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STUDYING THE CHEMICAL COMPOSITION OF WATER IN THE BASIN SUPPLYING ZARCHOB II HPP AND THE AVERAGE ANNUAL SUPPLY OF THE RIVER

Annotation: Hydroelectric power plants are now an integral part of energy. Taking this into account, it is appropriate to study the composition and annual costs of water coming to hydroelectric power plants. We know that, as a result of studying the consumption and composition of water in the supply canal, the continuity of production of the specified amount of electricity supply is ensured.

Keywords: HPP, water supply, water consumption, electricity.

The chemical composition of Topalang river water was obtained based on the inspection data. According to the results of chemical analysis, when the river water reaches the maximum level, it is less mineralized (dry residue 84-190 mg/l), soft (total hardness 1.12-2.39 mg-eq/l), bicarbonate alkalinity (dispersion with HCO_3 ions). Medium mineralized (dry residue 230-266 mg/l) very solid (3.20-3.75 mg-eq/l), (dispersion by HCO_3 ions) at minimum water level. Water has a neutral or weak alkaline reaction (pH=6.6-8.5) (table 1).

Chemical composition of Topalang river water.

Table 1.

Date of inspection	pH	Unit of measure	Dry residue	Alkalis		CL	SO4	Ca	Mg	Na+ K	hardness mg-eq/l		
				SO3	NSO3 total						total	carbonated	constant
Topalang river. Topalang reservoir.													
15.07.80	-	mg/l	108	-	73	7	25	24	sled.	16	1.20	1.19	0.01
26.08.80	-	mg/l	168	no	98	21	35	32	sled.	31	1.60	1.60	-
23.10.80	-	mg/l	190	no	98	7	65	48	sled.	17	2.39	1.61	0.78
Topalang river –k Xarduri													
03.07.93	8.52	mg/l	126	no	61	6.84	41.14	22.04	1.21	19.55	1.20	-	0.20
15.06.94	7.8	mg/l	84	no	61	5.7	8.23	20.07	9.73	5.06	1.12	-	0.12
27.04.95	8.0	mg/l	154	no	146	6.84	8.23	26.05	1.22	31.28	1.4	-	ustr.
22.05.96	7.6	mg/l	88	no	73.20	3.96	12.34	26.05	1.22	3.91	1.4	-	0.20
30.06.06	6.6	mg/l	175	no	73.20	8.4	59.2	20.04	9.73	31.28	1.31	-	0.11

Date of inspection	pH	Unit of measure	Dry residue	Alkalis		CL	SO4	Ca	Mg	Na+ K	hardness mg-eq/l		
				SO3	NSO3 total								
To‘polang river-k. Zarchob (0,2 km above the village Zarchob)													
11.01.85	8.10	mg/l	265.6	no	69.5	14.9	112.	39.5	21.7	11.0	3.75	-	-
11.03.85	7.70	mg/l	241	no	97.6	9.6	69.2	56.5	4.6	8.0	3.20	-	-
8.05.85	7.60	mg/l	175	no	64.0	8.5	56.4	21.1	11.2	3.0	1.97	-	-
10.06.85	8.0	mg/l	120	no	55.5	10.0	17.8	24.9	1.0	3.0	1.32	-	-
10.08.85	7.75	mg/l	129	no	62.8	10.0	19.6	24.7	2.2	13.0	1.41	-	-
14.10.85	8.05	mg/l	230	no	78.7	11.4	73.9	43.7	4.4	7.0	2.54	-	-

Fractional composition of sediments in water.

Table 2.

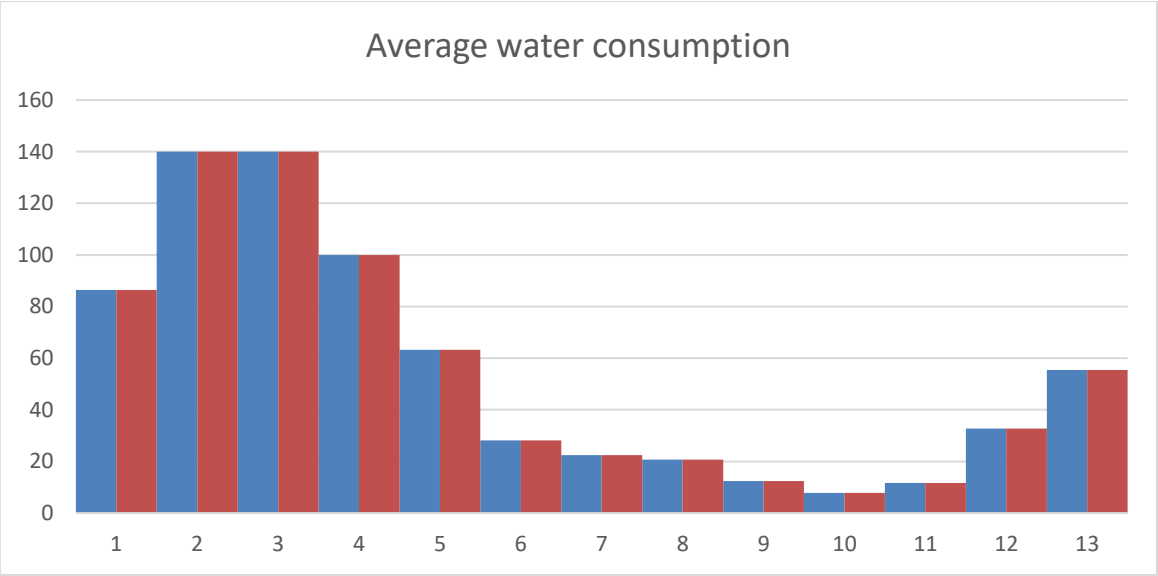
River, post	Observation year	Diameter (mm) and weight (%) of sediments			
		1,0 – 0,25	0,25 – 0,05	0,05 – 0,01	0,01 – 0,005
r. Topalang-c. Zarchob	1973-1980	15,3	29,2	19,7	35,8

Average monthly and average annual water consumption of the Topalang river.

Table 3.

Years	IV	V	VI	VII	VIII	IX	X	XI	XII	I	II	III	Average annual
2007	94,8	158	110	86,2	57,9	22,9	25,4	19,2	11,3	1,1	17,4	29,4	52,7
2008	158	166	146	100	64,6	20,4	25,2	19,8	4,15	2,7	8,73	42,2	63,4
2009	58,9	102	97,6	63,4	39,8	15	8,82	18,2	6,38	2,3	2,95	38,8	37,8
2010	71,9	135	171	139	89,8	51,2	36,4	32,1	23,1	13	14,3	62,4	69
2011	115	163	165	120	72,5	34,4	24,7	24	10,7	5,5	1,3	25,9	63,5
2012	67,2	130	99,7	79,1	52,1	28,2	18,6	8,62	26,2	18	13,5	27,2	47,36
2013	111	108	151	101	70,4	30,5	16,4	20,6	5,21	3,7	18,8	16,6	54,4
2014	48,9	113	160	85,1	58	35	20,5	18,8	13,4	10	2,06	27,3	49,3
2015	52,4	155	149	93,1	55,8	21,8	17,9	21,2	11,6	11	23,9	26,8	53,2
2016	87,1	166	160	140	73	21,9	31,2	25,3	12,8	12	14,4	32,1	64,6
Average	86,5	140	140	100	63,3	28,1	22,5	20,7	12,4	7,8	11,7	32,8	55,4

After determining the average multi-year water consumption, we construct a hydrograph of the hydroelectric plant and a water consumption return graph. After constructing the hydrograph of the hydroelectric power plant, we will draw the return graph of water consumption from the maximum water consumption Q_{max}=140 m^3/s to the minimum Q_{min}=7.8 m^3/s, and the calculated water consumption of the hydroelectric power plant will be determined.



Conclusion and recommendations.

The presence of minerals in the river water flowing into the hydroelectric power plant can occur for several reasons and should be addressed as follows:

1. **Solubility properties of the water**: As the river water passes through the ground and rocks, it absorbs minerals from them. If the river water is stopped or its flow is slowed down during the construction of the hydroelectric power plant, the amount of dissolved minerals in the water may increase.

2. **River basin composition**: The rocks, soil and plants present in the river basin cause the minerals to dissolve. If the river water comes from areas rich in minerals, these minerals can be more concentrated in the water through the hydroelectric power plant.

3. **Hydropower plant and water impoundment**: After the construction of the hydroelectric power plant, the flow of river water is stopped or slowed down. This can cause dissolved minerals in the water to accumulate on the riverbed or in stagnant water, rather than being transported to "other places." This leads to a high concentration of minerals in the water.

4. **Evaporation and accumulation**: During the process of evaporation of water, minerals in the water remain in high concentration. Increased evaporation

before or after a hydroelectric power plant can increase the amount of minerals in the water.

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