



UNITED STATES
 NUCLEAR REGULATORY COMMISSION
 REGION III
 755 ROOSEVELT ROAD
 GLEN ELLYN, ILLINOIS 60137

March 12, 1979

MEMORANDUM FOR: H. D. Thornburg, Director, Division of Reactor
 Construction Inspection
 Office of Inspection and Enforcement

FROM: James G. Keppler, Director

SUBJECT: MIDLAND DIESEL GENERATOR BUILDING AND PLANT AREA
 FILL

Meetings on this subject were held on February 23, 1979 and March 5, 1979, between Consumers Power Company, Bechtel Corporation and NRC. These meetings were a continuation of the investigation conducted by our inspectors during December 11-13, 18-20, 1978 and January 4-5, 9-11, 22-25, 1979.

During the February 23, 1979 meeting we presented to Consumers Power Company our preliminary investigation findings, a copy of which was previously forwarded to you.

During the March 5, 1979 meeting Consumers Power Company provided their responses to those findings, copies of which are enclosed.

Our summary findings with regard to this matter are as follows:

1. The quality assurance program for obtaining proper soil compaction of the Midland site was deficient in a number of areas.
2. Soil of the type used in the foundation of the diesel generator building is also located, to varying degrees, under other Class I structures. Whereas excessive settlement has been observed with the diesel generator building, the settlement of other Class I structures has not exceeded predicted values.
3. Several incorrect statements are contained in the FSAR with respect to the soil foundation.

In addition to these findings, we have compiled a list of technical questions which bear on the resolution of this problem. These are enclosed for your use in working with NRR.

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As previously discussed with you, one of our concerns is related to why construction activities at the Midland site, which could be affected by a Class I structure settlement should be continued while the total cause of the diesel generator settlement has not yet been determined. During the meeting on March 5, 1979, this question was posed to the licensee. Their response was that continuing scheduled construction work would not compromise the committed evaluations or remedial actions nor make irrevocable any conditions which do not fully satisfy FSAR or licensing requirements. Based on this, they are willing to accept the risk of continued construction.

In that we have questioned the licensee's intent to continue construction, we consider that the matter also warrants examination by HQ. This examination we feel also involves NRR for the following reasons:

1. If one assumes the foundation settlement placement was in accordance with design, then the matter of design adequacy becomes questionable.
2. If one assumes foundation placement did not meet design specification, one must question acceptability of the soils condition under the affected structures. It should be pointed out again, that the type of soils placed under the diesel generator building were also the type placed under other Class I structures and associated pipes and utility lines.
3. In light of items a and b above, the matter of seismic design also becomes one of concern.
4. Because of the licensee's total evaluation of the specific cause for the diesel generator and plant area fill settlement is not yet complete, the question of FSAR design review and its acceptability may warrant further attention by NRR.

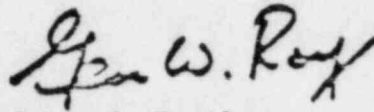
As an alternate approach to the issue, consideration should be given to an NRC Directive or Show Cause Order which could expedite the licensee's confirmation to the NRC that continued construction will not compromise the design function of the involved structures for the life-time of the plant. It may also expedite the licensee's investigation into the basic cause of the diesel generator settlement and its relationship (or absence) to other Class I structures.

H. D. Thornburg

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March 12, 1979

We will continue to followup on this matter and keep you informed of new information.


for James G. Keppler
Director

Enclosures:
As stated

MIDLAND QUESTIONS

1. The licensee has stated that the fill has settled under its own weight. What assurance is provided that the fill has not settled locally under:
 - a. Structures with rigid mat foundations as portions of the auxiliary building or service water pump structure.
 - b. Class I piping in the fill resulting in lack of continuous support causing additional stress not accounted for in design.
2. How has the lack of compaction and the increase in soil compressibility affected the seismic response spectra used in design and therefore, the soil-structure interaction during seismic loading?
3. After current preloading material is removed will additional borings be taken to ascertain that the material has been compacted to the original requirements set forth in the PSAR and construction license application?
4. Since the foundation material is variable as described in 50.55(e) interim report number 4, how can long term differential settlement be predicted to assure reliable startup of the D/G in the event of emergency?
5. What tolerance does the D/G manufacturer require on the alignment of the D/G for reliable operation and startup?
6. Preliminary information indicates that the piping in fill under and in the vicinity of the D/G building have gross deformations induced either prior to or during the preload program. What is the extent of the deformation. Is this deformation beyond predicted? If so, what plans are being taken to correct the condition?
7. The borated water storage tanks and diesel fuel oil tanks have not yet been constructed and are to be located in questionable plant fill of varying quality. Why should those Class I structures be constructed prior to assuring the foundation material is capable of supporting such structures for the plant life?

MIDLAND QUESTIONS

8. FSAR Figure 2.5-48 shows estimated ultimate settlements which indicate a differential settlement across individual mat foundation and within individual structures. Was this differential accounted for in the original design of the mat foundation and in the design of structural member within the structure. If not, what effect does this differential settlement have on additional stresses induced in the mat or in structure members such as slab-beam-column connections?

9. Based on the information provided in CPGO interim report number 4, it appears that the tests performed on the exploratory borings indicate soil properties that do not meet the original compaction criteria set forth in the PSAR and specification for soils work. What assurance is there that the soil under other Class I structures not accessible to exploratory boring meet the control compaction requirements?

These two requested records
are maintained by Eugene Gallagher
in an unlabeled 3-ring notebook.

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)
)
CONSUMERS POWER COMPANY) Docket Nos. 50-329 OM & OL
) 50-330 OM & OL
(Midland Plant, Units 1 and 2)

NRC STAFF TESTIMONY OF DARL S. HOOD, JEFFREY K. KIMBALL AND EUGENE GALLAGHER

ON STAMIRIS CONTENTION 1

Q. 1. Please state your names and positions with the NRC.

A. My name is Darl S. Hood. I am a Senior Project Manager in the Division of Licensing, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

My name is Jeffrey K. Kimball. I am a Seismologist/Geophysicist reviewer within the Geosciences Branch, Division of Engineering, Office of Nuclear Reactor Regulation, U. S. Nuclear Regulatory Commission.

My name is Eugene J. Gallagher. I am a civil engineer with the U.S. Nuclear Regulatory Commission. Since February, 1981, I have been assigned to the Reactor Engineering Branch, Division of Resident and Regional Reactor Inspection, Office of Inspection and Enforcement. Prior to February, 1981, I was a reactor inspector assigned to the Region III, Reactor Construction and Engineering Support Branch, Office of Inspection and Enforcement.

Q. 2. Have you prepared statements of professional qualifications?

A. Yes. Copies of these statements are Attachment 1.

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Q. 3. Please state the duration and nature of your responsibilities with respect to the Midland Plant, Units 1 and 2.

A. I, Darl Hood, am the Project Manager for the Midland Plant application for operating licenses. I have served in that position from August 29, 1977, when the application for operating licenses was tendered to the NRC for acceptance review, up to the present time. My responsibilities include management of the Staff's environmental and radiological safety reviews. I am responsible for the Staff testimony on the following parts of Stamiris' Contention 1: (a); Supplemental Items 2, 3, 4 and 6; and portions of Supplemental Items 1 and 5.

I, Jeffrey Kimball, have served in the position of Seismologist/ Geophysicist reviewer for the Midland Plant since July 1980. I am responsible for the Staff testimony on part 1 (b) of Stamiris Contention 1.

I, Eugene Gallagher, was assigned to the Midland Plant (among others) from October, 1978 until January, 1981. Since October of 1978, I have spent approximately one year of effort performing inspections, reviewing quality control records and procedures, observing work activities, reviewing Consumers Power Company (hereafter CPC or Applicant) responses to 10 CFR 50.54(f) questions 1 and 23, and attending meetings and presentations by CPC and Bechtel regarding the soil settlement matter at the Midland Plant. I am responsible for the Staff testimony for ^a portions of Supplemental Items 1 and 5 ^{all of} to Stamiris' Contention 1.

Q. 4. Please state the purpose of this testimony.

A. The purpose of this testimony is to address Contention 1 of the Contentions of Barbara Stamiris as identified in the Appendix to Prehearing Conference

connect

Order Ruling on Contentions and on Consolidation of Proceedings, dated October 24, 1980, and as supplemented by Intervenor Answer To Applicant's Interrogatories, dated April 20, 1981. This testimony does not address Stamiris Contention 1 (d) since this relates to matters to be addressed at a later time.

Stamiris' Contention 1 reads as follows:

Consumers Power Company statements and responses to NRC regarding soil settlement issues reflect a less than complete and candid dedication to providing information relevant to health and safety standards with respect to resolving the soil settlement problems, as seen in:

- a) the material false statement in the FSAR (Order of Modification, Appendix B);
- b) the failure to provide information resolving geologic classification of the site which is pertinent to the seismic design input on soil settlement issues (Responses to FSAR Questions 361.4, 361.5, 361.7 and 362.9);
- d) the failure to provide adequate acceptance criteria for remedial actions in response to 10 CFR §50.54(f) requests (as set forth in part II of the Order of Modification);

and this managerial attitude necessitates stricter than usual regulatory supervision (ALAB-106) to assure appropriate implementation of the remedial steps required by the Order Modifying Construction Permits, dated December 6, 1979.

April 20, 1981 Supplement to Contention 1

Examples of CPCo. reluctance to provide requested information

1. 3/31/80 NRC meeting notation of Applicant's reluctance to provide NRC consultants with requested information.
2. Vol. III, tab 65 50-54f, 8/6/79 meeting, attitude that "needlessly conservative decisions may be formulated on the 'what if' type questions" by the NRC on dewatering.
3. The 11/24/80 S.A.L.P. assessment on CPCo - NRR interface as presented by D. Hood in the following statements regarding soil settlement issues:

"A big contributor to the inability to make meaningful progress in this matter is the quality of responses gotten. We have set some kind of record on the number of questions re-asked, which speaks poorly for CPCo-NRR interface. ...The bottomline is there seems to be a lack of appreciation or support of Staff review necessities and a tendency to push ahead despite the lack of proper assurances."

4. The perfunctory manner in which CPCo. deponents answered questions. (I will tabulate examples from the depositions I attended.)

Examples of information withheld or incorrectly given:

5. The failure of CPCo. to discuss the Administration Building settlement problem with the NRC, as they did with their consultants, in the early meetings on the DGB settlement.
6. The false FSAR statements beyond the one cited as a "material false statement" in the Dec. 6 Order, as discussed in the 4/3/79 Keppler-Thornburg memo, and the 6/13/79 Thornburg - Thompson memo.

Q. 5. What is the NRC Staff response to Contention 1(a)?

A. Information submitted as part of an application for licenses in accordance with 10 CFR 50.30 is "material" if that information should 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.

The material false statement referred to in Contention 1(a) is described in Appendix B to the Order Modifying Construction Permits, dated December 6, 1979. Specifically, the material false statement was made in Section 2.5.4.5.3 of the FSAR. That section provided that "all fill and backfill were placed according to Table 2.5-9". Had the Staff relied on this statement, it would or could have erroneously concluded that the fill 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 fill and backfill beneath the structures and the Diesel Generator Building are neither "clay" nor a "controlled compacted cohesive fill", but consist of a heterogeneous mixture of sand, clay, silt and lean concrete, and the minimum compaction criterion 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 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 have precluded a more probing analysis or further questioning. Based upon the FSAR information, the 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 FSAR. The Staff'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.

I do not agree with Contention 1(a) to the extent that the material false statement is a reflection of "a less than complete and candid dedication to providing information relevant to health and safety standards with respect to resolving the soil settlement problems." In my opinion the material false statement in the FSAR is a reflection of the breakdown in quality assurance and quality control that existed for the Midland plant prior to December 6, 1979 for requirements such as design control (Criterion III of 10 CFR Part 50, Appendix B) and document control (Criterion VI of 10 CFR Part 50, Appendix B). I have no reason to believe, nor do I believe, that this material false statement was intentional. Similarly, I have heard no one else express this view that the was intentional.

Q. 6. What is the NRC Staff response to Contention 1(b)?

A. FSAR Questions 361.4, 361.5 and 361.7 referred to in Contention 1(b) were asked by the NRC's Geosciences Branch as part of its review of the Midland Plant application for operating licenses. Question 361.4 was issued on June 20, 1978; the Applicant's latest response prior to issuance of the December 6, 1979 Order on Modification was by FSAR Revision 15 (Amendment 54) dated November 27, 1978, (Attachment 2) and the current response was by FSAR Revision 30 (Amendment 83) dated October 21, 1980 (Attachment 3). Question 361.5 was also issued on June 20, 1978; the Applicant's latest response prior to December 6, 1979 was by FSAR Revision 14 (Amendment 51) dated October 17, 1978 (Attachment 4), and the current response was by FSAR Revision 30 (Amendment 83) dated October 21, 1980 (Attachment 5). Question 361.7 was issued on February 14, 1979; the Applicant

responded by FSAR Revision 24 (Amendment 69) dated September 28, 1979 (Attachment 6).

Question 362.9 was asked by the NRC's Geotechnical Engineering section on August 30, 1978; the Applicant's latest response prior to December 6, 1979 was by FSAR Revision 24 (Amendment 69) dated September 28, 1979 (Attachment 7) and the current response is by FSAR Revision 26 (Amendment 73) dated January 30, 1980 (Attachment 8).

The Applicant did not fail to provide information in responding to Questions 361.4, 361.5 and 361.7 as alleged in Contention 1(b); however, the information contained in the responses to these three questions did not resolve the open issue involving which tectonic province the Midland site is in. Specifically, the Applicant had used the Michigan Basin tectonic province whereas the NRC staff has been reluctant to accept subdivision of the whole Central Stable Region tectonic province.

Question 362.9 inquired about structural settlement measurements from certain benchmark numbers. The relationship, if any, of this subject to information resolving geologic classification of the site as alleged in Contention 1(b) is not understood, and Question 362.9 was not asked for such a purpose.

The Staff does not view the tectonic province disagreement between itself and CPC as any reflection of "a less than complete and candid dedication" to providing information relevant to resolving the open issue which is necessary for approval of the remedial actions associated with the soil settlement matter.

Q. 7. What is the NRC Staff response to Item 1 in Stamiris' supplement to Contention 1?

A. Item 1 refers to a March 31, 1980 "meeting notation".

This is a reference to the "Summary of February 27 & 28, 1980 Meeting and Site Tour with Consultants to Review Soil Settlement" (Attachment 9). The statement of interest is the first paragraph on page 3 of this meeting summary:

The staff noted that such documents as above are needed by its consultants for their independent assessment of the adequacy of the proposed remedial measures and requested that these be made publicly available. The applicant indicated a reluctance to this end, and noted that these were available through the I&E audit mechanism. The staff will issue a formal request for these documents.

The above statement refers to a discussion by the Applicant during the meeting in response to our request for documents. The Applicant replied, as best I can recall, that many of these documents are of a type not normally found within the docketed material of an application for licenses, and that the documents requested would be quite voluminous. The purpose of the comment, I believe, was to explore the possibility that the Staff's need for the documents might be accomplished through a less burdensome and expensive mechanism, such as the audit mechanism which would provide for NRC review at a local record center such as Bechtel, in Ann Arbor, Michigan.

The Staff, in fact, formally requested the documents by letter dated April 1, 1980 (Attachment 10). The Applicant replied initially by coverletter dated May 5, 1980 forwarding Amendment 77 and copies of Revision 7 to the document

entitled "Responses to NRC Requests Regarding Plant Fill." This coverletter acknowledged that five of the requested reports were not being forwarded at that time; two of the five had been superseded and the two replacement documents, also named in the staff request, would be forwarded as they became available. These four reports discuss the Sondex system and Borros Anchor procedures.

The fifth document identified for submittal at a later time in the Applicant's May 5, 1980 coverletter discussed qualification of compaction equipment. The documentation for qualification of compaction equipment had been previously requested by the Office of Inspection and Enforcement (IE) on December 4, 1978 as described by "Summary of December 4, 1978 meeting on Structural Settlements" (Attachment 11), page 4, which states in part:

The NRC Resident Inspector asked for a list of the equipment, with a discussion of the compaction capability and limitations of each, used for compacting the fill for the DG Building from elevation 618 to 628 feet. Bechtel will provide this information.

during a routine inspection -

This documentation was again requested unsuccessfully during IE site visits around mid 1979 and in May 1980 (Attachment 12). The Applicant's reply of August 15, 1980 forwarded, in part, a report on the Test Fill Program (tab 150 in "Responses to NRC Requests Regarding Plant Fill") which was conducted between May 1979 and October 1979 to requalify various compactors for structural and pit run sands. The August 15, 1980 reply also noted that "further testing is being conducted in order to substantiate qualification of certain equipment."

**Note:
The site was never able to qualify the equip + the original specified method of thickness i.e. lift
this qualification was with a different method; need their lift thickness; therefore comparative effort!*

*would have
that responsible as
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my attention; I
believe it was!*

While the difficulty and delay associated with acquiring documentation with respect to qualification of soils compaction equipment represents an instance of poor cooperation with NRC, the Staff does not believe that the discussions during the meetings of February 27 and 28, 1980, nor the subsequent actions of the Applicant to comply with the Staff request for documents other than those documents on qualification of soils compaction equipment, reflect an overall a deficiency in attitude. However, this poor cooperation reflected adversely upon the responsible officials involved in execution of CPC's quality assurance program.

Q. 8. What is the NRC Staff response to Item 2 in Stamiris' supplement to Contention 1?

A. The statement referred to in Item 2 is found in tab 66 of the document "Responses to NRC Requests Regarding Plant Fill". It specifically appears in the last paragraph of an internal correspondence by T. C. Cooke/RMW (R.M.Wheeler) which was prepared either on August 6 or 7, 1979 to summarize a pre-meeting of June 27, 1979 between CPC, Bechtel and Bechtel's consultants (Attachment 13).

The meeting summary is somewhat ambiguous as to the source of this statement. The entire last paragraph of the meeting summary, including this statement, appears to indicate the views of the consultants. From my reading of this paragraph, I believe the intent is to reflect the expressions of the consultants.

I am unable to conclude that the cited example reflects the view of any member of CPC. Views expressed by Bechtel's consultants on their own behalf, as may possibly be the case here, would not be a reflection on the Applicant's dedication to providing information nor the Applicant's managerial attitude. Furthermore, this cited example has nothing to do with CPC's alleged reluctance to provide requested information. Similarly, the statement does not demonstrate one way or the other whether CPC has a "less than complete and candid dedication to providing information."

Q. 9. What is the NRC Staff response to Item 3 in Stamiris' supplement to Contention 1?

A. Item 3 refers to the SALP assessment of CPC. SALP, or Systematic Assessment of Licensee Performance, is an NRC program for the comprehensive overview of licensee or applicant performance. The program was included as Task I.B.2 in the "Action Plans for Implementing Recommendations of the President's Commission and Other Studies of TMI-2 Accident", NUREG-0660. The program is also discussed in House Report No. 96-1452, by the Committee on Government Operations, entitled, "Evaluating Nuclear Utilities Performance: Nuclear Regulatory Commission Oversight." The objectives of SALP are:

- (1) Identification of unacceptable licensee performance;
- (2) Improvement of licensee performance;
- (3) Improvement of IE Inspection Program;

- (4) Providing a basis for NRC management's allocation of resources; and
- (5) Achieving regional consistency by appraising licensee performance from a national perspective.

Further description of SALP is provided in SECY 80-83 (Attachment 14).

Performance reviews and evaluations for SALP are conducted semiannually by a board consisting of NRC individuals who are involved in the inspection and licensing activities of the applicant or licensee such as resident inspectors, regional inspectors, regional managers, and NRR Project Managers. As Project Manager for the Midland plant, I, Darl Hood, am a member of the SALP Board responsible for the review and evaluation of the Midland Plant, Units 1 and 2. I participated in a meeting on November 24, 1980 between the SALP Board and CPC which was held to advise CPC of the results of the SALP evaluation for its nuclear plants, including Midland Plant, Units 1 and 2. During this meeting I made the statement:

A big contributor to the inability to make meaningful progress in this matter is the quality of responses gotten. We have set some kind of record on the number of questions re-asked, which speaks poorly for CPCo - NRR interface. ...The bottomline is there seems to be a lack of appreciation or support of Staff review necessities and a tendency to push ahead despite the lack of proper assurance.

Two examples that I had in mind when I made the above bottomline statement were associated with the Applicant's decision (1) to place and remove the surcharge for the Diesel Generator Building without first providing an adequate response to 50.54(f) Request 4, and (2) to proceed with construction of the Borated Water Storage Tanks without first performing the analyses for variable foundation properties and cracks as discussed in the response to 50.54(f) Request 14.

The statement cited above notes my agreement with Ms. Stamiris' contention that CPC has exhibited a reluctance to provide requested information.

Q. 10. What is the NRC Staff response to Item 4 in Stamiris' supplement to Contention 1?

A. Without the tabulated examples of "the perfunctory manner in which CPCo deponents answered questions" promised by Ms. Stamiris in her contention, the Staff is unable to evaluate or address this contention.

Q. 11. What is the NRC Staff response to Item 5 in Stamiris' supplement to Contention 1?

A. This contention lists an example which claims to represent information withheld by the Applicant from the NRC. The specific example cited is, "The failure of CPCo. to discuss the Administration Building settlement problem with the NRC, as they [CPCo] did with their consultants, in the early meetings on the DGB settlement."

Ms. Stamiris is correct in her statement that CPC did not discuss the settlement of the Administration Building grade beam with the NRC during early meetings on the Diesel Generator Building settlement, ~~or associated site visits of late 1978.~~ Although the Administration Building is not a safety related structure and CPC was not bound by 10 CFR 50.55(e) to report such a problem, the existence of that earlier problem was clearly of relevance to the 50.55(e) reports and reviews regarding Diesel Generator Building settlement.

*delete
Correct*

Consent about Dec '78

The NRC first learned of the Administration Building grade beam problem during the NRC investigation into the Diesel Generator Building settlement while at Bechtel's Ann Arbor office in January 1979. At that time, the Bechtel civil design supervisor, Mr. G. Tuveson, informed the NRC of a similiar problem with the Administration Building and provided the NRC with a December 1977 report on the issue.

The NRC documented this information in pages 21-23 of NRC investigation report 78-20 (see Attachment 2 of Staff Testimony on Stamiris' Contention 3), which describes various similarities between the Administration Building settlement and the Diesel Generator Building settlement.

epco should have informed us at the outset of this investigation

The Staff agrees with the contention that the Administration Building example represents information initially withheld from NRC. This information was known to the Applicant and was clearly relevant to the full understanding of the Diesel Generator Building settlement.

Q. 12. What is the NRC Staff response to Item 6 of Stamiris' supplement to Contention 1?

A. Item 6 refers to "false statements" discussed in the April 3, 1979 Keppler - Thornburg memorandum (Attachment 15) and the June 13, 1979 Thornburg - Thompson memorandum (Attachment 16)

The significance or "materiality" of these FSAR statements to NR's review is described in D. Hood's memorandum to file dated August 9, 1979, (Attachment 17). As indicated therein, these other statements would not or could not have had an influence upon a safety conclusion of the NRR staff. Rather, these other statements were viewed as an indicator of poor quality assurance performance.

DARL S. HOOD

OFFICE OF NUCLEAR REACTOR REGULATION
U.S. NUCLEAR REGULATORY COMMISSION

PROFESSIONAL QUALIFICATIONS

I am a Senior Project Manager in the Division of Licensing, Office of Nuclear Reactor Regulation. I am responsible for managing licensing activities by the Commission with respect to Midland Plant, Units 1 and 2.

I have served in the position of Project Manager with the Commission since August 1976. This position provides for the managing of radiological safety reviews of applications for licenses and authorization to construct or operate light water nuclear power plants. As of April 1980, the position also provides for the managing of the environmental reviews of such applications. I assumed responsibility for Midland Plant, Units 1 and 2, when the application for operating licenses was tendered in August 1977. Other nuclear plants for which I have previously served in this capacity are the standardization design of Westinghouse which is designated RESAR-414 (Docket STN50-572), Catawaba Nuclear Station, Units 1 and 2 (Dockets 50-413 and 50-414), and River Bend Station, Units 1 and 2 (Dockets 50-458 and 50-459).

Between June 1969 and August 1976 I held two sequential positions within the Nuclear Power Systems Division of Combustion Engineering, Inc. (C-E) at Windsor, Connecticut. After March, 1973, I was Assistant Project Manager for the Duke Power Project. This position provided assistance in directing all efforts by C-E to design, fabricate, purchase and license the nuclear steam supply systems, reactor core, and associated auxiliary systems for Cherokee Units 1, 2 & 3 and Thomas L. Perkins Units 1, 2 & 3. The position assured that all aspects of the contracts were met and that safe and reliable systems were provided to the required schedule and at a reasonable profit to C-E. I assisted Duke Power in preparing the Preliminary Safety Analysis Report (PSAR) and provided for all C-E licensing support for these units. I also provided coordination of all other nuclear plants referencing the C-E Standard Safety Analysis Report to assure compatibility with C-E standard reference design. Until March, 1973, I was a Project Engineer in C-E's Safety and Licensing Department and was responsible for licensing of nuclear power plants. I coordinated the preparation of the Millstone Unit 2 PSAR and FSAR and the Calvert Cliffs Units 1 & 2 FSAR and interfaced with NRC, the utility, architect engineer and all C-E functional departments on licensing support matters. I ensured that NRC criteria, standards, and guides were incorporated into the nuclear steam supply system design.

Between August 1966 and June 1969, I was a Nuclear Safety and Radiation Analysis Engineer in the Nuclear Safety Unit, Nuclear Division of the Martin Marietta Corporation at Baltimore, Maryland. The purpose of this position was to perform hazard evaluations for nuclear power sources applied in space missions. My primary duty was to determine public exposure to radiation for malfunctions occurring during the intended mission. I also determined means by which the hazard potential for nuclear space systems could be mitigated to the extent that nuclear safety criteria were met. I conducted research with regards to the development of suitable criteria for permissible exposure levels and their probabilities, taking into account the dependence of acceptable risk on the benefit to be derived. My primary assignment was with the SNAP 29 (Systems for Nuclear Auxiliary Power) project. My evaluations of this nuclear power source included the formulation and application of computerized models for the transport of fuel released at high altitudes, in deep ocean and in shallow waters. I derived models for these release areas to incorporate the activity into human food chains and determined the expected ingestion dose, the number of people involved and the exposure probabilities. Inhalation dose was determined for radioactive fallout from the high-altitude release.

Between February 1965 and August 1966 I was a Nuclear Quality Control Engineer within the Electric Boat Division of General Dynamics at Groton, Connecticut. The purpose of this position was to provide control of quality for naval reactor systems, components, and shielding during the construction or overhaul of submarines by this shipyard. My primary area of responsibility was shielding. Duties included establishing procedures for the inspection of fabrication and installation of lead and polyethylene shielding, and resolving problems in complying with these or other shielding procedures. The position required a knowledge of nuclear theory, SSW systems design, Bureau of Ships contract and design requirements, non-destructive testing techniques, and quality control requirements.

Between November 1963 and February 1965, I was an Aeronautical Engineer for Nuclear Propulsion and Power at the George C. Marshall Space Flight Center, National Aeronautics and Space Administration in Huntsville, Alabama. I performed investigations of the nature and magnitude of the nuclear radiation environment, shielding systems and safety systems associated with proposed nuclear space vehicles for candidate space missions.

Between November 1963 and college graduation in 1962, I held various positions including chief of a missile electronics training unit at Redstone Arsenal, Alabama; student at the U.S. Army Signal Officer's Orientation Course at Fort Gordon, Georgia; and Marine Engineer for ordnance and special weapons within the Design Division of the Norfolk Naval Shipyard, Portsmouth, Virginia.

I received a Bachelor of Science Degree in Nuclear Engineering from North Carolina State University in 1962. I am a member of the Health Physics Society.

EUGENE J. GALLAGHER

OFFICE OF INSPECTION AND ENFORCEMENT
U.S. NUCLEAR REGULATORY COMMISSION

PROFESSIONAL QUALIFICATIONS

I am a Civil Engineer in the Division of Resident and Regional Reactor Inspection, Reactor Engineering Branch, Office of Inspection and Enforcement.

I received a Bachelor of Engineering Degree in Civil Engineering from Villanova University in 1973 and a Master of Science Degree in Civil/Structural Engineering from Polytechnical Institute of New York in 1974. I am a registered Professional Engineer in the States of Illinois (#37828), Florida (#29114) and Louisiana (#16376). I am a member of the American Society of Civil Engineers, American Concrete Institute and Tau Beta Pi National Engineering Honor Society.

In my present work at the NRC, I provide technical assistance in the area of civil engineering to Regional offices and resident inspectors with particular emphasis on the design and construction of reinforced and prestressed concrete structures, foundations, structural steel buildings and in structural testing and surveillance. In addition, I provide technical input for the development and interpretation of industry codes, standards and regulatory requirements relating to inspection activities.

From 1978 to 1981 I was a member of the NRC Region 3 inspection staff responsible for the inspections of civil engineering aspects of plants under construction and in operation. This included the inspection of laboratory and field testing of concrete, steel and soils materials, earth embankments and dams, material sources, piping systems and reinforced and prestressed concrete structures. In addition, a review of management controls and quality assurance programs were performed at plants under construction. I participated in approximately 90 inspections of reactor facilities.

Prior to joining the NRC Staff I was employed by EBASCO Services, Inc. in New York City from 1973 to 1978. I performed designs of reinforced concrete and steel structures, design of hydraulic and water supply systems and preparation of specifications for construction. From 1976 to 1978, I was the civil resident engineer at the Waterford 3 Nuclear Plant site responsible for providing technical assistance to construction.

During 1972 and 1973 I was employed by Valley Forge Laboratory in Devon, PA performing inspection and testing on concrete, steel and soil materials.

ADDITIONAL NRC TRAINING

Fundamentals of Inspection, NRC, February 1978 (40 hours)
BWR Fundamentals Course, NRC, March 1978 (40 hours)
Concrete Technology and Codes, Portland Cement Assoc., May 1978 (80
hours)
Quality Assurance Course, NRC, August 1978 (40 hours)
Nondestructive Examination and Codes, Rockwell Int'l., August 1978 (120
hours)
PWR Fundamentals Course, NRC, November 1978 (40 hours)
Welding Metallurgy, Ohio State University, September 1980 (80 hours)



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

ATTACHMENT 3

JAN 12 1981

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

80-32
80-33

Consumers Power Company
ATTN: Mr. James W. Cook
Vice President
Midland Project
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

This refers to a special announced inspection conducted by Messrs. E. J. Gallagher and R. B. Landsman of this office and Mr. J. W. Gilray of the Office of Nuclear Reactor Regulation, Quality Assurance Branch on December 8-11, 1980, of activities at the Midland Nuclear Power Plant, Units 1 and 2, authorized by NRC Construction Permits No. CPPR-81 and No. CPPR-82 and to the discussion of our findings with you and others of your staff at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. The inspection consisted of a review of the Consumers Power Company response and implementation of corrective actions regarding the 10 CFR 50.54(f), Question 1 of NRC letter dated March 21, 1979 and Question 23, request for additional information dated September 11, 1979.

During this inspection, certain of your activities appeared to be in non-compliance with NRC requirements, as described in the enclosed Appendix A, and a written response is required.

In addition to the above, the unresolved items described in Paragraph 3(c) and 3(d) requires your attention. Please provide a written response to each individual part of the unresolved items for our review along with your response to the identified items of noncompliance.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter, the enclosures, and your response to this letter will be placed in the NRC's Public Document Room, except as follows. If the enclosures contain information that you or

~~81-223-134~~ 2pp

your contractors believe to be proprietary, you must apply in writing to this office, within twenty-five days of the date of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

James G. Keppler
Director

Enclosures:

- 1. Appendix A, Notice of Violation
- 2. IE Inspection Reports
No. 50-329/80-32
and No. 50-330/80-33

cc w/encls:

Central Files
 Reproduction Unit NRC 20b
 PDR
 Local PDR
 NSIC
 TIC
 Ronald Callen, Michigan
 Public Service Commission
 Myron M. Cherry

EA 1/5	RIII Gallagher/jp 1/5/80	RIII Landsman 1-5-81	RIII Hayes	RIII Knop	RIII Sutphin 1/5/81	RIII Fiorelli	RIII Nepelins 1/3/81	RIII Keppler 1.2/81
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Appendix A

NOTICE OF VIOLATION

Consumers Power Co.

Docket No. 50-329

Docket No. 50-330

As a result of the inspection conducted on December 8 - 11, 1980, and in accordance with the Interim Enforcement Policy, 45 FR 66754 (October 7, 1980), the following violations were identified:

1. 10 CFR 50, Appendix B, Criterion XVI states, in part, that "Measures shall be established to assure that conditions adverse to quality such as...deficiencies...are promptly ...corrected. The measures shall assure that the cause...is determined and corrective action taken to preclude repetition."

Consumers Power Co. QA Program, Policy No. 16, corrective action states, in part, that "corrective action is that action taken to correct and preclude recurrence of significant recurrence of significant conditions adverse to the quality of items...Conditions or trends observed or identified which are adverse to quality are considered for corrective action..."

The "FSAR Re-review Procedure" instructions for Block 8 requires that "the engineering design documents against which the FSAR review package is to be reviewed are listed by the primary review engineer."

CPCO Audit No. M-01-53-0 states, in part, "the following significant items were revealed by this audit...in many instances not all of the design documents were listed as required by the instructions for performing the re-review."

Contrary to the above, CPCO did not initiate preventive action to preclude repetition of not identifying design documents for the remaining re-review packages as evidenced by the inspectors review of other FSAR re-review packages which did not include all of the design documents. In addition, interviews with some of the primary reviewers indicated that they were not reviewing the FSAR for technical accuracy against references at the end of the FSAR chapter as required by the procedure. Based on the above, the adequacy of the FSAR re-review is in question.

This is a Severity Level IV violation (Supplement II).

2. 10 CFR 50, Appendix B, Criteria III, states, in part, that "Measures shall be established to assure that...design bases ...are correctly translated into specifications...and for the identification and control of design interfaces...these measures shall include the establishment of procedures...for the review of documents involving design interfaces."

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Consumers Power Co. QA Program, Policy No. 3 states, in part that "Each group...performing detailed design translates the applicable regulatory requirements...design criteria into design documents, such as specifications...procedures. The design organization...establishes and controls the interface with other design organizations.

- a. Bechtel EDPI 4.25-1, Section 6.1, states, in part "Each originating design group shall maintain a log of all documents which are routed to personnel external to the design group. These logs shall be retained...providing visibility of the projects design interface control.

Contrary to the above, Bechtel Civil Project Engineering group did not maintain a coordination log of specification and specification change notices as evidenced by our review of soils related specifications C-211 and C-210.

- b. ANSI N45.2.11, Paragraph 4.1 requires that applicable design inputs are correctly translated into specifications drawings, procedures or instructions. In addition, Paragraph 7.0 requires that documents including changes are reviewed for adequacy.

Consumers Power Co.'s 50.54(f) response, Page I-17, Paragraph 4(a) required that specification change notice (SCN)-9004 be issued to require a laboratory compaction test to be performed for each field density test. SCN-9004 was initiated on 4/13/79.

Contrary to the above, Revision 16, dated 8/24/79, to the present Revision 20 of specification C-208 did not correctly translate SCN-9004 as a requirement into the specification. Revision 16 permitted laboratory density tests to be performed at a frequency as determined by the geotechnical engineer rather than for each field density test performed.

- c. ANSI N45.2.11, Paragraph 8.2 requires that design changes be reviewed and approved by the same groups or organizations which reviewed and approved the original design documents.

Consumers Power Co. 50.54(f) response, Page 23-11 committed to revise existing design control measures and require design interfaces on design changes. EDPI 4.25.1, Revision 7 added Section 4.2 which states, "It is the responsibility of the originator of a design change to effect coordination of the change with all groups which reviewed and/or used the original or subsequent revisions of that design document."

Contrary to the above, Revision 8 to EDPI 4.25.1 permits the group supervisor to waive the design interface requirement by adding to Section 4.2, "as determined by the group supervisor of the discipline which originated the document." Revision 8 does not establish adequate measures as required by ANSI N45.2.11 or as committed per 50.54(f) response.

This is a Severity Level IV violation (Supplement II).

Pursuant to the provisions of 10 CFR 2.201, you are required to submit to this office within twenty-five days of the date of this Notice a written statement or explanation in reply, including for each item of noncompliance: (1) corrective action taken and the results achieved; (2) corrective action to be taken to avoid further noncompliance; and (3) the date when full compliance will be achieved. Under the authority of Section 182 of the Atomic Energy Act of 1954, as amended, this response shall be submitted under oath or affirmation.

Dated January 12, 1981

James G. Keppler
James G. Keppler
Director

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Reports No. 50-329/80-32; 50-330/80-33

Docket Nos. 50-329; 50-330

Licenses No. CPPR-81; CPPR-82

Licensee: Consumers Power Company
1945 West Parnall Road
Jackson, MI 49201

Facility Name: Midland Nuclear Power Plant, Units 1 and 2

Inspection At: Bechtel Power Co., Ann Arbor, Michigan

Inspection Conducted: December 8-11, 1980

Inspectors: *E. J. Gallagher*
E. J. Gallagher, Region III 1/5/81

R. B. Landsman
R. B. Landsman, Region III 1-5-81

R. C. Knop for
J. Gilray, NRR, Quality Assurance Branch 1-7-81

Reviewed By: *R. C. Knop*
R. C. Knop, Chief
Projects Section No. 1 1-7-81

Approved By: G. Fiorelli, Chief
Reactor Construction and
Engineering Support Branch _____

Inspection Summary

Inspection on December 8-11, 1980 (Reports No. 50-329/80-32; 50-330/80-33)

Areas Inspected: Consumers Power Company response and implementation of corrective actions regarding the 10 CFR 50.54(f) request of Question 1 of NRC letter dated March 21, 1979 and Question 23, request for additional information dated September 11, 1979. The inspection involved 106 inspector-hours at the Bechtel Ann Arbor office by three NRC staff. In addition, approximately 120 hours of review of the licensee response was performed prior to the inspection.

Results: Two items of noncompliance were identified in the above areas inspected - Severity Level IV, Inadequate Design Control with three examples; Severity Level IV, Inadequate Corrective Action; and Unresolved Items identified in Paragraph 3(c) and 3(d).

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31 pp.

DETAILS

Exit Meeting Attendees at Ann Arbor, Michigan, December 11, 1980

Nuclear Regulatory Commission

E. J. Gallagher, Civil Engineer Inspector, IE:Region III
R. B. Landsman, Civil Engineer Inspector, IE:Region III
J. W. Gilray, Quality Assurance Branch, NRR

Consumers Power Company

J. W. Cook, Vice President, Projects, Engineering and Construction
B. W. Marguglio, Director, Environmental Services and Quality Assurance
W. R. Bird, Quality Assurance Manager, Midland Project
D. M. Turnbull, Site Quality Assurance Superintendent
G. R. Eagle, Supervising Quality Assurance Engineer
G. S. Keeley, Midland Project Manager
G. E. Clyde, Licensing Engineer
H. P. Leonard, Section Head, Quality Assurance Engineer
D. E. Horn, Group Civil Supervisor, Quality Assurance Engineer

Bechtel, Ann Arbor Office

J. Rutgers, Midland Project Manager
J. Milandin, Manager of Quality Assurance
L. A. Dreisbach, Assistant Project Manager
V. J. Manta, Project Quality Engineer
N. Swanberg, Assistant Project Engineer
G. L. Richardson, Quality Assurance Manager, Midland Project
D. F. Lewis, Licensing Engineer
R. E. Sevo, Quality Assurance Engineer
A. E. Bico, Quality Assurance Engineer
R. L. Rixford, Quality Assurance Engineer
J. R. McBride, Quality Engineer
R. C. Hollar, Quality Engineer

1. Background

Meetings were held on February 23, 1979 and March 5, 1979 at the NRC Region III office in Glen Ellyn, Illinois to discuss the circumstances associated with the settlement of the diesel generator building at the Midland facility. This discussion was part of the investigation conducted by Region III as documented in NRC Investigation Report No. 50-329/78-20; 50-330/78-20, dated March 22, 1979. Representatives of the NRC staff from headquarters attended the meeting on March 5, 1979. The staff stated that it's concern was not limited to the narrow scope of the settlement of the diesel generator building, but extended to various buildings, utilities and other structures located in and on the plant area fill. In addition, the staff expressed concern with the Consumers Power Company Quality Assurance Program.

Under the authority of Section 182 of the Atomic Energy Act of 1954, as amended, and Section 50.54(f) of 10 CFR Part 50, additional information was requested regarding the adequacy of the fill and the quality assurance program for the Midland site in order for the Commission to determine whether enforcement action such as license modification, suspension or revocation should be taken. Question 1 of the 50.54(f) letter dated March 21, 1979 requested information regarding the quality assurance program. On April 24, 1979, Consumers Power Company submitted the initial response to the 50.54(f) request, Questions 1 through 22. As a result of the NRC staff review of Question 1, the NRC concluded that the information provided was not sufficient for a complete review. Subsequently, on September 11, 1979 the NRC issued a request for additional quality assurance information (Question 23). On November 13, 1979, Consumers Power Company submitted revision 4 to the 50.54(f) responses which included response to Question 23. As a result of the Region III investigation report and CPCO responses, the NRC issued an Order modifying construction Permits No. CPPR-81 and No. CPPR-82, dated December 6, 1979. The latest revision to Consumers Power Company response to the 50.54(f) request is revision 10, dated November 21, 1980.

2. Purpose of Inspection

The inspection was conducted at the Bechtel Power Company Ann Arbor, Michigan offices on December 8-11, 1980 to verify implementation of the specific commitments and action items reflected in Consumers Power Company response to 10 CFR 50.54(f) Questions 1 and 23 with the exception of those areas where completion of commitments has not been satisfied as of this time.

The inspection was divided into the following areas:

- a. A review of CPCo response to Question 1, Part (a) and Question 23, Part (1) regarding the identification of the specific quality assurance deficiencies that contributed to the soils problem, including the root cause of the deficiency, remedial action in the soils area, the programmatic and generic corrective actions as committed to in the response.
- b. A review of CPCo response to Question 1, Part (b) and Question 23, Part (2) regarding the provisions to be implemented to preclude areas of contradictions between the PSAR, FSAR and design documents.
- c. A review of CPCo response to Question 1, Part (c) and Question 23, Part (3) regarding the programmatic and generic corrective actions to provide confidence that quality assurance deficiencies do not (or will not) exist in other areas.

The following sections of this report discuss the results of the review of the above areas of CPCo response to Questions 1 and 23.

3. Review of Question 1, Part (a) and Question 23, Part (1)

The identification of quality assurance deficiencies that contributed to the soils problem was discussed in Question 1, Part (a) and Question 23, Part (1). Consumers Power Company identified the root cause of the deficiencies, the remedial measures in the soils area, and the programmatic and generic corrective action to preclude further recurrence of the deficiencies. CPCo compiled a list of specific action items that would have to be accomplished in order to satisfy the commitments made in response to Questions 1 and 23 of the 50.54(f) request.

Attachment No. 1 provides an action item tracking system which includes the action item description and reference and the status and documentation verified by the NRC during this inspection.

Those action items for which CPCo commitments have been accomplished are identified as being "closed"; items identified as "open" either have not been completed by CPCo or the action taken was considered insufficient.

Question 1 provided 26 action items of which the NRC verified 18 had been satisfactorily accomplished while 8 remain open. Question 23 provided 57 action items of which 34 were determined to be satisfactorily accomplished while 23 remain open.

The following are NRC findings regarding the implementation of certain CPCo commitments.

- a. Action items 23-5 and 23-38 as identified in Attachment No. 1 provided commitments to examine current procedures and practices for the preparation and control of the FSAR in view of past experiences. CPCo committed to procedural changes to existing engineering department procedures.

Seven Bechtel procedures were examined and revised to clarify design control procedures for the FSAR. Engineering Department Procedure Instruction (EDPI) 4.25.1, Design Interface Control, was revised by Revision 7 by including section 4.2 which states, "It is the responsibility of the originator of a design document change to effect coordination of the change with all groups which reviewed and/or used the original or subsequent revisions of that design document."

Subsequently, Revision 8 to EDPI 4.25.1, changes the above by adding to the end of the statement, "as determined by the group supervisor of the discipline which originated the document." The originator of Revision 8 stated that the intent was that only technical changes have to be interfaced while editorial changes would not necessarily require this interface control. The procedural change, however, does not reflect the intent and permits

the group supervisor to waive interface control for any changes as evidenced by inspection finding in Paragraph 3(b) of this report. The engineering procedures EDPI 4.25.1 does not satisfy CPCo commitment made to the NRC in response to Question 23, subsection 3.3, page 11 and identified as action item 23-5 of Attachment No. 1.

This failure to provide adequate design interface control is considered contrary to 10 CFR 50, Appendix B, Criterion III as described in the Notice of Violation. (50-329/80-32-01; 50-330/80-33-01).

- b. Engineering Department Procedure Instruction, EDPI 4.25.1, Section 6.1 requires that, "each originating design group shall maintain a log of all documents which are routed to personnel external to the design group. These logs shall be retained . . . providing visibility of the projects design interface control." It was determined based on a review of specification C-208, Revision 20, Materials Testing Services, Section 9, Soils Testing and C-211, Revision 12, Technical Specification for Backfill, that the civil project engineering group is not maintaining a complete coordination log of specifications and specification change notices.

Interviews with cognizant Bechtel personnel indicated that it is up to the originator of the document to transmit the design document to the coordinator clerk to log it in as being interfaced with the appropriate groups. It was determined from reviewing the interface log that the originator of the documents are not aware of this requirement and documents are not being interfaced with other design groups as required by the procedure. In addition, Regulatory Guide 1.64, Quality Assurance Requirements for the Design of Nuclear Power Plants and ANSI N.45.2.11-1974, Section 10 requires design interface records to be maintained.

This failure to maintain design interface and coordinator control is considered contrary to 10 CFR 50, Appendix B, Criterion III as described in the Notice of Violation. (50-329/80-32-02; 50-330/80-33-02).

- c. Specification C-208, Revision 10, Section 9 regarding soil testing requirements was reviewed for technical content. It was determined that the specification was not adequate as written. The following specific findings were identified.
- (1) CPCo was identified in Question 1, Appendix I, Page I-13, Paragraph A.4(a) that the subcontractors test procedures for soil testing service were inadequate; specifically, U. S. Testing procedures did not provide for developing and updating a family of proctor curves used to compare in-place field density tests to maximum laboratory standards. CPCo committed to the remedial action on Page I-17, Paragraph 4(a)

which states, "Selection of proctor curves will no longer be a problem because each field density test will be accompanied by a separate laboratory standard compaction test which will provide a direct comparison." It was also stated that SCN-9004, dated April 13, 1979 was issued to require the above.

It was determined that SCN-9004 was issued as committed; however, during Revision 16, dated August 24, 1979, of specification C-208, the civil project engineer failed to include the above requirement and instead revised Table 9-1 to permit the frequency of the laboratory test to be "as directed by the on-site geotechnical engineer" rather than for each field density test.

This does not comply with the commitment made in 50.54(f) response to Question 1. This occurred because adequate design interface controls had not been implemented as required by ANSI N 45.2.11. There was no evidence that the geotechnical group had reviewed or approved the revision to the specification.

This failure to provide adequate design interface control is considered contrary to 10 CFR 50, Appendix B, Criterion III as described in the Notice of Violation. (50-329/80-32-03; 50-330/80-33-03).

- (2) Specification C-208, Section 9.1.1 should be reworded to remove confusion which exists about the word "compaction". This section should read: Modified proctor tests on cohesive material shall be performed in accordance with ASTM D 1557, Method D.
- (3) Section 9.1.3 (first paragraph) does not specifically indicate how ASTM D 1566 has been modified by USBR DES E-24. In addition, why does the specification prohibit the use of the nuclear density device for measuring in-place field density? This device is an industry accepted method with a standard ASTM designation.
- (4) Section 9.1.3 (second paragraph) assumes a specific gravity of 2.75. The actual specific gravity should be known and used as is the industry practice.
- (5) Section 9.1.3(c) should also include: if the results still plot to the right of the ZAV curve the test should be rejected and a new density test performed.
- (6) Section 9.1.3(d) uses the phrase 101% compaction. This should read 101% of maximum proctor density. This section also permits the on-site geotechnical engineer "to evaluate" the results of tests that exceed 101% proctor density for cohesive material and

105% for cohesionless material. This section should include the qualitative acceptance criteria and/or instructions to be used for the basis of this evaluation.

The above items 3(c) 2, 3, 4, 5 and 6 are considered unresolved items pending a review of CPCo response to each item. (50-329/80-32-04; 50-330/80-33-04).

d. Specification C-211, Revision 12 regarding backfill work activities was reviewed for technical content. It was determined that the specification was not adequate as written. The following specific items were identified.

- (1) Section 8.1 does not specify the type of material to be used beneath Category I, safety related structures. This should be included in this specification.
- (2) Section 8.1.1 does not specify the type of material to be used around pipes and duct banks. The specification should specify or refer to appropriate instructions.
- (3) Section 8.3.2 (third paragraph) states, "the uncompacted lift thickness of the backfill material shall be determined by the on-site geotechnical soils engineer . . ." The on-site soils engineer should not have to determine the lift thickness when Attachment No. 1 to specification C-211 specifies the requirement for each type of equipment based on equipment qualification tests.
- (4) Section 8.5.2 permits the use of rubber-tired rollers to compact structural backfill and sand. Attachment No. 1 to specification C-211 does not indicate rubber-tired rollers as having been qualified and rubber-tired rollers should not be used to compact structural backfill and sand.

The above items 3(d) 1, 2, 3 and 4 are considered unresolved items pending a review of CPCo response to each item. (50-329/80-32-05; 50-330/80-33-05).

4. Review of Question 1, Part (b) and Question 23, Part (2)

The provisions and the procedures to be implemented to preclude conflicts between PSAR, FSAR and design documents was discussed in response to Question 1, Part (b) and Question 23, Part (2). Consumers Power Company included in their response a procedure entitled, "FSAR Rereview Procedure" to be implemented to accomplish this commitment.

Action items 23-1, 23-44 and 23-44(a) as identified in Attachment No. 1 provided the commitments to be implemented to assure FSAR accuracy. The following are the NRC findings regarding the implementation of these commitments.

It was determined that, in general, consultant reports were not attached to the FSAR. However, the complete text of a consultant report prepared by Weston Geophysical Engineering Company was found as an attachment to the FSAR and included in the FSAR, as Appendix 2C. Therefore, the CPCo response which states, "Consultant reports were not attached to the FSAR, but portions of consultant reports were extracted and incorporated into the FSAR text itself" (re: Question 23, Page 23-7) is not correct.

CPCo also stated that the FSAR was rereviewed against design documents such as consultant reports for conflicts.

It was determined that verification of portions of consultant reports incorporated into the FSAR have been adequately reflected in design documents has not been satisfactorily accomplished. FSAR Rereview Procedure, Revision 1, dated March 13, 1980, Subsection 2.1.3 states that each FSAR section should be carefully reviewed against design documents . . . as a minimum, the following should be checked . . . references at the end of the FSAR chapter. The procedure also requires in Item 8 that engineering design documents against which the FSAR review package is to be reviewed are to be listed by the primary review engineer in Block 8 of the FSAR rereview form. A review of FSAR packages Nos. 9474, 9473, 9472, 9471, 9096, 9097 and 9098 indicates that no design documents other than a few drawings were identified and listed. Numerous reports were referenced throughout the FSAR text of these sections, however, they were not recorded as required in Block 8 as being reviewed for consistency with the FSAR text.

An interview with a Bechtel cognizant primary review engineer indicated that he physically checked the references to make sure that they agreed with the FSAR text. Subsequently, after the NRC inspector found an apparent discrepancy between the FSAR text and one of the references, the Bechtel reviewer indicated that he did not check the text of the references, but merely checked the reference for consistency of subject matter, i.e., title vs. sentence content not technical substance vs. FSAR statements. Another cognizant Bechtel primary review engineer indicated he could not check references in his section because he was not qualified to review the technical matter in this area. He indicated that he relied on the Bechtel Geotech group (the interface reviewer in Block 11) to verify the references. Discussions with a Geotech reviewer indicated he did check reports for consistency with the FSAR, but did not list them in Block 8 as required.

After this was determined, the inspector was informed that a CPCo interim audit No. M-01-53-0, dated March 1980, identified the same problem concerning the lack of identifying design documents in Block 8 of the FSAR review form. At this time approximately 600 of a total of 900 FSAR rereview packages had been completed. However, no corrective action was taken. CPCo final audit of this activity, audit No. M-03-202-0, dated November 1980, once again identified an unresolved item, URI-3, regarding this same problem. The FSAR rereview is now complete and the unresolved item was pending resolution as of the date of this inspection.

Cognizant individuals indicated that one of the reasons why documents were not listed in Block 8 was because there was not sufficient space. An interview with the preparer of the FSAR rereview document indicated that the intent of Block 8, and its instructions, was to list all of the design documents to which the FSAR section was reviewed against in order to assure there were no more conflicts between design documents and the FSAR text.

Based on the above, it was determined the CPCo failed to provide adequate corrective action with regard to the identified audit results. This is considered contrary to 10 CFR 50, Appendix B, Criterion XVI, as described in the Notice of Violation. (50-329/80-32-06; 50-330/80-33-06).

Due to this finding, CPCo implementation of the specific commitment as discussed in response to Question 23, Part (2) has not been accomplished and the adequacy of the FSAR rereview which has been completed is questionable.

5. Review of Question 1, Part (c) and Question 23, Part (3)

CPCo and Bechtel have performed a detailed re-review of specifications, installations, and construction inspection plans, procurement documents, inspection and test procedures, including the results of inspections and tests to determine the completeness and accuracy of documents and the acceptability of hardware. In this regard, the I&E inspection activities involved a review and evaluation of activities associated with the above re-review actions and included discussions with main participants in the re-review effort. The following is a summary of this inspection.

- a. CPCo and Bechtel were able to demonstrate that an extensive re-review of specification, inspections and test procedures, and documents associated with procurements were conducted with meaningful results. The documents were evaluated by CPCo and Bechtel to assure that the necessary tolerance call outs and quality requirements were specified; that the qualification requirements were adequately called out and met; that there were sufficient specificity provided in the documents; and that there were the necessary inspection requirements specified. In addition, the completed documentation was evaluated to determine that technical and quality requirements were met in an acceptable manner.

Areas that were found deficient resulted in revision and improvement to procedural controls and specifications. Hardware suspected of not meeting quality requirements were re-evaluated by engineering and quality assurance to determine their accept, repair, or reject status.

Throughout this particular I&E inspection effort, specifications, procedures, and instructions were reviewed and a determination made that revisions and improvements were accomplished.

- b. The improved trend analysis and corrective action program established by CPCo and Bechtel was evaluated and found acceptable. It is expected that this program will prove effective in detecting major weaknesses in the early stages such that meaningful, prompt corrective actions can be initiated during the design and construction phase.
- c. The "flag program," which provides assurance that problems, similar to those experienced with reactor vessels holddown anchor bolts, do not exist in other similar procurement actions where in-process source inspection activities are involved, was evaluated. Purchase orders and receiving documentation were reviewed by Bechtel to determine that critical design and specification requirements were properly carried out and where questions were raised concerning product function, a "flag" was identified to the concern requiring further evaluation, discussions, and resolution by engineering and quality assurance. Evidence showed this activity to be productive and in accordance with documented instructions.
- d. The 1978 and 1980 independent audit results performed by the Management Analysis Corporation on CPCo and Bechtel were evaluated and found in accordance with program requirements.

Overall, the personnel contacted conveyed their QA knowledge and their sincerity and dedication towards performing the activities described above. However, as a result of the findings identified during this inspection, it is clear that more emphasis must be placed on the attention to detail in the preparation and review of documents. In order to accomplish this, upper management must play a more active role in conveying this principle to the working staff and observing attitudes and activities to assure QA principles and attention to detail are being properly carried out.

Unresolved Item

Unresolved items disclosed during the inspection are discussed in Paragraph 3(c) and 3(d) of the report.

Exit Meeting

The inspector met with licensee and contractor representatives at the conclusion of the inspection on December 11, 1980 and summarized the inspection scope and findings. The items of noncompliance identified during the inspection were discussed in detail. The licensee acknowledged the inspection results.

Attachment:
Attachment No. 1

ACTION ITEMSPROGRAMMATIC AND GENERIC CORRECTIVE ACTIONS
COMMITTED TO IN THE RESPONSE TO QUESTION 1, PART (a)
AND IN THE RESPONSE TO QUESTION 23, PARTS (1) AND (2)

Action Item Number	Action Item Description and Reference	Actions Verified (Status) During NRC Inspection
23-1	<p>Consultant reports other than Dames & Moore were considered in accordance with the guidelines provided in NRC Regulatory Guide 1.70, Revision 2. Consultant reports were not attached to the FSAR, but portions of consultant reports were extracted and incorporated into the FSAR text itself. Those portions incorporated into the FSAR become commitments. Therefore, disposition of recommendations in consulting reports has been adequately accounted for in the preparation of the FSAR.</p>	<p>(Open) Refer to Action Item 44 for Review of FSAR Re-review</p>
23-1(a) and - 11	<p>The two Bechtel QA audit findings reported in our April 24, 1979, response (Paragraph D.1, Page I-8) have been closed out. The results of this audit are being utilized in the FSAR control system study committed to in Subsection 3.3 of this response to Part (1).</p>	<p>(Closed) Reviewed quality assurance audit 4.0-special 1, "SAR change control", & audit findings A-34 & A-35. The audit was performed to assure that there is a system to assure design changes are reflected in the FSAR. Audit findings identified cases where design changes were not reflected in the FSAR. Corrective action resulted in a review of all design requirement verification checklists (DRVCL's) for groups identified with problems. This review is documented in QE monitoring report DRVC-8.</p>
	<p>(Question 1, Appendix I, Section D.1, Page I-8 Question 23, Subsection 3.1, Page 7)</p>	

Action Item Number	Action Item Description and Reference	(Status)
23-2	<p>On April 3, 1979, Midland Project Engineering Group Supervisors in all disciplines were reinstructed that the only procedurally correct methods of implementing specification changes are through the use of specification revisions or Specification Change Notices. This was followed by an interoffice memorandum from the Project Engineer to all Engineering Group Supervisors on April 12, 1979.</p> <p>(Question 23, Subsection 3.2, Page 8; and Subsection 3.9, Page 24)</p>	<p><u>(Closed)</u> Reviewed & verified memos & letters instructing proj. engr. field eng, & QC of procedure for implementing clarification or change to approved drawings or specifications:</p> <ol style="list-style-type: none">(1) Bechtel memo to QCE's, dtd 5/30/79.(2) Bechtel memo to Field Engr's, dtd 3/28/79.(3) CPCo letter to Bechtel, dtd 3/12/79.(4) Bechtel memo to Proj. Engr, dtd 3/21/79.(5) Bechtel memo to Group Suprv, dtd 3/12/79.(6) Bechtel letter to CPCo, dtd 6/5/79.
23-3 and 1 - 12	<p>Engineering Department Project Instruction 4.49.1 was revised in Revision 2 to state, "Under no circumstances will interoffice memoranda, memoranda, telexes, TWXs, etc be used to change the requirements of a specification."</p> <p>(Question 1, Appendix I, Section 0.2.d, Page I-8 Question 23, Subsection 3.2, Page 9, and Subsection 3.9, Page 24)</p>	<p><u>(Closed)</u> Reviewed & verified EDPI 4.49.1, Rev. 4, "specification change notice" to include requirement that IOM's, memo's, telex's, TWS's, etc. can not be used to change spec. requirements. A spec. change notice must be issued in order to change spec. requirements.</p>

Action Item Number	Action Item Description and Reference	(Status)
23-4	<p>A review of interoffice memoranda, memoranda, telexes, TWXs, and other correspondence relating to specifications for construction and selected procurements of Q-listed items will be initiated.</p> <p>The purpose of the review will be to identify any clarifications which might reasonably have been interpreted as modifying a specification requirement and for which the specification itself was not formally changed. An evaluation will be made to determine the effect on the technical acceptability, safety implications of the potential specification modification, and any work that has been or may be affected. If it is determined that the interpretation may have affected any completed work or future work, a formal change will be issued and remedial action necessary for product quality will be taken in accordance with approved procedures.</p> <p>The foregoing procedure will be followed for all specifications applying to construction of Q-Listed items.</p> <p>For specifications concerning the procurement of Q-Listed items, the foregoing procedure will be implemented on a random sampling basis. The sample size has been established and the specification selection has been made.</p>	<p>(Closed) Verified Bechtel memo dated 12/20/79 (File 0455) which provides the procedure for review of all (100%) Q-listed construction type spec's. and sampling plan procedure for procurement type spec's.</p>
(21)	<p>Review and acceptance criteria for the specifications have been defined.</p>	<p>(Open) Review criteria has been established (see above action item 4); acceptance criteria was not defined. Audit report MOI-200-0 also identified this as an unresolved item.</p>
(47)	<p>The review of construction and selected procurement specifications is scheduled to be completed by April 1, 1981.</p>	<p>(Open) File had no review data for construction type or procurement type spec's.</p>

Action Item Number	Action Item Description and Reference	(Status)
(47) (cont'd)	<p>If the acceptance criteria are not met, the review will be expanded to include other specifications for Q-listed items. At that time, a revised completion date will be established.</p> <p>(Question 23, Subsection 3.2, Page 9, and Subsection 3.9, Page 25)</p>	<p>(Open) Preliminary indication per Bechtel Representative indicated that the review will be required to be expanded to include other spec's than sampling plan identified.</p>
23-5 (23-38)	<p>A study was completed which examined current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes have been initiated by the revision of or addition to the Engineering Department Procedures.</p> <p>(Question 23, Subsection 3.3, Page 11)</p>	
23-6	<p>An interoffice memorandum dated April 12, 1979, was issued by Geotechnical Services to alert personnel of the need to revise or annotate calculations to reflect current design status.</p> <p>(Question 23, Subsection 3.4, Page 13)</p>	<p>(Closed) Reviewed & verified inter-office memo from S. Blue to Geotech personnel, dated 4/12/79 which requires that changes in design be reflected in the original calculations & to reflect proper interdepartmental coordination has been achieved.</p>
23-7	<p>Field Instruction FIC 1.100, "Q-Listed Soils Placement Job Responsibilities Matrix," has been prepared and establishes responsibilities for performing soils placement and compaction.</p> <p>(Question 23, Subsection 3.6, Page 18; Subsection 3.7, Page 20; and Subsection 3.11, Page 30)</p>	<p>(Closed) Reviewed & verified, field instruction FIC1.100, Rev. 3, dated 8/15/80 to include daily job responsibilities of the onsite geotechnical engineer.</p>

Action Item Number	Action Item Description and Reference	(Status)
23-7A and 1 - 17	Review Field Procedure FPG-3.000 to ensure clarity and completeness (Question 1, Appendix I, Section 0.2, Page I-11)	(Closed) Verified that FPG-3,000, Rev. 0, "Job responsibilities for field engineers" was reviewed as a result of this review FIC 1.100, "Job responsibilities for the onsite geotechnical engineer" was established.
23-8 and 1 - 16	Construction specifications, instructions, and procedures were reviewed to identify any other equipment requiring qualification which had not yet been qualified. No such equipment was identified. (Question 1, Appendix I, Section D.1, Page I-11 Question 23, Subsection 3.6, Page 18)	(Open) CPCo commitment not completed.
23-9	A dimensional tolerance study was completed using the reactor building spray pump and ancillary system as the study mechanism. (Question 1, Appendix I, Section D.2.b, Page I-8)	(Closed) Verified that dimensional tolerance study was performed on the reactor building spray pump system.
23-10 and 1-5	Engineering reviewed specifications not previously reviewed for the specificity or tolerance studies. (Question 1, Appendix I, Section D.2.c, Page I-8)	(Closed) verified that a review of spec's A-17, C-67, M-342, C-208, C-231 & A-41 was performed for specificity & tolerances. Revisions were made to spec. as needed.
23-11	A specific review of the FSAR and specification requirements for the qualification of electrical and mechanical components has been made as part of the corrective action relating to CPCo's 50.55(e) report on component qualification. (Question 1, Appendix I, Section D.2.e, Page I-8)	(Closed) Verified a review of FSAR & Spec requirements for qualification of electrical and mechanical components has been performed & documented in CPCO letter to NRC, Region III dated December 5, 1980, as required by 50.55(e) reporting requirements.
23-12	Quality Assurance will schedule yearly audits of the design calculational process for techniques and actual analysis in each of the design disciplines. (Question 1, Appendix I, Section D.4, Page I-8)	(Open) CPCo commitment not completed.

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Action Item Number	Action Item Description and Reference	(Status)
23-13	Audits of ITT Grinnell hanger design and CPCo relay setting calculation have been conducted. (Question 1, Appendix I, Section D.4, Page I-8)	<u>(Closed)</u> Verified that audit OT-ITT Grinnell (April 5, 1979) and audit of electrical and I&C calculations (June 26, 1979) was performed.
23-14 and 1 - 10	Bechtel Project Engineering will review design drawings for cases where ducts penetrate vertically through foundations. The possibility of the duct being enlarged over the design requirements and the effect this enlargement may have upon the structure's behavior will be evaluated by June 1, 1979. Proper remedial measures will be taken if the investigation shows potential problems. (Question 1, Appendix I, Section C.5.b, Page I-7)	<u>(Closed)</u> Reviewed file No. 54601-54618 (calc #41-1) dated 9/5/78 which identifies each duct bank in the plant and interface with any buildings. Results of study were documented in memo from L. Curtis to R. Rixford dated 5/27/80 which indicates no other safety-related structure except D. G. Bldg was effected by an interface with duct banks. Provisions were made to allow independent vertical movement between the diesel generator bldg and duct banks.
23-15 and 1 - 20	An in-depth audit of U.S. Testing operations, covering testing and implementation of their QA program will be conducted in late April or early May 1979, by Bechtel Project QA and Engineering. (Question 1, Appendix I, Section C.4.b, Page I-18; Section D.3.c, Page I-18)	<u>(Closed)</u> Reviewed and verified audit 25-2-7 of U.S. Testing Company was performed on April 25-26, 1979.
23-16 and 1 - 25	An in-depth training session will be given to Midland QA Engineers covering the settlement problem and methods to identify similar conditions in the future. (Question 1, Appendix I, Section D.1.b, Page I-22)	<u>(Open)</u> See review of Action Item 23-17

Action Item Number	Action Item Description and Reference	(Status)
23-17 and 1 - 25	An in-depth training session will be given to all CPCo and Bechtel QA Engineers and Auditors to increase their awareness of the settlement problem and to discuss auditing and monitoring techniques to increase audit effectiveness. (Question 1, Appendix I, Section D.2, Page I-22)	<u>(Open)</u> Reviewed IOM dated July 27, 1979 and June 4, 1979 documenting training to CPCo and Bechtel QA personnel on Midland plant fill experiences. The file does not contain documentation of the contents or detail of the training nor any material handed out to participants for their future reference.
23-18 and 1 - 24	An in-depth review of the Bechtel trend program data will be undertaken by Bechtel QA management to ensure the identification of any other similar areas that were not analyzed in sufficient depth in the past reviews. (Question 1, Appendix I, Section D.1.a, Page I-22)	<u>(Open)</u> CPCo commitment not completed.
23-19 and 1 - 21 1 - 22	Quality Control Instructions have been evaluated to ensure that the documentation characteristics which are to be inspected (i.e., surveillance and review callouts) are clearly specified.	<u>(Closed)</u> Verified the QCI's were reviewed and items requiring further action and resolution identified (See Action Item 23-19A).
23-19A and 1 - 21A	(This action modified to include necessary revision to QCIs resulting from evaluation of surveillance and review callouts.) (Question 1, Appendix I, Section D.3.a, Page I-18 and Section D.1, Page I-18)	<u>(Open)</u> Completion of required changes to QCI's per Action Item 23-19 have not been completed.
23-20	Field Instruction 1.100 has been supplemented by establishing requirements for demonstrating equipment capability, including responsibility for equipment approval, and providing records identifying this capability. (Question 23, Subsection 3.6, Page 18)	<u>(Open)</u> CPCo commitment not completed. Records identifying equip. capability not documented in Action Item file.
23-21	See Action Item Number 4 (21)	<u>(Open)</u> Acceptance criteria not defined (See Action Item 4 for review).

Action Item Number	Action Item Description and Reference	(Status)
23-22	<p>Guidelines for surveillance of testing operations have been developed and included in Field Instructions for the onsite Soils Engineer. Engineering/Geotechnical Services has developed the guidelines.</p> <p>(Question 23, Subsection 3.10, Page 27)</p>	<p>(Closed) Responsibilities for on-site Geotechnical Engineer have been established per FIC 1.100, Rev. 3 which include requirements.</p>
23-23 and 1 - 3	<p>Engineering has revised Engineering Department Procedure 4.22 to clarify that Engineering personnel preparing the FSAR will follow the requirements of Regulatory Guide 1.70, Revision 2, "Standard Format and Content of Safety Analysis Reports for Nuclear Power Plants" (September 1975). Specifically, Regulatory Guide 1.70 (Pages iv and v of the Introduction) requires that such consultant reports only be referenced with the applicable commitments and supporting information included in the test (third paragraph, Page v). Such a requirement precludes repetition of this circumstance.</p> <p>(Question 23, Subsection 3.1, Page 7 and Subsection 3.3d, Page 46)</p>	<p>(Closed) Verified EDP 4.22 has been revised by issuance of MED 4.22, Rev. 6 to include Regulatory Guide 1.70 which requires consultant reports to be referred with specific commitments included in text of the FSAR.</p>
23-24	<p>To preclude any future inconsistencies between the FSAR and specifications, Engineering Department Project Instruction 4.1.1 has been revised to state that all specification changes, rather than just "major changes," will be reviewed for consistency with the FSAR.</p> <p>(Question 23, Subsection 3.3, Page 11)</p>	<p>(Closed) Verified EDP 4.1.1, Rev. 2, "Preparation of the design requirement verification checklist," Para. 3.1 requires the discipline engineer who originates a design change document to fill out a DRVC as the change is developed. The DRVC include verification of consistency with the FSAR for design changes.</p>

Action Item Number	Action Item Description and Reference	(Status)
23-25	<p>Quality Assurance has issued a Nuclear Quality Assurance Manual amendment to clarify the requirement that procedures include measures for qualifying equipment under specified conditions.</p> <p>(Question 23, Subsection 3.6, Page 18)</p>	<p>(Closed) Quality Assurance policy, Section II, No. 2, "design control procedures", Para. 3.1.4, Rev. 2B states, engineering department procedure shall include criteria for specifying equip. qualification requirements. Also construction quality program, Section IV, No. 1, Rev. 2B Para. 3.2.3(P) requires instructions for qualifications of equip.</p>
23-26	<p>In view of Action Item 6, Geotechnical Services has revised Procedure FP-6437 to require that calculations be annotated to reflect current design status.</p> <p>(Question 23, Subsection 3.4; Page 13)</p>	<p>(Closed) Reviewed and verified procedure FP-6437-A2 was issued (See ref. letter from S. Blue to R. Rixford dated 4/10/80).</p>
23-27	<p>Engineering Department Procedure 4.37 has also been revised to require that calculations be annotated to reflect current design status.</p> <p>(Question 23, Subsection 3.4, Page 13)</p>	<p>(Closed) Verified procedure MED 4.37, Rev. 11, "Design Calculation" and EDPI 4.25.1, Rev. 7, "Design Interface Control" was issued to require the originator of a design change to notify all groups which used the original design document and to check the latest design info prior to revising calculations.</p>
23-28	<p>Civil/Structural Design Criteria 7220-C-501 has been modified to contain the requirements that a duct bank penetration shall be designed to eliminate the possibility of the nonspecific size duct interacting with the structures.</p> <p>(Question 23, Subsection 3.5, Page 15)</p>	<p>(Closed) Verified civil design criteria C-501, Rev. 11, Para. 6.6 has been added which states, "All interfaces between bldg's or foundations and duct banks designed after Jan. 1, 1980 shall be included on civil design drawings and shall indicate clearances or const. restrictions as required to account for differential settlement, seismic movement, etc.</p>
23-29	<p>The civil standard detail drawings have been revised to include a detail showing horizontal and vertical clearance requirements for duct bank penetrations. The detail addresses any mud mat restrictions.</p> <p>(Question 23, Subsection 3.5, Page 15)</p>	<p>(Closed) Verified civil standards and misc. concrete details, sheet 2, dwg C-141, Rev. 6 detail 12 provides duct bank clearance criteria.</p>

Action Item Number	Action Item Description and Reference	(Status)
23-30 (39)	<p>Engineering clarified specifications and Construction prepared procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Action Item 25.</p> <p>(Question 23, Subsection 3.6, Page 18)</p>	<p><u>(Closed)</u> Verified spec C-211, Rev. 12, Para. 8.5.1 (compaction equipment) now requires proposed compaction equipment to be qualified to demonstrate compaction can be achieved at a specified lift thickness, number of passes, speed of equipment and frequency of vibration for vibrating equip.</p>
23-31	<p>Design documents, instructions, and procedures for those activities requiring inprocess controls have been reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed.</p> <p>(Question 1, Appendix I, Section D.2, Page I-11; and Question 23, Subsection 3.7, Page 20; and Subsection 3.11, Page 30)</p>	<p><u>(Open)</u> CPCo commitment not completed.</p>
23-32	<p>Guidelines for surveillance of testing operations have been developed and included in Field Instructions for the onsite Soils Engineer. Engineering/Geotechnical Services has developed the guidelines and Field Engineering has prepared the instructions.</p> <p>(Question 23, Subsection 3.10, Page 27)</p>	<p><u>(Closed)</u> See Action Item 23-22.</p>
23-33	<p>The Quality Assurance audit and monitoring program will be revised to emphasize and increase attention to the need for evaluating policy and procedural adequacy and assessment of product quality. A specialized audit training program will be developed and implemented to ensure guidance for this revised approach.</p> <p>(Question 23, Subsection 3.13, Page 35)</p>	<p><u>(Open)</u> CPCo commitment not completed.</p>

Action Item Number	Action Item Description and Reference	(Status)
23-34 and 1 - 23	<p>Control Document SF/PSP G-6.1 has been revised to provide requirements for inspection planning specificity and for the utilization of scientific sampling rather than percentage sampling.</p> <p>(Question 1, Appendix I, Section D.5.f, Page I-20; and Question 23, Subsection 3.8, Page 22; Subsection 3.9, Page 24; Subsection 4.2.2, Page 59)</p>	<p><u>(Closed)</u> Verified Procedure G-6.1, Rev. 5 has been revised to include requirements for planning, specificity (Para. 3.3.2) and utilization of scientific sampling (Para. 3.3.3.a.8). This deleted surveillance type inspection and now requires inspection by witness or test.</p>
23-35 and 23-36 and 1 - 24 and 1 - 25	<p>Control Documents SF/PSP G-3.2, "Control of Nonconforming Items," and QADP C-101, "Project Quality Assurance Trend Analysis" have been revised to provide an improved definition of implementing requirements for identifying repetitive nonconforming conditions.</p> <p>(Question 23, Subsection 3.12, Page 33)</p>	<p><u>(Closed)</u> Verified G-3.2, Rev. 6, "Control of Nonconforming Items" and QAPP C-101 "QA Trend Analysis" have been modified to provide for identifying repetitive nonconforming conditions. Interviewed Mr. T. K. Subramanian.</p>
23-37	<p>Consistent with the intent of Action Item Numbers 35 and 36, Quality Assurance will review nonconformance reports which were open as of November 13, 1979, or became open prior to implementation of the improved Project Quality Assurance Trend Analysis program as stated in Action Item 36. This review will be to identify any repetitive nonconforming conditions pertaining to product type or activity, or pertaining to nonconformance cause.</p> <p>(Question 23, Subsection 3.12, Page 33)</p>	<p><u>(Open)</u> CPCo commitment not completed.</p>

Action Item Number	Action Item Description and Reference	(Status)
23-38 (23-5)	<p>A study was completed which examined current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes have been initiated by the revision of or addition to the Engineering Department Procedures.</p> <p>(Question 23, Subsection 3.3, Page 11)</p>	<u>(Open)</u> See Action Item 23-5
23-39 (30)	<p>Engineering clarified specifications and Construction prepared procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Action Item 25.</p> <p>(Question 23, Subsection 3.6, Page 18)</p>	<u>(Closed)</u> Verified FIC 1.100, Rev. 3 requires on-site geotechnical engineer to ensure compaction equipment is qualified and listed in the spec and can deliver required degree of compaction.
23-40 (31)	<p>Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed, and Field Engineering and quality control review is scheduled for completion by February 27, 1981.</p> <p>(Question 1, Appendix I, Section D.2, Page I-11; Question 23, Subsection 3.7, Page 20, and Subsection 3.11, Page 30)</p>	<u>(Open)</u> CPCo commitment not completed.

Action Item Number	Action Item Description and Reference	(Status)
23-41	<p>QCIs in use will be reviewed to ascertain that provisions have been included consistent with the revised control document, SF/PSP G-6.1, "Quality Control Inspection Plans."</p> <p>(Question 1, Appendix 1, Section D.1, Page I-18; Question 23, Subsection 3.8, Page 22; and Subsection 3.9, Page 24)</p>	<u>(Open)</u> CPCo commitment not completed.
23-42	<p>Design documents, instructions, and procedures for those activities requiring inprocess controls will be reviewed to assess the adequacy of existing procedural controls and technical direction. Engineering review has been completed, and Field Engineering and quality control review is scheduled for completion by February 27, 1981. Any revisions required will be completed by April 17, 1981.</p> <p>(31) (40)</p> <p>(Question 1, Appendix I, Section D.2, Page I-11; Question 23, Subsection 3.7, Page 20; and Subsection 3.11, Page 30)</p>	<u>(Open)</u> CPCo commitment not completed.
23-43	<p>The impact of Action Item 41 on completed work will be evaluated, and appropriate actions will be taken as necessary.</p> <p>(Question 23, Subsection 3.8, Page 22; and Subsection 3.9, Page 25)</p>	<u>(Open)</u> CPCo commitment not completed.
23-44	<p>FSAR sections have been rereviewed as discussed in the Response to Question 23, Part (2).</p> <p>(Question 23, Subsection 3.1, Page 7; Subsection 3.3, Page 11; Subsection 3.2, Page 41; and Section 4.0, Page 47)</p>	<u>(Open)</u> 9 re-review packages were reviewed by the NRC. Not all of the design documents were listed in Block 8 of required form per procedure for performing review issued 3/13/80. This was identified as an item of noncompliance as discussed in Paragraph 4 of this report.

Action Item Number	Action Item Description and Reference	
23- 44A	The audit committed to in our response to Question 1, Part b, and described in Part (2), Section 5.0 was conducted once during the course of the FSAR rereview (commencing March 17, 1980) and again after completion of the rereview (commencing November 3, 1980). (Question 23, Part (2), Section 5.0, Page 48)	<u>(Open)</u> (1) CCo Audit not completed & (2) Existing Audit findings (MO1-53-0) not satisfactorily resolve; i.e., inadequate corrective action. This item has been identified as an item of noncompliance as discussed in paragraph 4 of this report.

Action Item Number	Action Item Description and Reference	
23-45	<p>U.S. Testing was required to demonstrate to cognizant Engineering Representatives that testing procedures, equipment, and personnel used for quality verification testing (for other than NDE and soils) were capable of providing accurate test results in accordance with the requirements of applicable design documents.</p> <p>(Question 1, Appendix I, Section D.3.b, Page I-18; Question 23, Subsection 3.10, Page 27; and Subsection 3.11, Page 31)</p>	<u>(Open)</u> CPCo commitment not completed.
23-46	<p>A sampling of U.S. Testing's test reports (for other than NDE and soils) were reviewed by cognizant Engineering Representatives to ascertain that results evidence conformance to testing requirements and design document limits.</p> <p>(Question 23, Subsection 3.10, Page 28; and Subsection 3.11, Page 31)</p>	<u>(Open)</u> CPCo commitment not completed.
23-47	See Action Item Number 4 (47)	<u>(Open)</u> CPCo commitment not completed.
23-48	<p>CPCo performs overinspection for soils placement, utilizing a specific overinspection plan.</p> <p>(Question 1, Appendix I, Section C.2.b, Page I-11; Section C.1.c, Page I-16)</p>	<u>(Closed)</u> Verified CPCo overinspection plan. 01-C-3A, Rev. 1 for soil placement and reviewed completed overinspection results performed on weekly basis. This overinspection program is an ongoing activity by Midland QA group.
23-49	<p>CPCo performs overinspection of the U.S. Testing soils testing activities and reports, utilizing a specific overinspection plan.</p> <p>(Question 1, Appendix I, Section C.3.c, Page I-17)</p>	<u>(Closed)</u> Verified CPCo overinspection plan 01-C-4A, Revision 3, for soil testing and review completed overinspections performed on U. S. Testing.

Action Item Number	Action Item Description and Reference	
23-50	CPCo Project Management and QA review field procedures (new and revised) and CPCo QA reviews QCIs (new and revised) in line with Bechtel before release. (Question 1, Appendix I, Section D.5.b, Page I-19)	<u>(Closed)</u> Verified CPCo reviews of field procedures and quality control instruction in addition to Bechtel prior to release.
23-51	In 1978, CPCo implemented an overinspection plan structure and the Bechtel inspection process, with the exception of civil activities. Reinforcing steel and embeds were covered in the overinspection. (Question 1, Appendix I, Section D.5.c, Page I-19)	<u>(Closed)</u> Verified CPCo has overinspection plans in the civil, electrical, mechanical, and welding/NDE work activities.
23-52	CPCo reviews onsite subcontractor QA manuals and covers their work in the audit process. (Question 1, Appendix I, Section D.5.d, Page I-19)	<u>(Closed)</u> Verified CPCo reviews subcontractor QA manuals and audits subcontractor work.
23-53	An ongoing effort is improving the "surveillance" mode called for in the QCIs by causing more specific accountability as to what characteristics are inspected on what specific hardware and in some cases changing "surveillance" to "inspection." (Question 1, Appendix I, Section D.5.e, Page I-19)	<u>(Closed)</u> Verified that SF/PSP G-6.1, Rev. 5 "procedure for Quality Control inspection plans" have deleted surveillance method and new requirements direct inspection by witness or test to be performed by Quality Control surveillance method has been deleted in para 3.3.3.a.3 of G-6.1, Rev. 5.

Action Item Number	Action Item Description and Reference	(Status)
1 - 1	Perform a final review & update of PSAR commitment list.	<u>(Open)</u> Action item not reviewed by NRC during the inspection.
1 - 2	Review sections of FSAR determined to be inactive.	<u>(Open)</u> . See Action Item 23-44 for NRC review & results.
1 - 3	Review EDP 4.22.	<u>(Closed)</u> See Action Item 23-23 for NRC review.
1 - 4	Audit Action Items 1-3	<u>(Open)</u> See Action Item 23-44A for NRC review & results.
1 - 5	Review specifications not included in specificity study initially.	<u>(Closed)</u> See Action Item 23-10 for NRC review and results.
1 - 6	Dames and Moore Report was reviewed and recommendations identified and dispositioned. (Question 23, Subsection 3.1, Page 23-6) (Question 1, Apx, I, Page I-6, Para C.1.(b)	<u>(Open)</u> File indicated review was complete, however, no details of the recommendations identified or the dispositions were available.
1 - 7	Complete review of pertinent portions of FSAR sections 2.5 and 3.8. Inconsistencies between FSAR subsection 2.5.4. and 3.8.5 have been corrected via FSAR Amendment 18 (Feb 28, 1979) the same revision also corrected inconsistency between 2.5.4 and drawing C-45. (Question 23, Subsection 3.3, Page 23-11) (Question 1, Apx I, Page I-6, Para 3)	<u>(Closed)</u> Verified FSAR, Revision 18 to have corrected: (1) inconsistency between FSAR 3.8.5.5 and 2.5.4, Figure 2.5-48, settlement values, (2) Table 2.5-9 and Table 2.5-14 regarding soil type supporting structures from clay to (Zone 2) random fill, (3) Table 2.5-16, index of compressibility factors to be determined from fill studies. (4) Table 2.5-21 compaction requirements. Reviews of Section 2.5.4. are on "Hold" until resolution of soils issue. NRC office of NRR Geotechnical Branch will review FSAR section when final.

Action Item Number	Action Item Description and Reference	
1 - 8	<p>Correct Settlement Calculations</p> <p>Settlement calculations will be revised after completion of diesel generator building surcharge operations.</p> <p>(Question 23, Subsection 3.4, Para 23-13)</p> <p>(Question 1, Apx I, Page I-6, Para C.4.a)</p>	<p>(Closed) Verified settlement calculations have been made subsequent to surcharge operations (RE: calculation No. S-105 File 8230, dated February 14, 1980), results of these calculations have been included in response to question 27 of 50.54(f) requests. Review of this response and results of calculations are being made by NRC office of NRR Geotechnical Branch.</p>
1 - 9	<p>Schedule audits of the Geotechnical Section on a six month basis.</p> <p>A recent Bechtel QA audit of Bechtel Geotech Section was conducted in February 1979. Additional audits will be performed in this area on a six month cycle until completion of soil work.</p> <p>(Question 1, Apx I, Page I-7, Para C.4.c)</p>	<p>(Closed) Review audits of Bechtel Geotechnical dated February 26-28, 1979, and August 29-31, 1979, and February 26-28, 1980.</p> <p>Audits are scheduled for every six months.</p>
1 - 10	<p>Review drawings for possible effect of vertical duct bank restrictions.</p>	<p>(Closed) See Action Item 23-14 for NRC review.</p>
1 - 11	<p>Complete actions in response to DRUCL audit.</p>	<p>(Closed) See Action Item 23-1 for NRC review.</p>
1 - 12	<p>Revise EDP 4-49 to incorporate clarifications and instructors for use of specification change notices.</p>	<p>(Closed) See Action Item 23-3 for NRC review.</p>
1 - 13	<p>Schedule audits of each design discipline calculations on a yearly basis.</p>	<p>(Open) CPCo commitment not completed.</p>
1 - 14	<p>Re-evaluate construction equipment used for compaction.</p> <p>Compaction equipment currently in use has been qualified and construction notified of parameters governing use of equipment.</p> <p>(Question 23, Subsection 3.6., Page 23-18)</p> <p>(Question 1, Apx I, Page I-11, Para C.1)</p>	<p>(Closed) Verified 50.54(f) submittal, "Report on Test Fill Program" which provides documentation for qualification of compaction equipment currently in use, Spec. C-211, attachment 1, provides a list of equipment to be used and compaction requirements.</p>

Action Item Number	Action Item Description and Reference	
1 - 15	<p>Assign Field Soils Engineer and Soils Engineer from design section.</p> <p>One full time and one part time onsite Geotechnical Soils Engineer has been assigned.</p> <p>(Question 23, Subsection 3.7., Page 23-20)</p> <p>(Question 1, Apx I, Page I-11, Para C.2.a)</p>	<p><u>(Closed)</u> Verified Spec. C-211 Para 8.3.5. requires soil work to be performed under direction of qualified onsite soils engineer.</p>
1 - 16	<p>Review construction specifications and procedures to identify equipment requiring qualifications.</p>	<p><u>(Open)</u> See Action Item 23-8 , CPCo Commitment not completed.</p>
1 - 17	<p>Review field procedure FPG-3.00 to ensure clarify and completeness.</p>	<p><u>(Closed)</u> See Action Item 23-7a for NRC review.</p>
1 - 18	<p>PQCI 1.02 has been revised to incorporate the specific characteristics to be verified by Quality Control.</p> <p>(Question 23, Subsection 3.8, Page 23-22)</p> <p>(Question 1, Apx I, Page I-16, Para C.1.a)</p> <p>Project Quality Control Instructions C-1.02 was revised to include verification of use of qualified equipment & compliance with qualified procedures.</p> <p>(Question 23, Subsection 3.6, Page 23-18)</p> <p>(Question 1, Apx I, Page I-16, Para C.1.a)</p> <p>(Question 1, Apx I, Page I-17, Para C.4.a)</p>	<p><u>(Closed)</u> Verified PQCI 1.02 (Rev. 5) has been revised to include specific characteristics to be inspected.</p> <p><u>(Closed)</u> Verified C-1.02, Rev. 5 requires compaction equipment to be qualified and will adequately compact the material being placed and provides for a daily soil placement report.</p>

Action Item Number	Action Item Description and Reference	
1 - 18 Cont'	<p>PQCI 1.02 was revised to provide specific inspection requirements for verifying soil moisture contents, rather than surveillance.</p> <p>(Question 23, Subsection 3.9, Para 23-24)</p>	<p>(Closed) Verified PQCI 1.02 (Rev. 5) Para 2.3 has been revised to provide inspection of moisture testing.</p>
1 - 19	<p>Complete in depth review of soil test results Geotechnical Services has completed an investigation which includes an in depth review of testing performed by U. S. Testing and reported test results.</p> <p>(Question 23, Subsection 3.10, Page 23-27)</p> <p>(Question 1, Apx I, Page I-17, Para C.3.a)</p>	<p>(Closed) Reviewed and verified report entitled, "Review of U. S. Testing Field and Laboratory Construction Test Data on Soil Uses as Fill", dated July, 1979 was performed.</p>
	<p>An in depth soils investigation program provides verification of the acceptability of the soils or identified any nonconformances requiring further remedial action.</p> <p>(Question 23, Subsection 3.8, Page 23-23)</p> <p>(Question 1, Apx I, Page I-17, Para 3.a)</p>	<p>(Closed) Verified that borings, test pits, laboratory tests, analysis of past test results and plots of all tests have been performed as part of the investigation of the subsurface materials. This information has been submitted to the NRC and is currently under review by NRC office of NRR, Geotechnical Branch.</p>
1 - 20	<p>Perform in depth audits of U. S. Testing.</p>	<p>(Closed) See Action Item 23-15 for NRC review.</p>
1 - 21	<p>Review of QCI's for surveillance call outs.</p>	<p>(Closed) See Action Item 23-19 for NRC review.</p>
1 - 21A	<p>Modify QCI's Based on Item 1-21.</p>	<p>(Open) CPCo commitment not completed.</p>
1 - 22	<p>Evaluate documentation call outs on QCI's</p>	<p>(Closed) See Action Item 23-19 for NRC review.</p>
1 - 23	<p>Incorporate scientific sampling plans for inspection.</p>	<p>(Closed) See Action Item 23-34 for NRC review.</p>
1 - 24	<p>Complete in depth review of Bechtel trend program.</p>	<p>(Closed) See Action Items 23-35 and 23-36 for NRC review.</p>

Action Item Number	Action Item Description and Reference	
1 - 25	Conduct QA Training.	<u>(Open)</u> See Action Items 23-16 and 23-17 for NRC review.
(Unnumbered)	Selection of protor curves will no longer be a problem because each field density test will be accompanied by a separate laboratory standard which will provide a direct comparison. This was directed by a letter to U. S. Testing and reflected in specification change notice C-208-9004, dated April 13, 1979. (Question 23, Subsection 3.10, Page 23-27) (Question 1, Apx I, Page I-17, Para C.4a)	<u>(Open)</u> A review of this commitment resulted in an item of noncompliance as discussed in paragraph 3.(c) of this report.
(Unnumbered)	Specifications wer revised to provide more definition requirement for soil moisture testing. (Question 1, Apx I, Page I-16, Para C.2.a.)	<u>(Closed)</u> Verified spec. C-211, Rev. 12, Para 8.4 (moisture control) has been revised to provide specific requirements for moisture testing.
(Unnumbered)	Spec. C-210 and 211 were revised to incorporate interpretations that affected specification requirements. (Question 23, Subsection 3.2., Page 23-8) (Question 1, Apx I, Page I-6, Page C.1.a)	<u>(Open)</u> Interpretations had not been identified or evidence of being incorporated into specifications.
(Unnumbered)	The requirements for the control of testing were adjusted, requiring the testing subcontractor to check all field density tests for cohesive material against the zero-air-voids curve. (Question 23, Subsection 3.10, Page 23-27)	<u>(Closed)</u> Reviewed and verified Spec. C-208, Rev. 20, Para 9.1.3. to require all field devstiy tests to be checked to the zero-air voids curve.
(Unnumbered)	PQCI SC-1.05 was revised to add more stringent requirements for in process inspections of U. S. Testing. (Question 23, Subsection 3.10, Page 23-27)	<u>(Closed)</u> Verified PQCI 1.05, Rev. 11 was revised to include requirements for inspecting in process testing activities.