



Environmental Remediation in Central Asia

Towards the Global Goals



EUROPEAN UNION



European Bank
for Reconstruction and Development

"Since the dawn of the nuclear age, the hazard of abandoned uranium sites and toxic waste on the environment, the economy and above all people, has been an increasing challenge and one that is particularly visible in Central Asia. As part of the EU strategy for the region and in line with the Sustainable Development Goals, our key objective is to protect the planet from degradation and preserve it for future generations. This is why the European Union, in close cooperation with local, regional and international partners, has set out a comprehensive programme focusing on environmental remediation - making affected areas safe again. However, we want to continue widening the range of our partners. Only broad international solidarity will be able to provide a comprehensive answer to the problem of radioactive and toxic waste".

Neven Mimica, European Commissioner for International
Cooperation and Development

"We are joining forces to address an urgent issue which has not yet received the attention it deserves. The legacy of uranium mining and processing in Central Asia is an imminent threat to the affected countries and our joint challenge is to act before irreversible damage has been done. The EBRD's experience in nuclear safety demonstrates that only a joint effort combining governments' and institutions' funds and capacities will lead to success. We have risen to this challenge before and we shall do so again".

Sir Suma Chakrabarti, President of the European Bank for
Reconstruction and Development (EBRD)

The background features a white central area with teal geometric shapes in the corners. A large teal triangle is in the top-left corner, and a smaller teal triangle is in the bottom-right corner. A greyish-blue triangle is in the bottom-left corner.

Environmental Remediation in Central Asia

Towards the Global Goals



THE KYRGYZ REPUBLIC
Diversion channel in Mailuu-Suu



ENVIRONMENTAL REMEDIATION IN CENTRAL ASIA

Resolving the legacy of uranium mining and production in Central Asia is an important task of growing urgency. Without action, the release of radioactive and toxic waste into rivers in densely populated areas is inevitable. As radioactive pollution knows no borders it is imperative that the affected countries and the international community join forces and act before irreversible damage occurs.

Concerted efforts have gathered momentum following the adoption of a resolution by the UN General Assembly in 2013 calling for international support in dealing with the issue. Subsequently, the European Union funded impact and feasibility studies in the framework of its environmental strategy for Central Asia. The International Atomic Energy Agency led efforts to develop a Strategic Master Plan for the most contaminated sites in the Kyrgyz Republic, Tajikistan and Uzbekistan. The appeal for international support was repeated in the framework of a new UN resolution adopted in 2018.

This essential preparatory work culminated in the establishment of the Environmental Remediation Account for Central Asia (ERA) at the European Bank for Reconstruction

and Development (EBRD) in 2015. The Bank manages the multilateral donor account building on the considerable experience it has gathered in the past 20 years in carrying out multi-donor nuclear safety programmes such as the enclosure of the destroyed reactor in Chernobyl.

The European Union became the first donor to the new Fund. While this has allowed the Fund to become fully operational and be ready to implement the necessary remediation, much more is needed. Total cost of the programme is estimated at €85 million. A pledging conference held in 2018 yielded additional funds. However, more financial means are needed to bridge the current financial gap.

Current available finances allow the programme to start remediation projects at selected sites in the Kyrgyz Republic and in Uzbekistan. Significant challenges requiring urgent action remain at other priority sites in Central Asia. The issues and solutions are explained in this booklet.

The joint effort of the countries of Central Asia and the international community can make it happen. Your contribution is key.

“The General Assembly, [...] Reaffirming the human rights to an adequate standard of living [...] Stressing the need to mitigate the impact of natural and man-made disasters in the areas around uranium waste burial sites and tailings ponds in order to avoid loss of human life, as well as immediate and long-term negative consequences for human health, [...] Considering that a number of states continue to have serious social, economic and environmental problems associated with former uranium tailing mines and tailing ponds [...] Calls upon the international community to assist the states of Central Asia in solving the problems [...]”

UN resolution 73/238 adopted by the General Assembly, 20 December 2018

THE CHALLENGE

The legacy of uranium mining and processing in Central Asia poses a potential danger to the population living in the region. The fertile Ferghana Valley alone which links Uzbekistan, Tajikistan and the Kyrgyz Republic is populated by 14 million people and could be negatively affected by the release of toxic material into the soil, surface and waterways. Not only the environment and health of the population, but also the economy of the region will be affected.

While the danger is imminent, the history of uranium-related activities in the region goes back to the mid-1940s when mining started in the mountainous areas above the Syr Darya river and the Ferghana Valley. When production stopped in the 1990s after the countries' independence, abandoned mining and milling sites, dumps of waste rock and low-grade ore as well as piles and ponds of tailings became an environmental hazard which over the years grew into a serious threat.

Few protective measures were in place prior to mine and mill closures and little remediation has since been carried out at disused facilities and waste sites. Today where measures have been put in place, they generally do not meet international standards or best practice. Mine shafts, tunnels and adits often remain open and accessible to local people and livestock. Waste rock and low grade ore dumps and tailings piles are often not, or only poorly, covered, and in some cases exposed to the elements. The possible entry of

rainwater and groundwater into mines, dumps and piles poses an imminent danger of contamination of water used for drinking and irrigation.

Seven priority sites have been identified covered in-depth under section "Priority Sites":



The Kyrgyz Republic

- Min-Kush
- Shekaftar
- Mailuu-Suu



Tajikistan

- Degmay
- Istiklol



Uzbekistan

- Charkesar
- Yangiabad

The waste sites also pose wider risks because of the possibility of structural failure caused by erosion, floods, earthquakes, landslides or mudslides. This could lead to a wide dispersion of radioactive and toxic material via the Syr Darya river system beyond state borders. Consequently, waste releases may affect the stability and security of the whole region.

Meanwhile, continued releases may also place lasting restrictions on the downstream use of water for drinking and irrigation and/or its treatment to





reduce the levels of radioactive or toxic material to tolerable levels. This could have major implications for the health and economic well-being of the people in the Ferghana Valley, where agricultural production is a major contributor to the economy and food supplies of the region.

Without environmental remediation the release of radioactive and toxic waste into rivers is a given. The legacy sites will remain a source of elevated environmental danger and health risk for generations to come. It is not a question of "if", but "when" an accident will happen.



THE KYRGYZ REPUBLIC

The village of Min-Kush

Several studies estimate the total remediation costs at €85 million. This estimate is based on financing the remediation works at the selected seven priority hotspots and includes the financing of works, project management and monitoring.

WHAT IS ENVIRONMENTAL REMEDIATION?

In dealing with uranium production legacies, environmental remediation means reducing exposure to radiation and toxic substances from contaminated soil, groundwater or surface water. The purpose is to protect people and the environment against potential harmful effects from exposure to pollution or contaminants.

This requires thoroughly analysing exposure pathways, quantifying the risks and designing remediation solutions which may include treatment, containment or removal of hazardous or toxic wastes. The design of solutions is dependent on the specifics of each site. They often include fencing of sites, closures of shafts, adits, sinkholes, covers for tailings, relocation of waste rock dumps, and protective measures for waterways and demolition of contaminated facilities.

Environmental impact assessments and feasibility studies provide the basis for a state-of-the-art approach to identifying appropriate remediation solutions. The EU has funded such studies for seven high priority sites in the Kyrgyz Republic, Tajikistan and Uzbekistan. They outline the best solutions in line with highest safety standards and international best practice.



THE STRATEGIC MASTER PLAN (SMP)

The Strategic Master Plan (SMP) for the environmental remediation of uranium legacy sites in Central Asia has been prepared under the aegis of the IAEA by the Coordination Group for Uranium Legacy Sites.

It comprises two key elements: First, a strategy to address the legacy sites and second, a plan for its implementation including time frames, cost estimates, and roles and responsibilities. It takes into account the site studies commissioned by the European Commission and those of a separate programme funded by the Commonwealth of Independent States. The SMP covers physical remediation projects and measures for capacity building and regional cooperation which are indispensable for a safe and sustainable remediation of the legacy sites.

As the joint programme of all key parties, the SMP constitutes a shared framework guiding individual actions of the parties towards overcoming the dangerous legacy. It will be regularly updated on the basis of further developments.

THE ENVIRONMENTAL REMEDIATION ACCOUNT (ERA)

The Environmental Remediation Account for Central Asia (ERA) was established in 2015 by the European Bank for Reconstruction and Development (EBRD) following an initiative of the European Commission.

The aim of the Fund is to pool donor contributions to assist the Kyrgyz Republic, Tajikistan and Uzbekistan to remediate seven priority sites which have been agreed on as scope of the initiative. To date, the countries have signed Framework Agreements with the EBRD setting out the conditions for project implementation. These include tax exemption for grant funds, applicability of the EBRD's Procurement Policies and Rules and transparency in project implementation and financial management. Independent oversight at local project level will be provided for.

The EBRD, a Development Bank, has a strong track record in managing nuclear safety programmes, as most publicly demonstrated with the Chernobyl Shelter Fund. Established in 1991 the EBRD has wide experience in supporting the countries of Eastern Europe and Central Asia.

THE RESPONSE

The legacy of uranium mining and processing endangers the well-being, prosperity and sustainable development of the affected countries, and it needs to be dealt with.

Faced with budgetary constraints the Central Asian countries, the Kyrgyz Republic, Tajikistan and Uzbekistan have asked for international support to address this pressing issue. The international community was asked to provide assistance in resolutions adopted by the UN General Assembly respectively in December 2013 and December 2018 as well as through numerous IAEA General Conference resolutions.

The international community's engagement is in line with the Sustainable Development Goals, signed by world leaders in September 2015 at a UN summit and effective since the beginning of 2016. With these universal goals countries are mobilising efforts to end poverty, fight inequality and tackle climate change, while ensuring that no one is left behind.



3

GOOD HEALTH
& WELL-BEING

6

CLEAN WATER
& SANITATION

15

LIFE
ON LAND

THE SUSTAINABLE DEVELOPMENT GOALS AND ERA

The environmental remediation programme for Central Asia, to be implemented by ERA, contributes to the Sustainable Development Goals by addressing goals 3, 6 and 15 as well as to the implementation of national development plans.

The programme supports Goal 3 (Good Health and Well-Being), which stands for ensuring healthy lives and promotes well-being for all at all ages, aims at combating disease and reducing deaths and illnesses from air, water and soil pollution and contamination. This is particularly relevant for all uranium legacy sites since water, air and soil pollution are key risks originating from the sites.

Furthermore, Goal 6 (Clean Water and Sanitation) stands for ensuring the availability and sustainable management of water and sanitation for all. The planned environmental remediation works will improve water quality through reducing pollution caused by the release of hazardous substances into surface and ground water.

On Goal 15 (Life on Land) the programme ensures the further conservation and restoration of terrestrial and inland freshwater and ecosystems, thus enhancing the countries' potential as agriculture is an important economic resource and means of development for Central Asia.

REMEDIATION COST TOTAL ESTIMATE

Based on currently available assessments for each site



Over the past years significant progress has been made and the cornerstones for an effective environmental remediation programme are now in place.

The Strategic Master Plan provides guidance on what needs to be done and how the Central Asian countries and the international community can effectively coordinate their efforts to guarantee the most efficient and cost-effective approach.

An unprecedented extent of cooperation between international organisations such as the EU, EBRD, IAEA, UNDP, CIS, OSCE has been established over time and will ensure that synergies will be fully leveraged.

Environmental impact and feasibility studies for the seven high priority sites have been or will soon be completed. They clearly define

appropriate remediation solutions and the estimated cost.

For the financing and implementation of these measures the multilateral ERA Fund was established by the EBRD in 2015 with the Bank as fund manager. The EBRD has more than 20 years of experience in nuclear safety and decommissioning projects in its countries of operation which can be deployed when tackling this new challenge. Pledges and funding have been provided by Belgium, the EU, Norway, Lithuania, Switzerland and the United States.

A robust organisational and financial structure is in place, the necessary risk assessments have been mostly completed, project management units are being established and remediation plans are ready for implementation.

Total cost of the programme is currently estimated at €85 million. To date pledges and funding have been provided by Belgium, the EU, Norway, Lithuania, Switzerland and the United States. To close the remaining shortfall and successfully implement the environmental remediation programme, a commitment to contribute about €50 million is still needed by the international community.



Uzbekistan

PRIORITY SITES

The European Commission has played a key role in addressing the legacy of uranium mining and processing in Central Asia. Starting in 2013 the EU has funded environmental impact assessments and feasibility studies for seven hot spots. These are Min-Kush, Shekaftar and Mailuu-Suu in the Kyrgyz Republic, Istiklol (formerly Taboshar) and Degmay in Tajikistan and Charkesar and Yangiabad in Uzbekistan.

To date EU funded studies have been completed for most sites. Preferred remediation options have been identified and their costs estimated; documentation has been developed that will serve as a basis for tendering the proposed remediation work. The main characteristics for each of the legacy sites are briefly outlined below.



TAJIKISTAN

Degmay tailing site containing 36 million tons of uranium tailing waste



● PRIORITY SITE

◆ CAPITAL

MIN-KUSH

Min-Kush is located approximately 130 km south of the capital Bishkek in the Kyrgyz Republic. As a former industry manufacturing hub, Min-Kush was home to more than 20,000 people. These days, the city is populated by 3,200 people and is filled with abandoned factories and crumbling houses. The factories produced a variety of goods, but Min-Kush was most valued for being an important uranium supplier. The health risks of mining and processing uranium were little known at the time and were given little attention. Min-Kush is a telling story in Central Asia: from industrial wealth to crippling poverty with environmental remediation desperately required for the remaining population.



EIA and feasibility study completed in March 2017



Remediation plans developed, evaluated and approved



Independent peer review done



Technical specifications finalised and ready as basis for tendering remediation works



WHAT ARE THE RISKS

Of special concern is the risk of radiological and chemical impact from mine waters used for drinking and irrigation. Many mine openings (shafts, adits, sinkholes) and especially the old dilapidated uranium processing facilities represent a high risk to

the public. Waste rock dumps pose an elevated environmental risk due to water infiltration spreading contamination via erosion and exposure to landslides.

WHAT HAS ALREADY HAPPENED

A systematic and comprehensive evaluation of the risks and remediation options (including costs) for each object presenting

a significant risk on the Min-Kush site has been undertaken with support from the EU.



WHAT REMEDIATION WORKS ARE PLANNED

Various options for remediating all legacy objects (apart from tailings ponds being targeted in a CIS programme) that presented a significant risk on the Min-Kush site were assessed in the EU supported project. Technical specifications, costings and safety assessments have been prepared for the closure of

7 shafts or adits and 7 sink-holes; demolition of old dilapidated processing facilities including two bunkers and a mill with in-situ disposal; and various activities at three waste rock dumps concerned with the drainage, discharge or diversion of water.



THE KYRGYZ REPUBLIC
Cattle drinking contaminated
mining water

REMEDATION WORKS ACTIVITIES

Remediation works timetable
1.5 years



- Closures of shafts, adits, sinkholes
- Demolition of and cover layer for processing plant and other legacy facilities
- Construction of diversion channels
- Cover layer on waste rock dumps

SHEKAFTAR

Shekaftar is a village of 3,500 people in the southwestern part of the Kyrgyz Republic and it is located about 10 km from the border with Uzbekistan. The mining complex encompasses 3 closed mines and 8 mining waste disposal areas that contain about 700,000 cubic metres of waste from the mining operations.

In the past Shekaftar had a thriving community working in the uranium mines. At present, due to its geographical position and the closure of the mines, Shekaftar is left with a 70% unemployment rate and risks posed by the radioactive waste rock dumps scattered around the village and next to a school.



EIA and feasibility study completed in March 2017



Remediation plans developed, evaluated and approved



Independent peer review done



Technical specifications finalised and ready as basis for tendering remediation works



WHAT ARE THE RISKS

One waste rock dump located at the Sumsar river poses risks due to floods and erosion processes that can spread contaminated material downstream towards Uzbekistan. Many mine openings (shafts, adits, sinkholes) pose a relatively high risk to the public in general.

WHAT HAS ALREADY HAPPENED

A systematic and comprehensive evaluation of the risks and remediation options (including costs) for each object presenting

a significant risk on the Shekaftar site has been carried out with support from the EU.



THE KYRGYZ REPUBLIC
River erosion and river protection
of rock dump

REMEDIATION WORKS ACTIVITIES

Remediation works timetable
2 years



- Closures of shafts, adits, sinkholes
- Demolition of old contaminated mining facilities
- Construction of diversion channels and river bank protections
- Relocation of waste rock dumps



MAILUU-SUU

The town of Mailuu-Suu with approximately 25,000 inhabitants is located in the Jalal-Abad Region which is in the south of the Kyrgyz Republic, about 25 km from the border with Uzbekistan. From 1946 to 1968 the Zapadnyi Mining and Chemical Combine in Mailuu-Suu mined and processed more than 9,000 tonnes of uranium ore for the Soviet nuclear programme.

More than 2 million m³ of tailings were generated and subsequently disposed of at 23 sites spread over a total area of 50 ha. Since the mine closure and the fall of the Soviet Union the town has been economically depressed and the many unsecured deposits of uranium tailings on the steep and unstable mountain slopes around the city pose serious risks to the health of the local population and the environment.



EIA and feasibility study will be completed in 2020



Remediation plans are being developed, evaluated and approved



Independent peer review foreseen



Technical specifications under preparation as basis for tendering remediation works



WHAT ARE THE RISKS

Major risks include the release of toxic contaminated material from the many tailings sites situated unsafely on the slopes next to the banks of the Mailuu-Suu and Ailampa Sai rivers. Flash floods, land- and mudslides as well as earthquakes can cause

dams and embankments to collapse, releasing contaminated materials into the rivers and washing contamination downstream into Uzbekistan. Groundwater contaminated by mining waste can pose a risk when used for drinking and irrigation.

WHAT HAS ALREADY HAPPENED

Between 2004-2013 partial remediation was undertaken with support from the World Bank for a few high risk objects at Mailuu-Suu. A comprehensive and systematic evaluation of the

risks and remediation options (including costs) for all the remaining objects presenting a significant risk at Mailuu-Suu is being carried out with support from the EU.



WHAT REMEDIATION WORKS ARE PLANNED

With support from the World Bank, remediation was undertaken for a few high risk objects at Mailuu-Suu in the period 2004-2013. An unstable tailings facility on the banks of the Mailuu-Suu river and a waste rock dump on the banks of the Kulmen Say creek was relocated. The work undertaken revealed that the extent of remediation required was greater than originally envisaged. While this project demonstrates that remediation projects can be successfully implemented in the region, remediation of the site

remains incomplete and health concerns persist among the local communities.

Detailed technical specifications (suitable as a basis for tendering remediation works) of the final remediation plan are being prepared under EU funded environmental impact and feasibility studies, together with cost estimates, safety assessments and regulatory approvals for the proposed remediation of each object.



THE KYRGYZ REPUBLIC
Abandoned uranium processing
plant in Mailuu-Suu

REMEDIATION WORKS ACTIVITIES

Remediation works timetable
6 years



- Closures of shafts, adits, sinkholes
- Cover and relocation of tailings and waste rock dumps
- Demolition of processing plant and other legacy facilities
- Construction of diversion channels and river bank protections

DEGMAY

Degmay, located in the Northern Sughd province of Tajikistan, is considered to be one of the largest tailings dumps of uranium mining wastes in Central Asia. The former uranium mining operations reached their peak intensity between 1963 and 1993.

The unprotected tailing site, which is only 5 km from the Syr Darya River Valley, covers an area of 90 ha and contains an estimated 36 million tonnes of radioactive toxic waste with a total activity estimated to be about 150 TBq. The tailing site is located some 10 km from the regional capital Khujand; the population of the wider area is more than one million.



EIA and feasibility study completed in February 2018



Remediation plans developed, evaluated and approved



Independent peer review done



Technical specifications under preparation as basis for tendering remediation works



WHAT ARE THE RISKS

Radiological risks posed by direct exposure to water from certain wells, which contain elevated doses of uranium. Contaminated infrastructure especially former tailings pipeline with radioactive residuals poses risks to the general public.

Geomechanical risks for tailing dam collapse with release of a huge volume of radiological and toxic inventory into the Syr Darya river in case of resumed operations of the tailing site.

WHAT HAS ALREADY HAPPENED

A systematic and comprehensive evaluation of the risks and remediation options (including costs) for each object presenting

a significant risk on the Degmay site is being carried out with support from the EU.



TAJIKISTAN
Degmay tailing site

REMEDIATION WORKS ACTIVITIES

Remediation works timetable
4 years



- Construction of new protection cover layer for the whole tailings site
- Demolition and removal of contaminated infrastructure and tailings pipeline

ISTIKLOL

The village of Istiklol (formerly Taboshar) has a population of about 14,000 inhabitants and is located in the Northern Sough Region of Tajikistan some 40 km from the regional capital Khujand. The uranium mine dating from 1936 was one of the oldest uranium mines on the territory of the former Soviet Union.

Workers of the uranium site settled in the city that had a peak population of almost 39,000 in 1979. The mining facility extends over some 400 ha and is rather complex. Although mining operations ceased in the 1970s, the mining legacy objects were never remediated and today they represent a daily hazard for the population and the environment.



EIA and feasibility study completed in February 2018



Remediation plans developed, evaluation and approval ongoing



Independent peer review done



Technical specifications under preparation as basis for tendering remediation works



WHAT ARE THE RISKS

There is considerable concern about the radiological and chemical impact of contaminated mine water used for drinking and irrigation. Neither mine water nor river water of the Sarym Sakhly Soy should be used in their present state as drinking

water or for agricultural use (grazing of livestock, farming). Most of the identified shafts, open adits and sinkholes pose a significant risk to the local population due to erosion, direct radiation and ingestion.

WHAT HAS ALREADY HAPPENED

A systematic and comprehensive evaluation of the risks and remediation options (including costs) for each object presenting a significant risk on the Istiklol site is being finalised with support from the EU.



TAJIKISTAN
Children collecting
water in Istiklol

REMEDIATION WORKS ACTIVITIES

Remediation works timetable
4 years



- Closures of shafts, adits, sinkholes
- Demolition of contaminated infrastructure and other legacy facilities
- Construction of water treatment plant for contaminated mine water
- Relocation of waste rock dumps

CHARKESAR

The Charkesar village and legacy sites are located 140 km east of Tashkent in Uzbekistan. The mining was done by conventional methods and by underground leaching down to a depth of 280 m.

After the closure of the mine in 1995, most of the miners and professionals left the village due to a lack of jobs. Today, Charkesar has approximately 3,500 inhabitants.



EIA and feasibility study completed in November 2015



Remediation plans developed, evaluated and approved



Independent peer review done



Technical specifications finalised and ready as basis for tendering remediation works



WHAT ARE THE RISKS

Radiological risks associated with contaminated mine water being used for livestock and irrigation. Geomechanical risks from mine openings (shafts and adits) to the local population.

WHAT HAS ALREADY HAPPENED

A systematic and comprehensive evaluation of the risks and remediation options (including costs) for each object presenting

a significant risk on the Charkesar site has been carried out with support from the EU.



UZBEKISTAN
Warning sign in Charkesar

REMEDIATION WORKS ACTIVITIES

Remediation works timetable
6 months



- Closures of shafts, adits, sinkholes
- Demolition of abandoned facilities



YANGIABAD

Yangiabad is located at an altitude of 1300 meters some 70 km east of the capital Tashkent in Uzbekistan in an area with high seismic risk. Uranium mining activities were carried out for 40 years ending in the 1980s and the associated waste rock piles extend over an area of 50 km², and contain about 2.6 million m³ of radioactive waste. After the mine closures, the town gradually fell into decay and today the population is around 1000 persons or only around 10% of the former population. An increasing number of tourists visit the area for skiing, trekking, and sporting facilities.



EIA and feasibility study completed in November 2015



Remediation plans developed, evaluated and approved



Independent peer review done



Technical specifications finalised and ready as basis for tendering remediation works



WHAT ARE THE RISKS

Waste rock dumps on river banks pose risks due to floods and erosion processes that can spread contaminated material downstream. Significant geomechanical risks from mine openings (shafts, adits, sinkholes) accessible to the general public. Old ore bunker buildings also represent a high risk to the public.



UZBEKISTAN
Contaminated bunker
facility in Yangiabad

REMEDIATION WORKS ACTIVITIES

Remediation works timetable
3 years



- Closures of shafts, adits, sinkholes
- Demolition ore bunker facilities
- Construction of diversion channels and river bank protections
- Relocation of waste rock dumps





THE KYRGYZ REPUBLIC

The future generation living in Mailuu-Suu

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of the following information

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