


Bechtel Associates Professional Corporation
Ann Arbor, Michigan

TECHNICAL SPECIFICATION
FOR
SUBCONTRACT FOR
AREA DEWATERING SYSTEM
FOR THE
CONSUMERS POWER COMPANY
MIDLAND PLANT
MIDLAND MICHIGAN

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AA-G-100373

NO	DATE	REVISIONS	BY	CHK	APPR
1	11-12-79	Revised as noted on facing sheet; INC SCN 9001			
2	7/11/79	Issued for subcontract - revised as noted on facing sheet			
3	6/12/79	ISSUE FOR BIDS			

ORIGIN		CONSUMERS POWER COMPANY MIDLAND PLANT UNITS 1&2 MIDLAND MICHIGAN	JOB No	7220
BAPC			SPEC DES GUIDE No	REV
			C-88-Q	2

SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.	SHEET	LATEST REV.
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NO.	DATE	REVISIONS	BY	CHK'D	APP'D	NO.	DATE	REVISIONS	BY	CHK'D	APP'D
2	11/12/70	Revised shts. 1, 11, 111 1-0, App A sht 1									
1	7/11/70	Issued for subcontract rev. sh. 1, 11, 111, 2-9									
0	10/12/70	ISSUE FOR BIDS									



FACING SHEET
 AREA DEWATERING SYSTEM
 CONSUMERS POWER COMPANY
 MIDLAND POWER PLANT UNITS 1&2
 MIDLAND, MICHIGAN

JOB No. 7220
 C-88-Q
 Rev
 ?

AA-G-110273



TECHNICAL SPECIFICATION
FOR
SUBCONTRACT FOR
AREA DEWATERING SYSTEM

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APPENDIX

A DOCUMENTATION REQUIREMENTS



1. SCOPE

A. GENERAL

- 1) The work to be performed under this Subcontract shall consist of designing a dewatering system capable of lowering the groundwater to a minimum elevation of 580 feet with the pond at el 627'+. The lowering of the groundwater will allow others to excavate portions of the auxiliary building and feedwater isolation valve pit in a dry condition. This specification includes Q-listed work to be performed exclusively by Contractor as noted in Article 7.

B. ITEMS INCLUDED

- 1) Design, furnish, install, maintain, operate, and remove dewatering system as indicated in the design drawings.
- 2) Provide and maintain standby equipment and power of sufficient capacity to perform the intended work.
- 3) Install, maintain, and observe observation wells and/or piezometers and test pits for logging the water table elevations at the locations as required and approved by Contractor.
- 4) Dispose of the groundwater to the cooling pond by installing a piping system from the dewatering system indicated in the drawings to the site storm drain system.
- 5) Provide protection of the dewatering system in areas designated as construction access as shown in the drawings.
- 6) Grout placement for all dewatering holes and wells upon completion of the subgrade dewatering.
- 7) Install 1/4-inch petcocks, bushing, and nipples at each dewatering well for obtaining samples of the return water.
- 8) Provide all reducers, couplings, piping etc necessary to adapt Contractor's flow meters to discharge line, fire hydrant, and recirculation line.

C. RELATED ITEMS NOT INCLUDED

- 1) Access roads to the area
- 2) Inspecting the water being pumped to determine the amount of fines being removed. In this specification, fines are defined as any nonorganic materials coarser than 0.005 millimeter.

- 3) Concrete grout for sealing holes and wells
- 4) Excavation required (trenching) to provide the areas for installing the dewatering systems
- 5) Location of all utilities, embedded plant facilities, and other subsurface structures at the location of the dewatering system
- 6) Drilling holes through the turbine building and auxiliary building concrete floors at elevations 614' and 634' at the locations required by Subcontractor
- 7) Repairing the holes drilled in the auxiliary building and turbine building concrete floors
- 8) Electrical power to operate the pumps
- 9) All lines, grade, survey, excavation, fill, backfill, and protection of dewatering equipment at the road or ramp crossing as necessary
- 10) Repair and/or replacement of any utilities, embedded plant facilities, and/or other substructure damage encountered at the locations indicated by Contractor for locating eductor wells

2. QUALITY STANDARDS

A. GENERAL

- 1) Subcontractor shall be responsible for the quality of items and services to meet the requirements of this specification, applicable codes and standards, and other contract documents.

3. SUBMITTALS

A. STANDARD FORMS

- 1) Engineering document and quality verification document requirements are summarized in Form G-321-D and are augmented by detailed requirements in this specification.

B. PROCEDURES

Subcontractor shall submit the following procedures (in detail) to the satisfaction of Contractor.

- 1) Dewatering plant area procedure
- 2) Test pits procedure

- 3) Observation wells
- 4) Jetting procedure
- 5) Grouting procedure

4. SERVICE REQUIREMENTS

A. OPERATIONAL REQUIREMENTS

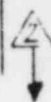
- 1) An adequate dewatering system shall be installed to lower and control the groundwater to provide a dry condition during construction, excavation, and placement of fill materials. The dewatering system shall be capable of lowering and continuously maintaining the groundwater level to el 600' initially so construction work can start and then lowering and maintaining the groundwater level as directed by Contractor to a minimum elevation of 580' until a written directive from Contractor to cease dewatering operations has been received.
- 2) Deleted
- 3) Contractor shall provide operating electrical power. The drawing will indicate these locations.

B. SUBCONTRACTOR'S RESPONSIBILITY

- 1) Subcontractor shall be solely responsible for the design, installation, operation, and removal of a dewatering system. This system shall prevent the loss of fines in the soil, seepage, boils, quick conditions, or softening of the foundation strata. The stability of sides and bottom of excavation shall be maintained, thereby resulting in every phase of the excavation and construction being performed in dry conditions.

C. DATA AVAILABLE

- 1) The subsurface data and preliminary pump test results are available upon request and are for Subcontractor's information only. Subcontractor assumes the responsibility for any deductions, interpretations, or conclusions made on the basis of these data.
- 2) The test boring report and the Dames and Moore Report for this plant are located at Contractor's office and are available for review.
- 3) The estimated elevation of the groundwater table is 627 feet.



D. APPROVAL OF DEWATERING SYSTEM

- 1) Approval by Contractor of the dewatering system proposed by Subcontractor will be only with respect to the basic methods Subcontractor intends to use. Approval of the dewatering system will be based on the demonstrated performance of the system to satisfy the requirements for dewatering as specified.

E. CONTROL

- 1) The observation wells, piezometers, and measurements of fines shall be used as a primary basis of determining compliance with the requirements of this specification.
- 2) Test pits shall be used only as directed by Contractor in writing.

5. FIELD OPERATIONS

A. GENERAL

- 1) Subcontractor shall furnish, install, operate, and maintain the dewatering system and, upon completion, remove all dewatering equipment except as approved in writing in advance by Contractor. Subcontractor shall perform all associated work required to remove and control the subsurface water so that the excavation, construction, and backfilling operations can be performed completely in dry conditions as approved by Contractor. All associated work required to remove and control localized pockets of trapped groundwater within the excavation will be done by others.

B. TRENCHING

- 1) Contractor shall perform excavation where required to allow for installation of the dewatering system.

C. TESTING DEWATERING SYSTEM

- 1) Prior to any excavation below the groundwater level, the dewatering system shall be tested and placed in operation to lower the water levels as required and shall function continuously as required to provide a dry construction area. The pumping shall continue until the excavation and backfill operations are completed to the upper limits of the original groundwater level. Subcontractor shall obtain written approval from Contractor before discontinuing the dewatering operation.



D. DISPOSAL OF WATER

- 1) Subcontractor shall be responsible for all surface and subsurface water resulting from its operations and shall dispose of all water removed from the dewatering system in a manner that will not endanger public health, property, or any portion of the work under construction by other Subcontractors and associates working in the area. The water shall be conveyed through piping from the dewatering system to the existing site storm drain system only after it has been monitored for fines.



E. STANDBY EQUIPMENT

- 1) Subcontractor shall provide standby equipment installed and available for immediate operation as may be required to maintain the dewatering adequately on a continuous basis in the event that all or any part of the dewatering system may become inadequate or fail.
- 2) Subcontractor shall provide and maintain, in an operable condition, standby diesel-powered pumps and/or generators of sufficient capacity to start and operate all pumps and other required dewatering equipment for the duration of the dewatering.

F. OBSERVATION WELLS

- 1) Subcontractor shall supply, install, take measurements, and maintain the required number of observation wells and/or piezometers and such additional observation wells as may be ordered by Contractor. Water levels in the observation wells and/or piezometers and volume of water shall be recorded and submitted to Contractor daily, Monday through Friday, during dewatering.
- 2) The observation wells shall be of a type that will permit portions of the riser to be removed as the excavation work progresses. The proposed type shall be submitted to Contractor for approval prior to installation.
- 3) Subcontractor shall, by adding or removing water from all observation well risers, demonstrate that the observation wells are functioning properly prior to commencement of dewatering.
- 4) Any observation wells and/or piezometers that become inactive, damaged, or destroyed by Subcontractor shall be replaced within 24 hours by Subcontractor at no additional expense to Contractor.

- 5) Jetting shall not be used for the installation of the observation wells/dewatering wells under any structure. Controlled jetting may be used for the installation of the observation wells/dewatering wells outside the structures, provided the jet water is brought up through the inside of the jetted casing and does not blow up the outside of the jetted casing. The above is applicable after the casing has been installed 10 feet below the ground surface. Jetting shall be done in accordance with the Subcontractor's approved procedure.

G. DEWATERING

- 1) Subcontractor shall be solely responsible for the arrangement, location, and depths of the dewatering system necessary to accomplish the work described under this section of the specification. Limits of the work are shown in the drawing. The dewatering shall be accomplished in a manner that will reduce the hydrostatic head in water-bearing strata below any excavation to the extent that the water level and piezometric water levels in the construction area are substantially (a minimum of 3 feet) below the prevailing excavation surface; will prevent the loss of fines, seepage, boils, quick conditions, or softening of the foundation strata; will maintain stability of the sides and bottom of the excavation; and will result in all construction operations being performed in a dry condition. For the area outside of the structures where pervious soil strata overlay considerably less pervious soil strata above the subgrade level, the groundwater in the pervious strata shall be lowered to within less than 2 feet of the top of the less pervious strata. As the area is excavated to the top of the less pervious strata, any groundwater remaining perched in the pervious strata above the less pervious strata shall be removed by others. If the water bearing strata are found to be absent, the well location shall be abandoned and the hole shall be sealed in accordance with Paragraph 5.G.7 of this specification.
- 2) The dewatering operation shall be controlled in such a manner that the amount of fines of the soil in the discharge water shall be limited to 5 ppm. This is to be determined by measuring the amount of fines in the return line and discharge line corresponding to the quantity of groundwater measured at the discharge line.
- a) All dewatering and observation wells located within the turbine building shall be installed using stainless steel well screen and risers. Unless directed otherwise in writing by the onsite geotechnical engineer.

- b) Dewatering wells located outside the turbine building area may be installed with a 6-inch diameter well screen, provided there is a sufficient quantity of sand and approval is obtained from the Contractor's onsite field geotechnical engineer.
- 3) Jetting procedures shall be approved in advance in writing by Contractor and as indicated in Subparagraph 5.F.5 of this specification.
- 4) If the dewatering requirements are not satisfied because of inadequacy or failure of the dewatering system, loosening of the foundation strata and/or instability of the slopes may occur. The supply of all labor, materials, and the performance of all work necessary to carry out additional work for reinstatement of foundation soil resulting from such inadequacy or failure shall be undertaken by Subcontractor to the full satisfaction of Contractor, and at no additional expense to Contractor.
- 5) Prior to any excavation below the groundwater level, the dewatering system shall be placed into operation to lower the water levels as required and then shall be operated continuously 24 hours a day, 7 days a week until construction and placement of the subgrade structure and backfill has been satisfactorily completed and no longer requires dewatering, as notified by Contractor in written form.
- 6) Subcontractor shall obtain written approval from Contractor before discontinuing the operation of the dewatering system.
- 7) Subcontractor shall seal, with 2,000 psi minimum concrete grout, any dewatering equipment buried or left in place under the structure and all observation wells, test pits, and holes after the dewatering operation is discontinued in accordance with the latest Michigan Wells Act.

6. INSPECTION

A. CONTRACTOR

- 1) Contractor shall inspect the effluent of the well points to determine the amount of material (fines) being removed by the dewatering operation. This monitoring is Q-listed and shall be in accordance with 10 CFR 50, Appendix B.
- 2) The dewatering system shall be accepted by Contractor based on the difference in quantity of fines measured in the return line and discharge line and correlated with the quantity of groundwater being discharged

through a water meter calibrated in gallons. The average quantity of fines shall not exceed the ratio of 5 ppm. The average quantity of fines shall be determined by testing a sample of water from the return line and the discharge line every Monday and Thursday that the pumping is in operation using a 1-liter Buchner funnel. The filter paper shall not be coarser than 0.005 millimeters. The corresponding number of gallons of groundwater pumped through an In-Line flowmeter located on the discharge line shall also be recorded by Contractor and the average ppm calculated. Contractor shall also monitor the number of gallons of recirculating water in Subcontractors eductor system. Contractor shall supply the 1-liter Buchner funnel and filter paper (no coarser than 0.005 millimeters) for the testing, and three flowmeters; one on the recirculation water line (10-inch Sparling In-Line with totalizer, Saddle Mount Series FM112) one on the discharge line (6-inch Sparling In-Line with totalizer Saddle Mount Series FM112) and one on the hydrant (3-inch Sparling In-Line with totalizer Series 162). If an individual test indicates the fines are greater than 5 ppm but the average ratio of fines to ground water pumped is less than 5 ppm, Subcontractor shall be alerted. If the quantity of fines exceeds the average ratio of 5 ppm for the total quantity of groundwater pumped, Subcontractor shall be notified that it has 24 hours to correct the condition. If, after 24 hours, Subcontractor has not been able to correct the problem, Contractor shall begin a systematic testing of each individual dewatering well. Any dewatering wells found to produce greater than 5 ppm of fines shall be repaired by Subcontractor or removed from the system. Subcontractor shall notify Contractor whenever it intends to purge any collected fines from the eductor tank. Subcontractor will estimate the quantity of water purged, and Contractor will collect all material from Subcontractor's eductor tank. The discharged bottom material shall be sieved through a Number 325 U.S. standard screen. The collected material shall be retained and stored for inspection by the onsite field geotechnical engineer.

- 3) Each individual well shall be inspected by Contractor during installation in accordance with the following criteria. After the initial 15 minutes of pumping, the effluent shall be tested for fines using a 1-liter Buchner funnel.
- a) If the fines observed are 10 ppm or less, the well shall be accepted.
 - b) If the fines observed exceed 100 ppm, the well shall be rejected and pumping stopped.
 - c) If the fines observed are less than 100 ppm, but more than 10 ppm, the pumping shall stop. The well may be retested in accordance with the above



criteria after a minimum of a 1-hour delay. If the well has not met the acceptance criteria for fines within three retests, the well shall be rejected and pumping stopped.

- 4) Records shall be maintained for each well and for the entire system, including the amount of fines (ppm) each time readings are taken.



B. SUBCONTRACTOR

- 1) Subcontractor shall perform all inspection and recording of the piezometers/observation wells in accordance with its approved procedure. All other inspection shall be in accordance with Subcontractor's approved procedures.

7. CLEANING AND RESTORATION

- A. Subcontractor shall leave the work area in the same condition as prior to the start of operation and to the satisfaction of Contractor.

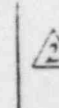
8. QUALITY ASSURANCE REQUIREMENTS

- A. The monitoring of the fines of the soil in the discharge water is Q-listed and shall be performed and controlled by Contractor's quality assurance program.
- B. Contractor has the authority to stop or regulate any part of the dewatering operation to prevent damage to any part of Contractor's work.

9. MEASUREMENT FOR PAYMENT

A. BASIS OF MEASUREMENT

- 1) The measurement of payment shall be in accordance with the terms of the subcontract.



APPENDIX A

DOCUMENTATION REQUIREMENTS

- 1.0 The Subcontractor shall furnish documentation in accordance with the specification as summarized and directed by form G-321-D. To complete form G-321-D, the Subcontractor shall check in column 8 which documents are being transmitted, and shall sign line 21. The Subcontractor shall fill in lines 13 through 20 as applicable. Entries such as N/A (not applicable) and "See attached sheets" are permissible. The completed G-321-D form is then used for a cover sheet as directed on the back of the form.

Attachments:

1. Form G-321-D, Engineering and Quality Verification Document Requirements

READ INSTRUCTIONS ON BACK BEFORE FILLING IN FORM

These requirements for Engineering and Quality Verification Documents are to be fulfilled in accordance with the schedule set forth below. Supplier's failure to comply with these requirements may result in order cancellation or withholding of payment until compliance is established.

1. Document Category Number	2. Specification Paragraph Reference	3. Kind of Copies	ENGINEERING DOCUMENTS				QUALITY VERIFICATION DOCUMENTS					12. Remarks	
			4. Quantity Required		5. Prior Approval Required		6. Quantity Required for Release	7. Distribution Code	8. Supplier Conform Check	9. Inspection Release	10. Engineering Review		11. Field QCE Check In
			Initial	Final	Yes	No							
4.2E	3.B.5	Reproducible Microfilm	1	1	X								
4.2E	3.B.1 3.B.2	Reproducible Microfilm	1	1		X							
4.2E	3.B.3 3.B.4	Reproducible Microfilm	1	1		X							
8.0E	4.D.1 5.F.2	Reproducible Microfilm	1	1		X							
25.0V	4.E.1 5.F.1	Reproducible Microfilm		N/A			2	B		Δ			
27.0B	4.D.1 5.C.1	Reproducible Microfilm	1	1		X							
27.0V	4.D.1 5.C.1	Reproducible Microfilm		N/A			2	B		Δ			
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13. Supplier's Order No.	14. Supplier's Part No.	15. Supplier's Part Name	16. Quantity
17. Buyer's Req. Item No.	18. Buyer's Line/Equip. Tag or Code No.	19. Buyer's Part Name	20. Traceability


21. Supplier's Conformance Statement: We certify that the listed work and required documents meet the requirements of the procuring documents. Supplier: _____ Signature _____ Title _____ Date _____

22. Inspection Release Statement: Work was released based on satisfactory completion of inspection and review of documentation. Authorized Deviations: Yes, Noted under 12, Remarks NONE. Releaser: _____ Signature _____ Date _____

23. Engineering Review Statement: The Quality Verification Documents submitted to Engineering with this form have been reviewed for conformance to the specified requirements and are acceptable. Engineer: _____ Signature _____ Date _____

24. QCE Check-in Statement: This form and the Quality Verification Documents referenced herein have been received and their relationship to the hardware items verified. CONTROL NO. _____ FILE NO. _____ QCE: _____ Signature _____ Date _____

After QCE Check-in Distribute to: Procurement Manager, Field Office Manager, Material Supervisor

 8-321-0 AA REV 2 5/74	MIDLAND PLANT UNITS 1 AND 2 CONSUMERS POWER COMPANY ENGINEERING AND QUALITY VERIFICATION DOCUMENT REQUIREMENTS	JOB NO. 7220
		P.O./SPEC. NUMBER 7220-C-88(0)
		REV. SHEET 1 OF 2

INSTRUCTIONS FOR PREPARING G-321-D

- A. **PURPOSE:** This is a multi-purpose form to be used by Buyer/Contractor to specifically identify documents required of the supplier to satisfy specification requirements, and is to be used by the supplier as a cover sheet for Quality Verification Documents when submitting them to the Buyer/Contractor.
- B. **GENERAL INFORMATION:** Engineering (E) and Quality Verification (V) Documents are identified by Category number and title in section H, below.
- C. **USE:** A copy of the front of this form shall be completed by the supplier and provided to the Buyer's/Contractor's Inspector along with the applicable Quality Verification Documents for his review prior to release of the unit(s).
- D. **DISTRIBUTION:** All Engineering (E) Documents are to be sent to the Project Engineer at the address shown below (Code a).

When inspection release is completed, the Verification (V) Documents are to be distributed to the respective addresses shown below in accordance with the distribution code specified in Column 7. A copy of the completed Form G-321-D must accompany each "package" of Verification Documents to its destination. Also, a copy of completed Form G-321-D is to be included with the hardware shipment and a copy sent separately to the Project Field Quality Control Engineer at the jobsite.

Code a.	Code b. With hardware shipment	Code c.
Bechtel Associates Professional Co. P.O. Box 1000 Ann Arbor, Michigan 48106 Attn: Project Engineer, Job 7220	Bechtel Power Corp. 3500 E. Miller Rd. Midland, Michigan 48640	N/A

- E. **DEFINITIONS OF TERMS:** (See also Document Category Definitions G-321-SUP A)
 - Supplier - This is a generic term and is synonymous with the terms seller, vendor, contractor, sub-contractor, sub-supplier, etc.
 - Reproducible - can be legibly duplicated by either microreproduction or electrostatic dry process.
 - Microfilm - 35mm microfilm conforming to the requirements of the procurement documents. When not specified, supplier shall submit his standard for approval.
 - Prior Approval Required - Bechtel approval required prior to use of documents in the design, fabrication, installation, or other work process.
 - Initial - the first submittal of a document in accordance with the schedule mutually agreed to by the Buyer and the supplier.
 - Final - the submittal that reflects the resolution of review comments, or the complete submittal required. Both are to be accepted prior to rendering final payment. Drawings submitted as final must be full size reproducible made from original document. Adjacent to the title block, each drawing must be certified and show Buyer's job title, job number, purchase order number, line, equipment, tag or code number, and the manufacturer's serial number(s).
 - Certified - the dated Signature and Title of an authorized and responsible employee of the supplier.
 - N/A - Not applicable - can be used for individual entries, columns and lines by Project engineering, and for individual entries by the supplier.

F. BECHTEL ENTRY INSTRUCTIONS		G. SUPPLIER ENTRY INSTRUCTIONS	
Entry No.	Information Required	Entry No.	Information Required
1	Enter Document Category Number.	8	Enter number of pages of each type of Quality Verification Documents being submitted for the unit(s) being released. Sign Statement of Conformance on line 21.
2	Enter Specification paragraph reference.	12	Enter remarks as appropriate. When a deviation has occurred, reference the deviation(s) and Buyer/Contractor's authorization in this column, and include the authorization document(s) in the Verification Document Package.
3	Make no entry. Relates to kind of copies required.	13, 14, 15	Enter information as required.
4	Enter the number of each kind of copy for "initial" or "final" submittals of Engineering Documents.	1	Enter the numbers of units covered by the Quality Verification Documents being submitted. For each requirement item as being released provide a separate copy of this completed form and the supporting Quality Verification Documents.
5	Enter approval requirement by X under "Yes" or "No" column.	17, 18, 19	Enter information as required.
6	Enter the number of each kind of copy of Quality Verification Documents required for release of the item or installation.	20	Enter identification number(s) traceable to the unit(s) being released, e.g. serial no., heat no. of major component, cable reel no. or other unique designator.
7	Enter Quality Verification Document distribution code letter in accordance with paragraph D above.		
8	Make no entry. For supplier use only.		
9	Bechtel Inspector to complete upon release. Sign on line 22.		
10	Enter Bechtel Engineering review confirmation. Sign on line 23.		
11	Bechtel QCE to complete check-in. Sign on line 24.		
12	Enter remarks as appropriate.		

H. **DOCUMENT CATEGORY NUMBERS:** Engineering (E) and Quality Verification (V) Document Requirements as entered in Column 1, and defined in G-321-SUP A Document Category Definitions. For details, see specification paragraph(s) referenced in Column 2.

1.0 DRAWINGS (E)	10.2 Typical Material Used	20.0 RT - RADIOGRAPHIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
1.1 Outline Dimensions, Services and Foundation/Mounting Details	11.0 MATERIAL DESCRIPTION (E)	21.0 MT - MAGNETIC PARTICLE EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
1.2 Assembly Drawings	12.0 WELDING PROCEDURES AND QUALIFICATIONS (E), AND VERIFICATION REPORTS (V)	22.0 PT - LIQUID PENETRANT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
1.3 Shop Detail Drawings	13.0 WELD ROD CONTROL PROCEDURES (E), AND VERIFICATION REPORTS (V)	23.0 EDDY CURRENT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)
1.4 Wiring Diagrams	14.0 REPAIR PROCEDURES (E), AND MAJOR REPAIR VERIFICATION REPORTS (V)	24.0 PRESSURE TEST - HYDRO, AIR, LEAK, BUBBLE OR VACUUM TEST PROCEDURE (E), AND VERIFICATION REPORTS (V)
1.5 Control Logic Diagrams	15.0 CLEANING AND COATING PROCEDURES (E), AND VERIFICATION REPORTS (V)	25.0 INSPECTION PROCEDURE (E), AND VERIFICATION REPORTS (V)
1.6 P & ID's	16.0 HEAT TREATMENT PROCEDURES (E), AND VERIFICATION REPORTS (V)	26.0 PERFORMANCE TEST PROCEDURES (E), AND VERIFICATION REPORTS (V)
2.0 PARTS LIST AND COST (E)	17.0 CERTIFIED MATERIAL PROPERTY REPORTS (V)	26.1 Mechanical Tests
3.0 COMPLETED BECHTEL DATA SHEETS (E)	17.1 MTR (Certified Material Test Reports)	26.2 Electrical Tests
4.0 INSTRUCTIONS (E)	17.2 Impact Test Data	27.0 PROTOTYPE TEST REPORT (E & V)
4.1 Erection/Installation	17.3 Ferrite Data	28.0 SUPPLIER SHIPPING PREPARATION PROCEDURE (E)
4.2 Operating	17.4 Material Certificate of Compliance	
4.3 Maintenance	17.5 Electrical Property Reports	
4.4 Site Storage and Handling	18.0 CODE COMPLIANCE (V)	
5.0 SCHEDULES, ENGINEERING AND FABRICATION/ERECTION (E)	19.0 UT - ULTRASONIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)	
6.0 QUALITY ASSURANCE MANUAL/PROCEDURES (E)		
7.0 SEISMIC DATA REPORT (E)		
8.0 ANALYSIS AND DESIGN REPORT (E)		
9.0 ACOUSTIC DATA REPORT (E)		
10.0 SAMPLES (E)		
10.1 Typical Quality Verification Documents		

Specification 7220-C-88(Q)
Appendix A

DOCUMENT CATEGORY DEFINITIONS

(E) – Engineering Documents. This term comprises procedures, drawings, specifications, QA plans, prototype qualification test reports, and other similar documents that require Bechtel approval prior to fabrication, or prior to use of the document in the design, fabrication, installation, or other work process. The term is also applied to price lists, and instructional documents for handling, storage, maintenance, etc., that are of informational interest only to project engineering.

(V) – Quality Verification Documents. This term comprises material test reports, heat treatment charts, welding records, NDE results, performance test reports, etc., which demonstrate or certify conformance to the technical or inspection requirements of the procurement documents.

1.0 DRAWINGS (E)

- 1.1 Outline Dimensions, Services and Foundation/Mounting Details – Drawings providing external envelope, including lugs, center line(s), location and size for electrical cable, conduit, fluid, and other service connections, isometrics, and details related to foundations and mountings.
- 1.2 Assembly Drawings – Detailed drawings indicating sufficient information to facilitate assembly of the component parts of an equipment item.
- 1.3 Shop Detail Drawings – Drawings which provide sufficient detail to facilitate the fabrication or manufacture of the equipment item. This includes but is not limited to, spool drawings, heat exchanger internal details, internal piping and wiring, cross-section details and architectural details.
- 1.4 Wiring Diagrams – Drawings which show the schematic wiring and connection information for electrical items.
- 1.5 Control Logic Diagrams – Drawings which show the paths which input signals must follow to accomplish the required responses.
- 1.6 P & IDs – Piping and Instrumentation Diagrams which show piping system details and the basic control elements.

2.0 PARTS LIST AND COST (E) – Exploded view with identified parts and recommended spare parts for one year's operation with unit cost.

- 3.0 COMPLETED BECHTEL DATA SHEETS (E) – Information provided by a supplier on data sheets furnished by Bechtel which states serial numbers, operating ranges, etc., of equipment that the supplier intends to deliver to satisfy the specification requirements.

4.0 INSTRUCTIONS (E)

- 4.1 Erection/Installation – Detailed written procedures, instructions, and drawings required to erect or install material or equipment.
- 4.2 Operating – Detailed written instructions describing how an item or system should be operated.
- 4.3 Maintenance – Detailed written instructions required to disassemble, reassemble and maintain items or systems in an operating condition.
- 4.4 Site Storage and Handline – Detailed written instructions which define the requirements and time period for lubrication, rotation, heating, lifting or other handling requirements to prevent damage or deterioration during storage and handling at jobsite. This includes return shipping instructions.

5.0 SCHEDULES: ENGINEERING AND FABRICATION/ERECTION (E) – Bar charts, critical path methods, etc., which chronologically detail the sequence of activities.

- 6.0 QUALITY ASSURANCE MANUAL/PROCEDURES (E) – The document(s) which describe(s) the planned and systematic measures that are used to assure that structures, systems, and components will meet the requirements of the procurement documents.

- 7.0 SEISMIC DATA REPORT (E) – The analytical or test data which provides physical response information on an item, material, component or system in relation to the conditions imposed by the stated seismic criteria.

- 8.0 ANALYSIS AND DESIGN REPORT (E) – The analytical data, (stress, electrical loading, fluid dynamics, etc.), which assures that an item satisfies specified requirements.

- 9.0 ACOUSTIC DATA REPORT (E) – The noise, sound and other vibration data required by specification which is in the audible range and above the seismic frequency.

10.0 SAMPLES (E)

- 10.1 A representative data package which will be submitted for the items purchased as required in the specification.
- 10.2 A representative example of the material to be used.

- 11.0 MATERIAL DESCRIPTION (E) – The technical data describing a material which a supplier proposes to use for a specific order. This usually applies to architectural items, e.g., metal siding, decking, doors, paints, coatings.

- 12.0 WELDING PROCEDURES AND QUALIFICATIONS (E), AND VERIFICATION REPORTS (V) – The welding procedure specification and supporting welding procedure qualification test records required for welding, hard facing, overlay, brazing and soldering. A verification report of welds performed includes the identification of the qualified welder(s), and the procedure(s) used, and certification that the welder(s) were qualified.

- 13.0 WELD ROD CONTROL PROCEDURES (E), AND VERIFICATION REPORTS (V) – The procedures for controlling issuance, handling, storage and traceability. Verification report(s) for weld rod are defined as certified material test reports which include the requirements defined by the code and material specification imposed by the procurement documents.

- 14.0 REPAIR PROCEDURES (E), AND MAJOR REPAIR VERIFICATION REPORTS (V) – The procedures for controlling material removal and replacement by welding, brazing, etc., subsequent thermal treatments, and final acceptance inspection. Verification reports may include weld repair locations (maps), material test reports for filler metal, pre-and-post-weld heat treatment records, NDE records, etc. The resolution of whether a repair is major or not is a Bechtel responsibility.

- 15.0 **CLEANING AND COATING PROCEDURES (E), AND VERIFICATION REPORTS (V)** - The procedures for removal of dirt, grease or other surface contamination and includes application of protective coating. Verification reports include certification of visual examination for surface preparation, surface profile, materials, etc. Geometry data, Dimensional data and Coating thickness data as required by the procurement documents.
- 16.0 **HEAT TREATMENT PROCEDURES (E), AND VERIFICATION REPORTS (V)** - The procedures for controlling temperature, time at temperature as a function of thickness, furnace atmosphere, cooling rate and method, etc. Verification reports normally include furnace charts or similar records which identify and certify the item(s) treated, the procedure used, furnace atmosphere, time at temperature, cooling rate, etc. Verification data may be in either narrative or tabular form.
- 17.0 **CERTIFIED MATERIAL PROPERTY REPORTS (V)**
- 17.1 **MTR (Certified Material Test Reports)** - These reports include all chemical, physical, mechanical and electrical property test data required by the material specification and applicable codes. This is applicable to cement, concrete, rebar, cable jacket materials, rebar, rebar splices, etc. The certified MTR shall include a statement of performance that the material meets the specification requirements.
- 17.2 **Impact Test Data** - Results of all Charpy or drop weight tests including specimen configuration, test temperature and fracture data.
- 17.3 **Ferrite Data** - Report of the ferrite percentage for stainless steel materials used, including castings & welding filler metals as deposited.
- 17.4 **Material Certificate of Compliance** - Verification document which certifies conformance to the requirements of the applicable material specification.
- 17.5 **Electrical Property Reports** - Report of electrical characteristics, e.g., dielectric, impedance, resistance, flash test, corona, etc.
- 18.0 **CODE COMPLIANCE (V)** - Verified documents (such as data Forms U-1, M-2, State, etc.), which are prepared by the manufacturer or installer and certified by the Authorized Code Inspector.
- 19.0 **UT - ULTRASONIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)** - Method of detection and examination results of presence and certain characteristics of discontinuities and inclusions in materials by the use of high frequency acoustic energy.
- 20.0 **RT - RADIOGRAPHIC EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)** - Method of detection and examination results of presence and certain characteristics of discontinuities and inclusions in materials by x-ray or gamma ray exposure of photographic film.
- 21.0 **MT - MAGNETIC PARTICLE EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)** - Method of detection and examination results of surface (or near surface) discontinuities in magnetic materials by distortion of an applied magnetic field.
- 22.0 **PT - LIQUID PENETRANT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)** - Method of detection and examination results of surface discontinuities in materials by application of a penetrating liquid in conjunction with suitable developing techniques.
- 23.0 **EDDY CURRENT EXAMINATION PROCEDURES (E), AND VERIFICATION REPORTS (V)** - Method for detection and examination results of discontinuities in material by distortion of an applied electromagnetic field.
- 24.0 **PRESSURE TEST - HYDRO, AIR, LEAK, BUBBLE OR VACUUM TEST PROCEDURE (E), AND VERIFICATION REPORTS (V)** - Method for evaluating the structural and mechanical adequacy or integrity by application of differential pressures, and report of the test results.
- 25.0 **INSPECTION PROCEDURE (E), AND VERIFICATION REPORTS (V)** - Organized process followed for the purpose of determining that specified requirements (dimensions, properties, performance results, etc.) are met. Documented findings resulting from an inspection are included in the verification report.
- 26.0 **PERFORMANCE TEST PROCEDURES (E), AND VERIFICATION REPORTS (V)** - Tests performed to demonstrate that functional design and operational parameters are met and the report of the test results.
- 26.1 **Mechanical Tests**, e.g., pump curves, valve stroking, load, temperature rise, calibration, environmental, etc.
- 26.2 **Electrical Tests**, e.g., load, impulse, overload, continuity, voltage, temperature rise, calibration, saturation, loss, etc.
- 27.0 **PROTOTYPE TEST REPORT (E & V)** - Report of a test which is performed on a standard or typical example of equipment, material or item, and is not required for each item produced in order to substantiate the acceptability of equal items. This normally includes tests which may, or could be expected to, result in damage to the item(s) tested.
- 28.0 **SUPPLIER SHIPPING PREPARATION PROCEDURE (E)** - The procedure used by a supplier to prepare finished materials or equipment for shipment from his facility to the jobsite.

Send to Chuck Hunt
in J Ax.

FEB 26 1975

PROBLEM: "UNCOMPACTED BACKFILL" Plant Area-does not Include Dikes

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<u>IS</u>	<u>IS NOT</u>	<u>DISTINCTION</u>	<u>CHANGES</u>
D/G Bldg.	Power Block	Recent Plant Area Fill	Use of both C-210, C-211 Prior - used only C-210
X-Former Pads	Evaporator Bldg	Not part of Dike/ North Plant Area Fill	Sand & clay vx clay alone
Condensate Tanks	Cooling Tower	Fill placed during different time periods	Two contractors - Bechtel & Canonie
Radwaste Bldg*	Steam Tunnel	Last areas to be backfilled	Bechtel used C-211
Tank Farm*	Service** Water	Settlements seem to occur in spread type footings	Large equipment to large & small equipment
*Not as significant or wide spread as other areas	Circulating Water **Problem exists with sands around structure but not under	Excavation/Re-excavations (significant areas)	Use of ramps/temporary fill
Guard House			
<u>Occurred After 1975</u>	<u>Prior to 1975</u>	<u>Slowdown of 75 with personnel changes</u>	<u>Specification interpretations by different individuals</u>
		Late in jobless emphasis on civil work	deletion of 4" lift requirement
		Cooling Pond Filled	Urgent need to see work completed
			Sand/structural fill used together with clays
			Qualification of personnel may have changed
			Differing weather conditions
			Rebar problems occurred

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PROBLEM: "UNCOMPACTED BACKFILL" Limited to Plant Area - does not Include Dikes

	<u>IS</u>	<u>IS NOT</u>	<u>DISTINCTION</u>	<u>CHANGES</u>
E X T E N T ?	Plant Area Fill AFTER 1975	Plant Area Fill prior to 1975	Sand incorporated in fill	Sand/clay interfaces - softing of clays due to watering
	elev 612' & above	Below elev 612'	Smaller areas of fill	Larger lift thickness for equipment and harder to control lift thickness
	Most signifi- cant problem area south & southeast of Turb Bldg		Most extensive examination re-excavations	Introduction of smaller equipment
W H E R E ?		Glacial Fill Undisturbed	Require handling & Placement by Equip- ment	
	Backfill (clay) (sands)	Natural sands	Clays - N/W Plant dike sand/clay rest of area	More mixing & material interfacing
		Backfill Concrete	Area exposed the longest during construction	More winters
		North/West Plant Fill		

Test	Possible Causes			Cause
	Yes	No	?	
Use of different Specification	X			Problem is only associated with areas which used Spec C-211
Recent Work		X		
Not Part of Dike/Plant (N/W) Area			X	
Placement of Fill during different periods	X			Different personnel different equipment
Last Areas to be Backfilled	X			Schedule pressures
Occurs on spread FIGS	X			Design may be deficient
Excavations Re-Excavation	X			Most significant problem in area where most excavation/re-excavation occurred
Introduction of C-211	X			Differing requirements/people/interpretations
Different Materials	X			Differing methods for compaction - addition of water to sands
Use of small equipment	X			Not able to compact as effectively (no test pads for small equipment qualifications)
75 Slow Down	X			Changes in personnel and discontinuing of work
Filled Cooling Pond		X		Designed to be in saturated condition
Less emphasis on civil work 4	X			Less supervision and inspection
Specification intrepretation	X			Relates to personnel
Larger lifts per spec.	X			Coupled with small equipment

Test	Yes	No	?	Cause
Schedule pressures	X			Complete work hastily
Personnel qualifications	X			No soils engineer on site
Smaller fill areas	X			Relates to equipment and lifts
More Freeze-thaw cycles	X			These areas filled during several winters
Weather (dry or wet) also when material was placed			X	
Removal of temporary ramps and fill	X			Uncompacted materials placed and left in large amounts
Rebar Problem occurred	X			Deals - priorities for inspection/ extent of inspection

ACTION PLAN

1. Define problem areas better by boring logs and TOPO's (PMO - work on this).
2. Define problems by elevations (use boring logs) (PMO - QA later).
3. Define difference between C-211 and C-210 (QA).
4. Define what work was done by Bechtel and Canonie (PMO).
5. Define where trenches were made (excavations) (photos, TOPO's, etc) (PMO - QA).
6. List all equipment used by a) Bechtel
b) Canonie
(photos, rental sheets).
7. Look at changes in personnel/qualifications (QA, PMO).
8. Look at assignments of supervision to earthwork by period.
9. Look at telecons/FCR's to spec, DR's (QA).
10. Look at specs and also photos.
11. Look at rate fill in areas where there was problems (PMO).
12. Check problem areas with completion of the year's work (freeze - thaw) do with 4.
13. Look at number of QC people assigned to soils, their time involved with soils (IR's, FE Reports).
14. Ramps - Check photos, TOPO's, compare with borings (also gravelly areas in borings)
(can do in conjunction with 12, 4) (QA, PMO).
15. Review weather data for periods of problems (PMO).

DEFINITION STATEMENT:
"INSUFFICIENTLY COMPLETED BACKFILL"

	Is	Is Not	Distinctions	Changes
WHAT	DG Bldg Admin Bldg Transf FND Cond Tank Area Diesel Tanks	Pond Dikes Plant Area Dikes Incl Evap Bldg Cooling Tower Radwaste Bldg Tank Farm Area Pipe Tunnel	Spec / Acceptance Criteria Diff Material	Reliance on Testing Introduced Struct Backfill C-211
WHERE	Plant Fill Area	Glacial Till (Undisturbed) Insitu Natural Sand Backfill under Powerblock N&W Plant Dikes Pond Dikes ① Undisturbed Plant Fill (? Cond Tank Area)	Smaller Areas Temporary Fill Ramps Q-Listed Process (Inspection)	Small Equipment Nonuniform Compaction Different Contractors Test Frequency

POSSIBLE CAUSES

Test		Cause
SPECIFICATION / ACCEPTANCE CRITERIA	No	Used All over Site
TESTING	✓	Questionable, under Review, Check RW
DIFFERENT MATERIAL (5)	?	Under Review, Relates to Proctors
STRUCTURAL BACKFILL	No	Used All over Site
REEXCAVATED AND REFILLED AREA (Procedures and Controls)	✓	? Investigate Photos, Procedures, Controls
SMALLER AREAS	No	? May continue especially in Subcategory of Reexcavated Area
NONUNIFORM COMPACTION		Used All over Site
SMALL EQUIPMENT (Large Lifts)		Used All over Site
TEMPORARY FILL NOT REMOVED ?	✓	Review Photos
RAMPS NOT REMOVED ?	✓	Review Photos
DIFFERENT CONTRACTORS	No	(6)
TEST FREQUENCY	?	Check RW

Preliminary 2/15/79

POSSIBLE CAUSES (Cont.)

Test	Cause
Q-LISTED PROCESS (Inspection Process)	✓ Except for IR/W
POND FILLED	Other Areas Have Not Settled Although Pond Filled Now
74-75 SLOWDOWN	? Impacted Personnel, Procedures, Controls
76-77 Dry Years	? Involves Moisture Content Questions Below
BORROW AREA (Stockpile)	? Involves Moisture Content Questions Below
INITIAL MOISTURE CONTENT	? Under Review with Tests
FINAL MOISTURE CONTENT	? Under Review with Tests
LATE IN SCHEDULE	No Other Areas Not Affected
MORE WINTERS	No Other Areas Not Affected
PERSONNEL	✓ ?
PROXIMITY TO COOLING POND	?
EXTENSIVE Disturbance U/G	
INSTALLATIONS	

Preliminary 2/5/79

ITEMS TO INVESTIGATE FOR MOST PROBABLE CAUSE(S)

REEXCAVATION AND BACKFILL

Material Selection

Inadequate Procedures & Controls

Review Photos, Procedures, Controls & Subcontractor Daily Reports

TEMPORARY FILL AND RAMPS NOT REMOVED

Inadequate Procedures & Controls

Review Photos, Procedures, Controls & Subcontractor Daily Reports

Q-LISTED PROCESS-INSPECTION PROCESS (f)

Review Surveillance & Inspection Procedures in Relation to Other Findings

Audit Procedures Bechtel and Canonic

TESTING

Results are Questionable - Relied on (f)

Testing is under Review

Procedure Changed 9/78

PERSONNEL

Minimal Involvement of Technical Support after 74-75 Shutdown

Bulk of Earthwork Complete


Review Qualifications of Testing, Inspection, & Supervisory Personnel

Preliminary 2/15/79

FEB 22 1979

TR: x

To CAHunt, P14-209B

FROM TCCooke/RM 

DATE February 20, 1979

SUBJECT MIDLAND PROJECT GWO 7020 - SETTLEMENT OF
MIDLAND DIESEL GENERATOR BUILDING
File: B3.0.3 Serial: CSC-3852

CC GSKeeley

**Consumers
Power
Company**

INTERNAL
CORRESPONDENCE

Reference: CPCo Memo - DRW-12-78 and DRW-13-78

In reference to the comments presented in DRW-13-78, we provide the following response for each numbered comment.

1. Although the Bechtel summary reports the percentage as percent compaction, it is in fact percent relative density. A relative density of 125% does seem to be unreasonable, however, our efforts have been focused on clays. A number of proctor curves have been examined for compatibility with the zero air voids curve and some of these tests fall outside the curve which would indicate the selection of an incorrect standard for that particular type fill.
2. Many tests were conducted other than those attached. A ramp was constructed in this area and these tests were not included but tests were available.
3. Tests are requested to be taken every 500 cubic yards. There is no specification requirement to locate tests under buildings, utilities, or other references. Therefore, test locations are randomly selected.
4. With the addition of the ramp tests, the number of tests appear to exceed the amount required. Since location is not addressed by the specification, we cannot address the question of test locations.
5. In determining the causes for this problem these items are being examined.
6. The borings and resultant tests are being examined both by Bechtel and the consultants.
7. An extensive monitoring program has been implemented to identify the magnitude of differential settlements.
8. The settlement rate for the Diesel Generator Building is significantly greater than that observed in other structures.
9. There are no settlement vs. time curves to compare the to date settlements with, but continued monitoring has shown that during the preload cycle the settling has started to slow down and to

Page 2

CAHunt

File: B3.0.3 Serial: CSC-3852

level off as more weight is added to the area around the buildings.
It is safe to say, however, that the to date settlements exceed
Bechtel's expectations.

We hope this satisfactorily addresses your comments. We assume that any other
comments or questions have been brought out at subsequent meetings with Bechtel's
consultants and ourselves, which you have attended.

Should you have any further questions, please contact us.

plw

MEETING NOTICE

MAY 25 1979

BECHTEL JOB NO. 7220-101
PROJECT Midland

K-T. ANALYSIS



SUBJECT OF THE MEETING

Cause Investigation and Analysis of Plant Area
Backfill Settlement Problems

DAY Wednesday, May 30, 1979

TIME 9:30 a.m. TO Noon

LOCATION Conference Room 7B3

ATTENDEES

Bechtel

S. Afifi
A. Boos
R. Castleberry (optional)
B. Dhar
J. Hink
P. Martinez
G. Richardson
J. Wanzeck
K. Wiedner

Consumers

D. Horn
C. Hunt
B. Wheeler

The addressee, checked above, if unable to attend, is requested to:

NOTIFY CHAIRPERSON SEND REPRESENTATION

PURPOSE OF THE MEETING

- o Discuss action items listed in March 12, 1979 meeting notes (each attendee is requested to prepare responses to the action items as appropriate)
- o Prepare outline and strategy for cause presentation to NRC scheduled for mid-June, 1979.

AGENDA ATTACHED

MEETING NOTES WILL BE DISTRIBUTED

CHAIRPERSON

Karl Wiedner

PHONE

x 7169

DATE

5/22/79

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BECHTEL INVESTIGATION
INTO CAUSES
OF DIESEL GENERATOR
BUILDING SETTLEMENT

Consumers Power Company
Midland Plant Units 1 and 2

DEVIATION STATEMENT: "INSUFFICIENTLY COMPACTED BACKFILL"

	Is	Is Not	Distinctions	Changes
WHAT	DG Bldg Admin Bldg Transf FND Cond Tank Area Diesel Tanks	Pond Dikes Plant Area Dikes incl Evap Bldg Cooling Tower Radwaste Bldg Tank Farm Area Pipe Tunnel	Spec / Acceptance Criteria Diff Material	Reliance on Testing Introduced Struct Backfill
WHERE	Plant Fill Area	Glacial Till (Undisturbed) Insitu Natural Sand Backfill under Powerblock N&W Plant Dikes Pond Dikes Undisturbed Plant Fill (? Cond Tank Area)	Smaller Areas Temporary Fill Ramps Q-Listed Process (Inspection)	Small Equipment Nonuniform Compaction Different Contractors Test Frequency

Preliminary 2/15/79

DEVIATION STATEMENT: "INSUFFICIENTLY COMPACTED BACKFILL" (Cont.)

	Is	Is Not	Distinctions	Changes
WHEN	Sept 77 Admin Mid 78 Other	Prior to 1977	Pond Filled 74-75 Slowdown 76-77 Dry Yrs Late In Schedule	Borrow Area Moisture Personnel Initial Moisture Content More Winters
EXTENT	Area South of Turbine Bldg In the Upper Portion of the Fill Approx EL 615 to EL 628	Elsewhere or Below EL 615	Proximity to Cooling Pond Extensive U/G Installations Reexcavated Area	

Preliminary 2/15/79

POSSIBLE CAUSES

Test		Cause
SPECIFICATION / ACCEPTANCE CRITERIA	No	Used All over Site
TESTING	✓	Questionable, under Review, Check RW
DIFFERENT MATERIAL	?	Under Review, Relates to Proctors
STRUCTURAL BACKFILL	No	Used All over Site
REEXCAVATED AND REFILLED AREA (Procedures and Controls)	✓	Investigate Photos, Procedures, Controls
SMALLER AREAS	No	
NONUNIFORM COMPACTION		Subcategory of Reexcavated Area
SMALL EQUIPMENT (Large Lifts)		Used All over Site
TEMPORARY FILL NOT REMOVED?	✓	Review Photos
RAMPS NOT REMOVED?	✓	Review Photos
DIFFERENT CONTRACTORS	No	
TEST FREQUENCY	?	Check RW

Preliminary 2/15/79

POSSIBLE CAUSES (Cont.)

Test	Cause
Q-LISTED PROCESS (Inspection Process)	✓ Except for R/W
POND FILLED	Other Areas Have Not Settled Although Pond Filled Now
74-75 SLOWDOWN	? Impacted Personnel, Procedures, Controls
76-77 Dry Years	? Involves Moisture Content Questions Below
BORROW AREA (Stockpile)	? Involves Moisture Content Questions Below
INITIAL MOISTURE CONTENT	? Under Review with Tests
FINAL MOISTURE CONTENT	? Under Review with Tests
LATE IN SCHEDULE	No Other Areas Not Affected
MORE WINTERS	No Other Areas Not Affected
PERSONNEL	✓
PROXIMITY TO COOLING POND	? <hr style="width: 10%; margin-left: auto; margin-right: 0;"/>
EXTENSIVE UNDERGROUND INSTALLATIONS	

Preliminary 2/15/79

ITEMS TO INVESTIGATE FOR MOST PROBABLE CAUSE(S)

REEXCAVATION AND BACKFILL

Material Selection

Inadequate Procedures & Controls

Review Photos, Procedures, Controls & Subcontractor Daily Reports

TEMPORARY FILL AND RAMPS NOT REMOVED

Inadequate Procedures & Controls

Review Photos, Procedures, Controls & Subcontractor Daily Reports

Q-LISTED PROCESS-INSPECTION PROCESS

Review Surveillance & Inspection Procedures In Relation to

Other Findings

Audit Procedures Bechtel and Canone

TESTING

Results are Questionable - Relied on

Testing Is under Review

Procedure Changed 9/78

PERSONNEL

Minimal Involvement of Technical Support after 74-75 Slowdown

Bulk of Earthwork Complete

Review Qualifications of Testing, Inspection, & Supervisory Personnel

Preliminary 2/15/79

PRELIMINARY

February 16, 1979

PROBLEM of INSUFFICIENTLY COMPACTED BACKFILL

QUESTIONS to be INVESTIGATED to ARRIVE at
MOST PROBABLE CAUSE(S)

- (1) Re-excavation and backfill process --
 - (a) Material mix unacceptable?
 - (b) Construction did/did not have adequate procedural control for this type of activity?
- (2) Nonremoval of temporary fill and construction ramps?
- (3) Was inspection process by Bechtel (QC, Field Engineering and Subcontracts), Canonic QC, and audit process adequate?
- (4) Nonrepresentative or invalid test results used as acceptance criteria?
- (5) Personnel --
 - (a) Insufficient support by technical groups such as Geotech?
 - (b) Turnover due to Project delays?
 - (c) Turnover in UST personnel?
 - (d) Qualification of all parties (Bechtel Field Engineering, QC, Canonic, UST technicians, etc.)?

February 16, 1979

TASK FORCE PLAN

INVESTIGATION INTO CAUSE(S) OF INSUFFICIENTLY COMPACTED BACKFILL

<u>QUESTION</u>	<u>Investigate By</u>	<u>Status of Investigation</u>
1) Re-excavation & backfill process--		
a) Material mix unacceptable?	Consultant review	Planned
b) Construction did/did not have adequate procedural control for this type of activity?	Review of records (QCIRs, Subcon. reports, etc.)	Planned
2) Nonremoval of temp. fill & construction ramps?	Review of Construction records, photos, soil test records, Canonic's records.	In process
3) Was inspection process by Bechtel (QC, Field Eng. & Subcontracts), Canonic QC and audit process adequate?	Plot soil test results & review QCIRs, Canonic daily reports, audit reports, NCRs.	In process
4) Nonrepresentative or invalid test results used as acceptance criteria?	Review UST records; plot & review soil test records; select & dig test pits.	In process
5) Personnel		
a) Insufficient support by tech. groups such as Geotech?	Review freq. of visits & trip reports.	Planned
b) Turnover due to Project delays?	Review Project manpower records.	Planned
c) Turnover in UST personnel?	Reviewing UST records.	Planned
d) Qualification of all parties? (Bechtel Field Eng., QC, Canonic, UST technicians, etc.)	Review personnel records & resumes, training records.	Planned

P. A. Martinez

MIDLAND PROJECT GNO 7020 - DIESEL GENERATOR FOUNDATION
 PRELIMINARY DEVIATION STATEMENT 2/15/79 (Kepler - Tregue Analysis)
 File: Serial:

*General
 Wilchman* 1
 1

We have some comments on the Bechtel's approach to identify the "most probable causes." Because the analysis could be self serving, CPCo has asked and Bechtel has agreed that CPCo should provide comments. These comments are noted below:

1. Can Bechtel provide information regarding the levels of confidence which can be obtained in arriving at the most probable cause(s).
2. The individual items considered are broad and general rather than specific and narrow. By not being specific, certain basic items are deleted and will be ignored or forgotten in the final analysis. We believe specification/acceptance is one of the distinctions which is deleted on broad and general analysis while in fact it is very germane to the cause discussion.
3. This method also discards items which are not different and concludes they are not problems. One could argue that this is not valid and use the liner plate bulge as an example. Embedded pipe was used on other projects and even in other areas of this project, yet at Midland it froze, cracked the concrete and bulged the liner plate.
4. We also note that ~~development of~~ CPCo and Bechtel Field were not involved in the development of the K-T Analysis used for this presentation.

Specific comments on analysis items listed by Bechtel:

Page 1:

- A. Second column; Radwaste Building and Tank Farm area should be under IS
- B. Fifth column; Introduced Struct. Backfill - cite specification C-211.

- C. Should also add the difference in Spec C-210, C-211.
- D. Method for compacting material for dikes vs. plant area fill (excluding north & west plant area) was different. Should be included under changes.
Under Changes; less inspection should be included.

Page 2:

- A. Third Column; Elsewhere or below 615' -- Was this material excavated (disturbed)?
- B. Column 4 - 74-75 Slowdown - The time during the slow down (1974-75) would have provided more time for natural consolidation which was an early 1900's method of compaction.
- C. Column 5 - More winters - The local of the fill affected by "number of winters" is probably below elevation 615. Since this locale is supposedly satisfactorily compacted "winters" in itself should not be considered as an adverse factor. Incorporation of frozen backfill should be considered, however.
- D. Column 5 - Opposite "Extent" - The lower part of the Diesel Generator building foundation which lies below elev. 615' has already been subjected to preloading by the 20' of fill above it. Since portions of the lower part of the fill appears to be satisfactory preloading promises good results for the upper 20' of fill this observation may render the distinction of elevation of no consequence. In reviews of your records the differences in the fill between the lower and upper elevations should be documented and analyzed.

Page 3:

- A. Column 3 - Distinction - Because buildings were constructed the problem was discovered. This should be added as a distinction.
Is not - Prior to 1977 - Special emphasis has been placed on the work below 615' and prior to 1977. Obviously, the time period should be developed

for the fill placed below elev. 615', and the conditions in which placement was executed. It should also be determined whether major re-excavations were made below elevation 615' and whether sand was re-introduced to the fill below elevation 615'. In total Bechtel should scope the extent of the re-excavations in the problem areas.

- B. Different Material and different contractors - relates to the capabilities of the individual personnel involved. Both these areas should be checked as a possible cause.
- C. Re-excavated and refilled area - More research is required to define whether materials in question were disturbed.
- D. Small areas - Small equipment - These two items may contribute to non-uniform and inadequate compaction and should be included as a possible cause.

Page 4:

- A. Initial & Final Moisture Content - should be examined from a time and elevation standpoint.
- B. Proximity to cooling pond - This item should be answered "no" at this time considering the test item "pond filled".
- C. Testing - Inspection - Should also be tied in with elevation and timing.

Listed below are some of the items we feel should be investigated as possible causes:

1. Application of different specification criteria may have contributed to the problem. Specifications may not have been clear or simple enough to satisfy proper implementation.
2. Backfill sand and clay interfaces may have not been blended correctly. Sand in this regard may have been a problem.
3. The fact that the work under the D/G Building was completed in smaller areas may have contributed to the problem.
4. From borings it would appear that non-uniform compaction may be a site wide problem.

5. The use of smaller equipment and large lifts should be included as a possible cause.
6. Because Bechtel and Canonie both worked extensively in this area we feel that this aspect should be investigated. (This would relate also to inspection effort, controls and space.)
7. Structural backfill and pit run sands may not have been placed in the correct areas.
8. During placement of foundation footings, the underlying soil may have been frozen and subsequently heaved.
9. Frozen soil may have been incorporated in the fill and covered by subsequent lifts.
10. Equipment utilized for small areas may not have been adequate to achieve the required compaction.
11. Material placement and compaction may not have been properly supervised or inspected.
12. Areas of re-excavation may not have been dressed up to blend with materials used for trench backfill.
13. Fill may have been placed during rainy days.
14. Material may have been placed but not compacted, or test frequency required by specifications may have not been adequate for small areas.
15. Bechtel inspection was not as detailed or comprehensive as Canonie (lift checks, time in field).
16. No qualified soils engineer on site during 1975-1977 backfill operations.
17. No plots of tests made to assure uniform coverage. This may be a specification deficiency.
18. Test location incorrectly called out.
19. Areas may have been prepared solely for the purpose of taking a test.
20. Test records were not reviewed in a timely fashion and in the depth necessary to identify testing errors.

21. Investigate the refill vs. the primary process of placing soils. There could be some differences that cause the problem.
22. Look hard at the Bechtel vs. Canonic performance - why was there a difference in performance.
23. Flooding sand in trenches was a common practice to achieve compaction. It may be that surrounding clays were saturated and subsequently softened resulting in weak fill and poorly compacted sands.
24. Bechtel's QC involvement administration and direction of U.S. Testing activities may have resulted in inadequate testing procedures.

The above comments do not necessarily provide guidance or limit the extent of possible concerns or areas of investigation and should not be constructed as such.

To BWMarguglio, JSC-220A
 FROM DEHorn, Midland *DEH*
 DATE October 31, 1978
 SUBJECT MIDLAND PROJECT - NRC EXIT
 INTERVIEW OF OCTOBER 27, 1978
 File: 0.4.2 Serial: 280FQA78

Consumers
 Power
 Company

INTERNAL
 CORRESPONDENCE

CC SAFifi, Bechtel - Ann Arbor JLCorley, Midland
 WRBird, JSC-216B GSKeeley, P14-408B
 RLCastleberry, Bechtel - Ann Arbor DBMiller, Midland
 TCCooke, Midland JFNewgen, Bechtel

The following people were in attendance at the subject exit interview which was conducted at the end of G. J. Gallagher's inspection of October 24-27, 1978:

<u>CPCo</u>	<u>Bechtel</u>	<u>NRC</u>
RCBauman	WLBarclay	RJCook
TCCooke	ABoos	GJGallagher
JLCorley	RLCastleberry	
DEHorn	LADreisbach	
GSKeeley	PAMartinez	
DBMiller		
BHPeck		
RMWheeler		

Mr. Gallagher stated that the visit was a follow-up on 50.55(e) report of the diesel generator settlement and that it was also a fact finding visit. The inspection consisted of a review of past data, activities in progress and planned activities for future work. Inspection was performed by review of the FSAR commitments; Specification C-210; Specification C-211; PQCI/IR C-1.02; Dames and Moore Report of Foundation Investigation and Preliminary Explorations for Borrowed Materials dated June 28, 1968 and supplement to this report dated March 15, 1969; preliminary data on diesel generator settlement problem including boring plan, cross sections of fill, blow count versus the elevation graphs, lab data, settlement data, boring logs, dutch cone logs, weather data and penetrometer readings in test pits; design drawings C-45, C-109, C-117 and C-1001; soil tests taken in the diesel generator building area during construction compiled by B. T. Cheek, Bechtel QC; observation of soil testing at the test lab and in the field; and discussions with Bechtel Geo-Tech, Project Engineering, Field Engineering, Quality Control Engineering, U.S. Testing, Consumers Power Company, PMO and QA personnel. Mr. Gallagher stated that he would not handle the findings as noncompliances, however, they could become items of noncompliance when they are reviewed by his management.

His findings/observations were as follows:

1. The FSAR states that during operation, settlement readings will be taken every 90 days. Because of the diesel generator settlement problem, this frequency should be re-evaluated for adequacy.

Let's re-evaluate the frequency at the time...

2. FSAR Table 2.5-14 "Summary of Foundation Supporting Seismic Category I Structures" identifies the supporting soil materials under the diesel generator building as being controlled, compacted cohesive soils. However, construction drawing C-109, Rev. 9 and C-117, Rev. 6 identifies the material in this area as Zone 2 material. Zone 2 material is identified as random fill described as any material free of organic or other deleterious materials. In the field a variety of materials have been used for the diesel generator foundation material, in particular, sands, clay, and lean concrete, silty sands and clayey sands. The apparent conflict is that Table 2.5-14 identifies cohesive soils where, in actuality, cohesionless sands have been utilized. A review of the records indicate that sands have been used between elevation 594'-608', areas of elevation 611'-613' and areas between 616'-~~613~~'. This indicates the extent of the variability of the material placed under the diesel generator building foundation. Mr. Gallagher did not feel it was good judgement to use random material under the support of a structure.
3. FSAR Table 2.5-21 "Summary of Compaction Requirements" identify random fill to require a compaction effort of a minimum of 4 passes with the specified equipment in this table. This requirement has not been an imposed requirement of Bechtel Specification C-210 nor an inspection requirement of Bechtel Quality Control Instruction C-1.02 for backfill.
4. FSAR section 3.8.5.5 states that settlements of shallow spread footings founded on compacted fill are estimated to be on the order of $\frac{1}{2}$ " or less. Site Survey Program has identified settlements in the diesel generator building foundation on spread footings to range from 0.55 inches to 2.30 inches and in excess of 3.0 inches for the diesel generator pedestal.
5. FSAR figure 2.5-47 indicates the foundation of the diesel generator building to be at elevation 634', according to design drawings C-1001, Rev. 5 it is indicated for the diesel generator spread footings and pedestal foundation to be at 628'.
6. A. Specification C-210, section 13.7.1 requires all cohesive backfill in the plant area to be compacted to not less than 95% maximum density as determined by ASTM D1557 method D which requires an effective compactive effort of 56,000 foot-pounds of energy per cubic foot of soil. However, section 13.4 Testing requires testing of the materials placed in the plant area to be performed in accordance with tests listed in section 12.4. This section, in particular section 12.4.5.1, "Cohesive Soils," requires maximum lab densities to be determined using ASTM D1557 Method D provided a compactive energy equal to 20,000 foot-pounds per cubic foot is applied (Bechtel Modified Proctor Density). To date, the Bechtel Modified Proctor Density for determining maximum proctor density versus optimum moisture content has been utilized. This conflict results in an unconservative method of determining the maximum proctor density and method of assuring that the required percent compaction is achieved. In particular, the actual in-place compaction would be less using the Bechtel Modified Proctor Density as a reference than using the standard ASTM D1557 method D. This is due to the fact that the compactive energy exerted using the Bechtel Modified Method is less than the effort exerted by the standard method D - example: 20,000 foot-pounds versus 56,000 foot-pounds.

Bechtel Quality Control Instruction C-1.02 section 2.4 testing identifies the applicable inspection criteria and includes Specification C-210, section 13.7 and 12.4 which includes the apparent conflict as described in detail in Part A above.

A further review of the original subsurface investigation performed by Dames and Moore and documented in report supplement dated March 15, 1969 page 16 indicates that the recommended minimum compaction criteria for support of structures be 100% of maximum density using a compactive effort of 20,000 foot-pounds (resulting from Bechtel Modified Proctor determination). However, this 100% of Bechtel Modified Proctor corresponds to 95% compaction according to the standard ASTM D1557 method D and not 95% compaction according to Bechtel Modified Proctor method which has been utilized for the entire plant fill area to date. Furthermore, Dames and Moore Report, page 15 states that all fill and backfill material should be placed at or near the optimum moisture content in near horizontal lifts approximately 6-8" in loose thickness. Bechtel specification permits a maximum of 12 inches which affects the compactability of the material.

7. Piping, condensate lines, duct banks, and other utilities under the diesel generator building may also be affected and must be evaluated.
8. Mr. Gallagher stated he was leaving not having seen design calculations and will be discussing design calculations, assumptions made, and conflicts with the FSAR with Licensing.
9. The inspector observed the structural concrete crack that has developed in the east exterior wall. The crack was observed with members from Bechtel Geo-Tech and Consumers Power Company. The crack extended full height of the wall and continued down through the spread footing as seen from the inside of the building. The crack is expected to have been induced flexurally caused by differential settlement. Discussion with Bechtel design staff has indicated that this crack is under study and is currently being evaluated. ACI-318-71 in the commentary section 10.6.4 limits flexural crack exposed to the outside to 0.013". Corrective action may be required if this limit is exceeded.
10. The following tests were observed to be performed in accordance with the applicable tests standards by U.S. Testing:
 - A. Lab Test ASTM D1557-7G
 - B. Field Test ASTM D/1556-64
11. Calculations should be evaluated on the increase and the rate of increase of the pond fill and the effects of the water in other areas.
12. Mr. Gallagher stated that the NRC does not view preloading of the structure to be a fix or resolution of the problem of this size.
13. Seismic loading calculations should be determined for the type of material existing in its present condition.

Bob Wheeler has review of Request for 42, - 10/11/78
FSAR & FSAR of C-210 & C-211 & Compacted

10/11/78

INCONSISTENCIES DISCOVERED TO DATE

RMW
For memo on...
Engineering list

1) References:

- a. Dames & Moore Report (Page 15)
- b. Standard No. 7220-C-501, "Civil & Structural Design Criteria" (Page 8)

"Filling operations shall be performed under the technical supervision of a qualified Soils Engineer who will perform in-place density tests in compacted fill to verify that all materials are placed and compacted in accordance with recommended criteria."

Bechtel Field did not have a Soils Engineer on site.

2) References:

- a. Dames & Moore Report (Page 14)
- b. Bechtel Specs C-210 and C-211

Dames & Moore - "All fill and backfill materials should be placed at or near the optimum moisture content in nearly horizontal lifts approximately six to eight inches in loose thickness."

Bechtel Specs - C-211, Section 5.2.2 "However, in no case shall the uncompacted lift thickness exceed 12 inches."

Obviously, these two requirements conflict.

References:

- a. Dames & Moore Report (Page 15)
- b. Bechtel Specification C-211

Dames & Moore - "In addition, no compacted soils should be allowed to freeze. If fill or backfilling operations are discontinued during periods of cold weather, it is recommended that all frozen soils be removed or recompacted prior to resumption of operations."

Bechtel Spec - "No backfill shall be placed upon frozen surface nor shall any frozen material be incorporated in backfill."

This does not address the question of removal or recompaction upon resumption of work.

Bob Wheeler has review of Request for 42, - 10/11/78
FSAR & FSAR of C-210 & C-211 & Compacted
we have provision

CPL has noted areas...
excavated...
backfill...
may not have...
had as...
Pack...
dike...
conductor

9

Is having an Engineering list

Take sample of material to be used for fill & run test. This gives optimum If as you place it, you test it its 400 for... & a density (100... 500...)

Random fill is permitted and may have not any type edge... assigning Proctor Tests

10/11/78
Soils Engineer...
read criteria...
Bob was told to...
pond it...

4) References:

- a. Bechtel Design Standard C-501
- b. Bechtel Spec C-211

AA Bechtel Design Standard - Table of Minimum Compaction Criteria

<u>Purpose of fill</u>	-	On site
support of structure		Sand soil
		Percent relative density
		85% (D2049-69)

Would be significant under bldg.

Spec C-211, Section 5.5.1 - "Cohesionless (sand) material shall be compacted to not less than 80% relative density.... by ASTM D. 2049"

Spec and Design Standard conflict.

5) References:

- a. Dames & Moore Report (Page 14)
- b. FSAR Page 2-7
- c. Drawing C-44

*Sandstone
Dress*

Dames & Moore - "It is recommended that all areas in which the final grade will be raised by placement of fill be stripped of all topsoil and other unsuitable soil if any and be thoroughly proof rolled."

FSAR - "All loose in-site sands, soft or compressible clay soils, and organic soils will be excavated in the Turbine Building area."

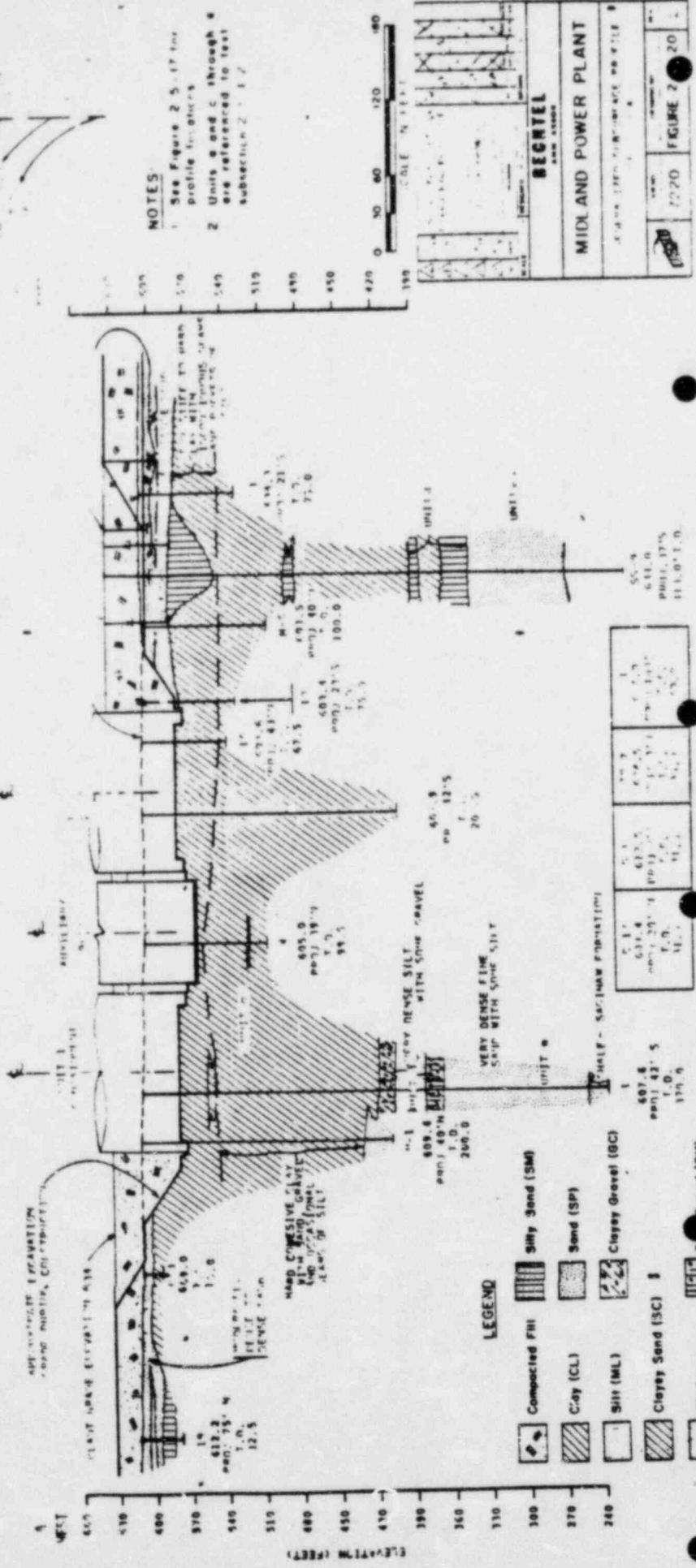
Bechtel Drawing C-44, Note #4 - "Within the excavation area shown all loose surficial sands with relative density less than 75% shall be removed."

Added to this drawing 8/23/75.

*was done
year ago*

Boring logs show us that the soil was not removed, however, it may be greater than 75%.

Vibration + water



NOTES
 1 See Figure 2 5-17 for profile locations
 2 Units B and C through E are referenced to test subsection 2 1 1 7

BECHTEL
 MIDLAND POWER PLANT
 7770 FIGURE 2

ELEVATION (FEET)

LEGEND

- Compacted Fill
- Clay (CL)
- Silty (ML)
- Clayey Sand (SC)
- Shale
- Silty Sand (SM)
- Sand (SP)
- Clayey Gravel (GC)
- Gravel (GM)

APPROPRIATE EXPANSION COMP. MIXTURE, CO. REPORT

UNIT 1
 613.2
 pen 75.4
 12.5

UNIT 2
 609.0
 pen 18.4
 98.5

UNIT 3
 605.0
 pen 12.5
 20.5

UNIT 4
 609.4
 pen 27.5
 100.0

UNIT 5
 607.8
 pen 42.5
 170.0

UNIT 6
 613.4
 pen 30.4
 11.1

UNIT 7
 613.5
 pen 31.1
 11.1

UNIT 8
 613.6
 pen 31.1
 11.1

UNIT 9
 613.7
 pen 31.1
 11.1

UNIT 10
 605.0
 pen 18.4
 98.5

UNIT 11
 609.4
 pen 27.5
 100.0

UNIT 12
 607.8
 pen 42.5
 170.0

UNIT 13
 613.4
 pen 30.4
 11.1

UNIT 14
 613.5
 pen 31.1
 11.1

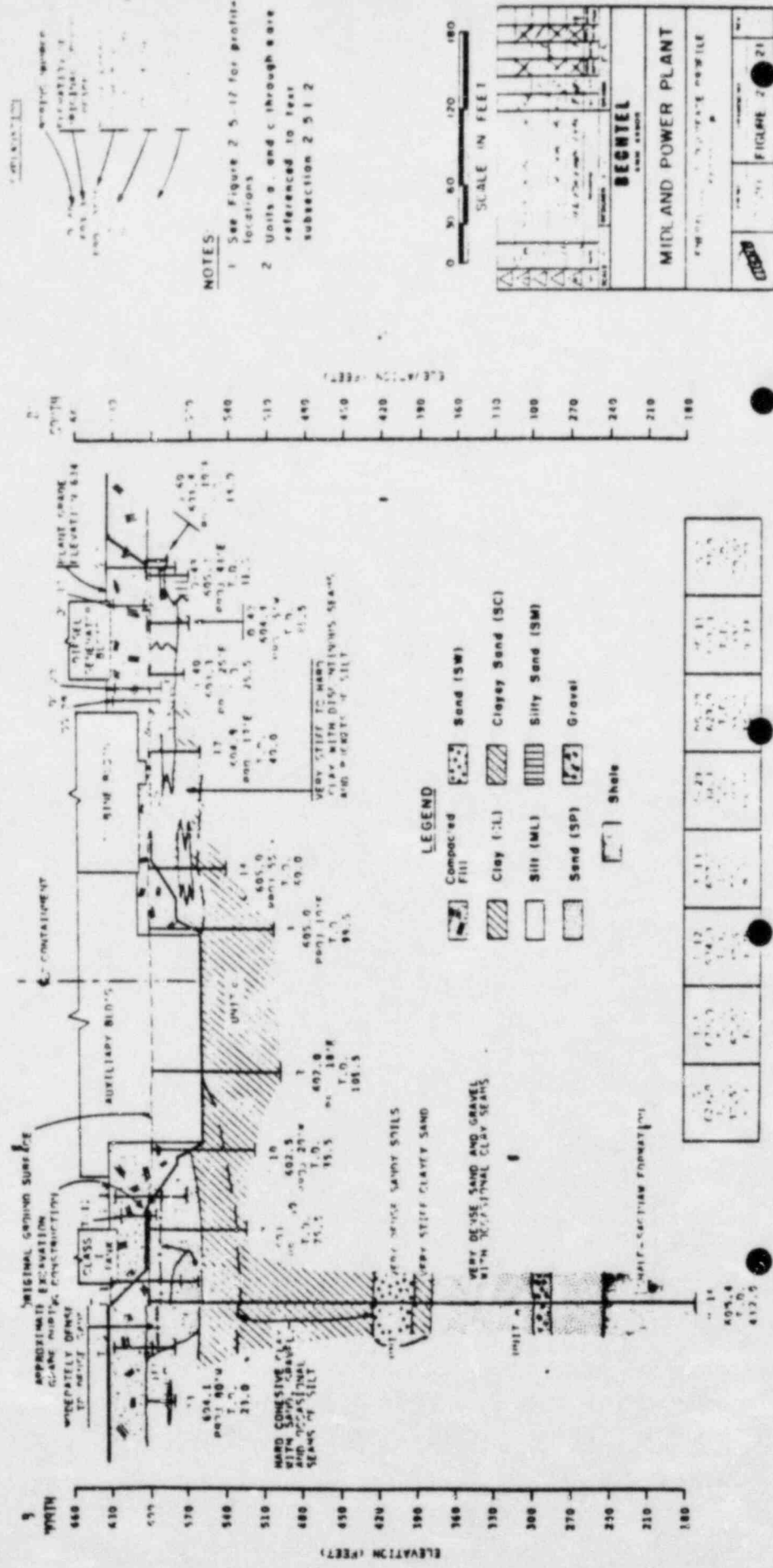
UNIT 15
 613.6
 pen 31.1
 11.1

UNIT 16
 613.7
 pen 31.1
 11.1

UNIT 17
 613.8
 pen 31.1
 11.1

UNIT 18
 613.9
 pen 31.1
 11.1

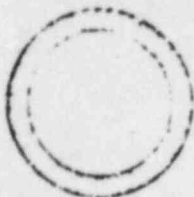
UNIT 19
 614.0
 pen 31.1
 11.1



NOTES

- 1 See Figure 2-5-17 for profile locations
- 2 Units a, b and c through e are referenced to test subsection 2-512

BECHTEL
MIDLAND POWER PLANT
FIGURE 2-512



Consumers
Power
Company

BOEP10.1.3

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • (517) 788-0650

January 23, 1980

Mr Tom Newell
Acting District Engineer
PO Box 30028
Lansing, MI 48909

MIDLAND PLANT - SITE DEWATERING

As part of the engineering design to control groundwater elevation in the area North of the cooling pond, dewatering wells have been installed by Loughney Dewatering, Inc, Certificate of Registration under Act 294 attached. Approximately 138 temporary wells (1-1/2") have been installed since August 1, 1979. Identification of individual wells, well depth and estimated pumping rate of each 'series' of wells is provided in the attached data sheets. Well locations are identified in the attached drawing entitled "Midland Power Plant, Temporary Dewatering Well Locations".

The dewatering discharge of all wells will be directed to the cooling pond. As you can see from the data sheets, the flow to the pond will be about 320 gpm. Data derived from the temporary dewatering operation will aid in the design and operation of a number of permanent dewatering wells to be installed at some future date.

The Company requests dewatering as described above be addressed in the following parts of the draft Midland NPDES permit issued January 2, 1980:

- (1) Fact Sheet
- (2) Final Effluent Limitations - Cooling Pond Discharge prior to outfall 001, page 6 of 19.

The dewatering discharge to the cooling pond is expected to commence January 31, 1980. Unless advised otherwise by Staff, the dewatering discharge to the pond will proceed as scheduled.

If you have any questions regarding this matter, please let me know.

Ronald L Fobes

R L Fobes
Environmental Advisor

CC Chang Bek

RLF/ksh

BCC TCCooke/RLBull, Midland
DLAndersen, Midland
RCBauman, P-14-412
RFGreen, P-14-303
~~EW~~/TRThiruvengadam, P-14-209B

upc attachments

49201 • (517) 788-0650

4. NRC Inspection Report

control groundwater elevation in the Ring wells have been installed by Act 294 attached. (2") have been installed since individual wells, well depth and estimated is provided in the attached data sheets. Attached drawing entitled "Midland Power ions".

will be directed to the cooling pond. he flow to the pond will be about 320 dewatering operation will aid in the rmanent dewatering wells to be installed

described above be addressed in the follow- permit issued January 2, 1980:

oling Pond Discharge prior to outfall

ing pond is expected to commence January 31, aff, the dewatering discharge to the pond

his matter, please let me know.

- BCC TCCooke/RLBull, Midland
- DLAndersen, Midland
- RCBauman, P-14-412
- RFGreen, P-14-303

~~TR~~/TRThiruvengadam, P-14-209B
w/o attachments

To Typist:
(Ball line)

In response to the conflicts addressed in NRC Inspection Reports 50-329/78-12 and 50-330/78-12 dated November 14, 1978, an FSAR change notice has been initiated to correct the ~~watering~~ discrepancies. SEE INSERT B ~~Corrected~~ Further evaluations of the additional items are continuing and will be addressed in subsequent reports.

Activities In Progress

1. EVALUATION OF FIELD RECORDS - Field density are being evaluated to determine if any other test results will be required.
2. Strengthening of the Turbine Building Wall

test results remedial work?

*

To File

From JEBrunner, P-24-513 *JEBrunner / rjg* CONSUMERS
POWER
COMPANY

Date October 3, 1980

Subject MIDLAND PROJECT Internal
MINUTES OF 8/29/80 MEETING TO APPEAL NEED FOR Correspondence
ADDITIONAL BORINGS
FILE: 0485.16 UFI: 00234S, 71*01 SERIAL: 9610

CC JWCook, P-14-113A MIMiller, IL&B
TCCooke, Midland JARutgers, Bechtel
GSKeeley, P-14-113B TRThiruvengadam, P-14-400
DBMiller, Midland CWiedner, Bechtel

The meeting was convened at 1:00 pm at the Midland Service Center. The attendance list is enclosed as Attachment 1. The agenda for the meeting is enclosed as Attachment 2. Following introductions, G S Keeley summarized historical events relating to the supply of soils-related information to the NRC. Keeley indicated that CP Co had submitted information via 50.54(f) responses, 50.55e reports, meetings and site visits, and responses to requests for document production covering a period of almost two years (See Attachment-3).

J D Wanzeck of Bechtel Geotech then described the soil investigation done to date, all of which excepting information on 59 borings have been supplied to the NRC in connection with CP Co's proposed soils fix. Wanzeck reviewed past borings taken to date, test pits, cross-hole shots, and settlement information as well as other aspects of CP Co's past efforts to develop soils data necessary to demonstrate the adequacy of the proposed fix. He stated that CP Co had taken over 900 borings at the Midland site and expressed the opinion that no additional borings are necessary.

Dr Ralph Peck, Bechtel's consultant, who is an internationally recognized expert on foundation soils, then discussed the technical basis for Consumer's conclusion that the pre-load program would provide an acceptable solution of the diesel generator building settlement problem. Peck, with admirable clarity and organization, described the pre-load program, the settlements observed upon surcharging, pore pressure variations as observed through piezometer readings and the future settlements which may be predicted based on an extrapolation of observed settlements. Peck expressed the opinion that the pre-load approach is universally accepted in the soils field and that the information directly supplied via pre-loading would accurately predict future settlement behavior.

A method utilizing results from borings lacks this accuracy, according to Peck, because of inherent inaccuracies in an indirect approach, and because the "fix" would not eliminate all variations in soils parameters below the diesel generator building. Peck felt that the borings approach would erroneously predict greater settlements than would be observed.

Peck's presentation was illustrated with charts and graphs showing settlement measurements and predictions with and without the surcharge, variations in porewater pressure during and after the pre-load, and the loading level on

soils below the diesel generator building as a function of elevation during the preload. The latter clearly showed that the effective stresses in the fill up to elevation 603 under full surcharge load exceeded the post-surcharge effective stresses upon the fill with the full dead and live loads, including effects of permanent dewatering. This was documented in Amendment 81.

Peck was followed by A J Hendron, Jr, another noted expert in the field. Hendron began his presentation with an analysis of inherent errors that can be expected in settlement computations derived from consolidation tests performed on best-possible, undisturbed samples obtained from borings. His conclusion was that the measurement errors inherent in such an approach would totally eliminate any value otherwise obtainable.

Hendron then addressed the subject of bearing capacity. He stated that new calculations which he had recently performed provide a more accurate prediction of the behavior of the soils from a bearing capacity standpoint than had past analyses, which had excluded certain terms from the bearing capacity equation. His latest calculations, which included such terms, demonstrated a factor of safety from a bearing capacity failure on the order of 6 or 7. The design goal for bearing capacity safety factor is 3. Hendron concluded that additional borings were totally unnecessary to demonstrate adequate bearing capacity. This was documented in Amendment 81.

M T Davisson then concluded the technical part of CP Co's presentation with a discussion of underpinnings - piles and caissons. Davisson stated that the use of underpinnings was designed to eliminate the need to consider soils characteristics in plant fill. Additional borings were technically inferior to the in-place tests under load which would be carried out when underpinnings are installed. Davisson felt that additional borings would be useless and misleading. This was documented in Amendment 81.

After a short recess, the staff presented its arguments in favor of more borings. Lyman Heller, US NRC, in a short introductory statement, argued that the additional borings were not intended to "negate" field data, but only to supplement it. Heller also argued that the Corps had requested only 18 additional borings, compared with over 900 already taken. Heller further stated that the staff had been "burned" twice at North Anna by the use of field data alone.

Joseph D Kane, US NRC/NRR/HGEB, then presented the major substance of the NRR arguments. Referring first to the cooling pond dike, Kane stated that a series of borings and lab tests should be taken to provide the dikes stable under all conditions and to determine the properties of fill after compaction.

In the area where underpinnings would be installed, Kane stated that it was proper engineering procedure to estimate foundation behavior prior to any field tests. Kane also stated that borings were necessary because of possible space limitations if the number of caissons necessary to do the job was under estimated. He also expressed concern about negative skin friction being factored into underpinning design.

With respect to the diesel generator building, Kane admitted that field testing was advantageous, but that borings would confirm predicted values, that he was not sure if primary consolidation had been completed, that the building had settled 4" before pre-load and 3-1/2" during pre-loading, and that certain observations of piezometer levels taken during the surcharge may have resulted from errors introduced by varying the level of the cooling pond. Kane also mentioned that CP Co had presented only positive effects of surcharge, and had failed to address 4"-settlement which took place and its effects on structures. Kane failed to state what connection the latter point has with the additional borings issue.

After Kane's presentation, the NRR caucused.

Messrs Vollmer and Knight then questioned the various individuals present. Vollmer indicated that, in view of the present political climate, he was somewhat surprised at CP Co's attitude toward not supplying additional technical information. He inquired of Mr Cook whether or not CP Co's objections went to the mere necessity of the borings or went to the possibility that the borings results would be actually misleading and counterproductive. Mr Cook answered that both points were primary objections.

Mr Knight wanted to know whether or not CP Co had been advised of the additional borings request when the latest 66 samples were taken. CP Co answered in the negative.

Following a discussion on the negative porewater pressure question (during which there was an exchange between Kane, Peck, Hendron, and Davisson, in which Peck stated that the results were exactly as he would expect), Vollmer indicated, though somewhat ambiguously, that the data supplied seemingly satisfied his concern on the settlement issue. He further stated that new information had been presented during the meeting and that this should formally be supplied. He stated that if he had to make a decision immediately he would have to agree with the staff's recommendation.

It was decided that CP Co would supply a summary of all soils information including the additional information supplied at the meeting, by 9/15/80. The meeting was then adjourned.

On the same day as and prior to the above meeting, Mr G Lear (NRC) was shown pictures of the piping associated with the return of emergency service water. The part of the piping which is buried along the sides of the emergency cooling pond was exhibited to Lear using the following photos:

Cartridge 4253	Frame 1965
	1966
	2057
	2058
	2033
	2039

Pictures 905
906
907
908
1080
1081

The review of the above photos showed that the pipe was located in an excavated trench in the berm and not the dike slope. Therefore, a postulated baffle dike failure precipitated by the trench is not considered to be a plausible scenario and would not interfere with functioning of the Emergency Cooling Pond.

CC: CAHunt
BMiller
TCCooke
RMWheeler

13

NRC Exit on Diesel Foundation -

Gallahger was asked to follow-up on 50.55(e) Report to fact-find on what brought it about and what our plans were. Findings which won't be infractions, but their management will evaluate. FSAR commits to checking settlement every 90 days. Assumes we will modify as necessary after we take corrective action.

FSAR 2.5-14 gives supporting materials as cohesive controlled fill. Another table shows clays. Thought it would not be sands. Feels random fills are not good policy. C-109 and -117 indicate Zone II, this is discrepancy from FSAR #1.

2.5.21 summarizes compaction requirement. Requires 4 minute passes but not req by C-210 until added in 1977 and was not imposed. C1.02 does not make reference to it. US Testing says they were not required to.

This is discrepancy from FSAR #2. 3.8.5.5 shallow footings settlements estimated to be 1/2" or less. Has to be corrected in FSAR.

Figure 2.5-47, Diesel Generator Building 634 but its at 628.

C-210; -211, 1.02 (QC instr) - C-210 Section 13.7.1 requires all cohesive backfill to 95% but 13.4 refers 12.4.5.4 to Bechtel Modified Proctor which gives unconservatism. 1.02 is confusing since has to compact to different requirements.

Dames & Moore 3/69 - recommends 100% and at or near 6" to 8".

Ductbanks and piping under building was looked at and probably effects diff settlement.

56

Using random fill makes it difficult to determine amount of settlement yet it was estimated as 1/4". Asked for calculation for basis of estimate but has not received. Crack on east wall. Does not feel these are minor but are flexural cracks and if so have to correct to meet ACI 318 Section 10.4. Feels Testing people are testing ok.

Does not believe material was placed as is indicated. Have low blow counts.

Pond level should and rate should be taken into account on effect on soil.

Should evaluate and effect on BWST main transformer tanks. Diff water levels between diesel generator area and BWST area.

Reviewed plans for monitoring preload. NRC does not feel this is corrective action.

Says mat foundations are usually used with random fill.

GSKeeley/cg
10/30/78

TRT

Bechtel Power Corporation

013421

777 East Eisenhower Parkway
Ann Arbor, Michigan

Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48106



October 8, 1980

BLC-9839

Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

CC: *See*
JEB

Attention: Mr. J.W. Cook
Vice President
Projects, Engineering and Construction

Subject: Midland Plant Units 1 and 2
Consumers Power Company
Bechtel Job 7220
50.54(f) September Status Report

Attached is the September Status Report giving the status of commitments made in the responses to NRC 50.54(f) Questions and supplementary questions from letters, meetings, etc. The structure of the report has been changed to group items by status code to allow greater visibility of outstanding items. The following is a summary of the attached report:

Status Codes:	(1) Ques 1-22	(1) Ques 23	(1) Ques 24-35	(1) Supp. Ques.
Code 1	62	30	0	0
Code 2	4	10	5	4
Code 3	21	11	2	0
Code 4	16	5	5	3
Code 5	<u>8</u>	<u>0</u>	<u>0</u>	<u>2</u>
Total Actions	111	56	12	9

(1) See first page of status report.

The October Status Report will be submitted by November 10, 1980.

Very truly yours,

John A. Rutgers
Project Manager

JAR/VDP/kes

Attachment: 50.54(f) September Status Report

cc: W.R. Bird ; G.R. Eagle (CPCo/AA); D.E. Horn; G.S. Keeley; B.W. Margulio .
(all w/a)

Written Response Requested: No

RECEIVED

OCT 13 1980

MIDLAND PROJECT

CONSUMERS POWER COMPANY

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES

STATUS SORT: PARTS I AND 2

013421

Bechtel Power Corporation

October 8, 1980

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES

LEGEND

RESPONSIBLE ORGANIZATIONS:

Status Codes:

- 1 Complete, verified by quality assurance
- 2 Reported complete, not yet verified
- 3 Due, but not complete. Dates have been reforecast. Original due dates are in parentheses.
- 4 Not yet due
- 5 Insufficient documentation in 50.54(f) files to establish or verify status

- | | | |
|-------------------------------|----------|---|
| PD Plant design | CPCo | Consumers Power Company |
| PS Pipe stress | CPCo QA | Consumers Power Company quality assurance |
| LS Licensing | | |
| GT Geotechnical services | CPCo PMO | Consumers Power Company project management organization |
| CE Civil engineering services | | |
| FE Field engineering | | |
| QA Quality assurance | | |
| QE Quality engineering | | |

Notes:

1. Commitment dates for action items indicated by asterisks (*) have been transmitted to the NRC. These dates will not be changed without a formal transmittal to the NRC.
2. Questions 1 through 22 action item numbers are basically the same as those used by the diesel generator building task group, but have been modified to acknowledge action items/commitments made in all revisions of the responses.
3. Question 23 action item numbering is based on the Response to Question 23 submitted to Consumers Power Company via BLC88460, J.A. Rutgers to G.S. Keeley, dated November 14, 1979. These action item numbers have been modified to acknowledge action items/commitments made in all revisions of the responses.
4. Questions 24 through 35 action items were identified for the first time in the April issue of this status report and will be referred to by the action item numbers established in that issue.

References (applicable to Part II only):

- A. Letter from G.S. Keeley to J.A. Rutgers, CPCo Serial 8548, 3/27/80
- B. Commitments made in February 1980 meeting with NRC, Midland, Michigan

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MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES

PART I: COMMITMENTS FROM QUESTIONS 1 to 35

<u>Item</u>	<u>Description</u>	<u>Page</u>	<u>Rev</u>	<u>Resp Org</u>	<u>Responsible Engineer</u>	<u>Due Date</u>	<u>Status</u>	<u>Status Remarks</u>
1-5*	Review specifications not included in the specificity study initially	1-5 1-8	0 0	QE		790629	5	See Item 23-10
1-19*	Complete in-depth review of soil test results	1-17		GT		790731	5	
6-5	Monitor the piping between the BWST and the auxiliary building	6-1	1	CE			5	Ongoing activity
6-6	Evaluate the settlement from Item 6-3 in accordance with the procedure described in Question 17	6-1	1	PS			5	Complete monitor upon load test
7-2	Make results of continuity checks and settlement surveys available						5	See Item 7-1
7-3	If further corrective action is required, determine corrective measures						5	See Item 7-1
13-9 (13-2)	Review piping system for seismic response from Item 13-6	13-2	0	PD	A. Patel		5	
15-3	Prepare additional response to the NRC					791231	5	

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
4-6	Monitor the non-Seismic Category I condensate storage tanks	4-4	5	GT CE	J. Wanzeck S. Rao	801130	4	Load test ongoing; results will be evaluated by geotech and civil
4-8	Fill the BWST with water to perform a full-scale test of subsurface material	4-3	3	GT CE	J. Wanzeck S. Rao	801130	4	See Items 6-1, 6-3, 6-6, and 31-1. Dwg C-1148 issued for construction. Load test to start in 10/80
6-9	Determine long-term settlement based on the measured settlement of the loaded tanks	6-2	3	GT			4	Geotech to review load and predict long-term settlement based on Items 4-6, 4-8, and 4-9
8-3	Review and modify the monitoring frequency for the diesel generator pedestal markers after 1 year of operation	8-2	0	CPCo		850101	4	
12-5	Pressure grouting of void below the mud mat of the control tower as required	Tbl 12-1	0	CE	R. Zao	801231	4	
13-7 (13-1)	Review structural design for seismic response from Item 13-6	13-2	0	CE		801031	4	
13-8 (13-2)	Review Seismic Category I equipment for seismic response from Item 13-6	13-2	0	CE	B. McConnel	810201 (801231)	4	
13-10 (13-2)	Review electrical system for seismic response from Item 13-6	13-2	0	CE	B. McConnel	810201 (801231)	4	
13-11 (13-3)	Conduct a seismic reanalysis for the service water pump structure	13-2	0	CE	B. McConnel	801031	4	
13-13 (13-3)	Review Seismic Category I equipment for seismic response from Item 13-11	13-2	0	CE	B. McConnel	810201 (801231)	4	
13-14 (13-3)	Review piping system for seismic response from Item 13-11	13-2	0	PD			4	
13-18 (13-4)	Review Seismic Category I equipment for seismic response from Item 13-16	13-3	0	CE	B. McConnel	801231	4	
13-19 (13-4)	Review piping system for seismic response from Item 13-16	13-3	0	PD			4	

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(F) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
13-20 (13-4)	Review electrical system for seismic response from Item 13-16	13-3	0	CE	B. McConnel	801231	4	
13-21 (13-5)	Investigate the effect on underground utilities for differential building displacement resulting from Items 13-6, 13-11, 13-16	13-5	0	CE PS	B. McConnel	810131	4	
17-4	Profile the borated water lines by optical means	17-1	2	CE			4	Tracked by Item 6-5
23-37*	Consistent with the intent of Items 23-35 and 23-36, QA 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 Item 36.	23-33	5	QA		801231	4	
23-40* (31)	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 is scheduled for completion by October 24, 1980, and field engineering and quality control review is scheduled for completion by November 28, 1980.	I-11, 23-20, 23-30	4	FE, QC		801128	4	Project engineering to provide list of design documents to FE and QC to start this item
23-41*	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.	I-18, 23-22, 23-25	5	QC		801115	4	See Item 23-34

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-42* (31) (40)	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 is scheduled for completion by October 24, 1980, and field engineering and quality control review is scheduled for completion by November 28, 1980. Any revisions required will be completed by January 23, 1981.	I-11, 23-22, 23-30	4	PE, FE, QC		810123	4	
23-43*	The impact of Item 41 on completed work will be evaluated, and appropriate actions will be taken as necessary.	23-22, 23-25	4	QC		810115	4	
24-1	Determine final number of observation wells	24-21	5	GT		811031	4	Ongoing activity
24-2	Develop frequency for monitoring the observation wells	24-21	5	GT		810131	4	Ongoing activity
24-3	Develop system and schedule for monitoring sand removal	24-22	5	GT		810131	4	Ongoing activity
24-4	Evaluate results of temporary dewatering system to verify design bases	24-8	5	GT		811031	4	Ongoing activity
25-3	Revise seismic analysis for service water pump structure using soil properties determined by the recent investigation and any foundation modification	25-5	5	CE			4	Tracked by Item 13-11

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MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
1-21A	Modify QCIs based on Item 1-21	NA		QC	E. Smith	801115 (800901)	3	See Items 23-15A, 23-34, and 23-41
1-23	Incorporate scientific sampling plans for inspection	I-20		QC		801115 (791019)	3	See Item 23-34. Committed statements not yet compiled with
13-6 (13-1)	Conduct a seismic reanalysis for the diesel generator building	13-2	0	CE	B. McConnell	801115 (801015)	3	
13-12 (13-3)	Review structural design for seismic response from Item 13-11	13-2	0	CE		801231 (800831)	3	
13-15 (13-3)	Review electrical system for seismic response from Item 13-11	13-2	0	CE	B. McConnell	810201 (801231)	3	
13-16 (13-4)	Conduct a seismic reanalysis for the auxiliary building	13-3	0	CE	B. McConnell	801215 (800815)	3	
13-17 (13-4)	Review structural design for seismic response from Item 13-16	13-3	0	CE	R. Zao	801130 (800930)	3	
14-7	Analyze the BWST foundation for variable foundation properties	14-2	5	CE	R. Zao	801231 (800831)	3	Analysis ongoing
14-8	Compare allowable versus calculated forces and moments at critical sections for auxiliary building electrical penetration area and service water pump structure	14-5	5	CE		801231 (800831)	3	Analysis ongoing
15-2	Expand the Midland project structural design criteria for Seismic Category I structures to include the differential settlement effect.	15-2	0	CE	D. Reeves	801130 (800831)	3	Design criteria in CPCo review
17-5	Analyze buried piping considering the probable ultimate settlement. Provide unique resolution for any unacceptable stress conditions for the portion of the system	17-3	5	PS	J. Legette	810131 (800801)	3	Report on method for analysis being reviewed
17-6	Investigate the excess rounding of profile data	Tbl 17-2	2	PS	J. Legette	810131 (800801)	3	Same as Item 17-5

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
18-1	Perform reexamination of the stresses in all Seismic Category I connecting piping between buildings as a normal iteration of design. Consider stresses induced by differential settlement after connecting pipe and anticipated future settlement	18-1	0	PS	J. Legette	810131 (800801)	3	Same as Item 17-5
18-2	Perform final analyses to demonstrate the margin of acceptability for additional differential settlement beyond that expected for the life of the plant	18-2	5	PS	J. Legette	810131 (800801)	3	Same as Item 17-5
18-3	Design piping connecting from the diesel generator building to the pedestals which will accommodate the expected future settlement	18-2	5	PS	J. Legette	810131 (800801)	3	Dependent on 17-5
19-1	Profile pipes in the vicinity of diesel generator building after removal of preload and evaluate as described in the Response to Question 17	19-1	0	PS	J. Legette	810131 (800801)	3	Dependent on 17-5
19-3*	Perform a complete evaluation of safety-related piping after completion of the preload program	19-3	0	PS	J. Legette	810131 (800801)	3	Dependent on Item 18-1
20-1	Analytically check the Seismic Category I systems affected by settlement for pump and nozzle loadings and verify that they are within specified or vendor-accepted limits	20-1	5	PS	J. Legette	810131 (800801)	3	Dependent on Item 18-1
20-2	Verify piping support loads for systems subjected to settlement-induced loads	20-1	5	PS	J. Legette	810131 (800801)	3	Dependent on Item 18-1
20-3	Prepare additional response to the NRC					810131 (800801)	3	
20-4	Evaluate active valves affected by settlement for imposed loads and reactions; compare to the allowable for operability	20-1	5	PS	J. Legette	810131 (800801)	3	Dependent on Item 18-1

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-19A*	This action modified to include necessary revision to QCIs resulting from evaluation of surveillance and review callouts	I-18		QC	E. Smith	801115 (800901)	3	To be completed when Item 23-41 is completed and QC Procedure G6.1 is approved by CPCo. See Item 1-21A
23-20*	Field Instruction 1.100 will be supplemented by establishing requirements for demonstrating equipment capability, including responsibility for equipment approval, and providing records identifying this capability.	23-18	5	FE		801231 (791204)	3	Awaiting equipment qualification report from geotechnical services based on CPCo NCR
23-25*	Quality assurance will issue a Nuclear Quality Assurance Manual amendment to clarify the requirement that procedures include measures for qualifying equipment under specified conditions.	23-18		QA		801017 (800902)	3	Awaiting issuance of remaining NQAM procedures needed for the CPCo/Bechtel QA integration
23-28*	Civil/Structural Design Criteria 7220-C-501 will be 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.	23-15	5	CE	D. Reeves	801130 (800831)	3	Design criteria in CPCo review
23-30* (39)	Engineering will clarify specifications and construction will prepare procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Item 25	23-18	5	CE/FE		801230 (800912)	3	Dependent on compaction report and NQAM
23-31*	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 is scheduled for completion by October 24, 1980.	I-11, 23-20, 23-30	5	PE	C. Russell	801131 (801024)	3	

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-33*	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.	23-35	5	QA		800912	3	Action completed except developing audit training program
23-34*	Control Document SF/PSP G-6.1 will be revised to provide requirements for inspection planning specificity and for the utilization of scientific sampling rather than percentage sampling.	1-20, 23-22, 23-24	5	QC		801115 (800915)	3	SF/PSP G-6.1 has been submitted for review. See Item 1-23
23-39* (30)	Engineering will clarify specifications and construction will prepare procedures (governing the soils compaction equipment) to implement the requirements of the Nuclear Quality Assurance Manual as stated in Item 25.	23-18	5	FE		801231 (801017)	3	
23-44A*	The audit committed to in our response to Question 1, Part b and described in Part 2, Section 5.0 will be conducted once during the FSAR rereview (commencing March 17, 1980) and again after completion of the rereview (commencing September 1, 1980).		4	QA		801231 (800901)	3	See Item 1-4
23-47*	See Item 23-4	23-9, 23-25	4	PE		801231 (801031)	3	
26-1	Analyze the effect of differential settlement of the diesel generator building in accordance with ACI 349 as supplemented by Regulatory Guide 1.142	26-2	5	CE	R. Zao	801031 (800930)	3	

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MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

<u>Item</u>	<u>Description</u>	<u>Page</u>	<u>Rev</u>	<u>Resp Org</u>	<u>Responsible Engineer</u>	<u>Due Date</u>	<u>Status</u>	<u>Status Remarks</u>
33-1	Fill the diesel fuel oil tanks with oil prior to preoperational testing	33-2	5	CE		810831 (800829)	3	See Items 4-9 and 6-4 Will be accomplished just prior to preoperational testing

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
4-7	Remove unsuitable material in the tank farm and replace by compacted fill	4-3	3	GT	J. Wanzeck S. Rao	791130	2	
15-1*	Evaluate the differential settlements in accordance with provisions of ACI 318-71 for Seismic Category I structures founded partially upon natural soil and partially upon fill material	15-1	0	CE		791231	2	Superseded by Items 26-1 and 26-2. See Item 14-6
17-2	If future profiles show any extreme conditions, analyze the piping system and make necessary repairs	17-3	0	CE		790901	2	Superseded by Item 17-5
19-2	Take additional gap measurements between embedded sleeves and pipes when surcharge is removed. Coordinate this information with the profile data	19-2	0	CE			2	Closed by Rev 5
23-35*	Control Document SF/PSP G-3.2. Control of Nonconforming Items, is being revised to improve the definition of implementing requirements for identifying repetitive non-conforming conditions.	23-33	5	QC		800815	2	See Item 1-24. PSP G-3.2 Rev. 6 issued 6/10/80
23-44*	FSAR sections are being rereviewed as discussed in the Response to Question 23, Part 2.	23-7, 23-11	4	PE		800931	2	See Item 1-2
23-45*	U.S. Testing will be required to demonstrate to the cognizant engineering representative that testing procedures, equipment, and personnel used for quality verification testing (for other than NDE and soils) were, and are, capable of providing accurate test results in accordance with the requirements of applicable design documents.	I-18, 23-27, 23-31	5	CE		801001	2	Report submitted to QA
23-46*	A sampling of U.S. Testing's test reports (for other than NDE and soils) will be reviewed by the cognizant engineering representative to ascertain that results evidence conformance to testing requirements and design document limits.	23-28, 23-31	5	CE		801001	2	Report submitted to QA

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-48*	CPCo will implement overinspection for soils placement, utilizing a specific overinspection plan.	I-11, I-16	4	CPCo-QA		NA	2	(1) Ongoing activity
23-49*	CPCo will perform overinspection of the U.S. Testing soils testing activities and reports, utilizing a specific overinspection plan.	I-17	4	CPCo-QA		NA	2	(1) Ongoing activity
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.	I-19	4	CPCo-QA, CPCo-PMO		NA	2	(1) Ongoing activity
23-51*	In 1978, CPCo implemented an overinspection plan to independently verify the adequacy of construction and the Bechtel inspection process, with the exception of civil activities. Reinforcing steel and embeds were covered in the overinspection.	I-19	4	CPCo-QA		NA	2	(1) Ongoing activity
23-52*	CPCo reviews onsite subcontractor QA manuals and covers their work in the audit process.	I-19	4	CPCo-QA		NA	2	(1) Ongoing activity
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."	I-19	4	QC		NA	2	See Item 23-19A
25-1	Revise seismic analysis for diesel generator building using the soil properties determined by the recent investigation and any foundation modifications	25-3	5	CE			2	Tracked by Item 13-6
25-2	Revise seismic analysis for auxiliary building using the soil properties determined by the recent investigation and any foundation modifications	25-3	5	CE			2	Tracked by Item 13-16

(1) Bechtel verification of this item is not required.

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(F) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

<u>Item</u>	<u>Description</u>	<u>Page</u>	<u>Rev</u>	<u>Resp Org</u>	<u>Responsible Engineer</u>	<u>Due Date</u>	<u>Status</u>	<u>Status Remarks</u>
26-2	Incorporate in the Midland project standard design criteria the effect of differential settlement of structures which are founded partially or totally on fill	26-1	5	CE			2	Tracked by Item 15-2
27-1	Prohibit final piping connection to the diesel generator building before 12/31/81	Fig 27-9	5	PD	R. Tulloch	800731	2	
31-1	Perform full-scale load test by filling the BWST with water	31-2	5	GT CE		801130	2	Tracked by Item 4-8

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
1-1*	Perform a final review and update of PSAR commitment list	1-3	1	LS		800101	1	
1-2*	Review sections of the FSAR determined to be inactive	1-4	1	LS		800101	1	Superseded by Item 23-44
1-3*	Review EDP 4.22	1-4	0	QE		790629	1	
1-4	Audit action items 1-3	1-4	0	QA		801101	1	Superseded by Item 23-44A
1-6*	Complete review of the Dames and Moore report	1-6		GT		790629	1	
1-7*	Complete review of pertinent portions of PSAR Sections 2.5 and 3.8	1-6		GT,CE		790629	1	
1-8	Correct settlement calculations	1-6		GT		791101	1	
1-9	Schedule audits of the geotech sections on a 6-month basis	1-7		QA		790504	1	
1-10*	Review drawings for possible effect of vertical duct bank restrictions	1-7		CE		790106	1	
1-11*	Complete actions in response to DRVCL audit	1-7/8		QE		790518	1	
1-12*	Revise EDP 4-49 to incorporate clarifications and instructions for use of SCN	1-8		QE		790504	1	See Item 23-4
1-13	Schedule audits of each design discipline calculations on a yearly basis	1-8/9		QA		790504	1	
1-14	Reevaluate construction equipment used for compaction	1-11		FE		791204	1	See Item 23-20
1-15	Assign field soils engineer and soils engineer from design section	1-11		FE		790501	1	
1-16*	Review construction specifications and procedures to identify equipment requiring qualification	1-11		FE		790529	1	See Item 23-8
1-17*	Review field procedure #PG-3.00 to ensure clarity and completeness	1-11		FE		790531	1	See Item 23-7A

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
1-18	Revise PQCI C-1.02 to provide inspection rather than surveillance and to record inspections	I-16		QC		800801	1	
1-20*	Perform in-depth audit of U.S. Testing	I-18		QA		790531	1	See Item 23-15
1-21*	Review all active QCIs for surveillance callouts	I-18		QC		790629	1	See Item 23-19
1-22*	Evaluate documentation (review) callouts on QCIs	I-18	1	QC		790629	1	Superseded by Item 23-19
1-24*	Complete in-depth review of the Bechtel trend program	I-22		QA		790601	1	See Items 23-18, 23-35, and 23-36
1-25*	Conduct QA training	I-22		QA		790601	1	Superseded by Items 23-16 and 23-17
3-1*	Clarify the Response to Question 362.12 in PSAR Revision 18	3-1	0	LS		790531	1	
4-1*	Provide criteria for permissible residual settlement	4-1	3	GT CE		791231	1	
4-2*	Provide details of treatment of loose sands	4-2	0	GT CE		790831	1	
4-3	Take dynamic modular measurements upon removal of preloads for diesel generator building and other buildings	4-3	3	GT		791031	1	
4-4	Use data of Item 4-3 to evaluate the seismic response of the structures	4-3	3	CE		791130	1	Partial Requirement of Items 13-6, 13-11, 13-16
4-5	Prepare additional response to NRC for Items 4-1 and 4-2	NA		CE		790831	1	
4-9	Fill the diesel fuel oil tank with water to perform a full-scale test of the foundation soil	4-2	0	GT			1	See Item 5-4
5-1	Monitor the settlement of the structures (which were subjected to preload) during the life of the plant to provide a record of performance	5-1	0	GT			1	Ongoing activity, requirements in Dwg C-994, Spec C-76

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
6-1	Construct and fill the borated water tank to make a full-scale test of the foundation soils	6-1	0	GT CE			1	Tracked by Item 4-8
6-2	Delay the piping connections to the BWST until most of the settlement has taken place under the test load	6-1	0				1	
6-3	Use settlement data from BWST to allow conservative piping connection design		0	NA			1	Tracked by Item 4-8
6-4	Evaluate the load test result of the diesel fuel oil tank and provide precise corrective measures if required	6-2	0	GT			1	See Item 4-9
6-7	Remove all unsuitable material in the tank farm area and replace with suitable compacted fill	6-1	3	GT			1	Tracked by Item 4-7
6-8	Monitor the non-Seismic Category I condensate storage tanks	6-2	3	GT			1	Tracked by Item 4-6
7-1*	Perform continuity check on duct banks after completion of preload program	7-3	3	FE		791130	1	
8-1	Establish a requirement to realign diesel generators if manufacturer's tolerance for pitch and roll are exceeded	8-2	0	CE		800304	1	Requirement shown in Dwg C-1011, Note 4
8-2	Monitor the diesel generator pedestal markers on a 60-day cycle throughout the construction phase.	8-2	0	CE		NA	1	Ongoing activity. Requirements in Dwg C-994 and Spec C-76. Included in Item 5-1
12-1	Complete one additional boring in the middle of diesel fuel oil tank area	12-1	0	GT		790423	1	
12-2	Complete three additional borings in the auxiliary building control tower area	12-1	0	GT		790531	1	
12-3	Complete Table 12-1 for soils investigation and planned remedial measures; respond to NRC	Tbl 12-1	1	CE		790531	1	
12-4	Provide supporting soil condition for Seismic Category I utilities	Tbl 12-1	0	CE		790531	1	

MIDLAND UNITS 1 AND 2

MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART 1: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
12-6	Provide a detailed description of planned corrective actions in Interim Report 6 of MCAR 24	Tbl 12-1	1	CE		790630	1	
12-7	Perform a continuity check on one conduit in each duct bank made with a hard-fiber rabbit prior to cable pulling	Tbl 12-1 Pg 4	1	FE		800630	1	See Item 7-1. Ongoing activity. See field procedure FIE 4.500
12-8	Measure the gaps between embedded sleeves and pipes entering the service water valve pits when the surcharge is removed	Tbl 12-1 Pg 5	3	CE			1	
13-1	Complete seismic reanalysis of diesel generator building to account for current lack of compaction	13-1	0	CE		791031	1	Superseded by Items 13-6 and 13-7
13-2	Review diesel generator building design and Seismic Category I equipment piping, and electrical systems to the enveloped seismic responses	13-		CE		791231	1	Superseded by Items 13-8 through 13-10
13-3A	Conduct a seismic reanalysis to account for revised soil structure interaction of service water pump structure	13-2	0	CE		791231	1	Superseded by Items 13-11 through 13-15
13-3B	Review structural design and Seismic Category I equipment, piping, and electrical systems and incorporate the seismic responses of the reanalysis for the service water pump structure	13-2	0	CE		791231	1	Superseded by Items 13-11 through 13-15
13-4A	If significant change of foundation properties of the auxiliary building result, conduct a seismic reanalysis;			CE		791231	1	Superseded by Items 13-16 through 13-20
13-4B	Review structural design and Seismic Category I equipment, piping, and electrical systems and incorporate the seismic response of the reanalysis for the auxiliary building			CE		791231	1	Superseded by Items 13-16 through 13-20

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
13-5	Underground utilities - Investigate the change in differential displacement separately for buildings founded on fill pending results of seismic reanalysis					791231	1	Superseded by Item 13-21
14-1	Review the estimated settlement upon completion of the load test program of the BWST	14-1	5	GT		810131	1	Tracked by Item 4-8
14-2	Analyze flexible buildings for differential settlement based on stiffness at the time of distortion. Evaluate forces due to arching or distortion according to Question 15	14-2	0	CE			1	Superseded by Item 26-1. See Item 14-6
14-3*	Map significant cracks in auxiliary building, feedwater isolation valve pits, and ring foundation for the BWSTs	14-3	0	CE		790630	1	
14-4*	Analyze buildings affected by differential settlement for observed differential settlement plus predicted differential settlement	14-4	0	CE		790831	1	Superseded by Item 26-1. See Items 14-2 and 14-6
14-5	Prepare additional response to the NRC	14-		CE		790831	1	
14-6*	Analyze the diesel generator building for variable foundation properties by finite element model	14-2	3	CE		791231	1	
16-1*	Perform soil borings in areas of buried pipes	16-1	0	GT		790831	1	Deleted in Rev 5. Requirement to perform borings is in Dwg C-1146
17-1*	Evaluate impact of the failure of buried non-Seismic Category I piping on safety-related structures, foundations, and equipment	17-1	0	CE		790629	1	Deleted in Rev 2. Evaluation was not requested by NRC.
17-3	Prepare additional response to the NRC					790629	1	

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
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>Verification that those portions of consultant reports determined to be commitments and incorporated into the FSAR have been adequately reflected in project design documents is being accomplished via the FSAR rereview program described in the response to Question 23, Part 2.</p> <p>The two Bechtel QA audit findings reported in our April 24, 1979, response (Paragraph D.1, Page I-8) have been closed.</p>	I-8, 23-7	4	PE		790518	1	
23-2*	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.	23-8, 23-24	4	PE		790312	1	
23-3*	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."	I-8, 23-9, 23-24	4	PE			1	

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

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23-4 ^b	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.	23-5, 23-9	4	PE			1	
	<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>							
(21)	Review and acceptance criteria for the specifications will be defined by March 14, 1980.							
(47)	The review of construction and selected procurement specifications is scheduled to be completed by October 1980.							

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
	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.							
23-5*	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 will be initiated by the revision of or addition to the engineering department procedures. This action is scheduled to be completed by January 31, 1980.	23-11	5			800131	1	
23-6*	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.	23-13	4	GT		790312	1	
23-7*	Field Instruction FIC 1.100, Q-listed Soils Placement Job Responsibilities Matrix, has been prepared and establishes responsibilities for performing soils placement and compaction.	I-11, 23-18, 23-20, 23-30		FE			1	
23-7A*	Review Field Procedure FPG 3.000 to ensure clarity and completeness	I-11		FE			1	See Item 1-17
23-8*	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.	I-11, 23-18	5	FE			1	See Item 1-16
23-9*	A dimensional tolerance study was completed using the reactor building spray pump and ancillary system as the study mechanism.	I-8	4	PE			1	
23-10*	Engineering reviewed specifications not previously reviewed for the specificity or tolerance studies.	I-8					1	See Item 1-5

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

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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.	I-8					1	
23-12*	Quality assurance will schedule yearly audits of the design calculational process for techniques and actual analysis in each of the design disciplines.	I-8					1	
23-13*	Audits of ITT Grinnell hanger design and CPCo relay setting calculation have been conducted.	I-8		QA			1	See Item 1-13
23-14*	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.	I-7					1	
23-15*	An in-depth audit of U.S. Testing operations, covering testing and implementation of its QA program, will be conducted in late April or early May 1979, by Bechtel project QA and engineering.	I-18		QA			1	See Item 1-20
23-16*	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.	I-22	4	QA		791130	1	See Items 1-25 and 23-17
23-17*	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 discuss auditing and monitoring techniques to increase audit effectiveness.	I-22	4	QA		800229	1	See Item 1-25 and 23-16

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-18*	An in-depth review of the Bechtel trend program data will be undertaken by Bechtel QA management to assure the identification of any other similar areas that were not analyzed in sufficient depth in the past reviews.	I-22	4	QA			1	See Item 1-24
23-19*	Quality control instructions will be evaluated to ensure that the documentation characteristics which are to be inspected (i.e., surveillance and review callouts) are clearly specified.	I-18	4	QC			1	See Items 1-21 and 1-22
23-21*	See Item 23-4		5	FE		800314	1	
23-22*	Guidelines for surveillance of testing operations will be developed and included in field instructions for the onsite soils engineer. Engineering/geotechnical services will develop the guidelines by November 30, 1979.	23-27	5	GT		791130	1	
23-23*	Engineering will revise Engineering Department Procedure 4.22 by December 1, 1979, 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 text (third paragraph, Page v). Such a requirement would preclude repetition of this circumstance.	23-7, 23-46	5	PE		791130	1	
23-24*	To preclude any future inconsistencies between the FSAR and specifications, Engineering Department Project Instruction 4.1.1 will be revised to state that all specification changes, rather than just "major changes," will be reviewed for consistency with the FSAR.	23-11	5	PE		791130	1	

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PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

Item	Description	Page	Rev	Resp Org	Responsible Engineer	Due Date	Status	Status Remarks
23-26*	In view of Item 6, geotechnical services will revise Procedure FP-6437 by December 31, 1979, to require that calculations be annotated to reflect current design status.	23-13	5	GT		800328	1	
23-27*	Engineering Department Procedure 4.37 will also be revised by December 31, 1979, to require that calculations be annotated to reflect current design status.	23-13	5	QA		800227	1	
23-29*	The civil standard detail drawings will be revised to include a detail showing horizontal and vertical clearance requirements for duct bank penetrations. The detail will address any mud mat restrictions.	23-15	5	CE		791231	1	Shown in Dwg C-141
23-32*	Guidelines for surveillance of testing operations will be developed and included in field instructions for the onsite soils engineer. Engineering/geotechnical services will develop the guidelines by November 30, 1979, and field engineering will prepare the instructions by February 29, 1980.	23-27	5	FE		800229	1	
23-36*	Control Document QADP C-101, Project Quality Assurance Trend Analysis, is being revised to improve the definition of implementing requirements for identifying repetitive nonconforming conditions.	23-33	5	QA		800124	1	See Item 1-24
23-38*	A study was completed by October 31, 1979, to examine current procedures and practices for the preparation and control of the FSAR in view of these experiences. Procedural changes will be initiated by the revision of or addition to the engineering department procedures.	23-11	5	LS		791130	1	

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART I: COMMITMENTS FROM QUESTIONS 1 to 35 (Continued)

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2-0	No Action Item						-	
9-0	No Action Item	NA					-	
10-0	No Action Item	NA					-	
11-0	No Action Item	NA					-	
21-0	No Action Item						-	
22-0	No Action Item						-	
28-0	No Action Item						-	
29-0	No Action Item						-	
30-0	No Action Item						-	
32-0	No Action Item						-	
34-0	No Action Item						-	
35-0	No Action Item						-	

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART II: COMMITMENTS FROM SUPPLEMENTARY QUESTIONS

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S-6	Continue involvement of CPCo/Bechtel consultants for reviewing remedial actions	B					5	
S-7	Monitor service water pump structure and pile displacement during jacking operation to verify pile dynamic stiffness used in seismic analysis	B		GT CE	B. McConnel		5	

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART II: COMMITMENTS FROM SUPPLEMENTARY QUESTIONS

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S-1	Advise Bechtel to commence dewatering and underpinning activities	A		CPCo			4	After favorable SER
S-2	Develop settlement time rate criteria for all Seismic Category I structures	A		GT		810331	4	
S-3	Monitor concrete cracks for service water B pump structure and auxiliary building electrical penetration areas and the feedwater isolation valve pits before and after installation of piles and caissons	B		CE		801031	4	Due date is for incorporating requirement into drawing

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MASTER LIST OF COMMITMENTS TO NRC ON 10 CFR 50.54(f) RESPONSES (Continued)

PART II: COMMITMENTS FROM SUPPLEMENTARY QUESTIONS

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S-4	Monitor concrete cracks in the BWST valve pits and repair any observed crack exceeding the ACI code limits	B		CE		800630	2	Due date is for incorporating requirement into drawing. Dwg C-1148 has been issued.
S-5	Grout the local gaps between diesel generator building footing and mud mat	B		CE		800407	2	Grouting requirement in Dwg C-1147
S-8	Envelope pile stiffness for the seismic analysis of service water pump structure	B		CE	B. McConnel		2	Completed seismic model. See Item 13-11.
S-9	Check the limited clearance between the service water pipe at the building penetration	B		PD CE	R. Tulloch	800731	2	See Response to Question 45

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