ELECTRIFICATION OF THE BUTTE, ANACONDA AND PACIFIC RAILWAY.

HE Butte, Anaconda and Pacific Railway has been entirely under electrical operation for the past six months. The installation is most interesting everywhere as it marks a new departure in electrification. Prior to it, railway electrification for the most part was influenced largely by the demand for rapid suburban and interurban service, by the frequency of that service and by other considerations, such as smoke abatement in cities. The above electrification is the first on record however, to

for the latter city. The ore traffic between the two cities is considerable, as is evidenced by the above figures of the Race Track first seven months of operation. The smelters are situated in Anaconda while the ore mines are in or near Butte. Fig. 1 illustrates the location of the electrified system and the relative situation of the two cities. ANACONDA (EL 5337) Energy for the operation of the system is obtained 5 from Great Falls, Montana, which has for some time been smelterLin supplying electrical power for the operation of the mines and smelting plants in the above cities. The power plant consists of six hydro-electric units with a nominal rated capacity of 21,000 kw. The current generated is of 66,000 volts, 60 cycles, 3-phase. It is transmitted at 102,000 volts over a distance of 130 miles by two parallel WILLOW DEER LODGE sing 0 R BOY REEK MILES

Fig. 1.-Route of the Butte, Anaconda and Pacific Railway.

have been made for the express purpose of securing Sreater economy. Further, as the first road to use 2,400volt direct current, it is likewise worthy of note.

The first electric locomotives were put in service about June 1, 1913, and set to hauling ore. By January 1, 1914, according to information furnished by the General Electric



lines to the sub-station at Butte. Another transmission line carries power at 60,000 volts to the Anaconda substation, 26 miles distant. These two sub-stations are equipped with 2,400-volt motor-generators. Each set consists of a 3-phase, 60-cycle, 720 r.p.m. synchronous motor direct connected to two 500-kw., 1,200-volt direct con-

Company, they had hauled nearly 21/2 million tons of ore

change from steam to electric haulage was made without

any change in the personnel of the train crews and with-

Pacific Railway was a single track main line about 30

miles in length with about 85 miles of sidings, yards, etc.

There is a maximum grade of 0.3% against loaded cars and of 1% against empties. The heaviest train has been

50 loaded ore cars, approximately 3,400 tons. The line

extends from Butte, where connection is made with several trunk lines to Anaconda, and is the only rail outlet

Prior to the installation, the Butte, Anaconda and

and had travelled approximately 201,000 miles.

out any delays or alterations in the schedule.

nected generators arranged to operate in series for 2,400 volts.

The overhead construction was especially designed to give the flexibility necessary for the satisfactory operation of the pantograph trolley used on the locomotives. The trolley used over all tracks is of copper and is supported by an 11-point catenary suspension from a stranded steel messenger cable. The trolley wire is reinforced between the substations with two copper cables tapped to the trolley at intervals of 1,000 ft. The rails are connected by No. 0000 bonds at every ioint.

The locomotive equipment consists of seventeen 80-ton units, two for passenger service and fifteen for freight. The ore trains are being hauled by two coupled units. The locomotives are of an articulated double-

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