WRBird	Power Company	DA: October 5-7, 1977
SHHowell	QUALITY ASSURANCE PROGRAM	PLANT: Midland UNIT 1 &
JMKlacking		SUBJECT OF AUDIT: Soil Placement Records
BWMarguglio		
JFNewgen		
GLRichardson		
QA SUBJ FILE	REPORT NO F-77-32	

RECEIVED NOV 04 1977 BECHTEL POWER CORP. JOB 7220 PER

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SECY		
FILE NO		

I. AUDIT SCOPE

The purpose of this record review audit is to verify the documentation associated with the placement of Structural Backfill, North Plant Dike, West Plant Dike, and Plant Area Fill conforms to the specifications and to expedite dike turnover.

II. AUDITORS

***D. A. Blumenthal, CPCo QAE (IE&TV) - Team Member
**D. E. Horn, CPCo QAE Civil Supervisor - Team Leader

III. PERSONNEL CONTACTED

**Ben Cheek, Bechtel Lead Civil Quality Control Engineer
*Keith Berk, Bechtel QCE (QC Vault)
*Pat Guiette, Bechtel QCE (QC Vault)
*Mary Kerridge, Bechtel QC Documentation Clerk
*Jim Miller, Bechtel QC Documentation Lead
*Tom Lieb, Bechtel QCE (Civil)
****Daryl Osborn, Bechtel Assistant Lead Civil QCE
*John Speltz, U.S. Testing Lab Chief

IV. SUMMARY OF AUDIT

A. A Pre-Audit Conference was held on August 31, 1977 in Ben Cheek's office with those in attendance as noted in Sections II and III above. The audit scope was the only item discussed. The audit scope originally was to observe soil placement, however, due to heavy rains and no soil placement in "Q" areas, the audit scope was changed to that given in Section I.

B. The audit was performed on soil reports North Plant Dike MD 72 (5-23-74) through MD 514 (9-21-74), West Plant Dike MD 25 (9-12-74) through MD 307 (9-27-76), Structural Backfill MDR 611 (10-7-76) through MDR 1121 (8-11-77), Plant Area Fill MD 1122 (10-7-76) through MD 1854 (8-12-77) and gradation reports for structural backfill material received February 4, 1977 through August 31, 1977 to assure failing tests have been cleared by passing tests; correct optimum moisture contents, maximum and minimum dry lab densities have been used; the test results were properly evaluated for acceptance; and test reports could be located in the Quality Control Documentation Vault using the attached checklist.

C. The findings associated with this audit are noted in Section V.

*Contacted during Audit
**Attended Pre-Audit Conference and Post-Audit Conference
***Attended Post-Audit Conference
****Contacted during Audit and attended Post-Audit Conference

SB125563

BY Donald E. Horn DATE 11-4-77
Donald A. Blumenthal 11/4/77

AUDIT REPORT NO F-77-32

IV. SUMMARY OF AUDIT (Contd)

D. Future audits will be run the same, when scheduled.

E. A Post-Audit Conference was held on October 11, 1977 in Ben Cheek's office with those in attendance as noted in Sections II and III above. The audit findings were presented to those in attendance by D. A. Blumenthal and D. E. Horn. Bechtel QC understood and agreed with the findings and recommended corrective action.

V. CLOSED OUT FINDINGS

Finding 1

West Plant Dike

MD-276 and 277 (sampled 9-15-76), 278 (sampled 9-16-76), and 285 (sampled 9-17-76) have NA in the optimum moisture content column.

North Plant Dike

MD-92 (sampled 5-25-74) shows maximum dry lab density 110.6. It should have been 103.4.

MD-93 (sampled 5-25-74) shows maximum dry lab desnity 110.6. It should have been 103.4.

MD-109 (sampled 5-28-74) shows maximum dry lab density 103.4. It should have been 115.1.

MD-119 (sampled 5-28-74) shows maximum dry lab density 127.2. It should have been 128.0.

MD-155 (sampled 6-4-74) shows optimum moisture content 18.8. It should have been 18.4.

MD-195 (sampled 6-24-74) shows optimum moisture content 11.0. It should have been 11.6.

MD-223 (sampled 6-25-74) shows optimum moisture content 10.3. It should have been 11.6.

MD-224 (sampled 6-25-74) shows optimum moisture content 13.5. It should have been 13.0.

MD-257 (sampled 7-11-74) shows optimum moisture content 9.8. It should have been 10.4. This also shows maximum dry lab density 126.8. It should have been 127.4.

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AUDIT REPORT NO F-77-32

V. CLOSED OUT FINDINGS

Finding 1

North Plant Dike (Contd)

MD-269 (sampled 7-12-74) shows maximum dry lab density 116.2. It should have been 116.3.

MD-290 (sampled 7-16-74) shows maximum dry lab density 125.2. It should have been 128.3.

MD-318 (sampled 7-19-74) shows optimum moisture content 13.0. It should have been 13.3.

MD-336 (sampled 7-20-74) shows optimum moisture content 20.5. It should have been 20.0.

MD-341 (sampled 7-25-74) shows optimum moisture content 17.0. It should have been 15.5.

MD-377 (sampled 8-6-74) shows maximum lab dry density 109. It should have been 112.9.

MD-476 (sampled 8-19-74) shows optimum moisture content 17.0. It should have been 17.1.

MD-512 (sampled 8-28-74) shows maximum lab dry density 109.4. This should have been 109.0.

Structural Backfill Area

MDR-919 (sampled 5-25-77) shows maximum dry lab density of 109.3. It should have been 125.3. It also shows minimum dry lab density as 90.3. It should have been 109.3.

Plant Area Fill

MD-1262 (sampled 4-8-77) gives maximum dry lab density of 117.0. It should have been 117.1.

MD-1300 (sampled 5-2-77) gives optimum moisture content of 11.1. It should have been 10.4.

MD-1385 (sampled 6-2-77) gives optimum moisture content of 13.5. It should have been 13.4.

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AUDIT REPORT NO F-77-32

V. CLOSED OUT FINDINGS

Finding 1

Plant Area Fill (Contd)

MD-1420 (sampled 6-8-77) gives optimum moisture content of 9.8. It should have been 8.6. It also gives maximum dry lab density of 127.3. It should have been 132.9.

MD-1521 (sampled 6-17-77) gives maximum dry lab density of 117.0. It should have been 117.1.

Corrective Action Requested: Recalculate the test results using the proper values and determine the acceptability of the corrected test results.

Corrective Action Taken: The test results were recalculated and corrections made. The above errors did not change the acceptance of these tests even though they did change the test results.

Corrective action verified October 25-26, 1977.

For further corrective action see Section VI "Open Findings" Finding 1.

Finding 2

Specification C-210, Revision 5 Section 12.6.1 states in part, "The water content during compaction shall not be more than 2 percentage points below optimum moisture content and shall not be more than 2 percentage points above optimum moisture content...."

Specification C-210, Revision 5 Section 13.7.1 states, "All cohesive backfill in the plant area and the berm shall be compacted to not less than 95 percent of maximum density as determined by ASTM D 1557, Method D".

Specification C-210, Revision 5 Section 13.7.2 states in part, "All cohesionless backfill in the plant area and the berm shall be compacted to not less than 80 percent of relative density as determined by ASTM D 2049..."

Contrary to these requirements, the following tests had failing results and did not indicate being cleared by passing tests.

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AUDIT REPORT NO F-77-32

V. CLOSED OUT FINDINGS

Finding 2 (Contd)

Plant Area Fill

Test No.	Date Sampled	Compaction	Moisture Actual	Moisture Optimum
MD 1153	10-21-76	61.6% of Relative Density		
1155	10-21-76	73.5% of Relative Density		
1191	11-03-76	74.6% of Relative Density		
1194	11-02-76	75.4% of Relative Density		
1317	5-09-77		18.0%	15.2%
1318	5-09-77		11.5%	15.2%
1319	5-09-77		11.7%	15.2%
1320	5-09-77		12.2%	15.2%
1321	5-09-77	94.0% of Maximum Density		
1337	5-17-77		12.4%	15.2%
1388	6-02-77		9.8%	15.2%
1393	6-03-77		11.1%	13.4%
1398	6-03-77		11.2%	13.4%
1404	6-03-77		10.2%	13.4%
1415	6-07-77		9.9%	13.4%
1498	6-15-77	88.2% of Maximum Density	14.5%	10.0%
1509	6-16-77		12.9%	15.2%

North Plant Dike

Test No.	Date Sampled	Compaction	Moisture Actual	Moisture Optimum
MD 418	8-14-74		17.2%	20.0%

Structural Backfill

Test No.	Date Sampled	Compaction
MDR 620	10-13-76	72.3% of Relative Density
625	10-12-76	51.5% of Relative Density
629	10-20-76	79.2% of Relative Density
632	10-20-76	73.5% of Relative Density
637	10-21-76	76.3% of Relative Density
663	11-11-76	53.0% of Relative Density
664	11-11-76	72.3% of Relative Density
667	11-11-76	67.5% of Relative Density
673	11-23-76	33.9% of Relative Density
679	11-23-76	71.8% of Relative Density
680	11-23-76	60.0% of Relative Density
682	11-24-76	70.6% of Relative Density
683	11-24-76	77.1% of Relative Density
700	1-13-77	75.0% of Relative Density
701	1-13-77	68.1% of Relative Density
721	3-14-77	60.0% of Relative Density

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AUDIT REPORT NO F-77-32

V. CLOSED OUT FINDINGS

Finding 2

Structural Backfill (Contd)

Test No.	Date Sampled	Compaction	Moisture Actual	Moisture Optimum
MDR 734	3-17-77	34.0% of Relative Density		
736	3-18-77	79.0% of Relative Density		
737	3-18-77	41.9% of Relative Density		
738	3-18-77	72.4% of Relative Density		
739	3-18-77	70.6% of Relative Density		
740	3-18-77	69.3% of Relative Density		
741	3-21-77	77.8% of Relative Density		
744	3-21-77	56.2% of Relative Density		
746	3-21-77	54.9% of Relative Density		
757	3-23-77	68.7% of Relative Density		
767	3-29-77	54.3% of Relative Density		
768	3-30-77	66.9% of Relative Density		
770	3-30-77	65.0% of Relative Density		
785	4-07-77	69.3% of Relative Density		
799	4-12-77	78.8% of Relative Density		
826	4-19-77	70.4% of Relative Density		
843	4-28-77	66.8% of Relative Density		
845	4-29-77	70.4% of Relative Density		
854	5-09-77	67.4% of Relative Density		
861	5-10-77	76.3% of Relative Density		
862	5-10-77	74.0% of Relative Density		
889	5-13-77	56.5% of Relative Density		
914	5-24-77		9.0%	11.8%
922	5-26-77	75.7% of Relative Density		
925	5-27-77		11.4%	15.2%
938	6-08-77	56.5% of Relative Density		
940	6-08-77	78.6% of Relative Density		
993	6-25-77	60.2% of Relative Density		
998	6-25-77	77.4% of Relative Density		

Corrective Action Requested: Determine if there are passing tests in the same area to clear these failing tests.

Corrective Action Taken: Test reports Plant Area Fill MD 1317-1320; North Plant Dike MD 418; and Structural Backfill MDR 620, 629, 632, 637, 673, 679, 700, 701, 757, 767, 768 and 770 have been cleared by passing tests and Structural Backfill represented by MDR 854, 861 and 862 was removed.

Corrective Action Verified October 26, 1977.

SB125568

V. CLOSED OUT FINDINGS

Finding 2 (Contd)

Corrective Action Taken: Test reports Plant Area Fill MD 1153, 1155, 1191, 1194, 1321, 1337, 1388, 1393, 1398, 1404, 1415, 1498, 1509 and Structural Backfill MDR 625, 663, 664, 667, 680, 682, 688, 721, 734, 736-741, 744, 746, 757, 768, 770, 785, 799, 826, 843, 845, 889, 914, 922, 925, 938, 940, 993 and 998 are in a "Non-Q" area and have been given to CPCo Project Management Organization (Field) for resolution in letter 186FQA77.

For further corrective action see Section VI "Open Findings" Finding 2.

Finding 3

Relative Density Reports 59 and 61 were missing from the QC Vault.

Corrective Action Requested: Obtain copies of these reports and place them in the QC Vault.

Corrective Action Taken: Copies have been obtained and placed in the QC Document Vault.

Corrective action verified October 26, 1977.

VI. OPEN FINDINGS

Finding 1

Specification C-210, Revision 5 Section 12.6.1 states in part, "The water content during compaction shall not be more than 2 percentage points below optimum moisture content and shall not be more than 2 percentage points above moisture content..."

Specification C-210, Revision 5 Section 13.7.1 states, "All cohesive backfill in the plant area and the berm shall be compacted to not less than 95 percent of maximum density as determined by ASTM D 1557, Method D".

Specification C-210, Revision 5 Section 13.7.2 states in part, "All cohesionless backfill in the plant area and the berm shall be compacted to not less than 80 percent of relative density as determined by ASTM D 2049..."

Contrary to these requirements, the following tests had been passed using incorrect testing data. Using the correct testing data, the tests fail.

SB125569

AUDIT REPORT NO F-77-32

VI. OPEN FINDINGS

Finding 1 (Contd)

North Plant Dike

MD 290 (sampled 7-16-74) shows optimum moisture content 11.6. It should be 9.5. Using the correct optimum moisture content of 9.5%, the actual moisture content is 2.2% above optimum moisture content.

MD 360 (sampled 7-31-74) shows optimum moisture content as 21.4. It should be 15.2. This also shows maximum lab dry density as 103.2. It should be 115.1. Using the correct optimum moisture content of 15.2%, the actual moisture content is 5.4% above optimum moisture content. Also using the correct maximum lab dry density of 115.1, the correct percent of maximum density is 86.4%.

MD 377 (sampled 8-6-74) shows optimum moisture content as 18.0. It should be 15.2. Using the correct optimum moisture content of 15.2%, the actual moisture content is 4.5% above optimum moisture content.

Structural Backfill

MDR 621 (sampled 10-14-76) shows minimum dry lab density as 94.2. It should be 112.2. Using the correct minimum dry lab density of 112.2, the correct percent of relative density is 41.5.

Corrective Action Requested:

(1) Determine if there are passing tests in the same area to clear these failing tests.

(2) If these failing tests cannot be cleared by passing tests in the same area, present these findings to Bechtel Project Engineering so Project Engineering can determine what additional tests, reviews, etc. are needed to justify the material these tests represent. Have Project Engineering justify the material these failing tests represent.

(3) Determine the underlying cause(s) and take corrective action to preclude repetition.

Corrective Action Taken:

(1) North Plant Dike MD 290 and MD 377 have been identified on Bechtel NCR 1005. North Plant Dike MD 360 and Structural Backfill MDR 621 density problems have been identified on Bechtel NCR 1004.

Corrective action verified October 26, 1977.

North Plant Dike MD 360 moisture problem has been identified on revised NCR 1005.

Corrective action verified October 28, 1977.

SB125570

AUDIT REPORT NO F-77-32

VI. OPEN FINDINGS

Finding 1 (Contd)

NCR QF-199 has been written to resolve the corrective action still open.

Finding 2

Specification C-210, Revision 5 Section 12.6.1 states in part, "The water content during compaction shall not be more than 2 percentage points below optimum moisture content and shall not be more than 2 percentage points above optimum moisture content..."

Specification C-210, Revision 5 Section 13.7.1 states, "All cohesive backfill in the plant area and the berm shall be compacted to not less than 95 percent of maximum density as determined by ASTM D 1557, Method D".

Specification C-210, Revision 5 Section 13.7.2 states in part, "All cohesionless backfill in the plant area and the berm shall be compacted to not less than 80 percent of relative density as determined by ASTM D 2049".

Contrary to these requirements, the following tests had failing results and did not indicate being cleared by passing tests or had been marked passing.

North Plant Dike

MD 142 (sampled 5-30-74) shows optimum moisture content 8.0, moisture content 10.3. This test failed but it is shown as passing.

MD 143 (sampled 5-30-74) shows optimum moisture content 13.8, moisture content 11.4. This failed but it is shown as passing.

West Plant Dike

MD 227 (sampled 10-6-75) failed moisture but has not been cleared.

Plant Area Fill

Test No.	Date Sampled	Compaction	Moisture Actual	Moisture Optimum
MD 1311	5-03-77	61.6% of Relative Density		
1326	5-10-77		18.5%	15.2%
1328	5-10-77		12.2%	15.2%
1412	6-07-77		10.4%	15.2%

SB125571

AUDIT REPORT NO F-77-32

VI. OPEN FINDINGS

Finding 2 (Contd)

Structural Backfill

Test No.	Date Sampled	Compaction	Moisture Actual	Moisture Optimum
MDR 621	10-14-76	78.0% of Relative Density		
671	11-12-76	74.8% of Relative Density		
672	11-23-76	75.4% of Relative Density		
685	11-24-76	56.2% of Relative Density		
686	11-24-76	70.9% of Relative Density		
691	11-24-76	62.0% of Relative Density		

Corrective Action Requested:

(1) Determine if there are passing tests in the same area to clear these failing tests.

(2) If these failing tests cannot be cleared by passing tests in the same area, present these findings to Bechtel Project Engineering so Project Engineering can determine what additional tests, reviews, etc. are needed to justify the material these tests represent. Have Project Engineering justify the material these failing tests represent.

(3) Determine the underlying cause(s) and take corrective action to preclude repetition.

Corrective Action Taken:

(1) Bechtel QC has determined that none of the above have passing tests in the same area to clear the failing tests.

(2) North Plant Dike MD 142 and MD 143, West Plant Dike MD 227 and Plant Area Fill MD 1326, 1328 and 1412 have been identified on Bechtel NCR 1005. Structural Backfill MDR 621, 671, 672, 685, and 686 have been identified on Bechtel NCR 1004.

(3) Corrective action has been taken as of the last of July, 1977 by Bechtel QC and U.S. Testing to more adequately clear failing tests. Therefore, the corrective action to preclude repetition for not clearing failing tests need not be addressed.

Corrective action verified October 26, 1977

Plant Area Fill MD 1311 has been identified on revised NCR 1004.

Corrective action verified November 1, 1977.

SB125572

NCR QF-199 has been written to resolve the corrective action still open.

AUDIT REPORT NO F-77-32

VI. OPEN FINDINGS (Contd)

Finding 3

Specification C-211 Revision 3 Section 5.6.2 states in part, "Material delivered to the jobsite for use as structural backfill shall be visually inspected, and tested in accordance with ASTM C-136..."

ASTM C136-71 Section 4.2 states in part, "In no case, however, shall the fraction retained on any sieve at the completion of the sieving operation weigh more than 4g/in.^{2} of sieving surface.

Note 2 - This amounts to 200g for the usual 8 in. (203-mm) diameter sieve".

To preclude repetition to NCR QF-152 (the same deficiency as this), U.S. Testing developed a new gradation form that has check points that include documenting that the 200 gram material limit on any individual 8 inch sieve has not been exceeded. In addition, a training session was held on February 21, 1977.

Project Quality Control Instruction No. SC-1.05 "Material Testing Services and Concrete Production" Rev. 3 Section 2.7.2 Reports, Item A states, "Perform a daily review of the subcontractor's jobsite inspection and test reports for acceptability, completeness, and the laboratory chief's signature for concrete, steel, and soils. Sign and date on the report verifying the acceptab status".

Contrary to these requirements:

Structural Backfill Log Number	Date Sampled	Amount Retained
G- 270	1-13-77	#40 Sieve - 225.2g
0364	4-27-77	#10 Sieve - 217.1g
0417	5-11-77	#10 Sieve - 221.4g
0431	5-16-77	#10 Sieve - 260.1g
0451	5-18-77	#10 Sieve - 211.7g
0505	6-02-77	#200 Sieve - 228.0g
0704	7-18-77	#10 Sieve - 249.5g

Corrective Action Requested:

(1) Present these findings to Bechtel Project Engineering and obtain engineering rationale from Bechtel Project Engineering as to the acceptability of the material these tests represent.

(2) Evidently the corrective action taken in NCR QF-152 was not adequate. Determine the underlying cause(s) and take further corrective action to preclude repetition.

SB125573

AUDIT REPORT NO F-77-32

VI. OPEN FINDINGS

Finding 3 (Contd)

Corrective Action Taken:

(1) These findings have been identified on Bechtel NCR 1006.

Corrective action verified October 26, 1977.

NCR QF-195 has been written to resolve the corrective action still open.

VII. NONCONFORMANCE REPORTS

QF-195
QF-199

FINDING #1 3-11
3-9

FINDING #2 3-15 (FAILING TESTS
NOT REWORKED)

FINDING #3 27V -3

SB125575

JOHN MILLARDIN

March 7, 1978

To: B. Marguglio

Ben - In December of 1977, you requested that I look into the quality performance of the US Testing activities for the Midland project's Soils Testing Program. I inturn asked Gary Richardson to develop information and analyses from our Quality Trend Program. The following notes reflect the analyses:

1. The Trend Program was reviewed in this area from 1975 to January 16, 1978 in the categories involving US Testing and Soils results.

2. There were a total of 176 test variances documented during the aforementioned period involving three categories. These were: Reports with moisture out of specification - 41 cases; density not as required by specification - 92 cases; and gradation techniques not performed as required - 49 cases. (Some dual classifications were involved).

3. These were further broken into the following categories:

Method of Detection	Category	Number Found Per Total
Audit & Review	No tests taken	8 out of 176
Audit	Technique Incorrect	48 out of 176
Review	Wrong Criteria	45 out of 176
Review	Missed pass or fail specification requirement	6 out of 176
Review	Retests not performed	73 out of 176

4. The review method of detection to identify 134 of the 176 items described above was performed during a 100% review of all of the records in turnover packages. A total tally was conducted and the rejection rate of the turnover packages indicated a 4.8% documentation variance rate. The majority of the discrepancies identified were for early work (prior to 1977). There was an improvement in 1977. All of the findings or variances were dispositioned as use-as-is, except for one where a nonconformance report number 1004 asked for borings to validate the quality of material.

5. Corrective actions and comments applicable to this performance:

   1. During the course of QA activity in 1977 by your and Bechtel's Quality Assurance, US Testing assigned new supervision to the laboratory.

   2. A new man was assigned from Bechtel Quality Control in November 1977, who reported directly to Barclay (PFQCE), to provide closer inspection surveillance of the activity.

   3. US Testing lab has instituted a double check procedure before submittal of reports to Bechtel. This was instituted in December of 1977.

   4. There has been no recurrence of technique failures since the training program was initiated.

   5. There has been a definite improvement in the performance.

   6. The Soils Work is essentially 85 - 90% complete.

SB 25663

I-78-490

B. Marguglio
March 7, 1978
Page 2

Our (CPCo and B) collective efforts over the last six to eight months has provided adequate assurance and control.

J. Milandin

JM/le
JM-78-38
File: 409
cc: ~~J.~~ Klacking
G. Richardson

Bechtel Power Corporation

Interoffice Memorandum

To J. Klacking

Subject Structural Backfill
Q-No. 1.004
GLR-2-77-32

File No

Date February 11, 1977

From G. L. Richardson

Of Quality Assurance

At Midland, MI Ext 207
Job 7220

Copies to

Described below is a series of problems and actions being taken involving procurement, inspection, testing and installation of structural backfill.

1. On 1-31-77 Bechtel QA identified that all structural backfill material purchased to date was purchased as "Non-Q" which is inconsistent with the "Q" list. This resulted in the material not being receipt inspected by Quality Control as is required by the "Bulk Items List" prepared by Project Engineering. (Ref. QAR SD-24)

2. Concurrent with Item 1 CPCo QA identified that structural backfill delivered to the jobsite during 12/76 and 1/77 had not in all cases been tested for gradation on a daily basis as required by Spec. 7220-C-211. (Ref. CPCo NCR QF-147) Lack of testing has been previously identified by Bechtel QA on 10/21/76 (Ref. QADR SD-6) and by CPCo QA on 10/14/74. (Ref. CPCo NCR QF-29)

3. On 2/10/77 CPCo QA, as a result of an audit, identified that in many cases the gradation tests performed on structural backfill were not performed using proper testing procedures. Specifically ASTM C-136-71 states that amounts of material retained on an individual sieves shall not exceed 200 grams. Some tests noted had as much as 360 grams retained on an individual sieve. (Ref. audit report F-77-5).

4. To assure material presently is use was acceptable Bechtel QA reviewed the test results and noted the following:

   a. Tests run on 2/4/77, 2/7/77, 2/8/77 and 2/9/77 all had weights retained in excess of 200 grams.

   b. Bechtel QC had not approved this test and the material was still in the process of receipt inspection.

   c. Bechtel Field Engineering was using this material without release by QC. NOTE: The Asst. PFQCE and PFE stopped use when notified of the discrepancy.

SB125665

d. A retest of the test run on 2/4/77 resulted in a failing gradation. NCR 700 was generated.

NOTE: QAR SD-25 has been issued to cover Item 4c.

5. Quality Control has requested U.S. Testing to review all structural backfill gradation tests run to date and to identify all those that do not comply with the technique requirements of ASTM C-136-71.

6. After completion of Item 5 Quality Control will evaluate the results and obtain necessary P.E. input to resolve the problem.

7. U.S. Testing's Project Manager will be on site 2/14/77 to investigate the cause of the testing technique problem.

In addition your attention is drawn to Bechtel NCR-578 which resulted from our QADR SD-6. This NCR has been dispositioned by Project Engineering as "Use As Is" based on satisfactory test results. It is not known at this time as to the acceptability of the test techniques used for these tests. Additional information will be provided as it becomes available.

G. L. Richardson

G. L. Richardson

GLR/sw

SB125666

QUALITY ACTION REQUEST

File.

From: (1)
G. L. Richardson Site QA Job 7220

To: J. F. Newgan/ J. P. Connolly (2)

Control Document ref.: (3) 7220-C-210

CAR Ident. No.: (4) SD-40

Action Requested: (5)

Section 13.0 of specification 7220-C-210, Rev. 4 provides the requirements for Q-listed backfill in the plant area. Section 13.6 states that the moisture contr in this area shall be in accordance with Section 12.6 of the same specification. Section 12.6 states in part: "The water content during compaction shall not be more than 2 percentage points below optimum moisture content and shall not be more than 2 percentage points above optimum moisture content ..."

"Tests done in accordance with para. 12.5 will indicate the degree of moisteni of aerating necessary to comply with para. 12.6.1. After placement of loose material on the embankment fill, the moisture content shall be further adjusted as necessary to bring such material within the moisture content limits required)O

Signature: (6) Gary L. Richardson

Date: (7) 7/22/77

Reply Requested by: (8) 1&3) 7/25/77 2) 8/19/77

Reply: (9)

1) A meeting was held on July 19, 1977 with Gene DeGeer (Canonie QA), Frank Teague (LCFE), Gary Coaster (FE), Ben Cheek (LCQCE), Tom Lee (Subcontracts) and John Speltz (UST) to discuss the coordination of obtaining moisture contents of the soil prior to placement.

Per Spec. 7220 C-210 moisture tests will be taken in the borrow areas at the start of the day and as needed to maintain the proper testing frequency.

3) A training session WAS held with the responsible QCE's addressing moisture control of the soils operation.

Signature: (10) I.AO K. Moreley

Date: (11) 8-11-77

Action Verified: (12) Joe H. Hook

Date: (13) 8-19-77

WHITE — Return to sender CANARY — Addressee's file PINK — Sender's file

CPC 20877
7100164905

SB125636

for compaction."

"Rolling of any section of embankment containing material too wet or too dry to obtain the required compaction shall be delayed until the moisture content of the material is brought to within the required limits or the material shall be removed and replaced with suitable material. . ."

Contrary to the above: The field does not take moisture control tests prior to and during placement of the backfill, but rather rely on the moisture results taken from the in-place soil density tests.

Recommended Corrective Action

1) A system for testing the soil for moisture content prior to compaction should be developed and implemented by Bechtel and the subcontractor. QC should make any necessary revisions to the QCI.

2) Recognizing that the soil has been tested for moisture content after compaction and meets the requirements of the specification it is not necessary to identify these materials as nonconforming. However Project Engineering should be apprized of the past testing methods. In addition it is recommended that engineering concur with the interpretation that moisture contents taken after compaction are for determining dry densities and should not be used for specified moisture control.

3) Assure responsible personnel are aware of the testing system.

1) Meeting was held morning July 19 with Gene [illegible], [illegible] [illegible] [illegible] of Chuck, Tom Lee, ~~[illegible]~~ & John [illegible] — conclusion of moisture tests in field —

2) Field Engineer, will contact Projt Eng

SB125637

Q.C RESPONSE

Verification of Corrective Action

Method:
X 1. Verify action of response as implemented.
X 2. Review of documentation or attachments to resolve finding.
___3. Requirement removed or finding withdrawn.
___4. Other:

Items Checked:

FOR THE WEEK OF 8-15 TO 8-19-77
I REVIEWED U.S TESTING'S RECORDS FOR DAILY
MOISTURE CONTROL ON BACKFILL. DAILY MOISTURES
WERE BEING TAKEN AS INDICATED IN SPEC C-210.
FOR DAYS IN WHICH MATERIAL WAS PLACED.

REVIEWED TRAINING HELD ON AUG 8 1977, COGNIZANT
QCE WERE IN ATTENDANCE

Closeout Documentation (list or attach) ☒ Verified ☐ Not Verified(explain)

QCFM-3900

[signature] 8-19-77
QAE Date

SB125638

Bechtel Power Corporation

Interoffice Memorandum

To G. Richardson

File No

Subject Job 7220 Midland Project
Moisture Requirements for
Backfill - QAR SD-40
0-1631

Date December 21, 1977

From J. F. Newgen

Of Construction

Copies to

At Midland, MI Ext.

References: 1) BEBC-1998
2) BEBC-1859

This memo is a complete response to the subject quality action request, which asked that Project Engineering be apprised of past testing methods used for determining moisture content of backfill.

Reference memos numbers 1 and 2 contain the Project Engineering response to our notification of past test methods.

We trust this information closes your action request.

J. F. Newgen

JFN/FGT/jae

SB125639

BECHTEL

Telephone call

ROUTE J. Hook
G. Richardson
J.P. Betts

BY J.P. Betts OF Midland

TO G. Tuveson OF A.A.O

DATE 1-6 19 77 TIME

SUBJECT BEBC-1998 dated 12-15-77 JOB NO. 7220

Gordon was phoned because of a request by Q.A. for clarification of the term "few days" as stated in the last sentence of the subject memo. The question to Gordon was that if a few days is acceptable, is one day acceptable.

Gordon's response was as follows: As stated in the memo the moisture content required is during placement and compaction and is not necessarily a measure of the soil adequacy after compaction. Therefore, if a few days ~~is~~ after compaction the soil is acceptable if the moisture content is not within 2% of optimum then it is certainly acceptable one day after compaction.

SB125640

0044 (12-67)

Bechtel Associates Professional Corporation

Inter-office Memorandum

BEBC- 1998

To	J. F. Newgen	Date	December 15, 1977
Subject	Midland Plant Units 1 & 2 Job 7220 Moisture Requirements for Backfill	From	R. L. Castleberry
		Of	Engineering
Copies to	File: 0274, C-210, C-208 S. Afifi	At	Ann Arbor

RECEIVED
DEC 15 1977
BECHTEL POWER CORP.
JOB 7220
PER

Reference: 1. BCBE-1669 dated 11/18/77

This is a complete response to Reference 1.

The moisture content of the soil should be within 2% of optimum during placement and compaction. However, this property of the soil is not necessarily a measure of its adequacy after compaction.

The primary goal is to obtain the specified dry density. In order to achieve this end, certain means are prescribed; e.g., maximum lift thickness, specified compactive effort and controlled moisture content.

Soil which has been tested a few days following compaction and found to have suitable dry density should not be rejected solely on the basis that its moisture content is not within 2% of optimum.

for J C Hirk
R. L. Castleberry

CA./sg
12/15/5

SB125641

TELECOPY

Bechtel Power Corporation

Interoffice Memorandum

To R. L. Castleberry

File No.

Subject Job 7220 Midland Project
Backfill Moisture Requirement
Spec. C-210
BCDE-1669R

Date November 18, 1977

From J. F. Newgen

Of Construction

Copies to G. Richardson
B. Cheek
G. Tuveson
J. Dean

At Midland, MI Ext.

Confirming verbal requests; please provide written clarification of the 2% tolerence on backfill moisture content during compaction. Although moisture tests are taken both during and sometimes after compaction we have been verbally informed that for Zone I material moisture tests taken within a few days after compaction which do not fall within 2% of optimum moisture shall be cause for rejection of the fill, even though proper compaction is achieved. Information moisture tests taken more than a week after Zone I fill has been properly compacted are not so limited. For Zone II materials these limits can also be extended in accordance with previous written direction.

Your response is required by 11/30/77 in order to process documentation of backfill which was not placed in accordance with the verbal information above, if necessary.

J. F. Newgen

JFN/FGT/jae

SB125642

7924-(2-74)

Telephone call

CC: S. Rao
XXXXX W. Barclay
G. Richardson
A. Boos
F. Teague
I. Lieb
J. Speltz - UST
File

BY J. G. Hook OF Site - QA

TO S. Rao OF AAO

DATE October 13, 77 TIME 11:35

SUBJECT Moisture Requirements for Backfill Ref: QAR SD-40 JOB NO: 7220

Returned S. Rao's call about the telecon dated October 10, 1977 on the same subject.

RAO: What I said on moisture requirements for backfill is not what you wrote on the telecon. The moisture requirement (± 2% of optimum) is mandatory and must be implemented at the time of placement and testing.

HOOK; OK. I will write a new telecon stating this and make distribution to the same people previously copied.

Jon G. Hook

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SECY		
FILE		

ST 25643

Telephone call

				CC:
BY	J. G. Hook	OF	QA - Site	S. Rao
TO	S. Rao	OF	AAO	W. Barclay
DATE	October 10, 19 77	TIME	1:40	G. Richardson
				A. Boos
				F. Teague
				File
SUBJECT	Moisture Requirements For Backfill		JOB NO.	

I called Rao, the originator of letter BEBC-1859, to clear up any misunderstanding I had on the letter.

HOOK: In the past, we controlled the moisture by taking the test at the same time we took our density tests. Was this acceptable?

RAO: Yes, it is, as indicated in letter BEBC-1859.

HOOK: Should we continue in the same manner as we have in the past?

RAO: No. Moisture should be controlled in the borrow area prior to compaction.

HOOK: Should a compaction area be rejected because it did not have the proper moisture content (± 2% of optimum) even though the density was acceptable.

RAO: There is no moisture requirements at the time of density testing, only a density requirement. The moisture requirement is prior to compaction.

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
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ELECT.		
INST.		
SECY		
FILE NO.	w/ CAR-SO	

SR125644

Bechtel Power Corporation

Interoffice Memorandum

To W. Barclay

Subject Job 7220 Midland Project
Project QAR SD-40
GLR-02-78-043

Copies to J. Klacking

File No

Date February 3, 1978

From G. L. Richardson

Of Quality Assurance

At Midland, MI Ext 207

In your response to the subject QAR, which identified problems with moisture tests on soils placement, you indicated on Aug. 11, 1977 that moisture tests will be taken in the borrow areas at the start of the day and as needed to maintain the proper testing frequency.

During review of the records in the QC Vault to verify actions taken in response to QAR SD-40 it was noted that there is no evidence of these record tests being taken. Upon further investigation it was discovered that U.S. Testing maintains a log for these tests and they are not being reviewed by Q.C. We feel that these tests should be maintained in the vault and reviewed by Q.C. for adequacy.

Please take appropriate actions to locate the moisture tests, review these tests and file them in the vault. It is requested that these actions be taken by March 1, 1978 so that QAR SD-40 can be closed out.

G. L. Richardson

G. L. Richardson

GLR/JGH/sw

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
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INST.		
SEC'Y		
FILE NO		

SB125645

3024 (2-74)

Bechtel Associates Professional Corporatio

Inter-office Memorandum

BEBC- 2286

To	J.F. Newgen	Date	June 1, 1978
Subject	Midland Plant Units 1 & 2 Job 7220 Moisture Control File: 0274	From	R. L. Castleberry
		Of	Engineering
Copies to		At	Ann Arbor

C-210
J. Wanzeck F. E. Meyer
J. Hurley
[redacted]
R. Schulman

Reference: 1) Memo from G.L. Richardson to R.L. Castleberry dated 5/16/78

The purpose of this letter is to clarify the intent of controlling moisture content in the borrow areas as requested in Reference 1.

Subparagraph 12.6.1 of Specification C-210 requires ("Insofar as practicable,...") qualitative control of moisture conditioning in the borrow areas so that the soil is not "too wet" or "too dry" to be compacted with the least amount of effort after being placed on the plant fill. The only quantitative control of moisture content is specified for soil during compaction.

Insufficient moisture control may lead to considerable increase in work effort and is therefore to be avoided. But moisture content is not necessarily a measure of a soil's adequacy to act as a foundation or as backfill material. If the density of a soil meets the requirements of the specification, in accordance with the correct standard, then the soil is acceptable.

The intent of this letter is to point out that a soil with the specified density following compaction should not be rejected on the basis that its moisture content was not controlled in the borrow area. On the other hand, we do not intend to eliminate moisture control in the borrow areas because this procedure minimizes the work effort required to attain the desired plant fill density.

R. L. Castleberry

JJD/jp
5/25/4

QA ROUTE	INFO	ACT.
LQAE	[illegible]	33?
CIVIL (1)		
MECH	[illegible]	
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[illegible]ND		
SEC'Y		
FILE NO.	22200	

SD-4C

SB125640

Bechtel Power Corporation

Interoffice Memorandum

To G. Richardson

Subject Job 7220 Midland Project
Moisture Requirements for
Backfill - QAR SD-40
0-1631

Copies to

File No.

Date December 21, 1977

From J. F. Newgen

Of Construction

At Midland, MI Ext.

References: 1) BEBC-1998
2) BEBC-1859

This memo is a complete response to the subject quality action request, which asked that Project Engineering be apprised of past testing methods used for determining moisture content of backfill.

Reference memos numbers 1 and 2 contain the Project Engineering response to our notification of past test methods.

We trust this information closes your action request.

J. F. Newgen

JFN/FGT/jae

QA ROUTE	INFO.	ACT.
LQAE	✓	
CIVIL (1)		
CIVIL (2)		
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INST.		
SEC'Y		
FILE NO	Q2220	

BECHTEL

I-77-184

SB125647

Bechtel Associate Professional Corporation

Inter-office Memorandum

BEBC-1859

To J. F. Newgen

Date September 30, 1977

Subject Midland Plant Units 1 & 2
Job 7220
Quality Action Report
QAR No. SD-40

From R. L. Castleberry

Of Engineering

At Ann Arbor

Copies to File: 0274, C-0467.1

S. Afifi
J. Klacking

RECEIVED
OCT 06 1977
BECHTEL POWER CORP.
JOB 7220
PER SW

Reference: 1) BCBE-1533 dated 8/15/77

This is a complete response to Reference 1.

It should be noted that it is ideal to control the moisture of backfill material at the borrow areas by conditioning. It is true that moisture content tests should be conducted at the borrow areas in order to establish the control to meet the specification requirements. However, in the placing of soil in large quantities, it should be noted that after placement and compaction, the moisture is not necessarily the same due to drying and mixing with other loads. This implies that a moisture content check is needed after the compaction is acheived. Therefore, the procedure used to take the moisture content tests after compaction would not have direct impact on the quality of work.

Based on the above, we agree with field and backfill placed prior to modification of the moisture testing methods to be accepted as is.

for J. E. Hink
R. L. Castleberry

SB/bkp
9/30/5

QA ROUTE	INFO.	ACT.
LQAE	M	
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SEC'Y		
FILE NO.	0220	

?, go! telecon

8125648

Telephone call

CC:
XXXXX S. Rao
W. Barclay
G. Richardson
A. Boos
F. Teague
T. Lieb
J. Speltz - UST
File

BY J. G. Hook OF Site - QA

TO S. Rao OF AAO

DATE October 13, 19 77 TIME 11:35

SUBJECT Moisture Requirements for Backfill Ref: QAR SD-40 JOB NO. 7220

Returned S. Rao's call about the telecon dated October 10, 1977 on the same subject.

RAO: What I said on moisture requirements for backfill is not what you wrote on the telecon. The moisture requirement ($\pm$ 2% of optimum) is mandatory and must be implemented at the time of placement and testing.

HOOK; OK. I will write a new telecon stating this and make distribution to the same people previously copied.

Jon G. Hook

QA ROUTE	INFO.	ACT.
LCAE		
CIVIL		
	RGH	
	LF	
FILE NO.		

SB125649

0046 (12-67)

Telephone call

			CC:	S. Rao
BY	J. G. Hook	OF	QA - Site	W. Barclay
TO	S. Rao	OF	AAO	G. Richardson
DATE	October 10, 19 77	TIME	1:40	A. Boos
				F. Teague
				File
SUBJECT:	Moisture Requirements For Backfill		JOB NO.	

I called Rao, the originator of letter BEBC-1859, to clear up any misunderstanding I had on the letter.

HOOK: In the past, we controlled the moisture by taking the test at the same time we took our density tests. Was this acceptable?

RAO: Yes, it is, as indicated in letter BEBC-1859.

HOOK: Should we continue in the same manner as we have in the past?

RAO: No. Moisture should be controlled in the borrow area prior to compaction.

HOOK: Should a compaction area be rejected because it did not have the proper moisture content (± 2% of optimum) even though the density was acceptable.

RAO: There is no moisture requirements at the time of density testing, only a density requirement. The moisture requirement is prior to compaction.

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SEC'Y		
FILE NO.	w/ CAR-SO-4	

SB125650

0046 (12-67)

Bechtel Power Corporation

Interoffice Memorandum

To R. L. Castleberry

File No

Subject
Job 7220 Midland Project
Specification 7220-C-210
Quality Action Request
QAR No. SD-40
BCBE-1533R

Date August 15, 1977

From J. F. Newgen

Of Construction

At Midland, MI Ext.

Copies to
G. Tuveson
S. Rao
F. Teague
G. Richardson

Reference: Quality Action Request - QAR No. SD-40

This memo is to bring to your attention item 2 under "Recommended Corrective Action" of the attached "Quality Action Request", wherein we are asked to advise Project Engineering of past moisture testing methods. In the past, it was found that densities meeting the specification requirements could be attained, irrespective of the use of moisture tests, because of the uniformity of materials. Therefore, moisture tests were taken after compaction for determining dry densities and acceptance or rejection was based on compaction tests. Moisture tests were not used to control backfill moisture. This practice has since been changed to making one moisture test each day at the beginning of backfill operations at 500 cubic yards intervals per Spec. C-210, and one after the density of the area compacted has reached 95%.

Based on the above, the Field requests that Project Engineering agree to acceptance of backfill materials installed in the past, along with records thereof, irrespective of the use of the moisture tests.

Please respond by August 26, 1977.

J. F. Newgen

JFN/JSPD/cb
Attachment

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SECY	Logged	
FILE NO	2220	

SB125651

RECEIVED
AUG 19 1977
BECHTEL POWER CORP.
JOB 7220
REC

5024-(2-74)

QUALITY ACTION REQUEST

From: G. L. Richardson Site QA Job 7220 (1)		
To: J. F. Haugen/ J. P. Connolly (2)	Control Document ref.: 7220-C-210 (3)	QAR ident. No.: SD-40 (4)

Action Requested: (5)

Section 13.0 of specification 7220-C-210, Rev. 4 provides the requirements for Q-listed backfill in the plant area. Section 13.6 states that the moisture cont[rol] in this area shall be in accordance with Section 12.6 of the same specification. Section 12.6 states in part: "The water content during compaction shall not be more than 2 percentage points below optimum moisture content and shall not be more than 2 percentage points above optimum moisture content . . ."

"Tests done in accordance with para. 12.5 will indicate the degree of moisteni[ng] of aerating necessary to comply with para. 12.6.1. After placement of loose material on the embankment fill, the moisture content shall be further adjusted as necessary to bring such material within the moisture content limits required)(

Signature: G L Richardson (6)	Date: 7/22/77 (7)	Reply Requested by: 1&3) 7/25/77 2) 8/19/77 (8)

Reply: (9)

Signature: (10)	Date: (11)
Action Verified: (12)	Date: (13)

8/2/74

WHITE — Return to sender CANARY — Addressee's file PINK — Sender's file

BPC-20877
G1001649-05

SD 25652

for compaction."

"Rolling of any section of embankment containing material too wet or too dry to obtain the required compaction shall be delayed until the moisture content of the material is brought to within the required limits or the material shall be removed and replaced with suitable material. . ."

Contrary to the above: The field does not take moisture control tests prior to and during placement of the backfill, but rather rely on the moisture results taken from the in-place soil density tests.

Recommended Corrective Action

1) A system for testing the soil for moisture content prior to compaction should be developed and implemented by Bechtel and the subcontractor. QC should make any necessary revisions to the QCI.

2) Recognizing that the soil has been tested for moisture content after compaction and meets the requirements of the specification it is not necessary to identify these materials as nonconforming. However Project Engineering should be apprized of the past testing methods. In addition it is recommended that engineering concur with the interpretation that moisture contents taken after compaction are for determining dry densities and should not be used for specified moisture control.

3) Assure responsible personnel are aware of the testing system.

TELECOPY

Bechtel Power Corporation

Interoffice Memorandum

To R. L. Castleberry

File No.

Subject Job 7220 Midland Project
Backfill Moisture Requirement
Spec. C-210
BCDE-1669R

Date November 18, 1977

From J. F. Newgen

Of Construction

At Midland, MI Ext.

Copies to [redacted]
B. Cheek
G. Tuveson
J. Dean

Confirming verbal requests; please provide written clarification of the 2% tolerance on backfill moisture content during compaction. Although moisture tests are taken both <u>during</u> and sometimes <u>after</u> compaction we have been verbally informed that for Zone I material moisture tests taken within a few days after compaction which do not fall within 2% of optimum moisture shall be cause for rejection of the fill, even though proper compaction is achieved. Information moisture tests taken more than a week after Zone I fill has been properly compacted are not so limited. For Zone II materials these limits can also be extended in accordance with previous written direction.

Your response is required by 11/30/77 in order to process documentation of backfill which was not placed in accordance with the verbal information above, if necessary.

J. F. Newgen

JFN/FGT/jae

RECEIVED
NOV 21 1977
BECHTEL POWER CORP
JOB 7220
PER

QA
ROUTE
ACT.

SB125654

5024 (2-74)

with BAR 50-40

Inter-office Memorandum

BEBC-1859

To	J. F. Newgen	Date	September 30, 1977
Subject	Midland Plant Units 1 & 2 Job 7220 Quality Action Report QAR No. SD-40	From	R. L. Castleberry
		Of	Engineering
Copies to	File: 0274, C-0467.1	At	Ann Arbor

S. Afifi
J. Klacking

Reference: 1) BCBE-1533 dated 8/15/77

This is a complete response to Reference 1.

It should be noted that it is ideal to control the moisture of backfill material at the borrow areas by conditioning. It is true that moisture content tests should be conducted at the borrow areas in order to establish the control to meet the specification requirements. However, in the placing of soil in large quantities, it should be noted that after placement and compaction, the moisture is not necessarily the same due to drying and mixing with other loads. This implies that a moisture content check is needed after the compaction is acheived. Therefore, the procedure used to take the moisture content tests after compaction would not have direct impact on the quality of work.

Based on the above, we agree with field and backfill placed prior to modification of the moisture testing methods to be accepted as is.

for J E Hirle
R. L. Castleberry

SB/bkp
9/30/5

SB125655

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640

July 22, 1977

Consumers Power Company
P. O. Box 1963
Midland, MI 48640

Attention: J. L. Corley

Job 7220 Midland Project
QAR SD-40 Issue
GLR-7-77-254

Dear Mr. Corley:

Attached for your information is a copy of the subject QAR.

Very truly yours,

G. L. Richardson

G. L. Richardson
LEAD QUALITY ASSURANCE ENGINEER

QA ROUTE	INFO	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SEC'Y		
FILE NO.	2220	

GLR/JGH/sw

Attachment

8125656

for compaction."

"Rolling of any section of embankment containing material too wet or too dry to obtain the required compaction shall be delayed until the moisture content of the material is brought to within the required limits or the material shall be removed and replaced with suitable material. . ."

Contrary to the above: The field does not take moisture control tests prior to and during placement of the backfill, but rather rely on the moisture results taken from the in-place soil density tests.

Recommended Corrective Action

1) A system for testing the soil for moisture content prior to compaction should be developed and implemented by Bechtel and the subcontractor. QC should make any necessary revisions to the QCI.

2) Recognizing that the soil has been tested for moisture content after compaction and meets the requirements of the specification it is not necessary to identify these materials as nonconforming. However Project Engineering should be apprized of the past testing methods. In addition it is recommended that engineering concur with the interpretation that moisture contents taken after compaction are for determining dry densities and should not be used for specified moisture control.

3) Assure responsible personnel are aware of the testing system.

SB125657

Bechtel Power Corporation

QCFM-5011

Inter-office Memorandum

To G. L. Richardson

Date July 20, 1978

Subject Midland Project, Units 1&2
Moisture Requirements for
Backfill prior to Placement
GLR-02-78-043, QAR SD-40

From W. L. Barclay

Of Quality Control

At Midland, Michigan
Job No. 07220

Copies to
J. F. Newgen w/o
D. R. Johnson w/o

RECEIVED
JUL 21 1978
BECHTEL POWER CORP.
JOB 7220
PER 204 I-78-282

References: a) BCBE 1802 JNewgen to RCastleberry dated 2/27/78 (with attachments)
b) BEBC 2287 RCastleberry to JNewgen dated 6/1/78

The following is Quality Control's complete response to subject letter GLR-02-78-043 which concerns missing moisture tests, review of US Testing mositure log by Quality Control and a file set-up in the vault.

Reference a) BCBE 1802 revealed subject soil tests were not performed prior to placement on August 9, 1977, September 30, 1977, October 3, 1977, October 4, 1977 and October 5, 1977. Project Engineering was requested to evaluate the acceptability of the material placed on above mentioned dates. Reference b) BEBC 2287, Project Engineering concluded that all soil placed and tested on August 9, 1977, September 30, 1977, October 3, 1977, October 4, 1977 and October 5, 1977 acceptable as placed.

In response to subject QAR which identifies problems with moisture tests on soils placement, mositure tests are being taken in borrow areas at the start of the day and as needed to maintain the proper control of materials being placed. A review of the moisture test is being made by the responsible QC Engineer and filed in the QC Vault.

If additional information is required concerning the above, please contact this office.

QA ROUTE	INFO.	ACT.
[illegible]	[illegible]	
CIVIL (1)		
[illegible]		
[illegible]	[illegible]	
[illegible]		
[illegible]		
[illegible]		
[illegible]		
FILE NO.	[illegible]	

W. L. Barclay

W. L. BARCLAY
PROJECT FIELD QUALITY CONTROL ENGINEER

WLB/HDF/ENE/RKS/jmw

Attachments

SB125658

Bechtel Power Corporation

Inter-office Memorandum

To R. L. Castleberry

Subject Job 7220 Midland Project
Moisture Content of Soils
GLR-249

Copies to J. Newgen
J. Hurley
J. Klacking
W. Barclay
S. Rao

Date May 16, 1978

From G. L. Richardson

Of Quality Assurance

At Midland, MI

QA ROUTE	INFO.	ACT
LOAD	dr 334	
SEC'Y		
FILE NO. Q2220		

QAR SD-40 was issued on 7/22/77 to request testing of soils for proper moisture content prior to compaction. Several IOMs and telecons were written to resolve this QAR cumulated by the attached IOM BEBC-1998 and J. Hook's telephone call record of 10/13/77. These documents indicate that moisture content for "Q" listed material must be controlled to assure that it is within +2% of optimum prior to compaction as required by Specification 7220-C-208. Moisture content after compaction not within the required range is not to be considered a problem.

Subsequent to this a telephone call record (attached) dated 4/7/78 was made to record a call to S. Rao requesting further clarification. Part II of this telecon appears to be in conflict with the foregoing. The current interpretation by Quality Control is to allow compaction to take place where the initial test indicates out of tolerance moisture content concurrent with corrective actions to correct the moisture.

Concerns in this area have been raised by D. Horn of CPCo QA who has requested that this area be clarified prior to resumption of work upon settlement of the laborers work stoppage.

It is requested that you take action to resolve this situation and to provide clear direction for the control of moisture content.

One possible solution would be to delete the requirement to control the moisture content and rely on the compaction requirement only for the completion of soils work realizing that the only "Q" listed work remaining is in the plant fill area.

Please respond by 5/26/78.

G. L. Richardson

G. L. Richardson

SB125659

GLR/sw

Telephone call

BY	J. G. Hook	OF	Site - QA
TO	S. Rao	OF	AAO
DATE	October 13, 77	TIME	11:35
SUBJECT	Moisture Requirements for Backfill Ref: QAR SD-40	JOB NO.	7220

CC:
S. Rao
W. Barclay
G. Richardson
A. Boos
F. Teague
T. Lieb
J. Speltz - UST-
File

Returned S. Rao's call about the telecon dated October 10, 1977 on the same subject.

RAO: What I said on moisture requirements for backfill is not what you wrote on the telecon. The moisture requirement (± 2% of optimum) is mandatory and must be implemented at the time of placement and testing.

HOOK; OK. I will write a new telecon stating this and make distribution to the same people previously copied.

Jon G. Hook

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL		
CIVIL		
MECH		
ENG		
SEC		
FILE NO.		

SB 25660

Inter-Office Memorandum

BEBC- 1998

To	J. F. Newgen	Date	December 15, 1977
Subject	Midland Plant Units 1 & 2 Job 7220 Moisture Requirements for Backfill	From	R. L. Castleberry
		Of	Engineering
Copies to	File: 0274, C-210, C-208	At	Ann Arbor

S. Afifi

RECEIVED

DEC 16 1977

BECHTEL POWER CORP.
JOB 7220

PER ______________________

Reference: 1. BCBE-1669 dated 11/18/77

This is a complete response to Reference 1.

The moisture content of the soil should be within 2% of optimum during placement and compaction. However, this property of the soil is not necessarily a measure of its adequacy after compaction.

The primary goal is to obtain the specified dry density. In order to achieve this end, certain means are prescribed; e.g., maximum lift thickness, specified compactive effort and controlled moisture content.

Soil which has been tested a few days following compaction and found to have suitable dry density should not be rejected solely on the basis that its moisture content is not within 2% of optimum.

for J. E. Hink
R. L. Castleberry

GAT/sg
12/15/5

SB125661

Telephone call

(

BY John Dean / Doyle Osborn OF F.E/QC.

TO S. Rao OF Proj. Eng.

DATE April 7 19 78 TIME 2:30 PM

SUBJECT Moisture Content of Soils (Clay)

ROUTE G. Coester
S. Rao
J. Betts
B. Cheek
B. Sigle

JOB NO. 7220

OSBORN

To clarify BEBC 1998 the following two situations were discussed with S Rao as to the acceptability of the soil:

1) the moisture sample taken from the borrow area at the start of the shift is acceptable (± 2%). The moisture tests taken on same day in conjunction with the density test fails. Proper compaction was obtained

2) The moisture sample taken from the borrow area at the start of the shift fails. - The superintendant in charge of soils is notified and corrective actions taken to adjust moisture (i.e. disking or wetting down). Passing compaction is obtained - but with failing moistures outside of the ± 2% range.

RAO

The above two situations are acceptable as is.

SB125662

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OCT 06 1977
BECHTEL POWER CORP.
JOB 7220

Bechtel Associates Professional Corporation

Inter-office Memorandum

TELECOPY

To	G. L. Richardson	Date	October 4, 1977
Subject	Midland Plant Units 1 & 2 Job 7220 Non-Conformance Reports QF-172 & 174	From	R. L. Castleberry
		Of	Engineering
Copies to	File: ~~[illegible]~~	At	Ann Arbor

J. M. Klacking
S. Afifi
J. F. Newgen

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SEC'Y		
FILE NO	2610	

Reference: 1. Memo from J. L. Corley to G. L. Richardson dated 9/8/77
2. ICM G. L. Richardson to R. L. Castleberry dated 9/9/77 and 9/16/77
3. ICM R. L. Castleberry to G. L. Richardson dated 8/31/77

This is a complete response to Reference 2.

1. Project Engineering's earlier review of test MD354 and MD356 was based on the measured distance as "100'R" of the centerline dike. Normal survey practice would interpret this to mean 100 feet right of the centerline, with the surveyor looking ahead on station. Because dike stationing is counterclockwise, the earlier evaluation assuming these two tests to be east of the centerline is appropriate.

   Not withstanding the above, Consumers Power apparently believes these tests to be west of the dike centerline (Reference 1). If MD354 and MD356 are indeed west of the dike centerline, these tests would be in the plant fill area. No safety related structure or system will be located in this area. Therefore, the four passes of the roller can be accepted as adequate.

   We concur that reference to MD359 in Reference 3, top of the second page, should read MD356.

2. The location of MD115 is 50 feet left or west of the dike centerline at station 5+00. Section T, Drawing C-119 and Section K, Drawing C-117 are identical on the plant side (i.e., west side) of the fill. Therefore, test MD115 is shown in a zone 2 area, based on either Section T, Drawing C-119 or Section K, Drawing C-117.

   Apparently our earlier evaluation of test MD358, 359, and 440 was not understood. The earlier evaluation noted that there may "...have been an error in identifying the location of the test MD358 and MD440." Consumers also has recognized such a possibility in their similar questions about NCR QF 172. It is agreed that there are discrepancies in the soils test reports, wherein the test location and soil types listed in the reports are not always consistent with the design drawing dike cross-sections (e.g. zone 2 material listed as material used where zone 1 material should have been used). However, we have reviewed reports for adjacent tests in the same vicinity of test MD358, 359, and 440; again we conclude that the zone 2 material in a zone 1 area should be considered an anomaly. (See Attachment A)

While it is unlikely that the dikes would be acceptable if there were conclusive evidence that zone 2 material had been widely used in lieu of the specified impervious material, the test reports in total do not support this position. The reports from adjacent test in the vicinity of MD358, 359, and 440 do not support the theorem that a zone 2 material is at the locations as described in the test report.

Therefore, the request for a Project Engineering evaluation to "determine the acceptability of the dike...." based on speculation about errors in recorded data is not appropriate, nor do we believe warranted in this case. Any Project Engineering evaluation would be based on the same test report information which already has been questioned as anomalous by Consumers; the conclusions would only be as good as the facts used as the basis of the evaluation. Although recognizing that documentation errors will infrequently occur, it is not recommended that each document discrepancy be evaluated as though if were fact. Our office is satisfied that appropriate quality control programs, including Geotech surveillance, should provide adequate confidence in the dike construction and its acceptability.

To reiterate our earlier evaluation, we recommend acceptance of test reports MD359 and 440, based on the soil classification as a zone 2 material, albeit in a location other than as described in the test report.

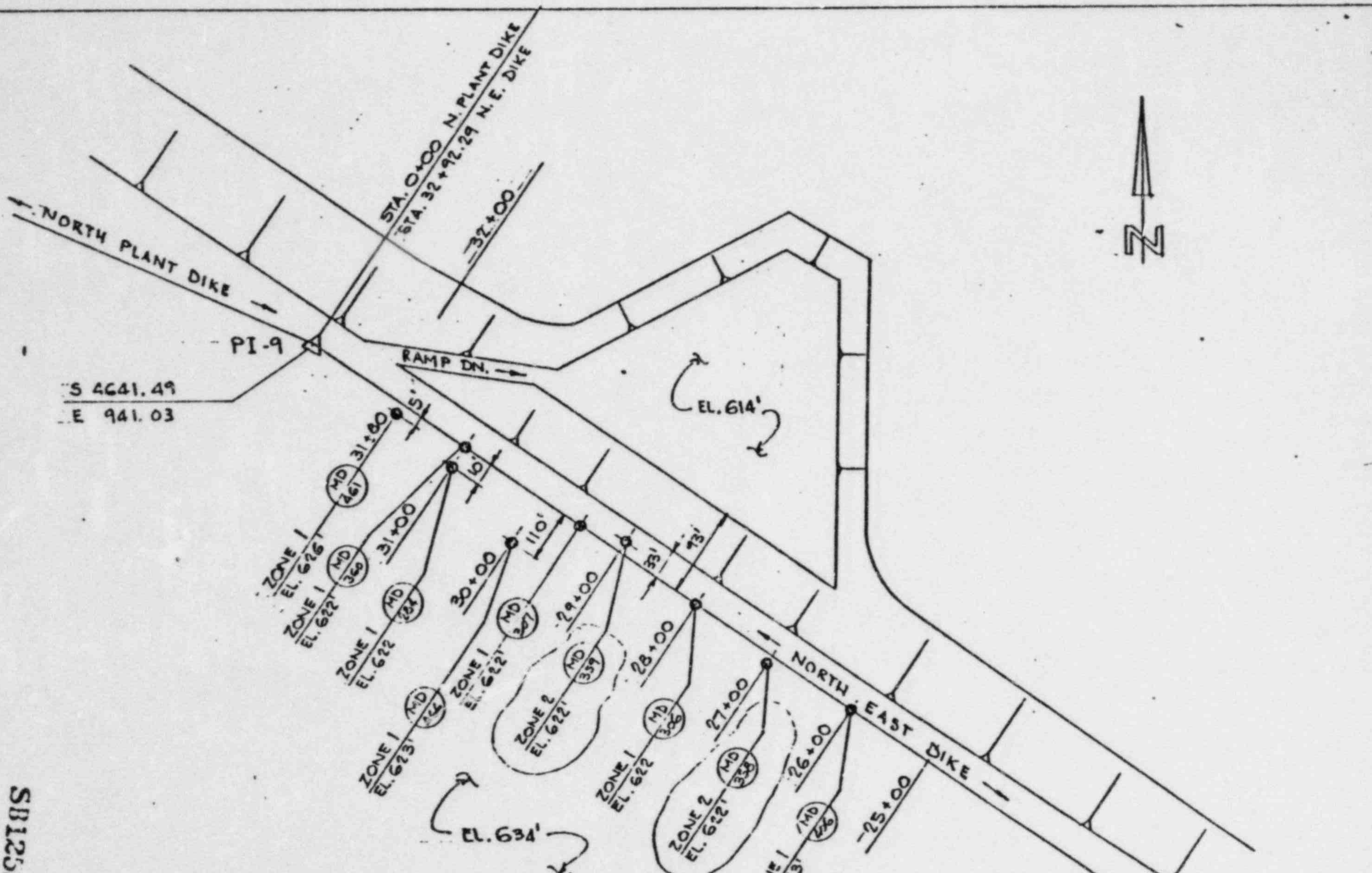
If requested, Project Engineering is available to visit the jobsite to further discuss this evaluation with your office and Consumers QA.

for JG Henk
R. L. Castleberry

JCH/bkp
10/3/2

Attachment A: Partial Plan of Northeast Dike Showing Test Location

SB125581



ATTACHMENT A

SB125582

Inter-office Memorandum

BEBC-2542

To J. F. Newgen

Date November 15, 1978

Subject Midland Plant Units 1 & 2
Job 7220
Diesel Generator Building
Settlement
File: 0274, C-2674

From R. L. Castleberry

Of Engineering

At Ann Arbor

Copies to

L. Basinski K. Weidner
P. Martinez
N. Swanberg
B. Dhar
B. C. McConnel
Com Log

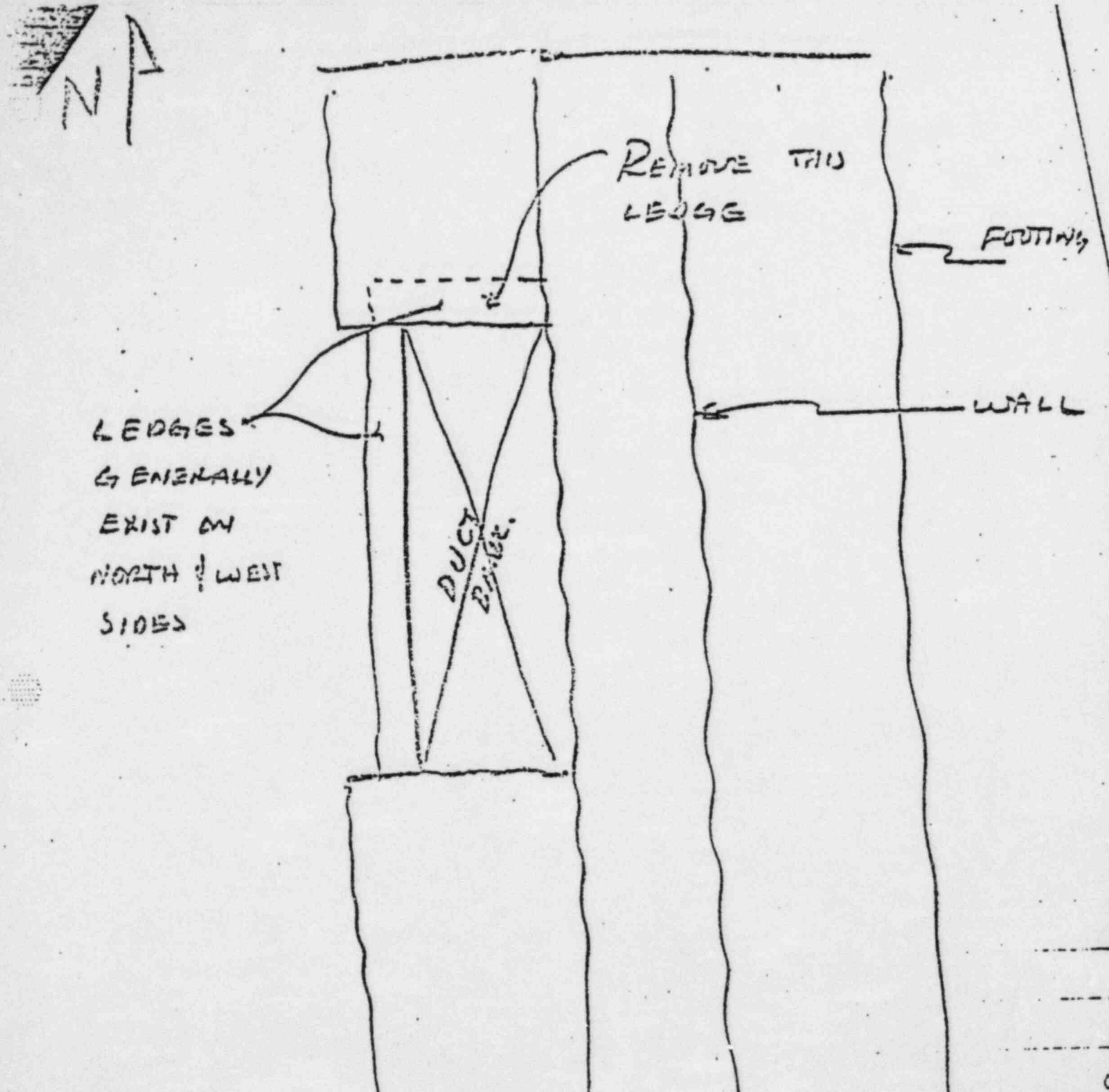
Portions of the concrete ledge found on all four electrical duct banks shall be removed to complete releasing the building support provided by the duct banks and to allow vertical movement of the building during surcharging. Rebar and concrete shall be removed from the electrical duct banks in such a manner that the duct envelope extending above the footing on the north, south and east sides, is maintained for approximately 12" below the footing (a maximum of 1" decrease in this envelope is acceptable.) However, extreme care should be taken not to puncture the embedded conduit. A record of the rebar removed shall be maintained and submitted to Project Engineering. Provisions shall be made to provide corrosion protection for the rebar exposed.

R. R. Basinski
for/ R. L. Castleberry

BCM/km

NCR 1482

SJ125814



PLAN.

(EXISTING CONDITIONS AS OF 11-15-78)

SB 25S15

Bechtel Associates Professional Corpora

Inter-office Memorandum

BEBC-2547

To	J. F. Newgen	Date	November 16, 1978
Subject	Midland Plant Units 1 & 2 Job 7220 Diesel Generator Building Settlement	From	R. L. Castleberry
		Of	Engineering
Copies to	File: 0274, C-2674	At	Ann Arbor

B. Dhar
N. Swanberg
K. Weidner
P. Martinez
W. Barclay
Com Log

Reference: NCR 1482

All construction activities required to complete the Diesel Generator structure may proceed except the actual placement of concrete. Activities required to complete the northern portion of the structure should be scheduled as a priority over the south. This sequence is required to provide the maximum amount of structural dead load on the north wall as early in the surcharge time frame as possible.

S. R. Borowski
for/ R. L. Castleberry

BCM/km

ROUTE QC 07220 INIT.
PEQCE
A. PEQCE
CIVIL
ELECT.
PIPING
MECH.

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NOV 17 1978
QUALITY
BECHTEL JOB 7220

Page 23 of 23
Page 22 of 22
20
19

Inter-office Memorandum

BEBC-2584

To	J. F. Newgen	Date	December 7, 1978
Subject	Midland Plant Units 1 & 2 Job 7220 Diesel Generator Building Backfill Around Duct Banks	From	R. L. Castleberry
		Of	Engineering
Copies to	File: 0274, C-2674, 0670.2	At	Ann Arbor

B. Dhar
J. Wasylewski
B. Cheek
P. Martinez
N. Swanberg
K. Wiedner
C. McConnel
J. Betts
Com Log

Reference: 1) NCR-1482
2) BCBE-2100R

The procedure outlined in BCBE-2100R to fill the excavations underneath the footings and around the duct banks, and to allow 12" of vertical movement of the footing is acceptable. The use of lean concrete backfill shall be in accordance with Specification C-230. Two inches of Ethafoam shall be placed around the largest outline of the duct bank and shall extend from El. 628 to the bottom of the excavation to prevent lean concrete from coming into contact with the duct bank.

L. R. Baimalin
for/ R. L. Castleberry

JEH/km

8312 5S17

Inter-office Memorandum

BEBC-2585

To	J. F. Newgen	Date	December 7, 1978
Subject	Midland Plant Units 1 & 2 Job 7220 Diesel Generator Building Floor Slab @ El. 664'-4"	From	R. L. Castleberry
		Of	Engineering
Copies to	File: 0274, C-2674, 0670.2	At	Ann Arbor

B. Dhar
P. Martinez
N. Swanberg
K. Wiedner
J. Betts
C. McConnel
J. Wasylewski
Com Log

Reference: NCR-1482

Construction activities may proceed on the floor slab at El. 664'-4" in the Diesel Generator Building in accordance with DCN #3, Drawing 10030, Revision 4, issued 12-6-78.

L. R. Basnaski
for/ R. L. Castleberry

JEH/km

NCR 1482 Page ~~25~~ 24 of ~~26~~ 39 21

S3125618

TELECOPY

Bechtel Associates Professional

Inter-office Memorandum

BEBC-2591

To J.F. Newgen

Subject Midland Plant Units 1 & 2
Job 7220
Soil Monitoring
File: 0274, C-82 PR, C-2645

Date December 8, 1978

From R.L. Castleberry

Of Engineering

At Ann Arbor

Copies to
S. Afifi
L. Basinski
J. Betts
A. Marshal
W.B. Barclay
L. Driesbach

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DEC 11 1978
BECHTEL POWER CORP
JOB 7220
PER

Reference: BEBC-2566 dated 11/29/78

This letter supersedes BEBC-2566 dated November 29, 1978, and provides additional requirements for monitoring the settlement of the diesel generator building.

1) Measurements are to be taken daily unless otherwise directed by the onsite geotechnical representative and should start immediately.

2) The measurements are to be taken from Benchmark 9 by survey.

3) The elevation of Benchmark 9 is to be checked monthly with the existing site benchmark.

4) The accuracy shall be to the nearest 0.001 foot, but the final written figure shall be recorded to the nearest 0.01 foot.

Additional information for the soil monitoring program will be forwarded to you as it is developed.

R.L. Castleberry

JGH:lm
12/5/4

SB25819

Telecopy

BEBC-2615

Inter-office Memorandum

To	J.F. Newgen	Date	January 2, 1979
Subject	Midland Plant Units 1 & 2 Job 7220 Diesel Generator Building El 664-0 and above	From	R.L. Castleberry
		Of	Engineering
Copies to	File: 0274, C-2674, C-2645	At	Ann Arbor

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JAN 2 1979
BECHTEL POWER COR
JOB 7220
PER

B. Dhar
K. Weidner
J. Betts
B.C. McConnel
J. Hartman
L. Basinski
Com Log

Reference: NCR-1482

Attention: A. Boos

Construction activities, including placement of concrete, may proceed for the diesel generator structure above el 664'-0".

Channel embeds, C4x725 per Detail 1 Drawing C-143, shall be provided on the interior of all walls for future system supports. The channels shall be located at approximately 6-foot centers. Additional embeds may be provided at the direction of field engineering. An as-built drawing of all embeds shall be forwarded to project engineering.

R.L. Castleberry

BCM:la
12/28/22

S3:25820

Bechtel Associates Professional Corporation

Inter-office Memorandum

BEBC-2549

To	J. F. Newgen	Date	November 20, 1978
Subject	Midland Plant Units 1 & 2 Job 7220 Diesel Generator Building File: 0274, C-2674, 0670.2	From	R. L. Castleberry
		Of	Engineering
		At	Ann Arbor

Copies to
B. Dhar
N. Swanberg
K. Weidner
P. Martinez
W. Barclay
Com Log

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NOV 20 1978
QUALITY CONTROL
BECHTEL 7220
SIGNATURE

Reference: NCR 1482

It will be required to eliminate the void under the Diesel Generator Building footings. The intent is to improve the uniformity of bearing and to maximize the amount of bearing surface between the footing and foundation soil.

It is envisioned that this would be a grouting operation and would be needed only between the mud mat and the footing. This operation would occur before, and after the surcharge operation but after the structure has been released from the settlement restraints. The existing excavations around the ducts would be filled with lean concrete but provisions must be made to allow the vertical movement between duct and footings.

It is requested that a procedure be developed to meet the intent of the above. The procedure should contain the material to be used to fill the voids and it's anticipated compressive strength. The anticipated performance of the method should also be defined, ie: how small or thin of a void can be filled. Also, the method to be used to provide settlement voids around the electrical ducts and eliminate contact between duct and footing during settlement.

It is presently unclear if this will be considered and extensio of the footing or of the mud mat, but for planning purposes the procedure should be written as if there was to be a quality related operation.

Since this operation should proceed as soon after release of settlement restraints as possible, it is requested that the proposed procedure be submitted for project approval by Novemb 22, 1978.

L. R. Baranski
for/ R. L. Castleberry

BCM/km

SQ1.25821

MIDLAND UNITS 1 & 2

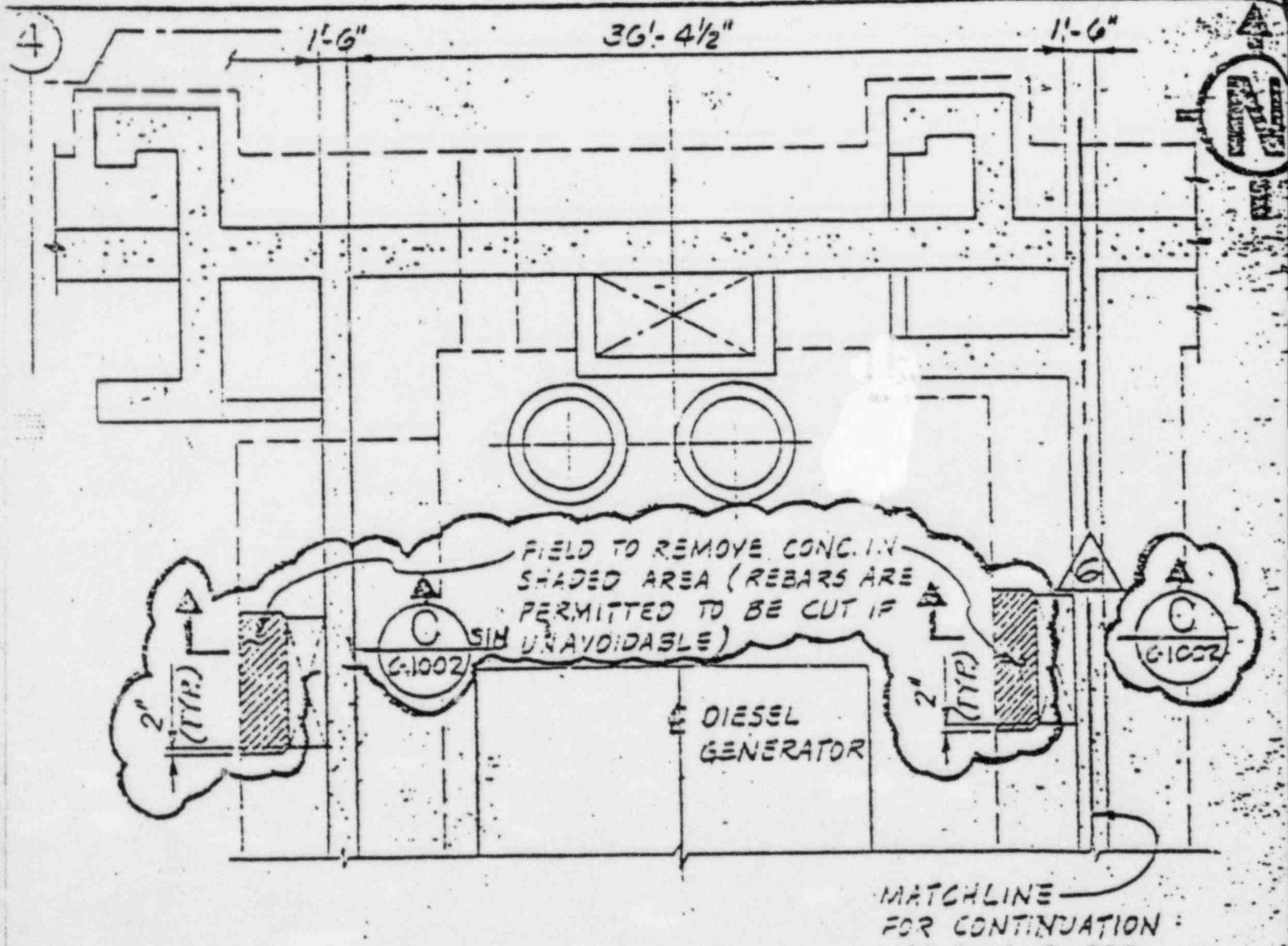
NOTICE

DCN No. 5	Page 1 of
DATE: 10-26-78	BY:
APPROVAL: JD	

Reason for change: DESIGN MODIFICATION TO ACCOMODATE PRELOADING REQUIREMENTS

The following Requisitions are affected by this change: NONE

They have / have not been revised in accordance with this DCN



FLOOR PLAN @ EL.634'-6"

SB125822

MIDLAND UNITS 1 & 2

DRAWING CHANGE NOTICE

DCN No. 3 Page 1

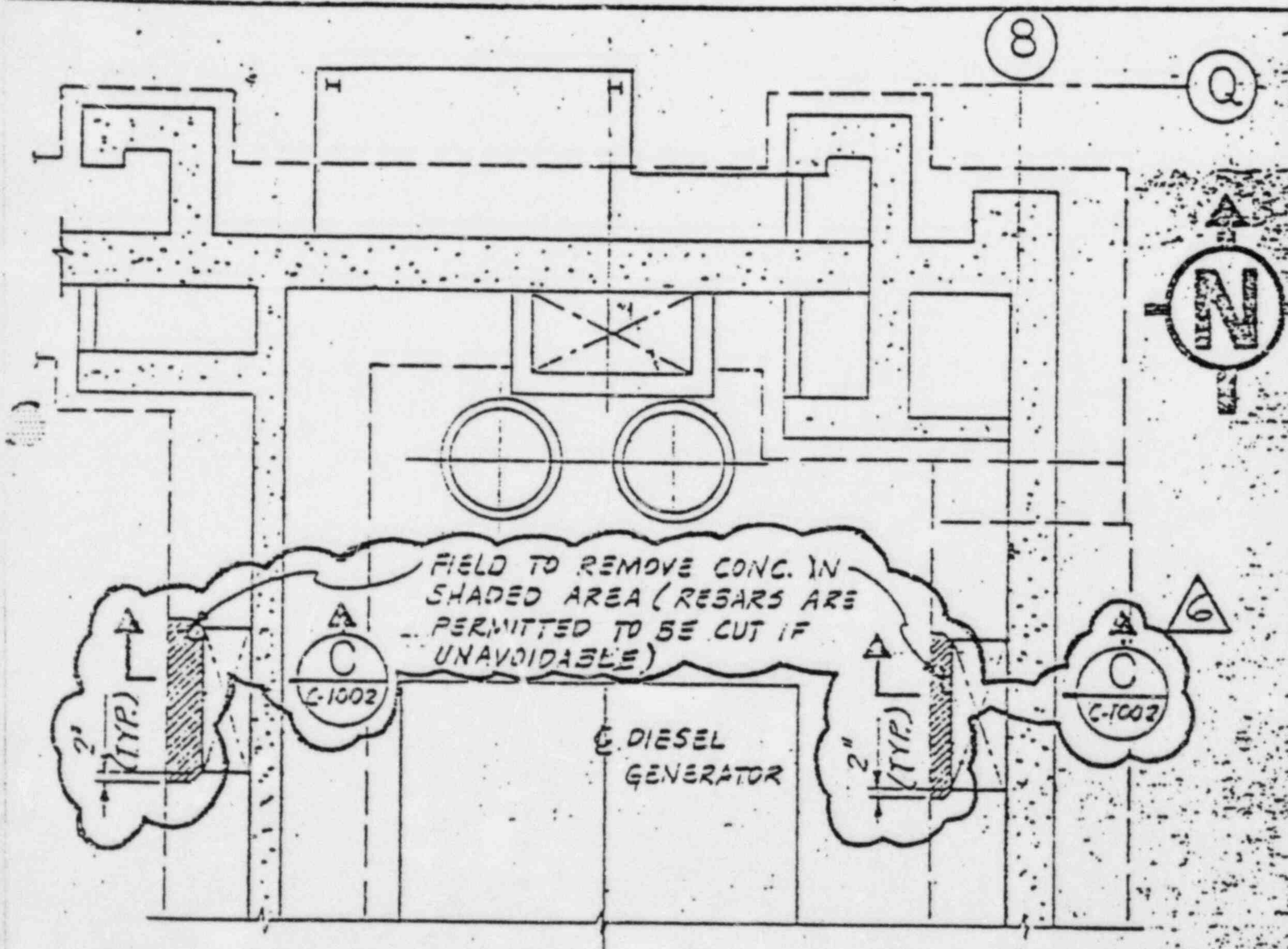
DATE: 10-26-78 BY:

APPROVAL: JD

Reason for change: DESIGN MODIFICATION TO ACCOMODATE PRELOADING REQUIREMENTS

The following Requisitions are affected by this change: NONE

They have / have not been revised in accordance with this DCN



FLOOR PLAN @ EL.634'-6"

Page 13 of 47
NCR 1482

S3125823

.AND UNITS 1 & 2

NOTICE

DCN NO.:

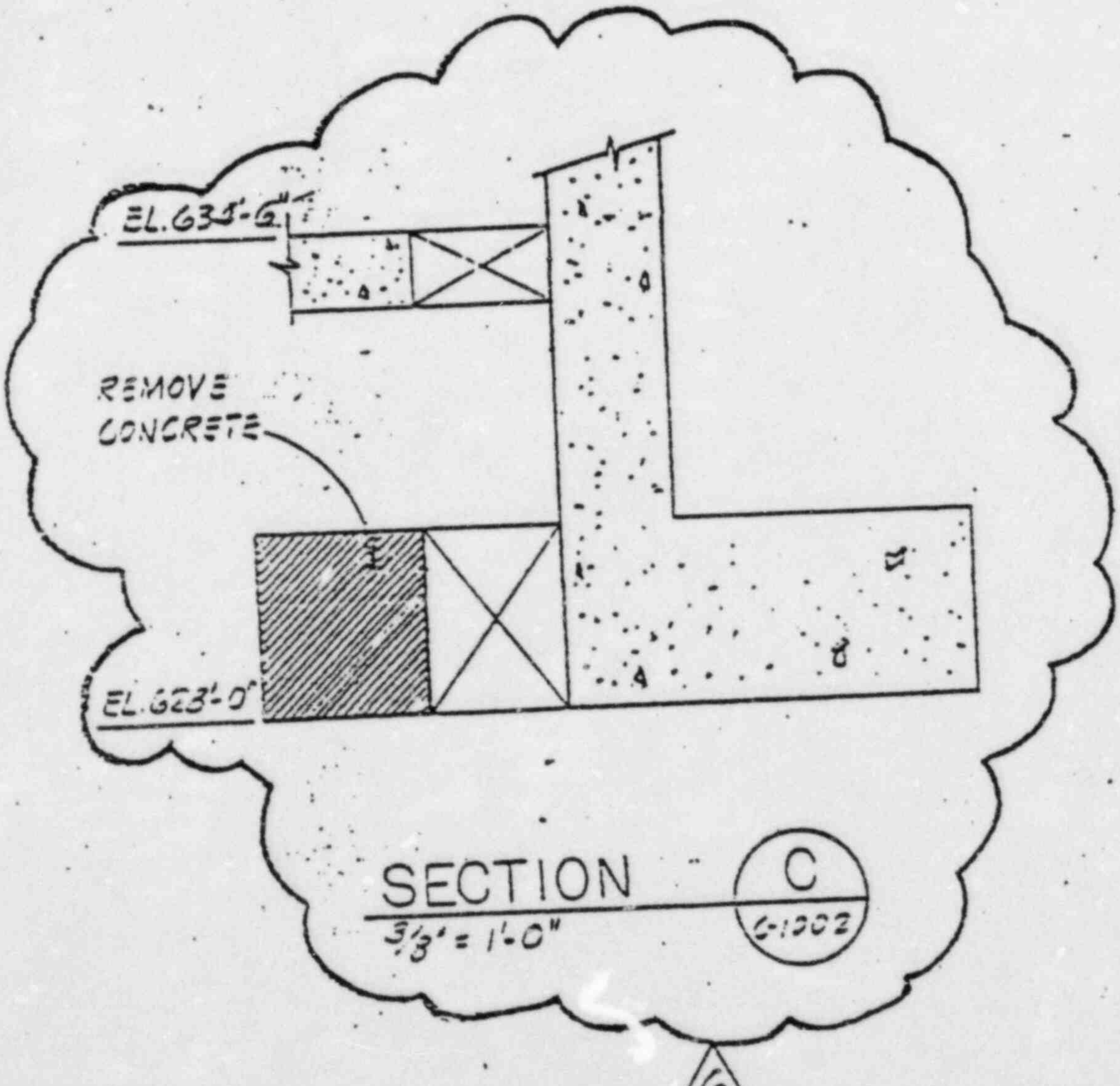
DATE: 10-26-78

APPROVAL: JD

...n for change: DESIGN MODIFICATION TO ACCOMODATE PRE-LOADING REQUIREMENTS

...ollowing Requisitions are affected by this change: NONE

have / have not been revised in accordance with this DCN.



S3125824

CNTEL MIDL

CNTEL ARB
?-223-4039 CLT 310-244-9497
5446 10/23/79 8:52

TO: L.E. DAVIS

BC-3844

SUBJECT:
CONSUMERS/MIDLAND PLANT JOB 7220
DIESEL GENERATOR BUILDING WORK RESUMPTION
FILE: 0274, C-2645
REF: 1) BCBE-2473R, 3/29/79
2) DRAWING M-147

IN CONJUNCTION WITH THE EXCAVATION BETWEEN THE TURBINE BUILDING AND THE DIESEL GENERATOR BUILDING TO REMOVE THE TEMPORARY TIE RODS, THE BURIED PIPE APPROXIMATELY 2 FEET BELOW THE TIE RODS SHOULD BE REBEDDED AND THE CONDENSATE LINES SHOULD BE REWELDED.

THE RESULTS OF THE YARD PIPE ANALYSIS HAVE NOT BEEN FINALIZED BUT BECAUSE THE EXCAVATION WILL BE MADE, THE LARGE (2 INCH) DEVIATION FROM THE DESIGN ELEVATION SHOULD BE CORRECTED. THE FOLLOWING PIPES SHALL BE REBEDDED:

8"-1HBC-81 FROM S 5062/E 210 TO S 5044/E 349
8"-1HBC-82 FROM S 506 E 219 TO S 5055/E 344
10"-0HBC-28 FROM S 5055/E 344 TO S 5104/E 370
4"-0JBD-739 FROM S 5046/E 226 TO S 5060/E 347

LINES 8"-1HBC-81 AND 8"-1HBC-82 SHALL BE REBEDDED TO PASS THROUGH THE CENTER OF THE EXISTING DIESEL GENERATOR BUILDING PENETRATIONS AND HAVE CONSTANT SLOPES ALONG THEIR LENGTHS TO THE EXISTING ELEVATIONS OF THE OTHER END POINTS SPECIFIED ABOVE. LINES 10"-0HBC-28

AND 4"-0JBD-739 SHALL BE REBEDDED WITH A CONSTANT SLOPE BETWEEN THE EXISTING ELEVATIONS OF THE POINTS SPECIFIED ABOVE.

LINES 3"-2JBD-527 AND 8"-2HBC-311 SHALL BE CUT FREE FROM THE ABOVE PIPES TO RELIEVE STRESS AND SHALL BE REWELDED AFTER THE LINES ARE REBEDDED.

THE ABOVE LINES SHALL BE SURVEYED BY OPTICAL MEANS BY RECORDING THE TOP OF PIPE ELEVATIONS AT 10-FOOT INTERVALS PRIOR TO DISTRUBING THE LINES AND AGAIN AFTER THE LINES ARE REBEDDED. PROVISIONS SHALL BE MADE TO ALLOW RESURBEYING OF 8"-1HBC-81 AT 20' C/C (SEE DRAWING M-146, NOTE 2). READINGS SHALL BE TAKEN AT 2 WEEK INTERVALS DURING DEWATERING.

REFERENCE 2 WILL BE REVISED TO REFLECT AS-BUILT CONDITIONS.

S_702750

IN ADDITION TO THE ABOVE, THE FOLLOWING CONDENSATE LINES WHICH WERE CUT PREVIOUSLY SHALL BE REWELDED AT THE TURBINE BUILDING:

-1HCD-513   20"-1HCD-149
-2HCD-513   20"-2HCD-149

CURTIS
MBDR/7PE2119/7220-001/ER

CNTEL MIDL

Confirmation Copy

Bechtel Associates Professional Corporation

Inter-office Memorandum

To	L. H. Curtis	Date	19 October 1979
Subject	Midland Units 1&2-Job 7220-001 Borated Water Tanks Load Testing	From	S. S. Afifi
		Of	Geotechnical Services
Copies to	S. L. Blue P. K. Chen B. Dhar G. Krzisnik J. O. Wanzeck K. Wiedner 1320, 3410	At	Ann Arbor 10 D 5 7220-79-228

REFERENCE: Item 6 Meeting Notes #1018, Page 9

Attached you will find our recommended procedure for load testing the borated water tanks.

If you have any questions, please call J. O. Wanzeck of this office.

JOWanzeck For/SSA
S. S. Afifi

JOW
JOW/nm
Attachment

RECEIVED
OCT 23 1979
BECHTEL
A.A. 7220

JOB 7220	ACT.	INFO	COPY	INIT.
PROJ. ENGR. [illegible]		2/1		[illegible]
ASST. P. E. T				
ASST. P. E. T				
ASST. P. E. P				
ASST. P. E. F				
MECH.				
ELECT.				
CS				
CIVIL	[redacted]			
P.D.				
ARCH.				
Q.E.				
C.TR./ENG'G PL.				
PROJ. MGR.				
PROC. MGR.				
FIELD				
CONST. COORD.				
FSAR				
ADMIN.				
FILE NO. 0.6.7.C. [illegible]				

S5702755

C-9231

III. LOCATION OF BORROS ANCHORS* FOR BORATED WATER TANK LOAD TESTS

ANCHOR	COORDINATES EAST	COORDINATES SOUTH
A-1	335	4585
A-2	292	4675
A-3	292	4585
A-4	180	4645
A-5	120	4645
A-6	150	4575

These will be installed under the supervision of Geotech, upon release to do borings from Engineering.

S8702756

I. SETTLEMENT MONUMENT READING PROCEDURE

1. Read monuments for tank farm area borated water tank TF-1 through TF-6 and every two weeks thereafter until engineering terminates the load test. (see drawings C-994 for location of monuments).

   All other monuments in tank farm area will be read every two weeks, until completion of load testing. Then readings will return the schedule specified on the drawing.

2. Three (3) borros anchors will be installed near each borated water tank to measure settlement of fill these will be located by Geotech and read on the same schedule as TF-1 through TF-6 (Item 1 above).

3. All monuments should be surveyed before any filling of tanks.

TANK FILLING PROCEDURE

1. Fill the tank (1/2) one half full and take readings as per settlement procedures, for a week period or until engineering concurrence to terminate this phase.

2. Complete filling of tank and monitor settlement as per settlement reading procedures.

S-702757

BECHTEL

ANN ARBOR

MEMORANDUM

TO: P. K Chen LOCATION:

FROM: B. Dhar / B.C. McConnel DATE: Oct 16 197[illegible]

SUBJECT: Buried Yard Pipe Settlement Analysis JOB NO: 7220-101

FILE: [redacted] /12 L 11

SOILS SETTLEMENT

Reference: Preliminary Settlement values for yard piping by G. Givens

The future settlement should not be extrapolated from the absolute elevations shown on GZD data sheets. The data was developed to define curvature rates. GZD's report dated February 1979 Vol indicates that the accuracy of data is approximately ± 0.02 feet and that the absolute elevations are only as accurate as the optical survey. Therefore it is requested that the secondary compression settlement estimate be establish in a similiar manner as the settlement due to dewatering to provide a consistent approach.

BD / BCM

S_70_764

10-521

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640

June 21, 1977

Consumers Power Company
P. O. Box 1963
Midland, MI 48640

Attention: J. L. Corley

Job 7220 Midland Project
Project QA Audit of Earthwork
Subcontractor No. 25-11-2 Closeout
GLR-6-77-202

Dear Mr. Corley:

Attached for your information is the closeout of the subject audit report.

Very truly yours,

G. L. Richardson

G. L. Richardson
LEAD QUALITY ASSURANCE ENGINEER

GLR/JGH/sw

Attachment

S3173614

QUALITY AUDIT FINDING

SA-1

9/14/76

25-11-2

..dland Units 1 & 2		Construction XXX	G. Richardson J. Hook
N/A	N/A	Canonie QA Manual	J. Connolly

Quality Control Notices Manual SF/PSP G-1.1

Section 7.1

"It shall be the responsibility of the Project Field Quality Control Engineer to assure that the work performed by on site subcontractors is done in full compliance with their Bechtel approved Quality Assurance/Quality Control Manuals and other quality requirements of the subcontract documents."

Contrary to the above; sections of the Bechtel approved subcontractors QA/QC manual (Canonie Construction Co.) are not being implemented, (some sections may not be applicable.) Upon further investigation, the approved subcontractor's manual is in direct conflict with Project approved specifications.

(following are examples of conflicts between the Canonie QA Manual and Project specifications.

SECTION17.0 Quality Assurance Program for Structural Fill (Soils) - Canonie QA Manual

1) 17.3 Quality of Material - "The soil shall ... contain no more than 40% minus #200 sieve material."

Spec. 7220-C-210; Table 12-1, sheet 1, "Zone 2 material ... random fill, gradation, no restrictions." (Continued on page 2)

1) Resolve the conflict between Canonie QA Manual and Project specifications.
2) Obtain clarification from Project Engineering as to which portions of this manual are applicable. It is recommended that portions of the manual that are not required be clearly indicated in the manual.
3) Require the subcontract to fully implement all portions of the manual determined to apply.

10/31/76 | PFQCE

The Canonie QA Manual dated August 16, 1976 and Addendum dated April 5, 1977 to Canonie's QA Manual dated August, 1976 were Project Engineering approved May 23, 1977.

This QA Manual and Addendum resolve conflicts previously noted in Quality Audit Finding SA-1. Canonie Construction Company shall be required to fully implement all requirements of their QA Manual when their work resumes.

8807 3615

6-1-77 J. Connolly PFQCE

[signature] 6-21-77

Block 11 continued:

2) 17.4 "A modified proctor compaction criterion will be used for field control of the backfill operations for soils containing from 12 to 40 percent fines ... work will be performed as described in ASTM designation D 1557-70 method A."

Specification 7220-C-210 Section 12.4.5.1

"The maximum dry density ... will be ... in accordance with ASTM D 1557 method D. Provided that the sample is prepared in four layers, each compacted with 25 blows ... (Bechtel modified proctor density test).

3) 17.5.1 "The in situ dry unit weight of the structural fill will be determined by the following two methods: a) water balloon b) sand cone."

Specification 7220-C-210 Section 12.4.4 "A nuclear density device may be used provided that the results are compatible with those obtained by the specified procedure."

4) 17.6.2 "Modified proctor tests will be conducted with every in situ dry density test..."

Specification 7220-C-208 Section 9.1a, "When directed by the contractor..."

5) 17.6.4 "One grain size analysis will be conducted for every 5,000 cubic yards of fill placed or each day backfill is placed."

Specification 7220-C-208 Table 9-1 "One per every 10,000 cubic yards of fill."

6) 17.8 2) "... all test equipment shall be calibrated and ceritifed at least once every two months.

Specification 7220-C-208 Table 9-1 "Frequency for each item to be submitted by subcontractor for contractor's approval." This involves another approved subcontractor's QA Manual (U.S. Testing Inc.).

S3173618

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640

June 14, 1977

Consumers Power Company
P. O. Box 1963
Midland, MI 48640

Attention: J. L. Corley

Job 7220 Midland Project
QA Audit Closeout 18-2-5
GLR-6-77-190

Dear Mr. Corley:

Attached for your information is the closeout of the subject audit report.

Very truly yours,

G. L. Richardson

G. L. Richardson
LEAD QUALITY ASSURANCE ENGINEER

GLR/JGH/sw

Attachment

S3173617

QUALITY ASSURANCE PROGRAM
PROJECT AUDIT REPORT

1 PROJECT Midland Units 1 & 2

5 AUDIT NO. 18-2-5

2 JOB NO. 7220

6 AUDIT DATE 4-1-77 to 4-29-77

3 TYPE OF AUDIT Construction

7 AUDITOR Jon G. Hook

4 ORGANIZATIONS AUDITED QC and U.S. Testing Co.

8 INDIVIDUALS CONTACTED T. Lieb, B. Cheek, J. Splitz, S. Edler, K. Kinkela, F. Teague

9 DESCRIPTION OF AUDIT (SCOPE AND EVALUATION)

This audit was an evaluation of constructions compliance with the requirements for performance at the on site test lab. This audit was accomplished using Checklist 18-2-P-4.

This audit included the review of the test results for, concrete materials, soils, concrete, both at the batch plant and in the field, and rebar properties. In addition, mill test reports/user's test/certificate of compliances, were reviewed for compliance for cement (12), flyash (15), water or ice (7), aggregate (4), and admixtures (7).

The results of this audit indicate that an isolated case in which UST did not indicate their review for flyash and admixtures certificate of compliances was found. This was brought to the attention of the lab chief and immediately corrected. Two instances in which Quality Control did not obtain Project Engineering evaluation on failing tests.were also found and has been identified on QAF SA-26.

With the exceptions on the areas noted above the effectiveness of the program characteristics audited were found to be satisfactory. The PFQCE has agreed to QAF SA-26 as stated.

10 DEFICIENCIES NOTED (QAF NO.) (SEE ATTACHED)	ACTION 11 RESPONSIBILITY	ACTION 12 COMPL SCHED DATE
QAF SA-26 Failure to obtain Project Engineering's evaluation on failing tests.	PFQCE	6/1/77

S3173618

AUDITOR(S) SIGNATURE Jon G. Hook DATE April 29 1977

BPC-20604
G1000432-01-01

QUALITY ASSURANCE FINDING

1. PROJECT/DEPARTMENT/SUPPLIER Midland Units 1 & 2	2. TYPE OF AUDIT/SURVEILLANCE OFFICE ☐ FIELD ☒ Construction	3. AUDIT IDENT. SA-26
4. AUDITOR Jon G. Hook	5. DATE OF FINDING 4-15-77	7. DISCUSSED WITH T. Lieb B. Cheek
6. CONTROLLING DOCUMENT, SECTION, PARAGRAPH, ETC. Spec. 7220-C-208, Rev. 9		

8. REQUIREMENTS

A) C-208, Rev. 9, Para. 6.1.1 "Subcontractor shall perform an acceptance test consisting of a complete chemical and physical analysis on a grab sample..." Spec. C-230, Rev. 9, Para. 7.1 "Ths cement shall not contain more than 1.00% by weight of alkalies calculated as Na_2O + 0.658 K_2O.

B) C-208, Rev. 9, Para 6.1.2 Chemical and physical properties of flyash and pozzolans shall be inaccordance with ASTM C-618. ASTM C-618-72 states that the requirements on the quantity of air entraining agent shall not vary more than 20%. . .

9. FINDING

Contrary to the above:

A) The acceptance test report for cement produced from Oct. 19-24, 1976 representing grind No. 6 did not indicate a test performed for Na_2O + 0.658 K_2O, yet the cement report was reviewed and accepted by QCE. (The test information was inadvertently left off and a corrected report was received April 15, 1977.)

B) The following two User's Tests on flyash have failing tests on the quantity of air entraining agent used (ASTM C-618 requires a max. of 20%).

SEE PAGE 2

10. RECOMMENDED ACTION/S

1) Determine how both above instances were accepted when they did not meet the required specification.
2) Investigate the reason why the prepared NCR on flyash was never validated and issued.
3) Have Project Engineering evaluate the acceptability of the flyash represented in shipments No. 54 & 55, or get an approved SCN to delete the requirement for rejection on the quantity of air entraining agents.
4) Take action to preclude repetition of the type of instance.

11. SCHEDULED COMPLETION DATE	12. RESPONSIBILITY FOR CORRECTIVE ACTION
6-1-77	PFQCE

13. CORRECTIVE ACTION TAKEN

Item 1 The QCE that reviewed the cement and pozzolan user's test was given additional training in the ASTM acceptance test requirements.

Additionally all user's test will be reviewed for QC acceptance by a Level II QCE.

Item 2 Project Engineering Disposition of NCR 572 states, "Variation in air content uniformity should be used as an indicator only and shall not be a cause for re-

14. DATE COMPLETED	15. SUBMITTED BY RESPONSIBLE AUTHORITY	16. CORRECTIVE ACTION	
6-7-77	J. Connolly	ACCEPTED (circled) / NOT ACCEPTED	Continued on Pg. 2. J. Hook QAE

17. VERIFICATION ACTIONS BY QAE

1) LETTER BCJE-1423R DATED 6-2-77, SENT TO PROJECT ENGINEER FROM PROJECT SUPT. REQUESTED AN EVALUATION ON THE 'FLY' ASH
2) TRAINING RECORDS QCFM-3011 DATED 3-11-77 AND QCFM-3000 DATED 3-10-77
3) COGNIZANT QCE'S HAVE BEEN INSTRUCTED TO WRITE NCR'S ON FAILING FLYASH TESTS

18. IMPLEMENTATION

ACCEPTED / NOT ACCEPTED — Jon G. Hook QAE — DATE June 13, 1977

DISTRIBUTION

S3173619

Block 9 continued

SHIPMENT NO.	DATE SAMPLED	TONAGE	TEST RESULTS
54	10-22-76	3430.58	25.9%; 30.9%
55	10-19-76	3360.43	25.6%; 32.6%

These User's Tests were reviewed and signed off by the QC Engineer. The corresponding QCI SC-1.05 for the month of December indicate the tests failed and a draft NCR was written on 12-21-76 but never validated and issued.

NOTE:

Project Engineering's response to NCR-572 which identified a similar problem with flyash states that "the variation in air content uniformity should be used as an indicator only and shall not be a cause for rejection. Air content requirements are established by Specification 7220-C-230 and adjustment to the air content admixture is made at the Batch Plant at the time of batching." However, no specification change has been made to indicate that the variation in air content uniformity shall not be cause for rejection.

S3173620

Quality Assurance Finding No. SA-26 Continued.

jection. Air content requirements are established by Specification 7220 C-230 and adjustments to the air content admixture is made at the batch plant at the time of batching".

The above rational was used in lieu of the initiation of an NCR.

Item 3 Pozzolan user's test #54 and #55 have been submitted to project engineering for evaluation.

Item 4 The responsible QCE's have been instructed to initiate Bechtel NCR's on any subsequent user's test failures.

S3173021

QUALITY ACTION REQUEST

From: G. L. Richardson   Site QA   Job 7220 (1)

To: (2) J. P. Connolly | Control Document ref.: (3) UST Manual | QAR Ident. No.: (4) SD-36

Action Requested: (5)

UST QA Manual Rev. 5, Sec. 6.2.5 states that "subsequent revisions to these procedures, however, shall be concurrently submitted for review and approval, and implemented by United States Testing."

Project Engineering has given Change Notice #1 to QCP-4 a Level 4 (disapproval). This is documented on letter BEBC-1615 dated 6-9-77 to J. F. Newgen.

Since the Change Notice was not approved, the original wording as stated in the QA Manual is applicable.

Direct U.S. Testing to identify, via an ICAR, all equipment that was calibrated since the issuance of Change Notice #1 to QCP-4 that did not meet the original criteria i.e. (4 to 1 ratio). UST to withdraw from service all equipment that had OVER

Signature: Jon G. Hook /GLR (6) | Date: 6-13-77 (7) | Reply Requested by: 6-16-77 – Identify + withdrawal; 6-21-77 – Resolution (8)

Reply: (9)

Signature: (10) | Date: (11)

Action Verified: (12) | Date: (13)

8/2/74

WHITE – Return to sender   CANARY – Addressee's file   PINK – Sender's file

BPC-20877
G1001649-05

8317?3622

been identified in the above ICAR, and hold for an evaluation and recalculate this equipment in accordance with approved criteria prior to further use.

S3173623

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640

June 6, 1977

Consumers Power Company
P. O. Box 1963
Midland, MI 48640

Attention: J. L. Corley

Job 7220 Midland Project
CPCo Comments on Bechtel NCRs
GLR-6-77-173

Dear Mr. Corley:

Ref: J. Corley letter to G. Richardson dated 4/25/77 (66FQA77)

In response to your concerns identified in the referenced letter the following is provided:

NCR-543 The NCR was closed out after a determination that the Drum Guard is a "Non-Q" item and therefore not a proper subject for an NCR. This determination is documented on page 4 of 5 of the Nonconformance Report. Concurrence of this disposition is found on page 5 of 5 of the NCR.

NCR-544 Bechtel also recognized that the disposition should be reject. The NCR was revised prior to your letter. Page 7 of 7 of this NCR documented the proper disposition on 3-1-77.

NCR-545 Specification G-27 does not provide for bending of structural steel. However, specification 7220-C-304 does provide for this bending. During this investigation additional problems with the disposition and closeout of this NCR were noted. These problems and required corrective actions have been documented on Quality Action Request SD-35.

NCR-550 Bechtel also recognized that the disposition should be reject. The NCR was revised prior to your letter. Page 12 of 12 of the NCR documented this disposition on 3-2-77.

NCR-667 We agree that a disposition of documentation may not be correct. However the work was accomplished in accordance with project specification and the drawing revisions in question were approved by the Resident Engineer as level one on 2-8-77. In addition this drawing has been forwarded to Project Engineering for their concurrence. As the hardware is correct no revision to the NCR is necessary.

S3173624

NCR-684 The QCE did use the work "rework" in his statement for disposition results (Block 25) however, the work was done in accordance with the approved disposition of standard repair. The use of the word "rework" in Block 25 does not have any effect on the item or the Nonconformance Report.

NCR-687 The disposition was not tied to slump loss in transit alone. The disposition indicated the cylinders at the batch plant made on the same batch (13059) would meet the specification requirements and that an increase in strength between the Batch Plant and placement is expected to occur. This disposition has been proved out in that the 90 day strengths for cylinders #1378 (which represent batch 13059) was 6795 PSI which is considerably higher than the required 6000 PSI. Based on this and the fact that an additional increase in strength of 900 PSI is expected between the Batch Plant and placement, the disposition of "Use-As-Is" is acceptable.

NCR-699 Bechtel QA also questioned this disposition on the NCR on 3-1-77. Reserach into the problem indicated that specification M-326 does allow the type of movement that resulted from this installation. Therefore the disposition that this is not a nonconforming condition is correct.

NCR-703 The disposition may very well be standard repair under present interpretations of PSP G-3.2. However, the hardware is not effected and no change will be made to the NCR.

QAF SA-8 We feel no further corrective action is necessary as US Testing home office was made aware of this single occurrence. In addition Quality Control has the responsibility to assure proper testing methods are used and documents this on QCI C-1.30 and QCI SC-1.05. Also it is QC's intent to observe the first test run by each temporary technicial assigned to this site.

Very truly yours,

G. L. Richardson

G. L. Richardson
LEAD QUALITY ASSURANCE ENGINEER

GLR/sw

S3173625

Consumers Power Company

Midland Project: P.O. Box 1963, Midland, Michigan 48640 • Area Code 517 631-0951

QA ROUTE | INFO | ACT.
LQAE
CIVIL (1) X
CIVIL (2) X
MECH X
PIPING
ELECT. X
INST.
SEC'Y
FILE NO. 2400

RECEIVED
APR 25 1977
BECHTEL POWER CORP.
JOB 7220
So I-77-38

April 25, 1977

Mr. G. L. Richardson
Bechtel Power Corp.
P.O. Box 2167
Midland, MI 48640

MIDLAND PROJECT - REVIEW OF NONCONFORMANCES FOR MARCH 1977 ALAB-106 REPORT
File: 0.4.6 & 16.10.2 Serial: 66FQA77

A review of the subject ALAB report has resulted in the following questions:

NCR 543 - The disposition for part A2 indicates that a coupling guard is to be sent and installed at a later date. Has this coupling guard been received? If not, how is this item being held open since the NCR has been closed?

NCR 544 - The actual disposition appears to be "reject". Why is block 24 marked "rework" and "use-as-is"?

NCR 545 - Does C-27 also cover bending? If not, what was the Project Engineering approved procedure?

NCR 550 - This again appears to be a "reject" disposition not "rework" and "use-as-is" as stated in Block 24.

NCR 667 - Block 22 does not indicate by whom the drawing was revised. However, the sketch number would seem to indicate a field revision. A field revision to a drawing so that a "use-as-is" condition results is in violation of procedures which requires "use-as-is" dispositions to be made by Project Engineering. Please investigate this situation and take the necessary corrective action.

NCR 684 - Since the disposition block has been revised to indicate a standard repair, why doesn't Block 25 indicate a standard repair rather than rework as stated?

NCR 687 - This NCR indicates that <u>end of line</u> slump was high for ticket #13059, but the disposition is tied to slump losses in transit which does not appear to be a valid point. This disposition will have to be corrected.

Talk with Jerry

SB173628

Dresit letter

NCR 699 - This represents a "use-as-is" disposition by Field Engineering and as such is improper and not in accordance with procedure. This NCR, therefore, must be corrected.

NCR 703 - In no way can this be considered a "rework" item. It is obviously a "repair," possibly a standard repair.

QAF SA-8 - Additional corrective action is needed to assure that U.S. Testing does not send us people who were at one time qualified but who are no longer familiar with testing requirements.

J. L. Corley
Qualit, Assurance Superintendent

CC: JPConnolly
TCCooke
DRJohnson
GSKeelcy
BWMarguglio
JMilandir
HWSlager

SB173627

Consumers
Power
Company

Midland Project: P.O. Box 1963, Midland, Michigan 48640 · Area Code 517 631-0951

May 25, 1979

Harry - Ask Geo Tech
if they were originally
aware / J

Mr L A Dreisbach
Bechtel Power Corp
PO Box 2167
Midland, MI 48640

MIDLAND PROJECT - FURTHER CORRECTIVE ACTION
REQUIRED PRIOR TO Q-LISTED BACKFILL PLACEMENT
File: 16.0 Serial: 181?QA79

It has come to our attention that on April 18, 1979 field density/moisture test 3432 in the Oily Waste Area had results of in-place dry density 133.3 and moisture content of 12%. Plotting these results on the Compaction Test (Proctor Curve) shows the results fall to the right of the zero air voids curve. The importance of understanding this anomaly cannot be too strongly stated based on the past settlement problems for which no clear cut base cause has ever been ascertained.

This problem must be understood and resolved prior to Q-listed backfill placement beginning in addition to the 13 action items attached to letter BCCC-3995 to TCCooke from JFNewgen dated May 4, 1979. Please consider this problem as action item 14.

D E Horn
for W R Bird
Section Head - QA Engineering, Midland

WRB/DEH

CC SAfifi
TCCooke
JLCorley
GSKeeley
BWMarguglio
[redacted]
DBMiller
JFNewgen
GLRichardson
JWanzeck
KWiedner

Job 7220-QA-Received 5/25/79
Log No. ______ File No. ______
Response Req'd ______ Date ______
QA Action Item No. ______

Route	Info	Act	Comment
PQAE			
Resp. Cor.			
Elect (1)			
Elect (2)			
Civil Mch			
Pipe/Weld			
Inst.			
Vn Ovr			
Trend			
Sect.			

SB173407

Bechtel Power Corporation

Interoffice Memorandum

To	J. Wanzeck Ann Arbor
Subject	Progress Report # 11 Test Fills (week ending July 21, 1979) Midland 1 & 2 Job 7220
Copies to	

File No.	
Date	July 25, 1979
From	N. M. Thiel
Of	Geotech - Ann Arbor
At	Midland, MI

GEOTECH
ANN ARBOR
DISTRIBUTION

DISC	ACT	INFO	W/A
MGR		1	
ADMIN			
DRFT			
SOILS		2	
		3	
		4	
		5	
Proj Mg			
Proj Eng			

JOB 7220 FILE

REC'D JUL 26 1979

There was no test fill construction activity this week.

Partial results on test fill no. 9 indicates about 12 density tests making 95% compaction or better. Also 24 of the 25 density tests taken will be 90% compaction or better. One density test is 89.0% compaction.

N. M. Thiel

N. M. Thiel
Geotech - A²

NMT/cas

sri

SOIL & ROCK INSTRUMENTATION

GEOTECH
ANN ARBOR
DISTRIBUTION

DISC	ACT	INFO		
MGR		1		
ADMIN				
DRFT				
SOILS		2		
		3		
		4		
		5		
Proj Mgr				
Proj Eng				1240
JOB 7220		FILE		3900
REC'D AUG 17 1979				

GEOTECHNICAL ... GOLDBERG - ZOINO ... & ASSOCIATES, INC.

August 13, 1979
File No. D-2010-C

Dr. Sherif Afifi,
Bechtel Associates Professional Corporation,
P.O. Box 1000,
Ann Arbor, Michigan 48106

Re: Midland Units 1 & 2
Diesel Generator Building
Settlement Measurements

Dear Sherif:

I have reviewed the modified Borros anchor settlement data through August 2, 1979, recently sent to you by SRI, in an effort to see whether measurement objectives are being met. Plotted data is summarized on enclosed Table 1. The contours on Figure 1 are based on data from the four anchors set at elev. 535 ft. Figure 2 is prepared from Table 1. I have the following comments:

1. BA 61 through 64 data indicates that those four points on the mezzanine floor are settling in a plane (i.e. 3 points define a plane, and the fourth lies on it). Referring to the set of 8½" x 11" sheets handed out during a meeting in early June, the contour orientation defining this plane is between the orientations on the fifth sheet (attached here as Fig. 3) and the sixth sheet (Fig. 4). Hence orientation appears consistent.

2. I've used Fig. 1 to determine NW and SE absolute settlements for the 60-120 day elapsed time period, and added these to your third sheet from the early June meeting (attached Fig. 5). Settlement rates appear consistent. This fact supports the contention that BA 61 through 64 data are absolute settlements, i.e. that elev. 535 ft is below the seat of settlement, because your plotted data are referenced to a deep benchmark. Sondex data will give further imput to this, as they will include a pattern of vertical movement throughout the foundation above elev. 535 ft.

SB171085

3. Fig. 2 indicates the same type of scatter noted on the optical survey Borros anchor and settlement platform plots (Eleventh sheet of your June meeting handout, here as Fig. 6) and I recommend that you work with these data in cluster groups, as you did to derive the twelfth sheet (Fig. 7). Fig. 2 shows, as it should, generally lesser settlement with depth and generally lesser settlement towards the NW zone. It also shows continuing settlement below elev. 585 ft. I believe it is realistic to add the four BA 61 through 64 points (0.230, 0.195, 0.140, 0.085 inches) on Fig. 2 at the elevation of the bottom of the footings (628 ft ?), i.e. to assume no significant length change between footings and mezzanine floor.

4. As described in Bill Beloff's July 13, 1979 letter to you, the plotted data are not yet corrected for temperature per se, but in general exclude afternoon readings. A study of temperature data to date (temperature readings and invar rod deformation readings) indicate that any temperature corrections will be minor.

5. Would you please give some thought to the need for settlement readings after surcharge removal, as per page 3 of my May 31, 1979 letter to you, so that we can be sure SRI has sufficient lead time to obtain any required materials.

Please call me if you have any questions on this.

Sincerely,

Joseph D. Gunter Jr.

C. John Dunnicliff
Geotechnical Instrumentation
Consultant

CJD:mc

cc: Walter R. Ferris,
Bechtel, San Francisco

SRI GEOTECHNICAL INSTRUMENTATION ENGINEERS

SB171086

TABLE 1. MODIFIED BORROS ANCHOR DATA

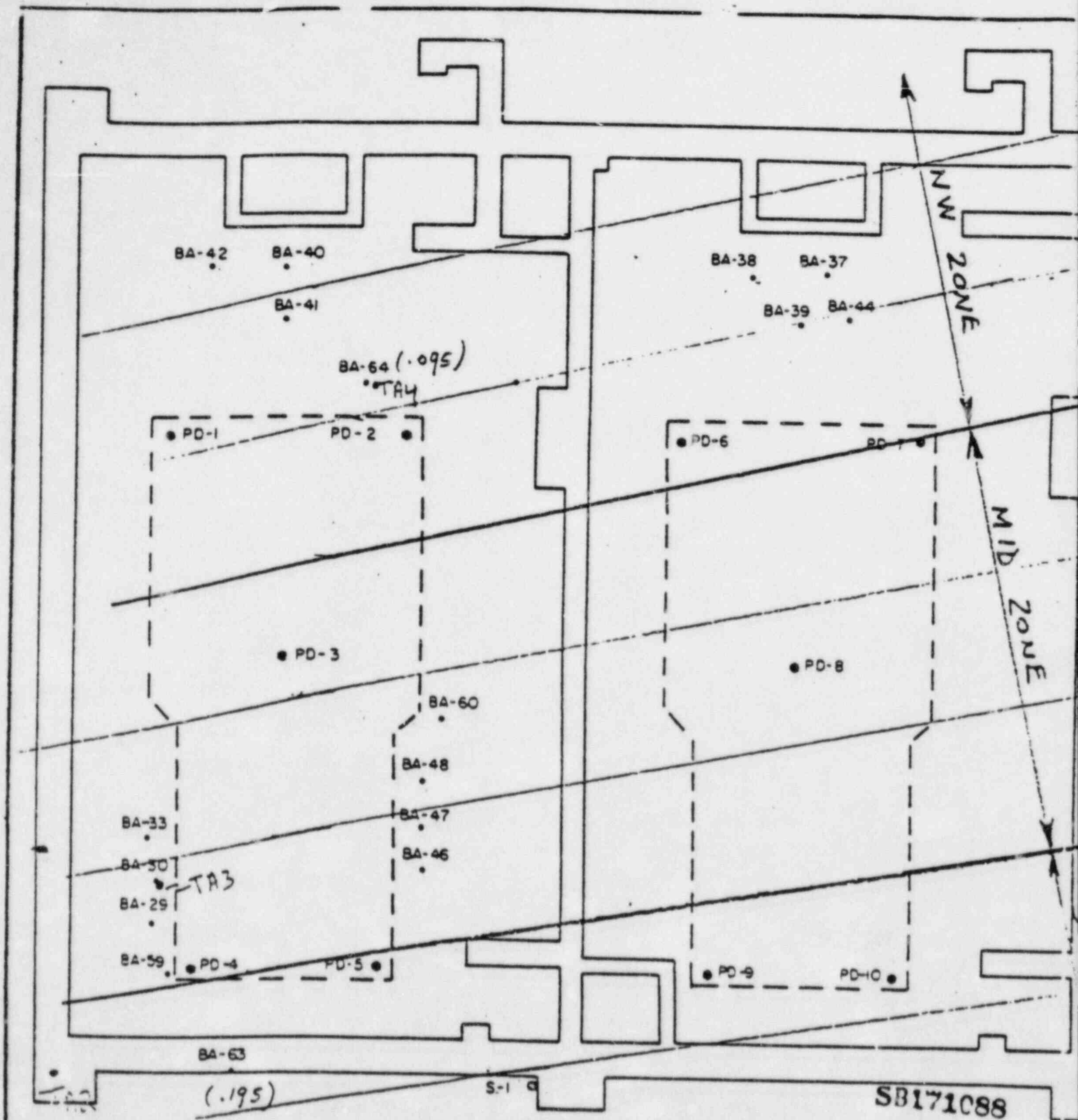
MODIFIED B.A.#	ANCHOR ELEV. ft.	RELATIVE SETTLEMENT in. (1)	ABSOLUTE SETTLEMENT OF MEZZANINE FLOOR AT ANCHOR LOCATION in. (2)	ABSOLUTE SETTLEMENT OF ANCHOR in. (3)	ZONE (4)
2	616.0	.035	.170	.135	MID
3	603.5	.040	.163	.123	MID
9	607.4	.095	.186	.091	SE
10	615.0	.095	.181	.086	MID
12	591.5	.075	.170	.095	MID
17	584.5	.035	.110	.075	NW
20	612.0	.040	.125	.085	MID
25	611.0	.045	.196	.151	SE
29	622.0	.020	.170	.150	MID
30	615.3	.035	.163	.128	MID
31	615.0	?	.192	?	SE
33	609.0	.070	.156	.086	MID
37	606.2	.020	.094	.074	NW
38	613.0	0	.092	.092	NW
39	622.0	0	.010	.010	NW
40	615.0	.030	.076	.046	NW
41	608.0	.015	.083	.068	NW
42	591.4	.045	.074	.029	NW
44	599.1	.025	.010	-.015	NW
49	599.5	.065	.175	.110	MID
52	586.0	.050	.121	.071	MID
61	535.0	.230	.230	0	SE
62	535.0	.140	.140	0	MID
63	535.0	.195	.195	0	SE
64	535.0	.095	.095	0	NW

(1) Relative settlement between anchor and mezzanine floor, between elapsed time 60 to 120 days, extrapolating as necessary on plots updated through August 2, 1979.

(2) Based on contours drawn using BA 61 through BA 64 data - See Figure 1.

(3) Difference between two previous columns.

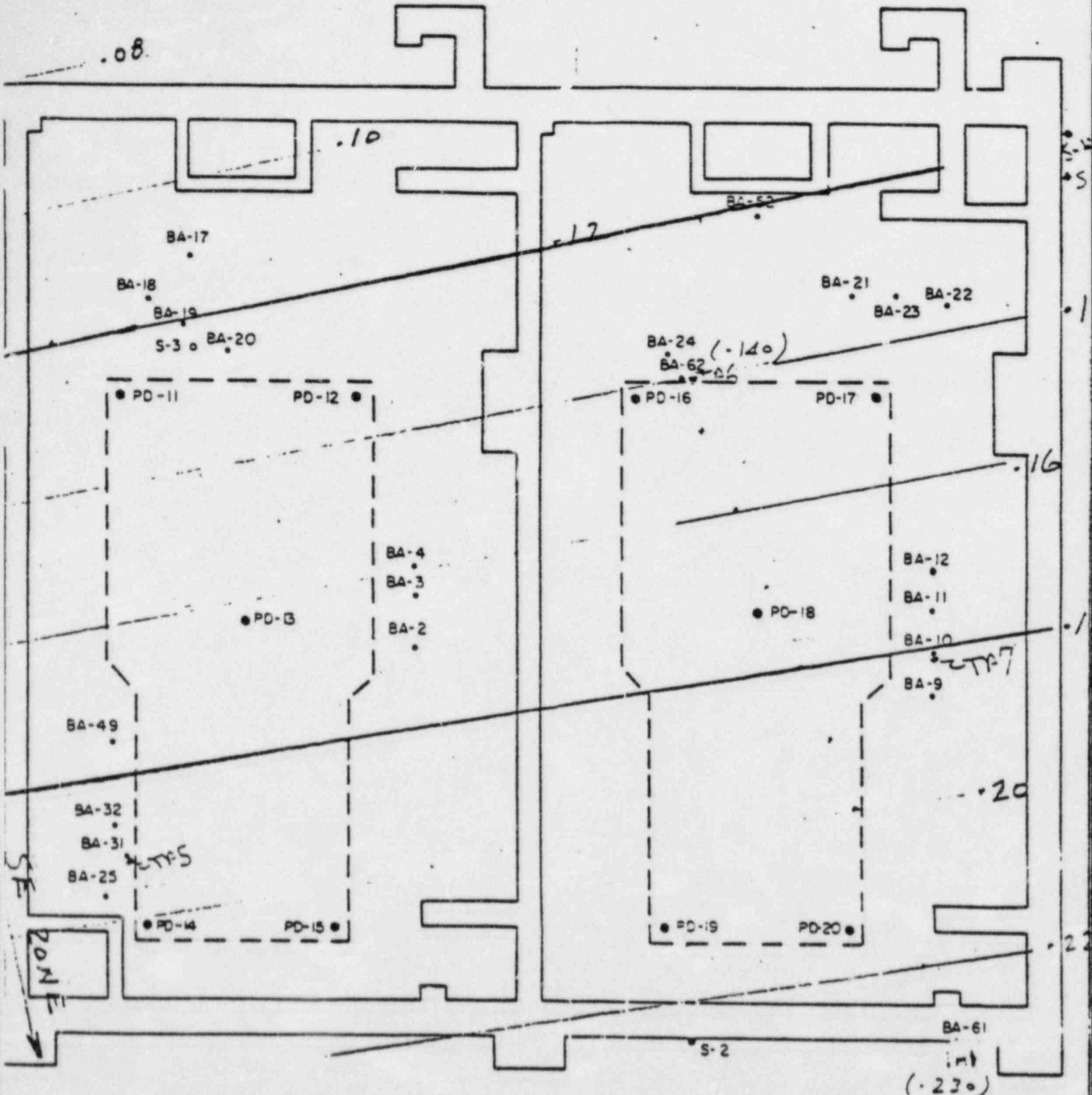
(4) See Figure 1 for zone locations.



SB171C88

Contours of absolute settlement of mezz floor br
time 60 to 120 days (day zero = Apr. 7, 1979),
based on BA 61 thru BA 64 data, assuming the
four anchors at elev. 535 ft are adequate benchmar

sri GEOTECHNICAL INSTRUMENTATION ENGINEERS



tween clapsed

DIESEL GENERATOR BUILDING
MIDLAND PLANT - MIDLAND, MICHIGAN

SB171089

LOCATIONS OF MODIFIED BORROS ANCHORS

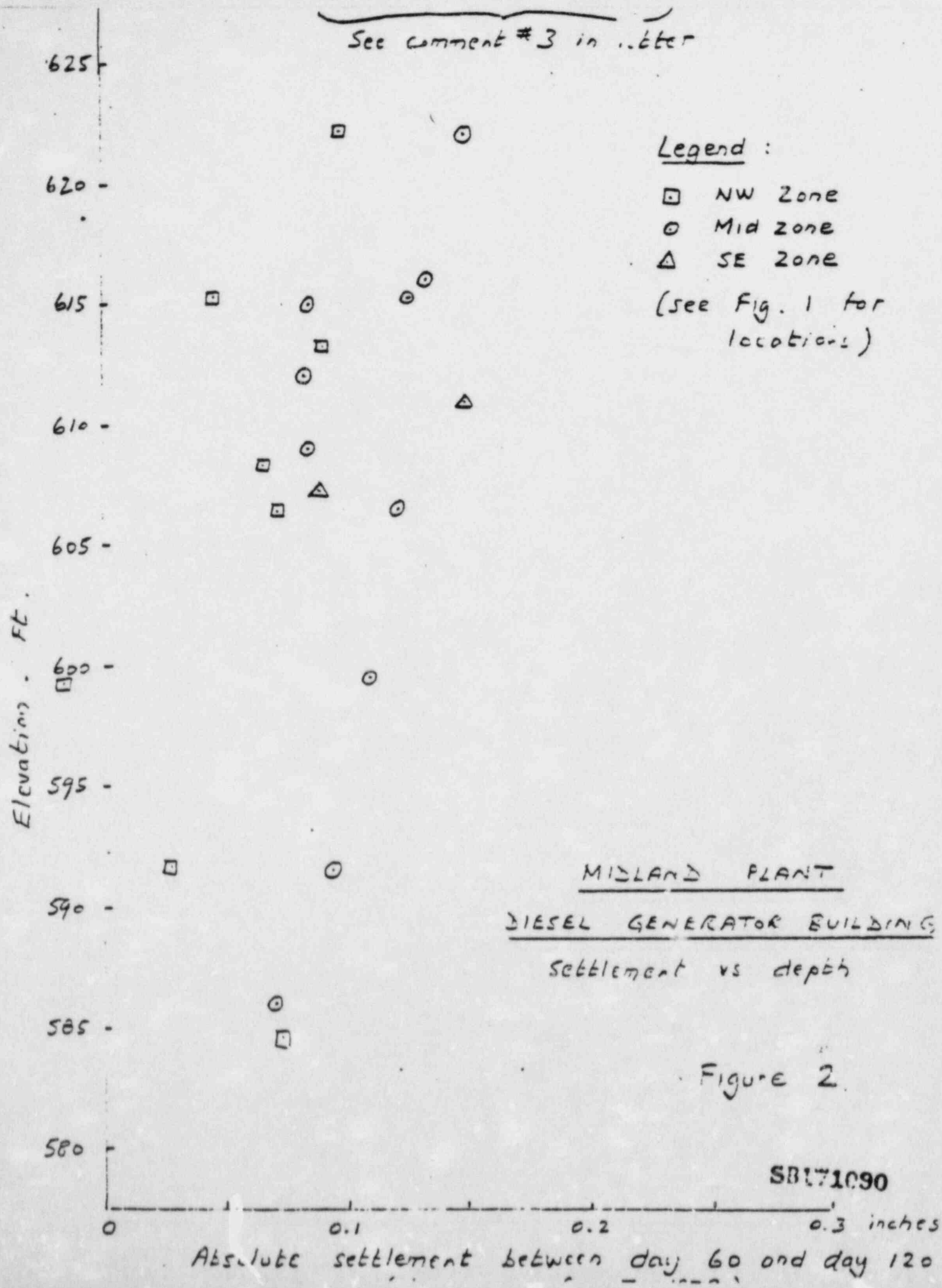
e

ks.

JULY 1979

SCALE: 1" = 10'

FIGURE 1



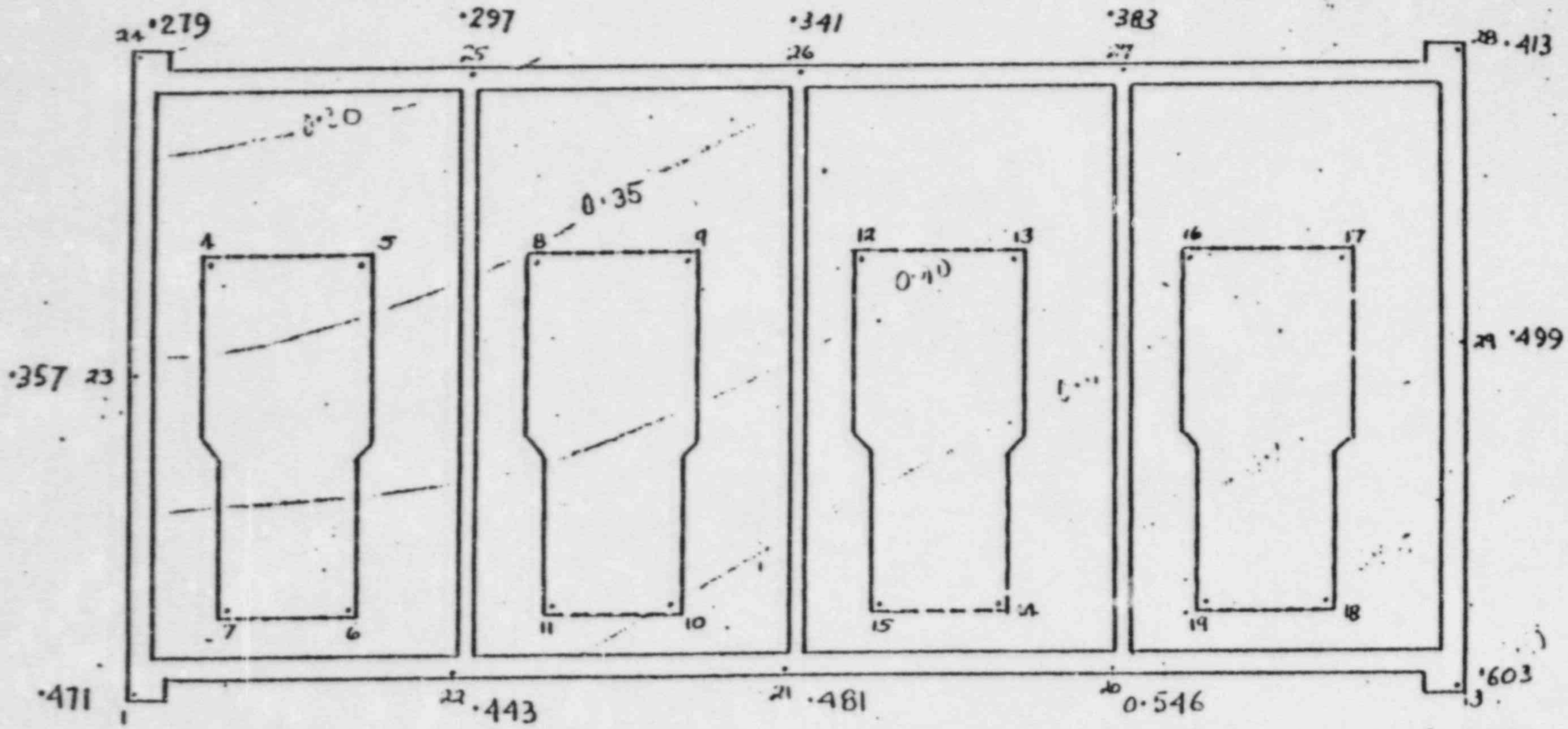
MIDLAND PLANT

DIESEL GENERATOR BUILDING

Settlement vs depth

Figure 2

SB171090

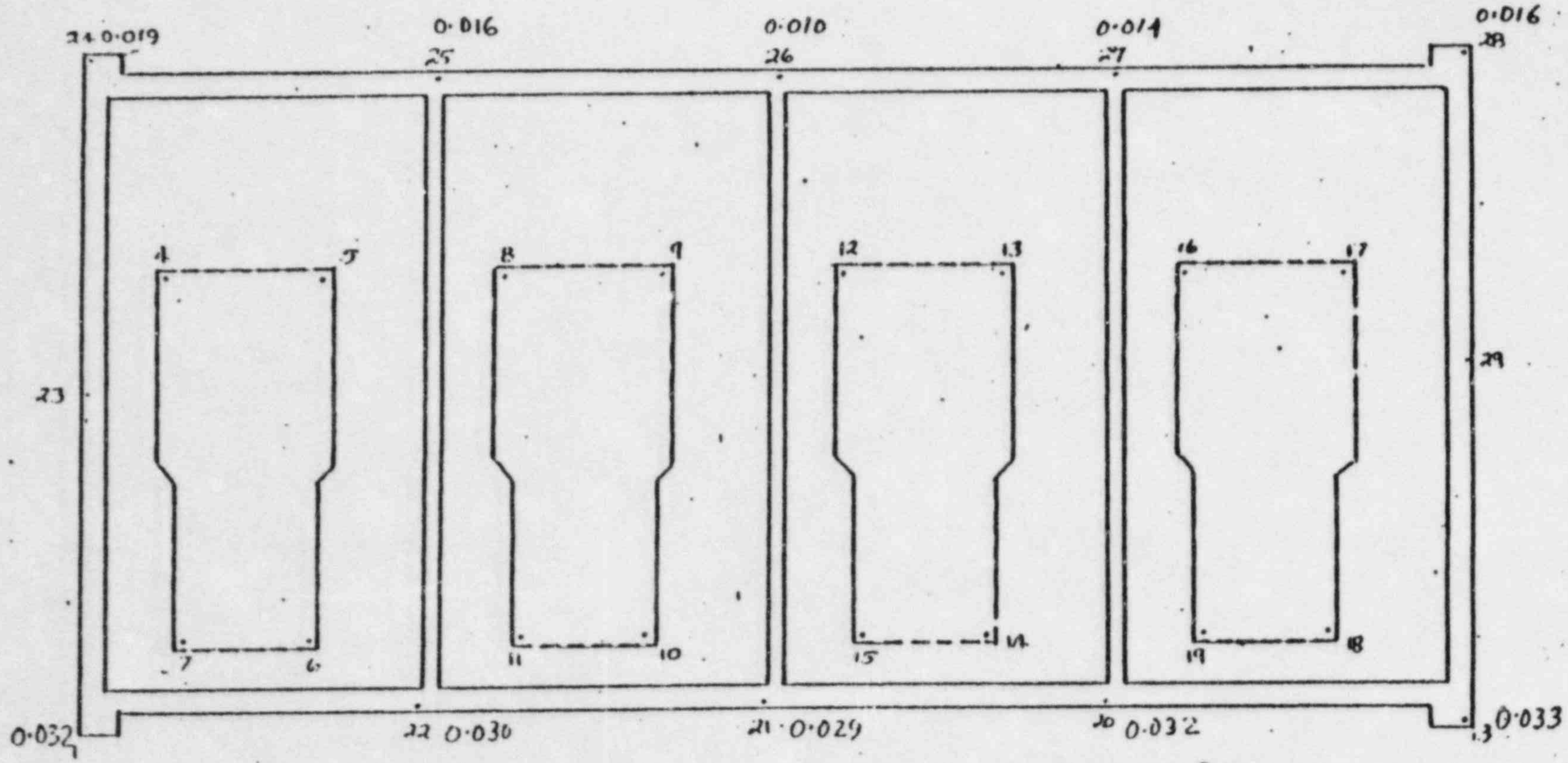


SETTLEMENT MARKERS : TOTAL SETTLEMENT OF WALLS TO 6-7-79

READING IN feet; TOTAL SURCHARGE OF 20 ft. (2200 PSF).

Figure 3

SB171C91



SETTLEMENT MARKERS: TOTAL SETTLEMENT OF WALLS FROM 4-13-79 to 6-7-7.

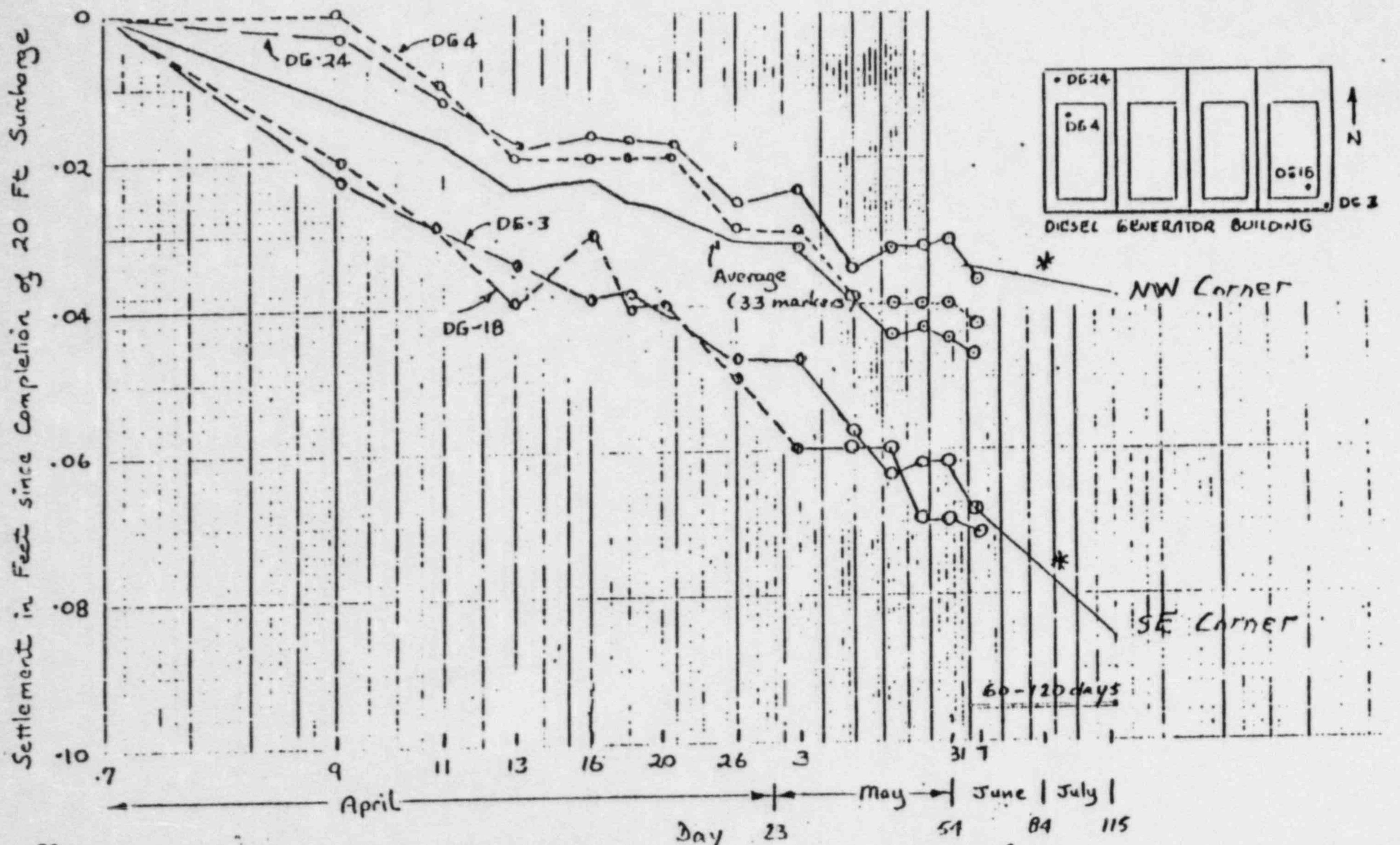
Reading in feet; 0 feet of surcharge added during this period

SURCHARGE OF 20ft. (2200 psf).

Contours approx. E-W.

Figure 4

SB171092

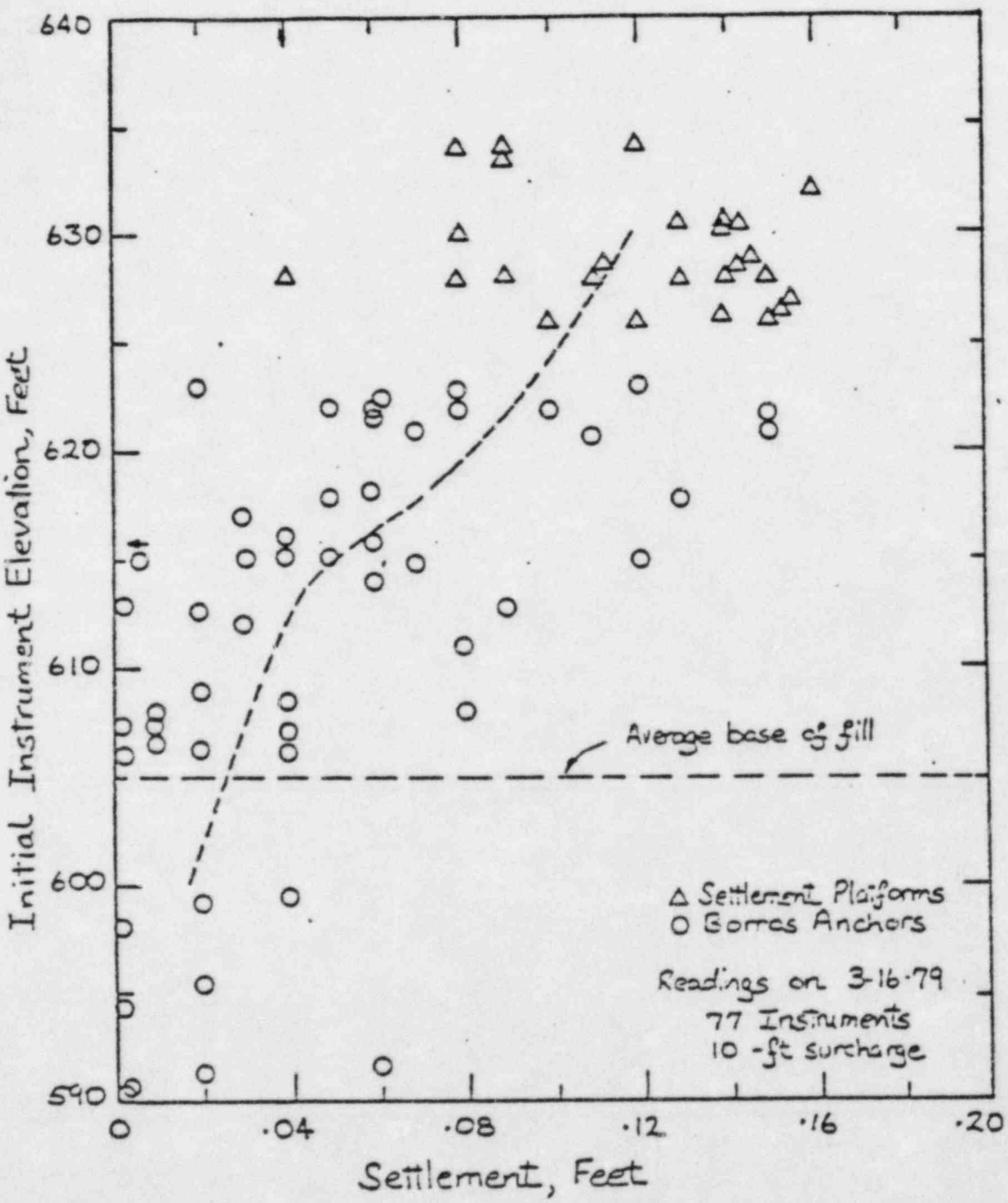


DIESEL GENERATOR BUILDING : SETTLEMENT VERSUS LOG TIME

* Data from modified BP 61 thru 64, using plot of absolute settlement contours (Fig. 1)

Figure 5

SB171093

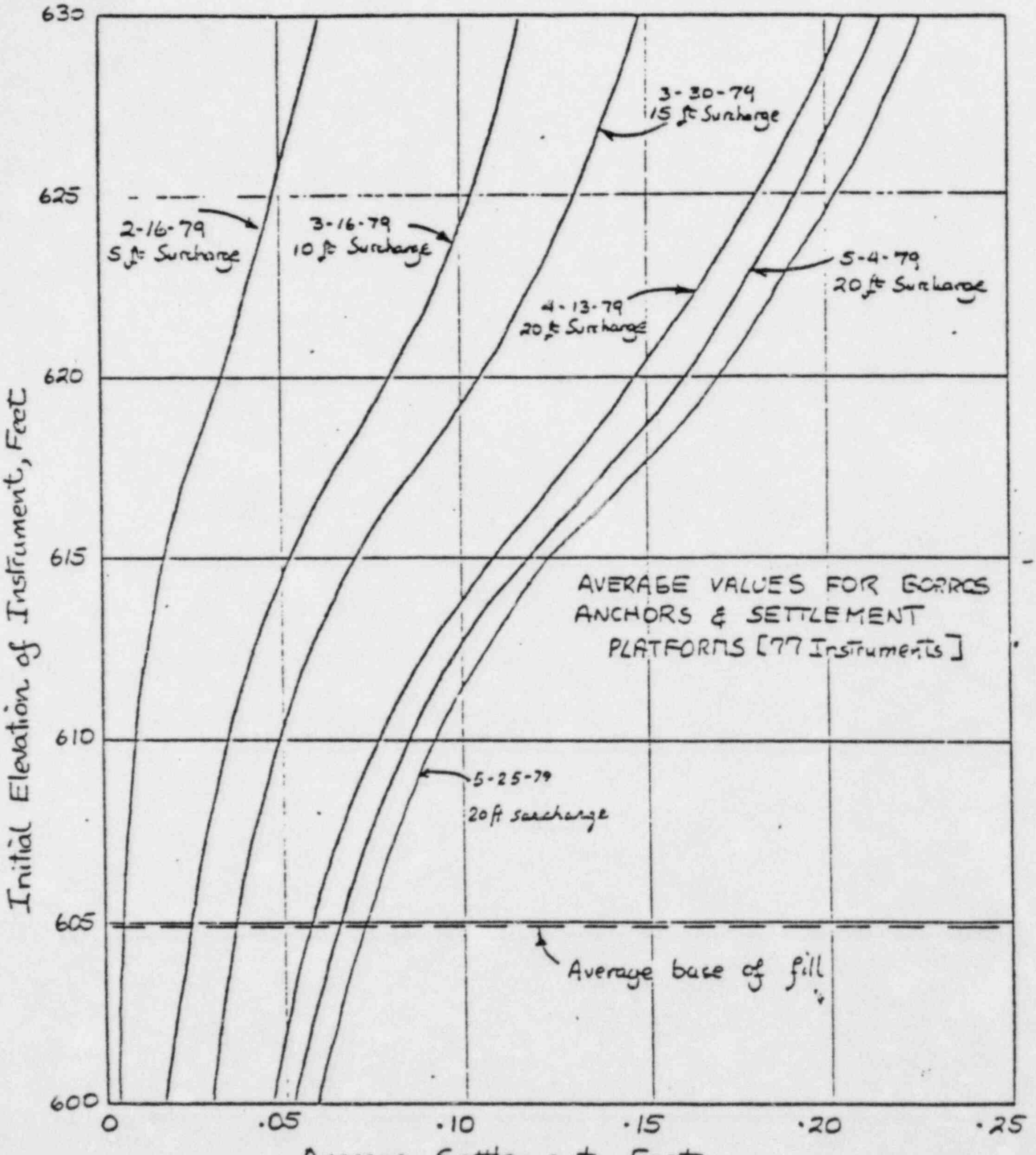


DIESEL GENERATOR BUILDING

SORROS ANCHORS & SETTLEMENT PLATFORMS

SB171094

Figure 6



SB171095

Figure 7

Canonie CONSTRUCTION COMPANY / P.O. BOX 509 / U.S. 31 & M-43 / SOUTH HAVEN, MICHIGAN 49090 / (616) 637-1171

RECEIVED
ACCOUNTING
SEP 1 3 1974

September 11, 1974

BECHTEL POWER CORP.
JOB 7220

Bechtel Power Corporation
P. O. Box 2167
Midland, Michigan 48640

Re: Subcontract 7220-C-210
Job 7220 Midland Project
Zone I Fill Material

Gentlemen:

During our meeting of September 5, 1974, Bechtel Corporation indicated that we did not have all the data relating to natural moisture content and grain size data for Zone I fill material. Specifically, you referred to the following data which we feel is necessary to properly evaluate the apparent discrepancies between the results obtained by Bechtel and E. D'Appolonia Consulting Engineers:

1. Several borings have been made on the "Murgard Property." Please give us the boring logs and corresponding laboratory data obtained form these borings.

2. We would like all Bechtel data relative to natural water content of borrow area materials (per section 12.4.1 of the contract specifications) also, grain size distribution data that may have been conducted on these samples.

3. We also request a summary of all Proctor Tests conducted in the borrow area and in the fill. Grain size distribution data and plasticity data associated with these tests is also requested.

4. If laboratory tests were conducted on the original contract boring information, we would like this information.

We request this information to resolve any discrepancies that exist between Bechtel and Canonie analysis of the nature of actual Zone I fill material and its relation to the original specified material.

Very truly yours,

CANONIE CONSTRUCTION COMPANY

Jack McKane

Jack McKane, Vice President
Earthmoving Division

RH:jkb

SBF 61177

Canonie CONSTRUCTION COMPANY / P.O. BOX 509 / U.S. 31 & M-43 / SOUTH HAVEN, MICHIGAN 49090 / (616) 637-1171

RECEIVED
AUG 22 1974
BECHTEL POWER CORP.
JOB 7220
PER C-210-33

August 21, 1974

Bechtel Power Corporation
P. O. Box 2167
Midland, Michigan 48640

ATTN: Mr. E. E. Felton
Project Superintendent

SUBJECT: QA-QC Record Audit
7220-C-210
N-75

Dear Sir:

Enclosed, please find the original of the audit of jobsite QA-QC records made by J. H. McKane, the Project QA-QC Manager, on August 12, 1974.

Very Truly Yours,

E. R. Haney
Project Manager
Midland

cc: J McKane

ERH/kls

SB161178

CANONIE CONSTRUCTION COMPANY

QA-QC PROGRAM AUDIT

1. PROJECT NO. 7220
   SUBCONTRACT C-210
2. DATE 8-12-74
3. CONTROL NO. ____
   FILE NO. ____

4. CANONIE CONSTRUCTION COMPANIES CONTROLLED QA-QC PROGRAM REQUIREMENTS REVIEWED:

SECT	DESCRIPTION	ACCEPTABLE	UNACCEPTABLE
1.0	ORGANIZATION	✓	
2.0	QUALITY PROGRAM	✓	
3.0	DESIGN CONTROL	NA	NA
4.0	PROCUREMENT DOCUMENT CONTROL	NA	NA
5.0	INSTRUCTIONS, PROCEDURES, AND DRAWINGS	✓	
6.0	DOCUMENT CONTROL	✓	
7.0	CONTROL OF PURCHASED MATERIAL, EQUIP, AND SERVICES	NA	NA
8.0	IDENTIFICATION AND CONTROL OF MAT'L, PARTS, & COMP	✓	
9.0	CONTROL OF SPECIAL PROCESSES	NA	NA
10.0	INSPECTION	✓	
11.0	TEST CONTROL	NA	NA
12.0	CALIBRATION OF MEASUREMENT AND TEST EQUIPMENT	NA	NA
13.0	HANDLING, STORAGE, SHIPPING, AND PRESERVATION	NA	NA
14.0	INSPECTION AND OPERATING STATUS	✓	
15.0	NON-CONFORMING MATERIALS, PARTS, OR COMPONENTS	✓	
16.0	CORRECTIVE ACTION	✓	
17.0	QUALITY PROGRAM RECORDS	✓	
18.0	AUDITS	✓	

5. INSPECTION LOCATION Middle J Job Site

[signature]

CANONIE CONSTRUCTION COMPANY

SB161180

CCC QA-QC PROGRAM AUDIT (CONT)

6. VISUAL INSPECTION

7. STANDARD/CODE/PROCEDURE/DRAWING/SPECIFICATION IS CANONIE'S QA/QC PROGRAM UNDER SPEC. C-210 REV. 7/26/73

8. INSPECTION EQUIPMENT USED- NONE

9. RESULTS OF INSPECTION: SATISFACTORY ✓ END OF REPORT
UNSATISFACTORY ____ REFER TO ITEM 10

10. COMMENTS/CORRECTIVE ACTION:

CANONIE CONSTRUCTION COMPANY

SB161-181

Canonie CONSTRUCTION COMPANY / P.O. BOX 509 / U.S. 31 & M-43 / SOUTH HAVEN, MICHIGAN 49090 / (616) 637-1171

May 17, 1974

RECEIVED
MAY 21 1974
BECHTEL POWER CORP.
JOB 7220
PER C-210-15

Bechtel Power Corporation
P. O. Box 2167
Midland, Michigan 48640

Attention: Mr. E. E. Felton, Project Superintendent

Subject: Midland Project Contract

Gentlemen:

At the request of your jobsite personnel, consider this correspondence our request for a meeting to discuss the problems that have been, and are being, encountered with attempting to place Zone 1 fill on the subject project.

The difference in characteristics of the fill material, from that on which our proposal was based necessitating the change in specification as per Change Notice #6F, has resulted in the following:

1. Because of the finer gradation of the material, it has been necessary to exert significantly more effort in order to get the material within the specification requirement on moisture, resulting in higher cost.

2. This also results in our not being able to place fill on many days because it is impossible to dry the material to the specification requirement prior to receiving additional rainfall, resulting in delay time on our equipment and personnel as well as schedule.

We feel a meeting could be significantly beneficial from both a schedule and financial standpoint. Possibly something can be done to initiate a more workable specification that will enable the job to progress much more rapidly and economically.

Because of the finer material encountered in the borrow area, we are looking at a significant cost differential which could result in a large claim if the present specification has to be adhered to. If the moisture requirement can be relaxed, we feel that the required densities can still be attained with a minimum of additional compactive effort lessening the possible claim very significantly. It would also enable us to work on many days that we are, at present, unable to work,

SB1911-1SO

Canonie CONSTRUCTION COMPANY / P.O. BOX 509 / U.S. 31 & M-43 / SOUTH HAVEN, MICHIGAN 49090 / (616) 637-1171

resulting in an earlier completion date and thereby significantly lessening the possible claim due to standby charges.

We feel that it would be beneficial to all parties concerned to hold a meeting as soon as possible in order to come to an early solution to our mutual problems.

We await your earliest reply.

Very truly yours,

CANONIE CONSTRUCTION COMPANY

Jack McKane, Vice President
Earthmoving Division

JM:jkb

SB161191

Bechtel Power Corporation

Post Office Box 2167
Midland, Michigan 48640

June 18, 1974

Canonie Construction Company
P. O. Box 509
South Haven, Michigan 49090

Attention: B. Haney (Jobsite)

Dear Mr. Haney:

Job 7220 Midland Project
Subcontract 7220-C-210
Zone 4 Materials
B-C-210-65

This is in answer to your letter of May 7, 1974 requesting that you be allowed to substitute Zone 4 Material in lieu of 4Z Material for expediting your work during the 1974 construction season.

The change to Specification 7220-C-210 (SCN #4001) was initiated in response to your request for Zone 4Z, i.e. due to difficulty in procuring Zone 4. If conditions have now reverted back to Zone 4 being the most available, you may proceed with the use of Zone 4 for both Zone 4 and 4Z.

This request is approved provided there is no change in prices for Bid Item #19, Exhibit "C", Section 2, Schedule of Quantities and Prices.

Very truly yours,

E. E. Felton

E. E. Felton

EEF/JCC/HJS/ja

cc: T. C. Valenzano
J. R. Serafin

SB161520

Bechtel Power Corporation

Interoffice Memorandum

To J. C. Church

Date January 15, 1975

Subject Job 7220 Midland Project
Final Summary of Dike
Construction for 1974

From J. Serafin

Of Construction

Copies to

At Midland, Michigan

PROBLEMS ENCOUNTERED AND METHODS USED TO ELIMINATE THEM

1. Oversize rocks and organic material inadvertantly placed in Zones 1 & 2 by Subcontractor.

   Whenever this violation was encountered, empty motor scrappers were routed over the affected area for removal of these non-conforming materials from the Dike.

2. Contamination of Sand Drain caused by traffic (construction equipment) crossing over it.

   Contamination was the result of clay soils bing mixed into the clean Zone 3 material. This situation was remedied by the removal of the contaminated soils from the Zone 3 areas and reusing it in the Zone 2 areas.

3. Material being placed on Dikes without control during shaping of slopes.

   The Subcontractor was informed that whenever this situation existed, the material being pushed up onto the top of the Dikes from the slopes would be considered as a material placement and would have to be documented and controlled as such (i.e.; compaction and moisture requirements).

4. Saturated soils placed on Dikes.

   When this situation existed, the Subcontractor was instructed to either remove or recondition this material before placement of additional materials would be allowed.

5. Sandy soils being placed as Zone 1 material.

   Any soils inadvertently placed in Zone 1 that could not be classified as impervious were removed by routing empty motor scrappers over the affected area.

SB1?1?13

PLACEMENT MONITORING

1. One (1) foot lifts were checked by

    a) Grade stakes
    b) Eye level
    c) Direct measurement
    d) Load count
    e) Visual

2. All spreads were monitored daily by Bechtel Subcontract personnel.

TESTING (Zones 1 & 2)

As per Specification C-208, the frequency of moisture and density tests is approximately one (1) per every 500 cyd. of fill and for compaction (proctors) one (1) per every 10,000 cyd. of fill.

The frequency for moisture and density tests utilized only passing tests and are as follows:

Dike	Frequency	CYd	#Tests
N.E. & N. Plant & Berm	384	450,023	1171
W. Plant	441	47,650	108
N. Miller	425	157,168	370
N.W. & West	452	103,527	229
South	477	262,561	550
East	542	425,853	785
Baffle	223	18,525	83
Plant Fill (Canonie Only)	130	11,305	87
Overall	436	1,476,612	3383

This frequency does not take into account those tests that failed or were taken for field information only. Spot tests were taken after rains to ensure that a previously tested and okayed Dike was still satisfactory to place additional materials.

Tests were taken in a random method in order to ensure that all areas and elevations were represented by the above frequencies.

This frequency utilized load counts for computation. Final quantities from cross sections will be forthcoming.

The last lift on the east and south dikes has not been cleared by passing tests. These areas will be retested when earthwork resumes. This accounts for the lower frequency on these dikes.

James Serafin
J. R. Serafin

JRS/ch

Item	Estimated Quantity and Unit	Item Description	Unit Price $	Total Price $
1.0		Visual classification (at the laboratory)		
1.1	200 Ea	Undisturbed clay samples	25.00	5000.00
1.2	25 Ea	Undisturbed sand samples	10.00	250.00
1.3	150 Ea	Split spoon samples	4.00	600.00
1.4	50 Ea	Bag sample handling	20.00	1000.00
2.0		Grain size analysis		
* 2.1	150 Ea	Sieve only	20.00	3000.00
2.2	25 Ea	Hydrometer only	20.00	500.00
2.3	150 Ea	Sieve, and hydrometer	35.00	5250.00
3.0	350 Ea	Moisture content (in addition to those reported with other tests)	3.00	1050.00
4.0	125 Ea	Atterberg limits (liquid and plastic limits and plasticity index) to include natural moisture content	25.00	3125.00
5.0	100 Ea	Dry unit weight (in addition to those reported with other tests)	4.00	400.00
6.0	20 Ea	Shrinkage limit (ASTM D 427)	20.00	400.00
7.0	50 Ea	Specific gravity	20.00	1000.00
8.0		Unconfined compression test to include stress-strain curve, moisture content, and dry unit weight. Price includes sample trimming to any size.		
8.1	60 Ea	Undisturbed sample	50.00	3000.00
8.2	40 Ea	Remolded sample	60.00	2400.00
8.3	50 Ea	Compacted samples	75.00	3750.00

* For samples greater than 50 lbs add $20.00 per test

Item	Estimated Quantity and Unit	Item Description	Unit Price $	Total Price $
9.0		Triaxial compression test, unconsolidated undrained to include deviator stress versus strain curve, moisture content and dry unit weight. Price includes sample trimming to any size		
9.1	25 Ea	Undisturbed sample	75.00	1875.00
9.2	5 Ea	Remolded sample	85.00	425.00
9.3	5 Ea	Compacted samples	100.00	500.00
** 10.0		Consolidation test to include plots of deformation versus square root of time for each pressure, deformation versus logarithmic time for each pressure, strain versus logarithmic pressure and void ratio versus logarithmic pressure. Include permeability values for each pressure, water content, and density for each specimen. Price includes sample trimming to any size.		
10.1	30 Ea	Per undisturbed sample	295.00	8850.00
10.2	10 Ea	Remolded sample	305.00	3050.00
10.3	10 Ea	Compacted samples	320.00	3200.00
11.0		Moisture-density relation, using 10-pound hammer and 18-inch drop, 5 points to include a natural moisture content (ASTM D 1557)		
*** 11.1	60 Ea	ASTM D 1557 - Method D	140.00	8400.00
*** 11.2	60 Ea	Bechtel Modified Proctor	100.00	6000.00
12.0	5 Ea	Relative density test to be performed in accordance with U.S. Army Corps of Engineers Manual, EM 1110-2-1906, 1965: Appendix XII A, Modified Providence Vibrated Density Test	90.00	450.00

** Price quoted does not include specific gravity

*** Price quoted includes breakdown, separation, air drying and curing of samples greater than 50 lbs. For samples between 25 and 50 lbs. deduct $20.00, if less than 25 lbs. used, deduct $40.00.

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Item	Estimated Quantity and Unit	Item Description	Unit Price $	Total Price $
13.0	300 Hrs	Special laboratory tests or other tests will be measured to the nearest hour as the number of hours of such tests or work satisfactorily performed	15.00-45.00 per hr	4500.00-13,500.00
14.00	As Required	Pickup of samples at subject project to be delivered to GZD Laboratories for testing	15.00-40.00 per hr plus direct costs	______
15.0	As Required	In-place density determinations to be performed at the subject project (D 1556-74)	25.00-30.00 per hr plus direct costs	______
16.0	As Required	Special materials or equipment needed as authorized by Bechtel (any set-up time required will be listed under Item 13.0)	Direct cost $	______
17.0	CU FT/Mo	Storage of samples at the laboratory	0.25	______
18.0		QA/QC surcharge		3000.00

It is current practice of Goldberg, Zoino, Dunnicliff and Associates to require a "Start-up" fee for all jobs including QA/QC consideration. This fee is intended to cover the additional costs associated with QA/QC jobs particularly those involved with QA meetings and in-house or client initiated audits of Goldberg, Zoino, Dunnicliff and Associates, Inc. A lump sum fee of $3000.00 is assigned. The charges will be billed directly at the costs indicated below, not to exceed $3000.00.

SB177784

Item	Estimated Quantity and Unit	Item Description	Unit Price $	Total Price $
		Hourly rates of individuals who may become involved with quality assurance matters for the projects are as follows:		

Name	Hourly Rate
Principal in Charge	$45.00
Staff Consultant	40.00
Q. A. Officer	35.00
Assistant Laboratory Director	30.00
Senior Laboratory Technician (I)	25.00
Laboratory Technician (II)	20.00
Laboratory Technician (III)	15.00

Item	Estimated Quantity and Unit	Item Description	Unit Price $	Total Price $
19.0	As Required	Meetings with engineers, telephone bill, meals, Zerox charges, etc.	15.00 to 45.00/hr plus direct cost	
20.0	6 Ea	Cation Exchange Capacity Exchangeable Cation Determination	75.00	450.00
21.0	6 Ea	X-ray diffraction tests	80.00	480.00

BECHTEL

Ann Arbor Area Office

Teletype Message

TYPE DOUBLE SPACE · BE BRIEF

TELETYPE USE ONLY		
MESSAGE NUMBER	OPR. INL.	DATEL

DBG	TELTEX	TWX	TELEX	OTHER

CHECK APPROPRIATE BOX: Night Ltr: Full Rate: Report Delivery: YES NO

CHARGE ACCT. CODE: 7220-001

NUMBER TO BE CALLED

MESSAGE ADDRESSED TO

ADDRESSEE	ADDRESS	LOCATION (CITY, STATE OR COUNTRY)
Goldberg-Zoino-Dunnicliff & Associates Inc.	30 Tower Rd.	Newton Upper Falls, MA 02164
Attn: Don Shultz		

RECEIVED
NOV 29 1978
BECHTEL POWER CORP.
JOB 7220
PER 5(E) C-79

MESSAGE SECTION - If additional addresses are required continue to list below:

Subject: Consumers Power Company, Midland Units 1 & 2, Technical Services Agreement, 7220-C-79(Q)

Please make the following changes in Bechtel's letter to G-Z-D Associates dated Nov. 20, 1978.

1) Item 1, change "Delete Items 1.0 through 11.0" to "Incorporate the below listed items"

Item 1, delete "and replace with the following schedule of prices."

2) Change the Estimated Quantity in each of the following items as follows:

Item	Est. Qty.
1.3	150
3.0	350
4.0	125

3) Item 20.0 should be revised as follows:

"20.0 6 Cation exchange capacity and exchangeable cation determinations."

4) Add the following item:

"21.0 6 X-ray diffraction

If you have any questions, please contact Gini White at (313) 994-7648.

JOB 7220 ROUTING	ACT	RTN	LET
Proj. Supt.			
P. Sup.			
P.F. Engr.			
APP. Eng. 1	X		
APP. Eng. 2			
Cost-Sch.			
Cont Bldg.			
Aux. Bldg.			
Tu & Turb.			
Civ. Sup.	X		
Civ. Eng.	X		
Mech. Sup.			
Mech. Eng.			
Elec. Sup.			
Elec. Eng.			
Weld. Eng.			
Oth. Eng.			
F & A			
Q.C.			
Purch.			
Sub-Con			

COPIES TO: R. L. Castleberry, L. D. Sokol, J. Hook, W. Jones, T. C. Cooke, [redacted] V. P. White

DATE	SIGNATURE	LOCATION & EXT:	ORGANIZATION CODE:
11/27/78	L. D. Sokol L. D. Sokol, Project Procurement Manager	6B2, 7370	8XB5206

AAO - 17 - 1

ORIGINAL TO TELETYPE SB177786

bcc: R. L. Castleberry, L. D. Sokol, W. G. Jones, J. Hook, G. Butler, J. Jeffers, [redacted] T. C. Cooke

JOB 7220 ROUTING	Proj. Supt.	F. Sup.	P.F. Engr.	APP. Eng. 1	APP. Eng. 2	Con-Sch.	Cont Bldg.	Aux. Bldg.	Yard-Turb.	Civ. Sup.	Civ. Eng.	Mech. S.P.	Mech. Eng.	Elec. Sup.	Elec. Eng.	Weld Eng.	Off. Eng.	F & A	Q C	Purch.	Sub-Con
ACTION / INFO																					

RECEIVED
NOV 22 1978
BECHTEL POWER CORP
JOB 7220
PER 4(5) C-79

November 20, 1978

Goldberg-Zoino-Dunnicliff & Associates Inc.
30 Tower Road
Newton Upper Falls, Massachusetts 02164

Attention: John E. Ayres

Subject: Consumers Power Company
Midland Units 1 & 2
Technical Services Agreement
7220-C-79 (Q)

Dear Mr. Ayres:

Please incorporate the following changes into the subject TSA forwarded to you on September 11, 1978.

1. Delete Items 1.0 through 11.0 in Schedule A, Section B, Compensation and replace with the following schedule of prices.

Item	Est. Quantity	Description
1.1	200 EA	Undisturbed clay samples
1.2	25 EA	Undisturbed sand samples
1.3	100 EA	Split spoon samples
1.4	50 EA	Bag sample handling
2.3	150 EA	Sieve, and hydrometer
6.0	20 EA	Shrinkage limit (ASTM D 427)
7.0	50 EA	Specific gravity
8.3	~~50 EA~~	Reconstituted samples
9.0		Triaxial compression test, unconsolidated undrained to include deviator stress versus strain curve, moisture content and dry unit weight. Price to include sample trimming to any size.
9.1	25 EA	Undisturbed sample
9.2	5 EA	Remolded sample
9.3	5 EA	Reconstituted sample

SB177787

Item	Est. Quantity	Description
10.1	330 EA	Per undisturbed sample
10.2	10 EA	Remolded sample
10.3	10 EA	Reconstituted sample
11.1	60 EA	ASTM D 1557 - Method D
11.2	60 EA	Bechtel modified proctor
12.0	5 EA	Relative density test - U.S. Army Corps of Engineers EM 1110-2-1906, 1965
13.0	300 HRS	Special laboratory tests or other tests will be measured to the nearest hour as the number of hours of such tests or work satisfactorily performed.
14.0	As required	Pickup of samples at subject project to be delivered to GZD laboratories for testing
15.0	As required	In-place density determinations to be performed at the subject project (ASTM D 1556-74)
16.0	As required	Special material or equipment needed as authorized by Bechtel (any set up time required will be listed under Item 13.0)
17.0	cu ft/mo	Storage of samples at the Laboratory
18.0		QA/QC surcharge
19.0	As required	Meetings with Bechtel engineers
20.0	6	Cation exchange capacity, X-ray diffraction, and exchangeable cation determinations

2. Replace Schedule B, Technical Specification 7220-C-79(Q), Rev. 0, with Technical Specification 7220-C-79(Q), Rev. 1.

Your proposal should reach the undersigned no later than December 1, 1978. If you have any questions, please call.

Very truly yours,

BECHTEL POWER CORPORATION

V. P. White
Subcontract Specialist

VPW/mb

Attachment

SB177787A

Bechtel Power Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan
Mail Address: P.O. Box 1000, Ann Arbor, Michigan 48106

001315

JOB 7220
ROUTING
Site Mgr.
Proj. Supt.
Serv. Supt.
P.F. Engr
APP Eng. 1
APP Eng. 2
S.U. Turnover
Cost-Sche.
Inst. Engr.
Civ. Sup
Civ. Eng
Mech. Supt.
Mech. Eng.
Elec. Sup.
Elec. Eng
Weld Eng
QA Eng
F & A
P.C.
Purch.
Sub-Con.
Doc Con

October 18, 1979

RECEIVED
OCT 22 1979
BECHTEL POWER CORP
JOB 7220
PER

BLC-8313

Mr. G. S. Keeley
Project Manager
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Midland Units 1 and 2
Consumers Power Company
Bechtel Job 7220
TEMPORARY AIR LINE LEAK
IN TANK FARM AREA
File 2801/0626

References: 1) CCBC-2100 (Serial CSC-4334) T. C. Cooke to J. F. Newgen dated 8/21/79.

2) CCBC-1918 (Serial CSC-4066) T. C. Cooke to J. F. Newgen dated 5/17/79.

3) CCBC-1914 (Serial CSC-4094) T. C. Cooke to J. F. Newgen dated 5/31/79.

4) BCCC-4060 J. F. Newgen to T. C. Cooke dated 6-18-79.

Dear Mr. Keeley:

This letter is written to provide a complete and factual response to reference 1), an "Article 9" letter regarding the use of the permanent air piping due to the temporary air line leak in the tank farm area. Confirming previous discussions between Joel Newgen of Bechtel and Tom Cooke of Consumers, we identified this leak in the fall of 1978. We started excavating in early spring 1979 in an attempt to locate and repair the source of the leak in the air line. We stopped this effort shortly after it started because we were in a "stop work" mode on Q-listed soils work. We felt that continuing the excavation (to reach the leak) would only expose a larger area to weathering during the ground thawing and spring rains period with no quick recourse for refilling because

SB178157

006365

of the stop work. It is important to note that our decision to stop was also based on the feeling that the disruption to the soil was local and, in that respect, posed no great overall threat to the entire tank farm area. We believe that subsequent investigations have adequately substantiated that position. In stopping, we planned to resume our investigation in early summer.

When the NRC inspector, Mr. Gallagher, visited the site the week of May 14, 1979, he showed great concern over the presence of air bubbles in the tank farm area. He, in effect, demanded that the air line be shut down. Bechtel and Consumers Power Company worked very closely on this matter since shutting down this air line would require a cessation of many work activities in the auxiliary building which required construction air service. It was the project's considered decision that work must continue and, also, that the temporary air line be shut down. Tom Cooke's letter (reference 3) formalized this decision.

Reference 3) presented Consumers Power Company's concern over the fact that a portion of the permanent plant air system was used after the decision to shut off the leaking temporary line. Reference 4) was prepared to provide Bechtel's response to Consumers Power Company's concerns expressed in reference 3). In effect, our response in reference 4) acknowledges that we did not properly coordinate the use of part of the permanent plant air system with Consumers Power Company when we learned that it would take additional time beyond that originally estimated to tie in a new construction line. In making the decision to use a portion of the permanent system, Bechtel was acting purely in line with Consumers Power Company's overriding decision, namely, work in the auxiliary building must not be stopped because of a shut down of the temporary leaking line. Moreover, work did continue on a rerouting of the temporary air system with the work being completed in mid-June, 197?.

Based on the facts presented above, it is Bechtel's considered opinion that subsection B.3 of Article 9 does not apply to the contamination of the permanent plant air system, and that the limitation of liability in subsection A.2.c of Article 9 applies to the damage to property by contamination as encoutered in this matter.

Very truly yours,

John A. Rutgers pp
Project Manager

JAR/AJB/kb

cc: D. B. Miller (CPCo-Mid)
P. A. Becnel (B-SF)
[redacted])

SB178158

Bechtel Associates Professional Corporation

Inter-office Memorandum

BEBC-3053

To	J.F. Newgen	Date	June 27, 1979
Subject	Midland Plant Units 1 & 2 Job 7220 Plant Area Underground Electrical Duct Banks	From	R.L. Ca[illegible]
		Of	Engineering
Copies to	File: 0274, C-2645	At	Ann Arbor

RECEIVED
JUN 28 1979
Bechtel Power Corp.
JOB 7220
Per file [illegible]

K. Wiedner — R. Schulman
B. Dhar — L. Basinski
B.C. McConnal — W. Terrell
Com Log

To evaluate the adequacy of the electrical duct banks in the plant area fill, project engineering requires the following.

a) A summary of records for all cleaning and cable pulling operations regarding the electrical duct banks (Q and non-Q) will be transmitted to project engineering. The summary of records will include general observations and the location of any obstruction, snags, or excessive pulling tension that is encountered during:

   1) The construction inspection with a rigid foam rabbit or cleaning mandrel just prior to cable pulling
   2) The cable pulling operation

   The summary records will be submitted to project engineering within 15 days of cable pulling.

b) Monitoring of duct banks by pulling a rigid fiber rabbit in both directions through each empty conduit and pressurizing each empty conduit to 100 psig with a 15-minute hold. Duct banks to be monitored comprise the following:

   1) All of the duct banks from the auxiliary building to the diesel generator building and service water pump structure
   2) All of the (Q) duct banks from the auxiliary building to the borated water storage tanks
   3) All of the duct banks from the diesel generator building to the emergency diesel fuel oil tanks and service water valve pits
   4) The duct banks from the turbine building to the main transformer pads shown in Sections B and C on Drawing E-530
   5) The duct bank from the turbine building to manhole 1NMH016/2NMH016

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These duct banks will be monitored by July 1, 1979, and also just prior to cable pulling, except for the duct banks which are inaccessible because of the temporary surcharge which will be monitored within 2 weeks after the surcharge is removed.

If two or more of the conduits in a duct bank cannot maintain the pressure or have obstructions at a common location, project engineering will be notified immediately. In either case, a summary of the results will be transmitted to project engineering.

c) The following conduits will be placed on hold for future monitoring as directed by project engineering:

1) Diesel generator building
   a. 1BA 027
   b. 1AA 014
   c. 2AA 006
   d. 2BA 015

2) Service water pump structure: 1BA 038

3) Emergency diesel fuel oil tanks: 2NA 513

4) Borated water tanks
   a. 2NA 282
   b. 1NA 242

5) Turbine building to manhole 16: 2NA 106

for MOKothwell
R.L. Castleberry

CM/pd
6/22/2

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