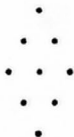


STATE OF NEVADA
OFFICE OF THE STATE ENGINEER



GEOLOGY OF CLEAR CREEK DAM SITE, ORMSBY AND DOUGLAS COUNTIES, NEVADA

By David A. Phoenix



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The Clear Creek dam site was examined by the writer during September 1948, at the request of the State Engineer of Nevada. It is anticipated that a dam will be constructed at this site jointly by the State of Nevada and the Department of the Interior, Bureau of Indian Affairs, at Stewart, Nevada. This report gives a brief description of the geology of the dam site.

The site is in the SW $\frac{1}{4}$ sec. 31, T. 15 N., R. 20 E., and in the NW $\frac{1}{4}$ sec. 6, T. 14 N., R. 20 E. It is on the south side of U. S. Highway 50, half a mile west of the junction of U. S. Highways 50 and 395, and about 100 feet upstream from a wooden bridge over which passes the dirt road to Jacks Valley. The dam site lies in both Ormsby and Douglas Counties, Nevada, as Clear Creek is the county line.

Clear Creek drains 15 square miles of the east slope of the Sierra Nevada Mountains above the dam site. It heads in a basin east of Spooner Summit, and flows with a gradient of 300 feet per mile at the base of the range. About half a mile upstream from the dam site it passes through a narrow gorge in granodiorite and enters the west side of the floor of Eagle Valley. Upstream from this narrow gorge the stream flows directly on granodiorite. Upon entering the valley it flows over sand and decomposed granitic rock. The stream channel at the dam site, and for a short distance above it, is entrenched about 18 feet into these alluvial materials.

The reservoir will occupy a shallow topographic depression, in part paralleling the range front, and also extending downstream from the narrow gorge at the mouth of Clear Creek Canyon to the dam site. On the north side the reservoir is bounded by the lower slope of the range front. The granodiorite there is mantled by at least 15 feet of sand and decomposed rock.

On the south side the reservoir will extend southward and occupy a shallow depression paralleling the range front. The floor of this shallow depression is underlain by a thin mantle of sandy soil which overlies sandy deposits and decomposed granitic rock. Parts of the area may be underlain by glacial morainic material.

Four drill holes were put down by the State Engineer at the dam site along a line normal to the trend of the channel of Clear Creek. A cross section along this line is shown on plate 1. This cross section is referred to an arbitrary datum, assumed elevation 200 feet, at the south edge of U. S. Highway 50. The logs and depths to water, measured from the land surface, are plotted on the profile and shown in the following table:

14/20-6A1. State Engineer of Nevada, Clear Creek dam site, test hole No. 1. Drilled by J. J. Harrison. Open hole, diameter 6 inches to a depth of $37\frac{1}{2}$ feet. Altitude of land surface 146.7 (arbitrary datum). Water level 11.9 feet below land surface.

Material	Thickness (feet)	Depth (feet)
Silt and fine sand; "quicksand" (?). Source rock, granodiorite. Less than 1% biotite.....	11 1/3	11 1/3
Driller reports this interval as follows:		
Topsoil, decomposed granite, sand and dirt, 3 feet; decomposed granite sand, and clay, 2 feet; decomposed granite sand, coarse, dark brown, 6 1/3 feet.		
No sample.....	11 2/3	23
Sand, fine; "quicksand".....	5	28
Driller reports clay from 23 to 24 feet.		
Sand, medium to coarse, subangular. Medium sand 60% of sample, coarse sand 40% of sample.....	9 1/2	37 1/2
Granodiorite.....	--	37 1/2
Total depth.....	--	37 1/2

14/20/6A2. State Engineer of Nevada, Clear Creek dam site, test hole No. 2. Drilled by J. J. Harrison. Open hole, diameter 6 inches to a depth of $26\frac{1}{2}$ feet. Altitude of land surface 141.2 (arbitrary datum). Water level 3.7 feet below land surface.

Material	Thickness (feet)	Depth (feet)
No sample.....	$2\frac{1}{2}$	$2\frac{1}{2}$
Sand, fine to coarse, ill-sorted, angular to subrounded, and fine to medium gravel. Fine to coarse sand 65% of sample, fine to medium gravel 35% of sample.....	$6\frac{1}{2}$	9
No sample.....	9	18
Driller reports black mud and gravel.		
Sand, fine to coarse, ill-sorted, angular to subrounded, and fine to medium gravel. Fine to medium sand 75% of sample, fine to medium gravel 20% of sample.....	6	24
Driller reports coarse rocks and granite sand.		
Sample same as from 18 to 24.....	$2\frac{1}{2}$	$26\frac{1}{2}$
Sand and ill-sorted angular particles of granitic rock. Granodiorite.....	--	$26\frac{1}{2}$
Total depth.....	--	$26\frac{1}{2}$

14/20-6A3. State Engineer of Nevada, Clear Creek dam site, test hole No. 3. Drilled by J. J. Harrison. Open hole, diameter 6 inches to a depth of 24 feet. Altitude of land surface 153.1 (arbitrary datum). Water level 5.9 feet below land surface.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Silt and fine to medium sand. Sand grains angular, color brown. Silt 3% to 5% of sample, fine sand 65% of sample, medium sand 25% to 30% of sample. Source rock, granodiorite. Biotite approximately 1% to 3% of sample.....	10	10
No sample.....	1	11
Sand, fine to medium, sand grains angular. Fine sand 80% of sample, medium sand 20% of sample. Source rock, granodiorite. Biotite approximately 1% to 2% of sample.....	2	13
Driller reports hardpan.		
Silt, medium to coarse sand. Sand grains angular, color light brown. Silt 1% of sample, medium sand 70% of sample, coarse sand 30% of sample. Source rock, granodiorite. Biotite approximately 1% of sample.....	2	15
Sand, fine to medium. Sand grains angular, color light brown. Fine sand 80% of sample, medium sand 20% of sample. Source rock, granodiorite. Biotite approximately 2% of sample.....	1½	16½
No sample.....	2½	19
Driller reports hardpan with rocks.		
Sample similar to that from 15 to 16½ feet.....	5	24
Granodiorite.....	---	24
Total depth.....	---	24

15/20-31C1. State Engineer of Nevada, Clear Creek dam site, test hole No. 4. Drilled by J. J. Harrison. Open hole, diameter 6 inches to a depth of 14 feet. Altitude of land surface 173.2 (arbitrary datum). Dry hole.

<u>Material</u>	<u>Thickness (feet)</u>	<u>Depth (feet)</u>
Silt, ill-sorted, to coarse angular sand. Silt 20% of sample, fine sand 30% of sample, sand, medium to coarse 50% of sample. Source rock, granodiorite. Biotite about 1% of sample.....	12	12
Sand, ill-sorted, fine to coarse, angular.....	2	14
Granodiorite.....	---	14
Total depth.....	---	14

The logs indicate that the profile of the top of the granodiorite follows a generalized profile of the land surface, with the greatest thickness of alluvium and decomposed granodiorite adjacent to the channel of Clear Creek. The granodiorite is overlain by a zone 6 to 8 feet thick of medium- to coarse-grained decomposed granodiorite and sand, and ~~that~~ this in turn is overlain by crudely bedded fine to medium sand interstratified with some gravel and discontinuous layers of sandy clay. The presence of biotite and clay, the poorly sorted character of the sediments, and the angularity of the sand grains of these materials is indicative of low permeability. They will, however, transmit some water.

The north abutment of the dam will rest against granodiorite. In the canyon walls above Clear Creek this rock in surface exposures is jointed. In fresh road cuts, however, the joints are less numerous. The rock will not transmit water readily except through joints or cracks. The south abutment of the dam will rest against a low hill composed of ill-sorted material, probably a glacial moraine. Outcrops of this material indicate that it carries numerous subrounded cobbles and boulders. However, unstratified reddish to brown clay sand predominates in the outcrops. It is believed that the morainic material also will not transmit water readily.