Keppler
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Consumers Power Company

James W Cook
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March 4, 1981

Mr J G Keppler, Regional Director
Office of Inspection and Enforcement
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND NUCLEAR PLANT -
INSPECTION REPORT NO 50-329/81-01 and 50-330/81-01
FILE 0.4.2 UFI 73*60*13 SERIAL 11510

References (1) NRC Letter, J G Keppler to J W Cook, Dated February 2, 1981
(2) NRC Letter, G Fiorelli to J W Cook, Dated February 5, 1981

This letter, including all attachments, provides Consumers Power Company's response to References 1 and 2, which transmitted the subject Inspection Report and Appendix A and B, respectively, and which requested our written statement regarding three items of noncompliance and one deviation described in Sections II, 1a, 1b, 1c(1) and 1e of the Inspection Report. It is noted for the items of noncompliance 81-01-01 and -02 that Appendix A provides a classification of severity level V, whereas the Inspection Report in the Inspection Summary, gives a severity level of IV for these items.

Per Reference 2, previous approval was given by Region III to extend the response date by one (1) week due to the delay in the transmittal of Appendix A and Appendix B.

The item of noncompliance (50-329/81-01-01; 50-330/81-01-01) concerning the lack of formalized procedures is responded to in Attachment 1 by stating that we are taking positive measures to improve the proceduralization of soil testing activities and to eliminate any questions of whether or not this is an item of noncompliance.

Our response to the items of noncompliance (50-329/81-01-02; 50-330/81-01-02) and (50-329/81-01-03; 50-330/81-01-03) respectively, is that upon a more extensive evaluation by Consumers Power Company the noncompliances, as stated, do not exist. Attachment 1 provides the details of this evaluation and we request that you reconsider the classification of these as items of noncompliance.

Attachment 2 addresses the deviation (50-329/81-01-05 and 50-330/81-01-05) stated in Section II, 1e of the Inspection Report. Attachment 3 provides

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Consumers Power Company's response to the unresolved item described in Section II, 1c(2) of the Inspection Report. This letter also transmits the revised and closed Safety Concern and Reportability Evaluation (SCRE) No 5 for the Borated Water Storage Tank (BWST) ring foundation as Attachment 4.

Consumers Power Company

Dated March 4, 1981 By G S Keeley

G S Keeley For
James W Cook, Vice President

Sworn and subscribed to before me on this 4 day of March, 1981

Barbara P Swansen

Notary Public, Jackson County, Michigan
My commission expires September 8, 1984

CC RJCook, US NRC Resident Inspector
Midland Nuclear Plant (1)

023539

ITEMS OF NONCOMPLIANCE

This response addresses the three items of noncompliance identified in the Notice of Violation, referenced as Appendix A in a letter from J.G. Keppler to J.W. Cook, dated February 2, 1981, and attached to a letter from G. Fiorelli to J.W. Cook, dated February 5, 1981.

These items of noncompliance are identified as:

50-329/81-01-01; 50-330/81-01-01
50-329/81-01-02; 50-330/81-01-02
50-329/81-01-03; 50-330/81-01-03

and are further discussed in I&E Report 50-329/81-01; 50-330/81-01, Section II, 1a, b, and c(1).

Each of the three items of noncompliance are responded to separately.

ITEM OF NONCOMPLIANCE

023539 (50-329/81-01-01; 50-330/81-01-01)

The Notice of Violation (Appendix A to J.G. Keppler's letter to J.W. Cook, dated February 2, 1981), Item 1, states:

> ...the inspector determined that U.S. Testing Company has not established test procedures for soils work activities. The specification for testing, C-208, references ASTM standards for performing specific tests, but does not include procedural controls or instructions for implementing the tests.

Response -

This statement was based on three observations, each of which will be discussed individually, followed by a response to the finding, and then a discussion of a related 10 CFR 50.54(f) commitment.

The first observation is found in the I&E Report, Section II, 1a(1), and states: 023539

> While observing a laboratory relative density test (ASTM 2049) it was observed that the variable rheostat on the testing apparatus was set at maximum setting. The lab technician stated that ASTM D 2049 requires the setting of the machine at maximum amplitude. It was determined that UST did not previously determine the rheostat setting that produced the maximum density for the material being used onsite. It was assumed by UST that maximum setting produced maximum density. Relative density tests are used to assure that the inplace field density meets the specification requirements.
>
> Corps of Engineers Manual EM 1110-2-1906 dated November 30, 1970, Appendix XII, Page XII-8 states the following:
>
> "It has been determined that for a particular vibrating table, mold, and surcharge assembly, the maximum dry density of a specimen may be obtained at a displacement amplitude (rheostat setting) less than the maximum amplitude of which the apparatus is capable; i.e. dry density may increase with increase in rheostat setting to a setting, beyond which the dry density decreases, therefore each laboratory should determine for it's apparatus the rheostat setting at which maximum density is produced and use this setting for subsequent maximum density testing."
>
> Footnote on Page XII-8 states:
>
> "It may be desirable to redetermine the optimum rheostat setting at the inception of testing for each major project."
>
> U.S. Testing had not determined this setting nor did a procedural control exist for the determination of the rheostat setting.

Response

Midland project is committed to conduct laboratory relative density tests in accordance with ASTM D 2049-69, not the Corps of Engineers Manual. ASTM D 2049 provides the procedure to be used by the U.S. Testing lab technician, in determining the maximum density. The lab technician was, therefore, both correct and accurate in referring to the ASTM requirement that the vibrator be set at maximum amplitude.

The inspector's determination that U.S. Testing "... did not previously determine the rheostat setting that produced the maximum density..." is correct. However, U.S. Testing, did previously determine the rheostat setting that produced the maximum amplitude required by ASTM D 2049. 023539

ASTM D 2049-69, Section 3.1.1 "Vibratory Table", states in part, "The vibrator shall have a frequency of 3600 vibrations per minute, a vibrator amplitude variable between 0.002 and 0.025 in. (0.05 and 0.06 mm) under a 250-lb (1112-N) load..." It should be noted that Corps of Engineers Manual EM 1110-2-1906 November 30, 1970, Appendix XII, Page XII-5, Paragraph f requires a variable vibrator amplitude to a maximum of at least 0.015 in.with the same load as ASTM D 2049-69. This Corps of Engineers Manual requirement allows a maximum vibrator amplitude less than ASTM D 2049-69 and also allows a maximum greater than ASTM D 2049-69, which may be the reason for the statements quoted from the Corps of Engineers Manual in I&E Report, Section II, 1a(1). During receipt inspection (August 1, 1980) of the Humboldt H3756 vibrating table, it was determined that the maximum amplitude of 0.025 in. required by ASTM D 2049-69 was obtained at the maximum rheostat setting.

Subsequent to the NRC inspection, tests were performed which again verified that the maximum rheostat setting yields the maximum amplitude on the relative density table used on the project. This is documented in U.S. Testing's letter to L.E. Davis of Bechtel, Serial UST-J-100, January 26, 1981. These tests will not change the yearly recalibration of the vibratory table scheduled for August 1, 1981.

Tests were performed for the NRC inspectors, and presented during the inspection, which verified that the maximum rheostat setting provided the highest maximum density and conversely, the lower the rheostat setting the lower the density achieved. This provides evidence that, at least for the equipment used on this project, there is no difference between the ASTM method utilized on Midland project, and the Corps of Engineers method quoted by the inspector. It should again be reemphasized that ASTM D 2049 does not require the determination of a maximum density setting.

Although ASTM D 2049, Section 7, entitled, "Maximum Density Procedure" provides adequate procedural control for the proper determination of maximum density, U.S. Testing issued QCP-10, Rev 0 (Quality Control Procedures for the Testing of Soil). This procedure was implemented on February 4, 1981, and in Section 7.1.1.5 states maximum amplitude (0.025" single amplitude) is obtained at the maximum control dial setting for the Humboldt H3756 vibrating table in use on the Midland project.

The second observation is found in the I&E Report, Section II, 1a(2), and states:

> While observing limited field soils work being performed at the metering pits south of the essential service water intake structure at elevation 630' it was determined that samples used to perform relative density tests have been taken after the material has been compacted. These samples should be taken prior to compaction since grain size and gradations can be altered during compaction. The relative density test should be performed on as received material used prior to compaction. Grain size is one of the important characteristics of how soil behaves. The inspector determined from a review of the available grain size analysis that there appears to be a gradation change of the material comparing before and after compaction.
>
> A procedural control specifying where and when to taken soil samples should have been established. UST does not have procedural instructions specifying the field technique where and when to take samples for density tests.

Response

The sampling and testing of structural backfill sand is accomplished in the following manner:

a) Upon receipt, incoming structural backfill sand is tested for gradation in accordance with ASTM D 422.

b) The material is stockpiled then moved to the placement site, placed, moisture conditioned (if necessary), compacted, and sampled.

c) In order to determine in-place density of the material, it is tested in accordance with ASTM D 1556.

d) At the time of the in-place density a gradation is taken for information (ASTM D 422) and maximum and minimum densities are determined in accordance with ASTM D 2049.

The available grain size analyses reviewed by the inspector included gradations obtained from receipt inspections and gradations obtained at the time of in-place density tests. The material gradations, at the time of receipt, show a fluctuation between samples of approximately ten percent for some sieve sizes. This is perfectly acceptable within the range allowed by the specification. The gradations, after compaction, would be expected to show a comparable fluctuation. To look at one sample taken before compaction and another sample taken after compaction and say that the difference in gradation represents a gradation change of the material is an incorrect usage of the data. Hence, it is unknown how the inspector made the determination that, "there appears to be a gradation change of the material comparing before and after compaction."

A rigorous academic evaluation would agree that whenever there is handling and compaction of soil, a degree of reduction in particle size occurs. However, this change in gradation is small, indeterminable from the data reviewed, and insignificant in comparison to the nonhomogeneity of the material itself.

If the material were to undergo a significant gradation change during compaction, a sample taken prior to compaction would no longer be representative of material in place. Determination of in-place density, gradation, and the corresponding maximum and minimum density values after compaction, automatically accounts for possible grain size changes in the evaluation of the in-situ relative density and provides the project with records of the actual properties of the material in place.

The second paragraph of the second observation, refers to procedural control. Specification 7220-C-211, Section 8.9.1, specifies that the testing frequency for all fills will be determined in accordance with their volume, or by the onsite geotechnical soils engineer.

Specification 7220-C-211, Section 8.10, requires that the onsite geotechnical soils engineer determine all density test locations.

02353 Hence, procedural controls have already been established assigning the responsibility for determining where and when to take soil samples to the onsite geotechnical soils engineer, not to U.S. Testing. U.S. Testing's procedure QCP-10 (Quality Control Procedures for the Testing of Soil) implemented February 4, 1981, reflects these specification requirements.

The third observation is found in the I&E Report, Section II, 1a(3), and states:

> It was determined from discussions with the cognizant UST personnel that they have been performing in place density tests "at the direction of the onsite geotechnical engineer." However, there are no procedural instructions as to what depth below the lift being compacted the test should be performed. A review of the density test reports indicate that they are not correlating the density test depth to the lift being compacted.

Response

The testing of soil materials is performed in accordance with Specifications 7220-C-208, Section 9.0 and 7220-C-211, Section 8.0. Specification 7220-C-211, Sections 8.9 and 8.10, specify that the frequency and location of the in-place density tests are to be determined by the onsite geotechnical soils engineer.

The minimum test frequency for field density and moisture content is given in Specification 7220-C-211, Section 8.9. In accordance with that section, the minimum test frequency is dependent upon the extent of the area, compaction equipment used, and the volume of backfill material to be placed. Hence, according to the established requirements the density tests are to correlate to a volume of soil, not to a specific lift. Thus, it is not necessary to test every lift nor to correlate the test to the lift being compacted. Any correlation that may be needed at some future date would be based upon the elevations recorded on the test report form.

It should be noted that by following Specification 7220-C-211 for placement of material and using the prequalified compaction equipment, all lifts of the backfill materials are uniformly compacted to meet the density requirements.

The practice has been to perform in-place density testing about 1 foot below the surface for sand and about 0.5 feet below the surface for clay. The determination of the location (depth/elevation) of these tests is the responsibility of the onsite geotechnical soils engineer in accordance with Specification 7220-C-211, Section 8.10. The determination of where to take the density test(s) should be left to the judgment of the onsite geotechnical soils engineer and not proceduralized. U.S. Testing's recently issued QCP-10 reflects this responsibility.

Based on the three preceding observations, the item of noncompliance was stated in the I&E Report, Section II, 1a(1), (2), and (3) as:

> Based on the above, it has been determined that CPCo is in noncompliance with 10 CFR 50, Criterion V (Procedures) in that adequate laboratory and field test procedures have not been established for the control of soil testing activities. (50-329/81-01-01; 50-330/81-01-01).

Response

The procedural control for establishing the proper rheostat setting (first observation) was provided by the "Maximum Density Procedure" in ASTM D 2049 which was imposed by the project specification (7220-C-208) controlling U.S. Testing's work. The periodic recalibration of this equipment was identified and controlled by the recalibration procedures. There is, therefore, no evidence of lack of sufficient procedural control to accomplish the activities associated with the qualification, usage, and periodic checking of this equipment.

The project specifications put the responsibility for determining where and when to take soils samples (second observation), including the depth for in-place density tests (third observation), on the onsite geotechnical soils engineer. This position was established to have a knowledgeable, experienced individual in a position to exercise control and judgment over the soil operations. To further proceduralize the work in this area could negate the "active role" currently established for this position.

This response establishes that, in the areas questioned, adequate laboratory and field controls have been in existence for the soil testing activities. Nevertheless, U.S. Testing has generated procedure QCP-10 to direct the testing personnel's attention to the already established requirements.

The I&E Report, Section II, 1a, continues:

D23539 CPCo response to 50.54(f) question 23, subsection 3.11, page 23-31 states that "U.S. Testing was required to demonstrate to cognizant engineering representatives that testing procedures, equipment, and personnel used for quality verification testing were capable of providing accurate test results..." This commitment has not been satisfied based on the above findings.

Response

The quotation referenced above is missing a key phrase. The full quotation is:

> 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.

The parenthetical phrase was omitted. This missing phrase specifically exempted the soils activities from this commitment. Hence, the inspector's findings had no bearing on the completion of this commitment.

Additionally, the preceding response to the three observations concluded that adequate procedures existed to control the soil testing activities.

ITEM OF NONCOMPLIANCE

023539 (50-329/81-01-02; 50-330/81-01-02)

I&E Report 50-329/81-01; 50-330/81-01 in Section II, 1b, states:

> It was determined that U.S. Testing was using uncontrolled forms to record quality control test results. A binder was observed in the U.S. Testing lab which contained QC forms used to record test results. On the inside cover it stated that the index does not reflect the latest revision of each form. The cognizant lab personnel were not able to demonstrate that the latest revision of QC test forms were being used since there were no document control provisions established to control these forms. An undated U.S. Testing inter-office memo was presented to the NRC inspector as the procedure to follow when receiving revised forms. It states in part, "log into controlled forms index". The inspector requested such a form index but did not receive it. There was no documentation onsite as to what forms are to be used for what test as well as what are the latest revisions of the forms.
>
> Based on the above, it was determined that CPCo is in noncompliance with 10 CFR 50, Appendix B, Criterion VI, (Document Control) in that measures have not been established to control the issuance of documents which affect quality activities. (50-329/81-01-02; 50-330/81-01-02)

Response

All forms in use were controlled. Each form had a unique identifying number and either the date of latest revision or a revision number (with the exception of forms MEI-115 and MEI-116 which were original issues and did not have revision dates or numbers).

The binder which contained quality control (QC) forms was labeled Controlled Forms Book. This book contained a copy of each form available for use and Controlled Form Indexes for several subjects (concrete, soils, etc) identifying these forms by name and number. The inside cover states:

> "Midland Project Instruction
> CONTROLLED FORMS BOOK"

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The controlled forms indexes are lists of forms and need not be updated to indicate the latest revisions. A copy of the latest revision for any form in current use is to be included in the body of the Controlled Forms Book.

All U S. Testing personnel were aware that forms are controlled and the cognizant lab personnel (i.e., lab chief, assistant lab chief, and records controller) were capable of demonstrating that the latest revisions of QC test forms were being used. As committed to the NRC during the January 9, 1981 exit meeting, the Midland Project Quality Assurance Department did a survey on actual forms being used against approximately half of the forms contained in the Controlled Forms Book for soils, concrete, and steel and found all forms checked were the current revisions.

The U.S. Testing interoffice memorandum referred to by the inspector was dated February 12, 1979, and was labeled Midland Project Instruction Processing New or Revised Forms and Documents. This instruction contains step-by-step procedures for handling forms and documents, and was signed by the laboratory chief.

Each QC form and worksheet contained the ASTM test method, by number, for which it was to be used, as well as an identifying number for the form and either the date it was last revised or a revision number (with the exception of forms MEI-115 and MEI-116 which were original issues and did not have revision dates or numbers).

Based on the preceding, there is no evidence of noncompliance with Criterion VI of 10 CFR 50. However, based on the inspector's concern for the lack of formalized procedures, stated in Section II, 1a, of the I&E Report, U.S. Testing implemented QCP-14, Rev 0 (Quality Control Procedure of Forms) on Feburary 4, 1981.

The Notice of Violation, Item 2, notes the following discrepancy which was not discussed in the I&E Report previously quoted; "There is no distribution list for the forms...."

Distribution of the test result forms for soils activities has been: original to quality control with copies to the onsite geotechnical soils engineer, Midland Project Quality Assurance Department (MPQAD), CPCo-Project Management Organization (PMO), and U.S. Testing's jobsite files. To address the concern regarding the lack of formal procedures, Change No. 1 to QCP-10, Rev 0 was issued effective February 26, 1981, to incorporate this distribution into the procedure.

ITEM OF NONCOMPLIANCE

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(50-329/81-01-03; 50-330/81-01-03)

I&E Report 50-329/81-01; 50-330/81-01 in Section II, 1c(1) states:

> Quality assurance records for backfill work activities were reviewed for completeness and compliance with licensee specifications, procedures, and commitments.
>
> Bechtel field instruction FIC 1.100, Appendix A, duties and responsibilities of the onsite geotechnical engineer, Paragraph 18, requires that the onsite geotechnical engineer review and initial all acceptable UST test report forms.
>
> ANSI N45.2.9 (Quality Assurance Records), Section 3.2.1, requires that "quality assurance records shall be considered valid only if stamped, initialed, signed, or otherwise authenticated and dated by authorized personnel".
>
> Numerous UST density test reports were rubber stamped by the geotechnical engineer, however, none were dated. In addition no procedural controls were established for use or control of the rubber signature stamp of the geotechnical engineer.
>
> Based on the above it was determined that CPCo is in noncompliance with 10 CFR 50, Appendix B, Criterion XVII (Quality Assurance Records) in that the soil test reports are not initialed or dated and there were no established controls on the use of a rubber signature stamp. (50-329/81-01-03; 50-330/81-01-03)

Response

The referenced FIC 1.100 requirement was intended to direct the onsite geotechnical soils engineer to review each test report and to indicate on the report that he had done so. The instruction stated, "initial", but signature or stamp are also acceptable methods of indicating this review.

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The ANSI reference quoted above has been taken out of context. The ANSI standard is referring to what must be done when the test report is being filled out, for it to be considered a valid quality assurance record (i.e., the person doing the test shall authenticate and date it). These test reports are valid quality assurance records in compliance with ANSI requirements regardless of any commitments for a subsequent review by the onsite geotechnical soils engineer.

10 CFR 50, Appendix B, Criterion XVII, requires that:

> Sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include at least the following: ...the results of reviews, inspections, tests, audits.... Inspection and test records shall, as a minimum, identify the inspector or data recorder, the type of observation, the results, the acceptability, and the action taken in connection with any deficiencies noted....

The subject test reports are quality assurance records within the Appendix B definition, and identify the elements required by this criterion. The "reviews" addressed in the reference above is a generic term used in the same sense, and at the same level, as inspections, tests, audits, etc. It is not intended to refer to the particular review and approval cycles that an individual quality assurance record, such as a test report, may go through. Hence, Criterion XVII is not applicable to the review and sign-off of a test report by the onsite geotechnical soils engineer.

Thus, ANSI N45.2.9 and 10 CFR 50, Appendix B, Criterion XVII, are not applicable as the detailed controlling requirements for review and sign-off of test reports by the onsite geotechnical soils engineer. Neither regulation requires control of signature stamps.

Any violation which occurred should be limited to permitting a signature stamp as a loose interpretation of the FIC 1.100 requirement that the onsite geotechnical soils engineer "review and initial" all acceptable U.S. Testing test reports.

The ANSI requirements for quality assurance records indicate that forms of sign-off, other than initials, are acceptable, but that it would also be advisable to indicate the date of review. Hence, the "separate instruction to the onsite geotechnical engineer" committed to in the response to the

unresolved items of I&E Report 50-329/80-32; 50-330/80-33, will also address the acceptable ways of documenting this review and the need to indicate the date of review.

23539 The control of usage of a signature stamp remains the responsibility of the individual whose signature it bears.

DEVIATION

023539

This response addresses the deviation identified in the Notice of Deviation, referenced as Appendix B in a letter from J.G. Keppler to J.W. Cook, February 2, 1981, and attached to a letter from G. Fiorelli to J.W. Cook, February 5, 1981.

This deviation is identified as:

50-329/81-01-05; 50-330/81-01-05

and is discussed in I&E Report No.

50-329/81-01; 50-330/81-01, Section II, 1e

The response to this deviation begins on the following page and is followed by a discussion of follow-up action.

DEVIATION

023539

(50-329/81-01-05;50-330/81-01-05)

I&E Report 50-329/81-01; 50-330/81-01 in Section II, le states:

> CPCo response to 50.54(f) question 23, Subsection 3.7, page 23-20, states that, "one full time and one part time onsite geotechnical soils engineer have been assigned." The inspector requested the qualifications of the onsite geotechnical engineer. A resume was presented to the inspector as representing the assigned individual to implement the commitment in order to preclude future soils problems. This engineer is to provide the technical direction and monitoring of the entire earthwork process.
>
> The resume that was presented was of an "Engineering Technician" with no previous formal education in engineering or geotechnical engineering. The engineering technician had nominally 15 years of field and laboratory testing of soils.
>
> This information was discussed with representatives of the NRC geotechnical branch. It was determined that CPCo committed to provide technical direction from a geotechnical engineer capable of being recognized and licensed by a state board of registration of professional engineering or equivalent.
>
> In view of the fact that adequate technical direction had not been provided per the commitment by CPCo in the 50.54(f) response it has been determined that CPCo is in deviation from a NRC commitment as described in Appendix B of the transmittal letter of this report. (50-329/81-01-05; 50-330/81-01-05)

Response

The purpose of the onsite geotechnical soils engineer position is to provide technical direction and monitoring of the entire earthwork process as a qualified representative of project engineering. The responsibilities of the onsite geotechnical soils engineer include assisting field engineering in the implementation of soils engineering design and specification requirements; notifying the project soils engineer and quality control engineer of any onsite soil-related activity not in accordance with the specifications,

drawings, or good engineering practice; notifying project field engineering and the project soils engineer of any construction activity detrimentally affecting the quality of soil-related work; and documenting explanations, approvals, and inadequacies regarding placement of soils. The onsite geotechnical soils engineer monitors but does not perform the actual field and laboratory testing of soils.

A job description for the onsite geotechnical soils engineer (backfill and laboratory testing) position, including principal responsibilities is provided as Appendix A.

The following are the qualification requirements for the onsite geotechnical soils engineer (backfill and laboratory testing) position:

1. Knowledge of procedures required for fill placement, compaction, and laboratory testing as required by the applicable specifications

2. Qualifications for this position are a recognized degree in civil engineering from an accredited college or university or a registered professional engineer; and two years of field experience with soil compaction and laboratory testing on earthwork projects.

3. The applicability of field experience will be established through interviews with the soils engineering group supervisor responsible for the technical content of the work and with the geotechnical services manager responsible for staffing the position.

The onsite geotechnical soils engineer now at Midland meets the above qualification requirements.

After stating the deviation, the I&E Report, Section II, 1e, contained the following statement concerning follow-up activities:

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> Subsequent to the inspection, CPCo informed the RIII office that a geotechnical engineer would be onsite beginning January 19, 1981 and that job descriptions and qualifications for the geotechnical engineer for the speciality remedial work to follow would be developed. This action will be verified during subsequent inspection.

Response

The following is a job description and definition of the qualifications of the onsite geotechnical engineer for the special remedial work.

A. Purpose and Responsibilities

The purpose of this position is to provide technical direction and monitoring of special remedial work which may be required to repair or strengthen existing foundations of structures, tanks, and other facilities. This remedial work may include underpinning using piles, caissons, reinforced concrete, or compacted backfill. The onsite geotechnical soils engineer (special remedial work) will be responsible for observing and coordinating critical operations of this remedial work, including inspection of subgrades and bearing strata, adequacy of pile driving equipment and methods (where applicable), safety of temporary earthwork support, load transfer by jacking, settlement measurement, etc. Full-time monitoring of routine operations, such as pile blowcounts and compaction testing, may be delegated to the onsite geotechnical soils engineer (backfill and laboratory testing).

B. Job Description

Observes and provides technical coordination for critical phases of the work beyond the routine earthwork aspects. Reports to project soils engineer and quality control any detrimental or inadequate work.

C. Qualification Requirements

1. Knowledge of design requirements and installation procedures required by the type of remedial foundation work being constructed.

2. Qualifications for this position must include a degree in civil engineering from an accredited college or university or a registered professional engineer; and two years of experience in the design and analysis of foundations and soils mechanics.

3. The applicability of design and analysis experience will be established through interviews with the soils engineering group supervisor responsible for the technical content of the work and with the geotechnical services manager responsible for staffing the position.

D. Implementation

The onsite geotechnical soils engineer (special remedial work) will be made available upon commencement of any special remedial work, and will be full-time at the jobsite during any critical, nonroutine phases of the work.

Prior to January 19, 1981, a geotechnical engineer meeting the qualification requirements for the onsite geotechnical soils engineer (backfill and laboratory testing) was present on the jobsite to perform the tasks indicated in Appendix A.

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UNRESOLVED ITEM

This response addresses the unresolved item identified in the I&E Report attached to a letter from J.G. Keppler to J.W. Cook dated February 2, 1981.

This unresolved item is identified as:

50-329/81-01-04; 50-330/81-01-04

and is discussed in I&E Report No.

50-329/81-01; 50-330/81-01, Section II, 1c(2)

The response to this unresolved item begins on the following page.

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UNRESOLVED ITEM

(50-329/81-01-04; 50-330/81-01-04)

I&E Report 50-329/81-01; 50-330/81-01 in Section II, 1c(2) states:

> Specification C-208, Section 9.1.3(d) requires the geotechnical engineer to review and evaluate test results when densities exceed certain values. From discussions with the previous geotechnical engineer, it was determined that the evaluation consisted only of a check of the numerical calculations for numerical errors. If the calculations were correct the disposition was "use as is", this review does not meet the requirement to evaluate test results.
>
> Subsequent to the inspection CPCo informed the RIII office that documented evaluations of the above would be performed. This is an unresolved item pending review of the evaluation (50-329/ 81-01-04; 50-330/81-01-04).

Response

The onsite geotechnical soils engineer provided the following explanation of the evaluation performed, by him, on all test reports indicating a density equal to or exceeding 101% or 105%, as appropriate, for the period April 16, 1980 to December 31, 1980. This explanation has been provided in a letter, February 27, 1981, to the manager of Geotechnical Services in Ann Arbor from the onsite geotechnical soils engineer.

The following checks were performed on density tests equal to or exceeding 101% compaction for cohesive materials and equal to or exceeding 105% relative density for cohesionless materials:

1. a reasonable in-situ wet density
2. a reasonable moisture content
3. a reasonable in-situ dry density
4. correct calculation of densities and moisture content
5. reasonable percent compaction for cohesive materials
6. reasonable laboratory maximum and minimum dry density using both the wet and dry methods allowed for the relative density test
7. correct computation of percent relative density

8. correct computation of laboratory maximum and minimum dry densities
9. correct computation of average of both trials of maximum and minimum densities for use in computing relative density
10. consistent volumes and dimensions of molds and their respective weights
11. gage reading for measurement of consolidation similarity and for any indication of severe tilting of disk surface
12. test labeling and information consistent on all corresponding test forms
13. verification of equipment calibration

The following additional checks were performed, by the onsite geotechnical soils engineer, to make a final determination of an acceptable test:

1. review of gradation analysis test (if applicable) to observe any inconsistencies
2. correct calculation of gradation analysis
3. compute percent compaction for cohesionless materials, and
4. a reasonable percent compaction for cohesionless materials.

The onsite geotechnical soils engineer further stated that he had witnessed all field density tests performed, a large portion of all the laboratory processing of the field tests, many of the relative density tests during the time interval indicated and found them to be performed with a very high degree of consistency with regard to established ASTM procedures and requirements.

In the above statements, reasonable refers to comparison with other tests, known information, and the engineering judgment of the onsite geotechnical soils engineer.

Attachment 4
Serial 11510

Consumers Power Company
QA69-0

SAFETY CONCERN AND REPORTABILITY EVALUATION

PROJECTS, ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT

PAGE 1

4. HOW WAS CONCERN IDENTIFIED, WHEN, WHERE?
As a result of the 50.54(f) commitments to do a structural reanalysis of Category I Structures (See Items 14-7 and 48-2), the BWST ring foundation was reanalyzed and values were obtained which were inconsistent with previous values, and inconsistent with FSAR requirements. The results of the analysis were obtained 1-4-81 and discussed in a 1-5-81 CPCo/Bechtel meeting. The Project Manager attended this meeting and subsequently briefed the Manager of Quality Assurance.

(CONTINUE ON NEXT PAGE)

TO MANAGER-MPQA

1. FROM: R L Rixford
ORGANIZATION: MPQAD - DQAE

SCRE NO: 5
[redacted] NO: 15.1 , 0.4.9.49
DATE RECEIVED:

2. IS CONCERN A PART 21?
☐ YES ☒ NO
WHEN? N/A
BY WHOM? N/A

3. IS NRC AWARE OF THIS?
☐ YES ☒ NO
WHEN? N/A
BY WHOM? N/A

5. BRIEF DESCRIPTION OF CONCERN - SYSTEM, COMPONENT, ACTIVITY, POSSIBLE SAFETY IMPACT - (ATTACH SUPPORTING DOCUMENTS).

The BWST ring foundation was analyzed for several loading combinations including the dead load plus live load which was determined to be the most severe. The analysis was first performed using ~~the methods of BC-TOP-4A, Rev. 3 (this method uses~~ springs for soil/structure interaction ~~during a seismic event)~~, but gave displacement values inconsistent with anticipated and measured values. The analysis was then done using a finite element technique which gave consistent displacement values but forces and moments in excess of FSAR allowables. The values obtained from the reanalyses which have been done indicate an overstressing and, hence, a potential for failure of the foundation of the Category I BWST.

(CONTINUE ON NEXT PAGE)

6. IMMEDIATE REPORTABILITY EVALUATION:
a. ☐ REPORTABLE - GO TO 13
b. ☐ POTENTIALLY REPORTABLE - GO TO 13
c. ☒ NOT REPORTABLE, FURTHER EVALUATION
d. ☐ NOT REPORTABLE

7. ORGANIZATION REPONSIBLE FOR FURTHER EVALUATION:
Bechtel Engineering - Civil

8. FINAL REPORTABILITY EVALUATION (IF 6.c. CHECKED):
a. ☒ REPORTABLE b. ☐ NOT REPORTABLE

9. QA APPROVAL OF EVALUATION OF BLOCKS 1 TO 7: W R Bird MANAGER - MPQA 1/7/81 DATE

10. JUSTIFICATION OF EVALUATION - (ATTACH SUPPORTING DOCUMENTS)

The first reanalysis gave displacement values which were inconsistent with measured settlement and anticipated values. This cast doubt upon the spring values used in the analysis. The subsequent finite element analysis gave displacement values which were consistent with the other values available for comparison, but gave forces and moments which exceeded the FSAR allowables by an amount sufficient to warrant an additional check on these values also.

Two actions planned to check these values are:

1. Retain a consultant to review the results obtained by analyses done, and/or do an independent check.
2. Excavate and inspect the foundation for signs of overstressing (i.e., cracking).

It was considered premature to judge this a reportable condition prior to confirmation of the values obtained by the finite element analysis.

(CONTINUE ON NEXT PAGE)

11. EVALUATORS SIGNATURE/DATE: R L Rixford 1-5-81

12. FINAL QA APPROVAL - MANAGER MPQA/DATE: W R Bird 2/19/81

13. NRC NOTIFICATION: HOW? By Phone DATE: 1/22/81 TIME: 1:30 PM
INDIVIDUAL NOTIFIED: Ray Sutphin & Gene Gallagher
REFERENCE: Telecon 1/22/81 Chron File #11175

Consumers Power Company
QA70-0

SAFETY CONCERN AND REPORTABILITY EVALUATION

PROJECTS, ENGINEERING AND CONSTRUCTION - QUALITY ASSURANCE DEPARTMENT
SCRE NO: 5

4. CONTINUED

5. CONTINUED

10. CONTINUED

14. MINIMUM DISTRIBUTION:

VICE PRESIDENT - PE&C
VICE PRESIDENT - MIDLAND PROJECT
DIRECTOR - ENVIRONMENTAL SERVICES & QA
MIDLAND SITE MANAGER
SITE QA SUPERINTENDENT
MANAGER - SAFETY & LICENSING
MIDLAND FILE NO 15.1
0.4.9.49

15. ADDITIONAL DISTRIBUTION:

MPQAD - DQAE Supervisor

Retransmitted to distribution on 2/27/81 to show modification to Block 5 wording.

ONSITE GEOTECHNICAL SOILS ENGINEER
(backfill and laboratory testing)

023539

POSITION DESCRIPTION:

Summary:

Provides technical coordination and monitoring of onsite earthwork during construction. Explains specification requirements, and provides technical direction for additional testing where necessary. Reports to the project soils engineer and quality control any detrimental or inadequate soils-related work. Documents all approvals, deficiencies, and resolutions, and all significant observations or explanations.

Principal Responsibilities:

1. Excavation: Observe excavations to ensure that foundations and other facilities are constructed in accordance with applicable specifications and drawings.

2. Backfill: Observe backfill operations to ensure conformance to specifications.

3. Compaction Testing: Observe onsite testing operations to ensure the requirements of applicable specifications are met. Observe selected laboratory tests daily to ensure compliance with specifications. Review all testing reports and notify project soils engineer of any problems.

4. Soil Placement: Observe soil placement to ensure conformance to requirements of applicable specifications.

5. Compaction Equipment: Observe soil placement to ensure that the compaction equipment is qualified and listed in the specification and can deliver the required degree of compaction for the proposed backfill area. Establish if the size of the backfill area is sufficient to enable checking the speed of advancement of compaction equipment. Advise quality control engineer of the in-place density testing frequency.

6. Inprocess Testing: Observe at least once a day the in-process field and laboratory testing operations. These testing operations shall include density and moisture tests, gradation tests, and plotting zero air voids curves.

7. Specification Clarification: If clarification to the specification is required, request such clarifications in writing by memorandum or TWX. The clarifications will be furnished by project engineering by a specification change notice or by revising the specification.

8. Testing Frequency: Determine the size of the backfill location to establish the frequency of testing based on applicable specifications. These requirements are minimum. If additional tests are required, advise appropriate personnel and document such requests. Ensure that soil placement is uniform and consistent.

9. Reworking Area Represented by Failing Tests: If a failing test is reported, review the calculations for errors. If the calculations are correct and the failing test is confirmed, advise appropriate personnel to rework the area represented by the failing test.

10. Test Fill Program: Observe soil placements to ensure that soil placement activities are compatible with those performed in the test fill program.

11. Reporting: Document in a daily report all significant observations, approvals, and deficiencies regarding soils-related work. Notify appropriate personnel of detrimental or inadequate work so that a resolution can be reached and rework and down-time minimized.