

REPORT ON SUITABILITY OF THE
DRAINAGE ZONE MATERIAL
PROPOSED EVAPORATION POND
EMBANKMENT
MORTON RANCH PROJECT
NEAR CASPER, WYOMING
FOR UNC MINING AND MILLING
SERVICES, INC.

DAMES & MOORE Job No. 02675-020-06
Salt Lake City, Utah
July 9, 1980

B011180

543

July 8, 1980

UNC Mining and Milling Services, Inc.
Post Office Box 2996
Casper, Wyoming 82602

Attention: Mr. Tom Hiscox

Gentlemen:

Report on Suitability of the
Drainage Zone Material
Proposed Evaporation Pond Embankment
Morton Ranch Project
Near Casper, Wyoming
For UNC Mining and Milling
Services, Inc.

INTRODUCTION

This report presents our evaluations regarding the suitability of the drainage zone material currently being utilized for the construction of the above referenced evaporation pond embankment. In general, the material being encountered in the designated borrow areas is slightly finer grained than originally recommended in the design specifications, and a laboratory testing program was initiated to evaluate its permeability characteristics.

The results of these tests were previously discussed with Dr. Steven R. Abt, representing the Nuclear Regulatory Commission.

BACKGROUND INFORMATION

The original design report for the proposed embankment was dated October 31, 1977*. The embankment design presented in this report recommended a central clay core with an associated central chimney drain and a blanket drain underlying the downstream shell. The core and drain material were to be excavated from adjacent open-pit borrow areas. Laboratory tests performed on representative samples of the materials indicated that, when compacted to recommended specifications, the embankment core and drain would have design permeabilities of .01 and 1,000 feet per year, respectively.

During current excavation operations within the designated borrow areas, the sand drain material was running slightly finer grained than originally specified. The contract specifications** required that the drainage material should have no more than 8 percent by weight passing the No. 200 sieve. These specifications were developed during the design phase of the project for a potential borrow source situated to the north of the impoundment area. However, at the time of construction this borrow source was not available to the contractor and an alternative borrow pit had to be utilized. In general, the material excavated from this pit area has been averaging approximately 10 to 11 percent by weight passing the No. 200 sieve. The following laboratory testing program was initiated to determine the permeability characteristics of the material and to check its suitability for use as a drainage material.

*"Report of Investigation and Design, Tailings Disposal Area, Morton Ranch Mine and Mill, Converse County, Wyoming, For United Nuclear Corporation."

**"Contract Specifications and Drawings For Evaporation Pond and Embankment Near Casper, Wyoming For United Nuclear Corporation, Morton Ranch Uranium Mine," prepared by Dames & Moore, December, 1978.

LABORATORY TESTING PROGRAM

GENERAL

The laboratory testing program was performed on a representative sample of the borrow material. The sample tested contained a higher percentage of minus No. 200 fines than the general material currently being utilized for the construction of the drain. The testing program consisted of a gradation test, a compaction test, and a series of percolation tests.

GRADATION TEST

For comparative purposes a gradation test was performed on the sample of drain material. The test was performed in accordance with the ASTM test standards. The results of the gradation test and the previously recommended design specifications are presented in tabular form below.

GRADATION TEST RESULTS

<u>U.S. Standard Sieve Size</u>	<u>Percent by Weight Passing</u>	<u>Previously Recommended Design Specifications</u>
3"	100	100
No. 4	83	50 - 100
No. 16	65	15 - 100
No. 30	48	0 - 85
No. 50	22	0 - 60
No. 200	12	0 - 8

COMPACTION TEST

A compaction test was performed on the drain material. The test was performed in accordance with the general procedures shown on Plate 1, Method of Performing Compaction Tests. The results of the test are presented graphically on Plate 2, Compaction Test Data.

PERCOLATION TESTS

A series of falling head percolation tests was performed on recompacted samples of the sand drain material to determine representative permeability rates. The samples were recompacted to approximately 90 percent of the maximum density as determined by the ASTM-1557-D, Method of Compaction. The tests were performed in accordance with the procedure shown on Plate 3, Method of Performing Percolation Tests. The results of the tests are tabulated below.

<u>Sample Density</u> (pcf)	<u>Confining Pressure</u> (psf)	<u>Permeability</u> (ft/year)
108	6,000	2,360
109	4,000	2,480
109	4,000	2,600
109	2,000	530
109	2,000	2,450
109	2,000	560
109	500	1,000

CONCLUSIONS

Based on the results of the current series of laboratory tests, it is our opinion that the performance of the drainage zone will not be affected by the slightly higher fines content. The laboratory tests indicate that the permeability characteristics of the drainage material are generally consistent with the values assumed during the initial design report. The permeability rates for the tested samples range from 500 to 2,000 feet per year which compares with the design value of 1,000 feet per year. It should be noted that the sample tested was slightly finer grained than the material generally being used for construction of the drain. Therefore, we feel that the recorded permeabilities, represent the minimum anticipated rates.

Due to the relatively low permeability of the core zone (.01 feet per year), it is our opinion that any slight reduction in the permeability of the drainage material would not significantly affect the overall performance of the zone. During the original design study it was estimated that a seepage rate of 2×10^{-5} gallons per minute per lineal foot would pass through the core at the deepest embankment section. Utilizing Darcy's Law and considering the lowest permeability value obtained from the series of laboratory tests (500 ft/year), the drainage zone will be capable of flow rates on the order of 7×10^{-4} gallons per minute per lineal foot. This value is more than one order of magnitude greater than the maximum rate anticipated.

It is our recommendation that for future construction the specified gradation requirements for the drainage zone material be amended as follows:

UNC Mining and Milling Services, Inc.
July 8, 1980
Page -6-

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
3 "	100
No. 4	50 - 100
No. 16	15 - 100
No. 30	0 - 85
No. 50	0 - 60
No. 200	0 - 12

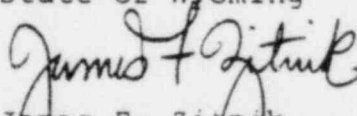
oOo

If you have any questions regarding the information presented herein or require additional information, please feel free to contact us.

Yours very truly,

DAMES & MOORE

Larry T. Murdock
Project Manager
Professional Engineer No. 2852
State of Wyoming


James F. Zitnik
Project Engineer

LTM:JFZ:11

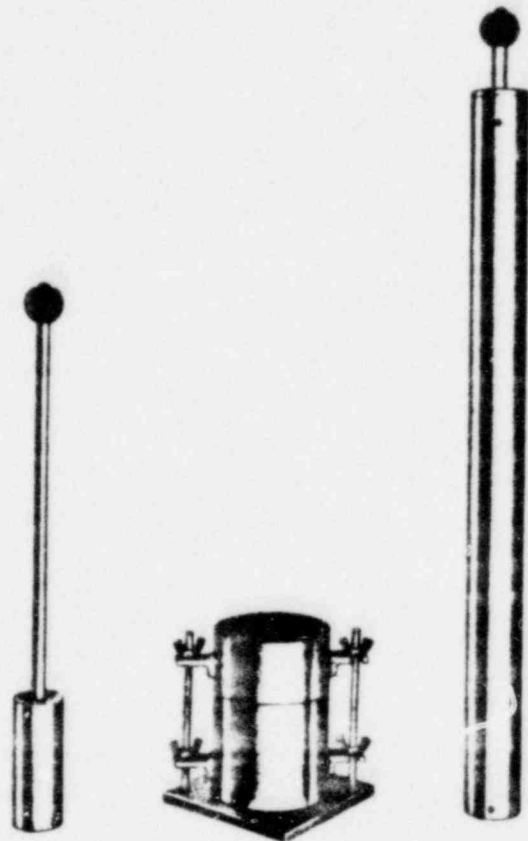
cc: Steve Abt

IT HAS BEEN ESTABLISHED THAT WHEN COMPACTING EFFORT IS HELD CONSTANT, THE DENSITY OF A ROLLED EARTH FILL INCREASES WITH ADDED MOISTURE UNTIL A MAXIMUM DRY DENSITY IS OBTAINED AT A MOISTURE CONTENT TERMED THE "OPTIMUM MOISTURE CONTENT," AFTER WHICH THE DRY DENSITY DECREASES. THE COMPACTION CURVE SHOWING THE RELATIONSHIP BETWEEN DENSITY AND MOISTURE CONTENT FOR A SPECIFIC COMPACTING EFFORT IS DETERMINED BY EXPERIMENTAL METHODS. TWO COMMONLY USED METHODS ARE DESCRIBED IN THE FOLLOWING PARAGRAPHS.

FOR THE "STANDARD A.A.S.H.T.O." (A.S.T.M. D698-58T & A.A.S.H.T.O. T99-57) METHOD OF COMPACTION A PORTION OF THE SOIL SAMPLE PASSING THE NO. 4 SIEVE IS COMPACTED AT A SPECIFIC MOISTURE CONTENT IN THREE EQUAL LAYERS IN A STANDARD COMPACTION CYLINDER HAVING A VOLUME OF 1/30 CUBIC FOOT, USING TWENTY-FIVE 12-INCH BLOWS OF A STANDARD 5-1/2 POUND RAMMER TO COMPACT EACH LAYER.

IN THE "MODIFIED A.A.S.H.T.O." (A.S.T.M. D-1557-58T & A.A.S.H.T.O. T180-57) METHOD OF COMPACTION A PORTION OF THE SOIL SAMPLE PASSING THE NO. 4 SIEVE IS COMPACTED AT A SPECIFIC MOISTURE CONTENT IN FIVE EQUAL LAYERS IN A STANDARD COMPACTION CYLINDER HAVING A VOLUME OF 1/30 CUBIC FOOT, USING TWENTY-FIVE 18-INCH BLOWS OF A 10-POUND RAMMER TO COMPACT EACH LAYER. SEVERAL VARIATIONS OF THESE COMPACTION TESTING METHODS ARE OFTEN USED AND THESE ARE DESCRIBED IN A.A.S.H.T.O. & A.S.T.M. SPECIFICATIONS.

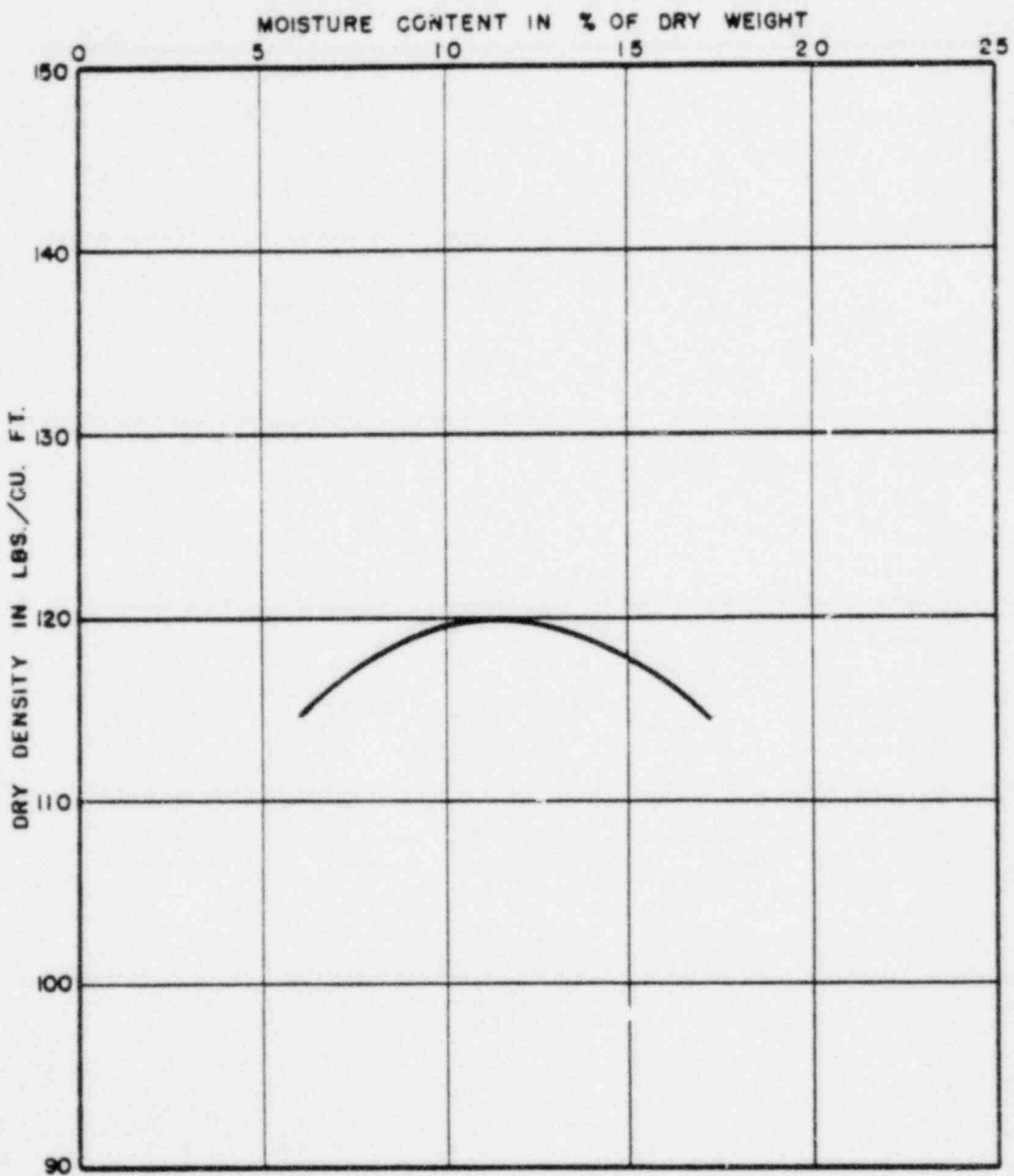
FOR BOTH METHODS, THE WET DENSITY OF THE COMPACTED SAMPLE IS DETERMINED BY WEIGHING THE KNOWN VOLUME OF SOIL; THE MOISTURE CONTENT, BY MEASURING THE LOSS OF WEIGHT OF A PORTION OF THE SAMPLE WHEN OVEN DRIED; AND THE DRY DENSITY, BY COMPUTING IT FROM THE WET DENSITY AND MOISTURE CONTENT. A SERIES OF SUCH COMPACTIONS IS PERFORMED AT INCREASING MOISTURE CONTENTS UNTIL A SUFFICIENT NUMBER OF POINTS DEFINING THE MOISTURE-DENSITY RELATIONSHIP HAVE BEEN OBTAINED TO PERMIT THE PLOTTING OF THE COMPACTION CURVE. THE MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT FOR THE PARTICULAR COMPACTING EFFORT ARE DETERMINED FROM THE COMPACTION CURVE.



SOME APPARATUS FOR PERFORMING COMPACTION TESTS
Shows, from left to right, 5-1/2 pound rammer (sleeve controlling 12" height of drop removed), 10 cubic-foot cylinder with removable collar and base plate, and 10 pound rammer within sleeve.

METHOD OF PERFORMING COMPACTION TESTS (STANDARD AND MODIFIED A.A.S.H.T.O. METHODS)

SOIL SAND DRAINAGE MATERIAL
LOCATION BORROW AREA 1802
OPTIMUM MOISTURE CONTENT 11.0 PERCENT
MAXIMUM DRY DENSITY 120.0 POUNDS PER CUBIC FOOT
METHOD OF COMPACTION AASHTO - T180



COMPACTION TEST DATA

DAMES & MOORE

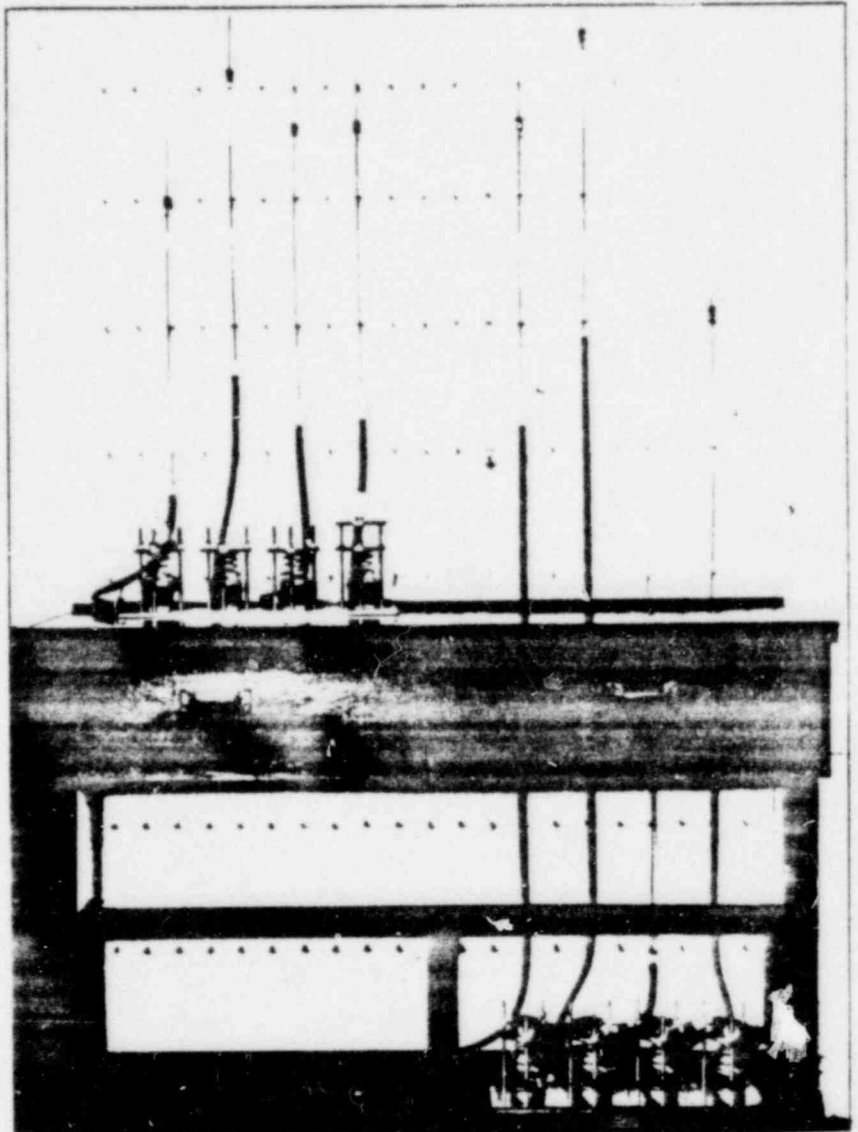
CHECKED BY _____ DATE _____
DATE _____
DATE _____

The quantity and the velocity of flow of water which will escape through an earth structure or percolate through soil are dependent upon the permeability of the earth structure or soil. The permeability of soil has often been calculated by empirical formulas but is best determined by laboratory tests, especially in the case of compacted soils.

A one-inch length of the core sample is sealed in the percolation apparatus, placed under a confining load, or surcharge pressure, and subjected to the pressure of a known head of water. The percolation rate is computed from the measurements of the volume of water which flows through the sample in a series of time intervals. These rates are usually expressed as the velocity of flow in feet per year under a hydraulic gradient of one and at

a temperature of 20 degrees Centigrade. The rate so expressed may be adjusted for any set of conditions involving the same soil by employing established physical laws. Generally, the percolation rate varies over a wide range at the beginning of the test and gradually approaches equilibrium as the test progresses.

During the performance of the test, continuous readings of the deflection of the sample are taken by means of micrometer dial gauges. The amount of compression or expansion, expressed as a percentage of the original length of the sample, is a valuable indication of the compression of the soil which will occur under the action of load or the expansion of the soil as saturation takes place.



APPARATUS FOR PERFORMING PERCOLATIONS TESTS
Shows tests in progress on eight samples simultaneously.

METHOD OF PERFORMING PERCOLATION TESTS

SUMMARY OF GRADATION TEST RESULTS

ZONE 1

PERCENT PASSING BY WEIGHT

<u>Test Date</u>	<u>Location of Test</u>	<u>U.S. Standard Sieve No.</u>		
		<u>No. 8</u>	<u>No. 30</u>	<u>No. 200</u>
<u>SPECIFICATION</u>	- - -	100	80-100	50-100
4-15-80	Pit 1802	100	99	92.9
4-15-80	Pit 1802	100	98	85.6
4-17-80	Pit 1802	100	98	86.2
4-23-80	Sta. 20+00	100	97	80.9
4-29-80	Sta. 20+00 (5168)	100	96	50.3
4-30-80	Sta. 21+00 (5168)	100	74	29.9*
5-01-80	Sta. 22+25 (5168)	100	98	86.1
5-01-80	Sta. 22-25 (5168)	100	99	81.5
5-02-80	Sta. 22+25 (5169)	100	97	77.0
5-05-80	Sta. 21+00 (5172)	100	98	83.4
5-06-80	Sta. 19+00 (5172)	100	98	80.6
5-07-80	Sta. 22+00 (5171)	100	95	72.1
5-08-80	Sta. 21+50	100	97	76.2
5-09-80	Sta. 17+50	100	97	69.3
5-19-80	Sta. 19+00 (5176)	100	97	90.4
5-20-80	Sta. 22+00 (5179)	100	97	92.3
5-27-80	Sta. 20+00 (5183)	100	100	97.0
5-29-80	Sta. 19+00 (5186)	100	100	87.0
6-03-80	Sta. 21+50 (5187)	100	96	80.1
6-10-80	Sta. 20+00 (5189)	100	94	84.2
6-12-80	Sta. 21+50 (5190)	99	98	82.0
6-17-80	Sta. 23+00 (5193)	100	96	83.0
6-24-80	Sta. 23+25 (5198)	100	98	93.0
6-24-80	Pit 1802	100	96	82.3
7-01-80	855,475N 421,104E (5195)	100	96	74.0

*Rejected by technician and failing material removed

SIEVE ANALYSIS

ZONE 2

PERCENT PASSING BY WEIGHT

<u>Test No.</u>	<u>Test Date</u>	<u>Location of Test</u>	<u>U.S. Standard Sieve No.</u>			
			<u>3"</u>	<u>No. 20</u>	<u>No. 50</u>	<u>No. 200</u>
		<u>SPECIFICATION - - -</u>	100	50-100	30-85	15-50
1	4-16-80	855,300N 422,200E	100	89	67	27.4
2	4-17-80	855,298N 422,516E	100	85	63	31.9
3	4-17-80	855,322N 422,210E	100	89	66	21.3
4	4-21-80	855,205N 422,400E	100	77	57	28.0
5	4-22-80	855,206N 421,381E	100	90	70	33.5

SIEVE ANALYSIS

ZONE 3

PERCENT PASSING BY WEIGHT

Test Date	Location of Test	<u>U.S. Standard Sieve No.</u>					
		<u>3"</u>	<u>No. 4</u>	<u>No. 16</u>	<u>No. 30</u>	<u>No. 50</u>	<u>No. 200</u>
	<u>SPECIFICATION - - -</u>	100	50-100	15-100	0-85	0-60	0-8
4-21-80	Pit 1802	100	96	82	52	28	8.7
4-21-80	Pit 1802	100	96	86	65	37	7.0
4-23-80	855,105N 422,431E	100	100	81	57	33	6.4
4-25-80	855,306N 422,331E (5192)	100	95	79	47	20	4.0
4-25-80	855,256N 422,531E	100	98	86	65	44	19.0*
4-28-80	855,156N 422,331E	100	97	83	57	31	8.9
5-02-80	Pit 1802	100	100	97	95	91	32.5**
5-08-80	Pit 1802	100	90	71	47	24	2.0
5-22-80	Pit 1802	100	100	96	81	41	7.0
6-04-80	Pit 1802	100	99	94	82	43	4.5
6-09-80	855,809N 420,534E (5212)	100	83	65	48	30	12.4
6-10-80	855,729N 421,455E (5192)	100	100	95	78	42	8.6
6-11-80	855,895N 420,914E (5195)	100	100	92	76	52	15.6
6-13-80	855,569N 422,184E (5186)	100	100	89	73	46	9.9
6-16-80	855,406N 422,431E (5191)	100	90	80	64	35	6.8
6-18-80	855,695N 420,894E (5207)	100	100	90	80	53	12.9
6-18-80	855,795N 420,994E	100	100	86	60	42	9.1
6-20-80	855,865N 420,906E (5198)	100	94	92	76	49	17.0
6-20-80	Pit 1802	100	100	90	69	32	8.5

*Rejected by technician

**Rejected in pit - used as zone 5 fill

SIEVE ANALYSIS

ZONE 4

PERCENT PASSING BY WEIGHT

		<u>U.S. Standard Sieve No.</u>				
		<u>3"</u>	<u>No. 4</u>	<u>No.16</u>	<u>No. 50</u>	<u>No. 200</u>
	<u>SPECIFICATION - - -</u>	100	30-100	15-100	0-85	0-50
<u>Test Date</u>	<u>Location of Test</u>					
4-17-80	Pit 2114	100	78	50	16	4.6
5-01-80	855,697N 421,713E	100	100	94	69	17.5
5-01-80	855,697N 421,713E	100	98	95	63	20.9
5-19-80	855,597N 421,435E	100	100	94	70	29.9
6-05-80	855,800N 421,100E	100	99	96	66	18.8

SIEVE ANALYSIS

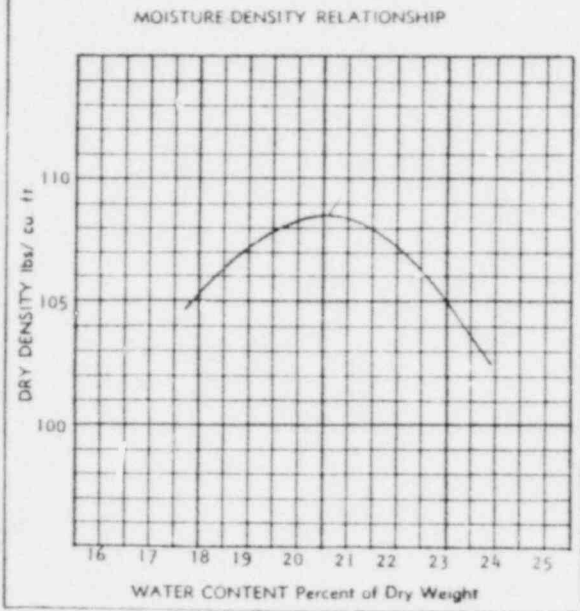
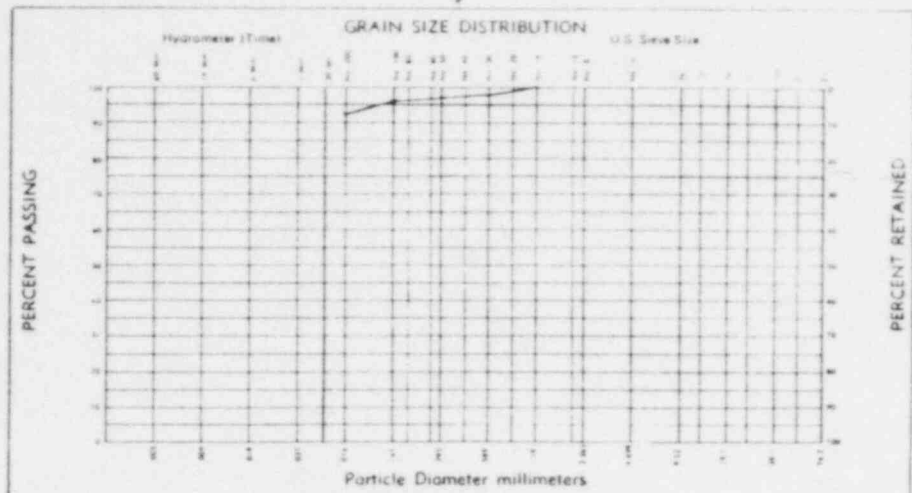
ZONE 5

PERCENT PASSING BY WEIGHT

		<u>U.S. Standard Sieve No.</u>		
		<u>3"</u>	<u>No. 4</u>	<u>No. 200</u>
SPECIFICATION - - -		85-100	50-100	15-50
<u>Test</u>	<u>Location of Test</u>			
<u>Date</u>				
4-17-80	Pit 2114	100	100	38.7
4-29-80	855,146N 421,304E	100	100	60.4*

*Material used within foundation excavation - accepted

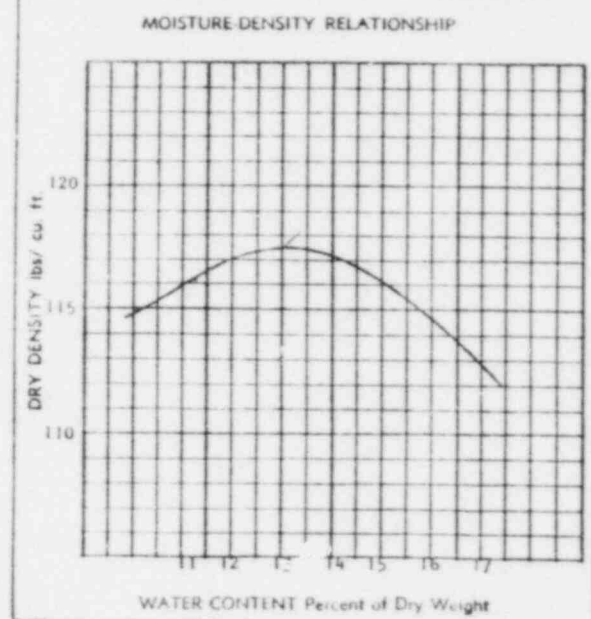
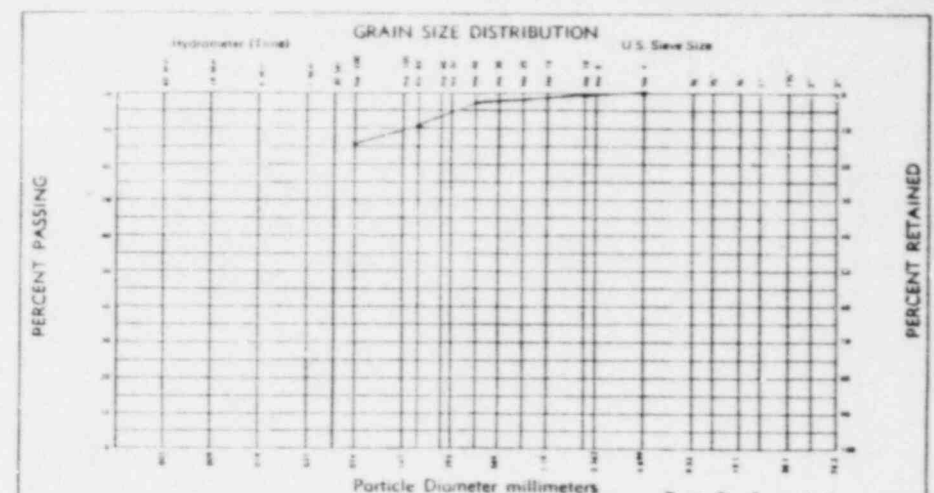
DATE: 11-11-80
 BY: J.L.C.C.
 CHECKED BY: J.L.C.C.



TEST METHODS
 ASTM D-1557
 Method "A"
 1/30 cu. ft. mold
 10 lb. hammer
 18 in. drop
 5 layers
 25 blows/layer

SOIL CONSTANTS
 Classification Clay-silty
 Liquid Limit _____
 Plasticity Index _____
 Max. Density 108.8 pcf
 Optimum Moisture 20.7 %
 Penetration Resist. _____ psi

United Nuclear
 Casper, Wyoming
 Morton Ranch Project
 Borrow Source 1802
 Zone 1 Fill
 Sample No. 1674 Job No. 80-1112



TEST METHODS
 ASTM D 1557
 Method "A"
 1/30 cu. ft. mold
 10 lb. hammer
 18 in. drop
 5 layers
 25 blows/layer

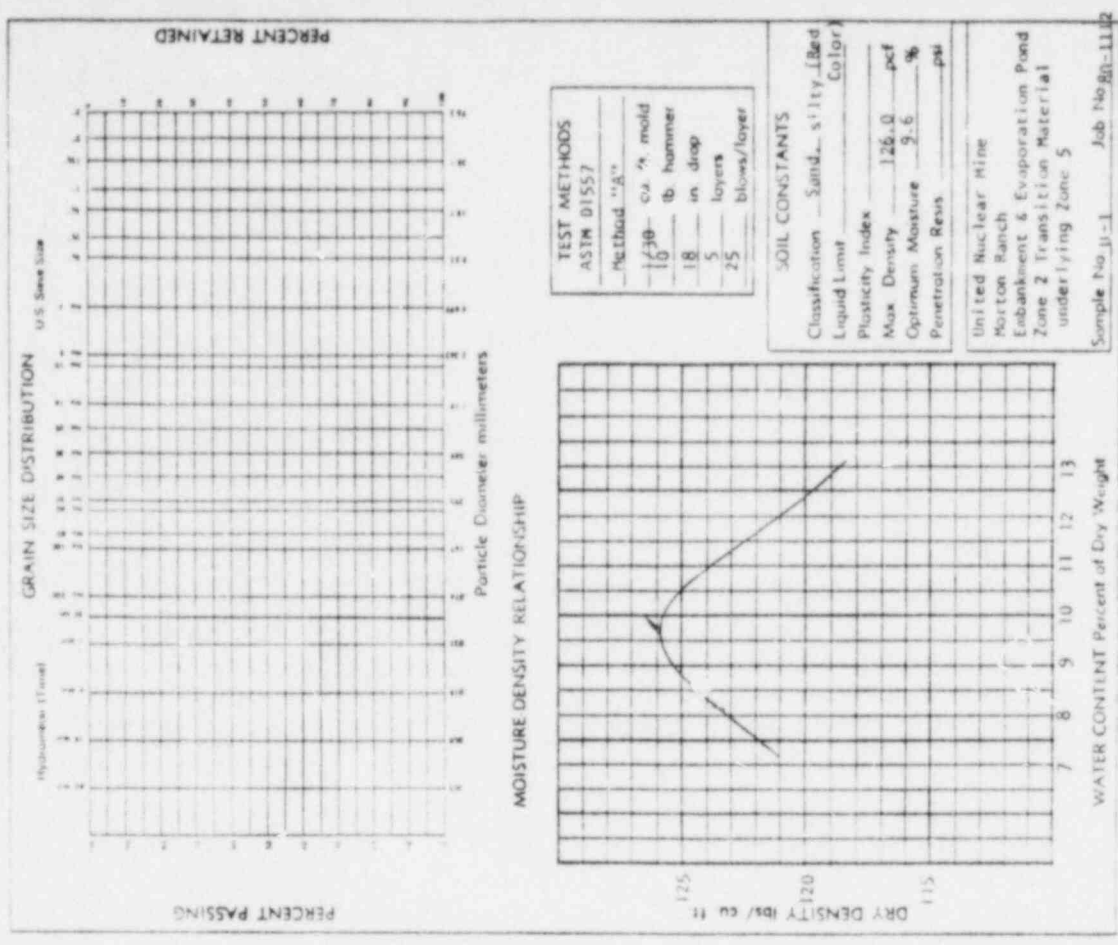
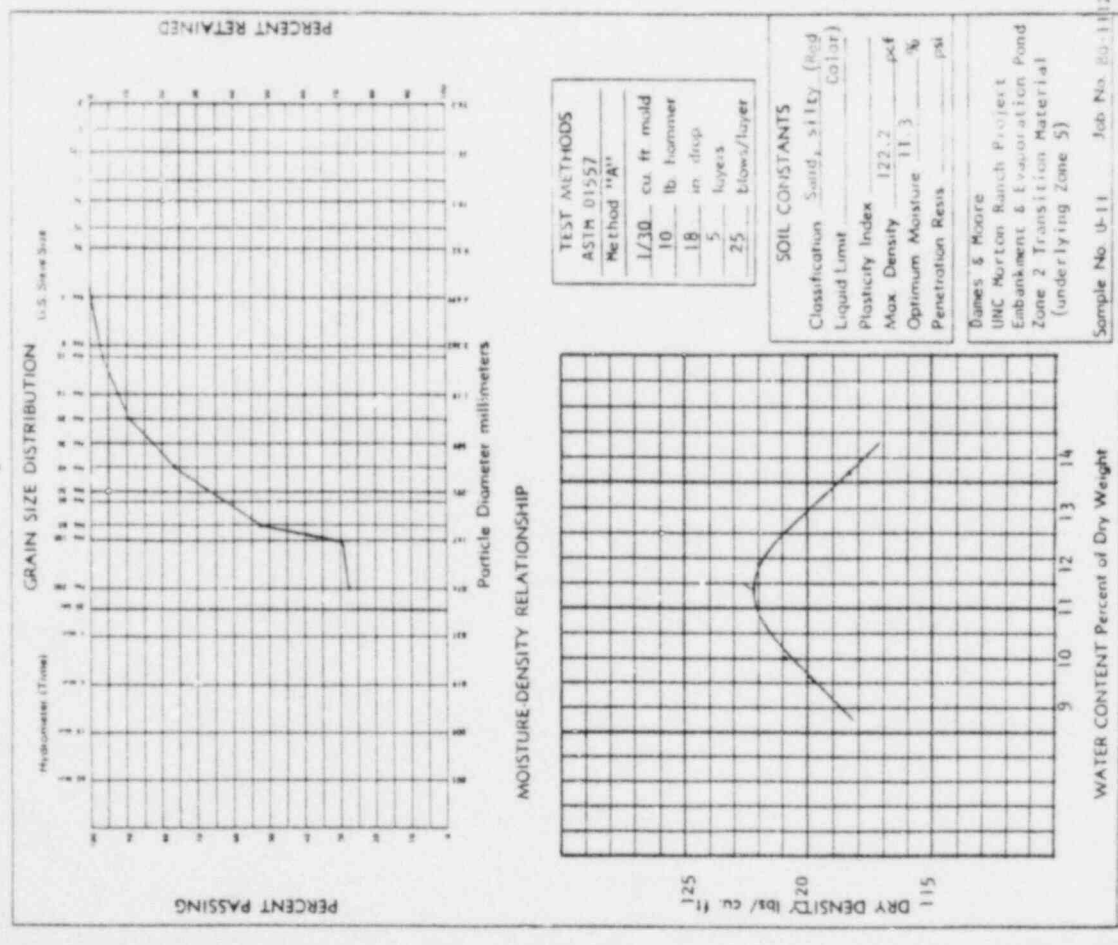
SOIL CONSTANTS
 Classification Clay, silty
 Liquid Limit _____
 Plasticity Index _____
 Max. Density 112.7 pcf
 Optimum Moisture 13.0 %
 Penetration Resist. _____ psi

Dames & Moore
 UNC Morton Ranch Project
 Embankment & Evaporation Pond
 Zone 1 & Clay liner material
 Source - Pit 1802, west end
 Sample No. 1255 Job No. 80-1112

Test Performed in
 N L-Casper Laboratory
 4-16-80

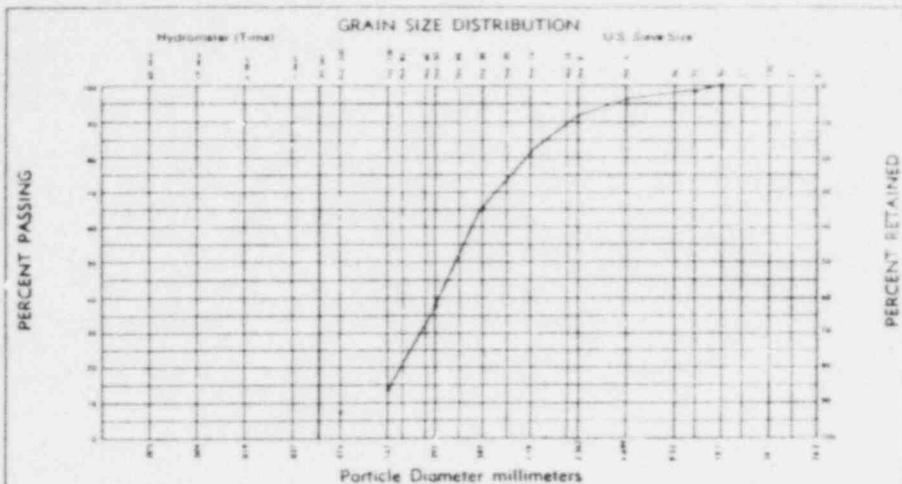
COMPACTION TEST DATA

POOR ORIGINAL

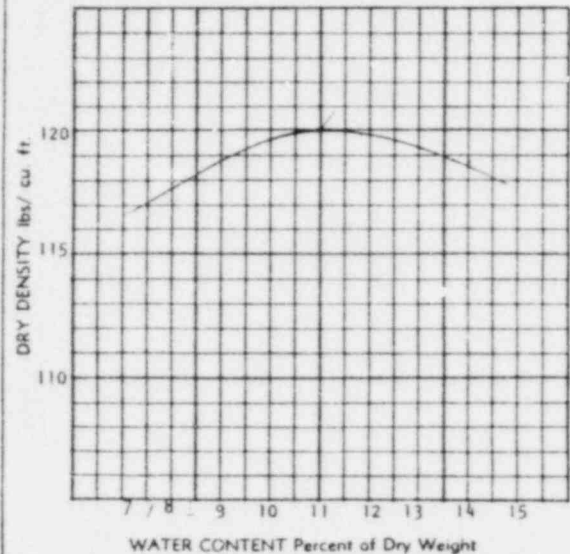


COMPACTION TEST DATA

POOR ORIGINAL



MOISTURE DENSITY RELATIONSHIP



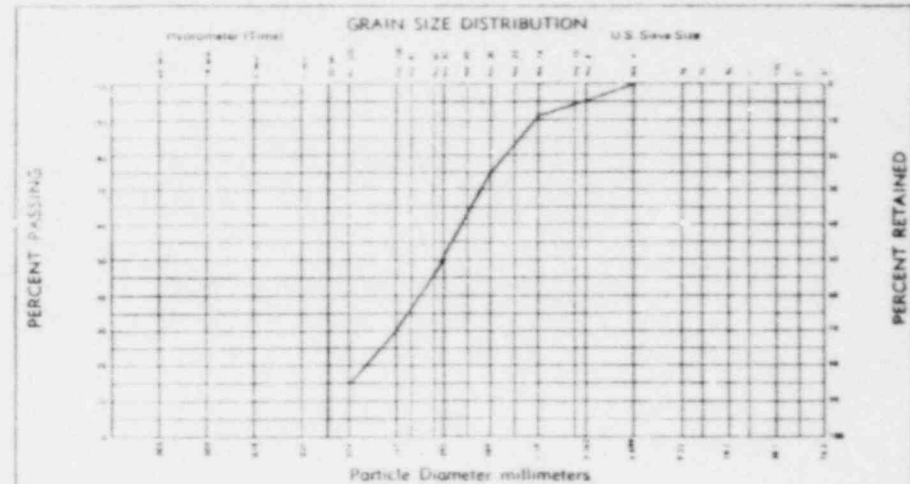
Test Performed in
Casper Lab - 4-22-80

TEST METHODS
ASTM D1557
Method "A"
1/30 cu. ft. mold
10 lb. hammer
18 in. drop
5 layers
25 blows/layer

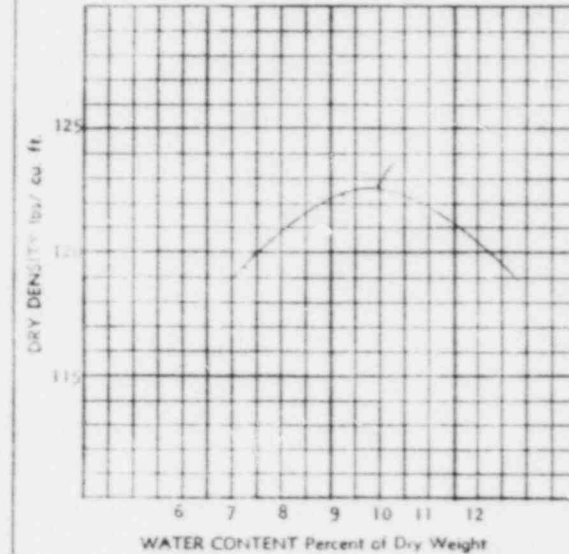
SOIL CONSTANTS
Classification Sand, well-graded
Liquid Limit _____
Plasticity Index _____
Max. Density 120.0 pcf
Optimum Moisture 11.0 %
Penetration Resist _____ psi

DAMES & MOORE
UNC Horton Ranch Project
Borrow Area 1802 - Zone 3
Sample No. 1283 Job No. 80-1112

Sample is 50/50 blend of Lab No. 1281 & 1282



MOISTURE DENSITY RELATIONSHIP



TEST METHODS
ASTM D1557
Method "D"
1/30 cu. ft. mold
10 lb. hammer
18 in. drop
5 layers
25 blows/layer

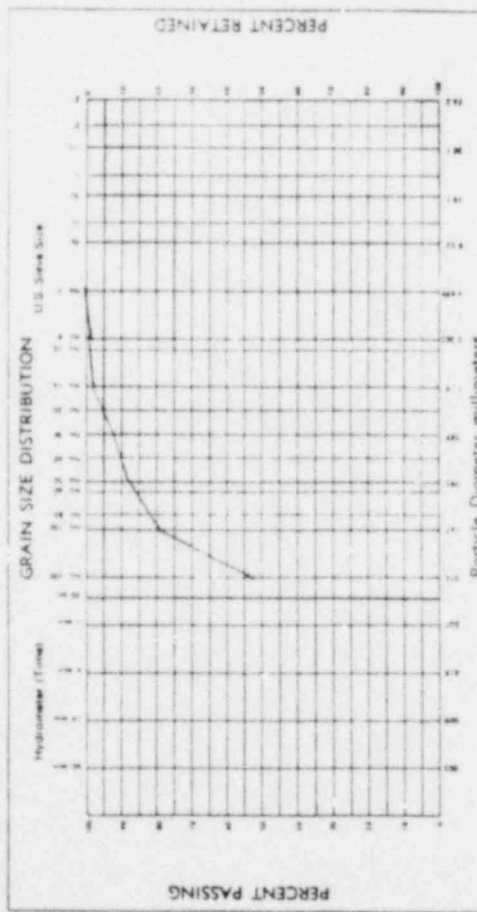
SOIL CONSTANTS
Classification Sand, silty
Liquid Limit _____
Plasticity Index _____
Max. Density 122.5 pcf
Optimum Moisture 10.0 %
Penetration Resist _____ psi

DAMES & MOORE
UNC Horton Ranch Project
Embankment & Evaporation Pond
Zone 3, drain blanket
Source - Pit 1802
Sample No. U-392B Job No. 80-1112

sheet revised to show material is Zone 3 fill.

COMPACT!ON TEST DATA

POOR ORIGINAL



Test performed in Casper Laboratory

TEST METHODS

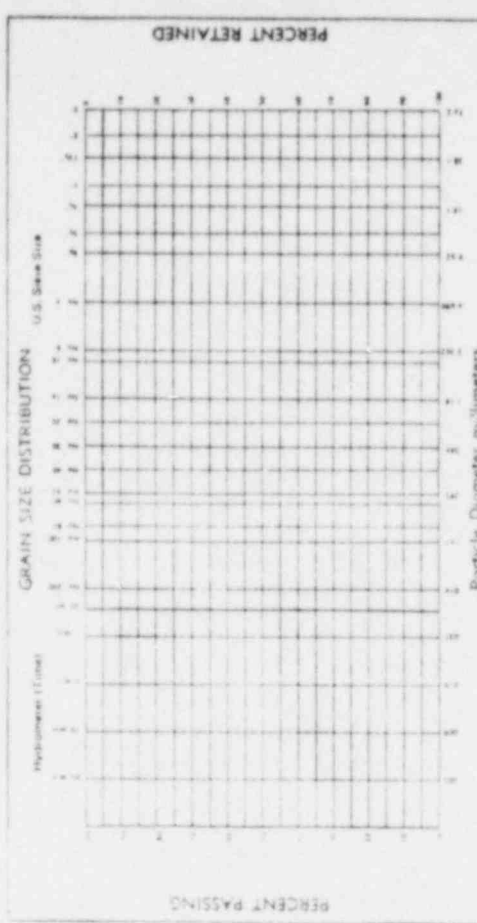
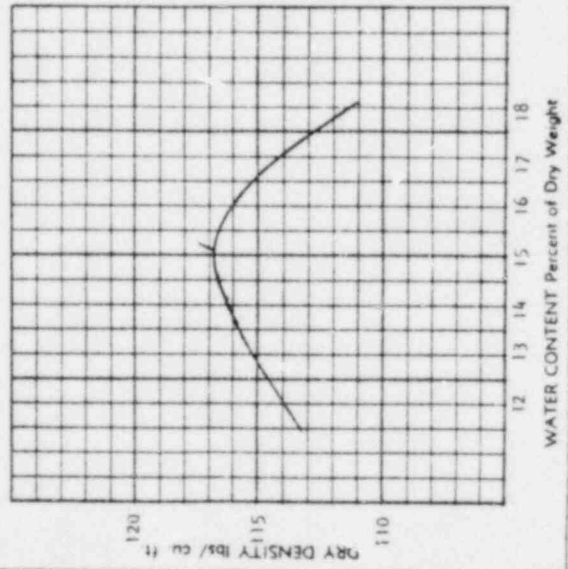
ASTM D 1557	Method	1730	cu. ft. mold
		10	lb. hammer
		18	in. drop
		5	layers
		25	blows/layer

SOIL CONSTANTS

Classification	Silt, clay
Liquid Limit	
Plasticity Index	116.9
Max. Density	pcf
Optimum Moisture	15.1
Penetration Resist.	psi

UNC, Inc.
Borton Ranch Project
Embankment and Evaporation Pond
Zone 5 Fill material
Borrow Area #1802

Sample No. U-70 Job No. 80-112



TEST METHODS

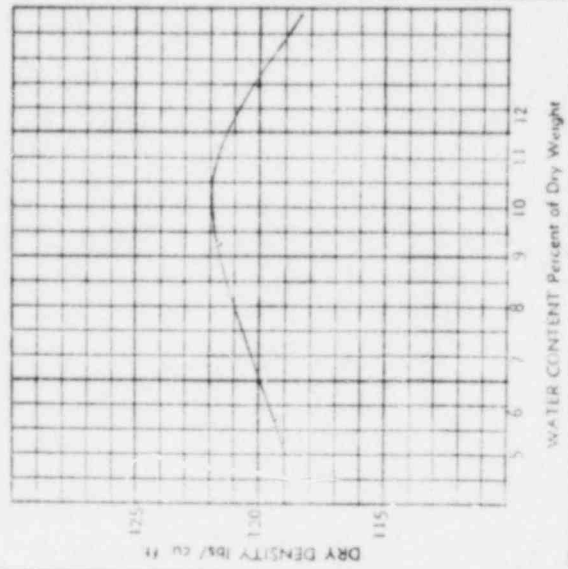
ASTM D 1557	Method	1730	cu. ft. mold
		10	lb. hammer
		18	in. drop
		5	layers
		25	blows/layer

SOIL CONSTANTS

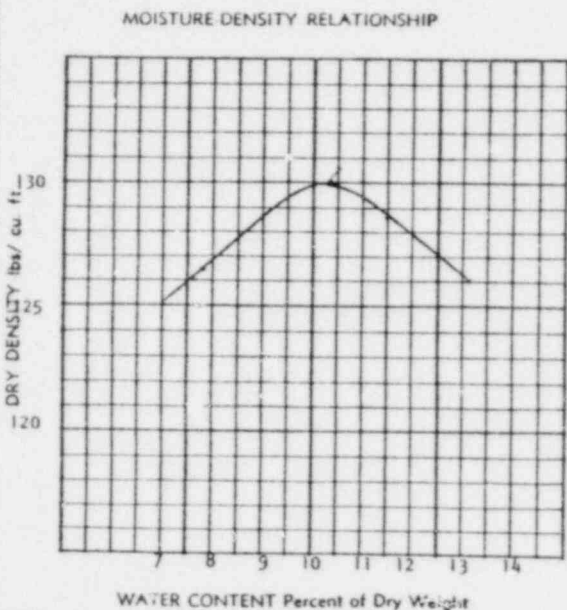
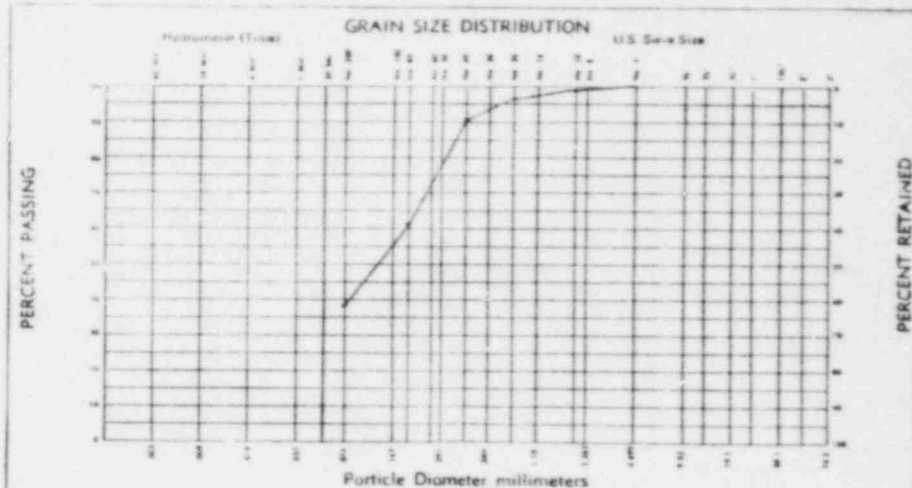
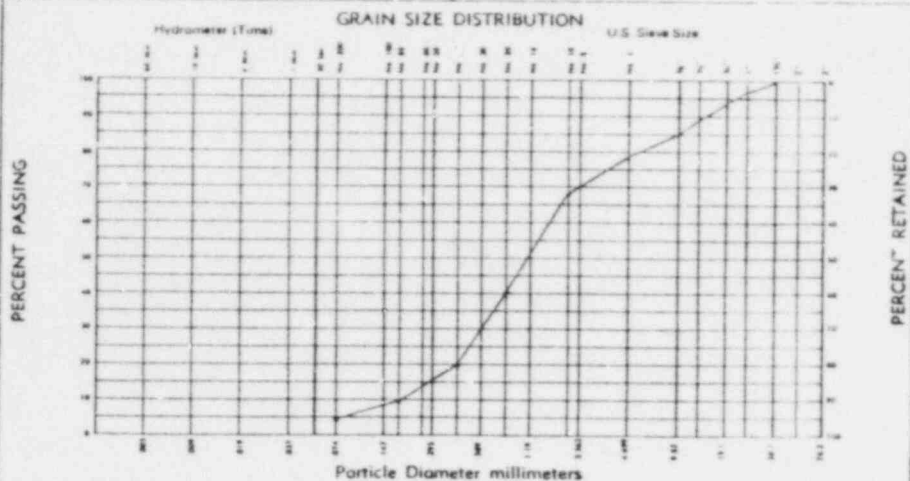
Classification	Clay, silty (light brown)
Liquid Limit	
Plasticity Index	122.0
Max. Density	pcf
Optimum Moisture	10.1
Penetration Resist.	psi

DIARES & MOORE
UNC Borton Ranch Project
Embankment & Evaporation Pond
Zone 5 Fill Material

Sample No. U-111 Job No. 80-112



COMPACTION TEST DATA



Test Performed in
NTL-Casper Laboratory
4-17-80

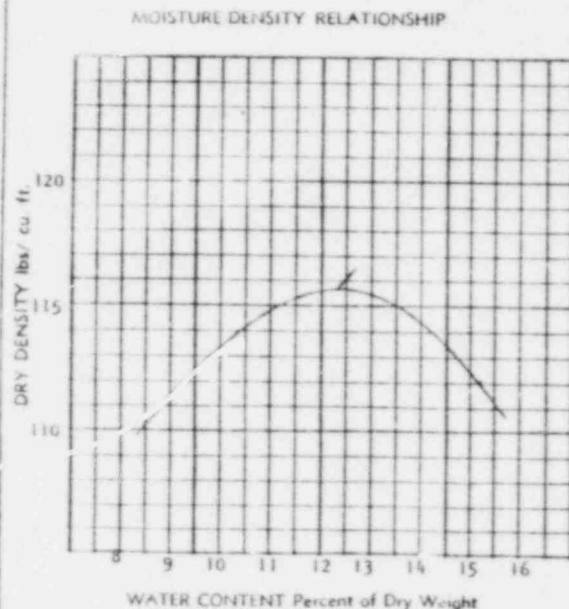
TEST METHODS
ASTM D 1557
Method "D"

.0247 cu. ft. mold
10 lb. hammer
18 in. drop
5 layers
56 blows/layer

SOIL CONSTANTS
Classification Sand, Gravelly
Liquid Limit _____
Plasticity Index _____
Max. Density 130.0 pcf
Optimum Moisture 10.3 %
Penetration Resist _____ psi

Dames & Moore
UNC Horton Ranch Project
Embankment & Evaporation Pond
Zone 5 Fill material
Source - Pit 2114, Sta. 78

Sample No. U-15 Job No. 80-1112



TEST METHODS
ASTM D 1557
Method "A"

1/30 cu. ft. mold
10 lb. hammer
18 in. drop
5 layers
25 blows/layer

SOIL CONSTANTS
Classification Sand, silty
Liquid Limit _____
Plasticity Index _____
Max. Density 115.8 pcf
Optimum Moisture 12.3 %
Penetration Resist _____ psi

Dames & Moore
UNC Horton Ranch Project
Embankment & Evaporation Pond
Zone 4B5 Upstream Shell
Borrow Pit 2114, Sta. 83

Sample No. U-18 Job No. 80-1112

COMPACTION TEST DATA

FIELD DENSITY TESTS

<u>Test</u> <u>Nc.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>		<u>Eleva-</u> <u>tion</u> <u>(feet)</u>	<u>Maximum</u> <u>Dry</u> <u>Density</u> <u>(pcf)</u>	<u>Moisture</u> <u>Content(%)</u>	<u>Test</u> <u>Dry</u> <u>Density</u> <u>(pcf)</u>	<u>Percent</u> <u>Compac-</u> <u>tion</u>
1	2	4-15-80	855,389N	422,430E	5,176	126.0	9.0	108.5	86.1*
2	2	4-15-80	855,298N	422,516E	5,179	126.0	15.1	112.7	89.4
3	2	4-15-80	855,376N	422,257E	5,179	126.0	13.8	116.0	92.1
4	2	4-15-80	855,319N	412,430E	5,178	126.0	12.5	110.7	87.9*
5	2	4-15-80	855,342N	422,321E	5,179	122.2	14.1	111.8	91.5
6-R	2	4-15-80	855,389N	422,430E	5,176	126.0	12.9	114.4	90.8
7	2	4-15-80	855,332N	422,200E	5,180	122.2	8.1	111.2	91.0
8-R	2	4-15-80	855,319N	422,300E	5,178	126.0	10.5	112.4	89.2
9	2	4-15-80	855,297N	422,400E	5,180	122.2	9.7	108.9	89.1
10	2	4-16-80	855,351N	422,406E	5,177	122.2	11.0	112.0	91.6
11	2	4-16-80	855,261N	422,327E	5,181	122.2	10.4	111.4	91.2
12	2	4-21-80	855,205N	422,400E	5,183	122.2	10.6	119.4	97.7
13	2	4-21-80	855,205N	422,200E	5,183	122.2	14.7	112.9	92.4
14	2	4-21-80	855,250N	422,230E	5,196	122.2	8.0	113.2	92.6
15	2	4-21-80	855,350N	422,300E	5,190	122.2	11.9	113.7	93.0
16	2	4-22-80	855,206N	422,381E	5,184	126.0	8.1	114.7	91.0
17-A	2	4-22-80	855,206N	422,381E	5,184	126.0	9.4	117.7	93.4
18	2	4-22-80	855,306N	422,430E	5,182	126.0	11.0	116.6	92.5
19	2	4-22-80	855,256N	422,481E	5,185	126.0	10.4	121.1	96.1
20	2	4-22-80	855,406N	422,331E	5,179	126.0	7.8	116.1	92.1
21	2	4-23-80	855,306N	422,530E	5,185	126.0	8.4	117.9	93.6
22	2	4-23-80	855,306N	422,281E	5,185	126.0	9.4	116.8	92.7
23	3	4-23-80	855,156N	422,531E	5,189	120.0	8.6	109.5	91.3
24	3	4-23-80	855,106N	422,531E	5,194	120.0	9.1	112.7	93.9
25-A	3	4-23-80	855,106N	422,531E	5,194	120.0	8.6	109.5	91.3
26	1	4-24-80	855,446N	421,659E	5,165	117.7	12.5	107.6	91.4
27-A	1	4-24-80	855,446N	421,659E	5,165	117.7	10.0	110.5	93.9
28	1	4-24-80	855,500N	421,550E	5,164	117.7	20.9	105.3	89.5**
29	1	4-24-80	855,570N	421,592E	5,164	117.7	16.0	106.9	90.8
30	1	4-24-80	Sta. 19+50		5,164	117.7	16.5	105.3	89.5*
31-R	1	4-24-80	Sta. 19+50		5,164	117.7	14.9	108.0	91.8
32	1	4-24-80	Sta. 20+50		5,162	117.7	16.0	103.1	87.6**
33-R	1	4-24-80	Sta. 20+50		5,162	117.7	15.2	105.1	89.3

A - Sandcone correlation test

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>	<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
34	1	4-24-80	Sta. 22+50	5,160	117.7	15.9	111.7	94.9
35	3	4-24-80	855,106N 422,481E	5,194	120.0	8.6	114.1	95.0
36	3	4-24-80	855,206N 422,421E	5,190	120.0	8.0	112.7	93.9
37	3	4-24-80	855,306N 422,531E	5,185	120.0	8.7	114.5	95.4
38	3	4-24-80	855,406N 422,581E	5,182	120.0	8.6	114.2	95.2
39	1	4-25-80	Sta. 21+00	5,161	117.7	17.1	105.1	89.3**
40-A	1	4-25-80	Sta. 21+00	5,161	117.7	8.1	108.8	92.4
41	1	4-25-80	Sta. 22+00	5,161	117.7	15.3	112.1	95.2
42	1	4-25-80	Sta. 21+50	5,162	117.7	16.3	105.8	89.9**
43	1	4-25-80	Sta. 22+50	5,162	117.7	13.0	110.0	93.5
44	1	4-25-80	Sta. 21+50	5,163	117.7	18.2	99.4	91.6
45	1	4-25-80	Sta. 21+50	5,163	117.7	16.4	108.6	92.3
46	1	4-25-80	Sta. 21+50	5,163	117.7	17.1	105.6	89.7**
47	1	4-25-80	Sta. 22+00	5,164	117.7	16.4	105.7	89.9**
48	1	4-25-80	Sta. 20+00	5,165	117.7	16.0	109.0	92.6
49	3	4-25-80	855,306N 422,331E	5,192	120.0	8.4	116.9	97.4
50-A	3	4-25-80	855,306N 422,331E	5,192	120.0	6.9	112.8	94.0
51	3	4-25-80	855,256N 422,531E	5,190	120.0	9.9	114.4	95.3
52	3	4-28-80	855,156N 422,331E	5,191	120.0	10.9	111.5	92.7
53-A	3	4-28-80	855,156N 422,331E	5,191	120.0	9.8	112.5	93.8
54	3	4-28-80	855,356N 422,481E	5,187	120.0	9.1	115.9	96.7
55	2	4-28-80	855,659N 421,870E	5,181	126.0	12.7	120.0	95.2
56	2	4-28-80	855,669N 421,970E	5,182	126.0	10.4	118.5	94.1
57	1	4-28-80	Sta. 22+00	5,165	117.7	25.9	99.7	84.7*
58-R	1	4-28-80	Sta. 22+00	5,165	117.7	14.5	113.5	96.4
59	1	4-28-80	Sta. 20+00	5,166	117.7	17.2	104.5	88.8*
60-R	1	4-28-80	Sta. 20+00	5,166	117.7	15.5	106.4	90.4
61	1	4-28-80	Sta. 22-50	5,166	117.7	17.8	108.7	92.4
62	1	4-28-80	Sta. 20+00	5,167	117.7	16.5	112.1	95.2
63	5	4-29-80	855,146N 421,304E	5,170	116.9	18.3	108.7	93.0
64-A	5	4-29-80	855,146N 421,304E	5,170	116.9	14.9	107.5	91.9
65	5	4-29-80	855,297N 421,304E	5,171	116.9	12.5	112.2	96.0
66	1	4-29-80	Sta. 20+00	5,168	117.7	16.8	105.9	90.0
67	1	4-29-80	Sta. 22+00	5,167	117.7	17.3	104.1	88.4*
68-R	1	4-29-80	Sta. 22+00	5,167	117.7	18.0	107.2	91.1

A - Sandcone correlation test

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>	<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
69	5	4-29-80	855,598N 421,789E	5,167	116.9	15.1	113.2	96.8
72	1	4-29-80	855,698N 421,759E	5,167	117.7	17.4	113.1	96.1
74	1	4-30-80	Sta. 20+00	5,169	117.7	16.3	113.9	96.8
75	1	4-30-80	Sta. 20+00	5,169	117.7	16.2	112.9	95.9
76	2	4-30-80	855,646N 421,714E	5,168	126.0	6.8	109.7	87.0*
77-R	2	4-30-80	855,646N 421,714E	5,168	126.0	9.2	115.2	91.4
78-A	2	4-30-80	855,646N 421,714E	5,168	126.0	5.0	111.8	88.7*
79	2	4-30-80	855,496N 421,764E	5,168	126.0	10.2	109.2	86.6*
80-R	2	4-30-80	855,496N 421,764E	5,168	126.0	10.6	117.4	93.2
81	5	4-30-80	855,190N 421,304E	5,171	116.9	12.1	113.8	97.4
82	5	4-30-80	855,255N 421,275E	5,172	116.9	8.4	110.8	94.8
83	5	4-30-80	855,346N 421,614E	5,169	116.9	10.9	99.2	84.9*
84-R	5	5-01-80	855,346N 421,614E	5,169	116.9	7.8	102.9	88.0*
85-R	5	5-01-80	855,346N 421,614E	5,169	116.9	10.3	113.3	96.9
86	1	4-30-80	855,247N 421,324E	5,171	117.7	14.6	113.9	96.8
87	5	5-01-80	855,297N 421,274E	5,172	116.9	13.4	109.6	93.1
88	2	5-01-80	855,347N 421,199E	5,172	126.0	9.3	121.0	96.0
89	2	5-01-80	855,272N 421,324E	5,173	122.2	9.8	112.5	92.1
90	1	5-01-80	855,337N 421,224E	5,174	117.7	20.7	103.6	88.0*
91-R	1	5-02-80	855,337N 421,224E	5,174	117.7	14.9	106.0	90.1
92	5	5-01-80	855,297N 421,547E	5,174	116.9	13.5	106.9	91.4
93	2	5-01-80	855,548N 421,813E	5,168	126.0	8.1	123.9	98.3
94	2	5-01-80	855,697N 421,713E	5,168	122.2	9.0	129.0	96.8
95-A	2	5-01-80	855,697N 421,713E	5,168	122.2	8.1	120.2	91.0
96	1	5-01-80	Sta. 22+25	5,168	117.7	15.6	106.7	90.6
97-A	1	5-01-80	Sta. 22+25	5,168	117.7	13.1	109.8	93.3
98	1	5-01-80	Sta. 20+50	5,169	117.7	16.2	113.0	96.0
99	1	5-01-80	Sta. 18+50	5,170	117.7	14.5	111.9	95.0
100	1	5-02-80	Sta. 22+50	5,169	117.7	17.2	107.2	91.1
101	1	5-02-80	Sta. 20+00	5,170	117.7	15.9	108.5	92.2
102	1	5-02-80	Sta. 18+50	5,171	117.7	17.4	107.5	91.3
103	1	5-02-80	Sta. 19+00	5,171	117.7	15.4	108.8	92.5
104	2	5-02-80	855,786N 421,256E	5,170	126.0	11.6	121.0	96.0
105	2	5-02-80	855,590N 421,693E	5,166	126.0	8.8	118.8	94.3
106	2	5-02-80	855,590N 421,573E	5,167	126.0	11.0	117.8	93.5

A - Sandcone correlation test

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

Test No.	Zone	Date	Location	Elevation (feet)	Maximum Dry Density (pcf)	Moisture Content(%)	Test Dry Density (pcf)	Percent Compaction
107-A	2	5-02-80	855,590N 421,573E	5,167	126.0	9.5	114.3	90.7
108	2	5-02-80	855,590N 421,683E	5,167	126.0	9.8	119.3	94.7
109	2	5-02-80	855,396N 421,140E	5,176	122.2	10.2	114.5	93.7
110	2	5-02-80	855,323N 421,444E	5,175	122.2	12.0	114.7	93.9
111	1	5-02-80	855,396N 421,165E	5,175	117.7	15.3	110.9	94.2
112	1	5-02-80	855,323N 421,519E	5,176	117.7	15.4	105.7	89.9
113	2	5-02-80	855,173N 421,569E	5,175	126.0	10.8	121.7	96.6
114	2	5-02-80	855,436N 421,256E	5,176	120.0	14.7	113.7	94.6
115	1	5-05-80	Sta. 21+00	5,172	117.7	17.2	109.2	92.8
116	1	5-05-80	Sta. 18+50	5,172	117.7	15.2	102.8	87.3*
117-R	1	5-05-80	Sta. 18+50	5,172	117.7	16.7	104.3	88.6*
118-R	1	5-06-80	Sta. 18+50	5,172	117.7	17.3	105.3	89.5*
119-RA	1	5-06-80	Sta. 18+50	5,172	117.7	14.2	105.9	89.9**
120	1	5-05-80	Sta. 19+00	5,172	117.7	18.5	101.1	85.9 *
121-R	1	5-06-80	Sta. 19+00	5,172	117.7	14.5	110.0	93.5
122-R	1	5-06-80	Sta. 19+00	5,172	117.7	16.7	109.3	92.9
123	2	5-05-80	855,590N 421,673E	5,168	126.0	12.5	117.6	93.3
124-A	2	5-05-80	855,590N 421,673E	5,168	126.0	11.1	118.5	94.0
125	2	5-05-80	855,436N 421,456E	5,168	126.0	11.7	120.6	95.7
126	5	5-05-80	855,449N 421,568E	5,177	116.9	21.5	105.3	90.0
127	2	5-05-80	855,396N 421,141E	5,177	126.0	14.9	113.2	89.8**
128	3	5-05-80	855,399N 421,519E	5,175	120.0	11.5	114.6	95.5
129	3	5-50-80	855,461N 421,060E	5,181	120.0	15.0	111.1	92.6
130	1	5-06-80	Sta. 20+00	5,172	117.7	17.5	109.8	93.3
131	1	5-06-80	Sta.19+00	5,172	117.7	16.1	113.3	96.3
132	1	5-06-80	Sta. 22+75	5,169	117.7	17.7	106.3	90.3
133	2	5-06-80	855,590N 421,623E	5,169	126.0	7.6	114.2	90.6
134	2	5-06-80	855,371N 421,115E	5,177	126.0	12.5	116.0	92.1
135	3	5-06-80	855,249N 421,469E	5,177	120.0	14.5	111.6	93.0
136	2	5-06-80	855,346N 421,090E	5,179	122.2(a)	12.2	107.8	88.2**
137-R	3	5-06-80	855,346N 421,090E	5,179	120.0	14.6	108.2	90.2
138	3	5-07-80	855,249N 421,494E	5,176	126.0	9.9	111.7	88.6*
139-R	3	5-07-80	855,249N 421,494E	5,176	120.0	11.3	110.5	92.1
140	1	5-07-80	Sta. 20+00	5,172	117.7	16.3	108.9	92.5
141	1	5-07-80	Sta. 18+50	5,174	117.7	18.3	106.0	90.0

A - Sandcone correlation test

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>	<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
142	1	5-07-80	Sta. 22+00	5,171	117.7	17.1	106.7	90.0
143-A	1	5-07-80	Sta. 22+00	5,171	117.7	11.1	107.1	91.0
144	1	5-07-80	Sta. 20+00	5,173	117.7	17.7	100.4	85.3*
145-R	1	5-07-80	Sta. 20+00	5,173	117.7	15.4	105.9	90.0
146	1	5-07-80	Sta. 22+00	5,172	117.7	17.9	100.7	85.5*
147-R	1	5-07-80	Sta. 22+00	5,172	117.7	16.7	105.2	89.4**
148	2	5-07-80	855,590N 421,648E	5,169	126.0	6.0	112.6	89.3*
149-R	2	5-07-80	855,590N 421,648E	5,169	126.0	7.8	114.4	90.8
150	2	5-07-80	855,690N 421,623E	5,170	126.0	7.9	109.4	86.8*
151-R	2	5-07-80	855,690N 421,623E	5,170	126.0	8.0	110.0	87.3**
152	3	5-07-80	855,349N 421,519E	5,178	120.0	10.5	111.2	92.7
153	2	5-07-80	855,199N 421,494E	5,176	122.2	12.8	109.7	89.8
154	1	5-07-80	855,349N 421,494E	5,179	117.7	16.9	104.4	88.7
155	3	5-07-80	855,149N 421,494E	5,178	120.0	9.2	110.5	92.1
156	3	5-07-80	855,349N 421,519E	5,178	120.0	11.5	110.8	92.3
157	3	5-07-80	855,174N 421,494E	5,177	120.0	9.3	111.3	91.2
158	1	5-08-80	Sta. 17+50	5,165	117.7	16.2	108.3	92.0
159	1	5-08-80	Sta. 18+50	5,173	117.7	17.7	108.9	92.5
160	1	5-08-80	Sta. 21+50	5,173	117.7	17.8	109.2	92.8
161-A	1	5-08-80	Sta. 21+50	5,173	117.7	12.9	111.8	95.0
162	1	5-08-80	Sta. 17+50	5,166	117.7	15.7	115.5	99.5
163	1	5-08-80	Sta. 22+50	5,172	117.7	16.6	109.1	92.7
164	1	5-08-80	Sta. 18+50	5,174	117.7	18.6	106.3	90.3
165	1	5-08-80	Sta. 17+50	5,167	117.7	17.6	105.0	89.2**
166	1	5-08-80	Sta. 19+50	5,172	117.7	15.1	110.5	93.9
167	2	5-08-80	855,571N 421,639E	5,170	126.0	7.2	119.0	94.4
168	2	5-08-80	855,574N 421,460E	5,170	126.0	9.4	117.2	93.0
169	2	5-08-80	855,561N 421,664E	5,171	126.0	7.8	115.0	96.3
170	2	5-08-80	855,572N 421,485E	5,171	126.0	6.2	114.8	91.1
171	3	5-08-80	855,318N 421,142E	5,180	120.0	9.6	109.7	91.4
172	3	5-08-80	855,280N 421,623E	5,179	120.0	10.5	111.2	92.7
173	5	5-08-80	855,267N 421,417E	5,180	116.9	14.0	105.3	90.0
174	3	5-08-80	855,280N 421,673E	5,181	120.0	8.5	112.9	94.0
175	1	5-09-80	Sta. 17+50	5,163	117.7	17.0	111.4	94.6
176-A	1	5-09-80	Sta. 17+50	5,168	117.7	12.2	112.6	95.6
177	1	5-09-80	Sta. 17+50	5,170	117.7	15.9	110.6	94.0

- A - Sandcone correlation test
R - Retest
* - Failing Test - area proofrolled and retested
** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>	<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content (%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
178	1	5-09-80	Sta. 17+50	5,173	117.7	16.1	111.5	94.7
179	3	5-09-80	855,393N 421,342E	5,180	120.0	10.7	113.6	94.7
180	3	5-09-80	855,380N 421,698E	5,180	120.0	14.0	112.8	94.0
181	3	5-09-80	855,243N 421,417E	5,181	120.0	11.8	102.0	85.0*
182-R	3	5-09-80	855,243N 421,417E	5,181	120.0	12.0	118.4	98.7
183	3	5-09-80	855,280N 421,673E	5,182	120.0	10.9	100.4	83.7*
184-R	3	5-09-80	855,280N 421,673E	5,182	120.0	12.2	115.9	96.6
185	3	5-09-80	855,318N 421,367E	5,182	120.0	14.1	111.7	93.1
186	3	5-09-80	855,476N 421,431E	5,181	120.0	6.3	102.9	85.7*
187-R	3	5-09-80	855,476N 421,431E	5,181	120.0	6.8	116.1	96.8
188	3	5-09-80	855,456N 421,281E	5,181	120.0	7.7	113.7	94.8
189	2	5-09-80	855,576N 421,664E	5,171	126.0	8.9	106.7	84.7*
190-R	2	5-09-80	855,576N 421,664E	5,171	126.0	7.6	113.9	90.4
191	2	5-09-80	855,547N 421,485E	5,171	126.0	8.7	104.0	82.5*
192-R	2	5-09-80	855,547N 421,485E	5,171	126.0	9.6	113.1	89.8
193	3	5-14-80	855,385N 421,342E	5,180	120.0	14.9	112.0	93.3
194	3	5-14-80	855,250N 421,415E	5,181	120.0	14.6	111.1	92.6
195	3	5-14-80	855,280N 421,673E	5,182	120.0	14.3	115.3	96.1
196	1	5-14-80	Sta. 19+50	5,173	117.7	21.8	104.8	89.0*
197	1	5-14-80	Sta. 21+50	5,173	117.7	21.6	105.0	89.2*
198	1	5-14-80	Sta. 22+50	5,172	117.7	20.8	103.8	88.1*
199	1	5-14-80	Sta. 18+50	5,174	117.7	22.9	103.9	88.3*
200	1	5-14-80	Sta. 18+50	5,173	117.7	20.8	104.5	88.8*
201	1	5-14-80	Sta. 18+50	5,172	117.7	21.0	108.3	92.0
202	1	5-15-80	Sta. 18+50	5,174	117.7	22.7	106.6	90.6
203	1	5-15-80	Sta. 18+50	5,173	117.7	19.9	109.4	92.9
204	1	5-15-80	Sta. 19+00	5,173	117.7	21.8	105.4	89.5*
205	1	5-15-80	Sta. 20+00	5,173	117.7	22.4	102.4	87.0*
206	1	5-15-80	Sta. 22+00	5,172	117.7	23.9	99.7	84.7*
207	3	5-16-80	855,180N 421,673E	5,181	120.0	16.9	106.9	89.1*
208	3	5-16-80	855,267N 421,417E	5,181	120.0	13.4	119.5	99.6
209	3	5-16-80	855,318N 421,292E	5,182	120.0	13.7	114.1	95.1
210	5	5-16-80	855,318N 421,723E	5,182	122.0	14.3	115.0	94.1

- A - Sandcone correlation test
 R - Retest
 * - Failing Test - area proofrolled and retested
 ** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>		<u>Eleva- tion</u>	<u>Maximum Dry Density</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density</u>	<u>Percent Compac- tion</u>
<u>No.</u>					<u>(feet)</u>	<u>(pcf)</u>		<u>(pcf)</u>	
211	5	5-16-80	855,115N	421,623E	5,182	122.0	13.2	114.7	93.9
212	2	5-16-80	855,597N	421,385E	5,171	126.0	11.9	116.3	92.3
213	2	5-16-80	855,497N	421,459E	5,171	126.0	14.7	117.0	92.9
214	2	5-16-80	855,576N	421,689E	5,171	126.0	13.9	115.3	91.5
215-R	1	5-16-80	Sta. 18+00		5,174	117.7	20.7	109.2	92.8
216-R	1	5-16-80	Sta. 19+00		5,172	117.7	20.7	107.0	90.9
217-R	1	5-16-80	Sta. 21+00		5,173	117.7	22.1	104.4	88.7*
218-R	1	5-16-80	Sta. 22+50		5,171	117.7	23.1	108.4	92.1
219-R	1	5-16-80	Sta. 22+50		5,170	117.7	22.8	109.1	92.7
220	3	5-19-80	855,318N	421,343E	5,183	120.0	16.7	114.2	95.2
221	3	5-19-80	855,192N	421,267E	5,183	120.0	13.8	117.7	98.0
222	3	5-19-80	855,230N	421,648E	5,183	120.0	17.2	110.9	92.4
223	3	5-19-80	855,330N	421,773E	5,181	120.0	12.9	116.1	96.8
224	3	5-19-80	855,280N	421,773E	5,181	120.0	13.8	112.4	93.7
225	3	5-19-80	855,393N	421,343E	5,182	120.0	13.5	113.7	94.7
226	1	5-19-80	Sta. 19+00		5,176	117.7	16.9	110.9	94.2
227-A	1	5-19-80	Sta. 19+00		5,176	117.7	15.2	110.8	94.1
228	1	5-19-80	Sta. 22+00		5,175	117.7	16.3	107.2	91.1
229	1	5-19-80	Sta. 18+50		5,176	117.7	19.5	106.0	90.1
230	1	5-19-80	Sta. 22+50		5,175	117.7	16.3	108.4	92.1
231	1	5-19-80	Sta. 22+50		5,176	117.7	15.2	109.7	93.2
232	1	5-19-80	Sta. 18+50		5,177	117.7	15.6	111.6	94.8
233	1	5-19-80	Sta. 23+00		5,181	117.7	17.4	107.9	91.7
234	2	5-19-80	855,601N	421,638E	5,173	126.0	14.3	114.6	91.0
235	2	5-19-80	855,597N	421,435E	5,174	126.0	14.9	112.9	89.6*
236-A	2	5-19-80	855,597N	421,435E	5,174	126.0	18.8	106.2	84.3*
237-R	2	5-19-80	855,597N	421,435E	5,174	126.0	10.9	115.3	91.3
238	2	5-19-80	855,576N	421,639E	5,175	126.0	11.1	116.6	92.5
239	2	5-19-80	855,522N	421,410E	5,176	126.0	14.3	118.4	94.4
240	2	5-20-80	855,300N	421,255E	5,183	126.0	10.7	121.3	96.3
241	2	5-20-80	855,310N	421,623E	5,183	126.0	9.9	118.5	94.0
242	2	5-20-80	855,318N	421,367E	5,181	126.0	11.6	118.9	94.4
243	2	5-20-80	855,243N	421,392E	5,181	126.0	12.8	118.9	94.4
244	3	5-20-80	855,395N	421,292E	5,185	120.0	13.6	104.9	87.4*
245-R	3	5-20-80	855,395N	421,292E	5,185	120.0	13.1	114.6	95.5

A - Sandcone correlation test

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test</u>	<u>No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>	<u>Eleva- tion</u> <u>(feet)</u>	<u>Maximum Dry Density</u> <u>(pcf)</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density</u> <u>(pcf)</u>	<u>Percent Compac- tion</u>
246	3		5-20-80	855,445N 421,292E	5,185	120.0	11.0	106.9	89.1*
247-R	3		5-20-80	855,445N 421,292E	5,185	120.0	11.1	114.9	95.7
248	1		5-20-80	Sta. 19+00	5,179	117.7	15.2	110.9	94.2
249	1		5-20-80	Sta. 22+00	5,179	117.7	14.6	109.5	93.0
250	1		5-20-80	Sta. 19+50	5,182	117.7	14.6	110.2	93.6
251	2		5-20-80	855,601N 421,639E	5,178	126.0	8.5	113.6	90.2
252	2		5-20-80	855,597N 421,435E	5,178	126.0	12.6	119.4	94.8
253	2		5-21-80	855,631N 421,664E	5,179	126.0	9.0	116.6	92.5
254	2		5-21-80	855,647N 421,445E	5,180	126.0	11.7	117.0	92.9
255	2		5-21-80	855,637N 421,385E	5,180	126.0	11.0	118.0	93.7
256	2		5-21-80	855,631N 421,659E	5,179	126.0	12.7	106.0	84.1**
257	2		5-21-80	855,647N 421,455E	5,180	126.0	10.7	122.9	97.5
258	1		5-21-80	Sta. 18+50	5,183	117.7	18.7	106.1	90.1
259-A	1		5-21-80	Sta. 18+50	5,183	117.7	12.3	108.1	91.8
260	1		5-21-80	Sta. 22+00	5,181	117.7	19.2	108.2	91.9
261	3		5-21-80	855,330N 421,673E	5,182	120.0	13.2	114.2	95.2
262	3		5-21-80	855,380N 421,623E	5,182	120.0	12.9	106.0	88.3
263	3		5-21-80	855,380N 421,623E	5,182	120.0	12.9	106.0	88.3
264	3		5-21-80	855,318N 421,217E	5,186	120.0	10.2	112.5	93.8
265	5		5-21-80	855,232N 421,594E	5,186	122.0	13.4	112.0	91.8
266	1		5-22-80	Sta. 22+00	5,180	117.7	15.8	110.3	93.7
267	1		5-22-80	Sta. 19+00	5,183	117.7	15.5	113.1	96.1
268	2		5-22-80	855,601N 421,539E	5,181	126.0	7.4	109.6	87.0*
269-R	2		5-22-80	855,601N 421,539E	5,181	126.0	6.8	117.7	93.4
270	2		5-22-80	855,601N 421,669E	5,180	126.0	9.5	110.9	88.0*
271-R	2		5-22-80	855,601N 421,669E	5,180	126.0	9.7	117.1	92.9
272	3		5-22-80	855,330N 421,783E	5,181	120.0	7.8	114.3	95.2
273	3		5-22-80	855,318N 421,417E	5,185	120.0	12.9	117.3	97.8
274	2		5-22-80	855,288N 421,392E	5,185	126.0	12.5	116.6	92.5
275-A	2		5-22-80	855,299N 421,392E	5,185	126.0	11.1	112.2	89.1**
276	3		5-22-80	855,230N 421,673E	5,184	120.0	14.1	110.2	91.8
277	3		5-22-80	855,368N 421,317E	5,185	120.0	11.6	112.0	93.3
278	1		5-22-80	855,357N 421,342E	5,184	117.7	16.3	109.9	93.4
279	5		5-22-80	855,268N 421,417E	5,185	122.0	18.7	111.3	91.2
280	2		5-22-80	855,305N 421,748E	5,186	126.0	12.8	115.3	91.5

A - Sandcone correlation test

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>		<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
281	2	5-23-80	855,418N	421,342E	5,185	122.2	13.1	114.1	93.4
282-B	2	5-23-80				122.2	11.3		
283-A	2	5-23-80	855,418N	421,342E	5,185	122.2	12.5	114.1	93.6
284	2	5-23-80	855,318N	421,492E	5,184	126.0	14.2	117.7	93.4
285	3	5-23-80	855,280N	421,773E	5,184	120.0	9.8	114.4	95.3
286	2	5-23-80	855,391N	421,317E	5,186	122.2	14.3	111.2	91.0
287	2	5-23-80	855,318N	421,302E	5,185	122.2	14.7	114.3	93.7
288	3	5-23-80	855,268N	421,417E	5,185	120.0	9.1	112.9	94.1
289	2	5-23-80	855,526N	421,664E	5,180	122.2	13.2	110.2	90.2
290	2	5-23-80	855,526N	421,664E	5,180	122.2	11.2	113.6	93.0
291	2	5-23-80	855,601N	421,564E	5,181	122.2	12.3	111.5	91.2
292-A	2	5-23-80	855,601N	421,564E	5,181	122.2	13.4	105.9	86.7*
293-R	2	5-23-80	855,601N	421,564E	5,181	122.2	10.1	116.5	93.3
294	1	5-23-80	Sta. 21+50		5,180	117.7	15.7	115.2	97.9
295	1	5-23-80	Sta. 19+00		5,183	117.7	16.1	114.8	97.5
296	1	5-27-80	Sta. 22+50		5,181	117.7	19.8	110.3	93.7
297	1	5-27-80	Sta. 20+00		5,183	117.7	17.2	111.9	95.1
298-A	1	5-27-80	Sta. 20+00		5,183	117.7	16.4	107.0	90.9
299-B	1	5-27-80	Sta. 80+00		5,183	114.0	16.4		
300	1	5-27-80	Sta. 21+50		5,182	117.7	17.0	112.9	95.9
301	1	5-27-80	Sta. 21+00		5,183	117.7	15.1	111.7	94.9
302	1	5-27-80	Sta. 21+00		5,184	117.7	16.4	111.4	94.6
303	1	5-27-80	Sta. 19+00		5,180	117.7	15.4	112.2	95.3
304	1	5-27-80	Sta. 22+00		5,183	117.7	17.7	102.4	87.0**
305	3	5-27-80	855,255N	421,773E	5,182	120.0	12.2	113.6	94.7
306-B	3	5-27-80	855,255N	421,773E	5,182	119.8	12.3		
307	5	5-27-80	855,430N	421,623E	5,185	116.9	14.9	105.0	89.8
308	5	5-27-80	855,418N	421,417E	5,186	116.9	14.8	107.4	91.9
309	3	5-27-80	855,180N	421,723E	5,187	120.0	16.5	116.7	97.2
310	5	5-27-80	855,368N	421,192E	5,188	122.0	11.1	113.8	93.3
311	3	5-27-80	855,305N	421,593E	5,186	120.0	11.7	113.2	94.3
312	3	5-27-80	855,210N	421,623E	5,185	120.0	14.2	111.2	92.7
313		5-28-80	Sta. 19+50		5,186	117.7	15.7	109.3	92.9
314	1	5-28-80	Sta. 22+00		5,185	117.7	13.6	112.1	95.2
315-A	1	5-28-80	Sta. 22+00		5,185	117.7	13.2	108.7	92.3

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test</u>	<u>No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>	<u>Eleva- tion (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compac- tion</u>
316	2		5-28-80	855,626N 421,714E	5,181	122.2	12.9	114.3	93.5
317-A	2		5-28-80	855,626N 421,714E	5,181	122.2	13.2	114.4	93.6
318-B	2		5-28-80	855,626N 421,714E	5,181	119.9	13.2		
319	2		5-28-80	855,601N 421,539E	5,181	126.0	9.6	111.5	88.5*
320-R	2		5-28-80	855,601N 421,539E	5,181	126.0	11.6	114.4	90.8
321	2		5-28-80	855,551N 421,639E	5,181	126.0	12.9	120.3	95.5
322	2		5-28-80	855,601N 421,539E	5,182	122.2	14.8	112.4	92.0
323	1		5-28-80	855,601N 421,514E	5,183	117.7	13.0	115.9	98.5
324	1		5-28-80	855,551N 421,689E	5,182	117.7	15.9	113.4	96.3
325	5		5-28-80	855,425N 421,445E	5,187	116.9	17.6	107.4	91.9
326	5		5-28-80	855,322N 421,754E	5,185	122.0	17.0	114.2	93.6
327	3		5-28-80	855,300N 421,045E	5,191	117.7	15.7	114.5	97.3
328	5		5-28-80	855,300N 421,995E	5,192	116.9	13.0	111.7	95.5
329	1		5-29-80	Sta. 19+00	5,186	117.7	16.2	111.0	94.3
330	1		5-29-80	Sta. 22+50	5,184	117.7	16.6	113.0	96.0
331	1		5-29-80	Sta. 19+50	5,187	117.7	17.0	115.0	97.7
332	1		5-29-80	Sta. 21+00	5,185	117.7	18.2	109.6	93.1
333	2		5-29-80	855,629N 421,530E	5,181	122.2	15.3	106.5	87.1*
334-R	2		5-29-80	855,629N 421,530E	5,181	122.2	16.6	114.9	94.0
335	2		5-29-80	855,704N 421,555E	5,181	126.0	9.0	121.0	96.0
336	1		5-29-80	855,601N 421,539E	5,182	117.7	14.4	112.4	95.5
337	1		5-29-80	855,679N 421,455E	5,182	117.7	17.3	111.8	95.0
338	1		5-29-80	855,355N 420,843E	5,192	117.7	13.5	111.6	94.8
339	2		5-29-80	855,415N 420,743	5,193	126.0	12.5	119.8	95.0
340	5		5-29-80	855,310N 420,793E	5,193	122.0	15.3	111.3	91.2
341	2		5-29-80	855,350N 420,818E	5,192	126.0	13.4	118.9	94.4
342	5		5-29-80	855,205N 421,648E	5,190	122.0	13.6	121.0	99.2
343	1		5-29-80	855,080N 421,698E	5,188	117.7	17.0	113.1	96.1
344	5		5-29-80	855,350N 421,225E	5,186	122.0	15.6	112.5	92.2
345-A	5		5-29-80	855,350N 421,225E	5,186	122.0	13.8	109.9	90.1
346-B	5		5-29-80	855,350N 421,225E	5,186	118.4			
347	5		5-30-80	855,180N 421,698E	5,186	122.0	12.9	119.1	97.6
348	5		5-30-80	855,280N 421,773E	5,186	122.0	14.7	115.7	94.8
349	5		5-30-80	855,393N 421,367E	5,188	122.0	14.7	114.3	93.7
350-A	5		5-30-80	855,393N 421,367E	5,188	122.0	15.9	110.8	90.8
351-B	5		5-30-80	855,393N 421,367E	5,188	116.3	15.9		

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>		<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content (%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
352	1	5-30-80	855,343N	421,267E	5,190	117.7	15.9	112.4	95.5
353	5	5-30-80	855,318N	421,367E	5,188	122.0	16.5	113.7	93.2
354	5	5-30-80	855,230N	421,673E	5,187	122.0	19.5	109.0	89.3**
355	2	5-30-80	855,431N	421,766E	5,183	126.0	11.3	115.5	91.7
356	2	5-30-80	855,629N	421,555E	5,182	126.0	10.4	115.2	91.4
357	2	5-30-80	855,479N	421,555E	5,183	126.0	14.0	115.3	91.5
358	2	5-30-80	855,604N	421,555E	5,183	126.0	15.6	116.5	92.5
359	2	5-30-80	855,601N	421,639E	5,184	126.0	15.9	112.4	89.2**
360	1	5-30-80	Sta. 18+00		5,186	117.7	14.5	113.9	96.8
361	1	5-30-80	Sta. 21+50		5,186	117.7	15.4	114.6	97.4
362	1	5-30-80	Sta. 23+50		5,186	117.7	15.5	109.4	92.9
363	1	5-30-80	Sta. 23+50		5,187	117.7	16.2	110.2	93.6
364	1	5-30-80	Sta. 23+50		5,188	117.7	14.9	110.7	94.0
365	5	6-02-80	855,290N	421,215E	5,193	122.0	13.8	118.2	96.9
366	5	6-02-80	855,322N	421,604E	5,190	122.0	13.4	118.2	96.9
367-A	5	6-02-80	855,322N	421,604E	5,190	122.0	14.2	108.0	88.5*
368-R	5	6-02-80	855,322N	421,604E	5,190	122.0	13.1	115.2	94.4
369-RA	5	6-02-80	855,322N	421,604E	5,190	122.0	12.1	114.1	93.5
370	5	6-02-80	855,400N	421,395E	5,190	122.0	14.7	115.7	94.8
371	5	6-02-80	855,300N	421,395E	5,189	122.0	12.8	113.7	93.2
372	5	6-02-80	855,255N	421,733E	5,188	122.0	15.5	115.4	91.6
373	1	6-02-80	Sta. 22+50		5,186	117.7	13.9	116.1	98.6
374	1	6-02-80	Sta. 21+00		5,186	117.7	15.3	108.7	92.3
375	1	6-02-80	Sta. 19+50		5,187	117.7	13.6	118.3	100.5
376-A	1	6-02-80	Sta. 19+50		5,187	117.7	15.9	110.8	94.1
377-B	1	6-02-80	Sta. 19+50		5,187	115.0	15.9		
378	2	6-02-80	855,741N	421,352E	5,188	126.0	9.9	114.7	91.0
379	2	6-02-80	855,741N	421,252E	5,189	126.0	6.4	105.4	83.6*
380	2	6-02-80	855,741N	421,152E	5,191	126.0	10.3	106.8	84.8*
381	2	6-02-80	855,631N	421,916E	5,181	126.0	11.2	117.5	93.2
382	2	6-02-80	855,681N	421,621E	5,183	126.0	7.5	115.2	91.4
383	2	6-02-80	855,681N	421,901E	5,182	126.0	7.1	107.3	85.1*
384-R	2	6-03-80	855,681N	421,901E	5,182	126.0	6.7	112.6	89.4**
385	2	6-03-80	855,315N	421,225E	5,193	122.0	17.8	103.7	85.0*
386-R	5	6-03-80	855,315N	421,225E	5,193	122.0	11.4	118.9	97.5

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>		<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content(%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
387	5	6-03-80	855,250N	421,270E	5,192	122.0	12.7	117.2	97.7
388	5	6-03-80	855,172N	421,624E	5,190	122.0	11.2	112.3	93.6
389	5	6-03-80	855,222N	421,729E	5,190	122.0	12.9	115.2	94.4
390	5	6-03-80	855,250N	421,420E	5,191	122.0	13.5	115.0	94.3
391	2	6-03-80	855,581N	420,641E	5,184	126.0	9.8	117.8	93.5
392	2	6-03-80	855,629N	421,505	5,183	126.0	9.4	120.0	95.2
393	1	6-03-80	Sta. 18+00		5,188	117.7	15.4	112.9	95.9
394	1	6-03-80	Sta. 21+50		5,187	117.7	15.1	112.3	95.4
395-A	1	6-03-80	Sta. 21+50		5,187	117.7	16.2	110.4	93.8
396	2	6-04-80	855,531N	421,841E	5,184	122.2	8.4	109.3	89.4*
397-R	2	6-04-80	855,531N	421,841E	5,184	122.2	8.6	113.7	93.0
398	2	6-04-80	855,481N	421,841E	5,184	122.2	7.0	108.9	89.1*
399-R	2	6-04-80	855,481N	421,841E	5,184	122.2	7.2	113.3	92.7
400-RA	2	6-04-80	855,481N	421,841E	5,184	122.2	6.9	110.0	90.0
401	5	6-04-80	855,791N	421,402E	5,188	116.9	7.7	105.0	89.9**
402	2	6-04-80	855,791N	421,302E	5,189	126.0	10.5	115.7	91.8
403	2	6-04-80	855,741N	421,202E	5,192	126.0	13.2	112.8	89.5**
404	2	6-04-80	855,791N	421,152	5,194	126.0	12.9	116.0	92.0
405	2	6-04-80	855,320N	421,215E	5,194	126.0	7.3	118.3	93.8
406-A	2	6-04-80	855,320N	421,215E	5,194	126.0	8.6	112.9	89.6**
407-B	2	6-04-80	855,320N	421,215E	5,194	123.5	8.6		
408	2	6-04-80	855,290N	421,270E	5,193	126.0	6.5	115.2	91.4
409	2	6-04-80	855,192N	421,634E	5,191	126.0	8.8	114.8	91.1
410	1	6-04-80	Sta. 19+00		5,190	117.7	17.3	107.1	91.0
411	1	6-04-80	Sta. 21+50		5,189	117.7	16.4	108.8	92.4
412	2	6-05-80	855,800N	421,100E	5,193	122.2	12.8	114.3	93.5
413-A	2	6-05-80	855,800N	421,100E	5,193	122.2	11.7	109.5	89.6**
414-B	2	6-05-80	855,800N	421,100E	5,193	118.3	11.7		
415	2	6-05-80	855,865N	421,743E	5,196	122.2	13.7	114.8	93.9
416-A	2	6-05-80	855,865N	421,743E	5,196	122.2	12.4	115.9	94.9
417	2	6-05-80	855,579N	421,554E	5,184	126.0	10.6	118.6	94.1
418	5	6-05-80	855,435N	420,942E	5,192.5	122.0	14.0	118.6	97.2
419	2	6-05-80	855,335N	420,942E	5,192.5	122.2	6.4	110.4	90.5

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

Test No.	Zone	Date	Location	Elevation (feet)	Maximum Dry Density (pcf)	Moisture Content(%)	Test Dry Density (pcf)	Percent Compaction
420	3	6-06-80	855,375N 421,843E	5,195	120.0	11.6	109.5	91.2
421	3	6-06-80	855,785N 421,843E	5,195	120.0	10.0	114.1	95.1
422	1	6-06-80	Sta. 18+50	5,188	117.7	15.6	102.4	87.0*
423-R	1	6-06-80	Sta. 18+50	5,188	117.7	16.8	108.1	91.8
424	1	6-06-80	Sta. 21+50	5,187	117.7	15.1	107.3	91.2
425	2	6-06-80	855,729N 421,505E	5,185	126.0	8.4	118.4	93.9
426	2	6-06-80	855,729N 421,605E	5,184	126.0	8.7	121.1	96.1
427-A	2	6-06-80	855,729N 421,605E	5,184	126.0	9.8	116.8	92.7
428-B	2	6-06-80	855,729N 421,605E	5,184	122.2	9.8		
429	2	6-06-80	855,579N 421,555E	5,185	122.2	10.0	112.5	92.1
430	2	6-06-80	855,679N 421,655E	5,185	122.2	8.1	115.8	94.8
431	2	6-06-80	855,860N 420,744E	5,196	126.0	13.0	119.0	94.4
432	2	6-06-80	855,895N 420,844E	5,195	126.0	11.8	115.1	91.3
433	1	6-09-80	Sta. 19+00	5,189	117.7	15.3	110.6	93.9
434	1	6-09-80	Sta. 22+00	5,188	117.7	15.9	104.1	88.4*
435-R	1	6-09-80	Sta. 22+00	5,188	117.7	14.9	110.1	93.5
436	2	6-09-80	855,809N 420,534E	5,212	122.2	8.0	120.5	98.6
437	2	6-09-80	855,880N 420,864E	5,196	122.2	9.4	114.4	93.6
438-A	2	6-09-80	855,880N 420,864E	5,195	122.2	9.7	105.3	86.2*
439-B	2	6-09-80	855,880N 420,864E	5,195	120.7	9.7		
440-R	2	6-09-80	855,880N 420,864E	5,195	122.2	10.5	114.1	93.4
441-RA	2	6-09-80	855,880N 420,864E	5,195	122.2	8.1	107.4	87.1*
442-R	2	6-09-80	855,880N 420,864E	5,195	122.2	9.8	118.0	96.6
443-R	2	6-10-80	855,880N 420,864E	5,195	122.2	8.7	120.0	98.2
444-RA	2	6-10-80	855,880N 420,864E	5,195	122.2	9.3	117.1	95.8
445-RB	2	6-10-80	855,880N 420,864E	5,195	122.2	9.3		
446	2	6-09-80	855,297N 421,184E	5,194	122.2	8.0	115.2	94.3
447	2	6-09-80	855,305N 421,607E	5,192	122.2	9.0	117.7	96.3
448	2	6-09-80	855,155N 421,627E	5,191	122.2	9.1	116.3	95.1
449	2	6-10-80	855,751N 421,253E	5,189	122.2	8.8	117.6	96.2
450	2	6-10-80	855,751N 421,153E	5,189	122.2	8.1	111.1	90.9
451-R	2	6-10-80	855,751N 421,153E	5,189	122.2	10.5	119.9	98.1
452	1	6-10-80	Sta. 20+00	5,189	117.7	14.5	109.3	92.9
453	1	6-10-80	Sta. 18+25	5,189	117.7	14.8	107.2	91.6

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>		<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content (%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
454	1	6-10-80	855,167N	421,154E	5,194	117.7	15.1	107.5	91.3
455	1	6-10-80	855,297N	421,149E	5,195	117.7	14.6	110.0	93.4
456	3	6-11-80	855,895N	420,914E	5,195	122.5	12.4	112.2	91.6
457-A	3	6-11-80	855,895N	420,914E	5,195	122.5	10.7	116.4	95.0
458-B	3	6-11-80	855,895N	420,914E	5,195	122.1	10.7		
459	3	6-11-80	855,857N	421,315E	5,188	122.5	9.6	116.2	94.9
460	5	6-11-80	855,422N	421,479E	5,189	122.0	8.6	113.7	93.2
461	1	6-11-80	855,479N	421,505E	5,188	117.7	14.8	108.6	91.7
462	1	6-11-80	Sta. 19+00		5,190	117.7	15.0	106.0	90.0
463	1	6-11-80	Sta. 18+00		5,190	117.7	13.9	111.8	95.0
464	5	6-11-80	855,297N	421,164E	5,195	122.0	14.5	113.7	93.2
465	1	6-11-80	855,280N	421,607E	5,194	117.7	15.4	107.6	91.4
466	1	6-12-80	855,230N	421,607E	5,194	117.7	17.1	105.9	90.0
467-A	1	6-12-80	855,230N	421,607E	5,194	117.7	15.6	105.1	89.3*
468-B	1	6-12-80	855,230N	421,607E	5,194	115.6	15.6		
469-R	1	6-12-80	855,230N	421,607E	5,194	117.7	16.4	108.6	92.2
470	3	6-12-80	855,155N	421,617E	5,193	122.5	9.7	108.5	88.6*
471-R	3	6-12-80	855,155N	421,617E	5,193	122.5	11.4	114.3	93.3
472	1	6-12-80	855,155N	421,632E	5,194	117.7	16.8	105.8	93.3
473	3	6-12-80	855,247N	421,274E	5,195	122.5	12.9	115.3	90.0
474	3	6-12-80	855,381N	421,741E	5,189	122.5	9.1	119.7	97.7
475	3	6-12-80	855,431N	421,691E	5,189	122.5	13.5	114.6	93.6
476	1	6-12-80	855,406N	421,691E	5,190	117.7	14.2	109.4	92.9
477	1	6-12-80	855,616N	421,552E	5,189	117.7	10.9	105.0	89.3
478	1	6-12-80	Sta. 21+50		5,190	117.7	14.4	112.9	95.9
479-A	1	6-12-80	Sta. 21+50		5,190	117.7	14.3	113.1	96.1
480-B	1	6-12-80	Sta. 21+50		5,190	117.2	14.3		
481	1	6-12-80	Sta. 19+50		5,190	117.7	14.5	111.1	94.4
482	3	6-13-80	855,456N	422,431E	5,186	120.0	8.9	108.7	90.6
483	3	6-13-80	855,506N	422,331E	5,186	120.0	6.5	113.6	94.7
484	3	6-13-80	855,569N	422,184E	5,186	120.0	9.9	116.0	96.7
485-A	3	6-13-80	855,569N	422,184E	5,186	120.0	10.8	113.9	94.9
486-B	3	6-13-80	855,569N	422,184E	5,186	118.7	10.8		
487	3	6-13-80	855,481N	422,531E	5,187	120.0	10.6	114.5	95.5
488	1	6-13-80	Sta. 23+00		5,191	117.7	14.7	108.9	92.5

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

Test No.	Zone	Date	Location	Elevation (feet)	Maximum Dry Density (pcf)	Moisture Content(%)	Test Dry Density (pcf)	Percent Compaction
489	1	6-13-80	Sta. 21+50	5,189	117.7	15.0	112.5	95.6
490	1	6-13-80	Sta. 22+50	5,190	117.7	13.9	109.7	93.2
491	1	6-13-80	Sta. 22+00	5,191	117.7	14.8	110.2	93.6
492	1	6-13-80	Sta. 21+00	5,191	117.7	13.9	113.3	96.3
493	1	6-13-80	855,280N 421,607E	5,196	117.7	15.5	113.4	96.3
494	1	6-13-80	855,247N 421,224E	5,197	117.7	17.1	108.1	91.8
495	3	6-16-80	855,381N 422,481E	5,193	120.0	7.9	110.8	92.3
496	3	6-16-80	855,406N 422,406E	5,191	120.0	7.0	112.2	93.5
497-A	3	6-16-80	855,406N 422,406E	5,191	120.0	7.5	107.9	90.0
498-B	3	6-16-80	855,406N 422,406E	5,191	113.4	7.5		
499	3	6-16-80	855,845N 420,894E	5,199	120.0	8.2	114.3	93.3
500	1	6-16-80	Sta. 23+00	5,192	117.7	12.7	110.0	93.5
501	1	6-16-80	Sta. 21+50	5,192	117.7	15.3	112.5	95.7
502	3	6-16-80	855,195N 421,607E	5,196	122.5	9.2	115.7	94.4
503	3	6-16-80	855,197N 421,174E	5,196	122.5	10.3	113.6	92.7
504	1	6-16-80	855,408N 421,763E	5,192	117.7	13.4	105.6	89.7**
505	1	6-16-80	855,591N 421,502E	5,189	117.7	15.3	112.0	95.2
506	1	6-17-80	855,394N 421,883E	5,192	117.7	16.0	103.5	87.9*
507-R	1	6-17-80	855,394N 421,883E	5,192	117.7	15.3	105.0	89.2
508	1	6-17-80	855,544N 421,858E	5,190	117.7	16.0	109.0	92.6
509	5	6-17-80	855,187N 421,624E	5,197	122.0	10.3	114.1	93.5
510-A	5	6-17-80	855,187N 421,624E	5,197	122.0	11.9	110.6	90.7
511-B	5	6-17-80	855,187N 421,624E	5,197	122.0	11.3	114.3	93.7
512	5	6-17-80	855,272N 421,594E	5,197	122.0	11.3	114.3	93.7
513	5	6-17-80	855,297N 421,199E	5,198	122.0	10.9	115.2	94.4
514	5	6-17-80	855,197N 421,694E	5,197	122.0	16.7	108.3	88.8*
515-R	5	6-18-80	855,197N 421,69E	5,197	122.0	9.0	116.7	95.7
516	5	6-17-80	855,297N 421,374E	5,198	122.0	11.0	119.6	98.0
517	5	6-17-80	855,297N 421,374E	5,198	122.0	11.0	119.6	98.0
518	5	6-17-80	Sta. 23+00	5,193	122.0	13.7	117.0	95.9
519-A	5	6-17-80	Sta. 23+00	5,193	122.0	10.6	119.6	98.0
520-B	5	6-17-80	Sta. 23+00	5,193	119.0	10.6		
521	5	6-13-80	Sta. 19+00	5,192	122.0	13.4	114.6	93.9
522	1	6-18-80	Sta. 21+50	5,193	117.7	13.7	112.1	95.2
523	1	6-18-80	Sta. 22+50	5,192	117.7	14.7	110.4	93.8
524	3	6-18-80	855,830N 420,956E	5,200	120.0	8.0	111.2	92.6

- A - S. .ae correlation test
 B - Ot. .nt M&D check
 R - Retest
 * - Failing Test - area proofrolled and retested
 ** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

<u>Test No.</u>	<u>Zone</u>	<u>Date</u>	<u>Location</u>		<u>Elevation (feet)</u>	<u>Maximum Dry Density (pcf)</u>	<u>Moisture Content (%)</u>	<u>Test Dry Density (pcf)</u>	<u>Percent Compaction</u>
525	3	6-18-80	855,695N	420,894E	5,207	120.0	9.4	106.5	88.7*
526-A	3	6-18-80	855,695N	420,894E	5,207	120.0	8.9	107.7	89.8*
527-B	3	6-18-80	855,695N	420,894E	5,207	113.3	8.9		
528-R	3	6-18-80	855,695N	420,894E	5,207	120.0	8.6	115.5	96.2
529	3	6-18-80	855,845N	420,994E	5,198	120.0	9.2	112.7	92.3
530	3	6-18-80	855,795N	420,794E	5,207	120.0	7.3	112.2	93.5
531	3	6-18-80	855,795N	420,994E	5,198	120.0	8.1	110.6	92.2
532	3	6-18-80	855,795N	421,119E	5,195	120.0	12.7	107.7	89.8**
533	1	6-19-80	Sta. 16+00		5,196	117.7	15.6	110.6	94.0
534	1	6-19-80	Sta. 15+00		5,198	117.7	14.4	110.4	93.8
535	1	6-19-80	Sta. 16+00		5,197	117.7	14.9	108.8	92.4
536	1	6-19-80	Sta. 21+50		5,193	117.7	18.0	108.2	91.9
537	1	6-19-80	Sta. 18+00		5,194	117.7	16.8	109.7	93.2
538	1	6-19-80	Sta. 16+10		5,198	117.7	15.1	111.4	94.6
539	1	6-19-80	Sta. 23+00		5,195	117.7	15.0	111.9	95.1
540	5	6-19-80	855,147N	421,619E	5,198	122.0	9.8	110.8	90.8
541	5	6-19-80	855,197N	421,694E	5,198	122.0	10.8	12.5	92.2
542	5	6-19-80	855,247N	421,274E	5,198	122.0	13.0	115.7	94.8
543	3	6-20-80	855,865N	420,906E	5,198	122.5	13.8	115.8	94.5
544-A	3	6-20-80	855,865N	420,906E	5,198	122.5	14.1	116.0	94.7
545-B	3	6-20-80	855,865N	420,906E	5,198	116.0	14.1		
546	3	6-20-80	855,847N	421,232E	5,193	122.5	11.0	117.1	95.6
547	3	6-20-80	855,805N	420,706E	5,212	122.5	10.2	118.8	97.0
548	3	6-20-80	855,855N	420,806E	5,209	122.5	12.3	117.1	95.6
549	3	6-20-80	855,797N	421,407E	5,195	122.5	11.0	129.4	98.3
550	5	6-20-80	855,494N	421,858E	5,193	122.0	13.9	109.2	91.0
551	5	6-20-80	855,591N	421,352E	5,190	122.0	11.7	116.0	95.2
552-A	5	6-20-80	855,591N	421,352E	5,190	122.0	12.6	110.9	90.9
553-B	5	6-20-80	855,591N	421,352E	5,190	120.5	12.6		
554	5	6-20-80	855,741N	421,402E	5,191	122.0	15.9	108.4	88.5*
555-R	5	6-20-80	855,741N	421,402E	5,191	122.0	10.8	111.6	91.5
556	5	6-20-80	855,147N	421,669E	5,198	122.0	7.7	115.7	94.8
557	5	6-20-80	855,247N	421,594E	5,198	122.0	12.2	116.0	95.1
558	5	6-20-80	855,147N	421,644E	5,199	122.0	13.1	108.8	89.2*
559-R	5	6-20-80	855,147N	421,644E	5,199	122.0	11.4	114.6	93.9

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

Test No.	Zone	Date	Location	Elevation (feet)	Maximum Dry Density (pcf)	Moisture Content(%)	Test Dry Density (pcf)	Percent Compaction
560	3	6-23-80	855,177N 421,654E	5,199	122.5	12.0	109.6	89.5*
561	2	6-23-80	855,297N 421,299E	5,198	126.0	15.4	113.9	90.4
562	2	6-23-80	855,272N 421,224E	5,198	126.0	15.2	112.7	89.4*
563	2	6-23-80	855,147N 421,619E	5,201	126.0	9.3	111.4	88.4*
564-A	2	6-23-80	855,147N 421,619E	5,201	126.0	10.8	109.1	86.6*
565-B	2	6-23-80	855,147N 421,619E	5,201	123.8	10.8		
566	1	6-23-80	Sta. 11+00	5,212	117.7	16.0	109.9	93.4
567	1	6-23-80	Sta. 18+50	5,194	117.7	13.2	115.5	98.4
568	1	6-23-80	Sta. 14+00	5,207	177.7	15.1	106.9	90.8
569	1	6-23-80	Sta. 10+00	5,213	117.7	13.3	111.2	94.5
570-R	3	6-24-80	855,147N 421,619E	5,201	120.0	13.3	108.8	90.7
571-RB	3	6-24-80	855,147N 421,619E	5,201	118.1	12.1		
572	1	6-24-80	Sta. 23+25	5,198	117.7	14.7	107.5	91.3
573-A	1	6-24-80	Sta. 23+25	5,198	117.7	12.6	107.7	91.5
574-B	1	6-24-80	Sta. 23+25	5,198	116.3	12.6		
575	1	6-24-80	Sta. 24+00	5,198	117.7	15.2	110.1	93.5
576	1	6-24-80	Sta. 20+00	5,195	117.7	15.1	113.9	96.8
577	1	6-24-80	Sta. 22+00	5,197	117.7	13.1	112.0	95.2
578	5	6-24-80	855,519N 421,888E	5,196	122.0	14.6	110.6	90.7
579	1	6-24-80	855,444N 421,888E	5,196	117.7	16.9	106.3	90.3
580	5	6-24-80	855,394N 421,858E	5,197	122.0	14.5	112.6	92.3
581	5	6-24-80	855,444N 421,888E	5,196	122.0	12.4	112.7	92.4
582	3	6-24-80	855,247N 421,644E	5,202	120.0	10.5	111.3	92.8
583	3	6-24-80	855,197N 421,694E	5,202	120.0	11.9	113.0	94.2
584	3	6-24-80	855,147N 421,644E	5,203	120.0	18.4	106.4	88.7*
585-R	3	6-24-80	855,147N 420,644E	5,203	120.0	12.3	119.6	99.7
586	3	6-25-80	855,286N 421,739E	5,205	122.5	13.9	116.2	94.9
587	3	6-25-80	855,369N 421,608E	5,203	122.5	12.6	111.9	91.3
588	3	6-25-80	855,222N 421,249E	5,200	122.5	15.3	113.2	92.4
589	3	6-25-80	855,201N 421,281E	5,199	122.5	12.3	117.5	95.9
590	3	6-25-80	855,118N 421,614E	5,202	122.5	11.9	117.2	95.7
591	1	6-25-80	Sta. 23+50	5,198	117.7	15.3	110.4	93.8
592	1	6-25-80	Sta. 21+50	5,196	117.7	13.9	110.2	93.6
593	1	6-25-80	Sta. 24+25	5,200	117.7	15.8	107.8	91.6
594	1	6-25-80	855,369N 421,883	5,197	117.7	16.2	107.5	91.3
595-A	1	6-25-80	855,369N 421,883	5,197	117.7	14.6	107.3	91.2
596-B	1	6-25-80	855,369N 421,883	5,197	115.2	14.6		

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted

FIELD DENSITY TESTS (Cont)

Test No.	Zone	Date	Location		Elevation (feet)	Maximum Dry Density (pcf)	Moisture Content(%)	Test Dry Density (pcf)	Percent Compaction
597	1	6-25-80	855,641N	421,522E	5,193	117.7	15.1	113.3	96.3
598	1	6-25-80	855,516N	421,552E	5,193	117.7	14.2	115.6	94.8
599	1	6-25-80	855,444N	421,858E	5,195	117.7	16.1	109.4	89.7**
600	2	6-26-80	855,118N	421,664E	5,202	122.2	11.6	114.1	93.4
601-A	2	6-26-80	855,118N	421,664E	5,202	122.2	13.9	109.9	89.9**
602-B	2	6-26-80	855,118N	421,664E	5,202	117.6	13.9		
603	2	6-26-80	855,297N	421,204E	5,200	122.2	9.5	116.9	95.7
604	2	6-26-80	855,258N	421,514E	5,202	122.2	11.5	117.9	96.5
605	2	6-26-80	855,368N	421,589E	5,201	122.2	13.8	113.0	92.5
606	2	6-26-80	855,218N	421,764E	5,201	122.2	10.2	112.3	91.9
607	3	6-26-80	855,451N	421,841E	5,194	122.5	8.9	114.1	92.1
608	1	6-26-80	855,481N	421,641E	5,187	117.7	10.8	111.6	94.8
609	3	6-26-80	855,716N	421,477E	5,186	122.5	11.6	120.8	98.6
610	3	6-27-80	855,691N	421,427E	5,190	122.5	10.5	112.7	92.0
611	1	6-27-80	855,592N	421,688E	5,189	117.7	12.4	110.0	93.5
612	3	6-27-80	855,541N	421,552E	5,192	122.5	10.5	114.1	93.1
613	1	6-27-80	855,297N	421,423E	5,195	117.7	14.1	112.8	95.8
614	1	6-27-80	855,475N	421,179E	5,195	117.7	13.4	108.7	92.3
615	1	6-27-80	855,425N	421,229E	5,195	117.7	13.4	108.6	92.3
616	1	6-27-80	855,118N	421,739E	5,196	117.7	12.9	112.7	95.8
617	1	6-30-80	855,475N	421,029E	5,196	117.7	14.2	109.5	93.0
618	1	6-30-80	855,118N	421,739E	5,205	117.7	16.9	113.3	92.4
619	1	6-30-80	855,193N	421,664E	5,204	117.7	13.1	111.7	92.8
620	1	6-30-80	855,475N	421,229E	5,198	117.7	12.2	115.2	94.2
621	1	6-30-80	855,475N	421,104E	5,195	117.7	14.8	112.4	88.7*
622-A	1	6-30-80	855,475N	420,104E	5,195	117.7	13.1	111.3	99.7
623-B	1	6-30-80	855,475N	421,104E	5,195	116.6	13.1		
624	1	6-30-80	855,218N	421,574E	5,200	117.7	15.9	114.9	97.6
625	1	6-30-80	855,544N	421,003E	5,198	117.7	17.0	108.9	92.5
626	5	7-01-80	855,158N	421,714E	5,205	122.0	16.7	111.0	91.0
627	5	7-01-80	855,238N	421,689E	5,203	122.0	14.6	113.2	92.8
628	5	7-01-80	855,418N	421,514E	5,199	117.7	13.4	111.1	94.4
629	5	7-01-80	855,422N	421,134E	5,197	122.0	14.4	112.9	92.5
630-A	5	7-01-80	855,422N	421,134E	5,197	122.0	11.3	120.1	98.5
631-B	5	7-01-80	855,422N	421,134E	5,197	118.7	11.3		

A - Sandcone correlation test

B - One point M&D check

R - Retest

* - Failing Test - area proofrolled and retested

** - Failing Test - area proofrolled and accepted