

2.5.4 STABILITY OF SUBSURFACE MATERIALS AND FOUNDATIONS

2.5.4.1 Geologic Features

2.5.4.1.1 Areas of Potential Uplift, Subsidence, or Collapse

The geology of the plant site is presented in Subsections 2.5.1.2.1 through 2.5.1.2.4. Foundation conditions including potential surface or subsurface uplift, subsidence, or collapse, regional warping, and unrelieved residual stresses are described in Subsection 2.5.1.2.5. The seismic response of the foundation materials is presented in Subsection 2.5.1.2.6. It is concluded that potential uplift, subsidence, or collapse is not significant to the site.

2.5.4.1.2 Previous Loading History

The site soil strata consists of 350 feet of clay, silt, and sand as described in Subsection 2.5.1.2.2. Except for a small amount of recent alluvium present in the Tittabawassee River floodplain, these soils were deposited by the last stage of the Pleistocene age glaciation. All the materials below the top of the brownish-gray clay (Unit c, Subsection 2.5.1.2.2.2) to the bedrock surface have been subjected to a load equivalent to at least 20,000 lb/ft². The load was probably caused by the latest thick ice sheet which covered the southern peninsula of Michigan.

2.5.4.2 Properties of Subsurface Materials

Laboratory soil testing was done by Dames & Moore and Michigan Drilling Company. (58) The scope and type of testing were specified by Bechtel for the Dames & Moore investigations. Michigan Drilling investigations were performed for Dow Chemical Company in 1956 and for Consumers Power Company in 1968. The following laboratory tests were performed to determine the soil design parameters in regard to plant foundation evaluation, dike design, and suitability of borrow material.

- a. Visual and laboratory classification
- b. Grain size analysis
- c. Atterberg limits
- d. Natural water content and density
- e. Specific gravity
- f. Compaction
- g. Relative density
- h. Permeability

SRP
Section
2.5.4.2
Pg. 2.5.4-3
define
occurrence
& properties
of
underlying
materials

SRP
Section
2.5.4.2
Testing
Pg. 2.5.4-3
also
R.G.1.138
Laboratory
Investigations
Adequacy
Pg. 2.5.4-8

- i. Consolidation
- j. Shear strength
- k. Dynamic moduli of elasticity
- l. Liquefaction

2.5.4.2.1 Visual and Laboratory Classification

Samples were initially classified visually in the field, and subsequently in the laboratory in accordance with the Unified Soil Classification System (see Lambe⁽⁵⁹⁾).

2.5.4.2.2 Grain Size Analysis

Mechanical analysis and hydrometer tests were performed on representative soil samples in accordance with ASTM D 422-63. Grain size curves from these tests are presented in Appendix 2B, Section 2B.2. Grain size distribution bands which encompass the individual grain size curves for the near surface in situ soil strata are shown in Figure 2.5-29. The mean grain size, D_{50} , for various areas is plotted against depth in Figures 2.5-30, 2.5-31, and 2.5-32.

The grain size distribution curves were used to refine the visual soil classifications, to judge suitability of borrow materials, to aid in compaction control, and to correlate with shear strength criteria.

2.5.4.2.3 Atterberg Limits

Atterberg limits, liquid limit (LL), plastic limit (PL), and plasticity index (PI), were determined according to ASTM D 423-66 and 424-59. The data are shown on the boring logs in Appendix 2A and are also summarized on plasticity charts in Figures 2.5-30, 2.5-31, and 2.5-32. R.G. 1.132
"Site
Investigations"

2.5.4.2.4 Natural Water Content and Dry Density

Natural water content according to ASTM D 2216-70 and dry density tests were made on undisturbed samples in conjunction with engineering properties tests and also for the purpose of soil identification. Moisture content tests were also made on disturbed soil samples. The data are shown on the boring logs in Appendix 2A. Summary of test data for the plant area is shown in Figure 2.5-33.

(Attempt to comply w/last para graph on pg. 2.5.4-3)

2.5.4.2.5 Specific Gravity

Specific gravity of solids was determined in accordance with ASTM D 854-50 in conjunction with consolidated-drained triaxial tests for cooling pond foundation and embankment soil samples. Results are presented in Table 2.5-3.

2.5.4.2.6 Compaction

R.G. 1.138
Compaction tests were performed to develop criteria for placement of fill underneath and around structures, and for embankments. Two compaction methods were used. These are the ASTM D 1557-66T method and the ASTM D 1557-66T method modified to achieve a compaction energy of 20,000 foot-pounds per cubic foot of soil. Compaction tests were performed on bulk samples retrieved from the borrow source. Results are presented in Appendix 2B, Section 2B.3.

2.5.4.2.7 Relative Density

Sect. 2.5.4.2
pg. 2.5.4.4
Relative density tests were performed on bulk samples of granular soils. These were made in accordance with ASTM D 2049-64T. Results are presented in Appendix 2B, Section 2B.4.

2.5.4.2.8 Permeability

Constant head permeability tests were conducted in the manner described in Appendix 2B, Section 2B.5 on undisturbed samples from the cooling pond foundation soils and on compacted samples from embankment borrow material. Most compacted samples were prepared at optimum moisture content and compacted to 95% of maximum dry density as determined by ASTM D 1557-66T modified to achieve 20,000 foot-pounds of compactive energy per cubic foot of soil or 70% relative density as determined by ASTM D 2049-64T. Three samples were compacted to 95%, 93%, and 100% of maximum dry density in accordance with ASTM D 1557-66T. The permeability data are presented in Appendix 2B, Section 2B.5, and summarized in Table 2.5-4.

2.5.4.2.9 Consolidation

Thirteen consolidation tests were performed by the dead load-pneumatic consolidometer developed by Dames & Moore. The test procedure is described in Appendix 2B, Section 2B.6. Samples were loaded (at the field moisture content) with a pressure equal to or greater than the existing overburden and were rebounded prior to performing standard consolidation tests. The standard test was then made under submerged conditions. An additional test was performed on a compacted specimen prepared from a bulk sample from the cooling pond area. The data are

shown in Appendix 2B, Section 2B.6. Consolidation tests were made to provide data for estimating settlement.

The preconsolidation pressures were estimated by the procedures developed by Casagrande,⁽⁶⁰⁾ Janbu,⁽⁶¹⁾ Rutledge,⁽⁶²⁾ and also from shear strength using the relationship developed by Skempton.⁽⁶³⁾ As depicted in Figure 2.5-34, the overconsolidation ratio for the glacial tills at the site is relatively large. The estimated preconsolidation pressure ranged from approximately 8,000 to 36,000 lb/ft² with a minimum range of 15,000 to 20,000 lb/ft² for the upper 50 feet of glacial till. For the lower stratum of glacial till, the evidence of the high degree of overconsolidation based on consolidation test data alone was not conclusive. However, the high preconsolidation for the till below 50 feet can be deduced from the geologic evidence, laboratory shear strength tests, and geophysical shear wave velocity measurements. Site geology study indicates that the plant area was overridden by a thick ice sheet during continental glaciation (see Subsection 2.5.1.2). Both laboratory shear strength and the measured shear wave velocities show that the rigidity of glacial tills increases with depth. Therefore, it can be conservatively concluded that minimum range of preconsolidation pressure of 15,000 to 20,000 lb/ft² is applicable for the entire depth of till.

The normalized compression and swelling indexes ($C_{c,r} / 1 + e_0$) for the glacial tills were estimated by Dames & Moore⁽⁵⁸⁾ on the basis of laboratory tests. Because the added pressures due to plant facilities will not exceed the estimated preconsolidation pressures, the normalized swelling indexes were calculated from the first load-rebound cycle and adjusted to account for sample disturbances which influence the slope of the compression rebound curve. These values, together with other pertinent soil parameters, are presented in Table 2.5-5.

2.5.4.2.10 Shear Strength

Two basic types of shear strength tests were made, namely undrained tests and drained tests.

The undrained strength tests were direct shear tests, unconfined compression tests, and unconsolidated-undrained triaxial compression tests. Tests were performed in the manner described by Dames & Moore (see Appendix 2B, Section 2B.7) The majority of these tests were made on undisturbed samples, although some tests were made on compacted samples.

Direct shear tests performed by Dames & Moore are shown on the individual boring logs in Appendix 2A. Unconfined compression and unconsolidated-undrained triaxial compression tests were performed for plant area, cooling pond dike, and railroad embankment soils by both Dames & Moore⁽⁵⁸⁾ and Michigan Drilling Company.⁽⁵⁸⁾ The results of tests made by Dames & Moore are

summarized in Table 2.5-6 and are included in Appendix 2B, Section 2B.7. The results of unconfined compression tests performed by Michigan Drilling Company are shown on the individual boring logs in Appendix 2A. Undrained shear strength based upon all direct shear, unconfined compression, and unconsolidated-undrained compression tests for plant area are plotted against elevation in Figure 2.5-33.

The drained tests consisted of drained direct shear tests and consolidated-drained triaxial compression tests. These tests were performed on undisturbed samples from the cooling pond embankment foundation soils and compacted embankment soils. The test methods and results are given in Appendix 2B, Section 2B.7, and further summarized in Table 2.5-3.

Rock compression tests were performed on selected samples of the gray shale bedrock which underlies the power plant area. These tests were performed utilizing Standard ASTM D 2938-71 procedures. The results of the rock compression tests are presented on the left of Boring Log D1 (Appendix 2A). Ultimate compressive strengths measured were 6,051 and 7,630 psi.

2.5.4.2.11 Dynamic Modulus of Elasticity

Four cyclic triaxial tests were performed on cohesive samples to determine the dynamic modulus of elasticity within a certain range of cyclic strain amplitude. Two tests were made in mid-1968 on undisturbed samples of silty clay containing some sand and gravel. In 1970 two more undisturbed samples of silty clay were tested. The results of all four cyclic triaxial tests are presented in Table 2.5-7.

2.5.4.2.12 Liquefaction

Six remolded samples from the plant area were tested in cyclic triaxial compression at various relative densities, confining pressures, and cyclic deviator stresses in accordance with the method of Lee and Seed.⁽⁶⁴⁾ Test results are illustrated in Appendix 2B, Section 2B.8.

2.5.4.3 Exploration

2.5.4.3.1 General

Seismic study is discussed in Subsection 2.5.4.4. Wells and geologic profiles are addressed in Subsections 2.4.13 and 2.5.1.2 respectively. Limits of required excavation and borrow site are presented in Subsections 2.5.4.5 and 2.5.6.4. Piezometers are discussed in Subsection 2.5.6.8.

Questions by J. Kane - Response to Interrog. 13-16

What documents are to be checked for acceptance criteria? (Before & after Dec 6, 1979)

How fine do we break acceptance criteria down? -
For instance - SRP Subsections?

^{EACH} or individual statements in documents -

e.g. a 5 foot differential in height of fill will
~~be permitted~~ not be permitted when raising
the surcharge fill against structure walls.

Do we tabulate each statement on accept. criteria in order to respond?

- ? Affidavit being requested by OELD
- ? give manhours to respond to our understanding of interrog. 13-16
- ? give time frame that this work can be completed which recognizes our schedule w/ other plants

Problem w/ something being acceptable when it is only part of the total picture of acceptability

For example

Drive piles to till is part of acceptance criteria but to be totally acceptable

the stability of soils (settlement - bearing capacity) have to be demonstrated

Acceptance criteria w/ regards to remedial
measures only.

All documents post July 1978 <sup>(since problem
was known)</sup>
FSAR is relevant since continuously updated

will miss criteria in PSAR that remains
applicable

Relevant documents

FSAR

50.55(e) Rpts

50.54(f) Responses

Meeting summaries

Telecon records

Interpreting the intent of Interrog. 13.

Interrog. No. 1 defines acceptance criteria & includes :

- information required by Staff to determine if there is REASONABLE assurance that the facility can be constructed & operated without undue risks to public health & safety
- cites use of SRP by Staff to make safety evaluation
- indicates SRP contains subsection "Acceptance criteria" which gives PURPOSE OF REVIEW & TECHNICAL BASIS for Acceptability of design or the programs within the scope of the area of review
- technical basis consists of specific criteria such as R.G., General Design Criteria Codes & Standards, Branch Technical Positions, etc.
- * - cites specific SRP sections (2.5.4II & 2.5.5II) where acceptance criteria would include for EACH specific & important engineering feature - a thorough evaluation of the particular engineering aspect based on analysis of basic data that supports ALL conclusions

Interrog. 13 directs NRC to STATE with PARTICULARITY EACH ACCEPTANCE CRITERIA with(?) CPCs had provided NRC UP UNTIL Dec. 6, 1979

No follow up
request
implies Staff
accepts
sufficiency

Interrog. 14 requires NRC to STATE whether the criteria identified in response to Interrog. 13 was sufficient to justify each acceptance criteria.

If not sufficient, STATE with particularity which info CPCs had failed to supply AS OF DECEMBER 6, 1979.

This is already answered in response to Interrog nos. 2, 5 (given in 2) & 6

My interpretation of Interrog. 13 is that we go back to the beginning of license application (PSAR) and identify each piece of information & data

J. Kane
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up until Dec. 6, 1979

that has been provided by CPCo, and state how this information & data fulfills the intent of NRC Standard Review Plans, Regulatory Guides, etc. with regards to acceptance criteria

As an example - take only one aspect of the very many engineering features which are reviewed by the NRC staff - take Sect. 2.5.4.2 of the FSAR documents - PROPERTIES of SUBSURFACE MATERIALS. Interr. 13 asks for a statement with PARTICULARS whether the information provided by CPCo (on pages 2.5-40 thru 2.5-44) meets the acceptance criteria discussed in SRP Section 2.5.4.2 and R.G. 1.70, Section 2.5.4.2

This request essentially requires a 100% ^{new} review in order to respond. To be accurate in our response to CPCo Interr. 13, we would have to check supporting tables, figures, applicable additional R.G. and cited references to have reasonable assurance that the acceptance criteria was met.

In actuality the ^{results of the} audit review which was completed by the NRC staff has already been given to CPCo w/ regards to acceptance criteria

- No questions by the Staff implies the information was acceptable or that the audit review did not uncover any inadequacy in the submitted documents that were identified by the Staff
- Questions on adequacy of information provided by CPCo, were followed up by NRC staff requests for information (Already identified in NRC response to Interr. 2.5 & 6 (BEFORE DEC. 6, 1979

3/17/81
1 of 2
J. Kom

Subject: CPCs Interrogatories

Interrog.
No.

Contents

1. Define acceptance criteria
As of Dec. 6, 1979
2. State which of NRC requests were directed to determining acceptance criteria to BE APPLIED to various remedial measures taken & which portion of each request was so directed
3. Explain reasons why such acceptance criteria are necessary for the Staff to evaluate technical adequacy
4. Explain basis for statement "the info provided by licensee fails to provide such criteria"
5. State w/particularity each item of info they^{NRC} requested up & until Dec. 6, 1979 w/regard to acceptance criteria
6. With regard to info identified in 5, state
 - a) identity of request
 - b) whether CPCs responded to that request
 - c) identity of communication that Staff considered CPCs response to the request
 - d) whether Staff considered the response adequate
 - e) identity of NRC communications that gave NRC position on adequacy of CPCs response
 - f) basis for NRC position on adequacy
 - g) responsible staff personnel
7. State each item of information the Staff requested after Dec. 6, 1979 w/regard to acceptance criteria

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2+2

Interrog.
No

Contents

- 8 With regards to each item of info in response to Inter. 7, state (same as 6)
- 9 Excluding info provided in response to Inter. 5, state w/particularity each item the Staff felt was necessary as of Dec. 6, 1979 for CPGs to provide in order for Staff to have concluded ^{safety} issues associated with remedial action will be resolved
- 10 For info given in Inter. 9 state (same as 6)
- 11 Excluding info provided in response to Inter. 7, state info the Staff feels, as of Feb 81, is necessary for CPGs to provide in order for Staff to conclude safety issues associated w/remedial action will be resolved
- 12 For each item of info given in response to Inter. 12, state (same as 6)
- 17 Material False Statement in FSAR

B Consumers Power

PSAR + Amendments

FSAR + Amendments

14. (a) PSAR → SER + Supp.
Issued CP

(b) FSAR → ~~Acceptance~~
related Qs

(c) Settlement Issue
50.54 f → Set of Qs

15. Response to 14c

50.55 e, submittals

16. Status Report on our review

GES Input into NRC Responses
to GPO Interrogatories

J. Kane

Rec'd 3/2/81

FEB 27 1981

Docket Nos. 50-329/330

MEMORANDUM FOR: Robert Tedesco, Assistant Director
for Licensing
Division of Licensing

THRU: Lyman Heller, Section Leader
Geotechnical Engineering Section
Hydrologic and Geotechnical Engineering Branch
Division of Engineering

George Lear, Chief
Hydrologic and Geotechnical Engineering Branch
Division of Engineering

FROM: James P. Knight, Assistant Director
for Components and Structures Engineering
Division of Engineering

SUBJECT: INTERROGATORY RESPONSES - GEOTECHNICAL ENGINEERING INPUT

Plant Name: Midland Plant, Units 1 and 2
Licensing Stage: Post CP
Docket Numbers: 50-329/330
Responsible Branch: LB No. 3, D. Hood, LPM
Requested Completion Date: February 25, 1981

We have enclosed the Geotechnical Engineering input for responding to Consumers Power Company's first set of interrogatories to the NRC staff which were dated November 17, 1980. This enclosed input was prepared by Joseph Kane, DOE, HGEB, GES and previous drafts of these responses had been provided to Darl Hood to assist him in his efforts of coordinating a consistent response format with other Branches.

15/
James P. Knight, Assistant Director
for Components and Structures
Division of Engineering

Enclosure:
As stated

cc: See page 2

~~81-316446-1710~~

OFFICE	HGEB:DE	HGEB:DE	HGEB:DE	A/D:CSE:DE		
SURNAME	JKane/mc	LHeller	GLear	JPKnight		
DATE	2/26/81	2/24/81	2/26/81	2/27/81		

Robert Tedesco

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FEB 27 1981

cc: w/o encl.
R. Vollmer
W. Paton

w/encl.
J. Knight
G. Lear
R. Jackson
L. Heller
D. Hood
H. Levin
N. Gehring, Detroit Dist. Corps of Engineers
F. Rinaldi
A. Cappucci
R. Gonzales
D. Gupta
J. Kane

Midland Plant - Units 1 and 2
Consumer Power Company
Docket Nos. 50-329/330
Geotechnical Engineering Input into Interrogatory Responses
Prepared by: Joseph Kane, DOE, HGEB, GES

Interrogatory 1. Define "acceptance criteria," as that term is used at page 3 of the Order.

Response. Staff acceptance criteria are criteria used by the NRC staff to determine whether the applicants design, requirements, criteria and information provides reasonable assurance that a facility, or repairs to a facility, can be constructed and operated without undue risk to the health and safety of the public.

The term "acceptance criteria" is widely used by the NRC staff in their work of evaluating the safety of nuclear power plant designs. For example in the field of geotechnical engineering, refer to Standard Review Plans (SRP) Sections 2.5.4 II, page 2.5.4-3 and Section 2.5.5 II, page 2.5.5-1. In the SRP examples it is indicated that acceptance criteria would include, for each specific and important engineering feature, a thorough evaluation of the particular engineering aspect along with submittal of basic data that supports all conclusions. This information is necessary to allow the staff to conduct independent analyses and to reach their conclusion that reasonable assurance of plant safety can be expected at the CP stage and demonstrated at the OL stage of review.

Interrogatory 2. State which "of the Staff's requests were directed [as of or before December 6, 1979] to the determination and justification of acceptance criteria to be applied to various remedial measures taken" (Order at page 3) and which portion of each request was so directed.

Response. The following table identifies and lists the Staff's requests directed [as of or before December 6, 1979] to the determination and justification of acceptance criteria to be applied to the various remedial measures taken and the portion of the request which is applicable.

Identification of Previous Staff Request	Applicable Portion of Request	Date Request Submitted to CP Co.
362.12 (2.5.4)	First sentence	December 11, 1978
362.13 (2.5.4)	All but last sentence	December 11, 1978
362.14 (2.5.4.10.3)	Entire request	January 18, 1979
362.15 (2.5.4.5)	Entire request	January 18, 1979
362.16 (2.5.4)	Entire request	January 18, 1979
362.17 (2.5.4.10.3)	Entire request	January 18, 1979
50.54 (f) Questions Nos. 4, 5, 6, 9, 10, 11, 12, 16	Entire requests	March 21, 1979
50.54 (f) Questions Nos. 24d, 24g, 27, 31, 35	Entire requests	November 19, 1979

Interrogatory 3. State and explain the reasons why "such [acceptance criteria], coupled with the details of the remedial action, are necessary for the Staff to evaluate the technical adequacy and proper implementation of the proposed action."

(Order at page 3.)

Response. The criteria as defined in response to Interrogatory 1. along with the specific details of the remedial action are necessary to permit the staff to reach their conclusion as to whether reasonable assurance of plant safety has been demonstrated by the licensee. Again, SRP 2.5.4 II reads "Sufficient information must be provided to allow the staff and its advisors to conduct independent analyses."

Interrogatory 4. State and explain the basis for the statement, at page 3 of the Order, that "the information provided by the licensee fails to provide such criteria." (Acceptance criteria). (Order at page 3).

Response. This interrogatory 4 is essentially the same as interrogatory 6 (d) and the Staff's response will be provided in answer to 6 (d).

Interrogatory 5. State with particularity each item of information the Staff requested up and until December 6, 1979 with regard to acceptance criteria.

Response. The particulars of each item of information requested by the Staff up and until December 6, 1979 with regards to acceptance criteria have previously been provided in response to interrogatory 2.

Interrogatory 6. With regard to each item of information identified in response to interrogatory 5, state: (a) the identity of the request; (b) whether Consumers responded to that request; (c) the identity of the communication that the Staff considered Consumers response to the request; (d) whether the Staff considered the response adequate; (e) the identity of the communication by which the Staff communicated its position as to the adequacy or inadequacy of the response; (f) the basis for the Staff's position regarding adequacy or inadequacy of

Consumers response; and (g) the Staff personnel responsible for determining whether Consumers' response was adequate or inadequate.

Response. With regard to each item of information identified in response to Interrogatory 5 (which in turn refers to the answer to interrogatory 2). Table 6-1 hereto responds to parts (a), (b), (c), (d), (e) and (g) of interrogatory 6. Answers to parts (e) and (f) of interrogatory 6 follow.

Regarding part (e) of interrogatory 6, the means by which the Staff communicated its position as to the inadequacy of the Licensee's response was primarily by the issuance of additional questions on the same subject. The identification of the followup requests are listed in Table 6-1. For example, 50.54(f) Request 35 specifically indicated the response to previous Request 5 was unacceptable. It is not Staff practice to indicate acceptable responses to Licensees, except by separate request on a case-by-case basis. Such indication of acceptance is typically left for issuance of the Staff's safety evaluation report for those responses which are of significance to that report.

Consumers in response to several 50.54(f) Requests from the Staff elected to combine their answer into a response with another request. As an example, Consumers answer to requests 9 and 10 was directed to

the response of request 12 and request 16 response was directed to request 17 and 19 response. The Staff in recognizing this combining would then direct any follow up question only to the finally referenced request.

The basis for the Staff position of inadequacy shown by part (f) of interrogatory 6 is that the Licensee's response failed to meet the Staff's acceptance criteria as defined in response to interrogatory 1. Specific reasons for failing included not being fully responsive to the Staff's requests or insufficient submittal of basic data to support the conclusions or positions submitted by the Licensee.

Consumers responses to 50.54(f) Requests 4, 5, 6, 12 and 21(c) were inadequate because of missing information or data or the responses raised additional questions. The portions of the above requests which were inadequate are identified in the contents of the follow up requests that are listed on Table 6-1, column 6e.

An example where Consumers has repeatedly failed to fully respond to the Staff's request is exemplified in the June 30, 1980 letter from A. Schwencer to J. W. Cook. This letter clearly indicates that Consumers previous responses to questions 5 and 35 continue to be unacceptable and offers observations to better clarify the Staff's

position and concern for the effectiveness of the preload program. As late as February 1981 Consumers has steadfastly refused to provide the requested information which the Staff and its Consultant feel is necessary to have reasonable assurance for plant safety.

Consumers responses to requests 362.13, 362.14 and 362.16 were inadequate because the Staff concerns raised in these FSAR questions were not to be fully resolved until Consumers completed additional field and laboratory work. Ultimately these issues have been pursued by the Staff in subsequent 50.54(f) questions.

The portions of the response to request 362.17 which deal with predicted settlement are similar to the above in that field work had to be completed before the issue could be resolved. The portion of the response pertaining to induced vertical stresses versus depth was unresponsive in providing needed specific data and results.

TABLE 6-1

Identity of 50.54 (f) Request	Whether Consumer Responded as of 12/6/79	Response Identification as of 12/6/79	Staff's Consideration of Response Adequacy as of 12/6/79	Follow-up Requests	Responsible Staff Personnel
6 (a)	6 (b)	6 (c)	6 (d)	6 (e)	6 (g)
4	Yes	Rev. 3, 9/13/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	27, 40	L. Heller & D. Gillen
5	Yes	Rev. 0, 4/24/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	35, 37	L. Heller & D. Gillen
6	Yes	Rev. 3, 9/13/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	31, 33, 43	L. Heller & D. Gillen
9	Yes	Rev. 0, 4/24/79, Responses to NRC Requests Regarding Plant Fill	Response referred to Question 12	Refer to Question 12	L. Heller & D. Gillen
10	Yes	Rev. 0, 4/24/79 Responses to NRC Requests Regarding Plant Fill	Response referred to Question 12	Refer to Question 12	L. Heller & D. Gillen
11	Yes	Rev. 0, 4/24/79 Responses to NRC Requests Regarding Plant Fill	Adequate		L. Heller & D. Gillen

TABLE 6-1

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Identity of 50.54 (f) Request	Whether Consumer Responded as of 12/6/79	Response Identification as of 12/6/79	Staff's Consideration of Response Adequacy as of 12/6/79	Follow-up Requests	Responsible Staff Personnel
6 (a)	6(b)	6 (c)	6 (d)	6 (e)	6 (g)
12	Yes	Rev. 3, 9/13/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	38, 39, 41, 42 43, 44, 45, 46 47, 48	L. Heller & D. Gillen
16	Yes	Rev. 0, 4/24/79 Responses to NRC Requests Regarding Plant Fill	Responsive but additional applicant work required to resolve	34	L. Heller & D. Gillen
21 (c)	Yes	Rev. 0, 4/24/79, Responses to NRC Requests Regarding Plant Fill	Responsive but Inadequate	35, 37, 40	L. Heller & D. Gillen
362.12	Yes	FSAR Rev. 24, 9/79, Responses to NRC Questions	Adequate		L. Heller D. Gillen
362.13	Yes	FSAR Rev. 20, 4/79, Responses to NRC Questions	Inadequate	4, 5, 7, 9, 12, 13, 14	L. Heller D. Gillen
362.14	Postponed	FSAR Rev. 24, 9/79, Responses to NRC Questions	Inadequate. Response postponed to future date.	9, 10, 12, 15	L. Heller D. Gillen

TABLE 6-1

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Identity of Request	Whether Consumer Responded as of 12/6/79	Communication Identification as of 12/6/79	Staff's Consideration of Response Adequacy	Follow-up Request	Responsible Staff
6 (a)	6 (b)	6 (c)	6 (d)	6 (e)	6 (g)
362.15	Yes	FSAR Rev. 24, 9/79, Responses to NRC Questions	Adequate		L. Heller D. Gillen
362.16	Yes	FSAR Responses to NRC Questions	Responsive but submittal of needed revised settlement analysis postponed to future	4, 12	L. Heller D. Gillen
362.17	Yes	FSAR Rev. 24, 9/79	Inadequate	4, 8, 14	L. Heller D. Gillen

Interrogatory 7. State with particularity each item of information the Staff requested after December 6, 1979 with regard to acceptance criteria.

Response. The following table identifies each Staff request after December 6, 1979 with regard to acceptance criteria. The information contained in each request has been available to Consumers since the date listed in the third column when the information was transmitted to them.

<u>Identification of Previous Staff Request</u>	<u>Applicable Portion of Request</u>	<u>Date Request Submitted to CPCo</u>
50.54(f) Questions 35, 37, 38	Entire requests	June 30, 1980
50.54(f) Questions 39, 40, 41, 42, 43, 44, 45, 46, 47, 48	Entire requests	August 4, 1980

Interrogatory 8. With regard to each item of information identified in response to interrogatory 7, state: (a) the identity of the request; (b) whether Consumers responded to that request; (c) the identity of the communication that the Staff considered Consumers response to the request; (d) whether the Staff considered the response adequate; (e) the identity of the communication by which the Staff communicated its position as to the adequacy or inadequacy of the response; (f) the basis for the Staff's position regarding adequacy or inadequacy of Consumers response; and (g) the Staff personnel responsible for determining whether Consumers' response was adequate or inadequate.

Response. This answer is provided by Table 8-1. Additionally, Table 8-1 includes items of information the Staff requested before December 6, 1979 with regard to acceptance criteria, but for which the initial reply by Consumers had not been submitted as of December 6, 1979.

Regarding part (e) of interrogatory 8, the means by which the Staff communicated its position as to the inadequacy of the Licensee's response was primarily by the issuance of additional questions on the same subject. It is not Staff practice to indicate acceptable responses to Licensees, except by separate request on a case-by-case basis. Such indication of acceptance is typically left for issuance of the Staff's safety evaluation report for those responses which are of significance to that report.

The basis for the Staff position of inadequacy shown by part (e) of interrogatory 8 is that the Licensee's response failed to meet the Staff's acceptance criteria as defined in response to interrogatory 1. The reasons that the Staff considered the responses to Requests 24(g) and 31 to be inadequate are given in the contents of the follow up requests which are listed on Table 8-1, column 8e.

The responses to Requests 35 and 37 are inadequate for the reasons stated in A. Schwencer's letter of June 30, 1980 and in the "Summary of Appeals Meeting of August 29, 1980 Regarding Additional Explorations and Testing of Midland Plant Fill," February 10, 1981.

As indicated at the January 28, 1981 Prehearing, the Staff and its consultant are currently reviewing Consumers submittal of Revision 10 (Amendment 85) which includes Consumers responses to requests 38 through 48. The Staff intends to formally respond to Consumers on the adequacy of Revision 10 responses by late March 1981.

TABLE 8-1

Identity of 50.54(f) Request	Whether Consumer Responded After 12/6/79 8(b)	Response Identification Reviewed by Staff 8(c)	Staff's Consideration of Response Adequacy as of 2/24/81 8(d)	Follow Up Request or Communication 8(e)	Responsible Staff Personnel 8(g)
24(d)	Yes	Rev. 5, 2/80 Response to NRC Request Regarding Plant Fill	Adequate		Corps of Engineers & J. Kane
24(g)	Yes	Rev. 5, 2/80	Inadequate	36, 42, 47	Corps of Engineers & J. Kane
27	Yes	Rev. 5, 2/80	Adequate		Corps of Engineers & J. Kane
31	Yes	Rev. 5, 2/80	Inadequate	43	Corps of Engineers & J. Kane
35	Yes	Rev. 5, 2/80	Inadequate	37, 40	Corps of Engineers & J. Kane
36	Yes	Rev. 9, 9/80 Responses to NRC Request Regarding Plant Fill	Adequate		Corps of Engineers & J. Kane
37	Yes	Sept. 14, 1980 Report Discussion of Applicant's Position	Inadequate	Tedesco Letter to Cook 11/10/80	Corps of Engineers & J. Kane

TABLE 8-1

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Identity of 50.54(f) Request	Whether Consumer Responded After 12/6/79 8(b)	Response Identification Reviewed By Staff 8(c)	Staff's Consideration of Response Adequacy as of 2/24/81 8(d)	Follow Up Request or Communication 8(e)	Responsible Staff Personnel 8(g)
38	Yes	Rev. 9 9/80 Responses to NRC Request Regarding Plant Fill	Adequate		Corps of Engineers & J. Kane
39	Yes	Rev. 10 11/80 Responses to NRC Request Regarding Plant Fill	Under review	To be determined	Corps of Engineers & J. Kane
40	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
41	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
42	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
43	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
44	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
45	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
46	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
47	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane
48	Yes	Rev. 10 11/80	Under review	To be determined	Corps of Engineers & J. Kane