

The second meeting of the Working Group on tailings safety and prevention of accidental water pollution in Tajikistan

4 April 2023



"Development of joint measures to prevent and respond to pollution of the Syr Darya River in emergency situations (stage I): inventory of tailings"

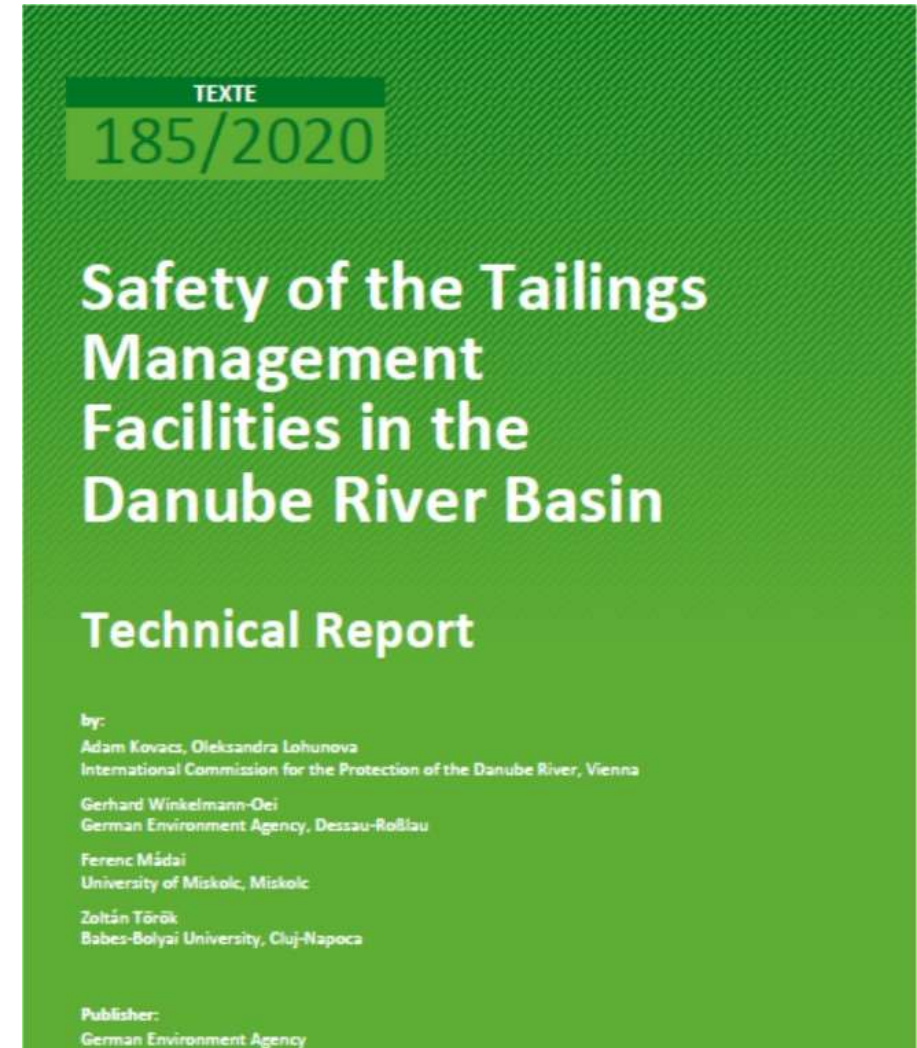


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# Methodology and objectives of the inventory

- Methodology for tailings (version 2020), hazard and risk index method for tailings.
- The template for data collection and analysis was refined based on the results of the project on the safety of tailings in the basin of the Danube river (Romania) in 2019-2020
- Inventory goals:
  - 1) collection and refinement of data on tailings in the basin of the Syr Darya river;
  - 2) calculation of hazard and risk indexes for tailings;
  - 3) carrying out ranking and preparing data for mapping.



# State-administrative map of the territory of the Syr Darya river basin



# Key data on tailings facilities in the basin countries

Parameter	Kazakhstan	Kyrgyzstan	Tajikistan	Uzbekistan	Total or average
Number of operating tailings / Total number of tailings	4/9	7/30	<b>0/10</b>	8/12	19/61
Share of operating tailings, %	44,4	23,3	<b>0</b>	66,6	31,1
Total amount of tailing materials, mln m <sup>3</sup>	514,359	130,049	<b>27,450</b>	704,550	1376,41
Share of tailings in operating tailings, %	86,2	89,8	<b>0</b>	98,9	91,3
Average tailings toxicity (UBA* scale)	1,27	2,97	<b>3,99</b>	3,00	2,37
Waste load on the territory of the country in the Syr Darya basin, m <sup>3</sup> /km <sup>2</sup>	1491	1176	<b>2495</b>	11735	2614
Waste load per capita in the Syr Darya basin, m <sup>3</sup> /person	150,03	40,17	<b>15,78</b>	45,35	57,54
Number of tailings with transboundary significance	0	19	<b>10</b>	4	33

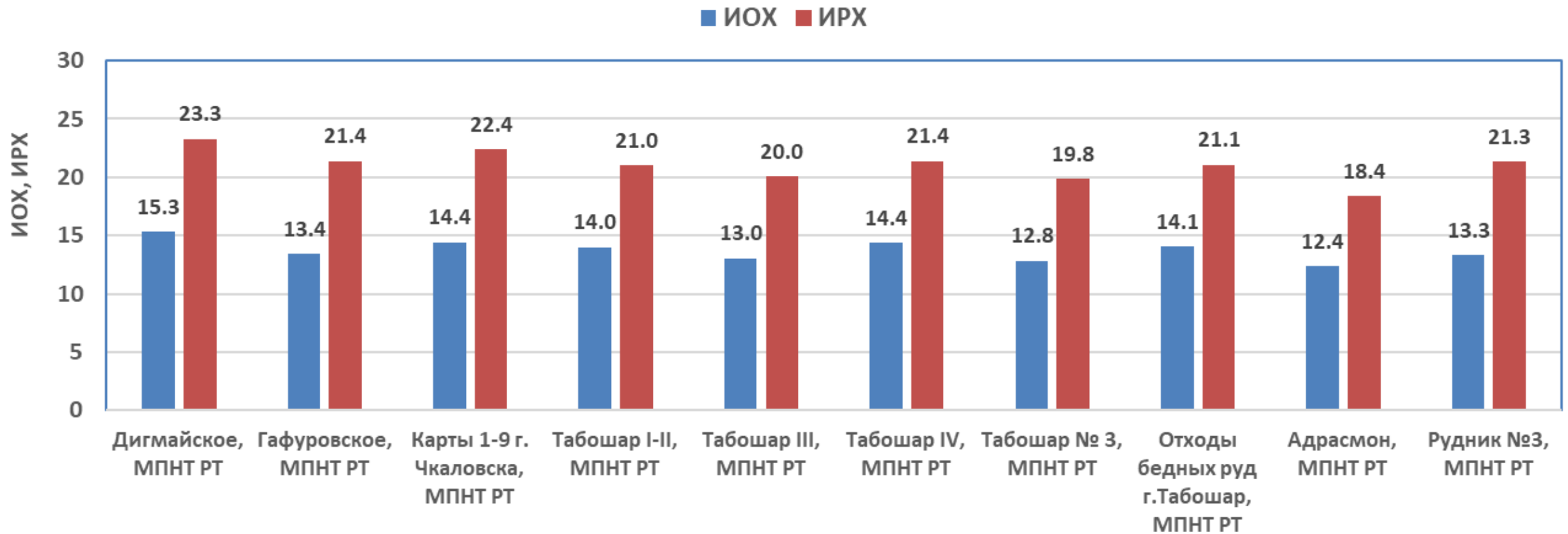
# Tailings ponds in the part of the Syr Darya basin occupied by Tajikistan

Number of tailings				Tailings storage capacity, mln m <sup>3</sup>				Dominant tailing materials
Operating	Closed	Abandoned	Recultivated	Min	Max	Average	Total	
0	10	0	0	0,070	19,400	2,745	27,45	Sludge from the extraction of radioactive ores and non-ferrous metal ores

## The most dangerous tailings

Name of tailings	Place	Tailings storage capacity, mln m <sup>3</sup>	Toxic elements	THI	Ranking of THI	TRI	Ranking of TRI
Digmayskoye, MIT RT	Goziyon	19,4	Radionuclides: U, Pu, Th, Rh, Po; Cd, Pb, Zn, cyanides	15,29	6	23,29	3
Maps 1-9 Chkalovsk, MIT RT	Buston	2,6	Radionuclides: U, Pu, Th, Rh, Po	14,41	15	22,41	5

# TAILING FACILITY HAZARD AND RISK ASSESSMENT BY THE TAILING HAZARD INDEX (THI) METHODS AND TAILING RISK INDEX (TRI)





# Tailings in part of the Syr Darya basin upstream of Kazakhstan

Country	Quantity of tailings				Tailings storage capacity, mln m <sup>3</sup>				Dominant tailing materials
	Operating	Closed	Abandoned	Recultivated	Min	Max	Average	Total	
Kazakhstan	4	4	0	1	0,100	286,624	57,151	514,359	Phosphorus production waste, non-ferrous metal slurry
Kyrgyzstan	7	18	5	0	0,020	100,000	4,335	130,049	Sludge from the extraction of radioactive ores and non-ferrous metal ores
Uzbekistan	12	3	1	0	0,165	409,100	58,713	704,55	Sludge from the extraction of non-ferrous metal ores and the production of phosphorus

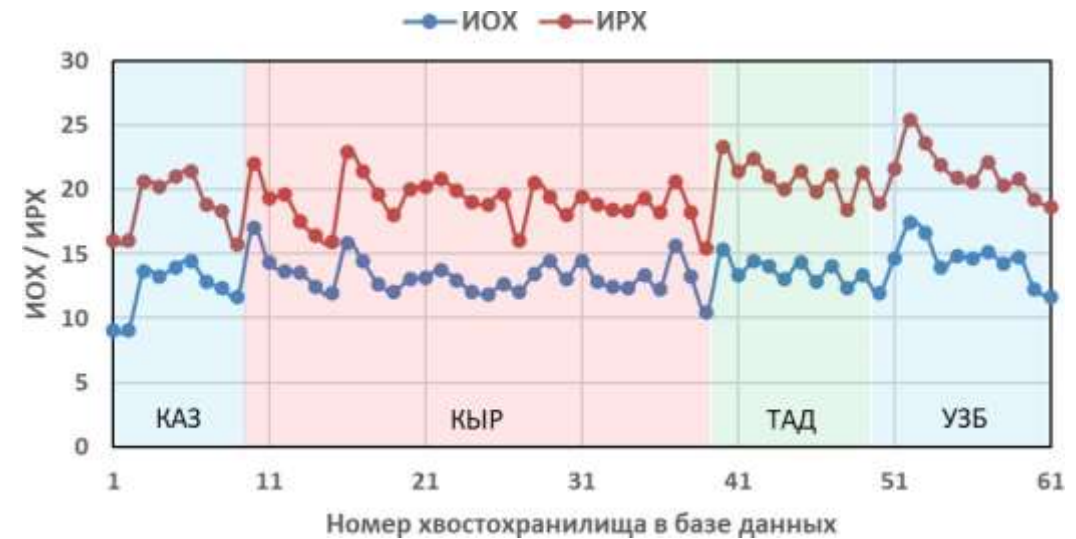
# Tailings with potential cross-border effects

Country	Location	Total quantity
<b>Kyrgyzstan</b>	Naryn, Mailuu-Suu, Sumsar, Chatkal region, Kadamjay, Aydarken	19
<b>Tajikistan</b>	Goziyon, Gafurov, Buston, Istiklol, Adrasman, Khujand	10
<b>Uzbekistan</b>	sChadak, Pap district, Namangan region, Almaly, Pskent region, Tashkent region	4



# Comparative analysis of the danger and risk of tailings in the Syr Darya river basin

	Казахстан	Кыргызстан	Таджикистан	Узбекистан
THI/TRI min	9,00 / 15,69	10,45 / 15,45	12,38 / 18,38	11,65 / 18,65
THI/TRI max	14,46 / 21,46	17,00 / 22,88	15,29 / 23,29	17,43 / 25,43
Average THI/TRI	<b>12,24 /18,69</b>	<b>13,24 / 19,07</b>	<b>13,71 / 21,01</b>	<b>14,34 /21,17</b>



# Conclusion

- In general, the most hazardous tailings are located in Uzbekistan and Tajikistan, compared to the less hazardous ones in Kyrgyzstan and Kazakhstan. Most of them store waste from the extraction of gold, non-ferrous metals, uranium, and phosphorus production.
- The basin countries have specific hazards and risks associated with tailings. Kazakhstan has the highest per capita burden; Uzbekistan has the highest volume of waste per country, Tajikistan has tailings with materials of higher toxicity.
- Thirty-three of the 61 tailings are of transboundary importance, with the majority located in Kyrgyzstan (19) and Tajikistan (10), while 2 of Uzbekistan's 4 transboundary tailings store hundreds of millions of m<sup>3</sup> of waste.

Thank you for your attention!