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Rio Algom Mining Corp.

November 15, 1993

Certified Mail
Return Receipt Requested P 176 737 773

RETURN ORIGINAL TO PDR, HQ.

Mr. Ramon Hall, Director
U. S. Nuclear Regulatory Commission
Uranium Recovery Field Office
Box 25325
Denver, Colorado 80225

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URFO
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Re: Lisbon Facility
License SUA-1119, Docket No. 40-8084
Amendment Request

Dear Mr. Hall:

Please find enclosed pursuant to license condition 45 (K) a construction report for the lower tailings evaporation cell and the as-built drawings of the upper and lower evaporation ponds. Work on the lower evaporation pond finished on August 15, 1993. If you have any questions concerning this matter, please contact me at (405) 842-1773.

Sincerely,

Bill Ferdinand

Bill Ferdinand, Manager
Radiation Safety, Licensing &
Regulatory Compliance

xc: F. Fossey
M. Freeman
T. Warner
file

9312150148 931115
PDR ADOCK 04008084
C PDR

RETURN ORIGINAL

Certified Mail Mary C. Hord

94-0087 D108

6305 Waterford Boulevard, Suite 325, Oklahoma City, Oklahoma 73118 • (405) 848-1190 • FAX (405) 848-1208

CONSTRUCTION REPORT

General Description

Rio Algom submitted on February 3, 1992, an application to NRC to construct an evaporation cell upon the lower tailings impoundment to assist the facility's groundwater Corrective Action Plan (CAP). The application was subsequently approved by NRC on March 23, 1993. Upon approval by the NRC and cessation of inclement weather conditions allowing work to proceed, a construction crew was mobilized on April 18, 1993, to initiate construction on the evaporation cell.

The lower tailings evaporation cell was constructed using clay and "silt" material previously employed during the placement of the final radon attenuation cover. These properties are described in detail in Appendix J of Rio Algom's submittal dated April 1, 1993.

The base of the evaporation cell was constructed with clay material to a final thickness of 20 inches. This layer was constructed in five (5) compacted lifts of approximately 4 inches each. Each lift was placed at $\pm$ 2% optimum moisture and compacted to at least 95% standard Proctor.

The embankment cores of the evaporation cell were constructed with both clay and a "silt" material. Although referred to as "silt" material by facility personnel, the "silt" material typically is a CL-ML material with approximately 69% of the material generally passing the minus 200 mesh. This material was placed and compacted at $\pm$ 2% and at least 95% of optimum moisture and standard Proctor respectively.

After completion of the embankment cores, a compacted 12 inch layer of clay was constructed on the inside slopes of the embankment. This material was placed using three compacted lifts of 4 inches each. As before, each lift was placed at $\pm$ 2% moisture and compacted to at least 95% standard Proctor. Upon completion of the clay layer, a loose six (6) inch lift of "silt" material was placed along the base and inside slopes of the evaporation cell.

The soil characterization of the material used in constructing the lower tailings evaporation cell is contained in Appendix A of this submittal.

The inside slopes of the embankments were constructed with a minimum grade of at least 3:1 while the outside slopes of the embankments were constructed with a minimum grade of at least 2:1. The widths of the embankments in all cases met the minimum design criteria of 15 feet. Due to safety considerations and to ensure the safe operation of the heavy equipment atop the embankments, crest widths were increased along curved areas of the cell. In these areas the width ranged from 24 to 28 feet.

Compaction of the soil materials was achieved by a combination of heavy construction equipment. Initial compaction of the material was with the weight of the 633 scrapers which were used in the placement of the earthen material on the impoundments. Upon placement of sufficient thickness of loose lift material by the scrapers, additional compaction was placed on the material by the weight of a road grader which evened the loose lift layers. Finally, after completion of these elements, an 815 compactor typically made 5-7 passes over the material until compaction and moisture met construction specifications.

The cell embankments and clay liners were completed on July 21 with dressing operations continuing until August 15. The finished evaporation cell was surveyed on September 20 and 21, 1993. The survey indicated the elevation along the cell's embankments were at a minimum at least 6653.0 feet msl. During the construction of the cell, a total of 31,640 yard^3 of "silt" material and 11,088 yard^3 of clay were used in building the lower tailings evaporation cell. Contained in Appendix B are the as-built drawings for both the upper and lower tailings evaporation cells.

QA/QC Program

Rio Algom constructed the evaporation cell using the approved methods contained within its submittal dated February 24, 1993. In this submittal, a compaction test would be performed every 500 yards^3. During the construction of the cell, a total of 174 compaction tests were

performed. This is equivalent to one test for each 245 yards^3 placed. The results are being maintained on site for future reference.

The compaction testings was primarily determined using a nuclear density meter after first establishing a correlation between the nuclear density meter and the sand cone method/oven drying method. After ten (10) tests were performed to establish a correlation, one sand cone/oven drying and nuclear density meter correlation test was performed at a frequency of approximately every 6,000 yards^3 of material placed. A total of nineteen (19) comparison tests were ultimately conducted during the project. Eighteen (18) of the comparison tests were within the $\pm$3% of standard Proctor and all moisture results were within the $\pm$2% limit comparing the oven dry and nuclear density meter methods.

One test, #13, did not fall within the correlation limits of $\pm$3%. As such, an additional two (2) correlation tests were performed, #14 and #15. Pursuant to the approved criteria, the three correlation tests were averaged to determine if a correlation still existed. The average was within the acceptable criteria for correlation between the methods. The results from this testing is presented in Appendix C.

Gradation testing was to be performed at a frequency of one test for every 1,000 yards^3 of material placed. A total of 69 tests were completed for an average test rate of one test per each 619 yards^3 placed. In addition to the gradation testing, an Atterberg limit test was conducted each day when a minimum of 150 yards^3 of material were placed. A total of 52 Atterberg limit tests were performed. All materials were classified as either CL, ML CL-ML using the Unified Soil Classification (UCS) system. The results from this testing are contained in Appendix A of this submittal.

To assure correct optimum moistures and compactions for the construction materials, Rio Algom proposed to conduct a five point proctor at a frequency of approximately every 5,000 yards^3 with one point Proctor every 2,500 yards^3. During the construction of the cell, it was determine that the frequency of the five point Proctors would be increased to a 2,500 yard^3 basis. This enabled the facility to continue to control its material construction while increasing its

QA/QC testing efficiency as the five point Proctor replaced the one point Proctor. As such, a total of twenty (20) five point Proctor tests were completed resulting in an average test frequency of 1 test per 2,136 yards^3. These results are maintained on site for future reference.

APPENDIX A
MATERIAL CHARACTERIZATION

SOIL CLASSIFICATION DATA

SILT

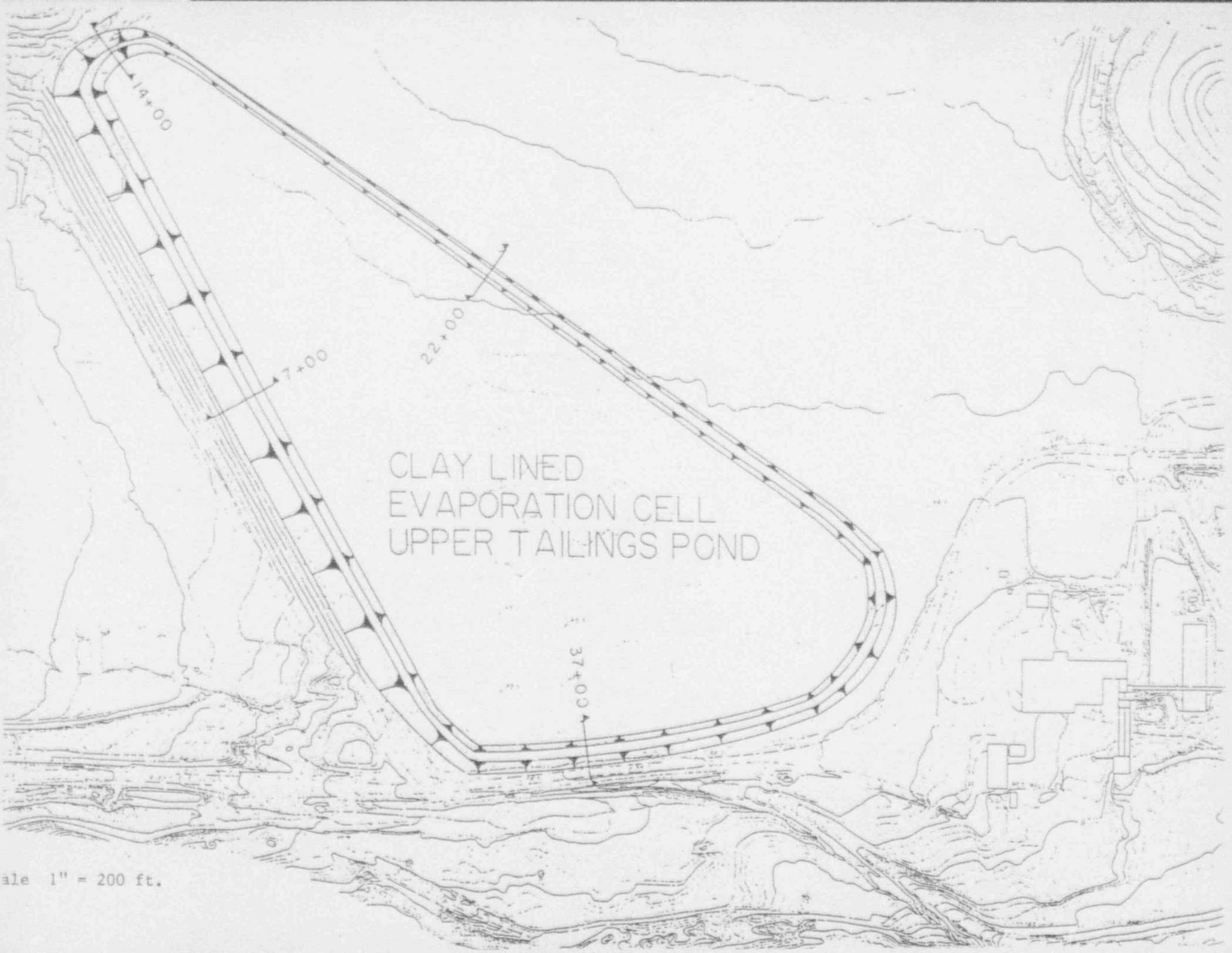
DATE	BARROW AREA	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	USC	% -200
10/28/92	10	22.0	11.9	10.1	CL	59
10/29/92	10	20.0	12.8	7.2	CL	77
11/11/92	10	25.0	12.8	8.4	CL	79
11/12/92	10	23.0	16.3	6.7	CL-ML	76
11/14/92	10	22.0	16.9	5.1	CL-ML	67
11/15/92	10	26.5	16.1	10.4	CL	74
11/16/92	10	24.0	15.2	8.8	CL	78
11/17/92	10	23.0	15.7	7.3	CL	73
11/18/92	10	22.0	17.6	4.4	CL-ML	66
11/19/92	10	26.5	16.3	10.2	CL	83
11/20/92	10	[illegible]	15.0	7.0	CL-ML	64
11/22/92	10	30.0	17.8	12.2	CL	89
11/23/92	10	25.0	17.0	8.0	CL	82
11/24/92	10	25.0	16.0	9.0	CL	80
05/17/93	11	28.0	18.4	9.6	CL	66
05/17/93	11	25.5	17.8	7.7	CL	73
05/17/93	11	25.5	15.5	10.0	CL	79
05/17/93	11	26.5	16.5	10.0	CL	67
05/19/93	11	27.0	14.9	12.1	CL	79
05/20/93	11	30.5	17.9	12.6	CL	88
05/21/93	11	24.5	15.4	9.1	CL	81
05/21/92	11	21.0	17.9	3.1	ML	75
05/21/93	11	21.5	19.3	2.2	ML	67
05/21/93	11	23.0	17.6	5.4	CL-ML	75
05/24/93	11	22.5	15.2	7.3	CL	73
05/25/93	11	24.0	16.3	7.7	CL	81
05/25/93	11	26.0	15.9	10.1	CL	83
05/25/93	11	22.5	16.9	5.6	CL-ML	59
05/26/93	11	24.0	17.8	6.2	CL-ML	34*
05/26/93	11	18.8	19.9	1.9	ML	43*
05/26/93	11	26.0	17.4	8.6	CL	81
05/26/93	11	23.0	14.3	8.7	CL	77
05/26/93	11	23.5	18.3	5.2	CL-ML	65
05/26/93	11	25.0	13.7	11.3	CL	74
05/26/93	11	22.7	17.5	5.2	CL-ML	71
05/27/93	11	23.0	17.2	5.8	CL-ML	68
05/28/93	11	24.0	17.8	6.2	CL-ML	70
06/01/93	11	23.5	17.2	6.3	CL-ML	75
06/02/93	11	24.0	18.2	5.8	CL-ML	71
06/15/93	11	25.3	16.8	8.5	CL	74
06/16/93	11	26.2	19.9	6.3	CL-ML	64

SOIL CLASSIFICATION DATA
CLAY

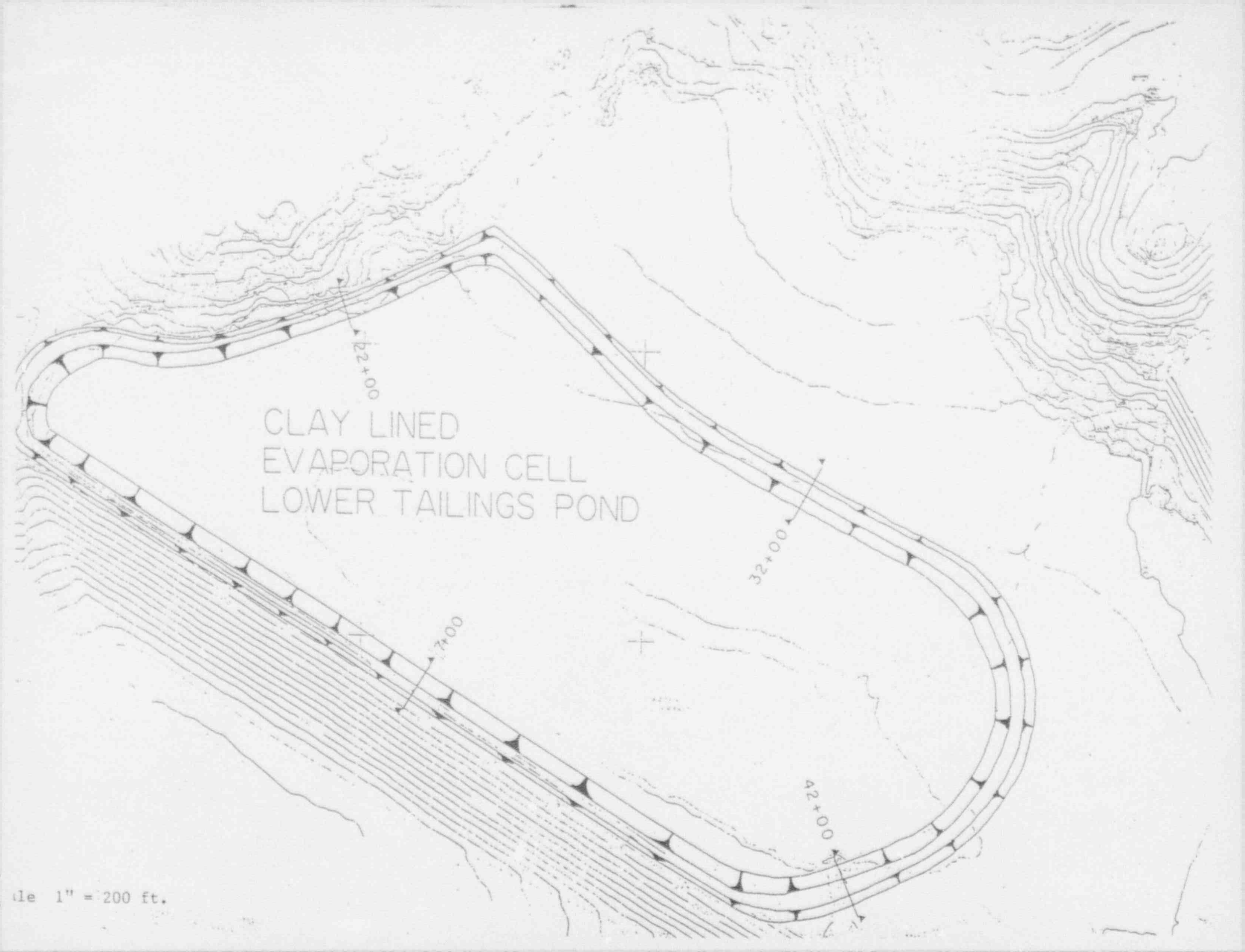
DATE	BARROW AREA	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	USC	% -200
05/21/93	4	40.0	18.1	21.9	CL	71
05/21/93	4	38.0	17.9	20.1	CL	68
05/21/93	4	39.5	18.3	21.2	CL	73
05/21/93	4	39.0	16.9	22.1	CL	77
06/02/93	4	39.9	17.5	22.4	CL	77
06/10/93	4	38.0	22.2	18.5	CL	83
06/11/93	4	39.0	21.9	17.1	CL	73
06/14/93	4	41.0	21.8	19.2	CL	75
07/26/93	4	37.0	17.9	19.9	CL	74
07/26/93	4	37.5	17.4	20.1	CL	71
07/26/93	4	36.5	17.1	19.4	CL	69

* Material Not Used

APPENDIX B
AS-BUILT DRAWINGS


14+00
7+00
22+00
37+00
CLAY LINED
EVAPORATION CELL
UPPER TAILINGS POND

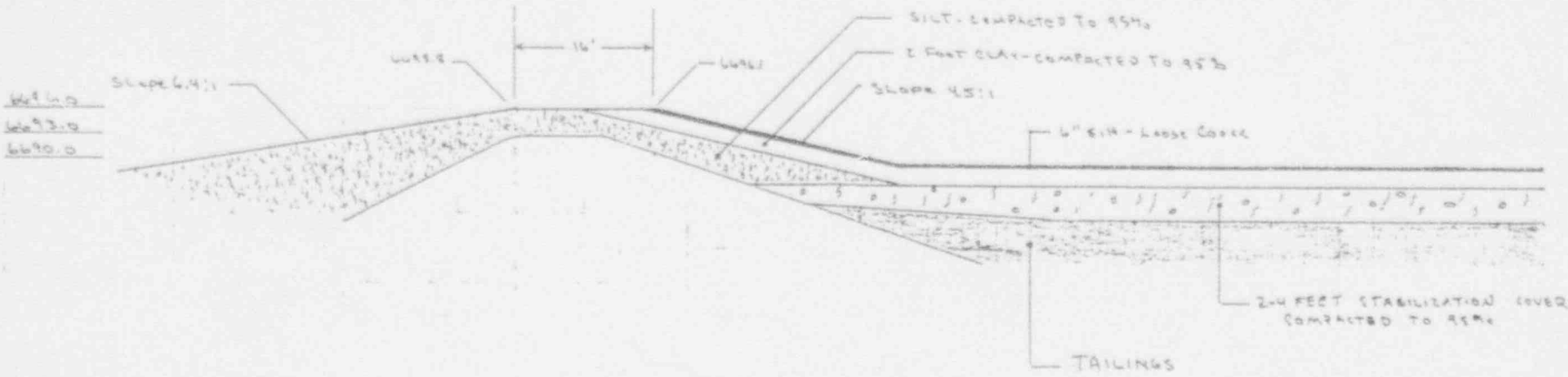
ale 1" = 200 ft.


22+00
CLAY LINED
EVAPORATION CELL
LOWER TAILINGS POND
32+00
7+00
42+00

cle 1" = 200 ft.

Upper Tails Pond - No. 1 Evaporation Cell

Station 7+00



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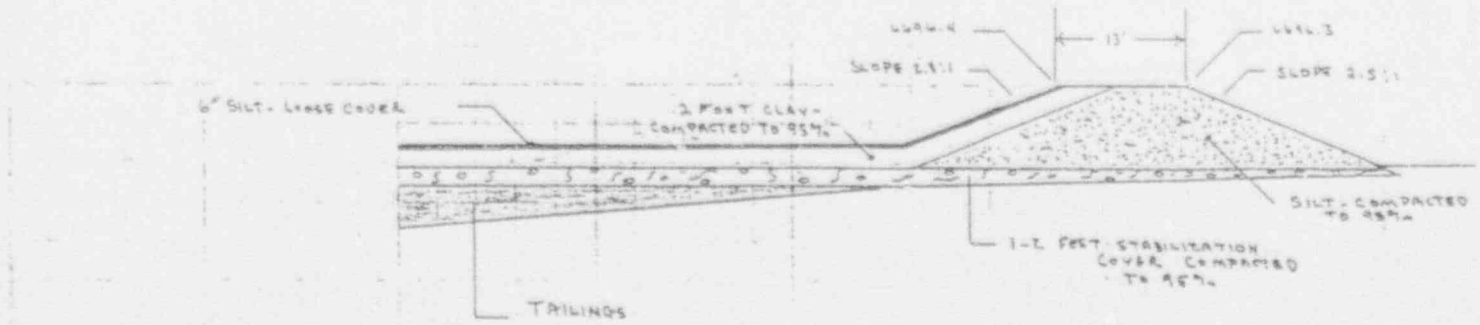
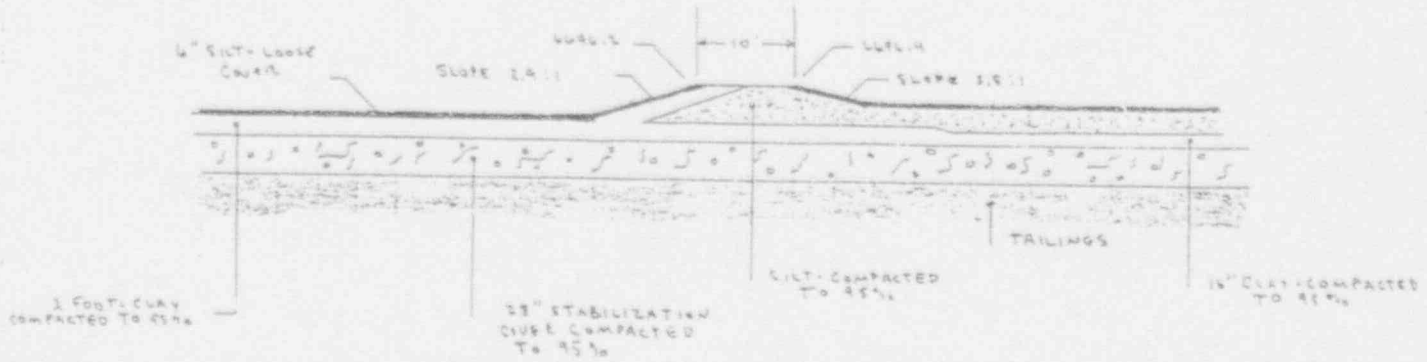
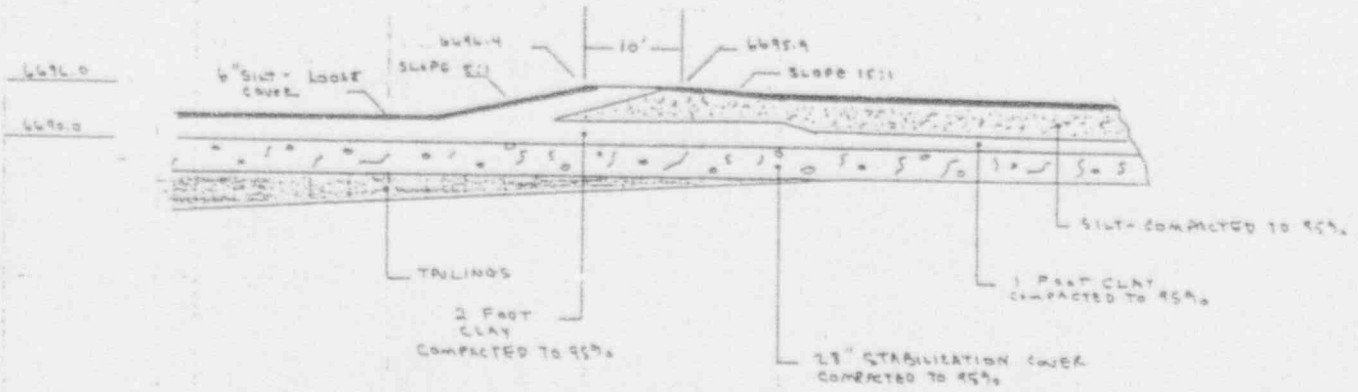


Upper Tails Pond - No. 1 Evaporation Cell

Station 22+00

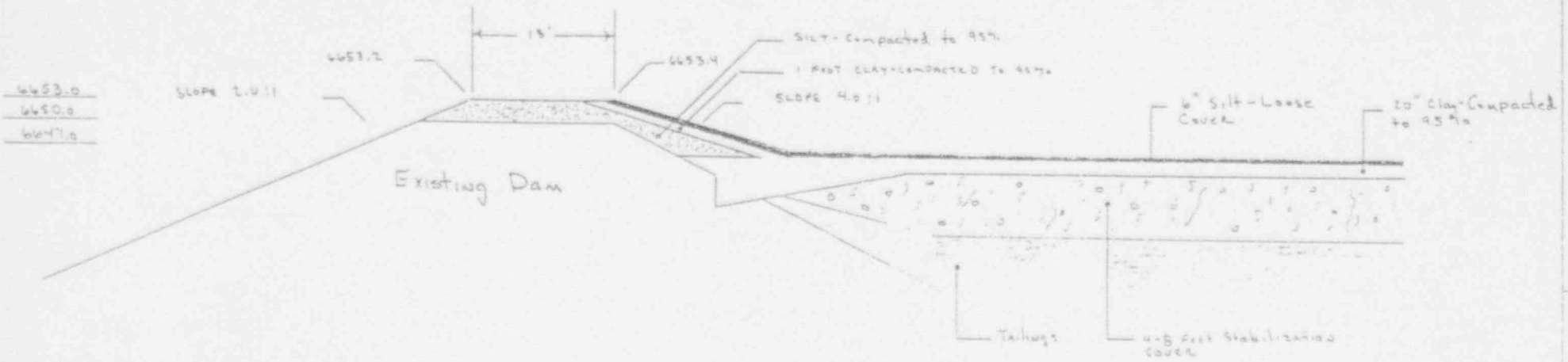


Station 14+00

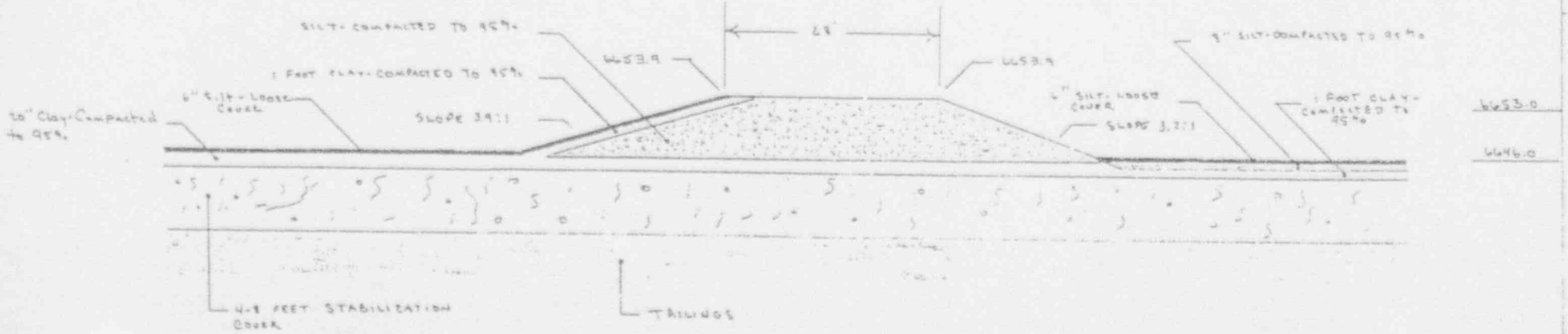


Lower Tails Pond - No. 2 Evaporation Cell

Station 7+00

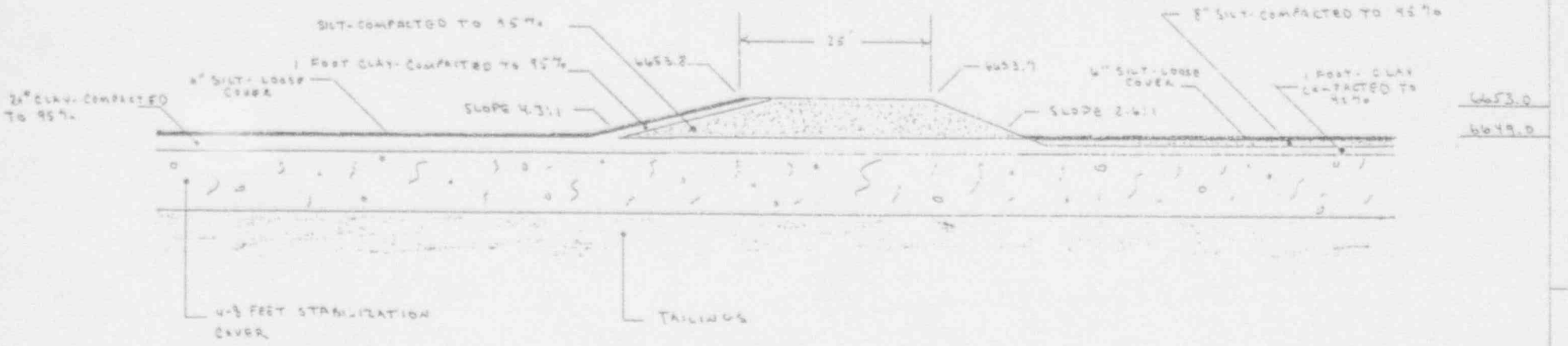


Station 42+00



Lower Tails Pond - No. 2 Evaporation Cell

Station 32+00



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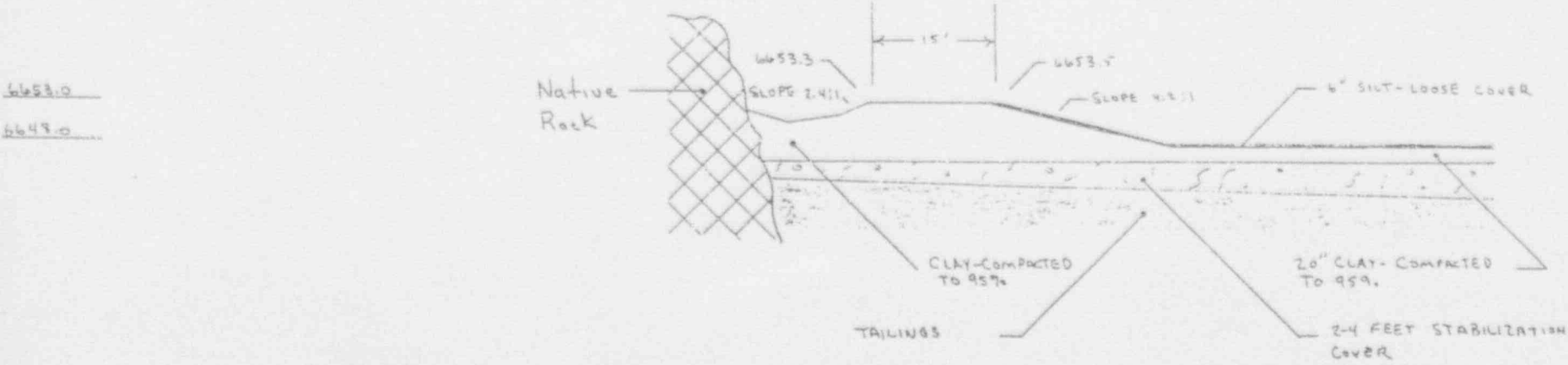

APPENDIX C
CORRELATION TESTING

SAND CONE/OVEN DRY AND NUCLEAR DENSITY METER CORRELATION

Test	Sand Cone Standard Proctor	NDM Standard Proctor	Difference (%)	Oven Dry Moisture (%)	NDM Moisture (%)	Difference (%)
#1	87.5	90.2	3.0	15.5	14.6	0.9
#2	93.9	96.9	3.0	13.3	11.8	1.5
#3	102.8	102.0	0.7	11.6	11.4	0.2
#4	100.3	98.4	1.9	13.7	13.4	0.3
#5	99.7	98.5	1.2	13.5	13.7	0.2
#6	100.8	97.9	2.9	14.0	13.7	0.3
#7	96.5	93.9	2.7	14.5	16.3	1.8
#8	95.4	95.5	0.1	14.8	14.2	0.6
#9	99.0	96.1	3.0	15.3	15.0	0.3
#10	100.8	97.8	3.0	13.0	12.5	0.5
#11	98.6	97.1	1.5	15.6	16.1	0.5
#12	97.5	95.8	1.7	14.3	12.7	1.6
#13	93.7	98.8	5.1	12.9	12.3	0.6
#14	95.6	96.6	1.0	12.8	13.0	0.2
#15	97.8	96.3	1.5	14.2	13.9	0.3
#16	97.9	97.9	0.0	12.3	12.6	0.3
#17	98.9	97.6	1.3	12.7	12.7	0.0
#18	93.7	96.0	2.3	13.3	15.2	1.9
#19	98.7	97.8	0.9	14.0	14.7	0.7
Average	97.3	96.9	0.7	13.8	13.7	0.1