

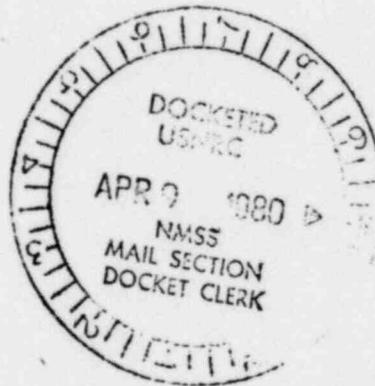
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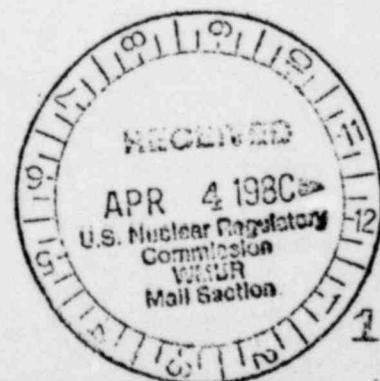
LPDR

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REPORT ON CONSTRUCTION INSPECTION
AND EMBANKMENT MONITORING PROGRAM
TAILINGS DAM EXPANSION PROJECT
MOAB MILL
MOAB, UTAH
FOR ATLAS MINERALS



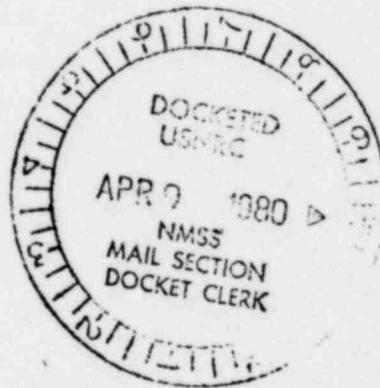
Dames & Moore Job No. 05467-027-06
Salt Lake City, Utah
February 22, 1980



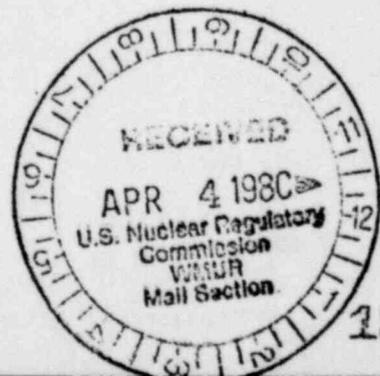
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REPORT ON CONSTRUCTION INSPECTION
AND EMBANKMENT MONITORING PROGRAM
TAILINGS DAM EXPANSION PROJECT
MOAB MILL
MOAB, UTAH
FOR ATLAS MINERALS



Dames & Moore Job No. 05467-027-06
Salt Lake City, Utah
February 22, 1980



15964

REPORT ON CONSTRUCTION INSPECTION
AND EMBANKMENT MONITORING PROGRAM
TAILINGS DAM EXPANSION PROJECT
MOAB MILL
MOAB, UTAH
FOR ATLAS MINERALS

INTRODUCTION

This report presents the results of our construction inspection and embankment monitoring program performed during the tailings dam expansion project at the Moab Mill for Atlas Minerals. The construction inspection program consisted of supervising the preparation and placement of compacted structural fill required to raise the existing tailings dam crest to elevation 4,058 feet. The embankment monitoring program primarily consisted of monitoring the existing embankment piezometers and the construction of three additional piezometers along the western embankment. The layout of the tailings dam with the approximate location of the borrow area and the new embankment addition is presented on Plate 1, Plot Plan.

The construction inspection and embankment monitoring programs generally conformed to the project specifications and in accordance with an addendum to the Nuclear Regulatory License No. SUA-917 issued to Atlas Minerals on October 29, 1979.

DAM DESIGN AND SPECIFICATIONS

Specifications followed for construction of the final dam stages are generally as presented in the following reports:

"Report of Engineering Design Study Additions to Tailings Pond Embankment System, Moab, Utah, For Atlas Minerals," Dames & Moore, Job No. 05467-018-06, dated February 15, 1978.

"Report of Supplementary Study, Geotechnical Evaluation of Tailing Pond Embankment System, Moab, Utah, For Atlas Minerals," Dames & Moore, Job No. 05467-023-06, dated February 16, 1979.

"Contract Specification and Drawings for Tailings Embankment Expansion Project, Twelve Foot Raise, For Atlas Minerals, Moab, Utah," Dames & Moore, Job No. 05467-026-06, dated August, 1979.

These reports were reviewed by the Nuclear Regulatory Commission with discussions authored by Dr. Terry Howard, Consulting Geotechnical Engineer as follows:

"Review of Expansion of Atlas tailings Retention System, Atlas Uranium Mill, Moab, Utah," Dr. Terry Howard, P.E., dated July 11, 1979.

"Review of Contract Specifications and Drawings for Tailing Embankment, Atlas Uranium Mill, Moab, Utah," Dr. Terry Howard, P.E., dated September 20, 1979.

"Review of Expansion of Atlas tailings Retention System, Addendum No. 1, Atlas Uranium Mill, Moab, Utah," Dr. Terry Howard, P.E., dated September 1979.

In brief, the design of the embankment addition required the placement of a silty sand fill obtained from an adjacent borrow area outlined on Plate 1. The western portion of the embankment was to be constructed utilizing a "downstream" form of construction with the remaining portion utilizing "upstream" construction.

The crest of the embankment was to be established at elevation 4,058 feet and was to be constructed in accordance with the lines and grades presented in the aforementioned reports.

EARTHWORK OPERATIONS

GENERAL

The general contractor for the earthwork operations was Nielson Incorporation from Cortez, Colorado. Principal construction operations commenced with foundation stripping operations on about October 22, 1979 and extended through final cleanup operations on December 14, 1979. The work was performed basically on an eight hour day, five days a week schedule with an estimated 293,000 cubic yards of fill material placed in a total of approximately 40 working days. Fill placement rates were typically about 6,000 to 9,000 cubic yards per day.

Weather conditions were such that there were only occasional brief delays due to inclement weather. Freezing was not considered a significant problem and no special procedures for removing frost were required.

SURVEYING

A stationing system was established by the contractor to provide survey control for the embankment construction.

* American Association of State Highway and Transportation Officials.

Initially, the toes of the embankment addition (both inboard and outboard toes) were staked at least every 100 feet and fill requirements were written on the stakes. To monitor the fill progress, periodic surveys were performed during construction. All field control tests were located using this survey reference.

EQUIPMENT

Fill hauling equipment consisted of four to six Caterpillar 633 scrapers. Within the borrow area, one or two Caterpillar D6 dozers were utilized to sort oversized rocks and to maintain proper grades. One or two graders were utilized for the spreading and general grading of the placed fill. One or two 40 ton rubber tire compactors were used to aid the compaction operation. A Caterpillar, 631 B, 10,000 magnum water truck was available on site to provide additional moisture to the fill soils as required.

EARTHWORK PROCEDURES

Foundation preparation for the proposed embankment generally consisted of stripping vegetation and organic soils, scarifying the surficial soils and recompacting them to the specifications for compacted fill. However, in areas where the embankment addition was to be constructed upon the tailings sand beach, scarification and compaction prior to fill placement was not possible due to the inability of the tailings sand to support the construction equipment. To construct the embankment

addition on the beach, scrapers would haul and dump fill material on nearly firm ground and dozers would push the fill out onto the beach. This process resulted in an initial lift which varied from 8 to 24 inches.

The embankment fill was obtained from the adjacent borrow area designated on Plate 1. The fill material was brought to near optimum moisture content by prewetting the borrow area with a system of irrigation sprinklers. Scrapers were utilized to transport the fill to the tailings pond where it was bladed and spread in maximum eight-inch loose lifts. Compaction was generally accomplished through a combination of wheel rolling by scrapers and the systematic routing of the 40 ton compactors. Additional moisture was added as needed by wetting the placed fill with a water truck. Occasionally, oversized rocks were observed within the fill. When encountered, such material was bladed from the fill by available graders.

EARTHWORK OBSERVATIONS AND FIELD CONTROL TESTING

GENERAL

Earthwork operations were performed under the direct supervision of a full time earthwork technician, Mr. Neal Backman of American Testing Laboratories, Inc., of Salt Lake City, Utah. American Testing was under subcontract to Dames & Moore and their services began with the commencement of earthwork operations and extended through to the completion of construction.

Mr. Backman's responsibilities were outlined in discussions between representatives of Atlas Minerals and Dames & Moore. Mr. Backman's main purpose was to observe the construction activities and perform the necessary field control tests to assure conformance with the plans and specifications and the Material Source License No. SUA-917. Daily written reports summarizing the field control test results and the project status were prepared by Mr. Backman.

Mr. James Zitnik was Dames & Moore's project engineer. Mr. Zitnik made approximately weekly site visits during construction to answer technical questions and to review the results of field control tests and observations made by Mr. Backman. Weekly summary reports were prepared by Mr. Zitnik, copies of which appear in the appendix to this report.

FIELD CONTROL TESTING

Field control testing was performed to confirm compliance with the material and compaction specifications given in the project plans. The field control testing basically consisted of three types of tests. The three tests are:

1. Gradation Tests
2. Compaction Tests
3. Field Density Tests

A discussion of these tests and a tabulation of the results are presented in the following sections.

GRADATION TESTS

During construction, gradation tests were performed on representative samples of material obtained from both the borrow and fill areas. The results of the gradation tests were used to confirm the general consistency of the fill. The test results indicate that the gradation of the fill was relatively consistent and conformed to the limits considered in the aforementioned design reports. The tests were performed in accordance with the ASTM* Test Designation D-422 (Particle-Size Analysis of Soils, Washed Sieve Method). A summary of the test results is presented in the appendix to this report.

COMPACTION TESTS

Compaction tests were performed on representative samples of the fill during construction operations to evaluate the maximum dry densities and optimum moisture contents. The compaction tests were performed in accordance with the AASHTO T-180 and T-99 Method of Compaction. The results of the tests are presented on Plates 2A and 2B.

FIELD DENSITY TESTS

Field density tests were performed as the fill operations progressed. The field density tests were performed in accordance with the ASTM Designation D-1556-64 (sand-cone method) and D-2922 (nuclear method). The compaction criteria was based upon 95

* American Society for Testing and Materials.

percent of the maximum dry density as determined by the AASHTO-T180 Method of Compaction. When the results indicated that an area had not been compacted to the specified degree of compaction, the fill material was carefully inspected to determine the limits of the poorly compacted material and the cause of the failure. Generally, the lower density resulted from one or a combination of the following:

1. Excess lift thickness
2. Insufficient or excessive moisture
3. Insufficient compact effort

After the limits of the lower density material had been established, the material was either removed or reworked and compacted until the specified degree of compaction had been achieved. The locations, elevations and results of the field density tests are presented in the attached Summary of In-Place Density Tests presented in the appendix to this report. The stationing system which was used to locate the tests is shown on the attached Plot Plan, Plate 1.

CONCLUSIONS

Based upon the results of the field testing and construction inspection, it is our opinion the embankment construction has been performed in accordance with the specifications set forth in the project specifications and the U.S. Nuclear Regulatory Commission Source Materials License SUA-917.

EMBANKMENT SURVEY

Surveyed embankment cross sections were performed before and after construction operations. The surveys were performed on approximately 100 foot centers along the embankment alignment. The survey work was performed under the supervision of Mr. Tom Phillips of Nielson Inc. The embankment sections on 600 foot centers are presented on Plates 3 and 4.

EMBANKMENT MONITORING PROGRAM

GENERAL

In accordance with the plans and specifications and the Nuclear Regulatory Commission Material Source License No. SUA-917, an embankment monitoring program was undertaken. The program consisted primarily of monitoring the water levels within the existing embankment piezometers during the duration of the construction operation and the installation of three new piezometers along the western embankment.

PIEZOMETER MONITORING

The existing piezometers within the tailings embankment were monitored on a daily basis for the duration of construction operations. The purpose of the monitoring program was to detect any construction induced increase in pore pressure which could result in a lower factor of safety within the embankment. Should

there have been any significant rise in water levels within the piezometers, Dames & Moore was to have been notified and appropriate operational recommendations made.

The piezometers were monitored by Atlas personnel with the daily recordings entered in graphical form as requested by Dr. Howard. Piezometric data recorded during the duration of construction operations are presented on Plates 5 and 6. Available data was reviewed by a Dames & Moore engineer (Mr. Zitnik) during his weekly site inspections. There was no indication of any significant increase in pore pressures within the embankment during the duration of construction operations.

PIEZOMETER INSTALLATION

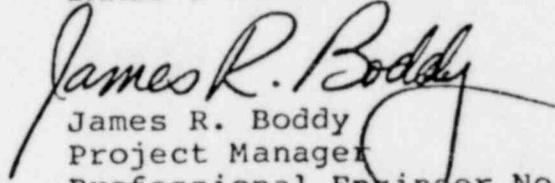
As dictated in the specifications, three piezometers were installed along the western embankment. The piezometers were established within five feet of the centerline of the final embankment crest with approximate locations as shown on Plate 1. The installation of the piezometers was performed by the Cooper Drilling Company from Moab, Utah under the direct supervision of representatives of Dames & Moore in accordance with the plans and specifications. A cross sectional view of the piezometers as constructed is presented on Plate 7.

oOo

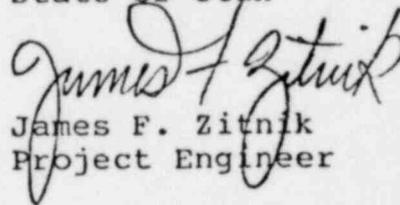
We appreciate being a part of this tailing dam expansion project. If you have any questions regarding this report, please contact us.

Very truly yours,

DAMES & MOORE



James R. Boddy
Project Manager
Professional Engineer No. 4445
State of Utah

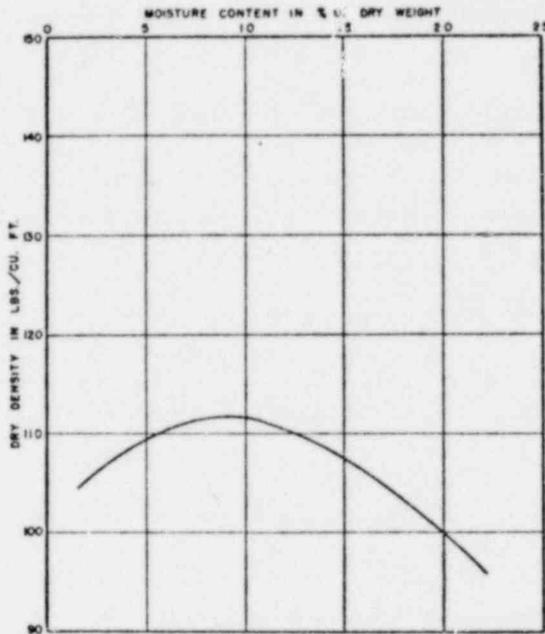


James F. Zitnik
Project Engineer

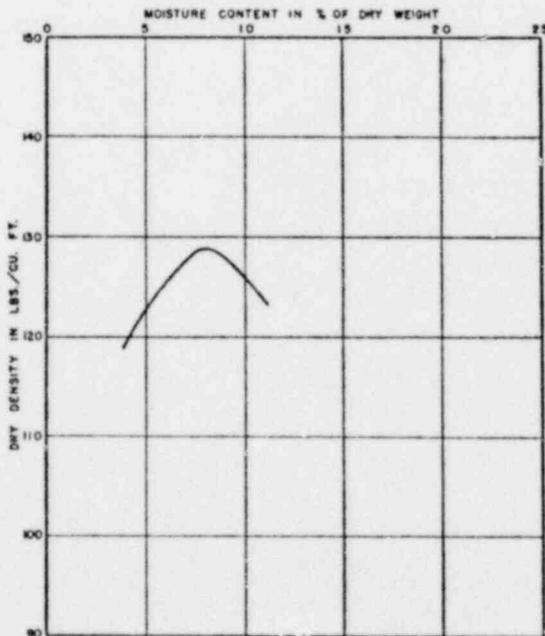
JRB/JFZ/jb

Attachments: Plate 1 - Plot Plan
Plates 2A and 2B - Compaction Test Data
Plates 3 and 4 - Embankment Profiles
Plates 5 and 6 - Piezometer Readings
Plate 7 - Piezometers Along Western Embankment

SAMPLE NO. _____ DEPTH _____ ELEVATION _____
 SOIL REDDISH-BROWN SILTY SAND
 LOCATION MOAB
 OPTIMUM MOISTURE CONTENT 8.5 PERCENT
 MAXIMUM DRY DENSITY 112 LBS. PER CUBIC FOOT
 METHOD OF COMPACTION T-99



SAMPLE NO. _____ DEPTH _____ ELEVATION _____
 SOIL REDDISH-BROWN SILTY SAND
 LOCATION BORROW AREA
 OPTIMUM MOISTURE CONTENT 8.0 PERCENT
 MAXIMUM DRY DENSITY 129 LBS. PER CUBIC FOOT
 METHOD OF COMPACTION T-150

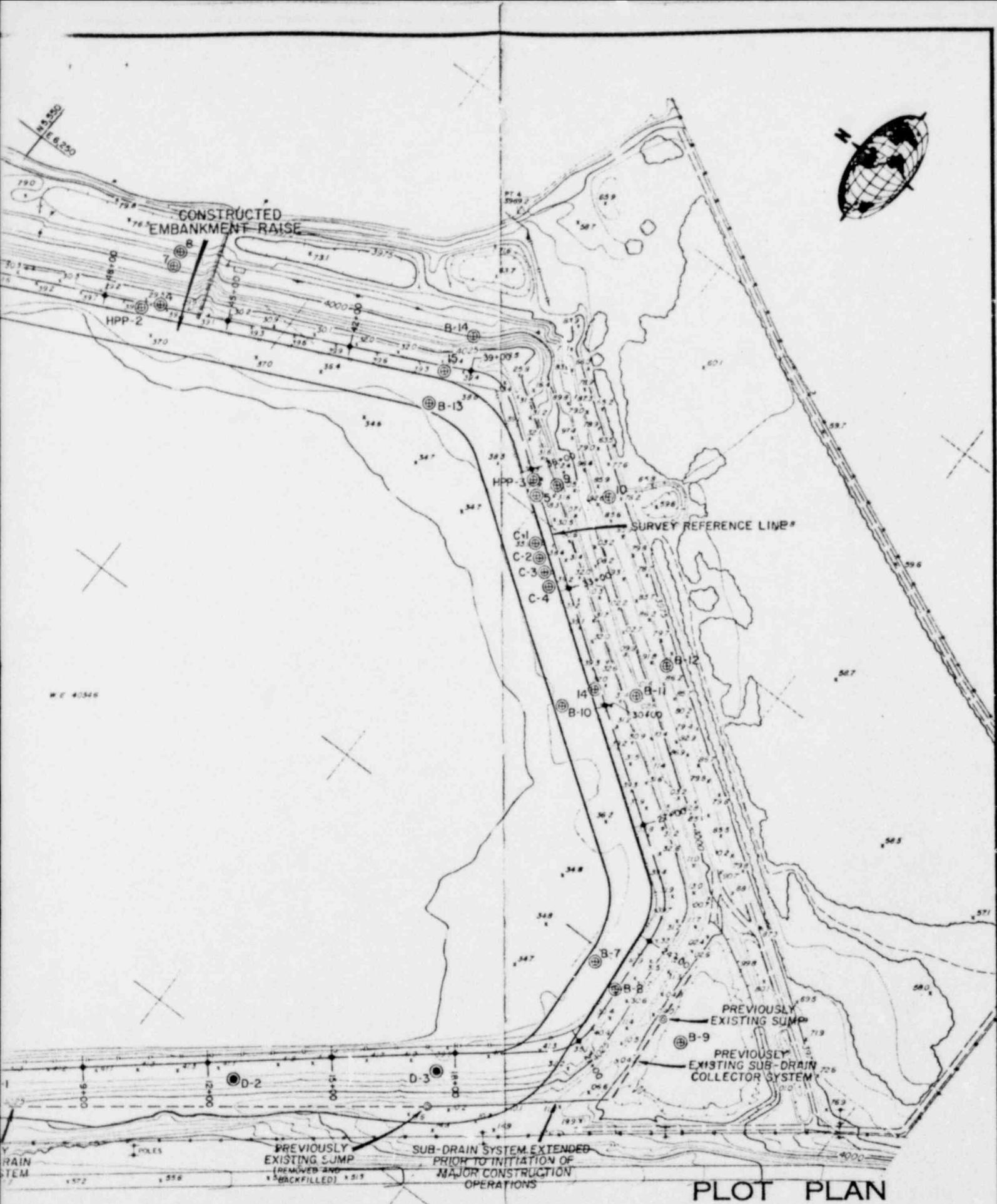


COMPACTION TEST DATA

POOR ORIGINAL

REVISIONS
 BY _____ DATE _____
 BY _____ DATE _____
 PLATE _____ OF _____

FILE # 2-15-57-227
 BY A.L.S. NICHOLS
 DATE 1-1-60
 CHECKED BY _____ DATE _____



W.C. 40346

PLOT PLAN

POOR ORIGINAL

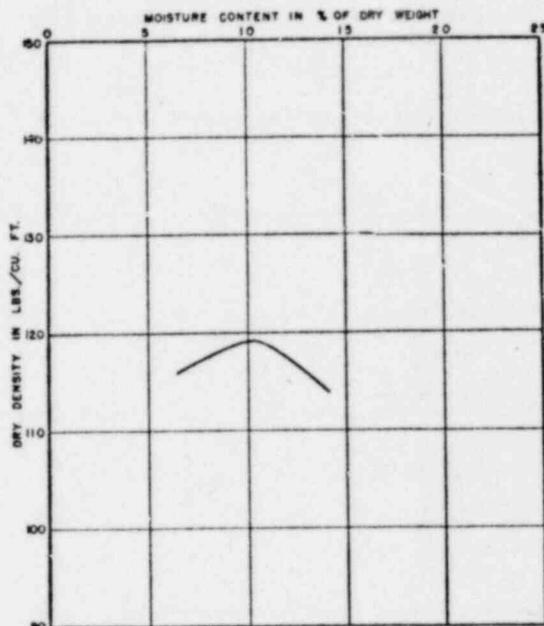
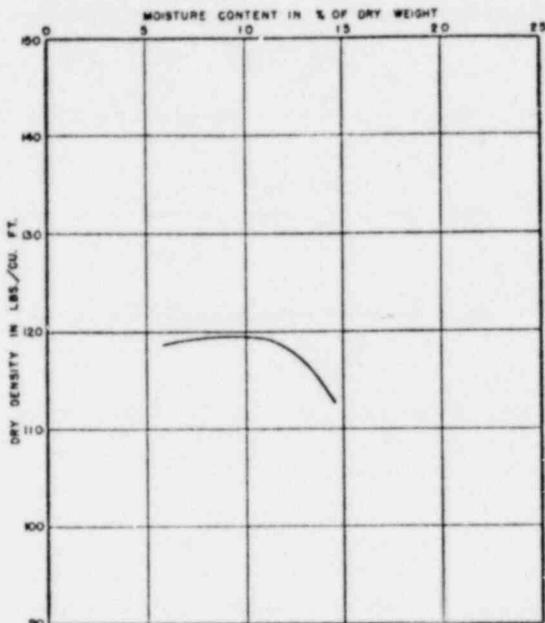
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E. 5730

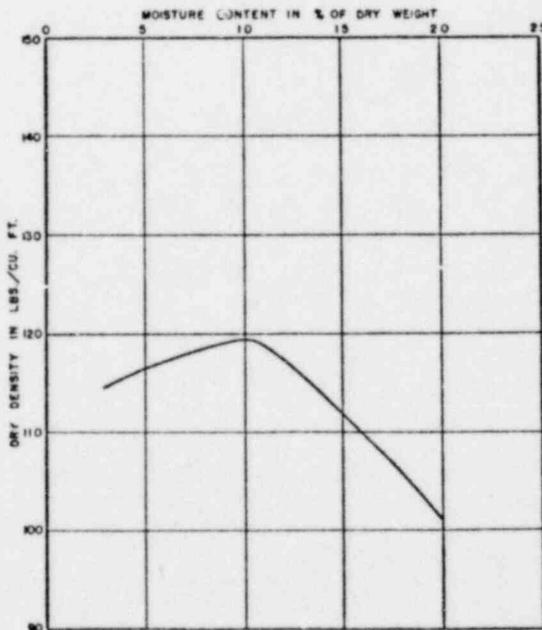
N. 3500

SAMPLE NO. _____ DEPTH _____ ELEVATION _____
 SOIL REDDISH-BROWN SILTY SAND
 LOCATION BORROW AREA
 OPTIMUM MOISTURE CONTENT 9.8 PERCENT
 MAXIMUM DRY DENSITY 120 LBS. PER CUBIC FOOT
 METHOD OF COMPACTION T-180

SAMPLE NO. _____ DEPTH _____ ELEVATION _____
 SOIL REDDISH-BROWN SILTY SAND
 LOCATION BORROW AREA
 OPTIMUM MOISTURE CONTENT 10.6 PERCENT
 MAXIMUM DRY DENSITY 119 LBS. PER CUBIC FOOT
 METHOD OF COMPACTION T-180



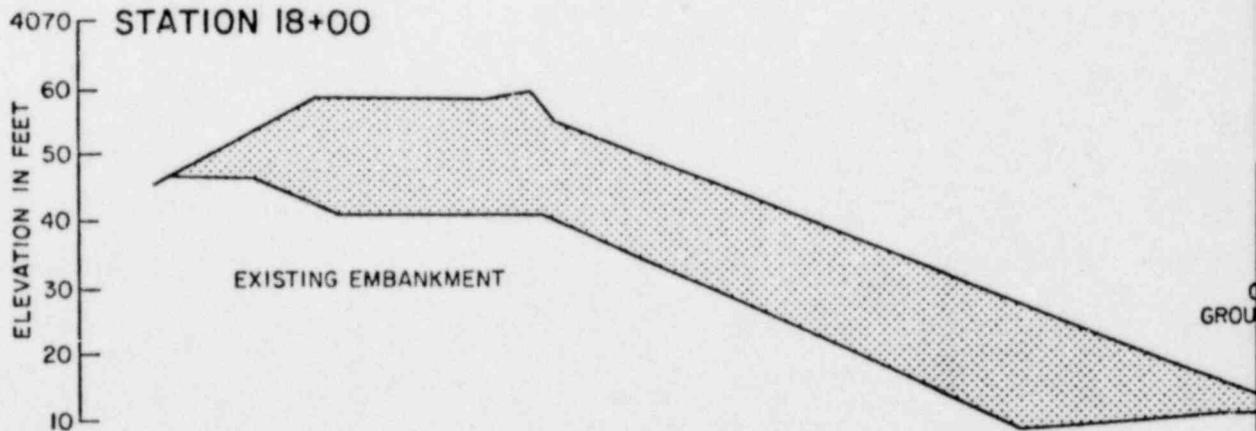
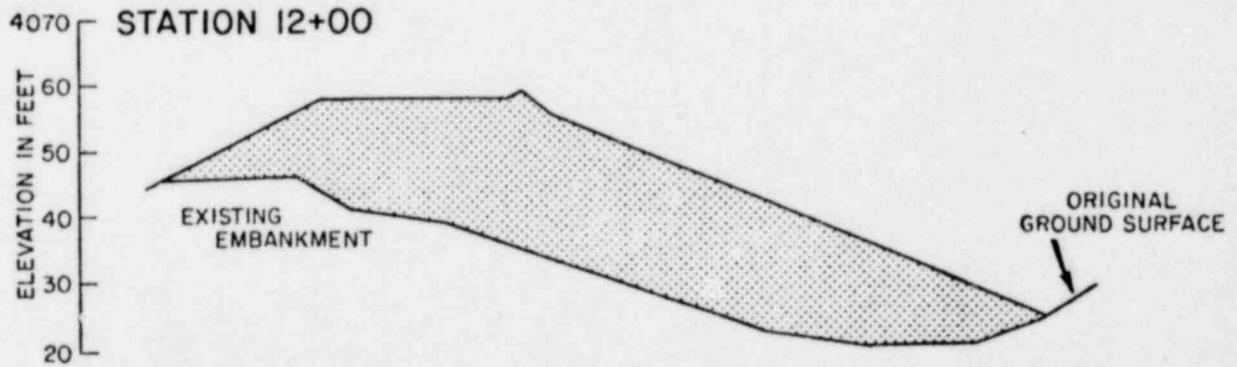
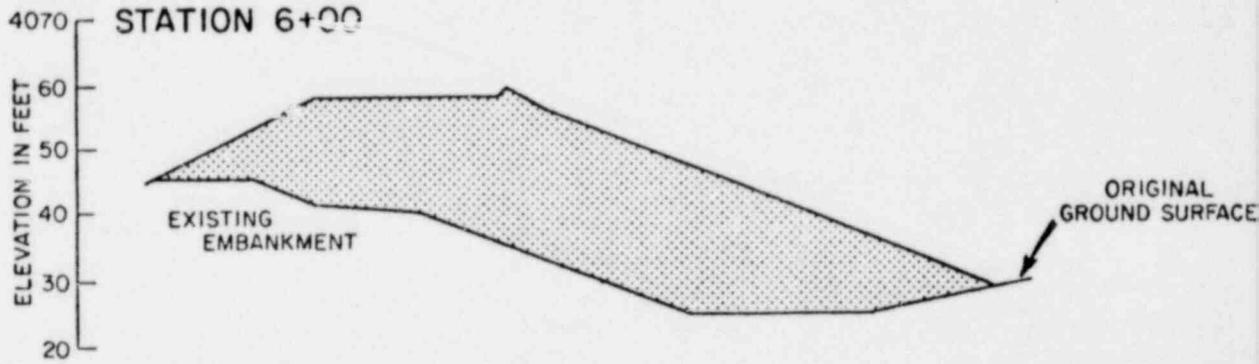
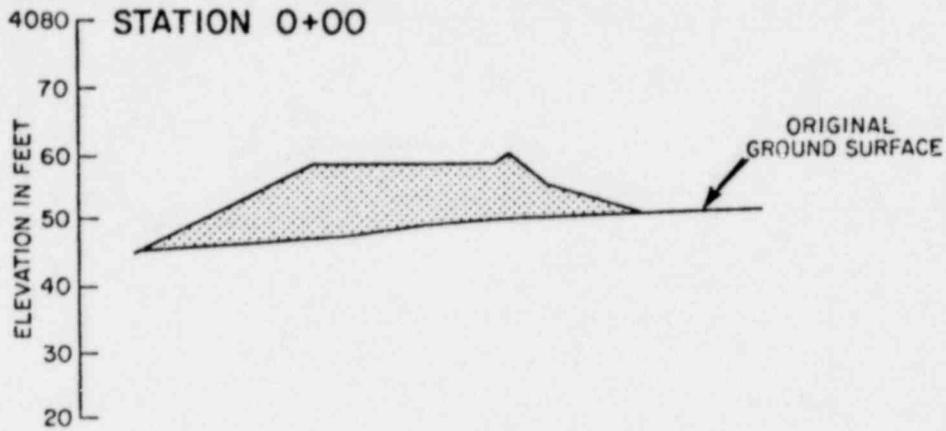
SAMPLE NO. _____ DEPTH _____ ELEVATION _____
 SOIL REDDISH-BROWN SILTY SAND
 LOCATION MOAB
 OPTIMUM MOISTURE CONTENT 10.5 PERCENT
 MAXIMUM DRY DENSITY 120 LBS. PER CUBIC FOOT
 METHOD OF COMPACTION T-180



COMPACTION TEST DATA

REVISIONS
 BY _____ DATE _____
 BY _____ DATE _____
 PLATE _____ OF _____

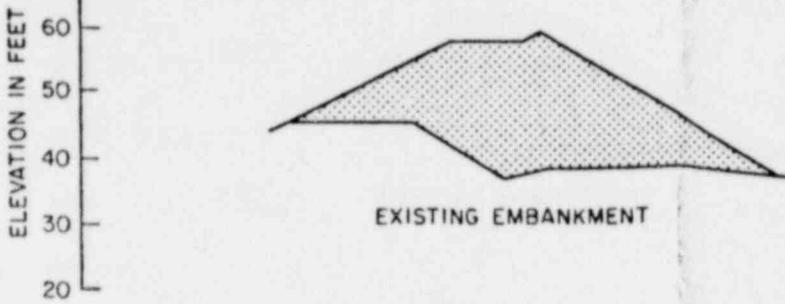
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 BY _____ DATE _____
 CHECKED BY _____ DATE _____



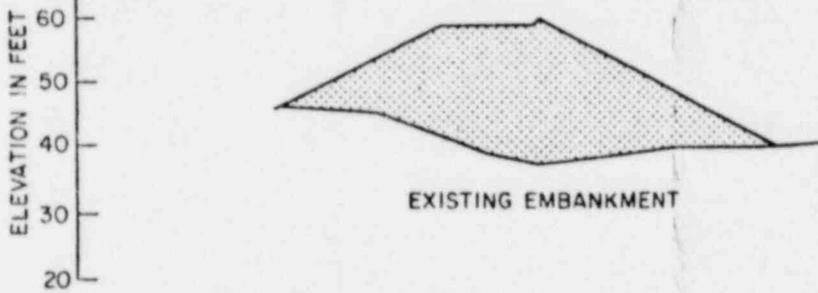
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FILE: DS467-027
 BY: _____ DATE: _____
 CHECKED BY: _____ DATE: _____

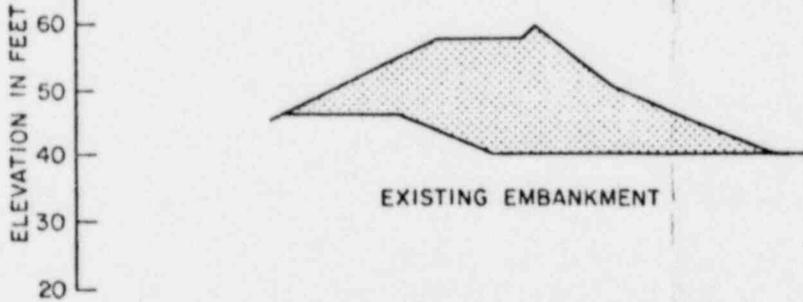
4070 STATION 24+00



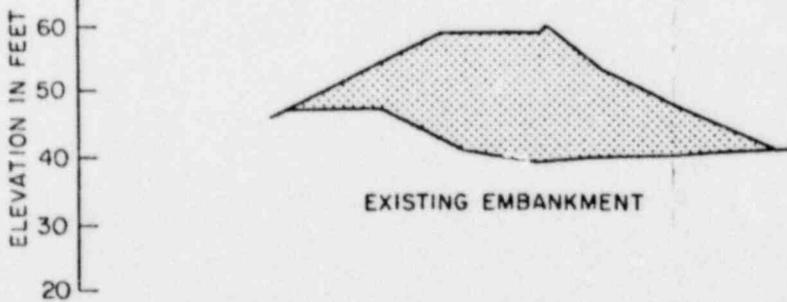
4070 STATION 30+00



4070 STATION 36+00



4070 STATION 42+00



AL
RFACE

EMBANKMENT PROFILES

4070 STATION 72+00

ELEVATION IN FEET
60
50
40
30
20

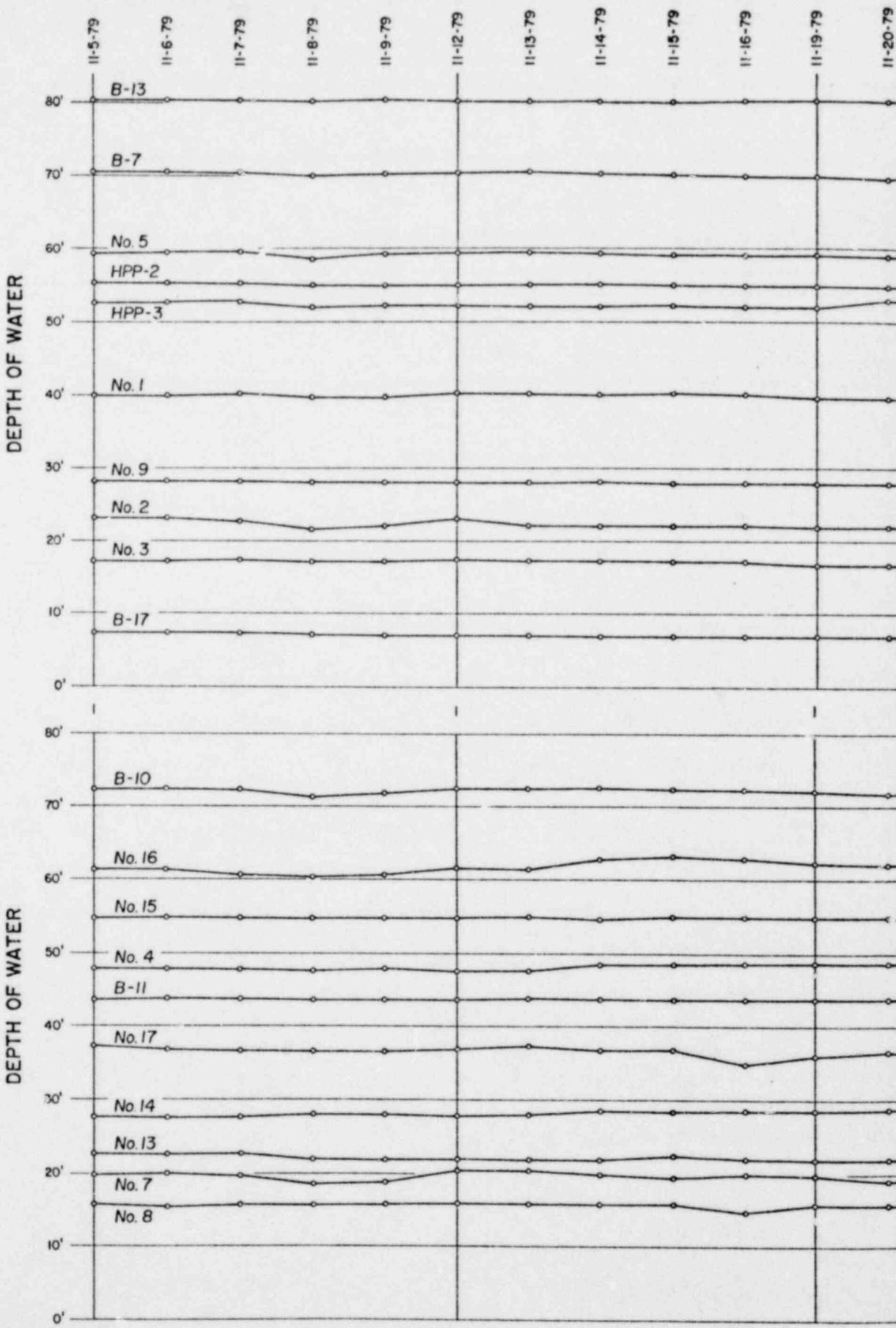
ORIGINAL
GROUND SURFACE



EMBANKMENT PROFILES

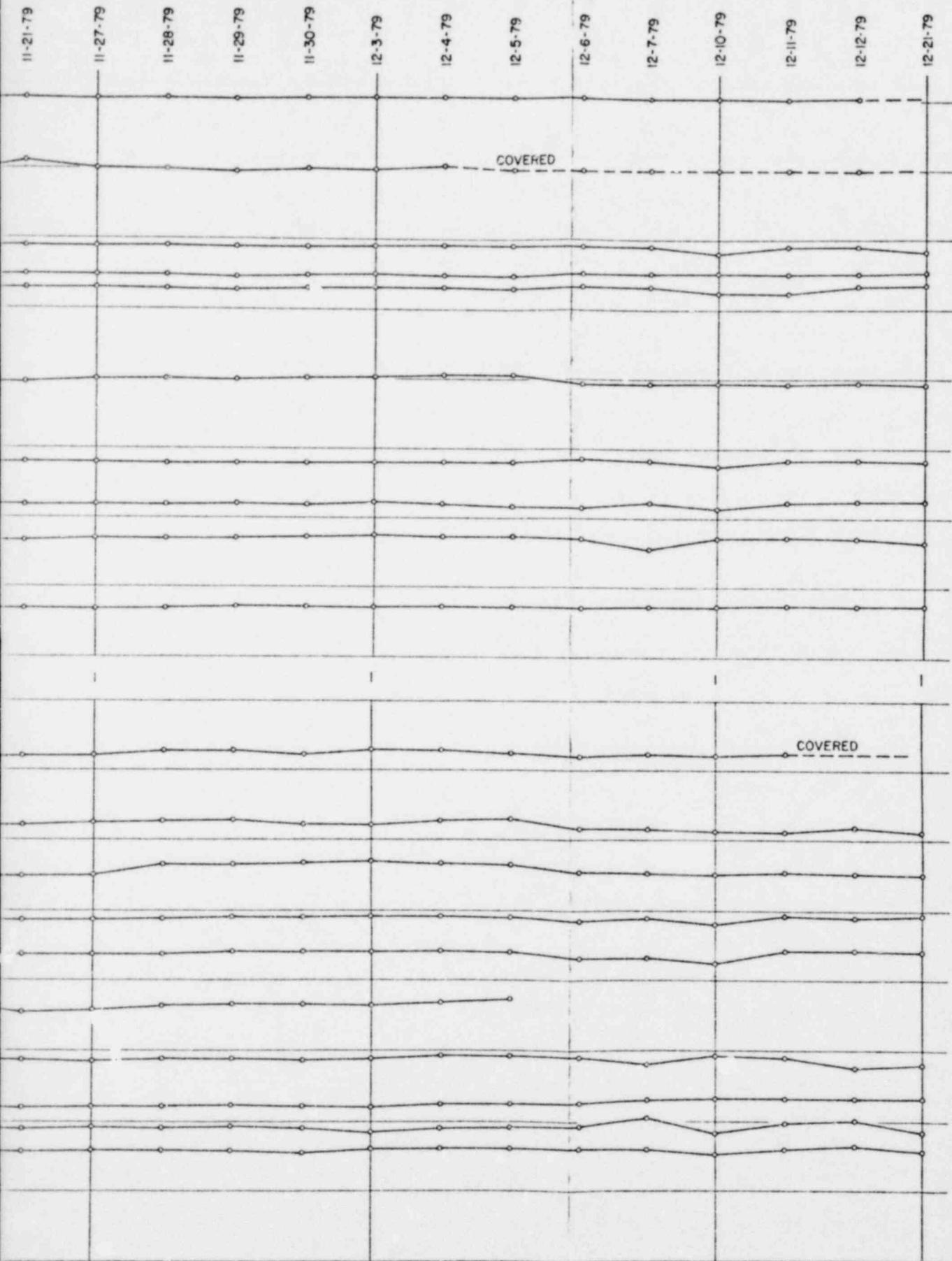
REVISIONS
BY _____ DATE _____
BY _____ DATE _____
PLATE _____ OF _____

FILE D-5247-201
BY _____ DATE _____
CHECKED BY _____ DATE _____



NOTE
PIEZOMETER LOCATIONS ARE
REFERENCED ON PLATE 1.

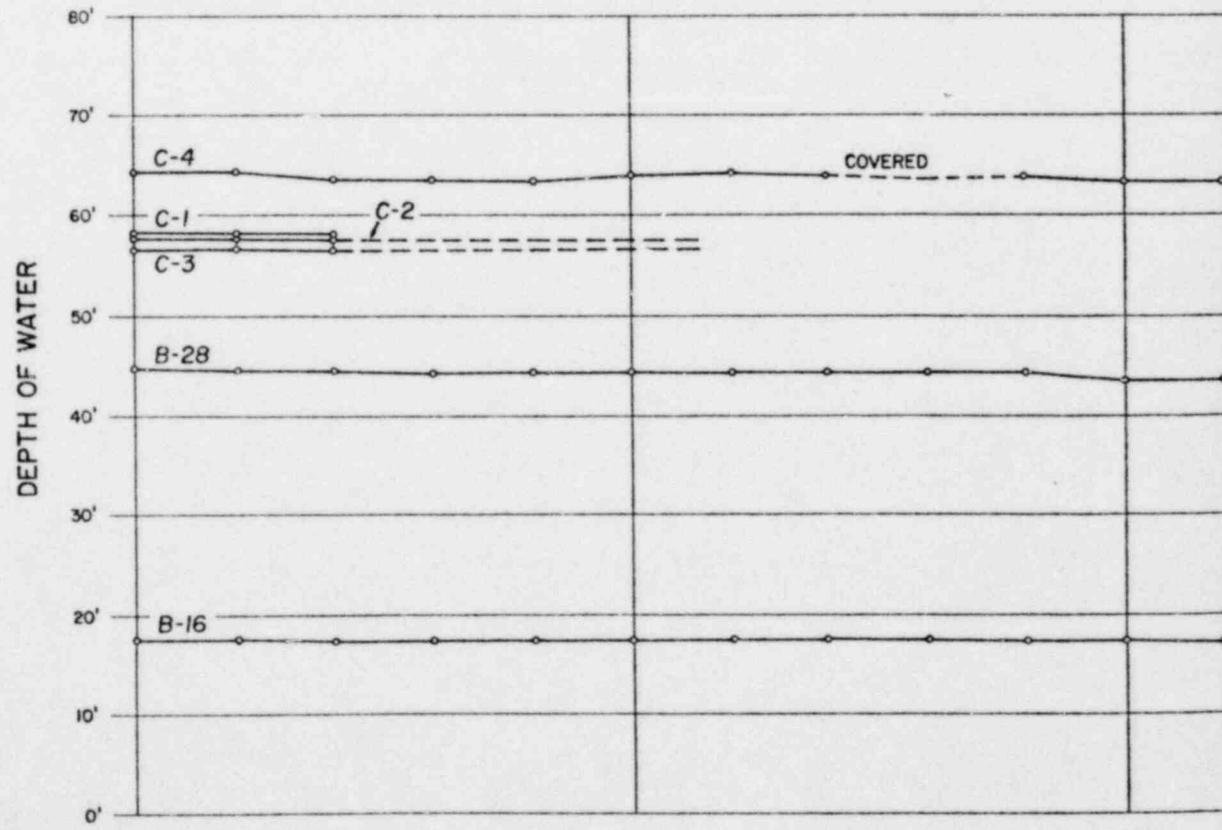
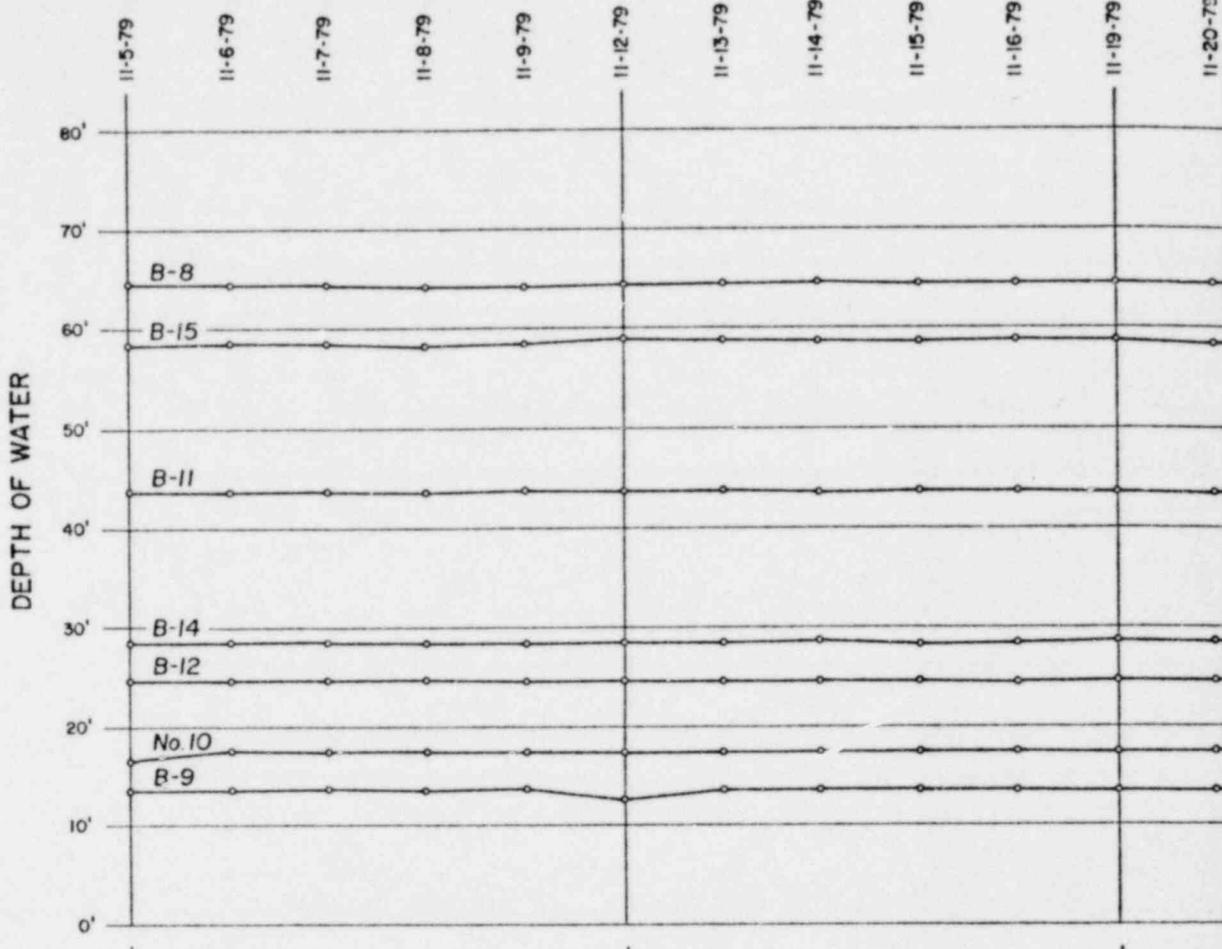
OF READING.



PIEZOMETER READINGS

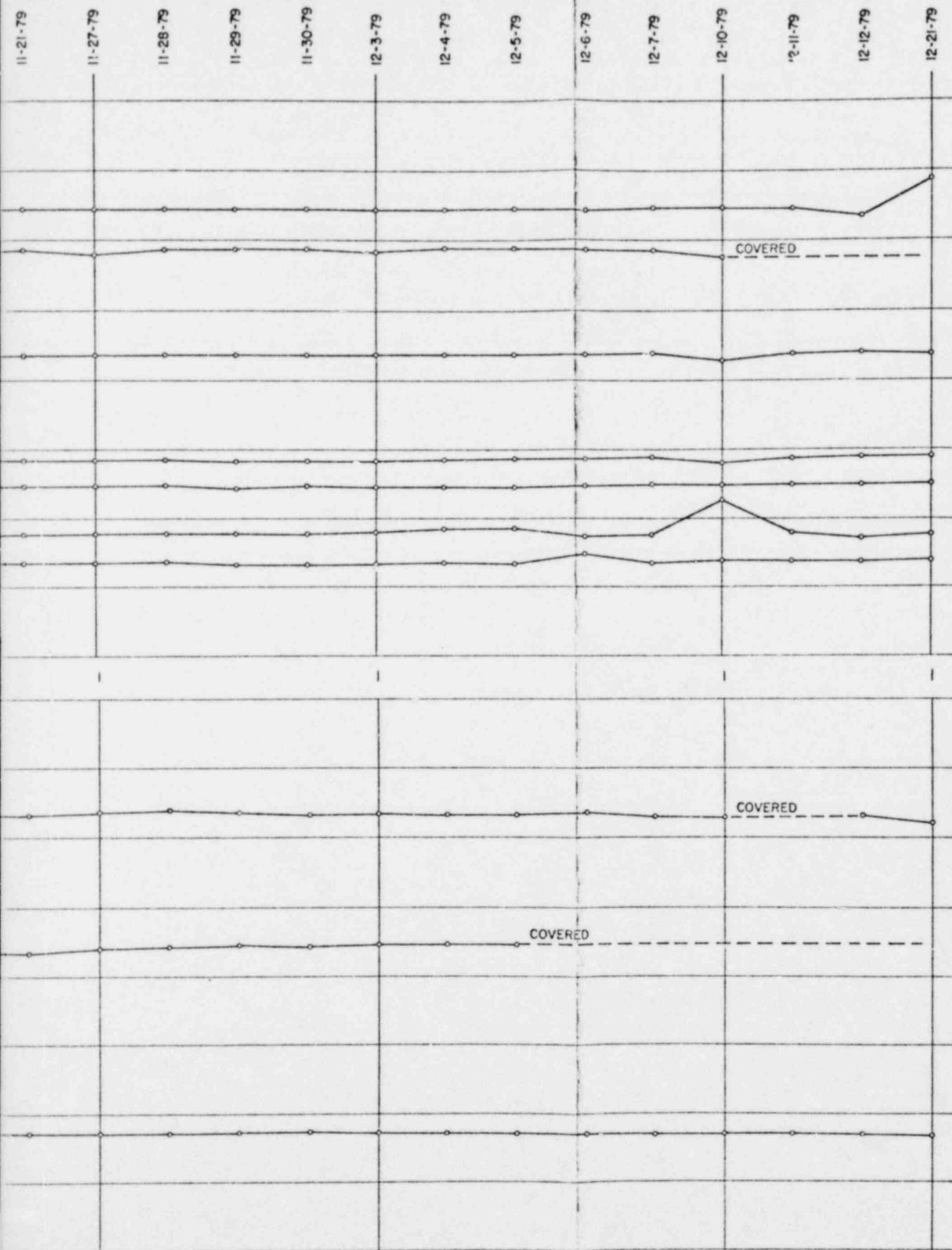
REVISIONS
 BY _____ DATE _____
 BY _____ DATE _____
 PLATE _____ OF _____

FILE _____
 BY _____ DATE _____
 CHECKED BY _____ DATE _____



NOTE
 PIEZOMETER LOCATIONS ARE
 REFERENCED ON PLATE 1.

OF READING .



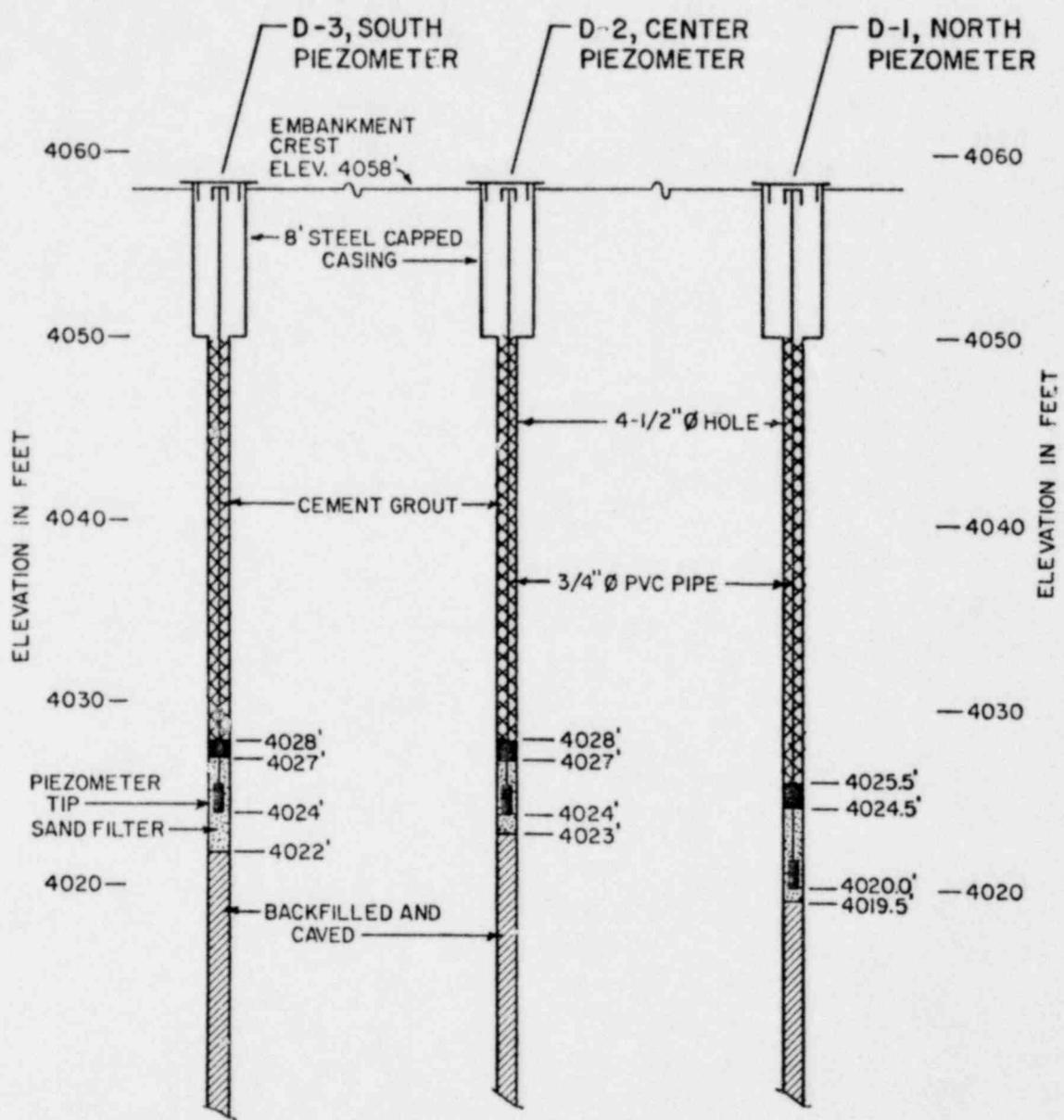
POOR ORIGINAL

PIEZOMETER READINGS

REVISIONS
BY _____ DATE _____

FILE *046.7* ATLAS

BY *H.B.* DATE *1-8-80*
CHECKED BY _____



NOTE
PIEZOMETER LOCATIONS ARE REFERENCED ON PLATE 1.

PIEZOMETERS ALONG WESTERN EMBANKMENT

SUMMARY OF GRADATION TEST RESULTS

PERCENT PASSING BY WEIGHT

U.S. Standard Sieve No.

	<u>1/2"</u>	<u>3/8"</u>	<u>#4</u>	<u>#8</u>	<u>#16</u>	<u>#30</u>	<u>#50</u>	<u>#100</u>	<u>#200</u>
12/12/79	98.5	98.1	97.5	96.7	95.3	91.2	81.0	52.5	18.1
12/12/79	-	97.8	93.8	88.2	82.7	81.0	75.5	48.7	20.5
12/05/79	97.3	95.6	91.8	88.5	84.4	74.8	66.7	55.8	25.7
12/03/79	97.9	96.5	93.3	90.2	85.0	82.9	76.9	54.7	18.3
11/28/79	99.1	99.0	98.9	98.6	98.2	96.9	89.7	57.9	15.1
11/26/79	98.0	96.8	90.4	83.1	76.6	70.7	63.6	41.2	20.9
11/21/79	95.9	92.1	87.9	85.0	83.0	78.0	72.0	42.7	18.4
11/18/79	100.0	99.4	99.2	99.0	98.7	98.2	90.4	51.1	14.0
11/15/79	98.2	97.3	95.1	92.5	89.4	86.1	78.6	48.7	19.3
11/15/79	95.5	94.7	91.0	88.2	86.2	82.0	79.2	48.6	17.4
11/13/79	98.2	97.2	93.6	90.7	88.7	84.0	78.0	48.5	20.1
11/09/79	98.4	97.9	95.8	93.1	90.5	87.8	80.7	49.7	18.9
11/06/79	99.4	99.0	97.6	95.9	93.6	91.2	83.6	50.1	18.0
11/05/79	96.6	95.2	92.5	90.1	87.7	85.4	78.2	47.3	16.2
11/01/79	-	98.0	93.1	88.9	84.0	80.3	74.8	51.1	20.8
10/30/79	-	79.5	67.0	51.4	40.4	33.5	28.7	21.3	11.4
10/29/79	-	89.9	83.8	73.9	64.1	58.8	53.9	39.9	28.0
10/26/79	-	-	85.2	75.9	65.5	57.4	51.7	40.6	32.7
10/25/79	-	-	91.7	87.3	82.5	78.3	71.8	41.2	16.5
10/24/79	-	-	87.3	81.8	76.2	71.2	66.2	51.5	31.6
10/23/79	-	-	85.0	78.6	71.7	66.4	62.1	51.3	31.3

SUMMARY OF IN-PLACE DENSITY TESTS

<u>TEST NO.</u>	<u>DATE</u>	<u>LOCATION</u>	<u>ELEVATION</u>	<u>MAXIMUM DRY DENSITY IN P.C.F.</u>	<u>REQUIRED DENSITY IN PERCENT</u>	<u>FILL MOISTURE IN PERCENT</u>	<u>FILL DRY DENSITY IN P.C.F.</u>	<u>PERCENT COMPACTION</u>	<u>REMARKS</u>
1	10/22/79	3+50		134.2	95	7.3	129.5	96	
2	"	12+00		"	"	7.1	114.8	86	*
3	"	17+00		"	"	10.8	124.1	92	
4	"	18+75		"	"	9.3	130.8	97	
5	10/23/79	5+25		129.0	"	8.5	125.8	97	
6	"	8+00		"	"	9.6	119.9	93	*
7	"	10+00		"	"	10.0	124.5	97	
8	"	15+00		"	"	9.5	123.2	96	
9	"	18+00		"	"	6.4	126.8	98	
10	"	18+75		"	"	7.9	126.5	98	
11	10/24/79	3+00	4,032	"	"	9.8	123.4	96	
12	"	6+00	4,029	"	"	7.7	126.8	98	
13	"	9+00	4,027	"	"	8.8	128.3	99	
14	"	12+00	4,026	"	"	6.7	130.9	100	
15	10/25/79	72+80	4,043	"	"	6.4	129.8	100	
16	"	70+00	4,042	"	"	9.0	127.5	99	
17	"	66+00	4,044	"	"	8.1	129.0	100	
18	"	64+00	4,044	"	"	8.8	126.8	98	
19	"	12+00	4,032	"	"	8.2	126.8	98	
20	"	12+00	4,031	"	"	8.8	129.4	100	
21	"	17+00	4,018	"	"	8.3	121.6	94	
22	"	18+25	4,017	"	"	7.0	123.3	96	
23	"	12+75	4,017	"	"	9.4	126.0	97	
24	"	7+50	4,020	"	"	9.2	121.7	95	

* Material was reworked and compacted to required specifications.

-Continued-

A-2

DAMES & MOORE

SUMMARY OF IN-PLACE DENSITY TESTS

-CONTINUED-

<u>TEST NO.</u>	<u>DATE</u>	<u>LOCATION</u>	<u>ELEVATION</u>	<u>MAXIMUM DRY DENSITY IN P.C.F.</u>	<u>REQUIRED DENSITY IN PERCENT</u>	<u>FILL MOISTURE IN PERCENT</u>	<u>FILL DRY DENSITY IN P.C.F.</u>	<u>PERCENT COMPACTION</u>	<u>REMARKS</u>
25	10/26/79	65+00	4,040	129.0	95	6.9	122.8	95	
26	"	63+00	4,040	"	"	7.2	124.3	96	
27	"	60+00	4,041	"	"	4.9	122.4	95	
28	"	57+00	"	"	"	6.3	123.7	96	
29	"	54+00	"	"	"	5.7	123.2	96	
30	10/29/79	54+00	"	"	"	4.2	122.8	95	
31	"	60+00	"	"	"	6.7	121.8	95	
32	"	63+00	4,040	"	"	5.3	120.6	94	*
33	"	3+75	4,046	"	"	4.2	124.2	96	
34	"	9+00	4,030	"	"	5.9	121.8	95	
35	10/29/79	12+00	4,020	"	"	4.6	120.4	93	*
36	"	18+00	4,013	"	"	4.9	122.0	95	
37	10/30/79	6+00	4,025	"	"	7.4	126.4	98	
38	"	7+00	"	"	"	6.8	127.8	99	
39	"	9+00	4,030	"	"	5.7	122.7	95	
40	"	17+00	4,025	"	"	6.1	123.1	95	
41	"	18+75	4,025	"	"	4.9	121.9	95	
42	10/31/79	3+00	4,030	"	"	6.9	123.4	96	
43	"	5+00	"	"	"	7.4	122.7	95	
44	"	12+00	4,028	"	"	7.2	124.0	96	
45	"	18+00	4,020	"	"	6.5	126.2	98	
46**	"	9+00	4,031	"	"	6.8	122.9	95	
47**	"	64+00	4,040	"	"	7.0	121.2	94	*

* Material was reworked and compacted to required specifications.

** Sand cone density tests.

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DAMES & MOORE

SUMMARY OF IN-PLACE DENSITY TESTS

-CONTINUED-

<u>TEST NO.</u>	<u>DATE</u>	<u>LOCATION</u>	<u>ELEVATION</u>	<u>MAXIMUM DRY DENSITY IN P.C.F.</u>	<u>REQUIRED DENSITY IN PERCENT</u>	<u>FILL MOISTURE IN PERCENT</u>	<u>FILL DRY DENSITY IN P.C.F.</u>	<u>PERCENT COMPACTION</u>	<u>REMARKS</u>
48	11/02/79	18+00	4,027	119.6	95	7.8	115.4	96	
49	"	9+00	4,031	"	"	6.9	113.9	95	
50	"	38+00	4,040	"	"	8.4	117.6	98	
51	"	58+00	4,043	"	"	7.8	114.7	96	
52	"	36+00	4,042	"	"	6.7	113.8	95	
53	"	21+00	4,032	"	"	6.0	116.2	97	
54	11/05/79	64+00	4,044	"	"	4.8	108.9	91	*
55	"	60+00	4,042	"	"	5.0	109.5	97	*
56	"	42+00	4,041	"	"	4.5	110.0	92	*
57	"	40+00	4,042	"	"	7.2	112.5	94	*
58	"	62+00	4,043	"	"	5.9	118.5	99	
59	"	40+00	4,042	"	"	5.5	114.2	95	
60	"	38+00	"	"	"	5.0	114.2	95	
61	"	32+00	"	"	"	6.1	114.0	95	
62	11/06/79	14+00	4,032	"	"	5.2	109.8	92	*
63	"	12+00	4,031	"	"	5.4	109.3	91	*
64	"	9+00	4,041	"	"	5.4	106.5	89	*
65	"	6+00	"	"	"	3.5	121.7	101	
66	"	9+00	"	"	"	7.0	126.9	98	
67	"	12+00	4,031	"	"	6.9	128.0	99	
68	"	14+00	4,032	"	"	5.2	119.0	100	
69	11/06/79	16+00	4,029	"	"	4.9	121.0	101	
70	11/07/79	17+00	"	"	"	7.1	114.3	95	

* Material was reworked and compacted to required specifications.

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DAMES & MOORE

SUMMARY OF IN-PLACE DENSITY TESTS

-CONTINUED-

<u>TEST NO.</u>	<u>DATE</u>	<u>LOCATION</u>	<u>ELEVATION</u>	<u>MAXIMUM DRY DENSITY IN P.C.F.</u>	<u>REQUIRED DENSITY IN PERCENT</u>	<u>FILL MOISTURE IN PERCENT</u>	<u>FILL DRY DENSITY IN P.C.F.</u>	<u>PERCENT COMPACTION</u>	<u>REMARKS</u>
94	11/14/79	12+00	4,043	119.6	95	6.5	113.8	95	
95	"	44+00	4,047	"	"	7.0	115.6	97	
96	11/15/79	69+00	"	"	"	7.4	116.7	98	
97	"	18+00	4,042	"	"	6.8	114.3	96	
98	"	44+00	4,050	"	"	7.1	114.9	96	
99	11/16/79	6+00	4,045	"	"	6.9	114.8	96	
100	"	19+00	"	"	"	7.3	115.9	95	
101	"	43+00	4,049	"	"	5.8	114.0	95	
102	"	49+00	4,048	"	"	7.6	114.3	96	
103	11/19/79	46+00	4,051	129.0	"	9.3	120.8	94	*
104	"	49+00	4,050	"	"	8.0	124.5	96	
105	"	58+00	4,048	"	"	8.6	124.3	96	
106	"	67+00	4,047	"	"	7.4	128.0	99	
107	"	17+00	"	"	"	7.7	126.3	98	
108	"	6+00	"	"	"	7.5	124.7	97	
109	11/20/79	39+00	4,048	"	"	8.3	124.6	96	
110	"	9+00	4,047	"	"	8.9	122.9	95	
111	11/21/79	18+00	"	119.6	"	7.9	116.5	97	
112	11/26/79	6+00	4,048	"	"	7.4	115.4	96	
113	"	14+00	4,053	"	"	6.9	114.7	96	
114	11/27/79	12+00	4,049	"	"	7.3	115.4	96	
115	"	6+00	4,050	"	"	6.9	116.9	98	
116	11/28/79	49+00	4,054	"	"	7.8	117.9	99	

* Material was reworked and compacted to required specifications.

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JAMES G. MOORE

SUMMARY OF IN-PLACE DENSITY TESTS

-CONTINUED-

<u>TEST NO.</u>	<u>DATE</u>	<u>LOCATION</u>	<u>ELEVATION</u>	<u>MAXIMUM DRY DENSITY IN P.C.F.</u>	<u>REQUIRED DENSITY IN PERCENT</u>	<u>FILL MOISTURE IN PERCENT</u>	<u>FILL DRY DENSITY IN P.C.F.</u>	<u>PERCENT COMPACTION</u>	<u>REMARKS</u>
117	11/28/79	51+00	4,051	119.6	95	7.6	117.4	98	
118	11/29/79	18+00	4,050	"	95	7.9	115.2	96	
119	"	36+00	4,054	"	"	6.9	114.7	96	
120	12/03/79	54+00	4,05	"	"	7.8	117.9	99	
121	"	68+00	4,049	"	"	8.2	118.0	99	
122	"	14+00	4,055	"	"	7.5	115.3	96	
123	12/04/79	38+00	4,052	"	"	7.2	115.9	97	
124	"	67+00	4,050	"	"	6.9	117.8	98	
125	"	60+00	"	"	"	7.3	116.2	98	
126	12/05/79	30+00	4,053	129.0	"	7.4	116.8	98	
127	"	59+00	4,052	"	"	7.8	118.3	99	
128	12/06/79	62+00	4,056	"	"	7.3	114.6	96	
129	"	29+00	4,057	"	"	7.9	117.3	99	
130	12/10/79	57+00	"	"	"	7.9	117.9	99	
131	"	5+00	"	"	"	8.3	116.0	97	
132	"	16+00	"	"	"	8.1	117.3	98	
133	12/11/79	56+00	4,058	"	"	7.8	114.0	95	
134	"	54+00	"	119.6	"	8.3	116.2	97	
135	"	18+00	"	"	"	5.0	115.9	97	
136**	"	6+00	"	"	"	8.0	113.9	95	

** Sand cone density tests.

DAMES & MOOREJOB ENGINEER'S FIELD REPORT
EARTHWORK AND FOUNDATION INSPECTION

JOB LOCATION Moab, Utah		JOB NUMBER 5467-027-0106	
CLIENT OR OWNER Atlas Minerals		REPORT SEQUENCE NUMBER 1	
GENERAL LOCATION OF INSPECTION Moab, Utah (Tailings Area)		DATE 10-17-79	DAY OF WEEK Wed.
GENERAL CONTRACTOR Nielsons, Inc.	EARTHWORK CONTRACTOR Nielsons, Inc.	PAGE 1 of 3	
OWNER'S CONTACT Larry Jacobs	CONTRACTOR'S CONTACT Rick Keck	JOB ENGINEER Jim Boddy	
REPORT DISTRIBUTION Rick Keck, Larry Jacobs		WEATHER Clear, 75°	

SUPPLEMENTARY REPORT (OBSERVATIONS and RECOMMENDATIONS)

On October 16, 1979, Jim Boddy and Jim Zitnik visited the Atlas Mineral Moab mill. The purpose of this site visit was to discuss the placement of the reference line around the entire tailings pond area, as well as agree upon the best location of the dike embankment within the transition zones at the north and south ends of the western embankment. Also, it was necessary to discuss the borrow material quantities and general construction schedules with Atlas Mineral and Nielsons.

Boddy and Zitnik met with Larry Jacobs of Atlas Minerals and Tom Phillips, the surveyor for Nielsons. Phillips has obtained the necessary bench mark and base line data from John Keough, Surveyor. At the time of our visit, Phillips had the lay-out of the reference survey line half completed. Upon inspecting the two transition areas an agreement was reached upon the actual center line for the new embankment within those areas. Also, it was agreed upon that the embankment cross-section will be constructed such that the toe of the in-board slope will not extend beyond the in-board most point along the existing six-foot dike crest (that is no sloughing should occur over the in-board side of the existing, six-foot high dike.)

Tom Phillips estimated that it will be approximately two days

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JOB ENGINEER'S FIELD REPORT EARTHWORK AND FOUNDATION INSPECTION

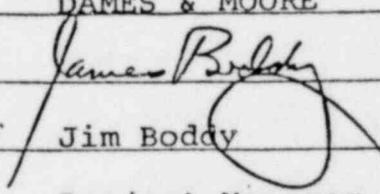
to complete the initial pre-construction survey. The cross-sections that are to be taken at 100-foot intervals will be completed before any site preparations work has begun. It was agreed that the stripping foundation preparations would include taking off only a couple of inches of surface	JOB NUMBER 5467-027-0106	
	REPORT SEQUENCE NUMBER 1	
	DATE 10-17-79	DAY OF WEEK Wed.
	PAGE 2 of 3	
	JOB ENGINEER Jim Boddy	
	WEATHER Clear, 75°	

material and, therefore, would not drastically effect the before-cross-section survey. Phillips will be contacting either Boddy or Zitnik by October 19, to discuss any problems he might have had during survey work.

At the time of receiving all the survey information from Phillips, we will re-estimate the amount of fill material required during construction-as well as re-estimate the available borrow material quantities in the existing borrow site. Hopefully, Phillips will be able to give us more survey information on the existing borrow site. Thus, we will have a better idea of the amount of material available in the borrow area.

At two locations along the existing embankment (approximately station 23+00 and 60+00) seepage water is carried from sumps located at the downstream toe of the slope, back into the tailings pond, by means of a two-inch PVC pipe extending over the existing embankment. The problem of what to do with these pipes during construction were discussed with Rick Keck and Larry Jacobs. It was decided that these lines would be removed during construction and the seepage water in the sumps would be allowed to discharge into a holding area at station 23+00 and to discharge into a low area in the borrow site near station 60+00. After construction of the new embankment is complete at those stations, new PVC pipe will be extended over the crest of the embankment to again discharge seepage water into the tailing pond.

DAMES & MOORE
JOB ENGINEER'S FIELD REPORT
EARTHWORK AND FOUNDATION INSPECTION

It was estimated by Rick Keck that the placement of fill would begin in approximately Monday or Tuesday of next week. Jim Zitnik plans to visit the site at that time. Also, our proposed schedule would be to have the American Testing Laboratories' technician on the site sometime on the week-end of October 20th.	<table border="1" style="width: 100%; border-collapse: collapse;"><tr><td colspan="2">JOB NUMBER 5467-027-0106</td></tr><tr><td colspan="2">REPORT SEQUENCE NUMBER 1</td></tr><tr><td>DATE 10-17-79</td><td>DAY OF WEEK Wed.</td></tr><tr><td colspan="2">PAGE 3 of 3</td></tr><tr><td colspan="2">JOB ENGINEER Jim Boddy</td></tr><tr><td colspan="2">WEATHER Clear, 75°</td></tr></table>	JOB NUMBER 5467-027-0106		REPORT SEQUENCE NUMBER 1		DATE 10-17-79	DAY OF WEEK Wed.	PAGE 3 of 3		JOB ENGINEER Jim Boddy		WEATHER Clear, 75°	
JOB NUMBER 5467-027-0106													
REPORT SEQUENCE NUMBER 1													
DATE 10-17-79	DAY OF WEEK Wed.												
PAGE 3 of 3													
JOB ENGINEER Jim Boddy													
WEATHER Clear, 75°													
<p>Sincerely</p> <p>DAMES & MOORE</p> <p></p> <p>Jim Boddy</p> <p>Project Manager</p>													
<p>cc: Larry Jacobs, Atlas Minerals</p> <p>Rick Keck, Neilsons, Inc.</p>													

DAMES & MOORE

JOB ENGINEER'S FIELD REPORT EARTHWORK AND FOUNDATION INSPECTION

JOB LOCATION Moab, Utah		JOB NUMBER 05467-027-06	
CLIENT OR OWNER Atlas Minerals		REPORT SEQUENCE NUMBER 2	
GENERAL LOCATION OF INSPECTION Moab, Utah (Tailings Area)		DATE 10/22/79	DAY OF WEEK Monday
GENERAL CONTRACTOR Nielsens, Inc.	EARTHWORK CONTRACTOR Nielsens, Inc.	PAGE 1 of 1	
OWNER'S CONTACT Larry Jacobs	CONTRACTOR'S CONTACT Rick Keck	JOB ENGINEER James Zitnik	
REPORT DISTRIBUTION Rick Keck, Larry Jacobs		WEATHER Clear, 65°	

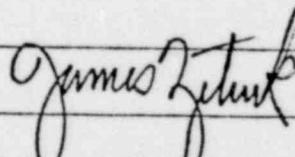
SUPPLEMENTARY REPORT (OBSERVATIONS and RECOMMENDATIONS)

On October 22, 1979 Jim Zitnik of Dames & Moore visited the Atlas Minerals Moab mill. The purpose of the visit was to brief the soils technician assigned to the project. The duties of the technician consisted of observing the earthwork operations and to perform field compaction, gradation and density tests to confirm compliance with the design specifications. The technician assigned to the project was Mr. Neal Backman of American Testing Lab.

Mr. Zitnik initially met with Mr. Jacobs of Atlas Minerals and Mr. Rick Keck of Nielsens, Inc. At the time of the inspection, foundation preparation in the vicinity of the western embankment had commenced and some fill had been placed. It was the opinion of the writer that the foundation areas had been properly prepared and that the placement of fill could be continued.

Sincerely,

DAMES & MOORE


James Zitnik

Project Engineer

CONTINUED ON NEXT PAGE

DAMES & MOORE

JOB ENGINEER'S FIELD REPORT EARTHWORK AND FOUNDATION INSPECTION

JOB LOCATION Moab, Utah		JOB NUMBER 05467-027-06	
CLIENT OR OWNER Atlas Minerals		REPORT SEQUENCE NUMBER 3	
GENERAL LOCATION OF INSPECTION Moab, Utah		DATE 10/25/79	DAY OF WEEK Thurs.
GENERAL CONTRACTOR Nielsen, Inc.	EARTHWORK CONTRACTOR Nielsens, Inc.	PAGE 1 of 1	
OWNER'S CONTACT Larry Jacobs	CONTRACTOR'S CONTACT Rick Keck	JOB ENGINEER Jim Zitnik	
REPORT DISTRIBUTION Rick Keck, Larry Jacobs		WEATHER Clear, 65°	

SUPPLEMENTARY REPORT (OBSERVATIONS and RECOMMENDATIONS)

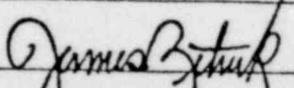
At the request of Larry Jacobs of Atlas Minerals, Jim Zitnik visited the Atlas Mineral Moab mill. The purpose of the site visit was to evaluate problems being encountered regarding large cobble and boulder sized rocks being excavated from the borrow area and soft pumping soils within the initial lifts of fill.

Upon arrival at the site Mr. Zitnik met with Larry Jacobs, Rick Keck of Nielsens, Inc. and Neal Backman, the quality control inspector from American Testing Lab. A brief tour of the borrow area indicated the presence of a number of oversized rocks within the borrow source. However it was the opinion of Mr. Zitnik and Mr. Keck that the cobbles and boulders were primarily associated with a number of isolated zones within the borrow source and was not considered a major problem. Mr. Keck stated that he would maintain one or two cats within the borrow area to sort out the larger pieces when encountered. It was agreed that if any oversized rocks were transported to the embankment, they would be removed from the fill during grading operations.

The initial lifts along the western embankment demonstrated a slight tendency to "pump" when traversed by loaded scrapers or the 40 ton rollers. Compaction tests however, indicated that the fill was compacted in excess of the requirements as stated in the specifications. It was recommended that drier material be bladed into the fill to alleviate the problem.

Sincerely,

DAMES & MOORE


James Zitnik
Project Engineer

CONTINUED ON NEXT PAGE

DAMES & MOORE

JOB ENGINEER'S FIELD REPORT EARTHWORK AND FOUNDATION INSPECTION

JOB LOCATION Moab, Utah		JOB NUMBER 05467-027-06	
CLIENT OR OWNER Atlas Minerals		REPORT SEQUENCE NUMBER 4	
GENERAL LOCATION OF INSPECTION Moab, Utah (Tailings Area)		DATE 11/1/79	DAY OF WEEK Thurs.
GENERAL CONTRACTOR Nielsens, Inc.	EARTHWORK CONTRACTOR Nielsens, Inc.	PAGE 1 of 1	
OWNER'S CONTACT Larry Jacobs	CONTRACTOR'S CONTACT Rick Keck	JOB ENGINEER Jim Zitnik	
REPORT DISTRIBUTION Rick Keck, Larry Jacobs		WEATHER Clear, 60°	

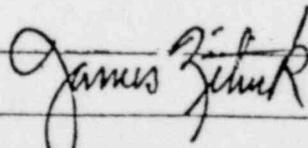
SUPPLEMENTARY REPORT (OBSERVATIONS and RECOMMENDATIONS)

On November 1, 1979, Jim Zitnik visited the Atlas Mineral Moab mill. The purpose of the visit was to observe general earthwork operations and to inspect the test results performed during the quality control program.

Mr. Zitnik initially met with Rick Keck of Nielsens, Inc. and Larry Jacobs of Atlas Minerals. The general earthwork operations were running smoothly. Some large oversized rocks were still being encountered in isolated areas within the borrow area, however, they were effectively being removed prior to the compaction of the fill. Mr. Zitnik then met with Mr. Backman of American Testing Lab. A review of available data indicated that the fill was being compacted in excess of the requirements stated in the specifications and the results of gradation tests indicated that the fill material was relatively uniform and consistent with the materials analyzed in the design reports.

Sincerely,

DAMES & MOORE



James Zitnik

Project Engineer

CONTINUED ON NEXT PAGE

JOB ENGINEER'S FIELD REPORT OF EARTHWORK

AND FOUNDATION INSPECTION

Job Location Moab, Utah		Job Number 05467-027
Client or Owner Atlas Minerals		Report Sequence No. 5
General Location of Inspection Moab, Utah		Date 11/16/79
		Day of Wk Friday
General Contractor Nielsons, Inc	Earthwork Contractor Nielsons, Inc.	Page 1 Of 2
Owner's Contact Larry Jacobs	Contractor's Contact Rick Keck	Job Engineer Jim Zitnik
Report Distribution Jim Zitnik		Weather Clear, 65°

SUPPLEMENTARY REPORT (Observations and Recommendations)

On November 13, 1979, Jim Boddy and Jim Zitnik of Dames & Moore in the company of Dr. Terry Howard, representing the Nuclear Regulatory Commission, visited the Atlas Minerals Moab mill. The purpose of the visit was to inspect the earthwork operations for the tailings dam expansion project which were currently on-going. At the time of the visit approximately one-half of the estimated 286,000 cubic yards of fill had been placed to date.

Prior to the inspection Boddy, Zitnik and Howard met with Larry Jacobs of Atlas Minerals at the site. In addition to his visual inspection of the borrow area and general construction operation, Dr. Howard renewed the available piezometric data and the results of gradation and compaction tests performed during the placement of the fill. In general, Dr. Howard was satisfied that construction operations were being performed according to recommended specifications and that proper control and supervision were being enforced. During his inspection, the installation of the proposed piezometers along the western embankment was discussed. Dr. Howard stated that these piezometers would provide valuable data regarding the development of pore pressures during construction and he was concerned that their installation has been delayed. It seems however, that by the time his official request to NRC regarding their installation is made, construction of the western embankment may be completed.

Dr. Howard also suggested that Atlas record of daily piezometer levels presently being maintained by Larry Jacobs be kept in graphic form and

JOB ENGINEER'S FIELD REPORT OF EARTHWORK
AND FOUNDATION INSPECTION

Job Location Moab, Utah		Job Number 05467-027
Client or Owner Atlas Minerals		Report Sequence No. 6
General Location of Inspection Moab, Utah		Date 11-20-79
		Day of Wk Tuesday
General Contractor Nielsen's, Inc.	Earthwork Contractor Nielsen's, Inc.	Page 1 Of 1
Owner's Contact Larry Jacobs	Contractor's Contact Rick Keck	Job Engineer Jim Zitnik
Report Distribution Jim Zitnik		Weather Overcast, 35°

SUPPLEMENTARY REPORT (Observations and Recommendations)

On November 20, 1979 Jim Zitnik of Dames & Moore visited the Atlas Minerals Moab mill. The purpose of the visit was to inspect the earthwork operations for the tailings dam expansion project which were currently on-going. At the time of the visit approximately 190,000 cubic yards of fill had been placed.

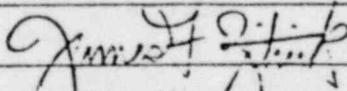
Mr. Zitnik initially met with Neal Backman of American Testing Labs and Rick Keck of Nielsens, Inc. to discuss general earthwork operations. There was some discussion about the quality of the fill at the back of borrow area.

Excavation problems had previously been encountered in conjunction with the numerous cobble and boulder size rocks. However due to the steadily decreasing fill source it was recommended that as much of this material be used as possible. Based upon current tests it appears that the materials encountered in the borrow area are within the specified gradational limits and that the fill is being adequately compacted.

Mr. Zitnik also met with Larry Jacobs of Atlas Minerals. During that meeting the available piezometric data was discussed. In general it appears that there has been no significant upward trend in the readings during the construction operations.

Very truly yours

DAMES & MOORE


 Jim Zitnik

JZ/sb

CONTINUED ON NEXT PAGE

JOB ENGINEER'S FIELD REPORT OF EARTHWORK

AND FOUNDATION INSPECTION

Job Location Moab, Utah		Job Number 05467-027	
Client or Owner Atlas Minerals		Report Sequence No. 7	
General Location of Inspection Moab, Utah		Date 11/29/79	Day of Wk Thursday
General Contractor Nielsens, Inc.	Earthwork Contractor Nielsens, Inc.	Page 1 of 2	
Owner's Contact Larry Jacobs	Contractor's Contact Rick Keck	Job Engineer Jim Zitnik	
Report Distribution Jim Zitnik, Larry Jacobs		Weather Clear, 40°	

SUPPLEMENTARY REPORT (Observations and Recommendations)

On November 29, 1979, Jim Zitnik of Dames & Moore visited the Atlas Minerals Moab mill. The purpose of the visit was to inspect the on-going earthwork operations for the tailings dam expansion project. At the time of the visit approximately 236,000 yards of fill had been placed.

Mr. Zitnik initially met with Neal Backman of American Testing Labs and Rick Keck of Nielsens, Inc. to discuss general earthwork operations. Mr. Zitnik reviewed the available gradation and compaction test results and it was apparent that the fill material being excavated from the borrow area was within the specified gradational limits and that the required compaction was being achieved. It was proposed by Atlas Minerals that the current borrow area be leveled to provide a suitable foundation for the construction of an evaporation pond. At the time of the inspection, grade stakes had been placed in the borrow area. It was estimated that a sufficient quantity of fill material will be available to complete construction operations by leveling the borrow area at an elevation of 4002 feet. It was the intention of Atlas Minerals that should the evaporation pond not be constructed, the borrow area will be suitably graded to drain.

Mr. Zitnik also met with Larry Jacobs of Atlas Minerals and reviewed the available piezometric data. Mr. Jacobs had presented the data in graphical form as requested by Terry Howard who is representing NRC on the project. In general, it appears that there has been no significant upward trend in the readings during the construction operations. In a brief tour of the tailings

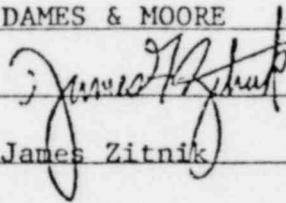
DAMES & MOORE

JOB ENGINEER'S FIELD REPORT EARTHWORK AND FOUNDATION INSPECTION

impoundment area it was apparent to Mr. Zitnik and to Mr. Jacobs that a water balance problem exists at least during the winter months. In many areas the pond of water had encroached well within the specified minimum beach width of 150 feet.	JOB NUMBER 05467-027	
	REPORT SEQUENCE NUMBER	
	DATE 11/29/79	DAY OF WEEK Thursday
	PAGE 2 of 2	
	JOB ENGINEER Jim Zitnik	
	WEATHER Clear, 40°	

Sincerely

DAMES & MOORE



James Zitnik

JZ/sb

DAMES & MOORE
JOB ENGINEER'S FIELD REPORT
EARTHWORK AND FOUNDATION INSPECTION

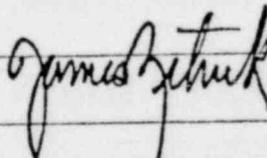
JOB LOCATION <u>Moab, Utah</u>		JOB NUMBER 5467-027-06	
CLIENT OR OWNER <u>Atlas Minerals</u>		REPORT SEQUENCE NUMBER 8	
GENERAL LOCATION OF INSPECTION <u>Moab, Utah (Tailings Area)</u>		DATE 12/6/79	DAY OF WEEK Thurs.
GENERAL CONTRACTOR <u>Nielsens, Inc.</u>	EARTHWORK CONTRACTOR <u>Nielsens, Inc.</u>	PAGE 1 of 1	
OWNER'S CONTACT <u>Larry Jacobs</u>	CONTRACTOR'S CONTACT <u>Rick Keck</u>	JOB ENGINEER <u>Jim Zitnik</u>	
REPORT DISTRIBUTION <u>Rick Keck, Larry Jacobs</u>		WEATHER Clear, 60°	

SUPPLEMENTARY REPORT (OBSERVATIONS and RECOMMENDATIONS)

On December 6, 1979, Jim Zitnik of Dames & Moore visited the Atlas Mineral Moab mill. The purpose of this site visit was to observe the on-going earthwork operations and inspect the test results performed during the quality control program and the available piezometer data. Mr. Zitnik initially met with Larry Jacobs of Atlas Minerals and Rick Keck of Nielsens, Inc. to discuss general earthwork operations. Mr. Zitnik reviewed the available gradation and compaction test results and it was apparent that the fill was being placed in accordance with specifications. Mr. Zitnik also reviewed the available piezometer data. In general it appeared that there has been no significant upward trend in the readings during the construction operations.

Sincerely,

DAMES & MOORE



James Zitnik

Project Engineer

JOB ENGINEER'S FIELD REPORT OF EARTHWORK
AND FOUNDATION INSPECTION

Job Location Moab, Utah		Job Number 5467-027-06
Client or Owner Atlas Minerals		Report Sequence No. 9
General Location of Inspection Moab, Utah - Tailings Embankment		Date 12/17/79
General Contractor Nielsen's, Inc.		Day of Wk Monday
Earthwork Contractor Nielsen's, Inc.		Page 1 Of 2
Owner's Contact Larry Jacobs	Contractor's Contact Rick Keck	Job Engineer Jim Zitnik, Jim Boddy
Report Distribution Jim Zitnik Larry Jacobs (Atlas Minerals)		Weather Clear, 40°

SUPPLEMENTARY REPORT (Observations and Recommendations)

On December 17, 1979, Jim Zitnik and Jim Boddy of Dames & Moore visited the Atlas Minerals Moab Mill tailings embankment site. The purpose of the visit was to observe the finished earthwork operation for the tailings dam expansion project and to observe and assist in the installation of the three piezometers to be installed along the western embankment.

At about 8:30 A.M. Mr. Zitnik and Mr. Boddy met with Larry Jacobs and Mr. Cooper of Cooper Drilling Company regarding the placement of the three piezometers on the western embankment. From about 9:00 until 12:00 (noon) Cooper installed the piezometers to the depths and specifications as called for in the contract documents. This was done under the supervision of Boddy and Zitnik. On the attached sketch the various pertinent tip elevations of the piezometers are shown. During the Dames & Moore on-site visit, a reconnaissance was made of the in-place completed embankment raise as well as the borrow source area. It was concluded at the end of the brief tour that the construction of the embankment as well as the final contouring of the borrow area was completed in an acceptable manner. It is Dames & Moore's understanding that a final as-built survey will be performed sometime during the week ending 12/21/79. Upon examining the survey cross-sections of the embankment, it may then be determined that the embankment raise was made to the lines and grades as shown on the contract document plans. It should be noted that during the site visit it was

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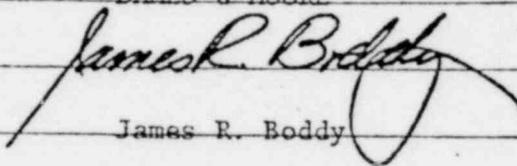
JOB ENGINEER'S FIELD REPORT EARTHWORK AND FOUNDATION INSPECTION

observed by Zitnik and Boddy that at several locations along the embankment the edge of ponded water is less than the specified minimum beach width of 150 feet. In several locations along the eastern embankment section the water is up to, or nearly up to, the actual embankment section.

JOB NUMBER	
5467-027-06	
REPORT SEQUENCE NUMBER	
DATE	DAY OF WEEK
12/17/79	Monday
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JOB ENGINEER	
Jim Zitnik, Jim Boddy	
WEATHER	
Clear 40°	

Sincerely

DAMES & MOORE



James R. Boddy

Project Engineer

JRB/sb

attachment

POOR ORIGINAL