

Energy Technology Engineering Center
Energy Systems Group
P.O. Box 1449
Canoga Park, CA 91304
(213) 341-1000

Operated for U.S. Department of Energy



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September 2, 1980

80ETEC-DRF-3747

Mr. R. J. Bosnak, Chief
Mechanical Engineering Branch
Division of Engineering
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Summary of Documents Submitted to NRC by ETEC Concerning
The Midland Plant Units 1 and 2

- References:
- 1) Ltr 80-ETEC-DRF-0123, "Review of Response to 10 CFR 50.54 Request on Plant Fill for Midland Plant, Units 1 and 2", J. O. Bates to A. J. Cappucci, January 17, 1980
 - 2) Ltr 80-ETEC-DRF-0650, "ETEC Review of Draft MEB SER for Midland Plant Units 1 and 2", J. O. Bates to R. J. Bosnak, February 27, 1980
 - 3) Ltr 80-ETEC-DRF-3195, "Review of Underground Utilities Section of 'Interagency Agreement No. NRC-03-79-167, Task No. 1 - Midland Plant Units 1 and 2, Subtask No. 1 - Letter Report'", J. O. Bates to A. J. Cappucci, July 30, 1980

Dear Mr. Bosnak:

Per the request of Mr. A. J. Cappucci, Jr. summaries of the documents submitted by ETEC to NRC - MEB concerning the Midland Plant Units 1 and 2 are enclosed. The documents submitted are References 1 through 3 listed above.

Sincerely yours,

J. O. Bates, Program Manager
Energy Programs Office
Energy Technology Engineering Center

Enclosure
As Noted

cc w/enc1.: H. L. Brammer - NRC
A. J. Cappucci - NRC

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CPCO - Depos exhibit #5
(Over) 11/21/81

SUMMARY OF DOCUMENTS SUBMITTED TO NRC BY ETEC
CONCERNING THE MIDLAND PLANT UNITS 1 AND 2

Reference 1 This is a review of Consumer Power Company responses to Questions 16-20 of the NRC 10 CFR 50.54(f) Revision 2 dated July 9, 1979. These questions concerned the effect of the plant fill settlement on the underground piping. In the review, concern was expressed over the following items:

- a) Buckling or crippling were not considered as failure modes.
- b) The stresses were based on the current pipe profiles and not the expected differential settlement over the life of the plant.
- c) The method outlined for calculating the stresses in the deformed piping was not particularly applicable for the profiled piping.
- d) What is to be done if stresses approach or exceed code allowables.
- e) The differential settlement between piping and building at areas of penetration.
- f) The additional loading that may be imposed on active components due to differential settlement.

Some of these same concerns were again expressed in Reference 3 based on latter revisions to Consumers Power Company responses.

Reference 2 The draft Safety Evaluation Report prepared by the NRC - MEB Staff based on the Midland 1 and 2 FSAR through Revision 21 was reviewed. It was found to be current with respect to the FSAR with no changes being required at the time.

The major remaining unresolved issues were:

- 1) Asymmetric cavity pressurization.
- 2) The effect of building settlement upon mechanical components.
- 3) Seismic qualification of mechanical and electrical equipment.
- 4) The completion of the confirmatory analysis.

Reference 3 Section g of the referenced report was reviewed and in general ETEC concurred with the concerns expressed therein. A summary of our comments follow:

- a) Methods of measuring in-situ stresses in the pipes should be investigated.
- b) Based on an elastic analysis, our calculations show maximum stresses as high as 212,000 psi in the buried pipe whereas the maximum stress calculated by CPC is 27,000 psi. These stresses are bending stresses based on the pipe profiles.
- c) Stresses other than bending stresses are also of concern. The external crushing loads required to cause the pipe to deform with a relatively sharp radius of curvature, as shown in some areas of the profiled pipes, will be high. This could induce high stresses and local crippling.
- d) Local crippling can also occur due to the high bending stresses; sudden changes in slope such as at building penetrations, attachments to heavy equipment and sharp dips in the pipe profile.

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<u>Gillies, BB</u>	<u>Twa, GJ</u>	<u>Library</u>
<u>Glumace, RJ</u>	<u>Wagner, RK</u>	<u>Prog. Adm. (SS)</u>
<u>Goggin, DE</u>	<u>Weigand, MA</u>	<u>Purchasing (SS)</u>
<u>Gould, MI</u>	<u>Werth, RL</u>	<u>Safety (SS)</u>
<u>Graner, SG</u>	<u>Wiese, RW</u>	<u>x With enclosure</u>

ETEC LETTER REVIEW RECORD

Prepared by: J.M. Brammer(J.O. Bates)

Typed by: Cecilia

Addressee: Mr. R. J. Bosnak - NRC

TWX/Ltr No.: 80 ETEC-DRF-3747

Date: September 2, 1980

DOE Lead Branch: _____

Completes action in: DRF- _____ - _____

Subject: Summary of Documents Submitted to NRC by ETEC Concerning The Midland Plant Units 1 and 2

Req. action: ETEC Other None

Remarks: _____

Department/Unit	Rev./Appr.	Signature
Vice President		
Mgr, Facil.Des.	X	<i>[Signature]</i>
Mgr, Stress	X	<i>[Signature]</i>
Mgr, Test Eng.		
Mgr, QA		
Mgr, Construct.		
Mgr, Tech.Serv.		
Mgr, Operations		
Prog/Proj Mgmt	X	<i>[Signature]</i>
Other		
J. M. Brammer	X	<i>[Signature]</i>

Energy Technology Engineering Center
Energy Systems Group
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October 1, 1980

80ETEC-DRF-4220

Mr. R. J. Bosnak, Chief
Mechanical Engineering Branch
Division of Engineering
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Midland Plant Units 1 & 2: Bending Stresses in Underground
Piping Due to Differential Soil Settlement

Reference: "Responses to the NRC 10 CFR 50.54(f) Request Regarding Plant
Fill For Midland Plant Units 1 & 2, Consumer Power Company,
Docket Numbers 50-329 and 50-330", Rev. 6, April 1, 1980

Dear Mr. Bosnak:

Enclosed are 7 copies of the ETEC stress analysis of several of the under-
ground pipe lines as profiled in the reference. All the copies are being
sent to your office per the instructions of Mr. A. J. Cappucci.

Sincerely yours,

J. O. Bates, Program Manager
Energy Programs Office
Energy Technology Engineering Center

Enclosures
As Noted

cc w/o encls.: H. L. Brammer, NRC
A. J. Cappucci, NRC

~~8010070529~~

(Re. Refo 5. # 6

Clar) 1/21/81

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ETEC LETTER REVIEW RECORD

Prepared by: J.M. Brammer (J.O. Bates)

Typed by: Cecilia

Addressee: Mr. R. J. Bosnak - NRC

TWX/Ltr No.: 80 ETEC-DRF-4220

Date: October 1, 1980




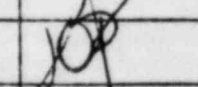
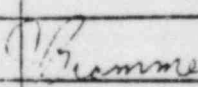
DOE Lead Branch: _____

Completes action in: DRF- -

Subject: Midland Plant Units 1 & 2:
Bending Stresses in Underground Pip-
ing Due to Differential Soil Settlement

Req. action: ETEC Other None

Remarks: _____

Department/Unit	Rev./ Appr.	Signature
Vice President		
Mgr, Facil.Des.	X	
Mgr, Stress	X	
Mgr, Test Eng.		
Mgr, QA		
Mgr, Construct.		
Mgr, Tech.Serv.		
Mgr, Operations		
Prog/Proj Mgmt	X	
Other		
J. M. Brammer	X	

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October 6, 1980

80ETEC-DRF-4264

Mr. R. J. Bosnak, Chief
Mechanical Engineering Branch
Division of Engineering
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Subject: Midland Plant Units 1 & 2: Summary of Conference Call of
September 8, 1980 Regarding Soil Settlement Problem

- References: 1) NRC Letter, Docket 50-539/330, "Summary of January
16, 1980 Meeting on Supplemental Requests Regarding
Plant Fill", D. S. Hood, February 4, 1980
- 2) ETEC Letter 80ETEC-DRF-0123, "Review of Response to
10 CFR 50.54 Request on Plant Fill for Midland Plant,
Units 1 and 2", J. O. Bates to A. J. Cappucci, January
17, 1980

Dear Mr. Bosnak:

Enclosed for record purposes is a summary of the subject conference call
between the NRC, ETEC and Consumers Power Company and their consultants
regarding the comment items contained in Enclosure 3 of Reference 1.
These items were based on the ETEC comments of Reference 2 and pertain to
the effects of soil settlement on buried piping for the subject plant.

Sincerely yours,

J. O. Bates, Program Manager
Energy Programs Office
Energy Technology Engineering Center

Enclosures
As Noted

cc: H. L. Brammer, NRC
A. J. Cappucci, NRC

~~8010160554~~

CFC. Depos. Exhibit # 7
(Chen) 11/21/81

SUMMARY OF CONFERENCE CALL BETWEEN NRC, ETEC,
CONSUMERS POWER COMPANY AND THEIR CONSULTANTS
ON SEPT. 8, 1980 REGARDING THE MIDLAND PLANT
UNITS 1 & 2 SOIL SETTLEMENT PROBLEM

The items of this summary are keyed to the comment numbers of Enclosure 3 of Reference 1.

2. Response to Question 16, Page 16-1
The Applicant committed to modify the response to address the maximum expected differential settlement over the life of the plant.
3. Response to Question 17, Page 17-1, Para. 1
The Applicant stated that the selection of the Service Water Piping for profiling was based on the criterion that this piping covered the largest area and was expected to represent the worst case. After some discussion, this item was left unresolved.
4. Response to Question 17, Page 17-2, Para. 2
The Applicant indicated that calculations currently being performed did not utilize the method described in the subject paragraph. NRC will investigate arrangements for an exchange of ETEC and Bechtel calculations for further review.
5. Response to Question 17, Page 17-3, Para. 2
The Applicant is investigating the settlements over the life of the plant.
6. Response to Question 17
The Applicant stated that stresses in excess of the previously proposed $3 S_c$ limit were obtained and is going to propose that the limit be increased. Such an increase is to be based on stress levels permitted by other aspects of the Code, e.g. manufacturing. ETEC's comments are on hold pending receipt of additional information.
7. Response to Question 18, Page 18-1, Para. 2 & 3
The Applicant stated that final closure welds have been made and that the amount of settlement before final closure is unknown. This item is unresolved.

-2-

8. Response to Question 18, Pages 18-2, Para. 2 & 3
The Applicant will re-evaluate this item.
9. Response to Question 19, Pages 19-1 to 19-3
The Applicant will re-evaluate this item.
10. Response to Question 20
The Applicant will re-evaluate this item.

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<u>Graner, SG</u>	<u>Wiese, RW</u>	<u>x With enclosure</u>

ETEC LETTER REVIEW RECORD

Prepared by: W. P. Chen (J. O. Bates)

Typed by: Cecilia

Addressee: Mr. R. J. Bosnak - NRC

TWX/Ltr No.: 80 ETEC-DRF-4264

Date: October 6, 1980


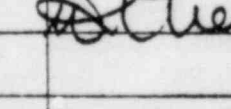
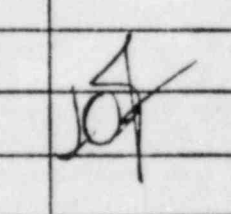
DOE Lead Branch: _____

Completes action in: DRF- _____
Midland Plant Units 1 & 2:

Subject: Summary of Conference Call
of September 8, 1980 Regarding Soil
Settlement Problem.

Req. action: ETEC Other None

Remarks: _____

Department/Unit	Rev./ Appr.	Signature
Vice President		
Mgr, Facil.Des.	X	
Mgr, Stress	X	
Mgr, Test Eng.		
Mgr, QA		
Mgr, Construct.		
Mgr, Tech.Serv.		
Mgr, Operations		
Prog/Proj Mgmt	X	
Other		