

Cleaning up a toxic legacy: environmental remediation of former uranium production sites in Central Asia

By Andrew Green

Nearly 60 abandoned uranium production sites dot the landscape and represent a hazard to the environment and inhabitants throughout rural Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan. Each site poses a challenge for local and national governments that lack technical expertise and resources for remediation.

Challenges in Kyrgyzstan

According to the Ministry of Emergency Situations of the Kyrgyz Republic, Kyrgyzstan has 35 tailings dumps and 25 sites with waste rock piles. Many of these contain toxic residues. The possibility of seismic instability, such as landslides dispersing these residues, poses the biggest risk to the surrounding environment, said Asel Seitkazieva, Deputy Director at the Ministry.

With this in mind, the government considers the Mailuu-Suu uranium legacy site (mark ① on map) and the Min-Kush uranium legacy site (mark ② on map) as the first priorities for remediation.

At the Min-Kush site, which lies in the centre of the country, the Kyrgyz authorities have received assistance in environmental remediation planning and project implementation from the IAEA's Coordination Group for Uranium Legacy Sites (CGULS). Through IAEA technical cooperation projects, specialists from the country's Ministry of Health, the National Academy of Sciences and the State Agency for Environmental Protection and Forestry have also learned how to use gamma and alpha spectrometry to assess and monitor radiation levels.

Although plans for remediation are beginning to be developed, the entire Min-Kush site remains in poor condition due to lack of funds, and remediation activities have yet to be implemented. However, by beginning to transfer tailings to safer sites and working to restore them, the groundwork has been set for future remediation. Once funding is secured, physical transfer of the waste and recultivation of the site will take place, Seitkazieva said.



●: Former uranium production sites in Kyrgyzstan.
①: Mailuu-Suu ②: Min-Kush

(Source: Ministry of Emergency Situations/ Kyrgyzstan)

The sites were used to produce uranium until the 1990s. They were built before proper regulatory infrastructure was in place to ensure eventual decommissioning, so leftover residues with long-lived radioactive and highly toxic chemical contaminants still pose substantial risks to the health of the public and the environment.

By some estimates, the quantity of uranium production residues in Central Asia — such as waste rock and tailings — approaches one billion tonnes, said John Rowat, Head of the Decommissioning and Remediation Unit at the IAEA Department of Nuclear Safety and Security. Many of these materials are stored in an unsafe manner at sites scattered across the region. Due to lack of funding, work over the last decade has focused mostly on short term measures to protect the public and the environment, Rowat said.



Progress and lessons learned in Mailuu-Suu

Landslides, flooding and the possible failure of containment barriers are also a concern at the Mailuu-Suu site, which houses a significant amount of residual radioactive contaminants. However, progress is being made. With assistance from the IAEA and at the request of Kyrgyzstan's Government, international aid for remediation of uranium legacy sites is provided by the Commonwealth of Independent States and the European Commission.

A total of 36 waste piles and mill tailings have been partially remediated and cultivated, and several landslide-prone spots near tailings have been improved and re-engineered to reduce the likelihood of seismic impact. Many of these projects remain incomplete, and many mines in need of remediation are in poor condition due to lack of funding. As with the Min-Kush site, regular monitoring and surveillance programmes need to be established, and better public communication and institutional control measures need to be put in place, Rowat said.

What neighbouring countries can learn from Kyrgyzstan's experience

Kyrgyzstan's experience with internationally supported remediation efforts may be helpful

for neighbouring countries working on similar projects, Seitkazieva said.

Tajikistan and Uzbekistan, for instance, have engaged the IAEA Technical Cooperation Programme to procure laboratory equipment, arrange training of staff and assist in site characterization exercises, much like what Kyrgyzstan has done. Seitkazieva said that Kyrgyzstan's positive experience with the IAEA could serve as a useful roadmap for future international remediation efforts, especially when seeking ways to implement programmes within existing national regulatory frameworks.

Member States in Central Asia often share common challenges when it comes to remediation. For instance, the Ferghana Valley is a watershed that spans Kyrgyzstan, Tajikistan and Uzbekistan, and it is a valued agricultural region for all three countries. But former uranium production sites impinge on the valley, threatening to contaminate it with toxic substances.

"The Ferghana Valley is a good example of why it's important to take a regional approach to uranium legacy site remediation in Central Asia, to complement country-specific programmes," Rowat said. "Kyrgyzstan, Tajikistan, and Uzbekistan all draw upon the water resources of the Valley."

The Min-Kush uranium production legacy site is situated in an area prone to landslides.

(Photo: IAEA)

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