

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)	Docket Nos. 50-329-0M
CONSUMERS POWER COMPANY)	50-330-0M
(Midland Plant, Units 1 and 2))	50-329-0L
<hr/>		50-330-0L

NRC STAFF'S ANSWERS TO INTERROGATORIES FILED
BY CONSUMERS POWER COMPANY

Interrogatory 1

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

Answer

Acceptance criteria are the standards on which a judgement or decision is based. As used in the December 6, 1979 Order on Modification, [the standards to be used by the licensee to make] the judgment or decision [that proposed remedial measures are acceptable was] sought by the NRC for its review ~~to determine~~ whether the information submitted by the licensee provided reasonable assurance that the facility, as modified by the proposed remedial measures, can be constructed and operated without undue risk to the health and safety of the public.

The NRC practice in performing radiological safety reviews is

~~such that the term "NRC"~~

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such that the term "acceptance criteria" has a wide meaning and it is this broader meaning that applies as the term is used within the Order. The NRC practice is to use a document entitled "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," NUREG-751087, for the radiological safety review of applications for licenses of nuclear power plants such as the Midland Plant. Each section of the Standard Review Plan (SRP) is organized into four subsections, and one of these subsections is entitled "Acceptance Criteria". This subsection contains a statement of the purpose of the review and the technical basis for determining the acceptability of the design or the programs within the scope of the area of review of the SRP section. The technical bases consist of specific criteria such as NRC Regulatory Guides, General Design Criteria Codes and Standards, Branch Technical Positions, and other criteria. This subsection is further discussed in the first section of the Standard Review Plan, which is entitled "Introduction".

To illustrate the term "acceptance criteria" refer to Standard Review Plan Section 2.5.4II, page 2.5.4-3 and Section 2.5.5II, page 2.5.5-1. From these examples it is seen that "acceptance criteria" [for an applicant's proposed geotechnical design submitted in its Safety Analysis Report] would include, for each specific and important engineering feature, a thorough evaluation of the particular engineering aspect based on analyses of basic data that support all conclusions. These analyses

and basic support data are required to allow the Staff, conduct independent analyses and reach independent conclusions on whether reasonable assurance of plant safety exists. [REDACTED]

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.

Answer

Attached Table 2-1 lists Staff's requests that were directed to the determination and justification of acceptance criteria to be applied to various remedial measures taken and proposed by licensee. As of December 6, 1979, the only remedial action that had been taken was the placement of the sand surcharge inside and around the Diesel Generator Building, which had reached the maximum height of 20 feet above final plant grade on April 7, 1979 ✓ and which had been removed by August 31, 1979. 21

The requests in Table 2-1 relevant to the remedial action for the Diesel Generator were Requests number 4, 5, 8, 12, 13, 14, 18, 19, 20, 21(c), 25, 26, 27, 28, 30, and 35.

1 S. Howell letter of April 30 1979 to J. Keppler, forwarding MCAR
24 Interim Report 5.

2 S. Howell letter of November 2, 1979 to J. Keppler, forwarding
MCAR 24 Interim Report 8.

In addition to the requests listed in Table 2-1, the Staff had previously submitted other requests to the licensee directed to the determination and justification of acceptance criteria to be applied to various remedial measures taken and proposed by the licensee. These requests are identified in Appendix A hereto.

Staff's
50.54(f)
Request No.

Signatory/Date of
Request Letter

Applicable Portion
of Request

[REDACTED]	24	L.S. Rubenstein, 11/19/79✓	ALL
	25	"	ALL
	26	"	ALL
	[REDACTED]	" ✓	ALL [REDACTED]
	28	"	ALL
	29	"	ALL
→	30	" ✓	ALL [REDACTED]
	34	" ✓	ALL [REDACTED]

NOTES:

1 Portion of Staff's request directed to be determination and justification of acceptance criteria to be applied to various remedial measures taken or proposed.

APPENDIX A

ADDITIONAL NRC REQUESTS PRIOR TO DECEMBER 6, 1979

Staff Request	Signaturee/ Date of Request Letter	Applicable Portion <u>1/</u> of Request
130.21	S. Varga, 12/11/78	All
362.12	" 	First sentence
362.13	" 	All but last sentence
40.106	S. Varga, 1/18/79	All
130.23	"	All, with respect to Category I structures other than Containment.
130.24	"	All, with respect to Category I structures other than Containment.
362.14	" 	All
362.15	" 	All
362.16	" 	All
362.17	" 	All

NOTES:

1/ Portion of Staff's request directed to the determination and justification of acceptance criteria to be applied to various remedial measures taken and proposed.

~~SECRET~~

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.)

Answer

Technical adequacy and proper implementation are two of the principal ingredients necessary to the Staff conclusion regarding reasonable assurance as to whether the facility as proposed to be modified can be constructed and operated without undue risk to the health and safety of the public. The [licensee's] criteria, as defined in response to Interrogatory 1, and the specific details of the remedial action constitute the basis of review from which such conclusions by the Staff are derived.

Interrogatory 4

State and explain the basis for 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.)

Answer

The reply to Interrogatory 6(d) identifies which of the licensee's responses the Staff found to be inadequate as of December 6, 1979. And the response to Interrogatory 6(f) explains why. The responses were inadequate, in part, because they did not provide the acceptance criteria, as defined in the response to Interrogatory 1, which the Staff requires for its radiological safety review. Consider, for example, 50.54(f) Request 4 which on March 21, 1979 in part asked (1) what criteria the licensee would use to judge the acceptability of fill, structures, and utilities upon conclusion of the preload program, (2) what extent of residual settlement would be permitted, and (3) the basis for the limit. The licensee's most recent reply prior to December 6, 1979 (Revision 3 to Amendment 72 dated September 13, 1979) stated that the criteria and the extent to which residual settlements would be permitted would be provided by December 1979. ✓ Therefore, the licensee's reply did not include acceptance criteria and the Staff considered the response to be inadequate and the matter remains unresolved. For further examples, refer to the response to Interrogatory 6(f).

1/ The licensee's response was ultimately submitted February 28, 1980 by Amendment 74; or about 10 months after the full surcharge for the Diesel Generator Building had been placed and 6 months after the surcharge had been completely removed.

~~SECRET~~

Interrogatory 5

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

Answer

The items of information the Staff requested up and until December 6, 1979 with regard to acceptance criteria are given in the reply to Interrogatory 2.

~~NOTE TO REVIEWERS REGARDING INTERROGATORY 6~~

~~It is important in checking the reply, including Table 6-1, that the information be accurate. This also means that the decision as to adequacy or inadequacy (column 6d of Table) must reflect the decision as made by the named reviewer(s) (6g) at the time of that decision which is or before 12/6/79. If a decision on adequacy or inadequacy had not been reached as of 12/6/79, the named review should so indicate.~~

~~Also let me know if any of the named individuals were not the responsible reviewer at that time.~~

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.

Answer

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.

For those requests shown in Table 6-1 to be issued before December 6, 1979, but for which replies were initially made after December 6, 1979, refers to the answer to Interrogatory 8.

Similar information for requests identified in Appendix A is provided by Appendix B.

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. ~~These~~ 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.

The basis for the Staff position of inadequacy shown by part of Interrogatory 6 is that the licensee's response failed to meet the Staff's acceptance criteria as defined in response to Interrogatory 2. Specific reasons for failing are given below, and typically include 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.

~~_____ (C-1, 12 and 2KC) were~~
~~_____ responses to 50.54(f) Request 8 is [was] inadequate because...~~
~~_____ Hetter/J. Kane to completely correct which were...~~
~~_____ follow up requests that are listed in table 6-1...~~
~~_____ response to 50.54(f) Request 6 is [was] inadequate because...~~
~~_____ Hetter/J. Kane to complete]~~

The response to 50.54(f) Request 8 is [was] inadequate because...

Watch This ↗

[L. Heller/J. Kane to complete] ~~_____~~

~~_____~~
The response to Request 12.
~~_____~~

The response to 50.54(f) Request 10 is [was] inadequate because

it consisted of a reference to the response to 50.54(f) Request 9

which is inadequate. [L. Heller/J. Kane to complete]

[L. Heller/J. Kane to complete]

The response to 50.54(f) Request 12 is [was] inadequate because...

[L. Heller/J. Kane to complete]

The response to 50.54(f) Response 13 is [was] inadequate because...

[F. Rinaldi to complete]

The response to 50.54(f) Response 14 is [was] inadequate because...

[F. Rinaldi to complete]

The response to 50.54(f) Response 15 is [was] inadequate because...

[F. Rinaldi to complete].

The response to 50.54(f) ~~Request~~ 16, although responsive, is of

a nature that additional work by the licensee is required for

an acceptable reply. ~~_____~~ Kane to confirm or rewrite ~~_____~~ Consumers

~~_____~~ staff ~~_____~~ with related off

requests 17-19 which is acceptable to the staff.

50.54(f) Request 17 asked how code-allowable conditions of underground Category I piping will be assured throughout plant life. The reply contains no commitment to use the 3.05c limit of part NC-3652.3 of Section III, of the ASME Code, Division 1. However, the response, in Table 17-2, does indicate that the Code calculations were used. The response provides a comparison of the ASME Code limit to the calculated pipe stresses resulting from settlement for illustration purposes only. [17?] The reply provided no acceptance criteria for inclusion of future settlement of buried piping over the life of the plant. Also, [17?] no acceptance criteria was provided for cases where the allowable stresses were exceeded. [A. Cappucci to confirm]

50.54(f) Request 18 asked for an identification and description of evaluations of seismic Category I piping to assure that it can withstand increased differential settlement between buildings, within the same building, or within the piping systems itself without exceeding code-allowable stress criteria. Request 18 also asks for the licensee's plans to assure compliance with code-allowable stress criteria throughout the life of the plant. The response for seismic Category I piping between structures makes a general reference to applicable codes, but provides no indication as to which codes or as to what specific acceptance criteria the piping is to meet. Therefore, more specific criteria as to the stress limits to be used is required. [A Cappucci to confirm or rewrite].

50.54(f) Request 20 asked for acceptance criteria required to define acceptable loads or components and supports produced by pipe deformations due to settlement. The reply defined no acceptance criteria, but only stated that the loads on components were within the allowables. The reply provides no acceptance criteria as to when flanged joints will be disassembled and the methods for determining nozzle loads. Acceptance criteria for the allowable differential settlement for the 2-inch and smaller diesel generator fuel oil lines was not addressed. [A. Cappucci to confirm or rewrite].

The response to FSAR 362.13, 362.14 and 362.17 indicated that the acceptance criteria was not met. The Staff's final decision regarding acceptability must await the determination of an acceptable alternative which requires, in part, a technically adequate remedial solution. Since an acceptable alternative does not presently exist, the response is considered inadequate.

As noted in Appendix B, certain of the licensee's responses indicated to be inadequate. The licensee's responses to requests 362.13, 362.14 and 362.17 were not fully satisfactory. The licensee completed additional field and laboratory work. Although these issues have been pursued by the Staff in subsequent FSAR 362.13, 362.14 and 362.17.

The portions of the response to request 362.17 which deal with predicted settlement are similar to the above. The Staff's final decision regarding the issue of pipe versus ductile fracture was made 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 Consideration of Response Adequacy as of 12/17/79 6 (d)	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 ✓
? 8	Yes	Rev. 0, 4/24/79 Responses to NRC Requests Regarding Plant Fill	Adequate ?	will include others including L. Heller L. Heller & D. Gillen	L. Heller & D. Gillen ✓
9 ✓	Yes ✓	Rev. 0, 4/24/79, Responses to NRC Requests Regarding Plant Fill	Response referred to Question 12 ✓	31, 33, 43 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 ✓	31, 33, 43 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

- 2 -

Identity of 50.54 (f) Request	Whether Consumer Responded as of 12/6/79	Response Identification as of 12/6/79	Staff's (Personnel) Consideration of Response Adequacy (Personnel)	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 ✓	25, 28, 29	L. Heller & D. Gillen
13	Yes	Rev. 1, 5/31/79 Responses to NRC Requests Regarding Plant Fill	?	25, 48	R. Lipinski, F. Rinaldi F. Schauer
14	Yes	Rev. 3, 9/13/79 Responses to NRC Requests Regarding Plant Fill	?	25, 28, 29	R. Lipinski F. Rinaldi F. Schauer
15	Yes	Rev. 3, 9/13/79 Responses to NRC Requests Regarding Plant Fill	?	25, 26	R. Lipinski F. Rinaldi F. Schauer
16	Yes	Rev. 0, 4/24/79 Responses to NRC Requests Regarding Plant Fill	Responsive but additional work required to resolve	34	L. Heller & D. Gillen
17	Yes	Rev. 2, 7/9/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	45	R. Stephens A. Cappucci
18	Yes	Rev. 0, 4/24/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	?	R. Stephens A. Cappucci

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 	Follow-up Requests	Responsible Staff Personnel
6 (a)	6 (b)	6 (c)	6 (d)	6 (e)	6 (g)
19	Yes	Rev. 0, 4/24/79, Responses to NRC Requests Regarding Plant Fill	Not determined	?	R. Stephens A. Cappucci
20	Yes	Rev. 2, 7/9/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	?	R. Stephens A. Cappucci
21(c)	Yes	Rev. 0, 4/24/79, Responses to NRC Requests Regarding Plant Fill	Responsive but Inadequate	 	L. Heller

112-6-7^a

?

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APPENDIX B

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)
362.12	Yes	FSAR Rev. 24, 9/79, Responses to NRC Questions	Adequate	4, 5, 7, 9, 12, 13, 14	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
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, 9, 12	L. Heller D. Gillen
362.17	Yes	FSAR Rev. 24, 9/79,	Inadequate	4, 8, 14	L. Heller D. Gillen
130.21	Yes	FSAR Rev. 24, 9/79, Responses to NRC Questions	Inadequate	?	R. Lipinski(?) F. Rinaldi F. Schauer

APPENDIX B

- 2 -

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)
(?) 130.23	Yes	FSAR Rev. 24, 9/79, Responses to NRC Questions	Inadequate	?	R. Lipinski ? F. Rinaldi F. Schauer
(?) 130.24	Yes	FSAR Rev. 24, 9/79, Responses to NRC Questions	Inadequate	?	R. Lipinski ? F. Rinaldi F. Schauer
40.106	Yes	FSAR Rev. 24, 9/79 Responses to NRC Questions	Inadequate	?	H. Balujian R. Stephens A. Cappucci

Interrogatory 7

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

~~The following information was provided to the Staff after December 6, 1979 with regard to acceptance criteria. The information contained in each request is available to consumers since requests were provided to the date listed in the table when this information was transmitted to them.~~

Identification of previous staff requests	Table 2a - Product Name / Process	Signature / Date submitted to CRCG Letter
--	--	--

first requests

50, 54(c), 36, 37, 38	All table posts	A. Schwinn / June 30, 1980
50, 54(c), 29, 40, 41, 42, 44, 45, 46, 47, 48	All posts	A. Schwinn / 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.

ANSWER

This answer, and the answer to interrogatory 7, is provided by Table 8-1 hereto. 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 (F) of interrogatory 8, it is not Staff practice to indicate acceptable responses to licensees, except by separate request considered by the Staff on a case-by-case basis. Such indication of acceptance is the function of the Staff's safety evaluation report for those

Parts g and d of 50.54(F) Request 24 involve review by both hydrologic and geotechnical engineering disciplines. The response to part d of 50.54(F) Request 24 is considered adequate with respect to geotechnical engineering considerations. With this exception, the remainder of response to Request 24 is considered inadequate. With respect to hydrologic engineering aspects, several items in the response required clarification or correction and were described in subsequent ^{request} numbers 49 through 52, as well as by Stoff interrogatory 7 to Commens, dated November 26, 1980 and Stoff interrogatory 5a and 16 to Commens, dated January 2, 1981. Other followup requests indicating why the response to 50.54(F) Request 24 is inadequate are requests 36, 47, and 48. [R. Gonzalez & J. Hane to confirm or rewrite].

The response to Request ²⁵ is [inadequate?] because ...
[7 Rinaldi to complete]

The response to Request 2.6 is inadequate because ...
[7 Rinaldi to complete]

~~The response to Request 2.7 is inadequate because ...~~
~~[J. Hane to complete]~~

The response to Request 28 is [inadequate?] because...
[F. Rinaldi to complete]

The response to Request 29 is [inadequate?] because...
[F. Rinaldi to complete]

The response to Request 30 is [inadequate?] because...
[F. Rinaldi to complete]

The response to Request 34 is [inadequate?] because...
[A. Cappucci to complete]

¹³⁷
The response to Requests ~~25~~ is inadequate for the reasons stated in A Schwenn's letters of June 30, 1980 and in "Summary of Appeals Meeting of August 29, 1980 Regarding Additional Explorations and Testing of Midland Plant 711," February 10, 1981.

~~The reasons that the Staff considered the response to Request 25 inadequate are given in follow up report to [unclear] dated [unclear].~~

~~As indicated at the January 28, 1981 Prehearing, the Staff and its consultant are currently reviewing Consumer's submitted of Revision to Amendments 55 which includes the Applicant's response to the Staff's [unclear] to the Staff. The Staff intends to formally [unclear] to March 1981.~~

Table 8-1

W. L. ...

Identity of Request 8(a)	Whether Consumer Responded after 12/6/79 8(b)	Response Identification Provided by Staff 8(c)	Staff's Classification of Response 8(d)	Followups Requests or communications 8(e)	Responsible Staff Personnel 8(f)
24	Yes	Rev. 10, 11/80, Response to NRC Request Regarding Plant #9 ill	Indefinite	36, 47-52 31, 47	R. Angeler, W. Berman Corps of Eng., J. Kane, R. ...
24 (i)	Yes				
24 (d)	Yes				
24 (e), (f)	Yes				
24 (g)	Yes				
24 (h), (i)	Yes				
25	Yes	Rev. 10, 11/80, Responses to...	?	?	Participated F. Rinaldi
26	Yes	Rev. 5, 2/80, Responses to...	Indefinite	?	Participated F. Rinaldi
27	Yes	Rev. 10, 11/80, Response to...	Indefinite		Corps of Eng., J. Kane
28	Yes	Rev. 5, 2/80, Response to...	?	?	F. Rinaldi
29	Yes	Rev. 5, 2/80, Response to...	?	?	F. Rinaldi
30	Yes	Rev. 8, 8/80, Response to...	?	?	F. Rinaldi
34	Yes	Rev. 5, 2/80, Response to...			A. Cappucci
35	Yes	Rev. 5, 2/80, Response to...			

At the time...

J Kane
2/23/81

~~Table 1 (cont.)~~

Identity of Request	Whether Consumers Responded After 12/6/79	Response Identification Reviewed by JKH	Staff's Consideration of Response Adequacy as of 2/2/81	Follow Up Requests or Communication	Responsible Staff Personnel
8(a)	8(b)	8(c)	8(d)		8(g)
36	Yes	Rev. 9 9/80 Response to NRC Request Regarding Plant F.11	Adequate		Corps of Engineers J. Kan
37	Yes	Sept. 14, 1980 Report Discussion of Applicant's Position	Inadequate	Tedley Letter To Cook 11/1/80	"
38	Yes	Rev. 9 9/80 Response etc.	Adequate		"
39	Yes	Rev. 10 11/80	Under review	To be determined	"
40	Yes	Rev. 10 11/80	Under review	To be determined	"
41	Yes	Rev. 10 11/80	Under review	To be determined	"
42	Yes	Rev. 10 11/80	Under review	To be determined	"
43	Yes	Rev. 10 11/80	Under review	To be determined	"
44	Yes	Rev. 10 11/80	Under review	To be determined	"
45	Yes	Rev. 10 11/80	Under review	To be determined	"
46	Yes	Rev. 10 11/80	Under review	To be determined	"
47	Yes	Rev. 10 11/80	Under review	To be determined	"
48	Yes	Rev. 10 11/80	Under review	To be determined	"

~~OK 1/11/80~~
~~1/11/80~~

Interrogatory 9

Excluding the information provided in response to interrogatory 5, state with particularity each item of information the Staff felt was necessary, as of December 6, 1979, for Consumers to provide in order for the Staff to have concluded that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3).

Answer

As of December 6, 1979 the Staff had determined that, because Licensee had failed to supply certain acceptance criteria, it could not conclude that the safety issues associated with remedial action taken or planned to be taken to correct the soil deficiencies would be resolved. The Staff had not determined, as of December 6, 1979 "each item of information the Staff felt was necessary, as of December 6, 1979 for Consumers to provide in order for the Staff to have concluded that the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved" Order at page 3."

Interrogatory 10

~~OR 01/28/81~~
~~1/28/81~~

For each item of information set forth in response to interrogatory 9, state (a) whether the Staff had requested Consumers to provide such information; (b) the identity of each request by the Staff to Consumers; (c) the identity of the communication that the Staff considered Consumers' response to the request; (d) whether Consumers' response was deemed adequate by the Staff; (e) the identity of the communication by which the Staff's evaluation of Consumers' response was communicated to Consumers; (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.

Answer

See answer to Interrogatory 9.

Interrogatory 11

Excluding the information provided in response to interrogatory 7, state with particularity each item of information the Staff feels, as of the date of answering this interrogatory, is necessary for Consumers to provide in order for the Staff to conclude that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3.)

Answer

The Staff has not completed its review of information submitted by Licensee relative to the proposed remedial actions. It is therefore impossible to delineate "with particularity each item of information the Staff feels, as of the date of answering this interrogatory, is necessary for Consumers to provide in order for the Staff to conclude that 'the safety issues associated with remedial action taken or planned be taken by the licensee to correct the soil deficiencies will be resolved.'" (Order at page 3.)"

~~SECRET~~
2/11/81

Interrogatory 17

Explain and provide the basis for the statement at page 2 of the Order that "This statement is material in that this portion of the FSAR would have been found unacceptable without further Staff analysis and questions if the Staff had known that Category I structures had been placed in fact on random fill rather than controlled compacted cohesive fill as stated in the FSAR."

Answer

Information submitted as part of an application for licenses in accordance with 10 CFR 50.30 is "material" if that information would or could have an influence upon a safety conclusion of the NRR Staff. A material statement which is false is of concern if it could have resulted in an improper finding or a less probing analysis by the NRR Staff. As described on page 2 and Appendix B of the Order, had the NRR Staff relied upon the statement in FSAR Section 2.5.4.5.3 which states that "all fill and backfill were placed according to Table 2.5-9", it would or could have erroneously concluded that the fills and backfill placed for the support of structures and the Diesel Generator Building consisted of "clay" (Table 2.5-9 under "Soil Types") or "Controlled compacted cohesive fill" (Table 2.5-14 under "Supporting Soils") which had been compacted, as a minimum, to 95% of ASTM D 1557-66 T modified to get 20,000 foot-pounds of compactive energy per cubic foot of soil (see Table 2.5-9 under "Compaction Criteria"). The reality of the situation is that the fills and backfills beneath the structures and the Diesel Generator Building are not "clay" or a "controlled compacted cohesive fill", but consist of a heterogeneous mixture of sand, clay, silt and lean concrete, and the

minimum compaction criteria implied as having been achieved by the quoted statement from FSAR Section 2.5.4.5.3 was not achieved. Therefore, a conclusion by the NRR Staff that the fills and backfills were of a different type or had been compacted to known minimum standards would have been erroneous and would or could contribute to or preclude a more probing analysis or further questioning. Based upon the FSAR information, the NRR reviewer would or could have concluded that the structure was adequately supported, that it would not experience detrimental settlement, that its foundations would remain stable under both static and earthquake loading, and that the fill properties would be at least equal to design values provided in the PSAR. The reviewer's conclusion would have been relevant to the NRC findings pursuant to 10 CFR 50.57 (3) for issuance of operating licenses and would have contributed to a finding that there is reasonable assurance that the activities authorized by the operating license can be conducted without endangering the health and safety of the public.

J. Kama
Rec'd 2/25/81
@ 3:15 p.m.

Interrogatory 9

Excluding the information provided in response to interrogatory 5, state with particularity each item of information the Staff felt was necessary, as of December 6, 1979, for Consumers to provide in order for the Staff to have concluded that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3).

Answer

As of December 6, 1979 the Staff had determined that, because **the** Licensee had failed to supply certain acceptance criteria, it could not conclude that the safety issues associated with remedial action taken or planned to be taken to correct the soil deficiencies would be resolved. The Staff had not determined, as of December 6, 1979 "each item of information the Staff felt was necessary, as of December 6, 1979 for Consumers to provide in order for the Staff to have concluded that the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved" Order at page 3." See

also discussion of need for seismological information in answer to Interrogatory 11.

The information the Staff felt was necessary, as of December 6, 1979 was essentially that identified in answer to Interrogatories 2 and 5, including Appendix A, relative to acceptance criteria. It should be noted, however, that prior to December 6, 1979, the full extent of the plant fill settlement problem was unknown and was under review. For example, 50.54(f) Request 12 from H. Denton letter of March 21, 1979 asked for documentation of the condition of the soils under all safety related structures and utilities founded on plant fill or natural lacustrine deposits. This same request asked for discussions of measures to be taken if foundation materials are found to be deficient. Consumer's response to Request 12 (initially on April 24, 1979 and subsequently by Revision 1 on May 31, 1979, Revision 2 on July 9, 1979, and Revision 3 on September 13, 1979) provided information which the Staff found not to be fully responsive and, therefore, unacceptable. The basis for the Staff's conclusion on acceptability is illustrated by the issuance of followup requests which seek to have Consumers provide its design and criteria in sufficient detail to enable the Staff to conclude whether there is reasonable assurance of plant safety considering those modifications. An example of this problem is illustrated by the issuance of Requests 41 and 42 by the Staff's letter of August 4, 1980 in which the Staff's geotechnical consultant, the U.S. Army Corps of Engineers, continue to seek basic information and data not previously provided in Consumers responses regarding the fixes proposed for the Service Water Intake Structure and the Auxiliary Building which the Staff needs to reach a conclusion on the acceptability of plant repairs.

Certain items of information, in addition to that provided in response to interrogatories 2 and 5 were probably ^U felt to be needed by the Staff prior to December 6, 1979 with respect to underground piping and associated components. The items are that:

- (a) All the seismic Category I piping be profiled.
- (b) Remedial action be specified for the case in which stresses due to settlement should approach or exceed Code allowable values.
- (c) Details as to the calculational methods and assumptions for determining stresses due to settlement and other combined loads be provided for review.
- (d) Results of the stress analysis of nozzle loads be submitted.
- (e) A suitable monitoring program be established to monitor future settlement for the life of the plant.
- (f) Future settlements be included in the planned stress analyses.

U

The initial staff reviewer in the Mechanical Engineering Branch (MEB), Mr. R. Stephens, is no longer employed with the NRC. The items identified reflect the opinion or recollection of the subsequent and present MEB Staff reviewed, Mr. A. Cappucci, from earlier personal discussions and notes. It is not known how or whether any of these possible needs may have been conveyed to Consumers.

Interrogatory 10

For each item of information set forth in response to interrogatory 9, state (a) whether the Staff had requested Consumers to provide such information; (b) the identity of each request by the Staff to Consumers; (c) the identity of the communication that the Staff considered Consumers' response to the request; (d) whether Consumers' response was deemed adequate by the Staff; (e) the identity of the communication by which the Staff's evaluation of Consumers' response was communicated to Consumers; (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.

Answer

See answer to Interrogatory 9.

Answer

See answer to Interrogatory 9. Because the information the Staff felt was necessary as of December 6, 1979 was essentially that identified in answer to Interrogatories 2 and 5, the answer to interrogatory 10 is essentially provided by the answers to Interrogatory 6, including Appendix B, and by that part of Interrogatory 8 relevant to indicated Requests 24 through 35.

With respect to certain items of information (a) through (f) identified in the answer to Interrogatory 9 with respect to underground piping and associated components, the answer to Interrogatory 10 is provided by Table 10-1. The answer to Interrogatory 10(f) follows.

- (a) The criteria for selection of the piping to be profiled appears to be based on the soils in the same proximity as being homogeneous. There appears to be insufficient evidence that this is the case.
- (b) The response to 50.54(f) Request 17 stated that the stresses due to settlement would be well below the code allowable values as indicated in Table 17-2 of that response. Therefore, it was indicated that remedial action was not planned by Consumers. This is not adequate because (1) not all seismic Category 1 piping was profiled, (2) future settlements had not been predicted, and (3) the results of the surcharge program had not been established.
- (c) The response to 50.54(f) Request 18 in July 1979 indicated no plans for a monitoring program if the settlements remain within the predicted range. It was not clear as to the time frame and methods for verifying the predicted ranges.
- (d) The response to 50.54(f) Request 17 provided no information on settlements over plant lifetime. The response to 50.54(f) Request 18 was adequate. The response to 50.54(f) Request 19 provided no information as to the predicted deformations.

TABLE 10-1

Item from Interr. 9	Whether Staff Requested Information 10(a)	Identity of Request 10(b)	Response Identification 10(c)	Staff's Con- sideration of Response Adequacy 10(d)	How Position Conveyed to Consumers 10(e)	Responsible Staff Personnel 10(g)
9(a)	Yes	50.54(f) Request 17, Denton 3/21/79	50.54(f) Re- quest 17, Rev. 2, 7/79, Res- ponses* to NRC Requests Re- garding Plant Fill	Inadequate	Unknown	R. Stephens A. Cappucci
9(b)	Yes	50.54(f) Request 17 Denton 3/21/79	50.54(f) Re- quest 17, Rev. 2, 7/79, Respon- ses to NRC Re- quests Regard- ing Plant Fill	Inadequate	Unknown	R. Stephens A. Cappucci

TABLE 10-1

9(c)	No	None	None	Not applicable	Not applicable	R. Stephens A. Cappucci
9(d)	No	None	None	Not applicable	Not applicable	R. Stephens A. Cappucci
9(e)	Yes	50.54(f) Request 18	50.54(f) Request 18, Rev. 2, 7/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	Unknown	R. Stephens A. Cappucci
9(f)	Yes	50.54(f) Requests 17, 18 and 19	50.54(f) Requests 17, 18 and 19, Rev. 2, 7/79, Responses to NRC Requests Regarding Plant Fill	Inadequate	Unknown	R. Stephens A. Cappucci

Interrogatory 11

Excluding the information provided in response to interrogatory 7, state with particularity each item of information the Staff feels, as of the date of answering this interrogatory, is necessary for Consumers to provide in order for the Staff to conclude that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3.)

Answer

The Staff has not completed its review of information submitted by Licensee relative to the proposed remedial actions. It is therefore impossible to delineate "with particularity each item of information the Staff feels, as of the date of answering this interrogatory, is necessary for Consumers to provide in order for the Staff to conclude that 'the safety issues associated with remedial action taken or planned be taken by the licensee to correct the soil deficiencies will be resolved.'" (Order at page 3.)"

To illustrate this inability, consider two recent occurrences:

(1) On January 21, 1981, Consumers submitted a potentially reportable 50.55(e) report advising of an error in the 1977 computer model used for the seismic analyses of the Control Tower and the main portion of the Auxiliary Building. Pending further analysis by Consumers, it is not possible for the NRC to assess the ability of the Control Tower to assume the additional load resulting from the bridged support scheme proposed for the Electrical Penetration Area; (2) Consumers has also indicated that additional cracking of the concrete ring base of the Borated Water Storage Tank has occurred during the full scale load test. The Staff is presently awaiting Consumers' assessment of this occurrence. It should also be noted that resolution of the matter of establishing appropriate seismological input, as discussed in the Staff's letter of October 14, 1980 and in a December 22, 1980 "Summary of December 5, 1980 Meeting on Seismic Input Parameters," is deemed to be relevant to the staff conclusion that the safety issues associated with remedial action taken or planned will be resolved.

The information needed by the staff for its review of the remedial actions is essentially that identified in response to interrogatories 2, 6, 7 and 8, plus Appendices A and B, with respect to acceptance criteria for those response items indicated to be inadequate. In Table 6-1 and Appendix A, the indication of

response adequacy by the staff is with respect to December 6, 1979. However, the present staff position may be ascertained from the indicated disposition of the associated follow-up questions. The occurrences and seismic matter discussed in interrogatory 11 also needs to be satisfactorily resolved.

With regard to underground piping, and excluding the information needed from interrogatory 7, the following information is needed:

- (a) A final stress analysis of the seismic Category I piping.
- (b) An explanation for some of the relatively rapid changes in some of the piping profiles and the magnitude of the loads which cause these changes.
- (c) The actual and predicted clearances at end of plant life of seismic Category I piping at building penetrations.
- (d) The loads and stresses on the piping at their termination points (anchors, equipment, larger pipe, etc.).
- (e) From the January 20, 1981 meeting, provide method and basis for normalizing the profile data prior to performing the stress analysis and use of 3-inch future settlement data. If a non-linear analysis is to be performed, provide the analysis methodology with a summary of the results. Include a presentation of the margin to the Code allowable value for settlement only

and the same for the margin to failure considering all primary and secondary stresses.

Interrogatory 12

For each item of information set forth in response to interrogatory 11 state: (a) whether the Staff had requested Consumers to provide such information; (b) the identity of each request by the Staff to Consumers; (c) the identity of the communication that the Staff considered Consumers' response; (d) whether Consumers' response was deemed adequate by the Staff; (e) the identity of the communication by which the Staff's evaluation of Consumers' response was communicated to Consumers; (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.

Answer

See answer to Interrogatory 11. With respect to the information needed with respect to underground piping, see Table 12-1.

With respect to the adequacy of item 11a on Table 12-1, the Bechtel stress analysis appeared to be unconservative and did not give a true representation of the actual stress in piping. There were questions as to which profiles were used and the justification for the boundary conditions assumed. An ETEC stress analysis demonstrated much higher stresses than those in the Bechtel report. At the 1/20/81 meeting Bechtel stated that subsequent analyses had shown higher stresses for some lines.

TABLE 12-1

Interr. 11 Item	Whether Staff Requested 12(a)	Request Identifi- cation 12(b)	Response Identity 12(c)	Adequacy Disposition 12(d)	How Disp. Communi- cated to Consumers 12(e)	Responsible Staff Personnel 12(f)
11a	Yes	Tedesco letter 10/20/80	Cook letter 11/14/80 with encl.	Inadequate	Conference call 1/14/81	A. Cappucci J. Brammer
11 b,c & d	Yes	Meeting of 1/20/81	No response	No response	No response	A. Cappucci J. Brammer
11e	In progress	Not Applicable	None	Not appl.	Not appl.	A. Cappucci J. Brammer

Interrogatories 13 through 16. See separate objections filed by the Staff.

Interrogatory 17

Explain and provide the basis for the statement at page 2 of the Order that "This statement is material in that this portion of the FSAR would have been found unacceptable without further Staff analysis and questions if the Staff had known that Category I structures had been placed in fact on random fill rather than controlled compacted cohesive fill as stated in the FSAR."

Answer

Information submitted as part of an application for licenses in accordance with 10 CFR 50.30 is "material" if that information would or could have an influence upon a safety conclusion of the NRR Staff. A material statement which is false is of concern if it could have resulted in an improper finding or a less probing analysis by the NRR Staff. As described on page 2 and Appendix B of the Order, had the NRR Staff relied upon the statement in FSAR Section 2.5.4.5.3 which states that "all fill and backfill were placed according to Table 2.5-9", it would or could have erroneously concluded that the fills and backfill placed for the support of structures and the Diesel Generator Building consisted of "clay" (Table 2.5-9 under "Soil Types") or "Controlled compacted cohesive fill" (Table 2.5-14 under "Supporting Soils") which had been compacted, as a minimum, to 95% of ASTM D 1557-66 T modified to get 20,000 foot-pounds of compactive energy per cubic foot of soil (see Table 2.5-9 under "Compaction Criteria"). The reality of the situation is that the fills and backfills beneath the structures and the Diesel Generator Building are not "clay" or a "controlled compacted cohesive fill", but consist of a heterogeneous mixture of sand, clay, silt and lean concrete, and the

minimum compaction criteria implied as having been achieved by the quoted statement from FSAR Section 2.5.4.5.3 was not achieved. Therefore, a conclusion by the ~~NRR~~ Staff that the fills and backfills were of a different type or had been compacted to known minimum standards would have been erroneous and would or could contribute to or preclude a more probing analysis or further questioning. Based upon the FSAR information, the ~~NRR reviewer~~ ^{Staff} would or could have concluded that the structure was adequately supported, that it would not experience detrimental settlement, that its foundations would remain stable under both static and earthquake loading, and that the fill properties would be at least equal to design values provided in the PSAR. The ~~reviewer's~~ ^{Staff's} conclusion would have been relevant to the NRC findings pursuant to 10 CFR 20.57 (3) for issuance of operating licenses and would have contributed to a finding that there is reasonable assurance that the activities authorized by the operating license can be conducted without endangering the health and safety of the public.

Darl Hood, being duly sworn, deposes and says that to the best of his knowledge and belief the above information and the answers to the above interrogatories are true and correct.

Darl Hood

Subscribed and sworn to before me
this day of February, 1981.

Notary Public _____

My Commission Expires: _____

One Copy
Double Space

D. Hood 412-8402 W. Kater 412-7543

MIDLAND PLANT - UNITS 1 AND 2
CONSUMER POWER COMPANY
DOCKET NOS. 50-329/330

[Handwritten signature]
1/18/81

GEOTECHNICAL ENGINEERING INPUT INTO INTERROGATORY RESPONSES
PREPARED BY: Joseph Kane, DOE, HGEB, GES

~~Subject: NRC Response to CP's Interrogatories~~

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 ~~submitted by the~~ ^{or repairs to a facility} ~~facility~~ provides reasonable assurance that ~~the~~ facility, (as modified by the proposed remedial measures) 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 ^{required} ~~to be provided in order~~ to allow the staff to conduct independent analyses and reach their conclusion ^{that} on ~~whether~~ reasonable assurance of plant safety ~~has been established~~. ^{can be expected at this CP stage and demonstrated at the OL stage of review}

(This is copy of original draft given to Durl Hood.
Revised draft rec'd from D. Hood on 2/23/81
Final draft w/ only Geot. Engr. Input to DL dated 1/81.

JDK

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.

efg

Identification of Previous Staff Request	Applicable portion of request	Date request submitted to CFCO
362.12 (2.5.4)	First sentence.	Dec. 11, 1978
362.13 (2.5.4)	All but last sentence.	Dec. 11, 1978
362.14 (2.5.4.10.3)	Entire request.	Jan. 18, 1979
362.15 (2.5.4.5)	Entire request.	Jan. 18, 1979
362.16 (2.5.4)	Entire request	Jan. 18, 1979
362.17 (2.5.4.10.3)	Entire request	Jan. 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. 24 d, 24 g, 27, 35	Entire requests.	Nov. 19, 1979

San Francisco

Skyline

Response. It should be noted that in Consumer Answer to Notice of Hearing (April 10, 1980, page 4) that the licensee admits the first and second sentence of the concluding paragraph of page 3 of the Order but now, in these interrogatories submitted on Nov. 17, 1980 again raises the same issues.

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.

J. Keane
[Signature] (3)

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. ~~are~~ 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 b (d) and the Staff's response will be provided in answer to (d).

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

~~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.

Resp. With regard to each item of information identified in response to interrogatory 5 (for GES purpose this is ^{actually} interrogatory 2) the following table is provided in response to parts 6(a), 6(b), 6(c), 6(d) and 6(g). Responses to parts 6(e) and 6(f) follow the table.

Identity of request 6(a)	Whether Consumer Responded 6(b)	Communication Identification 6(c)	Staff's consideration of response adequacy 6(d)	Responsible Staff Personnel 6(g)	
362.12	Yes	ESAR - Responses to NRC Questions	Adequate	L. Heller & D. Gilken	
362.13	Yes	↓	Inadequate	↓	
362.14	Postponed		Inadequate. Response postponed to future date		
362.15	Yes		Adequate		
362.16	Yes		revised Response but settlement analysis postponed to future -		
362.17	Yes		Inadequate		
50.54(f) Questions			↓		↓
4	Yes				
5	Yes	Inadequate			
6	Yes	Inadequate			
9	Yes	Response referred to Question 12			
10	Yes	Response referred to Question 12			
11	Yes	Adequate			
12	Yes	Inadequate			

Interrogatory 6 (cont.)

<u>Identity of Request</u> <u>6(a)</u>	<u>6(b)</u>	<u>6(c)</u>	<u>6(d)</u>	<u>6(g)</u>
16	Yes	Responses to NRC Requests Regarding Plant Fill	Responsive but additional work required to resolve	L. Heller & D. Gilken
24d*	Yes	↓	Adequate	COE & J. Kane
24g	Yes		Inadequate	
27	Yes		Inadequate	
35	Yes		Inadequate	

* Question 24d involves both hydrologic and geotechnical engineering considerations and ~~input from both COE & NRC should have been considered.~~

In answer to interrogatory 6(e), the means by which the Staff communicated its position as to the adequacy or inadequacy of the Applicant's response would be ^{the issuance of} by additional questions ^{on the same subject.} For example, SO.54(f) question 35 specifically indicates the response to ^{previous} question 5 is unacceptable and then requires the completion of exploration, sampling and testing of soil samples. The Applicant's responses which were found acceptable by the Staff should have been recognized by Consumers by the omission of further questions on those specific items. ~~by the Staff~~

The basis for the Staff position on ~~response~~ ^{Consumer's response} adequacy (interrogatory 6f) is that it failed to meet the Staff's acceptance criteria as defined in response to interrogatory 1. Specific reasons for failing include not being fully responsive to the questions asked or insufficient submittal of basic data to support the conclusions or positions submitted by Consumers.

7

An example where Consumer has repeatedly failed to ^{fully} respond to the Staff's request is exemplified in ~~the contents~~ the June 30, 1980 letter from A. Schwencer to J. W. Cook (copy enclosed). 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 pre-load 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.

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 (for GES purpose this is actually interrogatory 2) the following table is provided in response to parts 6 (a), 6 (b), 6 (c), 6 (d) and 6 (g). Responses to parts 6 (e) and 6 (f) follow the table.

Identity of Request	Whether Consumer Responded	Communication Identification	Staff's Consideration of Response Adequacy	Responsible Staff Personnel
6 (a)	6 (b)	6 (c)	6 (d)	6 (g)
362.12	Yes	FSAR - Responses to NRC Questions	Adequate	L. Heller & D. Gillen
362.13	Yes	FSAR - Responses to NRC Questions	Inadequate	L. Heller & D. Gillen
362.14	Yes Postponed	FSAR - Responses to NRC Questions	Inadequate. Response postponed to future date.	L. Heller & D. Gillen
362.15	Yes	FSAR - 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.	L. Heller & D. Gillen
362.17	Yes	FSAR - Responses to NRC Questions	Inadequate	L. Heller & D. Gillen

D. Halls
App. A
response
to
Interr. 6

Identity of Request	Whether Consumer Responded	Communication Identification	Staff's Consideration of Response Adequacy	Responsible Staff Personnel
6 (a)	6 (b)	6 (c)	6 (d)	6 (g)

50.54 (f) Questions

4	Yes	Responses to NRC Requests Regarding Plant Fill	Inadequate	L. Heller & D. Gillen
5	Yes	Responses to Requests Regarding Plant Fill	Inadequate	L. Heller & D. Gillen
6	Yes	Responses to NRC Requests Regarding Plant Fill	Inadequate	L. Heller & D. Gillen
9	Yes	Responses to NRC Requests Regarding Plant Fill	Response referred to Question 12	L. Heller & D. Gillen
10	Yes	Responses to NRC Requests Regarding Plant Fill	Response referred to Question 12	L. Heller & D. Gillen
11	Yes	Responses to NRC Requests Regarding Plant Fill	Adequate	L. Heller & D. Gillen
12	Yes	Responses to NRC Requests Regarding Plant Fill	Inadequate	L. Heller & D. Gillen
16	Yes	Responses to NRC Requests Regarding Plant Fill	Responsive but additional work required to resolve	L. Heller & D. Gillen
24d *	Yes	Responses to NRC Requests Regarding Plant Fill	Adequate	COE & J. Kane

Delete asterisk

*Question 24d involves both hydrologic and geotechnical engineering considerations.

Identity of Request	Whether Consumer Responded	Communication Identification	Staff's Consideration of Response Adequacy	Responsible Staff Personnel
6 (a)	6 (b)	6 (c)	6 (d)	6 (g)
24g	Yes	Responses to NRC Requests Regarding Plant Fill	Inadequate	COE & J. Kane
27	Yes	Responses to NRC Requests Regarding Plant Fill	Inadequate	COE & J. Kane
31	Yes	<u>Replut w/adeve</u>	Inadequate	COE & J. Kane
35	Yes	Responses to NRC Requests Regarding Plant Fill	Inadequate	COE & J. Kane

In answer to interrogatory 6 (e), the means by which the Staff communicated its position as to the adequacy or inadequacy of the Applicant's response would be by the issuance of additional questions on the same subject. For example, 50.54 (f) question 35 specifically indicates the response to previous question 5 is unacceptable and then requires the completion of exploration, sampling and testing of soil samples. The Applicant's responses which were found acceptable by the Staff should have been recognized by Consumers by the ^{absence} ~~omission~~ of further questions on those specific items.

The basis for the Staff position on adequacy (interrogatory 6f) is that Consumers response failed to meet the Staff's acceptance criteria as defined in response to interrogatory 1. ~~Specific reasons for failing include not being fully responsive to interrogatory 1.~~ Specific reasons for failing include not being fully responsive to the questions asked or insufficient submittal of basic data to support the conclusions or positions submitted by Consumers. An example where Consumers has repeatedly failed to fully respond

Now in D. Hood's response to Inter. 4

to the Staff's request is exemplified in the June 30, 1980 letter from A. Schwencer to J. W. Cook (copy enclosed). 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.

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 data listed in the third column when this 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 36, 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 identify of the communication by which the Staff communicated its position as to the adequacy or inadequacy of the response;

Response. The identity of the requests has been provided in response to interrogatory 7. Consumers did respond to the staff's requests with their submission of FSAR Amendment 85 (Revision 10, dated November 1980). The adequacy of Consumers response to the requests identified in interrogatory 7 is currently being evaluated by the NRC Staff and its Consultant, the U.S. Army Corps of Engineers. In the February 12, 1981 Memorandum and Order from the ASLB (page 4) it is indicated that Mr. Kane should be made available for deposition questioning on Amendment 85 to the FSAR. It is the intent of the Staff to formally respond to Consumers on the adequacy of their responses in Amendment 85 submittal following Mr. Kane's March 18, 1981 deposition.

Interrogatory 9. Excluding the information provided in response to interrogatory 5, state with particularity each item of information the Staff felt was necessary, as of December 6, 1979, for Consumers to provide in order for the Staff to have concluded that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3.).

Response. The information provided in response to interrogatory 5 (for GES purpose this is actually interrogatory 2) essentially identifies the information the Staff felt was necessary as of December 6, 1979. It should be noted, however, that prior to this date that the full extent of the plant fill settlement problem was unknown and was under investigation. For example, 50.54 (f) question 12 (submitted by NRC to Consumers on March 21, 1979) requires the documentation of the condition of the soils under all safety related structures and utilities founded on plant fill or natural lacustrine deposits. In this same question the Staff requests the submittal of discussions on measures to be taken if foundation materials are shown to be deficient. Consumers in their response to question 12 (initially on April 24, 1979, then in Rev. 1, May 31, 1979; Rev. 2, July 9, 1979; Rev. 3, Sept. 13, 1979) provides information that is evaluated by the Staff to be not fully responsive and acceptable. The basis for the Staff's conclusion on acceptability is best illustrated by the need to issue additional questions which seek to have

Consumers provide their design and criteria in sufficient detail to permit the staff to conclude there is reasonable assurance on plant safety. An example of this problem is illustrated by the issuance of 50.54 (f) questions 41 and 42 (submitted to Consumers on August 4, 1979) which were prepared by NRC Consultant, the U.S. Army Corps of Engineers. The Corps had become actively involved in the Midland review after the December 6, 1979 Order. Questions 41 and 42, continue to seek basic information and data not previously provided in Consumers responses on the fixes proposed for the Service Water Structure and the Auxiliary Building which will permit the Staff to reach a conclusion on the acceptability of plant repairs.

Interrogatory 10. For each item of information set forth in response to interrogatory 9, state (a) whether the Staff had requested Consumers to provide such information; (b) the identity of each request by the Staff to Consumers; (c) the identity of the communication that the Staff considered Consumers' response to the request; (d) whether Consumers' response was deemed adequate by the Staff; (e) the identity of the communication by which the Staff's evaluation of Consumers' response was communicated to Consumers; (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. Our response to Interrogatory 9 indicates the information provided in reply to interrogatory 5 essentially identifies the information the Staff felt was necessary as of December 6, 1979. For this reason no response to Interrogatory 10 is needed.

Interrogatory 11. Excluding the information provided in response to interrogatory 7, state with particularity each item of information the Staff feels, as of the date of answering this interrogatory, is necessary for Consumers to provide in order for the Staff to conclude that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3.).

Interrogatory 12. For each item of information set forth in response to interrogatory 11 state: (a) whether the Staff had requested Consumers to provide such information; (b) the identity of each request by the Staff to Consumers; (c) the identity of the communication that the Staff considered Consumers' response; (d) whether Consumers' response was deemed adequate by the Staff; (e) the identity of the communication by which the Staff's evaluation of Consumers' response was communicated to Consumers; (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. Excluding the information provided in response to interrogatory 7 the staff has not identified, as of February 19, 1981, any additional information 't feels is necessary for Consumers to provide in order for the Staff to conclude that the safety issues associated with remedial action will be resolved. For this reason a response to Interrogatories 11 and 12 is not required. It should be noted from the Staff's response to Interrogatory 8, however, that upon completion of our review of Amendment 85 there exists a possibility that additional requests for information and questioning may result.

Interrogatory 14. As of December 6, 1979 with regard to each criteria identified in your answer to interrogatory 13 state whether Consumers had submitted sufficient information to justify each acceptance criteria. If Consumers had not submitted sufficient information, state with particularity which information Consumers had failed to supply.

Interrogatory 15. Excluding the acceptance criteria identified in response to interrogatory 13, state with particularity each acceptance criteria which Consumers has to date provided to the staff.

Interrogatory 16. With regard to each criteria identified in your answer to interrogatory 15 state whether Consumers has submitted sufficient information to justify each acceptance criteria. If Consumers has not submitted sufficient information, state with particularity which information Consumers has failed to supply.

Response.

Interrogatory 13. State with particularity each acceptance criteria which Consumers Power Company had up until December 6, 1979 provided to the staff.

Response. Our interpretation of this Interrogatory is that the particulars requested here have already been previously asked and responded to in Interrogatories 1, 2, and 6. For example our response to Interrogatory 1 defines acceptance criteria and refers to the Standard Review Plans where the basic data and information to address each particular engineering aspect are discussed in detail. Our response to Interrogatory 2 identifies the Staff's requests [as of or before December 6, 1979] that were directed to the determination and justification of acceptance criteria and indicates which portion of those requests were directed to acceptance criteria. Our response to Interrogatory 6 where we have indicated which of our previous requests (that have been identified as directed towards acceptance criteria) have been found adequate by the Staff would be the indicator to Consumers what acceptance criteria the Staff feels has been provided. There are portions of the information provided in Consumer's responses to the staff request which responses in their entirety have been judged inadequate (NRC response to Interrogatory 6) that would also be considered by the Staff to be a needed portion of the supporting basic data in order to be found acceptable. As previously indicated in our responses to Interrogatory 6, the relevant portions of Consumers responses which were found acceptable by the Staff should have been recognized by Consumers by the absence of further questions on those specific items.

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 ~~item of information the~~ Staff request after December 6, 1979 with regard to acceptance criteria. The information contained in each request, ^{has been} ~~is~~ available to Consumers since ~~these~~ ~~requests were previously transmitted~~ the date listed in ^{the} third column when this information was transmitted to them.

Identification of Previous Staff Request	Applicable Portion of Request	Date request submitted to CPCo
50.54(f) Questions 36, 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;

Response. The identity of the requests has been provided in response to interrogatory 7. Consumers did respond to the Staff's requests with their submission of FSAR Amendment 85 (Revision 10, dated November 1980). The adequacy of Consumers response to the ~~identified~~ requests identified in interrogatory 7 is currently being evaluated by the NRC Staff and its Consultant, the U.S. Army Corps of Engineers. In the February 12, 1981 Memorandum and Order from ^{the} ASLB ^(page 4) it is indicated that Mr. Kane should be made available for ^{deposition} questioning on Amendment 85 to the FSAR. It is the intent of the Staff to formally respond to Consumers on the ^{responses in} adequacy of their Amendment 85 submittal following Mr. Kane's March 18, 1981 deposition.

Interrogatory 9. Excluding the information provided in response to interrogatory 5, state with particularity each item of information the Staff felt was necessary, as of December 6, 1979, for Consumers to provide in order for the Staff to have concluded that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3.)

Response. The information provided in response to Interrogatory 5 (for GES purpose this is actually interrogatory 2) essentially identifies the information the Staff felt was necessary as of December 6, 1979. It should be noted, however, that prior to this date ~~that~~ the ^{full} extent of the plant fill settlement problem was unknown and was under investigation. For example, SO. 54(f) question 12 (submitted ^{by NRC} to Consumers on March 21, 1979) requires the documentation of the condition of the soils under all safety related structures and utilities founded on plant fill or natural lacustrine deposits. In this same question the Staff requests the submittal of discussions on measures to be taken if foundation materials are shown to be deficient. Consumers in their response to question 12 (Initially on April 24, 1979, then in Rev. 1, May 31, 1979; Rev. 2, July 9, 1979; Rev. 3, Sept. 13, 1979) provides information that is evaluated by the Staff to be not fully responsive and acceptable. The basis for the Staff's conclusion on acceptability is best illustrated by the need to issue

which seek to have Consumers provide their design and criteria in sufficient detail to permit the staff to conclude there is reasonable assurance on plant safety. (11)

An example of this problem is illustrated by the issuance of 50.54(f) questions 41 and 42, which were prepared by NRC Consultant, the U.S. Army Corps of Engineers. ^(submitted to Consumers on August 4, 1979.) ~~The Corps~~ had become ^{actively} involved in the Midland review after the December 6, 1979 Order. Questions 41 and 42 continue to seek basic information and data ^{not previously provided in Consumers response} on the fixes proposed for the Service Water Structure and the Auxiliary Building which will permit the Staff to reach a conclusion that ~~there is reasonable assurance that the plant repairs will be acceptable~~ on the acceptability of plant repairs.

Interrogatory 10. For each item of information set forth in response to interrogatory 9, state (a) whether the Staff had requested Consumers to provide such information; (b) the identity of each request by the Staff to Consumers; (c) the identity of the communication that the Staff considered Consumers' response to the request; (d) whether Consumers' response was deemed adequate by the Staff; (e) the identity of the communication by which the Staff's evaluation of Consumers' response was communicated to Consumers; (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. Our response to Interrogatory 9 indicates the information provided in reply to Interrogatory 5 essentially identifies the information the Staff felt was necessary as of December 6, 1979. For this reason no ~~additional~~ response to Interrogatory 10 is needed.

Interrogatory 11. Excluding the information provided in response to interrogatory 7, state with particularity each item of information the Staff feels, as of the date of answering this interrogatory, is necessary for Consumers to provide in order for the Staff to conclude that "the safety issues associated with remedial action taken or planned to be taken by the licensee to correct the soil deficiencies will be resolved." (Order at page 3.)

Interrogatory 12. For each item of information set forth in response to interrogatory 11 state: (a) whether the Staff had requested Consumers to provide such information; (b) the identity of each request by the Staff to Consumers; (c) the identity of the communication that the Staff considered Consumers' response; (d) whether Consumers' response was deemed adequate by the Staff; (e) the identity of the communication by which the Staff's evaluation of Consumers' response was communicated to Consumers; (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. Excluding the information provided in response to Interrogatory 7 the Staff has not identified, as of Feb. 12, 1981, any additional information it feels is necessary for Consumers to provide in order for the Staff

to conclude that the safety issues associated with remedial action will be resolved. For this reason a response to Interrogatories 11 and 12 is not required. It should be noted from the Staff's response to Interrogatory 8, however, that upon completion of our review of Amendment 85 there exists a possibility that additional ^{request for} information and questioning may result.

Interrogatory 14. As of December 6, 1979 with regard to each criteria identified in your answer to interrogatory 13 state whether Consumers had submitted sufficient information to justify each acceptance criteria. If Consumers had not submitted sufficient information, state with particularity which information Consumers had failed to supply.

Interrogatory 15. Excluding the acceptance criteria identified in response to interrogatory 13, state with particularity each acceptance criteria which Consumers has to date provided to the Staff.

Interrogatory 16. With regard to each criteria identified in your answer to interrogatory 15 state whether Consumers has submitted sufficient information to justify each acceptance criteria. If Consumers has not submitted sufficient information, state with particularity which information Consumers has failed to supply.

Response

13. State with particularity each acceptance criteria which Consumers Power Company had up until December 6, 1979 provided to the Staff.

Response. Our interpretation of this Interrogatory is that the particulars requested here have already been previously asked and responded to in Interrogatories 1, 2, and 6. For example our response to Interrogatory 1 defines acceptance criteria and refers to the Standard Review Plans where the ^{basic data and information to address each} particular engineering aspect are discussed in detail. Our response to Interrogatory 2 identifies the Staff's requests [as of or before December 6, 1979] that were directed to the determination and justification of acceptance criteria and indicates which portion of those requests were directed to acceptance criteria. Our response to Interrogatory 6 where we have indicated which of our previous requests (that have been identified as directed towards acceptance criteria) have been found adequate by the Staff would be the indication to Consumers what acceptance criteria the Staff feels has been provided. There are ~~some~~ portions of the information provided in Consumer's responses to the staff request ~~(identified in response to Interrogatory 6)~~ ^{responses in their entirety} which have been judged inadequate (NRC response to Interrogatory 6) that would also be considered by the Staff to be a needed portion of the supporting basic data in order to be found acceptable. As previously indicated in our response to Interrogatory 6, the relevant portions of Consumers responses which were found acceptable by the Staff should have been recognized by Consumers by the absence of further questions on those specific items.

An example may help to illustrate the above discussion. On March 21, 1979, SO.54 (f) question 6 was submitted to Consumers. Question 6 has three parts, but this example will restrict itself to parts 6(a), ^{and 6(b)} which are concerned with foundation stability of the borated water storage tanks. ~~The questions asked in parts 6(a) and 6(b) were as follows~~ A copy of Question 6 in its entirety follows:

Question 6 (Issued 3/21/79)

You propose to fill the borated water storage tanks and measure the resulting structure settlements.

- (a) On what basis do you conclude a surcharge no greater than the tank loading will achieve compaction to the extent intended by the criteria stated in the PSAR? What assurance is provided by the technique that residual settlement for the life of the plant will not be excessive?
- (b) A similar procedure is proposed for other tanks, including the diesel fuel oil storage tanks, and should also be addressed.
- (c) The borated water storage tanks have not yet been constructed and are to be located upon questionable plant fill of varying quality. Provide justification why these safety-related tanks should be constructed prior to assuring the foundation material is suitable for supporting these tanks for the life of the plant. For example, can the tanks be removed with reasonable effort without significant impact?

Consumers responses to parts 6(a) and 6(b) were as follows:

Response (to Question 6, Part a) (Initially issued 4/24/79, Revised 5/13/79 & 9/13/79)

The field exploration program in the area of the borated water storage tanks (BWSTs) shows that the material below approximately the top 4 feet is satisfactory. All unsuitable material, as determined by soil testing, in the tank farm area will be removed and replaced by suitable compacted fill. The BWST foundations (bottom elevation 629'-0") are underlain by suitable material. To confirm that the fill is satisfactory, the tanks will be constructed and filled with water in order to make a full-scale test of the foundation soils. The tank filling will provide reliable information for predicting long-term settlement. Although the degree of compaction set forth in the PSAR may not be satisfied at all points, the PSAR design intent will be met because the fill will have been subjected to a full-scale load test, which will allow a reliable prediction of long-term settlement.

The full-scale load test provides direct and reliable assurance that unpredicted long-term settlements will not occur. Because the piping connections will be made to allow startup flushing, filling, and testing of the tank, selected points on the piping between the borated water tank and the auxiliary building will be monitored for differential settlement and

evaluated in accordance with the procedure described in Question 17.

Each borated water storage tank is constructed of 1/4-inch stainless steel plate. It is designed to have the tank bottom resting on the soil backfill inside the ring beam to transfer the vertical load directly to the soil. The tank bottom is flexible enough to accommodate the settlement of supporting fill and maintain proper load transfer capability. The stresses thus induced in the tank bottom are secondary in nature, and would not affect the integrity of the tank.

Response (to Question 6, Part c)

As described in the response to Part a, the exploratory program in the area shows the materials to be suitable for support of the tanks. However, in order to provide justification for this conclusion, the tanks will be constructed and filled as a full-scale test of the soils beneath them. A reliable estimate of long-term settlement will be determined based on the measured settlements of the loaded tanks. Although removal of the tanks after construction would be both costly and require a schedule delay, the tanks are accessible, and removal remains a viable alternative if unanticipated settlements that require remedial action occur.

The reply by Consumers was not considered adequate by the NRC staff in addressing the original question - what is the basis for the conclusion that the surcharge filling of the tank will produce a condition in the foundation soils equal to the original PSAR compaction criteria? Because of the ^{Staff's recognition of the} time element involved for ^{the tank's} settlement to take place ~~over a long period~~ ^{adverse impact} under a given loading and its ^{once} potential, during plant operation, this safety issue was, again addressed by issuing 50.54(f) Question 31.

QUESTION 31 (Issued 11/19/79)

Your reply to Question 6a does not provide the information requested. Your "full scale load test" proposed for the borated water storage tanks fails to provide any margin to account for additional loadings on the tank such as seismic forces, snow or ice packs, design and measurement uncertainties, etc. Your reply also fails to address the fact that the actual content of the tanks will be other than pure water. Consequently the test as currently proposed, will not produce conservative results and is unacceptable. Revise your proposed test to provide for worst case loadings or loading combinations, with allowances for uncertainties. Specify and describe the basis for the margins to be provided by revised test. Also define your minimum test duration. Describe the extent and type of measurements to be taken after completion of the load test to ascertain actual material properties.

Consumers response to Question 31 was as follows :

RESPONSE (Issued in Revision 5, 2/29/80)

General

The 32-foot high and 52-foot diameter borated water storage tanks are designed to store fluid with a density of approximately the same as water (63 lb/cu ft at 40F) and will be operated at above freezing temperatures by means of internal heaters. Each tank is constructed of 1/4-inch thick stainless steel plate. Figure 31-1 shows the arrangement of the tank and the foundation. The tank is designed to have the bottom plate resting on the sand fill inside the foundation ring to transfer the vertical load directly to the foundation soil. The tank bottom is flexible enough to accommodate the settlement of the foundation and maintain proper load transfer capability. The stresses induced in the tank bottom are secondary in nature and would not affect the integrity of the tank. The maximum contact stress beneath the ring wall due to dead load, live load, and wind load is 1.2 ksf. The maximum contact stress under the bottom plate of the tank due to weight of the fluid is approximately 2 ksf. Figure 31-2 shows boring locations in the tank farm area and Figures 31-3 through 31-8 show standard penetration test blowcount results for the borings within and around the tanks. These blowcounts are also summarized in Table 31-1. Based on the blowcount information in Table 31-1, it is concluded that the condition of the fill is satisfactory for support of the tanks.

Settlement

Two plate load tests were conducted near the ring wall foundations of the east and west tanks at the locations shown on Figure 31-9. The results of these tests are shown

on Figure 31-10. Based on these results it is estimated that the settlement of the tanks due to filling with water will be on the order of 3 inches. The differential settlement between the center and edge of the tanks is estimated to be on the order of 1 inch. Piping connections to the tanks will be disconnected during the load tests. Based on the experience of the diesel generator building, it is estimated that the long-term settlement of the tanks will be on the order of 1-1/2 inches. The estimated differential settlement is about 3/4 inch, which is half of the total.

The estimated values will be confirmed by the results of the full-scale tests to be performed by filling the tanks with water and monitoring them until the rate of movement becomes small, thus allowing prediction of residual settlement by extrapolation. The minimum duration of the test will be 4 months. No significant sand fill was encountered in the borings below and around the tank foundation elevation and, therefore, settlement due to earthquakes is not applicable. The sand within the ring wall was placed at 85% relative density and, therefore, it is not expected to settle during an earthquake. As a result of plant area dewatering, the fill supporting the tanks will settle an estimated 1/2 inch due to consolidation of the fill material. The corresponding differential settlement will be on the order of 1/4 inch. In addition, a uniform settlement on the order of 1/3 inch will also occur in the natural soil below the fill.

Shear Wave Velocity

Cross-hole shear wave velocity tests were conducted near the borated water tanks at the locations shown in Figure 31-9. The results are shown in Figure 31-11. It can be seen from this figure that the shear wave velocity increased with depth of the fill and was greater than 600 feet/second except near the surface.

Bearing Capacity

Bearing capacity calculations were made for the borated water storage tanks using the shear strength data presented in Figure 35-3. The computed ultimate bearing capacity was about 11 ksf. This results in a factor of safety greater than 3 for dead and live loads and a factor of safety of 2 for dead, live, and seismic loads.

Conclusions

Based on the settlement, bearing capacity, and shear wave velocity information discussed above, it is concluded that the engineering properties of the fill are sufficient for

support of the tanks and, therefore, preloading in excess of the tank pressures is not needed. The test to verify the predicted long-term settlement will be interpreted conservatively to account for uncertainties in measurements. Regarding the need for additional measurement, the procedures adopted to obtain the significant engineering properties provide a reliable means for predicting the required design parameters, and additional drilling, sampling, and testing would not provide better data to refine predictions. Further details are given in the response to Question 35. The loading from snow and ice will be small and will not significantly affect settlement or bearing capacity. The capacity of the supporting fill to resist seismic loading is accounted for by the factor of safety of 2 for this loading condition.

Structural analyses of the tank foundation are addressed in the response to Question 14.

As indicated in our response to Interrogatory 6, ~~the~~ ^{in its entirety} Consumers response to Question 31, was considered inadequate by the NRC staff. There are portions of the response to Question 31, ^{however,} which do provide basic data that supports ^{some of} Consumers conclusions and is considered needed acceptance criteria input by the staff. This information would include the density of the fluid to be stored in the tanks, the ~~contact~~ stresses beneath the ring walls and tanks, the boring locations, the summarization of SPT data, the plate load test results, shear wave velocities and the estimates of settlement. The portions of Consumers response to Question 31 which were found unacceptable were addressed by NRC 50.54(f) Question 43 which follows:

Interagency Agreement No. NRC-03-79-167, Task No. 1 - Midland Plant
Units 1 and 2, Subtask No. 1 - Letter Report

Identify specific information, data and method of presentation to be submitted for regulatory review at completion of underpinning operation. This report should summarize construction activities, field inspection records, results of field load tests on caissons and piles and an evaluation of the completed fix for assuring the stable foundation.

43. Borated Water Tanks.

(1) Settlement. The settlement estimate for the Borated Water Storage Tanks furnished by the applicant in response to NRC Question 31 (10 CFR 50.54f) is based upon the results of two plate load tests conducted at the foundation elevation (EL 627.00+) of the tanks. Since a plate load test is not effective in providing information regarding the soil beyond a depth more than twice the diameter of the bearing plate used in the test, the estimate of the settlement furnished by the applicant does not include the contribution of the soft clay layers located at depth more than 5' below the bottom of the tanks (see Boring No. T-14 and T-15, and T-22 thru T-26).

(a) Compute settlements which include contribution of all the soil layers influenced by the total load on the tanks. Discuss and provide for review the analysis evaluating differential settlement that could occur between the ring (foundations) and the center of the tanks.

(b) The bottom of the borated tanks being flexible could warp under differential settlement. Evaluate what additional stresses could be induced in the ring beams, tank walls, and tank bottoms, because of the settlement, and compare with allowable stresses. Furnish the computations on stresses including method, assumptions and adopted soil properties in the analysis.

(2) Bearing Capacity. Laboratory test results on samples from boring T-15 show a soft stratum of soil below the tank bottom. Consideration has not been given to using these test results to evaluate bearing capacity information furnished by the applicant in response to NRC Question 35 (10 CFR 50.54f). Provide bearing capacity computations based on the test results of the samples from relevant borings. This information should include method used, foundation design assumptions, adopted soil properties, ultimate bearing capacity and resulting factor of safety for the static and the seismic loads.

44. Underground Diesel Fuel Tank Foundation Design

(1) Bearing capacity. Provide bearing capacity computation based on the test results of samples from relevant borings, including method used, foundation design assumptions, adopted soil properties, ultimate bearing capacity and the resulting factor of safety.

(2) Provide tank settlement analysis due to static and dynamic loads including methods, assumptions made, etc.