0078

Document Information Form

Mine Number: C/007/006

File Name: Incoming

To: DOGM

From:

Person N/A

Company N/A

Date Sent: MAY 20, 1981.

Explanation:

LETTER

cc:

File in:
C/ 007, 006, Incoming
Refer to:
- ☐ **Confidential**
- ☐ **Shelf**
- ☐ **Expandable**

Date _____ For additional information

File ACT/007/006

May 18, 1981

Mr. James W. Smith, Jr.
Coordinator of Mined Land Development
Division of Oil, Gas, and Mining
1588 West North Temple
Salt Lake City, Utah 84116

Dear Mr. Smith:

Information regarding the as-built characteristics of the sedimentation pond No. 5 reconstruction was requested by the Division of Oil, Gas, and Mining in a letter addressed to Ben Grimes of Plateau Mining Company, dated April 22, 1981. Mr. Grimes has requested that I respond to said letter by providing the requested information. Therefore, outlined below are the requests from DOGM with the accompanying response.

Request No. 1: Typical gradation curves for the clay core material and native material, along with Unified Soil Classification rating for these materials.

Response: The clay core material for the pond embankment was prepared by mixing bentonite with the parent material. The mixture ratio was approximately 20 percent bentonite to 80 percent parent material. A sieve analysis has been conducted on the parent material only. However, a typical gradation curve has been calculated based upon known properties of bentonite (i.e. particle size for bentonite clay is smaller than the standard openings in the No. 200 mesh sieve, and the dry unit weight is approximately 27 pounds per cubic foot). The typical gradation curve for the parent material is given in Attachment 1 and the typical calculated gradation curve for the bentonite-soil mixture is given in Attachment 2. The Unified Soil Classification rating for the parent material based on the conducted sieve analysis is SW, well-graded sands and gravelly sands with little or no fines. The Unified Soil Classification for the bentonite-soil mixture is a border classification between SP, poorly graded sands and gravelly sands with little fines, and SM or SC, silty sands or clayey sands. As illustrated in Attachments 1 and 2, the addition of bentonite to the native soil has increased the percent passing the number 60 sieve from 16.9 percent to approximately 21 percent and has increased the percent passing the number 200 sieve from 2.8 percent to approximately 8 percent.

In accordance with the Unified Soil Classification System, the permeability when compacted of a SW-SP soil is considered pervious, whereas an SM or SC soil is considered to be relatively impervious. Therefore, the addition of bentonite to the parent soil material, thereby resulting in the border classification of SP to SM or SC, should result in a semi-impervious embankment material.

Request No. 2: The lift thickness as placed.

Response: The lift thickness during the reconstruction of the embankment was no more than 6-inches. OK

Request No. 3: The method of compaction utilized.

Response: A hand operated machine compactor was used in the reconstruction of sedimentation pond No. 5.

Request No. 4: Specifications for acceptable compacted densities and the results of any density testing performed on the compacted fill.

Response: No density tests were conducted during the construction of the pond, therefore compacted density data for the embankment are not available. 90% ? OK

Request No. 5: As-built drawings of the embankment, including appropriate cross-sections and construction details persuant to UMC 817.46.

Response: The as-built drawings should be similar to the construction details for sedimentation pond No. 5 as presented in the mine permit application. The only change in the pond reconstruction was the addition of bentonite to the entire embankment core material rather than solely lining the pond with a bentonite-soil mixture. The construction detail is included here-in for your reference.

Request No. 6: All hydrologic and hydraulic calculations and variables utilized in sizing the pond and the capacity of the pond as reconstructed.

Response: Reconstruction of the pond embankment does not in any way change the hydraulic or hydrologic calculations used in designing the pond, i.e. pond and spillway capacity requirements. Tables 7-13 through 7-15 from the mine permit application contain the design data for the sediment ponds. These tables are included here-in for easy reference. The methodology used in obtaining this data is contained within the mine permit application.

If further information is desired, please contact either myself or Ben Grimes.

Sincerely,

Marvin E. Allen
Engineer/Hydrologist

MEA/lg

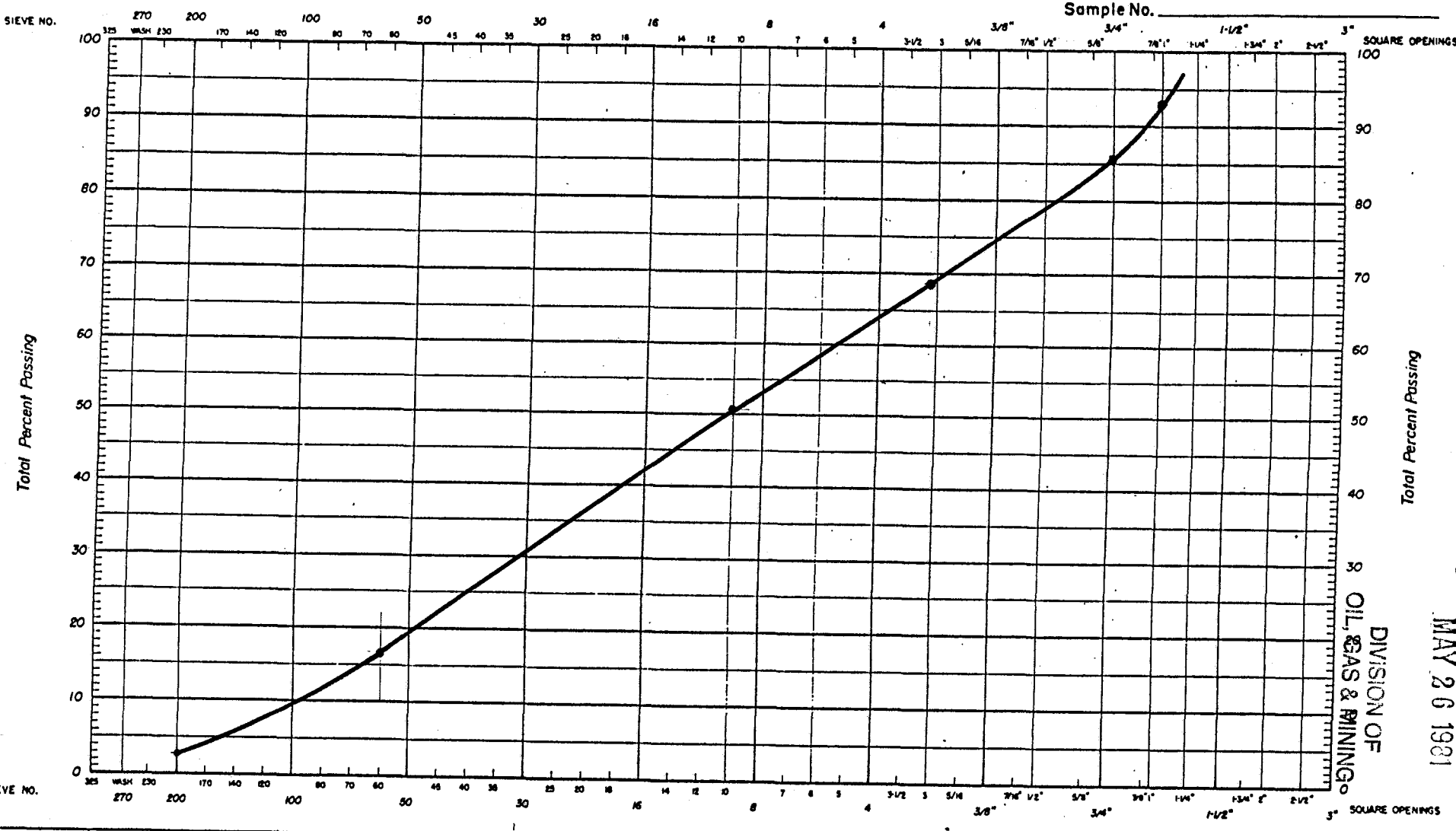
cc: Ben Grimes

Enclosures: Map (1)
Attachments (2)
Charts (3)

Materials Laboratory

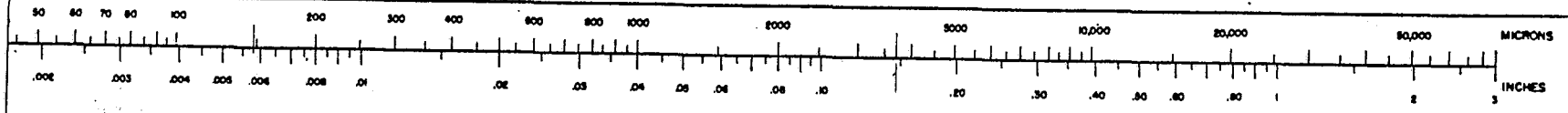
SEMI-LOG CHART FOR GRADING CURVES

Project Plateau Mining Co.
Location Wattis, Utah
Station Sedimentation Pond No. 5
Material Parent Material without Bentonite
Sample No.



LOG SCALE

AVERAGE CLEAR OPENING



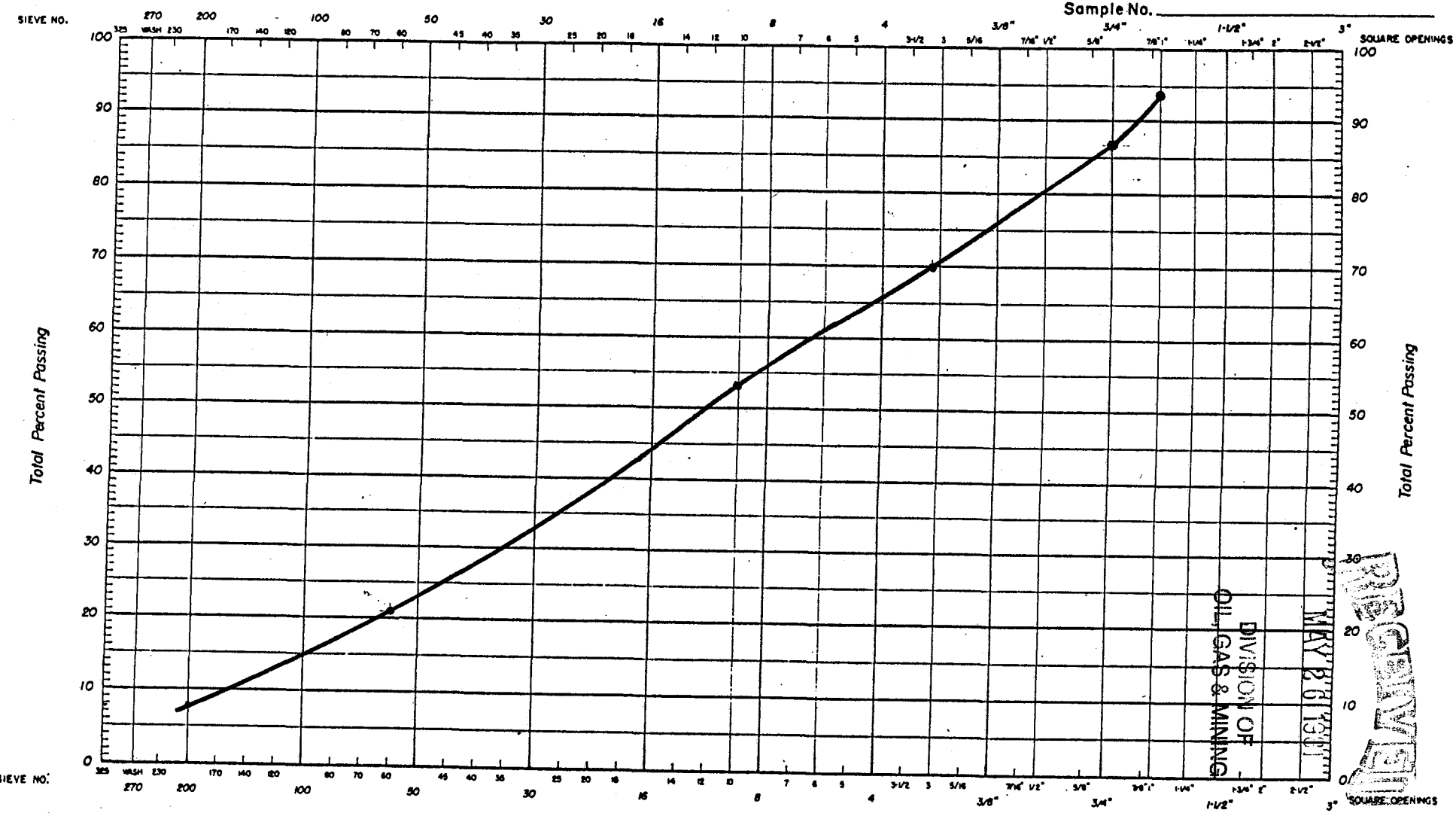
U.S. STANDARD SIEVES - A.A.S.H.O. METHOD T-27

Attachment 1

Materials Laboratory

SEMI-LOG CHART FOR GRADING CURVES

Project: Plateau Mining Co.
Location: Wattis, Utah
Station: Sedimentation Pond No. 5
Material: Parent Material with Bentonite
Sample No.:



LOG SCALE

AVERAGE CLEAR OPENING

50 60 70 80 100 200 300 400 600 800 1000 2000 5000 10,000 20,000 50,000 MICRONS

.002 .003 .004 .005 .006 .008 .01 .02 .03 .04 .06 .08 .10 .20 .30 .40 .60 .80 1 2 3 INCHES

U.S. STANDARD SIEVES - A.A.S.H.O. METHOD T-27

Attachment 2

Table 7-13. Sediment yield parameters and three-year accumulated sediment volume for sedimentation ponds.

Sedimentation Pond No.	Contributing Area D = Disturbed U = Undisturbed acres	Rainfall Factor (R) ft.-tons/ac./hr.	Soil Erodibility Factor (K) tons/ac/yr per unit of R	Slope Length Factor L ft.	Slope Gradient Factor S percent	LS	Cover Factor (C)	Erosion Control Practise Factor (P)	Estimated Soil Loss (A) ton/ac/yr.	Sediment* Delivery Ratio	Estimated Sediment Contribution to Sedimentation Ponds ac/ft/ac/yr	ac-ft/yr	3-year accumulated Sediment Volume ac.-ft.
1	5.1 - D	22.0	0.28	82	3.0	0.28	1.0	1.0	1.7	0.60	0.0006	0.003	0.25
	6.0 - U	22.0	0.28	105	70.0	29.4	0.2	1.0	36.2	0.60	0.0133	0.080	
2	4.3 - D	22.0	0.28	200	34.0	11.9	1.0	1.0	73.3	0.60	0.0269	0.116	0.52
	6.5 - U	22.0	0.28	220	38.0	19.0	0.2	1.0	23.4	0.60	0.0086	0.056	
3	3.3 - D	22.0	0.28	63	2.0	0.17	1.0	1.0	1.0	0.60	0.0004	0.001	1.55
	48.1 - U	22.0	0.28	140	64.7	31.6	0.2	1.0	38.9	0.45	0.0107	0.515	
4	19.2 - D	22.0	0.28	160	12.8	2.7	1.0	1.0	16.6	0.55	0.0056	0.108	0.48
	3.7 - U	22.0	0.28	84	45.0	13.8	0.2	1.0	17.0	0.65	0.0068	0.052	
5	69.7 - D	22.0	0.28	205	16.0	4.5	1.0	1.0	27.7	0.45	0.0076	0.330	2.27
	26.9 - U	22.0	0.28	118	54.0	22.2	0.2	1.0	27.4	0.50	0.0084	0.226	
6	23.7 - D	22.0	0.28	99	10.0	1.4	1.0	1.0	8.6	0.50	0.0026	0.062	0.34
	7.3 - U	22.0	0.28	99	43.5	14.5	0.2	1.0	17.9	0.65	0.0071	0.052	
7	16.3 - U	22.0	0.28	130	10.0	1.6	0.2	1.0	2.0	0.55	0.0007	0.011	0.03

* Taken from Renfro (1975).

Table 7-14. Sedimentation pond storage and spillway capacity requirements.

Variable	Pond No.1	Pond No 2	Pond No 3	Pond No 4	Pond No 5	Pond No 6	Pond No 7
Disturbed Area in acres	5.1	4.3	3.3	19.2	69.7	23.7	1.3
Undisturbed Area in acres	6.0	6.5	48.1	7.7	26.9	7.3	15.0
Total Area (A) in mi^2	0.0173	0.0169	0.0803	0.0420	0.1509	0.0484	0.0255
Weighted Curve Number	82	81	76	84*	78*	71*	76
S in inches	2.20	2.35	3.16	1.90	2.82	4.08	3.16
Time of Excess Rainfall	14.3	14.1	12.9	14.9	13.3	12.4	12.9
25-year, 24-hour Runoff (Q) in inches	1.072	1.014	0.756	1.194	0.853	0.542	0.756
Hydrograph Family Number	3	3	4	3	3	4	4
Hydraulic Length ( ) in feet	1310	1640	2900	3690	7560	3550	2750
Average Watershed Slope (Y) in percent	39.2	38.0	60.7	22.0	26.6	17.9	10.0
Time of Concentration (T_c) in hours	0.10	0.12	0.18	0.29	0.56	0.45	0.42
T_p in hours	0.07	0.08	0.12	0.19	0.37	0.30	0.28
Computed T_{o/T_p}	204	176	107	78	36	41	46
Used T_{o/T_p}	75	75	50	75	36	36	50
Revised T_p in hours	0.19	0.19	0.26	0.20	0.37	0.34	0.26
484 AQ/T_p revised	47.2	43.7	113.0	121.4	168.4	37.3	35.9
25-year, 24-hour Peak Inflow in cfs	3.2	2.9	5.2	8.1	21.9	2.5	1.7
10-year, 24-hour Runoff in inches	0.715	0.669	0.466	0.815	0.541	0.307	0.466
10-year, 24-hour Runoff in ac-ft	0.66	0.60	2.00	1.83	4.36	0.79	0.63
5-year, Sediment Storage Requirement in ac-ft	0.25	0.52	1.55	0.48	2.27	0.34	0.03
Pond Storage Requirement in ac-ft	0.91	1.12	3.55	2.31	6.63	1.13	0.66

* These weighted curve numbers include runoff from coal refuse and stock piles, for which a curve number of 70 was assumed.

Table 7-15. Design values of proposed and existing sedimentation ponds.

Variable	Pond+ No. 1	Pond No. 2	Pond+ No. 3	Pond+ No. 4	Pond+ No. 5	Pond+ No. 6	Pond No. 7
Sediment Storage Volume (ac.-ft.)	0.27	0.52	1.55	0.48	2.27	0.76	0.03
Dead Pool Storage Volume (ac.-ft.)	0.15	0.28	0.18	0.41	0.35	0.73	0.10
Runoff Storage Volume (ac.-ft.)	0.85	0.60	2.27	1.83	4.36	1.11	0.63
Total Storage Volume (ac.-ft.) (Design Volume)	1.27	1.40	4.00	2.72	6.98	2.60	0.76
Embankment Height at Design Volume * (ft.)	13.0	8.5	12.0	12.8	15.5	14.5	12.0
Spillway Capacity (cfs)	3.2	2.9	5.2	8.1	21.9	2.5	1.7
Spillway Diameter (inches)	24	15	24	24	30	15	15
Head Above Spillway Crest at Design Discharge (ft.)	0.3	0.4	0.4	0.6	0.9	0.4	0.3
Required Freeboard (ft.)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Required Total Embankment Height* (ft.)	14.3	9.9	13.4	14.4	17.4	15.9	13.3
Required Total Embankment Height* Including 5% Settlement Allowance (ft.)	15.0	10.4	14.1	15.1	17.7**	16.7	14.0
Actual Embankment Height of Existing Ponds (ft.)	18.0	-	15.0	14.0	18.0	17.0	-
Top Width (ft.)	13.0	15.0	18.0	10.0	15.0	15.0	15.0

*As Measured from the upstream toe of the embankment,
+Existing sedimentation ponds,
**Based on approximately 6 feet of embankment which are fill. The other 12 feet are excavated.