



National Academy of Sciences of Tajikistan
Chemical, Biological, Radiological and Nuclear Safety and Security Agency

“Regulatory activities for Remediation of Uranium production legacy sites in Tajikistan”

Bakhtiyor Barotov, PhD
Тел: +992 93 776 66 36
e-mail: b.barotov@cbrn.tj



NORTHERN TAJIKISTAN





Бустон Buston

Истиклол Istiklol

Адрасман Adrasman

Кансай Kansay Гаферов Gafurov

Чорух-Дайрон Chorukh-Dayron

Хучанд Худжанд

Расулов Rasulov

Гафуров Gafurov Гафуров Gafurov

Image Landsat
US Dept of State Geographer
© 2016 Google

Кайраккумское Водохранилище ©2010 Google

info@cbrn.tj



Information about the ULS

Наименование места и название хвостохранилища		Период эксплуатации	Сан. защитная зона, м Площадь, га	Толщина покрытия, м	МЭД на поверхность и, мкР/ч	Количество отходов, <u>млн. тонн</u> Кюри
1. Хвостохранилище «Дигмай»	Газиян 1,5 км -	с 1963 г.	400 90,0	-	650-2000	36 4218
2. Хвостохранилище Гафуровское	г. Гафуров, 0,5 км	1945-1950	- 4,0	2,5	20-60	0,4 159
3. Хвостохранилище Карты 1-9	г. Чкаловск	1949-1967	50,0 18,0	0,5	20-60	3,03 779
4. Хвостохранилище (I-II очереди)	г. Табошар,	1945-1959	50,0 24,7	0,7-1,0	40-60	1,69 218
5. Хвостохранилище (III очереди)	г. Табошар, 0,5 км	1947-1963	50,0 11,06	0,7-1,0	40-60	1,8 232
6. Хвостохранилище (IV очереди)	г. Табошар, 1,0 км	1949-1965	50,0 18,76	0,7-1,0	40-60	4,13 510
7. Хвостохранилище цеха №3	г. Табошар, 3,0 км	1949-1965	50,0 2,86	0,7-1,0	40-60	0,117 15,2
8. Отходы фабрики бедных руд (ФБР)	г. Табошар, 4,0 км	1950-1965	- 3,35	-	40-100	2,03 253
9. Хвостохранилище пос. Адрасман	1 км от пос. Адрасман	с 1991г.	- 2,5	1,0	50-60	0,4 160
10. Рудник-3 г. Худжанда	2 км от г. Худжанда	1976-1985	- 5,9	0,5 м	60-80	3,5 11,0



Degmay Site

- In operation from 1963 to 1994
- Territory 90 hectares
- Approximate total activity 4218 Ci.
- Dose rate in the surface up to 13 $\mu\text{Sv/h}$ (1 m).
- Volume 21 mln tonns reprocessed waste, 0,5 mln tonns rock waste and 5,7 mln tonns from Vanadium ore reprocessed waste.





Degmay doserate map ($\mu\text{Sv/h}$): 1. Not covered area I (5,0 to 13). 2. Not covered area II (0,5 to 5,0). 3. Covered area with 0,5 m soil (0,3 to 0,5). 4. Border area (0,15 to 0,3). 5. Dum. 6. Water collection basin.



Taboshar Tailing Sites

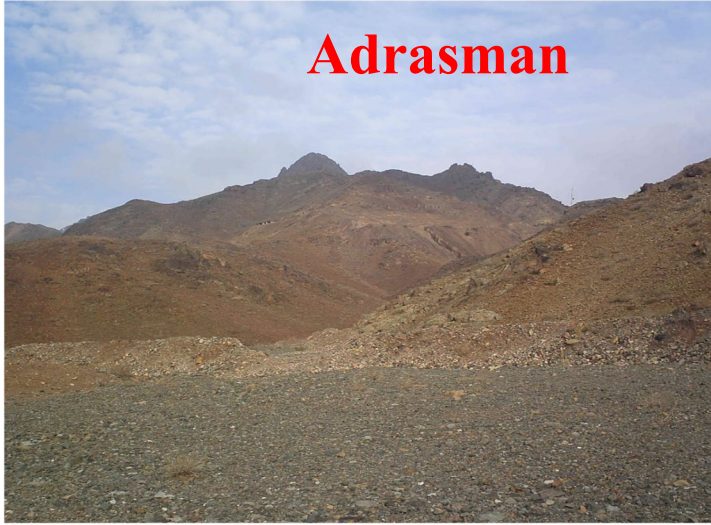
- Operation from 1945 to 1965 .
- Tailing territory – 50 hectares. Total site territory 800 hectares.
- Approximate total activity – 1228 Ci
- Dosrate in surface 0,4-2,5 $\mu\text{Sv/h}$.
- No fence and monitoring wells in the site.





Other ULS

Adrasman



Kiik-Tal



Map 1-9



Gafurov





Legislative basis for regulation of activities on environmental remediation of UPLS

The governmental and legislative framework for environmental remediation in Tajikistan is provided primarily through five main laws:

- Law on Radiation Safety (Law 42), issued 1 August 2003
- Law on Use of Atomic Energy (Law 69), issued 9 December 2004.
- Law on Radioactive Waste Management (Law 1002), issued on 22 July 2013.
- Law on Licensing of Specific Types of Activities (Law 37) issued 17 May 2004, (amended in 2009)
- Law on Inspection of Economic Entities' Activities in the Republic of Tajikistan (Law 194) amended on 28 July 2006.



Regulatory requirements and related documents approved within bilateral cooperation in 2013, 2014 and 2015

1. RT Governmental Decree ***№505 dated 1 August 2014*** on National strategy for remediation of legacy sites for the period from 2014-2024.
2. RT Governmental Decree ***№507 dated 1 August 2014*** on State Cadastre of RW storages.
3. RT Governmental Decree ***№524 dated 2 August 2014*** on State Authorized Body for legacy sites remediation (responsible for all stages of remediation process).
4. RT Governmental Decree ***№362 dated 30 May 2015*** on Order of radioactive waste movement through state border to foreign countries and within the Republic of Tajikistan.
5. - **Action plan on implementation of National conception (strategy) on Remediation of contaminated by uranium production legacy sites for 2014-2024 (2016)**



On going projects on site characterization and remediation in cooperation with

- IAEA (CGULS Project from 2013);**
- Interstate target program "Remediation of territories of EurAsEC member states affected by uranium mining industries" 2010-2020 (ROSATOM);**
- INSC TJ 4.01-02/11 "EIA and Feasibility studies in uranium legacy sites of Degmay and Taboshar of Tajikistan 2015-2018 (EC).**



Interstate target program "Remediation of territories of EurAsEC member states affected by uranium mining industries" 2010-2020

Two remediation projects were developed for Taboshar site:

- "Factory of poor ores" with territory of "Yellow Hill";**
- "Tailings of 1-4 site".**

State expertise of this projects already finished in August 2017. Radiation protection and technological part were expertise by CBRN SSA.

Project fund: round 800 mln rubles (13 mln US\$).

Contractor: The Joint-Stock Company "Central design and technology institute" under Rosatom win tender for implementation of remediation works of legacy sites in Istiklol under Inter-State Target Programm (CIS)



Expertise of remediation project (Radiation protection and technological part)

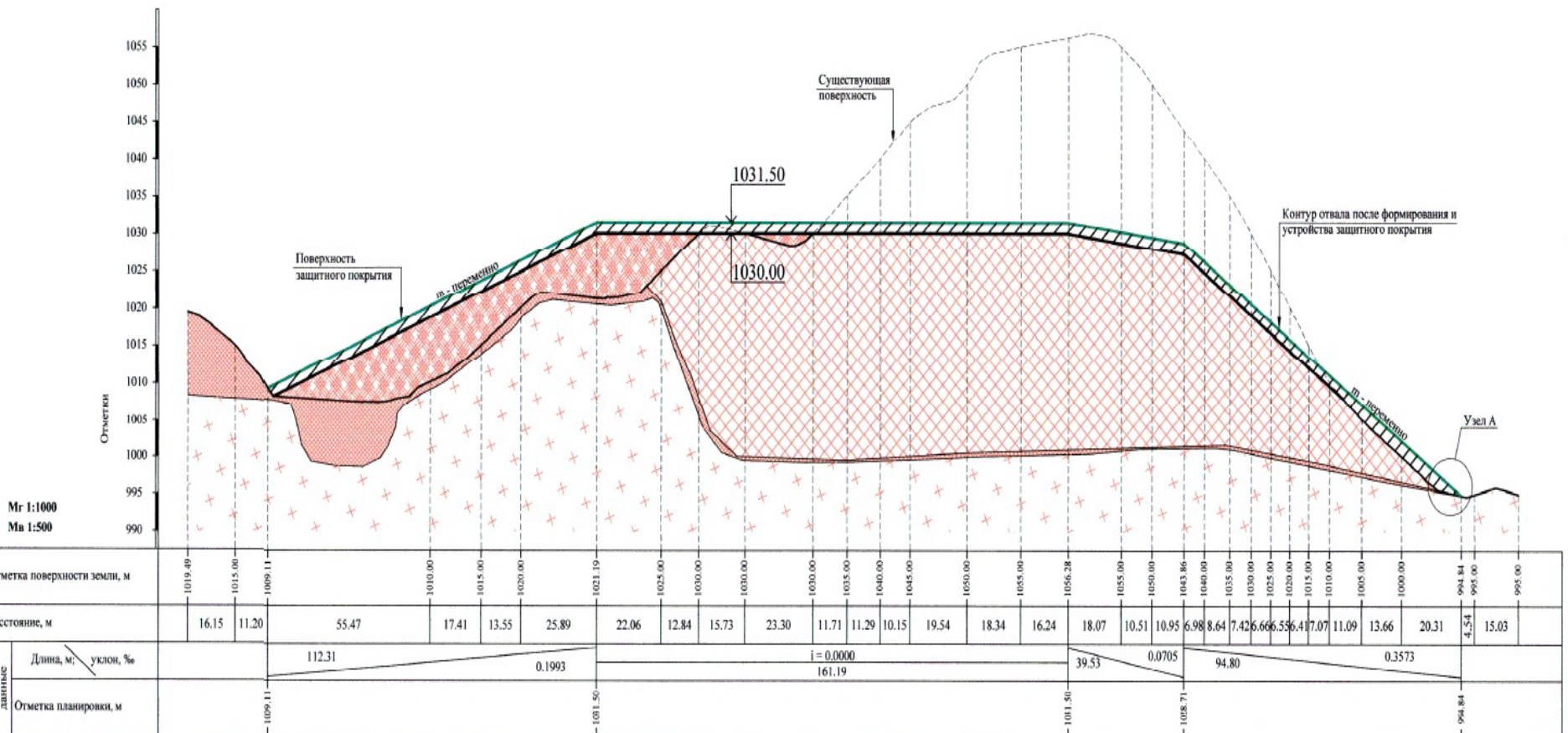
- Characteristics of tailings;
- Requirements for remediation;
- Remediation technical solutions;
- Water disposal;
- Monitoring, including dust and water;
- Safety engineering, radiation safety;
- Transfer of remediated objects;





Covering scheme of "Yellow Hill" in Istiklol (Taboshar)

2 - 2





Remediation projects of “Factory of pour ores” with territory of “Yellow Hill” and “Tailings of 1-4 site” of Taboshar Site (Istiklol).





INSC TJ 4.01-02/11 “EIA and Feasibility studies in uranium legacy sites of Degmay and Taboshar of Tajikistan 2015-2018

Site characterization and preliminary feasibility studies finished for this two sites in August 2017. Each step of the project were discussed with all stakeholders from different ministries and agencies. The next planned steps are Environmental impact assessment and public hearings.



EuropeAid/137542/DH/SER/TJ “Detail designing and technological decision of water treatment plant for Taboshar”

In 2017, during 6 months, research and investigation were carried out on the purification of water from open pit lake flowing from the edit No. 6 in the city of Istiklol (Taboshar). The technology of water purification and the design of a water treatment plant for further coordination and the announcement of a tender for the construction of the station are presented.



Degmay urgent covering project 2016-2017

With the financial support of the Government of the Sogd region of the Republic of Tajikistan, the site operator - Tajredmet developed and presented a project on covering the surface of the Degmay tailings as an urgent measure to prevent public exposure.

NRSA staff carried out project expertise and allowed to carry out coating works with the presented conditions. Periodically inspectors of NRSA check the compliance of work performed with the norms and rules for radiation safety.





Cooperation with the EBRD on the environmental account and UPLS remediation in Central Asia

On January 12 - 13, 2017 in Dushanbe, the "Strategic Master Plan for Remediation of Uranium Legacy Sites in Central Asia" was presented, which was reviewed, discussed and approved by Tajik side. All measures are being taken to attract stakeholders and to prepare information for the donor conference in 2018.



Introduction to CBRN Laboratory



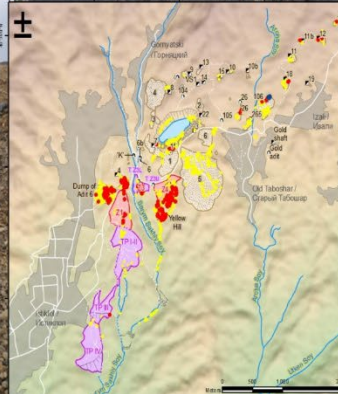
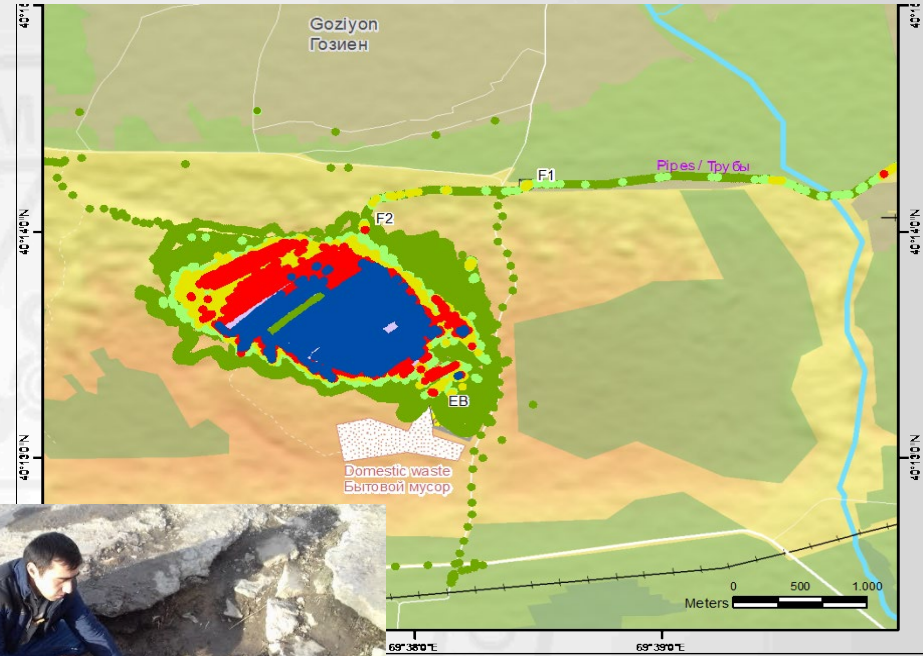
- **Established in 2011**
- **Accredited by ISO17025 in 2016**
- **Member of ALMERA from 2017**
- **Number of staff 19**
- **All analysis for radioactivity and Services on radiation safety**
- **New building of Lab will be in operation in September 2023.**





Environmental monitoring of Uranium production legacy sites

- Gamma survey, dose rate, radon
- Water in situ parameters

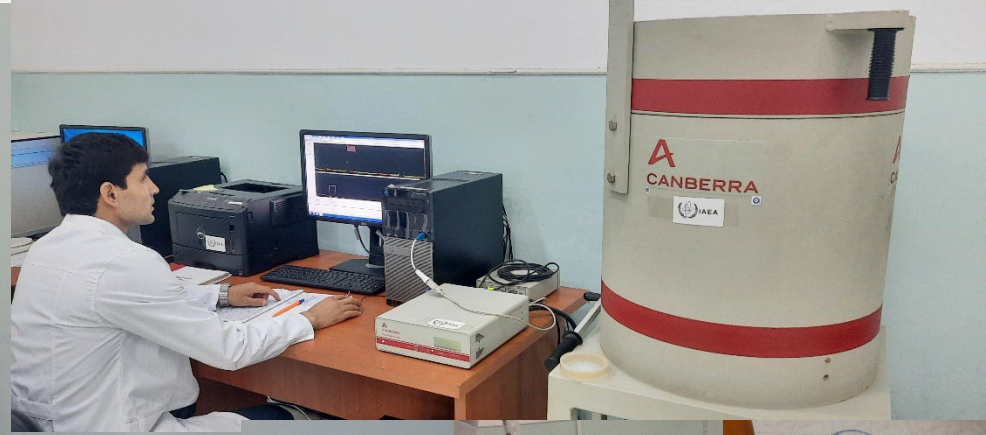


Soil and water sampling in and around tailings



Radioactivity component

Gamma spectrometry, alpha spectrometry, gamma-beta spectrometry, alpha-beta counter, air-sampler, radon-meter, radio-chemical analysis.



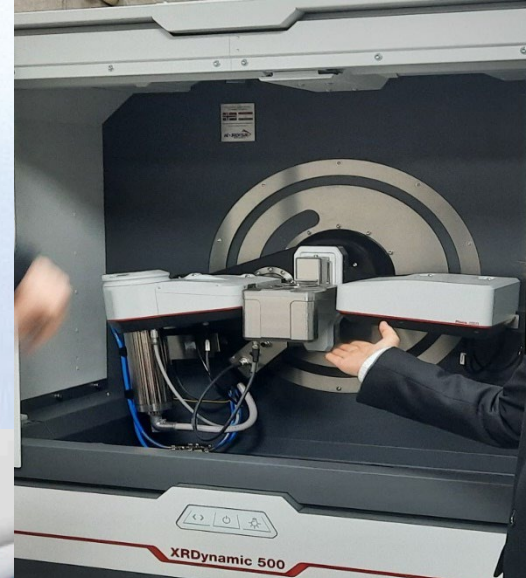


Chemical component

Determination of uranium, heavy metals, minerals, rare and rare earth elements, in samples.



H																				He
Li	Be											B	C	N	O	F	Ne			
Na	Mg											Al	Si	P	S	Cl	Ar			
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr			
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe			
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn			
Fr	Ra	Ac																		
					Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu		
					Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		



XRF, XRD, AAS, ...



Summary of regulator's activities related to Remediation of UPLS

- ***Drafting legislative documents***
- ***Inspection and verification of monitoring data.***
- ***Expertise documents during licensing***
- ***Inspection during remediation***
- ***Providing technical services through TSO***

Thank you for your kind attention!