

KYRGYZ REPUBLIC



**MINISTRY OF AGRICULTURE, FOOD PROCESSING AND LAND IMPROVEMENT
OF THE KYRGYZ REPUBLIC**

DEPARTMENT OF WATER RESOURCES AND LAND IMPROVEMENT

AGRICULTURAL PRODUCTIVITY AND NUTRITION IMPROVEMENT PROJECT

ENVIRONMENTAL MANAGEMENT PLAN
for WUA «Bereke-S», Manas rayon Talas oblast

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CONTENT

Abbreviations and acronyms.....	3
Introduction	4
1. Description of the rehabilitation subproject.....	7
2. Description of interventions executed within the subproject	7
3. Description of the environmental parameters at the site	8
3.1. The climate.....	8
3.2. The landscape.....	8
3.3. Hydrology	8
3.4. Geological and engineering conditions	8
3.5. Vegetation cover	9
4. Description of procedures related to regular operation works	9
4.1. Technical surveillance on canals and structures condition	9
4.2. Preparing on-farm network for the winter period	10
4.3. Looking after wood lines and access roads	10
4.4. Repair works	10
4.5. Desilting of canals and vegetation removal	11
5. Environmental impact	11
5.1. Expected positive environmental impact	12
5.2. Potential negative environmental impact	12
5.3. Impact on climate change.....	12
6. Environmental management and monitoring plan.....	14
7. Legislative support	20
8. Public hearings	22
8.1. Minutes of public hearings.....	23
Minutes of public hearings of WUA “Bereke-S”, Manas rayon.....	23
9. Photos of subprojects in current condition.....	25
10. Collection, storage, transportation and disposal of asbestos-containing wastes.	27
10.1. Collection and temporary storage of waste	27
10.2. Disposal of asbestos waste	28

Abbreviations and acronyms

AAS	Agricultural Advisory Services
AISP	Agricultural Investment and Services Project
AHE	Ameliorative Hydrogeological Expedition of DWRLI
APNIP	Agricultural Productivity and Nutrition Improvement Project
DSES	Department of Sanitary and Epidemiological Supervision
DWRLI	Department of Water Resources and Land Improvement
E	Environment
EA	Environmental Assessment
EMP	Environmental Management Plan
IDA	International Development Association
ISF	Irrigation Service Fee
GPAFS	Global Program for Agricultural and Food Security
GWT	Ground Water Table
KR	Kyrgyz Republic
OIP-2	Second On-farm Irrigation Project
OIP-2 AF	Additional Financing for OIP-2
O&M	Operation and maintenance
PIU	Project Implementation Unit
POL	Petroleum, Oil and Lubricants
RSU	WUA Rayon Support Unit
RVK	Rayon Irrigation Department (Rayvodkhoz)
SAEPF	State Agency for Environmental Protection and Forestry
SanPin	Sanitary Regulations and Rules
SETI	State Environmental and Technical Inspectorate
WBSMQRS	World Bank safety measures quality rating system
WUA	Water Users Association

Introduction

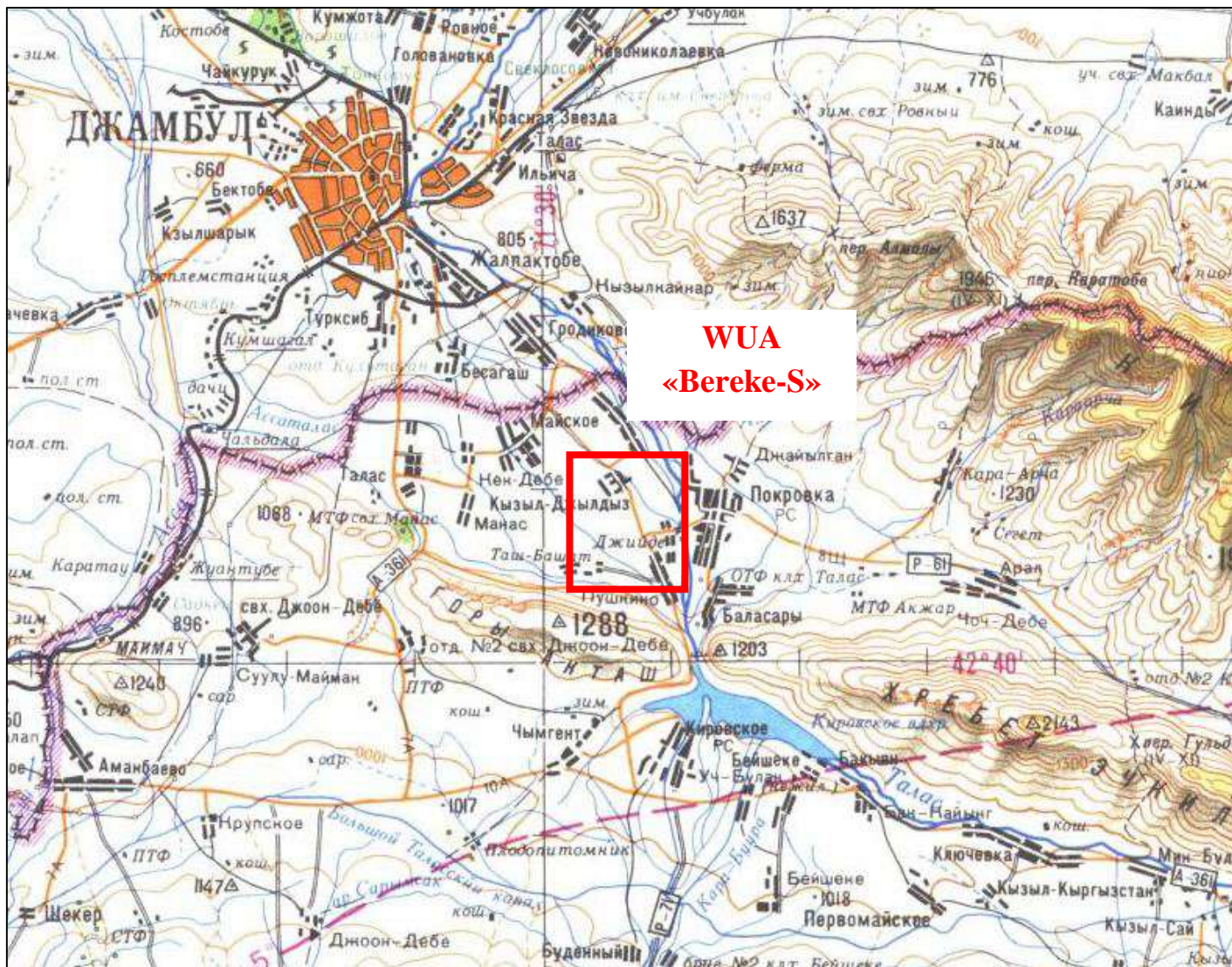
The Agricultural Productivity and Nutrition Improvement Project (APNIP) for the Kyrgyz Republic is being implemented by the International Development Association (IDA) and financed by the Trust Fund of the Global Program for Agricultural and Food Security.

Within APNIP framework the Environmental Management Plan (EMP) prepared that is aimed at ensuring that the Project complies with the principles and practices of environmental management and environmental protection policy and laws requirements of the Government of the Kyrgyz Republic, as well as IDA policy on environmental safety interventions.

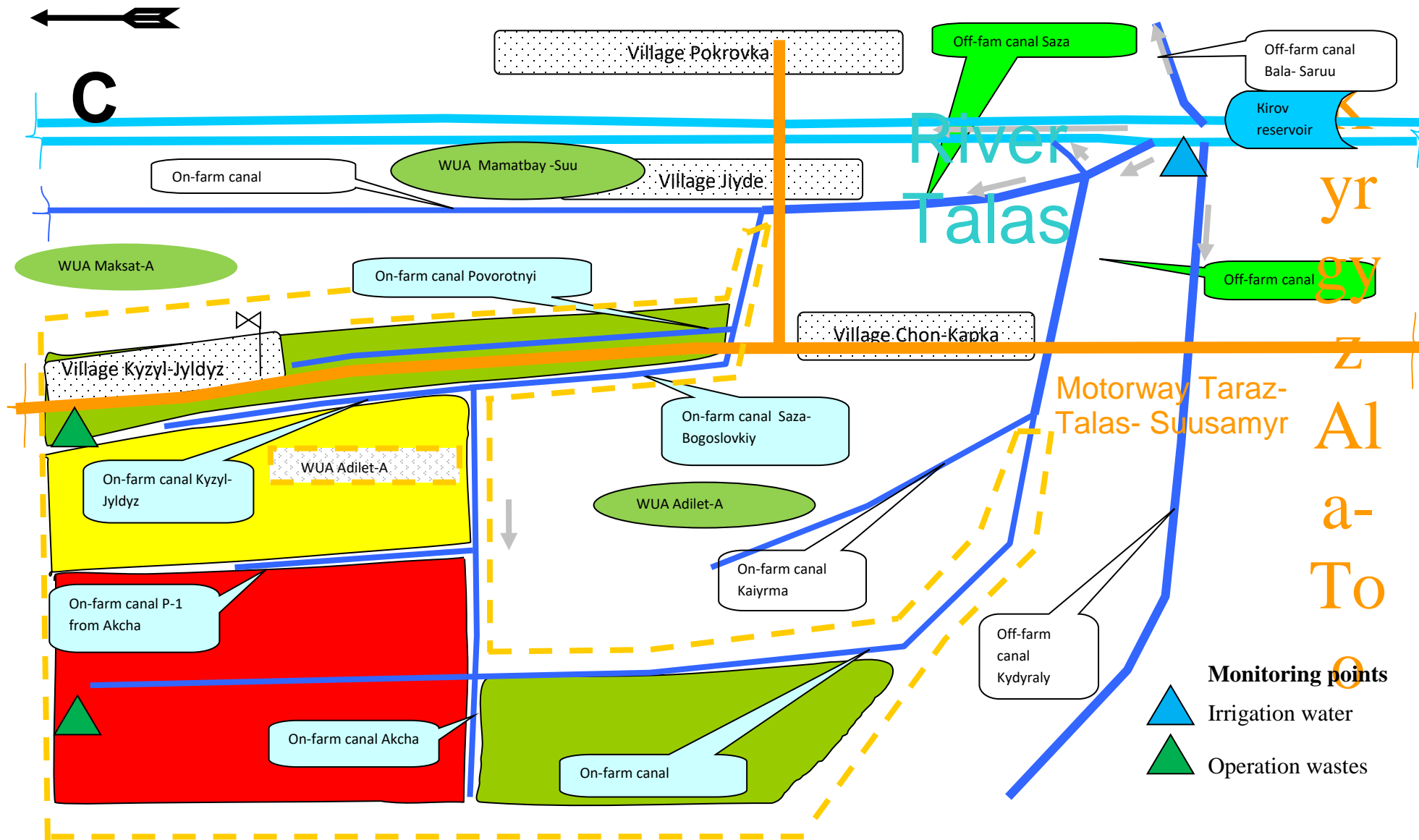
The environmental assessment (EA) goals are to identify the significant impact of the proposed project on surrounding environment (positive and negative), identify appropriate preventive and mitigation interventions aimed to minimize or eliminate any expected irreversible impacts. EMP serves as a management tool that ensures proper implementation of interventions to prevent and mitigate the environmental impact, as well as monitoring and institutional strengthening of recommended interventions while implementing the proposed project. EMP also establishes the necessary institutional obligations, proposes timing of the implementation of mentioned activities, as well as cost estimates for their implementation within the project's budget.

APNIP, in the World Bank environmental risks system, is classified as "B" category. No irreversible or significant impact on the surrounding environment is expected.

Based on the general EMP, the Environmental Management and Monitoring Plan (EMMP) for the rehabilitation of WUA "Bereke-S" has been developed, taking into account the specifics of this particular subproject



Picture1. Overview map of WUA «Bereke-S» location.



Picture 2. WUA «Bereke-S» irrigation system network layout, Manas rayon, Talas oblast

1. Description of the rehabilitation subproject

Location of WUA "Bereke-S" to the west of oblast city Talas, Manas rayon, Talas oblast within 85.0 km reach, to which leads an asphalt covered road (Picture 1) . The distinctive feature of this WUA is that practically adjoining to the rayon's center Pokrovka. The WUA crossed out with earth-bed access roads, providing vehicles and machinery transportation.

The specialists of the Project (north) in cooperation with WUA "Bereke-C" directorate and Manas RSU have surveyed technical condition of WUAs' irrigation scheme and composed a deficiency act, the survey resulted that there are 6 permanently operating water canals within the WUA's service area with the total length of 30.2 km in earth-bed. The irrigation network efficiency throughput is 0.65, which was built during the USSR and still in operating condition, however certain canals and structures require rehabilitation:

- Big filtration losses on the off-farm canal "Baysuu" observed, as canal is in earth-bed, and along the left side of it there is a quarry extracting sand and gravel;
- On the on-farm canals "Akcha" and "Tegirmen", there is necessary to recondition the head cross-regulators, since after many years of operation they are deformed, and large filtration losses and erosion on canal observed.
- Water metering and water discharge and other types of structures are absent.

The WUA also abstracts water from off-farm canals "Saza and Baysuu", (river system (r.s) Talas). The off-farm canal "Saza" is in good operating condition, lined with monolithic concrete, has no problems. The canal's length 2.314 km, designed water flow 3.5m³/s, the canal's command area 2.406 ha..

The off-farm canal "Baysuu" is in earth-bed, length 1.332 km, designed water flow 3.0m³/s, with serious water filtration losses, the command area 1.296 ha.

The off-farm scheme is under temporary responsibility of UWUA "Saza-Baysuu" and the WUAs "Bereke-S", "Mandalak", "Adilet-A" and "Mamatbay-Suu" are part of it.

The on-farm WUA "Bereke-S" scheme includes canals "Tegirmen", "Saza-Bogoslovskiy", "Akcha", "Kzyk-Jyldyz" and "Povorotnyi".

The number of WUA waterusers and members – 380 (379 farm households and land allocation fund).

The WUA "Bereke-S" water abstraction, per annum, is 8 289.0 thousand m³, the irrigation scheme efficiency is 0.65 and only 5 388.0 thousand m³ of irrigation water delivered to the farmers' lands. Expected canal's efficiency enhancement, after rehabilitation, is 0.75 and water volumes delivery rise to 7 184.0 thousand m³. This will make it possible to increase the agri crops yield and, due to this, the WUA can increase the size of ISF, accumulate sufficient funds for operation and maintenance of WUA's irrigation network.

2. Description of interventions executed within the subproject

Rehabilitation of WUA "Bereke-C" on-farm irrigation network will increase the throughput efficiency of entire irrigation system, agri crops yield, improve water distribution and water metering, as well as strengthen the welfare of rural residents.

In order to reduce water filtration losses, the Project ensures a canal's lining with monolithic concrete. All canals will be equipped with necessary operation facilities (hydroposts, water outlets, bridge crossings, etc. the total number of which is 30 units), which will make them aesthetically appealing, create convenient operation, and reduce a canal's alienation areas.

To ensure the normal operation of WUA "Bereke-C" irrigation system, the Project also ensures construction of necessary hydraulic structures: head cross-regulators, hydroposts, water outlets, pipe crossings, water inlet structures and an aqueduct:

- construction of head cross-regulator on canals Tegirmen and Akcha;
- hydroposts planned to be on canals Tegirmen, Akcha and R-1;
- construction of pipe crossings on canals Tegirmen, Akcha and R-1;

- construction of an aqueduct on Akcha;
- construction of water outlets and 3 water inlet structures on canal Akcha.

Water reservoirs, dams and dikes rehabilitation is not planned. Therefore, the irrigation dams and reservoirs policy (OP 4.37) is not applicable.

The application of the WB's policy OP4.12 (forced resettlement) is not required, since all works will be carried out within the existing irrigation system, without constructing additional facilities that capture lands of an individual landowner and land-user, which could require additional coordination and relocation.

The construction and rehabilitation works deadlines are: years 2018-2020

3. Description of the environmental parameters at the site

3.1. The climate

The climate is continental dry. Characterized by hot summers and cold winters. The highest average monthly temperature is observed in July and is + 30 + 35°C, the lowest average monthly temperature in January is -15 - 25°C. Annual rainfall is 300-400 mm.

3.2. The landscape

The landscape of the territory under consideration is a broad, slightly inclined river valley to the north on the left bank of river Talas. The area's altitude varies between 700-800 meters above sea level. Slopes angle vary from 0.002 till 0.0054. Design works will not damage the ground and will not affect the landscape.

The territory is prone to erosion. To prevent erosion, caused by irrigation of agricultural lands, it is necessary to use agro-ameliorative interventions aimed at preventing water erosion of soils. In the EMP, these kinds of interventions are proposed for the operation period of a facility. Construction works will not impact on erosion processes of a particular object's surrounding lands.

To prevent soil erosion during irrigation, the tail-end water discharge structures built on the existing irrigation network.

3.3. Hydrology

The source of irrigation water is river Talas. The WUA "Bereke-S" water abstraction, per annum, is 8 289.0 thousand m³, the irrigation scheme efficiency is 0.65 and only 5 388.0 thousand m³ of irrigation water reaches the farmers' lands. Expected canal's efficiency enhancement, after rehabilitation, is 0.75 and water volumes delivery rise to 7 184.0 thousand m³. This will make it possible to increase the agricrops yield and, due to this, WUA can increase the size of ISF, accumulate sufficient funds for operation and maintenance of WUA's irrigation network. There are no enterprises in the areas that discharge chemicals and waste water into the source of irrigation.

3.4. Geological and engineering conditions

The landscape's geological and lithological structure is unsophisticated and soil-vegetation layer with depth up to 0.3 m is spread from the surface.

Under the vegetation layer there are mainly loamy soils. Loams of light gray color, dry macroporous, homogeneous, have subsidence properties and refer to type I subsidence ground.

Challenges of earthworks development belong to Group II. The average density of dry soil is 1.45 t/m³. There are no stony, not cultivated soils. The seismicity of the area is 9 points.

3.5. Vegetation cover

Vegetation cover: trees, grass, agricultural lands. The soil-vegetation layer will not be disturbed, as construction works will be executed on existing water structures/facilities. The rehabilitation works will not impact the agricultural areas, as all projected objects for rehabilitation located beyond their borders.

In the process of canals rehabilitation, it is necessary to execute tree felling that hamper course of works and are in the alienation zone of water facilities/structures. According to the requirements of the Water Code of the Kyrgyz Republic, Art. 80 p.3, while executing repair and rehabilitation works, the shrubbery cutting and forest felling within the alienation zones of water management structures and canals, as well as sanitary cutting and deadwood cutting, do not require permission from specially authorized state agencies/bodies. Prior to commencement of work, the contractor will inform the environmental protection agency of forthcoming tree and shrub vegetation cutting to be conducted. If rehabilitation works to-be-conducted on the sections that are not within alienation water management zones, then tree and shrubbery cutting is the subject to approval with environmental protection agencies/bodies.

4. Description of procedures related to regular operation works

4.1. Technical surveillance on canals and structures condition

In the operational scheme activities, paramount importance is paid to the timely conduct of preventive and rehabilitation works that exclude probability of system failure, while complying to the rules of its operation.

The main indicators of normal technical condition and reliable operation of the on-farm irrigation network are provision of designed canal's capacity, minimum filtration and performance specification water losses, absence of sedimentation, greenery overgrowing, collapse and canal's erosion.

If the actual canal's capacity corresponds to the estimated throughput, then the technical condition of a canal is good and considered as reliable. If there are 20 -25% throughput deviations, then a canal's reliability is reduced, and the technical condition is an average. If the deviations are more than 25%, then a canal's performance considered as unreliable and its technical condition is below the average.

To ensure a canal's throughput, it is necessary to conduct a careful monitoring over water regulating structures. The water volumes regulating structures must be easily and reliably (re)adjusted and controlled. While operating water regulating structures, it is necessary to ensure that there is no water leakage through the water outlet gates and no canals' erosion and destruction on its structural parts. The lined sections, expansion and construction joint sections of a canal are the subject of constant surveillance. The damaged lining must be reworked immediately. A canal's lined sections must be of monolithic concrete and maintenance must be timely to prevent cracking. A particular attention must be paid to subsiding soils, as concrete lining on those soils is prone to cracks formation.

A daily maintenance of lined and unlined canals, facilities and equipment located on them, keeping them in good condition is reduced to the removal of vegetation and floating objects that block canals and lead to sedimentation in certain areas. During the maintenance, works are carried out to clean up structures and water distribution units from debris and ice, vegetation overgrowth and sedimentation.

A slight and gradual canal's base degradation, sometimes, leads to the formation of cracks on the lining that impossible to rehabilitate. In this case, the cracked and battered lining sections are cut down and filled with new concrete.

The joint sections of a canal, with prefabricated reinforced concrete slabs, are the subject of particular attention. Constant surveillance of which is necessary and, if there any urgency, must be treated with resilient water resistant materials that can withstand a vegetation impact.

Within the flumes it is prohibited to dissolve various types of fertilizers that may cause destruction of concrete. It is also not recommended the flumes network operation if water flow temperature is below -5 - 10°C. Therefore, in the process of preparing the network for winter, the whole canal's route must be completely freed of water.

The livestock crossing and pasturing on canal's dams and slopes is prohibited. The livestock drinking and dipping allowed on special canal's section only.

To monitor the quality of irrigation water and prevent a canal's sedimentation, the water samples must be regularly inspected for the following indicators: turbidity, temperature, hydrogen index and mineralization.

4.2. Preparing on-farm network for the winter period

In the winter period, the on-farm irrigation network can be used for water charging irrigation, washing off and other types winter watering, as well as for supplying water to the residential areas and livestock farms, filling up reservoirs. Control over canals and structures operation, in the winter, should be paid particular attention, as to prevent formation of ice jams near bridges, crossings, etc. The trash racks that were set for the summer in front of water structures, must be removed for the winter. When frosts are formed and structures are covered with the ice, in this case the ice must be chipped without violating integrity of the structures and canal's coating.

4.3. Looking after wood lines and access roads

Forest plantations along canals are designed to protect the canals from vegetation overgrowing, lowering the level of groundwater along a canal's route and reducing the adverse effect of wind force on crops. Alongside of permanently located canals of the farm network that require constant desilting interventions, it is recommended to create, on the one side two-row or three-row strips of fast-growing trees and shrubs. The distances between trees in the strip is 1-3 m, between bushes - 0.75 - 1 m with a distance between greenery strips of 1.5 - 3 m.

The field and on-farm roads on irrigated area, as a rule, are ground roads. If they pass through silty loams and solonchaks, then a road is made of gravel or other coating. Roads maintenance is limited to keeping the upper layer in good condition. The thickness of gravel coated roads is maintained within 8 - 10 cm. The roadbed condition is also the subject of maintenance and must be periodically planned and compacted. Roadside cuvettes and canals must be cleaned of dirt and vegetation. To improve the water flow into cuvettes, the roadways must be made with slopes and with a slight lateral inclination from the middle to the cuvettes.

4.4. Repair works

The irrigation schemes are subject to repair works according to the annually developed and approved plans. In the practice of irrigation and drainage systems operation the current, major and emergency repair works are executed.

The current repair works carried out annually including desilting of canals, removal of vegetation, strengthening and widening dams, cleaning berms, eliminating small landslides, collapses, rifts and sandpits, repairing damaged anchorages and canals' lining, repairing small

damages of a structure parts. While carrying out current repair works, a complex technical repair works and modifying a structural construction is not included. The preventive (prophylactic) repair works include:

- Patching ratholes;
- Structural cracks maintenance after ice impact;
- Tightening fixing bolts;
- Drainage structures winterization etc.

Preventive repair and a significant part of the current repair, including desilting of canals, vegetation and landslides removal, a minor canal repairs, repair of structures, buildings and other devices are performed annually without stopping the system operation.

Major repair is carried out, as required, within a few years' period and includes: repair works on a canal's sections, dams and parts of structures attritions and destructions, structural modification or replacement of certain elements and structural units.

Emergency repair - rehabilitation of canals, dams and structures or parts of them, destroyed as a result of natural phenomena (mudslides, floods, etc.), or violations of the technical operation rules, execution of which carried out 24/7, and all available material and technical resources and labor resources are mobilized for their implementation.

Repair and construction works on the on-farm network canals performed by WUAs contracting a construction company. Repair works expenses and operation of the on-farm network are annually provided by WUA budget.

4.5. Desilting of canals and vegetation removal

The solid particles of soil form sedimentation that moved around by water flow. The content of solid particles, per water volume unit, characterizes the water flow saturation with sediments, or its turbidity. Sediments, often, are formed as a result of soil wash-away in the catchment basin via snow/glaciers melting and rain waters. Partly the sedimentation is a product of a canal/river bed and banks erosion. The largest bed's sedimentation with pebbles and coarse sand observed and remain within the head section of a bulk water supply canal. The average sized sediment particles washed into a canal's distribution network and even into on-farm irrigation network.

On average, about 80% of sediments remains in the off-farm canals network and about 20% inflows into on-farm irrigation network. A canal's inclination impacts on sedimentation process, if an inclination is too steep then about 60% of sediments washed in on-farm network and fields. Desilting executed on annual basis and, if necessary, more often.

5. Environmental impact

Implementation of APNIP is addressed to provide economic, social and environmental benefits to farmers, farmer entities and local communities through WUA's development, the rehabilitation and modernization of irrigation and drainage infrastructures in projected areas. The best practices of previous projects demonstrate positive impacts on the environment. Namely, this project is aimed at reducing water losses in irrigation schemes, improving water resources management, improving agricultural productivity and improving soil fertility.

During the canals' rehabilitation process, the trees felling and shrubbery vegetation removal required, which is subject to approval with environmental protection authorities. Design and engineering works require strict compliance to the necessary requirements, including noise

control, planting new trees to protect against wind erosion and construction of access roads, air pollution and timely construction waste disposal.

The requirements for the prevention of environmental pollution and negative impact on the population are provided for in the Law of the Kyrgyz Republic "General Technical Regulations for Ensuring Environmental Safety in the Kyrgyz Republic", the Law "On Production and Consumption Wastes", the Law "On Protection of Atmospheric Air", SanPin "Noise in the workplaces, in premises of residential, public buildings and on the territory of residential buildings" the Governmental decree of the KR, dated 11/04/2016. №201,

5.1. Expected positive environmental impact

The positive impact consists of:

- Water losses reduction;
- Improved water resources management, consisting of construction and rehabilitation of water distribution and water-metering structures;
- Agricultural productivity increase;
- Improved soil fertility by increasing humus while applying an efficient irrigation schedules.

5.2. Potential negative environmental impact

At the same time, while carrying out irrigation network (re)construction works, there may be some potentially negative impacts on environmental protection conditions in the projected areas and require attention, preventive actions and appropriate mitigation measures during planning, development, construction, operation and maintenance.

While performing the planned irrigation networks rehabilitation works, no asbestos-containing materials will be used. It is necessary to mention that previously asbestos cement pipe crossings were used. But they were replaced with structures of more inert materials and, at the moment, problems with asbestos-containing materials are not expected. In the event of removal of asbestos cement pipes asbestos contained materials waste will be collected, transported and finally disposed by applying special protective measures in accordance with the hazardous waste handling standards. See Section 10 for detailed information on disposal of asbestos-containing materials.

The potential negative impacts are relatively minor, and positive economic, social and environmental benefits far outweigh them in environmental assessment. Consideration of these impacts is given below.

5.3. Impact on climate change

The irrigation and drainage schemes rehabilitation will enhance the agriculture and farming practices, materially-technical procurement, land owning, pastures and water management that will lead to productivity increase and adaptation to climate change and sustainable use of natural resources.

Table 1. Assessment and ranking of environmental risks

Activities	Impact	Type	Duration	Term	Degree	Risk	Reversibility	Probability
Construction phase								
Construction site location	Soil contamination at a construction site as a result of storage, construction and household waste, including liquid wastes.	direct	short-term	immediate	low	low	reversible	average
	surface water and ground water contamination at a construction site, as a result of storage of construction and household waste, including liquid waste	direct	mid-term	immediate	low	low	reversible	average
Unloading of excavated soil and construction waste	the landscape degradation, destruction of the animal world natural habitat	direct	mid-term	immediate	low	average/low	reversible	high
canals rehabilitation	Damage and trees felling and shrubbery currying	direct	long term	immediate	high	low	reversible	high
Operation and maintenance phase								
earth-bed canals cleaning while in operation	landscape and animals' natural habitat degradation, local drainage scheme alteration	direct	mid-term	immediate	low	low	reversible	average
increase in irrigation water supply, which increases the volumes of waste water	surface water pollution with agrochemicals, as a result of excessive application of pesticides and mineral fertilizers	indirect	mid-term	delayed	moderate	moderate	reversible	average
increase in irrigation water supply that leads to water speed increase	soil erosion, related to existing agricultural production practices	indirect	long-term	delayed	moderate	moderate	reversible	low

6. Environmental management and monitoring plan

All the construction phase risks are easily monitored and eliminated. They can be minimized by properly designing mitigation measures and monitoring the Contractor, while executing works. During the (re)construction works, trees felling and shrubbery cutting in a canal's alienation zone will be carried out in accordance with the requirements of the Water Code (Article 80, para. 3.) and in agreement with the specially authorized environmental protection agency/body.

Among the O&M risks, the risk of landscape and animals' natural habitat degradation, while cleaning earth-bed canals and drains, is clear and easily controlled. In case of suspected contamination of surface and groundwater by agrochemicals due to excessive use of pesticides and mineral fertilizers, soil erosion associated with existing practices of agricultural production, increasing groundwater table in the zone of their deep occurrence due to excessive irrigation and, as a consequence, soil salinization, an accredited laboratory will be mobilized for special monitoring. The need for mitigation interventions at the O&M phase is determined exactly in the process of environmental monitoring.

Table 2: Mitigation plan

Phase	Issue	Preventive/ Mitigation interventions	Cost, US \$		Institutional responsibility		Control
			installation	operation	installation	operation	
Construction	organizing a construction site	1) It is forbidden to locate a construction site in the water protection zones of rivers and canals; 2) Ensure removal of all waste and construction rubble from (re) construction sites to dispose on the authorized municipal landfills, with the permission of local authorities; 3) Execute planning and restoration measures to restore troubled lands during and after completing (re)construction	n/a	part of the (re)construction works contract 373 730	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	soil after a canal's cleaning	conduct a planned rehab works	n/a		PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	trees and shrubbery vegetation	Coordination with the specially authorized environmental protection agency/body cutting greenery plantations	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU;

							3) State Ecological Inspectorate
	vehicular emissions into the atmosphere	1) vehicular exhaust systems and construction equipment should be in good condition, in order to minimize air pollution; 2) Limiting the speed of vehicles and selecting suitable transportation routes to minimize dust emissions; 3) Moisturizing the road surface while driving through the residential area territories	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
	noise impact within labor area	machinery and equipment operation	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility for employers health and safety
	Workers' and rural population health and safety	1) construction sites will be equipped with information and designator boards concerning working regulations and requirements; 2) easily accessible and complete first aid kit to treat an injury. 3) ensuring personal protection equipment (helmets, protected shoes, gloves); 4) limiting access to (re)construction sites, zones, equipment locations and other potentially dangerous places by local citizens.	n/a	part of the (re)construction works contract	PIU/Contractor	Contractor	1) A Contractor bears responsibility to execute environmental mitigation interventions; 2) A construction site inspections made by PIU; 3) State Ecological Inspectorate
Operation	Threats to water quality due to salinity of soils because of drainage	- training on water and soil use improvement; - visual monitoring (preventing waterlogging)	n/a	n/a	AAS/AISP	WUA members	RSU on-site inspection, approval and coordination with SETI
	Threats to water	- best practices on pesticides	n/a	n/a	AAS/AISP	WUA	RSU on-site

	quality due to contamination by agrochemicals	application, - application of agrochemicals in accordance with recommended norms, - preventing effluent water discharge into canals and surface water objects,				members	inspection, approval and coordination with SETI
	Increase of soil erosion	- training on water use and soil science, - outreach campaign - rational use of irrigation water and applying water regimes in accordance with the irrigation requirements, - Arrangement of irrigation furrows on the lowest slope (cross-cut furrows); - shortened furrows length; - altering irrigation technology (sprinklers, drip irrigation)	n/a	n/a	AAS/AISP	WUA members	RSU on-site inspections
	Climate change impact	- education on environmental mitigation activities; - compliance of irrigation norms and regulations	n/a	n/a	AAS/AISP	WUA members	DWRLI

Table 3. Environmental monitoring plan

Project Phase	Parameter	Location	Method/Equipment	Frequency	Objective	Costs		Responsibility	
						Organization	Performance	Organization	Performance
baseline	salinity, concentration of hydrogen ions (pH), water turbidity	Headworks and tail-end of irrigation scheme: river system(r.s) Talas and waste water	Field equipment for parameters measurement	At the beginning, in the middle and at the end of vegetation season	Rehabilitation works and agricultural activities impact assessment	0	Insignificant	Samples selection RSU	water sampling and analysis
Construction	Site-specific environmental management and monitoring plan	subprojects under rehabilitation	Visual inspection of subproject	Before, during and after completion of construction	Compliance with environmental protection measures	0	Insignificant	PIU/Contractor	PIU/Contractor
	Salinity, concentration of hydrogen ions, turbidity	Canals under rehabilitation, located upstream and downstream of the rehabilitation site	Field equipment for parameters measurement	At the beginning, in the middle and at the end of vegetation season	assessment of construction works impact	0	Insignificant	RSU	water sampling and analysis. Introduction of results to PIU
	Pollution of watercourses by petroleum, oil and lubricants	Selectively for subprojects when suspected of contamination. Downstream of rehabilitation subproject	Sample for laboratory analysis	During construction	Civil works impact assessment	0	100 USD	Contractor	Accredited laboratory Water sampling and analysis. Introduction of results to PIU
operation	Salinity in soil	Problematic sites	Sample of soil/analysis	Quarterly	Soil quality identification	0	300 USD	AHE	AHE
	Salinity, concentration of	Headworks of WUA's irrigation	Field equipment for parameters	Before, during and after	Civil works impact assessment	0	Insignificant	RSU	RSU

	hydrogen ions, turbidity	scheme, river Talas, WUA waste waters	measurement	completion of construction					
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7. Legislative support

In the Kyrgyz Republic there are numerous laws on environmental protection, provisions and regulations, which address specific issues of environmental protection. Table 4 summarizes the legal regulations relevant to this project.

Table 4: Basic laws, provisions and resolutions

Legal authority	Legal mandate
Constitution (2010)	The state's ownership of natural resources, rights and duties of citizens.
Water Code of the Kyrgyz Republic (2005)	Identifies the state policy, legislative and institutional basics on water resources management and protection
Law on environmental protection (1999)	Identifies state policy on environmental protection, legislative and institutional basics on water resources management and environmental protection
Law "General technical regulation on ensuring environmental safety in the Kyrgyz Republic" (2009)	The Regulation determines the main provisions of technical regulation in the field of environmental safety and establishes general requirements for ensuring environmental safety while designing and implementing of interventions within economic and other types of production activities, storage, transportation and production disposal.
Law on environmental appraisal (1999)	Requires review of environmental protection issues (environmental appraisal) and prevents negative environmental impacts and human health as a result of economic and other activities
Law on specifically protected natural reservations (2011)	Establishes regulations for specially protected natural areas, various types and/or levels of economic activity.
Law on protection of atmosphere (1999)	Regulates emissions to atmosphere and specific obligations on protection of atmosphere
SanPin "Noise in the workplaces, in premises of residential, public buildings and on the territory of residential buildings" the Governmental decree of the KR, dated 11/04/2016. №201,	Establishes sanitary-epidemiological requirements, standardized parameters and maximum permissible noise levels at (re)construction sites, noise classification, permissible noise levels in the projected rooms, (re)construction sites, (re)constructed and operated residential, public buildings and on the territory of residential buildings.
the GovKR. Provision No.224 of 03/05/2013. "On approval of fees for calculating the amount of penalties for damages caused to objects of animal and plant life, mumijo-containing mineral materials and mushrooms by legal entities and individuals"	Fees designed to ensure preservation of biodiversity, proper protection of flora and fauna

The Government of the Kyrgyz Republic ratified a series of international conventions on environmental protection and agreements, related to this project:

- Convention on environmental impact assessment of the transboundary territories Espoo(2001);
- Agreement on cooperation in environmental protection and efficient use of natural resources (Kyrgyz Republic, Kazakhstan, Uzbekistan) (1998),
- Convention on wetlands, representing international importance for the main habitat for waterfowls (Ramsar Convention) (2002);

- Convention on right to use international watercourses as transport routes (1997), Agreement on the use of water structures for interstate purposes on the Chu and Talas Rivers (Kyrgyz Republic and Kazakhstan) (2000);
- the United Nations Framework Convention on Climate Change (2000 г.);
- Kyoto Protocol (2003).

8. Public hearings

In accordance with Operational Procedures OP4.01.¹ The WB has special requirements for information and public consultations disclosure. The disclosure includes presentation of information about the Project to the general public and population covered by the Project and other stakeholders, starting from earlier implementation cycle and throughout the framework. The information disclosure is intended to facilitate constructive interaction with the population covered by the Project and stakeholders throughout the Project's lifecycle.

In addition, the Kyrgyz Republic is a member of the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, the United Nations Economic Commission for Europe, which also contains provisions for ensuring the disclosure of objectives and environmental considerations of the Project.

Public hearings in the WUA "Bereke-C" were held on October 11, 2017, in v. Kyzyl-Jyldyz, Manas rayon, Talas oblast and took part in the public hearings: representatives of WUAs, local self-governing authorities, farmers, WUA's rayon support units, designers, PIU.

At public hearings, the information was provided concerning technical solutions of the Project and its environmental impact, as well as the interventions that would be taken to prevent and mitigate the impact.

Participants in the hearings were asked a number of questions, the activities for which are included in the EMP.

The minutes of the public hearings, list of participants and photos are attached.

¹ Operational Guidelines of the World Bank: OG 4.01, "Environmental Assessment", point 3.

8.1. Minutes of public hearings

Minutes of public hearings of WUA “Bereke-S”, Manas rayon

Village. Kyzyl-Jyldyz
Uch-Korgon AA
Manas rayon

October 11, 2017

AGENDA:

1. Protection of surrounding environment.
2. Minimizing the impact of pestiferous substances on surrounding environment, while the process of rehabilitation is ongoing within subproject “Rehabilitation of WUA “Bereke-S” irrigation network, Manas rayon, Talas oblast”

Attendees:

Representatives from canals Tegirmen, Akcha, R-1.
WUA Chairperson – A. Abduvaliev and Council members.
WUA Director – N. Sydykov and directorate representatives.

Guests:

Head of Uch-Korgon AO - M. Akmatov.
Chairperson of Uch-Korgon Aiyl kenesh – M. Umetaliyev and other deputies.
Design engineer PIU APNIP – B. Usenov.
Senior specialist of PIU RSU – A. Usenbaev.

The opening speech concerning surrounding environment was given to the WUA “Bereke-S” Chairperson A. Abduvaliev. Manas PIU RSU specialist A. Usenbaev has also updated all attendees concerning environmental issues and stressed on the importance of that particular question on worldwide agenda. Within APNIP framework, the environmental specialist was mobilized, who explained the paramount importance of environmental mitigation interventions, noncompliance to which may lead to serious consequences. After introduction the specialist answered multiple question of attendees. The WUA “Bereke-S” Director and other staff members have informed the specialist on WUAs activities from the very beginning, progress made, problems incurred and possible solutions. Thereafter, the design engineer B.Usenov was given speech to deliver brief introduction on rehabilitation interventions within the subproject. And at present, WUA “Bereke-S” maintains on-farm canals with the total length 30.2 km, all of which are in earth-bed and filtration losses observed, where no any water engineering structures, bridge crossings installed, and existing structures require urgent reconditioning. All WUA staff members got it clear that the irrigation schemes do require full scale rehabilitation and made an appeal to PIU APNIP via WUA Director, and B. Usenov has also brought to light existing issues within WUA “Bereke-S” such as;

1. Off-farm canal Baysuu;

- The canal abstracts water from r. Talas. The headwork and water metering station are in good operating condition and do not require rehabilitation. Off-farm canal Baysuu is in earth-bed, length 1332 m, designed water flow 3.0 m³/s, command area 1296 ha.
- Since canal is in earth-bed, there are big filtration losses and on the left bank of which there is a quarry extracting sand and gravel.
- Concrete lining of the canal will solve filtration losses and planned from HM4+00 to HM6+50, at length 250 m.
- There are also 3 water outlet structures but in non-operating condition, due to multiyear operation. Village Chon-Kapka also abstracts water from the water outlet structures, where are primitively designed structures installed instead. The subproject plans to build 3 water outlet structures of engineered type.

2. On-farm canal Tegirmen

- The canal abstracts water from off-farm canal Baysuu. The main cross structure require rehabilitation. The total length of canal is 14.5 km, command area 576 ha, calculated water flow 1.0m³/s.
- The canal's earth-bed does not require rehabilitation. Existing spillway at the head of canal is in non-operating condition, since there are lack of hydraulic engineering structures, water distribution is hindered.
- To improve water metering at the head of canal, the "fixed bed" water metering structure planned to be built.
- The head cross-regulator rehabilitation required, as well as construction of 6 water outlet structures.
- Construction of 1 pipe-crossing planned for transportation purposes.

3. On-farm canal Archa

- The canal abstracts water from canal Saza Bogoslovskiy and has the head cross-regulator requiring rehabilitation. The total length of earth-bed canal is 2.2 km, of which 1200 m require rehabilitation. The canal's command area 129 ha, designed water flow 1.0 m³/s, apart from it there is on-farm water distribution canal R-1 with total length 2.15 km, command area of which 246 ha.
- There are a big water filtration losses observed, canal's earth-bed covered with bulrush.
- There are lack of hydraulic engineering structures and water distribution is hindered.
- Water metering is not executed as hydrometric station is absent.
- Bridge crossing required for transportation.
- To improve water distribution, it is necessary to live the canal with monolithic concrete from HM0+00 till HM12+00, construction of a new head cross regulator and 4 water outlets.
- 1 pipe crossing required for transportation purposes, to regulate inflowing water from upper fields it is required to build 3 water inlet structures and 1 aqueduct.

4. On-farm canal R-1

- The canal abstracts water from canal Akcha, length 2.15 km, of which 2150 m require rehabilitation, command area 246 ha, designed water flow 0.4 m³/s.
- As result of multiyear canal's operation, multiple water structures are in non-operating condition, a big water loss, transportation hindered as of absence of bridge-crossing.
- To prevent filtration losses, the subproject plans to concrete lining with monolithic concrete from HM0+00 till HM21+50, at length 2150m.
- Construction of 5 water outlets, 1 hydrometric station and 1 pipe crossing planned.

B.Usenov also stressed on ongoing rehabilitation irrigation schemes interventions within WUA "Bereke-S" that after canals' rehab completed the irrigated lands will be watered rationally and in accordance with irrigation regimes. In the surrounding areas there are no entities that discharge hazardous chemicals, pesticides and sewage into the source of irrigation and threat to vegetation and animal kingdom, as result, is excluded. Improving irrigation schemes will create optimal temperature and humidity conditions of the soil, decrease soil deformation and improves the landscape.

At the end of his speech B.Usenov explained ongoing rehab procedures. All attendees took active participation in discussion and exchanged their opinions and all WUA members got clear understanding of environmental protection interventions. **And concluded that:**

- To require full compliance by specialists with environmental protection regulations that were developed by the APNIP PIU specialists and minimize impacts of rehab interventions on surrounding environment within subproject "Rehabilitation of WUA "Bereke-S" irrigation scheme, Manas rayon, Talas oblast"

Chairperson: _____A.Abduvaliev

Meeting Secretary: _____N. Sadyrov

9. Photos of subprojects in current condition



Picture 1. Canal “Baysuu”, 11July, 2017



Picture 2. Canal “Tegirmen”, 11 July, 2017



Picture 3. Canal “Akcha”, 11 July, 2017



Фото 4 . Canal R-1, 11 July, 2017

10. Collection, storage, transportation and disposal of asbestos-containing wastes.

Removal of materials that contain asbestos will be carried out in line with the local legislation, including construction standards, work safety issues, air borne emissions of hazardous pollutants and disposal of waste and hazardous waste (in the event that there is no local legislation, the Directive 2003/18/EC of the European Parliament will be used, that amends and supplements Directive of the Council 83/477/EEC on worker protection from workplace asbestos exposure risks: threshold values of airborne dust particles is 0.1 fiber/cm³; also use the Good Practice Note: Asbestos: Health Issues at Workplace and Community; World Bank). Asbestos materials shall be subject to immediate final disposal/burial under special conditions.

According to Order #885 of the Government of the Kyrgyz Republic *On Hazardous Waste Management in the Kyrgyz Republic* of December 28, 2015, asbestos-containing wastes should be disposed as follows.

The hazardous waste management process (waste lifecycle) consists of the following phases: generation, accumulation (collection, temporary storage, stockpiling), transportation, neutralization, recycling, reuse of recycled products, and disposal.

When asbestos is present at a project site, it should be clearly labeled as a hazardous material. Asbestos-containing materials should not be subject to cutting or breaking as this will result in dust generation. In reconstruction, all workers should avoid crushing/damaging asbestos-containing waste, stockpile such waste at designated locations within the construction site and dispose of it properly afterwards to a special location or landfill.

When asbestos-containing waste is subject to temporary on-site storage, they should be properly contained in leak-tight containers and labeled appropriately as a hazardous material. Safety precautions should be taken to prevent any unauthorized removal of such waste from the site.

10.1. Collection and temporary storage of waste

Asbestos waste generation should be minimized by using efficient technologies.

All asbestos-containing materials should be handled and disposed by qualified and experienced personnel only. The personnel should wear appropriate protective equipment (safety masks, gloves and overalls).

The amount of waste stored at the designated site must not be greater than permitted by the standards.

Industrial waste collection sites and access ways must not be blocked up.

When handling asbestos waste, the workers should necessarily wear special protective clothing, gloves and respirators. Prior to removing (if required) asbestos from the site, it should be treated with a wetting agent to minimize asbestos dust emission. Removed asbestos should never be reused.

Keeping foreign items, individual or working clothes, or personal protection equipment, or having meals at waste collection sites is not allowed.

During handling operations, workers must comply with applicable handling requirements and general safety rules. All operations should be carried out mechanically, using labor-saving lifting and transport equipment.

Hazardous wastes should be transported to the landfills by properly equipped vehicles, either own or of a specialized third party carrier. The transport vehicles should be constructed and used in a manner that prevents potential incidents, losses and environmental pollution both on the way to the landfill and when transferring waste from one vehicle to another. All activities that involve loading, transportation and unloading of waste at main and auxiliary sites should be mechanized and use leak-tight equipment. Opening hazardous waste containers during transportation is prohibited.

Solid and dusty wastes should be transported in special containers or containers fitted with gripping devices for unloading by truck cranes. Transporting unpacked asbestos in open trucks or on flat wagons is not allowed.

Using hooks and other sharp tools in handling operations is not allowed.

No one except the driver and staff members authorized to escort the waste off site is allowed to be in vehicles transporting hazardous waste. The drivers of vehicles that will transport asbestos waste must be trained in safe transport requirements.

All operations in connection with loading, transport, unloading and disposal of waste must be mechanized. The waste must be transported in a way to prevent transportation losses and environmental impacts.

10.2. Disposal of asbestos waste

Asbestos waste must be disposed to landfills for municipal solid waste or unrecycled industrial solid waste.