

Appendix A

NOTICE OF VIOLATION

Consumers Power
Company

Docket No. 50-329
Docket No. 50-330

Based on the results of an NRC investigation conducted on December 11-13, 18-20, 1978, and January 4-5, 9-11, 22-25, 1979, it appears that certain of your activities were not conducted in full compliance with NRC requirements as noted below. These items are infractions.

- 1.. 10 CFR 50, Appendix B, Criterion III requires, in part, that measures shall be established and executed to assure that regulatory requirements and the design basis as specified in the license application for structures are correctly translated into specifications, drawings, procedures and instructions. Also, it provides that measures shall be established for the identification and control of design interfaces and for coordinates among participating design organizations.

--- CPCo Topical Report CPC-1-A policy No. 3, Section 3.4 states, in part, "the assigned lead design group or organization (i.e., the NSSS supplier, A&E, supplier or CPCo) assure that designs and materials are suitable and that they comply with design criteria and regulatory requirements."

CPCo is committed to ANSI N45.2 (1971), Section 4.1, which states, in part, "measures shall be established and documented to assure that the applicable specified design requirements, such as a design basis, regulatory requirements . . . are correctly translated into specifications, drawings, procedures, or instructions."

Contrary to the above, measures did not assure that design basis were included in drawings and specifications nor did they provide for the identification and control of design interfaces. As a result, several inconsistencies were identified in the license application and in other design basis documents. Specific examples are set forth below:

- a. Construction Drawing C-45 (Class I fill material areas) specifies the foundation material for Class I structures to be Zone 2 material, defined as any material free of humus, organic or other deleterious material with no restrictions or gradation while FSAR Tables 2.5-9 and 2.5-14 indicate the foundation material for support of Class I structures to be controlled compacted cohesive (clay) material.

- b. The FSAR is internally inconsistent in that FSAR Figure 2.5-48 indicates settlement of the Diesel Generator Building to be on the order of 3" while FSAR Section 3.8.5.5 (structural acceptance criteria) indicates settlements on shallow spread footings founded on compacted fill to be on the order of 1/2" or less. The Diesel Generator Building is supported by a continuous shallow spread footing.
- c. The design settlement calculations for the diesel generator and borated water storage tanks were performed on the assumption of uniform mat foundations while these foundations were designed and constructed as spread footing foundations.
- d. The settlement calculations for the Diesel Generator Building indicate a load intensity of 3000 PSF while the FSAR, Figure 2.5-47, shows a load intensity of 4000 PSF, as actually constructed.
- e. The settlement calculations for the diesel generator building were based on an index of compressibility of the plant fill between elevations 603 and 634 of 0.001. These settlement

values were shown in FSAR Figure 2.5-48. However, FSAR, Table 2.5-16, indicates an index of compressibility of the same plant fill to be 0.003.

- f. PSAR, Amendment 3, indicated that if filling and backfilling operations are discontinued during periods of cold weather, all frozen soil would be removed or recompacted prior to the resumption of operations. Bechtel specification C-210 does not specifically include instructions for removal of frozen/thawed compacted material upon resumption of work after winter periods.
 - g. PSAR Amendment 3 indicates that cohesionless soil (sand) would be compacted to 85% relative density according to ASTM D-2049. However, Bechtel specification C-210, Section 13.7.2 required cohesionless soil to be compacted to not less than 80% relative density.
- 2. 10 CFR 50, Appendix B, Criterion V requires, in part, that activities affecting quality shall be prescribed and accomplished in accordance with documented instructions, procedures or drawings.

CPCo Topical Report CPC-1-A Policy No. 5, Section 1.0 states, in part, that, "Instructions for controlling and performing activities affecting quality of equipment or operation during design, construction and operations phase of the nuclear power plant such as procurement,

manufacturing, construction, installation, inspection, testing . . . are documented in instruction, procedures, specifications . . . these documents provide qualitative and quantitative acceptance criteria for determining important activities have been satisfactorily accomplished.

CPCo is committed to ANSI N45.2 (1971), Section 6 which states, in part, "activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures or drawings."

a. Contrary to the above, instructions provided to field construction for substituting lean concrete for Zone 2 material did not address the differing foundation properties which would result in differential settlement of the Diesel Generator Building.

b. Also, contrary to the above, certain activities were not accomplished according to instruction and procedures, in that:

(1) The compaction criteria used for fill material was 20,000 ft-lbs (Bechtel modified proctor test) rather than a

compactive energy of 56,000 ft-lbs as specified in Bechtel Specification C-210, Section 13.7.

(2) Soils activities were not accomplished under the continuous supervision of a qualified soils engineer who would perform in-place density tests in the compacted fill to verify that all materials are placed and compacted in accordance with specification criteria. This is required by Bechtel Specification C-501 as well as PSAR, Amendment 3 (Dames and Moore Report, page 16).

3. 10 CFR 50, Appendix B, Criterion X requires, in Part, that a program for inspection of activities affecting quality shall be established and executed to verify conformance with the documented instruction, procedures and drawings for accomplishing the activity.

CPCo Topical Report CPC-1-A Policy No. 10, Section 3.1, states, in part, that "work activities are accomplished according to approved procedures or instructions which include inspection hold points beyond which work does not proceed until the inspection is complete or written consent for bypassing the inspection has been received from the organization authorized to perform the inspections."

CPCo is committed to ANSI N45.2 (1971), which states, in part, "A program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance to the documented instructions, procedures, and drawings for accomplishing the activity."

Contrary to the above, Quality Control Instruction C-1.02 the program for inspection of compacted backfill issued on October 18, 1976, did not provide for inspection hold points to verify that soil work was satisfactorily accomplished according to documented instructions.

4. 10 CFR 50, Appendix B, Criterion XVI requires, in part, that measures shall be established to assure that conditions adverse to quality such as failures, deficiencies, defective material and nonconformances are promptly identified and corrected. In case of significant conditions adverse to quality, measures shall assure that corrective action is taken to preclude repetition.

CPCo Topical Report CPC-1-A Policy No. 16, Section 1.0 states, in part, "corrective action is that action taken to correct and preclude recurrence of significant conditions adverse to the quality of items or operations. Corrective action includes an evaluation of the

conditions that led to a nonconformance, that disposition of the nonconformance and completions of the actions necessary to prevent or reduce the possibility of recurrence."

Contrary to the above, measures did not assure that soils conditions of adverse quality were promptly corrected to preclude repetition.

For example:

- a. As of January 25, 1979, moisture control in fill material had not been established nor adequate direction given to implement this specification requirement. The finding that the field was not performing moisture control tests as required by specification C-210 was identified in Quality Action Request SD-40, dated July 22, 1977.
- b. Corrective action regarding nonconformance reports related to plant fill was insufficient or inadequate to preclude repetition as evidenced by repeated deviations from specification requirements. For example, nonconformance reports No. CPCo QF-29, QF-52, QF-68, QF-147, QF-174, QF-172 and QF-199 contain numerous examples of repeated nonconformances in the same areas of plant fill construction.

Consensus Ex # 301d
10/8/80 (HOOD)

Hood

8/17/80 2:00 Call from Barbara Stramin (Petitioner)

Ms Stramin called to request copies of reports referenced in para 4, App A of Dec. 6, 1979 order on CP modification/Spills matters. We also discussed where reference to subsistence from early brine extraction is located in PSAR, FSAR & SCR.

9/10/80 Prehearing on brine field today

10/2/80

Talked to Jerry Bittel (517) 373-3503 of the Michigan Dept of Natural Resources about their area of responsibility for the Dike in view of my concerns as to their integrity. He will call back early next week.

Dike Issue

Consumers Ex #24 I.C.
10/5/80 (HOOD)

D/HOOD

K.ve
Simpson

Meeting Notes 10/1/80

to brief R. V. Allen & J. Knight on results of additional borings
& info provided by CPCo by Vol. 8

J. Davis - It is questionable whether secondary consolidation
of DG fill has been achieved. Excess pore pressure
appears not to have dissipated. After surcharge
removed, piezometer level appears to be controlled
by pond level. Data COE requested will help resolve
this.

Boring data for DG Bldg is extrapolated by applicant from
BWST area. Not sufficient indicator of DG area.

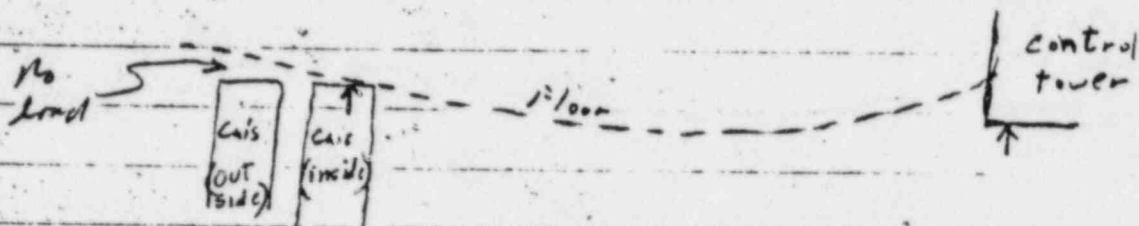
One boring used is a composite of 3 separate borings.
COE says this is an unwarranted practice.

H. King - If the caisson group load test should fail, action
necessary for further correction is prohibited.
What would you do then? Other alternatives foreclosed.

CPCo has not provided design info of the caisson
opt, like diameters.

— Caisson & Cont. Tower now support elect. penetr. area in a bridge fashion.
How to justify bearing capacity of soils under control tower which
now (but not before) is to have to support part of the elect.
penetration area also. Cont. Tower originally designed to be
self supporting.

might concern that only the innermost row of caissons will be effective in carrying the load after settling of soils under elect. penetration can lead to bowing of the floor. Could also cause structural damage.



Data provided for Aug. Bldg. to date is not the type needed. Need bearing capacity & shear strengths for 5 to 10 feet into the till. Davis & Moore data is at much greater distances into till.

Prod - Brings requests at highest dike sections. Concern - stability.
of Plans - The SER at CP show their more clear safety concerns when we raised the CP - slope stability - commitments to safety factors. Has the applicant delivered on these commitments?

Reason for NW dike being - plant access.

W Bivins - Away from the emergency pad, the dike has to be designed to OBE to meet GDC-44. A dike design here which would cause reliance upon the emergency source of water for an earthquake equal to OBE or less, would not be an acceptable design. Has the applicant delivered on its OBE commitment?

No berm near the SW intake structure. If discharge pipe breaks, no plant cooling by emergency pond.

Plan - all data on lifts (density) in below elevation 615. No data above this.

Hydraulic fracture of a lift filled is not a valid concern if right type of lining is taken. Use casing. P. Peck has been involved in such recommendations.

Height - retaining wall - is non-reinforced wall still valid in view of location of diesel fuel tanks? Will soil slide if wall taken out by SSE?

Height - New inspection summary - 114 additional borings in Rev 8. Mostly in tank farm area - too far away for other areas of interest. However, 6 of the standard penetration tests (SPTs) correspond with the SPT requested for 30. We can waive these 6. However, still need all the rest of the request.

Height - Without the data requested, COE can not issue a favorable report.

Plan - It is unusual to preload a structure after being built. Usually done prior to starting construction. The program produces further differential settlement and stresses in the structure. Applicant will have to show S&B that these stresses are acceptable.

Vollmer - told her to draft a reply denying appeal
but awaiting the 6 SPTs previously requested.
He will think further about the like things.

List of Exhibits to J. Kane Deposition
Kubiner

- | <u>No</u> | <u>Description</u> |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 ✓ | Professional Qualifications & Exp of J Kane |
| 2 ✓ | J. Kane handwritten note of 6/18/80
Subject: Questions on NRC Review Policy of Cooling Panels
(4 items, last item incomplete) |
| 3 ✓ | Large Plan View of Cooling Panel (centered in
Emergency Cooling Water Reservoir Area
J. Kane located 3 sections where cross geometry
would encourage stability analysis |
| 4 ✓ | Letters from CUE to R Jackson
One dated 27 Mar 80 -
later dated 16 Apr 80 Subject Request for
Addtl Bearings & Existing Soil Data |
| 5 ✓ | Deposition Form (from CUE) dated 1 Feb 80
Subject "Geotechnical Engineering Assistance
to NRC Core Containment Meeting @ Bethesda
7-8 Nov. 1979"
Kubiner to use File |
| 6 ✓ | J Kane Note dated 7/25/80
"Understanding of NRC Position (in Anticipation of Rpt)" |
| 7 ✓ | From turner's Deposition Papers
Harris
Copy of CUE contract on Midland (Pages 2, 3, 4 & 5) |
| 8 | Report dated Sept. 14, 1980 from CPLC
Entitled "Discussion of The Applicant's Position on the
Need for Addtl Bearings" etc |

- | <u>No</u> | <u>Description</u> |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| 9 ✓ | Report from CPCo dated Sept. 14, 1980
"Settlement Update for Millland Plant
Units 1 & 2," etc |
| 10 ✓ | 4 Mar 80 Telephax Record (From CUIE depts.,
documents)
From N. Gehring to P. Hadala |
| 11 ✓ | J Kane handwritten pages 1 thru 4) + List of
dated 9/27/80
Vugraphs
entitled "NRC Position - Diesel Generator Bldg" |
| 12 ✓ | J Kane handwritten pages dated 9/27/80
entitled "CPCo Position - Diesel Generator Bldg"
19 pages including 15 Vugraphs |
| 13 ✓ | J Kane handwritten pages (no date)
(Prepared for Oct. 1, 1980 meeting)
Entitled "CPCo Position - Cooling Pond Dike"
1 page plus 4 Vugraphs |

List of Exhibits (Cont.)

<u>No.</u>	<u>Description</u>	From COE Reps Reports
14 ✓	Telephone Record dated 6/26/80 Subject: Midland Nuclear Plant - Letter Report J. Kane calling H. Singh	

From COE Reps Reports	15 ✓ COE Report to R. Jackson dated 11 Apr. 80 NCEED-6 (24 Mar. 80) Int. Ind.
	Subject: Interagency Agreement No. NRC-03-77-167, Task No. 1, Midland Plant Unit 1 & 2, Subtask No. 1 - Letter Report (INTERIM) From Goehman to Dist. Engr., Detroit

6 pages
North Central Division

NCEED-6 Reviewer: John F. Mehta
James Simpson

8 pages
NCEED-T
Subject: Interagency Agreement No. NRC-03-77-167
Task No. 1, Midland Units 1 & 2
Subtask No. 1 Letter Rpt (INTERIM)
Thru - Div. Engr. North Central
To: R. Jackson

16 ✓ Hand sketch by R. Zarnarion w/ input
by J. Kense
Shows surcharge loading & complications
with installed concrete

~~#16~~ In Hood Deposition Minutes of Meeting?

#17 Disposition Form from COE (4 pages)
Trix Report of Meeting 15 Jan 1980
Dated 11 Feb. 1980
From Lowhead to Chf. Engr. Div

PROFESSIONAL QUALIFICATIONS AND EXPERIENCE

NAME: Joseph D. Kane
ADDRESS: 7421 Miller Fall Road
Derwood, MD 20855
EDUCATION: B.S. Civil Engineering 1961
Villanova University
M.S. Civil Engineering 1973
Villanova University
Post-degree studies, Soils and Foundation Engineering
University of California 1972
University of Maryland 1978

PROFESSIONAL REGISTRATION:

Registered Professional Engineer (1966) - Pennsylvania 12032E

PROFESSIONAL SOCIETY:

American Society of Civil Engineers

EMPLOYMENT POSITIONS:

February 1980 - Present	Principal Geotechnical Engineer U.S. Nuclear Regulatory Commission
May 1977 - February 1980	Geotechnical Engineer U.S. Nuclear Regulatory Commission
October 1975 - May 1977	Soils Engineer U.S. Nuclear Regulatory Commission
August 1973 - October 1975	Supervisory Civil Engineer Chief, Soils Design Section U.S. Army Corps of Engineers Philadelphia District
January 1963 - August 1973	Civil Engineer Soils Design Section U.S. Army Corps of Engineers Philadelphia District
January 1962 - January 1963	Design Engineer McCormick - Taylor Associates Philadelphia, Pa.

PROFESSIONAL EXPERIENCE SUMMARY:

1975 to Present

In NRC Division of Engineering, Geotechnical Engineering Section, Mr. Kane has specialized in soil mechanics and foundation engineering. Experiences in this position have included the following:

- a. Evaluation of the foundation adequacy of proposed sites for nuclear facilities with respect to design and operational safety. This work has included evaluation of geotechnical, soils and rock mechanics, foundation and earthquake engineering related aspects. The results of this review effort are summarized in a safety evaluation report for each of the proposed facilities which have included nuclear power plants, nuclear fuel reprocessing plants and uranium mill tailings waste systems.
- b. Serving as a technical adviser for soil and foundation engineering related aspects in the development of regulatory guides, acceptance and performance criteria that are intended to assure construction and operational safety of nuclear facilities.
- c. Serving as a technical representative for the Office of Nuclear Reactor Regulation on the NRC Advisory Group concerned with federal dam safety.
- d. Serving as an instructor for the Office of State Programs in the training of state personnel who are responsible for construction and operational inspections of uranium mill tailings embankment retention systems.

1963 to 1975

During this period Mr. Kane was employed with the U.S. Army Corps of Engineers, Philadelphia District and attained the position, Chief, Soils Design Section, Foundations and Materials Branch, in 1973. Professional experiences with the Corps of Engineers have included the following:

- a. The embankment and foundation design of four large multi-purpose earth and rockfill dams with appurtenant structures (spillways, inlet and outlet structures, control towers, flood protection facilities, etc.). Responsibilities ranged from the initial planning of

subsurface investigations to select the most feasible sites through all design stages which were culminated in the final preparation of construction plans and specifications. This work included planning and evaluation of laboratory testing programs, studies on slope stability, seepage control and dewatering systems, settlement, bearing capacity, liquefaction embankment safety instrumentation and slope protection.

- b. Served as a technical consultant to field offices charged with construction inspections for assuring completion of structures in compliance with design analysis and contract specifications. Participated in the development of needed modifications during construction whenever significant changed site conditions were uncovered.
- c. Directed the efforts of engineers in the Soils Design Section in other fields of civil work projects that included the embankment and foundation design of levees, waterfront pile supported structures and disposal basins for the retention of hydraulic dredge waste.

Served as design and project engineer for private consulting firm. This work included the design of large federally funded highways, a race track and various structures constructed to provide a Pennsylvania State park marina.

	1972
Award	1978

umers Exhibit # 2 (Kane)

6/12/80
- 1st
J. Kane

Midland ; Units 1 & 2

Questions on NRC Review Policy of Cooling Ponds (Cat. II)

al Comments

request for add'l. explorations in cooling pond dike system
to Jun. 13, 1980 Memo, Knight to Tedesco)
has indicated the following reasons for request:
concern for dike stability & pond seepage & emergency access
& fill that constitutes pond dikes is same type & probably
caused same compaction effort as plant fill now experiencing
a settlement problem. (Concern for dike adequacy & chance
increase knowledge on problem plant fill)

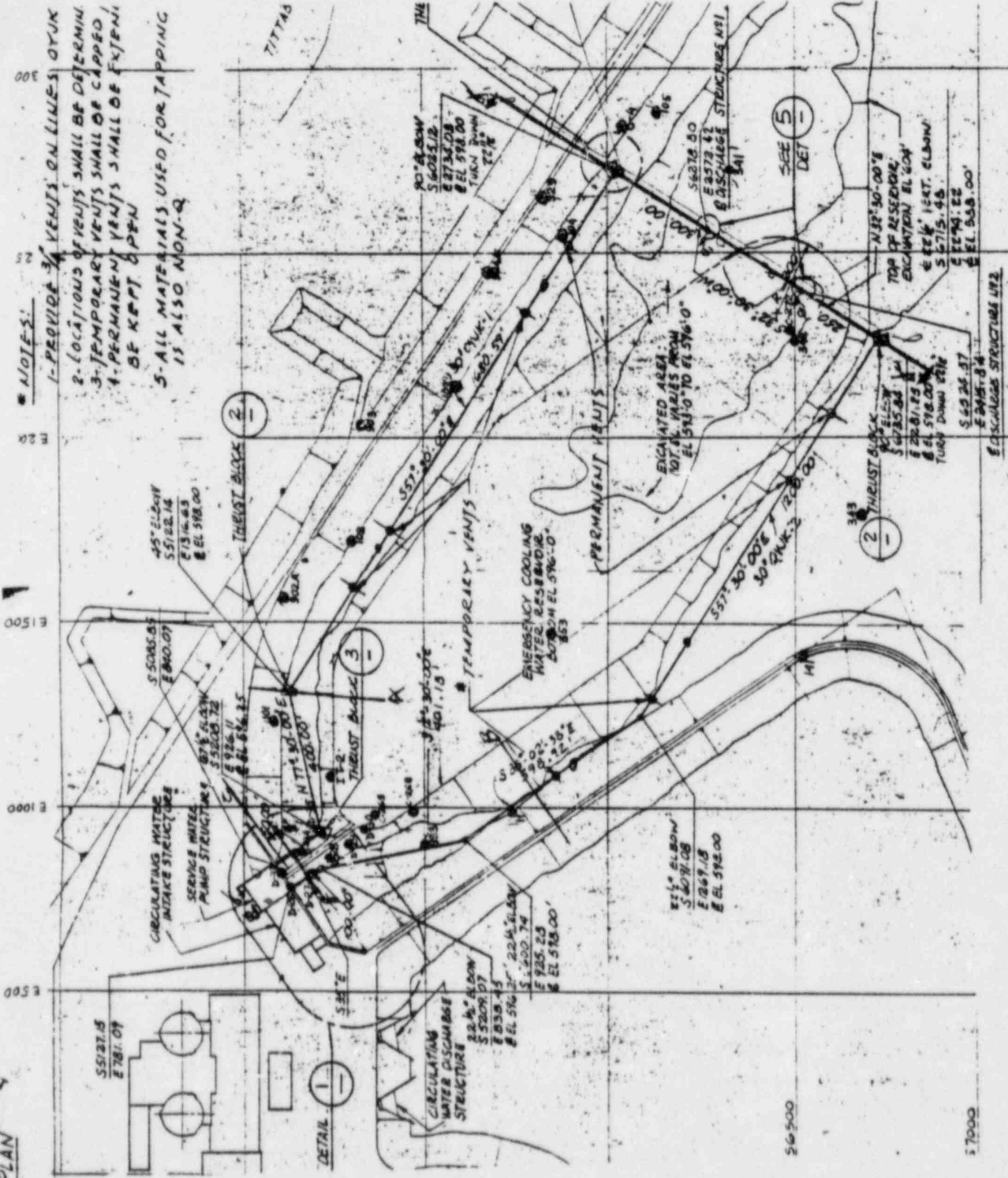
the position of Cat. I pipeline at tee of dike, a partic
ular Pond Embankment System & its stability would
result in determination that dikes in this portion are
Cat. I

As stated to be Cat. II, the Applicant has presented
a stability analysis of the cooling pond dike
. Does NRC in our review ignore the information
presented in the FSAR?

in of public & intervenor's conception of NRC
restricting review efforts of independent reviewers
consultant's work. Indicate NRC modification of

Consumers Exhibit # 3 (Kane)

PLAN



NOTES:

- 1- PROVIDE 3/4\"/>
- 2- LOCATIONS OF VENTS SHALL BE DETERMINED
- 3- TEMPORARY VENTS SHALL BE CAPPED
- 4- PERMANENT VENTS SHALL BE EXTERNAL BE KEPT OPEN
- 5- ALL MATERIALS USED FOR TAPPING IS ALSO NON-Q

E 500

E 1000

E 1500

E 2000

E 2500

E 3000

E 3500

DETAIL 1

5/6/50

5/7/50

SEE DET 5

DISCHARGE STRUCTURE U12

Consumers Exhibit # 4 (Kane)

J. Kane
Rec'd. 4/24/80



DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
BOX 1027
DETROIT, MICHIGAN 48231

APR 1980

NCEED-T

SUBJECT: NRC Midland Project, Request for Additional Borings and Existing
Soil Data - Revision No. 1

U.S. Nuclear Regulatory Commission
Dr. Robert E. Jackson
Division of Systems Safety
Mail Stop P-314
Washington, D.C. 20555

Dear Dr. Jackson:

Inclosure 1 to our letter of 27 March 1980 has been revised and attached
hereto. The two maps provided indicating boring locations remain unchanged.

FOR THE DISTRICT ENGINEER

1 Incl
As stated

[Handwritten signature]
R. E. JACKSON
Chief, Engineering Division

Boo!
SE
AD:
R.E. JACKSON

8004220055

COE reason for borings & consolidation test (Per R. Ericsson on 5/19/80)
Want to evaluate compressibility of fill following per-man pit dewatering
Not now addressed in documents.

INCLOSURE 1

1. It is requested that the applicant furnish the boring logs listed below indicating when and how these were taken, the type of sampling, and samples taken:
Referenced in Table 24.1 & Response to Quest 24, Rev 5 E6, pg. 24-30 to 24-39

- Pull down holes PD-1 thru PD-27* (35 holes)
- LOW-1 thru LOW-13 & W-1 thru W-4 (18 Holes) - *Response to Plant Fill - Vol. 4 PLAN*
- TW-1 thru TW-5 & PZ-1 thru PZ-48 (53 holes)
- OW-1 thru OW-3 & OL-1 thru OL-6 (9 holes) *Vol 4 FSA*
- TEW-1 thru TEW-7 & Q-1 thru Q-12 (19 holes)
- *Includes 8A, 20A, 20B, 20C, 15A, 15B, 15C, & 27A.

2. Locations, boring logs and test data from any other drill holes taken in 1979 and 1980 are also requested.

See response
Vol. 3
Tab. No. 11

3. Dutch cone penetrometer data from holes P-1 thru P-13 must also be provided.
Table 24.1 - Rev. 5 E6
Also available except no. PZ-45

Amend. 7b
Revision 6
Response to
Question 27

4. Information is requested on all piezometers that were installed to monitor problems related to plant fill. The information should include the number and location, the time of installation, the type of filter around the piezometer, the installed depth, and the type of piezometer.
Still need gradation of filter. All other info provided.
- Ask for logging of piezometer holes

Revision 6

5. All piezometer readings for each installation with dates and times are required.
Has been provided
Could eliminate cone requested holes if logs are available

6. The data and information requested in paragraphs 1 thru 5 above is needed to verify the applicant's computations and conclusions and to make any needed computations for the dewatering analysis, the seismic analysis and the settlement analysis.

7. A need exists for additional borings, since random exploratory borings throughout the plant site have revealed pockets of soft clay subject to settlement and or consolidation and loose sands subject to liquefaction. A need also exists to check the results of the proposed remedial measures of surcharge loading at the Diesel Generator Building and the dewatering plan.

a. In the case of the Diesel Generator Building, check borings must be made in the vicinity of borings which identified low "N" values in the clay and sand fill. The proposed borings shall be carried into the glacial till and all samples, including those in the glacial till, tested as indicated below.

FIG. 1007
5 1/2 35

COE want testing) Consol. - Secondary Comp. characteristics w/ settlement analysis

Shear - Estimate Test - Theoretical bearing capacity

Is Q test needed

George OK
w/COE

The boring locations are as indicated on the attached map. All soil for the full depths of the borings shall be classified according to the Unified Soil Classification System. Any tests necessary to classify the soil shall be accomplished. Unit weight and moisture content of all samples should also be determined. The samples obtained from any cohesive strata shall be tested. The tests for cohesive material shall be a consolidation drained and undrained triaxial shear tests (R&S) and a consolidation test with ~~restaining load~~ ^{loading to twice the dead load plus the live load.} equal to the load in place at the strata depth the sample represents. The sands shall be tested in direct shear for a loose and dense condition and the relative density of the sand in situ determined.

-Reward- Require borings now - state that studies to be completed will be detailed in interim rpt. to follow.

b. Where piling or caissons are proposed to underpin the Service Water Building and Auxiliary Building - feed water valve pits which are located on fill, the load bearing capacity of the bearing strata must be determined. The capability to resist lateral shearing stresses that could be induced in low "N" value soil subjected to seismic action must also be determined. The same tests required for soil samples obtained from the new borings at the Diesel Generator Building shall also be made on soil samples from new borings for these buildings.

c. The questionable site area fill may have a counterpart in the cooling pond embankment which was constructed contemporaneously with the site fill. It is requested that exploratory continuous drive borings be taken at a number of points along the north and east embankments, omitting the slurry trench cutoff areas which are positively sealed. The approximate boring locations are as indicated on the attached map of the cooling pond. Upon completion of drive boring a second undisturbed boring shall be made adjacent to the disturbed boring to sample cohesive soils. The tests on the soil samples obtained from the borings in the embankments shall include the following tests, consolidated - drained triaxial shear tests, (cohesive samples) Atterberg limits and all soils classified according to the Unified Soil Classification System. The drive borings shall be continuously sampled using a standard split spoon sampler. The hole shall be held open using a hollow stem auger or casing. Particular attention shall be paid to ground water conditions during and after completion of drilling. In the case of Hole 5, the boring should be drilled to the depth of the cooling pond bottom while the remaining borings need penetrate only 5 feet into underlying residual soils unless soft ground indicates a need for further hole penetration.

Clarify - What is wanted time of drilling and scope how is the drilling after completion of GW test station

Slope Stability Steady Seepage - Partial Pool Sudden Drawdown of max. pool & low pool

3. Summary of Requested Drilling

a. Diesel Generator Building - 4-6 holes around the perimeter of the building. Samples of all strata from ground surface into the glacial till (Holes 3-13). Include downhole, crosshole and surface geophysical tests to establish insitu compression and shear moduli for floor response spectra design check mentioned on pg. 18 Q VII-4 of Interim SER. 11/21/78 by NRC

J. Simpson Identified - but do not require all three

Check w/COE Ask COE to look @ message to Question 2 - 4/79 Rev. 5 dated Feb 28, 1983

What is this document? SER by NRC pg. 18 par. 11 Recommendation 2

- Request test results

- 10 CE

to check the stability

?

b. Auxiliary Building - Take two borings around the proposed support piling or caisson for remedial grouting of loose sands and soft clays adjacent to pile or caisson to stiffen piles and adjoining ground against lateral loading. Borings need to penetrate ^{a minimum of 5 feet into} glacial till. (see attached map for boring locations - Holes 4 & 5.)

c. Service Water Building - A boring (Hole 16) shall be made as indicated on the attached map to and into the glacial till. All samples obtained shall be classified according to the Unified Soil Classification System also consolidation, drained and undrained triaxial compression tests made on cohesive soil samples and direct shears for a loose and dense condition shall be made on all granular soil samples, as specified in paragraph 7B.

d. Plant Area Borings - ^{If not Cat. I - will log} IF feasible some borings should be taken under the Radwaste and Turbine Buildings to determine if unwatered pockets exist or persist. Suggested boring locations would be as indicated on the attached map. Further investigation could be needed after the results of these borings are obtained. No borings presently exist in these areas. The borings should be cased or hollow stem auger borings with drive samples every 2-1/2 feet through the fill. ~~The holes should be converted to dewatering holes or used for piezometers (Holes 1, 2, 3, 6 & 7).~~ Deleted per Ron Erikson on 4/21/80

Liquefaction of pockets a concern - Since not indicated they will occur after completion of borings

- If holes are detected revise boring location and

e. The site visit of 27 or 28 February 1980 turned up two differential settlement points on the retaining wall adjacent to the Service Water Pump Structure. Two borings, Holes 14 and 15 as indicated on the attached map shall be taken to investigate this problem. Tests required are consolidation tests, triaxial ^(RES) compression tests, Atterberg limits and gradation tests made on cohesive soils, and direct shear for loose and dense conditions and gradation tests made on granular soils. Settlement & re-check on wall stability

f. In all new borings made, the water table shall be determined.

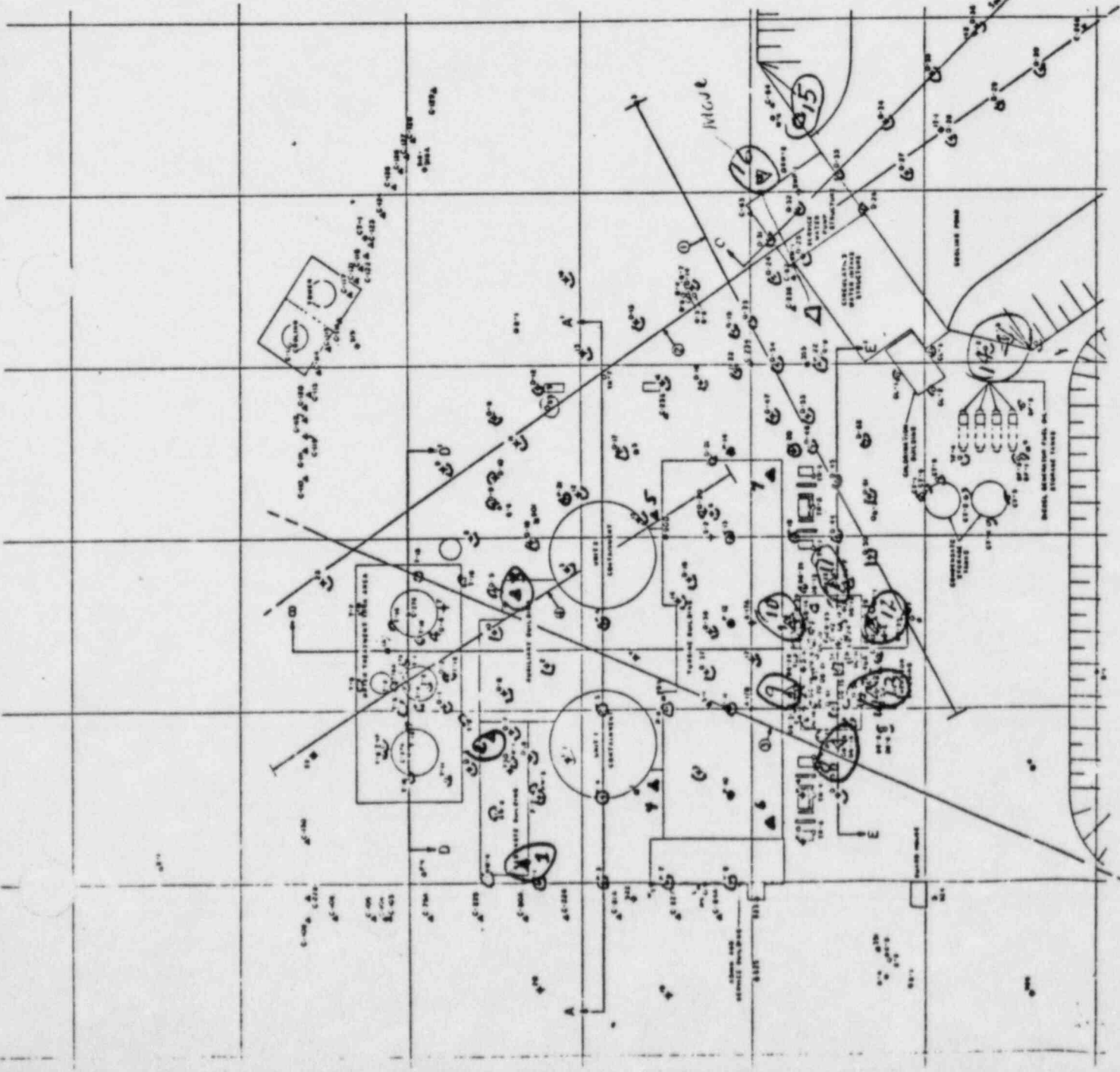
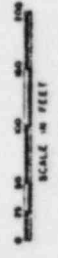
g. Request COE, ^{representative} be present at time sample tubes are opened & samples selected for testing (Per Ron Erikson request of 4/29/80)

• After F,
• Before;

EXPLANATION

- Michigan Boring Company Borings 1956 & 1968
- Jones & Moore Borings 1968 & 1969
- Bechtel Borings 1970
- Water Power Company Borings 1968 & 1970
- S&I and Materials Engineers Inc. Borings 1977
- Bechtel Borings 1973 & 1974
- Bechtel Borings 1977 & 1978
- Bechtel Borings August through October 1978
- 1948-50 Survey Line

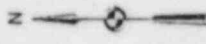
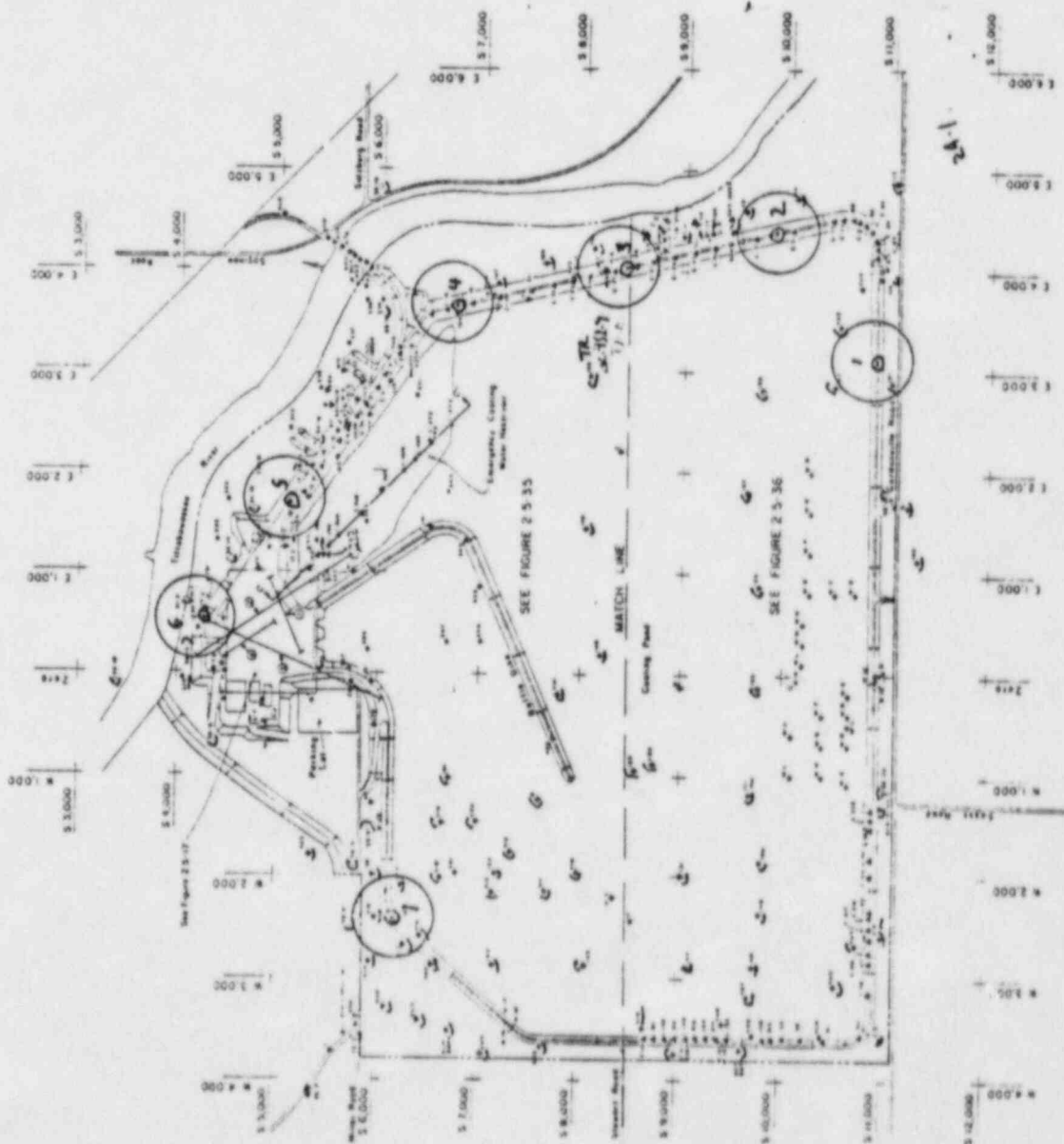
Subsurface Profile Section Line



**CONSUMERS POWER CO
MIDLAND PLANT UNITS
FINAL SAFETY ANALYSIS**

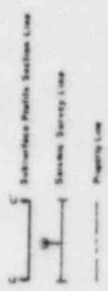
Plant Area Boring P

(SK-G-43, Rev 3)



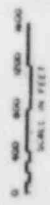
EXPLANATION

- Michigan Grading Co. Survey, 1936 B 12889
- Jones & Myers Survey, 1968, 1969 B 12710
- Beckley Survey, 1870
- Walter T. Case Co. Survey, 1865 B 1872
- Carl B. Mendenhall, Eng'rs. Survey, 1973
- Beckley Survey, 1973 B 13274
- Deane Survey, 1977 B 1926



NOTES

1. Station and Location of Jar and Drive Wells see Figure 2-5-12
2. Plot the locations of the Power Plant Area see Figure 2-5-17



ROUTING AND TRANSMITTAL SLIP

Date 4/11

To: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. Lyndon		
2. Joe	Rec'd	3/31/80
3.		
4.		
5.		

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS

Please review for adherence to branch/NRC standards for P's and forward to LPM ~~for~~ by cover memo with summary of requests. Send cc to ~~thought~~

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
Bob J	Phone No.