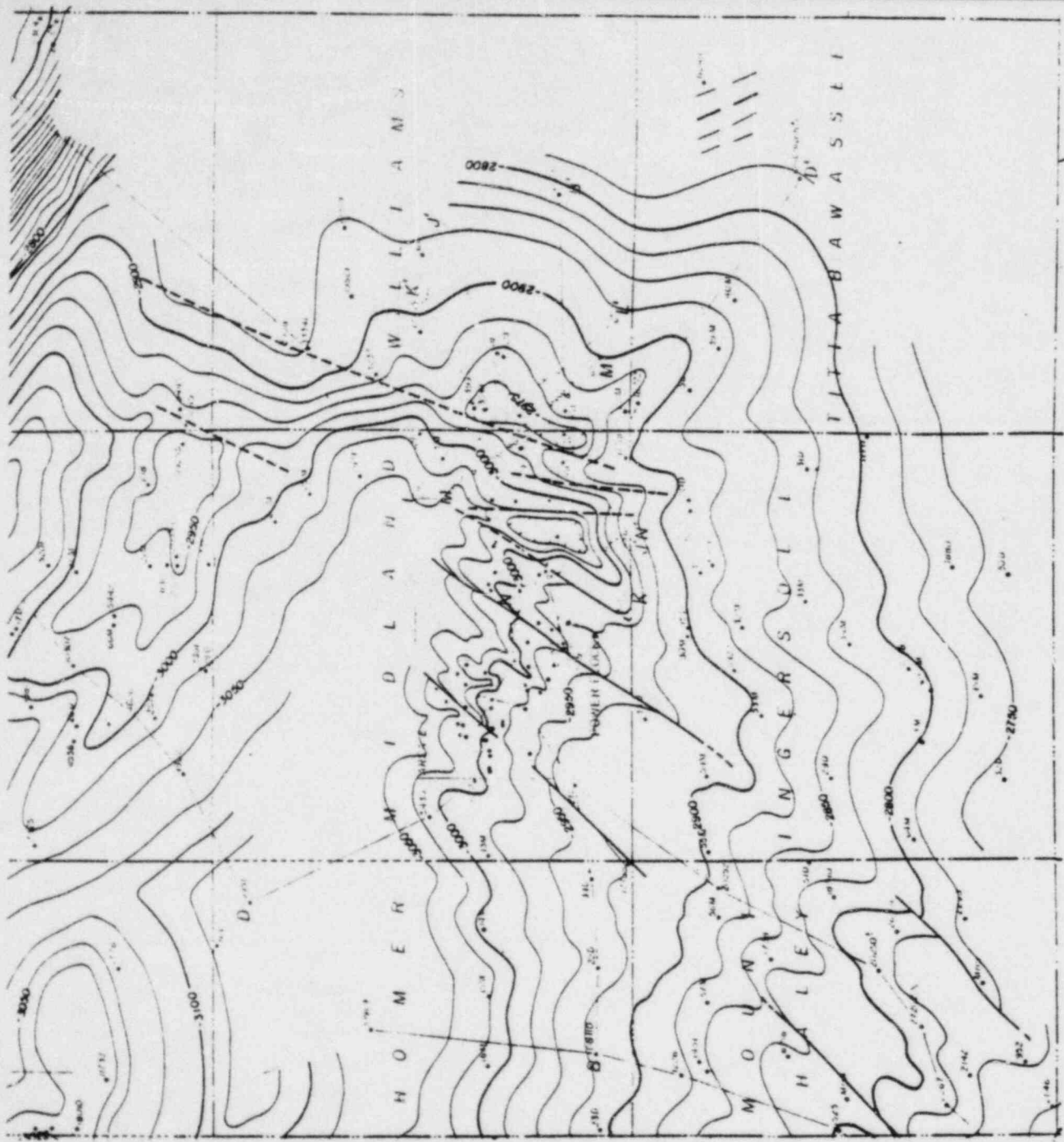
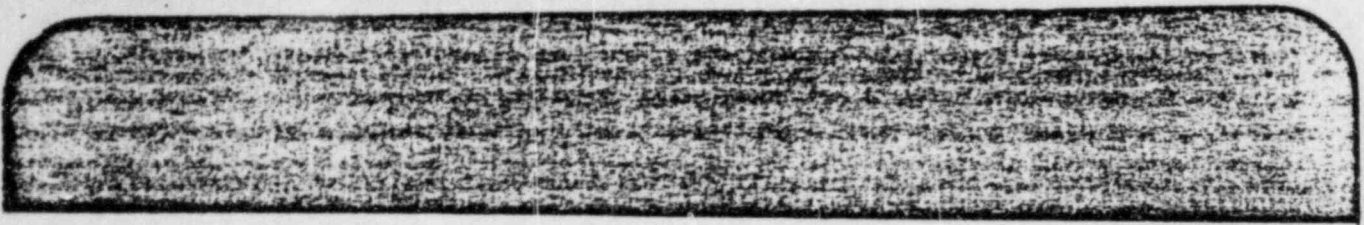


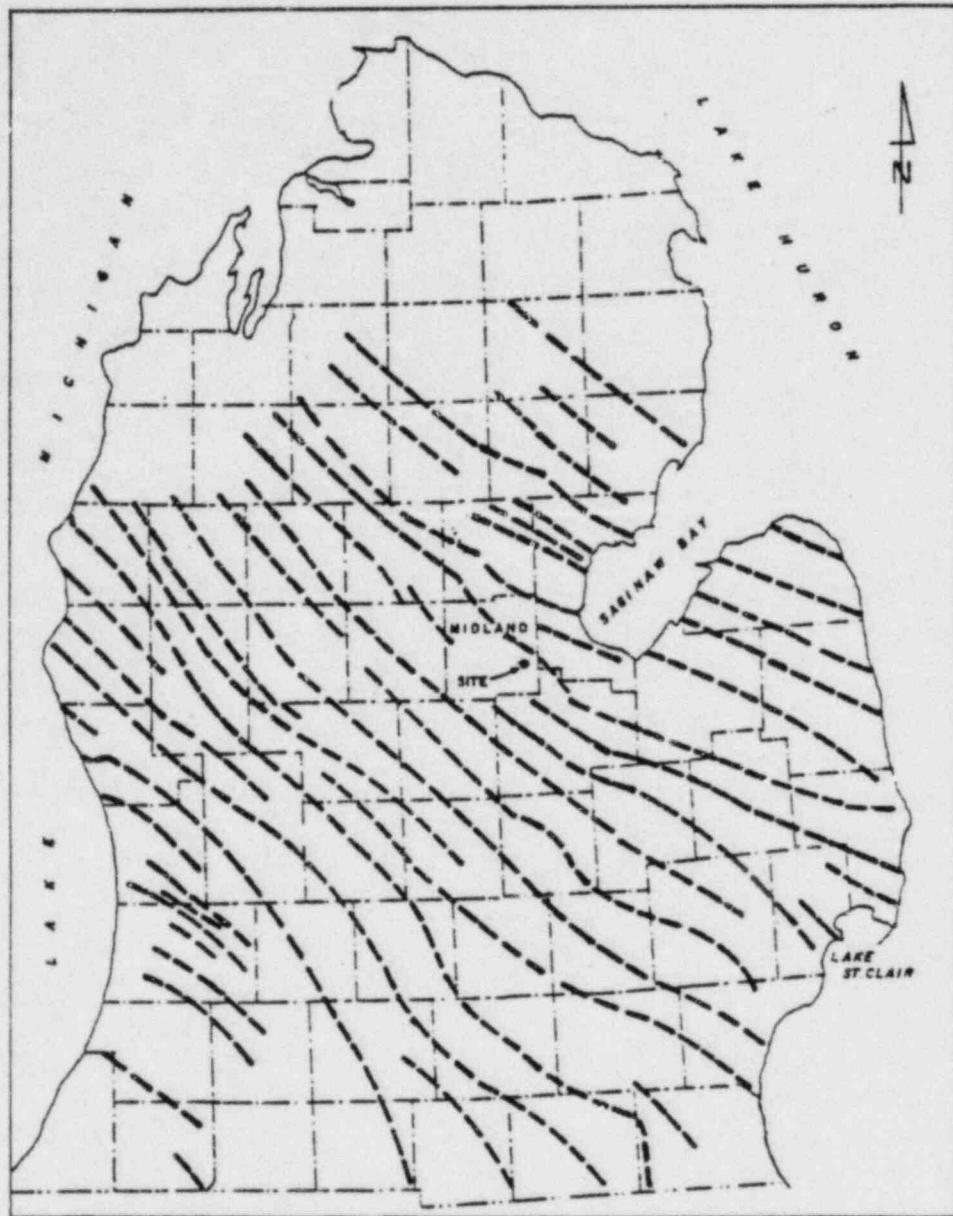
DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 for  
 MIDLAND PLANTS - UNITS 1B2  
 for  
 CONSUMERS POWER COMPANY

STUDY AREAS INVESTIGATED  
 IN PLATES 1, 2, 3, and 4

WESTON GEOPHYSICAL CORP.      FIGURE 8







0 10 20 30 40 50 Miles

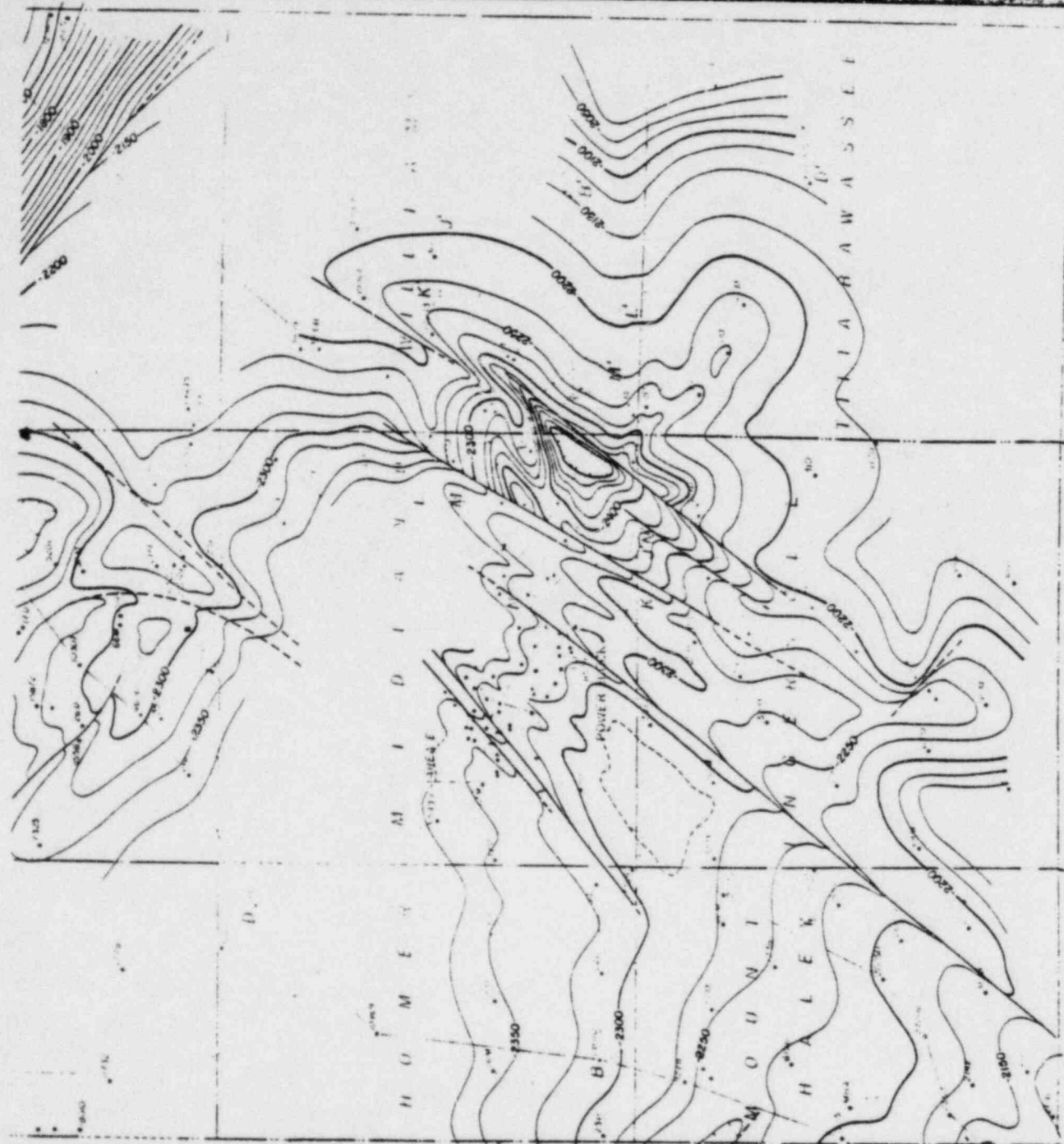
NOTE:  
 MAP TAKEN FROM CONSUMERS POWER  
 COMPANY, MIDLAND PLANT UNITS 1 & 2  
 FINAL SAFETY ANALYSIS REPORT  
 FIGURE 2.5-7, (REVISION 1, 11/77).

DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 MIDLAND PLANT - UNITS 1 & 2  
 for  
 CONSUMERS POWER COMPANY

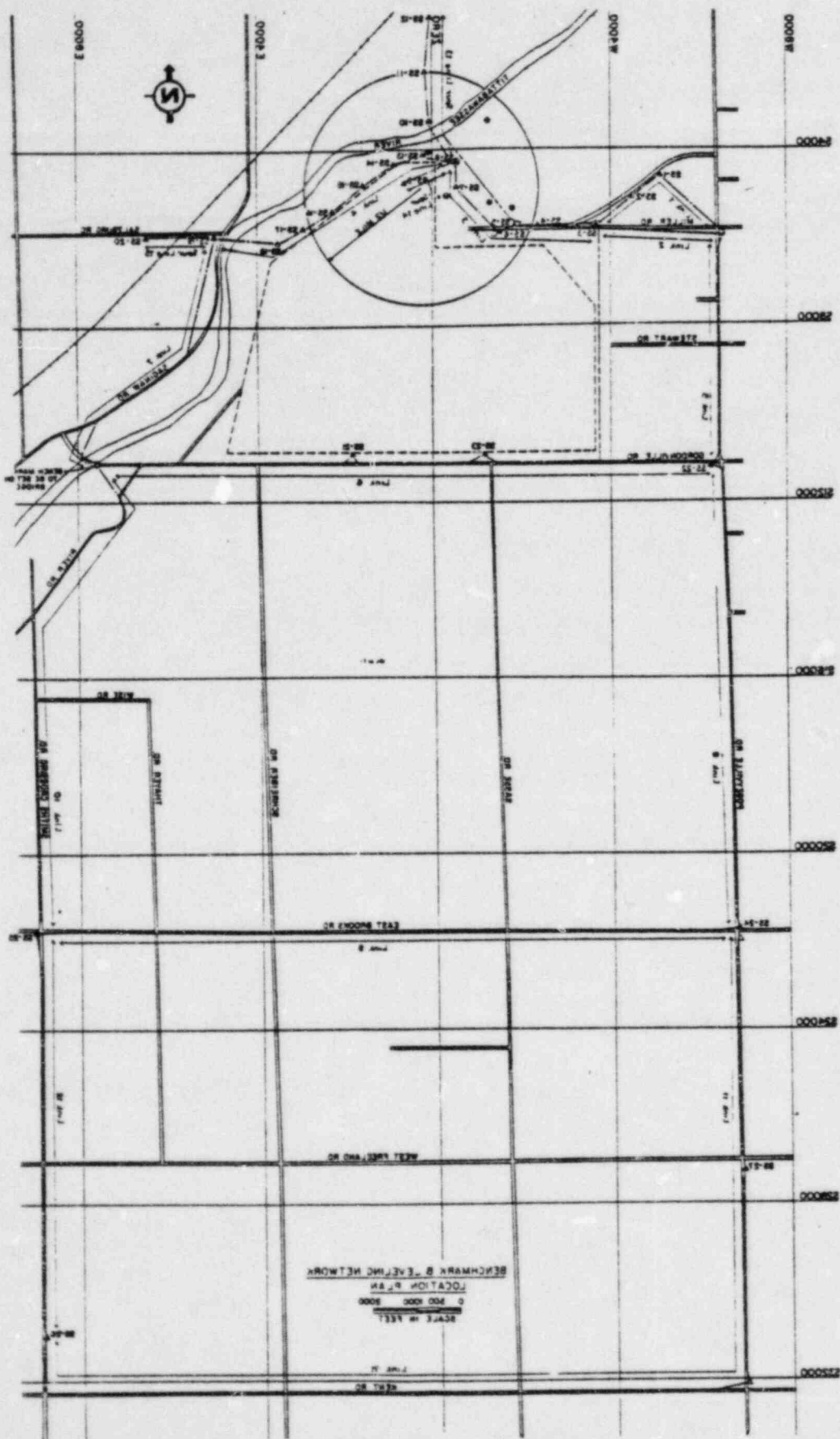
TREND OF ANTICLINAL FOLDING

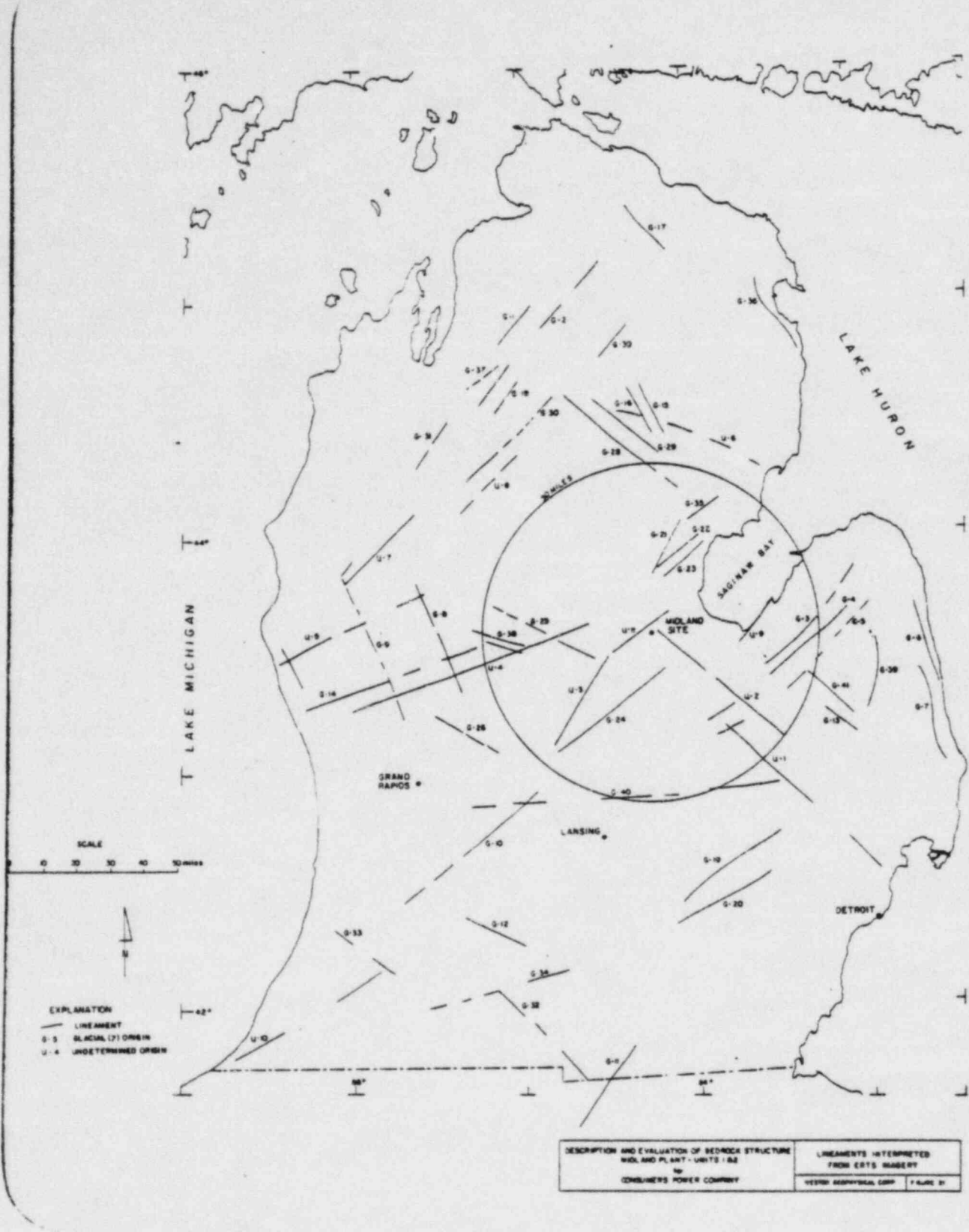
WESTON GEOPHYSICAL CORP

FIGURE 4









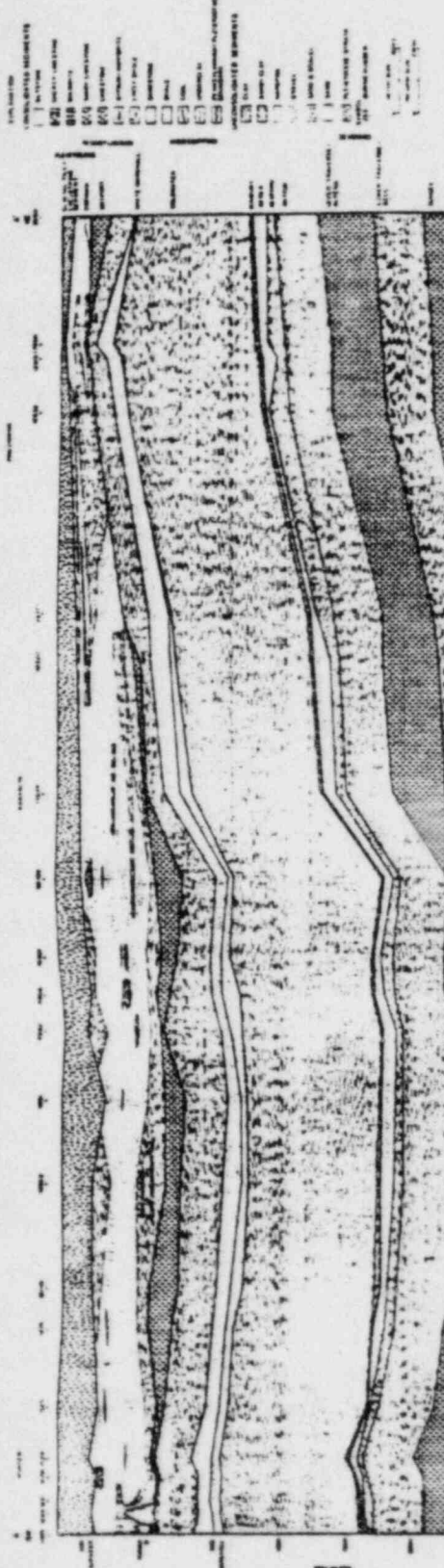
EXPLANATION  
 — LINEAMENT  
 S-5 GLACIAL (?) ORIGIN  
 U-4 UNDETERMINED ORIGIN

DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE MIDLAND PLANT - UNITS 1 & 2 FOR CONSUMERS POWER COMPANY	LINEAMENTS INTERPRETED FROM ERIS MAGNETY
	WESTON GEOLOGICAL CORP
	PLATE 21





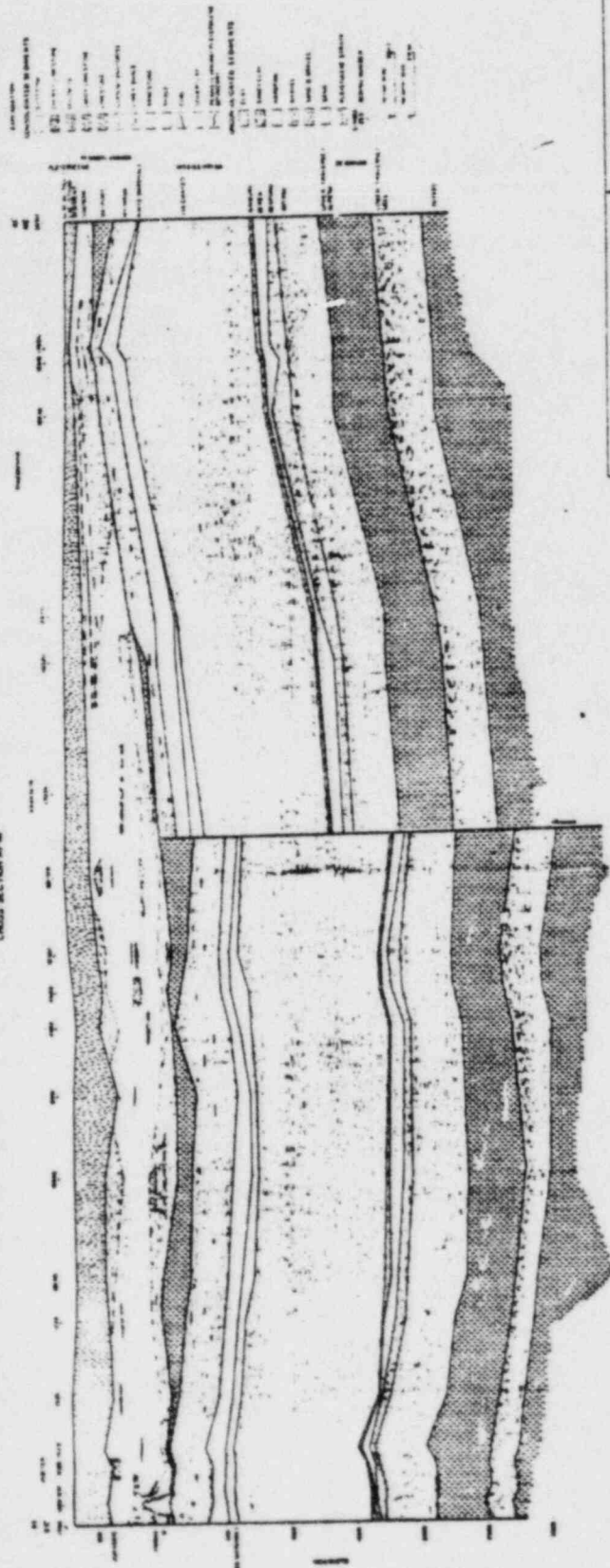
CROSS SECTION A-A'



DESCRIPTION AND EVALUATION OF BEARING STRUCTURES  
 FOR  
 MIDLAND PLANT - UNIT 1182  
 FOR  
 OIL-BURNING POWER COMPANY

CROSS SECTION A-A'  
 SECTION HORIZONTAL COMP. PAGE 10

CROSS SECTION A1-M'

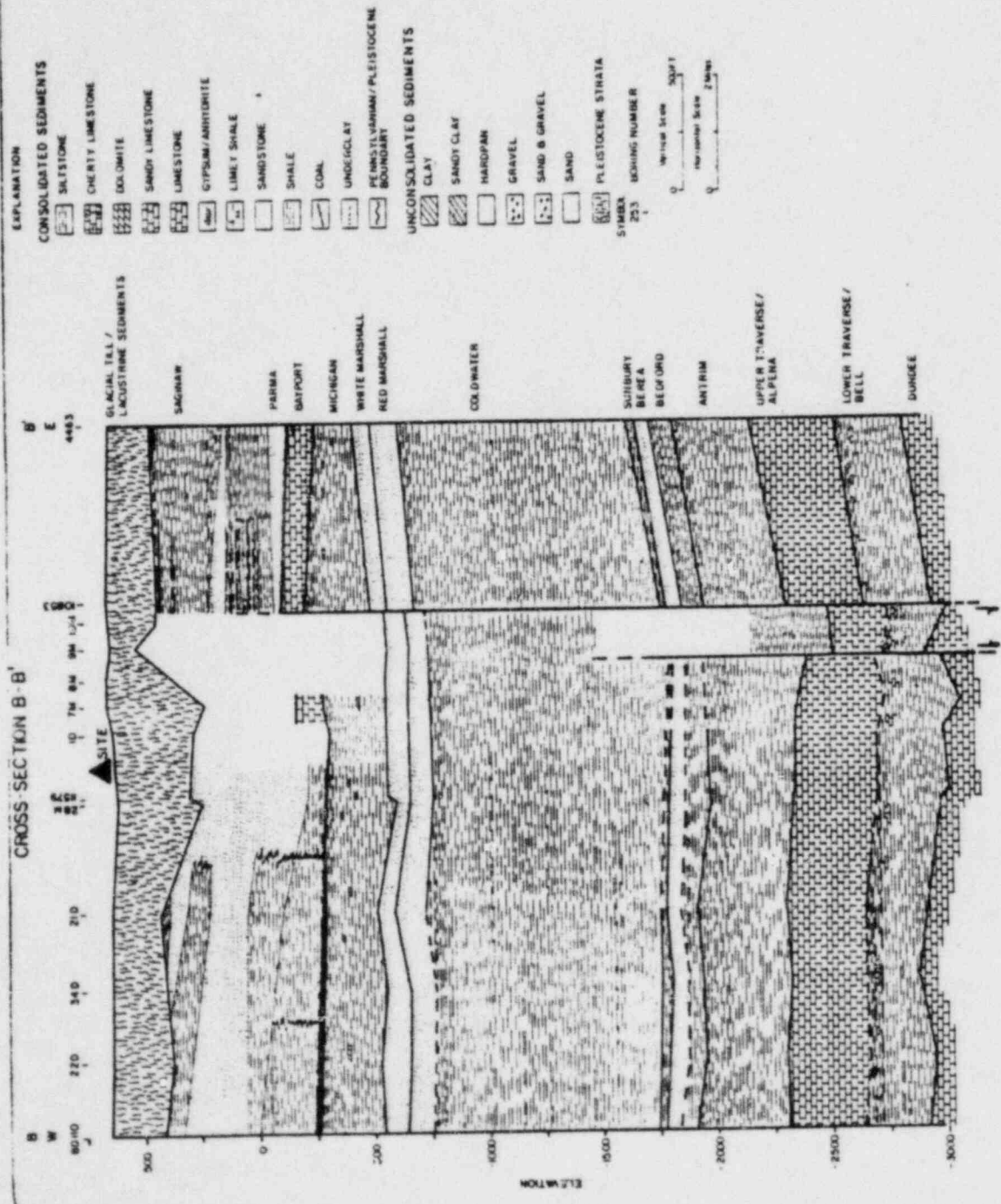


- LEGEND
- 1. SANDSTONE
  - 2. SHALE
  - 3. LIMESTONE
  - 4. GYPSUM
  - 5. CLAY
  - 6. SAND
  - 7. GRAVEL
  - 8. COBBLES
  - 9. CONGLOMERATE
  - 10. UNCONSOLIDATED SANDS
  - 11. UNCONSOLIDATED GRAVELS
  - 12. UNCONSOLIDATED CLAYS
  - 13. UNCONSOLIDATED SILTS
  - 14. UNCONSOLIDATED MUDS
  - 15. UNCONSOLIDATED SLUDGES
  - 16. UNCONSOLIDATED MUDS
  - 17. UNCONSOLIDATED SLUDGES
  - 18. UNCONSOLIDATED MUDS
  - 19. UNCONSOLIDATED SLUDGES
  - 20. UNCONSOLIDATED MUDS
  - 21. UNCONSOLIDATED SLUDGES
  - 22. UNCONSOLIDATED MUDS
  - 23. UNCONSOLIDATED SLUDGES
  - 24. UNCONSOLIDATED MUDS
  - 25. UNCONSOLIDATED SLUDGES
  - 26. UNCONSOLIDATED MUDS
  - 27. UNCONSOLIDATED SLUDGES
  - 28. UNCONSOLIDATED MUDS
  - 29. UNCONSOLIDATED SLUDGES
  - 30. UNCONSOLIDATED MUDS
  - 31. UNCONSOLIDATED SLUDGES
  - 32. UNCONSOLIDATED MUDS
  - 33. UNCONSOLIDATED SLUDGES
  - 34. UNCONSOLIDATED MUDS
  - 35. UNCONSOLIDATED SLUDGES
  - 36. UNCONSOLIDATED MUDS
  - 37. UNCONSOLIDATED SLUDGES
  - 38. UNCONSOLIDATED MUDS
  - 39. UNCONSOLIDATED SLUDGES
  - 40. UNCONSOLIDATED MUDS
  - 41. UNCONSOLIDATED SLUDGES
  - 42. UNCONSOLIDATED MUDS
  - 43. UNCONSOLIDATED SLUDGES
  - 44. UNCONSOLIDATED MUDS
  - 45. UNCONSOLIDATED SLUDGES
  - 46. UNCONSOLIDATED MUDS
  - 47. UNCONSOLIDATED SLUDGES
  - 48. UNCONSOLIDATED MUDS
  - 49. UNCONSOLIDATED SLUDGES
  - 50. UNCONSOLIDATED MUDS
  - 51. UNCONSOLIDATED SLUDGES
  - 52. UNCONSOLIDATED MUDS
  - 53. UNCONSOLIDATED SLUDGES
  - 54. UNCONSOLIDATED MUDS
  - 55. UNCONSOLIDATED SLUDGES
  - 56. UNCONSOLIDATED MUDS
  - 57. UNCONSOLIDATED SLUDGES
  - 58. UNCONSOLIDATED MUDS
  - 59. UNCONSOLIDATED SLUDGES
  - 60. UNCONSOLIDATED MUDS
  - 61. UNCONSOLIDATED SLUDGES
  - 62. UNCONSOLIDATED MUDS
  - 63. UNCONSOLIDATED SLUDGES
  - 64. UNCONSOLIDATED MUDS
  - 65. UNCONSOLIDATED SLUDGES
  - 66. UNCONSOLIDATED MUDS
  - 67. UNCONSOLIDATED SLUDGES
  - 68. UNCONSOLIDATED MUDS
  - 69. UNCONSOLIDATED SLUDGES
  - 70. UNCONSOLIDATED MUDS
  - 71. UNCONSOLIDATED SLUDGES
  - 72. UNCONSOLIDATED MUDS
  - 73. UNCONSOLIDATED SLUDGES
  - 74. UNCONSOLIDATED MUDS
  - 75. UNCONSOLIDATED SLUDGES
  - 76. UNCONSOLIDATED MUDS
  - 77. UNCONSOLIDATED SLUDGES
  - 78. UNCONSOLIDATED MUDS
  - 79. UNCONSOLIDATED SLUDGES
  - 80. UNCONSOLIDATED MUDS
  - 81. UNCONSOLIDATED SLUDGES
  - 82. UNCONSOLIDATED MUDS
  - 83. UNCONSOLIDATED SLUDGES
  - 84. UNCONSOLIDATED MUDS
  - 85. UNCONSOLIDATED SLUDGES
  - 86. UNCONSOLIDATED MUDS
  - 87. UNCONSOLIDATED SLUDGES
  - 88. UNCONSOLIDATED MUDS
  - 89. UNCONSOLIDATED SLUDGES
  - 90. UNCONSOLIDATED MUDS
  - 91. UNCONSOLIDATED SLUDGES
  - 92. UNCONSOLIDATED MUDS
  - 93. UNCONSOLIDATED SLUDGES
  - 94. UNCONSOLIDATED MUDS
  - 95. UNCONSOLIDATED SLUDGES
  - 96. UNCONSOLIDATED MUDS
  - 97. UNCONSOLIDATED SLUDGES
  - 98. UNCONSOLIDATED MUDS
  - 99. UNCONSOLIDATED SLUDGES
  - 100. UNCONSOLIDATED MUDS

DESCRIPTION AND EVALUATION OF JENKINS STRATIGRAPHY  
AND AND PAINT WHITE (S)  
BY  
GEOLOGICAL ENGINEERING COMPANY

CROSS SECTION A1-M'  
GEOLOGICAL ENGINEERING COMPANY





DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 MIDLAND PLANT - UNITS 1&2  
 for  
 CONSUMERS POWER COMPANY

CROSS SECTION B-B'

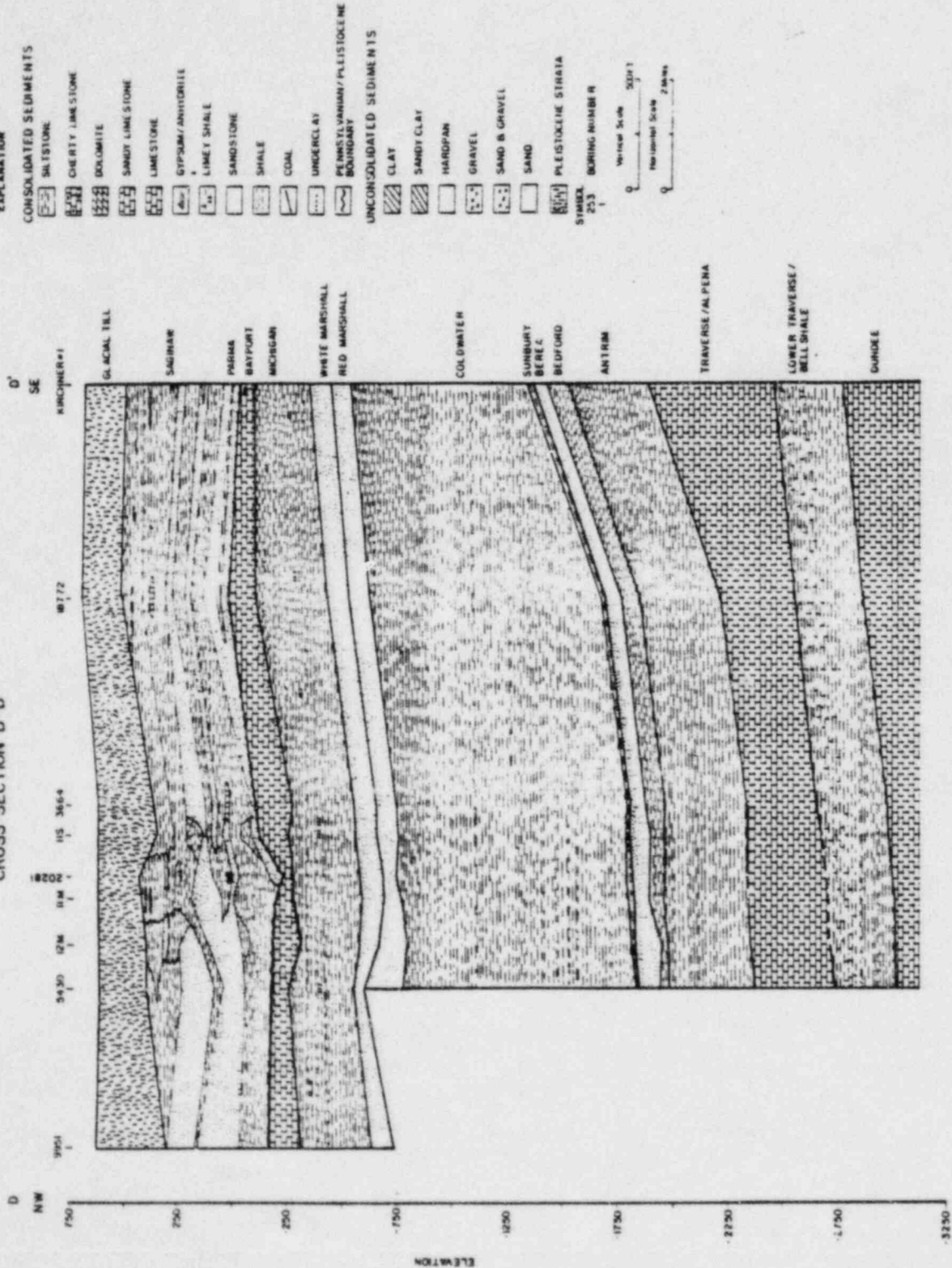
WESTON GEOPHYSICAL CORP

FIGURE 12

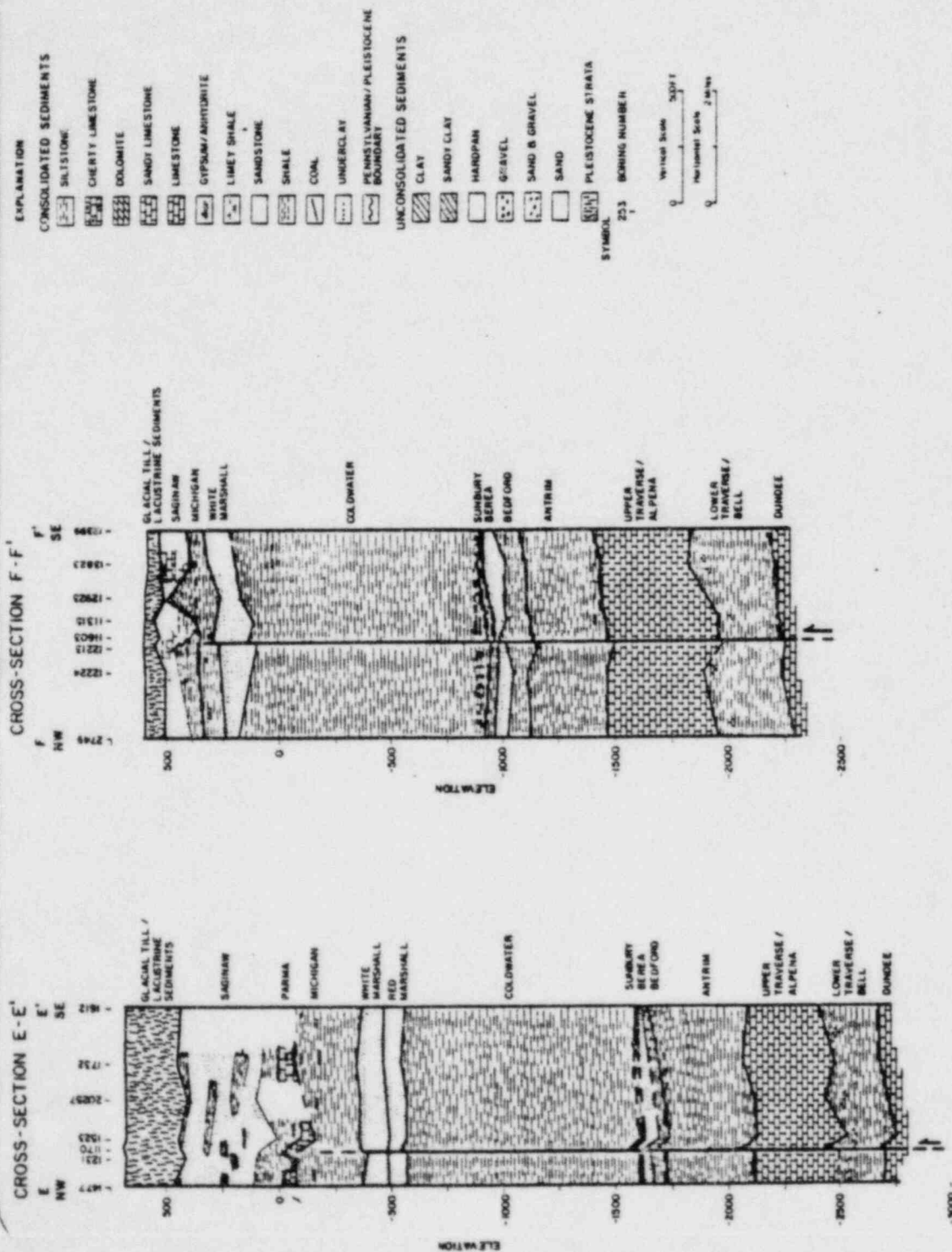




CROSS SECTION D-D'



DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 MIDLAND PLANT - UNITS 1 & 2  
 for  
 CROSS SECTION D-D'

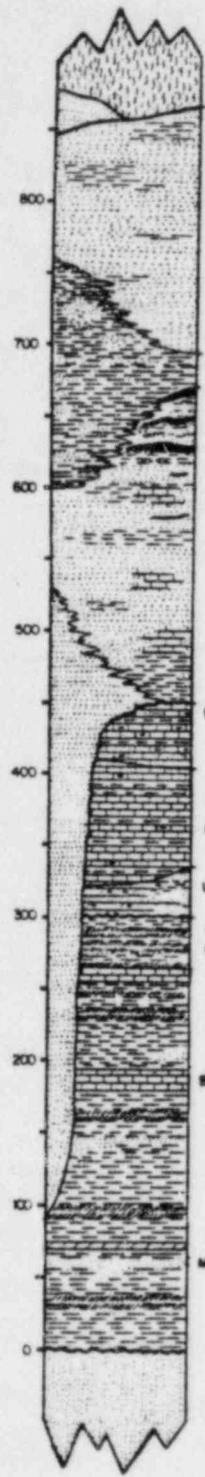


DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 for  
 MIDLAND PLANT - UNITS 1 & 2  
 CONSUMERS POWER COMPANY

CROSS SECTION E-E' and F-F'  
 WESTON GEOPHYSICAL CORP  
 FIGURE 15

A. 1000' - 1000' MISSISSIPPIAN  
 1000' - 1000' MISSISSIPPIAN  
 1000' - 1000' MISSISSIPPIAN  
 1000' - 1000' MISSISSIPPIAN  
 1000' - 1000' MISSISSIPPIAN

PERIOD	EARLY MISSISSIPPIAN	LATE MISSISSIPPIAN	EARLY PENNSYLVANIAN	QUATERNARY
	OSAGEAN			MERAMECIAN
SERIES			POTTSVILLE	PLEISTOCENE
			SACINAW	
GROUP				
FORMATION	MARSHALL	MICHIGAN	BAYPORT	
		GRAND RAPIDS		



**UNIT C** Sandstone/Shale Ratio of 4:1 to 1:1  
 Base is the Brown Limestone

**UNIT B** Sandstone/shale Ratio of 1:4  
 Base is the Saginaw Coal or the base of the dark shale sequence. 20% micaceous.

**UNIT A** Sandstone/Shale Ratio of 4:1 to 1:1  
 Sandstones are beach and channel deposits. Shales are upland deposits and shall are localized lowlands or abandon channels. Some sandstone is a channel fill/beach deposit, white, and marine.

**UNIT C** Limestone: gray to dark gray, micritic, interbedded with brown to light brown dolomite grading into light brown to buff limy dolomite or dolomite micrite. Lenses of quartzite sandstone that are friable and cemented with calcite, gypsum or dolomite. Thin beds of gray to greenish gray and brownish red shale are also present. Chert is found as nodules or pebbles. Thickness is 0 to 50 feet.

**UNIT B** Limestone: sandy grayish brown to tan with thin beds of gray to dark gray shale. Less chert is present than in units A and C. Clauconitic. Thickness is 15 to 70 feet.

**UNIT A** Dolomite: brown to light brown interbedded with grayish white quartzite sandstones (0 to 30 feet thick) and gray to dark gray or greenish gray thin beds of shale. Chert nodules. Dolomite in some areas replaced by a medium to fine grained sandstone, siltstone and blue gray silty clay. Thickness is 10 to 30 feet.

**TRIPLE GYPSUM**

**BROWN LIMESTONE**

**MICHIGAN STRAY**

VERTICAL SCALE  
 0 50 100 FT





Thickness of lower shale and area extent of coal beds of Saginaw Formation



Thickness of main coal unit of Saginaw Formation.



Thickness of upper shale unit overlying the main coal unit of Saginaw Formation



EXPLANATION

—20— Line of equal thickness of lower shale. Interval is 5 meters.

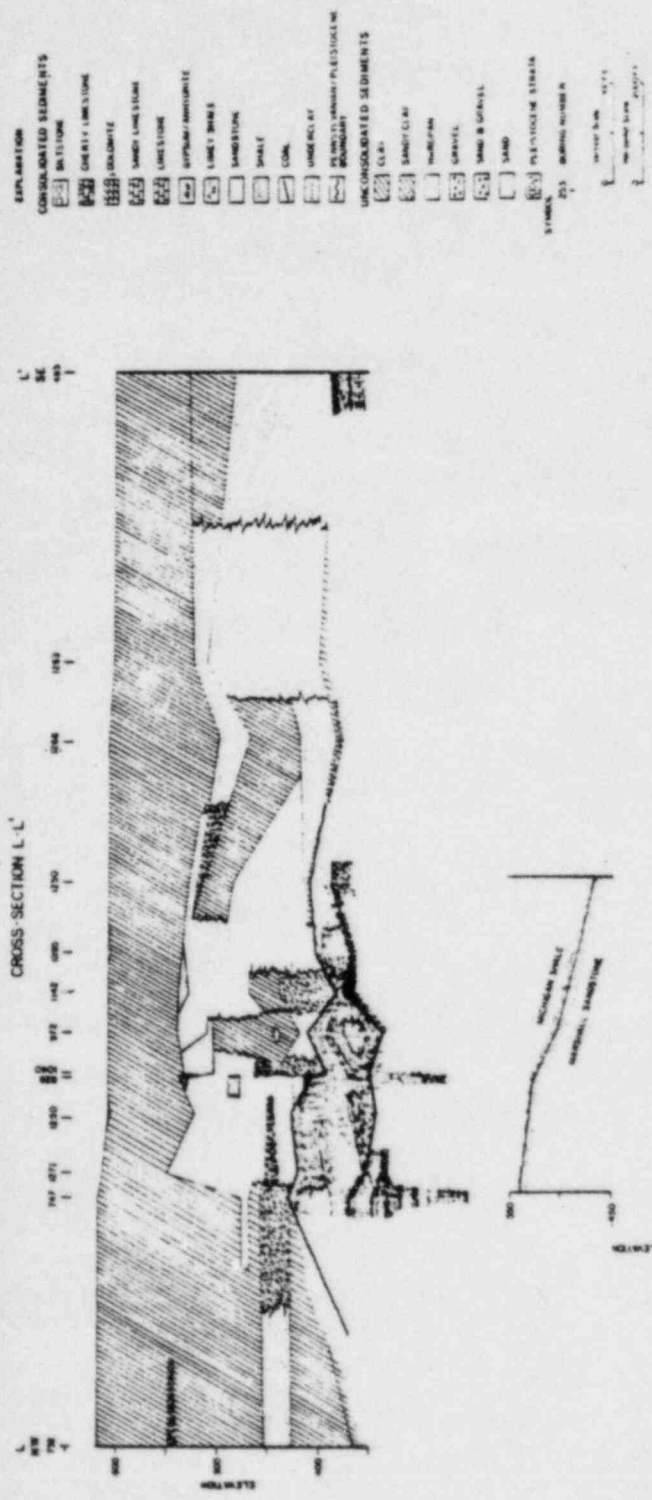
☐ Areal extent of coal beds.



DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE MIDLAND PLANT - UNITS 182 for CONSUMERS POWER COMPANY	MAIN COAL THICKNESS MAP, LOWER SHALE, AND UPPER SHALE STRUCTURE CONTOUR MAP WESTON SCIENTIFIC CORP. FIGURE 7
--	--







**DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 MIDLAND PLANT - UNITS 1 & 2  
 for  
 CONSUMERS POWER COMPANY**

**CROSS SECTION L-L'**

**WESTON GEOPHYSICAL CORP**

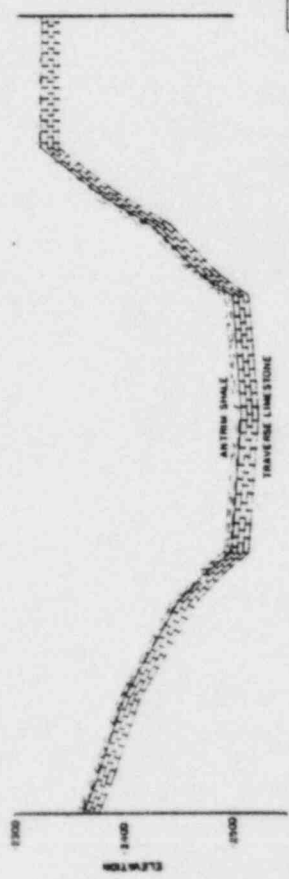
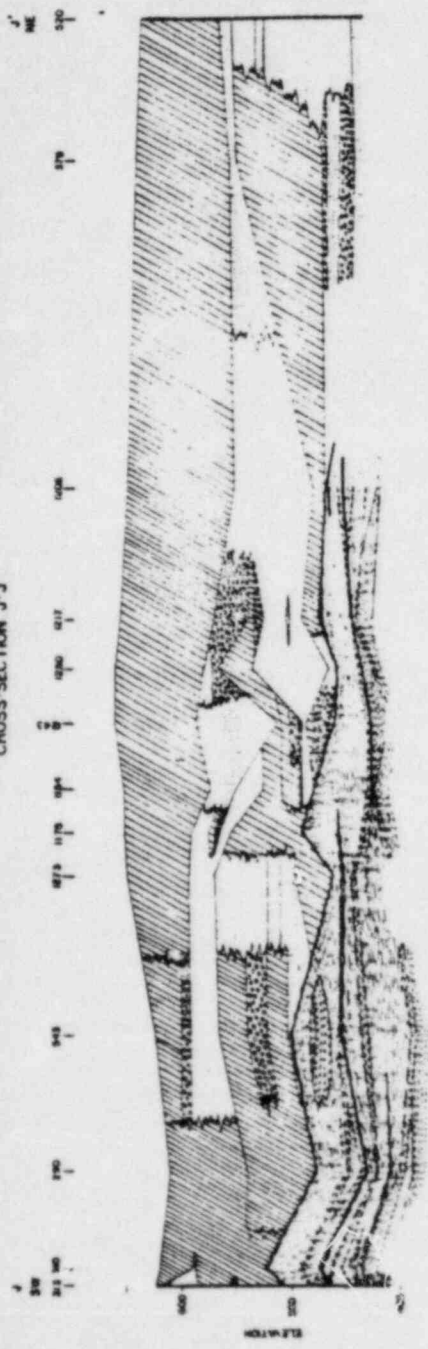
**FIGURE 10**



CROSS SECTION J-J'

EXPLANATION

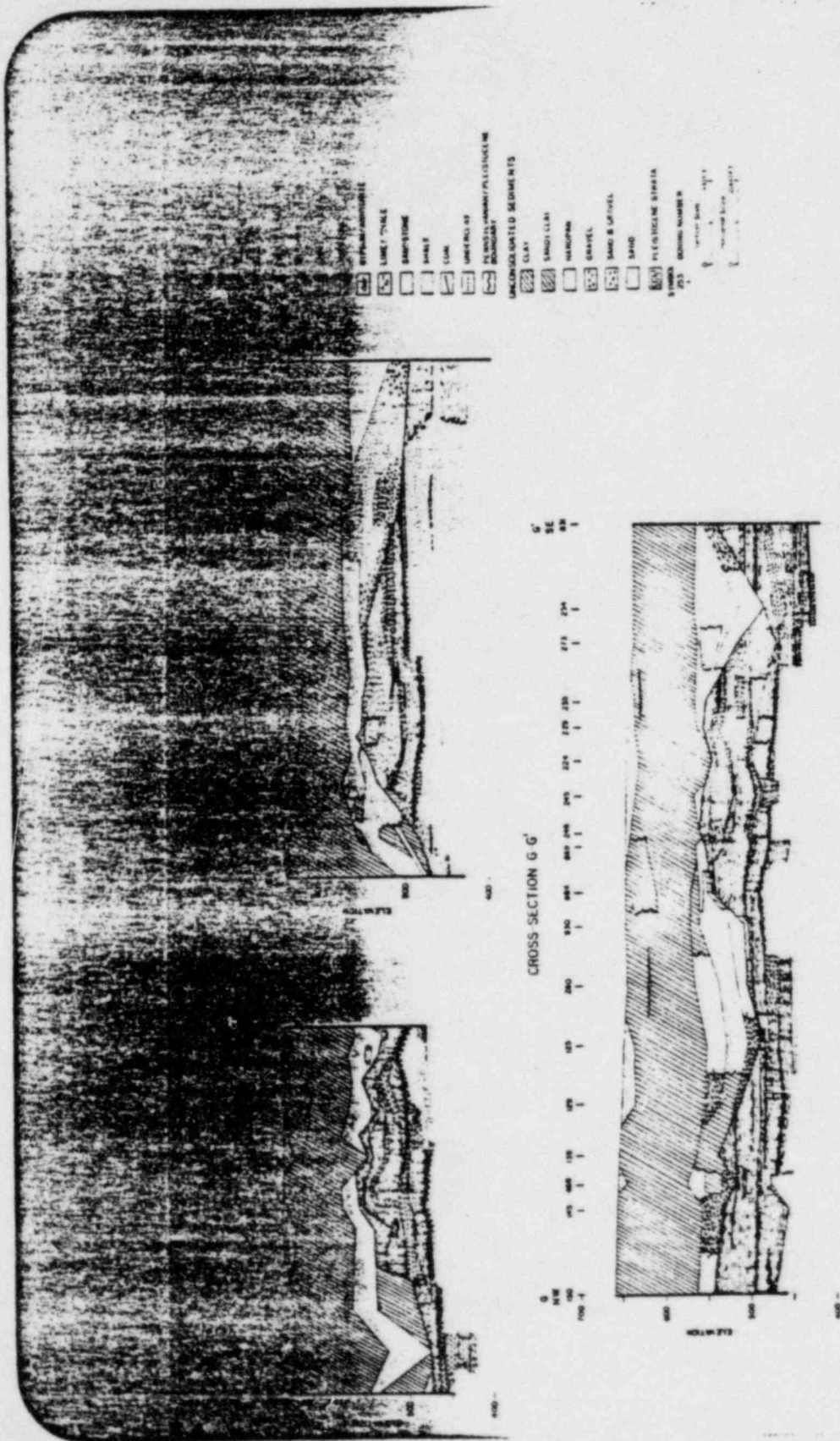
- CONSOLIDATED SEDIMENTS
- SILTSTONE
  - OREBIT LIMESTONE
  - ▨ CALCINITE
  - ▧ SANDY LIMESTONE
  - ▩ LIMESTONE
  - UPPER/SHIVERTON
  - LIMESTONE
  - ▬ SANDSTONE
  - ▭ SHALE
  - ▮ CLAY
  - ▯ UNLITHIFIED
  - ▰ UNLITHIFIED/PLEISTOCENE
  - ▱ UNLITHIFIED
- UNCONSOLIDATED SEDIMENTS
- ▧ CLAY
  - ▨ SANDY CLAY
  - ▩ SAND
  - GRAVEL
  - SAND & GRAVEL
  - ▬ SAND
  - ▭ PLEISTOCENE STRATA
- SYMBOLS
- BENCH NUMBER
  -
- Scale: 1" = 100 FT



DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
MIDLAND PLANT - UNITS 1 & 2  
for  
CONSUMERS POWER COMPANY

CROSS SECTION J-J'  
WESTON GEOPHYSICAL CORP  
FIGURE 17



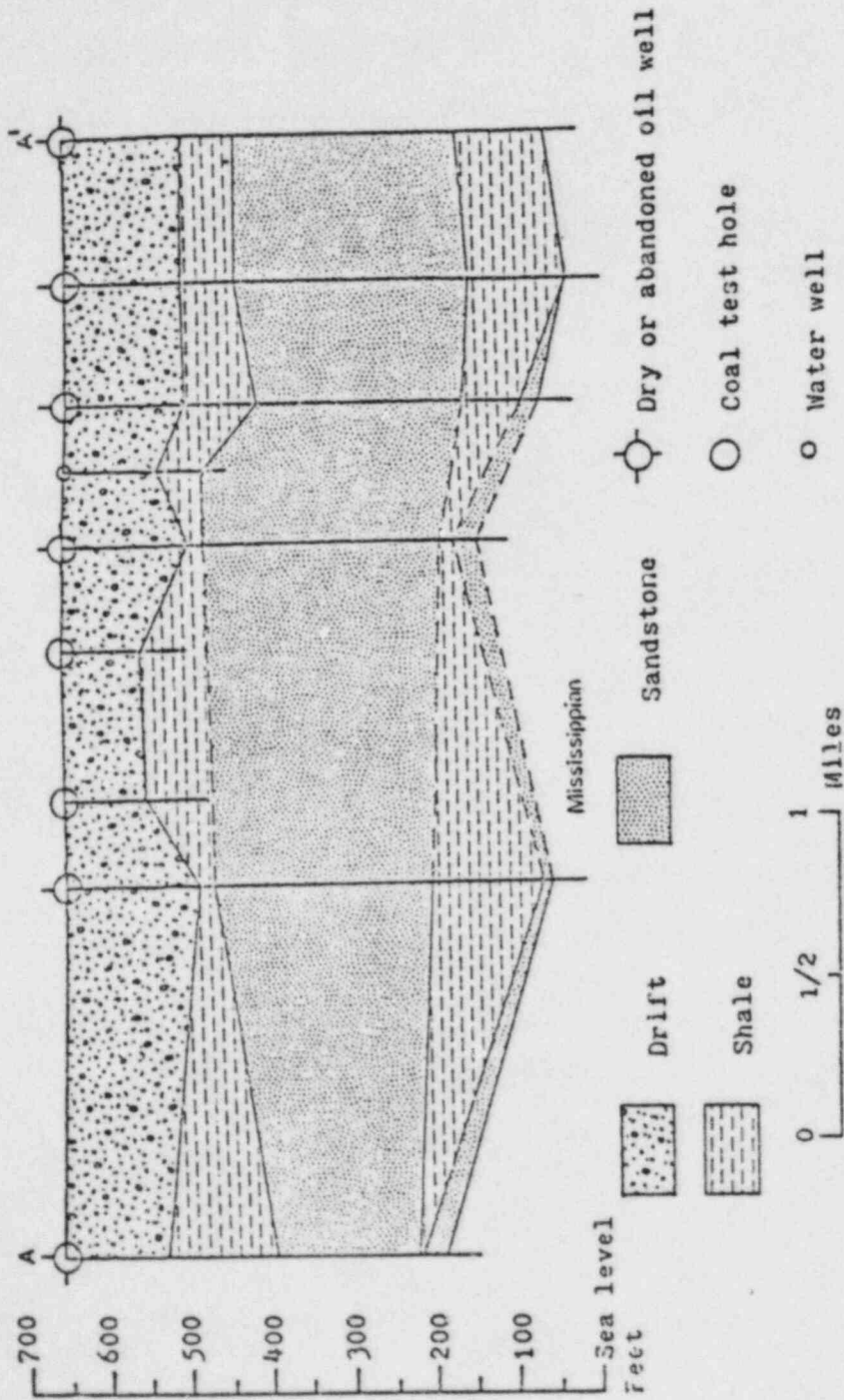


DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE  
 MIDLAND PLANT - UNITS 1 & 2  
 for  
 CONSUMERS POWER COMPANY

CROSS SECTION G-G', H-H', and I-I'

WESTON GEOPHYSICAL CORP. FIGURE 10





Cross Section C-C' through Dry or Abandoned Oil Wells

DESCRIPTION AND EVALUATION OF BEDROCK STRUCTURE MIDLAND PLANT - UNITS 1&2 for CONSUMERS POWER COMPANY		GARFIELD CROSS SECTION
		WESTON GEOPHYSICAL CORP
		FIGURE 8

### ENCLOSURE 3

It is felt that evidence for a pre-Early Pennsylvanian age for the youngest displacement along faults identified in Devonian and Mississippian strata has not been concluded from this presentation. The following questions and requests for additional information should help the staff make its decision as to the validity of this interpretation.

- 1) Can it be shown, by use of locally continuous beds or coal seams, that the Pennsylvanian Saginaw Formation has not suffered faulting over those fault traces identified from structure contour maps of the Dundee Formation, Traverse Group, or Marshall Formation?
- 2) In cross-section E-E' (Figure 15), which traverses the southeast corner of Porter township, 12 miles southwest of the plant site, a vertical fault is interpreted as extending from below the top of the Dundee Formation upwards into the Michigan Formation. Give a reason to why this fault could not be interpreted as extending vertically upward to cause the observed flexure in the Bayport limestone (labeled Parma sandstone) and the offset of the thin shale unit within the Pennsylvania Saginaw Formation.
- 3) Reprocess the data presented in your cross-sections by projecting critical stratigraphic horizons from other close drill-holes into the plane of the cross-section and by incorporating structures delineated in structure contour maps.
- 4) Supply the seismic reflection line available for an east-west traverse south of the plant site. Also provide an interpretation of what structural information can be obtained from this reflection line and how such structures relate to or do not show geologic data previously presented.
- 5) Use whatever "reliable" water well data is available to formulate cross-sections over areas containing the identified Paleozoic faults to show that locally continuous beds in Pennsylvanian strata are not similarly displaced by these faults. Again, incorporate and project whatever bore hole data you can to present all your geologic data in a consistent and coherent fashion.



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

JUN 3 6 1980

27/06

Docket Nos.: 50-329/330

Mr. J. W. Cook  
Vice President  
Consumers Power Company  
1945 West Parnall Road  
Jackson, Michigan 49201

Dear Mr. Cook:

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION REGARDING PLANT FILL

We have reviewed your responses to our requests of November 19, 1979 regarding the quality of plant fill, effects and remedial actions resulting therefrom. Our review is being performed with the assistance of the U. S. Army Corps of Engineers. We and they find that the results of additional explorations and laboratory testing identified in Enclosure 1 (Request 37) are needed to support required geotechnical engineering studies. Details on the extent of these studies will be provided shortly by separate correspondence. Enclosure 1 is provided in order that you may initiate planning of the required explorations in a timely manner. However we suggest you await receipt of these further details prior to physically beginning the explorations. Enclosure 1 (Footnote 4 of Table 37-1) also includes requests for advanced notification of the availability of certain samples.

As noted in our Request 37 of Enclosure 1, your position in previous responses to Requests 5 and 35 not to complete additional explorations, sampling and laboratory testing after preloading continues to be unacceptable to us. So that you might better understand our position, we offer the following observations:

- (1) The preload program as completed on the heterogeneous materials which were placed for the purpose of structural fill is not necessarily an improvement, nor does it necessarily produce foundation soils of more uniform engineering properties, compared to the soil performance which would have resulted if the material had been properly compacted to the original requirements established in the Midland PSAR.
- (2) To develop reasonable assurance of plant safety, the required studies are needed to serve as an independent verification of the predictions of future settlements and the conclusions of the preload program.

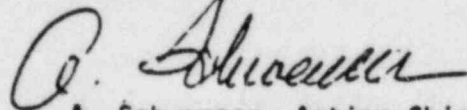
JUN 30 1930

- (3) The required studies will permit an estimate of total and differential settlement for involved structures and systems following drawdown with the proposed permanent dewatering system.
- (4) Certain aspects of the preload program, such as the complication introduced by the simultaneous raising of the cooling pond reservoir, present difficulties in our full acceptance of your conclusion of the preload program.

Enclosure 1 also includes other requests for information which we and the U. S. Army Corps of Engineers need to continue our review.

We would appreciate your response to Enclosure 1 at your earliest opportunity. A partial reply based upon data already available should be submitted rather than to await the results of new borings and tests contained in parts of Enclosure 1. Should you require clarifications of these requests and positions, please contact us.

Sincerely,



A. Schwencer, Acting Chief  
Licensing Branch No. 3  
Division of Licensing

Enclosure:  
As stated

cc: See next page



cc: Michael I. Miller, Esq.  
Isham, Lincoln & Beale  
Suite 4200  
1 First National Plaza  
Chicago, Illinois 60603

Judd L. Bacon, Esq.  
Managing Attorney  
Consumers Power Company  
212 West Michigan Avenue  
Jackson, Michigan 49201

Mr. Paul A. Perry, Secretary  
Consumers Power Company  
212 West Michigan Avenue  
Jackson, Michigan 49201

Myron M. Cherry, Esq.  
1 IBM Plaza  
Chicago, Illinois 60611

Ms. Mary Sinclair  
5711 Summerset Drive  
Midland, Michigan 48640

Frank J. Kelley, Esq.  
Attorney General  
State of Michigan Environmental  
Protection Division  
720 Law Building  
Lansing, Michigan 48913

Mr. Wendell Marshall  
Route 10  
Midland, Michigan 48640

Grant J. Merritt, Esq.  
Thompson, Nielsen, Klaverkamp & James  
4444 IDS Center  
80 South Eighth Street  
Minneapolis, Minnesota 55402

cc: Commander, Naval Surface Weapons Center  
ATTN: P. C. Huang  
G-402  
White Oak  
Silver Spring, Maryland 20910

Mr. L. J. Auge, Manager  
Facility Design Engineering  
Energy Technology Engineering Center  
P. O. Box 1449  
Canoga, Park, California 91304

Mr. William Lawhead  
U. S. Corps of Engineers  
NCEED - T  
7th Floor  
477 Michigan Avenue  
Detroit, Michigan 48226

ADDITIONAL REQUESTS REGARDING PLANT FILL

36. We have reviewed your response to Request 24 and find that information from additional boring logs is needed.

Provide the boring logs for the following explorations:

- a. Pull down holes PD-1 thru PD-27 (35 holes that include 8A, 20A, 20B, 20C, 15A, 15B, 15C and 27A)
- b. LOW-1 thru LOW-14 (14 holes)
- c. TW-1 thru TW-5 and PZ-1 thru PZ-48 (55 holes)
- d. OW-1 thru OW-5 (5 holes)
- e. TEW-1 thru TEW-8 (8 holes)

The logs should include date and method of drilling, the type and location of samples attempted. Also provide the locations, boring logs and available test data of any exploration completed in 1979 and 1980 which has not yet been submitted.

37. (RSP) Your position in previous responses to Requests 5 and 35 not to complete additional explorations, sampling and laboratory testing following the preload program continues to be unacceptable. We require that you complete as a minimum, the exploration and testing program indicated by Table 37-1.

38. Discuss the foundation design for any seismic safety-related piping and conduit connected to or located under the Radwaste Building and Turbine Building where piping and conduit have been placed on plant fill.

Table 37-1

Request for Additional Explorations, Sampling and Testing

<u>Location</u> <sup>1/</sup>	<u>Depth</u> <sup>2/</sup>	<u>Sampling</u> <sup>3/</sup>	<u>Lab Testing</u> <sup>4/</sup>	<u>Anticipated Geotechnical Engineering Studies to be Required</u> <sup>6/</sup>
Diesel Generator Building (6 holes along perimeter)	Thru fill and a minimum of 5' into natural glacial till soils	Classify samples according to Unified Soils Classification System	For cohesive soils C-D (Consolidated-Drained) C-U (Consolidated-Undrained) Consolidation <sup>5/</sup>  For sands Drained Direct Shear on both loose & dense specimens  Relative Density	Bearing Capacity Settlement Piping Distortion
Auxiliary Building (2 holes)	Same as above	Same as above	Same as above except add U-U (Unconsolidated-Undrained for cohesive soils	Caisson Foundation Design (Vertical and Lateral Load Support)
Service Water Pump (1 hole) Structure and Retaining Walls (2 holes)	Same as above	Same as above	Same as above except consolidation testing would be limited to samples in retaining wall foundations.	Pile Foundation Design (Vertical and Lateral Load Support) Retaining Wall Stability & Settlement.
Cooling Pond Embankments (7 holes along perimeter)	Extend thru fill and a minimum of 5' into natural residual soils except hole no. 5 which should extend to bottom elevation of cooling pond.	Same as above	For cohesive soils C-D (Consolidated-Drained) C-U (Consolidated-Undrained) U-U (Unconsolidated-Undrained)	Slope Stability Fill compaction adequacy

NOTES: See page 2



Table 37-1 (continued)

## NOTES:

- 1/ See attached Figs. 37-1 and 37-2 for approximate boring location. Holes to be accurately located in the field to avoid obstructions, underground piping and conduits and slurry trench area.
- 2/ No boring is to be terminated in loose or soft soils.
- 3/ Continuous split spoon sampling using SPT is required. Holes are to be held open using either casing or hollow stem auger. Additional borings to obtain representative undisturbed samples for detailed laboratory testing should be located at the completion and elevation of the split spoon sampling program. The groundwater level should be recorded at the completion of drilling in all borings once the level has stabilized.
- 4/ Normal classification (e.g., gradation, Atterberg Limits) unit weight and moisture content testing to be performed on representative samples from each significant foundation layer. This column pertains to lab testing in addition to the above mentioned tests. It is requested that at least one week notice be provided to the NRC before opening undisturbed samples to permit on site visual observation by Corps of Engineer representative.
- 5/ The maximum load should be great enough to establish the straight-line portion of the void ratio-pressure curve.
- 6/ Details on the extent of geotechnical engineering studies to be completed using the results of field and lab testing work will be provided in a separate letter.



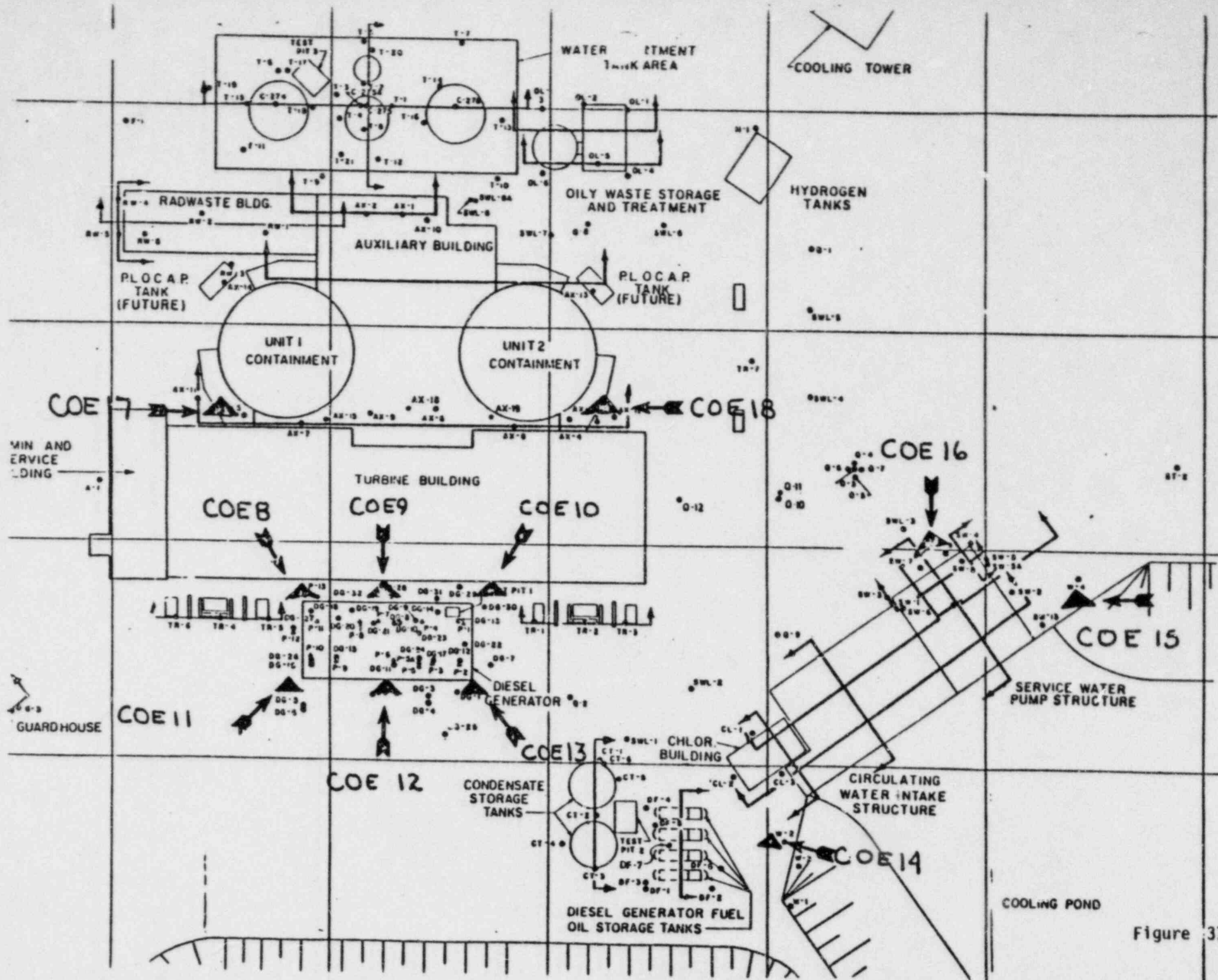
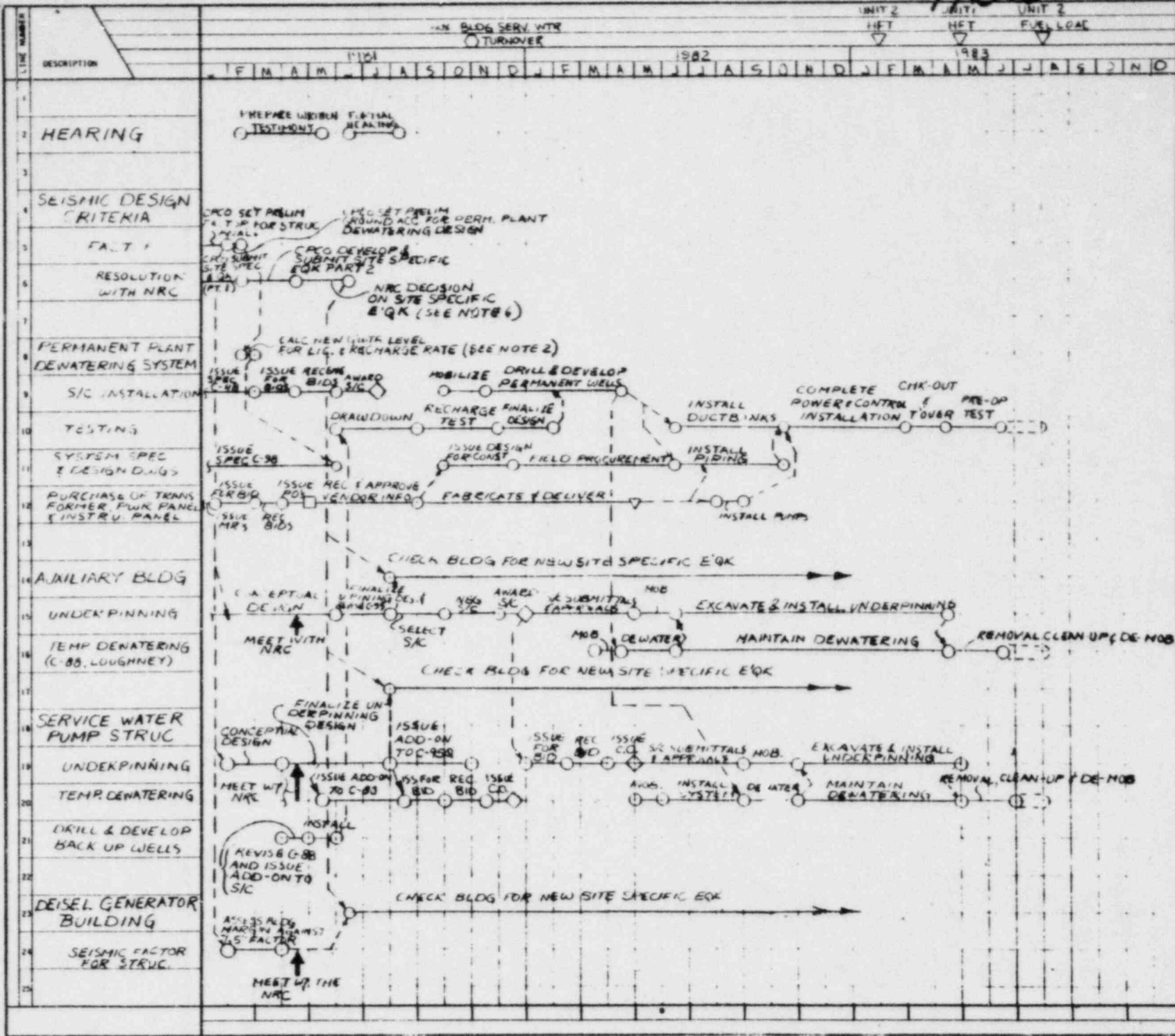


Figure 37-2



**NOTES**

**ASSUMPTIONS & BASIS**

1. "1.5" FACTOR FOR STRUC. ANALYSIS OF PORTIONS OF BLDGS AFFECTED BY SOILS REMEDIAL WORK FOR S.S.E. IS BELIEVED TO BE MORE CONSERVATIVE THAN EFFECT OF SITE SPECIFIC E'QK CURRENTLY BEING RESOLVED WITH THE NRC
2. ASSUMES REDUCED RECHARGE RATE TIME ASSOCIATED WITH SITE SPECIFIC E'QK CURRENTLY BEING RESOLVED WITH THE NRC IS ACCEPTABLE, I.E. NO SUBSTANTIVE CHANGES TO THE CURRENT PERMANENT PLANT DEWATERING LAYOUT)
3. NO TEMP DEWATERING CAN BE PERFORMED DURING DRILLING AND DEVELOPMENT OF THE PERMANENT WELLS
4. PREFERABLE TO HAVE COOLING POND FULL DURING DRILLING AND DEVELOPMENT OF PERMANENT WELLS
5. NO RECHARGE RATE TEST IS REQ'D TO PRE-OP TEST THE PERMANENT DEWATERING SYSTEM
6. DATE FOR RESOLUTION OF SITE SPECIFIC E'QK IS ARBITRARILY CHOSEN TO COINCIDE WITH START OF HEARING.

BECHTEL  
 HIGHLAND UNIT 1 & 2  
 COMPASSION POWER COMPANY  
 SOILS SETTLEMENT LOGIC STUDY

1982 PRELIM A

SHEET 1 OF 2



RECEIPTOR

1 BORATED WTR STORAGE TANK

2 ORIGINAL PROOF LOAD

3 REMEDIAL MEAS.

4 SEISMIC FACTOR

5 UNDERGROUND UTILITIES

6 SERVICE WATER

7 REPLACE PIPING MATLS (IF REQ'D)

8 ALLOT BORINGS & TESTING

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

