POSSIBLE DAMAGE TO HOT SPRINGS

The possibility of blasting at the tunnel site affecting either the volume or temperature of the hot springs has been carefully considered and the conclusion reached that such a possibility does not exist. These and neighboring springs have been flowing for many thousands of years through channels in the Redwall fault breccias. These channels are large, tortuous, and now well established. The source of their water is from that part of the ordinary precipitation of the region which soaks into the ground and thus escapes runoff, evaporation and transpiration by plant life. This part of the precipitation is generally about 30% of the total and it goes to maintain the ground water supply. In this locality this water circulates through deep channels formed in the fault breccias, reaching depths of many thousands of feet, where it derives its heat from the natural high temperatures of the rocks at those depths. It is known from deep mines and drill holes that rocks several thousand feet below the bottoms of great intermontane valleys, such as the Columbia, commonly attain temperatures of more than 100 degrees. Therefore, the sources which supply water and heat to the springs are inexhaustable and the only manner in which the flow or temperature of the springs could be reduced would be by collapsing the present channels.

The ground vibrations from blasts can be accurately measured with seismographs designed for that purpose and over the last 20 years hundreds of measurements have been made under a wide range of conditions. From the measurements an empirical equation has been developed by which it is now possible to predict with reasonable accuracy the amplitudes of vibrations from blasts at any distance within their range of propogation. From this formula it is estimated that the amplitude at the springs from blasts at