2.2. Use of the BVO Syr Darya Model Illustrating Eastern and Central Parts of the Chu Valley, A.V. Artukhin

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The decision was approved to use BVO Syr Darya models Illustrating offshoot systems of the Chu valley canals.

The purpose of the Research:

1) test of working capacity/efficiency of the model in estimating offshoot irrigation-river systems.
2) changes and possible corrections of the purposeful function to be adaptive to estimations of pairing water reservoirs with a complex use of a common source (analogue of the Tuaymuyun hydroengineering complex).

The selected research object is the section of the Chu river flow into Ortotokoy water reservoir up to water transmission points to the Sukulut district in the Kyrgyz Republic and up to water transmission points to the George canal and the Tashatkul water reservoir in the Republic of Kazahstan.

Data on sources and consumers are taken as average multi-year (see Tables 1-2). The morphology was selected for three from four estimated water reservoirs (see Table 3).

Data on Tashatkul water reservoir are accepted conventionally. Evaporation was not taken into account. Losses and time-lags were not taken into account. Some portion of a side inflow was not included into estimation and this probably caused some underestimated filling of the Tashatkul water reservoir.

The estimation scheme was formed through the BVO Syr Darya interface and is submitted in Figure 1.

It is seen as water swings off from the main waterway, is accumulated in side water reservoirs and partially returns back into the Chu river. Thus diverting irrigation-river net is realized and its estimation is usually highly complicated.

Limitations were put on the degree of filling and release/operation of water reservoirs in compliance with Table 3. Limitations on filling of water reservoirs were not introduced to the assigned date.

There were also introduced limitations on water delivery between points that "deliver water into HPS (hydro power stations)" and the "return into the Chu river". Limitation lines are marked by a cross in Figure 1.

Limitations are introduced to guarantee water delivery to the mini HPS cascade from the low side and transmission capacity of the canal from the upper side.

Figure 2 demonstrates water reservoirs operation graphs that participate in estimations. The main flow regulating load is on Ortotokoy reservoir which is located at the head of the estimating scheme. Water way and filling reservoirs' participation in flow regulation is not significant because of their small volumes.

Tashatkul water reservoir in our scheme is a "mouth point" and does not provide services to any consumer. That's why there are observed permanent accumulation of the flow without its operation/release.

Data used for production/construction of Picture 2 are shown in Table 4.

Estimations have shown applicability of BVO Syr Darya model to solve the tasks on off shoot /branching of irrigation-river systems. Dr. McKinney's approach, that has been applied in this model, turned out to be efficient enough and also in case of the estimation of branching irrigation-river systems.

Some model realization difficulties were caused by the fact that coefficients, enabling to estimate the return water flows when return water lines are missing, should be nulled, though there are not any return lines.

In future we are planning to add missing sources into the estimation system. We'll try to describe a filling regime of the Alaarchin water reservoir and a filling water reservoir interconnected with one source through an objective function.

We are planning to introduce the morphology for Tashatkul water reservoir and to introduce data on water delivery requirements into under command territories that are located in the down stream.