

LOWER OTAY DAM  
CITY OF SAN DIEGO

Alpha

COST BOOK

FIELD BOOK

361 S

W103



# KEUFFEL & ESSER CO.

DRAWING MATERIALS

AND

SURVEYING INSTRUMENTS.

NEW YORK.

CHICAGO. ST. LOUIS. SAN FRANCISCO. MONTREAL.

## TABLES FOR EXCAVATIONS AND EMBANKMENTS.

DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 18 FEET WIDE. SIDE SLOPES 1 TO 1.

FOR SINGLE TRACK EXCAVATION.

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	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	9.0	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	0
1	10.0	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	10.9	1
2	11.0	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	2
3	12.0	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.9	3
4	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	13.8	13.9	4
5	14.0	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	5
6	15.0	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	6
7	16.0	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	7
8	17.0	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	8
9	18.0	18.1	18.2	18.3	18.4	18.5	18.6	18.7	18.8	18.9	9
10	19.0	19.1	19.2	19.3	19.4	19.5	19.6	19.7	19.8	19.9	10
11	20.0	20.1	20.2	20.3	20.4	20.5	20.6	20.7	20.8	20.9	11
12	21.0	21.1	21.2	21.3	21.4	21.5	21.6	21.7	21.8	21.9	12
13	22.0	22.1	22.2	22.3	22.4	22.5	22.6	22.7	22.8	22.9	13
14	23.0	23.1	23.2	23.3	23.4	23.5	23.6	23.7	23.8	23.9	14
15	24.0	24.1	24.2	24.3	24.4	24.5	24.6	24.7	24.8	24.9	15
16	25.0	25.1	25.2	25.3	25.4	25.5	25.6	25.7	25.8	25.9	16
17	26.0	26.1	26.2	26.3	26.4	26.5	26.6	26.7	26.8	26.9	17
18	27.0	27.1	27.2	27.3	27.4	27.5	27.6	27.7	27.8	27.9	18
19	28.0	28.1	28.2	28.3	28.4	28.5	28.6	28.7	28.8	28.9	19
20	29.0	29.1	29.2	29.3	29.4	29.5	29.6	29.7	29.8	29.9	20
21	30.0	30.1	30.2	30.3	30.4	30.5	30.6	30.7	30.8	30.9	21
22	31.0	31.1	31.2	31.3	31.4	31.5	31.6	31.7	31.8	31.9	22
23	32.0	32.1	32.2	32.3	32.4	32.5	32.6	32.7	32.8	32.9	23
24	33.0	33.1	33.2	33.3	33.4	33.5	33.6	33.7	33.8	33.9	24
25	34.0	34.1	34.2	34.3	34.4	34.5	34.6	34.7	34.8	34.9	25
26	35.0	35.1	35.2	35.3	35.4	35.5	35.6	35.7	35.8	35.9	26
27	36.0	36.1	36.2	36.3	36.4	36.5	36.6	36.7	36.8	36.9	27
28	37.0	37.1	37.2	37.3	37.4	37.5	37.6	37.7	37.8	37.9	28
29	38.0	38.1	38.2	38.3	38.4	38.5	38.6	38.7	38.8	38.9	29
30	39.0	39.1	39.2	39.3	39.4	39.5	39.6	39.7	39.8	39.9	30
31	40.0	40.1	40.2	40.3	40.4	40.5	40.6	40.7	40.8	40.9	31
32	41.0	41.1	41.2	41.3	41.4	41.5	41.6	41.7	41.8	41.9	32
33	42.0	42.1	42.2	42.3	42.4	42.5	42.6	42.7	42.8	42.9	33
34	43.0	43.1	43.2	43.3	43.4	43.5	43.6	43.7	43.8	43.9	34
35	44.0	44.1	44.2	44.3	44.4	44.5	44.6	44.7	44.8	44.9	35
36	45.0	45.1	45.2	45.3	45.4	45.5	45.6	45.7	45.8	45.9	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

For Keith's Railroad Curve Tables see end of book.





## Derrick Identification Numbers

S.L.D. #1 Marked U.S.R.S. {22 Hoist #234  
 S.L.D. #2 Marked U.S.R.S. {22 Hoist #234  
 S.L.D. #3 Marked U.S.R.S. {24 #234  
 S.L.D. #4 #218 Marked U.S.R.S. {27 #234  
 G.D. #1 #226 Guy Derrick with Ratchet Le  
 G.D. #2 - " " " Side Lever

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Dam. Form Cost steel	110-118
Coyote #3 Cost.	91
Sand	50-

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1  
12/13 Moving Derrick (S.L.D. #4)

Derrick put on rollers & snatched back approx. 75 lin. ft. to protect it from blast. Engine not removed. Cost \$19.45

12/15-16 Moving Derrick (S.L.D. #4)

Derrick moved back into position about 75' taken off rollers & platforms loaded. Cost \$21.65

12/15/16 Moving Derrick (S.L.D. #1)

Derrick put on rollers turned 90° around & moved 15' to concrete ~~left~~ abutment. Cost 21.90

12/29 Moving Guy Derrick #1

G Derrick #1 moved 55' - All guys loosened taken down & moved to different locations.

12/29 Cost

54.60

12/30 "

50.70

Total Cost moving G.D. #1 105.30

12/31. Moving S.L.D. #4

Derrick put on rollers & moved 100' downstream. Cost 41.10

1/12 Derrick #3 turned around & moved 20' upstream.

Building Cribbing for leg

1/12/19 \$11.70 - Moving Derrick 52.70  
Total Cost \$64.40 - Fixed up by C

2  
1-15 & 16 - \$ S.L. Derricks #1 & 2

Moved respectively 10' & 12' on Dam. Platforms unloaded, put on rollers & snatched back & platforms reloaded. Not turned around.

Cost both derricks 50.65

1-19 S.L. Derrick #1 Moved to top of curtain wall portion of dam.

Engine taken off, picked up by cableway, lifted & turned around to new location 20' upstream & 20' higher. Cost below includes time from unloading counterweights to time derrick ready to operate on new location.

Cost

\$53.75

1-20 S.L. Derrick #2 Moved to top of curtain wall portion of dam under practically identical conditions of S.L.D. #1 on 19<sup>th</sup>

Cost

\$50.80

Jan 24, 25 & 26. Guy Derrick #1 Moved about 40' down stream & across mill track. Pit excavated about 5' deep to  
~~Jan 24 Cost - 30.50~~



allow cables to go under mill track. Cost as follows

Jan 24	52.65
25	86.70
26	35.70
Total Cost	\$175.05

Moving S.L.D.#3.

2/8 Derrick Moved down stream 10 ft. Turned 180° Degrees & moved 7' Vertically. Cost includes unloading counterweights, removing engine, replacing counterweights & engine & all labor in moving.

Cost. \$55.60

2-10 Moving S.L.D.#2.

Derrick moved down stream about 8' & turned completely around. Engine taken off, picked up by cableway, turned around.

Cost includes from time counterw. taken off until derrick ready to run again.

Cost \$45.95

2/12 Moving S.L.D.#1.

Derrick Moved 6' Downstream & turned completely around. Cost includes from time counterweights taken off until derrick ready to run.

Engine taken off & Derrick lifted by cableway.

Cost. \$37.30

2/24 Moving S.L.D.#2.

Derrick moved 15' West & 25' vertical & turned around 180° degrees. Counterweights, engine & boom removed.

Entire Cost \$42.95

2/27 Derrick (S.L.#3) Moved South 20' & 20' vertical & turned around 180°.

Counter weights, engine & boom removed.

Entire Cost. \$41.80

3/2 Derrick (S.L.#1) Moved 30' East & Turned 1/2 way around. Not raised.

Entire Cost. \$39.25

3/19 S.L.D.#3. - 12' Vert & 15' South - not turned around - Cableway not reeved with extra lines. Engine & boom removed

Entire labor Cost. 36.85



3/20 S.L.D. #2 Moved 150-175' North  
& 5' Down Vertically not turned  
around - Engine & boom removed.

Entire Cost. 33.40

3/21 S.L.D. #4 Moved 20' toward face  
of quarry. not turned around,  
engine not removed. Derrick at  
same elev. as before.

Entire Lab. Cost. 39.30

3/27 S.L.D. #1 Moved to top of dam  
50' west raised 20' & turned  
completely around. Engine, boom  
& counterweights removed

Total Cost 57.60

4/3 Guy Derrick #2 Dismantled  
Guys loosened, mast taken down  
boom taken off & engine moved  
back about 50-75 feet.

Cost. 45.25

4/4 Guy Derrick #1 Dismantled, guys  
loosened, boom & mast taken down  
& engine, mast & boom loaded in  
muss rock car.

Cost 43.90

4/5 S.L.D. #4 moved from location  
in quarry to place of safety from  
Blq Shot. Moved 200 on timbers &

rollers. Engine not removed.

Total Cost 48.90

4/7 Moving S.L. Derrick #4 back into  
position into Quarry after shot.  
Moved on timbers on rollers.

Total Cost. 27.85

4/8 Re erecting Guy Derrick #1.  
2 new dead men drilled.

Total Cost. 68.35 + 47.50 115.85

4/8 Moving S.L.D. #1 - Derrick moved  
50' South, raised 12' & turned 1/2 way  
around; Counter weights removed,  
boom removed, engine removed.

Total Cost moving & getting ready  
to operate again 58.95

4/8 Moving S.L.D. #3 - 12' Up stream  
Not turned nor raised or lowered.  
Engine not removed - Counterweights  
removed. Total Cost 51.50

4/19 Moving S.L.D. #2 - 20' South Raised  
12' & Turned 1/4 around. Engine &  
Counter weights removed

Total Cost 43.65

4-20-21 Moving S.L.D. #1 50' South &  
Raising 5 - Counter weights  
removed, engine not removed.



Total Cost 90.00  
 4/24 Stiff leg Derrick moved 30' farther toward faces of Quarry. Counter weights removed put on pipe rollers and snatched into place. Time 5 hrs Cost 32.20  
 4/29 Stiff leg derrick #2 moved 46' North & raised 10' & turned completely around. Counterweights, boom & engine, removed.

Total cost 78.50  
 4/30 Reerecting Guy Derrick #2 in quarry. Cost 4/30 16.80  
 5/1 24.75  
 5/2 10.90  
 5/8 66.30  
 5/10 63.10  
 5/12 36.25  
 5/13 9.45  
 5/14 45.40  
 275.95

5/12 Moving S.L.D. #1, Derrick moved 5' South & raised 5'. Engine or boom not removed.  
 Cost 5/1 16.25  
 " 5/2 32.00  
 48.85

5/3 Moving S.L.D. #3. Derrick moved 100 ft towards right abt. & raised 40 ft. Engine, boom & counter weights removed.

5/3 56.35  
 5/4 51.65  
 5/5 47.10

Total Cost 155.10  
 5/8 Stiff Leg Derrick #1 Moved 25' toward ~~left~~<sup>right</sup> abut. & raised 1 ft. Counter weights removed, put on rollers & snatched into position. Time 6 hrs. Cost 55.50

5/9 Stiff Leg Derrick #2 Moved 46' towards left abt. & turned completely around. Counterweights ~~not~~ removed - Engine & Boom not removed. Cost 64.50 ~~53.90~~

5/12 S.L.D. #1 Moved 25' towards left abt, same elevation. Counter weights removed - put on rollers & snatched into position. Time 6 1/2 hrs. Cost 44.45

5/13 Guy Derrick #1 Moved ahead 30' in toward toe of quarry. Same dead men used. Cost 81.90



9  
5/18. S.L.D. #1 Mored 25 feet toward left abutment. Counter weights removed & snatched by own engine into position. No change in elevation. Time 5 hrs.

Cost 25.20

5/18 S.L.D. #4 Mored 40' towards toe of Quarry. Counter weights removed & snatched by own engine into position. No change in elev. Time 3 hrs

Cost. 26.50

5/19-20 etc.

S.L.D. #2 Mored 125' North, raised 40' & turned completely around. Derrick practically dismantled. Boom, & Stiff Legs, Engine & Counter weights removed. Parts mored by cable way

Cost. 5/19	61.70
5/20	41.90
5/21	73.90
5/22	63.10
5/23	29.55

Total Cost. 270.15

5/23. S.L.D. #1 Mored 25' North. No change in El. Counterw. removed & snatched back on rollers. Time 5 1/2 hrs  
Cost 36.35



Outlet tower & tunnel  
Sections

Outlet tunnel lining. Sec. Area 8.06<sup>sq</sup>

" tower Sec. Area G.H. 113.40<sup>sq</sup>

E.F. 105.82<sup>sq</sup>

C.D.

A.B.

Section G.H. to El. 422.7

E.F. to El. 445.7

C.D. to El. 468.7

A.B. to El. 494.2

Derrick Identification Numbers.

S.L.D.#1. Marked on stiff legs U.S.R.S.  
#22 & U.S.R.S.#23 Hoist #234 Am. Hoist.

S.L.D.#2. Marked on stiff legs U.S.R.S.

#224 USRS #23 Amer Hoist #235

S.L.D.#3 Marked on stiff legs U.S.R.S.

#24 & U.S.R.S.#27 Amer. Hoist #220.

S.L.D.#4 Marked on stiff legs U.S.R.S.

#24 & U.S.R.S.#28 Amer Hoist #218

G.D.#1 - Guy Derrick with American  
Hoist #236

G.D.#2 - Guy Derrick with Lidgerwood  
Hoist with side levers belt drive.



### Milling Cost's

Cost of Crushing Rock as given below are unit labor costs from time rock reaches platform at Grizzly until finished product reaches bins.

<del>12/13</del>	<del>111 cu yds</del>	<del>28.80</del>	<del>.245 per c.y.</del>
<del>12/14</del>	<del>74 " "</del>	<del>14.40</del>	<del>.195</del>
<del>12/14</del>	<del>Changing Conc on #8 Eccent. &amp; Spid Bush #4</del>	<del>19.40</del>	
<del>12/15</del>			

12/13	111 cu yds	34.80
12/14	74	19.40
12/14	Changing Conc #8 & Eccent & Spid Bush #4	22.40
12/15	" "	70.03
12/16	" "	42.30
12/17	148 cu yds.	33.65
12/18	159.1 " yds.	30.00
12/19	162.8 " "	30.00
12/20	188.7	29.50

Total for 8 day period  
 Rock 843.60 Cost 310.08 Unit .368 space

12/21	37.5	5.15
12/22	changing mantle #4 (NIGHT)	23.40
12/22	" " (DAY)	24.00
12/23	" " (NIGHT)	7.60
12/23	" " (DAY)	31.10

12/24	Repairs (NIGHT)	17.20
12/24	148.	24.00
12/25		22.30
12/26	170.2*	26.80
12/27	129.5	26.80
12/28	170.2	26.80
12/29	218.3	32.70
12/30	40.70	5.90
	114.70	26.80
	88.80	11.80
12/31	199.80	26.80
	<u>1398.40</u>	<u>339.15</u>
		.242 per c y

1-1-19	152.0	26.80	.176
	57.00	6.40	.112
1-2-19	228.00	26.80	.117
	60.80	6.40	.105
1-3-19	212.80	28.30	.133
	49.40	4.50	.091
1-4-19	182.40	28.70	.157
	53.20	6.75	.127
1-5-19	159.60	28.70	.180
1-6-19	216.60	28.70	.132
	53.20	4.50	.086
1-7-19	220.40	28.70	.128
	Repairs	6.00	.151
1-8-19	216.60	28.00	.122
	49.40	6.00	.110
1-9-19	264.60	28.00	.112
	49.40	6.00	.119
1-10-19	235.60	28.00	.133
	<u>2451.00</u>	<u>327.25</u>	

3/4 hr. Delay  
 oversize rock



Rock Milling Crushed Cost Unit Cost

1-11	34.20	34.00	12.6
	235.60		
1-12	201.40	27.20	.135
1-13	159.60	27.20*	.170
1-14	125.40	27.20 <sup>2</sup>	.217
1-15	11.40	34.00	.114
	285.00		
1-16	45.60	34.00	.121
	235.60		
1-16#5	30.40	4.00	.133
1-17	174.80* <sup>3</sup>	34.50	.193
1-17#6	32.50	8.00	.246
	60.80		
1-18	220.40	34.00	.121
1-18#5	67.50	8.00	.118
1-19	197.60	34.00*	.17
1-20	209.00	26.80	.12.8
1-20#5	5.00* <sup>5</sup>		
#8 & 4	2196.40	312.90	.14.25
#5	135.40	20.00	.148
1-21	205.20	27.20	.132
1-21#5	37.50	5.50	.146
1-22	209.00	28.20	.135
1-23	220.40	34.00	.129
1-24		8530* <sup>7</sup>	
1-24#5	77.50	7.00	.093
1-25#5	<del>40.00</del> 37.5	32.80	
1-25		61.20	

\*1 - Run 5 hrs. only rock bins full.  
 \*2 - Run 4 hrs only full bins.  
 \*3 - 1 1/2 hrs Repair to #4 chute  
 \*4 - Repairs to #4 Mantle  
 \*5 - Repairs to #8 spider  
 \*6 - Repairs to #8 spider  
 \*7 - Changing Concaves on #8, Changing Concaves on Mantle on #4  
 \*8 - Rebabbling #8 Eccentric.

1-26		48.60	
1-27	224.20	27.20	.121
1-28	121.60* <sup>8</sup>	23.80	.195
1-29	311.60	34.00	.109
1-30	292.60	28.50	.0975
1-31	193.80	27.20	.140
	1972.70	470.50	23.8
2-1	155.80	23.80	.152
2-2	231.80	27.20* <sup>9</sup>	.233
2-3	75.00* <sup>5</sup>	26.75* <sup>9</sup>	
2-4	212.80	63.65 Night	
2-5	300.20	27.20	
2-6	338.20	7.20* <sup>5</sup>	
2-7	383.80	59.70 night	
2-8	323.00	53.55 day	
2-9	285.00	35.20	.117
2-10	357.00	37.40	.11
	2662.00	37.40	.097
2-11	126.40	32.20	.099
2-12	136.80	32.50	.114
2-13	258.40	37.50	.105
		501.25	.188
		11.90	.095
		28.20	.206
		59.40* <sup>11</sup>	.296

\*10 #8 Repairs  
 \*9 Repairs to rock screen  
 \*8 4 hrs run 3 hrs repair on #8 spider  
 \*7 Changing Concaves on #8, Changing Concaves on Mantle on #4  
 \*11 Rebabbling #8 Eccentric.



2/14	304.00	34.00	.112
2/15	338.20	37.40	.111
2/16	319.20	37.40	.117
2/17	323.00	45.20*	.140
2/18	296.40	34.00	.114
2/19	349.60	37.40	.107
2/20	129.20	27.20	.210
	<u>2592.20</u>	<u>352.10</u>	<u>.136</u>
2/21	258.40	38.55	.149
2/22	281.20	37.25	.132
2/23	—	87.40**	
2/24	—	58.60**	
2/24	<del>6.60</del>	6.60	<del>.190</del>
2/25	57.00	35.10	.115
2/26	277.40	35.20	.127
2/27 (night)	171.00	23.00	.134
2/27 (day)	129.20	24.10	.186
2/28 (night)	167.20	23.00	.138
2/28 (day)	193.80	24.10	.124
	<u>1618.80</u>	<u>392.90</u>	<u>.242</u>
3-1 (night)	171.00	23.40	.137
3-1 (day)	216.60	24.30	.113
3-2 (night)	155.80	26.00	.168
3-2 (day)	30.40	26.00	.856

\*1 - 3 1/2 hr. repairs to spider bushing #4 Ecc.  
 \*2 - Changing mantle, shaft, concave on #8

Rock Crushed Cost Unit C. 18

3-3 (night)	205.20	23.40	.114
3-3 (day)	155.80	24.30	.156
3-4 (night)	171.00	36.00	.210
3-4 (day)	102.60	29.30	.286
3-5 (night)	—	38.00	
3-5 (day)	209.00	23.30	.112
3-6 (night)	129.20	44.40	.344
3-6 (day)	148.20	24.30	.164
3-7 (night)	136.80	28.85	.215
3-7 (day)	136.80	27.50	.205
3-8 (night)	53.20	<del>27.60</del> 62.40	<del>.556</del>
3-8 (day)	152.00	24.35	.160
3-9 (night)	171.00	22.40	.131
3-9 (day)	186.20	28.30	.152
3-10 (night)	152.00	24.90	.164
3-10 (day)	186.20	24.70	.133
Total (Day)	1523.80	256.45	.168
Total (night)	1345.20	329.75	.245
	<u>2869.00</u>	<u>586.20</u>	<u>.204</u>
3-11 (night)	190.00	24.40	.132
3-11 (day)	209.00	24.30	.116
3-12 (night)	186.20	24.40	.131
3-12 (day)	190.00	28.10	.148
3-13 (night)	197.60	24.40	.123
3-13 (day)	102.60	21.70	.212



Date	Rock Crushed	Cost	Unit Cost
3/4 (night)	190.00	24.40	.128
3/4 (day)	152.00	25.50	.168
3/5 (night)	—	—	—
3/5 (day)	190.00	31.70	.167
3/6 (night)	174.80	27.60	.158
3/6 (day)	205.20	31.90	.155
3/7 (night)	239.40	24.40	.104
3/7 (day)	224.20	30.70	.137
3/8 (night)	212.80	24.40	.115
3/8 (day)	250.80	32.10	.124
3/9 (night)	205.20	24.40	.119
3/9 (day)	178.60	29.10	.163
3/20 (night)	106.40	19.80	.186
3/20 (day)	136.80	20.50	.150
night	1702.40	215.20	.128
day	1839.20	275.60	.149
	3541.60	493.80	.139
3/21 (night)	167.20	38.40	.239
3/21 (day)	121.60	25.90	.213
3/22 (night)	140.60	24.40	.173
3/22 (day)	209.00	28.90	.138
3/23 (night)	140.60	24.40	.173
3/23 (day)	209.00	25.10	.120
3/24 (night)	152.00	25.20	.166
3/24 (day)	209.00	24.60	.118

Date	Rock Crushed	Cost	Unit Cost
3/25 (night)	205.20	24.40	.119
3/25 (day)	235.60	25.10	.106
3/26 (night)	197.60	23.60	.119
3/26 (day)	209.00	25.50	.122
3/27 (night)	190.00	24.40	.128
3/27 (day)	174.80	25.50	.146
3/28 (night)	155.80	24.40	.156
3/28 (day)	186.20	25.50	.137
3/29 (night)	167.20	24.40	.146
3/29 (day)	231.80	25.50	.110
3/30 (night)	171.00	24.40	.143
3/30 (day)	190.00	25.10	.132
3/31 (night)	144.40	24.40	.169
3/31 (day)	—	22.30	—
Total (night)	1850.60	282.40	.1525
	1949.40	279.00	.1432
	3800.00	561.40	.1475
4/1 (night)	repairs	14.00	—
4/1 (day)	repairs	25.90	—
4/2 (night)	—	—	—
4/4 (day)	231.80	25.50	.110
4/3 (night)	163.40	24.40	.149
4/3 (day)	190.00	25.50	.134
4/4 (night)	155.80	24.40	.156
4/4 (day)	—	28.70	—



Date	Rock Crushed	Cost	Unit C.
<del>4/5 (night)</del>	<del>41.00</del>		
4/5 (night)	repairs *	46.00	
4/5 (day)	repairs *	21.90	
4/6 (night)	repairs *	24.80	
4/6 (day)	repairs *	18.30	
4/7 (night)	repairs *	22.00	
4/7 (day)	repairs *	21.90	
4/8 (day/night)	repairs *	61.30	
4/9 (night)	121.00	—	
4/9 (day)	<del>155.80</del>	21.90	.150
4/10 (night)	106.40	<del>24.80</del>	.23.30
4/10 (day)	178.50	<del>25.10</del>	.14.10
		456.40	

4/11 (night)	140.6	24.80	.176
4/11 (day)	178.6	25.50	.143
4-12 night.	186.2	24.80	.133
4-12 day.	212.8	26.25	.123
4-13 night	152.0	24.80	.163
4-13 day.	155.8	25.50	.164
4-14 (night)	155.8	24.80	.157
4-14 (day)	163.4	25.50	.156

New Concaves put in both crushers.

4-15 (night)	174.8	24.80	.142
4-15 (day)	163.4	25.50	.156
4-16 (night)	193.8	24.80	.128
4-16 (day)	190.0	24.70	.130
4-17 (night)	182.0	24.80	.136
4-17 (day)	192.5	24.70	.128
4-18 (night)	192.5	24.80	.129
4-18 (day)	175.0	24.70	.141
4-19 (night)	199.5	24.80	.124
4-19 (Day)	164.5	24.70	.150
4/20 (night)	94.5	24.80	.262
4/20 (Day)	17.5	24.20	.1.380
	3285.20	499.25	.152

4-21 (night)	189.00	24.80	.132
4-21 (day)	199.50	25.10	.126
4-22 (night)	175.00	24.80	.142
4-22 (day)	182.00	25.10	.137
4-23 (night)	122.50	24.80	.202
4-23 (day)	171.50	25.10	.146
4-24 (night)	178.50	24.80	.139
4-24 (day)	59.50 *	29.15	.479
4-25 (night)	115.50	21.80	.189
4-25 (day)	217.00	25.10	.116

\* changing dust jacket on screen.



Date	Rock Crushed C.Y.	Cost.	Unit Cost
4/26 (night)	178.50	24.80	.139
4/26 (day)	161.00	25.10	.156
4/27 (night)	35.00	12.40	.322
4/27 (day)	210.00	25.10	.119
4/28 (night)	185.50	24.80	.134
4/28 (day)	220.50	25.10	.114
4/29 (night)	140.00	24.80	
4/29 (day)	10.50	29.80	
4/30 (night)	150.50	24.80	.165
4/30 (day)	178.50	25.10	.141
Total night	1470.00	232.60	.158
Total Day	1610.00	259.75	.1610
Total	3080.00	492.35	.1595
5/1 (night)	154.00	24.80	.162
5/1 (day)	<del>150.50</del> 196.00	25.10	.165
5/2 (night)	164.50	24.80	.151
5/2 (day)	210.00	24.70	.118
5/3 (night)	129.50	30.80	.238
5/3 (day)	129.50	24.70	.191
5/4 (night)	31.50	24.80	
5/4 (day)	changing mantle # 8-	25.70	
5/5 (night)		32.00	
5/5 (day)	112.00	24.30	.217
5/6 (night)	115.50	24.40	.211
5/6 (day)	210.00	24.30	.117

Date	Rock Crushed C.Y.	Cost.	Unit Cost.
5/7 (night)	108.50	24.40	.225
5/7 (day)	175.00	22.70	.129
5/8 (night)	105.00	24.00	.228
5/8 (day)	164.50	24.30	.148
5/9 (night)	227.50	24.40	.107
5/9 (day)	126.00	27.70	.219
5/10 (night)	175.00	24.80	.142
5/10 (day)	122.50	24.30	.198
Total	2656.50	507.00	.192
Total (night)	1211.00	259.20	.214
" (Day)	1445.50	247.80	.172
5/11 (night)	157.50	24.80	.157
5/11 (day)	24.50	27.30*	1.110
5/12 (night)	126.00	24.80	.197
5/12 (day)	80.00	21.10	.264
5/13 (night)	129.50	33.80	.261
5/13 (day)	101.50	27.70	.273
5/14 (night)	101.50	24.80	.244
5/14 (day)	150.00	25.10	.167
5/15 (night)	122.50	24.80	.202
5/15 (day)	168.00	25.10	.149
5/16 (night)	140.00	24.80	.177
5/16 (day)	178.50	25.10	.141
* Changing mantle on # 4 crusher.			



25 Rock for Crushing  
Unit labor Costs

Unit labor costs given below include labor cost of quarrying breaking by hand, & loading into skips & delivering rock to mill.

Date.	Cu. Yds.	Cost	Unit Cost
12/11	129.5	150.75	1.16
12/12	118.4	141.95	1.195
12/13	111.0	165.65	1.48 *1
12/14	74.0	167.45	2.23 *1
12/15	—	193.15	*1 *2
12/16	14.8	168.85	*2
12/17	148.0	172.05	1.16
12/18	159.1	156.45	.98
12/19	162.8	214.20	1.315
12/20	190.5	188.10	.99
	<u>1108.10</u>	<u>1718.60</u>	<u>1.55</u>
12/21	57.20	37.20	.65
12/22	—	161.10	
12/23		175.10	
12/24	148.00	91.80	
12/25		6.40	
12/26	170.20	82.70	

\*1 Man cost due to loading & mucking up carote  
\*2 Mill down all day changing cones

Cu. Yds.	Cost	Unit Cost.	
12/29	129.50	105.95	.815
12/29	170.20	148.35	.870
12/29	55.50		
12/29	170.20	199.20	.885
12/30	62.90		
12/30	114.70	188.20	1.060 *1
12/31	88.80		
12/31	199.80	193.45	.67
	<u>1398.40</u>	<u>1388.45</u>	<u>.995</u>
Unit Cost for 10 day period		.995 perc. y.	
"	" " 20 "	1.225 " " "	
1-1	152.00	133.50	.88
1-2	57.00	183.15	.643
1-3	228.00	193.30	.708
1-4	60.80	179.60	.775
1-5	49.40	151.45	.712
1-6	182.40	184.45	.850
1-7	53.20	196.00	.720
1-8	220.40	<del>184.55</del> 213.72	<del>.850</del> .985
1-9	216.60	210.30	.693
1-10	49.40	243.00	.855
	235.60		
For 10 Pd.	2451.00	1888.47	.77
For 30d Period	4957.5	4996.52	1.01
1-11	34.20	258.25	.96
1-12	235.60	237.55	1.18
1-13	201.40	199.80	1.25
1-14	159.60 *2	179.55	1.43
1-14	125.40 *3		

\* Mill down 2h-20m in PM acct. burned out motor on Quarry Hoist  
\*2 Rock bins full for 3 hrs \* Rock bins full 4 hrs.



Date	cu. Yds.	Cost	Unit Cost.
1/15	296.40	170.25	.575
1/16	311.60	208.45	.670
1/17	207.30	195.15	.943
1/18	348.70	192.00	.550
1/19	197.60	145.15	.735
1/20	214.00	165.00	.771
	<u>2331.80</u>	<u>1951.15</u>	<u>.838</u>
1-21	242.70	175.30	.722
1-22	209.00	164.75	.790
1-23	262.20	187.70	.715
1-24 #5	77.50	217.90*	
1-25 #5	37.50	196.35*1	
1-26		96.40*1	
1-27	224.20	130.50	.58
1-28	121.60	116.95	.965
1-29	311.60	192.75	.618
1-30	292.60	177.70	.606
1-31	193.80	182.80	.945
	<u>1972.70</u>	<u>1839.10</u>	<u>.930</u>
2-1	155.80	126.75	.815
2-2	231.80	137.30	.589
2-3	75.00	132.40	1.72
2-4	212.80	208.60	.98
2-5	300.20	185.80	.618
*1	Moring G. Derrick #1		

Date	cu. Yds.	Cost	Unit Cost. 28
2-6	338.2	170.25	.503
2-7	383.8	199.75	.520
2-8	323.0	214.60	.665
2-9	285.0	157.55	.553
2-10	357.2	202.80	.568
	<u>2662.00</u>	<u>1735.80</u>	<u>.652</u>
2-11	125.40	82.55	.667
2-12	136.80	137.90	1.01
2-13	258.40	137.60	.53
2-14	304.00	191.85	<del>.63</del>
2-15	338.20	206.30	.61
2-16	319.20	201.80	.632
2-17	323.00	197.75	.613
2-18	296.40	188.70	.635
2-19	349.60	189.00	.540
2-20	129.20	170.80	1.320
	<u>2592.20</u>	<u>1704.25</u>	<u>.657</u>
2-21	258.40	228.25	.883
2-22	281.20	206.60	.735
2-23	87.40*5	97.25	1.110
2-24	83.60*5	140.40	1.680
2-25	57.00	159.30	2.700
2-26	277.40	192.70	.695
2-27	<del>235.75</del>	235.75	.783
2-28	300.20	225.00	.625
	<u>361.0</u>	<u>225.00</u>	<u>.625</u>
	<u>1646.20</u>	<u>1485.25</u>	<u>.903</u>



29 Date	Co. Yds	Cost	Unit C.
3-1	387.60	230.70	.614
3-2	186.20	221.95	1.190
3-3	361.00	234.15	.65
3-4	273.60	232.15	.85
3-5	209.00	209.80	1.00
3-6	277.40	233.70	.843
3-7	273.60	216.80	.794
3-8	205.20	224.35	1.092
3-9	357.20	237.25	.665
3-10	338.20	233.45	.69
	<u>2869.00</u>	<u>2274.30</u>	.792
3-11	399.00	246.60	.618
3-12	376.20	237.85	.632
3-13	300.20	219.70	.732
3-14	342.00	231.00	.675
3-15	190.00	161.25	.848
3-16	380.00	256.90	.675
3-17	463.60	260.60	.563
3-18	463.60	287.15	.620
3-19	383.80	285.85	.748
3-20	243.20	172.60	.71
	<u>3541.60</u>	<u>2359.80</u>	.665
3-21	288.80	249.05	.853
3-22	<del>349.60</del>	244.70	.723
	342.00		.700
3-23	349.60	200.65	.575

Date	Co. Yds	Cost	Unit C.30
3-24	361.00	257.20	.713
3-25	440.80	276.10	.627
3-26	406.60	264.95	.652
3-27	364.80	249.70	.684
3-28	342.00	249.60	.730
3-29	399.00	241.40	.605
3-30	361.00	242.65	.673
3-31	144.40	132.15	.915
	<u>3800.00</u>	<u>2608.15</u>	.685
4-1		32.55	—
4-1	231.80	(169.50)*	—
4-2	<del>112.65</del>	112.65	.486
4-2		(120.15)*	—
4-3	353.40	186.25	.528
4-3		(96.50)	—
4-4	155.80	92.05	.591
4-4		(204.80)	—
4-5		(173.05)	—
4-6		(52.00)	—
4-7		(121.00)	—
4-8		(52.15)	—
4-9	121.6	74.15	.610
4-9		(108.50)	—
4-10	284.9	171.15	.602

\* Labor cost chargeable to suspense  
 Chargeable to CD 86 for stripping overburden  
 from quarry - hold in suspense. Also Loading Carrot



Date	Co. Yds.	Cost.	Unit C.
4/11	319.2	197.25	.618
4/12	399.0	198.45	.498
4/13	307.0	206.50	.673
4/14	319.2	196.55	.651
4/15	338.2	199.40	.675
4/16	383.8	222.85	.580
4/17	374.5	223.80	.596
4/18	367.5	214.10	.584
4/19	364.0	196.50	.540
4/20	112.0	132.30	1.180
	<u>3284.40</u>	<u>1987.70</u>	<u>.605</u>
4/21	388.50	184.00	.474
4/22	357.00	201.80	.565
4/23	294.00	198.90	.676
4/24	238.00	170.45	.716
4/25	332.50	222.35	.669
4/26	339.50	211.10	.622
4/27	245.00	142.15	.582
4/28	406.00	209.15	.515
4/29	150.50	178.85	1.187
4/30	329.00	192.10	.584
	<u>3080.00</u>	<u>1910.85</u>	<u>.618</u>

5/1	350.00	201.35	.575
5/2	374.50	192.65	.514
5/3	259.00	178.95	.690
5/4	31.50	99.25	
5/5	112.00	88.25	
5/6	325.50	136.45	.418
5/7	283.50	148.90	.525
5/8	269.50	160.60	.596
5/9	353.50	185.00	.523
5/10	297.50	176.60	.594
	<u>2656.50</u>	<u>1568.00</u>	<u>.591</u>
5/11	182.00	164.15	.903
5/12	206.50	168.90	.818
5/13	231.00	194.40*	.841
5/14	251.50 <sup>251.50</sup>	178.20	.709
5/14		<u>206.95</u> *	
5/15	290.50	195.80	.673
5/16	318.50	223.60	.702
5/17	363.50	212.85	.603
5/18	234.50	167.60	.714
5/19	213.50	157.50	.738

\* Moring Guy Derrick #1  
 \* Erection Guy Derrick #2 - Hold in Susp.



Date	Co. Yds.	Cost	Unit C.
5/20.	164.50	151.30	.919
	2446.00	1814.30	.742

5/21	—	137.80	—
5/22	224.00	149.20	.665
5/23	217.00	151.40	.698
5/24	325.50	172.10	.529
5/25	220.50	156.30	.708
5/26	147.00	141.90	.965
5/27	189.00	132.75	.702
5/28	273.00	176.15	.645
5/29	252.00	167.60	.665
5/30	276.50	164.70	.595
5/31	248.50	155.50	.625
	<u>2373.00</u>	<u>1705.40</u>	<u>.719</u>



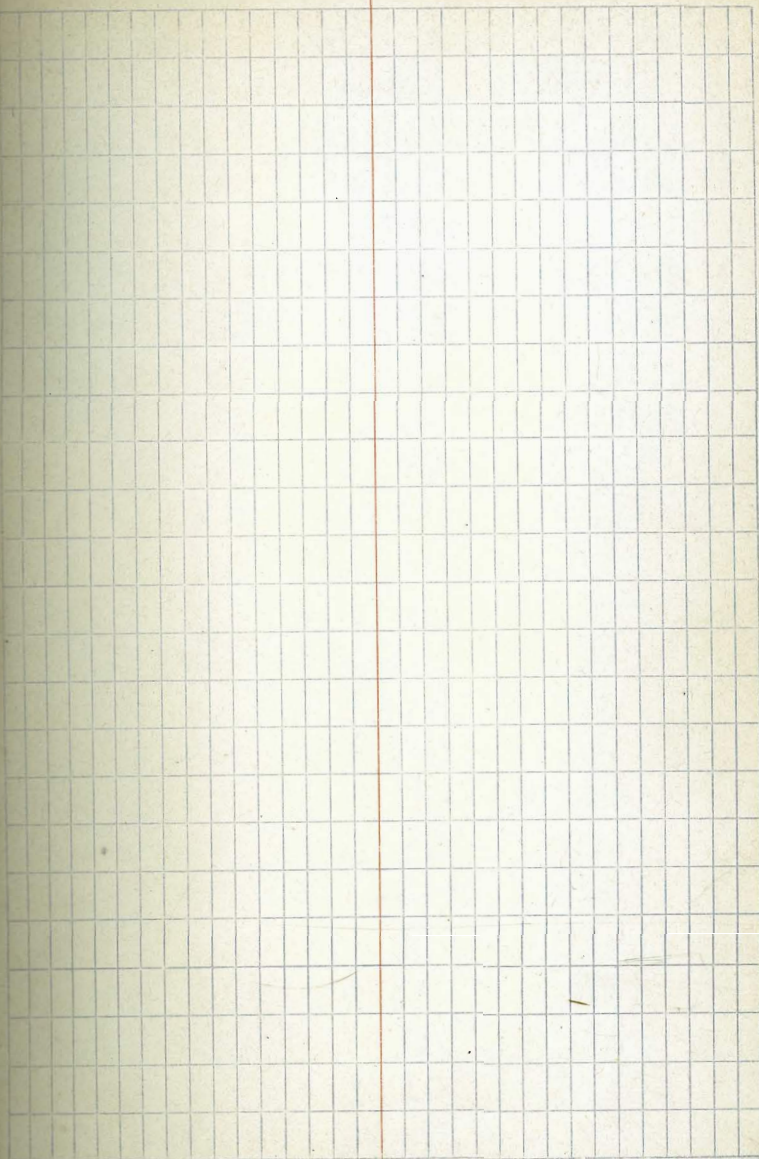
## Milling Cost.

Date	Rock Crushed	Cost	Unit.
5/17(night)	154.00	32.80	.213
5/17(day)	199.50	24.10	.121
5/18(night)	108.50	24.80	.228
5/18(day)	126.00	24.70	.196
5/19(night)	91.00	24.80	.272
5/19(day)	122.50	27.70	.226
5/20(night)	94.50	24.80	.262
5/20(day)	70.00	29.90	.428
night	1225.00	265.00	.216
day	1221.00	257.80	.211
		522.80	

5/21(night)	Rep.	44.00	—
5/21(day)	Rep.	25.90	—
5/22(night)	150.50	24.80	.165
5/22(day)	73.50	28.10	.382
5/23(night)	24.50	24.60	1.01
5/23(day)	192.50	24.70	.128
5/24(night)	185.50	24.80	.134
5/24(day)	140.00	24.70	.176
5/25(night)	129.50	24.80	.192
5/25(day)	91.00	24.70	.272
5/26(night)	73.50	24.80	.338
5/26(day)	73.50	22.90	.312

Date	Rock Crusht.	Cost	Unit C. <sup>36</sup>
5/27(night)	112.00	24.80	.221
5/27(day)	77.00	27.70	.360
5/28(night)	105.00	24.80	.236
5/28(day)	<del>168.00</del>	24.70	.147
5/29(night)	91.00	24.80	.272
5/29(day)	161.00	25.10	.156
5/30(night)	126.00	24.80	.197
5/30(day)	150.50	25.10	.167
5/31(night)	101.50	24.80	.244
5/31(day)	147.00	25.10	.171
Total	2373.00	570.50	.242
Total (night)	1099.00	291.80	.263
" (day)	1274.00	278.70	.219
Total 12/13-4/1		7715.83	







## Mass Rock

## Unit Cost's

Unit labor costs given below  
include quarrying, loading &  
delivering to derricks at dam.

	Yardage	Cost	Unit Cost
12/11	27	28.50	1.06
12/12	21	33.65	1.60
12/13	33	38.45	1.165
12/14	33	28.85	.875
12/15	35	34.25	.98
12/16	31	23.65	.765
12/17	32	27.95	.875
12/18	54	43.95	.815
12/19	67	60.85	.905
12/20	57	48.00	.84
	<u>390</u>	<u>328.10</u>	<u>.945</u>
12/21	27	24.70	.915
12/22	98	54.40	.565
12/23	77	42.70	.555
12/24	24	27.40	1.155
12/25	—	—	—
12/26	—	11.80	—
12/27	83	49.55	.597
12/28	32	24.35	.760
12/29	8	22.20	2.780
12/30	30	34.00	.57
12/31	52	35.75	.69
	461	326.85	.71



Unit	Cost	for part	10 day period	
1-1	65.00	48.90	.71	.75
1-2	95.00	45.95	.483	
1-3	99.00	36.90	.373	
1-4	89.00	43.90	.493	
1-5	72.00	38.45	.535	
1-6	45.00	28.65	.635	
1-7	70.00	36.05	.515	
1-8	30.00	<del>48.65</del> 43.35	.955	1.44
1-9	55.00	39.30	.715	
1-10	80.00	48.70	.610	
	<u>700.00</u>	<u>410.15</u>	<u>.587</u>	
1-11	90.00	39.55	.440	
1-12	<del>45.00</del>	57.35	<del>1.272</del>	
1-13	72.00	52.90	1.795	
1-14	45.00	58.65	1.22	
1-15	48.00	36.65	.455	
1-16	81.00	41.30	.608	
1-17	67.00	40.30	.604	
1-18	81.00	44.45	.550	
1-19	85.00	45.05	.530	
1-20	93.00	43.10	.463	
	<u>712.00</u>	<u>459.30</u>	<u>.645</u>	
1-21	78.00	35.80	.46	
1-22	95.00	37.05	.39	
1-23	95.00	57.25	.54	

1-24	45.0	68.50*	1.52
1-25	85.0	52.95*	.623
1-26	35.0	21.80*	.623
1-27	36.0	27.70	.718
1-28	46.0	24.80	.540
1-29	130.0	45.35	.348
1-30	118.0	46.70	.396
1-31	120.00	37.20	.311
	<u>883.00</u>	<u>449.10</u>	<u>.51</u>
2-1	70.00	30.80	.44
2-2	81.00	42.40	.524
2-3	66.00	24.50	.372
2-4	86.00	41.60	.483
2-5	88.00	39.40	.447
2-6	101.00	42.55	.420
2-7	85.00	50.05	.590
2-8	65.00	48.35	.740
2-9	104.00	48.45	.465
2-10	81.00	47.40	.585
	<u>827.00</u>	<u>409.50</u>	<u>.495</u>
2-11	40.00	20.60	.515
2-12	35.00	28.70	.82
2-13	73.00	43.80	.60
2-14	88.00	44.90	.528
2-15	63.00	44.25	.703
*1 Moring Coy Derrick #1			
2-16	70.00	46.90	.670



2-17	53.00	48.00	905
2-18	45.00	39.95	885
2-19	41.00	39.90	973
2-20	59.00	44.50	755
	<u>564.00</u>	<u>406.50</u>	<u>735</u>
2-21	63.00	42.50	675
2-22	55.00	43.45	790
2-23	20.00	24.70	1.232
2-24	—	43.15	
2-25	21.00	43.75	2.08
2-26	36.00	50.70	1.41
2-27	27.00	48.25	1.79
2-28	92.00	51.40	558
	<u>314.00</u>	<u>347.90</u>	<u>1.105</u>
3-1	72.00	50.85	706
3-2	70.00	49.65	710
3-3	81.00	49.65	613
3-4	55.00	52.90	96
3-5	60.00	45.70	763
3-6	80.00	45.50	569
3-7	68.00	44.40	653
3-8	65.00	48.25	742
3-9	94.00	44.55	474
3-10	82.00	48.76	595
	<u>727.00</u>	<u>480.20</u>	<u>663</u>

Date	Amount	Cost	Unit. 44
3/11	116.00	56.90	49
3/12	112.00	53.55	478
3/13	87.00	52.80	606
3/14	65.00	49.90	768
3/15	49.00	37.95	774
3/16	125.00	55.50	444
3/17	108.00	54.00	500
3/18	82.00	55.25	675
3/19	49.00	52.55	1.072
3/20	35.00	36.85	1.05
	<u>828.00</u>	<u>505.25</u>	<u>605</u>
3/21	70.00	55.75	797
3/22	<del>102.00</del>	49.15	712 <del>782</del>
3/23	102.00	41.05	405
3/24	92.00	47.60	518
3/25	89.00	52.40	589
3/26	94.00	55.10	586
3/27	41.00	54.70	1.332
3/28	59.00	56.25	937
3/29	80.00	51.85	648
3/30	87.00	44.85	515
3/31	46.00	29.95	650
3/31		<u>23.70*</u>	
	<u>829.00</u>	<u>538.65</u>	<u>650</u>

\* Labor Cost chargeable to C88 for stripping overboard, Hold in Sospense. Loading Coyote & Dismantling Quarry



<sup>45</sup> Date	Amount	Cost	Unit
4/1	—	10.85	—
	—	<u>56.50</u> *	
4/2	25.00	17.35	.694
		<u>40.05</u>	
4/3	65.00	33.55	.516
		<u>32.20</u>	
4/4	36.00	19.55	.543
		<u>68.25</u>	
4/5	—	<u>57.70</u>	
4/6	—	<u>17.30</u>	
4/7	—	<u>41.70</u>	
4/8	—	<u>50.70</u>	
4/9	4.0	18.25	
4/9		<u>36.40</u>	
4/10	78.00	32.25	
4/11	61.00	35.45	.581
4/12	68.00	34.45	.513
4/13	30.00	35.10	1.17
4/14	56.00	36.15	.645
4/15	91.00	36.90	.405

\* See note on preceding page.

Date	Amount	Cost	Unit Cost
4-16	85.00	53.50	.629
4-17	69.00	39.65	.575
4-18	74.00	39.10	.528
4-19	24.00	36.60	1.520
4-20	44.00	39.10	.888
	<u>602.00</u>	<u>386.00</u>	<u>.641</u>
4-21	40.00	38.30	.958
4-22	48.00	36.50	.760
4-23	70.00	36.20	.517
4-24	40.00	64.55*	1.610
4-25	76.00	35.75	.470
4-26	52.00	34.90	.672
4-27	36.00	28.15	.782
4-28	56.00	36.90	.658
4-29	28.00	40.50	1.445
4-30	44.00	38.70	.879
	<u>490.00</u>	<u>390.45</u>	<u>.804</u>
5-1	32.00	41.05	1.280
5-2	64.00	40.55	.634
5-3	44.00	35.45	.805
5-4	28.00	30.55	1.089
5-5	—	7.55	
5-6	54.00	29.25	.542

\* Extending mass Rock Track

184.40



47	Date	Amount	Cost	Unit Cost
	5/7	56.00	35.28	.628
	5/8	48.00	38.90	.810
	5/9	57.00	38.50	.676
	5/10	64.00	36.90	.576
	Total	447.00	333.90	.746

	5/11	32.00	40.65	1.271
	5/12	24.00	31.70	1.320
	5/13	48.00	51.50*	1.286
	5/14	58.00	37.20	.642
	5/14	—	69.00*1	
	5/15	64.00	39.88	.622
	5/16	64.00	59.10*2	.924
	5/17	40.00	36.45	.911
	5/18	52.00	37.30	.717
	5/19	27.00	46.40	1.72
	5/20	20.00	38.00	1.898
		421.00	418.00	.993

	5/21	20.00	30.55	1.525
	5/22	28.00	38.90	1.388
	5/23	40.00	28.70	.717
	5/24	36.00	38.60	1.071

Moring Goy Derrick #1  
 Erecting Goy Derrick #2 Hold in Susp.  
 #2 Extending Mass R. Track.

Cont. P.  
 95.

## Sand Cost.

50

Cost below includes cost of moving sand from stock pile to Sand washer, washing, & hauling to bin & delivering to bin by conveyor.

Date	Amt.	Labor	Stock Rental	Stock Equip.	Total Cost	Unit Cost
3/5	106.50	60.90	4.00	22.00	86.90	.815
3/6	70.50	64.05	4.00	22.00	90.05	1.278
3/7	113.40	61.55	4.00	22.00	87.55	.770
3/8	115.50	74.10	4.00	20.00	108.10	<del>88</del>
3/9	91.50	65.50	—	22.00	87.50	.955
3/10	174.00	69.65	4.00	22.00	95.65	.550
	671.40	395.75	20.00	130.00	548.95	.816
3/11	117.00	57.45	2.00	20.00	79.45	.678
3/12	117.00	55.95	2.00	20.00	77.95	.665
3/13	55.50	38.65	4.00	22.00	64.65	1.162
3/14	97.50	62.80	4.00	22.00	88.80	.91
3/15	106.50	54.25	4.00	21.00	79.25	.743
3/16	127.50	42.95	2.00	16.00	60.95	.485
3/17	157.50	85.45	4.00	22.00	111.45	.708
3/18	111.00	79.80	4.00	22.00	105.80	.954
3/19	108.00	70.75	4.00	22.00	96.75	.896
3/20	54.00	45.35	4.00	22.00	71.35	1.320
	1051.50	593.40	34.00	209.00	836.40	.795
3/21	150.00	87.15	4.00	22.00	113.15	.755
3/22	126.00	62.35	4.00	22.00	88.35	.700
3/23	117.00	57.35	3.00	16.00	76.35	.652
3/24	151.50	80.85	4.00	22.00	106.85	.705



Sand

Date	amt hauled	Labor Cost	Stock Rental	Stock Upkeep	Total Cost	Unit Cost
3/25	94.50	66.80	4.00	22.00	92.80	.982
3/26	157.50	88.00	4.00	22.00	114.00	.724
3/27	94.50	71.25	3.00	18.00	92.25	.975
3/28	111.00	62.35	4.00	22.00	88.35	.795
3/29	157.50	84.70	4.00	22.00	110.70	.703
3/30	157.50	73.90	4.00	22.00	99.90	.634
6/31	—	35.50	1.00	22.00	58.50	
	<u>1317.00</u>	<u>770.20</u>	<u>39.00</u>	<u>232.00</u>	<u>1041.20</u>	.791

4/1	54.00	46.60	1.00	22.00	69.60	1.29
4/2	<del>60.00</del> 60.00	58.85	3.50	22.00	84.35	1.405
4/3	105.00	67.20	3.50	22.00	92.70	.882
4/4	52.50	44.05	—	14.00	58.05	1.105
4/5	—	22.95	1.00	16.00	39.95	
4/6	—	—	—	16.00	16.00	
4/7	—	22.95	1.00	16.00	39.95	
4/8	—	22.95	1.00	16.00	39.95	
4/9	112.50	43.35	3.00	19.00	65.35	.58
4/10	—	22.95	1.00	16.00	39.95	—
	<u>384.00</u>	<u>351.85</u>	<u>15.00</u>	<u>179.00</u>	<u>545.85</u>	1.422

Date	amt. hauled	Labor Cost.	Stock rental	Stock Upkeep.	Total Cost	Unit Cost.
4/11	148.5	79.35	4.00	21.00	104.35	.705
4/12	96.0	56.35	3.00	19.00	78.35	.815
4/13	90.0	54.15	3.00	19.00	76.15	.846
4/14	<del>142.5</del>	<del>64.55</del>	<del>3.00</del>	<del>19.00</del>	<del>86.55</del>	<del>.607</del>
4/14	109.50	64.55	3.00	19.00	86.55	.790
4/15	142.50	70.35	4.00	19.00	93.35	.655
4/16	90.00	49.45	4.00	19.00	72.45	.805
4/17	111.00	47.35	3.50	19.00	69.85	.628
4/18	162.00	70.65	3.00	21.00	94.65	.584
4/19	54.00	53.85	3.00	21.00	77.85	1.439
4/20	<u>108.00</u>	<u>48.65</u>	<u>3.50</u>	<u>20.00</u>	<u>72.15</u>	<u>.658</u>
	<u>1111.50</u>	<u>594.70</u>	<u>34.00</u>	<u>197.00</u>	<u>825.70</u>	<u>.743</u>

4/21	108.00	59.25	3.50	20.00	82.75	.756
4/22	108.00	61.65	3.50	20.00	86.15	.788
4/23	162.00	74.65	4.00	20.00	98.65	.608
4/24	114.00	59.05	4.00	20.00	83.05	.728
4/25	108.00	58.25	4.00	20.00	82.25	.761
4/26	91.00	52.20	4.00	18.00	74.30	.820
4/27	42.00	34.75	4.00	20.00	58.75	1.395
4/28	114.00	56.65	4.00	20.00	80.65	.708
4/29	105.00	55.05	4.00	20.00	79.05	.753
4/30	<u>91.50</u>	<u>51.85</u>	<u>4.00</u>	<u>20.00</u>	<u>75.85</u>	<u>.828</u>
	<u>1043.5</u>	<u>563.45</u>	<u>39.00</u>	<u>198.00</u>	<u>800.45</u>	<u>.767</u>



Date	Amt Hauled	Labor Cost	Stock Rental	Stock Upkeep	Total Cost	Unit
5/1	96.00	51.85	4.00	20.00	75.85	.79
5/2	142.50	71.65	4.00	20.00	95.65	.672
5/3	75.00	51.85	4.00	20.00	75.85	1.010
5/4	54.00	33.80	3.50	20.00	57.80	1.062
5/5	—	9.40	—	20.00	29.40	—
5/6	85.50	44.80	4.00	20.00	68.80	.804
5/7	105.00	51.85	4.00	20.00	75.85	.722
5/8	97.50	47.30	4.00	18.00	69.30	.710
5/9	144.00	69.10	4.00	18.00	91.10	.632
5/10	90.00	45.45	3.50	17.00	65.95	.732
	<u>889.50</u>	<u>477.05</u>	<u>35.00</u>	<u>193.00</u>	<u>705.05</u>	<u>.788</u>

5/11	48.00	40.55	3.50	16.00	60.05	1.251
5/12	49.50	45.10	3.00	16.00	64.10	1.293
5/13	52.50	32.75	3.00	16.00	51.75	.985
5/14	82.50	51.55	3.50	16.00	71.05	.862
5/15	100.50	51.55	3.50	16.00	71.05	.707
5/16	120.00	65.30	3.50	16.00	84.80	.705
5/17	72.00	51.55	3.50	16.00	71.05	.987
5/18	96.00	47.55	3.50	16.00	67.05	.698
5/19	52.50	29.95	3.00	16.00	49.95	.932
5/20	51.00	30.10	3.00	16.00	49.10	.964
	<u>724.50</u>	<u>445.95</u>	<u>33.00</u>	<u>160.00</u>	<u>638.95</u>	<u>.883</u>

Date	Amt.	Labor	Stock Rental	Stock Upkeep	Total Cost	Unit
5/21	45.00	34.60	—	19.00	53.60	1.19
5/22	33.00	36.60	—	19.00	55.60	1.68
5/23	97.50	53.40	3.50	19.00	75.90	.778
5/24	76.50	44.45	3.00	16.00	63.45	.828
5/25	99.00	43.80	3.00	19.00	65.80	.664
5/26	72.00	48.20	3.00	19.00	70.20	.975
5/27	52.50	32.75	3.00	17.00	52.75	1.01
5/28	150.00	67.40	3.00	19.00	89.40	.595
5/29	49.50	29.80	3.00	16.00	48.80	.985
5/30	135.00	63.20	3.00	17.00	83.20	.615
5/31	102.00	47.00	3.00	19.00	69.00	.676
	<u>912.00</u>	<u>501.20</u>	<u>27.50</u>	<u>199.00</u>	<u>727.70</u>	<u>.798</u>



# Mixing & Placing Concrete Cyclopean Masonry

Unit labor cost below includes all labor costs from time rock is taken from bins until masonry is placed in Dam.

Concrete	Mass Rock	Total	Cost	Unit Cost
12/3 131.25	96	227.25	92.85	0.410
12/4 143.50	51	194.50	87.70	0.450
12/5 —	—	—	18.15	
12/16 36.75	14	50.75	29.38	0.578
12/17 176.75	47	223.75	90.45	0.405
12/18 152.25	71	223.25	97.88	0.438
12/19 185.50	57	242.50	90.20	0.370
12/20 248.50	72	320.50	137.50	0.43
1074.50	408	1482.50	644.03	0.435
12/21 57.75	17	74.75	63.55	0.85
12/22 —	(stock piling Mass Rock)	<del>23.20</del>	23.20	
12/23 —				
12/24 140	34	174.00	84.80	0.486
12/25 50.75	20	70.75	31.90	0.450
12/26 109.75	39	148.75	78.00	0.525
12/27 168	57	225.00	100.00	0.445
12/28 250.25	74	324.25	156.20	0.482
12/29 281.75	82	363.75	164.10	0.453
12/30 154.00	78	232.00	135.40	0.585
12/31 283.50	82	365.50	156.50	0.430
1489.50	483.00	1970.00	993.65	0.532

Date	Concrete	Mass R.	Total	Cost	Unit C.
1-1 <sup>day</sup>	182.00	66.0	248.00	97.60	.393
1-2 <sup>night</sup>	140.00	45.0	185.00	65.70	.355
1-2 <sup>day</sup>	143.50	54.0	197.50	95.80	.485
1-3 <sup>night</sup>	176.75	52	228.75	63.90	.279
1-3 <sup>day</sup>	129.50	54	183.50	97.60	.530
1-4 <sup>night</sup>	141.75	41	182.75	53.70	.293
1-4 <sup>day</sup>	178.50	55	233.50	89.70	.384
1-5 <sup>night</sup>	108.50	30	138.50	59.50	.428
1-5 <sup>day</sup>	78.75	26	104.75	78.85	.752
1-6 <sup>night</sup>	91.00	25	116.00	74.90	.645
1-6 <sup>day</sup>	159.25	51	210.25	101.05	.480
1-7 <sup>night</sup>	108.50	30	138.50	66.90	.482
1-7 <sup>day</sup>	145.25	47	192.25	101.10	.525
1-8 <sup>night</sup>	85.75	25	110.75	70.30	.635
1-8 <sup>day</sup>	140.00	51	191.00	98.60	.515
1-9 <sup>night</sup>	145.25	35	180.25	80.80	.448
1-9 <sup>day</sup>	141.75	39	180.75	95.50	.527
1-10 <sup>night</sup>	127.75	40	167.75	98.20	.585
1-10 <sup>day</sup>	124.25	41	165.25	90.90	.545
Total	2548.00	807	3355.00	1580.60	.473
10d period.					
Total days	1422.75	484	1906.75	946.70	.496
Total nights	1125.25	323	1448.25	633.90	.437



Date	Conc.	Mass R	Total	Unit
1-11 (night)	117.25	30.00	147.25	

Date	Concrete	Mass R	Total	Cost	Unit
1-11 (night)	117.25	30	147.25	91.95	.622
1-11 (day)	140.00	31	171.00	95.90	.560
1-12 (night)	92.75	25	117.75	78.35	.665
1-12 (day)	<del>64.75</del> 92.75	34	<del>98.75</del> 126.75	60.20	<del>.678</del>
1-13 night	96.25	25	121.25	74.70	.615
1-13 day	68.25	32	100.25	76.50	.760
1-14 night	87.50	18	105.50	64.75	.613
1-14 day	140.00	33	173.00	100.90	.583
1-15 night	122.50	27	149.50	110.45	.727
1-15 day	155.75	49	204.75	100.90	.492
1-16 night	145.25	36	181.25	81.30	.448
1-16 day	84.00	23	107.00	76.95	.718
1-17 night	157.50	45	202.50	91.70	.453
1-17 day	89.25	34	123.25	92.40	.748
1-18 (night)	166.25	36	202.25	89.95	.444
1-18 (day)	136.50	35	171.50	74.80	.436
1-19 (night)	150.50	60	210.50	90.95	.431
1-19 (day)	120.75	25	145.75	76.00	.520
1-20 (night)	99.75	25	124.75	88.55	.710
1-20 (day)	57.75	20	77.75	78.40	1.01
Total (night)		1569.50		862.65	.55
" (day)		1401.00		832.95	.595

Date	Concrete	Mass R.	Total	Cost	Units
1-21 <sup>night</sup>	106.75	50.00	156.75	91.15	.580
1-21 <sup>day</sup>	136.50	49.00	185.50	94.85	.510
1-22 <sup>night</sup>	168.00	45.00	213.00	105.90	.495
1-22 <sup>day</sup>	168.00	<del>61.00</del>	229.00	98.45	.430
1-23 <sup>night</sup>	155.75	45.00	200.75	86.75	.432
1-23 <sup>day</sup>	169.75	59.00	228.75	98.45	.428
1-24 <sup>night</sup>	63.00	20.00	83.00	64.45	.775
1-24 <sup>day</sup>	—	—	—	23.40	—
1-25	—	—	—	38.45	—
1-26 <sup>night</sup>	16.00	8.00	24.00	81.35	—
1-27 <sup>day</sup>	152.00	46	198.00	88.75	.448
1-28 <sup>night</sup>	56.00	20	76	105.15*	1.386
1-28 <sup>day</sup>	—	—	—	32.00**	—
1-29 <sup>night</sup>	187.25	75.0	262.25	96.25	.366
1-29 <sup>day</sup>	196.00	61.0	257.00	90.65	.352
1-30 <sup>night</sup>	206.50	68	274.50	89.45	.325
1-30 <sup>day</sup>	159.25	52	211.25	101.45	.480
1-31 <sup>night</sup>	112.00	32	144.00	61.05	.423
1-31 <sup>day</sup>	208.25	57	235.25	101.50	.430
Total (night)			1434.25		
Total (day)			1574.75		
Total night			1434.25	781.50	.544
			1574.75	768.00	.487

\* Cleaning out Drainage Tunnel & Cleaning up.  
 \* Concreted only 3hrs. Bal. of night cleaning up.



Date	Concrete	Mass	Rock	Total	Cost	Unit
2-1 (night)		8.00	8.00	8.00	26.85	—
2-1 (day)	150.50	398.00	189.50	194.25	26.85	.550
2-2 (night)	—	—	—	—	15.60	—
2-2 (day)	189.00	65.00	254.00	98.40	.398	
2-3 (night)	31.50	16.00	47.50	40.00	.840	
2-3 (day)	—	—	—	—	44.25	—
2-4 (night)	—	—	—	—	16.45	—
2-4 (day)	106.00	71.00	177.00	98.55	.556	
2-5 (night)	202.50	54.00	256.50	98.15	.382	
2-5 (day)	226.00	60.00	286.00	99.65	.348	
2-6 (night)	88.00	56.00	144.00	50.55	.350	
2-6 (day)	226.00	45.00	271.00	95.45	.352	
2-7 (night)	71.00	35.00	106.00	58.50	.550	
2-7 (day)	118.00	50.00	168.00	62.20	.370	
2-8 (night)	185.00	30.00	215.00	92.15	.428	
2-8 (day)	212.00	34.00	246.00	81.20	.330	
2-9 (night)	178.00	49.00	227.00	85.20	.376	
2-9 (day)	194.00	47.00	241.00	86.00	.356	
2-10 (night)	114.00	34.00	148.00	49.20	.332	
2-10 (day)	88.00	21.00	109.00	52.00	.475	
Day	1509.00	432.00	1941.50	821.75	.423	
Night	870.00	282.00	1152.00	532.65	.462	
2-11 night	181.00	40.00	221.00	96.50	.436	
2-11 day	10.00	—	10.00	9.35	.935	

Date	Concrete	Mass	Rock	Total	Cost	Unit	Cost.
2/12	116.00	21.00	137.00	71.80	.524		
2/13 (Night)	106.00	21.00	127.00	68.85	.542		
2/13 (day)	162.00	45.00	207.00	91.45	.442		
2/14 (night)	144.00	40.00	184.00	94.85	.515		
2/14 (day)	172.00	47.00	219.00	98.05	.448		
2/15 (night)	137.00	28.00	165.00	65.55	.398		
2/15 (day)	142.00	45.00	187.00	91.50	.488		
2/16 (night)	110.00	35.00	145.00	64.35	.443		
2/16 (day)	184.00	30.00	214.00	105.85	.494		
2/17 (night)	75.00	21.00	96.00	79.85	.830		
2/17 (day)	140.00	41.00	181.00	84.55	.467		
2/18 (night)	150.00	30.00	180.00	78.55	.436		
2/18 (day)	114.00	35.00	149.00	93.05	.625		
2/19 (night)	150.00	17.00	167.00	79.55	.475		
2/19 (day)	86.00	27.00	113.00	70.45	.623		
2/20 (night)	155.00	34.00	189.00	103.20	.545		
2/20 (day)	116.00	41.00	157.00	93.05	.592		
2/20 (night)	147.00	26.00	173.00	731.25	.496		
2/20 (day)	137.00	332.00	1574.00	809.10	.513		
2/21 (night)	86.40	16.00	102.40	44.75	.437		
2/21 (day)	192.00	43.00	235.00	89.45	.381		
2/22 (night)	144.00	20.00	164.00	65.30	.399		
2/22 (day)	139.20	28.00	167.20	71.15	.425		
2/23 (night)	159.60	20.00	179.60	82.60	.460		
2/23 (day)	4.80	—	—	—	—		



Date	Concrete	Mass R	Total	Cost	Unit C.
2/24		127			
2/25 (night)	—	—	—	44.65	
2/25 (day)	85.75	24.00	109.75	85.05	.775
2/26 (night)	127.75	8.00	135.75	84.85	.624
2/26 (day)	148.75	33.00	181.75	93.65	.515
2/27 (night)	194.25	6.00	200.25	100.05	.500
2/27 (day)	98.00	34.00	132.00	81.05	.613
2/28 (night)	215.25	50.00	265.25	112.20	.424
2/28 (day)	194.25	50.00	244.25	90.05	.369
night		337	1047.25	787.75	.753
day			1074.75	510.40	.475
3/1 night	194.25	30.00	224.25	80.40	<del>.358</del>
3/1 day	206.50	42.00	248.50	90.45	.363
3/2 night	194.25	25.00	219.25	97.95	.445
3/2 day	77.00	35.00	112.00	45.25	.403
3/3 night	201.25	55.00	256.25	102.75	.400
3/3 day	94.50	25.00	119.50	93.20	.780
3/4 night	126.00	30.00	156.00	99.10	.635
3/4 day	140.75	27.00	147.75	65.05	.440
3/5 night	112.00	30.00	142.00	75.45	.533
3/5 day	178.50	39.00	217.50	80.85	.371
3/6 night	96.00	40.00	136.00	70.55	.518
3/6 day	178.80	48.00	226.80	91.45	.405
3/7 (night)	178.80	<del>38.00</del>	<del>216.80</del>	98.35	.474
3/7 (day)	232.80	40.00	272.80	104.25	.383

Date	Conc	Mass R	Total	Cost	Unit Cost?
3/8 (night)	102.00	40.00	142.00	91.95	.646
3/8 (day)	174.00	25.00	199.00	99.40	.496
3/9 (night)	183.75	49.00	232.75	92.85	.398
3/9 (day)	211.75	45.00	256.75	104.30	.406
3/10 (night)	134.75	40.00	174.75	104.75	.599
3/10 (day)	222.25	46.00	268.25	108.25	.403
Total		739	3958.90	1796.95	.455
night			1890.05	914.10	.483
day			2068.85	882.85	.426
3/11 (night)	203.00	62.00	265.00	111.70	.422
3/11 (day)	220.50	55.00	270.50	101.45	.374
3/12 (night)	197.75	63.00	260.75	101.15	.388
3/12 (day)	231.00	63.00	294.00	109.05	.371
3/13 (night)	115.50	35.00	150.50	113.15	.753
3/13 (day)	115.50	53.00	168.50	78.65	.466
3/14 (night)	208.25	48.00	256.25	113.40	.442
3/14 (day)	82.25	26.00	108.25	98.25	.906
3/15 (night)					
3/15 (day)	269.50	57.00	326.50	106.45	.323
3/16 (night)	217.00	60.00	277.00	110.30	.399
3/16 (day)	236.25	60.00	296.25	98.25	.331
3/17 (night)	217.00	54.00	271.00	97.90	.361
3/17 (day)	241.50	68.00	309.50	108.25	.350
3/18 (night)	133.00	28.00	161.00	107.25	.666
3/18 (day)	262.50	44.00	306.50	103.45	.336
3/19 (night)	190.75	28.00	218.75	88.00	.402
3/19 (day)	133.00	32.00	165.00	72.60	.439



Date	Conc	Mass R.	Total	Cost	Unit
3/20 (night)	173.25	28.00	201.25	74.65	.371
3/20 (day)	48.00	8.00	56.00	46.85	.835
night		2061.50		917.50	444
day		2306.00		922.25	394
		4367.50		1839.75	421
3/21 (night)	169.75	35.00	204.75	96.55	.472
3/21 (day)	164.50	30.00	194.50	79.65	.409
3/22 (night)	187.25	40.00	227.25	85.50	.376
3/22 (day)	218.75	29.00	247.25	90.85	.367
3/23 (night)	182.00	50.00	232.00	90.45	.399
3/23 (day)	236.25	52.00	288.25	84.85	.295
3/24 (night)	136.50	52.00	188.50	90.05	.478
3/24 (day)	206.50	40.00	246.50	90.85	.368
3/25 (night)	<del>148.75</del>	38.00	207.75	89.55	.432
3/25 (day)	262.50	55.00	317.50	91.85	.289
3/26 (night)	182.00	50.00	232.00	91.00	.392
3/26 (day)	182.00	30.00	212.00	90.95	.426
3/27 (night)	215.25	51.00	266.25	88.30	.331
3/27 (day)					
3/28 (night)	215.25	40.00	255.25	100.85	.395
3/28 (day)	236.25	65.00	301.25	95.45	.317
3/29 (night)	204.75	50.00	254.75	94.25	.369
3/29 (day)	217.00	60.00	277.00	98.45	.354
3/30 (night)	190.75	42.00	232.75	79.55	.342
3/30 (day)	224.00	45.00	269.00	105.85	.408

Date	Concrete	Mass R.	Total	Cost	Unit
3/31 (night)	169.75	46.0	215.75	92.45	.428
3/31 (day)					
night		2517.00		998.50	396
day		2353.75		828.25	352
Total	4870.75			1826.75	375

4-1 (night)	—	—	—	—	—
4-1 (day)	—	—	—	—	—
4-2 (night)	—	—	—	—	—
4-2 (day)	146.00	36.00	182.00	98.45	.540
4-3 (night)	146.00	42.00	188.00	70.00	.372
4-3 (day)	143.00	40	183.00	69.45	.379
4-4 (night)	109.00	36	145.00	77.95	.536
4-9 (day)	87.50	—	87.50	41.45	.474
4-10 (night)	201.25	40	241.25	104.55	.433
4-10 (day)	190.75	61	251.75	104.05	.415
				56590	

4-11 (night)	148.75	40	188.75	108.50	.575
4-11 (day)	126.00	24	150.00	80.45	.535
4-12 (night)	175.00	44	219.00	90.65	.414
4-12 (day)	152.25	20	172.25	80.45	.466
4-13 (night)	189.00	21	210.00	102.75	.488
4-13 (day)	22.75	—	22.75	16.55	.727



Date	Concrete	Mass Rock	Total	Cost	Unit
4/4 (night)	192.50	26.00	218.50	104.45	.477
4/4 (day)	168.00	36.00	204.00	104.85	.514
4/5 (night)	234.50	66.00	300.50	107.10	.356
4/5 (day)	217.00	28.00	245.00	87.25	.356
4/6 (night)	189.00	63.00	252.00	112.25	.445
4/6 (day)	120.75	28.00	148.75	75.85	.510
4/7 (night)	194.25	45.00	239.25	105.45	.441
4/7 (day)	215.25	32.00	247.25	98.05	.396
4/8 (night)	171.50	37.00	208.50	109.05	.523
4/8 (day)	149.50	26.00	175.50	80.85	.460
4/9 (night)	224.00	20.00	244.00	111.45	.456
4/9 (day)	5.25	—	5.25	22.00	
4/20 (night)	181.00	48.00	229.00	99.05	.432
4/20 (day)	98.00	35.00	133.00	74.40	.558
Total night			2309.50	1050.70	.457
Day			1503.75	720.70	.483

4/21 (night)	140.00	34.00	174.00	95.85	.55
4/21 (day)	136.00	36.00	172.00	75.85	.441
4/22 (night)	174.00	26.00	200.00	95.20	.475
4/22 (day)	66.00	25.00	91.00	74.05	.814
4/23 (night)	166.00	40.00	206.00	100.40	.488
4/23 (day)	149.00	34.00	179.00	100.05	.559
4/24 (night)	199.50	28.00	227.50	108.15	.476
4/24 (day)	162.75	25.00	187.75	73.85	.393

Date	Concrete	Mass R.	Total	Total/Cost	Unit C68
4/25 (night)	155.75	38.00	193.75	107.05	.553
4/25 (day)	159.25	27.00	186.25	80.25	.431
4/26 (night)	210.00	32.00	242.00	112.05	.464
4/26 (day)	40.25	15.00	55.25	59.45	1.072
4/27 (night)	101.50	8.00	109.50	56.75	.518
4/27 (day)	159.25	35.00	194.25	78.45	.403
4/28 (night)	211.75	24.00	235.75	105.95	.449
4/28 (day)	108.00	31.00	139.00	82.45	.592
4/29 (night)	166.00	32.00	198.00	106.85	.643
4/29 (day)	—	—	—	50.00*	
4/30 (night)	160.00	28.00	188.00	108.85	.578
4/30 (day)	123.00	20.00	143.00	77.05	.538
Night			1974.50	997.10	.504
Day			1347.50	751.45	.558
Total			3322.00	1748.55	.526

5/1 (night)	224.00	20.00	244.00	118.75	.486
5/1 (day)	178.50	18.00	196.50	82.45	.418
5/2 (night)	208.25	36.00	244.25	109.25	.447
5/2 (day)	173.25	32.00	205.25	78.85	.384
5/3 (night)	199.25	32.00	226.25	114.65	.506
5/3 (day)	12.25	4.00	16.25	17.05	1.062
5/4 (night)	210.00	28.00	238.00	103.85	.436
5/4 (day)	—	—	—	8.20	—
5/5 (night)	—	—	—	6.60	—
5/5 (day)	—	—	—	13.20	—
*cleaning up & repairs.					



Date	Conc.	Mass R.	Total	Cost	Unit
5/6 (night)	155.75	34.00	189.75	66.10	.348
5/6 (day)	82.25	20.00	102.25	74.20	.725
5/7 (night)	175.00	32.00	207.00	110.40	.534
5/7 (day)	162.75	28.00	190.75	80.40	.421
5/8 (night)	190.75	30.00	220.75	120.20	.545
5/8 (day)	129.50	20.00	149.50	77.00	.514
5/9 (night)	157.50	30.00	187.50	121.60	.648
5/9 (day)	113.75	28.00	141.75	71.20	.502
5/10 (night)	190.75	40.00	230.75	123.80	.536
5/10 (day)	99.75	24.00	123.75	71.20	.575
Total		3114.25	1568.95		.503
Total (night)		1988.25	995.20		.501
" (day)		1126.00	573.75		.508
5/11 (night)	162.75	32.00	194.75	121.80	.625
5/11 (day)	—	—	—	8.60	
5/12 (night)	133.00	24.00	157.00	101.20	.645
5/12 (day)	—	—	—	22.20	
5/13 (night)	168.00	38.00	206.00	117.40	.569
5/13 (day)	42.00	6.00	48.00	33.40	.695
5/14 (night)	131.25	28.00	159.25	119.75	.738
5/14 (day)	152.25	28.00	180.25	91.20	.505
5/15 (night)	171.50	36.00	207.50	117.40	.565
5/15 (day)	143.50	26.00	169.50	91.20	.537
5/16 (night)	187.25	48.00	235.25	114.60	.487
5/16 (day)	61.25	20.00	81.00	55.00	.679

Cont. P. 81

## Breaking & Loading Rock For 70 Crushin 9.

Unit labor costs below include  
only breaking & loading into skips  
~~and hauling into cars~~ mill rock for  
crusher & are included in unit costs  
of Rock for crushing

Date	Co. Yds.	Total Cost	Unit Cost.
12/11	129.5	69.35	.535 perc.
12/12	118.4	62.90	.525 " "
12/13	111.0	74.30	.668 " "
12/14	74.0	103.30	1.400
12/15	—	115.30	
12/16	14.8	122.90	
12/17	148.0	113.50	.765 " "
12/18	159.1	99.70	.625
12/19	162.8	138.10	.850
12/20	190.5	114.50	.60
	1108.1	1033.05	.935
12/21	59.2	20.55	.346
12/22	—	100.40	
12/23		114.70	
12/24	148	33.70	.228
12/25	—	5.40	
12/26	170.20	54.90	.322¢
12/27	129.50	65.80	.505



Date	Cu. Yds.	Total Cost	Unit
12/28	170.2	95.10	.556
12/29	225.7	138.00	.610
12/30	177.6	134.70	.756
12/31	287.6	137.10	.478
For Period.	1398.40	900.35	.645
For 20d "	2538	1933.40	.760
1-1	152.00	81.70	.536
1-2	285.00	125.30	.440
1-3	273.60	108.10	.396
1-4	231.80	112.30	.480
1-5	212.80	106.10	.500
1-6	216.60	119.70	.550
1-7	273.60	121.75	.445
1-8	216.60	129.60	.598
1-9	304.00	127.40	.420
1-10	285.00	162.00	.570
	2451.00	1193.95	.488
1-11	269.80	180.20	.675
1-12	201.40	148.70	.695
1-13.	159.60	101.40	.635
1-14	125.40	92.80	.738
1-15	296.40	103.80	.350
1-16	311.60	132.60	.425
1-17	207.30	129.15	.625
1-18	348.70	126.65	.362
1-19	197.60	60.60	.330

1-20	214.00	81.00	.378
	2331.80	1156.90	.495
1-21	242.70	115.30	.475
1-22	209.00	97.00	.463
1-23	262.20	105.00	.40
1-24	77.50	43.60	.56
1-25	37.50	76.60	
1-26	—	52.60	
1-27	224.20	63.50	.283
1-28	121.60	61.90	.508
1-29	311.60	107.20	.345
1-30	292.60	100.40	.356
1-31	193.80	99.10	.51
	1972.70	922.20	.466
		57.30	
2-1	155.80	<del>36.80</del>	.368
2-2	231.80	75.20	.324
2-3	75.00 #5	89.60	1.192
2-4	212.80	126.60	.595
2-5	300.20	110.20	.367
2-6	338.20	119.00	.352
2-7	383.80	116.20	.303
2-8	323.00	101.60	.314
2-9	285.00	79.20	.278
2-10	357.20	127.30	.342



73 Date	Cu Yds	Cost	Unit
Total for 10d.	2662.00	1002.20	384
2/11	125.40	53.50	.426
2/12	136.80	69.80	.510
2/13	258.40	75.50	.292
2/14	304.00	96.45	.316
2/15	338.20	109.85	<del>.321</del>
2/16	319.20	98.40	.308
2/17	323.00	100.65	.328
2/18	296.40	95.05	<del>.321</del>
2/19	349.60	105.10	.305
2/20	129.20	76.80	.593
	<u>2592.20</u>	<u>881.10</u>	<u>.340</u>
2/21	258.40	127.00	.491
2/22	281.20	112.30	.399
2/23	87.40	<del>32.60</del>	.373
2/24	53.60	25.80	.308
2/25	95.00	48.75	.513
2/26	292.60	99.40	.339
2/27	300.20	116.60	.389
2/28	361.00	101.05	.285
	<u>1759.40</u>	<u>663.50</u>	<u>.377</u>
3/1	387.60	108.20	.278
3/2	186.20	107.60	.577
3/3	361.00	115.00	.318
3/4	288.80	107.60	.372

Date	Cu Yds.	Cost	Unit
2/5	209.00	108.60	.52
3/6	345.80	118.40	.343
3/7	353.40	104.80	.296
3/8	262.20	114.20	.435
3/9	357.20	126.00	.352
3/10	349.00	119.20	.342
	<u>3100.20</u>	<u>1129.60</u>	<u>.364</u>
3/11	399.00	109.20	.274
3/12	376.20	109.20	.290
3/13	300.20	97.00	.323
3/14	342.00	112.40	.329
3/15	190.00	64.00	.336
3/16	380.00	122.40	.322
3/17	463.60	131.20	.283
3/18	463.60	143.60	.310
3/19	383.80	153.60	.400
3/20	243.20	62.60	.258
	<u>3541.60</u>	<u>1105.20</u>	<u>.311</u>
3/21	288.80	118.40	.410
3/22	<del>344.00</del>	113.60	.322
3/23	349.60	104.20	.298
3/24	361.50	108.80	.302
3/25	440.80	126.40	.287
3/26	406.60	114.00	.280
3/27	364.80	110.80	.303
3/28	342.00	111.00	.324



75 Date	Co. Yds.	Cost	Unit Cost
3/29	399.00	106.00	.266
3/30	361.00	117.60	.326
3/31	144.00	41.60	.288
	3800.00	1172.40	.309

4-1	—	—	—
4-2	231.80	60.20	.260
4-3	353.40	117.60	.333
4-4	155.80	58.40	.375
4-5	—	—	—
4-6	—	—	—
4-7	—	—	—
4-8	—	—	—
4-9	121.6	25.60	.212
4-10	<del>284.9</del>	<del>103.20</del>	.363

4/11	319.2	118.60	.371
4/12	399.0	124.00	.311
4/13	308.0	132.00	.428
4/14	319.2	119.00	.374
4/15	338.2	120.80	.356
4/16	383.8	136.60	.356
4/17	374.5	133.60	.356

Date	Co. Yds.	Cost	Unit C. 76
4/18	367.5	126.8	.345
4/19	364.0	114.4	.314
4/20	112.0	44.20	.396
	3284.40	1170.00	.356

4/21	388.50	100.00	.257
4/22	357.00	116.80	.326
4/23	294.00	114.00	.388
4/24	238.00	89.80	.377
4/25	332.50	142.40	.428
4/26	339.50	133.60	.394
4/27	245.00	77.20	.317
4/28	406.00	125.60	.309
4/29	150.50	66.80	.444
4/30	329.00	98.00	.298
Total	3080.00	1064.20	.346

5/1	350.00	97.20	.278
5/2	374.50	90.00	.240
5/3	259.00	81.40	.314
5/4	31.50	4.10	.130
5/5	112.00	38.00	.339
5/6	325.50	52.10	.160
5/7	283.50	57.00	.201
5/8	269.50	68.20	.253



	Amount	Cost	Unit
5/9	353.50	92.80	.262
5/10	<u>297.50</u>	<u>89.20</u>	<u>.299</u>
Total	2656.50	670.00	.252

5/28	273.00	80.00	.293
5/29	252.00	75.80	.305
5/30	276.50	76.00	.275
<del>5/31</del>	<del>335.25</del>		
5/31	<u>248.50</u>	<u>70.80</u>	<u>.284</u>
	2373.00	756.40	.319

5/11	182.00	49.00	.269
5/12	206.50	77.60	.376
5/13	231.00	55.20	.238
5/14	251.50	90.80	.361
5/15	290.50	99.60	.342
5/16	318.50	121.20	.382
5/17	353.50	112.00	.317
5/18	234.50	77.60	.331
5/19	213.50	63.60	.298
5/20	<u>164.50</u>	<u>62.40</u>	<u>.379</u>
	2446.00	809.00	.332

5/21	<u>          </u>	59.80	<u>          </u>
5/22	224.00	58.40	.261
5/23	217.00	70.00	.322
5/24	325.50	86.60	.266
5/25	220.50	70.80	.321
5/26	147.00	52.60	.357
5/27	189.00	55.60	.294







Date	Conc.	Mass R.	Total	Cost.	Unit.
5/17 (night)	206.50	40.00	246.50	111.40	.452
5/17 (day)	—	—	—	30.20	—
5/18 (night)	175.00	22.00	197.00	109.20	.555
5/18 (day)	140.00	28.00	168.00	77.00	.458
5/19 (night)	147.00	24.00	171.00	86.20	.504
5/19 (day)	—	—	—	29.20	—
5/20 (night)	115.50	24.00	139.50	69.40	.497
5/20 (day)	—	—	—	29.20	—
Night	1973.75			1066.35	.557
	647.00			467.20	.723
	2560.75			1533.55	.599

Date	Conc.	Mass R.	Total	Cost	Unit.
5/28 (N)	206.50	38.00	244.50	125.40	.513
5/28 (day)	89.25	16.00	105.25	65.40	.621
5/29 (N)	154.00	20.00	174.00	123.60	.710
5/29 (Day)	89.25	6.00	95.25	76.60	.805
5/30 (N)	141.75	32.00	173.75	116.40	.669
5/30 (D)	143.50	18.00	161.50	82.60	.512
5/31 (N)	201.25	36.00	237.25	120.00	.506
5/31 (D)	36.00	—	36.00	79.60	2.210
Total N.			2010.25	1189.20	.592
" D.			850.50	707.20	.831
Total			2860.75	1896.40	.663

5/21 (night)	115.50	18.00	133.50	90.00	.673
5/21 (day)	—	—	—	29.20	—
5/22 (night)	87.50	12.00	99.50	87.00	.874
5/22 (day)	94.50	14.00	108.50	79.80	.735
5/23 (night)	187.25	32.00	219.25	118.00	.538
5/23 (day)	89.25	6.00	95.25	80.20	.898
5/24 (night)	129.50	24.00	153.50	109.40	.713
5/24 (day)	45.50	12.00	57.50	58.90	1.023
5/25 (night)	201.25	20.00	221.25	106.80	.482
5/25 (day)	59.50	16.00	75.50	60.90	.806
5/26 (night)	148.75	22.00	170.75	98.80	.578
5/26 (day)	—	—	—	19.20	—
5/27 (night)	161.00	22.00	183.00	93.80	.512
5/27 (day)	99.75	16.00	115.75	74.80	.646







Placing Cyclop. Masonry Per Derrick  
 Unit labor costs given below include  
 placing of masonry by individual  
 derricks and are included in unit  
 mixing & placing cost.

Date	Derrick	Conc.	Mass R.	Total	Cost	Unit
12/3	1	75.25	41	116.25	20.66	.180
12/3	2	56	55	111.00	21.40	.193
12/14	1	38.5	21	59.50	15.45	.240
12/14	2	105.0	30	135.00	21.40	.158
12/5	1	0	0	0	0	-
	2	0	0	0	3.25*	-
12/16	1	33.25	10.00	43.25	8.18	.189
12/16	2	3.50	4	7.50	4.00	.535
12/17	1	89.25	20.0	109.25	21.80	.198
12/17	2	87.50	27.0	114.50	21.80	.190
12/18	1+2	87.50	37	124.50	25.80	.207
12/18	3	64.75	34	98.75	21.80	.220
12/19	<del>2</del> (3)	68.25	31	99.25	21.80	.220
12/19	1+2	117.25	26	143.25	25.80	.180
12/20	3	82.25	36	118.25	21.80	.184
12/20	1+2	131.25	21	152.25	25.80	.169
5.12/21	2+3	15.75	6	21.75	5.20	.238

\*Derrick man & Foreman moving plums to dam.



Date	Description	Conc.	Mass R.	Total Cost	Unit
12/22					
12/23					
12/24	Derrick # 3 (Symons) 24+15-39 @ 10.20 = 398				
12/24	Derrick # 2 (Case) 98+19 = 117 @ 21.80 = 186				
12/25	Derrick Conc. Mass R. Total Cost Unit				
12/26	1 case	85.75	29.00	114.75	21.80
	2+3 SYMONS	24.00	10.00	34.00	11.10
12/27	3 SYMONS	73.50	25.00	98.50	23.60
	1 case	94.50	32.00	126.50	21.80
12/28	1 Johnson	99.75	28.00	127.75	30.80
	2 case	92.75	31.00	123.75	21.80
	3 SYMONS	57.75	15.00	72.75	20.40
12/29	3 Johnson	92.75	26	118.75	30.80
	3 SYMONS	115.50	30	145.50	20.40
	1 case	73.50	26	99.50	21.80
12/30	3 Johnson	66.50	38	104.50	30.80
	1 case	57.75	31	88.75	20.40
	3 SYMONS	29.75	9	38.75	10.20
12/31	3 Johnson	108.50	37	145.50	35.90
	1 case	82.25	21	103.25	21.80
	3 SYMONS	92.75	24	116.75	23.60
1-1	1 Johnson	—	15	15	6.80
	3 SYMONS	101.50	25	126.50	21.60
	1 case	80.50	26	106.50	21.80
1-2	2 Johnson	140.00	45	185.00	34.00
	1+2 Case	75.25	29	104.25	21.80
	3 SYMONS	68.25	26	93.25	23.60

Date	Description	Conc.	Mass R.	Total Cost	Unit
1-3	Derrick # Johnson	176.75	52.00	228.75	29.90
Night 2+3					131
Day 3	SYMONS	38.50	30.00	68.00	15.00
"	142 Case	91.00	24.00	115.00	21.80
1-4	(night) 2+3 case	741.75	41.00	182.75	28.70
(Day)	3 SYMONS	85.75	30.00	115.75	20.50
"	1 case	92.75	25.00	117.75	21.80
1-5	(night) 2+3 group	108.50	30.00	138.50	27.70
(Day)	1+2 SYMONS	78.75	26.00	104.75	20.80
1-6	(night) 3 L. 2	91.00	25.00	116.00	27.60
Day	3 SYMONS	84.00	30.00	114.00	24.00
"	S.L. 1 case	75.25	21.00	96.25	21.80
1-7	(night) 6 group	108.50	30.00	138.50	27.60
(Day)	5 L. 2 case	66.50	27.00	93.50	21.80
"	6 L. 3 SYMONS	78.75	20.00	98.75	22.00
1-8	(night) 3 L. 2 group	85.75	25.00	110.75	27.60
(Day)	5 L. 1 case	70.00	33.00	103.00	21.80
"	5 L. #3 SYMONS	70.00	18.00	88.00	22.00
1-9	night 3 L. #2 group	145.25	35.00	180.25	32.60
Day	3 L. #2 case	80.50	29	109.50	21.80
	3 L. #3 SYMONS	61.25	10	71.25	22.00
1-10	night 3 L. #3 group	127.75	40	167.75	38.70
Day	3 L. #1 case	63.00	26	89.00	21.80
	3 L. #3 SYMONS	61.25	15	76.25	22.40
1-11	night 3 L. #2 group	117.25	30	147.25	38.70
Day	3 L. #3 SYMONS	71.75	10	81.75	22.40
"	S.L. 1 case	68.25	21	89.25	21.80







## Coyote #3 or CARS Casts

	Labor	Powder	Progress	Total Cost	Unit Cost
2/12 (day)	21.70				
2/13 (night)	14.10				
2/13 (day)	18.00				
2/14 (night)	13.10				
2/14 (day)	22.80				
2/15 (night)	13.10				
2/15 (day)	20.60				
2/16 (night)	18.10				
2/16 (day)	16.20				
2/17 (night)	17.10				
2/17 (day)	20.60				
2/18 (night)	20.10				
2/18 (day)	19.80				
2/19 (night)	23.15				
2/19 (day)	20.80				
2/20 (night)	18.10				
2/20 (day)	23.70				
	<u>321.05</u>				
2/21 (night)	23.70				
2/21 (day)	21.90				
2/22 (night)	17.25				
2/22 (day)	22.10				
2/23 (night)	24.75				
2/23 (day)	21.30				
2/24 (night)	21.65				
2/24 (day)	21.30				
		38.39	27.0	359.44	13.31

2/25 (night)	29.70
2/25 (day)	22.70
2/26 (night)	23.60
2/26 (day)	30.90
2/27 (night)	26.30
2/27 (day)	24.70
2/28 (night)	30.55
2/28 (day)	<u>26.30</u>
	387.70
3/1 (day) (night)	31.85
(day)	28.90
3/2 (night)	27.10
(day)	28.90
3/3 (night)	24.90
(day)	24.90
	add acct. change 2.00
3/4 (night)	30.90
3/4 (day)	25.30
3/5 (night)	27.00
3/5 (day)	25.30
3/6 (night)	35.50
3/6 (day)	31.30
3/7 (night)	19.30
3/7 (day)	28.90
3/8 (night)	14.45
3/8 (day)	34.90

Labor raised to 3.20  
starting 3/1/19.



93  
 3/9 night 27.10  
 3/9 day 30.90  
 3/10 night 19.90  
 3/10 day 34.90  
 Total 10 days. ~~385.65~~ 554.20

3/11 (night) 30.80  
 3/11 (day) 32.40  
 3/12 (night) 26.60  
 3/12 (day) 32.40  
 3/13 (night) ~~27.40~~  
 3/13 (day) ~~32.40~~  
 3/14 (night) 25.80  
 3/14 (day) 29.40  
 3/15 (night) 29.80  
 3/15 (day) 35.20  
 3/16 (night) 35.40  
 3/16 (day) 31.40  
 3/17 (night) 29.40  
 3/17 (day) 32.20  
 3/18 (night) 33.00  
 3/18 (day) 37.80  
 3/19 (night) 26.20  
 3/19 (day) 34.80  
 3/20 (night) 30.90  
 3/20 (day) 31.20  
 Total for period 620.50

94  
 3/21 (night) 26.20  
 3/21 (day) 33.40  
 3/22 (night) 26.65  
 3/22 (day) 34.85  
 3/23 (night) 19.45  
 3/23 (day) 32.60  
 3/24 (night) 19.45  
 3/24 (day) 30.40  
 3/25 (night) 29.10  
 3/25 (day) 35.00  
 3/26 (night) 31.40  
 3/26 (day) 32.80  
 3/27 (night) 28.20  
 3/27 (day) 35.20  
 3/28 (night) 25.45  
 3/28 (day) 32.60  
 3/29 (night) 22.60  
 3/29 (day) 10.00  
 3/30 (night) 9.20  
 3/30 (day) 6.40  
 Tunnel Completed 520.95  
 Total for period



MASS ROCK

Date	Amt.	Cost	Unit
5/25	36.00	<sup>17440</sup> 33.00	.916
5/26	22.00	30.00	1.362
5/27	36.00	27.00	.750
5/28	60.00	45.55	.760
5/29	24.00	32.60	1.36
5/30	51.00	36.65	.718
5/31	40.00	28.50	.712
	<u>393.00</u>	<u>417.70</u>	<u>1.06</u>







## Unit Labor Cost.

100

Mixing & Placing Conc. Out Tower.  
 Unit Cost Below Includes Mixing  
 Placing & building forms.

Date	Conc Poured	Cost.	Unit Cost.
12/11		17.50	
12/12		11.10	
12/13	21	<del>60.85</del> 89.45	4.26
12/14		32.55	
12/15		25.70	
12/16	16	49.60	107.85
12/17	3	39.60	13.20
12/18	—	21.20	
12/19	—	21.20	
12/20	—	15.20	
Total for 10 days	40	294.50	7.30
12/21	—	3.00	
12/22		16.40	
12/23		34.80	
12/24		15.60	
12/25		—	
12/26		27.60	
12/27	12	38.80	
12/28	10	26.80	
12/29	13	27.20	
12/30	15	42.80	
12/31	3	30.40	
	<u>53</u>	<u>253.40</u>	4.78



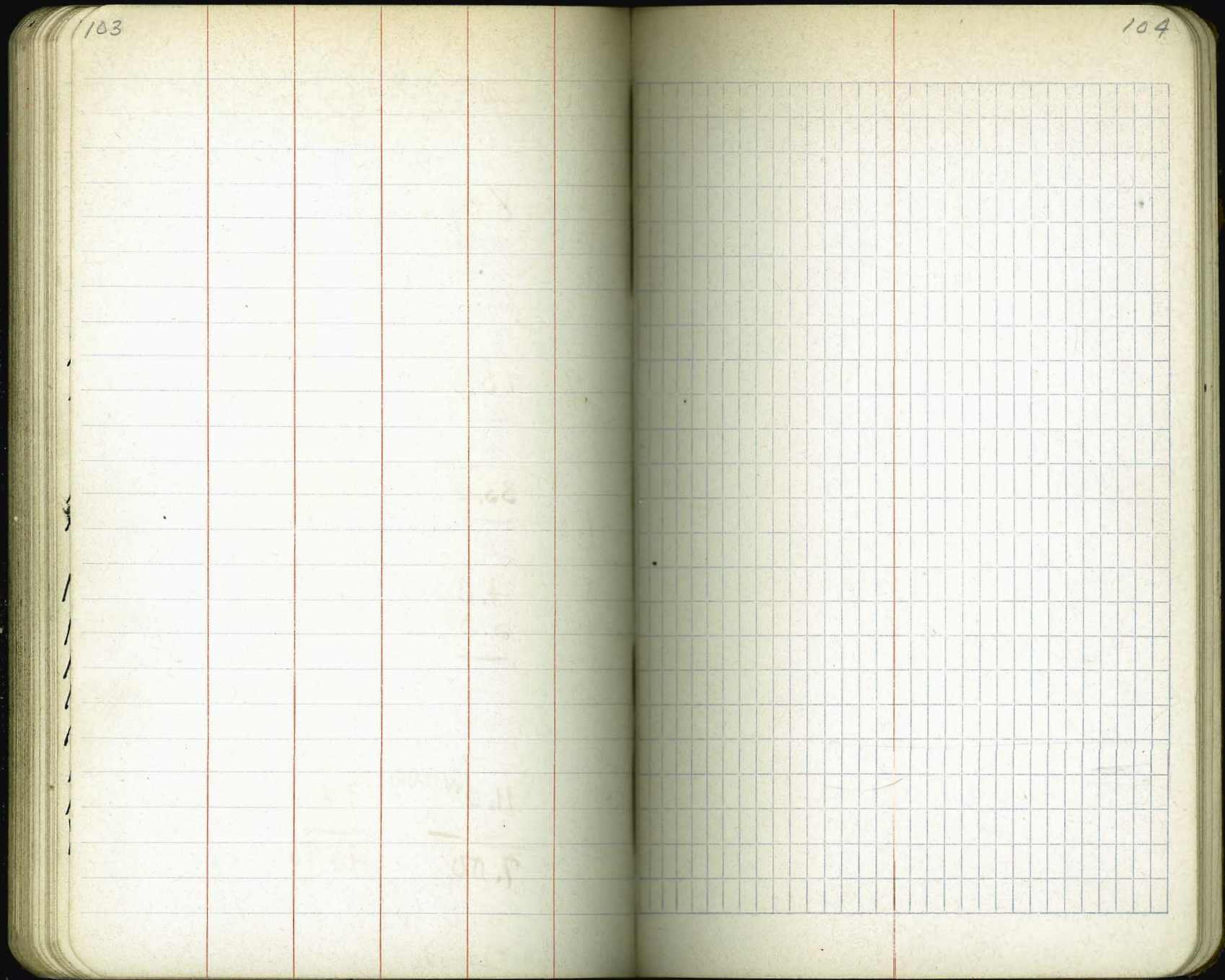
Date	Concrete	Cost	Units
		4.78	
		5.90	
1-1	—	34.80	
1-2	—	19.20	
1-3	—	12.50	
1-4	18	37.60	
1-5	—	6.00	
1-6	17	41.00	
1-7	—	33.20	
1-8	—	28.80	
1-9	17	46.80	
1-10	—	43.60	
Total 10d period.	52	303.00	5.82

1-11	13	34.40	
1-12	—	22.80	
1-13	—	14.40	
1-14	7 1/2	30.00	
1-15	11	48.90	
1-16	—	38.05	
1-17	12	38.20	
1-18	—	34.15	
1-19	—	17.20	
1-20	15	38.45	
	58.5	316.55	5.43

Date	Concrete	Cost	Units
1-21	—	32.80	
1-22	—	29.60	
1-23	—	28.45	
1-24	8cy.	40.40	
1-25	10cy.	48.50	
1-26	—	—	
1-27	—	10.00	
1-28	—	3.60	
1-29	15.0	36.80	
1-30	—	17.20	
1-31	—	—	
		33.0	247.35
2-1	—	.20	7.50
2-2	—	—	
2-3	4.0	12.40	
2-4	3.0	18.95	
2-5	—	5.00	
2-6	—	—	
2-7	—	—	
2-8	—	—	
2-9	11.0 W.O-12	9.40	
2-10	—	—	
		7.00	45.95
			6.56

Do not include.







105

106

A grid of 20 columns and 20 rows on page 106. The grid is formed by thin blue lines. A vertical red margin line is located on the left side of the grid, approximately one-fifth of the way across the page. The grid is empty.







All unit labor costs below include  
all labor setting & Stripping Conc.  
Forms on Dam & Grouting exposed faces.

	Labor Cost
11/11	25.75
11/12	16.75
11/13	24.70
11/14	45.90
11/15	45.40
11/16	44.85
11/16 Oiling forms	6.80
11/17	48.45
11/18	19.10
11/19	22.70
11/20	65.40
Total for 10 days 1836 cu yds.	365.88
Labor form cost per c.y.	.19.9¢
11/21	1.10
11/22	34.80
11/23	39.00
11/24	46.00
11/25	1.50
11/26	17.10
11/27	41.45
11/28	59.00
11/29	37.00
11/30	70.40



12/31 58.65  
 Total Cost 10d. period. 406.00  
 Cost per cu.yd. .233

1/1/19	248.00	62.05
1/2	382.50	63.45
1-3	412.25	58.40
1-4	416.25	61.20
1-5	243.25	56.60
1-6	326.25	92.60
1-7	330.75	81.80
1-8	301.75	109.40
1-9	361.00	93.80
1-10	333.00	99.00
	<u>3355.00</u>	<u>778.30</u>

1-11	318.25	63.20
1-12	244.50	33.00
1-13	221.50	102.10
1-14	278.50	99.00
1-15	354.25	101.80
1-16	288.25	115.75
1-17	325.75	108.90
1-18	373.75	109.80
1-19	356.25	36.40
1-20	202.50	68.20
	<u>2970.50</u>	<u>832.15</u>

.232

.280

1-21	342.25	83.85
1-22	442.00	73.25
1-23	429.50	42.55
1-24	83.00	7.75
1-25	-	7.75
1-26	24.00	5.40
1-27	198.00	<del>49.00</del> 55.20
1-28	76	40.15
1-29	519.25	51.10
1-30	485.75	48.30
1-31	409.25	94.00
	<u>3009.00</u>	<u>509.30</u>
2-1	197.50	54.40
2-2	254.00	30.90
2-3	47.50	84.40
2-4	177.00	62.70
2-5	542.50	54.00
2-6	415.00	48.80
2-7	274.00	58.50
2-8	461.00	50.00
2-9	468.00	47.40
2-10	257.00	98.05
	<u>3093.50</u>	<u>589.15</u>

169

.275

.122

.19



Date	Yardage	Cost	Unit Cost
2/11	231.00	12.90	
2/12	137.00	89.60	
2/13	334.00	115.45	
2/14	403.00	115.40	
2/15	352.00	108.15	
2/16	359.00	<del>51.00</del>	
2/17	277.00	114.20	
2/18	329.00	120.15	
2/19	280.00	128.35	
2/20	346.00	119.60	
	<u>3048.00</u>	<u>980.75</u>	.324
2/21	337.40	119.05	
2/22	331.20	83.70	
2/23	184.40	—	
2/24	—	31.10	
2/25	109.75	113.20	
2/26	317.50	109.60	
2/27	332.25	84.20	
2/28	509.50	80.55	
	<u>2122.0</u>	<u>621.40</u>	.292
3/1	472.75	81.40	
3/2	331.25	68.20	
3/3	375.75	109.80	
3/4	303.75	123.70	
3/5	359.50	91.40	
3/6	362.50	40.70	

3/7	479.60	80.80	
3/8	341.00	66.80	
3/9	489.50	46.40	
3/10	443.00	89.58	42.10
	<u>3958.90</u>	<u>751.30</u>	.189
3/11	540.50	48.40	
3/12	554.75	52.10	
3/13	319.00	68.50	
3/14	364.50	59.00	
3/15	326.50	37.50	
3/16	573.25	47.20	
3/17	580.50	72.80	
3/18	467.50	75.60	
3/19	383.75	91.00	
3/20	257.25	69.35	
	<u>4367.50</u>	<u>621.45</u>	.142
3/21	399.25	73.60	.184
3/22	475.00	58.00	.122
3/23	520.25	65.00	.125
3/24	435.00	84.60	.194
3/25	525.25	84.60	.161
3/26	444.00	97.90	.219
3/27	266.25	72.60	.272
3/28	556.50	114.15	.205
3/29	531.75	106.80	.202
3/30	501.75	90.80	.182
3/31	215.75	65.20	.302
	<u>4870.15</u>	<u>913.25</u>	.1875



115 Date Yardage Forms Cost Unit Cost.

4/1	—	110.70	
4/2	182.00	105.00	
4/3	371.00	121.00	
4/4	145.00	<del>60.80</del>	
4/5	—	44.35	
4/6	—	21.20	
4/7	—	65.50	
4/8	—	42.60	
4/9	87.50	77.20	
4/10	493.00	81.40	
		<u>1297.5</u>	

4/11	338.75	105.00	.310
4/12	391.25	81.25	.207
4/13	232.75	70.70	.303
4/14	422.50	97.40	.231
4/15	545.50	103.80	.190
4/16	400.75	106.55	.266
4/17	486.50	111.45	.229
4/18	384.00	115.15	.294
4/19	249.25	86.40	.346
4/20	362.00	70.25	.194
	<u>3813.25</u>	<u>947.95</u>	<u>.248</u>

4/21	346.00	83.20	.240
4/22	291.00	127.50	.438
4/23	385.00	120.20	.312
4/24	415.20	112.40	.271
4/25	380.00	127.30	.335
4/26	297.25	74.40	.251
4/27	303.75	63.45	.208
4/28	374.75	113.50	.330
4/29	198.00	118.40	.598
4/30	331.00	114.20	.345
	<u>3322.00</u>	<u>1054.55</u>	<u>.317</u>

5/1	440.50	98.40	.223
5/2	449.50	92.60	.206
5/3	242.50	74.10	.306
5/4	238.00	47.50	.199
5/5	—	67.55	—
5/6	292.00	107.00	.366
5/7	397.75	113.40	.286
5/8	370.25	109.50	.296
5/9	329.25	97.20	.294
5/10	354.50	98.60	.278
	<u>3114.25</u>	<u>905.85</u>	<u>.291</u>
5/11	194.75	62.80	.322
5/12	157.00	119.20	.758



5/13	254.00	132.15	.522
5/14	339.50	122.75	.361
5/15	377.00	130.40	.346
5/16	316.50	116.80	.368
5/17	246.50	120.80	.489
5/18	365.00	65.60	.179
5/19	171.00	100.20	.586
5/20	139.50	125.80	.902
	<u>2560.75</u>	<u>1096.50</u>	<u>.428</u>

5/21	133.50	90.80	.680
5/22	208.00	123.40	.593
5/23	314.50	116.80	.371
5/24	211.00	120.65	.572
5/25	296.75	78.80	.265
5/26	170.75	149.85	.878
5/27	298.75	161.00	.538
5/28	349.75	149.40	.427
5/29	269.25	148.65	.552
5/30	335.25	190.25	.568
5/31	273.25	162.70	.595
	<u>2860.75</u>	<u>1492.30</u>	<u>.522</u>



# KEITH'S RAILROAD CURVE TABLES.

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## HOW TO USE KEITH'S TABLES.

### EXAMPLE.

Wanted a Curve with an Ext. of about 12 ft. Angle  
of Intersection or I. P.= $23^{\circ} 20'$  to the R. at Station  
542+72.

Ext. in Tab. IV opposite  $23^{\circ} 20' = 120.87$   
 $120.87 + 12 = 10.07$ . Say a  $10^{\circ}$  Curve.

Tan. in Tab. IV opp.  $23^{\circ} 20' = 1183.1$   
 $1183.1 + 10 = 118.31$ .

Tab. V. correction for A.  $23^{\circ} 20'$  for a  $10^{\circ}$  Cur. = 0.16  
 $118.31 + 0.16 = 118.47 =$ corrected Tangent.

(If corrected Ext. is required find in same way)  
Ang.  $23^{\circ} 20' = 23.33^{\circ} + 10 = 2.3333 =$ L. C.

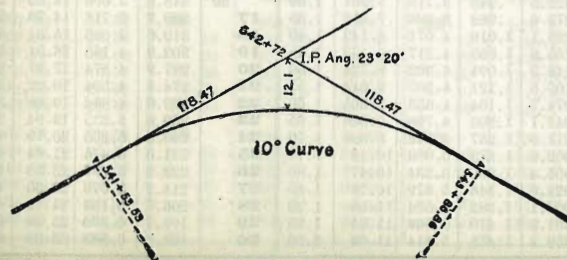
$2^{\circ} 19\frac{1}{2}' =$ def. for sta.	542	I. P. =sta.	542+72
$4^{\circ} 49\frac{1}{2}' =$ " " "	+50	Tan. =	1.18.47
$7^{\circ} 19\frac{1}{2}' =$ " " "	543	B. C. =sta.	541+53.53
$9^{\circ} 49\frac{1}{2}' =$ " " "	+50	L. C. =	2.33.33
$11^{\circ} 40' =$ " " "	543+	E. C. =sta.	543+86.86
	86.86		

$100 - 53.53 = 46.47 \times 3' (\text{def. for 1 ft. of } 10^{\circ} \text{ Cur.}) = 139.41' =$   
 $2^{\circ} 19\frac{1}{2}' =$ def. for sta. 542.

Def. for 50 ft. =  $2^{\circ} 30'$  for a  $10^{\circ}$  Curve.

Def. for 36.86 ft. =  $1^{\circ} 50\frac{1}{2}'$  for a  $10^{\circ}$  Curve

(These tables are published in Field Books of  
KEUFFEL & ESSER Co., New York, N. Y.)





473  
13

5.82  
2.50  
2.80  
50

1062

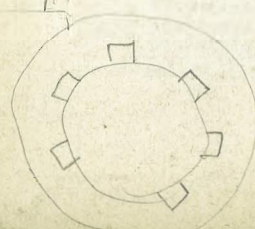
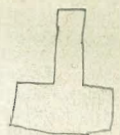
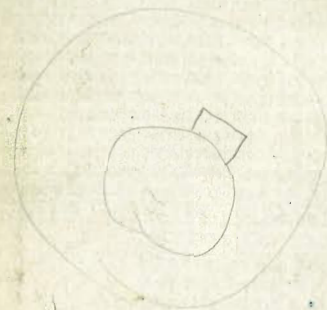
3.8 cu yds.

77  
13  
48  
23

+  
3/4+  
+

161  
25  
8  
132  
66

46  
22  
22



DISTANCES FROM CENTER OF ROADWAY FOR CROSS-SECTIONING.

ROADWAY 14 FEET WIDE. SIDE SLOPES 1 1/2 TO 1.

FOR SINGLE TRACK EMBANKMENT.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	7.0	7.2	7.3	7.5	7.6	7.8	7.9	8.1	8.2	8.4	0
1	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.6	9.7	9.9	1
2	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.2	11.4	2
3	11.5	11.7	11.8	12.0	12.1	12.3	12.4	12.6	12.7	12.9	3
4	13.0	13.2	13.3	13.5	13.6	13.8	13.9	14.1	14.2	14.4	4
5	14.5	14.7	14.8	15.0	15.1	15.3	15.4	15.6	15.7	15.9	5
6	16.0	16.2	16.3	16.5	16.6	16.8	16.9	17.1	17.2	17.4	6
7	17.5	17.7	17.8	18.0	18.1	18.3	18.4	18.6	18.7	18.9	7
8	19.0	19.2	19.3	19.5	19.6	19.8	19.9	20.1	20.2	20.4	8
9	20.5	20.7	20.8	21.0	21.1	21.3	21.4	21.6	21.7	21.9	9
10	22.0	22.2	22.3	22.5	22.6	22.8	22.9	23.1	23.2	23.4	10
11	23.5	23.7	23.8	24.0	24.1	24.3	24.4	24.6	24.7	24.9	11
12	25.0	25.2	25.3	25.5	25.6	25.8	25.9	26.1	26.2	26.4	12
13	26.5	26.7	26.8	27.0	27.1	27.3	27.4	27.6	27.7	27.9	13
14	28.0	28.2	28.3	28.5	28.6	28.8	28.9	29.1	29.2	29.4	14
15	29.5	29.7	29.8	30.0	30.1	30.3	30.4	30.6	30.7	30.9	15
16	31.0	31.2	31.3	31.5	31.6	31.8	31.9	32.1	32.2	32.4	16
17	32.5	32.7	32.8	33.0	33.1	33.3	33.4	33.6	33.7	33.9	17
18	34.0	34.2	34.3	34.5	34.6	34.8	34.9	35.1	35.2	35.4	18
19	35.5	35.7	35.8	36.0	36.1	36.3	36.4	36.6	36.7	36.9	19
20	37.0	37.2	37.3	37.5	37.6	37.8	37.9	38.1	38.2	38.4	20
21	38.5	38.7	38.8	39.0	39.1	39.3	39.4	39.6	39.7	39.9	21
22	40.0	40.2	40.3	40.5	40.6	40.8	40.9	41.1	41.2	41.4	22
23	41.5	41.7	41.8	42.0	42.1	42.3	42.4	42.6	42.7	42.9	23
24	43.0	43.2	43.3	43.5	43.6	43.8	43.9	44.1	44.2	44.4	24
25	44.5	44.7	44.8	45.0	45.1	45.3	45.4	45.6	45.7	45.9	25
26	46.0	46.2	46.3	46.5	46.6	46.8	46.9	47.1	47.2	47.4	26
27	47.5	47.7	47.8	48.0	48.1	48.3	48.4	48.6	48.7	48.9	27
28	49.0	49.2	49.3	49.5	49.6	49.8	49.9	50.1	50.2	50.4	28
29	50.5	50.7	50.8	51.0	51.1	51.3	51.4	51.6	51.7	51.9	29
30	52.0	52.2	52.3	52.5	52.6	52.8	52.9	53.1	53.2	53.4	30
31	53.5	53.7	53.8	54.0	54.1	54.3	54.4	54.6	54.7	54.9	31
32	55.0	55.2	55.3	55.5	55.6	55.8	55.9	56.1	56.2	56.4	32
33	56.5	56.7	56.8	57.0	57.1	57.3	57.4	57.6	57.7	57.9	33
34	58.0	58.2	58.3	58.5	58.6	58.8	58.9	59.1	59.2	59.4	34
35	59.5	59.7	59.8	60.0	60.1	60.3	60.4	60.6	60.7	60.9	35
36	61.0	61.2	61.3	61.5	61.6	61.8	61.9	62.1	62.2	62.4	36

Calculated by Julien A. Hall, M. Am. Soc. C. E.

MADE IN GERMANY.