CONCLUSIONS

1. Unification of mechanical equipment permits increasing the effectiveness of research and development, quality of manufacture and installation of mechanical equipment of bottom outlets, and shortening the time of design and construction.

2. It is expedient to use a universal gate chamber with slide gates of a special type as the basis for unification.

3. When selecting the number of openings of bottom outlets and their geometric dimensions preference should be given to variants which permit using standard-size equipment.

4. Standard-size mechanical equipment can be used in layouts of bottom outlets of the type at the Nurek, Charvak, and Rogun hydrostations.

LITERATURE CITED


INSTALLATION OF PIPELINES OF THE ZAGORSK AND KAISHYADORYS PUMPED-STORAGE STATIONS

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Unique precast reinforced concrete-encased steel pipelines are presently being constructed at the Zagorsk and Kaishyadorys pumped-storage stations under construction [5]. At the Zagorsk pumped-storage station each of the six pipelines has a length of 720 m. Eight pipelines each with a length of 840 m are to be constructed at the Kaishyadorys pumped-storage station.

During development of the installation project the All-Union Planning, Surveying, and Scientific-Research Institute (Gidroproekt) and the Moscow Special Design Department of Steel Hydraulic Structures (Mosgidrostal') examined variants of installing pipelines based on the use of special installation-transportation devices moving links of the pipeline along the route or based on the use of traditional block-and-tackle methods of moving loads along horizontal and inclined planes by means of pulleys. The second variant was approved.

Both for the Zagorsk and Kaishyadorys stations the route of the pipeline was divided into two installations stretches: upward and downward from the "crosscut," through which elements of the pipeline are delivered for installation.

During development of the installation scheme it was found necessary to enlarge two links into a so-called installation unit for the following reasons: the calculated time of transportation and alignment of the links on the pipeline route did not provide the prescribed rhythm of installation; the stability factor of a single link of the pipeline on the lower (steeply inclined) stretch of the route was minimum and in the event of jerking of the pulley system the link could overturn; in modern practice of installation works there is a tendency toward a maximum enlargement of the elements being installed, which makes it possible to preserve the number of operations being performed in the installation zone and to transfer these works to specialized permanent posts.

One of the factors that influenced making this decision was the small length of the link 4.41 m. Such a ratio of the length of the link to the inside diameter, equal to 0.59 for the Zagorsk and Kaishyadorys stations, is not characteristic for large-diameter pipelines.

In world practice the indicated value varies from 0.7 to 1.0 (for pipelines with an inside diameter greater than 4 m).

As a result of design studies, the technology and equipment of the zone of enlargement assembly (preinstallation works) were developed.

The area of the zone is $3610 \text{ m}^2$ and the mass of the equipment is 215 tons.

The main purpose of the zone is enlargement assembly of the links of the pipelines into an installation unit with a length of 8.85 m and mass up to 290 tons. The zone is an integral part of the experimental manufacturing yard of the pipeline links.