



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

3. QC ACCEPTANCE 12/22/76 DATE

CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/22/76

PAGE 1 OF

4. SPEC. NO. 7220-C-208

5. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/12/76	1215	JK	62'E. Col. 12 15'S. of K	629.5	---	135.5	9.5	123.75	270	11.1	2	124.6	99.3	P
<p>* Correction due to MD-1121 dated 11/12/76 renumbered as MD-1215 due to a typing error.</p>														

UNCONTROLLED
NOT TO BE USED
FOR CONSTRUCTION

8405260080 840517
PDR FOIA
RICE84-96 PDR

UST N-28

20. PHT 11 11 (Signature) Henry H. [Signature] DATE 12/22/76 RESPONSIBLE ENGINEER William G. [Signature] DATE 12/22/76

66901 115



COMPACTED FILL DENSITY TEST REPORT

3. *2025* 12/1/76
 QC ACCEPTANCE DATE
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1. PROJECT NO. 7220

2. DATE 11/17/76

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONE	17. Min. / MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % R1)	19. REMARKS
11/12/76	1211	RM	14' W. of W. Wall on S. wall Line	598.5	---	113.0	7.4	105.2	46 N/A 2	108.3 / 91.1	84.4	P
	1212		9' S. of N-wall 14' W. of W-wall	600.5	---	117.5	6.3	110.5	46 N/A 2	108.3 / 91.1	110.5	P
	1213		46' S. of K 12' off 1.0 14' S. of K	631	---	112.8	7.4	105.0	55 N/A 2	109.7 / 90.2	80.1	P
	1214		12' off 1.0	629	5---	115.5	6.5	108.5	55 N/A 2	109.7 / 90.2	95.9	P

UST W-233

20. PREP BY (Signature) [Signature] DATE 11/27/76 RESPONSIBLE ENGINEER [Signature] DATE 11/27/76

SR 10690



COMPACTED FILL DENSITY TEST REPORT

3. *[Signature]* 11/11/76
 QC ACCEPTANCE DATE
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1. PROJECT NO. 7220

2. DATE 11/11/76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
11/9/76	1209	JK	72'E. Col 38'N. of E K	12 633	---	133.5	9.4	122.0	270	11.1	2	124.6	97.9	P
	1210		124'E. Col 5'S. of E K	12 633	5--	140.0	10.0	127.25	270	11.1	2	124.6	102.1	P

UST N-142

20. PREF BY (Signature) _____ DATE _____

RESPONSIBLE ENGINEER *[Signature]* DATE 1/76

SR 10697



COMPACTED FILL DENSITY TEST REPORT

3. *J. Smith* 12/17/76
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.
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1. PROJECT NO. 7220

2. DATE 11/9/76

4. SPEC. NO. 7220-C-208

5. ~~INDICATING NO.~~ XXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/6/76	1205	RS	20' W. OF 1.0 12'S. OF Q	630	---	145.0	13.7	127.5	262	11.8	2	123.9	102.9	P
	1206		25' W. OF 1.0 39' N. OF Q	633	---	139.0	13.5	122.5					98.9	P
	1207		31' E. OF 1.0 85' S. OF Q	622	---	131.0	12.9	116.0	259	12.0	2	117.1	99.1	P
	1208		8' E. OF 1.0 68' S. OF Q	629	---	134.5	13.3	118.8	262	11.8	2	123.9	95.9	P

UST N-119

20. PREF

BY (Signature)

DATE

RESPONSIBLE ENGINEER *J. Smith*

DATE 11/16/76



COMPACTED FILL DENSITY TEST REPORT

3. John Dine 12/17/26
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.
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1. PROJECT NO. 7220 2. DATE 11/6/76

4. SPEC. NO. 7220-C-208 5. ~~TRAILING~~ Plant Area 6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION MP OMC ZONE			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/6/76	1202	RS	E of 1.0 30'S. of Q 37'E. of 12	631	---	139.5	13.2	123.3	262	11.8	2	123.9	99.5	P
	1203		50'S. of K 79'E. of 12	628	---	139.0	13.2	122.8	262	11.8	2	123.9	99.1	P
	1204		13'S. of K	633	---	139.5	10.7	126.0	262	11.8	2	123.9	101.7	P

UST N-116

20. PREP. BY (Signature) _____ DATE _____ 21. RESPONSIBLE ENGINEER *R. Shode* DATE 11/6/76

511 10693



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220 2. DATE 11/9/76 3. CONTROL NO. 4. FILE NO. 5. PAGE 1 OF 1

6. TESTED WEEK OF 7. SPEC. NO. 7220-C-208 8. XXXXXX 9. Plant Area

7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
DATE TAKEN	TEST NO. MD	TESTED BY	LOCATION	ELEV. OF TEST	DEPTH BELOW FINAL GRADE (FT)	IN PLACE WET DENSITY (LB./C.F.)	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (LB./C.F.)	SOIL CLASSIFICATION RD OMC ZONE	MAX. LAB. DRY DENSITY (LB./C.F.)	PERCENT COMPACTION As % RD	REMARKS
11/5/76	1200	BJ	90'E. of K	628	---	128.0	6.6	120.1	50 N/A 2	115.9	113.3	P
	1201	↓	8'S. of K	626	---	125.3	7.2	116.9	↓	↓	104.2	P
			90'E. of K									
			27'N. of K									

UST N-117

20. PREP BY (Signature) DATE RESPONSIBLE ENGINEER G. S. ... DATE

SB 1059



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 11/9/76

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QC ACCEPTANCE DATE 12/11/76

CONTROL NO. FILE NO.

4. SPEC. NO. 7220-C-208 5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION ¹ BMP OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COM. ACTION	19. REMARKS
11/4/76	1197	RM	35' W. of I	630	---	137.0	10.9	123.5	222 11.2 2	123.8	99.8	P Clears MD-1196
	1198		40' S. of I	632	---	137.0	11.8	122.5	241 11.1 2	125.8	97.4	P
	1199		70' S. of K	633	5---	139.5	11.6	125.0	241 11.1 2	125.8	99.4	P
			65' W. of I									
			35' S. of Q									

UST N-118

20. PREP BY (Signature)

DATE

RESPONSIBLE ENGINEER

DATE

Handwritten signature

11/11/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE 11/17/76
CONTROL NO. _____ FILE NO. _____

1. PROJECT NO. 7220

2. DATE 11/5/76

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4. SPEC. NO. 7220-C-208

5. ~~XXXXXXX~~ Plant Area

3. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
11/3/76	1195	RM	30'W.of I 15'N.of Q	628	---	134.5	12.6	119.5	222	11.2	2	123.8	96.5	P
✓	1196	✓	35'W.of I 10'S.of K	630	---	127.0	11.2	114.25	222	11.2	2	123.8	92.3	F

UST N-86

20. PREP BY (Signature) _____ DATE _____

RESPONSIBLE ENGINEER *Martin...* DATE 11/26/76



COMPACTED FILL DENSITY TEST REPORT

3. John J. V 12/17/76
 QC ACCEPTANCE DATE
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1. PROJECT NO. 7220

2. DATE 11/5/76

4. SPEC. NO. 7220-C-208 ~~5XXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MIN. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE			
11/3/76	1188	BJ	21'S. of K 60'E. of 12	628	---	126.5	6.5	118.8	60	N/A	2	115.9 96.4	112.1	P
	1189		33'S. of K 66'E. of 12 3'W. of 3	626	---	125.0	5.9	118.0	✓	✓	✓	126.7	108.8	P
	1190		S. of Sonovid 3'W. of 3	596	---	121.0	2.0	118.6	58	N/A	2	94.2	80.2	P
	1191		S. of Sonovid	596	---	124.2	6.6	116.5	✓	✓	✓	74.6		F - New q' <i>11/17</i>

UST N-84

20. PREP BY (Signature) _____ DATE _____

RESPONSIBLE ENGINEER John J. V DATE 11/5/76



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE 12/11/76
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1. PROJECT NO. 7220 2. DATE 11/5/76 PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. DRAWING NO. XXXXXXXX Plant Area 6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION MD OMC ZONE	17. Min./Max LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % Rd	19. REMARKS
11/2/76	1192	BJ	51'E. of 12 27'N. of E K	628	---	113.8	5.7	107.7	41 N/A 2	108.7 / 89.6	95.6	P
	1193		69'E. of 12 60'N. of K	626	---	119.3	5.6	113.0		↓	117.9	P
	1194		5'W. of 3 S. of Sonovid	596	---	121.2	3.8	116.8	58 N/A 2	126.7 / 94.2	75.4	F - Non-g ^{AS} 11/7

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COMPACTED FILL DENSITY TEST REPORT

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 CONTROL NO. FILE NO.
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1. PROJECT NO. 7220

2. DATE 11/5/76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/2/76	1187	JK	50'S. of R 38'W. of 1'	25.5	---	132.0	10.5	119.5	274 10.4 2	124.8	95.8	P

UST N-83

20. PREP BY (Signature) _____ DATE _____ RESPONSIBLE ENGINEER *[Signature]* DATE 11/5/76



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE 11/17/76
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116
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/1/76

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4. SPEC. NO. 7220-C-208

XXXXXXXXXX

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. (M)	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
10/30/76	1172	RS	25' W. OF 1.0 20' S. OF Q	612	---	133.5	13.2	118.0	200	13.4	2	118.1	99.9	P 23'
	1173		10' W. OF 1.0 52' S. OF K	614	---	139.0	15.1	120.8	256	13.9	2	119.4	101.2	P
	1174		20' W. OF 1.0 38' N. OF Q	616	---	132.0	11.6	118.3	200	13.4	2	118.1	100.2	P
	1175		28' W. OF 1.0 20' N. OF Q	618	---	136.0	10.6	123.0	262	11.8	2	123.9	99.2	P
	1176		31' W. OF 1.0 22' S. OF K	620.5	---	136.0	12.2	121.3	262	11.8	2	123.9	97.9	P
	1177		33' W. OF 1.0 E OF Q	623	---	139.5	12.0	124.5	262	11.8	2	123.9	100.5	P

UST N-21

20. PREPARED BY

(Signature)

DATE 11-1-76

RESPONSIBLE ENGINEER

(Signature)

DATE 11/1/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE [initials] DATE [initials]
CONTROL NO. _____ FILE NO. _____
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1. PROJECT NO. 7220 2. DATE 11-2-76

4. SPEC. NO. 7220-C-208 5. ~~XXXXXXXX~~ Plant Area 6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-29-76	1179	RM	1 + 52 8' R E 66" Water line	633.5	---	137.0	13.6	120.75	200	13.4	2	118.1	102.2	P
	1180		5 + 52 20' L E 72" Water line	633.5		134.5	12.6	119.5	200	13.4	2	118.1	101.2	P



COMPACTED FILL DENSITY TEST REPORT

PROJECT NO. 7220 DATE 11/2/76

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7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONES	17. M.L.D. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
10/29/76	1178	BJ	16'N. OF MA 28'E. of 4	55.629	---	115.8	5.2	110.1	41 N/A 2	108.7	106.1	P

UST N-25

20. PREPARED BY (Signature) _____ DATE 11/2/76 RESPONSIBLE ENGINEER *William G. Gandy* DATE 11/2/76

SR 10702



COMPACTED FILL DENSITY TEST REPORT

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1. PROJECT NO. 72202. DATE 11-1-764. SPEC. NO. 7220-C-2085. ~~DRYING NO.~~ XXXXXXXX Plant Area (66" Waterline)

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. FLEV. OF TEST	12. DEPTH BELOW FINAL GRADE (F.T.)	13. IN PLACE WET DENSITY (R.R./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
10-27-76	1181	RS	1 + 29 10' R E	622.5	---	138.5	14.5	121.0	200	13.4	2	118.1	102.5	P
	1182		1 + 47 8' L E	623	---	133.5	13.6	117.5					99.5	P
	1183		1 + 01 8' R E	625	---	135.5	12.0	121.0					102.5	P
	1184		1 + 78 12' R E	627	---	135.0	14.9	117.5					99.5	P
	1185		1 + 50 8' R E	629	---	136.0	13.6	119.8					101.4	P
	1186		2 + 01 12' L E	631.5	---	128.5	13.7	113.0	✓	✓	✓	✓	95.7	P

UST N-17

20. PREPARED BY (Signature) [Signature]DATE 11-1-7621 RESPONSIBLE ENGINEER [Signature]DATE 11-1-76

S: 10703



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE <u>11/16</u>	DATE <u>11/1/76</u>
CONTROL NO. <u> </u>	FILE NO. <u> </u>

1. PROJECT NO. 7220

2. DATE 10-29-76

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4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXXXX Plant Area (66" Waterline)*

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
10-28-76	1167	RM	1' + 86 5' + 25 L E	631	---	134.0	12.4	119.25	200	13.4	2	118.1	101.0	P
	1168		25' + 65 L E	630	---	137.5	12.7	122.0	270	11.1	2	124.6	97.9	P
	1169		22' + 11 L E	632	---	138.5	12.4	123.25	270	11.1	2	124.6	98.9	P
	1170		20' + 11 L E	633	---	134.0	11.9	119.75	200	13.4	2	118.1	101.4	P

@- 72" Waterline
*- 66" Waterline

UST N-3



COMPACTED FILL DENSITY TEST REPORT

3. *John J. ...* 11/11/76
 QC ACCEPTANCE DATE
 CONTROL NO. 116 FILE NO. 116

1. PROJECT NO. 7220

7. DATE 10/28/76

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4. SPEC. NO. 7220-C-208

5. ~~PROJECT/TEST NO.~~ XXXXXXXX

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
10-23-76	1162	RS	85'E. of I2 6'S. of K	630	---	134.0	13.0	118.5	270	11.1	2	124.6	95.1	P
	1163		30'E. of I2 65'N. of Q	622.5	---	133.5	16.3	114.8	269	10.0	2	127.3	90.2	F-Removed
	1164		30'E. of I2 65'N. of Q	622.5	---	140.0	10.9	126.3					99.2	P
	1165		15'E. of I2 36'S. of Q	617	---	131.0	12.4	116.5	259	12.0	2	117.1	99.5	P
	1166		22'E. of I2 50'S. of K	625.0	---	131.5	12.4	117.0					99.9	P

UST 0-284

20. PREPARED BY

(Signature) *T. Brown*

DATE 10-28-76

RESPONSIBLE ENGINEER

(Signature) *Wm. J. Yeisley*

DATE

11/2/76

SIB 10705



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 11/11/76 DATE
 CONTROL NO. 11 16 FILE NO. C-210-1

1. PROJECT NO. 7220

2. DATE 10/28/76

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4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-22-76	1158	JK	60'E. Col. 2 20'S. of K	629	---	136.0	10.3	123.25	270	11.1	2	124.6	98.9	P
	1159		27'E. Col. 2 8'N. of K	632	---	137.0	9.8	124.75					100.1	P
	1160		135'E. Col. 12 38'S. of K	627.5	---	130.0	13.9	114.25	200	13.4	2	118.1	96.7	P
	1161		24'E. Col. 2 73'N. of Q	620	---	135.5	13.9	119.0					100.8	P

UST 0-286

20. PREPARED BY

(Signature) T. Brown

DATE 10-28-76

RESPONSIBLE ENGINEER

(Signature) William J. Jewley

DATE

12/76

SIR 10700



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE 10/28/76 DATE 11/4/76
 CONTROL NO. _____ FILE NO. _____

1. PROJECT NO. 7220

2. DATE 10/28/76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	MO	MD	22 ^o CONT. 2						BMP	OMC	ZONE			
10-21-76	1157	JK5	7' off wall	633	---	139.0	13.2	122.75	249	11.6	2	124.3	98.8	P

UST 0-287

20. PREPARED BY (Signature) *[Signature]* DATE 10-28-76 21 RESPONSIBLE ENGINEER *[Signature]* DATE 11/4/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1. PROJECT NO. 72202. DATE 10/22/76PAGE 1 OF 14. SPEC. NO. 7220-C-2085. DRAWING/VIEW XXXXXXXXX

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION AS % RD	19. REMARKS
10/21/76	1152	RM	30'S. OF K 17'E. of E. 527	615	---	129.4	8.3	119.5	RD	OMC	2	115.9 / 96.4	114.9	P
	1153		S. 4900 26'S. OF K	624	---	113.2	11.0	102.0	43	N/A	2	110.5 / 90.8	61.6	F - New q 10/1/77
	1154		16' off E. 4898	617	---	119.1	8.5	109.8	41	N/A	2	103.7 / 89.6	104.7	P
	1155		E. 527	622	---	114.9	10.0	104.5	43	N/A	2	110.5 / 90.8	73.5	F - New q 10/1/77

UST C-236

20. PREPARED BY

(Signature)

[Signature]DATE 10/22/76

RESPONSIBLE ENGINEER

[Signature]DATE 11/1/76

SB 10708



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE DATE 11/15/76
 CONTROL NO. 116 FILE NO. C-2113

1. PROJECT NO. 7220

2. DATE 10-19-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DENSITY/AREA Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-18-76	1149	JK	58' E. Col. 12 5' N. of K 6 00' Cont. 2	29.5	---	138.0	12.0	123.25	250	11.6	2	123.9	99.5	P
Y	1150	Y	35' off wa	1.63	2.5	136.5	12.1	121.75	250	11.6	2	123.9	98.3	P

20. PREPARED BY (Signature) Robert Shedd

DATE 11/17/76

RESPONSIBLE ENGINEER William J. Yewley

DATE 11/17/76

SR 10710



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE *[Signature]* DATE 11/8/76
 CONTROL NO. 11/11 FILE NO. 6200.3

PAGE 1 OF 1

7 DATE 10-19-76

1 PROJECT NO. 7220

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-18-76	1148	BJ	39' N. Q-LINE JK4' off 1-Line	612	----	123.1	5.3	116.9	RD N/A	104.2	80.3	P

UST 0-204



COMPACTED FILL DENSITY TEST REPORT

3. *John J. [Signature]* 11/15/76
 QC ACCEPTANCE DATE
 11/16
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10-18-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXXXXX

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
10-15-76	1144	JK	75'E. Col. 12 45'S. of K	623.5	---	136.0	11.9	121.5	259	12.0	2	117.1	103.8	P Clears MD-1143
	1145		28'W. Col. 6 37'S. Q-Line	615	---	137.0	12.8	121.5	270	11.1	2	124.6	97.5	P 2-1
	1146		157'E. Col. 12 12'S. of K	627.5	---	137.0	12.8	121.5					97.5	P
	1147		90° Cont. 2 140' off wall	637.5	--	138.0	11.5	123.75	✓	✓	✓	✓	99.3	P

UST 0-198

20. PREP'ED BY

(Signature) *[Signature]*

DATE 10/18/76

RESPONSIBLE ENGINEER

[Signature]

DATE 11/22/76

SR 10712



COMPACTED FILL DENSITY TEST REPORT

3. *Control 10-11-74*
 QC ACCEPTANCE _____ DATE _____
 CONTROL NO. *111* FILE NO. _____

1. PROJECT NO. 7220

2. DATE 10-11-74

PAGE 1 OF 1

4. SPEC. NO. C-208 Rev 3

5. DRAWING NO. Plant Fill

6. TESTED WEEK OF 10-12-74

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION <i>8HP A-2 Curve II</i>	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-11	42	THM	40' Cnt #2 1' from wall	584	7.5	125.7	7.4	117.0	RD-16	119.2	98.2	P <i>320</i>
	43	THM	15' Cnt #2 7' from wall	583	8.5	120.7	7.5	112.3	RD-16	119.2	94.2	F <i>320</i>
	44	THM	5' Cnt #2 8' from wall	583	8.5	122.8	7.3	114.4	RD-16	119.2	96.0	P*
*MD-14 clears MD 42												

not done

S. J. 10-11-74

20. PREPARED BY

signature *V. Roberts*

DATE 12-23-74

RESPONSIBLE ENGINEER

Paul Caputo

DATE

2-3-79



COMPACTED FILL DENSITY TEST REPORT

3. *John Smith* 11/15/76
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10-18-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. (MD)	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
10-15-76	1140	JK	83 ⁰ Cont. 2 110' off Cont.	631	---	137.5	11.6	123.25	270	11.1	2	124.6	98.9	P
	1141		126' E. Col. 12 20' N. K-Line	626.5	---	135.5	12.7	120.25	✓		✓		96.5	P
	1142		105' E. Col. 12 23' S. K-Line	622	---	127.0	10.7	114.75	259	12.0	2	117.1	98.0	P
	1143	✓	75' E. Col. 12 45' S. K-Line	623.5	---	133.5	15.6	115.5	✓		✓		98.6	F(Moisture)

UST 0-199

20. PREPARED BY

(Signature) *John Smith*

DATE 10/19/76

RESPONSIBLE ENGINEER

(Signature) *John Smith*

DATE 10/19/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE DATE 11/1/76
 CONTROL NO. 11/16 FILE NO.

1. PROJECT NO 7220

2. DATE 11/1/76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. ~~XXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)		18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE				
10-14-76	1171	RS	17' W. of 16' N. of A	7.4 629.5	---	118.5	7.3	110.4	41	N/A	N/A	108.7 89.6	107.2	P	

UST N-19

20 PREP BY [Signature] DATE 11-1-76 RESPONSIBLE ENGINEER Clancy Gortley DATE 11/1/76

SB 10714



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
11/16	11/15/76
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

2. DATE 10-18-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONE			17. MAX. LAB. DRY DENSITY (LB./C.F.) Min /	18. PERCENT COMPACTION As % RD	19. REMARKS
10-14-76	11139	RM	13' N. of A 13' W. of 7.4	628	---	128.0	6.5	120.2	50	N/A	2	115.9 / 96.4	117.7	P

UST O-196

20. PREPARED BY (Signature) Robert Shew DATE 10/18/76 RESPONSIBLE ENGINEER C. J. J. Josley DATE 10/18/76

SB 10715



COMPACTED FILL DENSITY TEST REPORT

3. *J. M. Sub* 11/15/76
 QC ACCEPTANCE DATE
J. H. C-16
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220 2. DATE 10-18-76 PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. ~~XXXXXX~~ Plant Area 6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS	
									BMP	OMC	ZONE				
10-13-76	1136	JK	40' W. of I.D. 15' N. Q-Line 125' E. Col. 12	607	---	139.0	13.9	122.0	200	13.4	2	118.1	103.3	P	Clears MD-883, 887
	1137		47' S. Q-Line 305' Cont. 1	612	---	143.0	13.0	126.5	249	11.6	2	124.3	101.8	P	
	1138		125' off wall	631	5---	141.5	12.1	126.25	249	11.6	2	124.3	101.6	P	

UST 0-195

20. PREPARED BY (Signature) *Walter Reed* DATE 10/19/76 RESPONSIBLE ENGINEER *Clayton G. Gentry* DATE 10/21/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 11/8/76 DATE
 CONTROL NO. 11/16 FILE NO. C-210.3

1. PROJECT NO. 7220 2. DATE 10-14-76 PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. XXXXXX Plant Area

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. RD OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-13-76	1131	JK	E. 550 S. 4800	623	---	116.4	6.9	108.9	41 N/A 2	108.7	89.6	As % RD 100.9 P

UST 0-13b

20. PREPARED BY (Signature) A. Mendel DATE 10-14-76 RESPONSIBLE ENGINEER C. J. ... DATE ...



COMPACTED FILL DENSITY TEST REPORT
*Corrected Copy

3. *John J. York* 12/13/76
QC ACCEPTANCE DATE
CONTROL NO. FILE NO.
PAGE 1 OF 1

1. PROJECT NO. 7220 2. DATE 10/19/76

4. SPEC. NO. 7220-C-208 5. ~~7220-C-208~~ Plant Area 6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
	MD	RM	E-550						RD	OMC	ZONE	108.7		
10/12/76	115	RB	S-4845	623	---	117.8	5.2	117.0	41	N/A	2	89.6	113.8	P
*Correction made due to wrong Min. Dry Density used. This test has been recalculated and corrected.														

UST 0-217

SB 10718



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE W/15/76 DATE
 #16 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10-18-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-12-76	1132	JK	7 + 35 C	See Below	---	134.0	15.8	115.75	255	14.4	1	117.4	98.6	P
	1133		80'E.Col.12	605.5	--	140.0	9.8	127.5	251	9.2	2	130.6	97.6	P
	1134		95'E.Col.12	608	---	136.0	13.3	120.4	250	11.6	2	123.9	97.2	P
	1135		73'E.Col.12	610.5	---	139.0	10.9	125.25	251	9.2	2	130.6	95.9	P
			43'S.of Q											
* Note - MD-1132 Elevation - 5'5" Below Rail.														

UST O-194

20. PREPARED BY

Y (Signature)

Kendra Shuch

DATE 10/18/76

RESPONSIBLE ENGINEER

John J. Kelly

DATE

10/22/76

SB 10719



COMPACTED FILL DENSITY TEST REPORT

3. *J. S. Smith* 11/17/76
 QC ACCEPTANCE DATE
 11 11. CONTROL NO. FILE NO.
 PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 10-14-76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RL	19. REMARKS
									RD	OMC	ZONE			
10-12-76	1128	BJ	E. 550 S. 4895	623	---	103.5	7.6	96.2	41	N/A	2	108.7 89.6	39.0	F
	1129		33' W. OF S. 1 27' N. OF A	629	---	117.6	5.4	111.6					112.2	P
	1130		E. 550 S. 4895	623	---	113.7	5.2	108.1	✓	✓	✓	✓	97.4	P Clears MD-1128

UST 0-135

20. PREPARED BY (Signature)

J. S. Smith

DATE

10/14/76

21. RESPONSIBLE ENGINEER

Clara Yearley

DATE

11/17/76



COMPACTED FILL DENSITY TEST REPORT

3. *John Sudd* 11/8/76
 QC ACCEPTANCE DATE
 #16 C. S. C. J.
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10-14-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. EXISTING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MIN. / MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
10-11-76	76/1127BJ		15' W. of 22' N. of A	7.6 625	---	113.2	7.0	105.3	RD OMC ZONE 41 N/A N/A	108.7 89.6	87.1	P

UST 0-132

20. PREPARED BY (Signature) *J. Sudd* DATE *10/15/76* RESPONSIBLE ENGINEER *John J. Gately* DATE *10/22/76*



COMPACTED FILL DENSITY TEST REPORT

2. *John G. ...* 11/8/76
 QC ACCEPTANCE DATE
 11/ 11/21/76
 CONTROL NO. FILE NO.

1 PROJECT NO. 7220

7 DATE 10-14-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONE	17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
10-11-76	1126	RS	57' W. OF 7.4 12' N. OF A	627	---	121.9	5.9	115.1	38 N/A 2	113.3 / 116.6	106.6	P

UST O-131

20. PREPARED BY (Signature) *J. Shueck* DATE *11/12/76* 21 RESPONSIBLE ENGINEER *Clifford Yeatley* DATE *10/22/76*

SI 10722



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE: *30/10/76* DATE: *10/30/76*
 CONTROL NO.: *11* FILE NO.: *C-2103*

1. PROJECT NO. 7220 7. DATE 10-11-76 PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. ~~XXXXXXXXXX~~ Plant Area

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	6. TESTED WEEK OF		REMARKS
										17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION AS % RU	
10-8-76	1120	JK	18' off A 28' off	626	---	118.9	6.7	111.4	N/A	108.7	111.4	P

UST 0-117

SB 10723



COMPACTED FILL DENSITY TEST REPORT

*CORRECTED COPY

3. 7-3-76 4/6/77
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.
 PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 10/7/76

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/7/76	1125					VOIDED NUMBER						
												*Test location indeterminate - Test voided as per Bechtel QC. <i>Don</i> <i>3/24/77</i>

20. PREPARED BY *Bechtel* DATE 3-3-77 RESPONSIBLE ENGINEER *Alk Oslan* DATE 1/9/77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1. PROJECT NO. 72202. DATE 10-14-76PAGE 1 OF 14. SPEC. NO. 7220-C-2085. DRAWING NO. XXXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS	
									RD	OMC	ZONE				
10-7-76	1122	BJ	22' E. of 6.0 14' S. of Q			117.3	7.3	109.3	41	N/A	N/A	108.7 / 89.6	102.6	P	231
	1123		18' E. of 6-Line 16' off Q	613	---	111.8	6.0	105.5					85.8	P	232
	1124		15' W. of 4.55 12' off Q	609	---	113.9	5.8	107.7					95.6	P	

*MD-1125 is a voided test, as per Bechtel QC, Glenn Yeisley.
No location ever given to UST, so Bechtel voided the test.

UST 0-129

20. PREPARED BY (Signature) W. W. W.DATE 11-3-7621. RESPONSIBLE ENGINEER Glenn YeisleyDATE 11/17/76



COMPACTED FILL DENSITY TEST REPORT

3. *John Lee* 10/24/76
 QC ACCEPTANCE DATE
 16 10:30
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10-7-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE			
10-6-76	1116	BJ	12'W End of Turbin #2 12' off Q	610	---	110.5	6.0	104.2	1	N/A	2	108.7 / 89.6	79.7	F
4	1117	V	21'W End of Turbin #2 8'off Q	612	---	115.7	6.2	108.9	✓	✓	✓	✓	100.9	P <i>2 3/4</i>

UST 0-80

20. PREP BY

BY (Signature) *J. Shedd*

DATE *10/20/76*

RESPONSIBLE ENGINEER *J. Shedd*

DATE *10/24/76*

SB 10726



COMPACTED FILL DENSITY TEST REPORT

3. *H. J. ...* 10/26/76
 QC ACCEPTANCE DATE
 CONTROL NO. 11. FILE NO. C-1112

1. PROJECT NO. 7220

2. DATE 10-11-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
10-5-76	1118	JK	3 ^o Cont. 2	630.5--		133.5	13.4	117.75	200	13.4	2	118.1	99.7	P
			65' off wall 52' E. Col. 12											
	1119		E of Q	613.5--		133.0	9.5	121.5	270	11.1	2	124.6	97.5	P

UST OF-112

20. PREP BY (Signature) [Signature] DATE 10-14-76 RESPONSIBLE ENGINEER [Signature] DATE



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE _____ DATE _____
 CONTROL NO. _____ FILE NO. _____
 PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 10-7-76

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE			
10-1-76	1115	BJ	45' W of E-End 30" off wall Behind Carpenter Shop	63.4	---	114.1	6.4	107.2	41	N/A	2	108.7 89.6	93.4	P

UST 0-68

20. PREPARED BY

(Signature)

DATE

(Signature)

RESPONSIBLE ENGINEER

DATE

(Signature)



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1. PROJECT NO. 72202. DATE 10-4-76PAGE 1 OF 14. SPEC. NO. 7220-C-2085. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min./MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE			
9-29-76	1111	BJE	Elect. Line E. of Turb. 2	613	---	108.5	6.9	101.5	41	N/A	2	108.7 89.6	67	F
	1112		Elect. Line E. of Turb. 2	613	---	102.1	7.2	95.2					34	F
	1113		Elect. Line E. of Turb. 2	612	---	112.5	7.3	104.8					83	P
	1114		Elect. Line E. of Turb. 2	613	---	118.9	7.3	110.8	✓	✓		✓	109	P Clears MD-1111 & MD-1112

UST 0-19

20. PREPARED BY

1Y (Signature) [Signature]DATE 10/4/76

RESPONSIBLE ENGINEER _____

DATE _____



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE _____ DATE _____
 CONTROL NO. _____ FILE NO. _____

1. PROJECT NO. 7220

2. DATE 9-29-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

8. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-28-76	1102	JK RM	45' E. of 12 27' S. of Q	614.5	---	143.0	10.2	129.8	269	10.0	2	127.3	102	P
	1103		12' E. of 12 38' N. of Q	616	---	139.0	10.8	125.5					99	P
	1104		25' E. of 12 38' N. of Q	616.5	---	139.5	11.8	124.8					98	P
	1105		30' E. of 12 74' N. of Q	615	---	141.0	10.2	128.0					101	P
	1106		60' Cont. 1 28' off wall	633.5	--	142.0	11.4	127.5					100	P
	1107		10' Cont. 1 7' off wall	633.5	---	137.5	11.4	124.5					98	P
	1108		5' S. of Q E. Col. 12	615	---	135.0	10.0	122.8	✓			✓	96	P
	1109		40' Cont. 1 22' off wall	623	---	138.0	11.5	123.8	262	11.8	2	123.9	100	P
✓	1110	✓	275' Cont. 1 45' off wall	632.5	---	140.0	11.3	125.8	↓	↓	↓	↓	102	P

UST S-320

20. PREPARED BY (Signature) J. Good

DATE 9/29/76

RESPONSIBLE ENGINEER _____

DATE _____

50-10731



COMPACTED FILL DENSITY TEST REPORT

3. *J. J. 10/1/76*
 QC ACCEPTANCE DATE
 CONTROL NO. F.I.E. NO.

1. PROJECT NO. 7220

2. DATE 9-29-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX

Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-27-76	1095	JK	86 ⁰ Cont. 2 120' off wa	11 631	---	137.5	11.6	123.3	270	11.1	2	124.6	99	P
	1096		22' N of K 76' E. Col. 1 280 ⁰ Cont. 1	2 628	---	136.0	12.6	120.8					97	P
	1097		37' off wa 135' E. Col. 12	1 632	---	142.5	11.8	127.5					102	P
	1098		15' N of K 90 ⁰ Cont. 2	626	---	140.5	11.5	126.0					101	P
	1099		90' off wa 39' E. Col. 12	1 632	---	136.5	9.9	124.3					100	P
	1100		85' S of K 280 ⁰ Cont. 1	618	---	134.5	10.9	121.3					97	P
	1101		38' off wa	1 631	---	139.0	11.2	125.0	✓	✓	✓	✓	100	P

UST S-312

20. PREPARED BY (Signature) *Michael Street* DATE 9/19/76 21. RESPONSIBLE ENGINEER _____ DATE _____

SB 10732



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE 10/1/76
CONTROL NO. _____ FILE NO. _____
PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 9-28-76

4. SPEC. NO. 7220-C-298

5. ~~XXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-24-76	1083	RM	30'E. Col. 12 12'N of K 95°Cont. 2	620	---	144.0	10.8	130.0	260	10.6	2	129.8	100	P
	1084		25'off wall 90°Cont. 2	626	---	145.5	11.7	130.3	✓	✓	1	✓	100	P
	1085		10'off wall 102°Cont. 2	629	---	144.5	10.9	130.3	251	9.2	2	130.6	100	P
	1086	✓	32'off wall 90'E. Col. 12	629	---	143.5	12.1	128.0	260	10.6	2	129.8	99	P
	1087	JK	12'S of K 90°Cont. 2	622	---	139.0	9.0	127.5					98	P
	1088	✓	36'off wall	628	---	147.0	11.2	132.3	✓	✓	✓	✓	102	P

UST S-289

20. PREPARED BY (Signature) _____

[Signature]

DATE

9/27/76

21. RESPONSIBLE ENGINEER _____

DATE _____

[Signature]

SB 10731

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE 11/15/77
 CONTROL NO. _____ FILE NO. _____
 1. _____

1. PROJECT NO. 7220 2. DATE 9/24/76 3. PAGE 1 OF 1

4. SPEC. NO.	7. DATE TAKEN	8. TEST NO. BY	9. TEST NO. BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	9/23/76	1082	JR	150'S. of Manhole #1 Sant. Sewer	629	---	141.5	11.4	127.0	2 10.0 2	127.3	100	Pass

USF S-276

20. PREPARED BY *[Signature]* DATE 7.31.77 RESPONSIBLE ENGINEER [Signature] DATE 9/27
 QC-C1
 10002 (3-73)



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 10/11/76 DATE
CONTROL NO. 16 FILE NO. C-1103

1. PROJECT NO. 7220

2. DATE 9-24-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS	
									BMP	OMC	ZONE				
9-23-76	1079	JK	15' W. Col. 12 44' S of Q	613.5	25	142.5	9.4	130.3	251	9.2	2	130.6	100	P	2 ³ E
	1080		87' E. Col. 12 2' S. of Q	611.5	5	145.5	10.0	132.3					101	P	
	1081		100' Cont. 2 28' off wall	623.5	5	135.5	9.9	123.3	269	10.0	2	127.3	97	P	

USI S-274

20. PREPARED BY naturel DATE 9-24-76 RESPONSIBLE ENGINEER _____ DATE _____

SD 10738



COMPACTED FILL DENSITY TEST REPORT

*Resubmittal

QC ACCEPTANCE *Accepted* DATE *12/15/76*
CONTROL NO. FILE NO.
PAGE *1* OF *1*

1. PROJECT NO. 7220

DATE *12/15/76* 9/22/76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/21/76	1078	JK	5' N. Man-hole #3	620	---	137.0	13.4	120.8	200	13.4	2	118.1	102	P

UST S-236

20. PREPARED (Signature) *Henry Jones* DATE *12/15/76* RESPONSIBLE ENGINEER *William J. ...* DATE *12/15/76*

SB - 0037



COMPACTED FILL DENSITY TEST REPORT
*Corrected Copy

QC ACCEPTANCE *Jon Sub* DATE *11-8-76*
CONTROL NO. FILE NO.

1. PROJECT NO. 7220 2. DATE 9-21-76 PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. ~~XXXXXXXX~~ Plant Area 6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION (D OMC ZONE)	17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION AS % RD	19. REMARKS
9-20-76	1077	BJ	100'W of Manhole #9 Sanitary Sewer Line	632	---	115.1	6.7	107.9	61 N/A 2	108.7 89.6	94	P 10-18-76 P 98 X'
<p>*Corrected Copy</p> <p><i>BJ Check</i> <i>11/8/76</i></p>												
										<p><i>Jon Sub</i> 11/8/76</p>		

20. PREPARED BY Harold Shedd DATE 9/21/76 21. RESPONSIBLE ENGINEER R. Valentini DATE 9/21/76

SB 10720



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

QC ACCEPTANCE	DATE
16	9-20-76
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

2. DATE 9-20-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~(DRAWING NO.)~~ XXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-17-76	1076	JK	10'S. Man-hole #2 Sanitary Sewer Line	618 529	7.5 ---	139.5	12.0	124.5	270	11.1	1	124.6	100	P
*Elevation was changed as per an error by the Bechtel Labor Foreman.														

UST S-166

20. PREPARED BY _____

(Signature) Portia Shuch

DATE 9/21/76

RESPONSIBLE ENGINEER R. P. Lintner

DATE 9/21/76

SD 10739



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

QC ACCEPTANCE

DATE

CONTROL NO. 16

FILE NO.

1. PROJECT NO. 7220

2. DATE 9-20-76

PAGE 1 OF 1

4. SPEC NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WELK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-16-76	1074	JK	22'W. Col. 12 52'S. Q-Line 30'N. of	608	---	145.0	10.1	131.8	251	9.2	2	130.6	101	P
	1075		Manhole #3 Sanitary Sewer Line	616 621	---	143.5	10.6	129.8	251	9.2	2	130.6	99	P

*Elevation was changed as per an error by the Bechtel Labor Foreman.

UST 5-16

20. PREPARED

Signature

Gerald Shroder

DATE 9/21/76

RESPONSIBLE ENGINEER

K. V. [unclear]

DATE

9/21

76

SBS 10740



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE 9-20-76
 CONTROL NO. 16-010 FILE NO. _____

1. PROJECT NO. 7220 2. DATE 9-20-76 PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. ~~XXXXXXXXXX~~ XXXXXXXXXX Plant Area 6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. RD	17. SOIL CLASSIFICATION	18. MAX LAB. DRY DENSITY (LB./C.F.)	19. PERCENT COMPACTION	20. REMARKS
9-15-76	1073	BJ	6' W. of I2	609	---	117.6	10.5	106.4	46	N/A	108.3	91	P AS % RD

UST S157

20. PREPARED BY (Signature) Steve... DATE 9-20-76 RESPONSIBLE ENGINEER M. Sabatini DATE 9-20-76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 11/1/76
DATE
CONTROL NO. FILE NO.
PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 9-16-76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-15-76	1069	JK	45'E. Col. 12 28'N.Q-Line 5'E.Col.12	608	---	142.0	10.5	128.5	251	9.2	2	130.6	98	P
	1070		25'S.Q-Line 60'E.Col.12	606.5	--	140.0	9.6	127.8					98	P
	1071	RM	38'W.Q-Line 25'E.Col.12	611	---	145.0	13.5	127.8	228	11.8	2	123.8	103	P
	1072		12'W.Q-Line	610	---	145.0	12.8	128.5					104	P

Q. C. REVIEW

12/1/76 DATE 9-21-76

UST S-154

20. PREPARED BY (Signature) [Signature]

DATE 9/16/76

21. RESPONSIBLE ENGINEER [Signature]

DATE 9-1-76

SD 10722



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 11/11/76 DATE
 CONTROL NO. 1111 FILE NO.

1. PROJECT NO. 7220

2. DATE 9-16-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION IMP OMC ZONE			17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9-14-76	1064	JK	300' W. Man- hole #9	629	---	142.5	11.1	128.3	269	10.0	2	127.3	101	P
	1065		350' Cont. 45' off wall	630.5	---	134.5	13.0	119.0	200	13.4	2	118.1	101	P
	1066		328' Cont. 57' off wall	628	---	130.5	13.0	115.5	↓	↓	↓	↓	98	P
	1067		34' E. Col. 12 12' N.Q-Line	607	---	142.0	11.2	127.8	269	10.0	2	127.3	100	P
✓	1068	✓	31' E. Col. 12 16' S.Q-Line	609	---	142.0	11.4	127.5	↓	↓	↓	↓	100	P

Q. C. REVIEW

K. H. ... DATE 9-16-76

UST S-153

20. PREPARED BY (Signature) [Signature]

DATE 9-16-76

RESPONSIBLE ENGINEER [Signature]

DATE 9-1-76

59-10713



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

3. QC ACCEPTANCE 12/15/76 DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 9/15/76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. WLD / MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE			
9/14/76	1060	RS	26'E. of 12 4" Duct-	602	---	108.5	6.1	102.3	53	N/A	2	101.3 90.1	107.9	P
			Line											
	1061		50'E. 12 30'N. of Q	603.5	---	108.8	6.8	101.9					104.7	P
	1062		Sant. Sewer 8'S. of	614	---	112.1	6.8	105.0	46	N/A	2	108.3 91.1	83	P
			Manhole											
	1063		40'E. of 12 over 4" Duct	608	---	111.6	5.7	105.6					85	P
			Line											
*Corrected Copy due to the wrong minimum dry density used for tests MDR-1060, 1061. These test now stand corrected.														

UST S-132

20. PREPARE BY (Signature)

DATE

21. RESPONSIBLE ENGINEER S. Shred

DATE 11/9/76

U. C. REVIEW 11/29/76

SB 10744



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 9/21/76 DATE
 CONTROL NO. 16 FILE NO. 200-3

1. PROJECT NO. 7220

2. DATE 9-14-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									UMP	OMC	ZONE			
9-13-76	1055	JK	177'E. Col. 12 18'S-K-Line	616	---	145.0	11.5	130.0	269	10.0	2	127.3	102	P
	1056		110'E. Col. 12 @ Col. K-Line	617	.5--	147.5	10.7	133.3	251	9.2	2	130.6	102	P
	1057		80'E. Col. 12 32'N K-Line	622	---	145.5	9.8	132.5					102	P
	1058		62'E. Col. 12 24'S Q-Line	608	.5--	143.0	12.4	127.3	249	11.6	2	124.3	102	P
	1059		200'W. Man- hole #9	627	---	138.0	12.2	123.0	270	11.1	2	124.6	99	P

UST S-124

20. PREPARED BY (Signature) [Signature]

DATE 9-15-76

21. RESPONSIBLE ENGINEER [Signature]

DATE 9-15-76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 16 DATE 9/13/76
 CONTROL NO. C-211-3 FILE NO.

1. PROJECT NO. 7220

2. DATE 9-13-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. XXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-10-76	1053	JK	200' W. of RM Manhole #9	625	---	142.0	12.5	126.3	237	10.7	2	127.1	99	P

UST S-110

20. PREPARED [Signature] DATE 9/12/76 RESPONSIBLE ENGINEER [Signature] DATE 9/13/76

10002 (3-7)



COMPACTED FILL DENSITY TEST REPORT

3. *8/23/76*
 QC ACCEPTANCE DATE
 4. *16* 5. *2103*
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 9-13-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. Min. / Max. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	MD								RD OMC ZONE		As % RD	
9-9-76	1054	RS	8'S of Q 13'E. of 1.	606	---	116.5	4.5	111.5	55 N/A 2	109.7 90.2	108	P

UST S - 112

20. PREPARED BY (Signature) *[Signature]* DATE 9/13/76 RESPONSIBLE ENGINEER *[Signature]* DATE 9/13/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 1 DATE 9-10-76
CONTROL NO. 116 FILE NO. 5003

1. PROJECT NO 7220

2. DATE 9-10-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (F.F.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC Zone			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9-9-76	1052	JK	50'S A line 32'E Col. 12	606	--	145.0	11.8	129.75	271	10.1	2	126.6	103	P

UST S-84

[Handwritten signature]

DATE 9.10.76

SPONSORING ENGINEER Tom Sub

DATE 14-76

SB 10718



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

QC ACCEPTANCE 12/11/76 DATE 12/11/76
 CONTROL NO. _____ FILE NO. _____
 PAGE 1 OF 1

1. PROJECT NO. 7220

DATE 9/9/76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	1051		Sant. Sewer 150' E. of Manhole	623	---	113.4	4.7	108.3	46 N/A 2	108.3 91.1	100	P ?
*MD-1050 was omitted and MD-1051 had the wrong MD number. Now reads correctly.												
UST	S-78											

20. PREPARED BY (Signature) _____ DATE _____

21. RESPONSIBLE ENGINEER [Signature] DATE 12/11/76

C. C. REYNOLDS [Signature] 10/29/76



COMPACTED FILL DENSITY TEST REPORT

3. QC Acceptance 9/21/76
 QC ACCEPTANCE DATE
Control No. File No.
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 9-9-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (ft)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9-8-76	1045	JK	180' E. Col. 12 @ Q-Line	612.5	---	142.0	9.2	120.0	25 9.2 2	130.6	100	P
	1046		230' E. Col. 12 37' N. O-Line	613.5	---	142.5	9.8	129.8			99	P
	1047		62' E. Col. 12 10' N. K-Line	620.5	---	142.0	9.7	129.5			99	P
	1048		95' Cont. 2 64' off wall	1626	---	138.0	13.1	122.0	270 11.1 2	124.6	98	P

UST S-80

20. PREPARED

(Signature) [Signature]

DATE 9-9-76

21. RESPONSIBLE ENGINEER

R. Valentine

DATE 9/21/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
16	9-21-76
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

7. DATE 9-8-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
9-8-76	1039	JK	315 ⁰ Cont. 1 43' off wal	626	---	133.5	11.9	119.3	250	11.6	2	123.9	96	P
	1040		285 ⁰ Cont. 1 30' off wal	623	---	133.5	12.4	118.8					96	P
	1041		260 ⁰ Cont. 1 45' off wal	619.5	---	135.0	12.7	119.8	✓		✓		97	P
	1042		50' N.Q-Line 185' E.Col.	12/6	2---	142.5	9.6	130.0	251	9.2	2	130.6	100	P
	1043	1	20' S.K-Line 177' E.Col.	12	614.5	143.0	12.2	127.5	249	11.6	2	124.3	103	P
	1044	1	25' N.K-Line 128' E.Col.	12	618.5	143.0	10.9	129.0	251	9.2	2	130.6	99	P

UST S-60

20. PREPARED BY (Signature)

DATE 9-8-76

21. RESPONSIBLE ENGINEER R. Valentine

DATE 9/21/76

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 9-7-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. XXXXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS			
9-3-76	1027	JK	110'E Col. 12	611	---	140.5	13.1	124.3	BMP ONC ZONE	271	10.1	2	126.6	98	F-Moisture Clears MD
	1028		110'E Col. 12	611	---	138.5	10.8	125.0						99	P 1020, 1026 & 1029
	1029		18'N Q-Line 177'E Col. 12	612	---	143.0	11.7	128.0						101	P
	1030		55'S K-Line 210'E Col. 12	612	---	147.0	12.0	131.3						104	P
	1031		86° Cont. 2 96'off wal	628	---	142.0	12.0	126.8						100	P
	1032		94'E Col. 12 22'N K-Line	620	---	137.0	13.0	121.3						96	F-Moisture
	1033		90'E Col. 12 37'N Q-Line	613.5	---	144.5	12.0	129.0						102	P
	1034		142'E Col. 12 76'N Q-Line	613	---	146.0	11.7	130.8						103	P
	1035		170'E Col. 12 5'S Q-Line	611	---	143.5	11.0	129.3						102	P
	1036		145'E Col. 12 52'N Q-Line	612.5	---	140.0	11.8	125.3						99	P
	1037		50'E Col. 12 46'N Q-Line	612.5	---	141.5	12.1	126.3						100	P
	1038		94'E Col. 12 24' K-Line	620	---	147.0	11.2	132.3						105	P

UST 55

20. PREPARED BY

[Signature]

DATE 9-7-76

SPONSORING ENGINEER

[Signature]

DATE

9/16

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE DATE
 CONTROL NO. 16 FILE NO. C-20

1. PROJECT NO. 7220

2. DATE 9-3-76

PAGE 1 OF 1

4. SPEC. NO. 7220-G-208

5. XXXXXXXX

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (L.B./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (L.B./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX. LAB. DRY DENSITY (L.B./C.F.)	18. PERCENT COMPACTION	19. REMARKS	
9-2-76	1020	JK	110'E Col. 12												
	1021		18'N.Q-Line 190'E.Col. 12	611	---	142.0	12.7	126.0	271	10.1	2	126.6	100	F-Moisture	
	1022		28'N.Q-Line 190'E.Col. 12	610	---	141.0	12.2	125.8					99	F-Moisture	
	1023		27'N.Q-Line 173'E.Col. 12	610	---	142.0	11.6	127.3					101	P Clears MD-1021	
	1024		21'S.Q-Line 100'E.Col. 12	610.5	---	138.0	9.7	125.8					99	P	
	1025		10'S.K-Line 97'E.Col. 12	614.5	---	144.5	11.4	129.8					103	P	
	1026		58'N.Q-Line 110'E.Col. 12	611	---	144.0	12.1	128.5					102	P	
			18'N.Q-Line 110'E.Col. 12	611	---	134.0	13.1	118.5	✓	✓	✓	✓	94	F	

LIST S-43

20 PREPARE

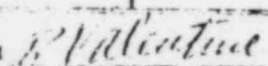
Signature of



DATE

9-3-76

RESPONSIBLE ENGINEER



DATE

9/3/76



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

4. SPEC. NO. 7220-C-203 6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW GRADE (FT)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9-1-76	1019	BJ	30'S OF K on 4.55	607	---	116.7	7.8	108.3	RD OMC ZONE 2	109.7	94	P

20. PREPARED BY [Signature] DATE 9.2.76 RESPONSIBLE ENGINEER [Signature] DA. [Signature]

UST. S-39



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE _____
 CONTROL NO. 112 FILE NO. 1103

1. PROJECT NO. 7220

2. DATE 9-2-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
8-31-76	1006	JK	155'E Col. 12 31'N. Q-Line 105'E Col. 12	607	---	140.5	10.2	127.5	251	9.2	2	130.6	98	P
	1007		25'N Q-Line E Col. K	608	---	133.5	12.4	118.8	200	13.4	2	118.1	101	P
	1008		75'W Col. 1	629	---	131.0	11.3	117.8	259	12.0	2	117.1	101	P
	1009		3+12 30' L E	615	---	134.5	11.2	121.0	244	13.3	2	120.9	100	F-Moisture
	1010		195'E Col. 12 5'N Q-Line 3+12	608.5	---	139.5	10.9	125.8	251	9.2	2	130.6	96	P
	1011		30' L E	615	---	135.0	11.6	121.0	244	13.3	2	120.9	100	CLEAR 3E P 1009 9/27/76 967
	1012		30'E Col. 12 50'S K-Line 2+00	610.5	---	139.0	11.2	125.0	251	9.2	2	130.6	96	P
	1013		6' R E	631	---	139.5	12.5	124.0	251	9.2	2	130.6	95	F-Moisture
	1014		155'E Col. 12 30'S K-Line 2+00	612	---	135.5	11.8	121.3	270	11.1	2	124.6	97	P
	1015		6' R E	631	---	136.5	11.2	122.8	251	9.2	2	130.6	94	F
	1016		175'E Col. 12 12'S Q-Line 75'E Col. 12	610.5	---	142.5	10.7	128.8	251	9.2	2	130.6	99	P
	1017		37'N Q-Line 2+00	611.5	---	139.5	10.5	126.3	251	9.2	2	130.6	97	P
	1018		6' R E	631	---	136.5	11.2	122.8	273	10.0	2	127.4	96	Clears MD- P 1013&1015

UST S-35

20. PREPARE

Signature) [Signature]

DATE 9-2-76

RESPONSIBLE ENGINEER

R. Valentini

DATE

9/3/76



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

3. QC ACCEPTANCE	12/14/76
CONTROL NO.	FILE NO.
PAGE 1 OF 1	

1. PROJECT NO. 7220

2. DATE 9/1/76

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH OF FLOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)		18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE	109.7	90.2		
8/31/76	1005	JK	55'S. of R on 4.55	608	---	123.1	7.5	114.5	55	N/A	2	109.7	90.2	119.3	P
*Corrected copy due to typo on the minimum dry density, now stands corrected.															

UST S-3

20. PREPARED BY (Signature)

DATE

21. RESPONSIBLE ENGINEER

A. Shook

DATE 11/18/76

J. C. REVIEW

11/29/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
CONTROL NO. <u>16</u>	DATE <u>8-31-76</u>
	FILE NO.

1. PROJECT NO. 72202. DATE 8-31-76PAGE 1 OF 14. SPEC. NO. 7220-C-2085. ~~INSTRUMENT NO.~~ XXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MDR	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINISH GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
8-30-76	1001	JK	1+50 12'R E	624.5	---	130.5	12.0	116.5	200	13.4	2	118.1	99	P
	1002		0+50 25'R E	630.5	---	142.0	10.3	128.8	251	9.2	2	130.6	99	P
	1003		2+50 E	619.5	---	139.5	10.7	126.0	251	9.2	2	130.6	97	P
	1004		75'N Col. Q 28'E Col. J	2605.5	--	138.5	16.6	118.8	275	16.0	2	115.4	103	P

UST Au-244

20. PREPARED

Signature:

DATE 8-31-76

RESPONSIBLE ENGINEER

DA

9/2/76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 4/1/76
 CONTROL NO. 16 FILE # C-210

1. PROJECT NO. 7220

2. DATE 8-30-76

PAGE 1 OF 1

4. SPEC NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-28-76	988	JK	65' N.Q line	607.5	--	142.0	11.8	127.0	269	10.0	1	127.3	100	P
			47' W.col. 1											
			52' W.Col. 1											
			10' N.K line											
			14' S.K line											
			150' E.col.12											
			45' S.K line											
			190' E.col.12											
			280' Cont. 1											
			120' off wall											
			270' Cont. 1											
			115' off wall											
			@ Col.K.											
			58' off Col. 1											
35' S.Col.K														
UST	Au-240		52' W.col. 1	618.5	--	141.0	12.6	125.3	249	11.6	1	124.3	101	P
			273' Cont. 1											
			127' off wall											
			12' N.K line											
			62' W.col. 1											

20. PREPARED BY [Signature] DATE 8-30-76 RESPONSIBLE ENGINEER [Signature] DA [Signature]



COMPACTED FILL DENSITY TEST REPORT

*CORRECTED COPY

QC ACCEPTANCE DATE 8/30/76
 CONTROL NO. 2103 FILE NO. 103

1. PROJECT NO. 7220 2. DATE 8/30/76 PAGE 1 OF 1

4. SPEC. NO. 7220-C-208 5. ~~XXXXXXXXXX~~ Plant Area 6. TESTED WEEK OF 18

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	18. TESTED WEEK OF		19. PERCENT COMPACTION	REMARKS
										MAX. DENSITY (LB./C.F.)	LAB. DRY DENSITY (LB./C.F.)		
8/27/76	MD 998	RS	40' Cont. 2 30' off wall 40' S. of K	629	---	109.9	8.5	101.3	53 N/A	2	101.3	100	Pass
	999		5' W. 4.55 26' Cont. 1	607	---	109.5	9.8	99.7	53 N/A	2	101.3	87.1	Pass
	1000		30' off wall	617	---	137.1	8.6	126.2	44 N/A	N/A	110.4	101.1	Pass
			*MD-998 & MD-999 were changed on the Relative Density to read correctly. MD-998 & MD-1000 were changed on the location to read correctly.										
UST App-241													Q. C. REVIEW

20. PREPARED BY 1996 DATE 6.2.77 RESPONSIBLE ENGINEER John Dwyer DATE 6/6/77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 100 DATE 8-30-76
 CONTROL NO. 16 FILE # 10-20-76

1. PROJECT NO. 7220

2. DATE 8-30-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-27-76	975	JK	270° Cont. 1 87' off wall	628.5	--	142.0	11.4	127.5	269	10.0	2	127.3	100	P
	976		8'S.K line 62'E. Col. 12	614.0	--	144.5	12.2	128.8	260	10.6	2	129.8	99	P
	977		5'N.K line 110'E. Col. 12	616.0	--	137.0	11.4	123.0	269	10.0	2	127.3	97	P
	978		92° Cont. 2 88' off wall	621.5	--	140.5	12.0	125.0	269	10.0	2	127.3	98	P
	979		80° Cont. 2 62' off wall	623.5	--	137.0	11.4	123.0	269	10.0	2	127.3	97	P
	980		55° Cont. 2 44' off wall	630.5	--	137.0	14.2	120.0	200	13.4	2	118.1	102	P
	981		54'S.K line 152'E. col. 12	605.5	--	144.0	11.6	129.0	260	10.6	2	129.8	99	P
	982		76'S.K line 165'E. col. 12	606.0	--	145.0	11.1	130.5	260	10.6	2	129.8	101	P
	983		48° Cont. 2 57' off wall	632.0	--	137.5	13.4	121.3	200	13.4	2	118.1	103	P
	984		45° Cont. 2 15' off wall	633.0	--	145.5	9.4	133.0	251	9.2	2	130.6	102	P
	985		295° Cont. 1 45' off wall	623.5	--	130.5	12.3	116.3	200	13.4	2	118.1	98	P
	986		340° Cont. 1 36' off wall	629.0	--	131.5	11.2	118.3	200	13.4	2	118.1	100	F-Moisture Clears
	987		340° Cont. 1 36' off wall	629.0	--	133.0	11.8	119.0	200	13.4	2	118.1	101	P MD-986

UST Au-239

20. PREPAR

Signature:

DATE 8-30-76

RESPONSIBLE ENGINEER

DATE 1-31-76



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE _____
 CONTROL NO. 11 FILE NO. 6-20-76

1. PROJECT NO. 7220

2. DATE 8-27-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-26-76	968	JK	15'W. Col. 6.6	634	--	130.5	11.3	116.7	200	13.4	2	118.1	99	P
	969		15'N. A line Col. 7.4	634	--	133.5	10.8	120.5	270	11.1	2	124.6	97	P
	970		102'N. A line 0 ^o Cont. 2	634	--	128.5	9.6	117.2	258	10.8	2	123.3	95	P
	971		137'off wall 25 ^o Cont. 2	634	--	128.5	9.6	117.2	258	10.8	2	123.3	95	P
	972		98'off wall 40 ^o Cont. 2	634	--	139.5	15.3	121.0	200	13.4	2	118.1	103	P
	973		105'off wall 66 ^o Cont. 2	632.5	--	133.5	14.6	116.5	200	13.4	2	118.1	99	P
	974		112'off wall 70 ^o Cont. 2	630.5	--	138.5	11.0	124.7	258	10.8	2	123.3	101	P
			138'off wall	628.0	--	134.0	14.5	117.0	200	13.4	2	118.1	99	P

UST Au-226

20. PREPARED

Signature

DATE 8-27-76

RESPONSIBLE ENGINEER J. F. O'Connell

DAI

11/20



COMPACTED FILL DENSITY TEST REPORT

3. *Jim Su* *8/25/76*
 QC ACCEPTANCE DATE
16 *C-210*
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 8-25-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
<i>24</i> 8-25-76	952	BJ	12' N of Q 30" off wall	608	---	113.4	7.5	105.6	RD OMC ZONE 41 N/A 2	108.7 89.6	As % RD 86	P
	953		65' N of Q 16' E-12 Line	607	---	112.1	7.6	104.2	41 N/A 2		80	P
	954		50' S of K 25' E-4.55	607	---	119.9	7.6	111.4	41 N/A 2		111	P
✓	955	✓	W of 72" Waterline over Elect. Line	624	---	122.6	7.8	113.7	41 N/A 2	✓	121	P



COMPACTED FILL DENSITY TEST REPORT

3. *Wm. S. G. 4/3/76*
 QC ACCEPTANCE DATE
 CONTROL NO. *147* FILE NO. *1-2/1-1*

1. PROJECT NO. 7220

2. DATE 8-25-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
8-24-76	938	JK	@1-line & P-line	6.10	0 --	136.0	9.8	123.9	279	5.7	2	140.8	88	F
	939		@5-line 15' N.L-line E-700, S-5022	606	0 --	144.5	5.5	137.0	279	5.7	2	140.8	97	P
	940		W. Int. St. 270° Cont. 1	600	0 --	141.5	8.2	130.8	274	10.4	2	124.8	105	F (Moisture)
	941		28' off wall E-700 S.-5022	617	5 --	127.5	14.6	111.3	275	16.0	2	115.4	96	P
	942		W. INT. STR. E-587, S-5176	604	0 --	141.0	9.7	128.5	251	9.2	2	130.6	98	P
	943		W. INT. STR. 350° Cont. 2	604	0 --	136.5	16.2	117.5	168	14.3	2	117.8	100	P
	944		112' off wall E-700 S.-5022	631	5 --	141.0	13.5	124.3	249	11.6	2	124.3	100	P
	945		W. INT. ST. 80° Cont. 2	600	0 --	141.0	8.9	129.5	274	10.4	2	124.8	104	Clears MD P 940
	946		70' off wall 340° Cont. 1	621	5 --	128.0	8.9	117.5	200	13.4	2	118.1	100	F (Moisture)
	947		46' off wall 313° Cont. 1	626	0 --	129.5	15.6	112.0	275	16.0	2	115.4	97	P
	948		37' off wall 0° Cont. 2	623	0 --	129.0	16.2	111.0	275	16.0	2	115.4	96	P
	949		37' off wall 18' E. col 5.6	623	5 --	141.0	14.6	123.0	200	13.4	2	118.1	104	P
	950		77' N.A line E-587, S-5176	632	5 --	135.0	15.1	117.2	200	13.4	2	118.1	99	Clears MD 8 P890, 898, 90 & 92
	951		W. INT. ST.	601	0 --	124.5	18.9	104.8	RD-37	N/A	2	108.2	97	P



COMPACTED FILL DENSITY TEST REPORT

3.1 *[Signature]* 11/2/76
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.
 PAGE OF

1. PROJECT NO. 7220

2. DATE 8-24-76

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS	
									BMP	OMC	Zone				
8-23-76	923	JKW	1400/4 West ramp	622.5	--	134.5	15.2	116.7	200	13.4	2	118.1	99	P	
	924		30' N. Col. Q	606.0	--	134.5	10.9	121.2	274	10.4	2	124.8	97	P	
	925		18' E. Col. 5.6	632.5	--	125.0	14.2	109.5	200	13.4	2	118.1	93	F	
	926		15' E. Col. 6.6	629.0	--	128.0	11.5	114.7	200	13.4	2	118.1	97	P	
	927		74' N. A line	632.0	--	136.5	12.1	121.7	200	13.4	2	118.1	103	P	
	928		22' E. Col. 8.7	603.0	--	139.5	11.8	124.7	274	10.4	2	124.8	100	P	
	929	RM JK	70' N. A line	626.0	--	129.0	17.3	110.0	238	19.3	2	106.9	103	P	
	930		20' N. Q turb.	623.5	--	131.0	14.9	114.0	210	15.7	2	114.4	100	P	
	931	RM	355' E. Col. 12	619.5	--	128.5	15.0	111.7	210	15.7	2	114.4	98	P	
	932		335' Cont. 1	609.0	--	132.0	12.6	117.2	255	14.4	2	117.4	100	P	
			27' off wall												
			320' Cont. 1												
			55' off wall												
		298' Cont. 1													
		58' off wall													
		33' N. of Q													
		308' E. Col. 12													
		Turb. Bldg.													
UST Au-178															

[Handwritten signature]



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

3. *June 30th* 12/15/71
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

7. DATE 8/24/76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONE	17. Min. / Max. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
8/23/76	933	BJ	10' off K on 4.55	607	---	114.6	5.4	108.7	41 N/A 2	108.7 / 89.6	100	P
	934		50'S. of K 30' off 12 N.E. Side of	607	---	118.2	9.5	108.7			97	P
	935		Pipeline S.W. end of	612	---	111.4	6.1	104.9			83	P
	936		Pipeline 55' N. of A	612	---	122.4	7.0	114.4	43 N/A 2	110.5 / 90.8	92	P
✓	937	✓	16'E. of 12	605	---	118.2	9.5	108.0	41 N/A 2	108.7 / 89.6	97	P
										*Corrected Copy due to Min./Max. were incorrect for test		
										MD-936 ⁹³⁷ 8/24/76		

UST Au-182



COMPACTED FILL DENSITY TEST REPORT

3. *Lantib* 11/1/76
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 72202. DATE 8-24-76PAGE 1 OF 14. SPEC. NO. 7220-C-2085. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC Zone	17. mini/ MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
8-20-76	920	RS	47'S. of K 4'E. 12 line	605.0	--	116.8	7.7	108.4	43 N/A 2	110.5	91	P
	921		26'N. of Q 30"E. of 12	606.0	--	116.5	9.5	106.4	43 N/A 2		82	P
	922		25'S. of K 21'E. of 4.5	605.0	--	117.1	8.2	108.2	43 N/A 2		90	P

UST Au-176

*Handwritten signature or initials**Handwritten numbers*



COMPACTED FILL DENSITY TEST REPORT

3. *[Signature]* *8/23/76*
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 8-23-76

PAGE OF

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-20-76	916	RM	80 ⁰ Cont. 2 70' off wall Col. 7.4	621.5	--	137.0	15.6	118.5	200	13.4	2	118.1	100	F(Moisture)
	917		65' W. Col. 4 Aux. Bldg.	626.0	--	129.15	14.1	113.5	200	13.4	2	118.1	96	P
	918		80 ⁰ Cont. 2 70' off wall	621.5	--	133.0	10.8	120.0	200	13.4	2	118.1	102	F(Moisture)
	919		50' S. K line 73' E. Col. 12	607.0	--	125.5	11.6	112.5	200	13.4	2	118.1	95	P
UST A-169														



COMPACTED FILL DENSITY TEST REPORT

3. 11/1/76 10/1/76
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 8-23-76

PAGE OF

4. SPEC. NO. 7220-C-208

5. XXXXXXXXXX

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-19-76	911	RM	48'E.Col.12 70'S.of Q	605	--	125.5	16.2	108.0	199	17.8	2	109.7	99	P
	912		85 ⁰ Cont.2 104'off wall	620.5	--	130.5	13.0	115.5	200	13.4	2	118.1	98	P
	913		47 ⁰ Cont.2 97'off wall	629	--	137.5	11.3	123.5	262	11.8	2	123.9	100	P
	914		20 ⁰ Cont.2 120'off wall	633	--	129.6	14.1	113.6	200	13.4	2	118.1	96	Clears MD P 904
✓	915	✓	22'E.Col.8.7 70'N.Col.A	632	--	133.5	17.6	113.5	200	13.4	2	118.1	96	F(Moisture)
UST Au-170														

ME 170



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE CONTROL NO. FILE

1. PROJECT NO. 7220

2. DATE 8-23-76

PAGE 1 OF

4. SPEC. NO. 7220-C-208

5. XXXXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONE	17. MIN. / MAX LAB DRY DENSITY (LB./C.F.) 110.5	18. PERCENT COMPACTION As % RD	19. REMARKS
[REDACTED]												
					118.0		8.4					26D 26D



COMPACTED FILL DENSITY TEST REPORT

3. *1.2m 1st* *6/21*
 QC ACCEPTANCE *D*
 CONTROL NO. _____ FILE _____

1. PROJECT NO. 7220

2. DATE 8-23-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMI	OMC	ZONE			
8-19-76	902	RM	18'E. Col. 5.6 77'N Col. A Aux. Bldg.	632.5	---	129.0	17.3	110.0	200	13.4	2	118.1	93	F
	903		22'E. Col. 8.7 70'N Col. A Aux. Bldg.	632.0	---	135.5	15.8	117.0	200	13.4	2	118.1	99	F-Moisture
	904		20 ⁰ Cont. 2 120'off wal	1633.0	---	128.5	11.0	115.7	200	13.4	2	118.1	98	F-Moisture
	905		334 ⁰ Cont. 1 27'off wal	623.5	---	129.5	13.8	113.7	200	13.4	2	118.1	96	P
	906		310 ⁰ Cont. 1 21'off wal	620.5	---	134.0	15.0	116.5	200	13.4	2	118.1	99	P
	907		270 ⁰ Cont. 1 36'off wal	615.5	---	132.5	14.5	115.7	200	13.4	2	118.1	98	P
	908		22'E. Col. 8.7 70'N A-Line	632.0	---	124.5	13.2	110.0	200	13.4	2	118.1	93	F

RM

M P A



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE DA
 CONTROL NO. FILE

1. PROJECT NO. 7220

2. DATE 8-19-76

PAGE 1 OF

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
8-18-76	894	JK	Col. 8.7 144' N A-Line 8' Cont. #2	633	---	124.0	13.0	109.7	191	15.0	2	115.4	95	P
	895		125' off wall 25' Cont. #2	630	---	129.0	18.3	109.0	238	19.3	2	106.9	102	P
	896		20' off wall 52' Cont. 2	628.5	--	129.5	11.6	116.0	200	13.4	2	118.1	98	P
	897		30' off wall	628	---	145.0	11.8	129.7	260	10.6	2	129.8	100	P
	898		18' E Col. 5.6 77' N A-Line	632.5	---	131.5	16.6	112.7	200	13.4	2	118.1	96	F-Moisture
	899		28' Cont. 2 46' off wall	629	---	131.5	13.4	116.0	200	13.4	2	118.1	98	P
	900		80' Cont. 2 81' off wall	622.5	---	136.0	12.6	120.7	200	13.4	2	118.1	102	P
[REDACTED]														
			5' E Col. 12	601	---	136.5	11.4	127.5	202	11.4	2	129.9	99	P 260



COMPACTED FILL DENSITY TEST REPORT

3. *DA* / *DA* / *DA*
 QC ACCEPTANCE *DA* / *DA* / *DA*
 CONTROL NO. _____ FILE _____

1. PROJECT NO 7220

2. DATE 8-19-76

PAGE _____ OF _____

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC Zone	17. MIN. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8-19-76	104	RS	30 E. of 12th	602	1.0	120.1	7.2	112.0	50 N/A	115.9	95% RD	P
UST Am-131												

260

PKS



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

DATE 8/19/76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. IDENTIFICATION NO. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
8/17/76	889	JK	18'E.Col.5.6	632.5	---	136.0	18.5	114.7	200	13.4	2	118.1	97	F-Moisture
	890		18'E.Col.5.6	632.5	---	135.0	16.4	116.0					98	F-Moisture
	891		10' Cont. 2											
	891		146' off wall	631.5	--	140.0	12.2	124.7	270	11.1	2	124.6	100	P
	892		15' Cont. 2											
	892		72' off wall	628.5	---	137.0	15.1	119.0	200	13.4	2	118.1	101	P
*MD-891 Moisture content changed to read correctly.														



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

2. DATE 8/16/76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH: BELOW FINAL GRADE (ft.)	13. IN PLACE WEI DENSITY (lb./c.f.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (lb./c.f.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX LAB. DRY DENSITY (lb./c.f.)	18. PERCENT COMPACTION	19. REMARKS
8/13/76	887	RS	40'W. 1.5 15'N. of Q	607	---	133.0	16.2	114.5	200	13.4	2	118.1	97	F ()
<p>*Correction made on the OMC, now stands corrected. See Md-136 for Retest!</p>														

UST A-108

20. PREPARED BY (Signature)

DATE 11/13/76 21. RESPONSIBLE ENGINEER (Signature)

(Signature)



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

J. Sub
 QC ACCEPTANCE DATE *9/1/76*
 CONTROL NO. *0.110.3* FILE NO.

1. PROJECT NO. 7220

2. DATE 8-16-76

PAGE 1 OF 1

4. SPEC. NO. 7220

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (L.B./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (L.B./C.F.)	16. SOIL CLASSIFICATION BMP OMC Zone	17. MAX. LAB. DRY DENSITY (L.B./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8-13-76	878	RS	28 ⁰ Cont. 2 78' off wal	626.5	--	134.0	11.6	120.0	274 10.4 2	124.8	96	P Clears MD 877
	879		64 ⁰ Cont. 2 25' off wal	622	--	147.5	12.2	131.5	274 10.4 2	↓	105	P
	880		44'E. 12 line									
	880		22'N.K line	609	--	135.0	14.6	117.8	255 14.4 2	117.4	100	P
	881		70 ⁰ Cont. 2 96' off wal	621	--	140.5	11.7	125.8	274 10.4 2	124.8	101	P
	882	RS	33'E. 87 line									
	882	JK	108'N.A line	631	--	134.0	13.3	118.3	255 14.4 2	117.4	101	P
	883	JK	40'N. 1.5 line 15'N.Q line	607	--	133.5	18.1	113.0	200 13.4 2	118.1	96	F(Moisture)
	884		18'W. 5.6 97' off EA line	631	--	130.5	15.2	113.2	200 13.4 2	↓	96	P
	885		@ Col. 87 line 135' off EA line	632	--	136.0	11.0	122.5	270 11.1 2	124.6	98	P
	886		350 ⁰ Cont. 1 38' off wal	623	--	131.0	14.9	114.0	235 11.4 2	125.2	91	F
	887		40'W. 1.5 15'N.Q line	607	--	133.0	16.2	114.5	200 15.7 2	118.1	97	P Clears MD 883

*11/2
11/2*

UST A-108

*MD-379 the location was corrected to 64⁰

Cont. 2 *CHK 9/1/76*

John Sub 9/3/76

8-2-76



COMPACTED FILL DENSITY TEST REPORT
*Corrected Copy

11 (check)
10-11-76

QC ACCEPTANCE 16 DATE 10/11/76
CONTROL NO. C2103 FILE NO. 1

1. PROJECT NO. 7220

2. DATE 8-11-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
8-10-76	860	JKS	1+75/10' R E S. Acc. Ramp	616.5	--	136.0	16.7	116.5	200	13.4	2	118.1	99	F (Moisture)
	861		1+05/10' R E S. Acc. Ramp	620.5	--	133.0	14.7	116.0					98	P
	862		20' R E S. Acc. Ramp	612.0	--	136.0	14.3	119.0					101	P
	863		1+75/10' R E S. Acc. Ramp	616.5	--	137.0	14.4	119.8	✓	✓	✓	✓	101	P Clears MD-860
	864		0+65/48' E cooling pond	620.0	--	136.5	20.3	112.0	238	19.3	2	106.9	105	P
	865	✓	Col. 5.6 118' N. A. Line	629.5	--	133.0	18.5	112.3	200	13.4	2	118.1	95	F (Moisture)
	866	RM	50' Cont. 2 118' N. A. Line	629.5	--	132.0	17.1	112.8	200	13.4	2	118.1	9	F (Moisture)
	867		100' off wall 33' Cont. 2	627.5	--	130.5	9.7	119.0					101	F (Moisture)
	868		112' off wall 90' Cont. 2	626.0	--	139.5	14.3	122.0					103	P
✓	869	✓	39' off wall	619.5	--	139.0	11.4	124.8	✓	✓	✓	✓	106	P

*MS MD-867 the elevation was corrected.

**All % Compaction was rounded off, In Place Dry Density was also rounded off.

UST Au-83

20. PREPARED BY (Signature)

DATE 9-24-76 RESPONSIBLE ENGINEER



COMPACTED FILL DENSITY TEST REPORT

* Corrected Copy

QC ACCEPTANCE	12/14/76
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

2. DATE 8-10-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXXX Plant Area

6. TESTED INFEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (F.T.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC ZONE	17. MAX LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8-9-76	855	BJ	15'N of Q 40'N of 10	Line E 1.5	607	133.8	7.0	125.0	45 N/A 2	124.8 109.9	101.2	P
	856		Water line 96'N of A	Line	625	121.8	8.9	111.8	41 N/A 2	108.7 89.6	113	P
*Corrected Copy due to the wrong minimum used in the dry density on Test MDR-855. This test has been recalculated and stands corrected.												
UST Au-60												



COMPACTED FILL DENSITY TEST REPORT
*Corrected Copy

12/17/76
DATE
GC ACCEPTED
CORRECTION NO. TEST NO.

1. PROJECT NO. 7220

2. DATE 8-10-76

PAGE OF

4. SPEC. NO. 7220-C-208

5. XXXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (R.U./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (R.U./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (R.U./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMF	OMC	Zone			
8-9-76	845B	JK	Col 8.7 130' N. A line	628	5 --	133.5	15.8	115.2	200	13.4	2	118.1	98	F (Moisture)
	846		12' E. Col. 6.6 122' N. A line	625	5 --	134.5	15.2	116.7	200	13.4	2	118.1	99	P
	847		48' Cont. 2 94' off wall	620	--	130.5	11.8	116.7	236	11.1	2	126.4	92	F
	848		28' E. Col. 1.2 15' N. Col. K	608	--	135.0	15.1	117.2	200	13.4	2	118.1	99	P
	849		Col. 8.7 130' N. A line	628	5 --	134.0	15.0	116.5	200	13.4	2	118.1	99	Clears MD P 845B
	850		10' W. Col. 6.6 131' N. A line	627	5 --	133.5	14.3	116.7	200	13.4	2	118.1	99	P
	851		48' Cont. 2 94' off wall	620	--	132.5	11.1	119.2	236	11.1	2	126.4	94	F
	852		48' Cont. 2 94' off wall	620	--	131.0	11.1	119.7	236	11.1	2	126.4	95	Clears MD P 847, 851
	853		0195/20' PE S. Access ramp	620	5 --	130.5	12.7	115.7	200	13.4	2	118.1	98	P
	854		25' Cont. 1 100' off wall	625	5 --	130.5	14.2	114.2	200	13.4	2	118.1	97	P

*Corrected Copy due to double numbers. A & B were used to determine the different tests. MD-345

UST Au-59

G. C. REVIEW
[Signature] DATE 11/27/76
[Signature] 11/22/76



COMPACTED FILL DENSITY TEST REPORT
*CORRECTED COPY

QC ACCEPTANCE *[Signature]* DATE *9/2/76*
CONTROL NO. *16* FILE NO. *C. 111*

1. PROJECT NO 7220

2. DATE 8-9-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8-6-76	956	JK	5' W. Col. 6.6 05' N. A line	624	---	146.5	12.0	130.7	269	10.0	2	127.3	103	P
*Correction made because it was not logged in, in correct sequence														
UST Au-51														

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8-24-76



COMPACTED FILL DENSITY TEST REPORT

*Corrected Copy

3. *12/14/76*
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 8/9/76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. XXXXXXX Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As-% RD	19. REMARKS
8/6/76	845A	JK	15'W. Col. 5.6 105'N.A-11	6.6	24 ---	146.5	12.0	130.7	269	10.0	2	127.3	103	P
*Corrected Copy due to double numbers. A & B were used to indicate the different tests.														

UST Au-51



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE 1
CONTROL NO. _____ FILE _____
PAGE _____ OF _____

1. PROJECT NO. 7220

2. DATE 8-9-76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-6-76	843	RM	315°Cont. 1 46' off wall	619	-----	131.0	19.4	109.7	199	17.8	2	109.7	100	P
✓	844	✓	350°Cont. 1 38' off wall	623	-----	134.0	15.3	116.2	235	11.4	2	125.2	93	F
UST	Au-49													

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COMPACTED FILL DENSITY TEST REPORT

3. *Tom Lind 8/27*
QC ACCEPTANCE DA
CONTROL NO. _____ FILE # _____

1. PROJECT NO. 7220

2. DATE 8-9-76

PAGE _____ OF _____

4 SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. mini/MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	Zone			
8-6-76	839	BJ	10' N.A. line 5'E. of 6.6 Col. 7.4	620	----	114.0	10.4	103.4	41	NA	2	108.7 / 89.6	76	F
	840		10' off wall	620	----	138.4	8.8	127.2	49	NA	2	132.4 / 113.3	76	F
	841		10' N.A. line 5'E. 6.6 Col. 7.4	620	----	114.5	8.5	105.5	41	NA	2	108.7 / 89.6	86	Clears MD-P 839
	842	✓	10' off wall	620	----	116.6	8.5	107.5	41	NA	2	✓	95	Clears MD-P 840, 841

UST Au-47



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	FILE
CONTROL NO.	FILE

1. PROJECT NO. 7220

2. DATE 8-6-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MIN. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE			
8-5-76	836	BJ	110'N A Line 25'E of 6.6	616	---	113.3	5.2	107.7	41	N/A	N/A	108.7 89.6	96	Clears MD 823
↓	837	↓	110'N A Line 5'E of 6.6	618	---	111.8	6.0	105.5	↓	↓	↓	↓	86	
↓	838	↓	110'N A Line 5'E of 6.6	620	---	118.9	9.7	108.4	↓	↓	↓	↓	99	P

BJ

8/6/76



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE _____ DATE _____
 CONTROL NO. _____ FILE _____
 PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 8-6-76

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
8-5-76	833	RM	110° Cont. 2 63' off wall	608	--	142.5	15.6	123.2	200	13.4	2	118.1	104	F-Moisture
	834		110° Cont. 2 63' off wall	607.5	--	149.0	11.0	134.2					114	F-Moisture
	835		110° Cont. 2 63' off wall	607.5	--	143.0	12.2	127.5					108	Clears M P 833, 834

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COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____
 CONTROL NO. _____ FILE _____

1. PROJECT NO. 7220

2. DATE 8-5-76

PAGE 1 OF _____

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS																																			
									BMP	OMC	ZONE																																						
8-4-76	826	RM/ /JK	Cont. 2	627.0	---	135.5	12.9	120.0	200	13.4	2	118.1	102	P																																			
			22'E. Col. A																																														
			77' off wall																																														
			120' Cont. 2																																														
			330' Cont. 2																																														
			108' off wall																																														
			68' Cont. 2																																														
			50' off wall																																														
827	RM	266' Cont. 1	615.5	---	132.0	19.2	110.7	199	17.8	2	109.7	101	P																																				
30' off wall																																																	
350' Cont. 1																																																	
48' off wall																																																	
290' Cont. 1																																																	
35' off wall																																																	
828		RM												290' Cont. 1	616	---	135.0	16.4	116.0	199	17.8	2	109.7	106	P																								
35' off wall																																																	
829	RM		290' Cont. 1	616	---	135.0	16.4	116.0	199	17.8	2	109.7	106	P																																			
35' off wall																																																	
830			RM																							290' Cont. 1	616	---	135.0	16.4	116.0	199	17.8	2	109.7	106	P												
35' off wall																																																	
831																										RM												290' Cont. 1	616	---	135.0	16.4	116.0	199	17.8	2	109.7	106	P
35' off wall																																																	
832		RM													290' Cont. 1	616	---	135.0	16.4	116.0	199	17.8	2	109.7	106													P											
35' off wall																																																	
UST Au-22	RM			290' Cont. 1	616	---	135.0	16.4	116.0	199	17.8	2	109.7	106	P																																		
35' off wall																																																	

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COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 6-6-
 CONTROL NO. FILE

1. PROJECT NO. 7220

2. DATE 8-5-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. Min. / MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
									RD	OMC	ZONE			
8-4-76 ↓	820	BJ	10' N A Line 25' E of 6.6	612	---	118.1	9.3	108.1	41	N/A	2	108.7 89.6	97	P
	821		10' N of A 25' E of 6.6	614	---	111.8	6.3	105.2	41	N/A	2	↓	84	P
	822		10' N A Line 5' E of 6.6	612	---	111.9	6.0	105.6	↓	↓	↓	↓	86	P
	823		10' N A Line 25' E of 6.6	616	---	111.2	7.5	103.4	↓	↓	↓	↓	76	F
	824		100' N A Line @ 7.4 Line	620	---	131.9	5.5	125.0	49	N/A	N/A	132.4 113.3	65	F
	825		100' N A Line @ 7.4 Line	620	---	132.9	6.0	125.3	↓	↓	↓	↓	66	F

UST Au-33

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COMPACTED FILL DENSITY TEST REPORT

3. Sum Lat 8-25-
 QC ACCEPTANCE DATE
11- 9-11-76
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 8-3-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. XXXXXXXX Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (ft.)	13. IN PLACE WET DENSITY (lb./c.f.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (lb./c.f.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (lb./c.f.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-3-76	817	RM	0 ^o Cont. 2 50' off wal	1 624	--	137.5	16.0	118.5	275	16.0	2	115.4	103	P
	818		53 ^o Cont. 2 83' off wal	1 615	--	138.5	14.5	121.0	275	16.0	2	115.4	105	P
	819		40 ^o Cont. 2 43' off wal	1 625.5	--	139.0	13.2	122.7	277	13.4	2	121.0	101	P
UST	Au-16													

SB 100

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Handwritten number 1126 at the bottom center.

Handwritten initials or signature at the bottom right.



COMPACTED FILL DENSITY TEST REPORT

3. *[Signature]* *[Signature]*
 QC ACCEPTANCE DA
 CONTROL NO. *16* FILE *P-11*

1. PROJECT NO 7220

2. DATE 8-3-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
8-2-76	811	RM JK	1+40 D.C. 60' L. E. ramp S. Access Ramp	613.5	--	132.5	17.8	112.5	275	16.0	2	115.4	97	P
	812		0+80 D.C. 75' L. E. ramp S. Access Ramp	619.5	--	131.5	11.2	118.3	276	10.7	2	124.8	95	P
	813		1+25 D.C. 75' L. E. ramp S. Access ramp	611.0	--	133.5	11.0	120.2	276	10.7	2	124.8	96	P
	814		1+30 D.C. S. access ramp	618.0	--	138.5	12.8	122.7	277	13.4	2	121.0	101	P
	815		360° Cont. 1 45' off wal	620.0	--	132.5	16.2	114.0	275	16.0	2	115.4	99	P
	816		22° Cont. 2 70' off wal	620.0	--	134.5	12.1	120.0	276	10.7	2	124.8	96	P

UST Au-11

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COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE DATE
CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 7-29-76

PAGE 1 OF 1

4. SPEC. NO. 7220-G-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
7-28-76	809	BJ	3+90 ^{10'} <i>D.L.</i> 25' L. Eramp S. Access ramp	606	--	124.6	14.6	108.7	RD OMC Zone 41 N/A 2	108.7 89.6	100	Clears MB P 784S
	*810		7' N. N line 15' E. of 1.5	607	--	118.8	8.0	110.0	41 N/A 2	✓	105	P
*Test # MD-810 is in a non Q area.												
UST	J1-286											

20. PREPARE

(Signature)

[Handwritten Signature]

DATE

7-29-76

RESPONSIBLE ENGINEER

[Handwritten Signature]

[Handwritten Signature]

10795



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

*CORRECTED COPY

2. DATE 7-29-76PAGE 1 OF 14. SPLC. NO. 7220-C-2085. ~~XXXXXXXXXX~~

Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
7-28-76	802	RS	2+20 O.G. 30' L. E	616.0	--	136.0	16.2	117.0	262	11.8	2	123.9	94	F Removed
	803		2+30/10' R.E. S. Access ramp	616.5	--	143.5	12.5	127.5	262	11.8	2	123.9	103	P
	804	S	2+50/30' L. E S. Access ramp	609.0	--	140.5	15.1	122.0	254	15.8	2	115.7	105	Clears MD P699, 704
	805		3420 Cont. l 37' off wall	618.0	--	136.5	15.6	118.0	254	15.8	2	115.7	102	P
	806		2900 Cont. l 43' off wall	615.0	--	132.0	17.6	112.3	254	15.8	2	115.7	97	P
	807	S	1+15/20' L.E S. Access ramp	618.5	--	136.0	16.5	116.7	254	15.8	2	115.7	101	P
✓	808	S	2+20/30' L.E S. Access ramp	616.0	--	133.0	14.2	116.5	262	11.8	2	123.9	94	F Removed
						*MD 802 and 808 were void and removed. Replaced by sand								
UST J1-285														

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Vertical stamp: DEPT 105



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE _____
 CONTROL NO. _____ FILE # _____

1. PROJECT NO. 7220

2. DATE 7-28-76

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC Zone	17. Mini/ MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION As % RD	19. REMARKS
7-2	797	BJ	L line	60	--	109.9	3.2	106.5	41 N/A 2	89.6	90	P 260
	798		2 line	60	--	113.5	7.0	111.7				P 260
	799		32'S.A line	622	--	119.5	7.0	111.7			113	P
	800		32'W.of 8.7 14'N.N line 2 line	606	--	119.9	8.5	110.5	✓ ✓ ✓	✓	108	P
*MD 797, 798, 800 are in Non Q area												

UST JI-276

BJ

7220

7220
50



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1. PROJECT NO. 7220

*Corrected Copy

2. DATE 7-28-76PAGE OF 4. SPEC. NO. 7220-C-2085. ~~XXXXXXXXXX~~ Plant Area6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
7-27-76	788	RS	5'W.8.7line 12'N.Aline	623.0	--	134.5	17.2	114.8	254	15.8	2	115.7	99	P
	789		30°Cont.2 135'off wall	621.5	--	138.0	15.2	119.8	254	15.8	2	115.7	103	P
	790		25°Cont.2 75'off wall	619.0	--	131.0	15.1	113.8	254	15.8	2	115.7	98	P
	791		1+35 D.C. 10'R.E.ramp	617.0	--	139.0	11.2	125.0	262	11.8	2	123.9	101	P
	792		2+20 D.C. 30'L.E.ramp	616.0	--	134.0	14.8	116.8	262	11.8	2	123.9	94	F Removed
	793		25°Cont.2 110'off wall	617.5	--	130.5	12.9	115.5	255	14.4	2	117.4	98	Clears MD P 763 750
	794		2+20/30'L.E. S.Access ramp	616.0	--	136.0	16.5	116.7	262	11.8	2	123.9	94	F Removed
	795		18'E.8.7line 23'N.of A	623.0	--	131.0	17.8	111.2	254	15.8	2	115.7	96	P
✓	796	✓	15°Cont.2 95'off wall	620.0	--	140.5	14.2	123.0	254	15.8	2	115.7	106	P

*MD-792 and 794 were void and removed. Replaced by Sand

UST J1-281

B110

7-28-76

[Signature]



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE _____ DATE _____
 CONTROL NO. _____ FILE NO. _____

1. PROJECT NO. 7220

2. DATE 7-27-76

PAGE _____ OF _____

4. SPEC. NO. 7220-C-208

5. ~~DESCRIPTION~~ Plant Area

6. TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION RD OMC Zone			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
7-26-76	783	BJ DP	40° Cont. 2 118' off wall 3+90	609	0.5 --	111.1	6.1	104.7	41	N/A	2	108.7 89.6	77	F
	784		25' L. Eramp S. Access ramp D.C. Area 2-7	606	--	97.0	7.2	90.5					6	F
	785		40° Cont. 2 118' off wall	609	0.5 --	120.5	8.5	111.1					110	P Clears MD 783
	786		36' N.A line 30' W. 7.8	621	--	117.8	7.0	110.0					105	P
✓	787	✓	40° Cont. 2 118' off wall	622	--	115.9	7.3	108.0	✓	✓	✓	✓	97	P
*UST	11-273													

SB 10800

20. PREPARED

Signature

[Handwritten Signature]

DATE 7-27-76

RESPONSIBLE ENGINEER

[Handwritten Signature]

COMPACTED FILL DENSITY TEST REPORT

S. Whitell
QC ACCEPTANCE

9/29/78
DATE

CONTROL NO. _____ FILE NO. _____

① PROJECT NO. 7220 ② DATE 9/18/78 ③ PAGE 1 OF 1

④ SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLAN ⑥ TESTED WEEK OF 9/18/78 to 9/15/78

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS.	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
1978	MD											
9/12	3159	RC	E-260 S-Y530	628.0	-	141.0	16.5	121.0	271/1001/1 Snp/one/zone	126.6	95.6	PASSED 18D

⑳ PREPARED BY (SIGNATURE) Robert L. Clark DATE 9/18/78 ㉑ RESPONSIBLE ENGR Don Lusk DATE 9-20-78
AS 9-20-78
UST 5-246A

COMPACTED FILL DENSITY TEST REPORT

5 (Signature)
QC ACCEPTANCE
9/29/78
DME

SB 10959

① PROJECT NO. 7220 CONTROL NO. FILE NO.
 ② DATE 9/12/78 ③ PAGE 1 OF 1
 ④ SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLANT TESTED WEEK OF 9/2/78 to 9/8/78

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE MET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. <small>BMP/comp/zone</small>	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
9/5	3157	RC	E-615	634.0	-	139.5	11.6	125.0	271/101/1	126.6	98.7	16C
9/7	3157	RC	E-100 S-4675	634.0	-	140.5	12.2	125.2	271/101/1	126.6	98.9	PASSED 16D
9/7	3157	RC	E-135 S-4675	634.0	-	138.5	11.5	124.2	271/101/1	126.6	98.1	PASSED 16D
9/8	3158	RC	E-530 S-4350	634.0	-	143.0	13.0	126.5	271/101/1	126.6	98.9	PASSED 16C

⑳ PREPARED BY (SIGNATURE) Robert S. Clark DATE 9/12/78 ㉑ RESPONSIBLE ENGR. John Lusk DATE 9/13/78
 WST 183 A 7220-QCF-25, Rev. 0/

COMPACTED FILL DENSITY TEST REPORT

S. W. Smith
QC ACCEPTANCE

9/29/78
DATE

CONTROL NO. _____ FILE NO. _____

① PROJECT NO. 7220 ② DATE 9/12/78 ③ PAGE 1 OF 1
④ SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLANT ⑥ TESTED WEEK OF 9/4/78 to 9/8/78

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. RD/OMC/20MR	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
1978	MD											
9/6	3151	NM	E-480 S-4270	630.0	-	121.2	6.3	114.0	65/AM/2	117.5	89.1	PASSED 6417-C
"	3152	NM	E-150 S-4675	628.0	-	117.4	6.2	110.5	65/AM/2	117.5	77.6	FAILED - BRONTEL NOTIFIED CLEARED BY MD 3153
"	3153	NM	E-150 S-4675	628.0	-	120.2	6.9	112.4	65/AM/2	117.5	84.0	> KSE PASSED - CLEARS MD 3152
9/7	3154	RC	E-400 S-4290	630.0	-	119.7	7.0	111.9	65/AM/2	117.5	82.9	PASSED 6417-C

TEST FAILURE

Bechtel
G.E. Rep. Notified S. HANEY
Time & Date of Notification TIME OF TEST
Reporting Person N. McCURTICK

Robert L. Cook 9.13.78

① PREPARED BY (SIGNATURE) Robert L. Cook DATE 9/12/78 ② RESPONSIBLE ENGR Tom Junt DATE 9/15/78

UPT S 83 B

SB 10960

COMPACTED FILL DENSITY TEST REPORT

J. W. WITTE
QC ACCEPTANCE

9/29/78
DATE

CONTROL NO.

FILE NO.

① PROJECT NO. 7220

② DATE 9/5/78 ③ PAGE 1 OF 1

④ SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 8/26/78 to 9/1/78

S 10961

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. RO/unc/zone	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
8/2			E-310									
8/2	3138	NM	E-600	626.0	-	118.1	5.6	111.8	65/NA/2	117.5	82.0	PASSED
8/30	3138	NM	S-4490	626.0	-	118.1	5.6	111.8	65/NA/2	117.5	82.0	PASSED 17F
8/31	3139	NM	E-505	627.0	-	112.6	6.0	106.7	65/NA/2	117.5	62.4	FAILED - QC NOTIFIED
9/1	3146	RC	S-4330	627.0	-	112.6	6.0	106.7	65/NA/2	117.5	62.4	FAILED - QC NOTIFIED CLEARED BY MD 3149
"	3147	RC	S-4300	629.0	-	116.7	5.8	110.3	65/NA/2	117.5	76.9	FAILED - QC NOTIFIED CLEARED BY MD 3148
"	3148	RC	S-4300	629.0	-	120.2	6.9	112.4	65/NA/2	117.5	84.0	SH. 17-C PASSED - CLEARS MD 3147
"	3149	RC	S-4330	627.0	-	118.6	6.7	111.2	65/NA/2	117.5	80.0	PASSED - CLEARS MD 3146

TEST FAILURE

Q.C. Rep. Notified S. GILBERT

Time & Date of Notification TIME OF TESTS

Reporting Person R. CLARK

MD 3146, MD 3147

① PREPARED BY (SIGNATURE) Robert L. Clark

DATE 9/5/78

② RESPONSIBLE ENGR Tom Witte

DATE 9-6-78

US 5-96
9-6-78

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 9/29/78 DATE

SR 10962

CONTROL NO. _____ FILE NO. _____

① PROJECT NO. 7220 ② DATE 9/5/78 ③ PAGE 2 OF 2

④ SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLANT ⑥ TESTED WEEK OF 9/26/78 to 9/1/78

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. <small>amp/one/leave</small>	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
9/30	3137	RC	E-800	633.0	-	147.5	10.9	133.0	271/10.1/1	126.6	105.1	PASSED 16 GF
9-1	3140	RC	E-70	614.0	-	134.5	13.3	118.7	271/10.1/1	126.6	93.8	FAILED - QC NOTIFIED CLEARED BY MD3143
"	3141	RC	E-56	614.0	-	145.0	12.7	128.7	271/10.1/1	126.6	101.7	PASSED 220
"	3142	RC	E-70	614.0	-	130.5	13.0	115.5	271/10.1/1	126.6	91.8	FAILED - QC NOTIFIED CLEARED BY MD3143
"	3143	RC	E-70	614.0	-	143.0	14.7	124.7	271/10.1/1	126.6	98.3	PASSED - CLEARED BY MD3140 & MD3142
"	3145	RC	E-160	634.0	-	142.5	12.9	126.2	271/10.1/1	126.6	99.7	PASSED 16 GF
"			E-200	620.0	-	149.5	15.9	129.0	271/10.1/1	126.6	101.9	PASSED 20D
TEST FAILURE												
Q.C. P. <u>Notified J. K. KERR</u> Time of Notification <u>Time of Tests</u> Reporting Person <u>R. QUACK</u> <u>MD 3140 MD 3142</u>												

⑳ PREPARED BY (SIGNATURE) Robert H. Clark DATE 9/5/78 RESPONSIBLE ENGR John Link DATE 9/6/78
9-6-78
657 5-918

COMPACTED FILL DENSITY TEST REPORT

D. W. Whell
QC ACCEPTANCE

9/29/78
DATE

CONTROL NO. _____ FILE NO. _____

① PROJECT NO. 7220 ② DATE 9/5/78 ③ PAGE 1 OF 2

④ SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLANT ⑥ TESTED WEEK OF 8/24/78 to 9/1/78

10963

DATE TAKEN	TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE MET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. <small>BASE/CONC/CLAY</small>	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
9/28	M10 3130	RC	w-120 S-4470	630.0	-	145.5	13.1	128.7	271/10.1/1	126.6	101.7	PASSED
"	3131	RC	w-100 S-4470	631.5	-	136.6	14.7	119.1	271/10.1/1	126.6	94.1	FAILED - QC NOTIFIED CLEARED BY MD3132
"	3132	RC	w-100 S-4470	631.5	-	139.0	13.9	122.0	271/10.1/1	126.6	96.4	PASSED - CLEARS MD313
"	3133	RC	E-300 S-5170	632.0	-	132.5	18.1	112.2	271/10.1/1	126.6	88.6	FAILED - QC NOTIFIED CLEARED BY MD3135
9/29	3134	RC	S-300 S-5170	632.0	-	140.5	13.1	124.2	271/10.1/1	126.6	98.1	PASSED - CLEARS MD3135
"	3135	AC	w-130 S-4470	634.0	-	132.0	13.8	116.0	271/10.1/1	126.6	91.6	FAILED - QC NOTIFIED CLEARED BY MD3136
"	3136	AC	w-130 S-4470	634.0	-	144.5	11.4	129.7	271/10.1/1	126.6	102.4	PASSED - CLEARS MD3135

TEST FAILURE

QC Rep. Notified S. K. RAKER

Time & Date of Notification TIME OF TESTS

Reporting Person R. CLARK

MD.3131 MD.3133, MD.3135

PREPARED BY (SIGNATURE) Robert S. Clark DATE 9/5/78 RESPONSIBLE ENGR Don York DATE 9-6-78

COMPACTED FILL DENSITY TEST REPORT

J. Delhall
of ACCEPTANCE

9/29/78
DATE

CONTROL NO.

FILE NO.

① PROJECT NO. 7220

② DATE 8/21/78 ③ PAGE 2 OF 2

④ SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 8/12/78 to 8/18/78

SB 10964

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. RD/OMC/ZONE	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
1978	MD											
8/15	5077		E-490						55/NA/2			PASSED 16C
8/17		AC	E-440 S-5240	632.0	-	120.2	8.7	110.6	65/NA/2	109.7	103.8	PASSED 516E
8/17		AM	E-450 S-5220	632.0	-	117.9	6.5	110.7	65/NA/2	117.5	78.3	516E FAILED - CLEARED BY 3116
18		AM	E-450 S-5220	632.0	-	119.1	6.6	111.7	65/NA/2	117.5	81.6	516E PASSED - CLEAR 3116

TEST FAILURE

Revised
G.C. Rep. Notified S. Haney

Time & Date of Notification TIME OF TEST

Reporting Person N. McCINTOCK

MD 3116. Failure cleared

⑳ PREPARED BY (SIGNATURE) Robert K. Clark

DATE 8/21/78

⑳ RESPONSIBLE ENGR R. Link

DATE 8/25/78

UST Au-144D

COMPACTED FILL DENSITY TEST REPORT.

QC ACCEPTANCE

DATE 8/29/78

FILE NO. 5965

PROJECT NO. 7220

DATE 8/21/78

PAGE 2 OF 2

SPEC. NO. 7220-C-208

BRAWING NO. PLANT

TESTED WEEK OF 8/12/78 to 8/18/78

DATE TAKEN	TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS.	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
1978	MD											
8/17	3104	RC	E-190 J-4530	633.0	-	146.5	11.7	131.2	271/10.1/1	126.6	103.6	PASSED 16D
"	3105	RC	E-350 S-4580	634.0	-	142.0	12.7	126.0	271/10.1/1	126.6	99.5	PASSED 16D
"	3106	AC	E-330 S-4590	633.0	-	144.0	12.8	127.7	271/10.1/1	126.6	100.9	PASSED 16D
"	3107	AC	E-500 S-4400	681.0	-	140.0	14.3	122.5	271/10.1/1	126.6	96.8	PASSED SH.17-C
"												
"	3109	RC	E-330 S-4580	636.0	-	137.5	14.3	120.3	271/10.1/1	126.6	95.0	PASSED 16.0
"	3110	RC	E-350 S-4580	638.0	-	139.0	13.9	122.0	271/10.1/1	126.6	96.4	PASSED
"	3111	RC	E-750 S-4580	631.0	-	142.0	17.6	120.7	271/10.1/1	126.6	95.3	PASSED 17G
"												
"	3114	RC	E-805 S-5020	633.0	-	141.5	13.0	126.2	271/10.1/1	126.6	98.9	PASSED 16G
"	3115	RC	E-500 S-4480	634.0	-	142.0	12.5	126.2	271/10.1/1	126.6	99.7	PASSED 16D

PREPARED BY (SIGNATURE) Robert X. Clark DATE 8/21/78 RESPONSIBLE ENGR [Signature] DATE 8/25/78

657 Au-245B

COMPACTED FILL DENSITY TEST REPORT

ACCEPTANCE DATE 9/29/70

CONTROL NO. FILE NO. 9966

DATE 8/21/78 PAGE 1 OF 2

PROJECT NO. 7220

SPEC. NO. 7220-C-208

DRAWING NO. PLANT TESTED WEEK OF 8/12/78 to 8/17/78

DATE TAKEN	TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. <small>BASE / FILL</small>	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
8/12	3025	RS	E-360 S-4530	639.0	-	141.0	13.1	124.7	271/100.1/1	126.6	98.5	PASSED 100D
8/14	3026	RS	E-500 S-4530	639.0	138.5	138.5	12.1	123.5	271/100.1/1	126.6	92.5	PASSED 100D
"	3027	AC	E-75 S-5175	632.0	141.5	141.5	10.5	128.0	271/100.1/1	126.6	101.1	PASSED 100D
8/16	3101	AC	E-800 S-5000	633.0	-	140.5	24.9	116.2	271/100.1/1	126.6	91.8	PASSED 100S cleared by 3114 FAILED - QC NOTIFIED
"	3102	AC	E-740 S-5000	633.0	-	137.5	19.3	120.2	271/100.1/1	126.6	94.9	100S CLEARED BY MD 3111 FAILED - QC NOTIFIED
8/17	3103	AC	E-200 S-4530	634.0	-	142.0	14.2	128.7	271/100.1/1	126.6	101.7	PASSED 100D
TEST FAILURE												
Q.C. Rep. Notified <u>J. H. HARRIS, J. HARRIS</u> Time & Date of Notification <u>Same as Test</u> Reporting Person <u>R. C. HARRIS</u> <u>110 3101, 3102</u>												

PREPARED BY (SIGNATURE) Robert H. Clark DATE 8/21/78 RESPONSIBLE ENGR J. H. HARRIS DATE 9/25/78

6-57 Au-244A 7220-QCF-25, Rev. 0

COMPACTED FILL DENSITY TEST REPORT

S. J. [Signature] OF ACCEPTANCE
 9/29/78 DATE

CONTROL NO. _____ FILE NO. _____

① PROJECT NO. 7220 ② DATE 8/21/78 ③ PAGE 1 OF 2
 ④ SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLANT ⑥ TESTED WEEK OF 8/12/78 to 8/18/78

SB 10967

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. RD/OMC/ZONE	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
8/12	3089	RS	W-30 S-4860	632.0	-	117.6	7.4	109.5	65/NA/2	117.5	74.2	FAILED - CLEARED BY 3090 16D
"	3090	RS	W-30 S-4860	632.0	-	123.0	7.4	114.5	65/NA/2	117.5	90.7	PASSED - CLEARS 3089 16D
"		RS	E-70 S-5180	626.0	-	122.8	7.4	114.3	65/NA/2	117.5	90.1	PASSED - 10E
"		NM	E-100 S-5180	626.0	-	117.6	6.7	110.0	65/NA/2	109.7	101.3	PASSED - 10E
"		NM	E-140 S-5185	628.0	-	117.7	7.4	109.6	55/NA/2	109.7	99.6	PASSED - 10E
REDACTED ROW												
REDACTED ROW												
REDACTED ROW												
REDACTED ROW												
REDACTED ROW												

TEST FAILURE

RECEIVED
 G.C. Rep. Notified M. Davis
 Time & Date of Notification TIME OF TEST
 Reporting Person R. Smith
MO 3089

Failure cleared

PREPARED BY (SIGNATURE) [Signature] DATE 8/21/78 RESPONSIBLE ENGR [Signature] DATE 8/25/78
 LIST Au-144C 7220-QCF-25, Rev. 0

① PROJECT NO. 7220

CONTROL NO. _____

FILE NO. 2006-7

SPEC. NO. 7220-C-208

② DATE 8/7/78 ③ PAGE 2 OF 3

④ DRAWING NO. PLANT

⑤ TESTED WEEK OF 7/29/78 to 8/4/78

①. TEST NO.	②. TEST MADE BY	③. LOCATION	④. ELEV.	⑤. DEPTH BELOW FINAL GRADE	⑥. IN PLACE NET DEN. (LB/CF)	⑦. MOISTURE CONTENT (%)	⑧. IN PLACE DRY DEN. (LB/CF)	⑨. SOIL CLASS. AD/OMC/ZONE	⑩. MAX LAB DRY DEN. (LB/CF)	⑪. % COMPT.	⑫. REMARKS
778	MD										
1/2 3054	NM	E-150 S-5130	630.0	-	121.1	5.3	115.0	65/NA/2 ZONE	117.5	92.3	PASSED
1/3 3055	RS	E-438 S-5225	634.0	-	118.8	5.5	112.6	65/NA/2	117.5	84.6	PASSED
3056	RS	E-50 S-5140	627.5	-	119.6	5.7	113.2	65/NA/2	117.5	86.6	PASSED
3057	RS	E-320 S-4630	624.0	-	115.4	6.3	108.6	65/NA/2	117.5	71.0	FAILURE - OC NOTIFIED CLEARED BY MD 3058
3058	RS	E-320 S-4630	624.0	-	129.0	7.4	120.1	65/NA/2	117.5	107.7	PASSED - CLEARS MD 3057
1/4 3061	NM	E-640 S-4910	632.0	-	120.4	5.4	114.2	65/NA/2	117.5	89.8	PASSED
3062	NM	E-650 S-4860	632.0	-	121.4	5.7	114.9	65/NA/2	117.5	92.0	PASSED

TEST FAILURE

Q.C. Rep. Notified M. KENG

Time & Date of Notification 1300 8/3/78

Reporting Person R. SMITH

MD 3052 - CLEARED BY MD 3058

PREPARED BY (SIGNATURE) [Signature]
DATE 8/7/78

① RESPONSIBLE ENGR [Signature] DATE _____

CONTROL NO.

FILE NO.

① PROJECT NO. 7220

② DATE 8/7/78 ③ PAGE 1 OF 1

SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 7/29/78 to 8/4/78

TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS.	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
78	MD	E. 80									
29	3045 RC	S. 5165	633.0	-	140.0	12.7	124.2	271/10.1/1	126.6	98.1	PASSED
3	3059 RS	E. 150 S. 5140	633.0	-	140.5	15.0	122.2	271/10.1/1	126.6	96.5	PASSED
"	3060 RS	E. 50 S. 5140	632.0	-	138.5	13.1	122.5	271/10.1/1	126.6	96.8	PASSED

SB 10969

PREPARED BY (SIGNATURE) [Signature] DATE 8.8.78

DATE 8/7/78 ⑦ RESPONSIBLE ENGR [Signature] DATE

① PROJECT NO. 7220

CONTROL NO.

FILE

② DATE 8/7/78

③ PAGE 1 OF 2

④ SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 7/29/78

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE NET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. RD/ONC/ZONE	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
8/1/78	3046	RC	E.430 S.5300	630.0	-	119.7	4.3	114.8	65/NA/2	117.5	91.7	PASSED
"	3047	RC	E.435 S.5297	631.0	-	115.7	5.3	109.9	65/NA/2	117.5	75.5	FAILED - QC NOT CLEARED BY MD
"	3048	NM, KH	E.435 S.5297	631.0	-	110.7	3.6	106.9	65/NA/2	117.5	64.9	FAILED - QC NOT CLEARED BY MD
"	3049	NM, KH	E.435 S.5297	631.0	-	116.4	5.4	110.4	65/NA/2	117.5	77.3	FAILED - QC NOT CLEARED BY MD
"	3050	NM, KH	E.435 S.5297	631.0	-	115.6	3.9	111.3	65/NA/2	117.5	80.3	PASSED - CLEAR MD 3047, 3048, 3049
8/1/78	3051	NM, KH	E.425 S.5300	634.0	-	122.7	4.5	117.4	65/NA/2	117.5	99.7	PASSED
8/2	3052	NM, KH	E.440 S.5290	634.0	-	123.5	8.6	113.7	65/NA/2	117.5	88.2	PASSED
8/2	3053	NM	E.310 S.4670	624.0	-	120.7	5.7	114.2	65/NA/2	117.5	89.8	PASSED

TEST FAILURE

Q.C. Rep. Notified S. KIRKER

Time & Date of Notification TIME OF TEST

Reporting Person P. CLARK, N. McCLINTOCK

MD 3047, 3048, 3049 CLEAR BY MD 3050

PREPARED BY (SIGNATURE) Peter L. Clark

DATE 8/7/78

① RESPONSIBLE ENGR [Signature]

8/13/78 DAT

CONTROL NO.

FILE NO.

1 PROJECT NO. 7220

2 DATE 7.12.78 3 PAGE 1 OF 1

4 SPEC. NO. 7220-C-208

5 DRAWING NO. PLANT

6 TESTED WEEK OF 6/24/78 to 6/30/78

7 DATE TAKEN	8 TEST NO.	9 TEST MADE BY	10 LOCATION	11 ELEV.	12 DEPTH BELOW FINAL GRADE	13 IN PLACE WET DEN. (LB/CF)	14 MOISTURE CONTENT (%)	15 IN PLACE DRY DEN. (LB/CF)	16 SOIL CLASS. RD/OMC/ZONE	17 MAX LAB DRY DEN. (LB/CF)	18 % COMPT.	19 REMARKS
5/31	2553	BJ	9' E of SW CORN. 1/5 of TRANS. FENCE TYP.	631	-	118.2	4.4	113.2	55/NA/2	109.7	114.3	PASSED

LAB 10971

20. PREPARED BY(SIGNATURE) Robert L. [Signature]
6.57 71700

DATE 7/12/78

21. RESPONSIBLE ENGR [Signature] DATE

CONTROL NO. _____ FILE NO. _____

① PROJECT NO. 7220

② DATE 7-12-78

③ PAGE 1 OF 1

④ SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 6/24/78 to 6/30/78

DATE TAKEN	TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. <small>BMP/OMC/ZONE</small>	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
25	2548	AM	30' W of Elev. 105.00 + 0.10	633	-	133.5	12.7	118.5	277/13.4/1	121.0	97.9	PASSED
6/24/78	2549	BJ	S-5160 W-150	620	-	141.5	14.1	124.0	277/10.1/1	126.6	97.9	PASSED
"	2550	BJ	S-5220 W-165	620	-	144.0	12.9	127.5	277/10.1/1	126.6	100.7	PASSED
6/30/78	2551	BJ	S-1560 W-200	622	-	143.5	13.9	126.0	277/13.4/1	121.0	104.1	PASSED
"	2552	BJ	S-1635 W-150	622	-	143.0	13.9	125.5	277/13.4/1	121.0	103.7	PASSED

⑦ PREPARED BY (SIGNATURE) Robert H. Clark

DATE 7-12-78

⑧ RESPONSIBLE ENGR. [Signature]

DATE

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 7/6/78

40 CONTROL NO. C-210-7 FILE NO.

① PROJECT NO. 7220 ② DATE 6/26/78 ③ PAGE 1 OF 1

④ SPEC. NO. 7220-C-20B ⑤ DRAWING NO. _____ ⑥ TESTED WEEK OF 4/29/78 To 5/5/78

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS.	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
						<u>NO TEST</u>	<u>TAKEN</u>					

SB 10973

⑲ PREPARED BY (SIGNATURE) B. Johnson DATE 6/26/78 ⑳ RESPONSIBLE ENGR [Signature] DATE 7-3-78
6-27-78
LIST 5n-96 A
 7220-QCF-25, Rev. 0

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE

DATE

40
CONTROL NO.

C-210-7
FILE NO.

① PROJECT NO. 7220

② DATE 6/26/78 ③ PAGE 1 OF 12

④ SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 4/22/78 To 6/28/78

⑦ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. R1/0mc/ZONE	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT. AS OF AD	⑲ REMARKS	SS
6/22/78	2527	N.M.	10' N. OF P. LINE 4' W. OF I. LINE W. END OF QUAD	630	—	118.0	6.9	110.4	55/N/A/2	109.7/90.2	102.9	PASSED	17
6/25/78	2528	N.M.	14' S. OF S. WALL OF STAIR TUNNEL 2' W. OF W. WALL OF STAIR TUNNEL	632	—	126.9	8.7	116.7	55/N/A/2	109.7/90.2	127.7	PASSED	S 16E
6/24/78	2529	N.M.	1' W. OF DUCT BANK 75' S. OF R.R. TRACKS	630	—	114.2	7.3	106.4	55/N/A/2	109.7/90.2	85.7	PASSED	
6/24/78	2530	"	1' E. OF DUCT BANK 183' S. OF R.R. TRACKS	630	—	120.1	6.6	112.7	55/N/A/2	109.7/90.2	112.3	PASSED	
6/5/78	THRU	2532	SEE	PAGE #2									
6/27/78	2533	BJ	DUCT BANK DIS. OIL STRAP 20'S. 15' OF DIS. #2 OF N.E. CORNER	626	—	123.0	8.1	113.8	55/N/A/2	109.7/90.2	116.7	PASSED	
"	2534	"	DUCT BANK DIS. OIL STRAP 20'S. 15' OF DIS. #2 OF N.E. CORNER	628	—	118.8	8.6	109.4	55/N/A/2	109.7/90.2	98.7	PASSED	
6/27/78	2535	NM	20' N. OF STATION 0+20 12" W. OF C.W.F.	623	—	119.3	8.4	110.1	55/N/A/2	109.7/90.2	101.7	PASSED	
"	2536	"	10' N. OF STATION 0+20 E. OF DUCT BANK	625	—	121.2	8.9	111.3	55/N/A/2	109.7/90.2	106.6	PASSED	
	2537	SEE	PAGE	#2									
6/28/78	2538	BJ	10' W. OF I. LINE 214' S. OF C LINE	625	5.52	117.9	7.9	109.3	55/N/A/2	109.7/90.2	98.3	PASSED	19E

① PREPARED BY (SIGNATURE) B. Johnson

DATE 6/26/78

② RESPONSIBLE ENGR J. Lutz

DATE 7-3-78

6-27-78
LIST Jn-95B

COMPACTED FILL DENSITY TEST REPORT

ACCEPTANCE

4/2/78
DATE

410
CONTROL NO.

C-210-7
FILE NO.

① PROJECT NO. 7220

② DATE 6/26/78 ③ PAGE 7 OF 27

SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 4/22/78 TO 4/28/78

⑧ DATE TAKEN	⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE NET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. EMPIRICAL ZONE	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
7/78	2531	BT N.M.	E. OF DUCT BANK 120'S. OF RR TRACK	633	—	138.5	12.9	122.7	27/10.1/1	126.6	96.9	PASSED 16 D
"	2532	"	E. OF DUCT BANK 75'S. OF RR TRACK	633	—	145.0	10.3	131.5	27/10.1/1	126.6	103.9	PASSED 16 D
8/78	2533	THRU	2536	SEE	PAGE #1							
"	2537	BJ	15' N. OF DISC 230'S. W. OF D.O. STORAGE TANKS	630	—	141.0	14.0	123.7	27/11.1/1	124.6	99.3	PASSED

SB 10975

PREPARED BY (SIGNATURE) B. Johnson

DATE 6/26/78

① RESPONSIBLE ENGR Y. G. Sube

DATE 7-3-78

6-27-78
LIST Jn-95C

COMPACTED FILL DENSITY TEST REPORT

NYM/Chm
 10. ACCEPTANCE
 2/12/78
 DATE

40
 CONTROL NO. 2-210-7
 FILE NO.

SB 10976

① PROJECT NO. 7220

② DATE 4/26/78 ③ PAGE 1 OF 3

SPEC. NO. 7220-G-208

④ DRAWING NO. PLANT

⑤ TESTED WEEK OF 4/15/78 TO 4/21/78

TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS.	MAX LAB DRY DEN. (LB/CF)	% COMPT. AS% RD	REMARKS
2504	BT	110'S. OF 3.0 LINE	630	---	119.6	6.8	112.0	55/N/A/2	109.7/90.2	109.5	PASSED 17-E
2505	"	90'S. OF 3.0 LINE	632	---	119.6	7.2	111.6	55/N/A/2	109.7/90.2	107.9	PASSED 17-E
2506	THRU.	2511	SEE	PAGE	2						
2512	B.T.	50' W. OF MANHOLE #10 S.N. OF DUCT BANK	626	---	121.6	7.0	113.6	55/N/A/2	109.7/90.2	115.9	PASSED
2513	"	6' W. OF MANHOLE #10 S.N. OF DUCT BANK	625	---	115.2	6.1	108.6	55/N/A/2	109.7/90.2	95.3	PASSED 19-D
2514	"	25'S. OF COMBO SHOP 25' W. CORNER OF COMBO SHOP	627	---	121.0	7.8	112.2	55/N/A/2	109.7/90.2	110.3	PASSED
2515	B.J.	30'S. OF 3.0 LINE S.E. SIDE OF COMBO SHOP	629	---	120.3	7.0	112.4	55/N/A/2	109.7/90.2	111.1	PASSED 17-D
2516	"	75' E. OF DIS 30' N. OF DUCT BANK	623	---	115.2	7.4	107.3	55/N/A/2	109.7/90.2	89.7	PASSED
2517	THRU.	2523	SEE	PAGES	2 & 3						
2524	B.J.	30' E. N. AND WASTE TUNNEL WITH 40' E. OF STEAM TUNNEL WALL	623	---	116.1	6.0	109.5	55/N/A/2	109.7/90.2	99.2	PASSED 10-D
2525	N.M.	32' E. OF W. WALL OF STEAM TUNNEL	625	---	118.6	6.7	111.2	55/N/A/2	109.7/90.2	106.2	PASSED 19-D

PREPARED BY (SIGNATURE) B. Johnson

DATE 4/26/78

RESPONSIBLE ENGR [Signature]

DATE 5-23-78

AST MA-159 B

COMPACTED FILL DENSITY TEST REPORT

NK Value
QC ACCEPTANCE
4/12/78
DATE

40
CONTROL NO. C-210-7
FILE NO.

SB 10977

① PROJECT NO. 7220
② DATE 4/26/78
③ PAGE 3 OF 3
SPEC. NO. 7220-C-208
④ DRAWING NO. PLANT
⑤ TESTED WEEK OF 4/15/78 To 4/21/78

TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE NET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. Bmp/omc/ZONE	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
2519	BJ NM	45'S. OF COMBO SHOP 15' W. OF MANHOLE #10	632	—	4515 113.0	303 209	93.5	270/11.1/1	124.6	75.0	FAILED 160
2520	"	35' N.W. OF MANHOLE #10 35'S. OF COMBO SHOP	632	—	4505 117.0	433 18.2	99.0	270/11.1/1	124.6	79.5	FAILED 160
2521	"	45'S. OF COMBO SHOP 115' W. OF MANHOLE #10	632	—	139.0	11.6	124.5	270/11.1/1	124.6	99.9	CLEAR MD 2519 PASSED 160
2522	NM	35' N.W. OF MANHOLE #10 35'S. OF COMBO SHOP	632	—	4505 144.0	433 14.6	125.7	270/11.1/1	124.6	100.9	CLEAR 2520 PASSED 160
2523	"	21' W. OF MANHOLE #10 75'S. OF COMBO SHOP	632	—	4645 143.0	436 12.6	127.0	270/11.1/1	124.6	101.9	PASSED 160
2524	SEE PAGE	PAGE	1								
2525	SEE PAGE	PAGE	1								
2526	BJ	W. OF ELECT DUCT BANK 75' E. OF DIS #11	628	—	136.0	10.6	123.0	270/11.1/1	124.6	98.7	PASSED

TEST FAILURE

Q.C. Rep. Notified
Time & Date of Notification
Reporting Person BJ

PREPARED BY (SIGNATURE) B. Johnson DATE 4/26/78 RESPONSIBLE ENGR MD 2519, 2520 DATE 5-23-78
5-15-78
U57 11a-159 D 7220-QCF-25, Rev. 0

COMPACTED FILL DENSITY TEST REPORT

DATE 4/12/78 ACCEPTANCE DATE

SB 10978

CONTROL NO. 410 FILE NO. C-210-7

PROJECT NO. 7220

DATE 4/26/78 PAGE 2 OF 3

SPEC. NO. 7220-C-208

DRAWING NO. PLANT

TESTED WEEK OF 4/15/78 To 4/21/78

TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE NET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. (emp/proc/zone)	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
MD 2506	BJ	7' N OF AND W/ ASLE WH#1, 30' E. OF E. STEAM TUNNEL WH#1 15' S OF RACQUISITE WH#1 18' E. OF E	622	—	143.0	13.5	126.0	270/11.1/1	124.6	101.1	PASSED 20D
2507	.	STEAM TUNNEL WH#1 21' S. OF RACQUISITE WH#1 18' E. OF E	621	—	142.0	14.1	124.5	270/11.1/1	124.6	99.9	PASSED 20D
2508	.	STEAM TUNNEL WH#1 21' S. OF RACQUISITE WH#1 18' E. OF E	633	—	138.5	13.3	122.2	270/11.1/1	124.6	98.1	PASSED 516E
2509	.	STEAM TUNNEL WH#1 21' S. OF RACQUISITE WH#1 18' E. OF E	619	—	138.0	14.5	120.5	270/11.1/1	124.6	96.7	PASSED 20D OF 21D
2510	.	40' E. OF W. RAD WH#1E 10' N. OF LINE	619	—	145.5	13.2	128.5	270/11.1/1	124.6	103.1	PASSED 20D OF 21D
2511	.	20' E. OF E. STEAM TUNNEL WH#1 30' S. OF A. LINE	624	—	134.5	12.6	119.5	270/11.1/1	124.6	95.9	PASSED 10-1
2512	THRU BJ	2516	SEE	PAGE 1							
2517	NM	20' S. OF Q. LINE 8' W. OF P. LINE	633	—	140.5	14.2	123.0	270/11.1/1	124.6	98.7	PASSED 516E
2518	.	35' N. W. OF MAN HOLE #10 15' S. OF C-208 SHIP	632	—	115.5	20.9	95.5	270/11.1/1	124.6	74.6	TEST FAILURE

Q.C. Rep. Notified
 Time & Date of Notification of Test
 Reporting Person BJ
MD 2518

PREPARED BY (SIGNATURE) B. Johnson DATE 4/26/78 RESPONSIBLE ENGR Sam Lusk DATE 5-23-78
Jeff 5-15-78
UST Ma-159 7220-QCF-25, Rev. 0

COMPACTED FILL DENSITY TEST REPORT

NR. U.S. 44
OF ACCEPTANCE

6.12.18
DATE

410
CONTROL NO.

C-210-7
FILE NO.

SB 10979

① PROJECT NO. 7220

② DATE 4/26/78 ③ PAGE 2 OF 3

SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 4/8/78 TO 4/14/78

⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. RD/OMC/ZONE	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT. AS TO RD	⑲ REMARKS
1/78 2494	BJ	4'S. OF HT LINE 8'E. OF O.9	632	—	4805 120.6	E 53 8.8	110.8	55/N/A/2	109.7/ 90.2	104.6	PASSED 16D
2495	.	4'S. OF HT LINE 4'E. OF O.9	633	—	4805 121.7	E 51 9.2	111.4	55/N/A/2	109.7/ 90.2	107.1	PASSED 16D
2496	THRU	2499	SEE	PAGE 3							
1/78 2500	BJ	5'W. OF O.4 LINE 12'N. OF MP LINE	626	—	119.1	7.0	111.3	55/N/A/2	109.7/ 90.2	106.6	PASSED 18D
2501	SEE	PAGE									
3/78 2502	BB	200' S. OF BLINE 36' W. OF METEA PIT 3'E. OF 7.0 LINE 140' S. OF BLINE	626	—	5.5236 111.0	E 730 5.4	105.3	55/N/A/2	109.7/ 90.2	80.7	PASSED 18E
2503			630	—	147.6	7.3	109.6	55/N/A/2	109.7/ 90.2	99.6	PASSED 17E

[Signature]
4.29.78

PREPARED BY (SIGNATURE) *B. Johnson*

DATE 4/26/78

① RESPONSIBLE ENGR *Tom Junt*

DATE 5-8-78

UST No. 2A

COMPACTED FILL DENSITY TEST REPORT

N. J. Oslam
QC ACCEPTANCE

6/26/78
DATE

410
CONTROL NO.

C-210-7
FILE NO.

SB 10980

① PROJECT NO. 7220

② DATE 4/26/78

③ PAGE 3 OF 3

SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 4/8/78 To 4/14/78

TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. <i>B₉₀/OMC/ZONE</i>	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
2496	BJ	20'S. OF RR 4'E. OF E. WHI STREAM TUNNEL	632	—	4490 146.5	W6 11.0	132.0	264/OMC/ZONE	131.7	100.2	CLEARED BY BJ 4-24...
2497	BJ	40'S. OF DG S.E. COR 175' S. OF Q	632	—	5129 146.0	5.45 12.7	129.5	264/8.2/1	131.7	98.3	PASSED - 10E
2498	"	175' W. OF W WHI S. WJ	633	—	5129 143.0	5.45 13.3	126.0	264/8.2/1	131.7	95.7	PASSED E
2499	"	80'S. OF N. WHI 50' N. OF N. WHI SWIT R ON 4/24/78	633	—	5003 144.0	4.88 12.1	128.5	264/8.2/1	131.7	97.6	PASSED 14 G
2500	SEE	PAGE									
2501	BJ	40'E. OF DG 100'S. OF TT 55%	633	—	144.0	13.2	127.2	264/8.2/1	131.7	96.6	PASSED S 10E

April 29 1978

PREPARED BY (SIGNATURE) *B. Johnson*

DATE 4/26/78

⑦ RESPONSIBLE ENGR *J. Gule*

DATE 5-9-78

UST 7-2C

COMPACTED FILL DENSITY TEST REPORT

NYA/Cela
QC ACCEPTANCE

6/26/78
DATE

40
CONTROL NO.

C-210-7
FILE NO.

① PROJECT NO. 7220

② DATE 4/26/78

③ PAGE 1 OF 3

SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 4/8/78 To 4/14/78

57 10981

⑧ TEST NO.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE NET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. <small>B^{mp}/omc/ZONE</small>	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
2486	BJ	50'S. OF R+R TRACK 8' W. OF W. STEAM TUNNEL WALL 12' W. OF N. WALL SWI	629	—	142.0	11.8	127.0	264/8.2/1	131.7	96.4	PASSED
2487	"	22'E. OF E. WALL	630	—	141.5	13.5	124.7	264/8.2/1	131.7	94.7	CLEARED BY 2489 ? FAILED
2488	"	21'S. OF N. WALL SWI	628	—	142.5	13.8	125.2	264/8.2/1	131.7	95.1	PASSED 186 ?
2489	"	22' N. OF N. WALL SWI	630	—	146.0	9.8	133.0	264/8.2/1	131.7	101.0	PASSED ?
2490	"	25'S. OF R+R 10' W. OF W. WALL STEAM TUNNEL	631	—	139.0	14.2	121.7	264/8.2/1	131.7	92.4	CLEARED BY 2492 FAILED
2491	"	20'S. OF R+R 4'E. OF E. WALL STEAM TUNNEL	632	w6	131.5	13.7	115.7	264/8.2/1	131.7	87.9	FAILED CLEARED BY 2496
2492	"	20'S. OF R+R 10' W. OF W. WALL STEAM TUNNEL	631	—	143.5	11.5	128.7	264/8.2/1	131.7	97.7	BJ 4/1/78 FAILED PASSED
2493	"	20'S. OF R+R 4'E. OF E. WALL STEAM TUNNEL	632	w6	139.5	12.5	124.0	264/8.2/1	131.7	94.2	CLEARED BY 2496 FAILED

J. Smith
4-29-78

TEST FAILURE

Q.C. Rep. Notified _____
Time & Date of Notification NOTIFIED DATA
Reporting Person BJ
OF TEST

MD - 2487, 2490, 2491, 2493

PREPARED BY (SIGNATURE) B. Johnson

DATE 4/26/78

① RESPONSIBLE ENGR John Smith

DATE 5-8-78

UST mla-2A

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE

DATE 6/26/78

410 CONTROL NO.

C-210-7 FILE NO.

SB 10982

① PROJECT NO. 7220

② DATE 4/24/78

③ PAGE 2 OF 2

SPEC. NO. 7220-C-208

⑤ DRAWING NO. PLANT

⑥ TESTED WEEK OF 4/1/78 To 4/7/78

TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. RD/omc/ZONE	MAX LAB DRY DEN. (LB/CF)	Z COMPT. % RD	REMARKS
483	RS	3' N. OF HT LINE ADJ. TO BLDG. 4' E. OF 0.4	630	—	125.9	7.7	116.9	WD/N/A/2	117.6/ 97.9	96.0	PASSED 7-D
2181	RT	30' N. OF HT LINE 12' E. OF 0.4 LINE	631	—	124.9	8.2	115.4	SS/N/A/2	109.7/ 94.2	122.8	

PREPARED BY (SIGNATURE) B. Johnson

DATE 4/24/78

⑦ RESPONSIBLE ENGR

[Signature]

DATE 5-8-76

US: 1-256 B

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE

DATE

40
CONTROL NO.

C-210-7
FILE NO.

SB 10983

① PROJECT NO. 7220

② DATE 4/24/78

③ PAGE 1 OF 2

SPEC. NO. 7220-C-208

④ DRAWING NO. PLANT

⑤ TESTED WEEK OF 4/1/78 To 4/7/78

⑧ TEST NO. MD.	⑨ TEST MADE BY	⑩ LOCATION	⑪ ELEV.	⑫ DEPTH BELOW FINAL GRADE	⑬ IN PLACE WET DEN. (LB/CF)	⑭ MOISTURE CONTENT (%)	⑮ IN PLACE DRY DEN. (LB/CF)	⑯ SOIL CLASS. B _{np} /O _{my} ZONE	⑰ MAX LAB DRY DEN. (LB/CF)	⑱ % COMPT.	⑲ REMARKS
2478	RS	8' W OF TANK #2 DIS. FUEL STORAGE & TANK	629	—	141.5	10.1	128.5	263/9.1/1	131.0	98.1	PASSED 17-E
2479	"	5' W OF TANK #4 DIS. FUEL STORAGE	629	—	5261 140.0	58.8 11.6	125.5	263/9.1/1	131.0	95.8	PASSED 17
2480	"	12' E OF TANK #3 DIS. FUEL STORAGE	629	—	5314 138.5	50.0 10.6	125.2	263/9.1/1	131.0	95.6	PASSED 17 G
2481	"	5' N OF TANK #1 DIS. FUEL STORAGE	629	—	5314 135.5	50.3 13.4	119.5	263/9.1/1	131.0	91.2	CLEARED BY MD 2482 FAILED NOT OF AREA
2482	"	12' E OF TANK #1 DIS. FUEL STORAGE	629	—	145.5	13.5	128.2	263/9.1/1	131.0	97.5	PASSED OUT OF AREA
2483 + 2484			SEE PAGE	PAGE	2						
4/78 2485	BJ	40' S OF E OF RR 4' W OF W. STEAM TUNNEL W/RA	624	—	140.0	8.9	128.5	264/8.2/1	131.7	97.6	PASSED 19-D

TEST FAILURE

O.C. Rep. Notified

Time & Date of Notification OF TEST

Reporting Person BJ 4/24/78 RS

MD 2481

PREPARED BY (SIGNATURE)

B. Johnson

DATE 4/24/78

① RESPONSIBLE ENGR

J. Sub

DATE 4-9-78

657 256 A

7220-QCF-25, R

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE

DATE

40
CONTROL NO.

C-210-7
FILE NO.

① PROJECT NO. 7220

② DATE 4/20/78 ③ PAGE 2 OF 2

SPEC. NO. 7220-C-208

④ DRAWING NO. PLANT

⑤ TESTED WEEK OF 3/25/78 To 3/31/78

10984

E EN	①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩		
	TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE WET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. RD/ORG/ZONE	MAX/MIN DRY DEN. (LB/CF)	% COMPT. 95% RD	REMARKS
1 90 78	474	BJ	20' N OF 10' METAL PIT IN C.C.F. TEMP 24" PIPE 12' E. OF 3 LINE	628	—	126.3	6.8	118.3	55/N/A/2	109.7/90.2	133.6	PASSED
	2475	"	180' S. OF Q LINE	630	—	119.5	7.6	111.1	55/N/A/2	109.7/90.2	105.8	PASSED
	2476		→	SEE PAGE	1							
1/18	2477	BJ	18' E. OF 3 LINE 125' S. OF Q LINE	632	—	116.4	3.0	113.0	55/N/A/2	109.7/90.2	113.5	PASSED

PREPARED BY (SIGNATURE) B. Johnson
WSTA-IE 4/25/78

DATE 4/20/78 ⑥ RESPONSIBLE ENGR Tom J. Sub DATE 5-8-78

COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE _____ DATE 4/20/78

CONTROL NO. 40 FILE NO. C-210-7

① PROJECT NO. 7220 ② DATE 4/20/78 ③ PAGE 1 OF 2

SPEC. NO. 7220-C-208 ⑤ DRAWING NO. PLANT ⑥ TESTED WEEK OF 3/25/78 TO 3/31/78

SBC 10085

TEST NO.	TEST MADE BY	LOCATION	ELEV.	DEPTH BELOW FINAL GRADE	IN PLACE NET DEN. (LB/CF)	MOISTURE CONTENT (%)	IN PLACE DRY DEN. (LB/CF)	SOIL CLASS. B.M.P. / O.M.C. / ZONE	MAX LAB DRY DEN. (LB/CF)	% COMPT.	REMARKS
2471	BT BSB	12' S. OF TANK #1 & OF TANK #1	623	—	141.5	E-525 10.8	5-5312 127.7	264/8.2/1	131.7	97.0	PASSED 19E
2472	H	BETWEEN TANKS 243 12' W. OF TANKS & BETWEEN TANKS 243	623	—	137.5	11.5 E-445	123.3	264/8.2/1	131.7	93.6	CLEARED BY 2473 FAILED 19E
2473	H	243 10' W. OF TANKS & BETWEEN TANKS 243	623	—	144.5	12.3	5-529 128.7	264/8.2/1	131.7	97.7	PASSED 19E
2474	THRU	2475	SEE PAGE	2							
2476	RS NM	3' W. OF W. WALL STEAM TUNNEL, 80' N. OF HT LINE OF ADMIN.	628	—	145.0	14.2	127.0	264/9.1/1	131.0	96.9	PASSED 10D

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification NOTIFIED DATE OF TEST
 Reporting Person _____

PREPARED BY (SIGNATURE) B. Johnson DATE 4/20/78 ⑦ RESPONSIBLE ENGR. H. Smith DATE 5-8-78
UST 244D 4.25.78
 7220-QCF-25, Rev. 0



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE Alexia DATE 7/1/78
 CONTROL NO. _____ FILE NO. _____

1. PROJECT NO. 7220

2. DATE 2/24/78

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO. _____

6. TESTED WEEK OF 2/18/78 To 2/24/78

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
<u>2/18/78</u>	<u>THRU</u>		<u>2/24/78</u>	<u>No</u>	<u>TEST</u>							<u>SS</u>

20. PREPARED BY B. Johnson DATE 2/24/78
 RESPONSIBLE ENGINEER [Signature] DAT. 78



COMPACTED FILL DENSITY TEST REPORT

3. NK Ulan 4/5/78
QC ACCEPTANCE DATE

CONTROL NO. FILE NO.

PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 2/24/78

4. SPEC. NO. 7220-C-208

5. DRAWING NO.

6. TESTED WEEK OF 2/11/78 To 2/17/78

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
2/11/78		THRU.	2/17/78			NO TEST						

20. PREPARED BY: B. Johnson DATE: 2/24/78 RESPONSIBLE ENGINEER: [Signature]

0002 (3-73) 457 7-309 [Signature] 2-25-78 DA: 78

531087



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE L. M. White 4/5/78 DATE
CONTROL NO. FILE NO.
PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 2/24/78

4. SPEC. NO. 7220-C-208

5. DRAWING NO.

6. TESTED WEEK OF 1/28/78 to 2/3/78

7. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
<u>1/28/78 Thru 2/3/78</u>						<u>NO TEST</u>						

20. PREPARED BY (signature) B. Johnson DATE 2/24/78 RESPONSIBLE ENGINEER Tom King
11/20/78 2-28-78 DATE 78
QC-CI



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE MM/BB DATE 4/8/78
 CONTROL NO. FILE NO.
 PAGE 1 OF 1

1. PROJECT NO 7220

2. DATE 2/24/78

4. SPEC. NO. 7220-C-208

5. DRAWING NO. _____

6. TESTED WEEK OF 1/21/78 to 1/27/78

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
<u>1/21/78</u>			<u>THROUGH</u>			<u>NO</u>		<u>TEST</u>				

20. PREPARED | signature B. Johnson DATE 2/24/78
1/5/78 7-301 BB-22 2-28-78

RESPONSIBLE ENGINEER [Signature] DA 1-78
 DC-1



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 1/24/78

3. AKU 2/2/78
QC ACCEPTANCE DATE
22 C-210-7
CONTROL NO. FILE NO.

4. SPEC. NO. 7220-C-208

5. DRAWING NO.

6. TESTED WEEK OF 1/7/78 To 1/13/78

PAGE 1 OF 1

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
<i>No TESTS THIS WEEK</i>												

20. PREPARED BY Bill Johnson DATE 1/24/78
1.25.78

RESPONSIBLE ENGINEER [Signature] DATE 1/78



COMPACTED FILL DENSITY TEST REPORT

N.L. Upman 4/8/78
 QC ACCEPTANCE DATE
 410 22 10-1778 C-210-7
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 1/24/78

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. DRAWING NO.

6. TESTED WEEK OF 12/31/77 TO 1/6/78

16901 115

1. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
NO TESTS THIS WEEK												

PREPARED BY Bill Johnson DATE 1/24/78
002 (3-73) 457-7 11 125-78

POSSIBLE ENGINEER J. J. [Signature] DATE 1-26
 QC-C1



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 1/17/78 DATE
 CONTROL NO. 30 FILE NO. C-208

1. PROJECT NO. 7220

2. DATE 12/30/77

PAGE 1 OF 2

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 12/24/77 To 12/31/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
12/29/77	2461	BJ	25' OFFS. W. COR. OF STEAM TUNNEL & OF FIRE LINE	632	-	129.5	11.4	116.2	BMP DMC ZONE	124.6	93.3	Free Lense J-77 Failed 10-B
TEST FAILURE												
Q.C. Rep. Notified _____ Time & Date of Notification _____ Reporting Person <u>Notified 1/3/78</u> <u>MD-2461</u> <u>Non & Gary Coaster</u> <u>Notified</u> <u>Sam Sub</u>												

30. PREPARED

Signature: Bill Johnson

DATE 12/30/77

RESPONSIBLE ENGINEER

Signature: Sam Sub

DATE

1/17/78



COMPACTED FILL DENSITY TEST REPORT

AVL/LLM 4/1/78
QC ACCEPTANCE DATE
30 C-20.3
CONTROL NO. FILE NO.
PAGE 2 OF 2

1. PROJECT NO. 7220 2. DATE 12/30/77

4. SPEC. NO. 7220-C-208 5. DRAWING NO. PLANT AREA 6. TESTED WEEK OF 12/24/77 To 12/30/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX-LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
12/29/77	MD 2459	J	170'S. OF BLME 33' W. OF 11.0	631	5.5206	120.4	6.4	113.2	RD OMC ZONE	109.1/90.2	95% RD	17-B
"	2460	"	200'S. OF BLME 20' W. OF 11.0	630	5.5236	124.7	8.9	114.5	N/A	109.1/90.2	114.3	PASS

20. PREPARED (Signature) Bill Johnson DATE 12/30/77 RESPONSIBLE ENGINEER
21. PREPARED (Signature) B-1350 DATE



COMPACTED FILL DENSITY TEST REPORT

3. *AKC/John* DATE *1/2/78*
 QC ACCEPTANCE
 CONTROL NO. *70* FILE NO. *C-2/20-6*

1. PROJECT NO. **7220**

2. DATE **12/30/77**

PAGE **1** OF **1**

4. SPEC. NO. **7220-C-208**

5. DRAWING NO. **PIANT AREA**

6. TESTED WEEK OF **12/11/77 To 12/23/77**

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
12/17/77	2452	BT	W. of 9' N. of 110 LINE	634	-	122.7	6.6	115.1	RD OMC ZONE	109.7/90.2	121.7	Pass 10D
"	2453	"	W. of 5' S. of 110 LINE	627	-	122.1	7.2	113.9	RD OMC ZONE	109.7/90.2	117.1	Pass 10D
12/19/77	2454	BJ	W. of 5' S. of 110 LINE	627	-	119.5	7.7	111.0	RD OMC ZONE	109.7/90.2	105.4	Pass 10D
12/22/77	2455	RS	W. of 10' E. of 0.4 LINE	633	-	122.0	8.7	112.2	RD OMC ZONE	109.7/90.2	110.3	Pass 10D
12/23/77	2456	BT	W. of 10' E. of 0.4 LINE	624	-	111.8	5.3	106.2	RD OMC ZONE	109.7/90.2	84.8	Pass 19-E
"	2457	"	W. of 10' E. of 0.4 LINE	629	-	117.6	4.8	109.0	RD OMC ZONE	109.7/90.2	97.0	Pass 17-E
"	2458	"	W. of 10' E. of 0.4 LINE	626	-	115.5	5.3	109.7	RD OMC ZONE	109.7/90.2	100.0	Pass 10D

20. PREPARED BY *John B. Johnson* DATE **12/30/77**
 10002 (3-73) *5-39 B* RESPONSIBLE ENGINEER *John B. Johnson* DATE **15/78**
 QC-CI



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 1/12/78 DATE
 CONTROL NO. 30 FILE NO. S-710.3

1. PROJECT NO. 7220 2. DATE 12/16/77 PAGE 1 OF 2

4. SPEC. NO. 7220-C-208 8. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 12-10-77 thru 12-16-77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. WET LAB. DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
12/12/77	2448	BJ	15' N. of S. Im. Pkg. 30' W. of Comp. Shop F.A.E. LINE	628	-	114.8	3.5	110.4	RD OMC ZONE	109.7/90.2	AS% RD 102.9	PASS
	2449	SEE	PAGE 2									
12/14/77	2450	BJ	2'-8" of 15" SEWER LINE	632	-	118.2	3.1	114.6	55 N/A 2	109.7/90.2	119.8	PASS 16D
	2451		2'-3" of 15" SEWER LINE	631	-	116.1	3.3	112.4	55 N/A 2	109.7/90.2	111.1	PASS 17-D

20. PREPARED BY B. Johnson DATE 12/16/77
 10002 (3-73) 457 - 3466 12-19-77
 FILE ENGINEER [Signature] DATE 12/21/77 QC-C1



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE OK DATE 1/11/78
CONTROL NO. 30 FILE NO. C-210
PAGE 2 OF 2

1. PROJECT NO. 7220

2. DATE 12/16/77

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

8. TESTED WEEK OF 12/14/77 To 12/16/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
<u>12/13/77</u>	<u>2449</u>	<u>BS</u>	<u>23'E. OF 7.8 LINE 18' N. OF A LINE</u>	<u>6.31</u>	<u>-</u>	<u>147.0</u>	<u>12.0</u>	<u>131.3</u>	<u>AMP OMC ZONE</u>	<u>126.6</u>	<u>103.7</u>	<u>PASS 17-D</u>
			<u>(7.8) 49' EAST OF 6.6 LINE</u>									

20. PREPARED: Signature B. Johnson DATE 12/16/77

RESPONSIBLE ENGINEER Tom J... DATE 12-21-77

10002 (3-73) 113 348 12.14.77 HST D-3468



COMPACTED FILL DENSITY TEST REPORT

3. *DKO* 14/10/77
 GC ACCEPTANCE DATE
 30 C. 110.3
 CONTROL NO. FILE NO.
 PAGE 1 OF 1

1. PROJECT NO. 7220

2. DATE 11/25/77

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 11/19/77 to 11/25/77

7. DATE TAKEN	8. TEST NO. MO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/22/77	2441	BJ	10' N. OF N. WALL 52' S. OF S.W.E	632	-	138.0	7.9	122.5 122.5	BMP OMC ZONE 50% MTS	126.0	97.2	PASS

20. PREPARED BY B. Johnson DATE 11/25/77
 10002 (3-73) 4'-6368 11-25-77

RESPONSIBLE ENGINEER DKO DATE 11/25/77
 GC-C1

SUB 10997



COMPLETED FILL DENSITY TEST REPORT

QC ACCEPTANCE 50 DATE C. 210,3
CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/25/77

PAGE 2 OF 2

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

8. TESTED WEEK OF 11/13/77 To 11/18/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/17/77	2436	BJ	3' W. OF STEAM TUNNEL WITH 10' N. OF CLINE STATION	621	-	138.5	11.5	124.2	270 11 1	124.6	99.7	PASS 20-D
11/17/77	2437	PR	10' W. OF W. SIDE STATION 30' N. OF S. SIDE BATHHOUSE OFFICE	624	-	144.0	11.5	129.2	274 10.4 1	124.8	103.5	PASS 19-D
11/17/77	2438	PR	4' W. OF W. SIDE STEAM TUNNEL 30' N. OF S. SIDE OFFICE	626	-	139.0	11.6	124.5	274 10.4 1	124.8	99.8	PASS
11/19/77	2439	BJ	N.E. OF S.W. INTAKE # OF INTAKE	623	-	137.5	13.2	121.5	277 9 1	121.0	100.4	PASS 19G
"	2440	"	3' W. OF STEAM TUNNEL WITH 6' N. OF C. LINE STEAM TUNNEL	589	-	135.0	11.1	121.5	270 11.1 1	124.6	97.1	PASS 3D

20. PREPARED BY (signature) B. Johnson

DATE 11/25/77

RESPONSIBLE ENGINEER Tom Lueb

DATE 2/15/77

SB 10996

QC ACCEPTANCE DATE 12/10/77
 CONTROL NO. 70 C. 21017
 FILE NO. 2

COMPACTED FILL DENSITY TEST REPORT

PROJECT NO. 7220 DATE 11/25/77

SPEC. NO. 1220-C-208 DRAWING NO. PLANT AREA TESTED WEEK OF 11/13/77 To 11/16/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
* 11/16/77	MD		33' R. OF COR. OF SW. 1/4 OF S. 1/4 FIRE ALONG	625		118.0	6.7	110.2	RD OMC Zone	109.7/90.2	102.1	PASS 19 G
2434		BJ	40' S. OF RAILLINE	627	2.0	118.8	5.8	112.3	N/A 2	109.7/90.2	110.7	PASS 10 E
2435		"	ON 12.0 LINE									

20. PREPARED BY B. Johnson DATE 11/25/77 RESPONSIBLE ENGINEER [Signature] DATE 11/15/77 QC-C1



COMPACTED FILL DENSITY TEST REPORT

3. *P.O. Osh*
 QC ACCEPTANCE 12/10/77 DATE
30 CONTROL NO. C-110.3 FILE NO.

1. PROJECT NO. 7220

2. DATE 11/17/77

PAGE 4 OF 4

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 11/5/77 to 11/12/77

7. DATE TAKEN	8. TEST NO.	9. TEST LED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/10/77	2428	B.J.	5' E. OF DESEL 30N. END OF 20'S OF TUNNEL 1098 2' W. OF W. SIDE STR. TUN. 50 N. OF N. 1098	624	-	117.9	7.2	110.0	AD OMC ZONE	109.7/90.2	AS% RD	
11/11/77	2429	P.R.	WAREHOUSE 8' W. OF W. SIDE OF TUNNEL 60'	624	-	113.3	4.0	108.9	55 N/A 2	109.7/90.2	101.3	PASS 14E
"	2430	"	20' N. OF H. LINE 3' E. OF 15 LINE	626	-	116.5	6.7	109.2	55 N/A 2	109.7/90.2	96.6	PASS
11/12/77	2431	P.R.	10' N. OF H. LINE 3' E. OF 15 LINE	628	-	123.9	6.3	116.0	55 N/A 2	109.7/90.2	97.9	PASS
"	2432	"	20' S. OF H. LINE 6' W. OF 12. LINE	626	-	114.8	6.6	107.7	55 N/A 2	109.7/90.2	125.1	PASS
"	2433	"		627	-	118.2	6.2	111.3	55 N/A 2	109.7/90.2	91.4	PASS
											106.6	PASS 14E

20. PREPARED (signature) B. Johnson
 10002 (3-73) N-634D

DATE 11/25/77
Pages 11.5.77

RESPONSIBLE ENGINEER [Signature] DATE 11/5/77

QC-C1



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE OK DATE 11/20/77
CONTROL NO. 30 FILE NO. C-21013

1. PROJECT NO. 7220

2. DATE 11/11/77

PAGE 3 OF 4

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 11/6/77 To 11/12/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS	
<u>11/10/77</u>	<u>2427</u>	<u>BJ</u>	<u>W 8 S'S. OF S. WALL</u>	<u>627</u>	<u>-</u>	<u>142.5</u>	<u>10.9</u>	<u>128.5</u>	<u>BMP OMC ZONE</u>	<u>276 10.7 1</u>	<u>124.8</u>	<u>103.0</u>	<u>PASS</u> <u>?</u>

20. PREPARED BY natural B. Johnson DATE 11/25/77

SPONSIBLE ENGINEER Tom Lutz DATE 11/27

S3 11001



COMPACTED FILL DENSITY TEST REPORT

3. OK Data 12/10/77
 QC ACCEPTANCE DATE
30 C-210.8
 CONTROL NO. FILE NO.
 PAGE 1 OF 4

1. PROJECT NO. 7220

2. DATE 11/10/77

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 11/5/77 To 11/12/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/5/77	2407	RS	ROVER SAWER 90' CONT. II 75'E OF CONF. II	630	-	137.5	13.0	121.7	BMP OMC ZONE	270 11.1 1	124.6	97.7 PASS 17-D
11/7/77	2412	PR	50' W. OF W. SIDE N. TRANSFORMER PAD	632	CB	139.5	13.9	122.5		271 13.4 1	121.0	101.2 PASS 16-D NE
"	2413	"	40' W. OF W. SIDE TRANSFORMER PAD	632	10	141.0	12.6	125.2		277 13.4 1	121.0	103.5 PASS 16-D NE
"	2414	"	20'S OF N. SIDE & SOURCE LINE 16" E. OF UNIT 2 40' W. OF N. SIDE TURBINE Bldg.	631	-	141.5	12.3	126.0		277 13.4 1	121.0	104.1 PASS
11/8/77	2419	BT	40'E. OF 12 LINE TURBINE	632	-	135.5	14.6	118.2		277 13.4 1	121.0	97.7 PASS 160
11/10/77	2419	PR	50' N. OF N. LINE & 5' FROM OIL WASTE Bldg. OF E. SIDE TURBINE Bldg.	626	-	145.0	11.1	130.5		276 10.7 1	124.8	104.6 PASS 180
"	2420	"	40'E. OF E. WALL 40'S. OF N. WALL TURBINE Bldg.	628	-	145.0	11.1	130.5		276 10.7 1	124.8	104.6 PASS 180
-	2421	SEE	PAGE 2									
11/9/77	2422	BT	E. 2 9'S. OF S. WALL	624	-	128.0	15.3	111.0		278 15.2 1	117.0	94.9 FAILED
"	2423	"	E. 2 9'S. OF S. WALL	624	-	142.5	13.4	126.0		278 15.2 1	117.0	107.7 PASS
-	2424	SEE	PAGE 2									
11/9/77	2426	PR	SEWER OIL WASTE LINE 50'S. OF W. TUR. Bldg. WALL	630	-	143.0	11.1	128.7		276 10.7 1	124.8	103.1 PASS

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person Notified DATE OF TEST
MD 2422

SB 1102

COMPACTED FILL DENSITY TEST REPORT

3. *R. H. White* 12/10/77
 QC ACCEPTANCE DATE
 CONTROL NO. *30 C-21023* FILE NO.
 PAGE 2 OF 4

1. PROJECT NO. **7220**

2. DATE **11/10/77**

4. SPEC. NO. **7220-C-208**

5. DRAWING NO. **PLANT AREA**

8. TESTED WEEK OF **11/5/77 To 11/2/77**

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. MAH. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	<i>MD.</i> 2408	PR	3' W. OF W. SIDE OF TRANSFORMER PAD 15' N. OF S. SIDE 5' N. OF MANHOLE	630	-	118.0	6.9	110.4	RD OMC ZONE			
	2409	"	20' W. OF W. SIDE OF TRANSFORMER PAD 10' W. OF W. SIDE OF MANHOLE	630	-	117.1	6.6	109.8	55 N/A 2	109.7/90.2	102.9	PASS 176
	2410	"	30' W. OF W. SIDE OF TRANSFORMER PAD 10' W. OF W. SIDE OF MANHOLE	632	5-4774	118.9	6.8	111.3	55 N/A 2	109.7/90.2	100.4	PASS 170%
	2411	"	30' S. OF W. SIDE OF TRANSFORMER PAD 10' W. OF W. SIDE OF MANHOLE	631	-	115.8	6.6	108.6	55 N/A 2	109.7/90.2	106.6	PASS 166
	2412 THRU 2414	SEE	PAGE 1							109.7/90.2	95.3	PASS 17-D
11/8/77	2415	PR	5' S. OF 2 LINE 40' E. OF 12 LINE	633	-	118.9	7.1	111.0	55 N/A 2	109.7/90.2	105.4	PASS 140
	2416	"	20' S. OF N.W. CORNER 12' W. OF 12 LINE	633	-	115.3	6.9	107.9	55 N/A 2	109.7/90.2	92.3	PASS 140
	2417	"	10' W. OF W. SIDE COMBO 20' S. OF S. SIDE COMBO SHOP	628	-	115.3	7.0	107.8	55 N/A 2	109.7/90.2	91.8	PASS
	2418 THRU 2420	SEE	PAGE 1									
11/9/77	2421	BS	2' OF MANHOLE 20' OF MANHOLE	632	-	117.7	6.9	110.1	55 N/A 2	109.7/90.2	101.7	PASS
	2422 THRU 2423	SEE	PAGE 1									
11/9/77	2424	PR	6' S. OF S. SIDE COMBO SHOP 60' W. OF E. SIDE	633	-	88.5	7.0	82.7	55 N/A 2	109.7/90.2	51.0	FAILED CLEAR
	2425	"	10' S. OF S. SIDE COMBO SHOP 60' W. OF E. SIDE	633	-	121.4	7.1	113.4	55 N/A 2	109.7/90.2	115.1	PASS

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____

Reporting Person *B. Johnson* DATE OF TEST *11/25/77*

20. PREPARED BY *B. Johnson*
 10002 (3-73) *42* N-6346

RESPONSIBLE ENGINEER *[Signature]* DATE *11/27*

SB 1100
 160
 160



COMPACTED FILL DENSITY TEST REPORT

3. *[Signature]* 12/20/77
 QC ACCEPTANCE DATE
 30 C-210.9
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/23/77

PAGE 5 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/29/77 TO 11/4/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. MAN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
11/4/77	2404	PR	15' W. OF TURBINE Bldg & N. TURBINE WALL	633	-	122.5	6.2	5.489T 115.3	RD OMC ZONE E 34	109.7 / 90.2	122.5	PASS #D
"	2405	"	15' W. OF TURBINE Bldg & N. TURBINE WALL	631	-	106.7	5.3	101.3	55 N/A 2	109.7 / 90.2	61.6	FAILED #D
"	2406	"	15' W. OF TURBINE Bldg & N. TURBINE WALL	631	-	119.9	6.3	112.8	55 N/A 2	109.7 / 90.2	112.8	CLEAR #D-2405 PASS #D

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person MD-2405 NOTIFIED DATE OF TEST _____

20. PREPARED

[Signature]
 DATE 11/25/77

DATE 11/25/77

RESPONSIBLE ENGINEER *[Signature]*

DATE 1-15-77



COMPACTED FILL DENSITY TEST REPORT

3. OK Data 12/20/77
 QC ACCEPTANCE DATE
 30 C-210.1
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/23/77

PAGE 3 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/29/77 To 11/4/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX./MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION AS% RD	19. REMARKS
10/31/77	2382	RS	10' E. OF E. WALL MANHOLE #10	630	-	118.6	7.1	110.7	RD OMC ZONE	109.7/90.2	104.2	PASS
-	2383 THRU 2387	SEE	PAGES 1 & 4				5.5143	W-27				
11/1/77	2370	RS	18' N. OF A-LINE 4' E. OF E. STEAM TUNNEL WALL	623.5	-	116.5	7.2	108.7	55 N/A 2	109.7/90.2	95.7	PASS 19-D
-	2371 THRU 2392	SEE	PAGE 4									
11/2/77	2393	RS	2' E. OF W. ADMIN. WALL 15' S. OF A-LINE OF TUNNEL	624	-	124.4	8.2	115.0	55 N/A 2	109.7/90.2	121.3	PASS 19-D
"	2394	"	2' W. OF W. ADMIN. WALL 15' S. OF A-LINE	624	-	117.9	7.1	110.1	55 N/A 2	109.7/90.2	101.7	PASS 19-D
"	2395	"	5' N. OF C-A LINE 2' W. OF I.O. EVAP. BLDG.	633	-	117.6	7.1	109.8	55 N/A 2	109.7/90.2	100.4	PASS 16C
"	2396	"	20' S. OF A-LINE 8' W. OF W. WALL Admin Bldg.	626	-	118.9	7.0	111.1	55 N/A 2	109.7/90.2	105.8	PASS 18D
-	2397	SEE	PAGE 4									
11/3/77	2398	RS	2' W. OF W. WALL MANHOLE #2	630	-	118.7	6.7	111.2	55 N/A 2	109.7/90.2	106.2	PASS 17C
"	2399	"	2' N. OF 2' E. OF W. WALL DISAL. PCT.	631	-	121.3	8.1	112.2	55 N/A 2	109.7/90.2	110.3	PASS
11/4/77	2400	RS	15' E. OF W. WALL Admin Bldg. 19' N. OF A.	632	-	122.7	11.5	110.0	55 N/A 2	109.7/90.2	101.3	PASS 16D

20. PREPARED BY

B. Johnson

DATE 11/23/77

RESPONSIBLE ENGINEER

John Lutz

DATE

11-23-77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 2/10/77 DATE
 CONTROL NO. 30 FILE NO. C. 110.7

1. PROJECT NO. 7220

2. DATE 11/23/77

PAGE 4 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/29/77 To 11/4/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/31/77	2385	PR	5'E. OF E. STREAM TUNNEL WALL 50'S. OF EVAP.	625	-	146.0	10.4	132.2	AMP OMC ZONE 273 10.0 1	127.4	103.8	PASS
11/1/77	2386	RS	45'S. OF S. WALL W. 2	625	-	141.5	12.6	125.7	270 11.1 1	124.6	100.9	PASS ?
REDACTED ROW												
"	2388	"	40'N. OF B LINE 7'E. OF E. WALL 5'N. OF S. LINE	633	-	140.0	11.6	125.5	264 10.0 1	127.3	98.6	PASS 16D
"	2389	"	5'E. OF W. ADMIN. WALL	632.5	-	145.5	11.1	131.0	269 10.0 1	127.3	102.9	PASS 16D
-	2390	SEE	PAGE									
	2391		6'N. OF N LINE 4'E. OF O LINE	633	-	140.0	11.7	125.3	276 10.7 1	124.8	100.4	PASS 16D
	2392		20'E. OF E. STREAM TUNNEL WALL 120'S. OF S. EVAP.	634	-	143.0	12.2	127.5	277 13.4 1	121.0	105.4	PASS 16D
-	2393 THRU 2396	SEE	PAGE 3									
11/2/77	2397	PR	2'S. OF N LINE 2'E. OF O LINE	632.5	-	142.5	12.8	128.8	277 13.4 1	121.0	106.4	PASS 16D
-	2398 THRU 2400	SEE	PAGE 3									
11/4/77	2401	PR	30" SWI	605	-	145.5	9.4	133.0	271 10.1 1	126.6	105.1	PASS 25 G
"	2402	"	30" SWI	605	-	148.5	10.4	134.5	271 10.1 1	126.6	106.2	PASS 25 G
"	2403	"	7'N. OF CONTROL 4' OF SEWER LINE	627	-	146.0	11.0	131.5	276 10.7 1	124.8	105.4	PASS 18D

20. PREPARED gatural B. Johnson DATE 11/23/77
 10002 (3-73) CA 77-578 d 11-23-77

RESPONSIBLE ENGINEER Don Eub DATE 11/27/77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 12/20/77 DATE
 CONTROL NO. 30 FILE NO. C 210.3

1. PROJECT NO. 72202. DATE 11/23/77PAGE 2 OF 54. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 10/29/77 To 11/4/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/29/77	2366	RS	E 3 12' M.F.P.S. WHII ADMIN BLDG.	625	-	123.9	8.7	114.0	RD ORG ZONE	109.7/90.2	117.4	PASS 19-D
"	2367	"	24' M.F.P.S. WHII 2' E. OF N. WHII ADMIN. BLDG.	625	-	117.3	7.5	109.1	55 N/A 2	109.7/90.2	97.5	PASS 19-D
"	2368	"	4' E. OF HOLE	630	-	118.3	7.2	110.4	55 N/A 2	109.7/90.2	103.0	PASS 17-D
	2369 THRU 2373	SEE	PAGE 1			5.45	35	6-10				
10/29/77	2374	PR	10' E. OF S.E. CORNER COMBO	629	-	119.3	8.0	110.5	55 N/A 2	109.7/90.2	103.3	PASS 17-D
"	2375	"	15' N. OF PA LINE	627	-	117.2	6.9	109.6	55 N/A 2	109.7/90.2	99.6	PASS 16-D
"	2376	"	4' E. OF OY LINE	627	-	114.0	7.5	106.0	55 N/A 2	109.7/90.2	83.9	PASS 16-D
10/31/77	2377	RS	1' N. OF NR LINE 2' W. OF OY LINE 45' N. OF Q LINE 5' E. OF P.	629	-	116.6	7.7	108.3	55 N/A 2	109.7/90.2	94.0	PASS 17-D
"	2378	"	ADMIN. WHII 45' N. OF Q LINE 5' E. OF P. STEAM TUNNEL WALL	629	-	121.6	7.7	112.9	55 N/A 2	109.7/90.2	113.1	PASS 17-D
"	2379	"	45' N. OF Q LINE 5' E. OF P. STEAM TUNNEL WALL	631	-	122.4	7.1	114.3	55 N/A 2	109.7/90.2	118.6	PASS 17-D
"	2380	"	45' N. OF Q LINE 5' E. OF P. STEAM TUNNEL WALL	631	-	116.3	11.6	104.2	55 N/A 2	109.7/90.2	75.6	FAILED 17-D
"	2381	"	20' W. OF S.W. CORNER OF COMBO SHOP 8' N. OF CORNER	628	-	118.3	7.3	110.3	55 N/A 2	109.7/90.2	102.5	PASS

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person MD, 2380 NOTIFIED DATE OF TEST _____

20. PREPARED BY nature) G. Johnson DATE 11/23/77
 10002 (3-73) 77-5786 11.23.77

RESPONSIBLE ENGINEER John Sub DATE 11-77
 QC-CI

SB 11007



COMPACTED FILL DENSITY TEST REPORT

3. W. J. O'Neil 12/10/77
 QC ACCEPTANCE DATE
30 C-40-9
 CONTROL NO. FILE NO.

1. PROJECT NO. 72202. DATE 11/23/77PAGE 1 OF 54. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 10/29/77 TO 11/4/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/27/77	2363	A.S.	27'S. OF STM. TURN	618	-	140.0	14.6	122.2	BMP OMC ZONE	124.6	98.1	FAILED
"	2364	"	37A. 28+70	599.0	-	147.0	10.9	132.5	297 11.1 1	131.6	100.7	PASS
"	2365	"	30' N. OF N.2 CWL.	633	-	137.5	16.2	118.3	278 15.2 1	117.0	101.1	PASS 16G
		SEE	PAGE 2									
10/27/77	2367	PR	27'S. OF STM. TURN	618	-	138.0	15.8	119.2	277 11.1 1	124.6	95.6	FAILED
"	2370	"	30'E. OF B CWL.	631	-	141.0	15.8	121.8	278 15.2 1	117.0	104.1	PASS 17A
10/27/77	2371	PR	27'S. OF STM. TURN	618	-	142.0	11.8	127.0	277 11.1 1	124.6	101.4	PASS
		SEE	PAGES 2 & 3									
10/27/77	2372	PR	20' W. OF W. COMBO	621	-	144.8	13.6	126.8	276 10.7 1	124.8	101.9	FAILED
10/31/77	2383	PR	60'S. OF N. COMBO	621	-	140.0	11.6	125.5	276 10.7 1	124.8	100.6	PASS
"	2384	"	30'S. OF S. EDMP.	623	-	145.0	10.7	131.0	273 10.0 1	127.4	102.8	PASS 19-D

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person MD 2363, 2369, 2373 Notified Date of Test _____

20. PREPARED BY B. Johnson DATE 11/23/77
 10002 (3-73) 7-5789 11-23-77

RESPONSIBLE ENGINEER [Signature] DATE 11-23-77

SB 11008

21-E

21-E

AIF



COMPACTED FILL DENSITY TEST REPORT

3. *W. B. Cohen* 12/16/77
QC ACCEPTANCE DATE
30 C-210.3
CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/18/77

PAGE 6 OF 6

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

8. TESTED WEEK OF 10/22/77 To 10/28/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
		<i>MD.</i>	<i>2'E. OF 2.0</i>						<i>RD CMC ZONE</i>		<i>AS% RD.</i>	
<i>10/20/77</i>	<i>2362</i>	<i>PR</i>	<i>15'S. OF N. TRANSFORMER</i> <i>30'E. OF W. Side</i>	<i>621</i>	<i>-</i>	<i>122.2</i>	<i>7.1</i>	<i>114.1</i>	<i>55 N/A 2</i>	<i>109.7/90.2</i>	<i>117.8</i>	<i>PASS 2D G</i>

S3 1100



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 12/20/77 DATE
CONTROL NO. 30 FILE NO. C-210.3

1. PROJECT NO. 7220

2. DATE 11/18/77

PAGE 5 OF 6

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/22/77 To 10/29/77

7. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/28/77	2359	RS	E. 7 1/2 W. OF AB E. OF STEAM TUNNEL	632	-	136.0	13.6	119.7	BMP OMC ZONE	126.6	94.5	FAILED
10/28/77	2360	PR	20' W. OF FID COMBO 1/2 S. OF MANHOLE	630	-	144.5	11.4	129.7	271 10.1 1	126.6	102.4	PASS

TEST FAILURE

Q.C. Rep. Notified _____
Time & Date of Notification _____
Reporting Person Neil Date of Test 10/28/77

20. PREPARED natural B. Johnson DATE 11/18/77 RESPONSIBLE ENGINEER Som Jit DATE 1-15-77
10002 (3-73) u 7-571c 11/18/77 1-77 QC-C1

SB 11C10



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 12/16/77 DATE
 CONTROL NO. 20 FILE NO. C-210.3

1. PROJECT NO. 7220

2. DATE 11/18/77

PAGE 4 OF 6

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/22/77 To 10/28/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/26/77	2344	RS	6' S. OF AB LINE Admin Bldg.	619	-	133.5	11.7	119.5	BMP ONC ZONE	124.6	96.0	PASS 21-D
"	2345	"	S. 4634 W. 5	629	-	133.5	12.2	119.0	277 13.4 1	121.0	98.3	PASS 17-D
"	2346	"	S. 6110 E. 485	614	-	149.0	9.0	137.0	297 9.0 1	131.6	104.1	PASS IN POND
"	2347	"	S. 6080 E. 643	613.5	-	146.0	8.0	135.2	297 9.0 1	131.6	102.7	PASS IN POND
"	2349	"	45' E. OF E. WALL 45' N. OF N. RET	633	-	145.5	10.2	132.0	297 9.0 1	131.6	100.3	PASS 16G
-	2350	SEE	PAGE 2									
10/26/77	2351	PR	S. 5862 E. 668	611.4	-	142.5	11.6	127.7	276 10.7 1	124.8	102.3	PASS IN POND
"	2352	"	S. 5870 E. 770	611.4	-	147.5	10.9	133.0	276 10.7 1	124.8	106.6	PASS IN POND
"	2353	"	3' E. OF STEAM TUNNEL WALL 30' N. OF N. TURBINE WALL	621	W ¹	149.5	11.2	134.5	274 10.4 1	124.8	107.8	PASS 20D
10/27/77	2354	RS	15' OF AB LINE Admin Bldg	625	-	137.5	11.8	123.0	270 11.1 1	124.6	98.7	PASS 19-D.
-	2355	SEE	PAGE 2									
10/27/77	2357	PR	15' E. OF STEAM TUNNEL WALL 30' N. OF N. TURBINE WALL	627	-	136.5	16.3	117.8	278 15.2 1	117.0	100.7	PASS 18D
"	2358	"	30' E. OF STEAM TUNNEL WALL 30' N. OF N. TURBINE WALL	629	-	142.5	12.5	126.7	277 13.4 1	121.0	104.7	PASS 17-D
11/10/77	2359											

20. PREPARED BY B. Johnson DATE 11/18/77 SPONSIBLE ENGINEER John Lutz DATE 1-15-77
 10002 (3-73) 4-577d 11-23-77 QC-C1



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE *W. Johnson* 12/20/77
 CONTROL NO. 303 FILE NO. C-703

1. PROJECT NO. 7220

2. DATE 11/15/77

PAGE 3 OF 6

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/22/77 To 10/28/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/23/77	2323	BT	S. 5761 E. 585	610.5	-	141.5	13.0	125.2	BMP OMC ZONE 270 11.1 1	124.6	100.5	PASS IN POND
10/24/77	2324	RS BT	10'S. OF W VALVE TYPE 18" W. OF 4.0	633	-	137.5	12.5	122.2	270 11.1 1	124.6	98.1	PASS 10E
"	2325	"	S. 5620 E. 378	608.5	-	137.5	12.7	122.0	277 13.4 1	121.0	100.0	PASS IN POND
"	2326	"	S. 5776 E. 382	610.5	-	140.5	12.0	125.5	277 13.4 1	121.0	103.1	PASS POND
10/24/77	2327	PR	S. 5877 E. 356	611.5	-	145.0	10.9	130.7	273 10.0 1	127.4	102.6	PASS POND
"	2328	"	S. 6792 E. 341	611	-	140.0	14.5	122.3	277 13.4 1	121.0	101.1	PASS POND
-	2329 2332	SEE	PAGE 2									
10/25/77	2333	RS	8'S. OF AB LINE W. 5 STM. TUN.	614	-	143.0	12.0	127.7	269 10.0 1	127.3	100.3	PASS POND
10/25/77	2334	PR	S. 5880 E. 493	611.5	-	141.5	11.9	126.5	274 10.4 1	124.8	101.4	PASS POND
"	2335	"	S. 5870 E. 446	611.5	-	141.0	11.7	126.2	274 10.4 1	124.8	101.1	PASS POND
"	2336	"	S. 6100 E. 618	613.5	-	146.0	9.2	133.7	274 10.4 1	124.8	107.1	PASS POND
"	2337	"	S. 6090 E. 473	613.5	-	137.5	9.8	125.2	274 10.4 1	124.8	100.3	PASS POND
-	2338 2339	SEE	PAGE 2									
10/26/77	2340	RS	10'S. OF AB LINE W. 5 ADMIN. Bldg.	617	-	143.0	12.0	127.7	269 10.0 1	127.3	100.3	PASS 21-9
"	2341	"	14'E. OF WHITING 57' N. OF N. RT.	630	-	5602.7 739.0	12.4	123.7	EB24 270 11.1 1	124.6	99.3	PASS 17-9
"	2342	"	S. 5135 E. 324	630	-	138.0	12.2	123.0	255 14.4 1	117.4	104.8	FAIL 17-9
"	2343	"	S. 5163 E. 280	632	-	136.0	10.8	122.7	271 10.1 1	126.6	96.9	PASS 10E

G.C. Rep. Modified
 Time & Date of Modification
 Reporting Engineer
 Date of Test



COMPACTED FILL DENSITY TEST REPORT

W. O. ... 12/20/77
 QC ACCEPTANCE DATE
 30 C-210.3
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/14/77

PAGE 2 OF 6

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/22/77 To 10/28/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. MAR. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/22/77	2317	RS	2' E. OF W. WALL 17' N. OF S. WALL EVAP. Bldg.	630.5	-	124.2	10.0	112.9	AD. OMC. ZONE	109.7/90.2	113.1	PASS 17-C
"	2318	"	17' N. OF S. WALL 2' E. OF W. WALL EVAP. Bldg.	631.5	-	119.9	7.5	111.5	55 N/A 2	109.7/90.2	107.5	PASS 17-C
"	2319	"	2' W. OF W. WALL 17' N. OF S. WALL EVAP. Bldg.	630.5	-	123.0	10.2	111.6	55 N/A 2	109.7/90.2	107.9	PASS 17-C
—		2320 THRU 2328	SEE PAGES 1 & 3									
[REDACTED]												
10/24/77	2330	PR	25' E. OF E. EQUIP. 50' S. OF N. SIDE 20' S. OF N. WALL 20' S. OF W. WALL	624	-	120.2	7.1	112.2	55 N/A 2	109.7/90.2	110.3	PASS 16C
[REDACTED]												
"	2332	"	20' E. OF MAY 11/16 17	626	-	112.8	6.4	106.0	55 N/A 2	109.7/90.2	83.9	PASS 16 90%
—		2333 THRU 2337	SEE PAGE 3									
10/25/77	2338	PR	20' S. OF N. WALL ELECT. TRANS. E. OF CENT. 2' W. OF W. WALL E. OF W. WALL	631	-	118.8	8.8	109.2	55 N/A 2	109.7/90.2	97.9	PASS 17-φ
"	2339	"	17' N. OF S. WALL TRANS. E. OF CENT. 2' 20' E. OF W. WALL	631	-	117.5	7.1	109.6	55 N/A 2	109.7/90.2	99.6	PASS 17-φ
—		2340 THRU 2349	SEE PAGE 4									
[REDACTED]												
10/27/77	2351	RS	20' S. OF N. WALL ELECT. TRANS. E. OF CENT. 2' W. OF W. WALL E. OF W. WALL	632.5	-	123.3	6.8	115.4	55 N/A 2	109.7/90.2	122.8	PASS 16E
"	2352	"	20' S. OF N. WALL ELECT. TRANS. E. OF CENT. 2' W. OF W. WALL E. OF W. WALL	632.5	-	120.0	7.2	111.9	55 N/A 2	109.7/90.2	109.1	PASS 16E

20. PREPARED BY

B. Johnson

DATE 11/18/77

SPONSIBLE ENGINEER

Tom Sub

DATE

11-77

SB 11C13



COMPACTED FILL DENSITY TEST REPORT

3. *AKO* 11/10/77
 QC ACCEPTANCE DATE
 30 C-210.3
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/14/77

PAGE 1 OF 6

4. SPEC. NO. 7220-C-206

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/22/77 To 10/28/77

7. DATE TAKEN	8. TEST NO. MP.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/22/77	2304	RS	S. 5663 E. 543	608	-	143.0	12.0	127.7	269 10.0 1	127.3	100.3	F155
"	2305	"	3' W. OF 4" D 18" N. OF 12" VALVE P. PE	629	-	142.0	12.1	126.7	270 11.1 1	124.6	101.7	1055
"	2306	"	S. 5578 E. 481	607.5	-	142.0	10.8	128.2	269 10.0 1	127.3	100.7	PASS IN Pond
"	2307	"	S. 5701 E. 668	609.5	-	142.5	10.9	128.5	269 10.0 1	127.3	100.9	PASS IN Pond
"	2308	"	34' N. OF N. RET. 45' E. OF E. SWH	620	-	140.5	11.3	126.2	269 10.0 1	127.3	99.1	PASS
"	2309	"	22' N. OF N. RET. 20' E. OF CORNER	633.5	-	143.0	12.9	126.7	270 11.1 1	124.6	101.7	PASS 10-ES
"	2310	"	S. 5783 E. 680	610.5	-	140.0	12.9	124.0	270 11.1 1	124.6	99.5	PASS IN Pond
"	2311	"	S. 5808 E. 717	611	-	140.5	12.9	124.5	270 11.1 1	124.6	99.9	PASS IN Pond
"	2312	"	S. 5687 E. 468	607.5	-	141.5	13.2	125.0	277 13.4 1	121.0	103.3	PASS IN P.
"	2313	"	S. 5762 E. 443	606	-	144.0	11.6	129.0	269 10.0 1	127.3	101.3	PASS
"	2314	"	12' N. OF S. E. TPA. CORNER SHIP 20' E. OF COR.	633.5	-	143.0	11.3	128.5	269 10.0 1	127.3	99.2	PASS 10D
"	2315	"	37' N. OF N. RET. 18' E. OF E. WALL	626	-	141.5	11.2	127.2	269 10.0 1	127.3	98.1	PASS 18G
"	2316	"	55' N. OF N. RET. 18' E. OF E. WALL	628	-	139.5	11.0	125.7	269 10.0 1	127.3	97.0	PASS 18G
-	2317 THRU 2319	SEE	PAGE 2									
10/23/77	2320	BT	S. 5560 E. 547	608	-	139.5	14.3	122.0	277 13.4 1	121.0	100.8	PASS 11
"	2321	"	S. 5672 E. 490	608.5	-	147.0	12.5	130.7	270 11.1 1	124.6	104.9	PASS POND
"	2322	"	S. 5707 E. 578	610	-	144.0	11.6	129.0	270 11.1 1	124.6	103.5	PASS P.

20. PREPARED BY B. Johnson DATE 11/18/77 2. RESPONSIBLE ENGINEER [Signature] DATE 11-77
 10002 (3-73) U 11-5770 [Signature] 11-23-77 QC-C1

SH 11014



COMPACTED FILL DENSITY TEST REPORT


1. PROJECT NO. **7220** 2. DATE _____

CONTROL NO. _____ FILE NO. _____

QC ACCEPTANCE DATE **12/10/77**

PAGE **7** OF **7**

4. SPEC. NO. **7220-C-208** 5. DRAWING NO. **PLANT AREA** 6. TESTED WEEK OF **10/15/77 TO 10/21/77**

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/21/77	2297	PR	15' W. of DIS. 2	630	—	143.0	13.8	125.7	BMP OMC 30%	124.8	100.7	PASS 17-E
"	2298	"	4' E. of W. WALL 20' W. of W. COMP	626	—	144.0	12.7	127.8	276 10.7	124.8	102.4	PASS
"	2299	"	20' S. of W. COMP	628	—	136.8	11.4	122.8	277 13.4	121.0	101.5	PASS
"	2300	"	20' W. of W. WALL 20' S. of MACHINE	630	—	142.5	12.6	126.5	54500 10.1	126.6	99.9	PASS 17D
												



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE DATE 10/21/77

CONTROL NO. FILE NO. PAGE 6 OF 7

1. PROJECT NO. 7220 DATE 2. DATE

4. SPEC. NO. 7220-C-208 5. DRAWING NO. PLANT AREA

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. TESTED WEEK OF	19. PERCENT COMPACTION	20. REMARKS
	2293		27'S. OF Q	6205		118.7	7.8	110.1	RD 01C 201E	109.7/90.2	10/17/77 to 10/21/77	101.7	PASS
	2294	THRU	2395 SEE PAGE 27'S. OF Q		4	109.3	6.9	102.2	55 N/A	109.7/90.2		106.1	FAIL by 2296-20E
10/20/77	2296	PR.	9'E. OF Q	6205		116.1	7.5	108.0	55 N/A	109.7/90.2		92.7	PASS
	2297	THRU	2300 SEE PAGE 20' W. OF WALL		7	114.0	5.6	108.0	55 N/A	109.7/90.2		92.7	PASS
10/21/77	2301	PR	40'S. OF N. WALL	6244		119.7	5.6	113.4	55 N/A	109.7/90.2		115.1	PASS
10/21/77	2302	RS	20' W. OF S. WALL	6246									

TEST FAILURE

Q.C. Rep. Notified
Time & Date of Notification
Reporting Person NOTIFIED DATE OF TEST
MD-2293

20. PREPAREI R. D. [Signature] DATE 11-8-77 RESPONSIBLE ENGINEER [Signature] DATE 15-77



COMPACTED FILL DENSITY TEST REPORT

3. *Phalsh* 12/29/77
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE _____

PAGE 4 OF 7

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/15/77 to 10/21/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS	
10/18/77	2272	RS	S. 5067 E. 94.5	617	—	138.0	14.5	120.5	BMP ORG ZONE	277 13.4 1	121.0	99.6	PASS 21-E
"	2273	"	W. 511 141' N. 06 AN W. 18 STREAM TURN	624	—	136.5	11.2	122.7	270 11.1 1	124.6	98.5	PASS 19-D	
	2274	THRU	2279	SEE PAGE	1-5								
10/19/77	2280	RS	S. 5030 E. 860	633	—	138.5	12.4	123.2	270 16.1 1	124.6	98.9	PASS 16	
"	2281	"	137' N. 8 AN W. 44 STREAM TURN	626	—	147.5	11.6	132.2	269 10.0 1	127.3	103.8	PASS 18E	
"	2282	"	8'E. 4.0 20'S. 8' 9"	627	—	125.7	9.1	115.2	270 11.1 1	124.6	92.5	FAIL ^{clear} _{11/29/73} 10E	
"	2283	"	8'E. 4.0 20'S. 8' 9"	627	—	131.4	9.0	120.6	270 11.1 1	124.6	96.8	PASS ^{2 CLEAR} _{MD-2282} 10E	
	2284	THRU	2290	SEE PAGE	5								
10/20/77	2291	RS	S. 5638 E. 400	606.5	—	144.5	12.0	129.0	271 10.1 1	126.6	101.9	PASS 25 E	
	2292	THRU	2293	SEE PAGE	6								
10/21/77	2294	PR	40' W. 08 DIS. 2 20' W. 08 DIS. 2	631	—	143.0	13.0	126.5	276 10.7 1	124.8	101.4	FAIL	
"	2295	"	40' W. 08 DIS. 2 20' N. 8 DIS. 2	633	—	143.5	14.5	125.3	277 13.4 1	121.0	103.6	PASS 10E	

DISC. STR UNIT 2

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person NOTIFIED DATE OF TEST
 MD-2282, 2294



E - Edge of Loading COMPACTED FILL DENSITY TEST REPORT
 Ditch = E 39

QC ACCEPTANCE OK DATE 12/10/77
 CONTROL NO. _____ FILE NO. _____

1. PROJECT NO. 7220 2. DATE _____
 3. DRAWING NO. 7220-C-208 4. SPEC. NO. 7220-C-208

5. DRAWING NO. 7220 6. TESTED WEEK OF 10/15/77 to 10/21/77

7. DATE TAKEN	8. TEST NO.	9. TEST. ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	2279	"		6335		122.5	7.1	114.4	RD OMC ZONE	109.7	118.0	PASS 16ES
	2280	THRU		PAGE 4								
10/19/77	2284	RS	2283 SEE PAGE 4	628		122.3	10.1	111.1	55 N/A	109.7	107.2	PASS 18D
"	2285	"	8' W. OF WALL	633		118.4	5.2	110.3	55 N/A	109.7	110.3	PASS 16ES
"	2286	"	3' S. OF WALL	631		116.3	6.3	113.1	55 N/A	109.7	116.3	PASS 17-D
"	2287	"	8' E. OF S.E. CORNER	631		118.7	5.8	112.2	55 N/A	109.7	110.3	PASS 17-D
"	2288	"	3' W. OF S.E. CORNER	635		118.4	6.4	111.3	55 N/A	109.7	106.6	PASS 16ES
10/19/77	2290	PR	2' W. OF S.E. CORNER	628		119.6	7.4	111.4	55 N/A	109.7	107.1	PASS 10D

TEST FAILURE

Q.C. Rep. Notified
 Time & Date of Notification
 Reporting Person
 MD-22276 12/27/77



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 12/20/77

CONTROL NO. FILE NO.
ACCEPTANCE DATE
PAGE 3 OF 7

4. SPEC. NO. 7220-C-208

8. DRAWING NO. PLANT AREA

8. TESTED WEEK OF 10/15/77 TO 10/21/77

7. DATE TAKEN	8. TEST NO. MD	9. TEST. EL. BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC %	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/17/77	2257	PR	S. 4634 W. 5	629	—	131.5	9.6	120.0	277 13.4	121.0	99.2	SOIL REF. # 17-50 FAIL
"	2258	"	S. 4680 E. 8	631.5	—	136.0	13.1	120.2	277 13.4	121.0	99.3	PASS 17-D
10/17/77	2259	RS	42' E. 4340 E. W. 11 10" 98" PIPE	625	—	139.0	12.1	124.0	270 11.1	124.6	99.5	PASS 1 G
"	2260	"	S. 5190 E. 219	633.5	—	145.0	12.2	129.2	270 11.1	124.6	103.5	PASS 16 E
"	2261	"	141' N. 98" W. 41 STEAM TUNNEL	623	11-7-77	132.5	13.1	117.2	277 13.4	121.0	96.9	PASS 16 D
"	2262	"	S. 4360 E. 527	633	—	144.0	11.0	129.7	270 11.1	124.6	104.1	PASS 16 C
"	2263	"	S. 5 REACTOR W. END	634	—	151.5	4.8	144.5	279 5.7	140.8	102.6	PASS UNLOADING
"	2264	"	S. 5 REACTOR CENTER	634	—	155.0	4.6	148.2	279 5.7	140.8	105.3	PASS REACTION
10/18/77	2265	THR	2268 SEE S. 5268	PAGE	1							CRANS PART 00
"	2269	RS	E. 538 S. 5253	612	—	136.0	9.2	124.5	270 11.1	124.6	99.9	PASS 23 E
"	2270	"	E. 541 S. 5260	612	—	132.5	10.7	119.7	270 11.1	124.6	96.1	PASS 23 E
"	2271	"	E. 508	612	—	131.5	12.7	116.7	277 13.4	121.0	96.4	PASS 23 E

TEST FAILURE

QC. Rep. 1-011-01
Time & Date of Test
Reporting Person M.D. 2257
DATE OF TEST

SB 11020

3. *Dellet* 12/20/77
QC ACCEPTANCE DATE

CONTROL NO. _____ FILE NO. _____

PAGE 1 OF 7

COMPACTED FILL DENSITY TEST REPORT

2. DATE 12/20/77

1. PROJECT NO. 7220

4. SPEC. NO. 7220-C-208 8. DRAWING NO. PLANT AREA

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION (% RD)	19. REMARKS
10/15/77	2245	BT	40' S. of 10' W	626	—	115.2	6.7	108.0	RD 55	109.7/90.2	92.7	PASS 10E
10/15/77	2246	RS	15' E. of 6.0 SW. Edge WALL	621	—	109.6	3.4	106.0	RD 55	109.7/90.2	83.9	PASS 20G
10/15/77	2247	PR	3' N. of 10' W. PIPE 3' N. of 10' W. WALL	628	—	122.0	7.4	113.6	RD 55	109.7/90.2	115.9	PASS 0
"	2248	"	30' S. of 10' W. WALL 10' N. of 10' W. WALL	626	—	116.8	8.0	108.1	RD 55	109.7/90.2	93.1	PASS
"	2249	THRU	2264 SEE PAGE 3									
10/17/77	2265	PR	10' N. of 10' W. WALL	632	—	127.1	10.5	115.0	RD 55	109.7/90.2	121.3	PASS
"	2266	"	10' S. of 10' W. WALL	633	—	119.3	7.6	110.9	RD 55	109.7/90.2	105.0	PASS 10D
"	2267	"	10' E. of 10' W. WALL	626	—	122.1	6.2	115.0	RD 55	109.7/90.2	121.3	PASS
10/17/77	2268	RS	10' N. of 10' W. WALL	631.5	—	120.0	6.7	112.5	RD 55	109.7/90.2	111.5	PASS
"	2269	THRU	2273 SEE PAGE 4									
10/18/77	2274	RS	10' E. of 10' W. WALL	633	—	120.4	7.0	112.5	RD 55	109.7/90.2	111.5	PASS
10/18/77	2215	PR	10' N. of 10' W. WALL	5296	—	113.2	6.7	106.7	RD 55	109.7/90.2	84.3	PASS 17-E

20. PREPARED BY *R. Smith* DATE 11-7-77 RESPONSIBLE ENGINEER *R. Smith* DATE -5-77

10002 (3-73) 4 N. 4756 Report 11.2



COMPACTED FILL DENSITY TEST REPORT

3. S. Schmidt
QC ACCEPTANCE
DATE 9/29/78

CONTROL NO. _____
PAGE 2 OF 7

1. PROJECT NO. 7220
2. DATE 12/20/77

4. SPEC. NO. 7220-C-208
5. DRAWING NO. PLANT AREA
6. TESTED WEEK 09/15/77 to 10/21/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/15/77	MD	BT +	S. 4716	633	—	141.5	10.5	128.0	BMP OMC 20%	126.6	101.1	PASS 16D
"	2242	BS	N. 60	613.5	—	139.5	13.0	123.5	270 11.1	124.6	99.1	PASS 16E
"	2243	"	S. 6035	623	—	140.5	13.1	124.2	270 11.1	124.6	99.7	PASS 16E
"	2244	"	E. 767	SEE PAGE 1	—	—	—	—	—	—	—	—
"	2245	THRU	2248	SEE PAGE 1	—	—	—	—	—	—	—	—
"	2250	"	S. 5116	634	—	135.0	13.8	121.2	277 13.4	121.0	100.2	PASS 16E
"	2251	"	E. 230	629	—	139.0	14.5	124.5	277 13.4	121.0	102.9	PASS 16E
"	2253	"	S. 5163	632	—	141.5	13.0	125.2	271 10.1	126.6	98.9	PASS 16E
"	2255	"	E. 230	619.5	—	145.0	11.1	130.5	270 11.1	124.6	104.7	PASS 16E
"	2256	"	S. 5160	633	—	144.5	11.6	129.5	271 10.1	126.6	102.3	PASS 16E
"	2257	"	E. 230	633	—	144.5	11.6	129.5	271 10.1	126.6	102.3	PASS 16E
TEST FAILURE												

20. PREPARED BY: S. Schmidt
 DATE: 11-17-77
 RESPONSIBLE ENGINEER: S. Schmidt
 DATE: 1/15/77

QC-C1



COMPACTED FILL DENSITY TEST REPORT

3. 17/8/77
 QC ACCEPTANCE 30 DATE 17/8/77
 CONTROL NO. C-203 FILE NO.

1. PROJECT NO. 7220

2. DATE 11/2/77

PAGE 4 OF 4

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/9/77 to 10/14/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
<u>10/14/77</u>	<u>2239</u>	<u>RS</u>	<u>38" WOP W SIDE WALL UNDER 48" PIPE</u>	<u>619</u>	<u>-</u>	<u>111.6</u>	<u>5.0</u>	<u>106.3</u>	<u>RD, OMC ZONE</u> <u>55 N/A 2</u>	<u>109.7/90.2</u>	<u>85.2</u>	<u>PASS</u>

20. PREPARED BY B. Johnson

DATE 11/2/77

RESPONSIBLE ENGINEER Tom [Signature]

DATE 5-77

SB 11022



COMPACTED FILL DENSITY TEST REPORT

3. *D. Johnson* 12/18/77
 QC ACCEPTANCE DATE
 CONTROL NO. *31* FILE NO. *C-710.3*

1. PROJECT NO. 7220

2. DATE 11/2/77

PAGE 3 OF 4

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/9/77 To 10/14/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/13/77	2232	BJ PR	S. 4900 E. 736	633.5	-	137.0	13.2	121.0	BMP OMC ZONE	121.0	100.0	PASS 16G
"	2233	"	S. 6163 E. 169	614.5	-	140.0	14.8	122.0	277 13.4 1	121.0	100.8	PASS OUT OF AREA
10/14/77	2234	RS	W. 41 W. 3rd. TUN 136' N. OF AA	617	-	136.5	10.5	123.5	269 10.0 1	127.3	97.0	PASS 21-D
"	2235	"	W. 43 S. 4275 W. 5108 STEAM TUNNEL	631	-	143.0	12.2	127.5	270 11.1 1	124.6	102.3	PASS 17D
"	2236	"	W. 41 W. 3rd. TUN. 6' W	625	-	142.5	12.6	126.5	270 11.1 1	124.6	101.5	PASS
"	2237	"	60' N. OF AA	629	-	140.0	12.4	124.5	270 11.1 1	124.6	99.9	PASS IT-D
-	2238	SEE	PAGES 2 & 3									
10/14/77	2240	PR	S. 6160 E. 629	614.5	-	135.0	12.8	119.7	256 13.6 1	119.4	100.3	PASS 22 G
"	2241	"	W. 41 W. 3rd. TUN. 4' N. OF FIRE HYDRANT LINE	619.5	-	139.0	11.2	125.0	276 10.7 1	124.8	100.2	PASS

20. PREPARED: Robert Johnson

DATE 11/2/77

RESPONSIBLE ENGINEER: Tom Lutz

DATE: 1-5-77



COMPACTED FILL DENSITY TEST REPORT

3. *N.H. O'Brien* 12/8/77
 QC ACCEPTANCE DATE
 30 (C-210-1)
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 11/2/77

PAGE 2 OF 4

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/9/77 To 10/14/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/10/77	2213	RS	S. 4770 E. 572	628	-	123.3	9.0	113.1	RD OMC 2	109.7/90.2	113.9	PASS 18 G
"	2214	"	S. 4763 E. 597	628	-	120.8	7.8	112.1	55 N/A 2	109.7/90.2	109.9	PASS 18 G
10/11/77	2215	PR	30'S. OF N. WALL CLAMP BLDG. 30'E. OF W. WALL	631	-	123.4	8.2	114.0	55 N/A 2	109.7/90.2	117.4	PASS 17-C
-	2216 TURN 2219	SEE	PAGE 1	630.5								
10/12/77	2221	PR RS	29'E. OF S. WALL 21'N. OF RGT.	611	-	118.8	7.4	55043 710.6	E 661 55 N/A 2	109.7/90.2	103.8	PASS 16 G
"	2222	"	10'S. OF Q 4'W. OF I	625	-	119.5	7.6	111.1	55 N/A 2	109.7/90.2	105.8	PASS 19-E
"	2223	"	20'S. OF Q 17'W. OF I	625	-	121.2	7.4	112.8	55 N/A 2	109.7/90.2	112.3	PASS 19-E
-	2224 2225	SEE	PAGE 1									
10/13/77	2226	RS	12'N. OF N. WALL STEAM TUNNEL 40'E. OF S. WALL 20'S. OF N. STEAM TUNNEL WALL W. 53	630.5	-	117.2	7.1	109.4	55 N/A 2	109.7/90.2	98.7	PASS
"	2227	"	30'S. OF Q	631	-	124.6	8.1	115.3	55 N/A 2	109.7/90.2	122.5	PASS
"	2228	"	8'W. OF I.O	628	-	116.5	7.3	108.6	55 N/A 2	109.7/90.2	95.3	PASS 18 E
"	2229	"	30' OF Q 20'W. OF I.O	628.5	-	125.1	8.2	115.9	55 N/A 2	109.7/90.2	124.7	PASS 18 E
"	2230	"	35'E. OF E. WALL 3'W. S. 5'3" OF 48" PIPE	615	-	120.4	8.9	110.6	55 N/A 2	109.7/90.2	103.8	PASS 22 G
"	2231	"	53' N. OF R. WALL 5'W. S. 5'N. OF 48" PIPE	613	-	119.6	8.3	110.4	55 N/A 2	109.7/90.2	103.6	PASS 23 G
-	2232 TURN 2237	SEE	PAGE 3									
10/14/77	2238	RS	20'W. OF I.O 30'S. OF Q	630	-	118.8	7.1	110.9	55 N/A 2	109.7/90.2	108.2	PASS

20 PREPARED

BY B. Johnson

DATE 11/2/77

RESPONSIBLE ENGINEER

Jim Lutz

DATE

5-77



COMPACTED FILL DENSITY TEST REPORT

3. W. H. [Signature] 12/8/77
 QC ACCEPTANCE DATE
W C-210.3
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10/28/77

PAGE 1 OF 4

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/9/77 To 10/14/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/10/77	2209	RS	S. 5265 E. 100	633.5	-	136.5	13.3	120.5	BMP OMC ZONE	121.0	99.6	PASS 16E
"	2212	"	S. 5635 E. 149	608	-	144.5	12.5	128.5	277 13.4 1	121.0	106.2	PASS IN 16E
-	2213 THRU 2215	SEE	PAGE 2									
10/12/77	2216	RS	KP LINE 4' W. OF 0.4 LINE	612	-	137.5	14.4	120.2	277 13.4 1	121.0	99.3	PASS 23D
"	2217	"	KP LINE 4' W. OF 0.4 LINE	612	-	137.5	13.6	121.0	277 13.4 1	121.0	100.0	PASS 23D
"	2218	"	HT LINE 4' W. OF 0.4 LINE	612	-	145.5	11.5	130.5	277 13.4 1	121.0	107.9	PASS 23D
"	2219	"	20' S. OF N. WALL 4' W. OF W. WALL EVAR BLDG.	629	-	146.0	10.9	131.7	297 9.0 1	131.6	100.1	PASS 17-C
-	2220 THRU 2223	SEE	PAGE 2									
10/12/77	2224	RS	42' S. OF N. WALL EVAR BLDG. 5' W. 5' W. OF W. WALL	627	-	147.5	10.1	134.0	297 9.0 1	131.6	101.8	PASS
10/13/77	2225	RS	S. 4843 E. 645	632	-	137.0	9.9	124.7	269 10.0 1	127.3	98.0	PASS 16G
	2226 THRU 2227											
	22	AS										

TEST FAILURE

Q.C. Rep. No. _____
 Time & Date of Test _____
 Reporting Person Asst. Insp. DC & OF TEST
 MD. 2210

20. PREPARED BY B. Johnson

DATE 11/2/77

RESPONSIBLE ENGINEER John [Signature]

DATE 1-5-77



COMPACTED FILL DENSITY TEST REPORT

3. *OC* *12/8/77*
 QC ACCEPTANCE DATE
 30 C-210.3
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10/26/77

PAGE 5 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 10/16/77 TO 10/18/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS		
10/6/77	2190	RS	6' R.D.F. N. WALL TUNNEL WALL	621	-	139.0	11.6	124.5	BMP OMC Zone	270 11.1	1	124.6	99.9	PASS
	2193		S. 422	633	-	144.0	12.9	127.5	270 11.1	1	124.6	102.3	PASS	16E5
	2194		6' R.D.F. N. WALL STEAM TUNNEL WALL	624	-	141.0	12.8	125.0	277 13.4	1	121.0	104.7	PASS	16E
	2196		5' R.D.F. N. WALL OF STEAM TUNNEL WALL	626	-	135.5	13.4	119.5	270 11.1	1	124.6	103.9	PASS	17E
	2197	SEE	PAGE 4											
	2201	RS	S. 2155 E. 425	633.5	-	147.0	9.3	134.5	297 9.0	1	131.6	102.2	PASS	?
	2202		S. 5151 E. 407	633.5	-	140.5	12.2	125.2	270 11.1	1	124.6	100.5	PASS	16E
	2203		6' R.D.F. N. WALL OF STEAM TUNNEL EW LOC.	627	-	143.0	10.7	129.2	270 11.1	1	124.6	103.7	PASS	

20. PREPARED nature) B. Johnson DATE 10/25/77 RESPONSIBLE ENGINEER Tom Link DATE 5-77
 10002 (3-73) 11-2-77 QC-C1



COMPACTED FILL DENSITY TEST REPORT

3. John 11/8/77
 QC ACCEPTANCE DATE
30
 CONTROL NO. FILE NO. C-210.9

1. PROJECT NO. 72202. DATE 10/26/77PAGE 4 OF 54. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 10/17/77 To 10/18/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/5/77	2188	BT	10'S. OF MANHOLE #16	628	-	124.1	8.1	114.8	RD OMC ZONE	109.7/90.2	120.5	PASS 18D
"	2189	"	15'S. OF MANHOLE #16	627	-	117.2	6.7	109.8	55 N/A 2	109.7/90.2	100.4	PASS 18D
-	2190 2191 2194	SEE	PAGE 5									
10/6/77	2197	RS	42'S. OF Q 4' W. OF 10.0	625	-	117.1	6.7	109.7	55 N/A 2	109.7/90.2	100.0	PASS 19-E
"	2198	"	60' CONT. #2 4' N. OF W. ELECT. DUCT	628	-	117.3	7.1	109.5	55 N/A 2	109.7/90.2	99.2	PASS
"	2199	"	60' CONT. #2 4'S. OF E. ELECT. DUCT.	627	-	119.4	7.6	111.0	55 N/A 2	109.7/90.2	105.4	PASS
"	2200	"	12' N. OF MANHOLE #16	627.5	-	116.3	6.8	108.9	55 N/A 2	109.7/90.2	96.6	PASS 18D
-	2201 2202	SEE	PAGE 5									
10/8/77	2204	BT	8' W. OF 3.0 120'S. OF Q	632	-	123.6	7.2	115.3	55 N/A 2	109.7/90.2	122.5	PASS 16 ^S E
"	2205	"	3'E. OF 3.0 125'S. OF Q	632	-	122.1	9.0	112.0	55 N/A 2	109.7/90.2	109.5	PASS 16 ^S E
10/8/77	2206	RS	21' N. OF N. SIDE MANHOLE #16	628	-	125.9	12.6	111.8	55 N/A 2	109.7/90.2	108.7	PASS 18D
"	2207	"	8' BETWEEN WATER METER MANHOLES	632	-	125.0	9.0	114.7	55 N/A 2	109.7/90.2	120.2	PASS
"	2208	"	17' N. OF MANHOLE #16	630	-	119.4	8.1	110.5	55 N/A 2	109.7/90.2	103.5	PASS

SB 11:27

20. PREPARED BY Bill Johnson DATE 10/26/77RESPONSIBLE ENGINEER John SmithDATE 11-2-77



COMPACTED FILL DENSITY TEST REPORT

3. N. H. H. 12/8/77
 QC ACCEPTANCE DATE
30 C-210.5
 CONTROL NO. FILE NO.

1. PROJECT NO. 72202. DATE 10/25/77PAGE 3 OF 54. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 10/2/77 To 10/8/77

7. DATE TAKEN	8. TEST NO. MD.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/5/77	2176	RS	W. OF STEAM TUNNEL W. OF 116' N. OF AA	617	-	135.0	17.7	114.7	BMP OMC ZONE	121.0	94.8	81-D FAILED NOW R.D.P.
"	2177	"	W. OF STEAM TUNNEL W. OF 116' N. OF AA	625	-	145.0	12.7	128.7	277 13.4 1	121.0	106.4	PASS
"	2178	"	W. OF STEAM TUNNEL W. OF 94' N. OF AA	629	-	144.0	13.4	127.0	277 13.4 1	121.0	105.0	PASS 17-D
		SEE	PAGE 2									
10/5/77	2182	BT	S. 5087 E. 562	633.5	-	143.0	13.5	126.0	277 13.4 1	121.0	104.1	PASS 16G
"	2183	"	S. 5150 E. 400	629	-	143.0	12.9	126.7	277 13.4 1	121.0	104.7	PASS 17-E
							13.1	128.2	277 13.4 1	121.0		
"	2185	"	15' N. OF B. LINE 25' N. OF M. W. COR. STEAM TUNNEL 12' N. OF B. LINE	619	-	144.5	12.7	128.2	277 13.4 1	121.0	106.0	PASS
"	2186	"	20' E. OF FAN COIL STEAM TUNNEL 7' N. OF B. LINE	621	-	139.5	13.4	123.0	277 13.4 1	121.0	101.7	PASS 20D
"	2187	"	20' E. OF M. W. COR. STEAM TUNNEL	623	-	142.0	13.4	125.2	277 13.4 1	121.0	103.5	PASS 19-D

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person Notified DATE OF TEST
MD - 2176

20. PREPARED BY gretel B. Johnson DATE 10/25/77RESPONSIBLE ENGINEER Tom Sait DATE 11-5-7782011
1128



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 30 DATE 10/25/77
 CONTROL NO. 30 FILE NO. C-210.3

1. PROJECT NO. 72202. DATE 10/25/77PAGE 2 OF 54. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 10/2/77 to 10/8/77

7. DATE TAKEN	8. TEST NO. MD.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10/3/77	2157	RS PR	4' S. OF A LINE 8' OF 8" SEWER N.E. OF MANHOLE	625	-	125.4	11.9	112.1	RD OMC ZONE 55 N/A 2	109.7/90.2	109.8	PASS
10/3/77	2158	BJ	7' E. OF 15" LINE 6' S. OF H LINE STEAM TUNNEL	633	-	115.6	7.5	107.5	55 N/A 2	109.7/90.2	90.5	PASS
-	2159	"	8' W. OF N. 4" W 15' E. OF MAN. COR. STEAM TUNNEL	615	-	122.9	5.7	116.3	55 N/A 2	109.7/90.2	126.2	PASS
-	2160 THRU 2165	SEE	PAGE 1									
10/4/77	2166	RS	17' S. OF MANHOLE 7' 4" W. OF DUCT	624	-	121.7	8.3	112.4	55 N/A 2	109.7/90.2	111.1	PASS
-	2167	"	80' CONT. 2 W. E. OF DUCT. DUCT. APPROX. 100' OF PIPE	625.5	-	125.7	6.2	118.4	55 N/A 2	109.7/90.2	134.0	PASS
-	2168 THRU 2170	SEE	PAGE 1									
10/4/77	2171	BT	MANHOLE #16	624	-	122.2	8.1	113.0	55 N/A 2	109.7/90.2	113.5	PASS
-	2172	"	MANHOLE #7	628	-	130.2	11.1	117.2	55 N/A 2	109.7/90.2	129.6	PASS
-	2173	"	TRANSFORMER PIT 100' E. OF UNIT 2	625	-	128.5	7.4	119.6	55 N/A 2	109.7/90.2	138.3	PASS
-	2174	"	MANHOLE #16	626	-	125.9	10.3	114.1	55 N/A 2	109.7/90.2	117.8	PASS
-	2175	"	TRANSFORMER PIT 100' E. OF UNIT 2	627	-	118.4	7.4	110.0	55 N/A 2	109.7/90.2	101.3	PASS
-	2176 THRU 2178	SEE	PAGE 3									
10/5/77	2179	RS	4' 25" S. OF R. STEAM TUNNEL	613	-	122.4	8.8	112.5	55 N/A 2	109.7/90.2	111.5	PASS
-	2180	"	4' S. OF EL. RISER 140' E. OF 12" LINE 76" CONT. 2	627	-	124.0	11.2	111.5	55 N/A 2	109.7/90.2	107.1	PASS
-	2181	"	40' S. OF Q 4' W. OF 14" C	624.5	-	128.9	11.4	115.7	55 N/A 2	109.7/90.2	124.0	PASS

20. PREPARED BY

nature) B. JohnsonDATE 10/25/77

RESPONSIBLE ENGINEER

J. G. Link

DATE

5-77

SB 11029



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220 2. DATE 10/24/77 3. CONTROL NO. 30 4. DRAWING NO. PLANT AREA 5. TESTED WEEK OF 10/2/77 TO 10/8/77 6. DATE 12/17/77 7. FILE NO. 0-2108 8. PAGE 1 OF 5

9. DATE TAKEN	10. TEST NO. AD.	11. TESTED BY	12. LOCATION	13. ELEV. OF TEST	14. DEPTH BELOW FINAL GRADE (FT.)	15. IN PLACE WET DENSITY (LB./C.F.)	16. MOISTURE CONTENT (%)	17. IN PLACE DRY DENSITY (LB./C.F.)	18. SOIL CLASSIFICATION	19. MAX. LAB. DRY DENSITY (LB./C.F.)	20. PERCENT COMPACTION	21. REMARKS
10/3/77	2151	AS	S. 3282	633.5	-	143.0	13.9	125.5	277 13.4 1	121.0	103.7	Pass S 16E
"	2152	PA.	E. 282	633.6	-	142.0	13.0	125.7	277 13.4 1	121.0	103.9	Pass S 16E
"	2153	"	S. 5308									
"	2154	"	E. 205									
"	2155	"	S. 5360	628	-	140.5	14.0	123.2	277 13.4 1	121.0	101.8	Pass 18E
"	2156	"	E. 435	632.5	-	140.5	12.4	125.0	277 13.4 1	121.0	103.3	Pass S 16E
"	2157	"	S. 5074									
"	2158	"	E. 552									
"	2159	"	S. 5074									
"	2160	"	E. 100									
"	2161	"	S. 3022	632.5	-	135.5	13.2	119.7	277 13.4 1	121.0	98.9	Pass 17E
"	2162	"	S. 5336	633.5	-	142.5	12.9	126.2	277 13.4 1	121.0	104.3	Pass S 16E
"	2163	"	E. 387	633.5	-	145.0	15.4	125.7	277 13.4 1	121.0	103.9	Pass 18E
"	2164	"	S. 5324	629	-	141.5	13.6	124.6	277 13.4 1	121.0	103.0	Pass S 16E
"	2165	"	E. 280	633	-	145.0	12.8	128.5	270 11.1 1	124.6	103.1	Pass S 16E
"	2166	"	S. 4960									
"	2167	"	E. 830									
"	2168	"	S. 5355									
"	2169	"	E. 421									
"	2170	"	SEE PAGE 2									
"	2171	"	S. 5030	633	-	142.0	13.1	125.5	277 13.4 1	121.0	103.7	Pass 16G
"	2172	"	E. 612	633	-	142.5	13.8	125.2	277 13.4 1	121.0	103.5	Pass S 16E
"	2173	"	S. 5388									
"	2174	"	E. 220									
"	2175	"	S. 5000									
"	2176	"	E. 657	633.5	-	142.5	12.5	126.7	277 13.4 1	121.0	104.7	Pass 16G

20. PREPARED BY: B. Spalmer DATE: 10/24/77 RESPONSIBLE ENGINEER: B. Spalmer DATE: 10/24/77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 10/27/77 DATE
 CONTROL NO. 30 FILE NO. C 210.3

1. PROJECT NO. 72202. DATE 10/17/77PAGE 5 OF 54. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 9/25/77 To 10/1/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/30/77	2144	RS.	W. 1/4 136 W. OF AA W. OF STEAM TUNNEL	615	-	139.5	14.3	122.0	APP OMC ZONE 277 13.4 1	121.0	100.8	PASS 720
	2145	-	W. 1/4 34 W. OF AA STEAM TUNNEL	628	-	138.0	12.5	122.7	271 13.4 1	121.0	101.4	PASS 180
	2146	-	S. 5282 E. 569	632	-	146.5	11.8	131.0	260 10.6 1	129.8	100.9	PASS 16 G
	2147	-	S. 5282 E. 296	6335	-	139.5	13.2	123.2	277 13.4 1	121.0	101.8	PASS 16 E
	2148	-	S. 5313 E. 145	6325	-	141.0 + 126.0 ^{as} 10/17/77	11.5	126.5	270 11.1 1	124.6	101.5	PASS 16 E
	2149	-	S. 5080 E. 614	632	-	143.0	10.4	129.5	260 10.6 1	129.8	99.8	PASS 16 G

20. PREPARED BY

J. J. Johnson

DATE 10/17/77

RESPONSIBLE ENGINEER

Tom Lutz

DATE

10/15/77

11031



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 10/17/77

PAGE 4 OF 5

4. SPEC. NO. 7220-C-208 5. DRAWING NO. PLANT AREA

8. TESTED WEEK OF 9/25/77 To 10/1/77

DATE TAKEN	TEST NO.	TESTED BY	LOCATION	ELEV. OF TEST	DEPTH BELOW GRADE (FT.)	IN PLACE WET DENSITY (LB./C.F.)	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (LB./C.F.)	SOIL CLASSIFICATION	MAX. LAB. DRY DENSITY (LB./C.F.)	PERCENT COMPACTION	REMARKS
9/20/77	2124	RS	S. 3395 E. 309	6215	-	138.5	10.8	125.0	BMP OMC ZONE	124.6	103	PASS 20E
	2127		15' E 2130-20' W 2128 15' W 2130-20' E 2128 OF MHP.	6265	-	137.0	14.4	119.8	277 13.4 1	121.0	99.0	PASS 18F
	2128	SEE	Page 2									
	2134		12' W 2135 SECTION OF MHP 20' W. OF S. OF CORNER MHP.	6235	-	139.0	13.0	123.0	277 13.4 1	121.0	101.7	PASS
	2135		5' W. OF S. OF CORNER MHP. 68.5' OF S. W. CORNER MHP.	632	NEED TO BE PLOWED ON	143.0	13.9	123.3	277 13.4 1	121.0	103.7	PASS 16C
	2136		376.05 S. OF 2' E. OF AN OF MHP.	6315	-	140.0	11.8	125.2	270 11.1 1	124.6	100.5	PASS
9/21/77	2137	KM	S. 3270 E. 320	633	-	138.0	12.4	122.8	270 11.1 1	124.6	98.6	PASS 16E
	2138	"	S. 5266 E. 249	633	-	143.0	11.5	128.3	270 11.1 1	124.6	103.0	PASS 16E
9/30/77	2140	RS	S. 5353 E. 133	6285	-	149.0	11.4	133.7	260 10.6 12	129.8	103.0	PASS 18E
"	2141	"	S. 5376 E. 269	628	-	139.5	11.9	124.7	270 11.1 1	124.6	100.1	PASS 18E
"	2142	"	12' W 2137 OF AN S. OF STREAM TUNNEL	626	-	141.0	14.6	123.0	277 13.4 1	121.0	101.7	PASS 18D
"	2143	"	11' W 2137 OF AN S. OF STREAM TUNNEL	622	-	145.0	12.0	129.5	277 13.4 1	121.0	107.0	PASS 20D

53 11-32



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 10/17/77

3. DEW CONTROL NO. 30 FILE NO. C-210.3

PAGE 3 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/25/77 TO 9/30/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	2107	MD	S. 5385	617	-	143.5	14.6	125.2	AMP AMP ZONE	121.0	103.5	PASS 21-E
	2108	E. 5302	S. 5302	628	-	142.0	13.0	125.7	277 13.4 1	121.0	103.9	PASS 18-E
	2109	E. 5376	S. 5376	622.5	-	140.5	11.8	125.7	277 13.4 1	121.0	103.7	PASS 20-E
	2110	E. 5409	S. 5409	617.5	-	143.0	10.3	129.7	297 9.0 1	131.6	98.6	PASS 21-E
	2111	E. 5277	S. 5277	627.5	-	147.5	11.7	132.0	270 11.1 1	124.6	105.9	PASS 18-E
	2112	E. 5366	S. 5366	622	-	140.5	12.2	126.3	277 13.4 1	121.0	103.6	PASS 20-E
	2113	E. 5370	S. 5370	624	-	139.5	10.3	126.5	270 11.1 1	124.6	101.5	PASS 11L
	2114	E. 5344	S. 5344	617	-	133.5	13.1	118.0	277 13.4 1	121.0	97.5	PASS 21D
	2115	E. 5368	S. 5368	622	-	140.0	11.3	125.8	270 11.1 1	124.6	101.0	PASS 20E
	2116	E. 5370	S. 5370	619	-	144.0	13.2	127.3	277 13.4 1	121.0	105.2	PASS 21D
	2117	E. 5370	S. 5370	621	-	141.0	13.3	124.5	277 13.4 1	121.0	102.9	PASS 21D
	2118	E. 5350	S. 5350	620	-	138.5	13.1	122.5	277 13.4 1	121.0	101.2	PASS 21D
	2119	E. 237	S. 237	625.5	-	143.0	12.6	127.0	270 11.1 1	124.6	101.9	PASS 19E
	2120	E. 5382	S. 5382	620	-	137.5	12.8	121.5	277 13.4 1	121.0	101.4	PASS 17-D
	2121	E. 5382	S. 5382	627	-	139.5	13.4	123.0	277 13.4 1	121.0	101.7	PASS 18D
	2122	E. 5382	S. 5382	621	-	142.5	12.2	127.0	277 13.4 1	121.0	105.0	PASS 20D
	2123	E. 275	S. 275	623	-	141.5	11.9	126.5	270 11.1 1	124.6	101.5	PASS 19E

20. PREPARED BY E. Johnson DATE 10/17/77 RESPONSIBLE ENGINEER John S. Gind DATE 10/17/77

10082 (3-73) 60-60-21819 PERM



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 30 DATE 10/27/77
 CONTROL NO. C 210.3 FILE NO.

1. PROJECT NO. 7220

2. DATE 10/17/77

PAGE 2 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/25/77 To 10/1/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/26/77	2101	RS	8' S. OF 7.0 2' E. OF EUMP. ALDO. N.E. OF 13 LINE	633.5	-	129.7	104	117.5	RD OMC ZONE	109.7/90.2	130.7	PASS
9/26/77	2102	RS	8' S. OF 7.0 2' E. OF EUMP. ALDO. N.E. OF 13 LINE	633.5	-	129.7	104	117.5	RD OMC ZONE	109.7/90.2	130.7	PASS
9/26/77	2103	RS	4.5' OF 7 LINE	633.5	-	129.7	104	117.5	RD OMC ZONE	109.7/90.2	130.7	PASS
	2103	SEE	PAGES 163									
9/28/77	2128	KM	100' OF 12 LINE 30' N. OF 11 LINE OVER DUCT LINE 100' OF 12 LINE WATER RET. WALL 5' W. OF 11 LINE 10' S. OF 12 LINE WATER STANT. 45' WEST	626	-	121.1	7.5	112.7	55 N/A 2	109.7/90.2	112.3	PASS
"	2129	"	100' OF 12 LINE 30' N. OF 11 LINE OVER DUCT LINE 100' OF 12 LINE WATER RET. WALL 5' W. OF 11 LINE 10' S. OF 12 LINE WATER STANT. 45' WEST	626	-	121.7	4.98	122.7	55 N/A 2	109.7/90.2	111.9	PASS 18G
"	2130	"	100' OF 12 LINE 30' N. OF 11 LINE OVER DUCT LINE 100' OF 12 LINE WATER RET. WALL 5' W. OF 11 LINE 10' S. OF 12 LINE WATER STANT. 45' WEST	627	-	122.9	8.7	113.1	55 N/A 2	109.7/90.2	113.9	PASS 18G
9/29/77	2131	RS	100' OF 12 LINE 30' N. OF 11 LINE NEXT TO DUCT	628	-	119.2	8.3	110.1	55 N/A 2	109.7/90.2	101.7	PASS
	2132	SEE	PAGES 564									
9/30/77	2150	KM	80' W. OF 7.0 LINE 10' S. OF 11 LINE CENTER 24" PIPE 5' W. OF 11 LINE 15' S. OF 11 LINE OVER DUCT	625	-	133.5	5.9	126.1	N/A B.J. 10/17/77			
9/30/77	2150	KM	80' W. OF 7.0 LINE 10' S. OF 11 LINE CENTER 24" PIPE 5' W. OF 11 LINE 15' S. OF 11 LINE OVER DUCT	625	-	124.6	9.1	114.2	55 N/A 2	109.7/90.2	118.2	PASS 19-E

20. PREPARED BY B. Johnson DATE 10/17/77 RESPONSIBLE ENGINEER Don Lutz DATE 10/27/77

SB 11-34



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE DATE 10/27/77
 CONTROL NO. 30 C 210.3 FILE NO. _____

1. PROJECT NO. 72202. DATE 10/11/77PAGE 1 OF 54. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 9/25/77 to 10/11/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
						144.5	10.7	130.5	8MP OMC ZONE			
						135.0	12.5	120.0	260 10.6 1	129.8	100.5	FAIL 17-E
	2095		S. 5395 E. 417	617.5	-	131.5	12.9	116.5	277 13.4 1	121.0	96.3	PASS 21-E
	2096		S. 5398 E. 330	615.5	-	136.0	13.6	119.8	277 13.4 1	121.0	99.0	PASS 22-E
9/26/77	2097	RS	S. 5272 E. 169	625.5	-	146.5	14.3	128.2	260 10.6 1	129.8	98.8	FAILED 18-E
	2098		S. 5285 E. 207	625.0	-	140.5	11.5	126.0	260 10.6 1	129.8	97.1	PASS 19-E
	2099		S. 5320 E. 345	626.5	-	143.5	13.9	126.0	277 13.4 1	121.0	104.1	PASS 18-E
	2100		S. 5272 E. 169	625.5	-	145.0	11.3	130.2	260 10.6 1	129.8	100.3	PASS 19-E
	2101 THRU 2103	SEE	PAGE 2									
9/27/77	2104	R.S.	S. 5552 E. 362	628.5	-	143.0	13.3	126.2	277 13.4 1	121.0	104.3	PASS 518E
	2105	R.S.	S. 5262 E. 278	632	-	141.5	12.3	126.0	277 13.4 1	121.0	104.1	PASS 316E
	2106	R.S.	S. 5402 E. 306	612.5	-	142.5	12.9	126.2	277 13.4 1	121.0	104.3	PASS 23E

TEST FAILURE

Q.C. Rep. Notified _____

Time & Date of Notification _____

Reporting Person Notified DATE OF TESTMD-2097

20. PREPARED

Patricia A. JohnsonDATE 10/11/77

RESPONSIBLE ENGINEER

Don Lutz

DATE

12/1/77



COMPACTED FILL DENSITY TEST REPORT

3. QC ACCEPTANCE 10/6/77
DATE
30 C.2103
CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10/10/77

PAGE 2 OF 6

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/17/77 To 9/24/77

7. DATE TAKEN	8. TEST NO.	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX / MIN. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	MD.		<u>PIPE L.D.</u>						<u>RD OMC ZONE</u>		<u>AS%RD</u>	
	<u>2037</u> <u>TRAV</u> <u>2074</u>	<u>SEE PAGES</u>	<u>3E4</u>									<u>PASS 16C</u>
<u>9/20</u>	<u>2076</u> <u>TRAV</u> <u>2096</u>	<u>SEE PAGE 5</u>	<u>PIPE L.D.</u>									<u>16C</u>
<u>9/17/2077</u>				<u>133.5</u>		<u>122.6</u>	<u>8.8</u>	<u>112.7</u>	<u>53 N/A</u>	<u>2 109.7/90.2</u>	<u>77</u>	<u>PASS 16C</u>
						<u>125.8</u>	<u>8.4</u>	<u>116.7</u>	<u>53 N/A</u>	<u>2 109.7/90.2</u>	<u>77</u>	<u>PASS 16C</u>

20. PREPARED B. Johnson

DATE 10/10/77

RESPONSIBLE ENGINEER Jim Sub

DATE 10/10/77



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 10/10/77

PAGE 6 OF 6

3. QC ACCEPTANCE TO C-10.3 DATE 10/27/77 CONTROL NO. FILE NO.

4. SPEC. NO. 7220-C-208 5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/17/77 To 9/24/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/23/77	2088	KM	90'S. OF 90+1000 5' FROM E. SIDE OF STATION	621	-	140.5	12.9	124.5	OMP OMC ZONE 277 13.4 1	121.0	102.9	Pass 200
9/23/77	2089	BT	3'S. OF G 5' W. OF I.O.	620	-	145.5	11.5	130.5	270 11.1 1	124.6	104.7	Pass 200
"	2090	"	WEST 0 60' N. OF AA	625	-	143.5	12.5	127.5	270 11.1 1	124.6	102.3	Pass 19-D

20. PREPARED BY: [Signature] DATE: 10/10/77
 RESPONSIBLE ENGINEER: [Signature] DATE: 10/17/77
 10002 (3-73) C-10.3-10.3



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 30 DATE 10/11/77
 CONTROL NO. 0-2103 FILE NO.

1. PROJECT NO. 7220

2. DATE 10/10/77

PAGE 5 OF 6

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/17/77 TO 9/24/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/22/77	2076	RS	E. 370	625.5	-	140.5	11.1	126.5	BMP CONC ZONE	127.3	99.4	PASS 17-E
"	2077	"	S. 5345 E. 355	625.5	-	143.5	10.8	129.5	269 10.0 1	127.3	101.7	PASS 19-E
"	2078	"	0.4 PA E. EDGE OF FOOTING	613	-	138.5	16.7	118.7	270 11.1 1	124.6	95.7	FAILED IMPROV SOIL
"	2079	"	0.4 PA W. EDGE OF FOOTING	613	-	144.5	13.3	127.5	269 10.0 1	127.3	101.6	FAILED excav on
"	2080	"	S. 5300 E. 225	6235	-	143.0	12.9	126.7	270 11.1 1	124.2	101.7	PASS 19E
"	2081	"	S. 5290 E. 317	6285	-	146.0	12.3	130.0	270 11.1 1	124.6	104.3	PASS 18E
"	2082	"	S. 5355 E. 245	621.5	-	141.0	13.1	124.7	270 11.1 1	124.6	100.1	PASS 20E
"	2083	"	S. 5320 E. 325	621	-	144.5	11.6	129.5	270 11.1 1	124.6	103.9	PASS 19E
"	2084	"	MIPS 45'S OF S.W. COR 5' W. OF WALL	626	-	138.5	13.3	122.2	277 13.4 1	121.0	101.0	PASS 18C
9/23/77	2085	KM	50'S. OF 90' W. E. OF E. WALL STEAM TUNNEL	618	-	142.5	15.1	123.8	277 13.4 1	121.0	102.3	PASS ?
9/23/77	2086	"	30'S. OF 90' W. E. OF E. WALL STEAM TUNNEL	620	-	138.5	13.3	122.3	277 13.4 1	121.0	101.1	PASS 19D
"	2087	"	15'S. OF 90' W. E. OF E. WALL STEAM TUNNEL	615	-	133.5	12.2	119.0	277 13.4 1	121.0	98.3	PASS

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person NOTIFIED DATE OF TEST _____
MR-2078 MR-2079



COMPACTED FILL DENSITY TEST REPORT

SB 1100

3. *Dr. Behr*
QC ACCEPTANCE *JO* DATE *10/27/77*
CONTROL NO. *C 260.3* FILE NO. *6*

2. DATE *10/17/77*

1. PROJECT NO. *7220*

4. SPEC. NO.	5. TEST NO.	6. TESTED BY	7. LOCATION	8. ELEV. OF TEST	9. DEPTH BELOW FINAL GRADE (FT.)	10. IN PLACE WET DENSITY (LB./C.F.)	11. MOISTURE CONTENT (%)	12. IN PLACE DRY DENSITY (LB./C.F.)	13. SOIL CLASSIFICATION	14. MAX. LAB. DRY DENSITY (LB./C.F.)	15. PERCENT COMPACTION	16. REMARKS
7220-C-208	2063	KM	<i>WORMHOLE ST. Pk. 0.5 mi. S. of Steam Tunnel</i>	618	-	141.0	14.4	123.3	277 13.4 1	121.0	101.9	Pass 21-D
	2064		<i>STEAM TUNNEL 100' N. OF ST. PK. 0.5 MI. S. OF ST. PK.</i>	620	-	140.5	12.9	124.5	277 13.4 1	121.0	102.9	Pass
	2065	RS	<i>S 5840</i>	622	-	148.5	10.4	134.5	260 10.6 1	129.8	109.6	Pass 20E
	2066		<i>E 370</i>	621.5	-	148.5	10.4	134.5	260 10.6 1	129.8	103.6	Pass 20E
	2067		<i>S 5313</i>	624	-	145.5	11.3	130.7	260 10.6 1	129.8	101.7	Pass 19-E
	2068		<i>E 380</i>	627	-	142.0	12.9	124.0	270 11.1 1	124.6	99.5	Pass 18P
	2069		<i>S 5291</i>	619	-	145.5	11.9	130.0	260 10.6 1	129.8	108.2	21-E
	2070		<i>S 5291</i>	619	-	143.5	12.3	114.7	260 10.6 1	129.8	98.2	21-E
	2071		<i>S 5291</i>	619	-	142.5	11.8	123.0	260 10.6 1	129.8	98.2	21-E
	2072		<i>S 3287</i>	627.5	-	142.5	11.8	127.5	260 10.6 1	129.8	98.2	Pass 20E
	2073		<i>E 4251</i>	617	-	137.5	17.5	117.0	262 11.8 1	123.9	94.4	INFO ONLY
	2074		<i>6'S</i>	617	-	142.5	18.3	120.5	262 11.8 1	123.9	97.3	FAILED SOIL TEST
			<i>0.4 PA</i>		-							INFO ONLY
					-							FAILED SOIL TEST

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person *Notified* DATE *10/27/77*
MD-2070, 2071, 2073, 2074



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 10/17/77 DATE 10/17/77
 CONTROL NO. 30 FILE NO. C-2103

1. PROJECT NO. 72202. DATE 10/7/77PAGE 3 OF 64. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA6. TESTED WEEK OF 9/17/77 To 9/24/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/19/77	2051	KM	PA 04 0.4	622	—	145.5	13.1	128.6	BMP OMC 20% 262 11.8 1	123.9	103.8	PASS
9/19/77	2052	RS	2' OFF SIDE OF FOOTING 2' S OF W SIDE SEMI-PIPE BRK 0.4	622	—	130.0	19.5	108.5	278 15.2 1	117.0	92.7	FAILED
"	2053	"	Admin Bldg. MP 0.4	622	—	139.0	15.7	119.2	270 11.1 1	124.6	95.7	FAILED
"	2054	"	Admin Bldg PA 0.4	622	—	137.0	16.6	117.5	262 11.8 1	123.9	94.8	FAILED
"	2055	"	Admin Bldg. S. 5350	622	—	141.5	16.2	121.7	262 11.8 1	123.9	98.2	FAILED
"	2056	"	E. 355	620	—	146.5	11.4	131.5	260 10.6 1	129.8	101.3	PASS 20E
"	2057	"	S. 5280 E. 322	624.5	—	146.0	11.0	131.5	260 10.6 1	129.8	101.3	PASS 19-E
"	2058	"	S. 5290 E. 210	612.5	—	140.0	12.7	124.3	276 10.7 1	124.8	99.6	PASS 21-E
9/24/77	2059	KM	S. 5370 E. 460	627	—	142.5	14.2	124.8	277 13.4 1	121.0	103.1	PASS 18E
"	2060	"	S. 5370 E. 460	612.5	—	139.5	14.6	121.8	277 13.4 1	121.0	100.1	PASS 23E
"	2061	"	2' OFF SIDE OF STEAM TUNNEL 1' W OF S.P. EXTEN. 3' OFF SIDE OF STEAM TUNNEL	628	—	142.5	13.3	125.8	277 13.4 1	121.0	104.0	PASS 18D
"	2062	"	OF STEAM TUNNEL	615	—	138.5	12.8	122.8	277 13.4 1	121.0	101.5	PASS

TEST FAILURE

Q.C. Rep. Notified _____

Time & Date of Notification _____

Reporting Person: NOTIFIED DATE OF TESTMD-2052, 2053, 2054, 2055 (soil removed)

20. PREPARED

signature: B. JohnsonDATE 10/7/77

RESPONSIBLE ENGINEER

signature: John Yule

DATE

10/17/77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE
CONTROL NO. 30
FILE NO. _____

1. PROJECT NO. 72202. DATE 10/6/77PAGE 1 OF 64. SPEC. NO. 7220-C-2085. DRAWING NO. PLANT AREA8. TESTED WEEK OF 9/17/77 to 9/24/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FICAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/17/77	2032	BT	S. 5350	6155	—	142.0	13.9	124.7	BMP OMC ZONE	121.0	103.1	PASS 22E
"	2033	—	S. 5305	6130.5	—	142.0	12.7	126.0	277 13.4 1	121.0	104.1	PASS 17E
9/17/77	2034	—	E. 376	617.5	—	145.5	11.5	130.5	270 11.1 1	124.6	104.7	PASS 21-E
9/17/77	2040	—	S. 5286	617	—	142.5	12.0	127.2	277 13.4 1	121.0	105.1	PASS 21-E
9/17/77	2041	—	E. 215	617	—	142.5	12.0	127.2	277 13.4 1	121.0	105.1	PASS 21-E
9/17/77	2041	—	S. 5310	619	—	145.5	11.3	130.7	270 11.1 1	124.6	104.9	PASS 21-E
"	2042	—	80' E. OF	634	—	140.5	14.0	123.2	277 13.4 1	121.0	101.8	PASS
"	2043	—	S. 5455	606	—	144.5	12.0	129.0	270 11.1 1	124.6	103.5	PASS 25 E
"	2044	—	E. 422	606	—	144.5	12.0	129.0	270 11.1 1	124.6	103.5	PASS 25 E
"	2044	—	S. 5330	620.5	—	137.5	13.0	121.7	270 11.1 1	124.6	97.7	PASS 20E
"	2044	—	P. 365	620.5	—	137.5	13.0	121.7	270 11.1 1	124.6	97.7	PASS 20E
9/17/77	2045	RS	3' E OF W-1 STEAM TUNNEL	616	—	136.5	12.6	121.2	270 11.1 1	124.6	97.3	PASS
"	2046	"	3' E OF W-1 STEAM TUNNEL	623	—	139.5	12.3	124.2	270 11.1 1	124.6	99.7	PASS 19-D
"	2047	"	3' E OF W-1 STEAM TUNNEL	618	—	138.5	12.1	123.5	270 11.1 1	124.6	99.1	PASS 21-D
"	2048	"	3' E OF W-1 STEAM TUNNEL	622	—	143.5	11.7	128.5	270 11.1 1	124.6	103.1	PASS 20-D
"	2049	"	3' E OF S-1 STEAM TUNNEL	629	—	142.5	12.5	124.5	270 11.1 1	124.6	100.3	FAILED 17-D

TEST FAILURE

Q.C. Rep. Notified _____
 Time & Date of Notification _____
 Reporting Person Notified DATA OF TEST
MD - 2049

SB 11041



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 10/6/77

4. SPEC. NO. 7220-C-208

8. DRAWING NO. PLANT AREA

2. TESTED WEEK OF 9/14/77 To 9/16/77

3. QC ACCEPTANCE DATE 10/17/77
CONTROL NO. FILE NO. 7115

PAGE 5 OF 5

DATE TAKEN	TEST NO.	TESTED BY	LOCATION	ELEV. OF TEST	DEPTH BELOW FINAL GRADE (FT.)	IN PLACE WET DENSITY (LB./C.F.)	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (LB./C.F.)	SOIL CLASSIFICATION	MASS-LAB DRY DENSITY (LB./C.F.)	PERCENT COMPACTION	REMARKS
9/15/77	2022	RS	50' W. DWS. ST. 7220	615	-	114.7	5.7	108.5	RD C-5C Zone 2	109.7/91.2	94.9	CLEMS ON 2021 FALLS 22
9/16/77	2034	RS	50' W. DWS. ST. 7220	630	-	121.6	7.6	113.0	RD C-5C Zone 2	109.7/90.2	113.5	PASS

20. PREPARE BY: [Signature] DATE: 10/6/77
 RESPONSIBLE ENGINEER: [Signature] DATE: 10/19/77
 QC-C1



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220 2. DATE 10/6/77 3. CONTROL NO. 243 4. DATE 10/17/77
 5. FILE NO. 110 6. PAGE 5 OF 5

4. SPEC. NO. 7220-C-208 8. DRAWING NO. PLANT AREA 9. TESTED WEEK OF 8/18/77 To 9/16/77

DATE TAKEN	TEST NO.	TEST NO. BY	LOCATION	ELEV. OF TEST	DEPTH BELOW FINAL GRADE (FT.)	IN PLACE WET DENSITY (LB./C.F.)	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (LB./C.F.)	SOIL CLASSIFICATION	MAX. LAB. DRY DENSITY (LB./C.F.)	PERCENT COMPACTION	REMARKS
9/15/77	2030	RG	S. 3310 E. 165'	613	-	142.5	16.8	127.5	270 11.1	124.6	102.3	Pass 23E
"	2031	RG	6'40" 316' off Cont. I	617	-	133.0	14.2	116.5	278 15.2	117.0	99.6	Client's 210 Pass
9/16/77	2032	RS	over sewer line S. 6280	628	-	141.0	16.0	121.5	277 16.2	117.0	103.8	Pass
"	2033	"	S. 319	615	-	142.0	12.1	126.7	260 10.8	129.1	97.6	5 12.8 Pass
"	2034	SEC	Page 4 over 2'									
9/16/77	2035	RM	sewer line over 2'	630	-	5612 148.5	6.71 16.1	121.0	278 15.2	117.0	103.4	Pass 17E
"	2036	"	sewer line over 2'	632	-	5512 142.3	6.51 13.0	124.2	277 13.4	121.0	104.3	Pass 16E

10. PREPARED BY B. Johnson 11. DATE 10/6/77 12. RESPONSIBLE ENGINEER Tom Fogel 13. DATE 1/10/77
 14. D-929 15. April 10 77 16. 10/17/77
 17. 10/17/77



COMPACTED FILL DENSITY TEST REPORT

3. *DK* 10/17/77
 QC ACCEPTANCE DATE
 30 C-210.3
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10/6/77

PAGE 2 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/10/77 To 9/16/77

7. DATE TAKEN	8. TEST NO. MD	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION Amp omc zone	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
			6' S. OF			148.0	11.7	132.5	270 11.1 1	124.6	106.3	PASS 17-E
	2007	"	6' S. OF W. ST. TRANSVERSE	628		139.0	12.8	123.2	270 11.1 1	124.6	98.9	PASS 1E-D
	2008	"	4' S. OF 17" H. OF R. LINE STEAM TUNNEL	621		135.5	20.2	112.7	270 11.1 1	124.6	90.4	FAILED - MA-9
	2009	"	S. 5393 E. 572	628.5		144.5	10.6	130.7	270 11.1 1	124.6	104.9	PASS CT
9/13/77	2010	RG	100' E. OF MANHOLE #10	628		145.5	11.3	130.7	270 11.1 1	124.6	104.9	PASS
		SEE	PAGE 2									
9/14/77	2018	RG	100' E. OF MANHOLE #10	631		140.5	12.4	125.0	270 11.1 1	124.6	100.3	PASS 17-D
	2019	"	75' E. OF MANHOLE #10	631		136.5	10.6	123.5	270 11.1 1	124.6	99.1	PASS 17-D
	2020	"	100' E. OF MANHOLE #10	633	6571	146.0	11.9	130.5	270 11.1 1	124.6	104.7	PASS
		SEE	PAGE 314									
9/15/77	2023	RS	315' CONT. W. 41	622		141.5	10.3	128.2	297 9.0 1	131.6	97.4	PASS 20D
	2024	"	67'S OF LOWER 8" SMOOR LINE 40' WEST L.C. LINE	626.6		136.0	12.2	121.2	277 11.4 1	124.6	100.2	PASS 518E
	2025	"	67'S OF Q	630		130.5	12.5	116.0	277 15.4 1	121.6	96.9	PASS 17-E
	2026	"	S. 5325 E. 128	609		133.0	12.2	118.5	277 15.9 1	121.6	97.9	PASS 21 E
	2027	"	S. 5315 E. 379	614.5		138.0	11.1	124.2	270 11.0 1	124.6	100.0	PASS 22 E
9/15/77	2028	RG	W. 7 310' OFF CONT. I	617.5		125.5	16.2	108.0	278 15.2 1	117.0	92.3	FAILED clear 10/20/77
9/15/77	2029	"	S. 5345 E. 375	613		138.5	12.1	123.5	270 11.1 1	124.6	99.1	PASS 21 E

TEST FAILURE

Q.C. Rep. Notified Total 10/2/77
 Title & Date of Notification 10/10/77
 Reporting Person R. Fabian

20. PREPARED (Signature) B. Johnson DATE 10/6/77

RESPONSIBLE ENGINEER Tom King DA 10/10/77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 10/17/77
 DATE
 CONTROL NO. 20 FILE NO. C-210.3

1. PROJECT NO. 7220

2. DATE 10/6/77

PAGE 3 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/10/77 TO 9/16/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. / MIN. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION AS % RD	19. REMARKS
9/10/77	1992	RG	15' E. OF MAN HOLE #10	626	—	113.8	6.6	106.8	RD OMC ZONE 55 N/A 2	109.7/90.2	87.4	PASS 18D
—	1993 THRU 1996	SEE	PAGE 1									
9/10/77	1997	KM	4' W. OF MAN HOLE #10	626	—	122.1	8.8	112.2	55 N/A 2	109.7/90.2	110.3	PASS 18D
"	1998	"	30' E. OF MAN HOLE #10	624	—	116.5	6.0	109.9	55 N/A 2	109.7/90.2	100.8	PASS 19-V
—	1999 THRU 2002	SEE	PAGE 1									
9/12/77	2003	KM	S. 4530 E. 500	627	—	118.1	7.7	109.7	55 N/A 2	109.7/90.2	100.0	PASS 18D
"	2004	"	100' N. OF MAN HOLE #10	628	—	122.2	6.3	115.0	55	109.7/90.2	121.3	PASS 18D
—	2005 THRU 2010	SEE	PAGE 1									
9/13/77	2011	KM	40' N. OF W. SIDE OF 96" PIPES	610	—	122.5	8.1	113.3	55 N/A 2	109.7/90.2	114.7	PASS 24 E
"	2012	"	40' N. OF W. SIDE OF 96" PIPES	608	—	117.0	6.2	110.2	55 N/A 2	109.7/90.2	102.1	PASS 24 E
"	2013	"	65' N. OF W. SIDE OF 96" PIPES	608	—	115.3	6.9	107.9	55 N/A 2	109.7/90.2	92.3	PASS 24 E
"	2014	"	75' N. OF W. SIDE OF 96" PIPES	610	—	122.3	7.8	113.5	55 N/A 2	109.7/90.2	115.5	PASS 24 E
"	2015	"	75' N. OF W. SIDE OF 96" PIPES	610	—	122.9	7.4	114.4	55 N/A 2	109.7/90.2	119.0	PASS 24 E
9/13/77	2016	RG	30' E. OF MAN HOLE #10	630	—	116.7	5.5	110.6	55 N/A 2	109.7/90.2	103.8	PASS
9/14/77	2017	KM	S. 5180 W. 50	624	—	113.3	6.0	106.9	55 N/A 2	109.7/90.2	87.9	PASS 19-E
—	2018 THRU 2020	SEE	PAGE 1									
9/15/77	2021	RG RS	50' N. DIS. STRUT BETWEEN 72" PIPES	615	—	111.3	6.1	104.9	55 N/A 2	109.7/90.2	78.8	22% dens FAILED by 2021

N/A

S S S S S

20. PREPARED BY signature DATE 10/6/77

RESPONSIBLE ENGINEER signature DATE 10/6/77



COMPACTED FILL DENSITY TEST REPORT

3. John Tub 10/17/77
 QC ACCEPTANCE DATE
 CONTROL NO. FILE NO.

1. PROJECT NO. 7220

2. DATE 10/6/77

PAGE 1 OF 5

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 9/10/77 TO 9/16/77

7. DATE TAKEN	8. TEST NO. MO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
* 9/10/77	1987	AG	S. 5305 RETURN E. 609 ON DIRT	619.5	—	143.0	13.0	124.5	BMP OMC ZONE	124.6	101.5	PASS
"	1988	"	S. 5300 BATTLE E. 589 DIRT	627	—	152.5	12.5	135.5		124.6	108.7	PASS
"	1989	"	W. Side STEAM TUNNEL	616	—	139.5	10.3	126.5		127.3	99.4	PASS
"	1990	"	S. 5325 BATTLE E. 530 RETURN 4' OFF W	626	—	146.0	11.5	131.0		124.6	105.1	PASS SIDE
"	1991	"	STEAM TUNNEL W	622	—	135.0	11.8	120.7		127.3	94.8	PASS
—	1992	SEE	PAGE 2									
9/10/77	1993	KM	S. 5340 E. 570	626.5	—	142.0	10.9	128.0		124.6	102.7	PASS in pond
"	1994	"	50'S. OF RT. BLDG 5' FROM E. SIDE OF STEAM TUNNEL	622	—	140.5	11.3	126.2		124.6	101.3	PASS
"	1995	"	20' N. OF F LINE 4' FROM W. SIDE OF STEAM TUNNEL	626	—	141.5	13.4	124.8		121.0	103.1	PASS
"	1996	"	60'S. OF RT. BLDG 4' E. OF E. WALL STEAM TUNNEL	624	—	142.5	13.8	125.2		121.0	103.5	PASS ?
1997 THRU 1998		SEE	PAGE 2									
9/11/77	1999	KM	S. 5385 E. 542	625.5	—	142.0	10.9	128.0		124.6	102.7	PASS 19-E
"	2000	"	S. 5332 E. 573	629.5	—	138.0	10.7	124.7		124.6	100.1	PASS 17G
"	2001	"	S. 5332 E. 567	629.0	—	141.0	11.5	126.5		124.6	101.5	PASS 17G
"	2002	"	S. 5393 E. 542	624.3	—	134.5	10.5	121.7		124.6	97.7	PASS 19-E
2003 THRU 2004		SEE	PAGE 2									
9/12/77	2005	KM	60'S. OF RT. BLDG 16' FROM W. SIDE OF E. WALL OF ST. TU.	630	—	143.0	11.3	128.5		124.6	103.1	PASS

20. PREPARE

Signature: B. Johnson DATE: 10/6/77

RESPONSIBLE ENGINEER

Signature: [Handwritten]

DATE: 9/10/77



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220 2. DATE 9.19.77 3. CONTROL NO. 3 OF 3

4. SPEC. NO. 7220-C-208 5. DRAWING NO. PLANT AREA 6. TESTED WEEK OF 9/13/77 to 9/19/77

QC ACCEPTANCE 10/6/77 DATE 10/6/77

FILE NO. _____

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/18/77	1977	BT	30' W. OF MAIN CONC #17	633	—	133.5	13.6	54.580 117.5	277 13.4 1	121.0	97.1	PASS 16F
9/19/77	1980	KM	5.5365 E. 562	623	—	144.0	11.2	129.5	269 11.2 1	127.3	101.7	PASS
"	1981	"	50' W. JF LAB W. SIDE OF CONC #17	630	—	139.0	12.1	124.0	270 12.1 1	124.6	99.5	PASS
"	1982	"	30' W. OF JF LAB E & S. SIDE CONC #17	630	—	142.0	12.0	126.8	270 12.0 1	124.6	101.8	PASS
9/19/77	1983	RS+H	280' CONC #1	626	—	138.5	11.5	124.2	269 10.0 1	127.3	97.6	PASS 18D
"	1984	"	45' CONC #1 270' CONC #1	629	—	140.5	10.5	127.2	269 10.0 1	127.3	99.9	PASS
"	1985	"	275' CONC #1 W. 44	628	—	140.0	10.5	126.7	269 10.0 1	127.3	99.5	PASS 18D
10	1986	"	5.5335 E. 547	625.5	—	143.5	10.6	129.8	297 9.0 1	131.6	98.6	PASS 19-E

??

20. PREPARE' R.S. Smith DATE 9/14/77 RESPONSIBLE ENGINEER Tom Boyd DAT. 9/21/77

10002 (3-73) Sheet 9/19/77



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE DATE 10/6/77
CONTROL NO. FILE NO. 3

1. PROJECT NO. 7220 2. DATE 9-19-77

4. SPEC. NO. 2220-C-208 5. DRAWING NO. PLANT AREA 6. TESTED WEEK OF 9/3/77 TO 9/19/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAR-LAB/DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/17/77			17.5' and 5'						RD ONE LANE			
"	1965	"	9'S. S. SIDE 2' S. E. SIDE MANHOLE #17	627		119.5	6.5	112.2	55 MHA	109.7	90.2	PASS 16C
9/21/77	1966	THRU	1968	SEE M. PAGE 13		125.4	10.5	113.5	55 MHA	109.7	90.2	PASS 17F
9/21/77	1969	KM	MANHOLE #17	629		123.8	7.2	113.4	55 MHA	109.7	90.2	PASS 16C
9/21/77	1971	THRU	1977	SEE		PAGE 1	3					
9/21/77	1973	KM	MANHOLE #13	632		123.7	6.1	116.6	55 MHA	109.7	90.2	PASS 16C

20. PREPARE Signature: R.C. Smith DATE: 9/14/77 RESPONSIBLE ENGINEER: R. J. J... DATE: 12/1/77
10002 (3-73) 6-7 20-3346



COMPACTED FILL DENSITY TEST REPORT

3. DATE 10/6/77
QC ACCEPTANCE DATE
CONTROL NO. 210.5
FILE NO.

1. PROJECT NO. 7220
2. DATE 9-19-77
PAGE 1 OF 3

4. SPEC. NO. 7220-C-208
5. DRAWING NO. PLANT AREA
6. TESTED WEEK OF 9/13/77 to 9/19/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC %	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
9/17/77	1958	RS	S. 5212	6596		142.5	10.3	129.2	269 10.0	127.3	101.5	PASS 20G
"	1959	"	S. 5280	598		140.5	10.0	127.7	269 10.0	127.3	100.3	PASS 20G
"											99.7	PASS 16C
"	1961	"	0' CONT. 2	628		144.0	12.3	128.2	260 10.6	129.8	98.8	PASS 18D
"	1962	"	S. 5160	5975		145.0	10.5	131.2	297 9.0	131.6	99.7	PASS 20G
"	1963	"	S. 5202	600		147.5	8.9	135.5	297 9.0	131.6	103.6	PASS 20G
9/17/77	1966	KM	1965 SEE PAGE 2	592		139.0	11.2	125.0	269 10.0	127.3	98.8	PASS 18D
"	1967	"	S. 4550	628		142.0	14.1	121.5	277 13.4	121.0	102.5	PASS 18D
"	1968	"	S. 4555	630		143.0	12.4	127.3	277 13.4	121.0	105.7	PASS 18D
9/18/77	1971	RS	1970 SEE PAGE 2	593		138.0	14.3	120.7	277 13.4	121.0	99.8	PASS 18D
"	1972	"	S. 4555	601		145.5	12.8	129.0	270 11.1	124.6	103.6	PASS 18D
"	1973	KM	1970 SEE PAGE 2	624		138.5	13.9	122.0	262 11.8	123.9	98.5	FAIL 19-D
"	1974	"	1970 SEE PAGE 2	626		139.0	10.9	133.5	262 11.8	123.9	107.7	PASS 18D
"	1975	"	1970 SEE PAGE 2	624		144.5	12.0	129.0	262 11.8	123.9	104.1	PASS 18D
"	1976	"	1970 SEE PAGE 2	623		140.5	11.1	126.5	262 11.8	123.9	102.1	PASS 19-D

20. PREPARE: R.C. Smith
DATE: 9/14/77
RES. ENGINEER: R.C. Smith
DATE: 9/14/77
10002 (3-73) 5768-3340



COMPACTED FILL DENSITY TEST REPORT

3. *OK* ACCEPTANCE DATE *10/6/77*
 CONTROL NO. *30* FILE NO. *C-2083*

1. PROJECT NO. **7220**

2. DATE **9-19-77**

PAGE **1** OF **2**

4. SPEC. NO. **7220-C-208** 5. DRAWING NO. **PLANT AREA** 6. TESTED WEEK OF **8/27/77 to 9/2/77**

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8/27/77	1943	KM	40' N. OF SF 1 AND 3 2' E. OF STATION	622	—	142.0	11.8	127.0	BMP OMC ZONE 270 11.1 1	124.6	101.9	Pass 20D
"	1944	"	50' N. OF SF 1 AND 4 2' E. OF STATION	624	—	142.5	12.2	127.0	270 11.1 1	124.6	101.9	Pass 19-D
8/27/77	1945	BT	5' E. OF STREAM TUNNEL WALL	618	—	138.0	12.7	122.5	270 11.1 1	124.6	98.3	Pass 21D
"	1946	"	5' W. OF STATION	622	—	134.5	12.6	119.5	270 11.1 1	124.6	95.9	Pass 20P
"	1947	"	8' E. OF STREAM TUNNEL WALL	620	—	138.0	14.3	120.7	277 13.4 1	121.0	99.8	Pass 20P
8/27/77	1948	TRV	1953	SEE	PAGE 2							
8/27/77	1954	RS	265' CONT #1 W. 44	623	—	141.5	15.8	122.2	278 6.2 1	117.0	104.4	Pass 19-D
8/27/77	1955	TRV	1956	SEE	PAGE 2							
9/2/77	1957	KM	120' S. OF MANHOLE #10	626	—	142.0	12.0	126.8	270 11.1 1	124.6	101.8	Pass 18D

20. PREPARE *R.C. Smith* DATE **9/13/77** RESPONSIBLE ENGINEER *Tom Kelly* DA: *9/20/77*
 5762 - 3330 *Sept 18 9:11:7*



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 9.19.77

PAGE 2 OF 2

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 8/27/77 to 9/2/77

7. DATE TAKEN	8. TEST NO.	9. TEST. BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8/27/77	1948	RS	80'S. & MARUMING 2' W. OF DUCT	625	—	114.8	5.7	108.6	RD OMC 20%	109.7/90.2	95.3	PASS 10-D
8/27/77	1949	RS	20' N. OF STEAM TOWER WALL	627	—	105.5	6.7	98.9	55 N/A	109.7/90.2	49.5	Fail INFO. NO. ONLY 0
8/30/77	1951	KM	S. 4665	628	—	124.5	8.7	114.5	55 N/A	109.7/90.2	119.4	19C
"	1952	"	E. 475	627	—	120.8	10.1	109.7	55 N/A	109.7/90.2	100.0	4
"	1953	"	S. 4660	628	—	116.6	9.6	106.4	55 N/A	109.7/90.2	85.7	10E
9/1/77	1955	RS	40'S. MARUMING 19' E. OF DUCT	630	—	123.7	7.1	115.5	55 N/A	109.7/90.2	123.2	17-D
9/1/77	1956	"	40'S. MARUMING 10' W. OF DUCT	630	—	118.1	7.5	109.9	55 N/A	109.7/90.2	100.8	17-D

20. PREPARED

Signature: RC. Smith

DATE 9/13/77

RESPONSIBLE ENGINEER Tom King

DATE 9/1/77

SE 1151

100
10D
10E



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE 10/1/77 DATE 10/1/77
CONTROL NO. 30 FILE NO. C-210.3
PAGE 4 OF 4

1. PROJECT NO. 7220

2. DATE 8/26/77

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 8/20/77 to 8/24/77

7. DATE TAKEN	8. TEST NO.	9. TEST. ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8/26/77	1942	RS	6" W. OF STEAM TUR. J. WALL - 2nd COAT	6B	—	131.5	14.4	115.2	BMP OMC ZONE	117.0	98.5	210 PASS 40

20. PREPARE (Signature) P.C. Smith DATE 9/12/77

RESPONSIBLE ENGINEER J. Smith DA) 15/77

1152



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220 2. DATE 8/26/77

3. DRAWING NO. PLANT AREA

4. SPEC. NO. 7220-C-208

6. TESTED WEEK OF 8/20/77 to 8/26/77

QC ACCEPTANCE DATE 10/6/77
CONTROL NO. 210.7 FILE NO. 7
PAGE 3 OF 4

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION AS % OF	19. REMARKS
8/25/77	1936	RS	72' W. SIDE	621	—	116.7	6.6	109.5	RD OMC ZONE	107.7/90.2	99.2	PASS
"	1937	"	62' N. SIDE WALL TO CURB	632	—	114.6	5.5	108.6	55 N/A	109.7/90.2	95.4	PASS
"	1938	"	2' S. SIDE CURB	635	—	119.3	6.9	111.6	55 N/A	109.7/90.2	107.9	PASS
8/25/77	1939	AV	2' S. SIDE 3' W. SIDE	624	—	114.3	6.1	107.7	55 N/A	109.7/90.2	101.4	PASS
	1940		SEE PAGE		1							
8/26/77	1941	KA	S. 5110 E 465	628	—	116.4	5.7	110.1	55 N/A	109.7/90.2	101.7	PASS

20. PREPARE (Signature) DATE 9/12/77 RESPONSIBLE ENGINEER DATE 10-5-77

10002 (3-73) 5-216C 9-18-77

QC-CI



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 8/26/77

PAGE 2 OF 4

4. SPEC. NO. 7220-C-208

5. DRAWING NO. PLANT AREA

6. TESTED WEEK OF 8/20/77 to 8/24/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. M.A. / MAR. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION (AS % RD)	19. REMARKS
		MD							RD OMC 20%			
	1916	"	20' W. OF S.E. COR. EMB. PIT. STR. R.S. OF S.W. COR.	630		118.9	7.7	110.4	55 N/A 2	109.7/90.2	102.9	PASS
	1917	THV	1919 SEE PAGE 1									
8/22/77	1920	RS	80' E. OF S.E. COR. OF CASTLE BLVD. R.S. OF S.E. COR.	622		115.8	6.3	108.9	55 N/A 2	109.7/90.2	96.6	PASS
"	1921	"	90' E. OF S.E. COR. OF CASTLE BLVD. R.S. OF S.E. COR.	623		118.0	6.9	110.4	55 N/A 2	109.7/90.2	102.9	PASS
8/22/77	1922	BT	10' W. OF S.E. COR. OF CASTLE BLVD. R.S. OF S.E. COR.	633		120.2	7.3	112.0	55 N/A 2	109.7/90.2	109.5	PASS 16C
"	1923	"	90' E. OF S.E. COR. OF CASTLE BLVD. R.S. OF S.E. COR.	625		123.0	6.0	116.0	55 N/A 2	109.7/90.2	125.1	PASS
8/23/77	1924	KM	36' W. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	620		118.6	8.4	109.4	55 N/A 2	109.7/90.2	98.7	PASS 20C
"	1925	"	28' W. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	620		120.2	7.3	113.9	55 N/A 2	109.7/90.2	117.1	PASS 20C
"	1926	BT	10' S. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	628		115.0	7.1	107.4	55 N/A 2	109.7/90.2	107.4	PASS 20C
"	1927	"	4' W. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	617		119.3	6.6	111.9	55 N/A 2	109.7/90.2	109.1	PASS
8/24/77	1928	KM	15' W. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	632		115.9	6.1	109.2	55 N/A 2	109.7/90.2	97.9	PASS
"	1929	"	20' S. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	632		111.4	6.1	105.0	55 N/A 2	109.7/90.2	87.4	PASS
"	1930	"	26' S. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	632		115.6	8.2	106.8	55 N/A 2	109.7/90.2	87.4	PASS
"	1931	"	5' W. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	622		116.1	6.5	109.7	55 N/A 2	109.7/90.2	109.0	PASS
8/24/77	1932	SEE PAGE 1		1								
8/24/77	1933	BT	4' E. OF S.W. COR. OF CASTLE BLVD. R.S. OF S.W. COR.	619		121.9	7.8	113.1	55 N/A 2	109.7/90.2	113.9	PASS

TEST FAILURE

20F

58 12055

QC ACCEPTANCE DATE 10/6/77
 CONTROL NO. 30 C 110.3
 FILE NO.

COMPACTED FILL DENSITY TEST REPORT

PROJECT NO. 7220

DATE 8/26/77

PAGE 1 OF 4

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8/20/77	1909	BT	S. 5190 E. 169	630.8	—	141.5	11.4	127.0	BMP OMC ZONE 269 10.0	127.3	99.8	PASS 17E
"	1911	"	14+00 S. 30' SW1	602.0	—	136.0	11.9	121.5	269 10.0	127.3	95.4	PASS IN Pond
"	1912	"	STA. 12+75 4' FROM SW. CORNER	604.0	—	136.5	10.5	123.5	269 10.0	127.3	97.0	PASS IN Pond
"	1913	"	S. 5125 E. 100	633	—	143.5	10.4	130.0	269 10.0	127.3	102.1	PASS 16E
"	1914	"	S. 5240 E. 140	633.5	—	144.5	11.8	129.2	269 10.0	127.3	101.5	PASS 16E
8/21/77	1915	THRU	1916	SEE PAGE 2	SEE PAGE 2	138.5	11.5	124.2	260 10.6	129.8	95.7	PASS 16E
"	1916	RS	S. 5236 E. 260	633	—	144.0	9.5	131.5	297 9.0	131.6	99.9	PASS 16E
8/22/77	1919	RS	S. 4976 E. 75	629	—	136.5	13.1	120.7	270 11.1	124.6	96.9	PASS 17G
8/24/77	1932	RS	170' ON WALL	632	—	139.5	11.4	125.2	269 10.0	127.3	98.3	PASS 16D
8/25/77	1934	BT	54' W OF SF UIC 4' FROM SW. CORNER	616	—	134.5	11.2	121.0	269 10.0	127.3	95.1	PASS
"	1935	RS	92' W OF W. WALL 64' W OF S. WALL	626	—	138.5	11.1	124.7	269 10.0	127.3	98.0	PASS 18G
8/26/77	1940	KM	46' S OF KLINE 3' FROM SW. CORNER	620	—	137.0	9.6	125.0	270 11.1	124.6	100.3	PASS 20D

20. PREPARED BY: [Signature] DATE: 9-12-77 RESPONSIBLE ENGINEER: [Signature] DATE: 1-177





COMPACTED FILL DENSITY TEST REPORT

3. *S. Sub* DATE *9/20/77*
 QC ACCEPTANCE *303* FILE NO. *2103*
 CONTROL NO. PAGE *4* OF *4*

1. PROJECT NO. 7220 2. DATE 9/8/77 PAGE 4 OF 4

4. SPEC. NO. 7220-C-208 5. DRAWING NO. PLANT AREA 6. TESTED WEEK OF 8/13/77 To 5/19/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
8/18/77	1900	BT	20' S. OF Q 150' S. OF Q	627	-	118.5	6.7	111.1	55 N/A	109.7/90.2	105.8	PASS
	1901	SEE PAGE										
8/19/77	1902	RS	200' S. OF Q 10' E. OF 12.0	628	-	118.7	7.8	109.6	55 N/A	109.7/90.2	99.6	PASS
"	1902	"	80' W. OF 12.0 150' S. OF Q	620	-	115.2	7.2	107.5	55 N/A	109.7/90.2	90.5	PASS

20. PREPARED BY *Bill Johnson* DATE 9/8/77 ENGINEER *S. Sub* DATE 9/17/77

V. MANTHA
E. NEWMAN
S. THURLOW

QUALITY PROBLEM RESPONSE REQUEST

QA ACTION ITEM NO. S-358

TO L. CURTIS Date 8/05/80

FROM R. SEVO QA Department

SUBJECT - Response to: AFR M-01-11-0-01 - ITEM 1

The subject quality problem has been discussed with the following personnel in your organization.

S. RAO

Written response is required from you by 8/15/80

to permit timely resolution of this problem. Your response should address the following items:

NOTIFY QUALITY ASSURANCE WHEN
NCR 3041 IS DISPOSITIONED BY
PROJECT ENGINEERING.

Comments:

W. D. [Signature]

SB 06871



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PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT

AUDIT FINDING REPORT

AS IS CONDITION VERSUS "AS REQUIRED" / "AS NEEDED" CONDITION WITH REFERENCES:

PQCI SC-1.05, Rev 9, Activity Task 2.2a9 states, "Field density tests resulting in 105% and over of maximum laboratory density of proctors and/or relative densities, retested". This is a "witness" point.

SC-1.05-18 was scoped for the period 6/9/80 - 6/13/80 and activity 2.2a9 was signed off "NA". However, on 6/11/80 a QC Engineer signed off Test Reports 6182 and 6184, which reflected relative densities of 108.1% and 106.6%, respectively. That is, for these two cases, retesting was not done as required by the PQCI. Specification C-208 does not impose a requirement for retesting. QC personnel had evaluated and concluded retesting was not necessary. While this approach may be technically appropriate, it is an option not now permitted by the PQCI.

In summary, the finding is that some tests resulting in over 105% of relative density have not been retested as required.

APR 583 208

M-01-11-0-01

PROJ/DEPT ASSIGNED:

Bechtel QC & GeoTech

DATE OF GENERATION:

7-9-80

FILE NUMBER:

18.4-3.6

DISTRIBUTION:

WRBird DATaggar

JWCook

TCCooke

JLCorley

LEDavis

LADreisbach

DEHorn

GSKeeley

HPLeonard

BWMarguglio

JMilandin

DBMiller

EDNewman

JARutgers

RECOMMENDED CORRECTIVE ACTION:

1. Prior to completion of this audit, Bechtel QC issued NCR 3041 to address the discrepancies noted above. This NCR must be dispositioned.
2. Project Engineering should determine if evaluation by the GeoTech Engineer, rather than automatically retesting, is an appropriate means of dispositioning the "suspect test" indicator, which the 105% criterion is supposed to be. If appropriate, (Contd on Back)

CORRECTIVE ACTION COMMITMENT:

DATE OF C/A COMPLETION:

DATE OF C/A EFFECTIVENESS:

ORG. RESP FOR C/A:

Bechtel QC &
Project Engineering

PERSON MAKING C/A COMMITMENT:

METHOD OF VERIFICATION:

IS AF REPORTABLE PER 50.55(4)?

YES NO

IF "YES", DATE OF REPORT TO EGC: NA

IF "YES", TYPE OF REPORT TO EGC:

NA

IF "YES", NAME OF EGC OFFICIAL TO WHOM REPORTED:

IF "YES", WHO MADE REPORT:

NA

NA

AF REPORTER'S SIGNATURE:

Ronald E. Horn

SUPERVISOR'S SIGNATURE:

[Signature] 7/14/80

C/A VERIFICATION SIGNATURE:

VERIFICATION DATE:



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AUDIT FINDING REPORT

PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT

CONTINUATION SHEET:

"AS IS" CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFERENCES (CONTINUED):

RECOMMENDED CORRECTIVE ACTIONS (CONTINUED):

2. (Contd)
Specification C-208 should be revised to specify that tests resulting in a 105% or greater relative density for cohesionless materials or 105% of maximum dry lab density for cohesive materials shall be evaluated and dispositioned by GeoTech. If retesting is, in fact, always required, Specification C-208 should be revised to reflect this.
3. If evaluation by GeoTech is appropriate, Quality Control Inspection Records should show disposition by the GeoTech Engineer's signature for test results over 105%.

CORRECTIVE ACTIONS (CONTINUED):

SB 06873

APPROVING AUTHORITY'S SIGNATURE:

Donald E Horn

SUPERVISOR'S SIGNATURE:

[Signature] 5/4/50

J. BETTS
S. GELNETT
S. RAO
V. MANA

QUALITY PROBLEM RESPONSE REQUEST

QA ACTION ITEM NO. S-359

TO E. NEWMAN Date 8/05/80

FROM R. SEVO QA Department

SUBJECT - Response to: AFR M-01-11-0-04

The subject quality problem has been discussed with the following personnel in your organization.

S. GELNETT

S. KIRKER

Written response is required from you by 8/22/80

to permit timely resolution of this problem. Your response should address the following items:

Perform review, make corrections
as indicated in blk. "Recommended
corrective action" of referenced AFR.

Comments:

58 06574

V. Manu

Lead Quality Assurance Engineer



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PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT

AUDIT FINDING REPORT

"AS IS" CONDITION VERSUS "AS RECEIVED" / "AS NEEDED" CONDITION WITH REFERENCES:

A. The Field Engineer Report prepared by the Onsite GeoTech Soils Engineer dated 5/14/80 states in part:

- "1. Backfill in Progress (Day)
(Backfilling done in accordance with C-211 Δ established procedures for both equipment and materials used.)...
- b) Pipe excavation south of oily waste bldg and tank from S4665 E405 to S4665 E500. Bottom of current excavation is at el 631.25 sloping downward and westward to 629.75. Work done was mainly done to prepare for placement of drain pipe and two stainless lines...

REMARKS:

Edge of backfilling area south of oily waste bldg extends into Q area. QC informed and on site also new excavation entirely with Q area QC informed."

Drawing C-45 Rev 4 requires material south of S4668 to be "Q" and north of S4668 to be "non-Q".

The Daily Soil Placement Report prepared by Bechtel QC for 5/14/80 indicated on line 13 "No 'Q' Backfill Placed Today".

(Contd on Back)

APR SCR ID: M-01-11-0-04
 PROJ/DEPT AUSTID: Bechtel QC & GeoTech
 DATE OF ORIGINATION: 7-9-80
 FILE NUMBER: 18.4.3.6
 DISTRIBUTION:
 WRBird DATagge
 JWCook
 TCCooke
 JLCorley
 LEDavis
 LADreisbach
 DEHorn
 GSKeeley
 HPLEonard
 BWMarguglio
 JMilandin
 DBMiller
 EDNewman
 JARutgers

RECOMMENDED CORRECTIVE ACTION:

It is recommended that the records be reviewed and determine why the Field Engineering Reports indicate "Q" fill placed and QC records indicate non "Q" fill placed. Make corrections to records per Bechtel procedures. Also, any "Q" placements not covered by C inspection, Project Engineering to disposition.

CORRECTIVE ACTION COMMENT:

DATE OF C/A COMPLETION:

ORG. RESP FOR C/A:

PERSON MAKING C/A COMMITMENT:

DATE OF C/A EFFECTIVENESS:

Bechtel QC & GeoTech

METHOD OF VERIFICATION:

IS AF REPORTABLE FOR 50.55(*): YES NO

IF "YES", DATE OF REPORT TO SRC: NA

IF "YES", TIME OF REPORT TO SRC: NA

IF "YES", NAME OF SRC OFFICIAL TO WHOM REPORTED:

IF "YES", WHO MADE REPORT: NA

NA

REPORTER'S SIGNATURE:

Donald E. Horn

SUPERVISOR'S SIGNATURE:

J. A. ... 8/9/80

C/A VERIFICATION SIGNATURE:

VERIFICATION DATE:

U



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AUDIT FINDING REPORT

PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT

CONTINUATION SHEET

"AS IS" CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFERENCES (CONTINUED)

B. The Field Engineer Report prepared by the Onsite GeoTech Soils Engineer dated 5/21/ states in part:

"1. Backfilling in Progress (Day)

(Backfilling done in accordance with C-211 A established specifications and procedures for both equipment and materials used.)...

H) East of oily waste bldg at S4673 E510 to S4673 E550. Current height of backfill E629.0...

REMARKS:

Q area is listed in 1(H) above QC rep on site."

Drawing C-45 Rev 4 requires material south of S4668 to be "Q" and north of S4668 to be "Non-Q".
(Contd on next sheet)

RECOMMENDED CORRECTIVE ACTION (CONTINUED):

CORRECTIVE ACTION (CONTINUED):

APPROVING AUTHORITY'S SIGNATURE:

Donald E. Horn

SUPPLIER'S SIGNATURE:

[Signature] 5/4/50

CONTINUATION SHEET:

AFR SER NO: M-01-11-0-04
PROJ/DEPT AUDITED: Bechtel QC & Geo1
DATE OF ORIGINIATION: 7-9-80
FILE NUMBER: 18.4.3.6

"AS IS" CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFERENCES (CONTD):

B. (Contd)

The Daily Soil Placement Report prepared by Bechtel QC for 5/21/80 indicated soil placement South 4665 \pm to 4680 \pm , East 515 \pm to 540 \pm , Length 25' \pm , Width 12' \pm .

C. The Field Engineer Report prepared by the Onsite GeoTech Soils Engineer dated 5/6/80 states in part:

"1. Backfilling in Progress

(Backfilling done in accordance with C-211 Δ established procedures for both equipment and materials used.)

a) South of Turb Bldg bounded by S5035 to S5042' and E320 to E379.
Finished today."

Drawing C-45 Rev 4 requires material south of the Turbine Building in this area to be "Q".

The Daily Soil Placement Report prepared by Bechtel QC for 5/6/80 indicated on line 13 "No 'Q' Backfill Placed Today".

The above discrepancies between the Field Engineer Reports prepared by the Onsite GeoTech Soils Engineer and the Daily Soil Placement Reports prepared by Bechtel QC indicate that soil was placed in "Q" areas without Bechtel QC inspection.

J. DETTS
S. GELNETT
S. RAO
V. MANITA

QUALITY PROBLEM RESPONSE REQUEST

QA ACTION ITEM NO. S-359

TO L. CURTIS Date 8/05/80

FROM R. SEVO QA Department

SUBJECT - Response to: AFR M-01-11-0-04

The subject quality problem has been discussed with the following personnel in your organization.

M. Elgaly
S. RAO

Written response is required from you by 8/22/80

to permit timely resolution of this problem. Your response should address the following items:

Per discussion in Soil Committee
on July 10, 1980; Project Engineering
will consider declassifying certain
areas identical as Q on drawing C-45.
Report to QA results of declassification
and make drawing changes as necessary.

Comments:

VADnearbach SB 06878

Lead Quality Assurance Engineer



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PROJECTS, ENGINEERING AND CONSTRUCT
QUALITY ASSURANCE DEPARTMENT

AUDIT FINDING REPORT

"AS IS" CONDITION VERSUS "AS REQUIRED" / "AS NEEDED" CONDITION WITH REFERENCES:

A. The Field Engineer Report prepared by the Onsite GeoTech Soils Engineer dated 5/14/80 states in part:

"1. Backfill in Progress (Day)

(Backfilling done in accordance with C-211 ⁹ established procedures for both equipment and materials used.)...

b) Pipe excavation south of oily waste bldg and tank from S4665 E405 to S4665 E500. Bottom of current excavation is at el 631.25 sloping downward and westward to 629.75. Work done was mainly done to prepare for placement of drain pipe and two stainless lines...

REMARKS:

Edge of backfilling area south of oily waste bldg extends into Q area. QC informed and on site also new excavation entirely with Q area QC informed."

Drawing C-45 Rev 4 requires material south of S4668 to be "Q" and north of S4668 to be "non-Q".

The Daily Soil Placement Report prepared by Bechtel QC for 5/14/80 indicated on line 13 "No 'Q' Backfill Placed Today".

(Contd on Back)

APR SCR NO:

M-01-11-0-04

PROJ/DEPT ACRONYM:

Bechtel QC & GeoTech

DATE OF ORIGINATION:

7-9-80

FILE NUMBER:

18.4.3.6

DISTRIBUTION:

WRBird DATagge

JWCook

TCCooke

JLCorley

LEDavis

LADreisbach

DEHorn

GSKeeley

HPLeonard

BWMarguglio

JMilandin

DBMiller

EDNewman

JARutgers

RECOMMENDED CORRECTIVE ACTION:

It is recommended that the records be reviewed and determine why the Field Engineering Reports indicate "Q" fill placed and QC records indicate no "Q" fill placed. Make corrections to records per Bechtel procedures. Also, any "Q" placements not covered by C inspection, Project Engineering to disposition.

CORRECTIVE ACTION COMMENT:

DATE OF C/A COMPLETION:

ORG. RESP FOR C/A:

Bechtel QC & GeoTech

PERSON MAKING C/A COMMITMENT:

DATE OF C/A EFFECTIVE DATE:

METHOD OF VERIFICATION:

IS AF REPORTABLE FOR 30.55(*):

YES NO

IF "YES", DATE OF REPORT TO SRC:

NA

IF "YES", TIME OF REPORT TO SRC:

NA

IF "YES", NAME OF SRC OFFICIAL TO WHOM REPORTED:

IF "YES", WHO MADE REPORT:

NA

NA

REPORTER'S SIGNATURE:

Donnell E. Horn

SUPERVISOR'S SIGNATURE:

J. E. ... 8/9/80

C/A VERIFICATION SIGNATURE:

VERIFICATION DATE:

U



Consumers
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AUDIT FINDING REPORT

PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT

CONTINUATION SHEET:

"AS IS" CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFERENCES (CONTINUED):

B. The Field Engineer Report prepared by the Onsite GeoTech Soils Engineer dated 5/21/80 states in part:

"1. Backfilling in Progress (Day)

(Backfilling done in accordance with C-211 A established specifications and procedures for both equipment and materials used.)...

H) East of oily waste bldg at S4673 E510 to S4673 E550. Current height of backfill E629.0...

REMARKS:

Q area is listed in 1(H) above QC rep on site."

Drawing C-45 Rev 4 requires material south of S4668 to be "Q" and north of S4668 to be "Non-Q".
(Contd on next sheet)

RECOMMENDED CORRECTIVE ACTION (CONTINUED):

CORRECTIVE ACTION (CONTINUED):

INSPECTOR'S SIGNATURE:

Donald E. Horn

SUPPLIER'S SIGNATURE:

[Signature] 5/4/80

CONTINUATION SHEET:

AFR SER NO: M-01-11-0-04
PROJ/DEPT AUDITED: Bechtel QC & Geo
DATE OF ORIGINIATION: 7-9-80
FILE NUMBER: 18.4.3.6

"AS IS" CONDITION VERSUS "AS REQUIRED" CONDITION WITH REFERENCES (CONTD):

B. (Contd)

The Daily Soil Placement Report prepared by Bechtel QC for 5/21/80 indicated soil placement South 4665 \pm to 4680 \pm , East 515 \pm to 540 \pm , Length 25' \pm , Width 12' \pm .

C. The Field Engineer Report prepared by the Onsite GeoTech Soils Engineer dated 5/6/80 states in part:

"1. Backfilling in Progress

(Backfilling done in accordance with C-211 Δ established procedures for both equipment and materials used.)

- a) South of Turb Bldg bounded by S5035 to S5042' and E320 to E379.
Finished today."

Drawing C-45 Rev 4 requires material south of the Turbine Building in this area to be "Q".

The Daily Soil Placement Report prepared by Bechtel QC for 5/6/80 indicated on line 13 "No 'Q' Backfill Placed Today".

The above discrepancies between the Field Engineer Reports prepared by the Onsite GeoTech Soils Engineer and the Daily Soil Placement Reports prepared by Bechtel QC indicate that soil was placed in "Q" areas without Bechtel QC inspection.

QUALITY PROBLEM RESPONSE REQUEST

V. Goguen
J. Wanzek
S. RAO
J. Stubbs.

QA ACTION ITEM NO. 5-360

TO L. DAVIS / A. BOOS Date 8/05/80

FROM R. SEVO QA Department

SUBJECT - Response to: AFR M-01-11-0-06

The subject quality problem has been discussed with the following personnel in your organization.

J. BETTS

P. Goguen

Written response is required from you by 8/15/80

to permit timely resolution of this problem. Your response

should address the following items:

Respond to this AFR upon notification
of Project Engineering Concurrence
and incorporation into FIC 1.100
of the formalized "summary of m-site
Geotech Soils Engineer Duties & Responsibilities"

Comments:

The recommended Project Engineering
clarification will be deleted by the
alternative actions described above.

W.D. [Signature]

SB 06882



Consumers
Power
Company

PROJECTS, ENGINEERING AND CONSTRUCTION
QUALITY ASSURANCE DEPARTMENT

AUDIT FINDING REPORT

"AS IS" CONDITION VERSUS "AS REQUIRED" / "AS NEEDED" CONDITION WITH REFERENCES:

Specification C-211 Rev 10, paragraph 8.11 states in part, "The onsite geotechnical soils engineer shall review and approve each soils test report. This shall include, but not be limited to, gradation, moisture, and density tests".

Contrary to the above, there was evidence that the onsite geotechnical soils engineer reviews the "Compacted Fill Density Test Report," but no objective evidence of reviewing structural sand gradations or approving any of these reports.

A/R REP NO:

M-01-11-0-06

PROJ/DEPT ACCT/ISS:

Bechtel QC & Geot

DATE OF COMPLETION:

7-9-80

FILE NUMBER:

18.4.3.6

DISTRIBUTION:

WRBird DATag

JWCook

TCCooke

JLCorey

LEDavis

LADreisbach

DEHorn

GSKeeley

HPLeonard

BWMargulio

JMilarein

DBMiller

EDNewman

JARutgers

RECOMMENDED CORRECTIVE ACTION:

Provide Project Engineering clarification of specification to define the actions required of, and the objectives to be satisfied by, the GeoTech engineer intended by "approve".

CORRECTIVE ACTION COMMITMENT:

DATE OF C/A COMPLETION:

DATE OF C/A EFFECTIVENESS:

ORG. RESP FOR C/A:

Project Engineering

PERSON MAKING C/A COMMITMENT:

METHOD OF VERIFICATION:

IS AF REPORTABLE PER 50.55(*):

YES

NO

IF "YES", DATE OF REPORT TO HQ:

NA

IF "YES", TIME OF REPORT TO HQ:

NA

IF "YES", NAME OF HQ OFFICIAL TO WHOM REPORTED:

IF "YES", WHO MADE REPORT:

NA

NA

A/R INVESTIGATOR'S SIGNATURE:

Donald E. Horn

SUPERVISOR'S SIGNATURE:

JR [Signature] 8/4/80

C/A VERIFICATION SIGNATURE:

VERIFICATION DATE:

Joel

Feel you should
see this. Please
return.

al

SB 16641

TO File
FROM TCCooke
DATE June 13, 1979
SUBJECT MIDLAND PROJECT GWO 7020 -
NRC SITE TOUR AND OBSERVATION OF TEST PITS
File: 0460.2 Serial: CSC-4138

**Consumers
Power
Company**

INTERNAL
CORRESPONDENCE

CC *Attendees GSKeeley, P14-408B
DBMiller JJZabritski, P14-416
*Bechtel and Consumers attendees only.

I. Individuals Present:

Sherif S. Afifi	Bechtel Assistant Chief Soils Engineer
R. E. Lipinski	DSS/NRC
J. P. Knight	DSS/NRC
Daniel M. Gillen	DSS/NRC
C. A. Hunt	Consumers Power Executive Civil Engineer
P. A. Martinez	Bechtel Project Manager
*A. J. Boos	Bechtel Project Field Engineer
*R. J. Cook	Resident Inspector/NRC
*T. E. Vandel (Entrance only)	US NRC Region III
Lyman Heller	US NRC NRR
T. E. Johnson	Bechtel Chief Civil/Structural Engineer
K. Dhar	Bechtel Supervisory Engineer
T. C. Cooke	Consumers Power Project Superintendent
D. E. Sibbald	Consumers Power Senior Construction Advisor
K. Wiedner	Bechtel Engineering Manager
*D. Horn	Consumers Power Quality Assurance Group Supervisor/Civil
R. M. Wheeler	Consumers Power Civil Section Head

*Part time

II. Discussion Tour Comments

- A. The individuals from the NRC were extremely interested in cracks in the Auxiliary Building, Service Water Building, and Diesel Generator Building. Many questions were asked regarding differential settlement. They seem to be under the impression that there was a great deal of building settlement other than the Diesel Generator Building and that large cracks exist somewhere on the site. We continually had to reiterate the fact that remedial actions were based on soil borings which showed questionable material and not settlement problems. Mr. Lipinski, in particular, was very interested in why we had cracks and analysis regarding same.
- B. During the tour it was apparent that the NRC's questions were oriented towards seismology aspects. They were also interested in whether or not we had re-reviewed the different seismic conditions in the light of our

SB 16642

concrete backfill revisions for the Auxiliary Building, wing walls, etc., since the addition of concrete could cause new reactions and forces requiring reanalysis. It was noted that the concrete backfill would be separated from the structures by styrofoam and not tied to the structures. The NRR alluded to possibly more stringent earthquake requirements.

- C. When observing the test pits, Mr. Heller expected more sand in the "random fill". It was noted that sand was used primarily around utilities and next to buildings.
- D. Mr. Heller appears to be of the view that the simpler engineering fix on the service water overhang, such as concrete backfill as opposed to more complex remedial action, would stand a much better chance of passing review, due at least partially to the fact that much of the available manpower in Washington was involved with Three Mile Island and also because simple straightforward engineering practices will be much easier to discuss in any hearing process. The NRR was informed that piling at the Service Water structure was only for vertical load and that no moments were involved. It appears that possibly Mr. Knight's staff has been reduced from about fifty to near eight, with the forty people being tied up on Three Mile Island activities. There will be a corresponding cutback in the normal amount of licensing activities that will be undertaken by his staff over the next several months.
- E. NRR noted that they should receive copies of any Diesel Generator (total site related) material that is being transmitted to Region III directly from the licensee. It also appears that Mr. Knight is more interested in resolving the Midland fill problems in the near future on a "real time basis" as opposed to later review and approval functions such as might be found in going the FSAR route. (Note: Consumer Power Company has been attempting for weeks to arrange a meeting with NRR but it was not until the week of June 4, 1979 that we were able to set a meeting date with them of July 10, 1979.) He recognized that presently the licensee was involved in answering the same or possibly similar questions on three fronts, namely the I&E questions, 50.54f responses and future FSAR revisions, and agreed that it would be beneficial to all parties to consolidate these areas. During the tour it also appeared that in the future NRR may become much more deeply involved in the details in all licensing aspects than they have in the past.
- F. It would appear that we should provide more rationale and better arguments for support of duct bank and pipes and man holes, valve pits, etc. during the seismic event. We have to verify or prove that duct banks, for example, will not shear during the earthquake. Mr. Heller was of the opinion that our responses on the safety aspects concerning the borated water storage tank lines will have to be extremely conservative, and that at this point in time for our responses to be accepted, he would be inclined to say that questionable material should be removed and fixed rather than going through some complex explanation as to why it was "acceptable as is" since this was a Category One item which would be required during the postulated accident conditions.

Page 3

Generally, the NRR personnel appeared to find the information gathered during the tour and observation of the test pits to be of value and the type of information which would expedite their decision making process.

plw

SB 16644

A. Boos

DRAFT
5-31-79
G. RICHARDSON

MEETING NOTES NO. _____
MIDLAND PLANT UNITS 1 & 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220-101

FOR YOUR
COMMENTS

DATE: May 30, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Diesel Generator Building Possible Causes and Action Items

CC
S. AFIFI
S. DHAR
RECEIVED
JUN 1 1979

ATTENDEES: Bechtel

- K. Wiedner
- J. Hook
- G. Tuveson
- J. Rink (part time)
- C. McConnel (part time)
- J. Wanzeck
- ~~A. Boos~~
- G. Richardson
- R. Simanek

Consumers

- D. Sibbald
- R. Wheeler
- D. Horn
- T. Thiruvengadam
- C. Hunt

BECHTEL POWER CORP.
JOB 7220
PER 21429(I)CSH
2284

PURPOSE: The meeting was held in the office to discuss the action items and possible causes appended to Meeting Notes No. 934 dated March 12, 1979 as Attachments 1 and 2.

ITEMS DISCUSSED:

- A. Review of the status of the action items listed in Attachment 1 to Meeting Notes No. 934.
 - 1. Confirm material compatibility adequacy
J. Wanzeck stated that placement of sand in trenches is not a problem if the material has been properly placed.
ACTION: Geotech will provide an ICM to close out this item.
 - 2. Confirm low blow count on radwaste building
Three additional borings inside the radwaste building resulted in no low blow counts. This item is closed.
 - 3. Confirm electrical duct banks in the yard
Two additional borings near duct banks between the service water structure and the turbine building and other borings have established

the soil conditions. Any further items will be tracked by the response to the 50.54F request. This item is closed.

4. Tabulated list of test results

Geotech has tabulated all test results and has issued a preliminary report for inhouse review.

ACTION: Geotech to issue draft report for CPCo review by June 11, 1979.

5. Check water level around site

Installed piezometers around the site indicate an average water level of about 625.5 feet. This item is closed.

6. Evaluate who placed fill (Wheeler study) under all seismic Category I structures

This is completed for the diesel generator building and service water structure. Review of other areas is in progress.

ACTION: Construction/CPCo complete study by June 8, 1979.

7. Check 1977 stockpile and rain data

Review of rainfall data indicates summer of 1977 was normal and not a dry year. This item is closed.

8. What fill was placed during winter of 1976

This item is being completed with Item 6.

9. Review work and testing in the time frame below elevation 615'

This item is being completed with Item 6.

- B. Review of the preliminary possible causes described in Attachment 2 to Meeting Notes No. 934 was accomplished. This resulted in revisions to the list. The revised list of preliminary possible causes is attached.

Prepared by: DR

Reviewed by: KW

PRELIMINARY POSSIBLE CAUSES

<u>Distinction or Change</u>	<u>Possible Cause</u>	<u>Comment</u>
1. Time difference between placement of fill and construction of facility.	No	Cannot cause insufficient compaction.
2. Placement method		
- lift thickness	Yes	Preliminary tests indicate some equipment may not be capable of compacting a 12" lift. Investigation continuing. <u>ACTION:</u> Geotech
- moisture control	No	Material placed during period when moisture control was not implemented is generally in the top two feet of fill.
- compaction equipment	Yes	Equipment used to be evaluated for 4" lifts to original standards. <u>ACTION:</u> Geotech
- types of materials	No	Materials have shown to be compactable in test fills.
- compactive effort	Yes	To be evaluated with lift thickness and equipment.
3. Theoretical comparison of BMP compaction vs. settlement	Yes	Compare effects of different compaction levels. <u>ACTION:</u> GEO-TECH

<u>Distinction or Change</u>	<u>Possible Causes</u>	<u>Comment</u>
4. Specification C-211		
- general	Yes	Include with Action 2
- frost protection omitted	Yes	Investigate impact (refer to Part A, No. 8 of this report)
- flooding of trenches	Yes	Possible cause in localized areas of sand fill areas - not a cause in clay fill.
5. Testing		
- methods	Yes	Investigate impact. <u>ACTION:</u> Geotech
- equipment		
- results/reports		
- retests		
- reviews/evaluations		
- personnel		
6. Increased test frequency and location for small areas.	Yes	Investigation of frequency/ distribution in process. <u>ACTION:</u> Construction/CPCo
7. Different contractors		
- personnel qualifications	No	Refer to No. 16
- different inspection methods	Yes	Refer to No. 15
- placement methods	Yes	Refer to No. 2
8. Extensively reexcavated area	No	Additional investigation indicates similar problems in areas where reexcavation was not accomplished.

Attachment 1

<u>Distinction or Change</u>	<u>Possible Causes</u>	<u>Comment</u>
9. Moisture intrusion in ground	Yes/No	Not a problem if properly compacted - possible problem if undercompacted and dry of optimum.
10. Lean concrete fill	No	
11. Pond filled March 1978	No	See No. 9
12. Stockpiled material - weathering - drying out	No	See No. 13
13. 1977 dry year	No	1977 was not a dry year.
14. Own weight settlement (calcs).	No	Cannot cause poor compaction.
15. Inspection procedures after 3/17	Yes	Investigation into inspection procedures used by Bechtel and Canonie indicate that inspection of Bechtel operations was not as intense as for Canonie operations, especially after 10/76. Inspection callout was surveillance and relied heavily on the test results to assure proper placement.
16. Personnel	No	Review of personnel qualifications for Bechtel, Canonie and U.S. Testing indicates the personnel probably had sufficient education, experience and training to carry out the tasks assigned to them. SB 16649

Distinction or Change

Possible
Causes

Comment

17. Effects of 1974-75 slowdown

No.

Bechtel Associates Professional Corporation
Inter-office Memorandum

To R. L. Castleberry
Subject Midland Units 1 & 2
Action Item #1

Date June 4, 1979

From S. S. Afifi

Of Geotechnical Services

At Ann Arbor 7220-79-90

RECEIVED

10 D 5 JUN 7 1979

BECHTEL POWER CORP.

JOB 7220
PER 31490-0723

Copies to S. L. Blue
K. Wiedner
[redacted]
J. O. Wanzek
1320, 3410

REFERENCE: Meeting notes date May 30, 1979
Subject: Diesel Generator Building Causes and Action
Items

The following IOM addresses item #1 Material Compatability Adequacy:

It is Geotech's opinion that the placement of sand backfill in Trench's will not cause any problems if placed properly ie, proper compaction proper trench cleanup and proper interface between sand and clay has been done.

This closes out this item.

Jow
JOW/nm

Jimm O Wanzek
S. S. Afifi SSA

Bechtel Associates Professional Corporation
Inter-office Memorandum

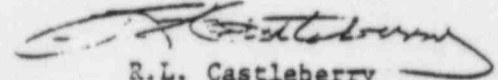
To Distribution Date May 13, 1979
Subject Midland Plant Units 1 & 2 From R.L. Castleberry
Job 7220 Meeting Notes No. 956 Of Engineering
Fixes to Category 1 Structures Ann Arbor
Copies to File: C-2647, C-2648 At
Com Log

RECEIVED
MAY 17 1979

BECHTEL ASSOCIATES CORP
JOB 7220

13/350 410

Attached for your information are the meeting notes discussing the
fixes to category one structures as a result of subsurface conditions.


R.L. Castleberry

DAZ/sp

Distribution:

S. Afifi

T. Johnson
P. Martinez
G. Tuveson
K. Wiedner

SB 16652

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 956
MIDLAND PLANTS UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220

DATE: Thursday, April 5, 1979
PLACE: Bechtel Ann Arbor Office
SUBJECT: Fixes to Category I Structures
FILE: 0279, C-2646, C-2647, C-2648
ATTENDEES: Bechtel

S. Afifi	T. Johnson
A. Almuti	P. Martinez*
A. Boos*	G. Tuveson
R. Castleberry	K. Wiedner
B. Dhar	

*Part-time

PURPOSE: Discussion of fixes to Category I structures

ITEMS DISCUSSED:

- 1) Soil borings in the fill relating to parts of the auxiliary building, isolation valve pits, and the service water structure were reviewed. The following was determined.
 - a) Fill under the control tower appears to be of good quality with the possibility of a local void or loose sand under the mud mat. Acceptable fill also appears to extend beyond the control tower to adjacent areas of the penetrations rooms. Additional borings will be taken to confirm localization of the void under the mud mat and to define the suitability of the fill east of the control tower. S. Afifi will advise on the number and location of additional soil borings in this area by April 20, 1979. A. Boos will advise S. Afifi on the feasible locations for additional borings by April 19, 1979.

SB 16653

G. Tuveson will investigate the feasibility of extending a narrow trench under the edge of the railroad bay slab to determine contact between the slab and fill, and will act on this by April 20, 1979.

- b) Based on the data available in the railroad bay area, it was determined that the only fix needed is for liquefaction potential, if determined to exist.
 - c) Exploratory soil work will be performed during implementation of the fix under the penetration rooms to determine the extent of poor fill.
- 2) The following fixes were identified and agreed upon.
- a) Auxiliary building penetration rooms (Units 1 and 2) - Removal and replacement of poor fill was identified as the primary recommended solution. The civil/structural group will investigate how much of the structure will be supported by cantilever action, the extent of the cantilever, probable reaction at the free end of the structure, and the need for temporary supports prior to dewatering. A conceptual scheme for underpinning and replacement of soil will be prepared by the project. The conceptual scheme will show temporary supports and the likely extent of the soil replacement operation. The scheme should be submitted to W. Jones and members of the task force for cost estimates and review by April 25, 1979.
 - b) Isolation valve pits (Units 1 and 2) - Replacement of poor fill with lean concrete was agreed to as the recommended solution. The need to support these structures prior to dewatering will be investigated by the civil/structural group, and the conceptual design will be submitted with Item 2a above for cost estimate and review by April 25, 1979.
 - c) Railroad bay - It was agreed that chemical grouting should be considered in case susceptibility to liquefaction is determined to be potentially feasible. The grout will provide a bonding agent among the sand particles and improve the density and shear strength of the soil. Grouting from inside as well as outside the structure is feasible.
 - d) Service water structure - The northern end of the structure will be supported on jacking piles. Two schemes were discussed. One scheme will require local dewatering and jacking piles against the wall foundation. The second scheme considers jacking piles against a corbel that will be made part of the northern wall. Conceptual design of the two schemes will be presented by the civil/structural group to W. Jones for an order-of-magnitude cost estimate by April 23, 1979.

- 3) Dewatering - The concept of local dewatering to permit structural fixes was discussed.
- 4) Schedule - A meeting between A. Almuti, W. Jones, G. Tuveson, and B. Dhar will be arranged to discuss scheduling the activities connected with implementation of the fixes on April 26, 1979.

ACTION ITEMS:

<u>Item</u>	<u>Reference Paragraph</u>	<u>Individual Responsible</u>	<u>Due Date</u>
1) Define future soil boring program in the fill.	1a	S. Afifi	4/20/79
2) Advise on feasible locations for additional borings in the control tower area.	1a	A. Boos	4/19/79
3) Complete likely structural behavior determination for the penetration rooms.	2a	G. Tuveson/ B. Dhar	4/23/79
4) Submit conceptual scheme for replacement of soil from underneath the penetration rooms and valve pits.	2a, 2b	G. Tuveson/ B. Dhar	4/25/79
5) Provide piling schemes.	2d	G. Tuveson/ B. Dhar	4/23/79
6) Arrange for scheduling meeting.	4	A. Almuti	4/26/79

Prepared by:


A. Almuti

AA/BD/DAZ/pd
4/30/1

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 957

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: April 26, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645 with attachments

ATTENDEES:

Bechtel

CPCo

S. Afifi	C. McConnel	D. Horn
A. Almuti	W. Netzella	C. Hunt
A. Boos	G. Tuveson	D. Sibbald
R. Castleberry	J. Wasylewski	T. Thiruvengadam
B. Dhar	K. Wiedner	
A. Ganguly		
W. Jones		

PURPOSE:

The meeting was held at the Ann Arbor office to discuss the following items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill:

- A) Review of action items initiated in the meeting of March 12, 1979. Identify future action items as required.
- B) Corrective actions for Seismic Category I structures on plant fill, other than the diesel generator building
- C) Corrective actions related to condensate storage tanks and diesel fuel oil tanks
- D) Reactivation of backfill operations (revision of specifications, etc)

- E) Comments on FSAR Section 2.5
- F) Comments on response to the NRC's 22 questions (10 CFR 50.54 request)
- G) Recommended actions regarding the letter from Mr. Keppler of the NRC's Region 3 office to Mr. S.H. Howell of CPCo, dated March 22, 1979

ITEMS DISCUSSED:

A) Review of prior action items

Action items from the previous meeting held on March 12, 1979 (Meeting Notes No. 934) were reviewed. (The numbers refer to the action items of those notes.) The current status of these items is as follows:

- 1) This item is closed. Activities regarding Q-listed utilities have been covered in the response to the NRC's 10 CFR 50.54 request of March 21, 1979.
- 2) This item is closed. Project engineering received the profile data for the Q-listed service waterlines.
- 3) This item is open. Profiling data for the surveyed service water lines have been plotted and compared against the previous profiles of the same lines as surveyed before surcharging. Comparison indicated that immediate rechecking of the reference elevations of those service water lines is necessary for accurate evaluation of the piping conditions.
- 4) This item is open. A revised cost estimate which will include corrective actions in other areas of fill in addition to the diesel generator building work will be issued 1 week after completion of the conceptual design of corrective work for the auxiliary building area.
- 5) This item is closed. Gallagher's question will be covered in the discussion of agenda item G of this meeting.
- 6) This item is complete. Milestone dates were incorporated in Drawing SK-C-628 on April 23, 1979. It was decided that before May 4, 1979, Geotech will discuss with GZD increasing the degree of accuracy of rebound anchor measurements and the measurement of settlement of the diesel building and foundations. Geotech indicated that plans for removal of surcharge or decisions regarding any additional surcharging requirement may be made by May 10, 1979, after the consultants' evaluation of currently available settlement data.

- 7) This item is closed. Results of evaluation of liquefaction potential of sand in the diesel generator building area was discussed with the consultants. Two methods of stabilizing the sand, grouting and vibratory compaction, were discussed as possible solutions for the liquefaction problem. Also discussed was the method of providing uniformly spaced sand piers to dissipate pore pressure buildup during liquefaction. Dr. Peck has recommended the method of stabilization by chemical grouting.
- 8) This item is closed. Actual loads experienced by the tie rods between the turbine building wall and diesel building wall were less than the designed value. Instrumentation results indicated that the deflection of the turbine building wall due to surcharge-earth pressure loads were not significant.
- 9) This item is open. Specification 7220-C-83 will be revised to include as-built information available to date and is scheduled to be reissued by May 4, 1979.
- 10) This item is closed. Adequacy of design of corbel with 4,750 psi concrete strength was checked by engineering, and continuation of surcharging was released by letter BEBC-2806 on March 22, 1979. Currently available concrete strength test results indicate that the average ultimate cylinder strength of concrete is approximately 4,950 psi.
- 11, 12) These items are closed. Surcharging was held at a level of 10 feet above final plant grade until March 16, 1979. Further surcharging to 20 feet was released by letter BEBC-2806 on March 22, 1979.
- 13, 14) These items are open. Construction reported that plots of density tests on plant fill have been completed for the diesel generator building, the service water structure area, and areas south of the power block. Plots for remaining portions of the power block will be completed (including back-checking) before May 18, 1979. Locations of borings will also be included in those plots.
- 15) This item is open. It was decided that separation of Canonic's work from Bechtel's work in the density test plots will be shown for the problem-related areas of fill. These areas are listed in Action Item 9 of these meeting notes.
- 16) This item is still open. Geotech will provide a projected schedule for activities regarding U.S. Testing's density tests.

(Writer's Note: Geotech provided the following schedule on May 1, 1979:

Draft of preliminary report - June 4, 1979
(U.S. Testing's data only)

Start test pits - May 21, 1979

Preliminary report on test pits - June 11, 1979)

- 17) This item is closed. The acceptance procedure for the diesel generator building has been discussed in response to Question 4 of the NRC's 10 CFR 50.54 request.
- 18) This item is closed. At present the FSAR does not have any criteria for differential settlement in the utilities. This item has been covered in the response to Questions 17, 18, and 20 of the NRC's 10 CFR 50.54 request.
- 19) This item is closed. Letter BEBC-2792, dated March 19, 1979, from engineering requested the completion dates of pipe connections. Construction has already replied (letter BCBE-2255R) suggesting that installation dates for anchors and hanger supports for pipes, in addition to the already requested dates of welding to penetration, will be more useful in the determination of the effects of differential settlement in the pipes. Construction will provide these installation dates after project engineering provides more specific data point requiring information.
- 20) This item is open. General plans for the evaluation of most of the Q-listed utilities, except the duct banks, have been discussed in the response to the NRC's 10 CFR 50.54 request. In order to be able to make continuity checks in the duct banks after the removal of surcharge, project engineering will determine which conduits in select duct banks should be used for that purpose. Construction activities related to those duct banks shall be put on hold.
- 21) This item is open. Geotech will discuss the time versus settlement values in FSAR Section 2.5 with CPCo. Necessary clarification will be made in the July amendment of the FSAR.
- 22) This item is open. Construction of the condensate tanks has not been done because CPCo expressed concern regarding the adequacy of settlement monitoring by constructing and filling the tanks. It was decided that Geotech will establish an estimated value for differential settlement between the piping and the condensate tanks. The ring foundation may have to be raised to satisfy the tanks' suction head requirements. Project engineering will develop a conceptual design of flexible connections for piping which will accommodate 6 inches of differential settlement. This design will be submitted to

CPCo for review on May 4, 1979. Construction and settlement monitoring of the condensate tanks will be discussed with the consultants on May 10, 1979.

- 23) This item is open. Surcharging and monitoring requirements for transformer foundation areas will be shown on Drawing C-1040 and will be issued by May 4, 1979.
- 24) This item is open. Project engineering will review the stator movement established by construction and then reevaluate the effect of stator load on the turbine building wall.
- 25) This item is open. Construction of borated water storage tanks has not been started because of delay in material delivery and hold on Q-listed fill. Cost and scheduling indicated that these tanks will also be used for flushing and hydrostatic testing of the piping system early in the fourth quarter of 1979.

There are potential schedule interferences between loading the tanks with water for settlement monitoring purposes and filling the tanks for hydrostatic testing of the pipes. Geotech requires that the tanks should stay full for at least 3 months for settlement monitoring.

It was decided that:

- a) It will be verified whether use of one tank is sufficient for testing the piping system.
 - b) The feasibility of constructing both tanks simultaneously with interconnected piping and feasibility of preloading one tank when the other will be used for testing will be investigated.
 - c) The field will expedite construction of the tanks.
 - d) Flexibility of piping with respect to settlement of the tank will be evaluated.
- 26) This item is open. Construction found that a portion of clay at the dike had plugged the sand drain in the guardhouse area. Construction has already started the cleaning operation. No additional boring is required. Geotech will complete its investigation, discuss it with project engineering, and then finalize the remedial measures by May 4, 1979.
 - 27) This item is open. Construction and CPCo will finalize and send their comments on FSAR Section 2.5 before May 31, 1979. Project engineering and Geotech will incorporate final comments on FSAR Section 2.5 for the July amendment by June 8, 1979.

- 28) This item is open. Geotech and engineering will resolve issues on FSAR Q&R 362.15 by May 31, 1979.
- 29, 30) These items are open. Engineering will reanalyse the effect of hydrostatic pressure on the service water structure walls if liquefaction is to take place.
- 31) This item is open. Crack mapping has been done for the diesel building walls and roof slab, service water structure walls, and portions of the auxiliary building, including the auxiliary building control tower area, and railroad bay. Crack mapping will also be done for the valve pit beneath the railroad bay, feedwater isolation valve pit (Units 1 and 2), borated water storage tank foundation, and valve pit.
- 32) This item is closed. The boring plan for the service water structure has been shown on Drawing C-1145.
- 33) This item is closed. A memo regarding filling and monitoring of emergency diesel oil storage tanks was issued on March 19, 1979. Geotech indicated that there is no liquefaction potential in that area. Engineering will check the nozzle load requirements for the piping and release the construction of concrete over the tanks by April 30, 1979.
- 34, 35) These items are closed. Tentative borings shown on Drawing C-1145 have been released for drilling. Borings in the area of the emergency diesel fuel oil tanks have been completed.

Kepner-Tregoe Analysis

The task group will continue working on the action items listed in Meeting Notes No. 934. These will be discussed in the next task group meeting.

B) Discussion of corrective actions for other Category I structures on fill

A. Almuti of engineering summarized the corrective action plans for the auxiliary building penetration room, railroad bay, and service water structure, which were also discussed in the response to Question 12 of the NRC's 10 CFR 50.54 request.

1) Auxiliary building penetration room

Inadequate fill under this portion of the structure will be removed and replaced by lean concrete. The final depth up to which the fill will be replaced by concrete will be determined by Geotech based on soil investigations in the area as the repair activity progresses.

During the removal and replacement of fill, the structure will be temporarily supported on jack piles. Dewatering will be done before the jack piles are placed. Project engineering will investigate and identify alternative methods of temporarily supporting the structure prior to the dewatering operation. They will also determine the forces in the temporary supports. The need for temporary supports depends on the extent of dewatering.

Investigation of temporary supports will be completed by May 7, 1979.

2) Railroad bay

There is no problem of static settlement and bearing in this area. The problem is the low blow counts in some areas of sand fill indicated by the boring results, which suggest liquefaction potential and settlement during an earthquake. The suspect area of sand fill will be stabilized by chemical grouting.

3) Service water structure

Project engineering is currently investigating two alternative solutions for supporting the portion of the structure on fill. These alternatives are:

- a) Support the north wall of the building on piles which will support the structure from a concrete corbel along the outside of the wall. This investigation will be completed by May 4, 1979.

(Writer's Note: After the meeting it was decided that H-bearing piles driven from the top without dewatering will be considered.)

- b) Dewater and provide jack piles (100-ton capacity) from underneath the north end wall instead of using the corbel.

4) Schedule for corrective actions

A preliminary schedule (Attachment 1) was handed out during the meeting by A. Almuti. It was decided that this schedule will be reviewed by the task group members and their comments will be forwarded to cost and scheduling by May 2, 1979. The revised schedule will be issued by May 11, 1979.

It was decided that two separate performance type specifications will be written for dewatering and underpinning. Engineering will issue a dewatering specification by May 25, 1979, and the underpinning specification by June 1, 1979, for in-house review.

(Writer's Note: In a subsequent meeting held on May 1, 1979, at the jobsite, it was decided that the dewatering specification will be based on the results of a dewatering test to be conducted during the week of May 7, 1979.)

Geotech reported that a consultant for chemical grouting will be inspecting the site on May 6 and will help develop a procedure and technical services agreement for the purpose of developing a testing program. Geotech will send a copy of the consultant's input to project engineering for review and use. Geotech and engineering will develop the TSA scope by May 11, 1979. Engineering will establish what portion of the corrective work is to be Q-listed.

- C) Corrective actions for the condensate storage tanks and diesel fuel oil storage tanks

This agenda item was covered during the review of prior action items.

- D) Reactivation of backfill operation

A meeting was held on this subject on April 24, 1979, with CPCo at the Midland jobsite. A. Boos of construction summarized the meeting notes (Attachment 2).

- E) FSAR Section 2.5

This agenda item was covered during the discussion of prior action items.

- F) Comments on responses to the NRC's 22 questions (10 CPR 50.54 request)

K. Wiedner reported that Bechtel QA prepared a detailed matrix of responses to the NRC's 22 questions, which will include commitments made to the NRC on various subjects, the corresponding dates, and the necessary action items. A preliminary copy of this matrix is attached for review and discussion at the next task group meeting (Attachment 3).

- G) NRC's (Kappler's) letter of March 22, 1979 and Gallagher's questions

CPCo will investigate necessary action to be taken on the NRC's investigation report and Gallagher's questions by April 30, 1979.

(Writer's Note: D. Horn of CPCo advised on April 30, 1979, that no further action is required at this time.)

The next task group meeting will be held approximately 2 weeks from April 26, 1979.

ACTION ITEMS:

- Construction ✓ 1) Recheck the reference elevations of the profiled service water lines and the coordinates of starting points.
- Project Engineering ✓ 2) Provide a conceptual design on corrective actions for the auxiliary building area to cost and scheduling.
- Cost & Scheduling ✓ 3) Issue a revised cost estimate within a week after receiving project engineering's input as specified in Action Item 2.
- Geotech ✓ 4) Provide project engineering with the requirements for installing rebound anchors and discuss increasing the degree of accuracy of rebound anchor and diesel building settlement measurements with GZD.
- Geotech ✓ 5) Discuss surcharge removal procedures with the consultants and finalize the plans by May 10, 1979.
- Project Engineering ✓ 6) Issue revised Specification 7220-C-83 by May 4, 1979.
- Construction ✓ 7) Send geotech coordinates of density test plots by May 4, 1979.
- Construction ✓ 8) Complete density test plots by May 18, 1979.
- Construction ✓ 9) By May 18, 1979, on density test plots, separate Canonie's work from Bechtel's work in the areas of diesel building, service water structure, auxiliary building penetration room, railroad bay, feedwater isolation valve pit, condensate tanks, diesel fuel oil tanks, and tank farm and critical portions of service water lines as designated by project engineering.
- Project Engineering ✓ 10) Provide construction with the critical areas of service water lines for separation of Bechtel's and Canonie's work.

- Project Engineering ✓ 11) Respond to construction's memo (BCBE-2235R) regarding installation dates for pipe anchors and pipe hangers by May 1, 1979.
- Project Engineering ✓ 12) Identify the conduits in select duct banks to be surveyed after surcharging, and request construction to put them on hold.
- Geotech ✓ 13) Provide explanation in the July amendment for the time versus settlement values in FSAR Section 2.5 after consulting with the client.
- Project Engineering/
Geotech ✓ 14) Establish an estimated value of differential settlement between pipe and condensate tanks. Then issue a conceptual design for flexible pipe connections to tanks for the client's review by May 11, 1979.
- Project Engineering ✓ 15) Establish condensate tanks' elevations to satisfy suction head requirements by May 11, 1979.
- Project Engineering ✓ 16) Issue Drawing C-1040 by May 4, 1979, showing surcharging and monitoring requirements for the transformer foundation area.
- Project Engineering ✓ 17) Review stator movement near the turbine building's south wall as proposed by construction and reevaluate the effect of stator load on the wall.
- Cost & Scheduling ✓ 18) Verify whether only one of the borated water tanks can store the water required for flushing and hydrostatic testing of pipes.
- Construction/
Cost & Scheduling ✓ 19) Check the feasibility of construction of both the borated water tanks and alternative use of the two tanks for settlement monitoring and hydrostatic testing of pipes by May 11, 1979.
- Construction ✓ 20) By May 11, 1979, check the feasibility of expediting construction of the borated water tanks.

Handwritten: Tankie duct N/S

- ✓
- Construction 21) Check the feasibility and cost required for providing an alternative storage area for water needed during hydrostatic testing by May 11, 1979.
 - Project Engineering 22) Evaluate the flexibility of the piping connected to borated water tanks.
 - Geotech/Project Engineering 23) Finalize and specify remedial measures for the guardhouse area by May 4, 1979.
 - Construction/CPCo 24) Provide engineering with comments to FSAR Section 2.5 by May 31, 1979.
 - Geotech/Project Engineering 25) Incorporate comments on FSAR Section 2.5 by June 8, 1979.
 - Geotech/Project Engineering 26) Resolve comments on FSAR Q&R 362.15 by May 31, 1979.
 - Project Engineering 27) Evaluate the effects of hydrostatic pressure on the service water structure wall during possible liquefaction of the soil around the structure.
 - Project Engineering 28) Complete crack mapping for the valve pit below the railroad bay, feedwater isolation valve pit (Units 1 and 2), and valve pit under the borated water storage tanks and the ring foundation for those tanks.
 - Project Engineering 29) Check the effect of settlement of the diesel fuel oil storage tank on the nozzle, and release the construction of concrete over the tanks by April 30, 1979.
 - Project Engineering 30) Evaluate and finalize the alternative schemes of temporarily supporting the auxiliary building electrical penetration room during dewatering operation by May 2, 1979.
 - Project Engineering 31) Finalize the pile design for the service water pump structure by May 4, 1979.
 - Task Group 32) Forward comments on the schedule (Attachment 1) of activities for corrective actions on other structures to W. Jones by May 2, 1979.

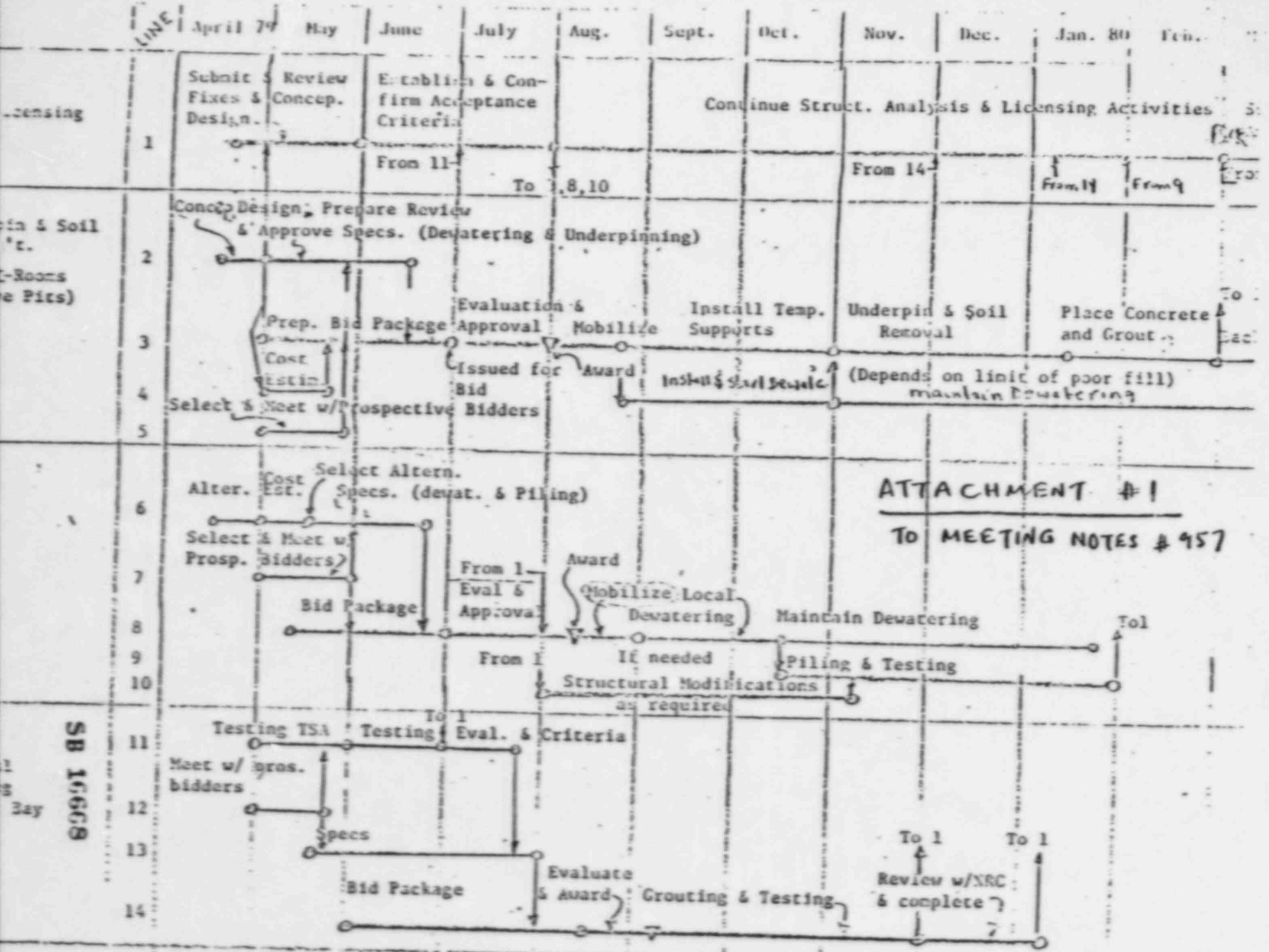
- Cost & Scheduling
- Project Engineering
- Project Engineering
- Geotech/Project Engineering
- Geotech
- Project Engineering
- Task Group
- 33) Issue an updated schedule for corrective actions for other structures by May 11, 1979.
- 34) Issue a draft of the dewatering specification for in-house review by May 25, 1979.
- 35) Issue an underpinning specification for in-house review by June 1, 1979.
- 36) Issue a TSA scope draft to the task group by May 11, 1979, for testing of chemical grouting.
- 37) Provide project engineering with a copy of the chemical grouting consultant's input by May 4, 1979.
- 38) Establish what portion of the work related to corrective actions for other structures shall be Q-listed.
- 39) Continue working on action items in relation to K-T analysis given in Meeting Notes No. 934 for March 12, 1979.
- Attachments: 1) Preliminary schedule for corrective actions for other structures
2) Meeting Notes (by A. Boos) for the meeting on April 24, 1979
3) Action items related to the response to the NRC's 10 CFR 50.54 request

A. Ganguly

A. Ganguly

4/30/2

SB 16667



ATTACHMENT #1
TO MEETING NOTES # 957

SB 16668

Bay

ATTACHMENT #2
TO MEETING
NOTES # 957

MEETING MINUTES
MIDLAND UNITS 1 & 2

Date: April 24, 1979
Time: 10:00 a.m.
Place: Midland Jobsite
Subject: Resumption of Q-listed Backfill Placement

Attendees:

<u>Bechtel</u>	<u>Consumers</u>	<u>U.S. Testing</u>
P. Martinez	D. Horn	J. Spelta
X. Wiedner	G. Black	
G. Richardson	D. Sibbald	
A. Boos		
J. Betts		
B. Dhar		
S. Kirker		
T. Lieb		
S. Afifi		

Minutes: The meeting minutes are summarized on the attached chart. All "planned" action items are to be entered as action items at the next Diesel Generator Task Group meeting scheduled for April 26, 1979.

Prepared by:

A. J. Boos

SB 16669

SUMMARY OF MEETING MINUTES
 "RESUMPTION OF Q-LISTED BACKFILL PLACEMENT"
 MIDLAND UNITS 1 & 2
 APRIL 24, 1979

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
1. Identify all conflicts within FSAR, within the FSAR, or between the FSAR and the FSAR, and correct these inconsistencies via official changes to the appropriate documents.	Project Engineering and Geo Tech have revised FSAR Section 2.5.4 to correct inconsistencies pertinent to soils placement.	Project Engineering and Geo Tech will perform a review of other subsections of FSAR section 2.5 pertaining to back-fill operations to eliminate inconsistencies, etc. (May 6, 1979)	Yes (As it applies to completion of review and changes to specification not processing of FSAR amendment.)	P.E. and Geo Tech
		Project Engineering and Geo Tech will perform a review of the Dames & Moore Soil Report and the	Yes (As it applies to completion of review and changes to specification not processing of FSAR amendment.)	P.E. and Geo Tech

SB 14070

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
		"PSAR Commitment List" pertaining to backfill placement to assure specs and PSAR are in conformance or are modified.		
		The review of "inactive" FSAR sections committed to in Appendix I, Section 1, Item C-3 (page 1-6) of the response to the NRC's 22 questions will identify and correct discrepancies in FSAR sections other than 2.5 which discuss backfill placement (Sept. 1979)	No	P.E. Geo Tech Construction
		Discuss and implement (as required) CPCo-PMO comments on FSAR Section 2.5.	Based on a prelim- inary review of the CPCo-PMO comments, the only restraint to resumption of backfill work is a revision to Spec. C-210 allowing the use of imported sands for Zone 2 Random Fill (May 6, 1979)	P.E. Geo Tech CPCo-PMO
Identify any inconsistencies between the PSAR/ FSAR and the		CPCo-QA will prepare their comments on Specifications C-210 and C-211 for discus- sion in conjunction with the CPCo-PMO comments listed in 1) above. (May 13, 1979)	Yes (As it applies to revising specifi- cation not processing of FSAR amendment.)	P.E. Geo Tech CPCo-QA

SB 16671

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
detailed specifications or drawings, and correct these inconsistencies via official changes to the appropriate documents.				
3. Identify any inconsistencies or omissions within the specifications and correct these inconsistencies via official Specification Change Notices.	SAME AS ITEM # 2 ABOVE			
4. Re-evaluate the appropriateness of the continued use of "random fill" in Zone 2 areas.		Specification C-210 and C-211 will be revised to redefine random fill with special emphasis on soils supporting structure (May 6, 1979)	Yes	P.E. Geo Tech
5. Provide a flow diagram of the steps which are needed for the quality control and assurance		A combined flow chart will be prepared illustrating the backfill process and the responsibilities of Bechtel Field Engineering, Bechtel Quality Control,	Yes	Construction

SB 16672

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
of soils work and assure that for each step there is a designation as to the specific organization primarily responsible for the action; a designation of the specific procedure to be used; and a designation of the specific acceptance criteria for the step.		and U. S. Testing. (May 6, 1979)		
6. Assure that all "clarifications" and "interpretations" are resolved via official Specification Change Notices.		EDPI 4.4.2.1 will be revised. (May 4, 1979)	No	P.E.
7. Establish a single individual at the site to be responsible for each of the following: directing the construction aspects of the soils	The following positions have been established a) Soils Field Engineer b) Geo Tech Soils Engineer (Assigned to Job 7220) c) Soils Q.C. Field Engineer			

SB 166:3

CPCo ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
work; directing the design aspects; and directing the quality control aspects.	Their responsibilities are defined in the flow chart described in 5) above.			
8. Institute 100 percent inspection of each lift placement with a corresponding Inspection Record documentation of the specific characteristics inspected in each case.		Bechtel Q.C. will work with CPCo-QA to finalize the revised QCIR for backfill placement. (CPCo-QA has a draft of the revised QCIR which calls for Surveillance (5) of backfill work by a fulltime Q.C. Soils Engineer with generation of daily reports) May 6, 1979	Yes	Bechtel Q.C. CPCo-QA
9. Re-evaluate the capability of the equipment being used in relation to the maximum allowable lift thickness and the inspection requirements.		Project Engineering has received the procedure for test pad placement from Geo Tech. Project Engineering will forward said procedure to Construction for initiation of pad placement by 4/27/79. (April 27, 1979)	Yes	P.E. Construction
10. Re-evaluate the appropriateness of the continued use of the nuclear densometer, with	The use of the nuclear densometer has been discontinued for inspection of record use.			

SB 16674

<p>ation limits of "plus or minus two percent of optimum".</p>				
<p>11. Re-evaluate the SAR's, specifications and procedures relative to their adequacy in specifying the points in the process at which the measurements or tests are to be made, the frequencies of these measurements or tests, and the conditions under which new laboratory standards must be acquired.</p>		<p>Geo Tech will review specification C-210 and C-211 requirements as related to adequacy of specified process and testing controls (May 6, 1979)</p>	<p>Yes</p>	<p>Geo Tech</p>
		<p>An audit will be performed on U.S. Testing by Bechtel to determine the adequacy of their coils testing procedures (April 26, 1979)</p>	<p>Yes (Results of audit will have to be evaluated.)</p>	<p>P.E. Geo Tech Bechtel QA</p>
<p>Assure that there is a method, on a three dimensional and volumetric basis, for identifying .</p>	<p>SAME AS ITEM # 8 ABOVE</p>			

SB 16675

CPCO ITEM NO.	ACTION(S) TAKEN TO DATE	PLANNED ACTION(S) TO BE TAKEN BY (DATE)	IS COMPLETION OF PLANNED ACTION A RESTRAINT TO STARTING Q-LISTED BACKFILL PLACEMENT	PARTY RESPONSIBLE FOR PLANNED ACTION(S)
the specific lifts which are inspected and tested.				
13. Assure that each nonconformance report (regardless of the type of report) is dispositioned.		For each Q-listed area where backfill is to be placed all Discrepancy Reports and NCR's (Bechtel and CPCo) will be fully dispositioned and closed out prior to placement of backfill.	Yes (As it relates to areas on an individual basis where backfill work is to be performed.) Note: This is an existing quality program requirement.	P.E. Construction Behctel QC
		Additionally, P.E. will release areas for backfill which are listed in MCAR 24 as questionable areas on a case by case basis by memo or TWX.	Yes	P.E.

015101

ATTACHMENT-3
TO
Meeting Notes # 957

ACTION ITEMS FROM RESPONSE
TO

DRAFT 5
G. RICHARD

50.54 F QUESTION NO 1

PAGE 1 OF 1

ACTION ITEM NO.	50.54 F RESISTANCE PAGE NO (PART)	ACTION DISCRPTION	RESPONSIBILITY	ACTION COMPLETION DATE	DATE COM
FROM RESPONSE TO QUESTION 1					
1.	1-3 (ITEM 1)	PERFORM A FINAL REVIEW AND UPDATE OF THE PSAR COMMITMENT LIST	PROJECT ENGINEER	9-28-79	
2.	1-4 (ITEM 2)	REVIEW SECTIONS OF THE PSAR DETERMINED TO BE INACTIVE	PROJECT ENGINEER	9-28-79	
3	1-4 (ITEM 3)	REVIEW EDP 4.2.2.	PROJECT ENGINEER	6-29-79	
4	1-4 (ITEM 4)	AUDIT ACTION ITEMS 1-3	PQAE	10-26-79	
5	1-4 & 1-5 (ITEM 2) APP. I I-B (O.2.C)	REVIEW SPECIFICATIONS NOT INCLUDED IN THE SPECIFICITY STUDY INITIALLY	PROJECT ENGINEER	6-29-79	
FROM APPENDIX I					
6	I-6 (C.1.b)	COMPLETE REVIEW OF THE DAMES AND MOORE REPORT	PROJECT ENGINEER	6-29-79	
7.	I-6 (C.3)	COMPLET REVIEW OF PERTINENT PORTIONS OF THE PSAR SECTIONS 2.5 AND 3.8	PROJECT ENGINEER	6-29-79	
8	I-6 (C.4.a)	CORRECT SETTLEMENT CALCULATIONS	PROJECT ENGINEER	SUBSE- QUENT TO D.G.B SURCHARGE	
9.	I-7 (C.4.c)	SCHEDULE AUDITS OF THE GEO-TECH SECTION ON A SIX MONTHS BASIS.	PQAE	7/27/79 (FIRST AUDIT)	

SB 16677

REVISED

ACTION ITEMS FROM RESPONSE TO

0501

50.54 F QUESTION NO 1.

ACTION ITEM NO.	50.54 F RESPONSE PAGE NO (PARA.)	ACTION DESCRIPTION	RESPONSIBILITY	ACTION/COMPLETION DATE	DATE COMP
10	I-7 (C.5.b)	REVIEW DRAWING FOR POSSIBLE EFFECT OF VERTICAL DUCT BANK RESTRICTIONS	PROJECT ENGINEER	6-1-79	
11	I-7/8 (D.1)	COMPLETE ACTIONS IN RESPONSE TO DRVCL AUDIT	PROJECT ENGINEER	5-18-79	
12	I-8 (D.2.d)	REVISE EDP 4.49.1 TO INCORPORATE CLARIFICATIONS & INSTRUCTIONS FOR USE OF SCN	PROJECT ENGINEER	5-18-79	
13	I-8/9 (D.4)	SCHEDULE AUDITS OF EACH DESIGN DISCIPLINE CALCULATIONS ON A YEARLY BASIS.	PGAE	6-27-79	
14	I-11 (C.1)	RE-EVALUATE CONSTRUCTION EQUIPMENT ^{USED} FOR COMPACTION	SITE MANAGER	5-18-79	RESUMING SOILS WORK
15	I-11 (C.2a)	ASSIGN FIELD SOILS ENG. AND SOILS ENG. FROM THE DESIGN SECTION.	SITE MAN. PROJ. ENG.	5-18-79	RESUMING SOILS WORK
16	I-11 (D.1)	REVIEW CONST. SPECS AND PROCEDURES TO IDENTIFY EQUIP REQUIRING QUALIFICATIONS	PROJECT ENGINEER	6-29-79	
17	I-11 (D.2)	REVIEW FIELD PROCEDURE FPG-3.000 TO ASSURE CLARITY AND COMPLETENESS	SITE MAN.	5-31-79	

BECHTEL

ACTION ITEMS FROM RESPONSE
TO

0501

PAGE 3 OF 1

50,59F QUESTION NO 1

ACTION ITEM NO.	50,59F RESPONSE page NO (PARA.)	ACTION DISCRPTION	RESPONSIBILITY	ACTION/ COMPLETION DATE	DATE COMP
18	I-16 (C.1.a) (C.1.b) I-17 (C.3,b)	REVISE PQCI C-1.02 TO PROVIDE INSPECTION RATHER THAN SURVEILLANCE AND TO RECORD INSPECTIONS	PFQCE	PRIOR TO RESUMING SOILS WORK	
19	I-17 (C.3.a)	COMPLETE INDEPTH REVIEW OF SOIL TEST RESULTS	GEO-TECH/ PROJ. ENG.	7-31-79	
20	I-18 (C.4.b) (D.3.C)	PERFORM INDEPTH AUDIT OF U.S. TESTING.	POAE	6-29-79	
21	I-18 (D.1)	REVIEW ALL ACTIVE QCIS FOR SURVEILLANCE CALLOUTS AND MODIFY WHERE NECESSARY	PFQCE	6-29-79	
22	I-18 (D.3.a)	EVALUATE DOCUMENTATION CALLOUTS ON QCIS	PFQCE	6-29-79	
23	I-20 (D.5.A)	INCORPORATE SCIENTIFIC SAMPLING PLANS FOR INSPECTION	PFQCE	CONTINUOUS (QCIS FOR RECEIPT) 6/5-15-79	
24	I-22 (D.1.a)	COMPLETE INDEPTH REVIEW OF THE BECHTEL TREND PROGRAM.	RAO-QA MANAGER	6-1-79	
25	I-22 (D.1.b)	CONDUCT QA TRAINING	RAO-QA MANAGER	6-1-79	

SB 16679

REVISED

ACTION ITEMS FROM RESPONSE
TO
50.54 F QUESTION NO 1.

ACTION ITEM NO.	50.54 F RESPONSE PAGE NO (PARA.)	ACTION DISCRPTION CPCO ACTIONS	RESPONSIBILITY	ACTION/ COMPLE- TION DATE	DATE COMPL
CPCO #1	I-11 (C.2.b) I-16 (C.1.c) I-17 (C.3.c)	IMPLEMENT OVER INSPECT- ION FOR SOILS PLACEMENT AND U.S. TESTING ACTIVITIES	CPCO - CA		
CPCO #2	I-22 (D.2)	CONDUCT QA TRAINING	CPCO - CA	6-1-79	

RECEIVED

ACTION ITEM FROM RESPONSE TO
50.54 F.
QUESTIONS 2-22

50.54 F QUESTION NO	ACTION ITEM	ACTION DISCRPTION	RESPONSIBILITY	ACTION COMPLE- TION DATE	DATE COMPLE
3	a	CLARIFY RESPONSE TO FSAR QUESTION 362.12	ENGINEERING	8-79 FSAR AMEND.	
4	a.	PROVIDE CRITERIA FOR PERMISSIBLE RESIDUAL SETTLEMENT	ENG.	8-79	
	b	PROVIDE DETAILS OF TREAT- MENT OF LOOSE SANDS	ENG.	8-79	
	c	TAKE DYNAMIC MODULI MEASUREMENTS UPON RE- MOVAL OF PRELOADS FOR D.G.B AND OTHER BUILDINGS.	ENG / CONST.	OPEN	
	d.	USE DATA (c) TO EVALUATE THE SEISMIC RESPONSE OF THESE STRUCTURES.	ENG.	OPEN	
	e	<u>PREPARE ADDITIONAL RESPONSE TO NRC FOR ITEMS 4a AND 4b.</u>	ENG.	8-79	
6	a.	FILL BORATED WATER STORAGE TANKS WITH WATER TO DEMONSTRATE SATISFACTORY FILL.	ENG / CONST.	OPEN	
	b.	DELAY PIPING CONNECTIONS ON BWST'S UNTILL MOST OF THE SETTLEMENT	CONST.	OPEN.	

SB 16681

BEATTI

ACTION ITEMS FROM RESPONSE TO
50.54 F

QUESTIONS 2-7

50.54 F QUESTION NO	ACTION ITEM	ACTION DISCRPTION	RESPONSIBILITY	ACTION/ COMPLE- TION DATE	DATE COMPL
6	c	USE SETTLEMENT DATA ON BWSTS TO ALLOW CON- SERVATIVE PIPING CONN- ECTION DESIGN	ENG.		OPEN
	d.	EVALUATE SETTLEMENT OF DIESEL FUEL OIL TANKS - PROVIDE PRECISE CORRECTIVE MEASURES IF REQUIRED.	ENG.		OPEN
7	a	PERFORM CONTINUITY CHECK ON DUCT BANKS AFTER COM- PLETION OF PRELOAD PROGRAM.	ENG/CONS'T.		OPEN
	b.	MAKE RESULTS OF CONTINUITY CHECKS AND SETTLEMENT SURVEYS AVAILABLE	ENG.		8-79
	c.	IF FURTHER CORRECTIVE ACTION IS REQUIRED DETER- MINE CORRECTIVE MEASURES	ENG.		OPEN
8	a.	REALIGN DIESEL GENERATORS IF MANUFACTURE'S TOLERANCES FOR PITCH AN ROLL ARE EXCEEDED.	CONS'T.		OPEN

RE-ENTER

ACTION ITEMS FROM RESPONSE TO
50.54 F

QUESTIONS 2-22

50.54 F QUESTION NO	ACTION ITEM	ACTION DISCRPTION	RESPONSIBILITY	ACTION/ COMPLE- TION DATE	DATE COMPLE
12	a	COMPLETE ONE ADDITIONAL BORING IN MIDDLE OF DIESEL FUEL OIL TANKS AREA	CONS'T.	OPEN	
	b	COMPLETE THREE ADDITIONAL BORINGS IN THE AUXILIARY BUILDING CONTROL TOWER AREA	CONS'T.	OPEN	
	c.	COMPLETE TABLE 12-1 FOR SOILS INVESTIGATION AND PLANNED REMEDIAL MEASURES. <u>RESPOND TO NRC.</u>	ENG./CONS'T.	OPEN	
13	a	COMPLETE SEISMIC REANALYSIS OF DGB TO ACCOUNT FOR CURRENT LACK OF COMPACTION	ENG.	OPEN	
	b.	REVIEW D.G.B. DESIGN AND CAT. I EQUIPMENT, PIPING AND ELEC. SYSTEMS TO THE ENVELOPED SEISMIC RESPONSES	ENG	OPEN	
	c.	SERVICE WATER PUMP STRUCTURE - CONDUCT A SEISMIC REANALYSIS TO ACCOUNT FOR REVISED SOIL-STRUCTURE INTERACTION - REVIEW STRUCTURAL DESIGN AND CAT. I EQUIPMENT, PIPING AND ELEC. SYSTEMS AND INCORPORATE THE SEISMIC RESPONSES OF THE	ENG.	OPEN	

SB 16683

REARTEL

ACTION ITEMS FROM RESPONSE TO
50.54 F

QUESTIONS 2 - 27

50.54 F QUESTION NO	ACTION ITEM	ACTION DESCRIPTION	RESPONSIBILITY	ACTION/ COMPLE- TION DATE	DATE COMPLE
13	d.	AUXILIARY BUILDING - IF SIGNIFICANT CHANGE OF FOUNDATION PROPERTIES RESULTS, CONDUCT A SEISMIC REANALYSIS. - REVIEW STRUCTURAL DESIGN AND CAT I EQUIP, PIPING, AND ELEC. SYSTEMS AND INCORPORATE THE SEISMIC RESPONSE OF THE RE- ANALYSIS.	ENG.	OPEN	
	r.	UNDERGROUND UTILITIES. - INVESTIGATE THE CHANGE IN DIFFERENTIAL DISPLACE- MENT SEPARATELY FOR BUILDINGS FOUNDED ON FILL PENDING RESULTS OF SEISMIC REANALYSIS	ENG.	OPEN	
14	a	REVIEW ESTIMATED SETTLE- MENT VALUES FOR BORATED WATER STORAGE TANKS UPON COMPLETION OF LOAD TEST PROGRAM	ENG.	OPEN	
	b.	FOR FLEXIBLE BUILDINGS - ANALYZE FOR DIFFERENTIAL SETTLEMENT BASED ON STIFFNESS AT THE TIME OF DISTORTION, EVALUATE FORCES DUE TO ARCHING AND	ENG.	OPEN	

ACTION ITEMS FROM RESPONSE TO
50.54 F

PAGE 9 OF 11

QUESTIONS 2-22

50.54 F QUESTION NO	ACTION ITEM	ACTION DESCRIPTION	RESPONSIBILITY	ACTION COMPLE- TION DATE	DATE COMPLE
14.	c	EXAMINE AUXILIARY BUILDING, A FEEDWATER ISOLATION VALVE PITS AND BORATED WATER STORAGE TANK RING FOUNDATIONS FOR CRACKS - MAP SIGNIFICANT CRACKS.	CONS'T.	6-79	
	d.	ANALYZE BUILDINGS EFFECTED BY DIFFERENTIAL SETTLE- MENT FOR OBSERVED DIFF. ERENTIAL SETTLEMENT PLUS PREDICTED DIFFERENTIAL SETTLEMENT.	ENG.	8-79	
	e.	PREPARE ADDITIONAL RESPONSE TO THE NRC TO PROVIDE ANALYSIS AND EVALUATION	ENG	8-79	
15	a.	FOR SEISMIC CATEGORY I STRUCTURES EVALUATE DIFFERENTIAL SETTLEMENTS IN ACCORDANCE WITH ACI 318-71	ENG.	12-79	
	b.	EXPAND THE MIDLAND STRUCTURAL DESIGN CRITERIA FOR CLASS I STRUCTURES TO INCLUDE THE DIFFERENTIAL SETTLEMENT EFFECTS.	ENG.	12-79	

SB 10685

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ACTION ITEMS FROM RESPONSE TO
50.54 F.
QUESTIONS 2-22

50.54 F QUESTION NO	ACTION ITEM	ACTION DESCRIPTION	RESPONSIBILITY	ACTION/ COMPLE- TION DATE	DATE COMPLE:
15	C	<u>PREPARE ADDITIONAL RESPONSE TO THE NRC</u>	ENG.	12-79	
16	Q	PERFORM SOIL BORINGS IN THE AREAS OF BURIED PIPES.	CONST/ENG	8-79	
17	Q	COMPLETE EVALUATION OF IMPACT OF THE FAILURE OF NON-SEISMIC CATEGORY I PIPING ON SAFETY-RELATED STRUCTURES, FOUNDATIONS AND/ OR EQUIPMENT	ENG.	6-29-79	
	b	IF FUTURE PROFILES SHOW ANY EXTREME CONDITIONS, ANALYZE THE PIPING SYSTEM AND MAKE NECESSARY REPAIRS.	CONST/ENG	OPEN	
	C	<u>PREPARE ADDITIONAL RESPONSE TO THE NRC</u>		6-29-79	
18	Q	PERFORM REEXAMINATION OF STRESSES IN SEISMIC CAT. I PIPING CONNECTING BETWEEN BUILDINGS AS PART OF NORMAL ITERATION OF DESIGN. CONSIDER STRESSES INDUCED BY DIFFERENTIAL SETTLEMENT AFTER ANNUAL INSPECTION	ENG.	OPEN	

SB 16686

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ACTION ITEMS FROM RESPONSE TO
50.54 F
QUESTIONS 2-22

50.54 F QUESTION NO	ACTION ITEM	ACTION DISCRPTION	RESPONSIBILITY	ACTION/ COMPLE- TION DATE	DATE COMPLE
19	a	PROFILE PIPES IN VICINITY OF D.C.B AFTER REMOVAL OF PRELOAD - EVALUATE AS DESCRIBED IN RESPONSE 17.	CONS'T/ENG	OPEN	
	b	TAKE ADDITIONAL GAP MEASUREMENTS BETWEEN EMBEDDED SLEEVES AND PIPES WHEN SURCHARGE IS REMOVED. COORDINATE THIS INFORMATION WITH THE PROFILE DATA.	CONS'T/ENG	OPEN	
	c	PERFORM A COMPLETE EVALUATION OF SAFETY RELATED PIRING AFTER COMPLETION OF THE PRELOAD PROGRAM.	ENG.	8-79	
20	a	ANALYTICALLY CHECK AFFECTED PUMP AND NOZZLE LOADINGS, IF NECESSARY DISASSEMBLE FLANGE JOINTS AND EVALUATE SEPARATION.	ENG/CONS'T,	6-29-79	
	b	VERIFY PIPING SUPPORT LOADS FOR SYSTEMS SUBJECTED SETTLEMENT INDUCED LOADS.	ENG.	6-29-79	SB 16687

MEMO
FROM - G. RICHARDSON 5/18/79

To: J. Clements
R. Baltazar
L. Dreisbach
J. Wanzeck
B. Dhar
P. Chen
C. McConnel
M. O'Mara
~~A. [REDACTED]~~
J. Newgen
R. Simanek
S. Afifi
J. Milandin
D. Riat

For your information.

Gary
G. Richardson

cc: K. Wiedner
P. Martinez
W. Moring
J. Hink



SB016637A

ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPI
		From response to Question 1			
1	1-3 (Item 1)	Perform a final review and update of the PSAR commitment list.	J. Clements	9-28-79	
2	1-4 (Item 2)	Review sections of the FSAR determined to be inactive	J. Clements	11/1/79 9-28-79	
3	1-4 (Item 3)	Review EDP 4.22	R. Baltazar	6-29-79	
4	1-4 (Item 4)	Audit action items 1-3	L. Dreisbach	10-26-79	
5	1-4 & I-5 (Item 2)	Review specifications not included in the specificity study initially	R. Baltazar	6-29-79	
	App. I I-8 (D.2.C)				
		FROM APPENDIX I			
6	I-6 (C.1.b)	Complete review of the Dames and Moore Report	J. Wanzeck B. Dhar	6-29-79	
7	I-6 (C.3)	Complete review of pertinent portions of the FSAR Sections 2.5 and 3.8	P. K. Chen B. Dhar	6-29-79	
8	I-6 (C-4.a)	Correct settlement calculations	P. K. Chen	Subse- quent to D.G.B. sur- charge	
9	I-7 (C.4.c)	Schedule audits of the geo-tech section on a six months basis.	L. Dreisbach	7-27-79 (first audit)	
10	I-7 (C.5.b)	Review drawing for possible effect of vertical duct bank restrictions	C. McConnel	6-1-79	
11	I-7/8 (D.1)	Complete actions in response to DRVCL audit	R. Baltazar	5-18-79	

ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

Page 2 of 8

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DIScription	RES PONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLI
12	I-8 (D.2.d)	Revise EDP 4.49.1 to incorporate clarifications & instructions for use of SCN	M. O'Mara	5-1-79	5-4-79
13	I-8/9 (D.4)	Schedule audits of each design discipline calculations on a yearly basis.	L. Dreisbach	6-27-79	5-4-79
14	I-11 (C.1)	Re-evaluate construction equipment used for compaction	A. Boos	Prior to resuming soils work	
15	I-11 (C.2.a)	Assign field soils engineer and soils engineer from the design section	J. Newgen	Prior to resuming soils work	5-1-79 (approx.)
16	I-11 (D.1)	Review cons't. specs and procedures to identify equip. requiring qualifications	A. Boos	6-29-79	
17	I-11 (D.2)	Review Field Procedure FPG-3.000 to assure clarity and completeness.	A. Boos	5-31-79	
18	I-16 (C.1.a) (C.1.b) I-17 (C.3.b)	Revise PQCI C-1.02 to provide inspection rather than surveillance and to record inspections	R. Simanek	Prior to resuming soils work	
19	I-17 (C.3.a)	Complete indepth review of soil test results	S. Afifi	7-31-79	
20	I-18 (C.4.b) (D.3.c)	Perform indepth audit of U.S. Testing	L. Dreisbach	5-31-79	4-26-7
21	I-18 (D.1)	Review all active QCI's for surveillance callouts and modify where necessary.	R. Simanek	5-15-79	
22	I-18	Evaluate documentation callouts on QCIs	R. Simanek	6-29-79	

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ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLE
23	I-20 (D.5.f)	Incorporate scientific sampling plans for inspection	R. Simanek	Continu- ous (QCI for receipt by 5-15-79)	
24	I-22 (D.1.a)	Complete indepth review of the Bechtel Trend Program	J. Milandin	6-1-79	
25	I-22 (D.1.b)	Conduct QA Training	J. Milandin	6-1-79	

ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRPTION CPCO ACTIONS	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLI
CPCo #1	I-11 (C.2.b) I-16 (C.1.c) I-17 (C.3.c)	Implement overinspection for soils placement and U.S. Testing Activities	CPCo - QA		
CPCo #2	I-22 (D.2)	Conduct QA Training	CPCo - QA	6-1-79	

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ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
3	a	Clarify response to FSAR Question 362.12	J. Clements B. Dhar	5-79 FSAR Amend.	
4	a	Provide criteria for permissible residual settlement	B. Dhar S. Afifi	8-79	
	b:	Provide details of treatment of loose sands	B. Dhar S. Afifi	8-79	
	c	Take dynamic moduli measurements upon removal of preloads for D.G.B. and other buildings	S. Afifi	Open	
	d	Use data (c) to evaluate the seismic response of these structures	B. Dhar	Open	
	e	<u>Prepare additional response to NRC for items 4a and 4b</u>	B. Dhar S. Afifi	8-79	
6	a	Fill borated water storage tanks with water to demonstrate satisfactory fill	B. Dhar	Open	
	b	Delay piping connections on BWST's until most of the settlement has occurred	B. Dhar	Open	
	c	Use settlement data on BWST's to allow conservative piping connection design	B. Dhar	Open	
	d	Evaluate settlement of diesel fuel oil tanks - provide precise corrective measures if required	S. Afifi	Open	
7	a	Perform continuity check on duck banks after completion of preload program	B. Dhar	Open	
	b	Make results of continuity checks and settlement surveys available	B. Dhar	8-79	
	c	If further corrective action is required, determine corrective measures	B. Dhar	Open	

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ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

Page 6 of 8

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLI
8	a	Realign diesel generators if manufacture's tolerances for pitch ^{AND} roll are exceeded	B. Dhar	Open	
12	a	Complete one additional boring in middle of diesel fuel oil tanks area	J. Wanzeck	Open	
	b	Complete three additional borings in the auxilary building control tower area	J. Wanzeck	Open	
	c	Complete table 12-1 for soils investigation and planned remedial measures. <u>Respond to NRC.</u>	B. Dhar	5-79	
13	a	Complete seismic reanalysis of D.G.B. to account for current lack of compaction	B. Dhar	Open	
	b	Review D.G.B. design and Cat. 1 equipment, piping and elec. systems to the enveloped seismic responses	B. Dhar	Open	
	c	Service water pump structure - Conduct a seismic reanalysis to account for revised soil - structure interaction. - Review structural design and Cat. 1 equipment, piping and elec. systems and incorporate the seismic responses of the reanalysis	B. Dhar	Open	
	d	Auxiliary Building - If significant change of found- ation properties results, conduct a seismic reanalysis. - Review structural design and cat. 1 equip, piping, and elec. systems and incorporate the seismic response of the re- analysis.	S. Afifi B. Dhar	Open	

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ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

50.54f QUESTION NO.	ACTION ITEM	ACTION DESCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
13	e	Underground Utilities - Investigate the change in differential displacement separately for buildings founded on fill pending results of seismic reanalysis	B. Dhar S. Afifi	Open	
14	a	Review estimated settlement values for borated water storage tanks upon completion of load test program	S. Afifi	Open	
	b	For flexible buildings - analyze for differential settlement based on stiffness at the time of distortion. Evaluate forces due to arching and combine with loads from Question 15	B. Dhar	Open	
	c	Examine auxiliary building, feed-water isolation valve pits and borated water storage tank ring foundations for cracks - map significant cracks.	B. Dhar	6-79	
	d	Analyze building effected by differential settlement for observed differential settlement plus predicted differential settlement.	B. Dhar S. Afifi	8-79	
	e	<u>Prepare additional response to the NRC to provide analysis and evaluation</u>	B. Dhar	8-79	
15	a	For Seismic Category I structures evaluate differential settlements in accordance with ACI 318-71	B. Dhar	12-79	
	b	Expand the Midland structural design criteria for Class I structures to include the differential settlement effects.	B. Dhar	12-79	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	12-79	

ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLE
16	a	Perform soils borings in the areas of buried pipes.	J. Wanzeck	8-79	
17	a	Complete evaluation of impact of the failure of non-seismic Category I piping on safety-related structures, foundations and/or equipment.	B. Dhar	6-29-79	
	b	If future profiles show any extreme conditions, analyze the piping system and make necessary repairs.	B. Dhar	Open	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	6-29-79	
18	a	Perform re-examination of stresses in seismic Cat. I piping connecting between buildings as part of normal iteration of design. Consider stresses induced by differential settlement after connecting pipe and anticipated future settlement.	D. Riat	Open	
19	a	Profile pipes in vicinity of D.G.B after removal of preload-evaluate as described in Response 17.	C. Connel	Open	
	b	Take additional gap measurements between embedded sleeves and pipes when surcharge is removed. Coordinate this information with the profile data.	C. McConnell	Open	
	c	Perform a complete evaluation of safety related piping after completion of the preload program.	D. Riat	8-79	
20	a	Analytically check affected pump and nozzle loadings. If necessary disassemble flange joints and evaluate separation.	D. Riat	6-29-79	
	b	Verify piping support loads for systems subjected to settlement induced loads.	D. Riat	6-29-79	
	c	<u>Prepare additional response to the NRC.</u>	D. Riat	6-29-79	

SB 16695

Bechtel Associates Professional Corporation
Inter-office Memorandum

To Distribution
 Subject Midland Plant: Units 1 & 2
 Job 7220
 Meeting Notes No. 956
 Fixes to Category 1
 Structures
 Copies to File: C-2647, C-2648
 Com Log

Date May 15, 1979
 From R.L. Castleberry
 Of Engineering
 At Ann Arbor

RECEIVED
 MAY 17 1979

BECHTEL POWER CORP
 JOB 7220
 PER 13350 110

Attached for your information are the meeting notes discussing the fixes to category one structures as a result of subsurface conditions.

R.L. Castleberry
 R.L. Castleberry

DAZ/sp

Distribution:

- S. Afifi
- ~~_____~~
- T. Johnson
- P. Martinez
- G. Tuveson
- K. Wiedner

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Bechtel Associates Professional Corporation

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Ann Arbor, Michigan

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



MEETING NOTES NO. 956

MIDLAND PLANTS UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220

DATE: Thursday, April 5, 1979
PLACE: Bechtel Ann Arbor Office
SUBJECT: Fixes to Category I Structures
FILE: 0279, C-2646, C-2647, C-2648
ATTENDEES: Bechtel
S. Afifi
A. Almuti
A. Boos*
R. Castleberry
B. Dhar
T. Johnson
P. Martinez*
G. Tuveson
K. Wiedner

*Part-time

PURPOSE: Discussion of fixes to Category I structures

ITEMS DISCUSSED:

- 1) Soil borings in the fill relating to parts of the auxiliary building, isolation valve pits, and the service water structure were reviewed. The following was determined.
 - a) Fill under the control tower appears to be of good quality with the possibility of a local void or loose sand under the mud mat. Acceptable fill also appears to extend beyond the control tower to adjacent areas of the penetrations rooms. Additional borings will be taken to confirm localization of the void under the mud mat and to define the suitability of the fill east of the control tower. S. Afifi will advise on the number and location of additional soil borings in this area by April 20, 1979. A. Boos will advise S. Afifi on the feasible locations for additional borings by April 19, 1979.

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G. Tuveson will investigate the feasibility of extending a narrow trench under the edge of the railroad bay slab to determine contact between the slab and fill, and will act on this by April 20, 1979.

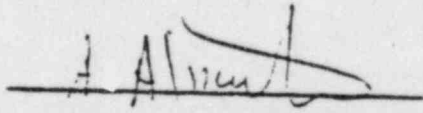
- b) Based on the data available in the railroad bay area, it was determined that the only fix needed is for liquefaction potential, if determined to exist.
 - c) Exploratory soil work will be performed during implementation of the fix under the penetration rooms to determine the extent of poor fill.
- 2) The following fixes were identified and agreed upon.
- a) Auxiliary building penetration rooms (Units 1 and 2) - Removal and replacement of poor fill was identified as the primary recommended solution. The civil/structural group will investigate how much of the structure will be supported by cantilever action, the extent of the cantilever, probable reaction at the free end of the structure, and the need for temporary supports prior to dewatering. A conceptual scheme for underpinning and replacement of soil will be prepared by the project. The conceptual scheme will show temporary supports and the likely extent of the soil replacement operation. The scheme should be submitted to W. Jones and members of the task force for cost estimates and review by April 25, 1979.
 - b) Isolation valve pits (Units 1 and 2) - Replacement of poor fill with lean concrete was agreed to as the recommended solution. The need to support these structures prior to dewatering will be investigated by the civil/structural group, and the conceptual design will be submitted with Item 2a above for cost estimate and review by April 25, 1979.
 - c) Railroad bay - It was agreed that chemical grouting should be considered in case susceptibility to liquefaction is determined to be potentially feasible. The grout will provide a bonding agent among the sand particles and improve the density and shear strength of the soil. Grouting from inside as well as outside the structure is feasible.
 - d) Service water structure - The northern end of the structure will be supported on jacking piles. Two schemes were discussed. One scheme will require local dewatering and jacking piles against the wall foundation. The second scheme considers jacking piles against a corbel that will be made part of the northern wall. Conceptual design of the two schemes will be presented by the civil/structural group to W. Jones for an order-of-magnitude cost estimate by April 23, 1979.

- 3) Dewatering - The concept of local dewatering to permit structural fixes was discussed.
- 4) Schedule - A meeting between A. Almuti, W. Jones, G. Tuveson, and B. Dhar will be arranged to discuss scheduling the activities connected with implementation of the fixes on April 26, 1979.

ACTION ITEMS:

	<u>Item</u>	<u>Reference Paragraph</u>	<u>Individual Responsible</u>	<u>Due Date</u>
1)	Define future soil boring program in the fill.	1a	S. Afifi	4/20/79
2)	Advise on feasible locations for additional borings in the control tower area.	1a	A. Boos	4/19/79
3)	Complete likely structural behavior determination for the penetration rooms.	2a	G. Tuveson/ B. Dhar	4/23/79
4)	Submit conceptual scheme for replacement of soil from underneath the penetration rooms and valve pits.	2a, 2b	G. Tuveson/ B. Dhar	4/25/79
5)	Provide piling schemes.	2d	G. Tuveson/ B. Dhar	4/23/79
6)	Arrange for scheduling meeting.	4	A. Almuti	4/26/79

Prepared by:


A. Almuti

AA/BD/DAZ/pd
4/30/1

SB 16639

A Boos
Bechtel Associates Professional Corporation
Inter-office Memorandum

To Meeting Attendees

Subject Meeting Notes of Midland
Diesel Generator Task Group
Job 7220-101

Copies to S. Blue, w/a
P. Hansen/R. Hermeston, w/a
T. Johnson, w/a
P. Martinez/R. Castleberry, w/a
J. Newgen, w/a
H. Wahl, wo/a

Date May 31, 1979

From Karl Wiedner

Of Engineering

At Ann Arbor

RECEIVED

JUN 4 1979

BECHTEL POWER CORP

JOB 7220

PER 3/4/52 (J) C-284

Attached for your information, record and further action are the meeting notes of the diesel generator task group meeting held on May 16, 1979. By copy of this memo, Phil Martinez is requested to forward copies of these notes to Consumers Power for their dissemination to their attendees.

KW

Karl Wiedner

KW/cf

Attachment

Attendees:

S. Afifi
A. Almuti
J. Betts

B. Dhar
A. Ganguly
J. Lillywhite
C. McConnel
G. Richardson
J. Wanzeck

SB 16700

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MEETING NOTES NO. 976

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: May 16, 1979
PLACE: Midland, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645 w/a

ATTENDEES:

Bechtel

CPCo

S. Afifi	P. Martinez*	D. Horn*
A. Almuti	C. McConnel	D. Sibbald*
J. Betts	G. Richardson	T. Thiruvengadam
A. Boos	J. Wanzeck	R. Wheeler*
R. Castleberry*	K. Wiedner	
B. Dhar		
A. Ganguly		
J. Lillywhite*		

*Part-time

PURPOSE: The meeting was held at the Midland jobsite to discuss the following items in relation to the diesel generator building settlement and other Seismic Category I structures on plant fill:

- A) Review of action items initiated in the meeting of April 26, 1979. Identify future action items as required.
- B) Resumption of Q-listed backfill placement. Review of status of the following site activities:
 - 1) Compaction Test

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- 2) Permeability test
- 3) Test pits
- C) Additional responses to the NRC's 10 CFR 50.54f questions which are due in May and June 1979
- D) Contracts on the following subjects for remedial work:
 - 1) Dewatering
 - 2) Chemical grouting
 - 3) Piling
 - 4) Underpinning
- E) Feasibility of using excavation and concreting in lieu of chemical grouting
- F) Next issue of interim report for MCAR 24
- G) Kepner-Tregoe analysis
- H) Next task group meeting

SUMMARY OF DISCUSSION:

A) Review of prior action items:

The current status of action items identified in the previous meeting held on April 26, 1979 is as follows (the numbers refer to the action items of Meeting Notes No. 957):

- 1) This item is open. Rechecking the reference elevations of profiled service water lines will no longer be possible. The Goldberg-Zoino-Dunncliff & Associates (GZD) profile devices record differences in height with respect to reference elevation at the time of profiling. The reference elevations used were difficult to establish during the initial profiling because of construction activities. Engineering will discuss with GZD a method of establishing more accurate reference elevations for profiling in the future.
- 2) This item is closed. A conceptual design on corrective actions for the auxiliary building area was given to cost and scheduling by project engineering on May 4, 1979.
- 3) This item is closed. A revised cost estimate, including the remedial work in the auxiliary building area, was issued on May 11, 1979.

- 4) This item is open. Two types of rebound anchors have been considered for installation. Installation of the ring type, in which measurement is taken by electrical means, is in progress. Measurement can be taken accurately up to 0.02 inches. The second type of rebound anchor, which uses a dial gage for measurement, will also be installed. Accuracy of measurement for the second type of anchor is 0.001 inch. It was indicated that accuracy of settlement measurement by optical survey can be greatly improved by taking relative measurements. It was decided that:
 - a) Geotech will decide the type of anchors for more accurate settlement measurement.
 - b) Construction will improve the accuracy of settlement measurement by optical surveying.
 - c) Construction, after discussion with geotech, will attach dial gages to the existing deep borros anchors inside the diesel building to obtain more accurate settlement values.
- 5) This item is still open. Settlement of the diesel generator building and foundations under the present surcharge load will be observed until June 6, 1979. On the basis of those observations, geotech will provide a projected date for the removal of the surcharge.
- 6) This item is closed. SCN C-83-9002 for Specification 7220-C-83 was issued on May 18, 1979.
- 7) This item is closed. Geotech received the coordinates of density tests.
- 8) This item is closed. Density test plots have been completed for the three areas of the power block. Test plots for an additional two areas to the north of the power block are in progress. These additional plots will be done by June 18, 1979.
- 9) This item is open. Separation of Canonie's work from Bechtel's work will be completed by May 30, 1979. It was decided that completion of this item has a higher priority than the completion of test plots in the additional two areas noted in Item 8.
- 10) This item is closed. Information regarding critical areas of service water lines for separation of Canonie's and Bechtel's work was given to construction in a letter (BEBC-2946), on May 10, 1979.

- 11) This item is closed as a task group action item. Project engineering indicated that installation dates of pipe hangers and anchors will be requested from construction on a case-by-case basis. Project engineering will issue a memo to construction relaying the above information.
- 12) This item is open. Project engineering reported that there are not sufficient spare conduits in Q-listed duct banks for future continuity checks of conduits. It was decided that immediately after the removal of surcharge, a single continuity check will be made for the conduits and duct banks in the diesel generator building area. In other areas project engineering will establish a surveillance requirement for duct banks and conduits as soon as possible. The surveillance program will be consistent with the responses to the NRC's 10 CFR 50.54f Question 12.
- 13) This item is open. After consulting with the client geotech will provide additional discussion on time-settlement in the July amendment of FSAR Section 2.5.
- 14) This item is closed. The conceptual design of flexible pipe connections to the condensate tanks has been approved by CPCo. Project engineering will issue the design details for construction by May 25, 1979.
- 15) This item is closed. There is no specific suction head requirement for the condensate tanks other than that the bottom of the tanks (i.e., the top of the concrete ring foundations) should be above grade. To accomplish the above requirement, project engineering will investigate the feasibility of regrading the area if the tank foundations undergo any settlement. (Writer's Note: Project engineering's investigation after the meeting indicated that the area around the condensate tank foundations can be regraded if necessary to keep the top of the foundation above grade. So, at present, the top of the ring-foundation will be as indicated in the design drawing.)
- 16) This item is closed. Revised Drawing C-1040, showing the surcharge requirements for the transformer foundation area, was issued on May 14, 1979.
- 17) This item is closed. Project engineering reviewed construction's proposal of Unit 1 stator movement and its effect on the turbine building south wall. Results of the review indicated that, in order to ensure the safety of the turbine building wall, the stator cannot be moved over the transformer area while the surcharge is on.

18-21) These items are closed. Construction reported that there is an existing crossover connection between the two tanks. It is possible to construct and use either of the borated water storage tanks for preloading, flushing, and hydrostatic testing. Construction also mentioned that one tank must be available before November 1, 1979.

It was decided that:

- a) The Unit 2 tank will be built as soon as possible and will be used for startup flushing and hydrostatic testing of pipes.
 - b) The Unit 1 tank will be built and test loaded for settlement monitoring for 3 months.
 - c) After 3 months the Unit 2 tank will be test loaded for settlement.
 - d) Piping connections to these tanks will be done before settlement monitoring. The response already made to the NRC's 10 CFR 50.54f Question 6 will be revised to indicate that piping connections will not be delayed until completion of the test load.
- 22) This item is open. Flexibility analysis of the piping connected to borated water tanks will be done assuming 4 inches of differential settlement between the tanks. Project engineering will also investigate the feasibility of eliminating link sealing at the pipe penetrations in the wall to provide room for settlement.
- 23) This item is closed. The sand drain and guardhouse problem has been solved. Guardhouse foundation work will be treated as normal project engineering work.
- 24,25) These items are open. Comments on FSAR Section 2.5 will be resolved and incorporated in the July amendment of the FSAR.
- 26) This item is still open. Geotech and engineering will resolve comments on FSAR Q&R 362.15 by May 31, 1979.
- 27) This item is open. Project engineering indicated that the service water structure wall will be able to withstand the hydrostatic pressure due to liquefaction under SSE conditions. It was decided that project engineering will further analyze the service water structure wall, assuming the worst possible load condition due to liquifaction effect, in OBE condition by June 4, 1979.

- 28) This item is open. Cracks in the valve pit west of the railroad bay, feedwater isolation valve pits, borated water storage tank foundations, and valve pit below those tanks have been measured and mapped. Plotting of these cracks in drawings will be completed by June 1, 1979.
 - 29) This item is closed. Construction of concrete over the emergency diesel fuel oil storage tanks has been released by BEBC-2907, dated May 1, 1979. Nozzle load capacity to withstand settlement has been found to be very low. Necessary actions regarding the nozzles will be taken after the completion of the settlement program.
 - 30) This item is closed. Project engineering finalized the method of temporarily supporting the auxiliary building penetration room during dewatering. If required, that portion of the auxiliary building will be supported by a temporary tower resting on the containment ring girder and turbine building crane column.
 - 31) This item is closed. A preliminary pile design for the service water structure has been completed. Drawings are in the process of being completed.
 - 32,33) These items are closed. An updated schedule for corrective actions in portions of the auxiliary building and service water structure has been issued.
 - 34-36) Discussion of these items is included in the discussion of Agenda Item D.
 - 37) This item is closed. Project engineering has received input regarding chemical grouting from geotech.
 - 38) This item is closed. A preliminary listing of portions of the remedial work which is to be Q-listed has been completed. These items will be identified in the respective specifications.
 - 39) This item (Kepner-Tregoe analysis) is covered in the discussion of Agenda Item G.
- B) Resumption of Q-listed backfill placement (Reference Attachment 2 to Meeting Notes No. 957)

Action items listed in the referenced attachment were reviewed and discussed. It was decided that:

- 1) Project engineering and geotech will complete all action items assigned to them to enable starting Q-listed backfill placement by May 21, 1979. Revised Specification 7220-C-211 will be issued by May 18, 1979.

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- 2) Placement of non-Q-listed backfill will begin immediately after completion of the qualification test, possibly by May 17, 1979.
- 3) Remedial actions, as required, will be taken in the area of the broken compressor air line under the tank farm.
- 4) Excavation of test pits in the tank farm, service water pump structure area, and the dike area will begin by May 18, 1979.

It was reported that the compaction test for 4-inch lift thickness in sand has been completed. The remainder of the compaction test program and the permeability test program are in progress.

- C) Additional responses to the NRC's 10 CFR 50.54f questions due in May and June 1979.

Actions items related to responses to the NRC's 10 CFR 50.54f questions were discussed and assigned to members of the task group, as shown in Attachment 1 to these meeting notes.

Geotech and project engineering will prepare responses to Question 12. Responses will include remedial actions to be taken on the buried pipes and duct banks in areas other than the diesel generator building. If possible, references will be made to earlier responses to similar questions where the same rationale has been applied.

The following schedule was set for this item:

- 1) A draft of responses will be sent to CPCo on May 22, 1979, after Bechtel's in-house review.
- 2) CPCo will send its comments to Bechtel project engineering by May 25, 1979.
- 3) Updated responses to these 22 questions will be issued in the beginning of June 1979.

- D) Contracts on remedial work

A preliminary schedule (Attachment 2) for four items i.e., dewatering, chemical grouting, piling, and underpinning work was presented to CPCo on May 11, 1979.

- 1) Dewatering

Dewatering will be a sole-source contract item. A draft of the specification has been given to construction for review. It was emphasized that early completion of the dewatering operation is important to accommodate removal of surcharge

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from the diesel building area. Efforts will be made to expedite the dates shown in Attachment 2 for the dewatering contract package. (Writer's Note: Project engineering will try to issue the dewatering subcontract package for client review and bids by June 1, 1979.)

2) Chemical grouting

It was decided that the grouting consultant will provide equipment and operators, and Bechtel will provide all labor. (Writer's Note: Construction suggested that the feasibility of subcontracting this work should be investigated in order to facilitate the administrative part of the work.)

3) Piling

Project engineering reported that the preliminary piling design for the service water structure has been finalized. The specification will be issued for bids and client review by July 2, 1979. It was decided that an effort will be made to include this portion of the piling work as an add-on to the existing piling subcontract work in other areas. Project engineering will expedite the issue of the specification for that purpose. (Writer's Note: Construction reported that it is feasible to include service water structure piling work as an add-on to other piling work as long as the progress of other work is not affected.)

4) Underpinning

Preparation of the underpinning bid package is in progress. For this phase of remedial work in the auxiliary building wings and valve pit area, project engineering will issue the specification for in-house review by June 1, 1979.

A standby support system for these auxiliary building wings will be constructed prior to dewatering so that the wings can be supported if necessary. Project engineering will complete the design of the support system by June 4, 1979, and inform construction of the amount of structural steel to be procured for fabrication.

E) Chemical grouting versus excavation

Preliminary cost information indicates that the method of soil stabilization by chemical grouting is very expensive. As an alternative to grouting, excavation of bad soil and then filling with lean

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concrete will be considered. A cost estimate and schedule impact study of the alternative method will be made. Geotech, along with the soil consultants will make a detailed review of the boring data and associated calculations made for establishing the liquefaction potential. Geotech will then define more precisely the areas of liquefaction potential.

F) MCAR 24 - Next interim report

It was decided that the next interim report on MCAR 24 should be ready by June 8, 1979, for the client review meeting. Details of remedial work in all areas other than the diesel generator building will be included in the report.

G) Kapner-Tregoe (K-T) Analysis

Geotech is preparing a report on the study of U.S. Testing's density tests. A separate meeting regarding action items related to K-T analysis will be held after the completion of the report.

H) The tentative date for the next task group meeting is June 6, 1979.

ACTION ITEMS:

Project Engineering

- 1) Discuss with GZD and develop a method of establishing accurate reference elevations for profiling utilities.

Geotech

- 2) Establish a criterion for rebound anchor measurement by May 18, 1979.

Construction

- 3) Investigate the feasibility of improving the accuracy of settlement measurement by optical surveying.

Geotech/Construction

- 4) Attach dial gages to the existing deep borros anchors inside the building for settlement measurements by June 1, 1979.

Geotech

- 5) Provide by June 6, 1979, a schedule and procedure for the removal of the surcharge.

Construction

- 6) Complete separation of Canonia's work from Bechtel's work on density test plots, including the service water pipe area, by May 30, 1979.

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- | | |
|-----------------------------|--|
| Construction | 7) Complete density test plots in two additional areas north of the auxiliary building by June 18, 1979. |
| Project Engineering | 8) Establish surveillance requirements for Q-listed duct banks and conduits by June 1, 1979. |
| Geotech | 9) Provide additional discussion on time settlement in FSAR Section 2.5 in the July 1979 amendment. |
| Project Engineering | 10) Issue the final design of flexible pipe connections to the condensate tanks by May 25, 1979. |
| Project Engineering | 11) Issue a memo to construction indicating that installation dates of pipe supports will be requested from them on a case-by-case basis. |
| Construction | 12) Expedite erection of both the condensate tanks starting with the Unit 2 tank, by June 29, 1979. |
| Project Engineering | 13) Revise by May 22, 1979, the response to Question 6 of the NRC's 10 CFR 50.54f request indicating that piping connections to the borated water storage tanks will not be delayed. |
| Project Engineering | 14) Analyze the flexibility of piping connected to the borated water storage tanks, assuming 4 inches of differential settlement. Also investigate the feasibility of eliminating link sealing from the pipe penetrations in the wall. |
| Construction/CPCo | 15) Provide engineering with comments to FSAR Section 2.5 by May 31, 1979. |
| Geotech/Project Engineering | 16) Incorporate comments on FSAR Section 2.5 by June 8, 1979. |
| Geotech/Project Engineering | 17) Resolve comments on FSAR Q&R 362.15 by May 31, 1979. |
| Project Engineering | 18) Analyze the service water structure wall for the worst possible loading due to liquefaction in OBE condition by June 4, 1979. |

- Project Engineering 19) Complete crack mapping in the areas of the railroad bay, feedwater isolation valve pit, and borated water storage tanks by June 1, 1979.
- Project Engineering 20) Identify Q-listed portions of remedial work in the respective specifications.
- Geotech/Project Engineering 21) Complete all open action items in accordance with Attachment 2 of Meeting Notes No. 957, to enable starting of Q-listed backfill on May 21, 1979.
- Geotech/Construction 22) Take necessary remedial action to solve the problem of the broken compressor air line under the tank farm by May 18, 1979.
- Geotech/Project Engineering 23) Prepare responses to Question 12 of the NRC's 10 CFR 50.54f questions and send a draft of responses to CPCo for review by May 22, 1979.
- Project Engineering 24) Prepare dewatering contract package and award the contract in accordance with the schedule given in Attachment 2.
- Project Engineering 25) Investigate the feasibility of subcontracting the chemical grouting work.
- Project Engineering 26) Award a TSA or subcontract on chemical grouting by June 4, 1979.
- Project Engineering 27) Issue underpinning bid package for in-house review by June 1, 1979.
- Project Engineering 28) Complete design of temporary support for the auxiliary building penetration room by June 4, 1979.
- Project Engineering 29) Provide construction with the amount of structural steel to be procured for the fabrication of temporary support by June 1, 1979.

- Geotech 30) Review soil boring data and define more precisely the areas of the diesel generator building susceptible to liquefaction by June 11, 1979.
- Cost & Scheduling/
Project Engineering 31) Provide a cost estimate and a schedule for using excavating and concreting, in lieu of chemical grouting in the diesel generator building area.
- Project Engineering 32) Prepare the sixth interim report of MCAR 24 by June 8, 1979, for the client review meeting.
- Geotech 33) Complete the report on U.S. Testing's density tests for review in the next meeting on K-T analyses.

A. Ganguly
A. Ganguly

AG/js
5/21/4

- Attachments: 1) Action items from response to the NRC's 10 CFR 50.54f questions (8 pages)
2) Preliminary schedule for corrective actions dated May 12, 1979

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ATTACHMENT

1

ACTION ITEMS FROM RESPONSE
TO

50.54f QUESTION NO. 1

Page 1 of 8

TO MEETING NOTES NO. 976

dt. 9-16-79

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLETION DATE	DATE COMPI
		From response to Question 1			
1	1-3 (Item 1)	Perform a final review and update of the PSAR commitment list.	J. Clements	9-28-79 1-1-80	
2	1-4 (Item 2)	Review sections of the FSAR determined to be inactive	J. Clements	9-28-79 1/1/80	
3	1-4 (Item 3)	Review EDP 4.22	R. Baltazar	6-29-79	
4	1-4 (Item 4)	Audit action items 1-3	L. Dreisbach	10-26-79	
5	1-4 & 1-5 (Item 2)	Review specifications not included in the specificity study initially	R. Baltazar	6-29-79	
	App. I I-8 (D.2.C)				
		FROM APPENDIX I			
6	I-6 (C.1.b)	Complete review of the Dames and Moore Report	J. Wanzeck B. Dhar	6-29-79	
7	I-6 (C.3)	Complete review of pertinent portions of the FSAR Sections 2.5 and 3.8	P. K. Chen B. Dhar	6-29-79	
8	I-6 (C-4.a)	Correct settlement calculations	P. K. Chen	Subsequent to D.G.B. surcharge	
9	I-7 (C.4.c)	Schedule audits of the geo-tech section on a six months basis.	L. Dreisbach	7-27-79 (first audit)	
10	I-7 (C.5.b)	Review drawing for possible effect of vertical duct bank restrictions	C. McConnel	6-1-79	
11	I-7/8 (D.1)	Complete actions in response to DRVCL audit	R. Baltazar	5-18-79	

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ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLE
12	I-8 (D.2.d)	Revise EDP 4.49.1 to incorporate clarifications & instructions for use of SCN	M. O'Mara	5-1-79	5-4-79
13	I-8/9 (D.4)	Schedule audits of each design discipline calculations on a yearly basis.	L. Dreisbach	6-27-79	5-4-79
14	I-11 (C.1)	Re-evaluate construction equipment used for compaction	A. Boos	Prior to resuming soils work	
15	I-11 (C.2.a)	Assign field soils engineer and soils engineer from the design section	J. Newgen	Prior to resuming soils work	5-1-79 (approx)
16	I-11 (D.1)	Review cons't. specs and procedures to identify equip. requiring qualifications	A. Boos	6-29-79	
17	I-11 (D.2)	Review Field Procedure FPG-3.000 to assure clarity and completeness.	A. Boos	5-31-79	
18	I-16 (C.1.a) (C.1.b) I-17 (C.3.b)	Revise PQCI C-1.02 to provide inspection rather than surveillance and to record inspections	R. Simanek	Prior to resuming soils work	
19	I-17 (C.3.a)	Complete indepth review of soil test results	S. Afifi	7-31-79	
20	I-18 (C.4.b) (D.3.c)	Perform indepth audit of U.S. Testing	L. Dreisbach	5-31-79	4-26-
21	I-18 (D.1)	Review all active QCI's for surveillance callouts and modify where necessary.	R. Simanek	5-15-79 6-29-79	
22	I-18	Evaluate documentation callouts on QCIs	R. Simanek	6-29-79	

ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
23	I-20 (D.5.f)	Incorporate scientific sampling plans for inspection	R. Simanek	Continu- ous (QCI for receipt by 5-15-79)	
24	I-22 (D.1.a)	Complete indepth review of the Bechtel Trend Program	J. Milandin	6-1-79	
25	I-22 (D.1.b)	Conduct QA Training	J. Milandin	6-1-79	

ACTION ITEMS FROM RESPONSE
TO
50.54f QUESTION NO. 1

ACTION ITEM NO.	50.54f RESPONSE PAGE NO. (PARA.)	ACTION DISCRPTION CPCO ACTIONS	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPLET
CPCo #1	I-11 (C.2.b) I-16 (C.1.c) I-17 (C.3.c)	Implement overinspection for soils placement and U.S. Testing Activities	CPCo - QA		
CPCo #2	I-22 (D.2)	Conduct QA Training	CPCo - QA	6-1-79	

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ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DAI COMP
3	a	Clarify response to FSAR Question 362.12	J. Clements B. Dhar	5-79 FSAR Amend.	
4	a	Provide criteria for permissible residual settlement	B. Dhar S. Afifi	8-79	
	b	Provide details of treatment of loose sands	B. Dhar S. Afifi	8-79	
	c	Take dynamic moduli measurements upon removal of preloads for D.G.B. and other buildings	S. Afifi	Open	
	d	Use data (c) to evaluate the seismic response of these structures	B. Dhar	Open	
	e	<u>Prepare additional response to NRC for items 4a and 4b</u>	B. Dhar S. Afifi	8-79	
6	a	Fill borated water storage tanks with water to demonstrate satisfactory fill	B. Dhar	Open	
	b	Delay piping connections on BWST's until most of the settlement has occurred	B. Dhar	Open	
	c	Use settlement data on BWST's to allow conservative piping connection design	B. Dhar	Open	
	d	Evaluate settlement of diesel fuel oil tanks - provide precise corrective measures if required	S. Afifi	Open	
7	a	Perform continuity check on duck banks after completion of preload program	B. Dhar	Open	
	b	Make results of continuity checks and settlement surveys available	B. Dhar	8-79	
	c	If further corrective action is required, determine corrective measures	B. Dhar	Open	

SB 16717

ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL.
8	a	Realign diesel generators if manufacture's tolerances for pitch ^{AND} roll are exceeded	B. Dhar	Open	
12	a	Complete one additional boring in middle of diesel fuel oil tanks area	J. Wanzeck	Open	
	b	Complete three additional borings in the auxilary building control tower area	J. Wanzeck	Open	
	c	Complete table 12-1 for soils investigation and planned remedial measures. <u>Respond to NRC.</u>	B. Dhar	5-79	
13	a	Complete seismic reanalysis of D.G.B. to account for current lack of compaction	B. Dhar	Open	
	b	Review D.G.B. design and Cat. 1 equipment, piping and elec. systems to the enveloped seismic responses	B. Dhar	Open	
	c	Service water pump structure - Conduct a seismic reanalysis to account for revised soil - structure interaction. - Review struc ural design and Cat. 1 equipment, piping and elec. systems and incorporate the seismic responses of the reanalysis	B. Dhar	Open	
	d	Auxilary Building - If significant change of found- ation properties results, conduct a seismic reanalysis. - Review structural design and cat. 1 equip, piping, and elec. systems and incorporate the seismic response of the re- analysis.	S. Afifi B. Dhar	Open	

ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

50.54f QUESTION NO.	ACTION ITEM	ACTION DESCRIPTION	RESPONSIBILITY	ACTION COMPLETION DATE	DATE COMPL
13	e	Underground Utilities - Investigate the change in differential displacement separately for buildings founded on fill pending results of seismic reanalysis	B. Dhar S. Afifi	Open	
14	a	Review estimated settlement values for borated water storage tanks upon completion of load test program	S. Afifi	Open	
	b	For flexible buildings - analyze for differential settlement based on stiffness at the time of distortion. Evaluate forces due to arching and combine with loads from Question 15	B. Dhar	Open	
	c	Examine auxiliary building, feed-water isolation valve pits and borated water storage tank ring foundations for cracks - map significant cracks.	B. Dhar	6-79	
	d	Analyze building effected by differential settlement for observed differential settlement plus predicted differential settlement.	B. Dhar S. Afifi	8-79	
	e	<u>Prepare additional response to the NRC to provide analysis and evaluation</u>	B. Dhar	8-79	
15	a	For Seismic Category I structures evaluate differential settlements in accordance with ACI 318-71	B. Dhar	12-79	
	b	Expand the Midland structural design criteria for Class I structures to include the differential settlement effects.	B. Dhar	12-79	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	12-79	

ACTION ITEMS FROM RESPONSE TO
50.54f
QUESTIONS 2-22

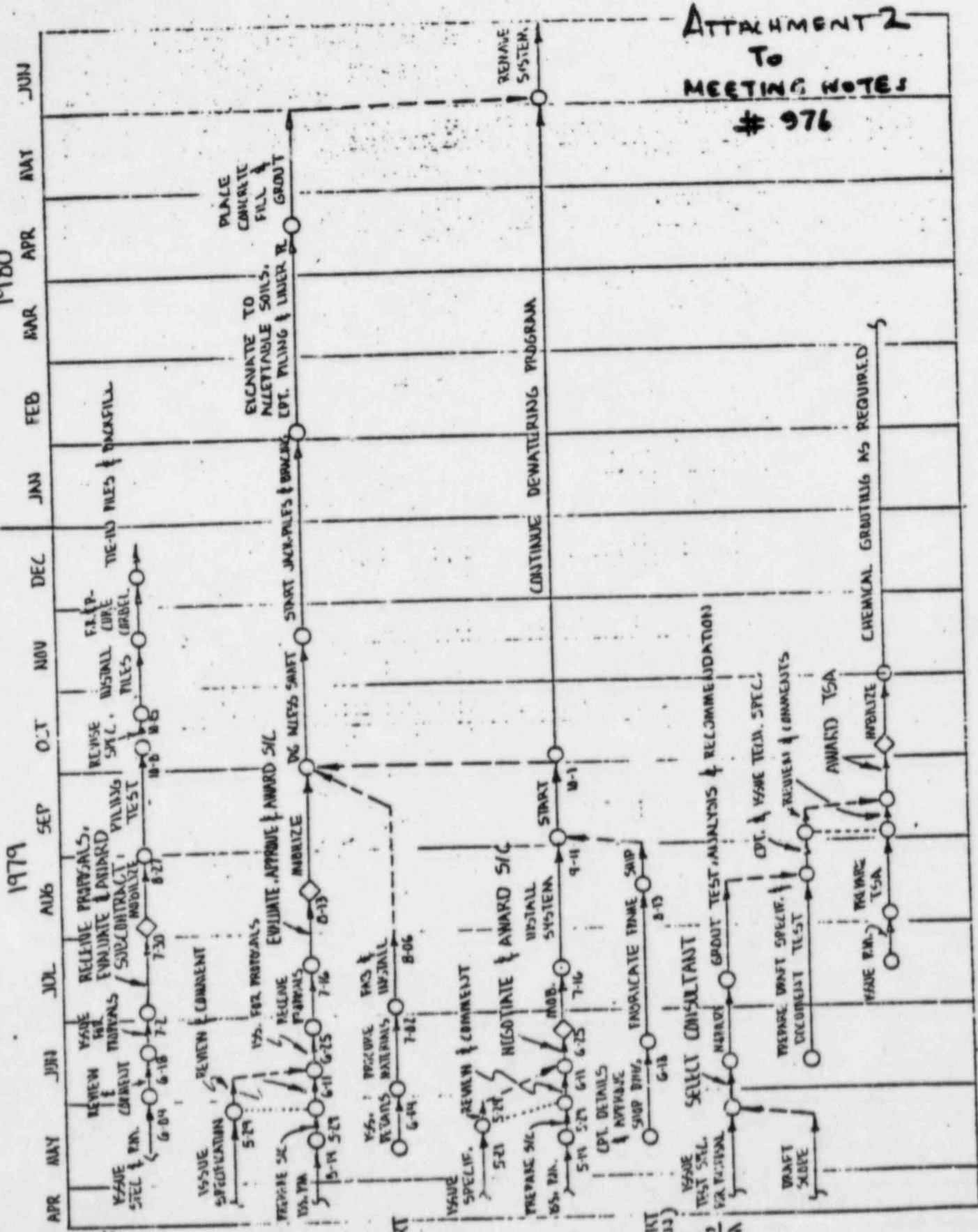
50.54f QUESTION NO.	ACTION ITEM	ACTION DISCRIPTION	RESPONSIBILITY	ACTION COMPLET- ION DATE	DATE COMPL
16	a	Perform soils borings in the areas of buried pipes.	J. Wanzeck	8-79	
17	a	Complete evaluation of impact of the failure of non-seismic Category I piping on safety-related structures, foundations and/or equipment.	B. Dhar	6-29-79	
	b	If future profiles show any extreme conditions, analyze the piping system and make necessary repairs.	B. Dhar	Open	
	c	<u>Prepare additional response to the NRC</u>	B. Dhar	6-29-79	
18	a	Perform re-examination of stresses in seismic Cat. I piping connecting between buildings as part of normal iteration of design. Consider stresses induced by differential settlement after connecting pipe and anticipated future settlement.	D. Riat	Open	
19	a	Profile pipes in vicinity of D.G.B. after removal of preload-evaluate as described in Response 17.	C. Connel	Open	
	b	Take additional gap measurements between embedded sleeves and pipes when surcharge is removed. Coordinate this information with the profile data.	C. McConnell	Open	
	c	Perform a complete evaluation of safety related piping after completion of the preload program.	D. Riat	8-79	
20	a	Analytically check affected pump and nozzle loadings. If necessary disassemble flange joints and evaluate separation.	D. Riat	6-29-79	
	b	Verify piping support loads for systems subjected to settlement induced loads.	D. Riat	6-29-79	SB 16720
	c	<u>Prepare additional response to the NRC.</u>	D. Riat	6-29-79	

PRELIMINARY SCHEDULE FOR CORRECTIVE ACTIONS

JOB 7270
MIDLAND UNIT 1 & 2

1980

1979



- ▲ JG @ SW PUMP STR.
- ▲ BEARING PILE TEST SUPPORT INSTALL.
- ▲ PERPILING SPECIFICATION
- ▲ SUBCONTRACT
- ▲ FOUNTR. VALUE PTT TEMPORARY SUPPORT
- ▲ WATERING SPECIFICATION
- ▲ SUBCONTRACT
- ▲ AUXILIARY BLDG. TEMPORARY SUPPORT (CONTINGENCY POND)
- ▲ MECHICAL GRANTING TESTING PROGRAM
- ▲ SPECIFICATION
- ▲ SUBCONTRACT



Consumers
Power
Company

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May 31, 1979
Howe 162-79

US Nuclear Regulatory Commission
Att Mr Harold R Denton
Office of Nuclear Reactor Regulation
Washington, DC 20555

MIDLAND PROJECT -
DOCKET NO 50-329 AND 50-330
RESPONSE TO 10 CFR 50.54 REQUEST ON PLANT FILL -
FILE 0485.16 SERIAL 7079

Enclosed are ten (10) copies of Revision 1 to Consumers Power Company's response of April 24, 1979 to your 10 CFR 50.54(f) request regarding plant fill dated March 21, 1979.

Revision 1 consists of revised material as outlined in the enclosed "Summary of Revisions to the 10 CFR 50.54(f) Responses" page.

Consumers Power Company

Dated May 31, 1979

by Stephen H. Howell
Stephen H Howell, Senior Vice President

Sworn and subscribed to before me on this 31st day of May 1979.

Betty L. Bishop
Notary Public, Jackson County, Michigan
My commission expires September 21, 1982

CC JGKepler (w/4 att)
NRC, Region III

SB 16722

Serial 7079

BCC SHHowell, P-26-336B (w/att)
PAPerry, M-767 (w/att)
GSKeeley, P-14-408B (w/att)
JLBacon, M-1085A (w/att)
BWMarguglio, JSC-220A (w/2 att)
CAHunt/TRThiruvengadam, P-14-208 (w/att)
MCKoschik, M-890A (w/att)
JJZabritski, P-14-416 (w/att)
DBMiller, Midland (w/3 att)
MEGibbs, IL&B (w/att)
JRRobinson, M-1056C (w/att)
RLCastleberry, Bechtel-AA (w/att)

SB 16723

SUMMARY OF REVISIONS
TO THE
10CFR 50.54 (f) RESPONSES
PREPARED ON
MAY 31, 1979

The following revisions have been incorporated into the responses previously submitted on April 24, 1979:

1. Cover sheet: added date of revision
2. PREFACE, first paragraph: the word "basement" has been deleted and replaced by the words "base mat."
3. COMPLETION STATUS page: revised to reflect completion of Question 12
4. Page 1-4, first and second paragraphs: the previous commitment dates of "September 28, 1979" have been revised to now read "January 1, 1980."
5. Appendix I, page I-10, discussion Item B-1: corrected typographical error.
6. Appendix I, pages I-13 and I-14, deficiency description A-4: has been revised to clarify the requirements of Specification G-22.
7. Appendix I, pages I-18, corrective action D-1: the previous commitment date of "May 15, 1979" has been revised to now read "June 29, 1979."
8. Page 6-1, response to Question 6, part a: has been revised to clarify several details as to the piping connections to the borated water tank.
9. Page 12-1: An additional paragraph has been added to complete the response to Question 12.
10. Table 12-1: the table has been expanded to include additional information obtained from boring work recently completed, and also several footnotes have been added/revised to clarify the information presented in the table.
11. Figure 12-1: additional borings drilled subsequent to April 1979 have been added.
12. Page 13-2, first paragraph of Item 3): has been revised to clarify the foundation conditions beneath the Auxiliary Building.
13. Page 13-3, first paragraph of Item 4): corrected typographical error.
14. Page 13-3, first paragraph of Item 4): the location of the feedwater isolation valve pits has been clarified.
15. Figure 14-1: has been revised to more accurately depict the Railroad Bay area of the Auxiliary Building.

SB 16724

Revision 1
5/79

RESPONSES TO THE
NRC 10 CFR 50.54(f) REQUEST
REGARDING PLANT FILL
FOR
MIDLAND PLANT UNITS 1 and 2
CONSUMERS POWER COMPANY
DOCKET NUMBERS 50-329 AND 50-330

Consisting of:

1. Preface
2. Completion Status of Each Response
3. Responses to the 22 Questions

Report Date: April 24, 1979
Revision 1: May 31, 1979

SB 16725

PREFACE

Subsequent to the March 5, 1979, meeting at the NRC Region III offices, additional soils investigation work has been performed at the Midland jobsite to further evaluate the questionable plant fill material. To date, about 45 additional borings have been performed, including some borings taken through the base mat structural slabs to evaluate the fill materials directly beneath several Seismic Category I buildings. Locations of borings performed in 1978 and 1979, including these recent borings, are shown in Figure 12-1 (attached to the Question 12 response). In addition to the borings, crack mapping and settlement monitoring of the diesel generator building and several other Seismic Category I structures are currently underway. | 1

These subsequent investigations have identified several areas of questionable fill material. These areas are described in Table 12-1. Table 12-1 also summarizes the planned remedial actions for each area.

Concurrent with the investigations described above, several other significant activities have been performed and/or completed since early March 1979. Preloading of the diesel generator building with approximately 20 feet of granular fill material has been completed. The roof slab of the diesel generator building was poured last month, and the construction of this building is now complete. The emergency diesel fuel oil tanks have been filled with water, and the settlements resulting from this load test have been recorded. Various pipes in the plant area have been profiled. An extensive engineering review and analysis of these site investigations are currently being performed.

The following responses to the 22 questions transmitted in Mr. H.R. Denton's March 21, 1979, letter to Consumers Power Company include input from the various investigations and evaluations. Upon conclusion of these investigations, the final safety analysis report (FSAR) requirements will be reviewed and updated to reflect the results of these evaluations.

Please note that additional activities are required to complete several of the responses. An interim response, including a scheduled completion date, has been included where additional information is needed.

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COMPLETION STATUS

<u>Question</u>	<u>Response Status</u>	<u>Date to Complete Question (If Applicable)</u>	<u>Actions and/or Remarks</u>
1	Complete		Corrective actions are currently in process.
2	Complete		
3	Complete		
4	Interim	August 1979	Provide acceptance criteria.
5	Complete		
6	Complete		
7	Complete		
8	Complete		
9	Complete		
10	Complete		
11	Complete		
12	Complete		Complete response submitted in Revision 1.
13	Complete		
14	Interim	August 1979	Provide analysis and evaluation.
15	Interim	December 1979	Provide evaluation.
16	Complete		
17	Interim	June 29, 1979	Evaluation of Category I pupils.
18	Complete		
19	Complete		
20	Interim	June 29, 1979	Complete review and analysis
21	Complete		
22	Complete		

document or the FSAR, a final review and update of the PSAR Commitment List will be completed by January 1, 1980. | 1

2. To assure that no areas of contradiction exist between the FSAR, PSAR, and project design documents, a review of sections of the FSAR that are determined to be inactive will be completed by January 1, 1980. For this purpose, an inactive FSAR section is defined as any section for which the basic technical content has not changed since the initial preparation of the FSAR and for which there are no outstanding unanswered NRC questions or identified Safety Evaluation Report open items. Any inconsistencies identified during these review activities will be resolved and all appropriate changes will be made to the FSAR. A review of the remaining sections of the FSAR is not considered necessary because of the ongoing review process described above. | 1
3. EDP 4.22, Preparation and Control of Safety Analysis Reports, provides a system for controlling the preparation and revision of safety analysis reports. This procedure will be reviewed by June 29, 1979, although there are no apparent needed improvements noted at this time.
4. A Quality Assurance audit will be made of the three actions noted above.

Response (to Question 1, Part c)

The previous discussions describe known quality assurance deficiencies relating to the diesel generator building settlement, corrective actions taken with regard to the deficiencies as they apply to the settlement problem, and actions taken for the deficiencies as they apply generally.

In addition to these specific actions previously noted, other actions related to the generic nature of the deficiencies identified have been taken or are in progress. These resulted from CPCo and Bechtel's implementation of their QA programs. A brief description of these actions follows.

1. A review was completed by Bechtel Quality Assurance in January 1978 of the use of the Field Change Request and Field Change Notice to obtain clarifications of specifications and drawings. This review concluded that there is an awareness of the need for specificity in specification and drawing preparation on the Midland project.
2. A review of specifications covering items such as references, tolerances, and clarity of the specifications was undertaken by Bechtel and CPCo in late 1977. This

CATEGORY II
CONSTRUCTION ACTIVITIES

A. Deficiency Description:

1. Insufficient Compactive Effort Used In Backfill Operation

There are no records available to indicate that the various types of compaction equipment used for structural backfill were evaluated or qualified to handle the specified lift thicknesses and that appropriate lift thicknesses were established for each type of equipment.

2. Insufficient Technical Direction In The Field

The Dames & Moore Report and the Civil-Structural Design Criteria 7220-C-501, Revision 9, Section 6.1.1 state, in part, "Filling operations shall be performed under the technical supervision of a qualified soils engineer...."

Technical direction and supervision were provided by Field Engineers and Superintendents who were assigned the responsibility for soils placement. The direction and supervision were not sufficiently employed.

B. Discussion Of The Deficiency, Its Scope, And Generic Implications: (The numbers below correspond to the numbers under Part A above.)

1. Areas of low density appear to be mostly confined to structural backfill placed in confined areas using vibratory type hand-operated equipment and in areas placed under Specification C-210 where equipment was not prequalified and acceptance was by test. The equipment was evaluated for its ability to handle lift thicknesses of up to 12 inches based on achieving satisfactory in-place test results. However, the specific type of equipment used and the number of passes needed to achieve the required density were not recorded.

Category III provides a discussion of the generic implications of the quality control and testing factors which had a primary impact on equipment qualification.

2. The soils tests during plant fill operations generally showed good compaction, and this informa-

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CATEGORY III
QUALITY CONTROL AND TESTING ACTIVITIES

A. Deficiency Description:

1. Inadequate Quality Control Inspection Of Placement Of Fill

Bechtel Quality Control inspection of soils work did not identify deficiencies which may have contributed to placement of fill that appears to have densities in place that are lower than those specified.

2. Inadequate Soil Moisture Testing

Prior to 1978, moisture content was controlled by tests taken after compaction. Few or no tests were taken on the fill prior to compaction, as required by Specification C-210, Section 12.6. Attachment 1-7 describes the methods that were used for soil control during the various stages of soil placement.

3. Incorrect Soil Test Results

A review of soils test reports indicates that there are some reports which contain errors and inconsistencies in the data. Technical direction, surveillance, and test report reviews by Bechtel Quality Control did not identify these errors and inconsistencies.

In addition, a preliminary review of these reports also indicates other possible problems with the compaction test data. Attachment 1-8 presents the preliminary findings of this review.

4. Inadequate Subcontractor Test Procedures

U.S. Testing's QA Program, Revision 6, dated March 20, 1978, did not provide procedures or instructions for the following areas:

- a. Developing and updating the family of proctor curves;
- b. Visually selecting the proper proctor curve;

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- c. Developing additional proctor curves for changing materials occurring between normal frequency curves;
- d. Alternative methods of determining the proper laboratory maximum density where visual comparison is not adequate.

Specification G-22, Revision 1, dated June 22, 1973, is an attachment to Specification C-208 and specifies the requirements for U.S. Testing's QA Program. Section 3.1.5 of Specification G-22 requires that this program provide instructions, procedures, and drawings, although it does not specifically call out the requirements of Subparagraphs a through d listed above.

B. Discussion Of the Deficiency, Its Scope, And Generic Implications: (The numbers below correspond to the numbers under Part A above.)

- 1. The inspection for soils was accomplished by surveillance which did not require extensive documentation of the specific characteristics inspected. In other construction areas for which surveillance is employed, acceptance is based on the final inspection of the physical characteristics after completion of the construction activity and the final inspection results are documented on a characteristic-by-characteristic basis. As such, the application of a defect prevention surveillance is not a generic problem where final inspections of record also exist. This item is considered to have generic implications in areas where inspection of processing methods, equipment, and personnel during construction is intended as an inspection of record requiring clear direction and recording of the specifics.
- 2. Prior to 1978, Section 12.6 of Specification C-210 was interpreted by field personnel as follows: "during compaction" was interpreted as the entire process of placing, compacting, and testing fill. The moisture content was measured during the density test, which was taken immediately after compaction. Therefore, by field interpretation, the moisture content was measured "during compaction" and the fill was not tested in its loose state. Reconditioning was done after testing. A summary of moisture measurements taken for each time period of construction is given in Attachment 1-7.

When cohesive soils are used, moisture control in the borrow areas or stockpiles is for the purpose of minimizing the construction impact of performi. r

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4.b. An in-depth audit of U.S. Testing's operations will be performed by Bechtel by May 31, 1979. This audit will include an evaluation of the need for any other procedures.

D. Corrective Actions Taken To Preclude Recurrence Elsewhere:
(The numbers below correspond to the numbers under Parts A, B, and C above.)

1. Bechtel Quality Control has initiated a review of all active Quality Control Instructions (QCIs). This review is being performed to identify those QCIs similar to PQCI C-1.02 which provide for defect prevention surveillances. Modifications will be made to these QCIs to distinguish between the defect prevention surveillances and the final inspections of record, recognizing that the final inspections of record may be made during or at the completion of the construction activity. The final inspections of record will be required to be documented, whereas the surveillances for defect prevention will not be required to be documented. The review is scheduled to be completed by June 29, 1979. Modifications to QCIs will then commence as necessary in accordance with SF/PSP G-6.1.
2. No additional action is required.
- 3.a. Quality Control Instructions will be evaluated to ensure that the documentation characteristics which are to be inspected (i.e., review callouts) are clearly specified. This will be completed by June 29, 1979.
- 3.b. The laboratory testing subcontractor is also performing other testing work, such as that for concrete materials and reinforcing steel mechanical splices. Through reviews of test results, test procedures, equipment used, and personnel performing the tests, similar deficiencies as addressed above are not apparent.
- 3.c. An in-depth Bechtel QA Project and Engineering audit of U.S. Testing operations covering testing and implementation of their QA program will be conducted in late April or early May 1979. This audit will consider generic elements.
4. No additional action is required.

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Question 6

You propose to fill the borated water storage tanks and measure the resulting structure settlements.

- (a) On what basis do you conclude a surcharge no greater than the tank loading will achieve compaction to the extent intended by the criteria stated in the PSAR? What assurance is provided by the technique that residual settlement for the life of the plant will not be excessive?
- (b) A similar procedure is proposed for other tanks, including the diesel fuel oil storage tanks, and should also be addressed.
- (c) The borated water storage tanks have not yet been constructed and are to be located upon questionable plant fill of varying quality. Provide justification why these safety-related tanks should be constructed prior to assuring the foundation material is suitable for supporting these tanks for the life of the plant. For example, can the tanks be removed with reasonable effort without significant impact?

Response (to Question 6, Part a)

The field exploration program in the area of borated water storage tanks shows that the fill consists of stiff to very stiff sandy clay fill. This condition is suitable for the support of these tanks. To confirm this and demonstrate that the fill is satisfactory, the tanks will be constructed and filled with water in order to make a full scale test of the foundation soils. The piping connections will be made to allow startup flushing, filling, and testing of the tank. Selected points on the piping between the borated water tank and the auxiliary building will be monitored for settlement and evaluated in accordance with the procedure described in Question 17. The tank filling will provide reliable information for predicting long-term settlement. While the degree of compaction set forth in the PSAR may not be satisfied at all points, the PSAR design intent will be met because the fill will have been subjected to a full scale load test which will allow a reliable prediction of long-term settlement. The full scale load test provides direct and reliable assurance that unpredicted long-term settlements will not occur.

Response (to Question 6, Part b)

The diesel fuel oil storage tanks have been filled with water and are being monitored to predict future settlement and to assess the need for remedial work required to ensure limited residual settlement. These tanks have a weight that is approximately the same as that of the fill they replace, and are supported on medium to stiff sandy clay fill. The

Question 12

Document the condition of soils under all safety-related structures and utilities founded on plant area fill or natural lacustrine deposits. Based on the results of investigations, compare the properties and performance of existing foundation materials under all expected loading conditions with those which would have been attained using the criteria stated in the PSAR. If the foundation materials are found to be deficient, discuss measures that will be taken to upgrade them to criteria stated in the PSAR.

Response

Soil conditions beneath safety-related structures and utilities and planned remedial measures are summarized on Table 12-1. The soil conditions described for each structure are based on the borings completed to date. Figure 12-1 shows the boring locations. These borings were made from July 1978 to April 1979. One additional boring is planned in the middle of the diesel oil fuel tanks area and three more borings are planned in the auxiliary building control tower area. Natural lacustrine deposits (sands) are addressed in the response to Question 2. Remedial measures will not necessarily result in densifying the fill to the degree of the PSAR compaction criteria, but support will be provided for the structures and utilities that will meet the intent of the PSAR in that settlement and structural response will be acceptable.

Subsequent to the above response submitted in April 1979, the boring program to document the condition of soils under and/or adjacent to safety-related structures has been completed. The soil conditions observed during this boring work are summarized in Table 12-1. Boring logs for the borings listed in Table 12-1 have been included into the PSAR, Appendix 2A (Revision 21).

This table also summarizes the planned remedial measures to correct any deficient foundation conditions. For a detailed description of the planned corrective actions, refer to Interim Report 6 to MCAR 24, which will be issued in June 1979.

TABLE 12-1

SUMMARY OF SUPPORTING SOIL CONDITIONS AND PLANNED REMEDIAL MEASURES
FOR ALL SAFETY-RELATED STRUCTURES AND UTILITIES

<u>Structures</u>	<u>Borings Performed from 7-78 to 5-79</u>	<u>Supporting Soil Conditions</u>	<u>Planned Remedial Measures</u>
A. Auxiliary Building⁽¹⁾			
1. Control tower	AX-6, 9, 18	Medium dense to very dense sand backfill over dense glacial till with the exception of possible local void under concrete mud mat elevation 590' to 589' at boring AX-9.	Pressure grouting below concrete mud mat as needed.
2. Unit 1 electrical penetration area	AX-7, 15	Generally dense to very dense sand backfill with occasional layers of loose sand and soft clay. The backfill is underlain by dense glacial till. Concrete was also used as backfill. A layer of concrete was encountered from elevations 583.5' to 580.1' at boring AX-7.	Removal of unsuitable material and replacement by lean concrete.
3. Unit 2 electrical penetration area	AX-8, 19	Medium dense to dense sand backfill with occasional medium stiff clay layers over dense glacial till, with the exception of very loose to loose sand backfill pockets encountered between elevations 596.5' to 600.5' at boring AX-19. Concrete was also used as backfill.	Corrective actions similar to the Unit 1 penetration room will be used.
4. Railroad bay (north end) ⁽⁴⁾	AX-1, 2, 10	Medium to very dense sand backfill over dense glacial till. Concrete was also used as backfill.	Grouting of fill to reduce liquefaction potential will be used as needed.
B. Feedwater Isolation Valve Pits			
1. Unit 1	AX-5, 11 (adjacent)	Loose to dense sand and medium stiff to very stiff clay backfill with occasional soft zones over dense glacial till. Concrete was also used as backfill.	Removal of unsuitable material and replacement by lean concrete.
2. Unit 2	AX-4, 3, & 12 (adjacent)	Loose to dense sand and medium stiff to very stiff clay backfill with occasional soft zones over dense glacial till. Concrete was also used as backfill. A layer of concrete was encountered from elevations 585.2' to 575.5' at boring AX-4.	Removal of unsuitable material and replacement by lean concrete.

Table 12-1 (continued)

<u>Structures</u>	<u>Borings Performed from 7-78 to 5-79</u>	<u>Supporting Soil Conditions</u>	<u>Planned Remedial Measures</u>
C. Service Water Pump Structure - Portion on Fill	SW-3 through 9 SW-5A, SW-1	Soft to very stiff clay and loose to very dense sand backfill over medium dense to very dense sand over glacial till, with the exception of 2.5 feet of loose sand encountered between elevations 601.5' and 599.0' in boring SW-6.	Piles under the north wall to support the vertical load.
D. Tanks			
1. Diesel fuel oil storage tanks	DF-1 through 7	The tanks are supported on medium to stiff sandy clay backfill. Surrounding backfill consists of loose to dense sands and very soft to stiff clay. The backfill is underlain by dense glacial till.	Fill the tanks with water. If limited residual settlements cannot be assured the tanks will be surcharged in excess of full weight or removed or reconstructed.
2. Borated water storage tanks	T-14, 15, 16, 18 C-274, 276	Medium to very stiff clay backfill with occasional medium to very dense sand layers over dense to very dense sand.	Full load test by filling of the tanks with water.
E. Seismic Category I Utilities		Borings made adjacent to the Seismic Category I utilities indicate:	
1. Piping			1. None anticipated. Discussed in detail in the response to Question 13, Section 5a, and Question 17.
a. Service water line service water pump structure to auxiliary building	Q-1, 3 through 8 SW-7, 9 SWL-3 through 8, 8A T-9, 10	Soft to very stiff silty clay and loose to very dense sand backfill over very dense sand	
b. Service water line, service water pump structure to diesel generator building	Q-2, 9 SW-7, 9 SWL-1, 2, 3 DG-1 through 7, 27	Medium dense to very dense sand and soft to hard silty, sandy clay backfill over very dense sand	

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Table 12-1 (continued)

<u>Structures</u>	<u>Borings Performed from 7-78 to 5-79</u>	<u>Supporting Soil Conditions</u>	<u>Planned Remedial Measures</u>
c. Emergency diesel fuel oil lines	DG-1 through 6 DF-4, 5, 6, 7 Q-2 SWL-1	Medium dense to very dense sand and soft to very stiff silty clay backfill over very dense sand	
d. Borated water lines	SWL-8, 8A T-9, 10, 21	Very loose to medium dense sand and medium stiff to hard silty clay backfill over very dense sand	
2. Electrical (2) Duct Banks			2. None anticipated. Discussed in detail in response to Question 13, Section 5a, and Note 2.
a. Auxiliary building to the service water pump structure	Q-3 through 7, 10, 11, 12 SWL-3, SW-4, 7, 9	Soft to very stiff silty clay and medium dense to very dense sand backfill over very dense sand	
b. Auxiliary building to the diesel generator building	AX-6, 9, 18 DG-19, 9, 14, 13, 30, 32, 28, 31, 29	Medium to very dense sand backfill over concrete and hard glacial till based on borings AX-6, AX-9, and AX-18	
c. Diesel generator building to the emergency diesel fuel oil tanks and the service water valve pits	CT-1, 5, 6, DF-4, 5, 7 DG-7, 27, 30 Q-2	Medium dense to very dense sand and medium stiff to very stiff silty clay backfill over very dense sand	
d. Auxiliary building to the borated water tanks	SWL-8, 8A T-9, 10, 21	Very loose to medium dense sand and medium stiff to hard silty clay backfill over very dense sand	

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Table 12-1 (continued)

<u>Structures</u>	<u>Borings Performed from 7-78 to 5-79</u>	<u>Supporting Soil Conditions</u>	<u>Planned Remedial Measures</u>
3. Service Water Valve Pits ⁽³⁾			3. None anticipated. Refer to Question 13, Section 5c, and Note 3.
a. Unit 1 pit	DG-27	Stiff to very stiff silty clay and medium dense sand backfill over hard glacial till	
b. Unit 2 pit	DG-27	Stiff to very stiff silty, sandy clay and medium dense to dense sand backfill over dense silty sand.	
F. Retaining Wall Adjacent to Service Water Pump Structure	W-4, SW-13	Borings made adjacent to the structure indicate that supporting backfill below the foundation level consists of stiff to very stiff clay. The backfill is underlain by medium dense to very dense sand.	None anticipated
G. Diesel Generator Building and Associated Utilities	DG-1 through 32	Very soft to very stiff clay with pockets and layers of very loose to dense sand backfill over medium dense to very dense sand. Concrete was also used as backfill.	Surcharge and grouting of loose sand fill.

NOTES:

- (1) The auxiliary building is partially founded on glacial till and partially supported on plant fill materials, as described in the above table. However, for several areas intended to be founded on glacial till, construction activities necessitated local excavation of the glacial till material (e.g., construction slopes for lower elevation excavations). Lean concrete backfill was used locally as required. This condition may occur beneath the foundation slabs adjacent to Area A (as shown on FSAR Figure 2.5-47), including Areas B, C, D, G, I, J, K, and L (as shown in the same figure).
- (2) The electrical duct banks are reinforced concrete elements enclosing PVC and rigid steel conduits thus providing a void for the cables. The following information generated during construction is being used to evaluate the adequacy of the Seismic Category I electrical duct banks in the plant area fill:

- (a) A construction inspection with a rigid foam rabbit prior to cable pulling
(b) The cable pulling records

In addition, at least one conduit in each duct bank will have a continuity check made with a hard fiber composition rabbit prior to cable pulling. Existing spare conduits will be maintained as long as feasible to allow future continuity checks. At present, one spare exists for the electrical duct bank from the auxiliary building to the service water pump structure and one from the diesel generator building to the emergency diesel fuel oil tanks. At present, only the electrical duct bank from the auxiliary building to the service water structure has had cable pulled. However, the remaining conduits in that duct bank have had the continuity check made with the solid rabbit. The information did not indicate that any section of the duct bank had abnormalities or obstructions in common.

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Table 12-1 (continued)

NOTES (continued)

- (3) The gaps between embedded sleeves and pipes entering the service water valve pits were measured at the top, bottom, and each side. The measurements were taken before the surcharge was applied. Additional measurements will be taken when the surcharge is removed. This information will be coordinated with the profile data.
- (4) Immediately west of the Railroad Bay is a valve pit area with approximate dimensions of 24'-6" x 28'-0", and the bottom of foundation slab is at elevation 610 (i.e., shown as Area H on FSAR Figure 2.5-47). For purposes of the soils review, this area has been evaluated as part of the railroad bay.

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envelopes for the diesel generator building are shown Figures 13-1 through 13-8.

The impact of considering a wide range of soil compaction properties is as follows:

- a) Structural response (acceleration, velocity, and displacement) is increased. This results in higher moments and shear and axial forces in the structure due to seismic loads.
- b) Floor response acceleration spectra curves are widened and increased. This results in more severe seismic loads on Seismic Category I equipment, piping, and electrical systems.

Review of the diesel generator building design and Seismic Category I equipment, piping, and electrical systems will be undertaken to the enveloped seismic responses.

2) Service Water Pump Structure (see Figure 13-10)

The service water pump structure is partially founded on fill (Table 12-1). At the lower elevation, a foundation mat is founded on natural soil. At the higher elevation, a foundation mat is founded on structural backfill.

The original seismic analysis considered the soil at both elevations to be natural soil. The lack of compaction of the fill coupled with the remedial work to be done to provide adequate support will affect soil-structure interaction and seismic responses. A seismic reanalysis will be conducted to account for the revised soil-structure interaction effect. Review of both structural design and Seismic Category I equipment, piping, and electrical systems will be undertaken which will incorporate the seismic responses of the reanalysis.

3) Auxiliary Building (see Figure 13-11)

The auxiliary building is partially founded on fill (Table 12-1). The control tower, electrical penetration rooms, and railroad bay are founded on fill. The remaining areas of this structure are founded on natural soil and/or on lean concrete backfill in localized areas. | 1

The original seismic analysis developed soil springs and dampers for soil-structure interaction which accounted for the composite nature of the foundation soil. Composite translational springs and dampers were developed

based on the proportionate areas of natural soil and fill underlying the structure. Composite rotational springs and dampers were developed based on the proportionate moment of inertia of natural soil and fill underlying the structure. The lack of compaction of the fill coupled with the remedial work to be done to provide adequate support may affect the soil-structure interaction and seismic responses. If a significant change of foundation properties results from the corrective action, a seismic reanalysis will be conducted to account for the revised soil-structure interaction effect. Review of both structural design and Seismic Category I equipment, piping, and electrical systems will be undertaken which will incorporate the seismic responses of the reanalysis.

4) Feedwater Isolation Valve Pits (see Figure 13-12)

Feedwater isolation valve pits are located at the southwest side of Unit 1 and the southeast side of the Unit 2 containment buildings and are immediately adjacent to the auxiliary building wings and turbine building. Each pit is a "C" shaped structure with open ends in contact with, but separate from, the containment building and buttress access shafts. Two wall panels of the valve pits are immediately adjacent to the auxiliary building and turbine building wall, and the third panel is in direct contact with the backfill. | 1


The small mass and its special building layout predicate that the seismic response is not a governing factor in the structural design. Seismic design, however, considers the seismically induced dynamic earth pressure, differential displacement for piping systems, and seismic design load for main feedwater isolation valves.

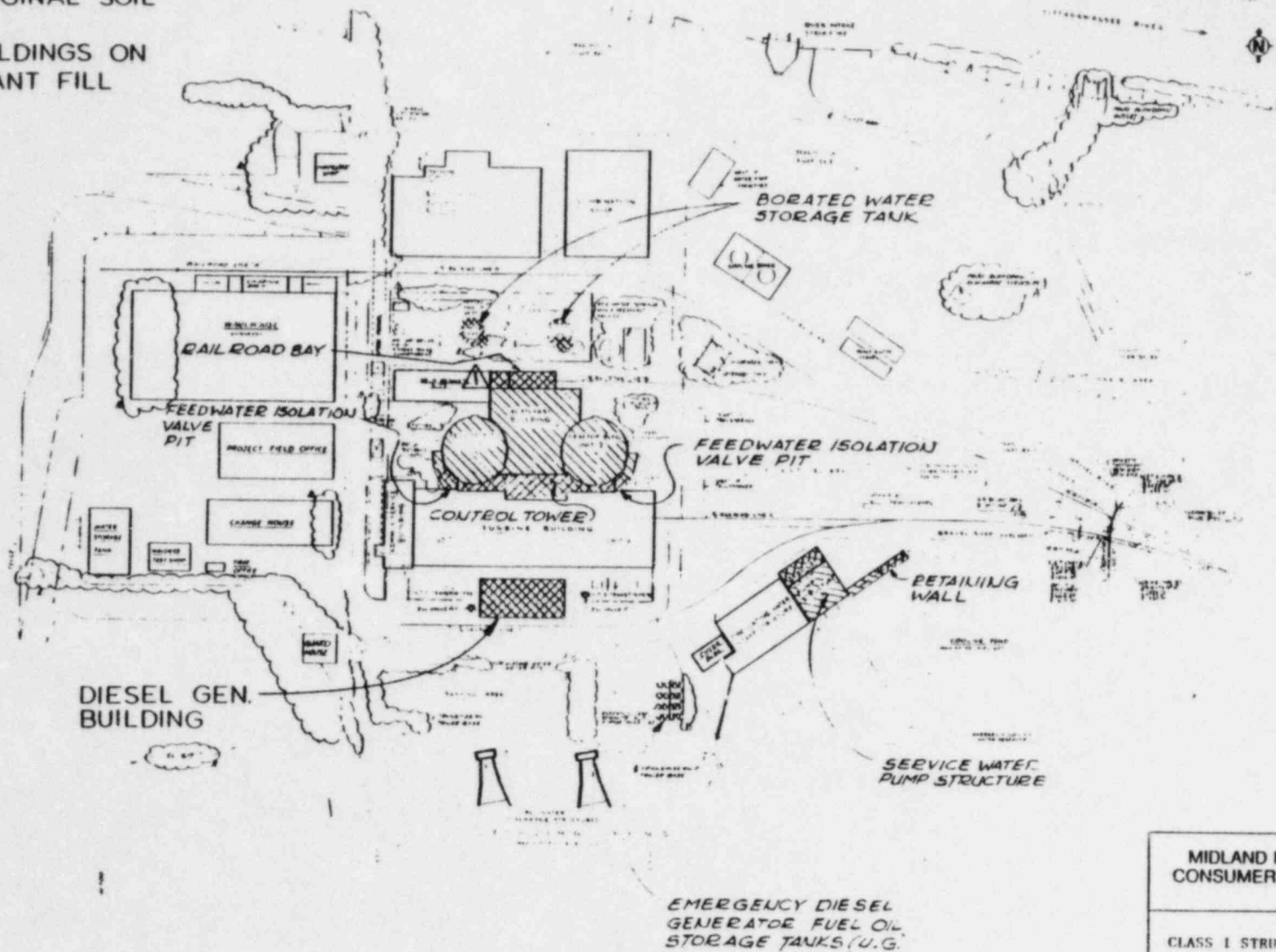
The original dynamic earth pressure calculation used a soil unit weight density of 120 pcf and an internal friction angle of 30 degrees. The actual backfill soil properties are not expected to alter the original analysis results. The original main feedwater isolation valves' qualification used a highly conservative value for horizontal and vertical SSE loads. The vertical differential displacement was assumed to be 0.25 inch for pipe design, which is more than five times that of the SSE-induced displacement of the adjacent containment building at the valve pit foundation elevation.

No change in seismic response is expected due to the remedial action described in Table 12-1.

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 BUILDINGS ON ORIGINAL SOIL

 BUILDINGS ON PLANT FILL



NO GUARANTEE AS TO ACCURACY OF THIS DRAWING
IT IS THE RESPONSIBILITY OF THE USER TO VERIFY THE
DIMENSIONS AND LOCATIONS OF ALL STRUCTURES
AND EQUIPMENT SHOWN ON THIS DRAWING
BEFORE CONSTRUCTION
THIS DRAWING IS THE PROPERTY OF THE
CONSUMERS POWER COMPANY
IT IS TO BE KEPT IN CONFIDENCE
AND NOT TO BE REPRODUCED OR
TRANSMITTED IN ANY MANNER
WITHOUT THE WRITTEN PERMISSION
OF THE COMPANY

MIDLAND PLANT UNITS 1 & 2 CONSUMERS POWER COMPANY	
CLASS I STRUCTURES	
FIGURE 14-1	DATE 5/31/79
SB 16743 0 0588	

Bechtel Associates Professional Corporation
Inter-office Memorandum

TELECOPY

BEBC-2906

To J.F. Newgen
Subject Midland Plant Units 1 & 2
Job 7220
Backfill Compacting Procedure
File: 0274, C-211PR, C-2645
Copies to S. Afifi
W. Barclay
J. Betts
S. Blue
K. Wiedner
Com Log

Date April 30, 1979
From R.L. Castleberry
Of Engineering
At Ann Arbor

RECEIVED

MAY 01 1979

BECHTEL POWER CORP
JOB 7220

PER _____

The following are our recommendations to develop a procedure for compacting sand fill to 95% of ASTM 1557 Method D and to 85 relative density (ASTM 2049).

1. A test area about 40 feet long and 25 feet wide should be selected with consultation with Geotech. This can be in the backfill and can be left there if the compaction meets the specification requirements.
2. Yellow sand and structural backfill sand will be used. Typical laboratory compaction and gradation tests will be run in consultation with J.O. Wanzeck of Geotech. Milt Peterson should inspect the borrow and the fill operation continuously.
3. The stockpile material should be prepared to a moisture content as close as possible to the optimum for compaction. It may later be necessary to add more water when the material is placed.
4. Prepare the test area by cleaning the surface of all loose and deleterious material. Compact the surface with 6 complete coverages of the hand compactor. If two hand compactors are used then each should apply three coverages.
5. Place a 4 inch loose lift of yellow sand at or near the optimum for compaction and compact with 6 complete coverages of the compactors.
6. Repeat step 5 until at least 6 lifts have been placed and compacted. (side slopes should be no steeper than 1.5 to 1).
7. The laboratory should make 4 sand cone tests (ASTM D 1556) each at the depth of 12 inches below the compacted surface of the test fill area and in random locations (but not at the edges of the fill). Take four bulk samples, one at each field density test location. Make sure that the laboratory identifies all samples properly.

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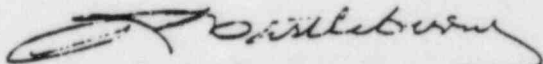
Bechtel Associates Professional Corporation

IOM to J.F. Newgen
BEBC-2906
Page 2

8. Have the laboratory make compaction tests (ASTM D 1557 Method D) and maximum-minimum density tests (ASTM D 2049) on each bulk sample.
9. After the laboratory has finished the field density tests, the field density test holes should be backfilled and compacted in 4 inch lifts up to the level of the top of the test fill. Place another 4 inch loose lift as in item 5 above the surface of the fill and compact with 6 complete coverages. Make tests and take samples as in item 7 above. Make all compaction and maximum-minimum tests as in item 8 above.
10. All the items of work covered in 9 until 12 lifts have been placed, compacted and tested. This should yield about 28 field density tests, 28 compaction tests (ASTM D 1557 Method D) and 28 maximum-minimum density tests (ASTM D 2049). However, if it is clear that the compaction procedure is yielding results less than 95% compaction by ASTM D 1557 Method D or 85% relative density by ASTM D 2049, the fill should be stopped and Geotech informed.

The results of all laboratory tests should be telephoned to Geotech daily.

Additional tests procedures for different lift thicknesses and roller passes will be developed and forwarded to you based on the information developed by this testing procedure.



R. L. Castleberry

JGH/skp

SB 16745

Bechtel Associates Professional Corporation
Inter-office Memorandum

To P. A. Martinez Date April 2, 1979
Subject Midland Plant Units 1 & 2 From Karl Wiedner
Job 7220-101 Of Engineering
Soils Investigations At Ann Arbor

Copies to S. Afifi W. Jones
A. Almuti J. Koupal
 D. Riat
R. Castleberry G. Richardson
J. Clements E. Rumbaugh
L. Curtis G. Trveson
B. Dhar H. Wahl
J. Hink

RECEIVED

APR 4 1979

BECHTEL POWER CORP
JOB 7220
SER 210 840 C-135

Effective immediately, Amin Almuti and John Hink will join the task group working on various soils problems at the Midland site and will be reporting directly to me.

Amin Almuti will be assigned on a full time basis for a couple of months. His responsibilities will include coordinating alternative structural solutions for several buildings with identified foundation problems (i.e., possible underpinning of the service water pump structure).

John Hink will be assigned on a part time basis for several months. His main responsibilities will be the preparation and/or coordinating the Bechtel input required for the recent 22 NRC questions. He will also be responsible for several other items, including a study of yard piping and duct runs, and providing background to previous soil activities.

In conjunction with the 22 NRC questions, the detailed schedule for the Bechtel input is as follows:

1. 4/9/79, 9:00 a.m. - issue first draft for review both internally and with copies to CPCo for their concurrent review; if a draft response is not possible, a detailed outline of the proposed response should be submitted.

CPCo shall be alerted that the first draft will be hand delivered Monday morning, 4/9/79, and comments will be requested by the time indicated below.

2. 4/11/79, 4:00 p.m. - receive CPCo comments on first draft copies.

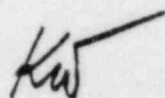
SB 16746

Bechtel Associates Professional Corporation

P. A. Martinez
April 2, 1979
Page Two

3. 4/16/79, 9:00 a.m. - issue second draft for review both internally and with copies to CCo for their concurrent review; input must be generally complete.
4. 4/18/79, 9:00 a.m. - receive CCo final comments.
5. 4/19/79, 9:00 a.m. - joint meeting with CCo to review all input.
6. 4/21/79 through 4/23/79 - final corrections, editing and typing.
7. 4/23/79, 9:00 a.m. - all typing complete.
8. 4/23/79, 5:00 p.m. - all printing complete.
9. 4/24/79 - response must be mailed by CCo.

Please note the assigned responsibilities are the same as discussed in the 3/23/79 meeting except that J. Hink is now responsible for Item 22(f) in lieu of S. Afifi. A copy of the assignments is attached for your reference.



Karl Wiedner

KW/JC/cf

Attachment

SB 16747

ITEMS DISCUSSED:

1. Each question included in the 10 CFR 50.54 request was discussed and the following persons were assigned responsibility to prepare the responses and obtain inputs from other groups as required:

<u>Question No.</u>	<u>Responsibility</u>
1 a, c, d	G. Richardson
1 b	J. Clements
2	S. Afifi
3	B. Dhar
4	S. Afifi
5	S. Afifi
6 a, b, c	S. Afifi
7	B. Dhar
8	B. Dhar
9	S. Afifi
10	S. Afifi
11	S. Afifi
12	S. Afifi
13	B. Dhar
14	B. Dhar
15	B. Dhar
16	B. Dhar
17	D. Riat
18	D. Riat
19	B. Dhar
20	D. Riat
21 a, b	W. Jones
21 c	S. Afifi
21 d	B. Dhar
22 a, b, c, d	W. Jones
22 e	B. Dhar
22 f	S. Afifi

SB 16748

Hink

A. Boas
Bechtel Power Corporation
Sent 7/11/79
Interoffice Memorandum

To P. A. Martinez File No.
Subject Job 7220 Midland Project Date April 9, 1979
Q-Listed Backfill From J. F. Newgen
BCBM-454 Of Construction
Copies to K. Wiedner S. Blue/S. Afifi At Midland, MI Ext 200
R. Hermeston R. Castleberry
W. Barclay J. Betts
L. Dreisbach M. Peterson

This memo is written to confirm the lifting of the project management "stop work" on Q-listed backfill placement for the Midland Project. The stop work removal is based on the following commitments:

- 1) Construction will assign a field engineer to technically direct the placement of all Q-listed backfill on the project. This assignment will be the individual's primary assignment and as such he should be able to devote his full time to soils placement. Milt Peterson, with over seven years of construction soils excavation and placement experience, has been initially assigned this responsibility.
- 2) Geo-Tech will assign a soils engineer in support of the field engineer as described in 1) above. This individual will visit the site frequently to assure that the soils are being placed properly and that the testing laboratory's work conforms to all requirements of technical specification 7220-C-208.
- 3) Construction will place test pads for cohesive and cohesionless fill materials under the surveillance of Geo-Tech to qualify lift thicknesses for hand held compaction equipment. Geo-Tech will provide the test parameters for the pads. This information will be transmitted to Construction via normal project channels.

J. F. Newgen
J. F. Newgen

JFN/AJB/smb

SB 16749

Bechtel Associates Professional Corporation
Inter-office Memorandum

To R. L. Castleberry Date 2 April 1979
Subject Midland Units 1 & 2-Job 7220-001 From S. S. Afifi
Test Site Locations, Midland Plant
Area Fill Soil Test Records Of Geotechnical Services
Copies to S. L. Blue At Ann Arbor (D)5
7220-79-50
A. S. Marshall
J. Newgen
T. Nehil
J. O. Wanzeck
K. Wiedner
1320, 3410

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APR 10 1979
EBCHEL POWER CORP
JOB 7220
SER 9109700770

As a result of a meeting with K. Wiedner on March 16, 1979 attended by S. S. Afifi, J. O. Wanzeck and T. Nehil, it is recommended that a temporary task force of several additional full-time employees be assigned immediately to aid Mr. Harry Mailley in the location of Plant Area compaction test sites.

Also as a result of the telephone conversation on March 28, 1979 between Austin Marshall and Al Boos, it has been agreed that the emphasis being placed on plotting the tests by area (Blocks A through G) and by elevation (16-18 levels) be temporarily relieved as soon as Blocks D, E and G have been completed and checked. Then the group can simply go through the record sequentially listing the test number, the Bechtel coordinates, and the elevation. Once the list has been prepared, it will be equally useful for analysis purposes as well as for drafting and/or computerized plotting.

It must be stressed that the analysis of the soil test records cannot progress meaningfully without determining the test locations.

T.N.
TN/lap

S. S. Afifi
S. S. Afifi

SB 16750

A. Bass

Distribution

Midland Plant Units 1 & 2
Bechtel Job 7220
FOUNDATION FIX UNDER THE
AUXILIARY BLDG. AND SERVICE
WATER STRUCTURE (SWS)
File:

A. Almuti
Engineering
Ann Arbor

As a result of the meetings on 4/4/79 and 4/5/79 with Spencer, White and Prentiss and Intrusion-PrePakt Inc., respectively, the following potential fixes were identified:

<u>Structure</u>	<u>Fix</u>	<u>Comments</u>
1. Auxiliary Bldg. Wings	Grouting to support removal and replacement of the soil with lean concrete	This is based on the feasibility of local dewatering
2. Control Tower	Additional soil investigation is necessary to confirm adequacy of the foundation as is.	
3. Auxiliary Building Railroad Bay	Chemical grouting of the loose sand to reduce potential for liquifaction	Bearing capacity of soil is assumed adequate
4. Service Water Structure	Piling on the outside of the structure to take vertical loads	The concept of limiting piles to vertical load only remains to be investigated.
5. Diesel Generator Bldg.	Continue surcharging, <u>if needed</u> , and grout less dense sand to reduce liquifaction potential	Investigate the need for additional surcharge

In order to investigate the feasibility and soundness of these fixes the following action items were assigned:

SB 16751

<u>Item</u>	<u>Responsibility</u>	<u>Scheduled Date*</u>
1. Investigate support of the auxiliary building wings showing how much cantilever action is supported by the structures	G. Tuveson/B. Dhar	4/10/79
2. Based on Item 1 above, investigate the impact of removing the hydrostatic pressure from underneath the auxiliary building wings	B. Dhar/S. Afifi	4/10/79
3. Recommend hard point, temporary support locations, under the auxiliary building wings, to precede dewatering for the case of dewatering	G. Tuveson/B. Dhar	4/11/79
4. Investigate and provide information on the sequence of construction of the control tower with respect to the remainder of the auxiliary building and the turbine building	B. Dhar/Construction	4/12/79
5. Investigate and provide information on the sequence of constructing the turbine building with respect to the remainder of the power block	B. Dhar/Construction	4/12/79
6. Provide information on type of fill under the turbine building	B. Dhar/Construction	
7. Investigate the permeability of soil under the turbine building and report in meeting tentatively set for 4/13/79	Geotech (S. Blue/S. Afifi)	4/13/79

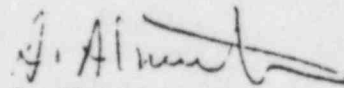
SB 16752

<u>Item</u>	<u>Responsibility</u>	<u>Scheduled Date*</u>
8. Investigate feasibility of local dewatering under the auxiliary building wings and adjacent areas. (Report in meeting)	Geotech (S. Blue/S. Afifi)	4/13/79
9. Investigate the impact of site (pond) dewatering on the following:		4/13/79
a. Stability of structures to be fixed	G. Tuveson/B. Dhar	
b. Bearing strata under other structures	Geotech (S. Afifi)	
c. Settlement of structures	Geotech (S. Afifi)	
d. Cost of dewatering	W. Jones	
e. Job schedule including timing limitations	W. Jones	
Report on investigation in meeting		
10. Provide input on the minimum number of borings required to verify the soil conditions under the control tower. Please check with the project for conduit locations.	Geotech (S. Blue)	4/11/79
11. Investigate the feasibility and effectiveness of providing a dewatering test pit next to the auxiliary building wings	S. Blue/J. LeFevre	4/11/79
12. Investigate the feasibility of limiting the load on piles to vertical loads under seismic conditions in the area of the service water structure	B. Dhar	4/13/79

SB 16753

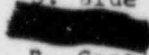
<u>Item</u>	<u>Responsibility</u>	<u>Scheduled Date*</u>
13. What is the impact on the structure (structural modifications) if piles, taking vertical load only, are used to support part of the service water structure?	B. Dhar	4/18/79
14. Identify areas in the turbine building, on drawing, where drilling for a grouting curtain wall can be installed along the auxiliary building wings. Consider utilities, reinforcement and equipment	B. Dhar	4/13/79
15. Provide the criteria for determining the magnitude of surcharge on the diesel generator building	Geotech (S. Afifi)	4/11/79
16. If additional surcharge of the diesel generator building is <u>determined necessary</u> , advise on alternatives for surcharging and the reasoning for recommendations. Compare the expected results of surcharging to the criteria set in Item 15.	B. Dhar/S. Afifi	4/13/79

* The scheduled dates were not set in the 4/4 and 4/5 meetings, however the need to expedite this preliminary investigation necessitates maximum effort to comply with the above dates. If you have any problems with these dates, please advise by 4/10/79. A meeting to discuss the closing of these action items is tentatively set for 4/13/79. You will be advised of the date and place of meeting.


A. Almuti

AA/mf

Distribution

S. Afifi	B. Dhar	A. Marshal
S. Blue	T. Johnson	P. Martinez
	W. Jones	G. Tuveson
R. Castleberry	G. T. LeFeyre	K. Wiedner

SB 16754

Bechtel Associates Professional Corporation

Inter-office Memorandum

To S. Afifi
 A. Boos B. Jones
 B. Dhar G. Richardson Date March 12, 1979

Subject Meeting Notes of Midland Diesel Generator Task Group Job 7220-101 From Karl Wiedner
 Of Engineering
 At Ann Arbor

Copies to S. Blue, w/a
 P. Hansen/R. Hermeston, w/a
 T. Johnson, w/a
 P. Martinez/R. Castleberry, w/a
 H. Wahl, w/a

RECEIVED

MAR 14 1979

BECHTEL POWER CORP
 JOB 7220
 PER 195510 0075

Attached for your information, record and further action are the meeting notes of the diesel generator task group meeting held on February 15 and 16, 1979. By copy of this memo, Phil Martinez is requested to forward copies of these notes to Consumers Power for their information.

KW

Karl Wiedner

KW/cf

Attachment

JOB 7220	A	R	I
ROUTING	C	T	N
	T	E	T
Proj. Supl.			
P. Sup.			
P.P. Engr.		X	
APP. Eng. 1			
APP. Eng. 2			
Cost-Act.			
Cont Bldg.			
Aux. Bldg.			
Yard-Turb.			
Civ. Sup.			
Civ. Eng.		X	
Mech. Sup.			
Mach. Eng.			
Elec. Sup.			
Elec. Eng.			
Weld. Eng.			
Off. Eng.			
F & A			
Q C			
Purch.			
Sub-Con			

SB 16755

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 920
MIDLAND PLANT UNITS 1 AND 2
CONSUMERS POWER COMPANY
BECHTEL JOB 7220-101

DATE: February 15 and 16, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645

ATTENDEES:

Bechtel

CPCo

Engineering

K. Wiedner	*J. Milandin
B. Dhar	*W. Jones
C. McConnel	*J. Wanzeck
R. Marl	S. Afifi
A. Ganguly	A. Marshall
*P. Martinez	G. Richardson

C. Hunt
R. Wheeler
D. Horn
T. Thiruvengadam
D. Sibbald

Construction

A. Boos
J. Betts

*Part-time

PURPOSE: The meeting was held at the Ann Arbor office to review the progress on the resolution of the diesel generator building settlement problem and to discuss action items initiated in the January 23, 1978, meeting at the Midland jobsite.

The following notes document the discussion on the agenda items.

ITEMS DISCUSSED:

- 1) Amendments to the January 23, 1978, Meeting Notes - No amendments to the Meeting Notes No. 907 were made.
- 2) Review of Prior Action Items - Action items from the January 23, 1979, meeting were reviewed with the following current status.

SB 16756

1. The diesel generator building model, including mechanical equipment, large piping, and HVAC, is essentially complete. It is estimated that the small field-run piping and electrical work will take an additional 2 to 3 weeks. Construction stated that they would like the model to be sent to the jobsite as soon as the present work is complete. It was agreed that the model will be shipped to the jobsite after the present information is added to the model.
2. This action item is complete. The DCN was issued February 6, 1979, showing counterfort design.
3. This action item is complete. An FCR was generated and approved February 6, 1979, showing a steel brace in lieu of a counterfort at turbine building column line 8.0.
4. Project engineering has reviewed the double wood form design submitted by construction. However, geotech should evaluate the passive soil pressure values used in the analysis. Geotech agreed to respond to this item by February 15, 1979.
5. Geotech has contacted the soil consultant regarding defrosting of the frost protection prior to surcharge. There will be no need to defrost any material above final grade. This action item is closed.
6. This item is still open. Drawing C-1141 will be revised by February 21, 1979, to show monitoring of the condensate line at hold points IV, VI, and VII.

Profiling of the 8-inch service water line was discussed. Results indicated that the lowest point in the present position of the line is 16 inches off the position shown in the design drawings. Profiling of other Q-listed pipelines was also discussed, and questions were raised as to whether any action is immediately required. It was agreed that project engineering will meet with the mechanical and stress groups and identify the functional requirements of the Q-listed pipelines (stress, allowable curvature, etc). Construction will review installation procedures and records to determine how accurately Q-listed pipes were placed. Construction will also review the feasibility of profiling all other Q-listed pipelines in the plant fill and report to project engineering.

7. This item is complete. Pipe profiling completed to date has been received from Goldberg-Zoino-Dunnicliff & Associates (GZD).
8. This item is still open. Project engineering will issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979.

9. This item is complete. Geotech has notified engineering of the necessary scope changes for the GZD contract.
10. This item is complete. Geotech has confirmed that the geology group will assist in taking piezometer readings. However, as long as continuous readings are necessary, GZD will perform this task.
11. This item is complete. The engineering and construction schedule for the diesel generator building was issued on January 26, 1979.
12. This item is still open. A preliminary cost estimate has been issued. The revised cost estimate is now scheduled for issue by March 2, 1979. The total estimate is now \$3 million for all corrective work on the diesel generator building. It was agreed that a cost estimate review will be an agenda item for the next task group meeting.
13. Engineering stated that they have responded to the FSAR questions. Some of the questions have only partial responses. These responses will be completed as criteria are developed and data from surcharge are available. This action item is closed.
14. This item is still open. A response to Gallagher's questions is now scheduled for March 2, 1979.
15. This item is complete. Interim report 4 for MCAR 24 was forwarded to CPCo on February 16, 1979.
16. This item is complete. The soil boring logs around the Class 1 structures have been completed for the MCAR report and were submitted to the FSAR.
17. This item is complete. The cover letter transmitting Meeting Notes No. 901 dated December 4, 1978, covering the meeting with the NRC was signed on March 1, 1979.
18. This item is still open. A list of milestone dates to be shown on the settlement drawings has been developed. It was agreed that the digging of the test pit in the diesel generator building and removal of surcharge should also be included in the milestone dates.
19. This item is complete. A time-history settlement drawing for the diesel generator building has been developed.
20. This item is still open. The location of the strain gage has been reviewed and revised. This information will be shown on Drawing C-1141 by February 21, 1979.

21. Construction will identify to engineering which rods used the turn-of-the-nut method of tightening and what procedure was used. This action item is closed.
22. This item is still open. Geotech is still working on evaluating liquifaction potential between the diesel generator building and the turbine building. The evaluation is expected to be sent to the consultant within 1 week. After concurrence from the consultant, a response will be forwarded to project engineering. Geotech will require additional borings to complete this evaluation.
23. This item is closed. The turbine building wall deflection monitoring will utilize dial gages. The amount of surveillance and monitoring of the turbine building wall was discussed. It was agreed that project engineering will review the monitoring program given in Specification C-83 and attempt to relax the present criteria.
24. Geotech will allow a 12-inch tolerance in lieu of the present 6-inch tolerance. Drawing C-1141 will be revised to show this by February 21, 1979. Drawing C-1141 will also be revised to allow 50% of the counterfort design strength prior to surcharge Step III.
25. Project engineering will resolve this at a later date. It was agreed that this action item should be removed from the task group's responsibility because it is a normal project engineering action.
26. This item is still open. Construction has completed seven drawings showing test locations down to el 620'-0". Each drawing shows 3 feet of fill. Construction asked if the entire plant area fill should be plotted to el 619' prior to plotting the diesel generator building area to the original grade. It was agreed that the plotting should be done in phases, with the two southern main plant areas and the area east of the power block plotted to el 619' first. Geotech will define the next phases of work after receipt of the Phase 1 work. Construction will attempt to define Canonic's work versus Bechtel's work on the plots.
27. This item is still open. An acceptance procedure has been developed by geotech. However, this acceptance procedure must be reviewed by the soil consultants. It was agreed that geotech will send a copy of its acceptance procedure to project engineering concurrently with sending it to the consultant.
28. This item is complete. Pile capacity data has been supplied to engineering.

29. The condensate tank foundation options were discussed. Engineering has estimated that 100 piles will be needed at a total cost of \$250,000. Engineering prefers the surcharge option. Construction stated that surcharging the condensate tank area to a height of 20 feet would jeopardize turnover to CPCo and would result in a claim from Chicago Bridge & Iron Co. It was agreed that a cost estimate of the two options would be developed by March 5, 1979, and that surcharge would be placed after a decision to follow this method has been made.
30. Project engineering discussed the surcharging of the Unit 1 transformer pad. It was agreed that the transformer area should be surcharged with 5 feet of fill without the transformer load as soon as possible. Construction stated that the Unit 1 stator will be moved over this same area in July 1979. Engineering agreed to investigate this potential problem and provide necessary directions to construction.
31. Plugging of drilled holes in the transformer basin will be done after surcharge. It was agreed that this action item should be treated as a regular construction item and should be removed from the task group's list of action items.
32. The corrective action on the tank farm was discussed. It was agreed that the borated water storage tank will be constructed as scheduled and then filled with water to observe settlement. Engineering will issue a memorandum to the field on this. No piping or any other utility should be connected to the tank at this time. The area should be backfilled to grade level as early as possible.
33. The corrective action on the guardhouse was addressed. It is engineering's intent to lower the foundation 2 feet and remove the central column. Engineering will discuss this plan with geotech. A minimum of three settlement plates will be installed below frost level to monitor settlements. CPCo stated that they are concerned about the possibility of a plugged sand drain in the guardhouse area. Geotech agreed to evaluate this problem and determine what remedial measures may be needed.
34. Response to Gallagher's questions. Project engineering's questions have been answered. This item is complete.
35. Comments on the potential cause list have been forwarded to QA. This item is complete.
36. This item is open. Some comments have been received by engineering on FSAR Section 2.5. However, comments are still required from CPCo and construction. Project engineering will resolve these comments, arrange for a meeting if necessary, and issue an FSAR change notice on any discrepancies or necessary changes.

Investigation of Cause

A Kepner-Tregoe problem analysis was presented to the task group by Bechtel management. This is a method of analysis which attempts to set the groundwork for establishing possible causes to a particular problem. The investigation of the diesel generator building settlement problem was presented and discussed using the Kepner-Tregoe analysis.

NCR 1004

Nonconformance Report 1004, which has remained open since November 1977, was discussed. It was agreed that engineering will analyze the service water pump structure section on plant fill to see if it can be supported by cantilever action without any support from fill. Geotech will provide the soil characteristics and conditions. Construction will provide the excavation drawing (plan and sections) used for the construction of the pumphouse foundation. Geotech will evaluate the liquifaction potential of the sand material adjacent to and/or below the structure. The civil resident engineers will perform a visual inspection of the structure for cracking and provide project engineering with the results of this inspection. Geotech will make additional borings required to evaluate the NCR.

- 3) Review of Construction Progress - The status of construction was presented. Step 1 of the surcharge placement will be completed by February 17, 1979. The monitoring of the turbine building wall may hold up surcharge Step 2. Step 2 can start on February 26, 1979, if the monitoring is complete. Step 3 may be delayed by 1 week due to the construction of the counterforts. However, Step 3 can be started on March 5, 1979, if 50% of the concrete strength is achieved on the counterforts.

The last walls in the diesel generator building were poured on February 20, 1979, with the placement of 550 yd³ of concrete. The roof is expected to be completed in mid-March.

- 4) Cost and Schedule Estimate - The cost and schedule will be reviewed at the next task group meeting.
- 5) Other Structures and Facilities - The following other Class 1 structures on plant fill were discussed.
 - a) Service Water Lines - The recent borings taken in the service water line area were discussed. One boring could not be filled with grout and had to be plugged by bridging the hole with concrete. CPCo expressed concern about this boring and requested that Bechtel investigate conditions that could affect these lines. Geotech agreed to pursue this problem

further with construction and possibly make borings, pending the results of pipe profiling. Engineering agreed to check the secondary stresses and requirement for slopes in the service water pipelines.

- b) Diesel Fuel Tanks - It was agreed that settlement or movement of the diesel fuel tanks should be monitored. A base survey will be performed as soon as possible, the tanks will be filled, and then the tanks will be monitored for settlement. Depending on the movement after filling, engineering and geotech will decide if additional surcharging is necessary. Construction will investigate and confirm that the tanks can be filled. It was noted that the original boring logs qualifying the area as Q have been lost. Construction will attempt to relocate these borings. Geotech will make borings if the old borings cannot be located.

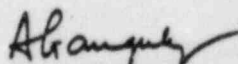
It was agreed that the next task group meeting would be held in approximately 2 weeks.

ACTION ITEMS:

- | | |
|---------------------|---|
| Geotech | 1) Look at passive pressure values used by construction in the double-wood form design and respond to engineering by February 15, 1979. |
| Project Engineering | 2) Meet with stress and mechanical groups to identify functional requirements for Q-listed pipeline. |
| Construction | 3) Review installation records and procedures for Q-listed pipe to determine how accurately the profiled pipelines were placed. |
| Construction | 4) Review the feasibility of profiling all other Q-listed pipelines and give this information to project engineering. |
| Project Engineering | 5) Issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979. |
| Cost and Schedule | 6) Issue a revised cost estimate by March 2, 1979. |
| Project Engineering | 7) Provide CPCo with a response to Gallagher's questions by March 2, 1979. |
| Project Engineering | 8) Show milestone dates on settlement drawings by March 2, 1979. |

- Project Engineering 9) Show revised strain gage locations on Drawing C-1141 by February 21, 1979.
- Construction 10) Inform project engineering by February 20, 1979, of the locations where hydraulic jacks can not be used on the tie rods (i.e. where turn-of-the-nut method was used) and provide procedure for turn-of-the-nut tightening.
- Geotech 11) Forward results of liquifaction evaluation to the soil consultant by February 28, 1979, prior to responding to engineering.
- Project Engineering 12) Review the monitoring program in Specification C-83 and attempt to relax the requirements.
- Project Engineering 13) Revise surcharge tolerances and concrete strength requirements on Drawing C-1141 by February 21, 1979.
- Construction 14) Plot density tests for plant fill for the two power block areas and the one area east of the power block prior to plotting any other areas. Construction will also attempt to separate Canonic's work versus Bechtel's work.
- Geotech 15) Define the next phase of plotting to be performed after receipt of the Phase 1 plotting.
- Geotech 16) Send a copy of the surcharge acceptance procedure to project engineering concurrently with forwarding it to the soil consultant.
- Cost and Schedule 17) Develop a cost comparison for the pile option versus the surcharge option for the condensate tanks by March 5, 1979. Engineering will provide necessary direction to construction regarding surcharging of the condensate tank area.
- Construction 18) Surcharge the condensate tank area with 10 feet of fill as soon as possible, after engineering's decision has been made.
- Engineering/
Construction 19) Place 5 feet of surcharge in the Unit 1 transformer areas as soon as possible after engineering evaluates the effect of 5'-0" fill in the transformer area and directs construction to do so.
- Project Engineering 20) Investigate the proposed Unit 1 stator loads in the transformer area.

- g 21) Issue a memorandum to construction on the release of the borated water storage tank without any piping connection.
- g 22) Get geotech's concurrence on the proposed corrective action on the guardhouse.
- 23) Review the plugged sand drain problem and provide recommendations for remedial work.
- 24) Forward their comments of FSAR Section 2.5 to project engineering.
- 25) Provide an excavation drawing of the service water pumphouse to project engineering.
- 26) Provide project engineering with the soil conditions and characteristics around the service water pumphouse which were found in the recent boring program.
- 27) Evaluate liquifaction potential of the loose sands around the service water pumphouse.
- ng 28) Analyze the pumphouse as a cantilever and see if the pumphouse can be supported independently of support by the fill.
- 29) Inspect the pumphouse for cracking and provide results to engineering.
- 30) Evaluate the potential fill support problems in the service water line area.
- ing 31) Check the secondary stresses in the service water pipe lines and also investigate if there is a need for slope in these lines.
- 32) Investigate and confirm that the diesel fuel tanks can be filled.
- 33) Attempt to locate the original borings made in the diesel fuel tank area.


R. Marl/A. Ganguly

Bechtel Associates Professional Corporation

777 East Eisenhower Parkway
Ann Arbor, Michigan

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



MEETING NOTES NO. 920

MIDLAND PLANT UNITS 1 AND 2

CONSUMERS POWER COMPANY

BECHTEL JOB 7220-101

DATE: February 15 and 16, 1979
PLACE: Ann Arbor, Michigan
SUBJECT: Meeting of the Diesel Generator Building Task Group
FILE: 0279, C-2645

ATTENDEES:

Bechtel

CPCo

Engineering

K. Wiedner *J. Milandin
B. Dhar *W. Jones
C. McConnel *J. Wanzeck
R. Marl S. Afifi
A. Ganguly A. Marshall
*P. Martinez G. Richardson

C. Hunt
R. Wheeler
D. Horn
T. Thiruvengadam
D. Sibbald

Construction

A. Boos
J. Betts

*Part-time

PURPOSE: The meeting was held at the Ann Arbor office to review the progress on the resolution of the diesel generator building settlement problem and to discuss action items initiated in the January 23, 1978, meeting at the Midland jobsite.

The following notes document the discussion on the agenda items.

ITEMS DISCUSSED:

- 1) Amendments to the January 23, 1978, Meeting Notes - No amendments to the Meeting Notes No. 907 were made.
- 2) Review of Prior Action Items - Action items from the January 23, 1979, meeting were reviewed with the following current status.

SB 16765

1. The diesel generator building model, including mechanical equipment, large piping, and HVAC, is essentially complete. It is estimated that the small field-run piping and electrical work will take an additional 2 to 3 weeks. Construction stated that they would like the model to be sent to the jobsite as soon as the present work is complete. It was agreed that the model will be shipped to the jobsite after the present information is added to the model.
2. This action item is complete. The DCN was issued February 6, 1979, showing counterfort design.
3. This action item is complete. An FCR was generated and approved February 6, 1979, showing a steel brace in lieu of a counterfort at turbine building column line 8.0.
4. Project engineering has reviewed the double wood form design submitted by construction. However, geotech should evaluate the passive soil pressure values used in the analysis. Geotech agreed to respond to this item by February 15, 1979.
5. Geotech has contacted the soil consultant regarding defrosting of the frost protection prior to surcharge. There will be no need to defrost any material above final grade. This action item is closed.
6. This item is still open. Drawing C-1141 will be revised by February 21, 1979, to show monitoring of the condensate line at hold points IV, VI, and VII.

Profiling of the 8-inch service water line was discussed. Results indicated that the lowest point in the present position of the line is 16 inches off the position shown in the design drawings. Profiling of other Q-listed pipelines was also discussed, and questions were raised as to whether any action is immediately required. It was agreed that project engineering will meet with the mechanical and stress groups and identify the functional requirements of the Q-listed pipelines (stress, allowable curvature, etc). Construction will review installation procedures and records to determine how accurately Q-listed pipes were placed. Construction will also review the feasibility of profiling all other Q-listed pipelines in the plant fill and report to project engineering.

7. This item is complete. Pipe profiling completed to date has been received from Goldberg-Zoino-Dunncliff & Associates (GZD).
8. This item is still open. Project engineering will issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979.

9. This item is complete. Geotech has notified engineering of the necessary scope changes for the GZD contract.
10. This item is complete. Geotech has confirmed that the geology group will assist in taking piezometer readings. However, as long as continuous readings are necessary, GZD will perform this task.
11. This item is complete. The engineering and construction schedule for the diesel generator building was issued on January 26, 1979.
12. This item is still open. A preliminary cost estimate has been issued. The revised cost estimate is now scheduled for issue by March 2, 1979. The total estimate is now \$3 million for all corrective work on the diesel generator building. It was agreed that a cost estimate review will be an agenda item for the next task group meeting.
13. Engineering stated that they have responded to the FSAR questions. Some of the questions have only partial responses. These responses will be completed as criteria are developed and data from surcharge are available. This action item is closed.
14. This item is still open. A response to Gallagher's questions is now scheduled for March 2, 1979.
15. This item is complete. Interim report 4 for MCAR 24 was forwarded to CPCo on February 16, 1979.
16. This item is complete. The soil boring logs around the Class 1 structures have been completed for the MCAR report and were submitted to the FSAR.
17. This item is complete. The cover letter transmitting Meeting Notes No. 901 dated December 4, 1978, covering the meeting with the NRC was signed on March 1, 1979.
18. This item is still open. A list of milestone dates to be shown on the settlement drawings has been developed. It was agreed that the digging of the test pit in the diesel generator building and removal of surcharge should also be included in the milestone dates.
19. This item is complete. A time-history settlement drawing for the diesel generator building has been developed.
20. This item is still open. The location of the strain gage has been reviewed and revised. This information will be shown on Drawing C-1141 by February 21, 1979.

21. Construction will identify to engineering which rods used the turn-of-the-nut method of tightening and what procedure was used. This action item is closed.
22. This item is still open. Geotech is still working on evaluating liquifaction potential between the diesel generator building and the turbine building. The evaluation is expected to be sent to the consultant within 1 week. After concurrence from the consultant, a response will be forwarded to project engineering. Geotech will require additional borings to complete this evaluation.
23. This item is closed. The turbine building wall deflection monitoring will utilize dial gages. The amount of surveillance and monitoring of the turbine building wall was discussed. It was agreed that project engineering will review the monitoring program given in Specification C-83 and attempt to relax the present criteria.
24. Geotech will allow a 12-inch tolerance in lieu of the present 6-inch tolerance. Drawing C-1141 will be revised to show this by February 21, 1979. Drawing C-1141 will also be revised to allow 50% of the counterfort design strength prior to surcharge Step III.
25. Project engineering will resolve this at a later date. It was agreed that this action item should be removed from the task group's responsibility because it is a normal project engineering action.
26. This item is still open. Construction has completed seven drawings showing test locations down to el 620'-0". Each drawing shows 3 feet of fill. Construction asked if the entire plant area fill should be plotted to el 619' prior to plotting the diesel generator building area to the original grade. It was agreed that the plotting should be done in phases, with the two southern main plant areas and the area east of the power block plotted to el 619' first. Geotech will define the next phases of work after receipt of the Phase 1 work. Construction will attempt to define Canonie's work versus Bechtel's work on the plots.
27. This item is still open. An acceptance procedure has been developed by geotech. However, this acceptance procedure must be reviewed by the soil consultants. It was agreed that geotech will send a copy of its acceptance procedure to project engineering concurrently with sending it to the consultant.
28. This item is complete. Pile capacity data has been supplied to engineering.

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27. This item is still open. An acceptance procedure has been developed by geotech. However, this acceptance procedure must be reviewed by the soil consultants. It was agreed that geotech will send a copy of its acceptance procedure to project engineering concurrently with sending it to the consultant.
28. This item is complete. Pile capacity data has been supplied to engineering.

29. The condensate tank foundation options were discussed. Engineering has estimated that 100 piles will be needed at a total cost of \$250,000. Engineering prefers the surcharge option. Construction stated that surcharging the condensate tank area to a height of 20 feet would jeopardize turnover to CPCo and would result in a claim from Chicago Bridge & Iron Co. It was agreed that a cost estimate of the two options would be developed by March 5, 1979, and that surcharge would be placed after a decision to follow this method has been made.
30. Project engineering discussed the surcharging of the Unit 1 transformer pad. It was agreed that the transformer area should be surcharged with 5 feet of fill without the transformer load as soon as possible. Construction stated that the Unit 1 stator will be moved over this same area in July 1979. Engineering agreed to investigate this potential problem and provide necessary directions to construction.
31. Plugging of drilled holes in the transformer basin will be done after surcharge. It was agreed that this action item should be treated as a regular construction item and should be removed from the task group's list of action items.
32. The corrective action on the tank farm was discussed. It was agreed that the borated water storage tank will be constructed as scheduled and then filled with water to observe settlement. Engineering will issue a memorandum to the field on this. No piping or any other utility should be connected to the tank at this time. The area should be backfilled to grade level as early as possible.
33. The corrective action on the guardhouse was addressed. It is engineering's intent to lower the foundation 2 feet and remove the central column. Engineering will discuss this plan with geotech. A minimum of three settlement plates will be installed below frost level to monitor settlements. CPCo stated that they are concerned about the possibility of a plugged sand drain in the guardhouse area. Geotech agreed to evaluate this problem and determine what remedial measures may be needed.
34. Response to Gallagher's questions. Project engineering's questions have been answered. This item is complete.
35. Comments on the potential cause list have been forwarded to QA. This item is complete.
36. This item is open. Some comments have been received by engineering on FSAR Section 2.5. However, comments are still required from CPCo and construction. Project engineering will resolve these comments, arrange for a meeting if necessary, and issue an FSAR change notice on any discrepancies or necessary changes.

Investigation of Cause

A Kepner-Tregoe problem analysis was presented to the task group by Bechtel management. This is a method of analysis which attempts to set the groundwork for establishing possible causes to a particular problem. The investigation of the diesel generator building settlement problem was presented and discussed using the Kepner-Tregoe analysis.

NCR 1004

Nonconformance Report 1004, which has remained open since November 1977, was discussed. It was agreed that engineering will analyze the service water pump structure section on plant fill to see if it can be supported by cantilever action without any support from fill. Geotech will provide the soil characteristics and conditions. Construction will provide the excavation drawing (plan and sections) used for the construction of the pumphouse foundation. Geotech will evaluate the liquifaction potential of the sand material adjacent to and/or below the structure. The civil resident engineers will perform a visual inspection of the structure for cracking and provide project engineering with the results of this inspection. Geotech will make additional borings required to evaluate the NCR.

- 3) Review of Construction Progress - The status of construction was presented. Step 1 of the surcharge placement will be completed by February 17, 1979. The monitoring of the turbine building wall may hold up surcharge Step 2. Step 2 can start on February 26, 1979, if the monitoring is complete. Step 3 may be delayed by 1 week due to the construction of the counterforts. However, Step 3 can be started on March 5, 1979, if 50% of the concrete strength is achieved on the counterforts.

The last walls in the diesel generator building were poured on February 20, 1979, with the placement of 550 yd³ of concrete. The roof is expected to be completed in mid-March.

- 4) Cost and Schedule Estimate - The cost and schedule will be reviewed at the next task group meeting.
- 5) Other Structures and Facilities - The following other Class 1 structures on plant fill were discussed.

- a) Service Water Lines - The recent borings taken in the service water line area were discussed. One boring could not be filled with grout and had to be plugged by bridging the hole with concrete. CPCo expressed concern about this boring and requested that Bechtel investigate conditions that could affect these lines. Geotech agreed to pursue this problem

further with construction and possibly make borings, pending the results of pipe profiling. Engineering agreed to check the secondary stresses and requirement for slopes in the service water pipelines.

- b) Diesel Fuel Tanks - It was agreed that settlement or movement of the diesel fuel tanks should be monitored. A base survey will be performed as soon as possible, the tanks will be filled, and then the tanks will be monitored for settlement. Depending on the movement after filling, engineering and geotech will decide if additional surcharging is necessary. Construction will investigate and confirm that the tanks can be filled. It was noted that the original boring logs qualifying the area as Q have been lost. Construction will attempt to relocate these borings. Geotech will make borings if the old borings cannot be located.

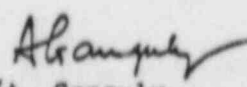
It was agreed that the next task group meeting would be held in approximately 2 weeks.

ACTION ITEMS:

- | | |
|---------------------|---|
| Geotech | 1) Look at passive pressure values used by construction in the double-wood form design and respond to engineering by February 15, 1979. |
| Project Engineering | 2) Meet with stress and mechanical groups to identify functional requirements for Q-listed pipeline. |
| Construction | 3) Review installation records and procedures for Q-listed pipe to determine how accurately the profiled pipelines were placed. |
| Construction | 4) Review the feasibility of profiling all other Q-listed pipelines and give this information to project engineering. |
| Project Engineering | 5) Issue Drawing C-1040 showing circulating water pipe ovality reading requirements by February 21, 1979. |
| Cost and Schedule | 6) Issue a revised cost estimate by March 2, 1979. |
| Project Engineering | 7) Provide CPCo with a response to Gallagher's questions by March 2, 1979. |
| Project Engineering | 8) Show milestone dates on settlement drawings by March 2, 1979. |

- Project Engineering 9) Show revised strain gage locations on Drawing C-1141 by February 21, 1979.
- Construction 10) Inform project engineering by February 20, 1979, of the locations where hydraulic jacks can not be used on the tie rods (i.e. where turn-of-the-nut method was used) and provide procedure for turn-of-the-nut tightening.
- Geotech 11) Forward results of liquifaction evaluation to the soil consultant by February 29, 1979, prior to responding to engineering.
- Project Engineering 12) Review the monitoring program in Specification C-83 and attempt to relax the requirements.
- Project Engineering 13) Revise surcharge tolerances and concrete strength requirements on Drawing C-1141 by February 21, 1979.
- Construction 14) Plot density tests for plant fill for the two power block areas and the one area east of the power block prior to plotting any other areas. Construction will also attempt to separate Canonic's work versus Bechtel's work.
- Geotech 15) Define the next phase of plotting to be performed after receipt of the Phase 1 plotting.
- Geotech 16) Send a copy of the surcharge acceptance procedure to project engineering concurrently with forwarding it to the soil consultant.
- Cost and Schedule 17) Develop a cost comparison for the pile option versus the surcharge option for the condensate tanks by March 5, 1979. Engineering will provide necessary direction to construction regarding surcharging of the condensate tank area.
- Construction 18) Surcharge the condensate tank area with 10 feet of fill as soon as possible, after engineering's decision has been made.
- Engineering/
Construction 19) Place 5 feet of surcharge in the Unit 1 transformer areas as soon as possible after engineering evaluates the effect of 5'-0" fill in the transformer area and directs construction to do so.
- Project Engineering 20) Investigate the proposed Unit 1 stator loads in the transformer area.

- Project Engineering 21) Issue a memorandum to construction on the release of the borated water storage tank without any piping connection.
- Project Engineering 22) Get geotech's concurrence on the proposed corrective action on the guardhouse.
- Geotech 23) Review the plugged sand drain problem and provide recommendations for remedial work.
- Construction/CPCo 24) Forward their comments of FSAR Section 2.5 to project engineering.
- Construction 25) Provide an excavation drawing of the service water pumphouse to project engineering.
- Geotech 26) Provide project engineering with the soil conditions and characteristics around the service water pumphouse which were found in the recent boring program.
- Geotech 27) Evaluate liquifaction potential of the loose sands around the service water pumphouse.
- Project Engineering 28) Analyze the pumphouse as a cantilever and see if the pumphouse can be supported independently of support by the fill.
- Civil Resident Engineer 29) Inspect the pumphouse for cracking and provide results to engineering.
- Geotech/Construction 30) Evaluate the potential fill support problems in the service water line area.
- Project Engineering 31) Check the secondary stresses in the service water pipe lines and also investigate if there is a need for slope in these lines.
- Construction 32) Investigate and confirm that the diesel fuel tanks can be filled.
- Construction 33) Attempt to locate the original borings made in the diesel fuel tank area.


R. Marl/A. Ganguly

RM/AG/js
2/21/4

SB 16773

J. F. Neugebauer

PRELIMINARY
POSSIBLE CAUSES

March 9, 1979
Midland Units 1 and 2
Bechtel Job 3330

<u>DISTINCTION OR CHANGE</u>	<u>POSSIBLE CAUSE</u>	<u>COMMENT</u>
1) Time difference between placement of fill and construction of facility.	No	Cannot cause insufficient compaction.
2) Placement method - Lift thickness - Moisture control - Compaction equipment - Type of materials	Yes	Investigate. Changed R/77 - 2/78. Large vs small (hand held). Random fill/structural backfill compatibility.
3) Theoretical comparison of BMP compaction vs settlement.	Yes	Compare effects of different compaction levels.
4) Spec C-211 - General - Frost protection omitted	- Yes	Include in 2. Investigate impact.
5) Testing	Yes	Investigate impact.
6) Increased test frequency & location for small areas.	Yes	Investigate frequency/distribution.
7) Different contractors.	Yes	Investigate personnel qualifications (ties to 2). Investigate different inspection methods.
8) Extensively reexcavated area.	Yes	Investigate procedures/controls.
9) Moisture intrusion in ground.	Yes	Investigate (compare with compaction).
10) Lean concrete fill.	No	
11) Pond filled March 1978.	Yes	See 9.
12) Stockpiled material - Weathering - Drying out	Yes	Investigate with moisture control. Check consultants.
13) 1977 dry year.	Yes	Investigate with moisture control.
14) Own weight settlement (calcs).	No	Cannot cause poor compaction.
15) Inspection procedures after 3/77.	Yes	Investigate extent.
16) Personnel.	Yes	Investigate qualifications. Bechtel, U.S.T., Canonic.
17) Effects of 1974-75 slowdown.	No	



Telephone call

BY T. C. Cooke Of CPCo Proj. Supt. ROUTE S. L. Blue
 TO P. A. Martinez Of Bechtel Proj. Mgr. J. F. Newgen
 DATE March 14, 19 79 TIME _____ K. Wiedner
 SUBJECT SETTLEMENT PROBLEM S. Afifi
 Attachment: List of Possible Causes JOB NO 7220, MIDLAND 1 & 2
 Dated March 9, 1979



P. A. Becnel
 B. Dhar
 G. Richardson

With Al Boos and Bob Wheeler, Tom Cooke called at Gil Keeley's request to advise additional CPCo comments on the possible cause analysis developed jointly (Bechtel/Consumers Power) on March 8 in Ann Arbor.

Cooke asked that in addressing possible causes Bechtel give top priority to:

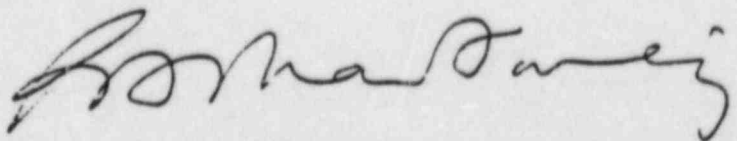
- 2) Placement Method
 - a) Lift thickness - Bechtel should verify the statement made by Afifi that handheld equipment will not adequately compact clay in layers as thick as 12 inches.
 - b) Moisture control - Bechtel including Geotech should review site pictures on compaction by flooding.
 - c) Compaction equipment - Bechtel and Canonic equipment qualification test records should be reviewed.
 - d) Material - Geotech should verify that the specification of random fill is correct. Provide discussion that inclusion of different materials was considered.
- 4) Spec C-211 - In the matrix comparison of Specs C-211 and C-210 the records on placement should be reviewed to be able to conclude to what extent frost might have been involved.
- 5) Testing - As soon as possible during the analysis and data computer retrieval study, including analysis of proctor selections, being undertaken by Geotech, test pits should be dug to compare results.

SB 16775

- 7) Different contractors - CCo hopes that by correlating borings it will be possible to confine the problem.
- 8) Extensively reexcavated area - It should be noted that when the diesel generator building foundations were placed late in 1977, August, September, and October had exceptionally heavy rainfall.
- 15) Inspection procedures after 3/77 - Verify the actual time spent on surveillance.
- 16) Personnel

In addition to the foregoing Cooke asked that the following receive priority in developing a position on the Show Cause order:

- Completion of soil borings.
- Seismic design questions.
- Adequacy of saturated and random fill.
- Portions of auxiliary building and service water pump structures supported on fill.
- Category 1 buried electrical duct banks and pipes.
- Diesel oil tanks foundations.
- Borated water storage tank foundations.
- Retaining wall.
- Diesel generator foundations current status.



P. A. Martinez

PAM/pp

SB 16776

PRELIMINARY
POSSIBLE CAUSES

March 9, 1979
Midland Units 1 and 2
Bechtel Job 7220

<u>DISTINCTION OR CHANGE</u>	<u>POSSIBLE CAUSE</u>	<u>COMMENT</u>
1) Time difference between placement of fill and construction of facility.	No	Cannot cause insufficient compaction.
2) Placement method	Yes	Investigate.
a) - Lift thickness		
b) - Moisture control		Changed 8/77 - 3/78.
c) - Compaction equipment		Large vs small (hand held).
d) - Type of materials		Random fill/structural backfill compatibility.
3) Theoretical comparison of BMP compaction vs settlement.	Yes	Compare effects of different compaction levels.
4) Spec C-211		
- General <i>COMPARISON WITH C-210</i>	-	Include in 2.
- Frost protection omitted	Yes	Investigate impact.
- <i>COMPACTION BY PONDING</i>		
5) Testing	Yes	Investigate impact.
6) Increased test frequency & location for small areas.	Yes	Investigate frequency/distribution.
7) Different contractors.	Yes	Investigate personnel qualifications (ties to 2). Investigate different inspection methods
8) Extensively reexcavated area.	Yes	Investigate procedures/controls.
9) Moisture intrusion in ground.	Yes	Investigate (compare with compaction).
10) Lean concrete fill.	No	
11) Pond filled March 1978.	Yes	See 9.
12) Stockpiled material	Yes	Investigate with moisture control. Check consultants.
- Weathering		
- Drying out		
13) 1977 dry year.	Yes	Investigate with moisture control.
14) Own weight settlement (calcs).	No	Cannot cause poor compaction.
15) Inspection procedures after 3/77.	Yes	Investigate extent.
16) Personnel.	Yes	Investigate qualifications, Bechtel, U.S.T., Canonic.
17) Effects of 1974-75 slowdown.	No	

PAM/pp

55 16777

BECHTEL INVESTIGATION
INTO CAUSES
OF DIESEL GENERATOR
BUILDING SETTLEMENT

Consumers Power Company
Midland Plant Units 1 and 2

SB 16778

DEVIATION STATEMENT: "INSUFFICIENTLY COMPACTED BACKFILL"

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

SB 16779

Preliminary 2/15/79

DEVIATION STATEMENT:

"INSUFFICIENTLY COMPACTED BACKFILL" (Cont.)

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

SB 16760

Preliminary 2/15/79

POSSIBLE CAUSES

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

Preliminary 2/15/79

G-0478-04

SB 16781

POSSIBLE CAUSES (Cont.)

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

ITEMS TO INVESTIGATE FOR MOST PROBABLE CAUSE(S)

REEXCAVATION AND BACKFILL

Material Selection

Inadequate Procedures & Controls

Review Photos, Procedures, Controls & Subcontractor Daily Reports

TEMPORARY FILL AND RAMPS NOT REMOVED

Inadequate Procedures & Controls

Review Photos, Procedures, Controls & Subcontractor Daily Reports

Q-LISTED PROCESS-INSPECTION PROCESS

Review Surveillance & Inspection Procedures In Relation to

Other Findings

Audit Procedures Bechtel and Canqnie

TESTING

Results are Questionable - Relied on

Testing is under Review

Procedure Changed 9/78

PERSONNEL

Minimal Involvement of Technical Support after 74-75 Slowdown

Bulk of Earthwork Complete

Review Qualifications of Testing, Inspection, & Supervisory Personnel

Preliminary 2/25/79

SB 16783

Bechtel Power Corporation

Midland Units 1 and 2
Bechtel Job 7220

February 16, 1979

PRELIMINARY

PROBLEM of INSUFFICIENTLY COMPACTED BACKFILL

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

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

SB 16784

February 16, 1979

TASK FORCE PLAN

INVESTIGATION INTO CAUSE(S) OF INSUFFICIENTLY COMPACTED BACKFILL

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

PRELIMINARY DRAFT

MAR 2 1979

P. A. Martinez

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

*Serial
Wieder*

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

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

Specific comments on analysis items listed by Bechtel:

Page 1:

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

SB 16786

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

Page 2:

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

Page 3:

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

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

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

Page 4:

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

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

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

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

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

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

Approved by C-457, D.D.O
(Previous C-457, D.D.O)
Superseded by C-457, D.D.O

- 1) Use red covers
- 2) All other structural steel material placed in the space regions is to be exact as indicated in
- 3) The only Colored structural steel that can be placed within 3' of the exterior wall of any plant structure and within the space region
- 4) For miscellaneous small diameter pipe placed within the space regions the following shall not be Colored unless:
 - a) The pipe is Colored
 - b) The pipe is larger than 24" dia. or requires more than 2" thickness
 - c) The backfill in space region is a Colored metal structure
- 5) All backfill outside the space regions is to be chosen any material removed from within the section must be removed with all requirements of the C-457, D.D.O. and must be Colored

United States Testing Company, Inc.

Engineering Inspection Division

1415 PARK AVENUE
HOBOKEN, NEW JERSEY 07030 (201) 792-2400 (212) 943-0488



soils
asphalt
Quality Control
Construction Supervision
Investigations.

June 13, 1974
UST Ju-94

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

Attn: Mr. E. E. Felton

Re: Proctor Methods &
Comparisons

Attached are the three proctor comparison tests as requested
by Mr. Jim Wanzeck.

Methods used were.

1. Modified Proctor Method (Bechtel Modified Proctor)
2. Modified Proctor Method (ASTM 1557D)
3. Standard Proctor Method (ASTM 698C)

Tests were run on a single sample thoroughly mixed and split
into thirds for testing by the above methods.

In addition California Bearing Ratio's (ASTM D1883-67) on
laboratory compacted specimens were performed at points above
optimum moisture content as indicated on further attached
reports. Also hydrometer analysis, Specific Gravity and
Atterberg limits were performed.

Tests were performed by Mr. Peter Wang of our site staff.

Respectfully,

United States Testing Co., Inc.

Keith Rademacher
Lab Chief - Midland jobsite

GEOTECH
3
20A XC.2

Attachments (8)

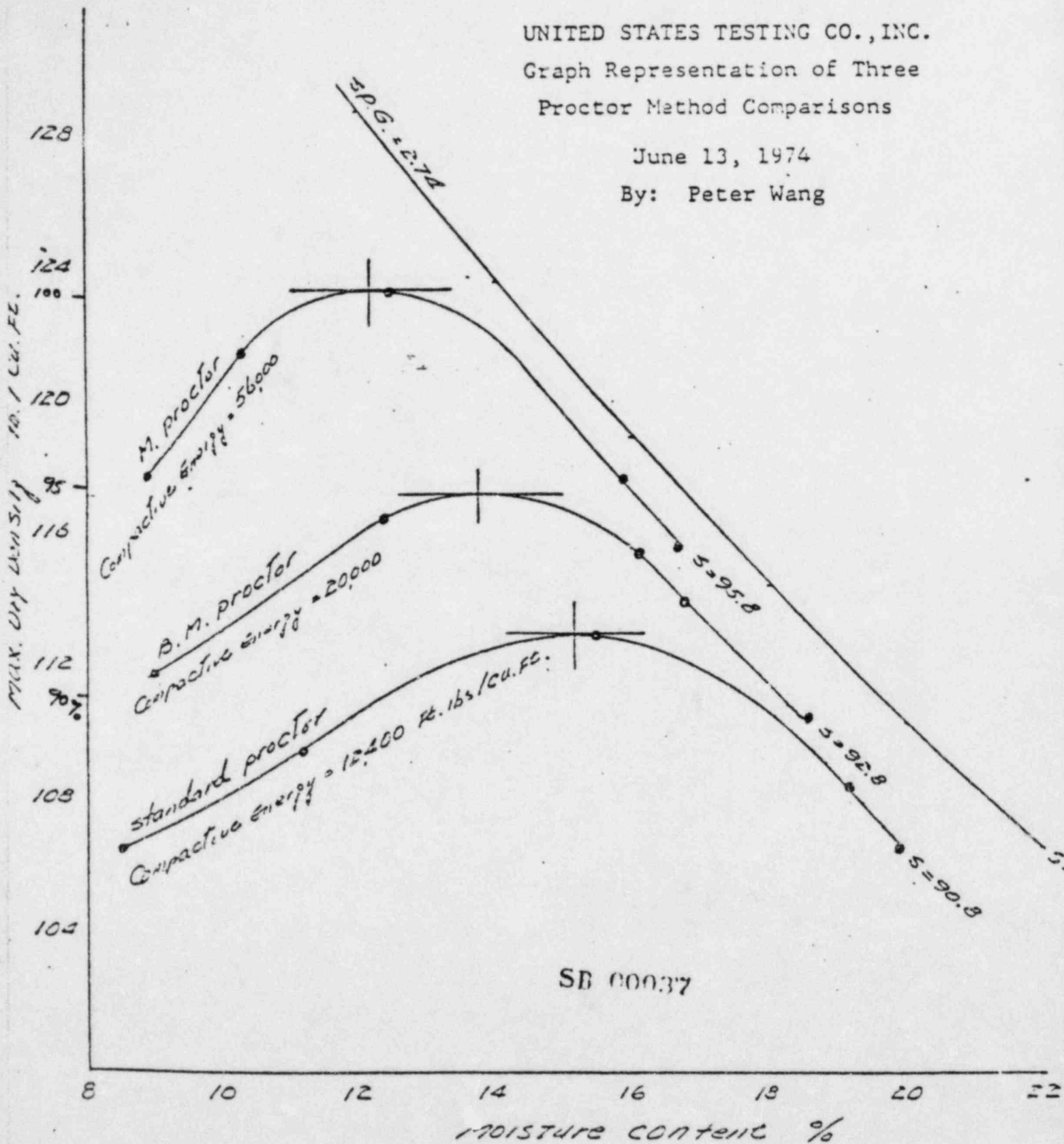
cc: Mr. D. Edley, UST, Hoboken, N.J.

KR:kls

SB 00035

UNITED STATES TESTING CO., INC.
 Graph Representation of Three
 Proctor Method Comparisons

June 13, 1974
 By: Peter Wang





UNITED STATES TESTING COMPANY, Inc.

CALIFORNIA BEARING RATIO

Test No. _____

Date 6-8-74

Project 7220

Location _____

Material _____

Surcharge 10 lbs

Penetration (in inches)	Dial Reading	Unit Load (lbs./sq.in.)	Standard (lbs./sq.in.)	Percent Standard
0.025	0	0		
0.050	4	9.9		
0.075	12	29.8		
0.100	18	44.8	1000	4.5
0.200	38	94.5	1500	6.3
0.300	58	144.2	1900	
0.400	—	—	2300	
0.500	—	—	2600	

REMARKS PROVING RING No. 12187

Ratio of proving ring 1×10^{-4} in. = 7.8125 lbs

Diameter of Needle = 2 in.

Area of Needle = 3.1416 sq. in.

Modified proctor

P. Wamp
Technician

SR (1)'38



UNITED STATES TESTING COMPANY, Inc.

CALIFORNIA BEARING RATIO

Test No. _____

Date 6-8-74

Project 7220

Location _____

Material _____ Surcharge 10 lbs

Penetration (in inches)	Dial Reading	Unit Load (lbs./sq.in.)	Standard (lbs./sq.in.)	Percent Standard
0.025	0	0		
0.050	4	9.9		
0.075	7	17.4		
0.100	11	27.4	1000	2.7
0.200	23	57.2	1500	3.8
0.300	32	79.6	1900	
0.400	—	—	2300	
0.500	—	—	2600	

REMARKS Proving Ring No 12187
Ratio of proving ring 1×10^{-4} in = 7.8125 lbs
Diameter of Needle = 2 in.
Area of Needle = 3.1416 sq. in.
Bechtel Modified Procter

P. Wamp
Technician

Sj 01039



EST 1880

UNITED STATES TESTING COMPANY, Inc.

CALIFORNIA BEARING RATIO

Test No. _____

Date 6-8-74

Project 7220

Location _____

Material _____ Surcharge 10 lbs

Penetration (in inches)	Dial Reading	Unit Load (lbs./sq.in.)	Standard (lbs./sq.in.)	Percent Standard
0.025	0			
0.050	0			
0.075	0			
0.100	0	0	1000	0
0.200	2	5.0	1500	0.3
0.300	6	14.9	1900	
0.400	-	-	2300	
0.500	-	-	2600	

REMARKS Proviap Ring No. 12187
Ratio of Proviap Ring 1×10^{-4} in = 7.8125 lbs
Diameter of Needle = 2 in
Area of Needle = 3.1416 sq. in.
Standard proctor

P. Wolf
 Technician

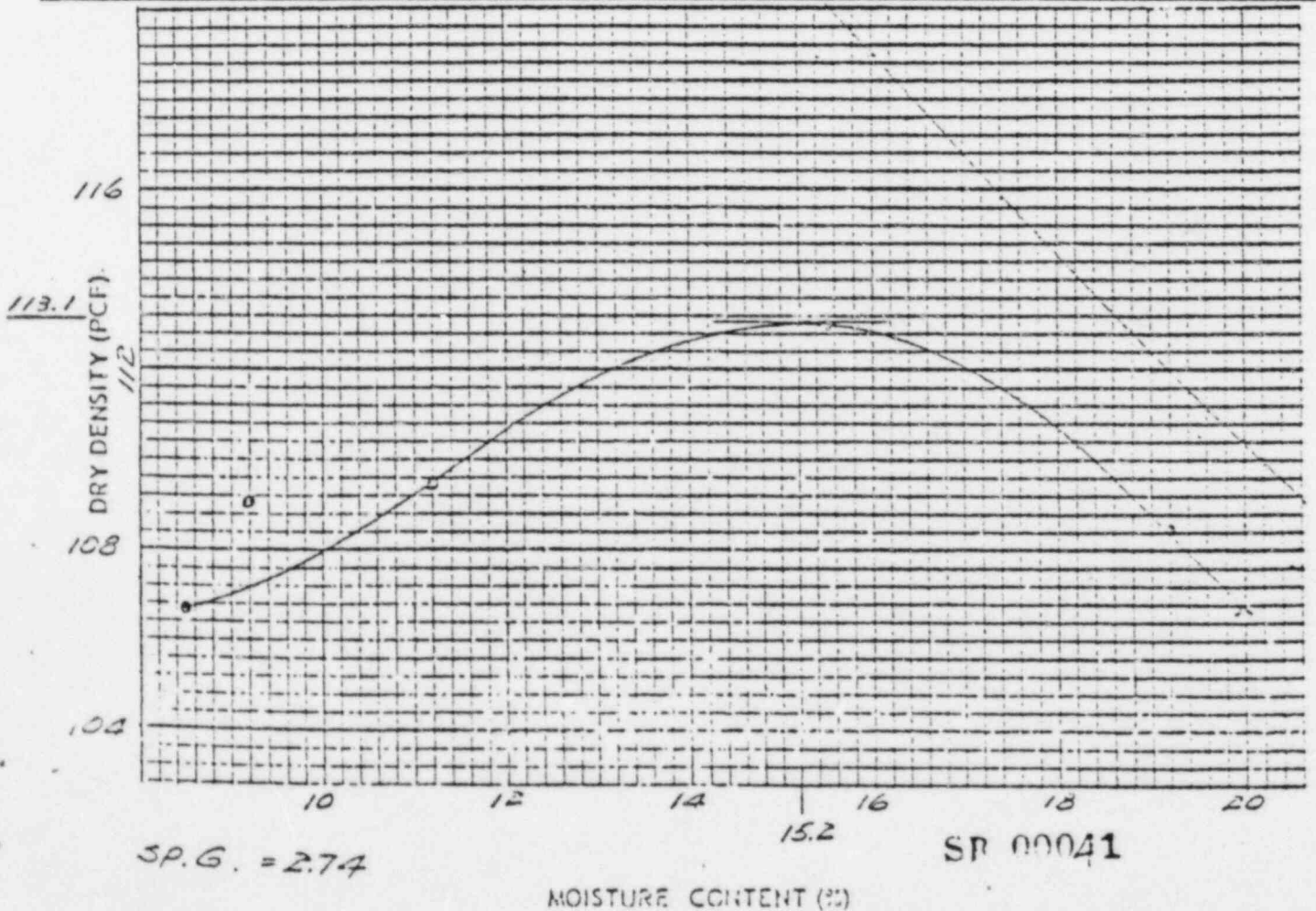
Hammer weight 5.5 lbs
 Drop distance 12 in
 No. Layers 3
 No. Blows 25



Type of test Standard
 Mold size 4"
 ASTM-698-C

Brown silty clay w/ little fine sand & TC M. sand

TEST DATA										C.B.R.		
Mold No.												
Wt. wet sample + Mold (lb)	13.28	13.39	13.48	13.77	13.73	13.68						
Wt. of Mold (lb)	9.42	9.42	9.42	9.42	9.42	9.42						
Wt. of wet sample (lb)	3.86	3.97	4.06	4.35	4.31	4.26						
Vol. of sample (cu. ft.)	1/30	1/30	1/30	1/30	1/30	1/30						
Wet Unit Weight (lb. /cu.ft.)	115.8	119.1	121.8	120.5	129.3	127.8						
Can No.	15	28	36	17	2	1	9	23	54	42	27	31
Wt. wet sample + Can (gm.)	217.7	207.0	209.3	205.5	207.0	212.9	215.1	207.0	202.6	202.7	201.8	202.5
Wt. Dry sample + Can (gm.)	205.7	205.9	277.7	273.6	263.8	293.7	262.6	262.4	257.6	244.1	241.0	262.5
Wt. water (gm.)	22.0	21.1	21.6	21.9	24.1	20.2	25.7	25.4	22.0	20.6	25.5	25.0
Wt. can (gm.)	37.2	36.6	36.6	37.0	36.4	35.6	34.2	36.3	30.1	34.2	35.5	36.0
Wt. dry sample (gm.)	252.5	249.3	241.1	226.5	227.6	248.1	226.6	226.1	212.5	205.8	226.3	237.5
Moisture Content %	8.5	8.5	9.0	9.3	10.6	11.8	15.2	15.7	12.2	14.2	19.4	12.8
Average Moisture Content %	8.5		9.2		11.2		15.5		19.2		19.9	
Dry Unit Weight (lb. /cu.ft.)	106.7	109.1	109.5		113.0		108.5		106.6			
Max. Dry Density											113.1 105/cu. ft.	
O.M.C.											15.2 %	



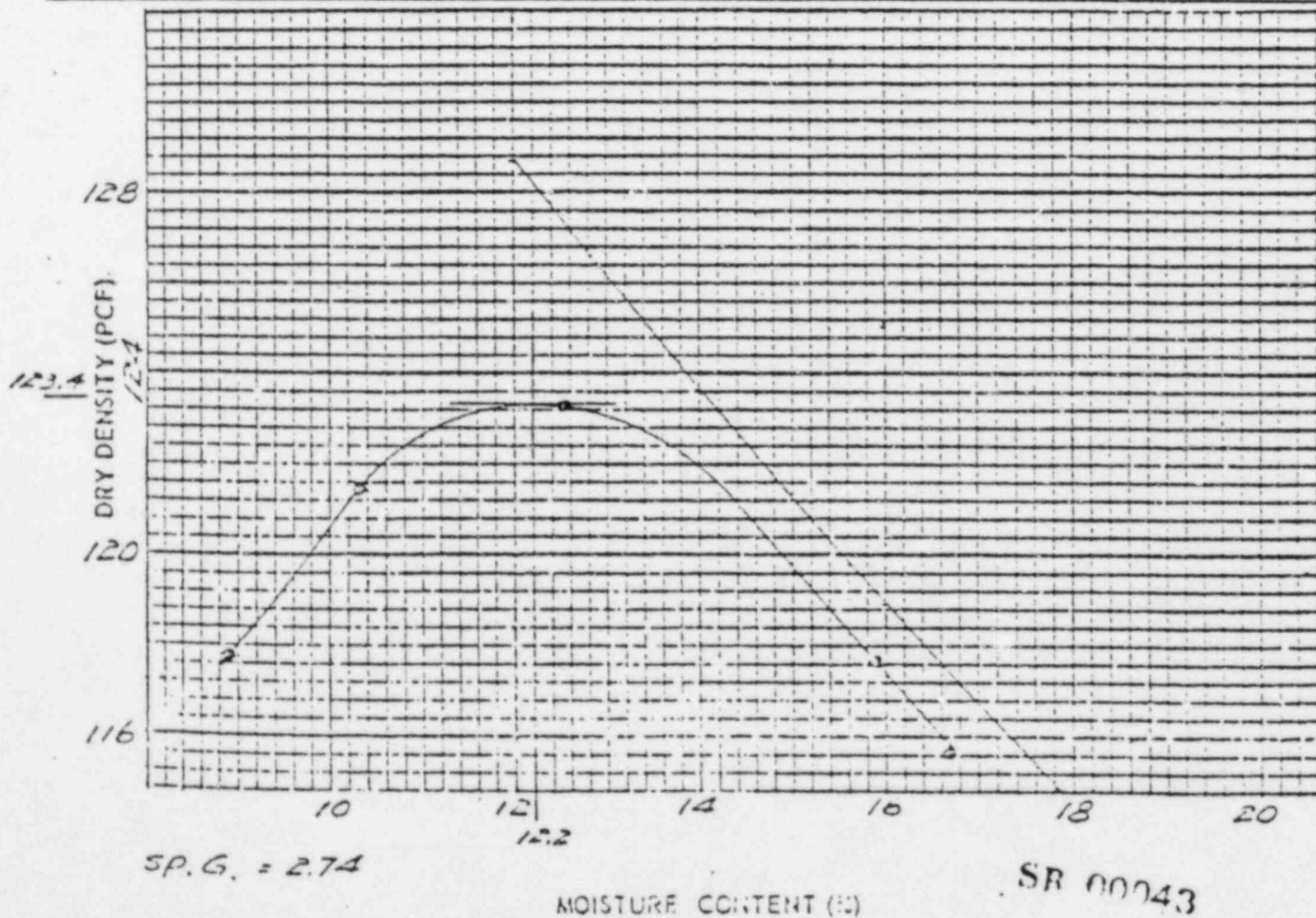
Hammer weight 15 lb
 Drop distance 15 in
 No. Layers 5
 No. Blows 56



Type of test M. Proctor
 Mold size 6"
 ASTM-1557-D

BROWN silty clay, w/ 1.5% F. sand & 7% M. sand

TEST DATA		C. B. R.									
Mold No.		PM-1	PM-1	PM-1	PM-1	PM-1	PM-1	PM-1	PM-1	PM-1	PM-1
Wt. wet sample + Mold (gms)	16	24.26	24.69	25.04	24.87	24.76					
Wt. of Mold (gms)	16	14.64	14.64	14.64	14.64	14.64					
Wt. of wet sample (gms)	16	9.62	10.05	10.40	10.23	10.12					
Vol. of sample (cc) C.F.		1/12.333	1/12.333	1/12.333	1/12.333	1/12.333					
Wet Unit Weight (lb. /cu.ft.)		128.3	134.0	139.7	136.4	134.9					
Can No.		22	10	6	22	53	47	54	13	16	29
Wt. wet sample + Can (gm.)		32.2	33.3	33.9	33.5	32.1	33.6	32.9	32.5	32.6	32.5
Wt. Dry sample + Can (gm.)		29.7	30.8	30.3	30.6	29.0	29.8	29.1	29.3	29.7	29.3
Wt. water (gm.)		2.5	2.5	2.5	2.9	2.3	2.5	2.0	2.2	2.1	2.2
Wt. can (gm.)		26.8	25.6	25.6	27.0	29.1	29.3	29.1	25.0	26.5	27.1
Wt. dry sample (gm.)		23.9	27.2	24.9	26.7	23.4	23.5	24.0	24.3	22.2	19.5
Moisture Content %		8.8	9.0	10.4	10.1	12.6	12.4	16.3	15.5	16.7	16.6
Average Moisture Content %		8.9	10.3		12.5		15.9		16.7		
Dry Unit Weight (lb. /cu.ft.)		117.8	121.5		123.3		117.7		115.6		
Max. Dry Density		123.4		165 / cu. ft.							
O. M. C.		12.2 %									





Telephone call

ROUTE _____

BY _____ OF _____

TO _____ OF _____

DATE _____ IS _____ TIME _____

SUBJECT _____ JOB NO _____

C-211 95.2 max to 90.5 max
 95.62 max to 80 max
 94.0 65.5

max'd ret with 2-
 structural demand

95.2 as per 1049

C-210 2000 hrs report ?
 - 100 hrs

C-2 2000 hrs To 6:00 am 100
 S-2 SB 00044

E-1 6500
 E-2 6500
 Leonard & Son
 North Meriden C.

→ To 1000 hrs per 1000 hrs - 5 hrs

ELECTRICAL

Rixford

NONCONFORMANCE REPORT

1 PAGE 1 OF 2	14. R. NO. 117
------------------	-------------------

2. DRAWING/PART NO. Specification 7220-C-210	REV. 2	7. PROJECT NO. 7220	12. REPORTED BY <i>W. E. A. Albert</i>	DATE 6-14-74
3. ITEM DESCRIPTION Zone III	8. ITEM LOCATION "Q" Listed Dikes	13. VALIDATED BY <i>R. Connolly</i>	DATE 6-14-74	
4. SERIAL NUMBER N/A	9. STARTUP SYSTEM NO. N/A	15. REPLACEMENT PART NO. N/A	REV.	
5. PURCHASE ORDER NO. N/A	10. QC FIELD INSPECTION PLAN NO. C-210-34, C-210-28, C-210-24	16. REPLACEMENT SERIAL NO. N/A		
6. CONTRACTOR/LOCATION Bechtel	11. ASME CODE ITEM <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	17. SOURCE Engineering/Construction		

25. DISPOSITION CONCURRENCE			
REWORK	REJECT	REPAIR	USE AS IS
			<input checked="" type="checkbox"/>
PROJECT FIELD ENGINEER <i>Richard Probst</i>			DATE 7/1
PROJECT ENGINEER			DATE
PROJECT FIELD QC ENGINEER			DATE
AUTHORISED INSPECTOR			DATE

18. ROUTING INSTRUCTIONS: ROUTE TO FIELD ENGINEERING ROUTE TO MATERIAL SUPERVISOR

19. NONCONFORMING CONDITION: Specification 7220-C-210, Rev. 2, Paragraph 13.7 states that "All backfill in the plant and the berm shall be compacted to not less than 95% of maximum density as determined by modified Proctor method (ASTM 1557, Method D) with the exception that Zone 4, 4A, 5, 5A, and 6 materials need no . . ." Contrary to the above, tests on Zone III materials were performed in accordance with Specification 7220-C-210 Rev. 2, Paragraph 12.4.5.2 which states that "maximum densities of cohesionless soils will be determined in accordance with the applicable requirements of ASTM Designation D-2049." Field densities were obtained in accordance with (Continued)

20. FIELD DISPOSITION FIELD RECOMMENDATION/ROUTE TO PROJECT ENGINEERING

"USE AS IS" Modified proctor method (ASTM D-1557, Method D) is not applicable to cohesionless soils. The correct method of determining maximum density of Zone III material is ASTM D-2049. Test results obtained are sufficient. The 95% acceptance criteria is not applicable to relative densities on Zone III material.

Richard Probst 6/21/74

21. FIELD DISPOSITION RESULTS:

22. ENGINEERING DISPOSITION
Inplace testing of zone 3 material by ASTM D-1556 to meet ASTM D-2049 is correct. Test results given in Block 19 indicate that the compaction achieved is greater than 85% of ASTM D-2049 (ref. telecon 7-12-4, R.L. Rixford to R.L. Anderson). 85% of D-2049, for zone 3, is comparable to 95% of D-1557, method D. (ref. telecon, 7-12-4, R.L. Rixford to S.S. Affi). Engineering recommends use as is.

R.L. Rixford 7-12-74
John C. Kunkle 7-12-74

23. ENGINEERING DISPOSITION RESULTS:

SB 00045

24. IS DESIGN CHANGE REQUIRED <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES, SEE ATTACHED:	26. REJECTED MATERIAL DISPOSITION <input type="checkbox"/> RETURN TO SUPPLIER <input type="checkbox"/> SCRAP	27. QC ACCEPTANCE
DRAWING _____ REV. _____ DCN _____	REMARKS	QC ENGINEER _____ DATE _____
SPEC _____ REV. _____ ADD _____		AUTHORIZED INSPECTOR _____ DATE _____

ORIGINATOR

BECHTEL

NONCONFORMANCE REPORT (CONT'D)

PAGE 2 OF 2

NCR NO 117

(Block 19 Continued) ASTM D-1556.

The following is a tabulated list of test results on the West Plant Dike, the North Plant Dike, and "Q" Listed area of the Northeast Dike:

West Plant Dike		Q Listed Area of Northeast Dike		North Plant Dike	
Test No.	Results Obtained	Test No.	Results Obtained	Test No.	Results Obtained
WOZ ₁ -1	101.8	WOZ -20	90.8	WOZ ₈ -1	93.9
WOZ ₁ -2	103.3	WOZ -21	91.6	WOZ ₈ -2	102.2
WOZ ₁ -3	102.2	WOZ -27	86.8	WOZ ₈ -3	103.0
WOZ ₁ -4	100.2	WOZ -26	96.1	WOZ ₈ -4	94.7
WOZ ₁ -5	96.1	WOZ -37	98.4	WOZ ₈ -5	88.6
WOZ ₁ -6	94.1	WOZ -38	94.6	WOZ ₈ -6	92.5
WOZ ₁ -7	93.0	WOZ ₇ -42	95.9	WOZ ₈ -7	94.1
WOZ ₁ -8	95.1	WOZ ₇ -43	92.4	WOZ ₈ -8	89.0
WOZ ₁ -9	91.5	WOZ ₇ -52	93.7	WOZ ₈ -9	93.8

SB 00046

from TCH 6-18

R. Grote

○ C-110 sects 12 & 13

27 tests for 14000 c_g
of material

none made 95%

may need spec. rev.

SB 00747



Telephone call

BY R. Grote OF B. Field ROUTE RLC
J. Hink OF B. Engin PAM
 DATE 6-15-74 TIME 8:15 X.C. C-210 PR
 SUBJECT VARIOUS JOB NO. 7220
 X.C. C-0750

R.L.R.
action

1. Q listed fill - zone 3. 27 tests taken. 15 failed; re spec C-210, testing provisions - Field used Bechtel modified test spec calls for 1557 D. Connolly has written NGR. R. Grote interprets spec to be speaking of relative density for cohesionless soil. Engineering agreed to review/revise spec.
2. Field is having trouble with Field prepared drawings reviewed by Engineering. Is agreed to
 - 1) work up a new stamp with L. Lark
 - 2) require our group to phone comment to Field.
3. Liner plate erection had not started because of bad weather.

SE 40049

SCN NO. C-210-

DATE 7-12-74

SPECIFICATION CHANGE NOTICE

A. SPECIFICATION NO. 2220-C-210 REV. 2 DATE 7-27-73

B. SPECIFICATION TITLE Plant Foundation Excavation & Cooling Pond Dikes

C. CHANGE REQUESTED BY
CLIENT ENG'R'G FIELD VENDOR/CONTRACTOR

D. CHANGE PREPARED BY RL Rixford DATE 7-12-74

E. DESCRIPTION OF CHANGE:
sect. 12.5.2, The first sentence shall read as follows:
"Zone 1 and zone 1A material shall be placed and compacted in the embankment fill as shown on the drawings or required in this specification."

sect. 12.5.3, The first sentence shall read as follows:
"Zone 2 material shall be placed and compacted in the embankment fill as shown on the drawings or required in this specification."

(See continuation sheet):

F. REASON FOR CHANGE

SB 00049

G. APPROVAL SIGNATURES DATE

BECHTEL ENGINEERING

PROJECT ENGINEER

GROUP SUPERVISOR

CHECKER

ORIGINATOR

H. INCORPORATED IN SPEC. _____
REV. _____ GROUP SUPERVISOR _____ DATE _____

SCN NO. C-210-

DATE 7-12-74

SPECIFICATION CHANGE NOTICE
CONTINUATION SHEET

SPECIFICATION NO. 2220-C-210 REV. 2 DATE 7-22-73

SPECIFICATION TITLE Abot

E. DESCRIPTION OF CHANGE (CON'T)

*Sect. 12.6.1, 2nd paragraph, The first sentence shall read
as follows:*

SB 00050

Mark-up of
C-210 which
would help clear
up the lack of
clarity re:
sensitivity per 1537
or BMP

SB. 00021

Compaction Requirements & Testing

12.0 Orka & R.R. Embankment

12.4 Testing of Embankment Mat'ls

12.4.5 Lab. Max Density & Opt Moist Content

12.4.5.1 Cohesive Soils

OK

Bechtel Mod. Proctor

12.4.5.2 Cohesionless Soils

ASTM D-2047

see attached
markup

12.8 Compaction Requirements

OK

12.8.1 Rolling

no. of passes

13.0 Plant Area Backfill & Berm Backfill

13.4 Testing

use ASTM method D
for clay & sand

ASTM per 104 N.G.

see attached
markup

13.7 Compaction Requirements

SB 00022

≥ 95% ASTM 1557 method D N.G.

≥ 90% clay ≥ 95% sand

see attached
markup

18.0 Temp. Const. Laydown Area

18.3 Testing

as per 12.4

18.5 Compaction

as shown on drawings to ASTM 1557 Method D

as in 12.4.5.1

28 00053

38 00023

120 DIKE AND RAILROAD EMBANKMENT CONSTRUCTION

124 Testing of Embankment Materials

124.3 add C136

- 1) For soils with little or no gravel: 6 inch diameter, 9 inch depth, cylindrical hole. (Volume of hole determined by 6 inch minimum size sand cone.)
- 2) For soils containing appreciable gravel: 10 to 12 inch diameter, 12 to 14 inch depth, conical hole. (Volume of hole determined by 12 inch maximum size sand cone.)

The density of material is defined as the weight of the material per unit of volume of the material in place.

12.4.5 Laboratory Maximum Density and Optimum Moisture Content

12.4.5.1 Cohesive Soils

The maximum dry density and optimum moisture content of cohesive material will be determined in the laboratory in accordance with ASTM Designation D 1557 Method D, provided that the sample is prepared in 4 layers, each compacted with 25 blows with a 10 pound hammer dropping 18 inches giving a compactive energy equal to 20,000 foot-pounds per cubic foot. (~~Beckel modified Proctor~~ Density test)

for Dike & RR this is fine

12.4.5.2 Cohesionless Soils

The maximum density of cohesionless soils will be determined in accordance with the ~~applicable requirements of ASTM Designation D-2049~~. Beckel modified Proctor Density test (As per 12.4.5.1)

no leave it as per 2019

12.4.6 Specific Gravity

SB 00024

ASTM Designation D 854.

12.5.2 Zone 1 and Zone 1A

Zone 1 and Zone 1A material shall be placed in the embankment fill as shown on the Drawings or as required and compacted ~~as specified in Paragraph 12.6 through Paragraph 12.8~~. The uncompacted lift thickness shall be not more than 12 inches. In areas not accessible to roller equipment the material shall be placed in lifts not to exceed 4 inches in uncompacted thickness.

*for R.R.R
Dike this is ok
but these reactions
on placement are*

12.5.3 Zone 2

Zone 2 material shall be placed in the embankment fill as shown on the Drawings or as required and compacted ~~as specified in Paragraph 12.6 through Paragraph 12.8~~. The uncompacted lift thickness of Zone 2 material shall not be greater than 12 inches. In areas not accessible to roller equipment, Zone 2 material shall be placed in lifts not to exceed 4 inches in uncompacted thickness.

*referenced for
plan forces &
temp. const. lay down*

12.5.4 Zone 3

Zone 3 material shall be placed in the embankment as shown on the Drawings or as required. The uncompacted lift thicknesses shall not be greater than 12 inches. In areas not accessible to roller equipment, the material shall be placed in lifts not exceeding 4 inches in uncompacted thickness. Approved placement methods shall be used which will prevent segregation of the materials and prevent mixing with other materials. Approval of the placing method will be on the basis of demonstrated ability to place Zone 3 materials without segregation. The surface of the adjacent fill shall be sloped throughout the construction operations so that water will readily drain away from Zone 3 toward the outer slopes of the embankment. The Subcontractor shall take particular care to prevent water from draining into Zone 3. Construction equipment shall cross Zone 3 only at specifically approved locations and elevations and the number of crossings shall be periodically changed as required. Provision shall be made to protect Zone 3 material from contamination at each crossing, and any contaminated Zone 3 material shall be removed and replaced with satisfactory material all by and at the expense of the Subcontractor. A vibratory roller or other suitable equipment may be substituted for the rubber tired roller to achieve the required compaction of Zone 3 material only.

is too dry. 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 provided that in Zone 2 the wet limit for compaction of the material shall be that moisture content at which the rubber tires of the specified rubber tired rollers rut the surface of the fill by more than 6 inches. If the material in the borrow area does not contain the required moisture content, it shall be moistened by sprinkling from a truck equipped with a sprinkler. The sprinkler truck shall be capable of uniformly distributing the water over the entire area to be used. When required by the Contractor, material in the borrow area shall be processed with plows, discs, dozers, motor graders or other approved equipment to distribute the moisture uniformly throughout the material to be used, or for the purpose of aerating material containing excessive moisture. If moisture conditioning is done in the borrow area, care shall be exercised to moisten the material uniformly and excessive runoff or accumulation of water shall be avoided in depressions.

~~Tests done in accordance with Paragraph 12.4.2~~ will indicate the degree of moistening or aerating necessary to comply with Paragraph 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 for compaction. If the material placed is too wet for compaction, it shall be aerated as specified and dried until the moisture content of the entire layer is uniform and reduced to within the required limits. If the material placed is too dry for suitable compaction, it shall be sprinkled and disked, harrowed or otherwise mixed until the moisture content of the entire layer is uniform and within the specified limits. Such sprinkling shall be by sprinkler truck which shall be equipped with pressure spray bars and valves to give a uniform and even application of water to the areas being covered and a positive control of the rate of application at all times. Rolling of any section of embankment containing material too wet or too dry

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no change

shall be of such size and ply that tire pressures can be maintained between 80 and 100 pounds per square inch for a 25,000 pound wheel load during rolling operations. Unless otherwise required, rolling shall be done with tires inflated to 100 psi. The roller wheels shall be located abreast in a rigid steel frame, each wheel loaded by an individual weight box so that each will carry an equal load when traversing uneven ground. The spacing of the wheels shall be such that the distance between the nearest edges of adjacent tires shall be not greater than one-half of the tire width of a single tire at the operating pressure for a 25,000 pound wheel load. The weight boxes shall be suitable for ballast loading such that the load per wheel may be varied as required from 18,000 to 25,000 pounds. The roller shall be towed at speeds not to exceed 10 miles per hour.

An alternate roller approved by the Contractor may be used in which case additional passes may be required.

12.7.3 Power Tampers

Power tampers shall be operator-held type of a size capable of performing the required compaction and shall be subject to approval. Approval will be on the basis of demonstrated ability of the tampers to accomplish adequate compaction as determined by the Contractor.

12.8 Compaction Requirements

12.8.1 Rolling

After material has been placed and spread on the fill and the moisture content and condition of the fill is satisfactory, the material shall immediately be compacted. All roller passes shall be made parallel to the axes of the dikes or embankment unless otherwise approved

SB 0027

by the Contractor. The rolling requirements for each zone of the dikes and embankment are as follows:

for Dike & RR the no. of passes rolled is OK.

<u>Zone</u>	<u>Type of Compaction Equipment</u>	<u>Minimum Number of Passes per Lift</u>
1	50-ton Rubber Tired Roller	4
1A	50-ton Rubber Tired Roller	4
2	50-ton Rubber Tired Roller	4
3	50-ton Rubber Tired Roller or Vibr. Roller	4
4	Construction Equipment routed over the zone or additional rolling as directed by Contractor	-
4A	50-ton Rubber Tired Roller as directed by Contractor	-
5	Not Required	-
5A	Not Required	-
6	Not Required	-

A pass shall consist of the entire coverage of the area with at least one trip of the equipment specified. In order to effect complete coverage of the area being rolled, each trip of the roller shall overlap the adjacent trip by not less than 2 feet. Dumping, spreading, sprinkling, disking, or harrowing, and compacting may be performed at the same time at different points along the section where there is sufficient area to permit these operations to proceed simultaneously.

12.8.2 Additional Rolling

If, as determined by the Contractor, the desired compaction of any portion of embankment is not obtained by the minimum passes specified, additional passes shall be made over the surface area of such designated portions of the embankment until the desired degree of compaction has been attained. However, where lift thickness is greater than specified, or moisture content at time of rolling is improper or specified rolling has not been performed, such rolling shall be by and at the expense of the Subcontractor.

13.0 PLANT AREA BACKFILL AND BERM BACKFILL

13.1 General

This section covers only embankment ~~materials placed in the plant area, (as defined on the contract drawings) and also backfill material required to provide a minimum 100 foot wide berm adjacent to the emergency cooling pond area.~~ All work under this section shall be subject to the Quality Assurance provisions as required by Section 16.0 "Quality Assurance Program Requirements".

13.2 Definition

The term backfill as used herein this section shall include all types of embankment zone materials required in the plant area and the berm, except that 1) backfill materials to be placed within three feet of any plant area structure, or 2) backfill areas inaccessible to motorized rollers will be considered structural backfill. Structural backfill will not be placed by the Subcontractor.

13.3 Materials

Materials shall conform to the application ^{b/e} paragraphs of Section ~~12.3.~~

13.4 Testing

to be replaced with hand-written text on following pages
~~Testing of all materials placed in the plant area and the berm will be performed in accordance with the tests listed in Section 12.4, except~~

13.5 Placement

Material placement procedures shall conform to Section ~~12.3.~~ ^{with change} Attention shall be given to not exceed the lift thickness specified for the various zones of materials.

SB 00029

13.4 Testing

13.4.1 General

Testing of all materials placed in the plant area and the test will be performed in accordance with the tests listed in Section 12.4, except as specified below.

13.4.2 Laboratory Maximum Density and Optimum Moisture Content

13.4.2.1 Cohesive Soils

The maximum dry density and optimum moisture content of cohesive material will be determined in the laboratory in accordance with ASTM Designation D 1557 - Method A

~~specify
method
with
test
method
1557~~

13.4.2.2 Cohesionless Soils

SB 00030

The maximum density of cohesionless soils will be determined in accordance with ASTM D-2049.

13.6 Moisture Control

Moisture control of the plant area and berm material shall conform to Section ~~12.6~~

with change

13.7 Compaction Requirements

to be replaced with hand-written text on following page.

~~All backfill in the plant area and the berm shall be compacted to not less than 95 per cent of maximum density as determined by modified Proctor method (ASTM 1557, Method D), with the exception that Zone 4, 4A, 5, 5A, and 6 materials need no special compactive effort other than as described in Section 12.8.1.~~

13.8 Slides and Winter Protection

All provisions for slides and winter protection shall be similar to requirements in Sections ~~12.9~~ and ~~12.10~~

13.9 Measurement & Payment

13.9.1 Measurement

Embankment will be measured in place to the nearest cubic yard of embankment material of the various zones, satisfactorily placed and compacted in the plant area and the berm. Such measurement will be made between the foundation lines as determined by survey in the field and the neat fill lines, grades and slopes shown. No allowance will be made for settlement of the foundation or of the embankment during construction.

13.9.2 Payment

Embankment will be paid for at the applicable contract price stated in the Price Schedule for the items listed below.

SB 00031

13.7 Compaction Requirements

13.7.1 Cohesive Soils

All cohesive backfill in the plant area

and the term shall be compacted to

not less than ⁹⁵~~75~~ percent of maximum

density as determined by ASTM D 1557, Method

13.7.2 Cohesionless Soils

All cohesionless backfill in the plant area

and the term shall be compacted to

not less than ⁸⁰~~90~~ percent of ~~relative~~ ^{relative}

density as determined by ASTM D ²⁰⁴⁹~~2049~~,

with the exception that zone 4, 4A, 5,

5A, and 6 materials need no special

compaction effort other than as

described in section 12 P.1

18.0 TEMPORARY CONSTRUCTION LAYDOWN AREAS

18.1 General

A temporary construction laydown area will be provided along the west side of the plant area. Permanent earthwork items in this area may be deferred until the laydown area is removed at a later date.

18.2 Material

Material for this area shall be either,

1) material obtained from excavating for the Bullock Creek diversion, 2) spoil material from the channel widening excavation presently located along the river's edge, or 3) Zone 2 material as described in Section 12.3.

18.3 Testing

to be replaced with handwritten text on following page
~~Testing of all materials placed in the laydown area will be performed in accordance with the tests listed in Section 12.4.~~

18.4 Placement and Moisture Control

with change
Material placement of laydown area backfill will be ~~in accordance with Sections 12.5.1 and 12.5.3,~~ *with change* except that no proof rolling is required. Moisture control of the material shall be in accordance with ~~Section 12.6.~~ Prior to placement of backfill, the laydown area shall be cleared and grubbed.

18.5 Compaction Requirements

Backfill in the laydown area will be to the required densities shown on the drawing. Such densities will be determined by the ~~modified ASTM 1557, Method D tests~~ described in Section ~~12.4.5.1.~~ *18.3.*

18.6 Channel Excavation

Immediately adjacent to the laydown area a new channel alignment of Bullock Creek shall be excavated by the Subcontractor. All channel excavation work shall be within 3 inches plus or minus of the design invert elevations. Such materials obtained from channel excavation shall be placed as fill for the laydown area.

SB 00033

18.3 Testing

18.3.1 Area to E1 634

→ Testing of all material placed in the ^{portion} region of the laydown area which goes to E1 634 will be in accordance with the tests specified in section 13.4

18.3.2 Area to E1 614

Testing of all material placed in the region of the laydown area which goes to E1 614 will be in accordance with the tests specified in Section 12.4

Bechtel Associates Professional Corporation

Inter-office Memorandum

BEBC - 531

To E. E. Felton Date September 12, 1974

Subject Midland Plant Units 1 & 2 Job 7220 From R. L. Castleberry
Plant Area Backfill
File: C-210, C-1140, 0274 Of Engineering

Copies to J. H. Allen At Ann Arbor
S. S. Afifi
R. A. Grote
R. L. Rixford

Reference: a) BCBE-370, 7-25-74
b) BEBC-456, 8-1-74

This letter is to confirm a verbal discussion between R. A. Grote of Field Engineering and R. L. Rixford of Project Engineering on 9-5-74. It will also provide a temporary course of action to be followed with regard to item 3 of reference a (95% of Bechtel Modified vs ASTM 1557, Method D). This letter will provide an interim response to be used until a final position is forthcoming from Geotech as mentioned in reference b.

Spec. 7220-C-210 covers "Backfilling around the structures in the Plant Area..." (Sect. 1.1.15) with Sect. 13.2 excluding "...1) backfill materials to be placed within three feet of any plant area structure, or 2) backfill areas inaccessible to motorized rollers will be considered structural backfill. Structural backfill will not be placed by the Subcontractor." It is the remainder of the "backfilling around the structures" (i.e., not structural backfill) which is the subject of this letter.

The verbal discussion referenced above in the 1st paragraph was to determine the compaction criteria for the backfilling around the structures in the plant area. Section 13.4 states, "Testing of all materials placed in the plant area...will be performed in accordance with the tests listed in Section 12.4." This requirement was not meant to include the compaction criteria given in Section 12.4.5; the compaction criteria for material placed in the plant area are given in Section 13.7. However, a mis-interpretation of these sections of the specification led to the usage of Section 12.4.5 criteria (95% of Bechtel Modified) in lieu of the specified Section 13.7 criteria (95% of ASTM 1557, Method D).

Until a complete evaluation of this problem can be made by Geotech (reference b), Engineering hereby approves the use of the Bechtel Modified Proctor as the standard for determining the degree of compaction of the backfill, not covered by Spec. C-211, around plant area structures.

SR 00010

Bechtel Associates Professional Corporation

BEBC - 531
Page 2

This approval is based upon:

- 1) Dames & Moore's "Supplement to Report - Foundation Investigation and Preliminary Explorations for Borrow Materials, Proposed Nuclear Power Plant, Midland, Michigan," dated March 15, 1969, which uses the Bechtel Modified Proctor (pg A-76) to define the compaction criteria.
- 2) Use of Bechtel Modified is consistent with all the material already in place in the plant area. To place material with a compactive effort equal to 1557, Method D over material compacted to Bechtel Modified (as would be the case on the excavation slopes), would be of doubtful value.
- 3) If Geotech's evaluation of this matter (reference b) should indicate that ASTM 1557, Method D is necessary in some areas and a correction program is then established, setting up the program, administrating it, and obtaining the samples would be facilitated by having a fill of uniform characteristics (i.e., all placed to meet one criteria).
- 4) Moreover, if Geotech's evaluation indicates a corrective program must be initiated, it will affect only a part of the backfill in question and the cost of including this additional amount of material in the corrective program will be small relative to the need to expedite the placement of this material.

Thus any backfill material in question, placed prior to the completion of Geotech's evaluation, should be placed in accordance with the compaction requirements utilized for the placement of the plant area fill under C-210.

R. L. Castleberry

RLR/rsm

SB 00020

Inter-office Memorandum

To R. L. Castleberry Date 13 September 1974

Subject Plant Area Fill From S. S. Afifi
Midland Units 1 & 2
Job 7220-001 Of Geotechnical Services

Copies to J. H. Allen At Ann Arbor - E
H. H. Burke/W. R. Ferris
J. C. Hink
[REDACTED]
J. O. Wanzack
1320,3410

1 This memo is intended to assist in preparing your formal response to Item 3 of BCBE-370 regarding compaction requirements for the plant area. Herein, we address recommendations given in the soils reports prepared by Dames & Moore for the Midland project and compare them with our earthwork specifications. The material in this memo confirms our previous discussions with your group.

2 The evaluation here pertains to plant area fill supporting and surrounding structures, any Category I slopes in the plant area, and the berm fill.

In-Situ Clays

3 Tables 1 & 2 attached (taken from Dames & Moore's soils report of June 28, 1968, Page 15 and its supplement of March 15, 1969, Page 16) present compaction recommendations for fill and backfill. In the June 28, 1968 report, the minimum clay compaction is recommended to be 95% for support of critical structures, 90% for support of non-critical structures, and 90% adjacent to structures, respectively; all percent compaction values are according to ASTM D 1557 Method D (about 56,000 ft-lb compaction energy). In the March 15, 1969 report, the minimum clay compaction is recommended to be 100% for support of structures, 95% adjacent to structures, and 90% for area fill (not supporting or adjacent to structures); all percent compaction values are according to Bechtel Modified Compaction (BMC: 20,000 ft-lb compaction energy).

4 Specification 7220-C-210 (Section 13.7) requires 95% of ASTM D 1557 Method D for in-situ clay in the plant area and berm.

5 In comparing the reports with the specification for in-situ clay supporting structures, it is seen that the specification and the 1968 Dames & Moore report are identical. Also, the specification and the 1969 report are consistent since 95% of ASTM D 1557 Method D is approximately equivalent to 100% BMC in some soils. However,

SR 00013

Bechtel Associates Professional Corporation

R. L. Castleberry
13 September 1974
Page Two

the requirement of 95% of ASTM D 1557 Method D given in the specification is the applicable criteria for compacting clay to support structures. Further assurance by conducting shear strength tests is required (see Section 12.4.8, Specification 7220-C-210). Compressibility tests may also be required.

- 6 The berm fill must be compacted to 95% of ASTM D 1557 Method D to insure adequate seepage protection and stability.
- 7 Category I fill placed within the failure zone of a slip circle may require a degree of compaction higher than 95% of BMC, because of design for the full SSE. However, it is conceivable that in-place fill compacted to 95% of the BMC will be adequate if strength and permeability properties are shown to be adequate.
- 8 Similarly, in-place fill supporting light structures may be adequate at 95% of BMC provided its strength and compressibility are shown to be adequate.
- 9 Fill in the plant area which will not support structures or pipes or be placed within the failure zone of Category I slopes may be compacted to a lesser degree than 95% of ASTM D 1557 Method D (e.g. 95% of BMC). This agrees with Dames & Moore's 1969 report and is consistent with their 1968 report which requires only 90% of ASTM D 1557 Method D.

In-Situ Sands

- 10 The Dames & Moore June 1968 report presents recommendations for compacting sand in terms of maximum density while their March 1969 report presents recommendations in terms of relative density. The later report is considered more applicable for sands since relative density is one of the basic parameters required to control liquefaction. Therefore, in-situ sands supporting structures must be compacted to a relative density of 85% (ASTM D-2049). For well-graded sands around structures, the 80% relative density specified in 7220-C-211 is adequate.
- 11 Accordingly, any in-situ clay which will be supporting structures or be involved in Category I slopes and the berm must be compacted to 95% of ASTM D 1557 Method D.
- 12 If the fill is already in place according to BMC, it may be adequate for some structures, pipes, or slopes, provided it is shown by sufficient testing that its strength, compressibility and seepage

SF 0014

Bechtel Associates Professional Corporation

R. L. Castleberry
13 September 1974
Page Three

characteristics are adequate. This requires sampling and laboratory shear strength and consolidation testing. Section 12.4.8 of the earthwork specification addresses this issue for any in-place fill. Compaction curves using both ASTM D 1557 Method D and Bechtel Modified Method must also be developed and correlated with shear strength and consolidation test results on the compacted soil to evaluate the compressibility and shear strength achieved from both methods of compaction for the in-place fill.

² This information will allow a complete evaluation of any in-place fill for its proposed function, in addition to providing information which will be needed for the FSAR. It should also clear up any questions as to how fill should be placed in the future.

⁴ We will be happy to discuss this matter further with you at your convenience.

Sheif S. Afifi
S. S. Afifi

SSA:lab

Attachments

58000045

TABLE 1

Minimum Compaction Criteria from Dames & Moore

June 1968 Report**

<u>Purpose of Fill</u>	Recommended Minimum Compaction Criteria Percent of Maximum Density*	
	<u>On-Site Cohesive Soils</u>	<u>On-Site Granular Soils</u>
Support of Critical Structures	95	100
Support of Non-Critical Structures	90	95
Adjacent to Structures	90	95

* Maximum density and optimum moisture content should be determined by the ASTM Test Designation D 1557 Method D.

SB 00016

** Report, Foundation Investigation and Preliminary Explorations for Borrow Materials Proposed Nuclear Power Plant, Midland, Michigan, June 28, 1968.

TABLE 2

Minimum Compaction Criteria from Dames & Moore

March 15, 1969 Report***

<u>Purpose of Fill</u>	Recommended Minimum Compaction Criteria	
	On-Site Sand Soils <u>Percent Relative Density*</u>	On-Site Clay Soils <u>Percent of Maximum Density**</u>
Support of Structures	85	100
Adjacent to Structures	75	95
Area Fill (not supporting or adjacent to structures)	70	90

* Maximum and minimum density of sand soils should be determined in accordance with ASTM Test Designation D-2049.

** Maximum dry density and optimum moisture content should be determined in accordance with ASTM Test Designation D-698, modified to require 20,000 foot-pounds of compactive energy per cubic foot of soil.

SB 00017

*** Supplement to Report, Foundation Investigation and Preliminary Explorations for Borrow Materials, Proposed Nuclear Plant, Midland, Michigan, March 15, 1969.



NONCONFORMANCE REPORT

PROJECT NO. 7220PAGE 1 OF 2SKETCH ATTACHED Yes No. 7220-C-26

MODAY YR

DATE 12 5 73

ITEM LOCATION	AREA/BLDG.	9. DWG/PART No.	REV.	6. ITEM NAME
Cooling Pond		7220-C-109	6	Dike Density

7. INSPECTION CRITERIA	DOCUMENT NUMBER & TITLE
DWG <input type="checkbox"/> SPEC <input checked="" type="checkbox"/> OTHER <input type="checkbox"/> (EXPLAIN)	7220-C-208 Material Testing Services

8. SOURCE:	ADDRESS	9. P.C. No.
ENGRG <input type="checkbox"/> CONSTR <input checked="" type="checkbox"/> OTHER <input type="checkbox"/> (EXPLAIN)		7220-C-210

10. No.	11. NONCONFORMANCE (DISCREPANCY) DESCRIPTION:	ASME YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
---------	---	-----------------------------------	--

1 Testing intervals for earthwork field densities taken during the interim material testing services subcontract (Specification 7220-C-208A) were established in Pittsburg Testing Laboratory's Quality assurance Manual. This interval was one (1) test per 500 cubic yards placed.

Testing intervals for earthwork field densities taken under the permanent material testing service subcontract is established in table 9-1, page 14a of specification 7220-C-208. This interval is one (1) test per 500 cubic yards placed. (Continued on Sheet 2.)

12. NCR PREPARED BY:	Date	CONCURRENCE	Date
Responsible Engr. <u>J. C. Chenev</u>	<u>12/7-73</u>	Responsible Lead Engr. <u>Richard Gote</u>	<u>12/11/73</u>

13. FIELD DISPOSITION:	REWORK <input type="checkbox"/>	REJECT <input type="checkbox"/>	ROUTE TO PROJECT ENGRG <input checked="" type="checkbox"/>
	NOTIFY AUTHORIZED INSP. <input type="checkbox"/>	ROUTE TO MAT'L SUPV. <input type="checkbox"/>	

1 Field recommends that borings be taken to evaluate the in-place density of affected areas.

Additional training and instruction will be given the inspectors to thoroughly educate them in the specification governing work they are involved in. Closer control will be maintained on the testing laboratory to insure their compliance with governing criteria.

14. FIELD DISPOSITION BY:	Date	APPROVAL OF FIELD DISPOSITION:	Date
<u>Richard Gote</u>	<u>12/13/73</u>	<u>Jerry C. Johnson</u>	<u>12/17/73</u>

15. ENGRG DISPOSITION:	REPAIR <input type="checkbox"/>	REJECT <input type="checkbox"/>	DCN REQD: YES <input type="checkbox"/>	DCN No. _____
	USE AS IS <input type="checkbox"/>	SEE BELOW <input checked="" type="checkbox"/>	NO <input checked="" type="checkbox"/>	

1 Engineering has requested that the GeoTech group evaluate the testing frequency required and the frequency achieved and recommend a program of corrective action. (IOM to J. H. Allen dated Jan. 17, 1974). Pending re-evaluation of required frequency all testing done shall be in accordance with existing specifications.

RFR 2/23/74 Gote 2/23/74 (see continuation sheet)

SB 00069

16. APPROVAL OF ENGRG. DISPOSITION	PE <u>[Signature]</u> Date <u>3/15/74</u>	17. REINSPECTION
PFE _____	Date _____	ACCEPT <input type="checkbox"/> Responsible Engr. _____ Date _____
CONCURRENCE AUTH. INSP _____	Date _____	REJECT <input type="checkbox"/> Responsible Lead Engr. _____ Date _____
		CONCURRENCE: Auth. Insp. _____ Date _____



NONCONFORMANCE REPORT

PAGE 2 OF 2

No. C-26

SKETCH ATTACHED Yes

3.	MO	DAY	YR
DATE	12	5	73

CONTINUATION SHEET
PROJECT NO. 7220

No.	11.	NONCONFORMANCE (DISCREPANCY) CONT'D	or	<input checked="" type="checkbox"/>
CONT'D	13.	FIELD DISPOSITION CONT'D	of	<input type="checkbox"/>
	15.	ENGRG. DISPOSITION CONT'D	and	<input checked="" type="checkbox"/>

1.) Field densities taken on the west plant dike, north plant dike, and the 100 ft. berm in the northeast dike average one (1) test per 2300 cubic yards placed.

15. Engrg. Disposition Cont'd.

1.) Based upon Geotech's evaluation, Engineering recommends that the testing frequency remain as specified and the boring program recommended in BEBC 238, be implemented.

RJR 3/15/74 *UJ 3/15/74*

SF 00070

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

Copies to

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

At Midland, MI

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 25, 1977.

JFN/JSPD/cb
Attachment

QA ROUTE	INFO.	ACT.
LQAE		
CIVIL (1)		
CIVIL (2)		
MECH		
PIPING		
ELECT.		
INST.		
SECY		
FILE NO	1533R	

J. F. Newgen
J. F. Newgen

RECEIVED
AUG 19 1977
BECHTEL POWER CORP.
JOB 7220
51-99505



Telephone call

CC: S. Rao
 W. Barclay
 G. Richardson
 A. Ecos
 F. Teague
 T. Lied
 J. Speltz - UST
 File
 Job No. 7220

BY J. G. Hook OF Site - QA
 TO S. Rao OF AAO
 DATE October 13, 1977 TIME 11:35
 SUBJECT Moisture Requirements for Backfill Ref: QAR SD-40

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

CA ROUTE	INFO.	ACT.

Inter-office Memorandum

C-210. Z. 010

To R. Solihmet Date June 14, 1973
Subject Consumers Power Company From P. A. Martinez
Midland Plant Units 1 & 2
Job No. 7220 Of Engineering
Fill Compaction
Copies to File: 0294, C-210 YR At Ann Arbor, Building "D"

J. Allen
P. Burcin
✓ E. Felton
L. Wilcox

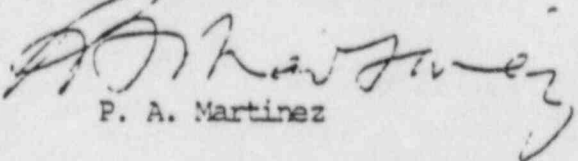
The request by Canonie to use a loaded motor scraper (model-Terex TS24) in lieu of standard compaction equipment for compacting of fill should not be accepted.

The distance between the tires on the scraper is much wider than on a standard rubber tired roller. This would make it extremely difficult to assure that a given number of passes was made over any particular area of fill since the alignment would have to be carefully controlled. In addition to the extremely careful tracking which would be necessary, it would be difficult on the narrow dikes or in narrow construction areas to use this equipment since the width of the scraper would make it difficult in certain cases to provide complete coverage.

Even if complete coverage of the area were attained, it is doubtful that adequate compaction could be achieved due to:

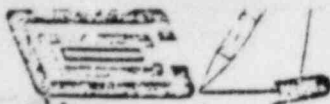
- 1) The decreased weight and increased tire bearing area would result in pressures too low to achieve the required compactive effort.
- 2) The distance between load points (i.e., tires) could result in a "pumping action" and/or "weaving" and result in inadequate compaction and/or a lateral displacement of the fill due to insufficient confinement on each pass.

The "Caterpillar 835" and "Hyster C-455" compactors listed in Canonie's proposal should be generally acceptable providing the equivalent number of passes as compared to the 50 ton roller are established in a test area in accordance with Section 12.7 of Specification 7220-C-210.


P. A. Martinez

RLR:sar

SB 00529



CANONIC CONSTRUCTION COMPANY / P.O. BOX 509 / U.S. 31 & M-43 / SOUTH HAVEN, MICHIGAN 49090 / (616) 627-1

June 25, 1973

Mr. E. E. Felton
Project Superintendent
Bechtel Power Corporation
P. O. Box 2167
Midland, Michigan 48640

Subject: Contract No. 7220-C-210
Requested Qualifications #5

Gentlemen:

There is an apparent area of confusion as to the scope of the Canonic Construction QA-QC procedures and personnel work assignments.

Please reference Addendum #2 to the proposal section 1-A and the last paragraph section 1. The manual entitled "Quality Assurance Nuclear Power Plant Civil Works Construction" submitted with our bid proposal was intended to provide a cursory example of our ability and willingness to perform in accordance with the Bechtel requirements. A more detailed QA-QC program specifically dealing with the Canonic Construction requirements at the Midland project was later prepared, in accordance with the above last paragraph of section 1, and submitted at the pre-award meeting of June 11, 1973 with the written stipulation that in areas of conflict the "Quality Assurance/Quality Control Program Rev. June 11, 1973" shall govern.

It is the intent that Canonic Construction shall be responsible for QA-QC program as outlined in the above mentioned addendum #2 item 1-A to the proposal. Our printed manual, submitted with the proposal, is designed to cover all possible areas of construction in which we may be involved from time to time. It is not our intent to perform other than or outside the scope herein outlined, nor will we necessarily furnish personnel qualified for QA-QC work beyond the scope of our contract.

The project manager, Mr. Bob Haney, shall, however, function as the QA-QC Technical Director and will lend assistance, guidance, and technical advice to the QA-QC engineer Mr. Gary Nelson. Mr. Haney will also be available to facilitate remedial or corrective action in the plant and berm areas. Attached you will find Mr. Haney's experience resume for your records.

Road Building / Foundation Piling / Earth Moving / Caisson Drilling / Marine Construction

An Equal Opportunity Employer

0135
SH 00536



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

Mr. E. E. Felton
June 25, 1973
Page 2

We understand there remain a few additional points that require clarification and are willing to do so in conjunction with Bechtels requirements.

Very truly yours,

CANONIE CONSTRUCTION COMPANY

[Handwritten Signature]
for Jack McKane, Vice President
Earthmoving Division

JWM:jkb

cc: P. M. Burcin
Buck Kinney

115.1

SB 00537

Inter-office Memorandum

To: R. Selimot/P. Burcin
 Date: July 3, 1973
 Subject: Midland Plant - Job 7220
 Earthwork
 File: 0294, C-210
 From: P. A. Martinez
 Of: Engineering
 Copies to: J. Allen
 J. Hirk
 E. Felton
 L. Wilcox
 J. Jeffers
 At: Ann Arbor, Bldg. "D"

C-210.201

Reference: a) Letter from Canonie Construction Company dated June 15, 1973.

The following are Engineering's comments on pertinent portions of reference a):

- 1) The sieve analysis, taken by Michigan Testing Engineers, of the existing Zone 3 material stockpiled at the Hubscher Deerfield Pit, shows that the material sampled is within the gradation called for in Specification C-210. As long as the material continues to conform with all requirements of Specification C-210, it will be acceptable.
- 2) The compaction equipment prepared appears to be acceptable pending evaluation of the performance on test fills.
- 3) The calculations done to date indicate that excavating the cooling pond to a general elevation of 614 will result in an additional 450,000 cu. yds. This is excluding Area A (the Margard property).

Please advise Canonie Construction Company that they may proceed with their excavation down to elev. 614. This excludes Area A and a determination will be made at a later date regarding whether or not Area A will be excavated below 615. Construction drawings will be revised accordingly.

P. A. Martinez
 P. A. Martinez

RLR:sar

RECEIVED
 JUL 6 1973

BECHTEL POWER CORP.
 JOB 7220

SB 00538

PER _____

Bechtel Associates Professional Corporation

Inter-office Memorandum

BEBC-395

To E. E. Felton

Subject Midland Plant Units 1 & 2
Job 7220
Report for NCR-55
File: C-210, 1700, 0274

Copies to J. Hink w/o
J. H. Allen w/o
S. S. Afifi w/o

OC FILE NO. C-210 2.045
Date June 26, 1974

From P. A. Martinez

Of Engineering

At Ann Arbor

RECEIVED
JUN 27 1974

BECHTEL POWER CORP.
JOB 7220

PER _____

Enclosure 1) Report of Evaluation of NCR-55, 6-25-74

Reference a) NCR-55

Transmitted herewith is the Report of Evaluation of NCR-55, dated 6-25-74.

This report fulfills the commitment made in the Engineering Disposition of NCR-55 to submit a summary of the results of our evaluation, and completes Engineering action on this NCR.

P. A. Martinez
P. A. Martinez

RLR/alr
Enclosures

RECEIVED
JUL 2 1974

BECHTEL POWER CORP.
JOB 7220

PER _____

SB 00613

REPORT OF EVALUATION OF NCR 55

This report summarizes the evaluation of NCR-55 and fulfills the commitments made in the Engineering Disposition of that report.

Table 1 shows data of NCR-55 expanded to include: a Group number for correlation with the body of the report, the unified soil classification obtained from the compaction curves used by field personnel, a remarks column indicating the conclusions reached in the body of this report, and Check Test data obtained in April 1974 from the boring program initiated by NCR-26.

The first eleven samples (Group 1) in Table 1 are within the moisture range specified in BEBC-104, dated November 7, 1973. Since these samples also satisfy 95% compaction as determined by Bechtel Modified Compaction (BMC) they are acceptable. Figure 1 shows the scattered locations and elevations of Group 1 samples.

Group 2 is composed of five samples of Zone 1 material which did not meet the required moisture content. It should be noted that the terms maximum density and optimum moisture, when used in this context, are of relative, not absolute significance. That is, the terms "percent compaction" and "optimum moisture content" for a given soil have a specific meaning only in connection with a specific compaction procedure (see Figure 7). Hence, the water content universally known as optimum is the best or most favorable moisture for obtaining the desired result with a particular compactive effort and although the desired degree of compaction can be attained at a moisture content above or below optimum it would require a greater effort and hence be an inefficient operation.

Therefore, although these samples were outside the specified range above or below optimum, sufficient compactive effort was applied to achieve the indicated densities of 95% or above according to the Bechtel Modified Compaction criteria and the samples are acceptable. Figure 2 shows the location and elevation of Group 2 samples.

The two samples of Group 3 (see Figure 3 for location) were below the specified moisture range by 0.6% and 1.0%. However, as stated in the MDSH, Density Control Handbook, "If the moisture content should drop below, the density can still be obtained with increased compactive effort." Since these samples did achieve densities of 98% and 103%, it appears the increased compactive effort was applied and the samples are acceptable.

All of the seven samples of Group 4 (see Figure 4) could have been acceptable based on BEBC-104; however, when percent moisture values were checked against the selected curves, they were found to plot outside the zero air voids line. This line is a theoretical line which indicates that for any given density there is a moisture content at which the soil is saturated and there are 'zero air voids'. It is theoretically impossible for a soil sample described by a density and a moisture content to lie to the right of this line

SH 00614

(see Figure 7). This condition suggests an error in interpretation of the correct soil classification and the corresponding compaction curve, or in the words of D. Taylor, Fundamentals of Soil Mechanics, "When unexplained irregularities occur, the most likely explanation is that there has been a mistake in identification of soil type."

With the exception of one sample (WOD8-12) the boring program of April 1974 did not provide data sufficiently close to the samples in question to verify or refute the initial test values. It is therefore concluded that the data in Group 4 were based on questionable identification of the soil type, and that the initial test results should be disregarded. Thus, one sample is acceptable based on the Check Test data, with the other six samples remaining questionable.

The six samples of Group 5 (see Figure 5) show a compaction below 95% of BMC along with high moisture content. All of these samples fell in the vicinity of borings made in April 1974. Results of the tests of the April 1974 boring program are shown to the right of the "Remarks" column of Table 1. The Check Test data indicate densities higher than 95% in all cases and on this basis the material is acceptable.

The ten samples of Group 6 (see Figure 6) were classified as sands. The first seven of these were Zone 2 soils and had a high moisture content along with a high percent compaction. When these values were plotted on the compaction curve indicated in NCR-55, they all fell far to the right of the compaction curve showing high moisture values near saturation, suggesting a possible error in testing and/or compaction curve interpretation. It is not conceivable that soils at this degree of compaction could have such a high moisture content.

The three remaining Group 6 samples described in the NCR as Zone 1 soils, were at Elevation 610 and fell in the vicinity of temporary structures. The compaction curve used to interpret these data appears questionable for several reasons. First, the applicability of a Proctor curve to a cohesionless sand material is questionable. Second, if the compaction curve had been appropriate to the material tested it is doubtful that the density shown would have been achieved at the low moisture content recorded. Third, based on sample description and location as shown on Figure 6, this material may belong to Zone 2 or Zone 3, further indicating a possible error in classification and/or application of the wrong compaction curve.

The material represented by the three Group 6 samples with Check Test data available from the April 1974, boring program (see Table 1) appears to be acceptable. However, due to the sand nature of the material, the use of Check Test data based on a proctor curve is questionable and without additional back-up data the samples of Group 6 must remain questionable.

The remaining two samples shown on NCR-55 are included in Group 7. This Group consists of two Zone 1 samples with moisture contents outside of the specified range. The first sample also falls outside of the zero air voids line. (see discussion of this situation for Group 4.) The second sample of this Group had no indication of the

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SB

compaction curve used. Hence, it is not possible to ascertain if this sample also falls to the right of the zero air voids line. Thus, without adequate Check Test data for comparison the results of the samples in this Group must remain questionable.

Table 2 shows a summary of the conclusions reached in the previous paragraphs. The table shows that among the 43 samples considered in the evaluation, 18 were acceptable as they were, 7 were acceptable with backup data based on the April 1974 boring program and 18 samples were questionable due to possible error in laboratory and field interpretation of compaction curves, soil type designation, or application errors which are suggested by inconsistencies between percent compaction and sample water content.

On the basis that, after evaluation of the initial sampling program plus an additional 451 samples obtained from the April 1974 boring program, only 15 samples remain questionable, it can be concluded that this small percentage of scattered samples which possibly exceed the specification moisture content limits does not adversely affect the quality of the earthwork.

Engineering recommends to "use-as-is" the earthwork allegedly not in conformance with Specification 7220-C-210.

TABLE 1

DATA OF MCR 55										CHECK DATA FROM APRIL 1974 DIKE INVESTIGATION			
Group	Test No	Zone	Unified Soil Classification	Moisture Content	Optimum Moisture	Difference From Optimum	Percent Compaction	Remarks	Check Test No.	Elevation	Moisture	Compaction	I
1	W008-9	2	SC	13.0	10.3	+2.7	98.0	Acceptable					
1	W008-29	2	CL	16.3	14.7	+3.6	99.6	Acceptable					
1	W007-74	2	CH	23.0	20.5	+2.5	96.6	Acceptable					
1	W008-41	2	CL	13.8	11.2	+2.6	100.2	Acceptable					
1	W008-47	2	SM	10.0	7.4	+2.6	99.4	Acceptable					
1	W008-61	2	SC	14.3	10.3	+4.0	96.8	Acceptable					
1	W001-14	2	ML	13.7	11.2	+2.5	99.3	Acceptable					
1	W007-35	2	SM	10.3	7.4	+2.9	97.1	Acceptable					
1	W007-46	2	CL	19.5	16.4	+3.1	98.4	Acceptable					
1	W007-58	2	CL	20.1	16.4	+3.7	96.2	Acceptable					
1	W005-15	2	CL	12.1	8.6	+3.5	94.9	Acceptable					
2	W008-32	1		6.9	9.4	-2.5	95.7	Acceptable	MTB-8(3A)	614.5	13.8	96.8	
2	W008-46	1	CL	19.5	16.4	+3.1	97.6	Acceptable					
2	W008-54	1	SC	14.6	11.2	+3.4	97.4	Acceptable					
2	W008-4	1	CL	6.8	11.8	-5.0	100.7	Acceptable	MTB-3(10B)	612.4	7.3	97.1	
2	W008-5	1	CL	6.6	11.8	-5.2	101.1	Acceptable	MTB-5(11B)	616.7	3.5	Sandy Clay	
3	W005-8	2	ML	4.5	7.1	-2.6	97.7	Acceptable	MTB-9(0B)	610.8	6.1	100.4	
3	W008-3	2	SM	9.6	17.6	-3.0	103.3	Acceptable	MTB-22(11A)	609.7	13.5	99.2	
4	W004-12	2	SH	10.0	7.4	+2.6	100.0	Curve Wrong	MTB-33(10)	607.7	18.3	98.6	
4	W008-13	2	SC	14.2	9.4	+4.8	98.0	Curve Wrong					
4	W008-19	2	HL	15.9	11.2	+4.7	96.0	Curve Wrong					
4	W008-48	2	SC	12.6	9.4	+3.2	100.0	Curve Wrong					
4	W008-59	2	CL	16.5	11.8	+4.7	102.4	Curve Wrong					
4	W007-64	2	CL	18.3	14.2	+4.1	95.3	Curve Wrong					
4	W007-78	2	ML	16.3	11.2	+5.1	97.3	Curve Wrong					

SB 00617

TABLE 1 (cont)

DATA OF MCR 55										CHECK DATA FROM APRIL 1974 DIKE INVESTIGATION				
Group	Test No	Zone	Unified Soil Classification	Moisture Content	Optimum Moisture	Difference From Optimum	Percent Compaction	Remarks	Check Test No	Elevation	Moisture	Compaction	I	
5	W008-1	2	ML	10.4	7.1	+3.3	84.9	Low Density	MTB-23(10)	609.8	17.3	102.4		
5	W008-14	2	SC	17.2	9.4	+7.8	86.3	Low Density	MTB-22(10A)	611.7	20.6	99.9		
5	W008-55	1	BC	18.3	11.2	+7.1	90.5	Low Density	MTB-34(1)	623.3	11.6	95.5		
5	W007-47	2	ML	19.6	12.7	+6.9	87.3	Low Density	NETB-2(3B)	616.5	17.0	99.2		
5	W007-69	2	ML	21.0	12.7	+8.3	93.3*	Low Density	NETB-2(3B)	616.5	27.0	99.2		
5	W007-80	2	CL	17.1	12.6	+4.5	93.9	Low Density	NETB-2(3B)	616.5	17.0	99.2		
6	W008-36	2	SP	15.2	10.8	+4.4	103.2	Sand	MTB-29(7)	615.3		Sand Drain		
6	W008-37	2	SP	14.2	10.8	+3.4	101.9	Sand	MTB-30(6)	615.9		Sand Drain		
6	W008-40	2	SP	15.2	10.8	+4.4	100.4	Sand	MTB-27(8)	614.7		Sand		
6	W008-23	2	SP	20.7	10.8	+9.9	94.9	Sand	MTB-22(9A)	613.7	17.7	94.7		
6	W008-24	2	SP	24.0	10.8	+13.2	100.8	Sand	MTB-23(8A)	613.3	15.3	96.3		
6	W008-38	2	SP	19.4	10.8	+8.6	95.2	Sand	MTB-29	615.3		Sand Drain		
6	W008-39	2	SP	17.3	10.8	+6.5	95.6	Sand	MTB-27(8B)	615.3		Sand Drain		
6	W001-1*	1	SP	4.8	12.0	-7.2	95.9	Sand				Area Under Slab		
6	W001-2*	1	SP	4.7	12.0	-7.3	96.7	Sand				Area Under Slab		
6	W001-3*	1	SP	5.0	12.0	-7.0	93.7	Sand	MTB-5(5)	612.0	6.5	95.0		
7	W001-16	1	ML	10.3	8.0	+2.3	99.6	Questionable						
7	W008-64	1	Y	10.5	8.0	+2.5	100.5	Questionable						

* These samples are in the area of the temporary construction buildings.

SB 00618

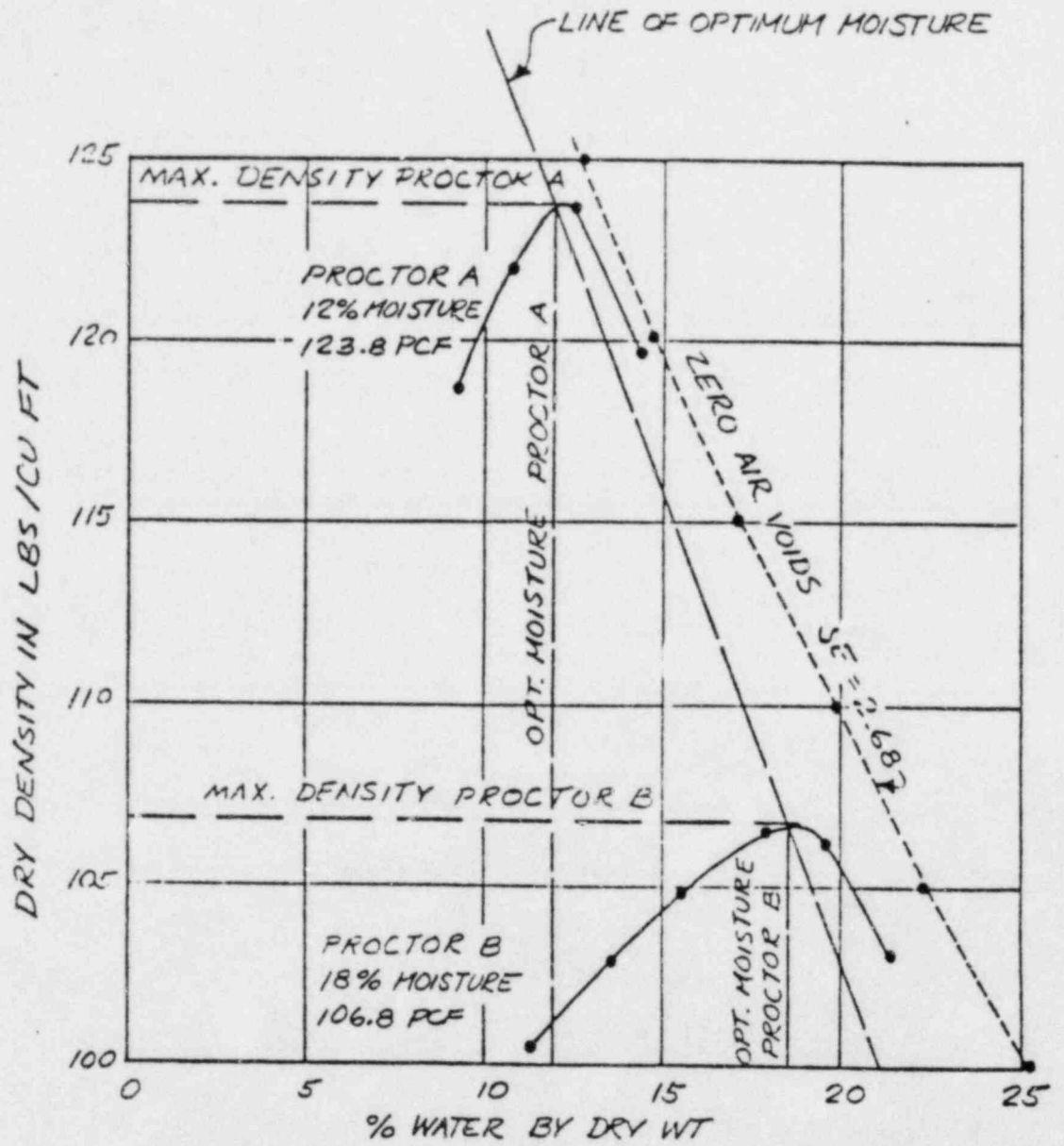
TABLE 2

Summary of Data
Evaluation for NCR 55

<u>Group No</u>	<u>Acceptable</u>	<u>Acceptable With Backup</u>	<u>Questionable</u>	<u>Not Acceptable</u>
1	11	-	-	-
2	5	-	-	-
3	2	-	-	-
4	-	1	6	-
5	-	6	-	-
6	-	-	10	-
7	-	-	2	-

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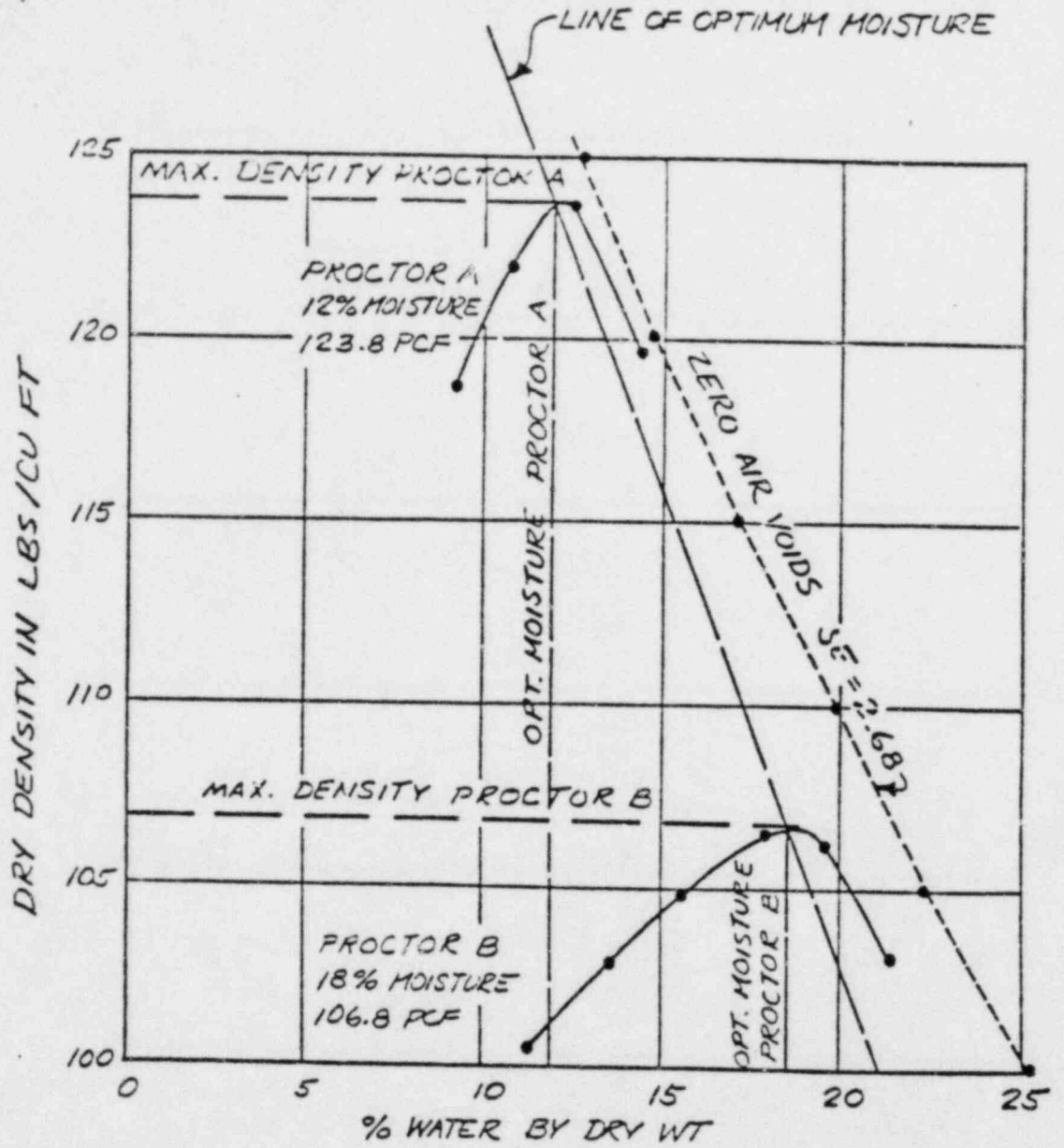
D 698-70 vs D 1557-70, SAME SAMPLE

1550

SUB 00620

BECHTEL ANN ARBOR		
MIDLAND POWER PLANT		
EXAMPLES OF COMPACTIVE EFFORTS		
	7270	FIG. 7


M³
5:16:29



D 698-70 vs D 1557-70, SAME SAMPLE

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SU 00621

BECHTEL ANN ARBOR			
MIDLAND POWER PLANT			
EXAMPLES OF COMPACTIVE EFFORTS			
	DATE	DRAWING NO.	REV.
	7/20	FIG. 7	

M
S.G-29

Bechtel Power Corporation

Interoffice Memorandum

To QC Files
Subject: M/D and Proctor Test Frequencies

Date October 2, 1974
From L. V. Hendry
Of Quality Control
At Midland, Michigan
Job No. 7220

Copies to

On May 23, 1974 construction of the "Q" areas of the cooling pond dikes recommenced, all work performed was under constant quality control surveillance by both Bechtel QC Engineers and the Subcontractors QA/QC Engineer. All Field Moisture Density Tests, Bechtel modified Proctor Tests and the Subcontractors QA/QC Daily Reports are reviewed on a continuing basis by Bechtel QC Engineers.

Attached is a summary of M/D and BMP Test frequencies based on these reviews to September 14, 1974. All earthwork quantities are based on load counts supplied by the Subcontractor. It has been noted that the earthwork quantities reported by the Subcontractors QA/QC Engineer differ from the earthwork quantities reported by the Bechtel QC Engineer. The difference is less than five per cent of the total and does not appreciably affect the testing frequency. Better communication has been established and future reports should show less deviation.

L. V. Hendry

L. V. Hendry

LVE/jmw

Attachments

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SB 00634

SUMMARY OF MOISTURE/DENSITY AND BECHTEL MODIFIED PROCTER TEST FREQUENCIES
 Northeast Dike, North Plant Dike, 100' Wide Berm "Q" Listed Areas
 Zone 1 & 2 Material

Based on the Daily Reports of Canonic Construction Companies QA/QC Engineer

Week Ending	Cum. Yardage Placed	Cum. Total M/D Tests	M/D Test Freq.	Cum. BMP Tests	BMP Test Freq.
5/25/74	3,990	40	1 @ 100 Yds ³	5	1 @ 798 Yds ³
6/8/74	29,697	89	1 @ 334 Yds ³	8	1 @ 3,712 Yds
8/9/74	55,442	129	1 @ 430 Yds ³	9	1 @ 6,160 Yds
6/15/74	55,442	130	1 @ 426 Yds ³	9	1 @ 6,160 Yds
6/22/74	55,442	143	1 @ 388 Yds ³	10	1 @ 5,544 Yds
6/29/74	70,737	192	1 @ 368 Yds ³	13	1 @ 5,441 Yds
7/6/74	70,737	197	1 @ 359 Yds ³	13	1 @ 5,441 Yds
7/13/74	88,901	272	1 @ 327 Yds ³	13	1 @ 6,839 Yds
7/20/74	115,026	338	1 @ 340 Yds ³	13	1 @ 8,848 Yds
7/27/74	133,399	358	1 @ 373 Yds ³	18	1 @ 7,411 Yds
8/3/74	158,517	396	1 @ 400 Yds ³	18	1 @ 8,807 Yds
8/10/74	172,862	455	1 @ 380 Yds ³	20	1 @ 8,643 Yds
8/17/74	225,568	581	1 @ 388 Yds ³	23	1 @ 9,807 Yds
8/24/74	254,907	644	1 @ 396 Yds ³	26	1 @ 9,804 Yds
8/31/74	262,355	648	1 @ 404 Yds ³	28	1 @ 9,369 Yds
9/7/74	262,355	668	1 @ 393 Yds ³	28	1 @ 9,369 Yds
9/14/74	273,816	696	1 @ 393 Yds ³	28	1 @ 9,782 Yds

SUMMARY OF MOISTURE/DENSITY AND BECHTEL MODIFIED PROCTER TEST FREQUENCIES
 Northeast Dike, North Plant Dike, 100' Wide Berm "Q" Listed Areas
 Zone 1 & 2 Material
 Based on Bechtel QC Daily Observations and Test Reviews

Week Ending	Cum. Yardage Placed	Cum. Total M/D Tests	M/D Test Freq.	Cum. BMP Tests	BMP Test Freq.
5/25/74	3,780	40	1 @ 95 Yds ³	5	1 @ 756 Yds
6/1/74	29,298	89	1 @ 329 Yds ³	8	1 @ 3,660
6/8/74	45,183	129	1 @ 350 Yds ³	9	1 @ 5,020
6/15/74	45,183	130	1 @ 348 Yds ³	9	1 @ 5,020
6/22/74	45,183	143	1 @ 316 Yds ³	10	1 @ 4,518
6/29/74	59,623	192	1 @ 310 Yds ³	13	1 @ 4,593
7/6/74	59,623	197	1 @ 303 Yds ³	13	1 @ 4,593
7/13/74	81,891	272	1 @ 301 Yds ³	13	1 @ 6,299
7/20/74	104,206	338	1 @ 308 Yds ³	13	1 @ 8,015
7/27/74	122,560	358	1 @ 342 Yds ³	18	1 @ 6,253
8/3/74	147,678	396	1 @ 373 Yds ³	18	1 @ 8,204
8/10/74	163,740	455	1 @ 359 Yds ³	20	1 @ 8,162
8/17/74	214,425	581	1 @ 369 Yds ³	23	1 @ 9,322
8/24/74	242,411	644	1 @ 376 Yds ³	26	1 @ 9,323
8/31/74	249,859	648	1 @ 385 Yds ³	28	1 @ 9,209
9/7/74	249,859	668	1 @ 374 Yds ³	28	1 @ 9,209
9/14/74	261,320	696	1 @ 375 Yds ³	28	1 @ 9,618

Bechtel Corporation

Interoffice Memorandum

To J. P. Connolly

Date October 4, 1974

Subject Job 7220 Midland Project
NCR 88
O-831

From John C. Church

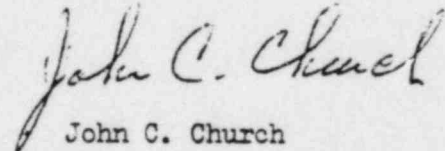
Of Subcontracts

Copies to

At Midland, Michigan

This is in response to your request for clarification of certain items on NCR 88.

1. NCR 88 was drafted after the approximate 500 samples were taken and it was noted that there were some failures (approximately 5%).
2. An IOM (enclosed) from P. A. Martinez to E. E. Felton dated June 10, 1974 explains in detail the reasons for disregarding or the method to recondition the material affected by the 5% failures.
3. The top two feet of all dikes exposed thru a winter were reconditioned as per Subcontract C-210. This eliminated all those failures taken in upper fill lifts.


John C. Church

JCC/JRS/gm

Enclosure

0001

SB 00637

NONCONFORMANCE REPORT

2. DRAWING, PART NO. <i>C-208</i>		REV. <i>2</i>	7. PROJECT NO. <i>7220</i>		12. REPORTED BY <i>J. C. Chappel</i>		DATE <i>4/17-79</i>	14. NCR NO. <i>188</i>	
3. ITEM DESCRIPTION <i>Plant Area F11</i>			8. ITEM LOCATION <i>"Q" LIFTED DIKES</i>		13. ALLOCATED BY <i>J. C. Chappel</i>		DATE <i>4/17-79</i>	25. DISPOSITION COMPLETION FILE	
4. SERIAL NUMBER <i>N/A</i>			9. STARTUP SYSTEM NO. <i>N/A</i>		15. REPLACEMENT PART NO. <i>N/A</i>		REV.	PROJECT FIELD ENGINEER <i>J. C. Chappel</i>	
5. PURCHASE ORDER NO. <i>C-210</i>			10. QC FIELD INSPECTION PLAN NO. <i>C-210</i>		16. REPLACEMENT SERIAL NO. <i>N/A</i>			PROJECT ENGINEER <i>J. C. Chappel</i>	
6. CONTRACTOR/LOCATION <i>Raymond Internation Co. South Texas Mill</i>			11. ASME CODE ITEM <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		17. SOURCE <i>Subcontract</i>			PROJECT FIELD QC ENGINEER <i>J. C. Chappel</i>	
18. ROUTING INSTRUCTIONS <input checked="" type="checkbox"/> ROUTE TO FIELD ENGINEERING								AUTHORIZE INSPECTION <i>J. C. Chappel</i>	

19. NONCONFORMING CONDITION:
 Spec 7220-C-208, Table 9-1, page 14a states in part: field densities, moisture content test frequency will be one per every 500 cubic yards of fill. Actual test taken was one per every 2300 cubic yards. Ref; NCR #C-26 & NCR #55. It was recommended by Project Engineering borings be taken to evaluate the in place density of affected areas. Approx. 500 samples were taken in areas as designated by Project Engineering (work done under subcontract FSC-60, Raymond Internation) Out of all samples taken 5% are actually failures.

20. FIELD DISPOSITION FIELD RECOMMENDATION/ROUTE TO PROJECT ENGINEERING

Disregard failures as they are widely spread out and not far out of spec. A large percentage of these failures are also in the top one to two feet of dike and would have to be reconditioned before placement of embankment anyway. We recommend leaving dike as is with reconditioning of top lift as required. *J. C. Chappel 4/17-79*

ENGINEERING DISPOSITION:

Based upon evaluation of data from the boring program initiated in response to NCR C-26, Engineering recommends the Plant Area fill be used-as-is. A summary of the results of the boring program is being completed and will be forwarded under separate cover. Earthwork may proceed on the plant Area F11. *J. C. Chappel 4-30-79*

21. FIELD DISPOSITION RESULTS

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 BECHTEL POWER CORP.
 JOB 7220

24. IS DESIGN CHANGE REQUIRED? <input type="checkbox"/> NO <input type="checkbox"/> YES, SEE ATTACHED.		26. REJECTED MATERIAL DISPOSITION <input type="checkbox"/> RETURN TO SUPPLIER <input type="checkbox"/> SCRAP		27. QC ACCEPTANCE <i>J. C. Chappel</i>	
REMARKS		DATE <i>4/30/79</i>		DATE	

SR 00633

ORIGINAL

Inter office Memorandum

BELC - 376

To E. E. Felton

Date June 10, 1974

Subject Midland Plant Units 1 and 2
Job No. 7220
Report of Soils Boring Program
File: C-210, 1700, 0274

From P. A. Martinez

Of Engineering

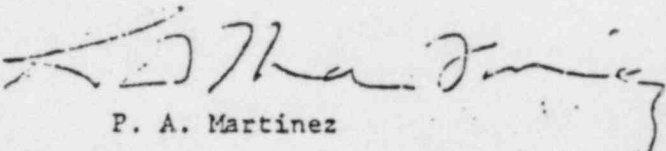
Copies to J. H. Allen w/o
S. S. Afifi w/o
J. C. Hink w/a (less appendices)

At Ann Arbor

References: a) NCR 26
b) NCR 88

Transmitted herewith is the report of the Soils Boring Program initiated as a result of NCR 26 and required to complete action on NCR 88.

This report completes Engineering action on the two referenced NCRs.


P. A. Martinez

RLR/slv

Enclosure

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SB 00639

REPORT FOR NCR 88

On March 26, 1974, a sampling and testing program for additional moisture and density checks was started under the supervision of a Geotech representative as requested by engineering to respond to NCR 26. Drilling and sampling was started March 26, 1974 and completed on April 5, 1974. Laboratory testing was completed April 11, 1974. The tests were compiled and since 5 percent compaction values fell below 95 percent, NCR 88 was initiated.

The data pertinent to NCR 88 in connection with the existing fill in the west plant dike, north plant dike, and northeast plant dike are discussed herein. The intent of this report is to assist engineering in evaluating and documenting NCR 88.

A total of 58 borings were drilled in the west plant dike, north plant dike, and northeast plant dike. These borings penetrated Zone 1 material and Zone 2 material as indicated on Figure 1 by solid symbols and open symbols, respectively. Boring ground surface elevation, coordinates and depth are shown in Table 1.

From these borings, a total of 356 Shelby tube samples were taken. The samples were cut in the laboratory to lengths of about 6 inches resulting in a total of approximately 451 specimens suitable for testing (338 in the north plant dike, 53 in the west plant dike, and 60 in the northeast plant dike). Another 84 specimens were not considered suitable for testing because of tube damage or excessive stone content, as indicated in the remarks columns of the tables in the attached Appendix A, which contains a tabulation of laboratory test data. Appendix B contains laboratory data worksheets.

Moisture determinations were made according to ASTM Designation D 2216, density determination according to Chapter 1, page 37 of Earth Manual, U.S. Department of Interior.

Test Results

Figures 2 and 3 show plots of percent Bechtel modified compaction (BMC) versus depth for the borings wherein percent compaction below 95 percent were encountered. Test results which were judged unacceptable by the soils engineer on the job were not included in these plots. These were results from samples which came from the sand drain (Zone 3 material), contained stones, or were disturbed. In the case of sand drain or excessive rock, it was judged that samples volume measurements were inaccurate. See remarks, column, Appendix A.

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JUN 10 1974

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JOB 7220

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SB 00640

Figure 2 contains data where the percent compaction below 95 percent was either above 94 percent or the samples taken were near the surface (TB 24, 21, and 4, NPD). Data between 94 percent and 95 percent, when occurring in the infrequent manner shown in Figure 2, is considered acceptable. The difference between 94 percent and 95 percent is not significant when considering the accuracy range inherent in sampling and testing procedures used in practical soil mechanics. Furthermore, these data were not a part of a trend of reducing density within the fill, as can be seen from Figure 2. This is substantiated further the lines of average percent compaction (Figure 2), which shows that the degree of compaction was above the 95 percent value. Averaging of soil properties, within a reasonable depth range which does not contain significant scatter is a commonly accepted tool exercised by soils engineers. Therefore, all data between 95 percent and 94 percent are considered within the intent of 95 percent BMC compaction and will not be further discussed.

Data near the surface fell within the zone where removal and reconditioning will be required before placement of new fill (only 3 cases: TB 24, TB 21, and TB 2, NPD). The degree of compaction should increase after reconditioning and passage of the 50-ton roller equipment.

Figure 3 shows plots where occasional percent compaction less than 94 percent were encountered. The plots also show the 95 percent compaction line and the average percent compaction line. These same borings are indicated with a hexagon on Figure 1 and amount to 10 borings.

All the above 10 cases in Figure 3 were between 90 percent and 95 percent compaction. The values below 95 percent occurred in the form of spikes in the percent compaction versus depth correlation. Further, they represent one value between 90 percent and 95 percent per 5000 cubic yards for northeast dike, 3200 cubic yards for west plant dike, 6350 cubic yards in north plant dike. These occurred at scattered locations as can be seen from hexagons in Figure 1.

Furthermore, lines of average percent compaction for the holes show percent compaction above 95 percent (Figure 3). Except when soil properties vary within a large range, the soil behavior is more determined by the average pertinent property than by the absolute maximum or the absolute minimum.

It can, therefore, be concluded that the in-place fill tested meets the intent of a 95 percent degree of compaction by the Modified Bechtel Method.

<u>Boring No</u>	<u>Ground Surface Elevation at Time of Boring</u>	<u>Coordinates</u>	<u>Depth of Boring</u>
19	614.7	S 4865 E 0765	4.0
20	611.7	S 4955 E 0760	2.0
21	632.4	S 4265 E 0005	21.0
22	631.7	S 4295 E 0130	25.0
23	630.8	S 4295 E 0245	25.0
24	629.3	S 4295 E 0360	23.0
25	627.4	S 4295 E 0475	19.5
26	626.3	S 4330 E 0560	20.0
27	632.3	S 4340 E 0030	23.0
28	633.9	S 4415 E 0035	23.0
29	630.3	S 4415 E 0080	19.0
30	628.9	S 4415 E 0195	21.0
31	629.8	S 4415 E 0315	22.5
32	629.7	S 4415 E 0430	22.0
33	628.7	S 4415 E 0590	21.0
34	626.3	S 4415 E 0640	19.0
35	622.7	S 4415 E 0735	13.0
36	621.2	S 4550 E 0840	13.0

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SB 00642

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3/12/44

TABLE 1 (cont)

LOCATION OF BORINGS

West Plant Dike

<u>Boring No</u>	<u>Ground Surface Elevation at Time of Boring</u>	<u>Coordinates</u>	<u>Depth of Boring</u>
3	633.4	S 4653 W 0050	23.0
4	634.5	S 4520 W 0055	22.5
5	633.7	S 4785 W 0090	23.0
6	634.4	S 4573 W 0090	23.0

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3-17-78

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SB 00643

C-219.2

Bechtel Power Corporation

Interoffice Memorandum

To QC Files
Subject: M/D & Proctor Test Frequencies

Date November 12, 1974
From L. V. Hendry
Of Quality Control
At Midland, Michigan
Job No. 7220

Copies to

Attached is a summary of Moisture/Density and Bechtel modified Proctor Test frequencies for all "Q" Listed dikes, including the 100 foot wide berm to October 26, 1974.

Work on the 100 foot berm has been completed, also the Northeast dike and North plant dike Zones 1, 2 & 3. All other "Q" Listed earthwork construction by the subcontractor has been suspended until spring.

L. V. Hendry
L. V. Hendry

LVE/jmw

SUMMARY OF MOISTURE/DENSITY AND BECHTEL MODIFIED PROCTER TEST FREQUENCIES
 Northeast Dike, North Plant Dike, 100' Wide Bents "Q" Listed Areas
 Zone 1 & 2 Material
 Based on Bechtel QC Daily Observations and Test Reviews

Week Ending	Cum. Yardage Placed	Cum. Total M/D Tests	M/D Test Freq.	Cum. BMP Tests	BMP Test Freq.
5/25/74	3,780	40	1 @ 95 Yds ³	5	1 @ 756 Yds ³
6/1/74	29,298	89	1 @ 329 Yds ³	8	1 @ 3,662 Yds ³
6/8/74	45,183	129	1 @ 350 Yds ³	9	1 @ 5,020 Yds ³
6/15/74	45,183	130	1 @ 348 Yds ³	9	1 @ 5,020 Yds ³
6/22/74	45,183	143	1 @ 316 Yds ³	10	1 @ 4,518 Yds ³
6/29/74	59,623	192	1 @ 310 Yds ³	13	1 @ 4,593 Yds ³
7/6/74	59,623	197	1 @ 303 Yds ³	13	1 @ 4,593 Yds ³
7/13/74	81,891	272	1 @ 301 Yds ³	13	1 @ 6,299 Yds ³
7/20/74	104,206	338	1 @ 308 Yds ³	13	1 @ 8,015 Yds ³
7/27/74	122,560	358	1 @ 342 Yds ³	18	1 @ 6,253 Yds ³
8/3/74	147,678	396	1 @ 373 Yds ³	18	1 @ 8,204 Yds ³
8/10/74	163,240	455	1 @ 359 Yds ³	20	1 @ 8,162 Yds ³
8/17/74	214,425	581	1 @ 369 Yds ³	23	1 @ 9,322 Yds ³
8/24/74	242,411	644	1 @ 376 Yds ³	26	1 @ 9,323 Yds ³
8/31/74	249,859	648	1 @ 385 Yds ³	28	1 @ 9,209 Yds ³
9/7/74	249,859	668	1 @ 374 Yds ³	28	1 @ 9,209 Yds ³
9/14/74	261,320	696	1 @ 375 Yds ³	28	1 @ 9,618 Yds ³
9/21/74	268,357	722	1 @ 371 Yds ³	29	1 @ 9,253 Yds ³
9/28/74	270,133	730	1 @ 370 Yds ³	29	1 @ 9,315 Yds ³
10/5/74	270,133	730	1 @ 370 Yds ³	29	1 @ 9,315 Yds ³
10/12/74	270,931	745	1 @ 377 Yds ³	29	1 @ 9,342 Yds ³
10/19/74	274,028	757	1 @ 362 Yds ³	29	1 @ 9,449 Yds ³
10/26/74	278,821	786	1 @ 355 Yds ³	29	1 @ 9,611 Yds ³

SUMMARY OF MOISTURE/DENSITY AND BECHTEL MODIFIED PROCTER TEST FREQUENCIES

"Q" LISTED WEST PLANT DIKE ZONE 1 & 2 MATERIALS
 BASED ON BECHTEL QC DAILY OBSERVATIONS AND TEST REVIEWS

Week Ending	Cum. Yardage Placed	Cum. Total N/D Tests	M/D Test Freq.	Cum. BMP Tests	BMP Test Freq.
9/14/74	3,777	7	1 @ 539 Yds ³	0	
9/21/74	20,539	56	1 @ 366 Yds ³	4	1 @ 5,139 Yds ³
9/28/74	30,828	88	1 @ 350 Yds ³	5	1 @ 6,166 Yds ³
10/5/74	30,828	88	1 @ 350 Yds ³	5	1 @ 6,166 Yds ³
10/12/74	33,108	95	1 @ 348 Yds ³	5	1 @ 6,621 Yds ³
10/19/74	33,108	95	1 @ 348 Yds ³	5	1 @ 6,621 Yds ³
10/26/74	33,108	106	1 @ 312 Yds ³	5	1 @ 6,621 Yds ³

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SB 00649

Bechtel Power Corporation

Interoffice Memorandum

To QC Files

Date November 4, 1974

Subject M/D & Proctor Test Frequencies

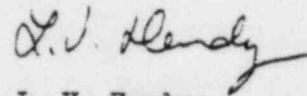
From L. V. Hendry

Of Quality Control

Copies to

At Midland, Michigan
Job No. 7220

Attached is a summary of M/D and BMP Test frequencies for all "Q" Listed dikes including the 100' wide berm, to October 5, 1974.


L. V. Hendry

LVE/jmw

SB 00644

SUMMARY OF MOISTURE/DENSITY AND BECHTEL MODIFIED PROCTER TEST FREQUENCIES
 Northeast Dike, North Plant Dike, 100' Wide Berms "Q" Listed Areas
 Zone 1 & 2 Material
 Based on Bechtel QC Daily Observations and Test Reviews

Week Ending	Cum. Yardage Placed	Cum. Total M/D Tests	M/D Test Freq.	Cum. BMP Tests	BMP Test Freq.
5/25/74	3,780	40	1 @ 95 Yds ³	5	1 @ 756 Yds ³
6/1/74	29,298	89	1 @ 329 Yds ³	8	1 @ 3,662 Yds ³
6/8/74	45,183	129	1 @ 350 Yds ³	9	1 @ 5,020 Yds ³
6/15/74	45,183	130	1 @ 348 Yds ³	9	1 @ 5,020 Yds ³
6/22/74	45,183	143	1 @ 316 Yds ³	10	1 @ 4,518 Yds ³
6/29/74	59,623	192	1 @ 310 Yds ³	13	1 @ 4,593 Yds ³
7/6/74	59,623	197	1 @ 303 Yds ³	13	1 @ 4,593 Yds ³
7/13/74	81,891	272	1 @ 301 Yds ³	13	1 @ 6,299 Yds ³
7/20/74	104,206	338	1 @ 308 Yds ³	13	1 @ 8,015 Yds ³
7/27/74	122,560	358	1 @ 342 Yds ³	18	1 @ 6,253 Yds ³
8/3/74	147,678	396	1 @ 373 Yds ³	18	1 @ 8,204 Yds ³
8/10/74	163,240	455	1 @ 359 Yds ³	20	1 @ 8,162 Yds ³
8/17/74	214,425	581	1 @ 369 Yds ³	23	1 @ 9,322 Yds ³
8/24/74	242,411	644	1 @ 376 Yds ³	26	1 @ 9,323 Yds ³
8/31/74	249,859	648	1 @ 385 Yds ³	28	1 @ 9,209 Yds ³
9/7/74	249,859	668	1 @ 374 Yds ³	28	1 @ 9,209 Yds ³
9/14/74	261,320	696	1 @ 375 Yds ³	28	1 @ 9,618 Yds ³
9/21/74	268,357	722	1 @ 371 Yds ³	29	1 @ 9,253 Yds ³
9/28/74	270,133	730	1 @ 370 Yds ³	29	1 @ 9,315 Yds ³
10/5/74	270,133	730	1 @ 370 Yds ³	29	1 @ 9,315 Yds ³

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SB 00645

SUMMARY OF MOISTURE/DENSITY AND BECHTEL MODIFIED PROCTER TEST FREQUENCIES

"Q" LISTED WEST PLANT DIKE ZONE 1 & 2 MATERIALS
 BASED ON BECHTEL QC DAILY OBSERVATIONS AND TEST REVIEWS

Week Ending	Cum. Yardage Placed	Cum. Total N/D Tests	M/D Test Freq.	Cum. BMP Tests	BMP Test Freq.
9/14/74	3,777	7	1 @ 539 Yds ³	0	
9/21/74	20,539	56	1 @ 366 Yds ³	4	1 @ 5,139 Yds
9/28/74	30,828	88	1 @ 350 Yds ³	5	1 @ 6,166 Yds
10/5/74	30,828	88	1 @ 350 Yds ³	5	1 @ 6,166 Yds

Bechtel Power Corporation

Interoffice Memorandum

To: R. L. Castieberry
Subject: Job 7220 Midland Project
Q-listed Backfill at
Diesel Generator Storage Tanks
BCBE-1494-R

File No.
Date: July 18, 1977
From: J. F. Newgen
Of: Construction

Copies to: G. Tuveson F. Teague
S. Rao ~~W. Connolly~~

At: Midland, MI Ext.

- References: 1) DCN #2, Drawing C-45
2) 7220-FSK-CY-137, Rev. 0
3) "Compacted Fill Density Test Reports",
Sheets 1, 2, and 3

As per DCN #2, Drawing C-45, the area around the Diesel Generator Storage Tanks has been designated as a Q-listed area.

In an effort to Q-qualify the placement of backfill material below Elevation 615'-0" in this area, the original field density tests were reviewed, plotted on Drawing FSK-CY-137 and are submitted for your consideration. You will note, on examination of the tests performed, the results and test frequencies are well within the requirements Spec. 7220-C-208.

Also, for your information, technical control of U.S. Testing Company testing activities during the installation of all backfill materials, whether Q-listed or non-Q-listed, is continuously maintained by Bechtel QC personnel. However, for non-Q-listed backfill operations, a QC surveillance is not carried out as in Q-listed areas.

Please review Drawing FSK-CY-137, Rev. 0 and the attached test data to determine whether or not the data is adequate documentation to qualify the subject Q-listed area. The pertinent field test data have been highlighted to assist in identification.

Please advise by July 29, 1977 as to the acceptability of the test data for qualifying the new Q-area in question.

J. F. Newgen
J. F. Newgen

NO.	7220
QC 07220	
PFQCE	
A. PFQCE	
CIVIL	
ELECT.	
PIPING	
MECH.	
WELDING	
DOC.	
RECEIVING	
ADMIN ASST	
OPEN LOOP	
<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	
DATE	

C-210.2

JFII/JSD/dp
Attachments

RECEIVED

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SB 00660

JUL 19 1977

QUALITY CONTROL
BECHTEL JOB 7220

COR. COMPACTED FILL DENSITY TEST REPORT

Sheet 1

1. PROJECT NO. 7120 2. DATE 5/4/77 3. TESTED WEEK OF 4/23/77

4. SPEC. NO. 7220-C-208 5. DRAWING NO. Plant Area 6. TESTED WEEK OF 4/23/77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAIR DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
4/24/77	1287	BS	76' S. of S. WALL 10' S. of W. WALL 10' S. of S. WALL	6.08	—	143.5	13.1	128.0	262 11.8	123.9	103.3	Pass
"	1288	"	14' S. of S. WALL 10' S. of W. WALL	6.16	—	142.5	9.9	129.7	274 10.4	124.8	103.9	Pass
"	1289	"	18' S. of S. WALL 10' S. of W. WALL	5.99	—	141.5	13.7	124.5	262 11.8	123.9	102.5	Pass
4/25/77	1290	BS	33' S. of S. WALL 10' S. of W. WALL	6.10	—	140.0	12.4	124.6	262 11.8	123.9	100.6	Pass
"	1291	"	15' S. of S. WALL 10' S. of W. WALL	6.11	—	144.0	11.2	129.5	260 10.6	129.8	97.8	Pass
4/25/77	1292	BS	24' S. of S. WALL 10' S. of W. WALL	6.06	—	143.0	14.2	125.2	277 13.4	121.0	103.5	Pass
"	1293	"	21' S. of S. WALL 10' S. of W. WALL	6.07	—	143.0	9.6	130.5	260 10.6	129.8	100.5	Pass
4/25/77	1294	BS	SEE PAGE 12		—							
4/25/77	1295	BS	10' S. of S. WALL 10' S. of W. WALL	6.08	—	133.0	17.1	113.6	278 15.2	117.0	97.1	Pass
4/25/77	1296	BS	SEE PAGE 2		—							
"	1297	"	SEE PAGE 2		—							

SB 00661

2157 7/20/83

COMPACTED FILL DENSITY TEST REPORT

Sheet 2

GC ACCEPTANCE DATE
 30 8-21-77
 CONTROL NO. FILL NO.

1. PROJECT NO. 7220 2. DATE 5-12-77 PAGE 2 OF 2

4. SPEC. NO. 7220-C-208 5. DRAWING NO. Plant Area 6. TESTED WEEK OF 5-6-77

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
5-2-77	1298	RS	15' E. of Pond	6.12	—	135.5	12.7	120.2	270 11.1	124.6	96.5	Pass
"	1299	"	17.5' S. of Pond	6.12	—	132.0	10.9	119.0	270 11.1	124.6	95.5	Pass
5-2-77	1300	RC	65' W. of Pond	6.18	—	144.5	11.4	129.7	274 11.1	124.8	103.9	Pass
5-2-77	1301	RC	54' W. of Pond	6.18	2	—	—	—	—	—	—	OK
"	1302	"	45' S. of Pond	"	"	—	—	—	—	—	—	—
"	1303	"	5' S. of Pond	"	"	—	—	—	—	—	—	—
5-3-77	1304	RS	114' S. of Pond	6.09	—	139.0	10.0	126.4	260 10.6	129.8	97.4	Pass
"	1305	"	65' W. of Pond	6.05	—	140.0	11.4	125.7	260 10.6	129.8	96.8	Pass
5-3-77	1306	RC	13' W. of Pond	5.22	2	—	—	—	—	—	—	—
5-4-77	1312	RC	13' W. of Pond	5.22	2	—	—	—	—	—	—	—
5-4-77	1316	RS	13' W. of Pond	6.10	—	138.5	9.9	126.0	260 10.6	129.8	97.1	Pass

Sheet 3

COMPACTED FILL DENSITY TEST REPORT

ACCIDENTAL
CONTROL NO. 70
DATE
FILE

PAGE 1 OF 2

2. DATE 5-26-77

1. PROJECT NO. 7220

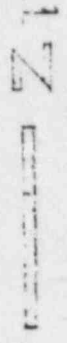
4. SPEC. NO.	9. TEST NO.	10. TEST. NO. BY	11. LOCATION	12. ELEV. OF FINAL TEST	13. DEPTH BELOW FINAL GRADE (FT.)	14. IN PLACE WET DENSITY (LB./C.F.)	15. MOISTURE CONTENT (%)	16. IN PLACE DRY DENSITY (LB./C.F.)	17. SOIL CLASSIFICATION	18. MAX. LAB. DRY DENSITY (LB./C.F.)	19. PERCENT COMPACTION	20. REMARKS
5-9-77	1317	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.07	—	131.0	18.0	111.0	278 15.2	117.0	94.9	Fail
"	1318	"	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.07	—	135.5	11.5	121.5	278 15.2	117.0	103.8	Fail
"	1319	"	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.07	—	136.5	11.7	122.2	278 15.2	117.0	104.1	Fail
"	1320	"	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.07	—	133.5	12.2	119.0	278 15.2	117.0	101.7	Fail
5-9-77	1321	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.04	—	129.0	10.7	116.5	262 11.8	123.9	94.0	Fail
—	1322	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.07	—	137.5	14.4	120.2	278 15.2	117.0	102.7	Pass
5-9-77	1324	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.11	—	136.5	12.3	121.5	262 11.8	123.9	98.1	Pass
5-9-77	1325	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.13	—	133.5	18.5	112.7	278 15.2	117.0	96.3	Fail
5-9-77	1326	"	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.13	—	137.0	15.9	118.2	278 15.2	117.0	101.0	Pass
5-9-77	1327	"	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.13	—	135.7	12.2	120.9	278 15.2	117.0	102.5	Pass
5-9-77	1328	"	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.13	—	135.7	12.2	120.9	278 15.2	117.0	102.5	Pass
5-9-77	1329	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.13	—	137.5	16.8	117.7	278 15.2	117.0	100.6	Pass
5-9-77	1330	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.14	—	130.7	8.6	122.9	278 15.2	117.0	96.3	Pass
5-9-77	1331	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.15	—	137.0	14.9	119.2	278 15.2	117.0	101.9	Pass
5-9-77	1332	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.16	—	144.0	14.6	125.7	278 15.2	117.0	107.4	Pass
5-9-77	1333	RS	31' W. of 9" D. on 31' W. of 9" D. on 31' W. of 9" D. on	6.10	—	132.1	10.7	119.3	262 11.8	123.9	96.3	Pass

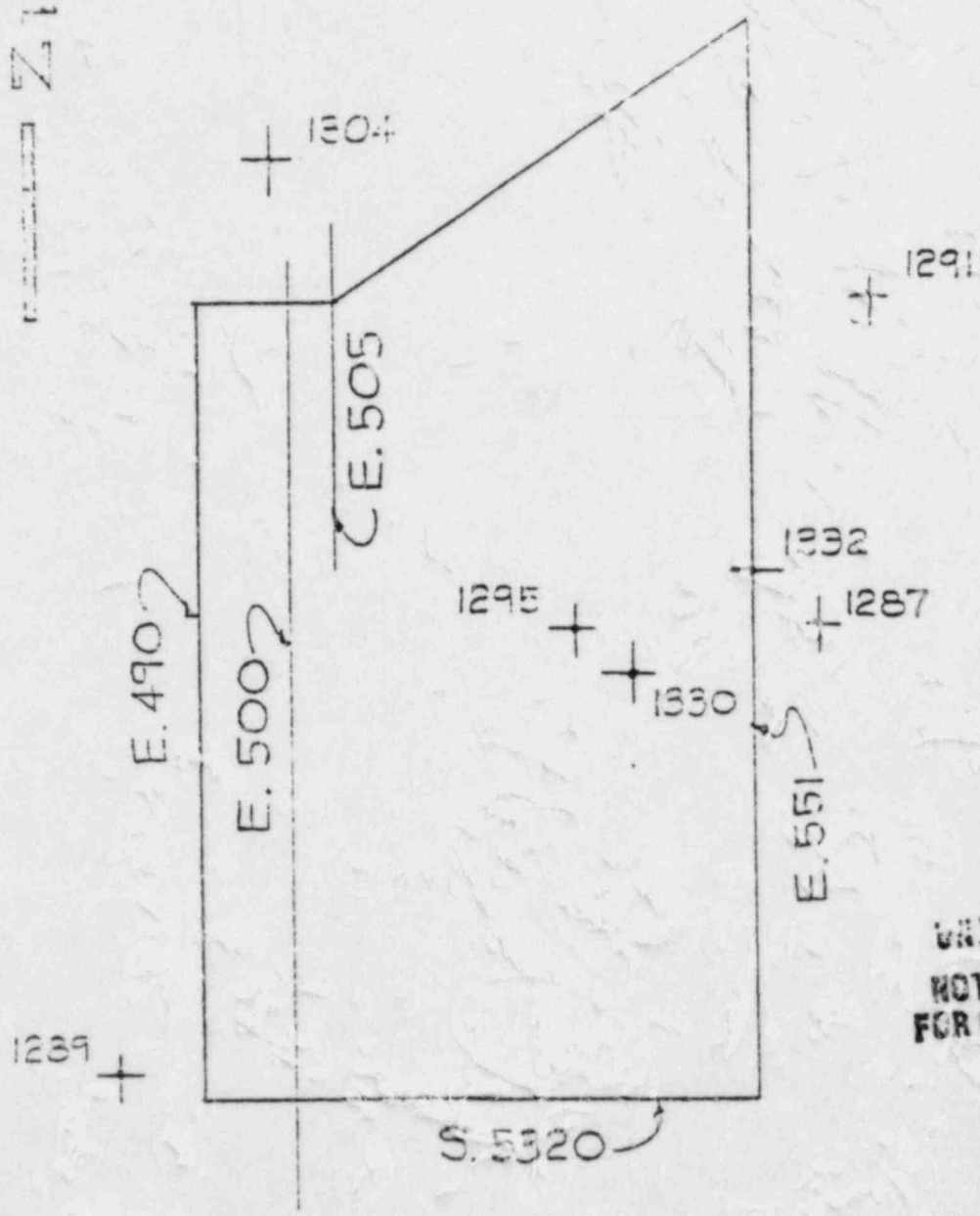
Plant Area

6. TESTED WEEK OF 5-7-77

00663

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NORTH




**UNCONTROLLED
 NOT TO BE USED
 FOR CONSTRUCTION**

SD 00664

SCALE 1/2" = 1'	DRAWN BY DJL		
BECHTEL POWER CORP. MIDLAND, MICHIGAN			
TITLE FILL DENSITY TEST LOCATIONS NEAR CWIS.			
JOB NO	DRAWING NO	REV	
7220	FSX-CY-137	O	

NO	DATE	REVISION	BY	CHK	APP.

RECEIVED

7220
QC EFFORTS

CGR-06
OF THE LINES 3/20/79

3/30/79

① MCR QC working mgt
②

ESSE

			FIRST EFFORT Approver	
Items	Sub No	Com - on	who	what
Compa line	4	inspection not sufficient	Ben & Doug	who is to sign work orders
	5	on completion		was placed to inspect crane
	6	<u>planning</u>		& since then, + records
	6			conditions have changed
	6			(addition of water level right, excavation)
	7	evaluation of equipment	Ben	no requirement to record
	8	inspect lift trucks		equipment - evaluation
monitor	7	surveillance did not identify	Tom	limit on QC documents
	7	lack of training	Ben/Stu	Field docs on common code
soil failure	1	errors in US steps	Tom/Doug	QC in area - 2.0 & not 2.0
	2	tech direction		range - US table and
	3	surveillance		reparable - geo's 9.1 with
	4	test reports failed to identify problem	Ben/Tom/Doug	on "not all 4 are" -
	5	frequency		review series of US Tech
	6			define test direction
no	12	no further	Ben/Tom	then did QC determine frequency
				since was there a requirement to keep track of frequency

SB 01401

Smalley
Chock
Jinnett
Simonek
R-mell
Rmkim

Item #6

- 4, 5, 6
- 1) who is to say that material was placed to a gunnery - after placement conditions may have changed (water level excavation)
 - 2) for sub contractor → second line activity & verified they implemented their QA program
Bechtel approved engineering
 - 3) for Bechtel work - first line current construction practices surveillance → ~~Bechtel to Bechtel~~ relation
need history Conover & Bechtel
 - 4) cross out "surveillance" in QA univise statement but address it as a minor change
 - 5) refer to last sentence → characteristics didn't change

2 persons who did work on Conover Actual Surveillance - whom supported by good test data

~~Handwritten scribbles and signatures~~

change change

- Ⓐ remove per dist
- Ⓑ U'lyb.
- Ⓒ send client, only

SB 01402

Testing
Acceptance
if fail or withdrawal
retest surveillance

BECHTEL

PWS
4/2/79

2

Dragicovic to Church 10/5/73
Buchanan to Jettens 9/18/73

Jettens to Volenzano 11/6/73

Item 6
7, 8

PWS

7 → 1) Divide between Bechtel & Canonic
 Canonic → reference documents
 2) Bechtel → no require for documenting results
 used same equipment
 used specified equipment
 "they don't care as long as get completion"
 an Engineering

Equipment

↳ Sept 18 1974
 Gate to ~~Rix~~
 Rixford.

Lifts → used twelle py spec
 no changes by field engineer so went
 with 12"

see Gray in Field
 on Evaluation team

Item 7
4, 5

1) problem was identified by field & correspondence

list out correspondence,
 NCRs & disposition
 moisture log

describe identification of moisture history

moisture is economic

SB 01403

Item 8

~~QC will wait to review Geotech output
need more time when get errors
QC needs to review the data~~ need input

2,3,4

- 1) define technical direction
- 2) number of times a curve was used
- 3) number of times got over 105
- 4) surveillance over a sub contractor
Bechtel 2nd line
- 5) QCE is not a Geotech
- 6) describe early miscalculations
- 7) NCR 55 @ other NCRs, DRs

not normal / in depth review

456

- 1) that's what signature means
- 2) describe what QC did & QC interpretation
visual classification for previous curves
- 3) disagree with "connect reference"
agree but no big deal

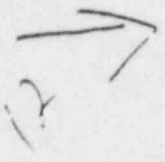
Item 12

1) QC did identify corrective actions
review corrective action log
repeat history CARs
take action on trends
action accepted by QA

A) The situation described is not a VARIANCE to the quality PROGRAM

earthwork consisted of two approaches for

The QC program for quality verification depending upon the organization performing the work.



- 1) For subcontractor (Canonie) activities, Bechtel QC provided subcontractor surveillance on operations based upon the inspection plans C-210-4 and S/C 1.10 which ~~caused~~ ^{required} Bechtel QC to perform a second level of monitoring the first level inspection activities performed by the subcontractor based upon his approved Quality Assurance program.
- 2) For earthwork performed by Bechtel, Bechtel QC provided inspection activities based upon the inspection plans C-211-1 and C-1.02 which ~~caused~~ ^{required} Bechtel QC to perform inspections, witnesses, surveillances, and reviews of Bechtel field work.

12
←

The work performed by each organization is as follows:
(This information provided by review of QC Records)

1) Canonie Work:

1975: Canonie started fill operation south of 2 line on 10/29/75 for the south access ramp and lay down area for the turbine bldg. Work proceeded thru 11/13/75 to Elev. 616+ - subcontractor surveillance inspection was provided by FIP C-2.10-4-53.

1976: Canonie started fill operation adjacent to south access ramp 7/11/76 and proceeded to Elev. 623+ - subcontractor surveillance provided by FIP's C-2.10-4-53

C-2.10-4-62..

243

1977: Canonic started hill operations in the area of
6/10/77 for the Q line. QC inspection will be provided

Ftg. elev. 628± 7/30/77 - subcontractor surveillance
p. 6 7/30/77 1, 2, 3, 4, 5, 6, 7, 8.

2) Bechtel Work:

Structural backfill (Plant Area Fill) started 10/17/75
in area south of Q line wall from Elev. 589' to 612.
QC Inspection provided by FIP 2.11-1-12.

Structural backfill started 7/9/76 for a 3 foot wide
area adjacent to Q line wall Elev. 606 to 618± Line 1
thru 12, QC Inspection provided by FIP C-2.11-1-19.

Structural backfill started in the spring of 1977
(April 4?) for hand work and motorized equipment.

E-4, 1876-

The application of surveillance activities by Bechtel QC to
the Canonic firstline QA program is an acceptable means of
performing in-process subcontractor inspection. Bechtel QC
surveillances did produce nonconformance reports and cor-
rective actions over Canonic activities when conditions in
the Canonic program were judged to be deficiencies by Bechtel
QC. Canonic QA records further describe the implementation
of their program.

The application of surveillance activities by Bechtel QC
to Bechtel earthwork operations is a proper and correct
method of performing in-process inspection when supported by
testing results. The soils activities observed by QC were
judged acceptable based upon both the inprocess surveillance
and the acceptable compaction test results. By the definition
of surveillance which requires the QCD to verify the work

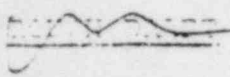
operations are performed in accordance with ~~incorporative~~ re-

as is necessary to effectively monitor the
activities of the test
degree
the

As described above, the inspection by Bechtel QC was performed in a proper and correct manner. As most of the earthwork was performed by Canonic under their first line and Bechtel QC second line quality programs, the activity of compaction control was covered sufficiently based upon the in-process inspection activities and test reports that were performed and available.

- B) No, this situation is not a generic problem in the quality program. The use of first line and second line surveillance activities when combined with inspections, witnesses and review ~~at~~ end result testing is an appropriate quality verification technique.
- C) Remedial action taken as ^{of} early October 1978
- 1) One proctor curve per density test
 - 2) A limit of 6 inches for lift thicknesses
 - 3) The use of the sand density test method only
- D) No Corrective Actions to be taken.

SB 01408



Use. 6
Spec. Reg. 748

A)

program requirement.

- 1) Evaluations of motorized compaction equipment did occur and are recorded in the following memorandums:

Buchanan to Jeffers of 9/18/73

Dragicevic to Church of 10/5/73

Jeffers to Valenzano of 11/16/73

This type of equipment was used by both Canonic and Rechtel for compaction work. Evaluations of hand held compaction equipment was accomplished on initial use based upon compaction reports. Formal evaluation reporting was not required by specification or provided by Field Engineering. In addition, the documented telephone conversation between Grote and Rixford on 9/18/74 provides that the equipment capacity was secondary to the main objective of obtaining acceptable compaction test results.

- 2) QC signatures on Inspection Plans and Records indicate that lift thicknesses did not exceed the 12 inch limit. No changes to the maximum lift thickness were made by Field Engineering and the inspection records indicate that the specification requirements were met.

B) No, not a generic problem as described above.

C) No remedial action required.

SB 01409

2) Corrective Action required to preclude repetition

perhaps
ments for documenting equipment evaluation testing in the
specifications

SB 01410

MSA

141

VAR 7
Pro. No. 485

A)

Concerns over moisture testing was the general knowledge among the field construction groups and identified by Bechtel QC and Field Engineering. The following is a list of the documentation on the subject:

- NCR-55 of 2/4/74
- NCR-324 of 8/6/75
- NCR-421 of 5/16/76
- QAR SD-40 of 7/22/77
- Memo Newgen to Castleberry of 8/15/77
- Memo Castleberry to Newgen of 9/30/77
- Telecon Hock to Roa of 10/10/77
- Telecon Hock to Roa of 10/12/77
- NCR-1005 of 10/26/77
- Memo Newgen to Castleberry of 11/18/77
- Memo Castleberry to Newgen of 12/15/77
- Memo Newgen to Richardson of 12/21/77
- Telecon Dean/Osborn to Roa of 4/7/78

In addition as a result of QAR SD-40, U. S. Testing performed moisture tests in the borrow area. Further documentation of this was begun on 8/1/77 with the initiation of a moisture control log which has continued to be in use today.

SB 01411

8) Soil Testing, Variance No. 8, Item 1

A) The situation described is not a variance from the Quality Assurance program requirements. The errors and inconsistencies in testing as identified by Geotech have not been fully documented and cannot be adequately discussed at this time. A full review and report is expected to be available April ____, 1979.

However, preliminary reports indicate testing frequency and material identification (matching laboratory data with field data) were performed incorrectly. Although all data is not yet available, the following is a description of the methods employed by Bechtel QC and U. S. Testing to identify and classify soils encountered ^{red} during field testing.

U. S. Testing Procedure

U. S. Testing soils technicians selected the lab standard (Proctor) used for comparison with the in-place density at the time of in-place density testing. They accomplished this by visual comparison to jarred samples brought to the field. An approximation of the active jarred samples to select from ranged from 10 to 25 at any given time. These samples included cohesive and non-cohesive material. The jar samples representing soils that were encountered frequently remained in this active collection. When a jar sample was no longer being used they would be placed in the inactive collection retained at the lab. Material such as that represented by BMP 278 was encountered frequently and is the reason it remained active for such an extended period. U. S. Testing also said that the valves for BMP 278 were periodically checked with information one point or complete proctors. Documentation of this was not maintained in all cases.

When material tested could not be readily identified through visual examination the U. S. Testing technician would bring the soil sample to the test lab and perform a one point proctor to

2)

assist in the selection. If identification could still not be made a complete proctor would be performed, a sample jarred and added to the active proctor collection.

Bechtel QC Inspection

The Bechtel QCE assigned to soil fill inspection would observe U.S. Testing's soil technicians visual inspection of proctor in place density relationships. If the fill being tested was placed by Canonie, this visual inspection was also observed by the responsible Canonie Inspector. Bechtel QCEs would also monitor for proper techniques in performing in place density tests.

The Bechtel Lab QCE would by surveillance inspection verify that proper procedures were used for lab proctor testing and would also observe the one point proctor points for proctor selection when visual examination could not be accomplished in the field.

Further, none of the testing methods specified (ASTM D1556, 1557, 2049, etc.) identify comparison of field moisture and density test results with saturation conditions (zero air voids) as a method of checking the validity of test results.

To establish whether or not a particular group of field tests are in error, it will be necessary to incorporate inherent errors in testing methods (sand cone and nuclear methods). The test methods specified (and geotechnical literature) indicate a standard deviation on density measurement of 3 to 5 lbs./cu. ft., and a standard deviation on moisture content on the order of one half to one percent moisture.

Incorrect calculation of relative density test results was identified in 1975 and the correct method of calculation has been employed ever since.

Material gradation specified in specification C-211 was not intended to match that specified as Zone 3 material in C-210. However, Zone 3

SB 01413

8)

material did meet the gradation requirements of C-211 and was used as structural backfill (cohesionless, free-draining material).

Using different laboratory curves to clear failing tests was recognition that the material had been incorrectly identified initially.

In summary, the methods employed at the time were believed to be correct methods. In particular, careful evaluation of the soil encountered in the field when determining the proper curve or laboratory maximum density to use is believed to be consistent with the specification and superior to using one laboratory maximum density test for every 20 field tests without consideration of soil type.

BCD

The item identified above is specific to soils testing and is therefor not a generic item.

8

- Items 2, 3, 4

This item is not at variance from the quality assurance program requirements, since the methods employed were correct and therefor not identifiable as problems.

SB 01414

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VAR 8
PQO Req 4, 5, 6

A) *is not a*
ments of the quality program.

The job records indicate that the minimum testing frequency requirements have been achieved and exceeded (1 test per 300 c. y. under D-3 Bldg.). This was accomplished by informal tracking methods achieved through daily QC surveillance of work activities. QC did not maintain a formal quantity tracking log. Quantity tracking is normally a function of Field Engineering. In addition for confined areas, Field Engineering is given the authority to establish testing frequencies.

- B) No, this is not a generic problem since there is no formal requirement or need for QC to perform quantity tracking. The surveillance process used by QC to keep up with work has been demonstrated to provide test frequencies that exceed requirements.
- C) No remedial actions required.
- D) No Corrective Action necessary.

~~CONFIDENTIAL~~

1/1

Var. C
Pro. Rep. 1

A) As indicated, QCI C-1.02 Rev. 2 of 8/77 and Rev. 3 of 2/78 do not reference the test frequency requirement found in paragraph 5.6 of specification 7220-C-211. As the appropriate inspection criteria. However, under activity number 3-1.b of QCI C-1.02 Rev. 2 & 3, a review of testing frequency ~~was~~ was and is required. Paragraphs 5.1 and 5.5 of Specification C-211 are referenced as the inspection criteria for proper test method and technical adequacy. Thus, Rev. 2 and 3 of QCI C-1.02 was written and approved for use by the quality groups with the additional requirements of paragraph 5.6.3 being omitted.

It should be noted that for the time period during fill placement up to the footing level for the diesel generator building, Rev. 1 of QCI C-1.02 was in effect which called out the proper specification paragraph reference for testing frequency.

- B) No, this variance is not of a generic nature for the frequency paragraph reference omission was due to a format revision of C-1.02 from Rev. 1 to Rev. 2. A review of C-1.02 Rev. 2 and 3 indicates that all other references were carried through.
- C) QCI C-1.02 will be revised to include paragraph 5.6 of specification 7220-C-211 Rev. 5 as the appropriate inspection criteria for testing frequency.
- D) No Corrective Action is required to preclude repetition.

SECRET

1 of 2

Ver. 1.1
Proc. Rev. 1 & 2

This is not a generic problem because of the
requirement.

Bechtel QC did implement the information feedback and cor-
rective action requirements addressed in SF/PSP G-3.2

- 1) The following listing represents particular actions taken within QC to correct and improve the QC soils program operations:

<u>QC Corrective Action Report</u>	<u>Based On</u>
QC-19 - 9/14/76	NCR-510
QC-36 - 2/16/77	CPCo QF-142
QC-37 - 2/24/77	CPCo QF-150
QC-63 - 11/1/77	NCR-1006
QC-64 - 11/21/77	CPCo QF-199

- 2) QC also routes copies of NCRs to the group responsible for the control of the activity which apparently caused the nonconformance. This was accomplished for the following identified NCRs:

	<u>Opened</u>	<u>Closed</u>	<u>Sent to</u>	<u>On</u>
NCR-421	5/5/76	6/23/76	Proj. Super.	6/23/76
NCR-686	2/11/77	3/7/77	Proj. Super.	3/7/77
NCR-698	2/9/77	3/7/77	Proj. Super.	3/7/77
NCR-1005	10/26/77	3/24/78	Proj. Super.	3/24/78

- B) No this is not a generic problem because the feedback and Corrective Action system was implemented.

- C) no remedial action required
- D) no corrective action necessary

SB 01417

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Probable Contributing Causes as QC Sees it. 4/3/79

- 1) Inadequate removal of frost damage soils at elevation 623 under D.G. Bldg. due to inadequate instructions for removal.
- 2) Proctor curve selection.
- 3) Reliance on testing showing satisfactory test results - inaccuracies of testing methods.
- 4) Raising of water table in fill area.
- 5) Selection of materials.
- 6) Footing design and settlement calculations.

SB 01418

Bechtel Power Corporation

Interoffice Memorandum

To . Terry Valenzano

Date November 16, 1973

Subject Job 7220 Midland Project
Subcontract 7220-C-210
Test Results for Substitution
of Compacter Equipment

From Jack M. Jeffers

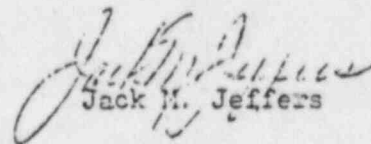
Of Subcontracts

Copies to

R. A. Grote

At Midland, Michigan

Canonie Construction Company has requested the use of alternate rollers in lieu of the 50 ton roller specified. This request is in accordance with Section 12.7.1 of the specifications. Tests reports of two different tests performed by Messrs. Tom Buchanan and Mario Dragicevic are attached as Enclosures 1 and 2 for your comment and/or approval.


Jack M. Jeffers

JMJ/RAG/ja

0035

SB 01419

Bechtel Power Corporation

Interoffice Memorandum

To Jack Jeffers

Date September 18, 1973

Subject Job 7220 Midland Project
Subcontract 7220-C-210
Substitution of 50 Ton Roller

From Tom Buchanan
of Geotechnical Services

Copies to

At Midland, Michigan

Reference: Letter dated July 5, 1973, to Canonic Construction Company from E. E. Felton concerning same subject.

In accordance with referenced letter, Canonic constructed three test pads on a section of the northeast dike that had been reconditioned and approved. The pads were located near S4, 800 and E-800. Each pad at the top was at least twice the width of the compacting equipment and about 100 feet long. A different type of compaction equipment was used to compact two one foot lifts of Zone 1 material in each pad. This equipment consisted of the following units:

1. A Caterpillar 835 sheepsfoot roller.

Specification

Operating weight	78,900 lb.	Two pass compaction coverage 16'9"
Wheels	sheepsfoot	
Drum width	48 inches	
Feet/wheel	90	
Feet/row	15	
Rows/wheel	6	
Area/foot	29.75in.2	
Length	7.5 in.	

2. A Bros SP446P Super Pactor padfoot roller with two rollers on front axle and two rollers on rear axle.

Specification

Number of rolls - 4	Shipping weight - 60,000 lbs.
Diameter of rolls over pads - 72"	Area coverage - 7½ feet compacted width per pass. Two effective roll passes in one ma- chine pass. Two machine passes produce 100% transverse coverage 15' wide processed twice (by front & rear rolls).
Pad size - 5" x 10 5/8"	
Number of rows of pads each roll: Front - 4 Rear - 5	
Number of pads - each roll: Front - 60 Rear - 75	

11/13/73
SB 01420

3. Bros roller, having 4 pneumatic rubber tires on one axle which had been loaded to a gross weight of 50 tons, pulled by a Terex 8240 dozer.

The 50 ton roller made four passes over its test pad. The other two machines, because of their geometry, made two passes (four rolls) in the same tracks, then moved over the width of each tire (about one-third the width of the equipment) and made two more passes (four rolls). After every two passes it moved over a tire width and made two passes there.

All the material placed in the test pads is Zone 1 material which has similar properties and corresponds to the same compaction curve. The optimum moisture content is 9.1% and the maximum dry density is 128.0 pcf. The density test results were as follows:

<u>Test No.</u>	<u>Moisture</u>	<u>Dry Density</u>	<u>% Compaction</u>	<u>Average % Compaction</u>	<u>Type Roller</u>
WOD7-66	7.6	128.5	100.4	96.4	Bros Padfoot
WOD7-67	7.1	124.5	97.3		Bros Padfoot
WOD7-68	7.8	117.1	91.5		Bros Padfoot
WOD7-69	7.3	128.5	100.4	95.3	Cat Spikefoot
WOD7-70	6.2	102.9	80.4*		Cat Spikefoot
WOD7-71	7.3	121.3	94.8		Cat Spikefoot
WOD7-79	6.8	128.0	90.7		Cat Spikefoot
*Bad test: retested by WOD7-79 and not counted in average.					
WOD7-72	6.8	128.2	100.2	96.0	50 Ton
WOD7-73	5.1	116.0	90.6		50 Ton
WOD7-74	5.9	125.3	97.9		50 Ton
WOD7-80	6.7	128.0	95.5		50 Ton

NOTE: The Padfoot pad and the Spikefoot pad were tested immediately upon blading off test place, but the 50 ton pad was tested about two hours later, allowing some drying to occur.

According to their results, all three pieces of compactive equipment achieved similar densities within a 1.1% spread. I recommend that both substitute rollers be accepted for compaction of Zone 1, 1-A and 2 material, provided that the passes of the alternate equipment are made as follows:

Four machine passes are required (eight roll passes). This is based on "up travel" and "down travel" in the same tracks to achieve specified compaction.

Thus, 2 machine passes achieve $\frac{1}{4}$ roll passes over $\frac{1}{2}$ the width of 180". With 2 machine passes, with "up travel" and "down travel" in adjacent lanes to cover the full area, only 2 roll passes will result and the areas will be doubled. But only $\frac{1}{2}$ the amount of processing will be achieved.

It should be noted that the test pads were made with only 2 machine passes for both alternate rollers, and the densities achieved were less than 1% from those achieved with the specified 50 ton roller. Therefore, 4 machine passes will assure more than adequate compaction.

J. A. Buchanan For Tom BUCHANAN
Tom Buchanan

TB/JMJ/al

SB 01422

Bechtel Power Corporation

Interoffice Memorandum

To J. C. Church

Date October 5, 1973

Subject Job 7220-C-210 Midland Project
Testing of Hyster C-455 A
No. 1125

From Mario M. Dragicevic

Of Construction

Copies to

At Midland, Michigan

In accordance with Section 12.7.1 of the specifications, Canonic constructed on September 20, 1973, a test pad of Zone 1 material on N. E. Dike, between St. 23+00 and St. 25+00.

Two types of compaction equipment were used to compact a one foot lift. This equipment consisted of the following units.

1. Bros roller, having 4 rubber tires on one axle, which has been loaded to a total weight (gross) of 50 tons, pulled by a Terex 8240 Dozer.
2. Hyster - C 455 A, No. 1125, self-propelled sheepfoot roller, two-axle drum compactor, with leveling blade attached.

Specifications:

Weight with blade	51,735 lbs.
Effective coverage per pass	144 inches
Rolling width	72 inches

Bros roller made 4 passes between St. 23+00 and St. 24+00, and Hyster C 455 A made 3 passes between St. 24+00 and St. 25+00. Materials placed in the test pad were compacted with aforementioned equipment and corresponded to the Proctor curve COD-2, where the optimum moisture content was 16.4%, and the maximum dry density was 110.4 pcf. Exception was material placed at St. 24+20 which corresponded to the Proctor curve COE-3 (optimum moisture = 12.7%; maximum dry density = 117.4 pcf).

SB 01423'

<u>Trial</u>	<u>Moisture</u>	<u>Dry Density</u>	<u>% Compaction</u>	<u>Location</u>	<u>Type of Equipment</u>
1	13.5	105.5	95.6	St. 23+30	50 ton rubber tire
2	11.6	108.1	97.9	St. 23+50	"
3	11.8	98.7	89.4	St. 23+70	"
1	7.2	118.3	100.8	St. 24+20	Hyster, No. 1125
2	13.7	110.1	99.7	St. 24+50	"
3	18.5	104.1	94.3	St. 24+87	"

According to these results, Hyster achieved higher densities with exception of trial test No. 3 where material was wet and well above optimum moisture.

I recommend that Hyster C 455 A, No. 1125 be accepted for compaction of Zone 1 and 2 material making at least 4 equipment passes.

J. Church For M.M.D.,
Mario M. Dragicevic

MMD/ja

Bechtel Power Corporation

Interoffice Memorandum

To John Church
Subject Roller Passes in "Q" Area
QCFM-194
Copies to L. Albert
D. Horn

Date June 6, 1974
From J. P. Connolly
Of Quality Control
At Midland, Michigan
Job 7220

QC FILE NO. C 2102035

Letters signed by you on September 18, 1973 and October 5, 1973 indicate that four (4) machine or equipment passes should be made by either the Hyster CL55A No. 1125 or the Caterpillar 835 sheepsfoot roller to attain the proper compaction requirements stated in paragraph 12.8.1 of Spec. C-210, Rev. 2.

Robert Haney of Canonic Construction Company feels that under paragraph 13.7 of Spec. C-210 Rev. 2, he is not held to any specified number of passes as long as he achieves 95% of maximum density.

Don Horn of Consumers Power Company feels that they are held to the four (4) passes and 95% of maximum density. Quality Control is also of the opinion that four (4) equipment passes are required because of existing documentation. The situation could be clarified with an F.C.R. to the effect that in the Q-Listed areas. No specified number of passes would be required as long as 95% of maximum density was achieved.

Please resolve this situation as soon as possible.

J. P. Connolly

JPC/LVH/JEW

SB 01425

Telephone call



BY P. Grote OF B. Midland ROUTE Valenzano
TO R. Rixford OF B.A.A.O. Church
DATE Sept. 18 1974 TIME 2:15 P.M. File C-210
SUBJECT Compaction Requirements in Q-list Fills JOB NO. 7220

I called R. Rixford concerning compaction requirements for specification C-210. He was in agreement with the following summarization of compaction requirements:

Non-Q Dikes (method spec)

Compaction acceptance is based on moisture conditioning and 4 passes with a 50-ton vibratory roller (or equivalent roller)

Q-list Plant Area Fill ("end product" spec)

Compaction acceptance is based on meeting an "end product" requirement, i.e. 95% of maximum density only. No method of achieving this requirement is specified or is required. The contractor can use any equipment he chooses as long as he achieves 95% maximum density.

Rixford fully agrees with the above summarization.

0079

R. Rixford
9/19/74

SB 01426

RECEIVED

Telephone call

BY _____ OF _____

TO _____ OF _____

DATE _____ IS _____ TIME _____

SUBJECT _____

ROUTE Valdez
Church
File C-216

JOB NO. _____

I made an analogy (an exaggeration admittedly but applicable) that if the compaction could be achieved with a herd of mules walking over the fill it would be acceptable as long as we got the required 95% compaction. Rixford agreed.

R. Dato
9/18/74

0020

SB 01427

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NONCONFORMANCE REPORT

2. DRAWING/PART NO. PKK-C-12 & C-109 Q	REV. 6	7. PROJECT NO. 7220	12. REPORTED BY L. Shively	DATE 1/28/74
3. ITEM DESCRIPTION Earthwork Zone 1 & 2	8. ITEM LOCATION Q Listed Dikes	13. VALIDATED BY M. Kelly	DATE 3-4-74	
4. SERIAL NUMBER NA	9. STARTUP SYSTEM NO. NA	14. REPLACEMENT PART NO. NA	REV.	
5. PURCHASE ORDER NO. C-210 Rev. 2	10. QC FIELD INSPECTION PLAN NO. C-210	16. REPLACEMENT SERIAL NO. NA		
6. CONTRACTOR/LOCATION Canonie Const. Co. South Haven, Michigan	11. ASME CODE ITEM <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	17. SOURCE Sub-Contractor		
18. ROUTING INSTRUCTIONS: <input type="checkbox"/> ROUTE TO FIELD ENGINEERING <input type="checkbox"/> ROUTE TO MATERIAL SUPERVISOR				

1. PAGE 1 OF 5	14. NCR NO. 55
25. DISPOSITION CONCURRENCE	
REWORK	REJECT
REPAIR	USE AS IS
DATE	DATE
PROJECT ENGINEER L. Shively	DATE 5-10-74
PROJECT FIELD SUPERVISOR M. Kelly	DATE 2/3/74
AUTHORISED INSPECTION	DATE

1. NONCONFORMING CONDITION:
Spec. C-210-Rev. 2, 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..."
Contrary to the above, compaction test records indicate that material with out-of-specification moisture content was placed as shown in the following lists:

20. FIELD DISPOSITION FIELD RECOMMENDATION/ROUTE TO PROJECT ENGINEERING

As per IOM BEBC-101, dated Nov. 7, 1973, the optimum moisture content range was relaxed to 2% dry to 5% wet on zone 2 material in the Bullock Creek area and the other selected areas of the dike as specified by the Hachtel representative. The following data from block 19 is on zone 2 material and within 2% dry to 5% wet of optimum. It is listed separately for project engineering's evaluation to BEBC-101.

Based on a review of test results listed on pages 2 thru 5 of this NCR and also on various test results submitted as a response to NCR C-25, Engineering concludes that the in-place material is satisfactory. A summary of the results of our evaluation will be forwarded under separate cover.

Engineering recommends proceeding with the Plant Area Fill work, and also recommends to "use as is" the in-place material described in this NCR.

21. FIELD DISPOSITION RESULTS
23. ENGINEERING DISPOSITION RESULTS:

26. IS A DESIGN CHANGE REQUIRED? <input type="checkbox"/> NO <input type="checkbox"/> YES, SEE ATTACHED:	28. REJECTED MATERIAL DISPOSITION <input type="checkbox"/> RETURN TO SUPPLIER <input type="checkbox"/> REUSE
DRAWING REV. DCN	29. PARTS
SPEC. REV. ADD.	

27. QC ACCEPTANCE L. Shively	DATE 2/15/74
QC ENGINEER	DATE
AUTHORISED INSPECTION	DATE
SB 01428	

ORIGINAL

BECHTEL

NONCONFORMANCE REPORT (CONT'D)

PAGE 2 OF 5

14 REC NO 55

TEST NO.	DATE	STATION	ELEV.	MOISTURE CONTENT	OPTIMUM MOISTURE	CURVE NO.	RIGHT OR LEFT	Q
<u>North Plant Dike</u>								
WOD 8- 1	9-12-73	7 + 32	610	10.4	7.1	COP 2Q	215' R	No Action Taken
3	9-12-73	8 + 93	610	9.6	12.6	COL 12	215' R	No Action Taken
4	9-14-73	10 + 50	612	6.8	11.8	COB 2	200' L	
5	9-14-73	9 + 50	612	6.6	11.8	COB 2	250' L	
8	9-18-73	9 + 19	610	4.5	7.1	COP 2Q	238' L	
9	9-18-73	6 + 52	610	13.0	10.3	COD-1	92' R	
12	9-25-73	4 + 09	608	10.0	7.4	COL-11	80' R	Reworked-No Retest
13	9-25-73	6 + 08	609	14.2	9.4	COD-8	105' R	Reworked-No Retest
14	9-25-73	9 + 08	612	17.2	9.4	COD-8	200' R	Reworked-No Retest
15	9-25-73	5 + 10	609	12.1	8.6	COP-2	80' R	Reworked-No Retest
19	9-25-73	8 + 59	611	15.9	11.2	COD-5	82' R	
23	10-06-73	8 + 92	613	20.7	10.8	COL-15	212' R	Material Replaced-No Retest
24	10-06-73	6 + 90	613	24.0	10.8	COL-15	212' R	Material Replaced-No Retest
29	10-08-73	4 + 25	613	18.3	14.7	COD-7	92' R	No Retest
32	10-12-73	1 + 00	615	6.9	9.4	COD-8	50' L	
36	10-17-73	8 + 82	615	15.2	10.8	COL-15	40' R	
37	10-17-73	7 + 82	615	14.2	10.8	COL-15	40' R	
38	10-19-73	8 + 99	615	19.4	10.8	COL-15	110' R	Reworked Area-No Retest
39	10-19-73	9 + 52	615	17.3	10.8	COL-15	110' R	No Retest
40	10-19-73	8 + 109	615	15.2	10.8	COL-15	210' R	
41	10-24-73	3 + 00	617	13.8	11.2	COD-4	150' R	Reworked Area
46	10-24-73	8 + 03	624	19.5	16.4	COD-2	Q	
47	10-25-73	6 + 03	621	10.0	7.4	COL-11	70' R	
48	10-25-73	6 + 03	621	12.6	9.4	COD-8	150' R	
54	11-08-73	4 + 00	624	14.6	11.2	COD-5	20' R	Retested Not Passed-See WOD

035

SB 01429

8-55
QC 613

ORIGINAL

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NONCONFORMANCE REPORT (CONT'D)

PAGE 3 OF 5

11 NOV 80 55

TEST NO.	DATE	STATION	ELEV.	MOISTURE CONTENT	OPTIMUM MOISTURE	CURVE NO.	RIGHT OR LEFT	Q.	
WOD 8-55	11-08-73	4 + 00	623	18.3	11.2	COB-5	20' R		
59	11-10-73	5 + 00	624	16.5	11.8	COB-2	20' L		Moisture Too High
61	11-10-73	4 + 00	623	14.3	10.3	COB-1	200' R		No Action Until Spring
64	11-13-73	5 + 50	622	10.5	8.0	?	50' L		"Start Up"
<u>West Plant Dike</u>									
WOD 1- 1	9-11-73	5 + 30	610	4.8	12.0	COB 1	80' R		No Retest
2	9-11-73	3 + 85	610	4.7	12.0	COB 1	80' R		No Retest
3	9-11-73	2 + 70	610	5.0	12.0	COB 1	80' R		Reworked Area-No Retest
14	10-24-73	3 + 52	624	13.7	11.2	COB-5	75' R		
16	11-08-73	5 + 00	633	10.3	8.0	COB-11	25' R		of shoulder
<u>North East Dike</u>									
WOD 7-35	9-12-73	27 + 00	608	10.3	7.4	COB 11	?		
46	9-25-73	33 + 00	616	19.5	16.4	COB 2	10' R		Reworked-Retest (see below)
47	9-25-73	31 + 00	616	19.6	12.7	COB 3	10' R		Reworked-Retest
58	10-02-73	28 + 45	612	20.1	16.4	COB 2	85' R		
64	10-11-73	32 + 00	614	18.3	14.2	COB 8	90' R		
69	10-12-73	31 + 00	616	21.0	12.7	COB 3	12' R		Retest-See WOD 7-47
74	10-20-73	28 + 00	617	23.0	20.5	COB 6	10' R		
78	11-14-73	30 + 00	622	16.3	11.2	COB-5	10' R		
80	11-13-73	31 + 00	616	17.1	12.6	COB 12	20' R		Retest of 47 & 69 (failed)

038

SB 01430

RECEIVED

NONCONFORMANCE REPORT (CONT'D)

PAGE 4 OF 5

LA. RCH NO. 55

BLOCK 20 CONTINUED

TEST NO.	ZONE	MOISTURE CONTENT	OPTIMUM MOISTURE	DIFFERENCE FROM OPTIMUM	% COMPACTION
W0D8-9	2	13.0	10.3	+2.7	97.6
W0D8-12	2	10.0	7.4	+2.6	100.2
W0D8-13	2	14.2	9.4	+4.8	97.7
W0D8-19	2	15.9	11.2	+4.7	96.0
W0D8-29	2	18.3	14.7	+3.6	99.6
W0D8-36	2	15.2	10.8	+4.4	103.2
W0D8-37	2	14.2	10.8	+3.4	101.9
W0D8-40	2	15.2	10.8	+4.4	100.4
W0D8-41	2	13.8	11.2	+2.6	100.2
W0D8-47	2	10.0	7.4	+2.6	99.4
W0D8-48	2	12.6	9.4	+3.2	100.0
W0D8-59	2	16.5	11.8	+4.7	102.4
W0D8-61	2	14.3	10.3	+4.0	96.8
W0D1-14	2	13.7	11.2	+2.5	99.3
W0D7-35	2	10.3	7.4	+2.9	97.1
W0D7-46	2	19.5	16.4	+3.1	98.4
W0D7-58	2	20.1	16.4	+3.7	96.2
W0D7-64	2	18.3	14.2	+4.1	95.3
W0D7-74	2	23.0	20.5	+2.5	96.6

037

On the remainder of tests the field submits the following supplemental data for Project Engineering review & evaluation.

W0D8-1	2	10.4	7.1	+3.3	84.9
W0D8-3	2	9.6	12.6	-3.0	103.3
W0D8-4	1	6.8	11.8	-5.0	100.7
W0D8-5	1	6.6	11.8	-5.2	101.1

11/11/73

BLOCK 20 CONTINUED

NONCONFORMANCE REPORT (CONT'D)

PAGE 5 OF 5

14 REC NO. 55

TEST NO.	ZONE	MOISTURE CONTENT	OPTIMUM MOISTURE	DIFFERENCE FROM OPTIMUM	% COMPACTION
W0D8-8	2	4.5	7.1	-2.6	97.7
W0D8-11	2	17.2	9.4	+7.8	86.3
W0D8-15	2	12.1	8.6	+3.5	94.9
W0D8-23	2	20.7	10.8	+9.9	94.9
W0D8-21	2	24.0	10.8	+13.2	100.8
W0D8-32	1	6.9	9.4	-2.5	95.7
W0D8-38	2	19.4	10.8	+8.6	95.2
W0D8-39	2	17.3	10.8	+6.5	95.6
W0D8-46	1	19.5	16.4	+3.1	97.8
W0D8-51	1	14.6	11.2	+3.4	97.4
W0D8-55	1	18.3	11.2	+7.1	90.5
W0D8-61	1	10.5	8.0	+2.5	100.5
W0D1-1	1	4.8	12.0	-7.2	95.9
W0D1-2	1	4.7	12.0	-7.3	98.7
W0D1-3	1	5.0	12.0	-7.0	93.7
W0D1-16	1	10.3	8.0	+2.3	99.6
W0D7-47	2	19.6	12.7	+6.9	87.3
W0D7-69	2	21.0	12.7	+8.3	93.3
W0D7-78	2	16.3	11.2	+5.1	97.3
W0D7-80	2	17.1	12.6	+4.5	93.9

038

If necessary, field recommends evaluation of affected in-place material be done at the same time that evaluation of areas affected by NCR C-26 are conducted.

Greg W. Knoll 3-6-74

SB 01432

ORIGINAL

CON 7

Bechtel Associates, Professional Corporation

Inter-office Memorandum

GRATE RD
IMPRESS
HUDSON

BEDC - 104

To: E. E. Felton

Subject: Midland Plant Units 1 & 2
Job No. 7220
Earthwork Moisture Content
File: C-210, C-208, 0274

Copies to: J. H. Allen
J. C. Hink
R. L. Rixford
L. F. Wilcox

Date: November 7, 1973
From: P. A. Martinez
Of: Engineering
At: Ann Arbor

Reference: a) FCR-C-18 dated November 2, 1973

In response to your FCR (ref. a) and based on laboratory test data, compaction data, and location of the material being placed, specification C-210 can be relaxed with the following stipulations:

The optimum moisture content range can be specified as 2% dry to 5% wet of optimum provided that if the moisture content exceeds 2% wet of optimum the fill shall be placed with a compactive effort equal to at least 95% of the Bechtel modified proctor test result (20,000 foot pounds effort). This will be done at no additional cost to Bechtel. This also applies only to zone 2 material which is placed in the Bullock Creek area and in other selected areas of the dike as specified by the Bechtel representative. The moisture control specifications originally written for zone 1 material still apply to zone 1 material. That is, zone 1 material must be placed within a moisture content range of 2% dry to 2% wet.

The above change in allowable range of optimum moisture content for the zone 2 material may result in more than four passes of compaction equipment. However, as pointed out above, this additional effort will not be at the expense of Bechtel since it is being done to allow construction to continue and give the contractor the best utilization of his equipment and people.

P. A. Martinez
P. A. Martinez

RLR/rc

SB 01433

Teletype Message

TYPE DOUBLE SPACE • BE BREF

DDP	TEL	NO	0

CHECK APPROPRIATE BOX			
N. of Ltr.	Full Rate:	Region Delivery:	CHARGE TO: CODE
		YES/NO	NUMBER TO BE CALLED
MESSAGE ADDRESSED TO	ADDRESSEE	ADDRESS	LOCATION/CITY/STATE OR COUNTRY
	Bechtel Power corporation	3500 E. Miller Road	Midland, Michigan
	Attn: E. E. Falton		

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

March 22, 1974

BEC - 249

Subject: Midland Plant Units 1 & 2, Job No. 7220

Soil Boring Program

File: C-210, C-208, 0274

Reference: 1) BEC-238 attach. Sht. 1

In response to telecon request from R. Grote on 3/20/74, this is to clarify that the "W-tests" referred to in ref. 1) consist of moisture content determination (ASTM D 2216) and dry density.

The dry density is to be determined by the following procedure:

Sample will be extracted in Shelby tubes. A representative four to six inch sample shall be cut from the Shelby tube. The cuts must be uniform and perpendicular to the axis of the tube. The sample should then be carefully extruded from the cut portion of the Shelby tube, using a tool with a diameter equal to the inside diameter of the Shelby tube. The extrusion should be

COPIES TO: R. Grote, J. L. Allen, S. S. Afifi

SB 01434

RLR/73E

040

DATE

3/22/74

[Signature]
E.A. Martinez, Project Engineer

LOCATION & Ltr.

Building 'F' - 202

ORIGINATOR'S COPY:

7PE-2113

U4605

Teletype Message

TYPE DOUBLE SPACE • BE BRIEF

CHECK APPROPRIATE BOX			CHARGE ACCT. TYPE	
MESSAGE ADDRESSED TO	ADDRESSEE	ADDRESS	LOCATION (CITY, STATE OR COUNTRY)	

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

made vertically with care taken to assure an undeformed sample.

The inside diameter of the Shelby Tube will be used to express the sample diameter and the volume of the sample computed from the cross-sectional area and the average of four height measurements.

The wet density is the ratio between the weight of the extruded sample and the calculated volume of the sample.

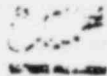
The dry density is the ratio between the weight after oven drying at 105°C for 24 hours and the calculated volume of the sample.

Extreme care is required in handling these samples between the boring location and the laboratory to assure obtaining an undeformed sample. The extrusion and weight and height measurements should be made by a qualified technician under the supervision of the engineer.

COPIES TO:

DATE	SIGNATURE	LOCATION & EXT.	COORDINATOR'S COPY:
	041		SB 01435

04605



Teletype Message

TYPE DOUBLE SPACE • BE BRIEF

CPR ENCL			
D&G	TELEX	TAX	TELETYPE UNIT

CHECK APPROPRIATE BOX:			
From List	Full Rate	Report Delivery:	NUMBER TO BE CALLED
		YES/NO	
MESSAGE ADDRESSED TO	ADDRESSEE	ADDRESS	LOCATION, CITY, STATE OR COUNTRY

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

Weight measurements are to be to the nearest 0.1 gm and dimensions
to the nearest 0.01 inch.

SB 01436

SECRET

NONCONFORMANCE REPORT

1 DRAWING/PART NO. Spec. 7220-C-210	REV. 4	7 PROJECT NO. 07220	12 APPROVED BY <i>L.R. Albert</i>	DATE 8/6/75	14 NCR NO. 324
3 ITEM DESCRIPTION Plant Area Fill	8 ITEM LOCATION 36 Ft. NE of Aux. Bldg. El.	9 STARTUP SYSTEM NO. N/A	13 VALIDATED BY <i>W. J. ...</i>	DATE 8/6/75	25 DISPOSITION CONFERENCE
4 SERIAL NUMBER N/A	10 QC FIELD INSPECTION PLAN NO. C-210-4-48 Rev. 0	11 ASME CODE ITEM <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	15 REPLACEMENT PART NO. N/A	16 REPLACEMENT SERIAL NO. N/A	REWORK
5 PURCHASE ORDER NO. N/A	6 CONTRACTOR/LOCATION Canonie Const. Co./Midland/Mich.	17 SOURCE Subcontractor	PROJECT FIELD ENGINEER <i>[Signature]</i> DATE 8/11/75		
18 ROUTING INSTRUCTIONS XX ROUTE TO FIELD ENGINEERING	19 NONCONFORMING CONDITION				PROJECT FIELD QC ENGINEER <i>[Signature]</i> DATE

Section 13.6 of Spec. 7220-C-210 Rev. 4 requires moisture control of plant area material to conform to Section 12.6 of the same specification which states in part that materials shall have a moisture content within two percentage points of optimum moisture. Contrary to the above, a soil test identified as MD-202 on US Testings Report No. UST-JL-21 dated 7/9/75 indicates the moisture content of the material to be 2.9% below optimum. Nonconformance noted during review of QC records. "Q" List No. 1.002.

20 <input type="checkbox"/> FIELD DISPOSITION	<input checked="" type="checkbox"/> FIELD RECOMMENDATION/ROUTE TO PROJECT ENGINEERING	21 FIELD DISPOSITION RESULTS
<i>Submitted without Field recommendation. Attached data reflects existing conditions. David P. ... 8-7-75</i>		

22 ENGINEERING DISPOSITION	23 ENGINEERING DISPOSITION RESULTS
Based upon satisfactory compaction, as evidenced by the attached test reports, Engineering recommends use as is. <i>ELR 8-11-75</i>	<i>[Signature]</i> 8/11/75

24 IS DESIGN CHANGE REQUIRED <input checked="" type="checkbox"/> NO <input type="checkbox"/> YES, SEE ATTACHED:	26 REJECTED MATERIAL DISPOSITION <input type="checkbox"/> RETURN TO SUPPLIER <input type="checkbox"/> SCRAP	27 QC ACCEPTANCE
DRAWING REV. DCH	REMARKS	ENGINEER DATE
SPEC REV. ADD		AUTHORIZED INSPECTOR DATE

White Copy - Originator
Canary Copy - Field Engineer
Pink Copy - PQAE
Goldenrod Copy - QC

SB 01437

QC 032



COMPACTED FILL DENSITY TEST REPORT

NCR 324 2 of 3

A. J. ... 7-11-75
 QC ACCEPTANCE DATE
 16 C. J. C.
 CONTROL NO FILE NO

1. PROJECT NO. 7220

2. DATE 7-9-75

PAGE 1 OF 1

4. SPEC. NO. 7220-C-208

5. ~~XXXXXXXXXX~~ Area: Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. MD#	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	Zone			
7-8-75	201	PW JK	16'E. 5.6 line 18'N. A line	593	-	121.0	18.0	102.5	170	16.7	2	111.4	92	Fail
	202		14'E. 8.7 line 36'N. A line	594.5	-	125.0	13.8	109.8					99	FAIL 7/9/75 Pass 7/12/75
	203		11'E. 5.6 line 15'N. A line	593	-	126.2	16.2	108.6					96	Clear Pass MD 201

UST J -21

SB 01438

20 PREPARED BY (signature) B. J. ...

DATE 7-22-75

RESPONSIBLE ENGINEER (signature) K. ...

DA 7220-22



COMPACTED FILL DENSITY TEST REPORT

NCR 324 3 of 3

QC ACCEPTANCE	DATE
CONTROL NO.	FILE NO.

1 PROJECT NO. 7220

2 DATE 8/7/75

PAGE 1 OF 1

4 SPEC. NO. 7220-C-208

5 DRAWING NO. Area: Plant Area

6 TESTED WEEK OF N/A

7. DATE TAKEN	8. TEST NO. MD#	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
									BMP	OMC	ZONE			
7/15/75	207	JK PW	18 ¹ N.A line 15 ¹ W.7.4	595.5	-	129.0	17.3	110.0	170	16.7	1	111.4	99	Pass Clears MD 204
7/16/75	220	PW	12 ¹ E 6.6 line 36 ¹ N.A line	596	-	116.5	14.2	102.0	211	13.3	1	104.6	98	Pass
7/18/75	211	PW JK	35 ¹ E 8.7 line 15 ¹ N.A line	598	-	128.5	13.1	113.6	200	13.4	1	118.1	96	Pass
7/7/75	196	PW JK	8 ¹ E 7.4 line 18 ¹ N.A line	592.5	-	124.0	15.9	107.0	170	16.7	2	111.4	96	Pass
7/7/75	191	PW JK	22 ¹ E 8.7 line C ₁ A line	593.5	-	127.3	16.1	109.6	170	16.7	2	111.4	98	Pass

SB 01439

20 PREPARED BY (Signature) _____

DATE _____

21 RESPONSIBLE ENGINEER _____

DATE _____

1 DRAWING PART NO Spec. 7220-C-210 2 ITEM DESCRIPTION Plant Area Fill 3 SERIAL NUMBER N/A 4 PURCHASE ORDER NO N/A 5 CONTRACTOR OR DESIGN Canonic Const. Co./Midland/Mich.	6 PROJECT NO 4 07220 7 ITEM LOCATION 36 Ft. NE of Aux. Bldg. Bl. 594.5 8 STARTUP SYSTEM NO N/A 9 IN OR FROM INSPECTION PLAN NO C-210-4-4B Rev. 0 10 DATE 8/6/75 11 VALUED BY M. Albert 12 REPLACEMENT PART NO N/A 13 REPLACEMENT SERIAL NO N/A 14 REQUIRED Subcontracter	15 DISPOSITION CONCURRENCE 16 DATE 8/11/75 17 DATE 8/11/75 18 DATE 8/11/75
--	---	--

19 NONCONFORMING CONDITION
 Section 13.6 of Spec. 7220-C-210 Rev. 4 requires moisture control of plant area material to conform to Section 12.6 of the same specification which states in part that materials shall have a moisture content within two percentage points of optimum moisture. Contrary to the above, a soil test identified as MD-202 on US Testings Report No. UST-IL-21 dated 7/9/75 indicates the moisture content of the material to be 2.7% below optimum. Nonconformance noted during review of QC records. "q" List No. 1.002.

20 FIELD DISPOSITION
UNCONTROLLED
RECEIVED
 AUG 11 1975
 BECHTEL POWER CORP.
 "JOB 7220"
 PER _____

21 ENGINEERING DISPOSITION
 Based upon satisfactory compaction, as evidenced by the attached test reports, Engineering recommends use as is. *see 8-11-75*
Ed J. Swanson 8/11/75

22 TO BE RETURNED TO THE SOURCE RECEIVED DATE AUG 11 1975 QUALITY CONTROL BECHTEL JOB 7220 SIGNATURE <i>G. Miller</i>	23 REJECTED MATERIAL DISPOSITION 24 ACTION TO BE TAKEN Discard White Copy Green Copy Pink Copy Statement Copy	25 BY ACCEPTABLE <i>M. Albert</i> DATE 8/11/75 26 DATE 8/11/75 27 DATE 8/11/75
--	---	---

SB 01440

NONCONFORMANCE REPORT

1 DRAWING PART NO
Spec. 1220-C-210

2 ITEM DESCRIPTION
Plant Area Fill

3 SERIAL NUMBER
N/A

4 PURCHASE ORDER NO
N/A

5 CONTRACTOR'S ID. FROM

6 CONTRACTOR'S NAME
Canonic Const. Co./Midland/Mich.

7 DIVISION/INTERDEPT

8 PROJECT NO

9 ITEM LOCATION
07220

10 STARTUP SYSTEM NO
36 Fl. NE of Aux. Bldg. El.

11 N/A

12 QUALITY INSPECTION PLAN NO
C-210-4-48 Rev. 0

13 SOME YES

14 COST ITEM NO

15 NO

R. Albert

16 VALIDATED BY
R. Albert

17 REPLACEMENT PART NO
594.5

18 N/A

19 REPLACEMENT SERIAL NO
N/A

20 SOURCE
Subcontractor

8/6/75

8/6/75

1 PAGE OF 1	22 NUMBER 324
23 DISPOSITION CONFIRMED	
24 GENERAL	25 SPECIAL
26	27
28	29
30	31
32	33
34	35
36	37
38	39
40	41
42	43
44	45
46	47
48	49
50	51
52	53
54	55
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80	81
82	83
84	85
86	87
88	89
90	91
92	93
94	95
96	97
98	99
100	101

16 NONCONFORMING CONDITIONS
Section 13.6 of Spec. 1220-C-210 Rev. 4 requires moisture control of plant area material to conform to Section 12.6 of the same specification which states in part that materials shall have a moisture content within two percentage points of optimum moisture. Contrary to the above, a soil test identified as HD-202 on US Testings Report No. UST-JL-21 dated 7/9/75 indicates the moisture content of the material to be 2.9% below optimum. Nonconformance noted during review of QC records. "Q" List No. 1.002.

17 FIELD DISPOSITION
 FIELD RECOMMENDATION ROUTE TO PROJECT ENGINEERING

ADVANCE COPY

22 ENGINEERING DISPOSITION

Based upon satisfactory compaction, as evidenced by the attached test reports, Engineering recommends use as is. *RLR 8-11-75* *GH Duvener 8/10/75*

24 REVISIONS	25 REVISIONS	26 REVISIONS	27 REVISIONS
28	29	30	31
32	33	34	35
36	37	38	39
40	41	42	43
44	45	46	47
48	49	50	51
52	53	54	55
56	57	58	59
60	61	62	63
64	65	66	67
68	69	70	71
72	73	74	75
76	77	78	79
80	81	82	83
84	85	86	87
88	89	90	91
92	93	94	95
96	97	98	99
100	101	102	103

White Copy
Carbon Copy
Fax Copy
Raymond Copy

Original
Field Engineer
FIELD
FIC

Source South Duke 60+00
 Hammer weight 10 lbs
 Drop distance 18 in
 No. Layers 2
 No. Blows 25

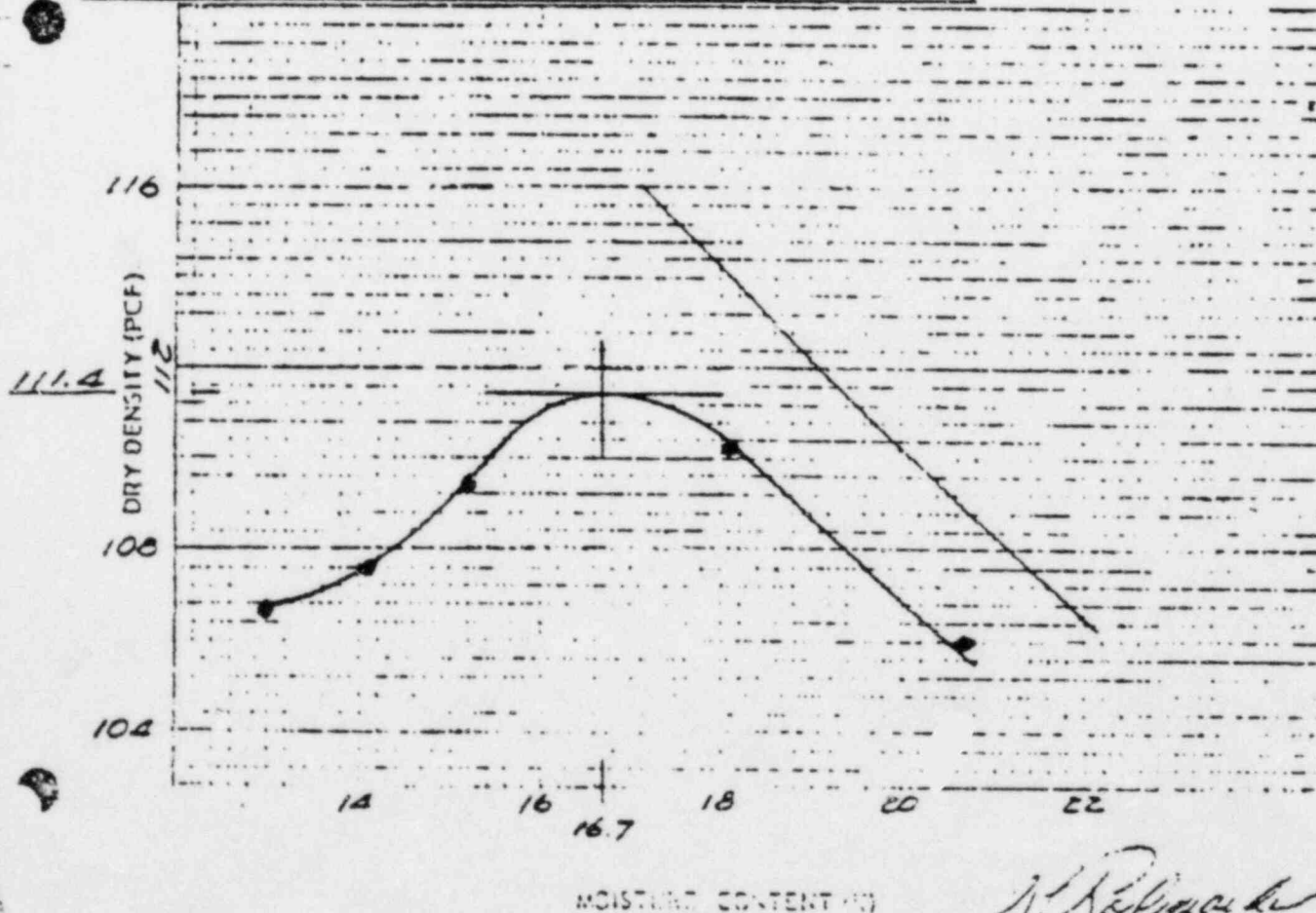
Initials S. H.
 Type of test U.S. MOLEC
 Mold size 6"

Control No 17 File No. C-210, 3

Pinkish Brown Clay w/so. silty F. sand & tr. Gravel

TEST DATA

Mold No.	PM-1	PM-1	PM-1	PM-1	PM-1
Wt. wet sample - Mold (g)	10753.0	10829.0	10937.0	11081.0	11000.0
Wt. of mold (g)	6648.0	6648.0	6648.0	6648.0	6648.0
Wt. of wet sample (g)	4105.0	4181.0	4289.0	4433.0	4352.0
Vol. of sample (cc)	2124.0	2124.0	2124.0	2124.0	2124.0
Wt. Limit (g) (20.0%)	120.6	122.8	126.0	130.2	127.9
Comp. No.	34	21	29	16	10
Wt. wet sample - Comp. (g)	372.9	370.0	359.0	696.6	718.7
Wt. dry sample - Comp. (g)	298.3	309.9	278.7	616.1	557.4
Wt. water (g)	74.6	60.1	80.3	80.5	161.3
Moisture Content (%)	25.4	16.1	28.9	11.6	22.7
Average Moisture Content (%)	13.0	14.1	15.2	18.1	20.7
Dry Unit Weight (pcf)	106.7	107.6	109.4	110.2	106.0
MAX Dry Density	111.4 pcf				
O. M. C.	16.7 %				



TEST 5206

S. H.
 Karl's Report 7-10-70



COMPACTED FILL

DATE: 7-9-75
 SHEET NO. 1

PROJECT NO. 7220

4 SPEC. NO. 7220-C-208

Area: Plant Area

DATE	TEST NO.	DEPTH (ft)	DEPTH (cm)	NO. OF CORNERS	MOISTURE (%)	DENSITY (pcf)	DENSITY (kg/m ³)	WATER CONTENT (%)	WATER CONTENT (%)	WATER CONTENT (%)	WATER CONTENT (%)	WATER CONTENT (%)	WATER CONTENT (%)	WATER CONTENT (%)
-8-75	201	16' E. 5.6 line	59.5	121.5	18.0	132.5	170	10.7	2	111.5	97	Fail	14% water	
	202	14' E. 8.7 line	59.5	125.0	13.8	139.8					99	Pass	14% water	
	203	11' E. 5.6 line	59.5	126.2	16.2	138.6					96	Pass	MD 201	

*this test
 is it should
 be 14.7%
 @ 16.7% MC*

LIST 11-21

BY: *B.H. White*

DATE 7-2-75

GEORGETOWN ENGINEERS
L. Lawrence

SB 01443

108

7 1941 8/7/75

7220

N/A

100

99

98

96

98

95

6

7

8

9

10

11

12

170

211

200

170

170

170

111.4

104.6

118.1

111.4

111.6

16.7

13.1

11.4

16.7

16.7

1

1

1

2

2

110.0

102.0

113.6

107.0

109.6

17.3

14.2

13.1

15.9

16.1

129.0

116.5

128.5

124.0

127.3

595.5

596

598

592.5

593.5

197

210

211

196

197

13.1

12.8

12.7

111.6

111.6

111.6

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SU 01444

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108

BECHTEL

RYDEN

NONCONFORMANCE REPORT

1 PAGE OF 42	14 NCR NO 421			
25 DISPOSITION CONCURRENCE				
REWORK	REJECT	REPAIR	DATE	BY
			6/22/76	T.C. Valenzano
			6/18/76	R.L.C.
PROJECT FIELD QC ENGINEER		DATE		
AUTHORIZED INSPECTOR		DATE		

2 DRAWING PART NO 7220-C-210	Spec.	REV. 4	7 PROJECT NO. 7220	12 REPORTED BY C. H. Helton	DATE 5/5/76
3 ITEM DESCRIPTION Plant Area Backfill			8 ITEM LOCATION Ramp North of Aux. Bldg	13 VALIDATED BY [Signature]	DATE
4 SERIAL NUMBER			9 STARTUP SYSTEM NO	14 REPLACEMENT PART NO N/A	REV.
5 PURCHASE ORDER NO N/A			10 QC FIELD INSPECTION PLAN NO N/A	15 REPLACEMENT SERIAL NO N/A	
6 CONTRACTOR/LOCATION Canonic Construction Co., South Haven, MI			11 ASME CODE ITEM <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	16 SOURCE Subcontractor	
18 ROUTING INSTRUCTIONS: <input checked="" type="checkbox"/> ROUTE TO FIELD ENGINEERING <input type="checkbox"/> ROUTE TO MATERIAL SUPERVISOR					

19 NONCONFORMING CONDITION:
Specification 7220-C-210, Rev. 4, Para. 12.6.1 states in part, "The water content during compaction . . . shall not be more than 2 percentage points above optimum moisture content . . .". Contrary to the above, during the fall of 1975 a construction access ramp was constructed from material which exceeded the moisture content requirements of Specification C-210. The field forces, including Bechtel Quality Control, were aware that the material exceeded moisture when placed. When the material was placed it was

Q-LIST NO. 1.002

Continued on Page 2

20 FIELD DISPOSITION FIELD RECOMMENDATION/ROUTE TO PROJECT ENGINEERING

Recommend "accept as is," subject to Project Engineering review and evaluation. Backfill material has been compacted to not less than 95% of maximum density in accordance with Specification C-210.

C. Helton 5/19/76 [Signature]

21 FIELD DISPOSITION RESULTS

22 ENGINEERING DISPOSITION

Discussion of the background to this condition with Field personnel indicated (1) that the ramp was installed as a temporary means for access into adjacent work areas and not as permanent backfill; and (2) that the Field now wishes to use the ramp as part of the permanent backfill. We understand that should the ramp not be suitable as

23 ENGINEERING DISPOSITION RESULTS

The Nonconforming material was rejected.

[Signature] 5/19/76

24 IS DESIGN CHANGE REQUIRED NO YES, SEE ATTACHED:

DRAWING REV. DCN
SPEC REV. ADD

26 REJECTED MATERIAL DISPOSITION RETURN TO SUPPLIER SCRAP

REMARKS

27 QC ACCEPTANCE

QC ENGINEER [Signature]

AUTHORIZED INSPECTOR [Signature]

DATE 5/19/76

- White Copy - Originator
- Canary Copy - Field Engineer
- Pink Copy - PQAE
- Goldenrod Copy - QC

SB 01445

EE-111

Block 19 Continued -

considered temporary fill for construction access. The field now wishes to leave this material in place.

With the exception of the moisture content requirement, the material meets all requirements of Specification C-210. The testing frequency was maintained and the compaction test results are as shown on the following list:

Block 22 Continued:

permanent backfill it can readily be removed. Hence Engineering submits that a non-conforming condition does not exist since the ramp is still a temporary facility.

Engineering suggests that if the Field wishes to use the ramp as part of permanent backfill, they request Engineering approval via an FCR.

6-18-76
GA P...
[Handwritten signature]

10000 2

White Copy	--	Originator
Canary Copy	--	Field Engineer
Pink Copy	--	PGAE
Goldenrod Copy	--	QC

QC 013

SB 01446

01-102

NONCONFORMANCE REPORT (CONT'D)

Block 19 Continued -

Test No	Date	Location	Elev.	Moisture Content(%)	Optimum Moisture	% Above Optimum	Percent Compaction
MD-490*	10-31-75	356° Cont #1, 76' off wall	631'	14.8	10.6	4.2	95
MD-492*	10-31-75	356° Cont #1, 79' off wall	631'	12.9	10.6	2.3	96
MD-512	11-13-75	45° Cont #2, 95' off wall	610'	14.2	9.8	4.4	98
MD-513	11-13-75	28° Cont #2, 100' off wall	615'	13.5	9.8	3.7	98
MD-514**	11-13-75	356° Cont #1, 76' off wall	631'	12.6	10.6	2.0	100
MD-524	11-17-75	25' E. 4.55 line, 90' N. "A" line	630'	14.4	9.8	4.6	97
MD-525	11-17-75	75' N. "A" line @ 5.6 line	627'	15.2	9.8	5.4	98
MD-526***	11-17-75	85' N. "A" line @ 8.7 line	624'	16.4	9.8	6.6	93
MD-527	11-17-75	28° Cont #2, 110' off wall	619'	14.7	9.8	4.9	97
MD-530	11-18-75	365° Cont #1, 115' off wall	633'	13.9	9.8	4.1	96
MD-531	11-18-75	31' E. 4.55 line, 88' N. "A" line	632'	14.3	9.8	4.5	98
MD-532	11-18-75	108' N. "A" line @ 7.8 line	628'	16.6	13.7	2.9	96
MD-533	11-18-75	87' N. "A" line @ 8.7 line	624'	14.5	9.8	4.7	96
MD-534	11-18-75	68' N. "A" line @ 8.7 line	624'	16.9	13.7	3.2	99
MD-535**	11-18-75	25° Cont #2, 90' off wall	620'	14.8	9.8	5.0	98
MD-536**	11-18-75	45° Cont #2, 95' off wall	615'	15.1	9.8	5.3	94
MD-537	11-18-75	90° Cont #2, 85' off wall	610'	14.9	9.8	5.1	95
MD-539	11-19-75	45° Cont #2, 97' off wall	615'	11.9	9.8	2.1	97

Notes:

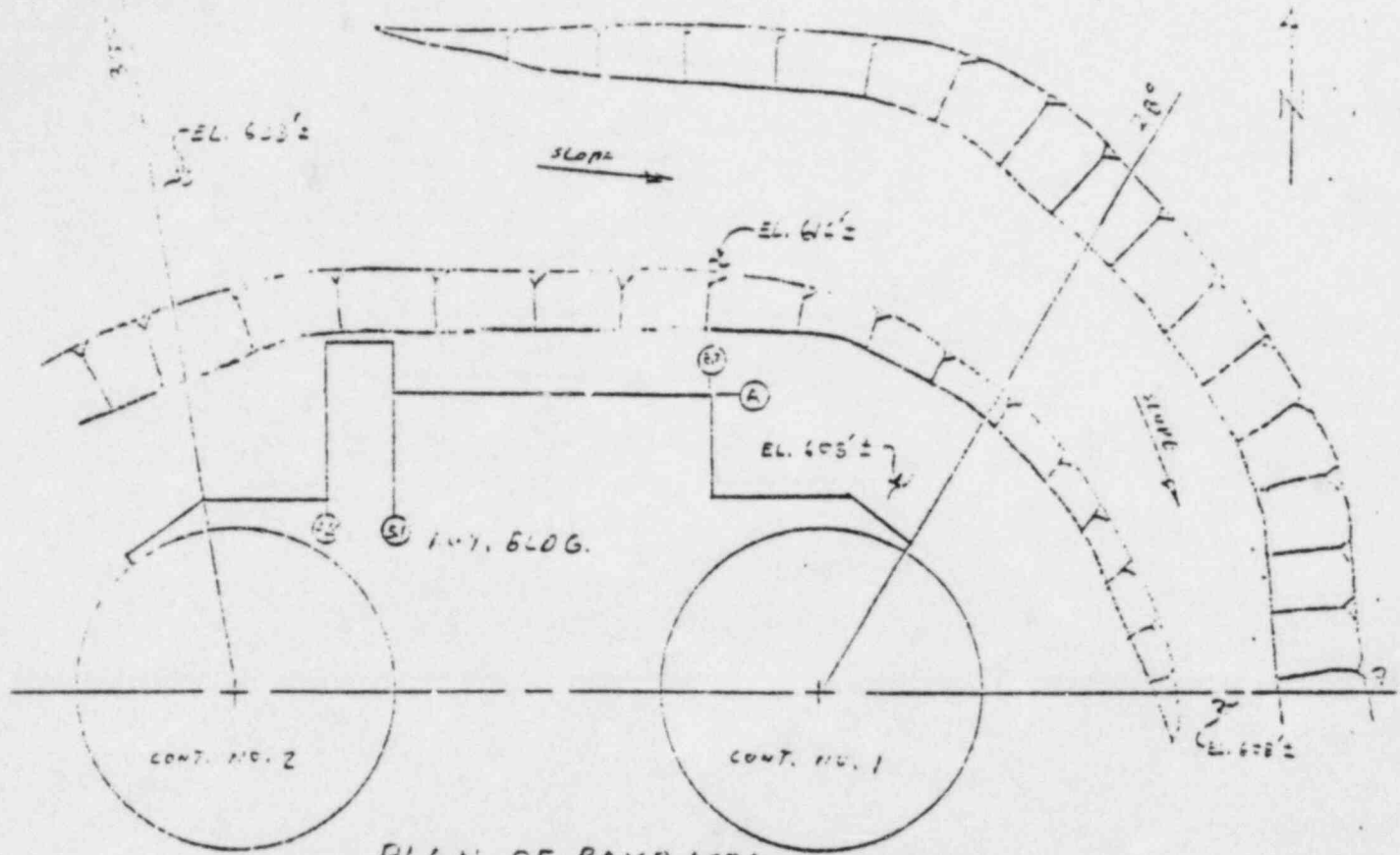
- * This area reworked and retested: See test No. MD-514
 - ** Moisture and Compaction pass: clears MD-490 and MD-492
 - *** This area reworked and retested: See test No. MD-533 for passing compaction
 - *** This area reworked and retested: See test No. MD-539 for passing compaction
- See page 3 for location sketch.

10000 1

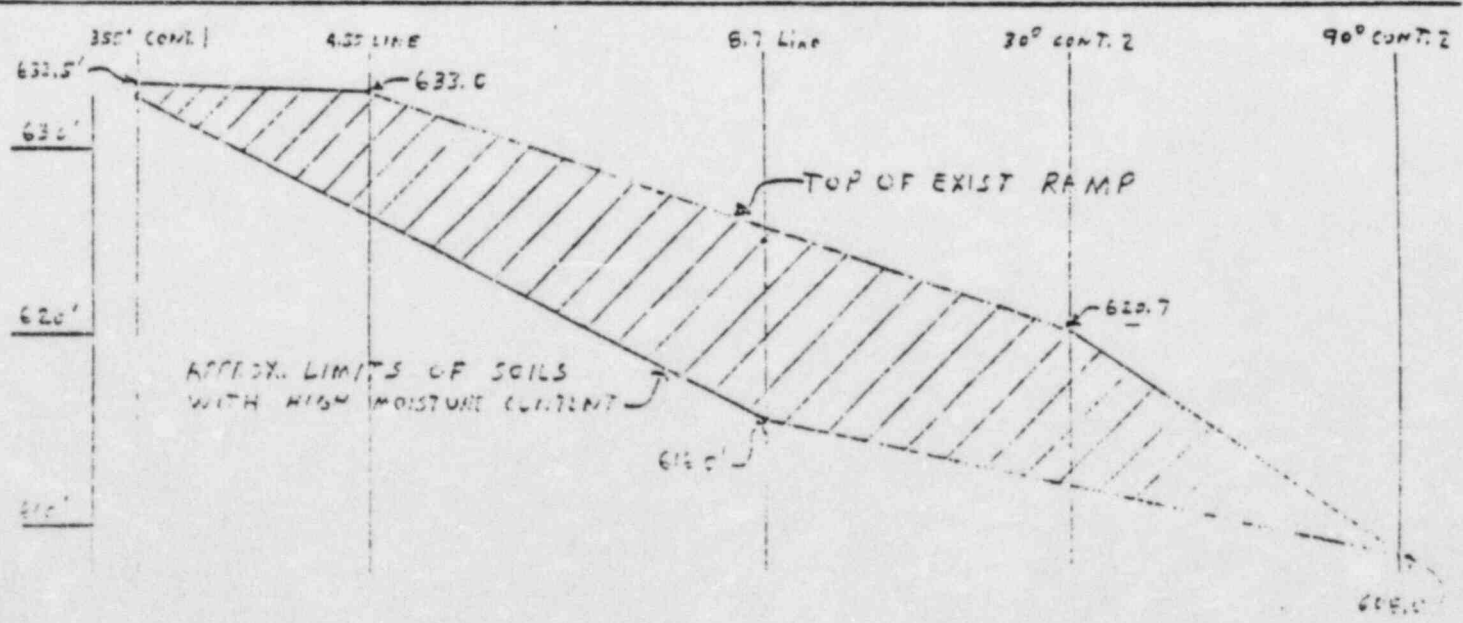
White Copy - Originator
 Canary Copy - Field Engineer
 Pink Copy - PCIAE
 Goldenrod Copy - GC

QC 613

SB 01447



PLAN OF RAMP AREA
N.T.S.



PROFILE OF RAMP AREA
N.T.S.

SB 01448



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220

2. DATE 11-375

4. SPEC NO. 7220-C-208

5. ~~SECTION~~ Area: Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TEST-ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION BMP OMC ZONE	17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
10-31-75	490	PW	356 ⁰ Cont 1 76' off Wall	631	-	141.8	14.8	123.5	260 10.6 2	129.8	95	Fail (by 90% moisture)
	491		315 ⁰ Cont 1 81' off Wall	633	-	137.5	13.8	120.8	262 11.8 "	123.9	98	Fail (by 90% moisture)
	492		356 ⁰ Cont 1 79' off Wall	631	-	140.5	12.9	124.4	260 10.6 "	129.8	96	Fail (by 90% moisture)
	493		78' S Q line C6.6 Line	607	-	134.6	12.3	119.9	262 11.8 "	123.9	97	Fail

SB 01449

LIST No. 2

20 PREPARED

signature

DATE 11-3-75

RESPONSIBLE ENGINEER R.H. [Signature]

11/3/75



COMPACTED FILL DENSITY TEST REPORT

1. PROJECT NO. 7220 2. DATE 11-14-75
 3. QUANTITY OF FILL 4. DATE
 5. CONTRACT NO. 6. TESTED WEEK OF

1. PROJECT NO. 7220

2. DATE 11-14-75

3. QUANTITY OF FILL
4. DATE
5. CONTRACT NO.
6. TESTED WEEK OF

4. SPEC. NO. 7220-C-208

5. ~~WORKING~~ AREA: Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO.	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTION	19. REMARKS
	MD								BMP	OMC	ZONE			
11-13-75	511	PW	75' NA line W 8.7 Col. Aux Bld	25' 616	-	135.1	10.8	121.9	261	9.8	2	127.3	96	Pass
	512		45' Cont 2 95' off Wall	610	-	125.3	14.2	125.3	"	"	"	"	98	Fail Moisture
	513		28' Cont 2 100' off Wall	615	-	124.9	13.5	124.9	"	"	"	"	98	Fail Moisture
	514		356' Cont 1 76' off Wall	631	-	129.2	12.6	129.2	260	10.6	2	129.8	100	Pass Clear H 490, 492

SB 01450

UST N-65

10. PREPARED BY (signature) [Signature]

DATE 11-22-75

RESPONSIBLE ENGINEER [Signature]

11/15

COMPACTED FILL DENSITY TEST REPORT



1. PROJECT NO. 7220

2. DATE 11-18-75

4. SPEC. NO. 7220-C-208

5. DRAWING NO. AREA: Plant Area

6. TESTED WEEK OF

7. DATE TAKEN	8. TEST NO. ND	9. TESTED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX LAB DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTOR	19. REMARKS
									BMP	OMC	ZONE			
11-17-75	524	PW	25'E 4.55 line 90'N A line	630	-	141.0	14.4	123.3	261	9.8	2	127.3	97	Fail Moisture
	525		6.6 line 75'N A line	627	-	143.0	15.2	124.1	"	"	"	"	96	Fail Moisture
	526		8.7 line 85'N A line	624	-	137.5	16.4	118.1	"	"	"	"	93	Fail Moisture
	527		28 Cont 2 110' off Wall	619	-	142.0	14.7	123.8	"	"	"	"	97	Fail Moisture
	528		53'E Col 9 85'S Q line	614	-	140.2	13.6	123.4	262	11.8	"	123.9	100	Pass
	529		40'W 8.7 line 125'N A line	628	-	119.5	12.1	105.5	RD 37	N/A	"	108.2	98	Pass over pipe

SB 01451

UST N-87

20. PREPARED

signature *[Handwritten Signature]*

DATE 11-18-75

RESPONSIBLE ENGINEER

[Handwritten Signature]

[Handwritten Signature]

COMPACTED FILL DENSITY TEST REPORT

GC PROJECT NO. _____ DATE _____
 TESTED BY _____
 PAGE 01

1 PROJECT NO 7220

2 DATE 11-19-75

4 SPEC. NO. 7220-C-208

5 ~~XXXXXXXXXX~~ AREA: Plant Area

6 TESTED WEEK OF _____

7. DATE TAKEN	8. TEST NO. MD	9. TEST ED BY	10. LOCATION	11. ELEV. OF TEST	12. DEPTH BELOW FINAL GRADE (FT.)	13. IN PLACE WET DENSITY (LB./C.F.)	14. MOISTURE CONTENT (%)	15. IN PLACE DRY DENSITY (LB./C.F.)	16. SOIL CLASSIFICATION			17. MAX. LAB. DRY DENSITY (LB./C.F.)	18. PERCENT COMPACTED	19. REMARKS
									BMP	OMC	ZONE			
-18-75	530	PW	365 ⁰ Cont 1 115' off Wall 31'E 4.55 line	633	-	139.5	13.9	122.5	261	9.8	2	127.3	96	14.1 Soil Moisture
	531		88' N A line C 7.8 line	632	-	143.2	14.3	125.3	"	"	"	"	98	" "
	532		68' N A line C 8.7 line	628	-	130.8	16.6	112.2	220	13.7	"	116.5	96	" "
	533		87' N A line C 8.7 line	624	-	139.5	14.5	121.8	261	9.8	"	127.3	96	" "
	534		68' N A line 25 ⁰ Cont 2	624	-	135.0	16.9	115.5	220	13.7	"	116.5	99	" "
	535		90' off Wall 45 ⁰ Cont 2	620	-	142.5	14.8	124.1	261	9.8	"	127.3	98	" "
	536		95' off Wall 90 ⁰ Cont 2	615	-	138.2	15.1	120.1	"	"	"	"	94	" "
	537		85' off Wall	610	-	139.5	14.9	121.4	"	"	"	"	95	" "

SB 01452

UST N-96

10. PREPARE

Signature: *[Handwritten Signature]*

DATE 11-19-75

RESPONSIBLE ENGINEER

[Handwritten Signature]

[Handwritten Initials]



COMPACTED FILL DENSITY TEST REPORT

QC ACCEPTANCE	DATE
CHECKED BY	FILE NO.

1. PROJECT NO. 7220

2. DATE 11-20-75

3. SPEC. NO. 7220-C-208

5. DRAWING NO. AREA: Plant Area

6. TESTED WEEK OF

DATE TAKEN	TEST NO. MD	TESTED BY	LOCATION	ELEV. OF TEST	DEPTH BELOW FINAL GRADE (FT.)	IN PLACE WET DENSITY (LB./C.F.)	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (LB./C.F.)	SOIL CLASSIFICATION			MAX. LAB. DRY DENSITY (LB./C.F.)	PERCENT COMPACTION	REMARKS
									BMP	OMC	ZONE			
19-75	538	PW	45° Cont 2 82' off Wall	616	-	141.0	9.6	128.6	260	10.6	2	129.8	99	Pass
	539		45° Cont 2 97' off Wall	615	-	137.5	11.9	122.9	261	9.8	"	127.3	97	Fail Moisture
	540		55° Cont 2 77' off Wall	613	-	138.7	10.5	125.5	260	10.6	"	129.8	97	Pass
	541		107° Cont 2 92' off Wall	610	-	142.5	10.7	128.8	"	"	"	"	99	Pass

SB 01453

IST N-108

PREPARED BY [signature] DATE 11-21-75

RESPONSIBLE ENGINEER [signature]

QUALITY ACTION REQUEST

From:	G. L. Richardson	Site QA	Job 7220	(1)
To:	J. F. Newgen/ P. Connolly	(2) Control Document #	(3) QAR Invt. No.	(4)
		7220-C-210	CD-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 13.5 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. 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:	<i>G. L. Richardson</i>	(6) Date:	7/22/77	(7) Reply Requested by:
				1) 7/25/77 2) 8/19/77
Reply:	(9)			
<div style="font-size: 2em; font-weight: bold; margin-bottom: 10px;">RECEIVED</div> <div style="font-size: 1.2em; margin-bottom: 10px;">JUL 22 1977</div> <div style="font-size: 1.1em; margin-bottom: 10px;">QUALITY CONTROL</div> <div style="font-size: 1.1em; margin-bottom: 10px;">SECTEL JOB 7220</div> <div style="font-size: 1.1em; margin-bottom: 10px;"><i>dp</i></div>		ROUTE		
		A. P. G. C. E.		
		ELECT.		
		PIPING		
		MECH.		
WELDING				
RECEIVING				
ASST.				
DATE				
Signature:		(10) Date:		
Action Verified:		(12) Date:	SB 01454	

WHITE - Return to sender
840 20R77
0107144

CANARY

PINK -- Sender's file

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.

SB 01455

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

Copies to

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

At Midland, MI

Est

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.

JFN/JSPD/cb
Attachment

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

J. F. Newgen
J. F. Newgen

SB 01456

RECEIVED
AUG 19 1977
BECHTEL POWER CORP.
JOB 7220

Inter-office Memorandum

DEBC-1859
 To J. F. Newgen
 Subject Midland Plant Units 1 & 2
 Job 7220
 Quality Action Report
 QAR No. SD-40
 Copies to File: 0274, C-0467.1
 S. Afifi
 J. Klacking

Date September 30, 1977
 From R. L. Castleberry
 Of Engineering
 At Ann Arbor

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 achieved. 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.

R. L. Castleberry
 R. L. Castleberry

SR/bkp
 9/30/75

QA ROUTE	INFO.	ACT.
LOAN		
CIVIL (V)		
CIVIL (W)		
MACH		
PAVING		
ELECT.		
INSTR.		
GENY		
FILE NO.	0220	

SB 01457

? get
 telegram



Telephone call

CC: ~~XXXXXX~~ S. Rao
 W. Barclay
 G. Richardson
 A. Boos
 F. Teague
 File

BY J. G. Hook OF QA - Site

TO S. Rao OI AAO

DATE October 10, 77 TIME 1:40

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.
LOME		
CIVIL (1)		
CIVIL (2)		
MECH		
WING		
ELECT.		
INSTR.		
SECY		
FILE NO.	w/ C-2-504	

SB 01458



Telephone call

BY	J. G. Hook	or	Site - QA	CC:	S. Rao
TO	S. Rao	or	AAO	XXXX	W. Barclay
DATE	October 13,		1977		G. Richardson
					A. Ecos
					F. Teague
					T. Lieb
SUBJECT	Moisture Requirements for Backfill Ref: QAR SD-40				J. Speltz - UST
					File
				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.

J. G. Hook

QA	ENG	ACT
ROUTE		
DATE		
BY		
REVIEWED		
DATE		
BY		
DATE		
BY		
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BY		
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BY		
DATE		

Handwritten initials and signatures are present in the table cells.

SB 01459



Corrected Copy

NONCONFORMANCE REPORT

2-2778
5-885-201

1. PROJECT NAME Midland		JOB NO. 7220		19. NO. 1005	20. PAGE 1 OF 2																				
2. UNIT(S) Common	3. DRAWING/PART NO. N/A	REV N/A	4. ITEM DESCRIPTION Soil	5. ITEM LOCATION Plant Area																					
6. P.O. OR SPEC NO. N/A	7. SERIAL NO. N/A	8. REPLACEMENT PART P/N - N/A - REV. N/A - SER NO. - N/A		9. SOURCE Construction	10. CONTRACTOR/SUPPLIER N/A																				
11. INSPECTION CRITERIA () DWG (X) SPEC () OTHER		IR NO. NO. C-210, R.5	12. ASME AUTHORIZED INSPECTION RECD () YES (X) NO	13. SKETCH ATTACHED () YES (X) NO	14. Discovered During () Rec'g (X) Const () Test	15. Equip Furnished By () Client (X) N/A () FLD																			
16. NONCONFORMING CONDITION: Specification C-210 Rev. 5, Section 12.6.1 states in part.... "That the moisture content is to be within +2% of the optimum moisture content." Contrary to the above, the following moisture tests are failing without retests taken:				24. DISPOSITION CONCURRENCE																					
				<table border="1"> <tr> <td>rework</td> <td>reject</td> <td>repair</td> <td>use as is</td> </tr> <tr> <td></td> <td></td> <td>10/27/77</td> <td>10/27/77</td> </tr> <tr> <td colspan="3">PROJECT FIELD ENGINEER</td> <td>DATE</td> </tr> <tr> <td colspan="3">PROJECT ENGINEER</td> <td>DATE</td> </tr> <tr> <td colspan="3">PROJ CONSTR. CL. ENGINEER</td> <td>DATE</td> </tr> </table>		rework	reject	repair	use as is			10/27/77	10/27/77	PROJECT FIELD ENGINEER			DATE	PROJECT ENGINEER			DATE	PROJ CONSTR. CL. ENGINEER			DATE
rework	reject	repair	use as is																						
		10/27/77	10/27/77																						
PROJECT FIELD ENGINEER			DATE																						
PROJECT ENGINEER			DATE																						
PROJ CONSTR. CL. ENGINEER			DATE																						
(CONTINUED ON PAGE 2)																									
17. REPORTED BY <i>D.K. Oslan</i>		DATE 10/26/77	QUALIFIED BY <i>R. Barclay</i>	DATE 11-14-77	25. DISPOSITION RESULTS																				
21. ROUTING: (X) TO FIELD ENGINEERING () TO OTHERS (SPECIFY)																									
22. (X) Field Engineering Disposition () Field Engineering Recommended Disposition to Project Engineering		SEE PAGE 3																							
SPEC. C-210, SEC. 12.8.2 - ADDITIONAL ROLLING STATES IN PART ... WHERE MOISTURE CONTENT AT TIME OF ROLLING IS IMPROPER, SUCH ROLLING SHALL BE AT THE EXPENSE OF THE SUB CONTRACTOR. THE FACT THAT PROPER COMPACTION WAS ACHIEVED IS EVIDENCE THAT ADDITIONAL ROLLING WAS PERFORMED (CONT)																									
23. PROJECT ENGINEERING DISPOSITION Project Engineering has previously responded to the condition in which acceptable dry density test has been obtained with moisture content out of the specified limits. This information is found in BEC-1859 & 1998; and need not be further addressed. There ^{FCU} Project Engineering concurs with Field Engineering's disposition. For the material represented by test No. MD-360, Project Engineering has evaluated adjacent tests results in the same general area and subsequent lifts results all of which are acceptable. In addition the location of test MD-360 lies in																									
				26. AUTHORIZED INSPECTOR <i>D.K. Oslan</i>	DATE 3/23/78																				
				AUTHORIZED INSPECTOR SR 01460	DATE																				

(Contd. on page 3)



BLOCK #16 CONTINUED:

NONCONFORMANCE REPORT (CONT'D)

PAGE 2

OF

2

19NCR NO 1005

AREA	ELEV.	DATE OF TEST	DENSITY TEST NO.	PERCENT COMPACTION	MOISTURE CONTENT	OPTIMUM MOISTURE CONTENT
West Plant Dike						
7 + 00 37' L Center Line	622'	10/6/75	MD-227	99%	10.2	8.1
North Plant Dike						
1 + 00 40' R Center Line	625'	5/30/74	MD-142	95.2%	10.3	8.0
North Plant Dike						
3 + 00 40' R Center Line	625'	5/30/74	MD-143	95.7%	11.4	13.8
Plant Area						
183' S of S. Wall -- SWI						
53' W of "A" Line -- SWI	613.5'	5/10/77	MD-1326	96.3%	18.5	15.2
Plant Area						
183' S of S. Wall -- SWI						
53' W of "A" Line -- SWI	613.5'	5/10/77	MD-1328	103.3%	12.2	15.2
Plant Area						
30' East of 12.0						
90' South of Q	622'	6/7/77	MD-1412	106.4%	10.4	15.2
North Plant Dike						
1 + 25 100' L Center Line	626'	7/16/74	MD-290	96.3%	11.7	9.5
North Plant Dike						
3 + 50 130' L Center Line	630.5	7/16/74	MD-377	95.4%	19.7	15.2
North Plant Dike 0 + 00 100' L Center Line	629'	7/31/74	MD-360	86.4%	20.6	15.2

Hold for Engineering Disposition. No Hold Tags Applied. "Q"-List #1.002.

Block 22 CONT.

AS REQUIRED BY SPECIFICATION, OR THAT THE SPECIFIED ROUTING WAS
ADEQUATE. *John*

John
10/21/77

SB 01461



BLOCK 22 CONTINUED:

Spec. (210), Section 12.1 states in part that the water content during compaction shall not be more than 2 percentage points below or above optimum moisture content. The tests listed in this NCR were taken after proper compaction was achieved. This test procedure was accepted for the tests listed in this NCR by Project Engineering in letter #BEBC-1859. (copy attached) The Project Engineering Acceptance, clearly addresses the fact that tests taken after compaction may have a different moisture than the moisture during compaction. As there are no specified restrictions on in place soil moisture content, after compaction, this condition is not unacceptable or indeterminate. No NCR is therefore required.

Jul 6/92 10/20/77

BLOCK 22 CONTINUED

THE ABOVE DISPOSITION APPLIES TO ALL ITEMS WITH MOISTURE CONTENT ABOVE OR BELOW 2% OF OPTIMUM MOISTURE. THE FACT THAT THESE ARE NOT NONCONFORMING CONDITIONS IS FURTHER SUPPORTED BY PROJECT ENGINEERING LETTER #BEBC-1998

FOR THE TEST TAKEN AT NORTH PLANT DIRT STATION 0T80 WITH NONCONFORMING COMPACTION, ROUTE TO PROJECT ENG. FOR DISPOSITION.

Jul 6/92 1/13/78
J.P. Kelly 1/18/78

Block # 23 Project Engineering Disposition (Contd, from page 1):
an area away from Q-listed limits per dwg. C-45.

Since adjacent tests to MD-360 indicates acceptable density and there are no safety implications due to the location of test MD-360, Project Engineering concludes that the soil represented by test MD-360 be "used as is" with no additional testing.

J.P. Kelly 2-27-78
EPH 2-27-78
Rao 2/27/78
J. ... 2-27-78

Bechtel Associates Professional Corporation

Inter-office Memorandum

BEBC-1839

To J. F. Newgen
Subject Midland Plant Units 1 & 2
Job 7220
Quality Action Report
QAR No. SD-40
Copies to File: 0274, C-0467.1

Date September 30, 1977
From R. L. Castleberry
Of Engineering
At Ann Arbor

RECEIVED

OCT 05 1977

BECHTEL POWER CORP.
JOB 7220

PER _____

S. Afifi
J. Klacking

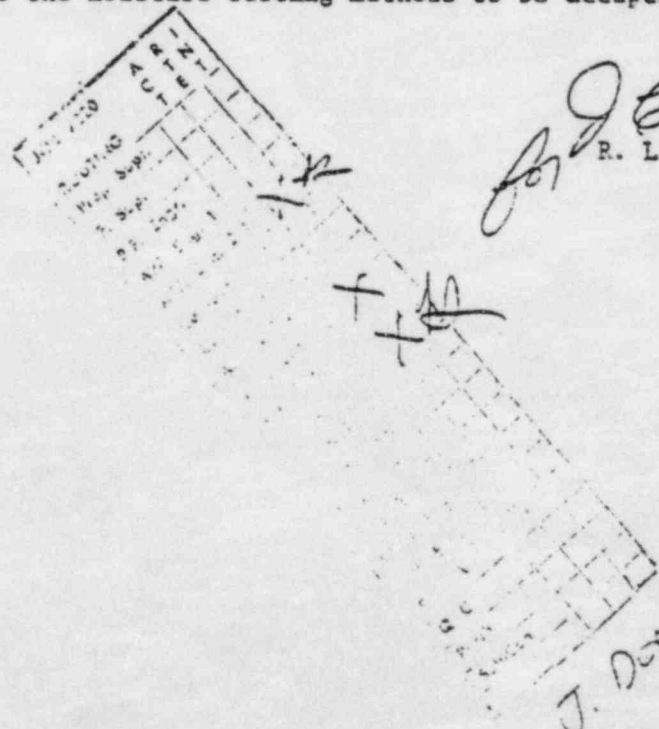
Reference: 1) BCBE-1533 dated 8/15/77

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 achieved. 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.

SR/bkp
9/30/5



R. L. Castleberry
R. L. Castleberry

J. Deane

SB 01463

RECEIVED
OCT 05 1977

Bechtel Associates Professional Corporation

Inter-office Memorandum

TELECOPY

BERC- 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
Copies to	File: Q274, C-210, C-208	Of	Engineering
	S. Afifi	At	Ann Arbor

Reference: 1. BCDE-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. L. Castleberry
R. L. Castleberry

CAT/sg
12/15/77

SB 01464

Bechtel Power Corporation

Interoffice Memorandum

To: R. L. Castleberry

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% tolerance 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
J. F. Newgen

JFN/FGT/jae

RECEIVED
NOV 21 1977
BECHTEL POWER CORP.
MIDLAND, MI 48850
[Handwritten Signature]

CA
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...
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SB 01465

BEPC- 1998

To: J. F. Newsum
From: Midland Plant Units 1 & 2
Job 7220
Moisture Requirements for
Backfill
Concern: File: 0274, C-210, C-208.

Date: December 15, 1977
From: R. L. Castleberry
Of: Engineering
At: Ann Arbor

RECEIVED
DEC 15 1977
GENERAL ASSOCIATES PROFESSIONAL CORPORATION

S. AILFI

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.

R. L. Castleberry
R. L. Castleberry

627/33
12/15/77

Bechtel Power Corporation

Interoffice Memorandum

To: G. Richardson
Subject: Job 7220 Midland Project
Moisture Requirements for
Backfill - QAR SD-40
O-1631

Date: December 21, 1977
From: J. F. Newgen
Of: Construction
At: Midland, MI Ext.

Copies to

- 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
J. F. Newgen

JFN/FGT/jae

QA ROUTE	INFO.	ACT.
LOAE	✓	
CIVIL (1)	<i>JFN</i>	
CIVIL (2)		
MECH		
PIPING		
ELECT.	<i>JFN</i>	
INST.		
SECY		
FILE NO.	<i>Q220</i>	

SEARCHED
INDEXED
SERIALIZED
FILED
DEC 21 1977
MIDLAND, MI
DO I-77-184

SB 01467

BECHTEL

Telephone call

FROM: G. Coaster
 TO: S. Rao
 DATE: April 7 78 TIME: 2:30 PM
 SUBJECT: Moisture Content of Soils (Clay)
 JOB NO: 7220

BY: John Dean / Darple Osborn, F.E / O.C.
 BY: S. Rao, Proj. Eng.
 BY: J. Betts
 BY: B. Check
 BY: B. Siple

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 ($\pm 2\%$). 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 superintendent change of soils is notified and corrective actions taken to adjust moisture (i.e. disk or wetting down). Passing compaction is obtained - but with failing moistures outside of the $\pm 2\%$ range.

RAO

The above two situations are acceptable as is.



QUALITY CONTROL CORRECTIVE ACTION REPORT

DATE: 4/14/76
PROJECT: 410

1. PROJECT: 410
JOB NO: 7200

4. DESCRIPTION OF QC ERROR
Volume of water test tubes is excessive leading to contamination of material

5. QC PERSONNEL INVOLVED
D. Oshiro

6. PROBABLE CAUSE
Change in graduation of material resulted in excessive material and a change in test tube volume when change was not in the 2 tubes used in QC

7. IMMEDIATE CORRECTIVE ACTION TAKEN TO CORRECT QC ERROR
Letter sent to USF detailing the problem on 4-15-76

8. PROPOSED CORRECTIVE ACTION TO PREVENT RECURRENCE
See 7 above -
QC personnel involved instructed to check volume of test tubes regarding vol. of test tube when using 2 tubes reports

9. SCHEDULED COMPLETION DATE
9/1/76

10. PREPARED BY: [Signature]
11. REVIEWED BY: [Signature]

12. HQ COMMENTS

13. ACTUAL COMPLETION DATE

14. CONFIRMED BY: [Signature]

SPC 70813
G1001607-01

QC-36



QUALITY CONTROL CORRECTIVE ACTION REPORT

1. PROJECT		DATE
Midland	7220	2/16/77
2. DESCRIPTION OF QUALITY CONTROL		3. CONTROL NUMBER
Inadequate knowledge of U.S. Testing QA Manual.		CPCo QF-142

4. IDENTIFICATION OF PERSONNEL INVOLVED

Tom Lieb

5. PROBABLE CAUSE

The statement concerning out-of-calibration equipment was in the wrong section of U.S. Testing QA Manual.

7. IMMEDIATE CORRECTIVE ACTION TAKEN TO CORRECT THE ERROR

U.S. Testing was directed to revise their manual on February 17, 1977.

8. PROPOSED CORRECTIVE ACTION TO PREVENT RE-OCURRENCE

Further indoctrination concerning U.S. Testing's QA Manual was performed on February 2, 1977.

9. ESTIMATED COMPLETION DATE: 2/16/77

10. PREPARED BY: *[Signature]*

11. REVIEWED BY: *[Signature]*

12. OTHER COMMENTS:

13. ACTUAL COMPLETION DATE: 2-18-77

14. CHECKED BY: *[Signature]*

NFC 21815
G1001097-01

SB 01470

C/QC-37



QUALITY CONTROL CORRECTIVE ACTION REPORT

DATE
2/24/77
PROJECT NO.
CPCo QF-150

1. PROJECT
Midland 7220

4. DESCRIPTION OF DEFECT
The assigned QCE covering the soils operations did not sign-in and sign-out the applicable Inspection Records.

5. QC PERSONNEL INVOLVED
Daryle Osborn

6. PROBABLE CAUSE
The quantities of soil being placed was minimal due to the slowness of winter soils operations.

7. IMMEDIATE CORRECTIVE ACTION TAKEN TO CORRECT DEFECT
The assigned QCE was directed to sign-in and sign-out the IR's during all the surveillance activities of the soils operations.

8. PROPOSED CORRECTIVE ACTION TO PREVENT RE-CURRENCE
Same as immediate corrective action.

9. SCHEDULED COMPLETION DATE
2/24/77

10. PREPARED BY
D.Osborn

11. REVIEWED BY (TITLE)
J-94-77 J. Kinnally

12. PQC COMMENTS
Required inspections were performed. The discrepancy was that the QCE did not have the IR with him when the work was performed.

13. ACTUAL COMPLETION DATE
3-25-77

14. COMPLETED BY
J. Kinnally

BP 20115
G100107-01

SB 01471



QUALITY CONTROL CORRECTIVE ACTION REPORT

DATE 11/1/77

PROJECT Midland JOB NO 7220 NCR NO 1006

DESCRIPTION OF DEFECT: Accepting structural backfill gradation tests when over 200 grams of material was retained on one sieve.

QC PERSONNEL INVOLVED: Tom Lieb, Mel Hymas and Ken Krug

PROBABLE CAUSE: Improper review of test reports.

QC-CB

IMMEDIATE CORRECTIVE ACTION TAKEN TO CORRECT QC ERROR: NCR written.

PROPOSED CORRECTIVE ACTION TO PREVENT RECURRENTLY: A training session was held 10/19/77 to the requirements of ASTM C-136-71 Sieve Analysis and the responsible QCE's were instructed to review the test reports more thoroughly.

SCHEDULED COMPLETION DATE 11/1/77 PREPARED BY [Signature]

REVIEWED BY [Signature]

QC COMMENTS

ACTUAL COMPLETION DATE 11-1-77 CONFIRMED BY [Signature]

SFP 20816 G 1001607.01

7220 FORM QC G-324



QUALITY CONTROL CORRECTIVE ACTION REPORT

11/21/77

Midland Units 1 & 2

7220

OF-199

Failing soils tests not cleared by retest.

D. L. Osborn

Improper review of test reports to identify failing tests in a timely manner.

CR 64

NCR's No. 1004, 1005 and 1006 written.

As of June, 1977 a failing test log has been implemented to document and control all failing soils tests.

11/21/77

H. D. Foster 12-16-77
By Check 11/21/77

H. D. Foster 12-16-77

SB 01473