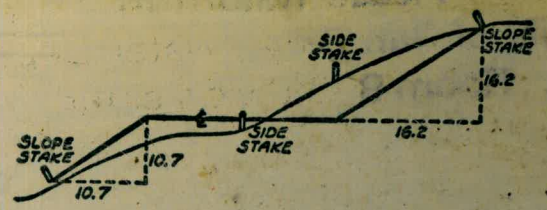
BLACK CANYON TUNNEL

W 848



Distances from Side Stakes for Cross-Sectioning

Slope 1 to 1. Roadway of Any Width

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.10	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90	0
1	1.00	1.10	1.20	1.30	1.40	1.50	1.60	1.70	1.80	1.90	1
2	2.00	2.10	2.20	2.30	2.40	2.50	2.60	2.70	2.80	2.90	2
3	3.00	3.10	3.20	3.30	3.40	3.50	3.60	3.70	3.80	3.90	3
4	4.00	4.10	4.20	4.30	4.40	4.50	4.60	4.70	4.80	4.90	4
5	5.00	5.10	5.20	5.30	5.40	5.50	5.60	5.70	5.80	5.90	5
6	6.00	6.10	6.20	6.30	6.40	6.50	6.60	6.70	6.80	6.90	6
7	7.00	7.10	7.20	7.30	7.40	7.50	7.60	7.70	7.80	7.90	7
8	8.00	8.10	8.20	8.30	8.40	8.50	8.60	8.70	8.80	8.90	8
9	9.00	9.10	9.20	9.30	9.40	9.50	9.60	9.70	9.80	9.90	9
10	10.00	10.10	10.20	10.30	10.40	10.50	10.60	10.70	10.80	10.90	10
11	11.00	11.10	11.20	11.30	11.40	11.50	11.60	11.70	11.80	11.90	11
12	12.00	12.10	12.20	12.30	12.40	12.50	12.60	12.70	12.80	12.90	12
13	13.00	13.10	13.20	13.30	13.40	13.50	13.60	13.70	13.80	13.90	13
14	14.00	14.10	14.20	14.30	14.40	14.50	14.60	14.70	14.80	14.90	14
15	15.00	15.10	15.20	15.30	15.40	15.50	15.60	15.70	15.80	15.90	15
16	16.00	16.10	16.20	16.30	16.40	16.50	16.60	16.70	16.80	16.90	16
17	17.00	17.10	17.20	17.30	17.40	17.50	17.60	17.70	17.80	17.90	17
18	18.00	18.10	18.20	18.30	18.40	18.50	18.60	18.70	18.80	18.90	18
19	19.00	19.10	19.20	19.30	19.40	19.50	19.60	19.70	19.80	19.90	19
20	20.00	20.10	20.20	20.30	20.40	20.50	20.60	20.70	20.80	20.90	20
21	21.00	21.10	21.20	21.30	21.40	21.50	21.60	21.70	21.80	21.90	21
22	22.00	22.10	22.20	22.30	22.40	22.50	22.60	22.70	22.80	22.90	22
23	23.00	23.10	23.20	23.30	23.40	23.50	23.60	23.70	23.80	23.90	23
24	24.00	24.10	24.20	24.30	24.40	24.50	24.60	24.70	24.80	24.90	24
25	25.00	25.10	25.20	25.30	25.40	25.50	25.60	25.70	25.80	25.90	25
26	26.00	26.10	26.20	26.30	26.40	26.50	26.60	26.70	26.80	26.90	26
27	27.00	27.10	27.20	27.30	27.40	27.50	27.60	27.70	27.80	27.90	27
28	28.00	28.10	28.20	28.30	28.40	28.50	28.60	28.70	28.80	28.90	28
29	29.00	29.10	29.20	29.30	29.40	29.50	29.60	29.70	29.80	29.90	29
30	30.00	30.10	30.20	30.30	30.40	30.50	30.60	30.70	30.80	30.90	30
31	31.00	31.10	31.20	31.30	31.40	31.50	31.60	31.70	31.80	31.90	31
32	32.00	32.10	32.20	32.30	32.40	32.50	32.60	32.70	32.80	32.90	32
33	33.00	33.10	33.20	33.30	33.40	33.50	33.60	33.70	33.80	33.90	33
34	34.00	34.10	34.20	34.30	34.40	34.50	34.60	34.70	34.80	34.90	34
35	35.00	35.10	35.20	35.30	35.40	35.50	35.60	35.70	35.80	35.90	35
36	36.00	36.10	36.20	36.30	36.40	36.50	36.60	36.70	36.80	36.90	36
37	37.00	37.10	37.20	37.30	37.40	37.50	37.60	37.70	37.80	37.90	37
38	38.00	38.10	38.20	38.30	38.40	38.50	38.60	38.70	38.80	38.90	38
39	39.00	39.10	39.20	39.30	39.40	39.50	39.60	39.70	39.80	39.90	39
40	40.00	40.10	40.20	40.30	40.40	40.50	40.60	40.70	40.80	40.90	40
41	41.00	41.10	41.20	41.30	41.40	41.50	41.60	41.70	41.80	41.90	41
42	42.00	42.10	42.20	42.30	42.40	42.50	42.60	42.70	42.80	42.90	42
43	43.00	43.10	43.20	43.30	43.40	43.50	43.60	43.70	43.80	43.90	43
44	44.00	44.10	44.20	44.30	44.40	44.50	44.60	44.70	44.80	44.90	44
45	45.00	45.10	45.20	45.30	45.40	45.50	45.60	45.70	45.80	45.90	45
46	46.00	46.10	46.20	46.30	46.40	46.50	46.60	46.70	46.80	46.90	46
47	47.00	47.10	47.20	47.30	47.40	47.50	47.60	47.70	47.80	47.90	47
48	48.00	48.10	48.20	48.30	48.40	48.50	48.60	48.70	48.80	48.90	48
49	49.00	49.10	49.20	49.30	49.40	49.50	49.60	49.70	49.80	49.90	49
50	50.00	50.10	50.20	50.30	50.40	50.50	50.60	50.70	50.80	50.90	50

Distance of slope stake from side or shoulder stake for any width roadway, slope 1 to 1. If ground is nearly level the cut or fill at side stake is located by the double entry method in left column and top row. The number in body of table in same row and column gives distance from side stake to slope stake. If ground is not level estimate the difference in elevation between the side stake and slope stake, lower target by this amount if cut, elevate if fill. Add this amount to cut or fill and find distance in table. Set up rod at this point, and line of sight should cut target. If it does not make the slight adjustment necessary.

MICROFILMED
JUN 18 1965

Please Return to
City of San Diego Water Dept.
Room 903 Civic Center

TYPE "D" = 3'8¼" RADIUS
13'3" LONG ON ARC.

TYPE "B" = 3'6½" RADIUS
12'9½" LONG ON ARC.

2 FT. STEEL RING. 6'2½" I.D.

Face at 144+52.67

Spad #55 = 144+98.07
−144+52.67

Distance from #55 = 45.40' on ℄

45.50 to spring line from #55

Inv. Elev. 1894.57.

C.M. 1896.24 +2.51 = 1898.75
−1894.57
4.18

4.43 = 3" Low.

Table XIII—Corrections for Tangents and Externals

These corrections are to be added to the approximate values, found by dividing the tangent, or external, for a 1° curve (Table VIII) by the degree of curve, in order to obtain the true tangents, or externals. Intermediate values may be obtained by interpolation.

For Tangents Add

Central Angle	Degree of Curve													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	03	.06	09	13	16	19	.22	.25	.28	.31	34	38	42	.46
15°	04	10	14	19	24	.29	.34	.39	45	.51	.53	58	.63	.68
20°	06	.13	19	.26	.32	.39	.45	.51	.58	.65	.72	79	.84	.90
25°	.08	16	24	.33	40	49	.58	67	.75	.83	90	.99	1.06	1.14
30°	10	19	.29	39	49	.59	.69	79	.89	.99	1.09	1.20	1.29	1.39
35°	11	22	.34	47	.58	.69	.70	.81	.92	1.04	1.29	1.42	1.54	1.66
40°	13	.26	.40	.53	.67	.80	.93	1.06	1.20	1.34	1.49	1.64	1.79	1.94
45°	15	.30	44	60	76	91	1.06	1.21	1.37	1.52	1.70	1.87	2.04	2.21
50°	17	.34	.51	.68	.85	1.02	1.19	1.36	1.54	1.72	1.91	2.10	2.29	2.48
55°	19	38	.57	76	.95	1.14	1.32	1.52	1.72	1.92	2.14	2.35	2.56	2.77
60°	.21	42	.63	.84	1.05	1.27	1.49	1.71	1.94	2.17	2.38	2.60	2.83	3.07
65°	23	46	.69	.93	1.16	1 40	1.64	1.88	2.13	2.38	2.63	2.88	3.13	3.39
70°	25	.51	76	1.02	1.28	1.54	1.80	2.06	2.33	2.60	2.88	3.16	3.44	3.72
75°	.27	.56	.83	1.12	1.40	1.69	1.98	2.27	2.57	2.87	3.16	3.47	3.78	4.09
80°	30	.61	.91	1.22	1.53	1.84	2.15	2.46	2 78	3.10	3.44	3.78	4.12	4.46
85°	33	66	1.00	1.33	1.68	2.02	2.36	2 70	3.05	3.40	3.77	4.14	4.55	4 89
90°	36	.72	1.09	1.45	1.83	2.20	2.57	2.94	3.32	3.70	4.10	4.50	4.91	5.32
95°	39	79	1.19	1.55	2.00	2.40	2.80	3.20	3.61	4.02	4.40	4.98	5.38	5.83
100°	43	.86	1.30	1.74	2.18	2.62	3.06	3.50	3.95	4.40	4.88	5.37	5.85	6.34
110°	51	1.03	1.56	2.08	2.61	3.14	3.67	4.21	4 76	5.31	5 86	6.43	7 01	7 60
120°	62	1.25	1 93	2.52	3.16	3.81	4 45	5.11	5.77	6 44	7 12	7.80	8.50	9 22

For Externals Add

Central Angle	Degree of Curve													
	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
10°	.001	.003	.004	.006	.007	.008	.009	.011	.012	.014	.015	.017	.018	.020
15°	.003	.007	.010	.014	.018	.023	.027	.029	.032	.035	.039	.043	.047	.051
20°	.006	.011	.017	.022	.028	.034	.038	.045	.051	.057	.063	.070	.076	.083
25°	.009	.018	.027	036	.046	.056	.065	.074	.083	.093	.106	120	127	135
30°	.013	.025	.038	.051	.065	.078	.090	.103	.116	.129	.149	.170	.179	.188
35°	.018	.035	.054	.072	.086	.109	.131	.153	.175	.197	.213	.230	.247	.264
40°	.023	.046	.070	.093	.117	.141	.172	.203	.234	.265	.277	.290	.315	.341
45°	.030	.060	.093	.119	.153	.184	.216	.254	.289	.325	.351	.378	.411	.445
50°	.037	.075	.116	.151	.189	.227	.266	.305	.345	.384	.425	.467	.508	.550
55°	.046	.093	.142	.188	.236	.283	.332	.381	.420	.479	.530	.582	.641	.700
60°	.056	.112	.168	.225	.283	.340	.398	.457	.516	.575	.636	.697	.774	.851
65°	.067	.135	.204	.273	.343	.412	.483	.554	.625	.697	.711	.845	.922	1.01
70°	.080	.159	.240	.321	.403	.485	.568	.652	.735	.819	.906	.994	1.08	1.17
75°	.095	.182	.286	.383	.480	.578	.678	.777	.877	.977	1.07	1.18	1.29	1.39
80°	.110	.220	.332	.445	.558	.671	.787	.903	1.02	1.13	1.25	1.38	1.50	1.62
85°	.128	.259	.391	.524	.657	.790	.926	1.06	1.20	1.34	1.47	1.62	1.76	1.91
90°	.149	.299	.450	.603	.756	.910	1.07	1.22	1.38	1.54	1.70	1.87	2.03	2.20
95°	.174	.350	.522	.706	.985	1.06	1.25	1.43	1.62	1.80	1.99	2.18	2.38	2.58
100°	.200	.401	.604	.809	1.01	1.22	1.43	1.64	1.85	2.06	2.28	2.50	2.73	2.96
110°	.268	.536	.806	1.08	1.35	1.63	1.91	2.20	2.48	2.76	3.05	3.35	3.66	3.96
120°	.360	.721	1.08	1.45	1.82	2.19	2.57	2.95	3.33	3.72	4.11	4.50	4.91	5.32

Notes Entered Field Note Index Book.

Page	Date	By

Notes Reduced.

Drawing No.	Date	By

Field Party Start Index next page
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Cross sections for Monthly Estimate, only, excavation not completed.

Dec. 1, 1952.
Overcast, Cool.

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Page 1

Black Canyon Tunnel, South Portal - X-Sections.

B.M. +0.10	1917.71		1917.61
T.P. +0.52	1906.82	-11.41	1906.30
T.P. +2.25	1899.42	-9.65	1897.17
178+00 ℄	1889.76 Fin. Grd.	-4.4	1895.0 ✓
" 14.0 Lt.		-4.7	1894.7 ✓
" 16.0 Lt.		-3.8	1895.6 ✓
177+50 ℄	1889.96	-6.4	1893.0 ✓
8.0 Lt.		-6.1	1893.3 ✓
14.0 Lt.		-4.9	1894.5 ✓
4.5 Rt.		-6.2	1893.2
6.0 Rt.		-5.1	1894.3
177+00 ℄	1890.16	-7.3	1892.1 ✓
8.0 Lt.		-6.9	1892.5 ✓
13.0 Lt.		-3.8	1895.5 ✓
5.0 Rt.		-7.1	1892.3 ✓
8.0 Rt.		-5.0	1894.4 ✓
176+50 ℄	1890.36	-6.5	1892.9 ✓
8.0 Lt.		-5.8	1893.6 ✓
13.0 Lt.		-3.2	1896.2 ✓

B.d.	1899.42		
176+50 4.5 RT.		-6.5	1892.9 ✓
7.0 RT.		-4.9	1894.5 ✓
176+00 ℄	1890.56	-5.5	1894.1 ✓
10.0 LT.		-5.5	1893.9 ✓
13.0 LT.		-3.0	1896.4 ✓
5.0 RT.		-5.1	1894.3 ✓
8.0 RT.		-2.0	1897.4 ✓
175+54 ℄	1890.74	-4.0	1895.4 ✓
11.5 LT.		-3.9	1895.5 ✓
13.0 LT.		-1.8	1897.6 ✓
6.0 RT.		-4.4	1895.0 ✓
10.0 RT.		-3.8	1896.1 ✓
175+09 ℄	1890.92	-2.6	1896.8 ✓
11.5 LT.		-2.8	1897.1 ✓
15.0 LT.		-0.4	1899.0 ✓
12.0 RT.		-3.6	1895.8 ✓
174+88.26 ℄	1891.01	-2.0	1897.4 ✓
11.0 LT.		-1.4	1898.0 ✓

	N.d.	1899.42		
	174+88.26 14.0 LT.	1891.01	-0.4	1899.0 ✓
	13.0 RT.		-2.2	1897.2 ✓
	T.P. +9.48	N.d. 1906.71	-2.19	1897.23
60 PENNY SPIKE IN OAK TREE.	SET T.B.M.		-8.17	1898.54
	174+59 ℄	1891.12	-8.6	1898.1 ✓
	11.0 LT.		-8.1	1898.6 ✓
	15.0 LT.		-5.3	1901.4 ✓
	10.5 RT.		-7.9	1898.8 ✓
	13.0 RT.		-7.4	1899.3
	174+25 ℄	1891.26	-7.7	1899.0 ✓
	11.3 LT.		-7.6	1899.1 ✓
	14.0 LT.		-4.6	1902.1 ✓
	6.0 RT.		-7.3	1899.4 ✓
	13.0 RT.		-6.1	1900.6 ✓
	174+00 ℄	1891.36	-7.2	1899.5 ✓
	11.5 LT.		-6.6	1900.1 ✓
	16.0 LT.		-2.7	1904.0 ✓
	11.0 RT.		-5.9	1900.8 ✓

H.d.	1906.71		
174+00 13.0 RT.		-4.0	1902.7 ✓
173+75 ℄	1891.46	-6.3	1900.4 ✓
13.0 LT.		-5.8	1901.4 ✓
17.0 LT.		-2.2	1904.5 ✓
8.0 RT.		-6.3	1900.4 ✓
11.5 RT.		-4.4	1902.3 ✓
173+50 ℄	1891.56	-5.7	1900.8 ✓
13.0 LT.		-5.3	1901.4 ✓
16.0 LT.		-2.5	1903.9 ✓
8.5 RT.		-6.0	1900.7 ✓
11.5 RT.		-3.9	1902.8 ✓
173.00 ℄	1891.76	-4.5	1901.9 ✓
13.5 LT.		-4.5	1901.9 ✓
16.0 LT.		-3.8	1902.9 ✓
12.0 RT.		-5.2	1901.5 ✓
15.0 RT.		-2.7	1904.0 ✓
172+63 ℄	1891.91	-3.0	1903.7 ✓
16.0 LT.		-3.4	1903.3 ✓

H.L.	1906.71		
172+65 20.0 LT.	1891.91	+ 0.6	1906.1
" 11.5 RT.	"	-3.1	1903.6
" 15.5 RT.		-0.2	1906.5
172+58.5 ℄	1892.00	-2.1	1904.6
15.0 LT.		-1.0	1905.7
22.0 LT.		+2.5	1909.2
5.0 RT.		-1.8	1904.9
" 10.0 RT.		+0.2	1906.9
T.P. +12.95	1916.79	-2.87	1903.84
T.P. +12.56	1929.13	-0.22	1916.57
CHECK T.B.M.		-0.17	1928.96 =
HUB SET FOR CURVE			1929.00

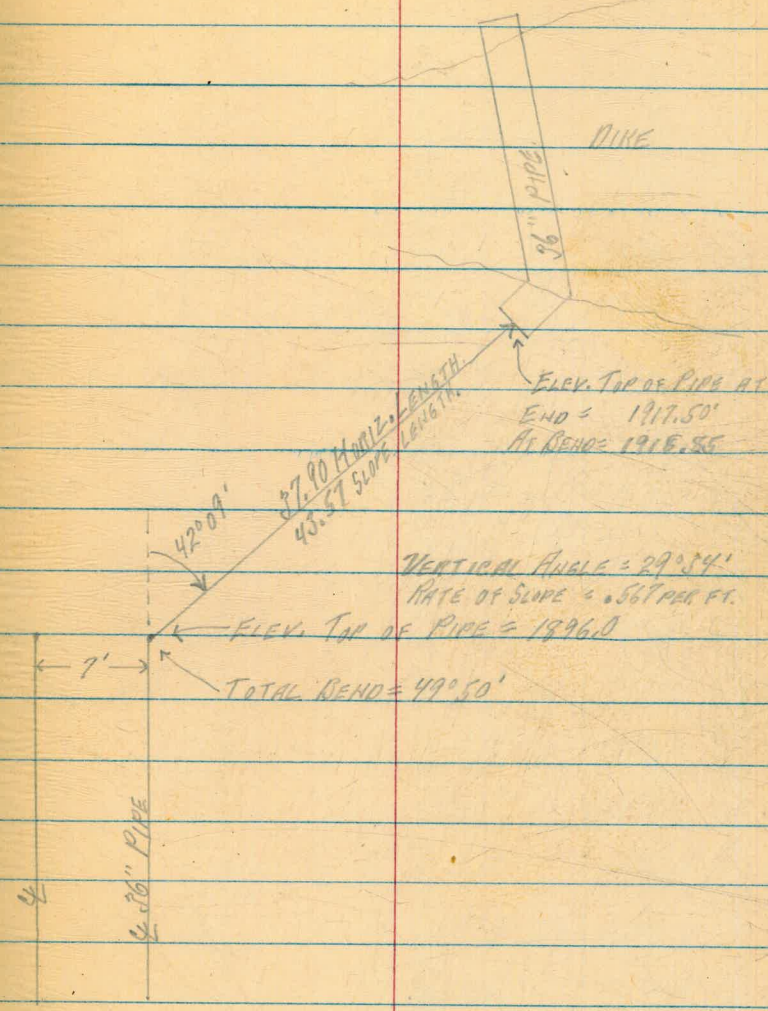
Dec. 7, 1952.

Leonard, D. - R, Notes
Leonard, T. - Rod.

Black Canyon Tunnel, S. Approach Cut, ℄ Profile.

B.M. +4.17	1902.71		1898.54
	Fin. Grade.		C 11.4
172+40	1892.0	+0.7	1903.4
			C 6.7
+50	1891.96	-4.0	1898.7
			C 1.4
+75	1891.86	-9.4	1893.8
			Grade
173+00	1891.76	-10.9	1891.8
			F 1.0
+50	1891.56	-12.2	1890.5
			F 0.26
174+00	1891.36	-11.6	1891.1
			Grade
+50	1891.16	-11.5	1891.2
			C 0.5
175+00	1890.96	-11.3	1891.4
			F 0.26
+50	1890.76	-12.2	1890.5
			C 0.5
176+00	1890.56	-11.7	1891.0
			C 1.2
+50	1890.36	-11.1	1891.6
			C 2.1
177+00	1890.16	-10.4	1892.3
			C 3.2
177+50	1889.96	-9.5	1893.2
			C 5.0
178+00	1889.76	-7.9	1894.8

36" DRAIN PIPE AS LAID UNDER DIKE.



BLACK CANYON TUNNEL, SOUTH PORTAL APPROACH CUT.

B.M. +2.38	1900.92		1898.54
172+50 ℄	GRADE: 1891.96	-8.8	1892.2 CO 2
173+00 L.H.	1891.76	-10.0	1890.9 FO 8
" R.H.	"	-9.9	1891.0 FO 8
173+50 L.H.	1891.56	-10.2	1890.7 FO 2
" R.H.	"	-10.5	1890.4 FI 2
174+00 L.H.	1891.36	-9.7	1891.2 FO 2
" R.H.	"	-10.0	1890.9 FO 5
174+50 L.H.	1891.16	-9.4	1891.5 CO 3
" R.H.	"	-9.8	1891.1 FO 1
175+00 L.H.	1890.96	-9.6	1891.3 CO 2
" R.H.	"	-9.9	1891.0 O.K.
175+50 L.H.	1890.76	-9.8	1891.1 CO 2
" R.H.	"	-10.3	1890.6 FO 2
176+00 L.H.	1890.56	-9.2	1891.7 CI 1
" R.H.	"	-10.0	1890.9 CO 2
176+50 L.H.	1890.36	-10.0	1890.9 CO 5
" R.H.	"	-10.4	1890.5 CO 1

	1900.92		
177+00 L.H.	1890.16	-10.6	1890.3 CO^{1}
" R.H.	"	-10.9	1890.0 FO^{2}
177+50 L.H.	1889.96	-10.8	1890.1 CO^{1}
" R.H.	"	-11.0	1889.9 O.K.
178+00 L.H.	1889.76	-11.0	1889.9 CO^{1}
" R.H.	"	-11.3	1889.6 FO^{2}
178+50 L.H.	1889.64	-11.2	1889.7 O.K.
" R.H.	"	-11.5	1889.4 FO^{2}

.004
.00
.120

(3) Line for 36" CMP Storm Drain South Side tunnel #2

West
Martel
Voronfaks
Kemp

22 Dec 52

Sta	+	Hi	−	Elev	Grade	
	2.34	1900.88		1898.54		BM nail in Oak Tree
172+13			5.60	1895.28	1893.00	C 2 28
173+00			10.10	1890.78	1892.75	F 1 97
173+50			10.10	1890.78	1892.55	F 1 77
174+00			9.80	1891.08	1892.35	F 1 27
+50			9.90	1890.98	1890.75	C 0 23
175+00			10.10	1890.78	1889.15	C 1 63
+43	Δ 60°	125	10.50	1890.38	1887.75	C 2 63
+83			14.30	1886.58	1886.5	C 0 0
			−2.34	1898.54	= 1898.54	

SPIKE IN TREE.

NOTE: GRADE REVISED TO PLACE PIPE ON A VERTICAL CURVE BETWEEN STA's. 174+01 AND 176+41 IN ORDER TO DISTRIBUTE VERTICAL ANGLE EVENLY OVER SEVEN JOINTS OF PIPE. PIPE WILL NOT BEND TO GRADE SHOWN ON PLANS.

DEC. 30, 1952. LEONARD. 11.

BLACK CANYON TUNNEL - SOUTH PORTAL.
36" DRAIN LINE: REVISED GRADE:

STA:	H.I.	—	PIPE GRADE:	
+1.70	1900.24		1898.54 B.M.	
172+43		-6.64	1893.60	.16
+61		-6.80	1893.44	.15
+81		-6.95	1893.29	.16
173+01		-7.11	1893.13	.15
+21		-7.26	1892.98	.16
+41		-7.42	1892.82	.15
+61		-7.57	1892.67	.16
+81		-7.73	1892.51	.16
174+01		-7.89	1892.35	.25
+21		-8.14	1892.10	.37
+41		-8.51	1891.73	.49
+61		-9.00	1891.24	.61
+81		-9.61	1890.63	.73
175+01		-10.34	1889.90	.85
+21		-11.19	1889.05	.95
+41		-12.14	1888.10	.10
Δ +43		-12.24	1888.00	

SET ½" ROUND STEEL PINS FOR FINISH GRADE –
PINS 2.75 RT. OF ℄.

T.B.M. STEEL PIN.

TURN DOWN TO WELL LOCATION ON NARONEY'S
LAND.

½" STEEL ROD THRU ROOT OF 6" ENG. TREE IN
CLUSTER OF THREE TRUNKS.

1' FILL GRADE:
FINISH GRADE – SOUTH PORTAL APPROACH CUT.

B.M. +0.76	1918.37		1917.61
T.P. +0.04	1906.13	-12.28	1906.09
T.P. +7.52	1898.48	-10.17	1895.96
178+30		-7.84 ✓	1890.64
178+00		-7.72 ✓	1890.76
177+50		-7.52 ✓	1890.96
177+00		-7.32 ✓	1891.16
176+50		-7.12 ✓	1891.36
176+00		-6.92 ✓	1891.56
175+50		-6.72 ✓	1891.76
175+00		-6.52 ✓	1891.96 T.B.M.
T.P.	1898.48	-12.67	1885.81 ROCK
+0.04	1885.85	-12.66	1873.19 AXE
+0.05	1873.24	-12.52	1860.72 AXE
+0.84	1861.56	-12.82	1848.74 AXE.
+0.13	1848.87		
SET T.B.M.		-8.25	1840.62
GROUND AT WELL.		-5.3	1843.6

SOUTH PORTAL - GRADES FOR TIMBER SETS.

B.M. + 5.34	1903.88		1898.54
℄ -172+40		-7.88	1896.00
TRACK GRADE.		-11.34	1892.54
TOP FOOTING		-11.67	1892.21
TOP OF TIE AT PORTAL.		-11.10	1892.78
TOP STEEL ROD AT 175+00.		-11.91	1891.97 = 1891.96
JAN. 28, 1955.			
T.B.M. +5.75	1897.71		1891.96
FOOT OF STEEL RIB	~~(1896 - 5.04)~~	~~-4.75~~	NOT USED. ~~1892.96~~
+5.86	1897.82		1891.96
		+1.97	1899.79
JAN. 29.			
T.B.M. +5.63	1897.59		1891.96
STA 172+25		-5.04	1892.55

SPIKE IN TREE BY CHANGE HOUSE.

STEEL PIN AT STA. 175+00, 2.75 RT.

SET #6 NAILS. ~~PIN CUT OFF~~

UNDER SIDE OF WOOD SET CAP AT PORTAL.

SET GRADE FOR FOOT BLOCKS FOR RIBS.

STEEL PIN AT STA. 175+00

FEB. 4, 1953. LEONARD VOGEL.

FINISH GRADE FOR 1' BACKFILL IN SOUTH PORTAL APPROACH.

T.B.M. +5.16	1897.12		1891.96
STA. 174+75		-5.06	1892.06
" 174+50		-4.96	1892.16
" 174+25		-4.86	1892.26
" 174+00		-4.76	1892.36
" 173+75		-4.66	1892.46
" 173+50		-4.56	1892.56
" 173+25		-4.46	1892.66
" 173+00		-4.36	1892.76
" 172+75		-4.26	1892.86
" 172+50		-4.16	1892.96
" 172+40		-4.12	1893.00
CHECK T.B.M.		-4.53	1892.59
CHECK B.M.		-5.16	1891.96

GRADES IN TUNNEL - FOR EXCAVATION.

	FEB. 2, 1953	LEONARD, SCHMELING.	
B.M. +5.61	1897.57		1891.96
SET T.B.M.		~~-4.98~~	~~1892.65~~
~~STA. 172+09~~	NOT SET.		~~1892.56~~
	FEB. 4, 1953		
B.M. +4.97	1896.93		1891.96
SET T.B.M.		-4.34	1892.59
+4.28	1896.87		
STA. 172+01 RIB #8.		2.31	1894.56
	FEB. 6, 1953.	LEONARD & SCHMELING.	RIB.
B.M. +4.87	1896.85		1891.96
CHECK T.B.M.		-4.24	1892.59
+4.40	1896.99		
STA. 171+79 RIB #12.		-2.41	1894.58
	FEB. 9, 1953.	LEONARD. SCHMELING	
T.B.M. +4.28	1896.87		1892.59
STA. 171+64 RIB #15.		-2.28	1894.59

STEEL PIN AT STA. 175+00 2.75 RT.
DESTROYED BY MUCKER.
SET $\frac{5}{8}$" STEEL ROD BETWEEN TRACKS AT 1ST. STEEL RIB.

SET FOOTBLOCK GRADE, 3.46' BELOW ℄ GRADE.

RESET $\frac{5}{8}$" STEEL ROD BETWEEN TRACKS AT 1ST. RIB.

SET GRADE 2' ABOVE FOOTBLOCKS.

STEEL PIN AT STA. 175+00
" " BETWEEN TRACKS AT 1ST. STEEL RIB.

SET GRADE 2' ABOVE FOOTBLOCKS FOR STEEL RIBS.

SET GRADE 2' ABOVE FOOTBLOCKS FOR STEEL RIBS.

FOOT BLOCK AT PORTAL 1892.59.

STEEL PIN BETWEEN RAILS AT 1ST. STEEL RIB.

GRADE SET 2' ABOVE FOOT OF RIB.

C 4.08 TO ℄ OF TUNNEL BELOW BOTTOM OF SPAD.

SET GRADE ON STEEL RIB, 2' ABOVE FOOT BLOCK.

STEEL PIN AT PORTAL.

SET GRADE ON ROCK WALL WITH YELLOW KEEL.

CHECK ELEV. ON TOP OF R.R. RAIL.

SET GRADE ON LAST RIB IN PLACE.

STEEL PIN AT PORTAL.

SPAD 126 FT. FROM PORTAL. ℄ ELEV. 1896.08

" 158 FT. " " ℄ ELEV. 1896.10

FOOT BLOCK GRADE:

	FEB. 11, 1953.	LEONARD - π G. JOHNSON - ROD.	
T.B.M. +3.96	1896.55		1892.59
171+39 RIB #20		-1.95	1894.60
171+48.6 BOTTOM OF SPAD	℄ GRADE 1896.06	+3.59	C 4.08 1900.14
	FEB. 13.	LEONARD - π G. JOHNSON - ROD.	
B.M. +4.17	1896.76		1892.59
171+29 RIB #22		-2.15	1894.61
	FEB. 18, '53.	LEONARD HARROUN	
B.M. +4.30	1896.89		1892.59
STA. 170+79.5		-2.27	1894.62
" " TOP OF RAIL.		-3.43	.21" HI. 1893.46
171+19 RIB #24		-2.28	1894.61
	FEB. 18, '53	LEONARD.	
B.M. +4.80	1897.39		1892.59
STA. 171+14 BOTTOM OF SPAD		+3.81	C 5.12 1901.20
STA. 170+82 BOTTOM OF SPAD.		+4.39	C 5.68 1901.78
	FEB. 20, '53	LEONARD.	
B.M. +4.96	1897.55		1892.59
RIB #27		-4.93	1892.62
STA. 170+92 ℄	GRADE.	-1.43	1896.12

BOTTOM OF ℄ SPAD. ℄ ELEV.=1896.14 C5.17 TO ℄.

PROFILE OVER R.R. TRACK AS LAID INSIDE TUNNEL TO DETERMINE HIGH AND LOW SPOTS.

H.I.	1897.18		
170+06.6	SLIDERAIL 1892.93	-4.64	1892.54 F0.39'
CHECK SPAD.		+4.11	1901.29 = 1901.31'

	FEB. 21.	LEONARD.	
B.M. +4.09	1896.58		1892.59
172+10 ℄		0.56	1896.02
	FEB. 24.	LEONARD.	
B.M. +4.79	1897.38		1892.59
170+15±		+3.93	C5.17 1901.31
R.R. TRACK AS LAID.		LEONARD & WHITSON-ROD.	
B.M. +4.59	1897.18		1892.59
	TOP OF RAIL GRADE:		
172+40'	1892.79	-4.26	1892.92 C0.13'
" +23.3'	1892.80	-4.42	1892.76 F0.04'
" +06.6'	1892.81	-4.63	1892.55 F0.26'
171+90'	1892.82	-4.74	1892.44 F0.38'
171+73.3'	1892.83	-4.81	1892.37 F0.46'
171+56.7'	1892.84	-4.72	1892.46 F0.38'
171+40.0'	1892.85	-4.49	1892.69 F0.16'
171+23.3'	1892.86	-4.22	1892.96 C0.10'
171+06.6'	1892.87	-4.13	1893.05 C0.18'
170+90'	1892.88	-4.14	1893.04 C0.16'
170+73.3'	1892.89	-3.98	1893.20 C0.31'
170+56.7	1892.90	-3.94	1893.24 C0.34'
170+40.0	1892.91	-4.17	1893.01 C0.10'
170+23.3	1892.92	-4.36	1892.82 F0.10'

CHECK SPAD ELEV'S.

B.M. +4.20	1896.79		1892.59
171+49	2 GRADE 1896.05	+3.37	1900.16 C 4.11
171+14	1896.08	+4.41	1901.20 C 5.12
170+82	1896.09		

Slope Stk's for North Tunnel

NORTH PORTAL APPROACH CUT.

Sta	+	Hi	−	Elev	Grade
	0.21	1936.11		1935.90	
	4.40	1932.68	7.83	1928.28	
	5.18	1925.35	12.51	1920.17	
	5.12	1918.11	12.36	1912.99	
Lt 90° 0+19			10.8	1907.3	1894.0
	4.53	1911.07	11.57	1906.54	
Lt 0+44			8.6	1902.5	1894.0
	5.46	1905.59	10.94	1900.13	
Lt 0+69			6.4	1899.2	1894.0
Lt 0+79^{3}			11.6	1894.0	
	12.17	1917.64	0.12	1905.47	
Rt 0+69			9.6	1908.0	1894.0
	10.45	1926.22	1.87	1915.77	
Rt 0+44			7.5	1918.7	1894.0
	10.82	1936.70		0.34	1925.88
				0.80	1935.90

West
Williams
Varonfakis
Kemp

FEB. 26, 1953.

BLACK CANYON TUNNEL.

BM Nail in Oak Tree

C 13^{3} C 1^{0} (10')

C

C 8^{5} C 3^{9} (10')

1905.9

C 5^{2} C 6^{7} (10')

C 0^{0}

C 14^{0} C 3^{8} (10')

C 24^{7} C 4^{9} (10')

= 1935.90 Nail in Oak Tree

SAME PARTY.

March 2 53
Cold (Brrr)

North Portal Approach Cut

Sta	+	Hi	−	Elev	Grade		
	10.87	1946.77		1935.90			
	5.36	1939.99	12.14	1934.63			
					1894.0		
RT 0+19			7.4	1932.6	1894.0	C 38.6	C 3.9 (10')
	3.75	1932.94	10.80	1929.19			
	12.24	1936.04	9.14	1923.80			
	10.72	1946.62	0.14	1935.90			
0-30			12.6	1934.0	1894.0	C 40.0	C 3.6 (10)
RT 0+00			3.0	1943.6	1894.0	C 49.6	C 5.1 (10)
	8.04	1952.54	2.12	1944.50			
0+00			0.9	1951.6	1894.0	C 57.6	C 6.5 (10)
	0.82	1940.66	12.70	1939.84			
	1.01	1929.58	12.09	1928.57			
LT 0+00	45°		13.2	1916.4	1894.0	C 22.4	F 0.2 (10)
LT 0+00			17.0	1912.6	1894.0	C 18.6	C 2.5 (10)
	12.25	1936.06	5.77	1923.81			
			0.15	1935.91	= 1935.90	Nail in Oak	

LEVELS (CON. MON. ON ROAD) TO CON MON. STA. 173+87

WILLIAMS T
VARONFAKIS J.

MARCH 3, 1955.

	+	HI	−	EL.		
B.M.	1.72	1963.31			1961.59	TOP CON. MON. S. SIDE RD. ABOVE TUN.
T.P.	0.39	1951.26	12.44	1950.87		
T.P	0.30	1939.48	12.08	1939.18		
T.P.	0.09	1928.96	10.61	1928.87		
T.P.	0.80	1918.21	11.55	1917.41		
T.P.	0.40	1907.77	10.84	1907.37		
T.P.	0.45	1896.99	11.23	1896.54		
T.P.	5.98	1895.96	7.01	1889.98		
T.P	9.99	1902.65	3.30	1892.66		
T.B.M			6.15	1896.50		CON. MON. STA. 173+87± 10' RT.
T.B.M.	5.90	1902.40			1896.50	CON. MON. STA 173+87± 10' RT.
T.P.	11.12	1912.92	0.60	1901.80		
T.P.	12.64	1922.51	3.05	1909.87		
T.P.	12.73	1934.97	0.27	1922.24		
T.P.	12.32	1946.99	0.30	1934.67		
T.P	12.46	1958.95	0.50	1946.49		
T.P.	9.10	1967.00	1.05	1957.90		
CHECK TO B.M.			5.41	1961.59	1961.59	TOP CON. MON. S. SIDE RD. ABOVE TUN.

LEVELS CON MON. STA. 173+87 TO IRON PIN STA. 172+35 ±

	+	HI.	−	EL.	
T.B.M.	6.17	1902.67			1896.50
T.P.	4.88	1897.46	10.09	1892.58	
CHECK TO IRON PIN			4.92	1892.54	1892.59
T.B.M.	4.89	1897.43			1892.54
T.P.	10.29	1902.66	5.06	1892.37	
CHECK TO T.B.M.			6.15	1896.51	1896.50

WILLIAMS π
VARONFAKIS †

MARCH 3, 1953

CON. MON. STA. 173+87 ± 10' RT.

IRON PIN ENTRANCE S. TUN. PORT STA. 172+35 ±

IRON PIN ENTRANCE S. TUN. PORT STA 172+35 ±

CON. MON. STA. 173+87 ± 10' RT.

			MARCH 3, 53	LEONARD VAROUFAKIS	
(ELEV. CORRECTED BY FIELD PARTY - SEE PAGE 22) STEEL PIN AT RIB #1. (PREVIOUSLY USED AS 1892.59)			B.M. +5.02	1897.56		1892.54
℄ OF TUNNEL GRADE = 1896.14		C 5.13 REAR	170+13.05 SPAD		+5.71	1901.27
" " " " = 1896.18		C 4.35 FRONT.	169+47.35 SPAD.		+2.97	1900.53
NOTE: SPAD AT STA. 170+13.05 WAS MOVED TODAY TO RECENTER SAME — BLASTING KNOCKED IT OFF CENTER.						
				MARCH 6, 53	LEONARD - π HARROUN - ROD	
STEEL PIN AT RIB #1.			B.M. +4.85	1897.39		1892.54
SET ℄ ELEV. ON FACE OF HEADING.			STA. 168+85.	℄ GRADE: 1896.21	-1.18	SET. 1896.21
CHECK ELEV. ON TOP OF RAILS.		(℄ ELEV. - 2.71)	"	TOP OF RAILS 1893.50	-4.58	0.64' LOW. 1892.86
CHECK LOW POINT IN OVERHEAD.			"	TOP OF HOLE; 1899.46	+2.06	O.K. 1899.45
				MARCH 9 '53	LEONARD.	
SPAD AT 169+47.35		C 4.35 REAR	T.P. -2.84	1897.69		1900.53
℄ OF TUNNEL GRADE = 1896.21		C 3.57 FRONT	168+92.72		+2.09	1899.78
				MARCH 10, 53.	LEONARD.	
			B.M. +4.81	1897.35		1892.54
	℄ ELEV. = 1896.14		SPAD - 170+13.05		+3.90	1901.25
	℄ ELEV. = 1896.18		SPAD - 169+47.35		+3.15	1900.50
	℄ ELEV. = 1896.21		SPAD - 168+92.72		+2.42	1899.77

SPAD: 169+47.35		
SET SPAD: #10.	℄ ELEV. = 1896.24	C 3.96 FRONT
CHECK SPAD:	℄ ELEV. = 1896.21	C 3.57 REAR.
BOTTOM OF SPAD.	℄ ELEV. = 1896.21	
CHECK SPAD.	" 1896.24	C 3.96 REAR
SET NEW SPAD	" 1896.26	C 3.78 FRONT.
CONC. MON. ON ℄ TUNNEL AT STA 172+87 ±		
STEEL PIN AT PORTAL, CHECK ELEV.		
CHECK SPAD.		
CHECK SPAD.		
LOCOMOTIVE PREVENTED TAKING SHOT ON NEW SPAD.		
B.M. SPAD.	℄ GRADE: 1896.24	C 3.96 REAR.
	" 1896.27	C 3.91 FRONT.
RESET SPAD IN NEW PLUG.		

	MARCH 12, '53	LEONARD.	
T.P. -2.79	1897.71		1900.50
168+34 ±		+2.49	1900.20
168+92.72		+2.07	1899.78
	MARCH 17, '63	LEONARD - K SCHMELING - ROD.	
168+92.72 -2.06	1897.~~72~~ .68		1899.~~78~~ .74
168+33.94		+2.52	1900.~~24~~ .20
168+03.48 REMOVED 3/19/53.		+2.36	1900.~~08~~ .04
	MARCH 17.	LEONARD - K ERICKSON - ROD	
B.M. +0.92	1897.42		1896.50
+4.90	1897.43	-4.89	1892.53
168+92.72		+2.31	1899.74
168+33.94		+2.77	1900.20
168+03.48 SPAD DESTROYED 3/19/53.			—
	MARCH 18.	LEONARD SCHMELING.	
STATION.			
168+33.94 -2.37	1897.83		1900.20
167+87.5 ±		+2.35	1900.18

MARCH 14, 53

LEONARD - ★ & NOTES. 25.
DAN BROWN - ROD.

BLACK CANYON TUNNEL.

PROFILE OF ℄ STATIONS - NORTH PORTAL.

B.M.	+0.03	1935.93	NAIL IN OAK TREE: 1935.90	
144+70		-2.18	1933.75	20.35 -13.4 30'
144+60		-4.87	1931.06	18.8 -12.3 30'
144+50		-7.76	1928.17	
T.P.	+1.19	1928.22 -8.90	1927.03	PLUMB BOB.
144+40 PORTAL.		-3.20	1925.02	
144+30		-7.56	1920.66	
T.P.	+1.20	1921.17 -8.25	1919.97	TOP OF STAKE 5' RT. OLD PORTAL.
144+20		-4.72	1916.49	
144+19.19 ON HUB.		-4.95	1916.22	TOP OF 2"x2" REDWOOD HUB - OLD PORTAL.
144+10		-7.06	1914.11	
T.P.	+0.97	1913.25 -8.89	1912.28	PLUMB BOB.
144+00		-2.28	1910.97	
143+90		-6.36	1906.89	
T.P.	+0.31	1904.71 -8.85	1904.40	ROCK.

X - SECTIONS NORTH PORTAL.

	LEFT.						RIGHT.				
	18.0	16.2	22.5	24.35	27.25	29.35	38.15	42.35	47.0	51.6	57.0
144+70	-15.7 27'	-17.5 24'	-11.2 18'	-9.4 15	-6.5 12'	-4.0 8'	+4.4 9'	+8.6' 18'	+13.2 27'	+17.8 36'	+23.2 45'
	16.4	15.3	16.8	20.3	24.3	27.8	35.1	39.1	43.3	48.2	52.3
144+60	-14.7' 25'	-15.8 21.3'	-14.3' 19'	-10.8' 16'	-6.8' 11.2'	-3.3' 7'	+4.0 9'	+8.0' 18'	+12.2' 27'	+17.1 36'	+21.2' 45'
144+50											
	-11.3 30'	-14.6' 25'	-14.2 18'	-9.2 14.5'	-4.4 9'		+3.3' 9	+6.9' 18'	+11.6 27'	+15.3 36'	+19.5 45'
144+40 PORTAL.			-9.3 30	-13.1 25.5'	-12.6 19.5'	-4.4 9'	+3.5 10'	+7.2 20'	+9.3 25'	+12.7 30	+14.2 35'
										+16.5 40	+18.8 45
144+30	-8.3 35'	-11.6 30'	-12.4 26'	-12.8 21'	-10.9 17'	-5.8 9	+2.5 5'	+7.0 15'	+11.3 25'	+14.0' 30'	+16.7 35'
										+19.1 40	+20.7' 45'
144+20	-7.1 30	-8.5 24'	-9.8 22'	-9.3 15'	-6.0' 10'	-3.0 5'	+2.6 5'	+4.9 10'	+7.7 15'	+10.5 20	+13.1 25
										+15.1 30'	+16.5 35'
144+10	-2.6 30	-6.0 25'	-7.7 19.2'	-8.0' 14.3'	-6.3 10'	-2.5 5'	+2.7' 5'	+4.8' 10'	+6.7' 15'	+9.2' 20'	+12.1' 25'
										+14.5' 30'	+16.2 35'
144+00	-3.1 25'	-5.4 20'	-7.0' 14.5'	-9.6 13'	-6.5 9'	-3.8 5'	+3.0 5'	+5.3 10'	+7.1 15'	+9.1 20'	+11.3 25'
143+90			0 20'	-4.4 13'	-6.8 9.2'	-6.0 7'	+3.8' 5'	+6.0' 10'	+8.5' 15'	+10.0' 20'	+12.2 25'

NORTH PORTAL -	PROFILE CONT'D.		
H.I.	1904.71		
143+80		-2.35	1902.36
143+70		-5.56	1899.15
T.P. +5.02	1902.68	-7.05	1897.66 - ROCK.
143+60		-8.55	1894.16
CHECK HUB BY WEST		-8.67	1894.01 = 1894.0

NORTH PORTAL X-SECTIONS, CONT'D.

LEFT						RIGHT					
+7.6 / 25'	+4.6 / 20'	+2.0 / 17.0	-2.1 / 9.0	-4.0 / 7.0'	-3.1 / 5.0	+1.8 / 1.0	+6.5 / 9.0'	+9.1 / 15'	+11.5 / 20'	+13.4 / 25'	+15.9 / 30'
+5.0 / 15.8	0 / 9.0	-1.6 / 7.0'	-2.9' / 4.5'	-3.0' / 2.2'	-1.5 / 1.2'	+6.0' / 9.0'	+9.0' / 16.0'				
1899.7' +5.5' / 10'	1896.8' +2.6 / 5.6'	1894.4' +0.2 / 4.0'				1894.2' 0.0' / 1.0'	1899.0' +4.8' / 5.0'	1901.8' +7.6 / 10'			

3' LT. ±

(AT STA. 143+60.7 MARKED "C.O.D." SHOWN ON PAGE 19 AS 0+79.3 LT.)

B.M. CONC. MON. ON ROAD AT STA. 170+95.35

T.P. ON TOP OF 2" PIPE IN CORE HOLE

DROPPED CHAIN DOWN THRU CORE HOLE.

SET ½" STEEL ROD ON LEFT SIDE (WEST) AT STA. 171+02 ±

ELEV. SET ON PIN BY WILLIAMS – PAGE 22.

BOTTOM OF SPAD.	℄ ELEV. = 1896.10	C 5.62
" " "	" 1896.14	C 5.10
" " "	" 1896.18	C 4.32
" " "	" 1896.21	C 3.57
" " "	" 1896.24	C 4.07
" " "	" 1896.27	C 3.91
NAIL IN FLOOR ON ℄	℄ GRADE = 1896.11	F 3.14

RESET ℄ SPADS AND TOOK ELEV'S ON SAME.

B.M. +4.97	1966.56		1966.59
TOP OF PIPE FLANGE		-4.66	1961.90
H.L. -63.93	1897.97		
T.B.M. SET.		-5.33	1892.64
CHECK PIN AT PORTAL.		-5.43	1892.54 (1892.54 =)
170+91.61 #6.		+5.75	1901.72
170+12.96 #7.		+3.27	1901.24
169+47.24 #8.		+2.53	1900.50
168+92.58 #9.		+1.81	1899.78
168+53.77 #10.		+2.54	1900.31
167+87.52 #11.		+2.21	1900.18
CHECK T.B.M.		-5.33	1892.64
170+60		-5.00	1892.97

				MARCH 25, '55	LEONARD HARROUN.	
SPAD #10.			T.P. -2.68	1897.63		1900.31
SET SPAD #12.	℄ ELEV. 1896.30	C 3.94	167+37.3		+2.61	1900.24
				MARCH 27, '55	LEONARD HARROUN.	
T.P.			SPAD #11. -2.48	1897.70		1900.18
SET SPAD #13.	℄ ELEV. 1896.32	C 3.90	167+05.1±		+2.52	1900.22
				MARCH 28, '55	LEONARD DAN BROWN.	
STEEL PIN AT PORTAL.			B.M. #1. +4.99	1897.~~53~~ 52		1892.54
" " " STATION 171+02.			CHECK B.M. #2.		-4.88	1892.~~65~~ 1892.64
			170+81.6		+4.20	1901.72
			170+72.96		+3.72	1901.24
			169+47.24		+2.96	1900.48
			168+92.58		+2.25	1899.77 T.P.
			-1.78	1897.99		
			168+33.77		+2.30	1900.29
RESTORED SPAD #11.			167+87.62		+2.18	1900.17
RESET SPAD. #12.	℄ ELEV. 1896.30	C 3.95	167+37.32		+2.26	1900.25
" " #13.	℄ ELEV. 1896.32	C 3.91	167+05.20		+2.24	1900.23
RECHECK BETWEEN B.M. #2 AND			B.M. #2. +3.94	1896.58		1892.64
B.M. #1.					-4.04	1892.54

	STATION.	℄ ELEV.
SPAD #11.	167+87.5±	1896.27 C 3.91
" #12.	167+57.3±	1896.30 C 3.95
" #13.	167+05.2±	1896.52 C 3.91
" #14. SET.	166+61.8±	1896.55 C 4.47
" 10.	168+38.8±	1896.24 C 4.06
" 9.	168+92.6±	1896.21 C 3.56
T.B.M. #12.		
CHECK. #14.	166+61.8±	1896.35 C. 4.47
SET NEW SPAD. #15.	166+08±	1896.38 C 4.79
T.B.M. #14.	166+61.79	
#15.	166+08.17	1896.38 C 4.79
SET NEW SPAD. #16.	165+66±	1896.40 C 4.97
T.B.M. #12.		
SPAD #15.	166+08.17	1896.38 C 4.79
" #16.	165+66±	1896.40 C 4.99
" #17.	165+23.2±	1896.43 C 4.55

MARCH 31, 53 LEONARD
DAN BROWN.

T.B.M. -2.39	1897.79		1900.18
CHECK #12		+2.45	1900.24
" #13		+2.44	1900.23
SET #14.		+3.03	1900.82
CHECK #10.		+2.51	1900.30
" #9.		+1.98	1899.77
	APRIL 3, 53.	LEONARD - K TOM CLUBB.	Rod
SPAD #12. -2.38	1897.87		1900.25
" #14		+2.96	1900.83 = 1900.92
SET SPAD #15.		+3.30	1901.17
	APRIL 7, 53	LEONARD - K SCHMELING. -	Rod.
SPAD #14 -2.79	1898.03		1900.82
CHECK #15.		+3.14	1901.17
SET #16.		+3.34	1901.37
	APRIL 10, 53	LEONARD - K SCHMELING. -	Rod.
SPAD #12 -1.55	1898.70		1900.25
" #13		+1.54	1900.24
#14		+2.13	1900.83
#15		+2.47	1901.17
#16		+2.69	1901.39
SET #17.		+2.28	1900.98

B.M. CONC. MON. STA. 173+87 - 10' RT. (PAGE 21)

T.B.M. #1. STEEL PIN BETWEEN RAILS AT PIR #1.

STEEL PIN LEFT SIDE, STA. 171+02

	℄ ELEV.	
	1896.27	C 3.86
	1896.30	C 3.95
	1896.32	C 3.92
	1896.35	C 4.48
	1896.38	C 4.19
	1896.40	C 4.97
	1896.43.	C 4.53

APRIL 11, 53. D. LEONARD - T
D. BROWN - ROD.

CHECK LEVELS OVER SPADS IN TUNNEL.

B.M. +0.77	1897.27		1896.50
T.B.M. #1 +4.51	1897.04	-4.74	1892.53 = 1892.54
SPAD #2.		+3.22	
" #3.		+2.305	
" #4.		+3.06	
" #5.		+4.10	
" #6.		+4.67	
T.B.M. #2.		-4.41	1892.63 = 1892.64
+5.14	1897.78		1892.64
SPAD #7.		+3.465	
" #8.		+2.71	
" #9.		+2.00	
" #10. T.P. -2.24	1898.05	+2.51	1900.29
" #11.		+2.08	1900.13
" #12.		+2.205	1900.255
" #13.		+2.19	1900.24
" #14		+2.78	1900.83
" #15		+3.12	1901.17
" #16		+3.32	1901.37
" #17		+2.91	1900.96
T.B.M. #2.		-5.41	1892.64

	℄ ELEV.	CUT
T.B.M.	1896.38	C 4.79
CHECK	1896.40	C 4.98 CHECK
"	1896.45	C 4.55 REAR
SET NEW SPAD.	1896.46	C. 4.63 FRONT
T.B.M.		
CHECK.		
"	1896.45	C 4.55 REAR.
RE-SET SPAD #18.	1896.46	C 4.62 FRONT.
	STATION:	℄ ELEV. CUT.
T.B.M. #16	165+66.0	1896.40 C 4.98
CHECK. #18	164+71.02	1896.46 C 4.62
SET NEW SPAD #19.	164+22±	1896.49 C 4.97
NOTE: CORE HOLE #2 IS 2.4' EAST OF STA. 164+27.8		
T.B.M. #18.	164+71.02	1896.46 C 4.62
CHECK #19.	164+22±	1896.49 C 4.97
SET NEW SPAD #20.	165+76.7±	1896.52 C 4.17

	APRIL 15, '53	LEONARD SCHMELING.	
SPAD #15 -2.53	1898.64		1901.17
" #16		+2.74	1901.38
" #17		+2.34	1900.98
" #18		+2.45	TORN OUT 3/17 1901.09
	APRIL 17, '53	LEONARD.	
SPAD #15 -2.43	1898.74		1901.17
" #16		+2.64	1901.38
" #17		+2.24	1900.98
" #18.		+2.34	1901.08
	APRIL 21, '53.	LEONARD HARROUN.	
SPAD #16 -3.15	1898.23		1901.38
" #18		+2.85	1901.08
" #19		+3.23	1901.46
IN THE ROOF OF THE TUNNEL.			
	APRIL 24, '53	LEONARD BAILEY	
SPAD #18 -2.85	1898.23		1901.08
" #19		+3.23	1901.46
" #20,		+2.46	1900.69

B.M. STEEL PIN AT STA. 171+02 LEFT SIDE.

SPAD:	STATION:	℄ ELEV.	CUT.
#14		1896.35	
#15		1896.38	
#16		1896.40	C 4.97
#17		1896.43	C 4.53
#18		1896.46	C 4.61
#19		1896.49	C 4.96
#20		1896.52	C 4.17

APRIL 25, '53 LEONARD -T
BROWN. -ROD. 30

CHECK ELEV'S. OF SPADS.

	+4.46	1897.10		1892.64
T.P. ON RAIL.			-3.90	1893.20
	+4.885	1898.085		
SPAD # 14			+2.74	1900.825
" 15			+3.075	1901.16
" 16			+3.28	1901.365
" 17			+2.98	1900.96 ~~1901.065~~
" 18			+2.99	1901.07 ~~1901.075~~
" 19			+3.365	1901.45
" 20			+2.60	1900.685

RECHECK FOR SPAD #17

#15.	-2.765	1898.395		1901.16
#16.			+2.96	1901.355
#17			+2.555	1900.95
#18			+2.66	1901.055
#14	-2.45	1898.375		1900.825
#15			+2.785	1901.16
#16			+2.985	1901.36
#17			+2.585	1900.96
#18			+2.69	1901.065

No.	STATION:	℄ ELEV.	CUT.
19.	164+22.07	1896.49	C 4.96
20.	163+76.74	1896.52	C 4.16
21. SET.	163+26+	1896.55	C 4.73

NOTE: ALL SPADS FROM #7 TO #21 RESET AND TIGHTENED ON 5-2.

STEEL PIN AT STA. 171+02, LEFT SIDE.

		℄ ELEV.	CUT.
TOP OF RAIL AT	166+62±		
" " " "	166+08±		
" " " "	165+66±		
" " " "	165+23±		
" " " "	164+71±		
" " " "	164+22±		
BOTTOM OF SPAD	"	1896.49	4.96
TOP OF RAIL AT	163+77±		
BOTTOM OF SPAD	"	1896.52	4.16
TOP OF RAIL AT	163+26±		
BOTTOM OF SPAD	"	1896.55	4.69
TOP OF RAIL AT	162+74±		
BOTTOM OF SPAD SET MAY 2ND.		1896.58	4.45

SPAD # 19. +3.07	1898.58		1901.45
" 20.		+2.30	1900.68
" 21. SET.		+2.90	1901.28

MAY 4, 53. LEONARD - K. McFADDEN - ROD.

T.B.M. #2. +4.69	1897.33		1892.64
T.P. +4.61	1897.79	-4.15	1893.18
#14		-4.46	1893.33
#15		-4.27	1893.52
#16		-3.98	1893.81
#17 T.P. +4.76	1898.34	-4.21	1893.58
#18		-4.65	1893.69
#19.		-4.71	1893.63
#19. SPAD.		+3.11	1901.45
#20		-4.80	1893.54
#20 SPAD.		+2.34	1900.68
#21		-5.00	1893.34
#21 SPAD.		+2.90	1901.24
#22		-5.33	1893.01
#22 SPAD.		+2.69	1901.03

	STATION:	E GRADE:	CUT:
T.B.M. SPAD #21	163+26±	1896.55	4.69
CHECK. " #22	162+74±	1896.58	4.45
SET SPAD #23.	162+25±	1896.61	4.31
T.B.M. SPAD #22.	162+74±	1896.58	4.45
CHECK " #23.	162+25.5±	1896.61	4.32
SET " #24.	161+74.5±	1896.64	4.15

MAY 29, 53 LEONARD.

CHECK ELEVATIONS IN BOTTOM OF CUT, N. PORTAL.

T.B.M. +0.22	1936.12		1935.90	
T.P. +0.24	1928.17	-8.19	1927.93	ROCK
+0.42	1919.58	-9.01	1919.16	GAO.
+0.15	1910.77	-8.96	1910.62	
+0.34	1906.35	-4.86	1905.91	(10') HUB (C6')
+1.18	1899.04	-8.39	1897.86	
PORTAL:	GRADE 1894.0	-3.64	1895.40	C1.4
" -20		-4.15	1894.9	C0.9
-40		-4.15	1894.9	C1.0
-60		-4.95	1894.1	
-80		-4.9	1894.15	
T.P.		-3.57	1895.97	HUB AT 143+00

NOTE: LEVELS DOUBTFUL - ROD SLIPPED

MAY 7, 1953. LEONARD.

#21,	-2.98	1898.26		1901.24
#22.			+2.77	1901.03
#23.			+2.66	1900.~~92~~ 93

MAY 13, 53. LEONARD.

#22.	-2.68	1898.35		1901.03
#23.			+2.58	1900.93
#24.			+2.44	1900.79

STEEL PIN IN MON. OUTSIDE OF SOUTH PORTAL.
" " BETWEEN TRACKS AT " "
" " AT 171+02, LEFT SIDE.

CONTINUE CHECK LEVELS, FROM OPPOSITE PAGE.

SPAD #22. −2.935	1897.990		1900.925
T.P. ON RR. +4.275	1897.90	−4.365	1893.625
" +4.515	1897.71	−4.705	1893.195
CHECK B.M. #2.		−5.075	1892.635 = 1892.64

	MAY 23'53		LEONARD − R DAN BROWN − ROD.
B.M. #2. +5.035	1897.675		1892.64
SPAD #18		+2.565	1900.24
−1.88	1898.36		
#22 RESET		+2.69	1901.05 SPIKE HEAD.
#23 "		+2.60	1900.96
#24 "		+2.11	1900.47
#25 "		+1.73	1900.09
#26 "		+2.85	1901.21

CHECK LEVELS OVER ADJUSTED SPADS.

B.M. #1. +0.50	1897.00		1896.50
T.P. +4.325	1896.86	−4.465	1892.535
B.M. #2. +4.95	1897.59	−4.22	1892.64
SPAD #7		+3.65	1901.24
" #8		+2.90	1900.49
" #9		+2.18	1899.77
" #10 −2.06	1898.18	+2.65	1900.24
" #11		+2.00	1900.18
" #12		+2.07	1900.25
" #13		+2.055	1900.235
" #14		+2.69	1900.87
" #15 −3.02	1898.13	+2.97	1901.15
" #16		+3.23	1901.36
" #17		+2.815	1900.945
" #18		+2.915	1901.045
" #19		+3.31	1901.44
" #20 −2.875	1897.795	+2.54	1900.67
" #21		+3.435	1901.23
" #22		+3.23	1901.025
" #23		+3.13	1900.925

½" STEEL PIN AT STA. 171+02, LEFT SIDE.			
RESET SPADS IN NEW PLUGS.	1896.61	C4.33	
	1896.64	C4.02	
	STATION:	℄ ELEV.	CUT.
T.B.M. #23.	162+26.67	1896.61	C4.33
CHECK. #24.	161+74.74	1896.64	C3.98
SET SPAD #25.	161+24.9±	1896.67	C3.38
		1896.61	C4.33
SPAD #24 BROKE OFF – RESET		1896.64	C3.78
		1896.67	C3.38
T.B.M.	162+25.67	1896.61	
CHECK	161+74.±	1896.64	C3.~~78~~.83
CHECK.	161+24.9±	1896.67	C3.~~38~~.42
SET SPAD #26.	160+75.8±	1896.70	C4.~~49~~.51

	MAY 16, '53	LEONARD. BROWN.	
B.M. +4.57	1897.21		1892.64
T.P. +4.72	1897.96	-3.97	1893.24
SPAD #23.		+2.98	1900.94
" #24.		+2.70	1900.66
	MAY 18, 53.	LEONARD.	
TRANSIT & RULER.			
#23. 2.77	1898.17		1900.94
#24.		+2.45	1900.62
#25.		+1.88	1900.05
	MAY 21, 53.	LEONARD.	
TRANSIT & RULER.			
#23 -2.70	1898.24		1900.94
#24		+2.18	1900.42
#26		+1.81	1900.05
	MAY 22, 53.	LEONARD.	
USED TRANSIT & RULER.			
#23 -2.67	1898.27		1900.~~94~~.96
#24		+2.15	1900.~~42~~.47
#25		+1.78	1900.~~05~~.09
#26.		+2.92	1901.~~49~~.21
SEE PREVIOUS PAGE FOR LATER LEVELS.			

	STATION:	℄ ELEV.	CUT.
SPAD #24: T.B.M.	161+74.74	1896.64	C 3.83
" #25:	161+24.98	1896.67	C 3.41
" 26:	160+75.96	1896.70	C 4.51
SET SPAD #27.	160+28.1±	1896.73	C 4.04
SPAD #25. T.B.M.	161+24.98	1896.67	C 3.41
" #26. CHECK	160+75.96	1896.70	C 4.51
" #27. CHECK.	160+28.1±	1896.73	C 4.04
" #28. SET.	159+73±	1896.76	C 4.36
T.B.M.		1896.64	
		1896.67	
USED THESE CUTS.		1896.70	C 4.52
		1896.73	C 4.05
		1896.76	C 4.37
T.B.M.	160+75.96	1896.70	
CHECK	160+28.1±	1896.73	C 4.05
"	159+73±	1896.76	C 4.37
SET SPAD #29.	159+23±	1896.79	C 3.47

MAY 26, 53. LEONARD.

USED TRANSIT & RULER.

SPAD #24 -2.04	1898.45		1900.47
" #25		+1.65	1900.08.
" #26		+2.78	1901.21
" #27.		+2.34	1900.77

10:30 A.M. MAY 28, 53 LEONARD.

USED TRANSIT & RULER.

SPAD #25. -1.57	1898.51		1900.08
" #26.		+2.70	1901.21.
" #27.		+2.26	1900.77.
" #28		+2.61	1901.12

MAY 28, 53. 12:30 P.M. LEONARD & RIOS-ROD

CHECK LEVELS: USED LEVEL & ROD.

SPAD #24, -2.08	1898.39		1900.47
" 25.		+1.69	1900.08
" 26.		+2.83	1901.22
" 27.		+2.39	1900.78
" 28.		+2.74	1901.13

JUNE 3RD, 53. LEONARD.

USED TRANSIT & RULER.

SPAD #26. -2.99	1898.23		1901.22
" 27.		+2.55	1900.78
" 28.		+2.90	1901.13
" 29.		+2.05	1900.26

North Portal New Bench 6-2-53

West
Williams
Varonfakis
~~Kemp~~

Mark +	Hi	-	Elev	
0.88	1936.78		1935.90	BM nail in Oak Tree
3.12	1927.68	12.22	1924.56	
0.82	1915.50	13.00	1914.68	
2.38	1905.12	12.76	1902.74	
11.97	1905.24	11.85	1893.27	IRON Pin BM
10.76	1915.54	0.46	1904.78	
12.36	1927.42	0.48	1915.06	
11.03	1938.34	0.11	1927.31	
		2.46	1935.88	= 1935.90 Nail in Oak Tree
				1901.91 1897.68 @ Tunnel Bex 8.23
8.64	1901.91		1893.27	
		4.23	1897.68	@ Grade Tunnel North Portal
		7.96	95.96	
		8.64	1893.27	= 1893.27

STEEL PIN L. SIDE.

SPAD.	STATION.	℄ ELEV.	CUT.
#25	161+24.98	1896.67	3.40
#26	160+75.96	1896.70	4.51
#27	160+28.11	1896.78	4.03
#28	159+72.97	1896.76	4.84
#29	159+22.21	1896.79	3.45
#30 SET TODAY.	158+58.63	1896.85	3.94
T.B.M. #29.	159+22.21	1896.79	C 3.45
CHECK. #30.	158+58.63	1896.85	C 3.94
SET SPAD #31.	158+12 ±	1896.86	C 4.26
T.B.M. #30.	158+58.63	1896.85	C 3.94
CHECK #31.	158+12 ±	1896.86	C 4.25
SET SPAD #32.	157+62 ±	1896.89	C 3.92

JUNE 6, 53 — D. LEONARD - X, D. BROWN - ROD.

CHECK ELEV'S. ON SPADS.

B.M. +4.67	1897.31		1892.64
SPAD #13		+2.92	1900.23
-1.95	1898.28		
SPAD #23		+2.67	1900.95
-2.47	1898.48		SPAD ELEV.
SPAD #24		+1.97	1900.45
" #25		+1.59	1900.07
" 26.		+2.73	1901.21
" 27.		+2.28	1900.76
" 28		+2.62	1901.10
" 29		+1.76	1900.24
" 30.		+2.29	1900.77
USED TRANSIT &	JUNE 10. RULER.	LEONARD.	
SPAD #29. -1.50	1898.74		1900.24
" #30.		+2.04	1900.78 = 1900.77
" #31.		+2.38	1901.12
USED TRANSIT &	JUNE 16, 53. RULER.	LEONARD.	
SPAD #30. -2.46	1898.31		1900.77
" #31.		+2.80	1901.11
" #32.		+2.50	1900.81

STEEL PIN IN CONC. MON., S. PORTAL.

" " BETWEEN RAILS AT S. PORTAL.

" " AT 171+02 LEFT SIDE.

STATION:	℄ ELEV.	CUT:
160+28.11	1896.75	4.05
159+72.97	1896.76	4.34
159+22.21	1896.79	3.45
158+58.63	1896.85	3.94
158+12±	1896.86	4.25

SET B.M.
DRILL ROD CEMENTED INTO WALL, L. SIDE 158+21+

JONES, 53 LEONARD, K
D. BROWN, ROD

CHECK LEVELS FOR SETTING NEW B.M.

B.M.	+1.55	1898.05		1896.50
	+4.51	1897.04	-5.52	1892.53
B.M.	+4.87	1897.50	-4.41	1892.63
SPAD #K:	-1.82	1898.41	+2.73	1900.23
" #22:	-2.76	1898.27	+2.62	1901.03
" #27:			+2.49	1900.76
" #28:	-2.75	1898.35	+2.83	1901.10
" #29:			+1.89	1900.24
" #30			+2.42	1900.77
" #31			+2.76	1901.11
B.M.			-3.91	1894.44
	+3.78	1898.22		
T.P.	+4.70	1898.22	-4.70	1893.52
	+3.98	1897.68	-4.52	1893.70
	+4.32	1897.53	-4.67	1893.01
			-0.82	1896.51 =
CHECK B.M.				1896.50 B.M.

				JUNE 20, 1953.	LEONARD, R BROWN, ROD.	
DRILL ROD IN SIDE.		℄ ELEV. CUT.	B.M. +4.25	1898.69		1894.44
	158+11.95	1896.86 4.25	SPAD #31		+2.42	1901.11
	157+61.90	1896.89 3.92	" #32		+2.12	1900.81
SET SPAD #33.	157+11.63	1896.92 3.60	" #33		+1.83	1900.52
				JUNE 23, '53	LEONARD R MCDERMOTT - ROD.	
T.B.M.			SPAD #31. -1.92	1899.19		1901.11
CHECK	157+61.90	1896.89 3.92	" #32.		+1.62	1900.81
"	157+11.63	1896.92 3.60	" #33.		+1.33	1900.52
SET SPAD #34.	156+54.5±	1896.95 4.36	" #34.		+2.12	1901.31
				JUNE 26, '53	LEONARD.	
T.B.M.			SPAD #32. -1.47	1899.34		1900.81
CHECK	157+11.63	℄ ELEV. CUT 1896.92 3.60	" #33.		+1.18	1900.52
"	156+54.5±	1896.95 4.34	" #34.		+1.95	1901.29
SET SPAD #35.		1896.98 4.69	" #35.		+2.33	1901.67
CHECK ELEV.'S ON SPADS, AFTER RESETTING.				JUNE 27, '53	LEONARD R. BROWN. - R. ROD.	
	STATION:	℄ ELEV. CUT.	B.M. +4.40	1898.84		1894.44
	157+61.90	1896.89 3.91	SPAD #32.		+1.96	1900.80
	157+11.63	1896.92 3.62	" #33.		+1.70	1900.54
REPLACED PLUG.	156+54.50	1896.95 4.35	" #34.		+2.46	1901.30
	156+06.05	1896.98 4.77	" #35.		+2.91	1901.75

STEEL PIN IN WEST WALL, STA. 158+21
CORRECTED ALIGNMENT OF SPADS #7, 13, 18, 24, 30, 31, 32, 33, 34, AND 35. MOVED SPADS TO LEFT FROM .02' AT #7 TO .18' AT #35. STARTED WORK AT 7 A.M. IN ORDER TO SEE TARGET ON HILL SOUTH OF NAKONEY'S RANCH BEFORE HEAT WAVES MADE TARGET INVISIBLE FROM INSIDE TUNNEL.

	STATION:	℄ ELEV.	CUT:
T.B.M.	156+54.30	1896.95	4.35
CHECK.	156+06.03	1896.98	4.77
SET SPAD #36.	155+51 ±	1897.01	4.26

		℄ ELEV.	CUT:
T.B.M. SPAD. #35.	156+03.06	1896.98	4.77
RESET SPAD. #36.	155+51 ±	1897.01	4.28
SET SPAD. #37.	154+98 ±	1897.04	4.17

		℄ ELEV.	CUT.
T.B.M. SPAD #36	155+50.6 ±	1897.01	4.28
CHECK " #37	154+97.8 ±	1897.04	4.17
SET " #38.	154+47 ±	1897.08	4.41

JUNE 27, '53 — LEONARD. D. BROWN.

CHECK ELEV'S. ON RESET		SPADS.	SPAD. ELEV:
B.M. #2. +4.40	1898.84		1894.44
SPAD #30		+1.97	1900.81
" #31		+2.28	1901.12
" #32		+1.96	1900.80
" #33		+1.70	1900.54
" #34		+2.46	1901.30
" #35.		+2.91	1901.75
B.M.		-4.40	1894.44

TRANSIT & RULER.	JULY 2, '53	LEONARD.	
SPAD #34 -1.57	1899.73		1901.30
" #35		+2.02	1901.75
" #36.		+1.54	1901.27

TRANSIT & RULER.	JULY 7, 53.	LEONARD.	
SPAD #35. -2.24	1899.51		1901.75
" #36,		+1.78	1901.29
" #37.		+1.70	1901.21

TRANSIT & RULER.	JULY 10, '53	LEONARD.	
SPAD #36 -1.67	1899.62		1901.29
" #37		+1.59	1901.21
" #38		+1.87	1901.49

JULY 11, 53 LEONARD - ⊼
BROWN. - ROD.

BERGER LEVEL & ROD.

CHECK ELEV'S. ON SPADS.

B.M. STEEL ROD 158+21.	STATION:	℄ ELEV.	CUT:	B.M. #2. +4.72	1899.16		1894.44
SPAD #33.	157+11.63	1896.92	3.62	SPAD #33		+1.38	1900.54
34.	156+54.30	1896.95	4.35	#34		+2.14	1901.30
35.	156+06.03	1896.98	4.78	#35		+2.60	1901.76
36.	155+50.41	1897.01	4.27	#36		+2.12	1901.28
37.	154+97.28	1897.04	4.17	#37		+2.05	1901.21
38.	154+45.78	1897.08	4.41	#38		+2.33	1901.49
				B.M. #2.		-4.72	1894.44
		℄ ELEV.	CUT.	TRANSIT & RULER.	JULY 16, '53	LEONARD.	
SPAD #37. T.B.M.	154+97.28	1897.04	4.17	SPAD #37 -1.73	1899.48		1901.21
" #38. CHECK	154+45.78	1897.08	4.41	" #38		+2.01	1901.49
" #39. SET.	153+87.5 ±	1897.11	4.51	" #39		+2.14	1901.62
		℄ ELEV.	CUT.	TRANSIT & RULER.	JULY 22, '53	LEONARD.	
T.B.M. SPAD #37	154+97.28	1897.04		SPAD #37 -1.87	1899.34		1901.21
CHECK " #38.	154+45.78	1897.08	4.41	" #38		+2.15	1901.49
REPLACED " #39.	153+87.15	1897.11	4.46	" #39		+2.23	1901.57
SET NEW " #40.	153+28.47	1897.15	4.78	" #40		+2.59	1901.93

JULY 25, '53 — LEONARD D. BROWN:

STEEL PIN, LEFT TOE, STA. 158+21			

		℄ ELEV.	CUT.
T.B.M. SPAD #39	153+87.15	1897.11	4.46
CHECK " #40.	153+28.47	1897.15	4.77
SET " #41.	152+74±	1897.18	3.63

T.B.M. SPAD #40	153+28.47	1897.15	4.77
CHECK " #41	152+74±	1897.18	3.63
SET " #42	152+19±	1897.21	4.01

		℄ ELEV.	CUT.
T.B.M. SPAD #41	152+75.54	1897.18	3.63
CHECK " #42	152+18.52	1897.21	4.02
SET " #43.		1897.24	3.96

CHECK LEVELS ON SPADS. — LEVEL & ROD.

B.M. #2 + 4.~~89~~ 88	1899.~~33~~ 32		1894.44
SPAD #36		+1.97	1901.~~30~~ 29
" #37		+1.89	1901.~~22~~ 21
" #38		+2.17	1901.~~50~~ 49
" #39		+2.25	1901.~~58~~ 57
" #40		+2.60	1901.~~93~~ 92
CHECK B.M.		-4.88	1894.44

TRANSIT & RULE.	JULY 27, '53	LEONARD.	
SPAD #39 - 2.34	1899.23		1901.57
" #40		+2.69	1901.92
" #41		+1.58	1900.81

TRANSIT & RULE.	JULY 31, '53	LEONARD.	
SPAD #40 -2.51	1899.41		1901.92
" #41		+1.40	1900.81
" #42		+1.81	1901.22

TRANSIT & RULE.	AUG. 5, '53	LEONARD.	
SPAD #41. -1.43	1899.38		1900.81
" #42.		+1.85	1901.23
" #43.		+1.82	1901.20

Aug. 1, 1953. Leonard Brown,

STEEL ROD AT STA. 158+21, LEFT SIDE.

STEEL ROD, WEST SIDE, AT STA. 158+21

SET B.M. ON CUT OFF DRILL STEEL, WEST SIDE 155+81.

" " " " " " " EAST " 152+30.

		℄ ELEV.	CUT.
CHECK SPAD #42.	STA. 152+18.52	1897.21	4.01
" " #43.	" 151+61.67	1897.24	3.96
SET " #44.	" 151+02.45	1897.28	4.42
CHECK " #41			

		℄ ELEV.	CUT:
T.B.M. SPAD #43.	STA. 151+61.67	1897.24	3.96
TIGHTENED SPAD #44.	" 151+02.45	1897.28	4.44
SET SPAD #45.	" 150+49±	1897.31	4.40

CHECK ELEV. OF SPADS.

B.M. #2 + 4.73	1899.17		1894.44
SPAD #39		+2.40	1901.57
#40		+2.75	1901.92
#41		+1.64	1900.81
#42		+2.06	1901.23

LEVEL & ROD.	Aug. 8, '53	LEONARD BROWN.	
B.M. #2 +4.36	1898.80		1894.44
B.M. #3 +4.13	1898.93	-4.00	1894.80
B.M. #4 +3.96	1898.71	-4.18	1894.75
SPAD #42		+2.51	1901.22
" #43		+2.49	1901.20
" #44		+2.99	1901.70
" #41		+2.10	1900.81

TRANSIT & RULE.	Aug. 13, '53	LEONARD.	
SPAD #43 -1.67	1899.53		1901.20
" #44		+2.19	1901.72
" #45		+2.18	1901.71

PIN IN CONC. MON. ON TUNNEL ℄ STA. 173+87±
GRADE OF 1 FT. FILL TO BE PUT IN, USING
SELECT TUNNEL MUCK.
SET STEEL PINS AT TOE OF WEST SLOPE.

GRADE STAKES FOR SOUTH PORTAL APPROACH CUT

B.M. 0.78	1897.28		1896.50
STA. 172+50		- 4.32 ✓	1892.96
" 172+75		- 4.42 ✓	1892.86
173+00		- 4.52 ✓	1892.76
173+25		- 4.62 ✓	1892.66
+50		- 4.72 ✓	1892.56
+75		- 4.82 ✓	1892.46
174+00		- 4.92 ✓	1892.36
+25		- 5.02 ✓	1892.26
+50		- 5.12 ✓	1892.16
+75		- 5.22 ✓	1892.06
175+00		- 5.32 ✓	1891.96
+25		- 5.42 ✓	1891.86
+50		- 5.52 ✓	1891.76
+75		- 5.62 ✓	1891.66
176+00		- 5.72 ✓	1891.56
+25		- 5.82 ✓	1891.46
+50		- 5.92 ✓	1891.36
+75		- 6.02 ✓	1891.26

SOUTH PORTAL APPROACH CUT GRADES, CONT'D.

H.d.	1897.28		
177+00		-6.12	1891.16
+25		-6.22	1891.06
+50		-6.32	1890.96
+75		-6.42	1890.86
178+00		-6.52	1890.76
+25		-6.62	1890.66

	STATION	℄ ELEV.	CUT.
T.B.M. SPAD #43.	151+61.67	1897.24	
CHECK SPAD #44	151+02.45	1897.28	4.41
CHECK SPAD #45	150+49±	1897.31	4.40
SET SPAD #46	149+92±	1897.35	4.23
T.B.M. SPAD #44	151+02.45	1897.28	
CHECK " #45	150+49±	1897.31	4.40
" " #46	149+92±	1897.35	4.23
SET " #47.	149+54±	1897.38	3.64

B.M. #4 DRILL ROD IN FLOOR, AT TOE, STA. 152+30±

CHECK ELEV'S. ON BOTTOM OF SPADS.

TRANSIT & RULE.			
SPAD #43. -1.73	1899.47		1901.20
" #44.		+2.22	1901.69
" #45.		+2.24	1901.71
" #46.		+2.11	1901.58
TRANSIT & RULE.	AUG. 20, '53	LEONARD.	
SPAD #44 -2.30	1899.40		1901.70
" #45		+2.31	1901.71
" #46		+2.18	1901.58
" #47		+1.62	1901.02
LEVEL & ROD.	AUG. 22, '53	LEONARD - ⊼ O. BROWN - ROD	
B.M. #4 +4.12	1898.87		1894.75
SPAD #43		+2.83	1901.20
#44		+2.83	1901.70
#45		+2.84	1901.71
#46		+2.71	1901.58
#47		+2.15	1901.02
B.M. #4		-4.12	1894.75

	STATION.	℄ ELEV.	CUT.
T.B.M. SPAD #45.	150+49±	1897.51	4.40
CHECK " #46.	149+92±	1897.55	4.23
REPLACED #47.	149+33.6±	1897.38	~~3.67~~ 3.64
SET SPAD #48.	148+76 ±	1897.42	3.95
T.B.M.			
CHECK.			
RESET.			
RESET.			
TEMPORARY SPAD FOR X-SECTIONS ONLY.		1897.45	C 4.32

	STATION.	℄ ELEV.	CUT.
T.B.M. SPAD #47	149+33.6±	1897.38	3.64
CHECK " 48.	148+75.9±	1897.42	3.95
SET NEW SPAD #49	148+26 ±	1897.45	3.70

		℄ ELEV.	CUT
T.B.M. SPAD #48	148+75.9	1897.42	3.95
CHECK " #49	148+26 ±	1897.45	3.70
SET NEW SPAD #50	147+65.5±	1897.48	4.29

AUG. 26, 58. LEONARD.

TRANSIT & RULE.

SPAD. #45. -2.13	1899.58		1901.71
" #46		+2.00	1901.58
" #47		+1.47	1901.~~05~~ 02.
" #48.		+1.79	1901.37

CHECK LEVELS.	AUG. 29, 58.	LEONARD D. BROWN.	
SPAD #45 -2.37	1899.34		1901.71
" #46		+2.24	1901.58
#47		+1.68	1901.02
#48		+2.03	1901.37
#49		+2.48	1901.77

TRANSIT & RULE	SEPT. 1, 58	LEONARD.	
SPAD #47 -1.65	1899.37		1901.02
" #48		+2.00	1901.37
" #49.		+1.78	1901.15

TRANSIT & RULE.	SEPT. 4.	LEONARD.	
SPAD #48 -1.74	1899.63		1901.37
" #49		+1.53	1901.16 = 1901.15
" #50		+2.14	1901.77

	STATION ±	℄ ELEV.	CUT.	TRANSIT & RULE.			
T.B.M. SPAD #48	148+75.9	1897.42	3.95	SPAD #48 -1.54	1899.83		1901.37
CHECK " #49	148+26	1897.45	3.70	" #49		+1.32	1901.15
" " #50	147+65.5	1897.48	4.29	" #50		+1.94	1901.77
SET " #51.	147+15	1897.51	4.39	" #51.		+2.07	1901.90
CHECK ELEV'S. ON SPADS.				LEVEL & ROD.	SEPT. 12, 53	LEONARD - π PALOMINO - ROD	SPAD. ELEV.
DRILL ROD IN FLOOR, E. SIDE, STA. 152+30±		℄ ELEV.	CUT.	B.M. #4. +3.83	1898.58		1894.75
SPAD #48	148+75.91	1897.42	3.95	SPAD # 48.		+2.79	1901.37
" #49	148+26.06	1897.45	3.71	#49.		+2.58	1901.16
" #50	147+65.43	1897.48	4.29	#50.		+3.19	1901.77
" #51	147+15.01	1897.51	4.40	#51.		+3.33	1901.91
CHECK SPAD #47.				#47.		+2.45	1901.03
		℄ ELEV.	CUT.	TRANSIT & RULE:	SEPT. 16, 53	LEONARD.	
T.B.M. SPAD # 50.	147+65.43	1897.48	4.29	SPAD #50. -1.91	1899.86		1901.77
CHECK " #51.	147+15.	1897.51	4.40	" #51.		+2.05	1901.91
SET " #52.	146+55.5±	1897.55	4.80	" #52.		+2.49	1902.35
		℄ ELEV.	CUT.	TRANSIT & RULE.	SEPT. 22, 53.	LEONARD.	
T.B.M. SPAD # 51	147+15	1897.51	4.40	SPAD #51. -1.70	1900.21		1901.91
CHECK " #52	146+55.5	1897.55	4.83	" #52.		+2.17	1902.38 OFF .03'
SET " #53	145+99±	1897.58	4.51	" #53.		+1.88	1902.09

		℄ ELEV.	CUT.
T.B.M. SPAD #51	STA. 147+15	1897.51	4.40
CHECK " #52	146+55.5±	1897.55	4.82
RESET SPAD IN NEW HOLE, #53.	145+99±	1897.58	4.48

		℄ ELEV.	CUT:
SPAD #50 T.B.M.	147+65.48	1897.48	4.29
CHECK #51	147+15.01	1897.51	4.39
" #52	146+55.55	1897.55	4.80
" #53	145+98.39	1897.58	4.47
" #49 T.B.M.			

	1897.55	4.80
	1897.58	4.47
	1897.61	4.24

T.B.M. SPAD #50		
CHECK " #51		
" " #52.	1897.55	
" " #53.	1897.58	4.48
" " #54.	1897.61	4.21

RESET BROKEN SPAD #53.

SPAD #51 -2.09	1899.82		1901.91
" #52		+2.55	1902.37
" #53.		+2.24	1902.06

	SEPT. 26 '58	LEONARD PALOMINO	& ROD.
CHECK LEVELS.			
SPAD #50 -2.04	1899.73		1901.77
" #51.		+2.17	1901.90
" #52.		+2.67	1902.35
" #53.		+2.32	1902.05
" #49.		+1.43	1901.16

	SEPT. 29.	LEONARD.	
SPAD #52 -2.39	1899.96		1902.35
" #53		+2.13	1902.09 = .05
" #54		+1.89	1901.85

CHECK LEVELS.	SEPT. 30.	LEONARD.	
#50 -2.26	1899.51		1901.77
#51		+2.39	1901.90
#52		+2.85	1902.36
#53		+2.55	1902.06
#54		+2.31	1901.82

	146+55.55			
	145+98.59			
			℄ ELEV.	CUT.
SPAD #54			1897.61	C4.21
" #55			1897.64	C4.13
ROCK IN INVERT AT N. PORTAL.			1897.67	F3.15
DRILL STEEL, RT. TOE, STA. 152+30±			NEAR SPAD #42.	

T.P.	+3.14	1899.11		1895.97 ROCK.
T.B.M.			-2.87	1896.24=1896.26
T.B.M.	+0.21	1936.11		1935.90 SPIKE IN OAK TREE.
	+0.31	1928.28	-8.14	1927.97
	+0.32	1920.59	-8.01	1920.27
	+0.79	1912.75	-8.63	1911.96
	+0.20	1905.08	-7.87	1904.88
SET T.B.M. ON	ROCK, N. PORTAL.		-8.82	1896.26

	OCT. 3, '53	LEONARD. PALOMINO.	
SPAD #52 -3.05	1899.30		1902.35
" #53.		+2.75	1902.05
" #54.		+2.52	1901.82
" #55.		+2.47	1901.77
	OCT. 5, 8 A.M.	LEONARD.	
#54 -2.59	1899.23		1901.82
#55			1901.77
#56.		-4.91	1894.52
CHECK LEVELS.	OCT. 7, '53	LEONARD & ROMERO-ROD.	
B.M. #4. +3.81	1898.56		1894.75
SPAD #48 -1.76	1899.61	+2.81	1901.37
" #49		+1.54	1901.15
" #50		+2.15	1901.76
" #51		+2.29	1901.90
" #52		+2.74	1902.35
" 53		+2.44	1902.05
" 54		+2.22	1901.83
# 55		+2.16	1901.77
# 56 IN PORTAL SHED.		+1.79	1901.40
T.P. ROCK		-3.64	1895.97

T.B.M. SPAD #52, ELEV. = 1902.35.

NOTE: ELEV.'S FROM 146+00 TO 144+30 ARE ON TOP OF R.R. RAILS, SUBTRACT .6' FOR APPROXIMATE GROUND LINE BENEATH TIES.

PROFILE ON TOP OF RAILS

#52 -3.24	1899.11		1902.35
146+00		-4.27	1894.84
145+95		-4.25	1894.86
+90		-4.26	1894.85
+85		-4.26	1894.85
+80		-4.26	1894.85
+75		-4.30	1894.81
+70		-4.35	1894.76
+65		-4.39	1894.72
+60		-4.41	1894.70
+55		-4.43	1894.68
+50		-4.43	1894.68
+45		-4.44	1894.67
+40		-4.48	1894.63
+35		-4.52	1894.59
+30		-4.56	1894.55
+25		-4.60	1894.51
+20		-4.63	1894.48
+15		-4.64	1894.47

PROFILE, CONT'D.

H.d.	1899.11		
145+10		-4.59	1894.52
+05		-4.58	1894.58
145+00		-4.50	1894.61
144+95		-4.51	1894.60
+90		-4.47	1894.64
+85		-4.44	1894.67
+80		-4.35	1894.76
+75		-4.30	1894.81
+70		-4.25	1894.86
+65		-4.25	1894.86
+60		-4.26	1894.85
+55		-4.32	1894.79
+50		-4.38	1894.73
+45		-4.37	1894.74
+40		-4.39	1894.72
+35		-4.57	1894.54
+30		-4.72	1894.39
+25	MUCK PILE, NO READING.		

MUCK PILE OVER END OF RAILS.

GROUND. LINE - NO R.R. HERE.

" "

" "

" "

" "

CHECK SPAD #53 FOR T.B.M. ELEV. = 1902.06

1897.66 F 5.08

PROFILE, CONT'D.

H.d.	1899.11		
144+20		-5.5	1893.6
+15		-5.55	1893.55
+10		-5.5	1893.6
+05		-5.4	1893.7
144+00		-5.45	1893.65
CHECK SPAD #53.		+2.95	1902.06
SET #56		-4.53	1894.58

Oct. 8, '53 LEONARD. B. ROMERO, JR. 56.

PROFILE OF BOTTOM ℄ AFTER CLEAN-UP.

B.M. II 5 +2.68	1898.92		1896.24
144+70		-5.65	1893.25
+75.0		-5.35	1893.55
+77.5		-4.5	1894.4
+81.5		-5.35	1893.55
+84.0		-5.0	1893.9
+86.0		-5.45	1893.45
+90.0		-6.8	1892.1
+94.0		-6.0	1892.9
+97.5		-5.1	1893.8
145+01.5		-6.1	1892.8
+07.5		-5.4	1893.5
+12.0		-5.7	1893.2
+16.0		-5.35	1893.55
+20.0		-6.0	1892.9
+23.0		-5.3	1893.6
+30.0		-6.0	1892.9
+33.0		-5.3	1893.6
+36.0		-5.95	1892.95
+42.0		-5.1	1893.8
+45.5		-5.9	1893.0

Check Levels at North Tunnel Portal

West
Williams
Kemp
Varonfakis

10-12-63

0.34	1936.24		1935.90	BM Nail in Oak Tree
1.19	1924.37	13.06	1923.18	
0.22	1911.61	12.98	1911.39	
6.88	1906.06	12.43	1899.18	
		9.72	1896.34 =	1896.24 FROM MON. AT SOUTH PORTAL.
9.73	1906.07		1896.34	TBM on rock
12.11	1917.02	1.16	1904.91	
11.73	1928.35	0.40	1916.62	
8.98	1936.35	0.98	1927.37	
		0.45	1935.90	= 1935.90 Nail in Oak

DEC. 10, 53. LEONARD. VARNEY.

OFFSET TO RIBS - S. PORTAL:

RIB NO:	WEST SIDE	EAST SIDE.
1.	3.46	3.64
2.	3.41	3.59
3.	3.40	3.51
4.	3.47	3.48
5.	3.54	3.51
6.	3.50	3.46
7.	3.62	3.33
8.	3.64	3.28
9.	3.51	3.49
10.	3.45	3.45
11.	3.45	3.54
12.	3.46	3.57
13.	3.52	3.58
14.	3.58	3.52
15.	3.53	3.47
16.	3.43	3.59
17.	3.48	3.54
18.	3.49	3.53

ELEV. OF UNDERSIDE OF RIBS AT ℄.

B.M. 1/R: +5.08	1897.70		1892.62,
		+2.41	1900.11
		+2.40	1900.10
		+1.92	1899.62 LOW .08
		+1.89	1899.59 LOW .11
		+2.06	1899.76
		+2.05	1899.75
		+2.07	1899.77
		+2.12	1899.82
		+2.11	1899.81
		+2.12	1899.82
		+2.09	1899.79
		+2.04	1899.74
		+2.08	1899.78
		+2.16	1899.86
		+2.12	1899.82
		+2.07	1899.77
		+2.19	1899.89
		+2.02	1899.72

OFFSET TO RIBS: S. PORTAL, CONT'D.

RIB NO.	WEST SIDE	EAST SIDE:
19.	3.47	3.51
20.	3.54	3.47
21.	3.50	3.51
22.	3.45	3.52
23.	3.50	3.58
24.	3.48	3.55
25.	3.49	3.51
26.	3.59	3.37
27.	3.54	3.42
28.	3.48	3.51
29.	3.44	3.57

ELEV. OF UNDER SIDE OF RIBS AT ℄, CONT'D.

	1897.70		
		+2.16	1899.86
		+2.15	1899.85
		+2.20	1899.90
		+2.22	1899.92
		+2.21	1899.91
		+2.16	1899.86
		+2.14	1899.84
		+2.28	1899.98
		+2.21	1899.91
		+2.21	1899.91
		+2.89	1900.09
CHECK SHOT		+1.64	1899.34 =
			1899.55

TIMBER LEFT IN PLACE —
SOUTH REINFORCED SECTION

TOP ¼, EAST SIDE. HOLDING UP D.6.

HOLDING UP D.6. ON E. TOP ¼.
" " " " " " "

LARGE BOULDER RESTING ON 2"x13" BACKED UP BY 4"x6"
[illegible]

RIB # 2 — ~~1 - 2"x13" x 63"~~ REMOVED. [illegible]
172+29.2' — ~~1 - 2" x 6" x 64"~~ REMOVED [illegible]
~~1 - 4" x 4" x 50"~~ "
1 - 2 x 10 x 67"
~~1 - 4 x 4 x 24"~~ "

RIB #3 — ~~1 - 4 x 4 x 60"~~ REMOVED. [illegible]
172+24.2 — 1 ~~2~~ - 2 x 13 x 68" 1 REMOVED [illegible]
RIB #4 — 1 ~~2~~ - 2 x 13 x 63' 2 REMOVED [illegible]
172+19.2 — ~~1 - 4 x 6 x 61"~~ REMOVED. [illegible]
~~1 - 4 x 4 x 36"~~ REMOVED. [illegible]
1 ~~5~~ 4"x6"x 44" - 4 REMOVED. [illegible]

RIB #5 — ~~2 - 2 x 13 x 63"~~ "
172+14.2 — ~~2 - 2 x 8 x 63"~~ "
~~4 - 4 x 6 x 44"~~ "
~~1 - 4 x 4 x 40"~~ "

RIB #6 — ~~3 - 2 x 13 x 70"~~ "
172+09.2 — ~~1 - 2 x 8 x 70"~~ "
~~4 - 4 x 6 x 44"~~ "

(CON'T) TIMBER IN SOUTH PORTAL

RIB #7	~~2 3 - 2 x 13 x 70"~~	REMOVED.
172+04.2	~~6 - 4 x 6 x 44"~~	"
RIB #8	~~1 - 2 x 13 x 70"~~	"
171+99.2	~~1 - 2 x 13 x 30"~~	"
RIB #9	~~1 - 2 x 13 x 70"~~	Removed.
171+94.2	~~1 - 4 x 6 x 44"~~	"
RIB #10 171+89.2	~~0~~	
RIB #11	~~1 2 - 2 x 13 x 70"~~	Removed.
171+84.2	~~2 - 4 x 6 x 44"~~	"
RIB #12	~~2 - 2 x 13 x 70"~~	Removed.
171+79.2	~~2 - 4 x 6 x 44"~~	"
RIB #13	~~1 - 2 x 13 x 70"~~	"
171+74.2	1 ~~2 3~~ - 4 x 6 x 44'	
RIB #14 171+69.2	~~0~~	
RIB #15	1 ~~2~~ - 4 x 6 x 44"	1 REMOVED.
171+64.2	2 ~~3~~ - 2 x 8 x 70"	1 REMOVED.
	2 - 2 x 6 x 70"	
	~~1 - 2 x 13 x 50"~~	REMOVED.

HOLDING UP LARGE BOULDER.

HOLDING UP LOOSE O.G. AND BOULDERS.

(CONT) TIMBER IN SOUTH PORTAL

RIB # 16	~~4 - 4 x 6 x 44"~~	REMOVED.
171+59.2	~~2 - 2 x 8 x 65"~~	REMOVED.
	1 - 2 x 6 x 65"	
RIB # 17	~~3 - 2 x 13 x 65"~~	ALL REMOVED.
171+54.2	~~38 - 4 x 6 x 44"~~	ALL REMOVED.
RIB #18	~~1 - 2 x 6 x 70"~~	ALL REMOVED.
171+49.2	~~7 - 4 x 6 x 44"~~	REMOVED
	~~1 - 4 x 4 x 60"~~	REMOVED.
RIB #19	2 ~~5~~ - 4" x 6" x 44"	3 REMOVED.
171+44.2	2 - 8" x 8" x 53"	
	1 - 8" x 8" x 56"	
	5 ~~6~~ - 2" x 6" x 65"	1 REMOVED.
	~~2 - 2" x 12" x 60"~~	REMOVED.
RIB #20	0 ~~5~~ - ~~4 x 6 x 44"~~	REMOVED
171+39.1	~~0 4 - 2 x 6 x 60"~~	
	1 - 2 x 12 x 60"	
	1 - 4" x 6" x 44"	

SUPPORTING MASSIVE BOULDARS ON UPPER 1/4 OF WEST SIDE.

SUPPORTING BOULDERS OVERHEAD. [illegible]

MASSIVE BOULDER OVER CENTER OF TUNNEL.

NOTE: TIMBER REMOVED AFTER SIDES LINED; ONLY TOP OPEN. [illegible]

HOLDING UP BOULDERS OVERHEAD.

LARGE BOULDERS OVER TOP AND WEST SIDE.

FRACTURED AND LOOSE.

(CON'T) TIMBER IN SOUTH PORTAL

RIB # 21	1 ~~3~~	-	2"x6"x60" 2 REMOVED. [illegible]
171+34.1	2	-	4"x4"x36"
	~~1~~	-	~~2x10x64"~~ REMOVED. [illegible]
RIB # 22 171+29.1	~~0~~		CUT OFF COLLAR,
RIB # 23	2 ~~3~~	-	2"x6"x60"
171+24.1	1	-	4"x4"x28"
RIB # 24	1	-	2"x6"x60"
171+19.1	1	-	2"x6"x40"
RIB # 25	~~11~~	-	~~4x6x44"~~ REMOVED 3/2. [illegible]
171+14.1	4	-	2"x6"x60"
RIB # 26	4	-	2"x6"x60"
171+09.1	1	-	2"x4"x65"
	8 ~~9~~	-	4x6x44" 1 3/2. REMOVED. [illegible]
RIB # 27 171+04	~~2~~	-	~~4x6x44"~~ REMOVED. [illegible]
RIB # 28 170+99	~~0~~		
RIB # 29 170+79	1	-	6"x6"x120" TOP 1/4 W. SIDE
	3	-	6"x6"x36"±
	1	-	4x4x60"
	1	-	4x6x44"

GROUT HOLES, N. PORTAL:

NO:	STATION:	POSITION:	DEPTH:	REMARKS:
1.	144+57.5	E. SPRINGLINE.	1.50'	1 MISS, 0.6'
2.	144+57.5	W. UPPER ¼	2.20'	3 MISSES, 0.5', 0.7', 0.9'
3.	144+65	W. UPPER ¼	1.92'	
4.	144+66	E. UPPER ¼	1.70'	2 MISSES, 0.6' + 0.7'
5.	144+70.5	E. SPRINGLINE	1.60'	1 MISS, 0.5'
6.	144+74	TOP ℄.	1.95'	
7.	144+78	W. UPPER ¼	1.95'	
8.	144+79.5	E. TOP ¼	2.05'	1 MISS 0.75'
9.	144+86	W. UPPER ¼.	2.10'	2 MISSES, 0.6', 0.5'
10.	144+93	W. UPPER ¼	2.36'	
11.	144+93	E. "	1.80'	
12.	145+03	W. "	1.33'	
13.	145+03	E. "	1.46'	
			23.92'	TOTAL GOOD HOLES.

GROUT HOLES – S. PORTAL:

No.	STATION:	POSITION:	DEPTH:	REMARKS:
1.	172+26.9	TOP, 15" W. ℄	14"	
2.	172+16.7'	TOP, 15" E. ℄	30"	3 MISSES. 0.4", 0.6", 0.4" DEEP.
3.	172+07	TOP, 19" W. ℄	23"	
4.	171+97	TOP, 15" E. ℄	25"	
5.	171+87.6	TOP 15" W. ℄	19½"	CUT OFF COLLAR.
6.	171+86.4	W. SPRINGLINE	47½"	" " "
7.	171+86.3	E. "	34½"	1 MISS – 6" " " "
8.	171+86.3	BOTTOM ℄	34"	" " "
9.	171+76	TOP 9" W. ℄	43"	2 MISSES, 4", 6"
10.	171+66	TOP, 8" E. ℄	24"	
11.	171+55.8'	TOP 16" W. ℄	33½"	1 MISS 6"
12.	171+45.25	TOP 14" E. ℄	22"	
13.	171+35.5	TOP 16" W. ℄	33"	
14.	171+26.7'	TOP 15" E. ℄	31"	CUT OFF COLLAR.
16.	171+26.5	E. SPRINGLINE	34½"	2 MISSES 6" & 7" CUT OFF COLLAR.
16.	171+26.3	W. "	47"	2 MISSES 5" & 6" CUT OFF COLLAR.
17.	171+26.5	BOTTOM ℄	37½"	CUT OFF COLLAR.
		TOTAL:	533" = 44'5"	
		TOTAL DRILLED:	= 44.42'	

$$12\overline{)533} = 44.42'$$
48
53
48

FILE.

BLACK CANYON TUNNEL.

December 2, 1953.

From: City Inspector, Black Canyon Tunnel.
To: Resident Engineer, Sutherland Dam Project.

Subject: Leaks and Seepage Areas in the Tunnel before lining.

The following spots have been located, and observed as follows:

Station:	Present Condition:	Position in Tunnel:	Remarks:
145 50	Dry.	Top & W. side	Small leak from rock joint.
146 52	Dry.	E. side, upper half.	Small leak.
146 60	Damp.	E. side.	Fault line crack.
146 63	Dripping.	Top.	Fault line crack.
146 69	Damp.	Top & E. side.	Small damp area 5 ft. long.
147 50	Dry.	Both sides.	Slip crack 1" to 8" thick, pitch 60 N.
147 68	Dry.	Top to W.	Leak about 2 ft. wide, now dry.
147 79	Dry.	Top.	Leak zone about 2 ft. square, in crack.
148 58	Dry.	Across top.	Leak at joint line, 5 ft. wide.
148 76	Dry.	Top & W. side.	Leak at joint line, 3 ft. wide.
149 06	Dry.	Top, on angle.	Slip 4" to 12" thick, pitch 60 NE.
149 85 to 149 95	Dry.	Top & E. side.	Damp area in many small cracks.
150 07	Dry.	Top.	Leak in fault line, now dried up.
150 27	Dry.	& Top.	Small leak in joint line.
150 33 to 36.	Dry.	Lower E. side.	Soft area from spring line to toe.
151 00 to 05.	Dry.	Top & E. side.	Many small leaks in rock joint lines.
151 20 to 35.	Dry.	" E. "	Many small leaks in fracture zone 2 ft. thick, pitching 60 degrees NE.
151 62	Dry.	Top.	Small leak in spad hole in fault line.
151 70 to 80.	Dry.	Top. to E. toe.	Fault line pitches 45 N. on both sides.
152 05	Dry.	E. side spring line.	Damp area in joint line.
152 90 to 153 05	Dry.	Top & E. side.	General damp area, no bad leaks.
153 36 to 45.	Dry.	Full E. side.	General damp area.
153 68 to 153 72	Dry.	W. side, toe. Top.	Split in rock, bad leak when dug, runs up on 60 degree angle to top. Pitch N.
153 85	Dry.	E. side, spring line.	Seepage from slip joint.
153 92	Dry.	Top center.	Seepage from slip joint, pitchs 60 E.
154 10	Dry.	Full E. side.	Heavy seepage from slip joint when dug.
154 54	Dry.	Top W. side.	Spring from hole in rock, when dug.
154 90	Slow drip.	Full E. side.	Vertical joint about 2 ft. wide, wet.
155 52	Seepage.	Top center.	Small damp area about 2 ft. diameter.
156 11.	Damp.	Upper E. side.	Spring in crack 1" thick, 2 ft. long. Heavy inflow of water when first dug.
156 17.	Seepage.	East toe.	Seepage from breccia beneath quartz vein. 80 S.
156 96 to 157 03.	Slow drip.	Full circle.	Crush zone in rock. 4" quartz vein dips
157 12.	Wet.	Full circle.	Begin extensive wet area, leaks on all sides of tunnel. Worst leaks at:

157 54 to 60. Seeping. E. spring line.
157 64 Seeping. Full circle.
157 87 Dripping wet. Full circle.
158 02 to 10 Dripping wet, full circle.
158 27 to 30 " " " "

BLACK CANYON TUNNEL - Data on Leaks, continued.

Station:	Present Condition:	Position in Tunnel:	Remarks:
158 47	Dry.		End of general wet zone.
158 60	Damp.	Full circumference.	Start second wet zone. Crush zone.
158 80	Dripping.	" "	Worst wet spot in tunnel. Spring in top ran 60 g.p.m. when dug.
158 84	Dry.		End of crush and wet zone.
159 28 to 41.	Seepage.	W. side, lower.	Crack 13' long in rock, seeping.
159 61 to 92.	Wet.	Top and E. side.	General wet zone.
159 85	Dripping.	Top center.	Constant drip since dug.
159 95	Wet.	W. side springline.	Damp area about 4 ft. square.
160 00	Wet.	W. side top ¼	Small drip from crack. Solid granite
160 18	Wet.	W. side springline.	Horiz. crack 2 ft. long in gneiss.
160 38 to 43.	Dry.	E. side top ¼	Long weep line at rock joint.
161 76	Seeping.	E. side lower ¼	Damp area 4 ft. square; quartz vein.
162 66 to 70.	Damp.	Full top, W. side.	Massive quartz vein, top & W. side.
163 35 to 55	Seeping.	E. side lower ¼.	Long crack in massive granite rock.
163 35 to 78	Seeping.	W. side lower ¼	" " " " " "
163 66	Spring.	W. side lower ½.	Constant flow from joint line.
164 09	Seeping.	E. side lower ½	Damp area about 2 ft. wide.
164 27	Dripping.	Top, E. side.	Dripping from Core Hole #2.
164 44	Dry.	Top & W. side.	Seepage beneath 8" quartz vein.
164 49.	Seeping.	W. side, lower ½.	Spring on top of 6" quartz vein.
164 53.	Damp.	Entire W. side.	Heavy leak, originally, from joint.
164 66	Seeping.	E. side lower ½.	Seeping next to thick quartz vein.
165 67	Damp.	Top E. side.	Seeping at joint line.
165 71	Damp.	Top ½ E. side.	Seeping at joint line.
165 74.	Damp.	Top ½ W. side.	Seeping at joint line.
165 75 to 80.	Seeping.	E. side lower ½.	Seeping from long crack in rock.
165 80.	Damp.	Top ½ W. side.	Seeping from joint line.
165 86.	Spring.	E. side lower ½.	In 1" crack below spring line. Flowing about a quart a minute.
165 97 to 166 04	Damp.	Full W. side.	Seepage from many small joints.
166 11	Damp.	Top half E. side.	Seeping from pin hole in joint.
167 30	Dripping.	Top & E. side.	Crush zone about 4 ft. wide.
167 42 to 48.	Seeping.	East Side.	Seeping from joints. Car hole.
167 50 to 85.	Damp.	Full circumference.	Many small joint lines seeping.
167 84	Seeping.	Top ½ W. side.	Worst spot in this damp zone.
167 95 to 168 20	~~Full~~ Damp.	Full circumference.	Many small joint lines seeping.
167 96	Drip.	Top center.	Drip from 12" quartz vein.
168 02	Drip.	Top & both sides.	Drip from 2" quartz vein.
168 12	Drip.	Top & both sides.	Drip from thin quartz vein.
170 12 to 22.	Damp.	Full top.	D.G. damp since recent rains.

Don E. Leonard,
Inspector.

STATIONING OF WEEPER VALVES IN TUNNEL.

NO.	STATION:	REMARKS.
1.	148+58	UPPER W. SIDE.
2.	148+76	TOP.
3.	149+06	TOP.
4.	149+66	TOP WEST SIDE.
5.	149+85	E. UPPER 1/4
6.	149+95	"
7.	150+07	TOP.
8.	150+27	TOP.
9.	150+35	LOWER E. SIDE.
10.	150+64	HEAVY INFLOW DURING RAINS. IN CORE HOLE #3.
11.	151+02	UPPER E. SIDE.
12.	151+25	" " "
13.	151+35	" " "
14.	151+62	TOP, E. SIDE.
15.	151+80	TOP.
16.	154+90	E. SIDE.
17.	155+19	STEADY INFLOW. FLOWING SPRING, E. TOE.
18.	156+11	DRY SPRING, UPPER E. SIDE.

NOTE: ORIGINAL INSTRUCTIONS WERE TO INSTALL WEEPER VALVES IN ALL PLACES WHERE LEAKS HAD OCCURRED DURING EXCAVATION. AFTER 15 VALVES HAD BEEN PLACED, RECEIVED ORDERS FROM RES. ENG. TO ELIMINATE AS MANY VALVES AS POSSIBLE, AND USE ONLY ONE IN EACH WET AREA, AND NOT TO INSTALL MORE THAN 40 VALVES IN ALL, PER INSTRUCTIONS OF CARL RANKIN.

Wfeard.

STATIONING OF WEEPER VALVES, CONT'D.

No.	Station.	Remarks.
19.	157+00	Top E. Side.
20.	157+87	Top.
21.	158+01	Upper E. Side.
22.	158+10	Upper W. Side.
23.	158+21.5	Upper E. Side.
24.	158+27	Upper W. Side.
25.	158+80	8" Nipple + 12" Nipple.
26.	158+82	Nipple 24" Long in Spring.
27.	159+37.5	Lower Half, W. Side.
28.	159+85.5	Top, E. Side. Heavy drip.
29.	160+18	W. Springline.
30.	161+76	Lower E. Side.
31.	163+35	Lower W. Side.
32.	163+78	" " "
33.	164+09	Lower E. Side.
34.	164+27	In Core Hole #2.
35.	165+86	Spring, E. Toe.
36.	165+98	Steady inflow. Flowing Spring W. Toe.
37.	168+14	Last one.

SPADS IN TUNNEL, CONT'D.

SPAD NO.	DISTANCE:	STATION:	
#38.	51.50	154+45.78	
#39	58.63	153+87.15	
#40	58.68	153+28.47 = 28.99	
#41	-54.93	152+73.54	
#42.	-55.02	152+18.52	
#43	-56.85	151+61.67	
#44	-59.22	151+02.45	
#45,	-53.47	150+48.98	
#46,	-57.12	149+91.86	
#47.	-58.28	149+33.58	
#48.	-57.67	148+75.91	CORRECTED STATIONING FROM △ AT -143+69.19
#49,	-49.85	148+26.06 =	148+26.51
#50.	-60.63	147+65.43 = 66.15 =	147+65.88
#51.	-50.42	147+15.01 =	147+15.46
#52.	-59.46	146+55.55 =	146+56.00
#53.	-57.16	145+98.39 =	145+98.84
#54,	-48.87	145+49.52 =	145+49.97
#55.	-51.90	144+97.62 = 98.41 CLYDE	= 144+98.07
N. PORTAL FRAME.	-46.38	144+51.24 =	= 144+51.69
△ = 143+69.19			

SPADS IN TUNNEL - CONT'D.

SPAD NO.	DISTANCE:	STATION
#19.	-48.96	164+22.10
#20.	-45.41	163+76.69
#21.	-50.57	163+26.12
#22.	-52.03	162+74.09
#23.	-48.47	162+25.62
#24.	-50.84	161+74.78
#25.	-49.80	161+24.98 = +25.35
#26.	-49.02	160+75.96
#27.	-47.85	160+28.11
#28.	-55.14	159+72.97
#29.	-50.76	159+22.21
#30.	-63.58	158+58.63 = 59.05
#31.	-46.68	158+11.95
#32.	-50.05	157+61.90
#33.	-50.27	157+11.63
#34.	-57.33	156+54.30
#35.	-48.27	156+06.03 = 06.49
#36.	-55.62	155+50.41
#37.	-53.13	154+97.28

SPADS IN TUNNEL, STATION.

#1. SOUTH PORTAL:		172+40.41
COPPER TACK IN TIE.	-5.23	172+35.18
#2. SPAD IN 4"x4".	-38.94	172+01.47
#3. SPAD IN 2"x4"	-71.84	171+68.57
#4. SPAD IN 2"x4"	-91.70	171+48.71
#5. SPAD IN 2"x4"	-34.85	171+13.86
#6. SPAD IN 2"x4". BY CAR PAGS HOLE.	-67.10	170+81.61
#7. " " "	-68.65	170+12.96
#8. " " "	-65.72	169+47.24
#9. " " "	-54.66	168+92.58
#10. " " "	-58.81	168+33.77
#11 " " "	-46.28"	167+87.49
#12 " " "	-50.20"	167+37.29
#13. " " "	-32.10	167+05.19
#14. " " "	-43.40	166+61.79
#15. " " "	-53.62	166+08.17
#16. " " "	-42.17	165+66.00
#17. " " "	-42.71	165+23.29
#18. " " "	-52.23	164+71.06

172+40.41
169+47.24
293.18

169+47.4
166+61.8
283.6

165+30
26.35
165+23.65

165+23.3
-38.3
164+85.0 Face 4/11.

164+71
-49
164+22

180
6
1080

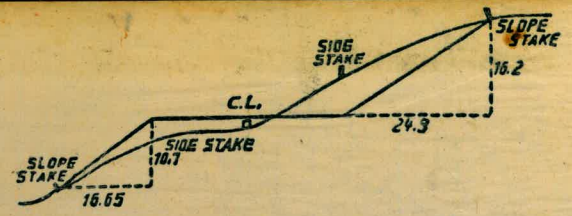
167+05
-53
166+52

166+08.17 170+60 = 1796.11
84.88
165+23.29

Please Return to
City of San Diego Water Dept.
Room 903 Civic Center

SPA
#1. SO
COPPER
#2. SP
#3. SPA
#4. SPA
#5. SPA
BY
#6. SPA
#7. "
#8. "
#9. "
#10. "
#11 "
#12 "
#13. "
#14. "
#15. "
#16. "
#17. "
#18. "

135
6
.0810



DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING.

SLOPE 1½ TO 1. ROADWAY OF ANY WIDTH.

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.00	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	0
1	1.50	1.65	1.80	1.95	2.10	2.25	2.40	2.55	2.70	2.85	1
2	3.00	3.15	3.30	3.45	3.60	3.75	3.90	4.05	4.20	4.35	2
3	4.50	4.65	4.80	4.95	5.10	5.25	5.40	5.55	5.70	5.85	3
4	6.00	6.15	6.30	6.45	6.60	6.75	6.90	7.05	7.20	7.35	4
5	7.50	7.65	7.80	7.95	8.10	8.25	8.40	8.55	8.70	8.85	5
6	9.00	9.15	9.30	9.45	9.60	9.75	9.90	10.05	10.20	10.35	6
7	10.50	10.65	10.80	10.95	11.10	11.25	11.40	11.55	11.70	11.85	7
8	12.00	12.15	12.30	12.45	12.60	12.75	12.90	13.05	13.20	13.35	8
9	13.50	13.65	13.80	13.95	14.10	14.25	14.40	14.55	14.70	14.85	9
10	15.00	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	10
11	16.50	16.65	16.80	16.95	17.10	17.25	17.40	17.55	17.70	17.85	11
12	18.00	18.15	18.30	18.45	18.60	18.75	18.90	19.05	19.20	19.35	12
13	19.50	19.65	19.80	19.95	20.10	20.25	20.40	20.55	20.70	20.85	13
14	21.00	21.15	21.30	21.45	21.60	21.75	21.90	22.05	22.20	22.35	14
15	22.50	22.65	22.80	22.95	23.10	23.25	23.40	23.55	23.70	23.85	15
16	24.00	24.15	24.30	24.45	24.60	24.75	24.90	25.05	25.20	25.35	16
17	25.50	25.65	25.80	25.95	26.10	26.25	26.40	26.55	26.70	26.85	17
18	27.00	27.15	27.30	27.45	27.60	27.75	27.90	28.05	28.20	28.35	18
19	28.50	28.65	28.80	28.95	29.10	29.25	29.40	29.55	29.70	29.85	19
20	30.00	30.15	30.30	30.45	30.60	30.75	30.90	31.05	31.20	31.35	20
21	31.50	31.65	31.80	31.95	32.10	32.25	32.40	32.55	32.70	32.85	21
22	33.00	33.15	33.30	33.45	33.60	33.75	33.90	34.05	34.20	34.35	22
23	34.50	34.65	34.80	34.95	35.10	35.25	35.40	35.55	35.70	35.85	23
24	36.00	36.15	36.30	36.45	36.60	36.75	36.90	37.05	37.20	37.35	24
25	37.50	37.65	37.80	37.95	38.10	38.25	38.40	38.55	38.70	38.85	25
26	39.00	39.15	39.30	39.45	39.60	39.75	39.90	40.05	40.20	40.35	26
27	40.50	40.65	40.80	40.95	41.10	41.25	41.40	41.55	41.70	41.85	27
28	42.00	42.15	42.30	42.45	42.60	42.75	42.90	43.05	43.20	43.35	28
29	43.50	43.65	43.80	43.95	44.10	44.25	44.40	44.55	44.70	44.85	29
30	45.00	45.15	45.30	45.45	45.60	45.75	45.90	46.05	46.20	46.35	30
31	46.50	46.65	46.80	46.95	47.10	47.25	47.40	47.55	47.70	47.85	31
32	48.00	48.15	48.30	48.45	48.60	48.75	48.90	49.05	49.20	49.35	32
33	49.50	49.65	49.80	49.95	50.10	50.25	50.40	50.55	50.70	50.85	33
34	51.00	51.15	51.30	51.45	51.60	51.75	51.90	52.05	52.20	52.35	34
35	52.50	52.65	52.80	52.95	53.10	53.25	53.40	53.55	53.70	53.85	35
36	54.00	54.15	54.30	54.45	54.60	54.75	54.90	55.05	55.20	55.35	36
37	55.50	55.65	55.80	55.95	56.10	56.25	56.40	56.55	56.70	56.85	37
38	57.00	57.15	57.30	57.45	57.60	57.75	57.90	58.05	58.20	58.35	38
39	58.50	58.65	58.80	58.95	59.10	59.25	59.40	59.55	59.70	59.85	39
40	60.00	60.[illegible]	[illegible]	60.45	60.60	60.75	60.90	61.05	61.20	61.35	40
41	61.50	61.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	62.70	62.85	41
42	63.00	63.15	63.30	63.45	[illegible]	[illegible]	[illegible]	[illegible]	64.20	64.35	42
43	64.50	64.65	64.80	64.95	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	43
44	66.00	66.15	66.30	[illegible]	[illegible]	66.75	66.90	67.05	67.20	67.35	44
45	67.50	67.65	67.80	67.95	68.10	68.25	68.40	68.55	68.70	68.85	45
46	69.00	69.15	69.30	69.45	69.60	69.75	69.90	70.05	70.20	70.35	46
47	70.50	[illegible]	[illegible]	70.95	71.10	71.20	71.40	71.55	71.70	71.85	47
48	[illegible]	72.15	72.30	72.45	72.60	72.75	72.90	73.05	73.20	73.35	48
49	[illegible]	73.65	73.80	[illegible]	74.10	74.25	74.40	74.55	74.70	74.85	49
50	75.00	75.15	75.30		75.60	75.75	75.90	76.05	76.20	76.35	50

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