Environmental Monitoring Report

Annual Environmental Monitoring Report - January – December 2016

UZB: Northwest Region Power Transmission Line Project

Prepared by State Joint Stock Company UzbekEnergo for the Republic of Uzbekistan and the Asian Development Bank.

Annual Environmental Monitoring Report

Project Number: *3285:* UZB
Reporting Period: Jan-Dec 2016

Republic of Uzbekistan: Northwest Region Power Transmission Line Project

(Financed by the Asian Development Bank)

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ABBREVIATIONS

ADB	Asian Development Bank
EA	executing agency
GHG	greenhouse gas
GRC	grievance redress committee
GRM	grievance redress mechanism
IEE	initial environmental examination
km	kilometer
kV	kilovolt
NWTL	Northwest transmission line
PCP	Public Communications Policy
PIC	project implementation consultant
PMU	project management unit
OHL	Overhead line
SPS	Safeguard Policy Statement
TPP	Thermal Power Plant
TL	Transmission Line

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PART I – INTRODUCTION

1.1 Construction activities and project progress during the previous 6 months

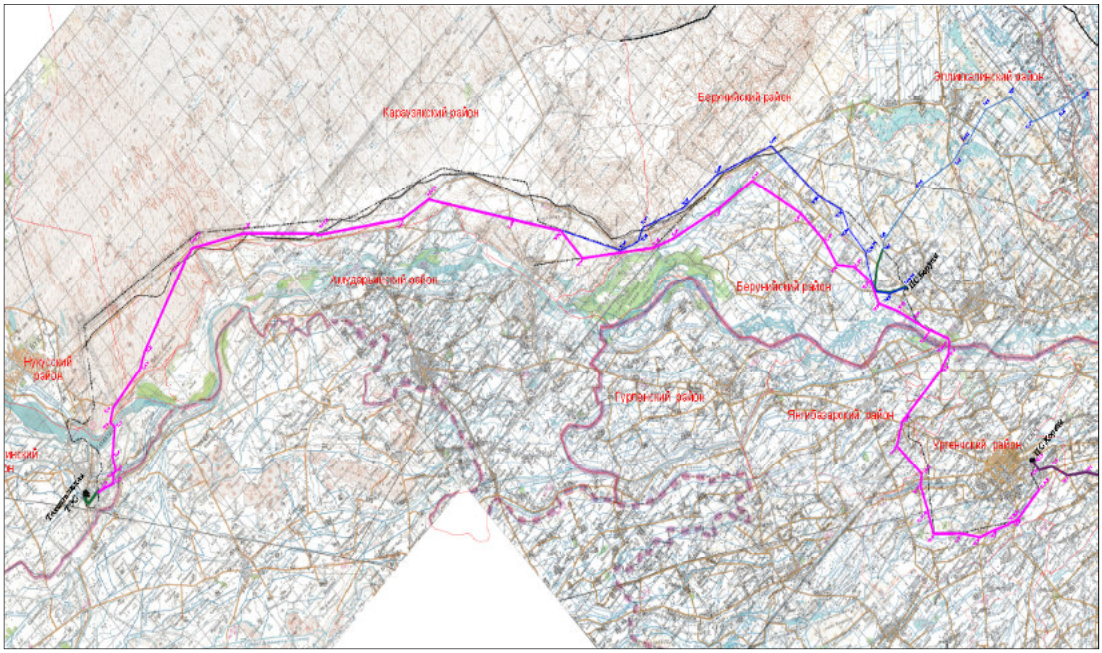
A. General information about the project

1. The Northwest Region Power Transmission Line Project (the Project) is located in the south-western provinces of Karakalpakstan and Khorezm of the Republic of Uzbekistan, near the border of Turkmenistan.
2. The new transmission line will transmit power from Takhiatash Thermal Power Plant and increase reliability of power supply for the Khorezm province and Karakalpakstan in the northwestern part of Uzbekistan benefiting at least 3 million population.
3. The objectives of the Project are: (i) increase energy security through the diversification and expansion of energy supply routes; (ii) improve power supply reliability in the country and region; (iii) reduce transmission losses; and (iv) improve operational efficiency of the power sector.
4. The first part of the TL route passes across the territories of Hojeyli, Nukus, Karauzyak, Amudarya and Beruniy districts of the Republic of Karakalpakstan, and Urgench and Yangibazar districts of the Khorezm region of the Republic of Uzbekistan. The second part of the projected TL route is laid across territories of Urgench, Hanka, Yangiar, Bagat and Hazarasp districts of the Khorezm region and the Turtkul district of the Republic of Karakalpakstan.
5. Construction activities of above mentioned facilitates will be done and financially covered by Uzbekenergo. Procurement of the equipment and goods will be performed under ADB loan. The total cost of the project: 258,5 mln. USD. Feasibility study approved by Decree of the President of Uzbekistan No. 2541 on 06 June 2016.
6. The Project consists of the following main components:

i. Construction of 363,8 km of 220 kV single-circuit overhead transmission line: between Takhiatash TPP and 220 kV Khorezm substation (197,7 km) and between Khorezm and V1 node (166,1 km);
ii. Expansion/Rehabilitation/Construction of 2 Substations. Including (a) rehabilitation and expansion of 220/110 kV Khorezm SS; and (b) construction of an open switchyard 220 kV of a new 500/220 kV SS Sarymay near V-1 node (Sarymay settlement); and
iii. Support for Institutional Development, Capacity Building, and Project Management: including (a) consultancy service for project supervision and management, (b) upgrading transmission system planning and dispatch automation, (c) implementation of assets management system, (d) external auditing for project account, and (e) strengthening UE operational and maintenance capacity for transmission assets.

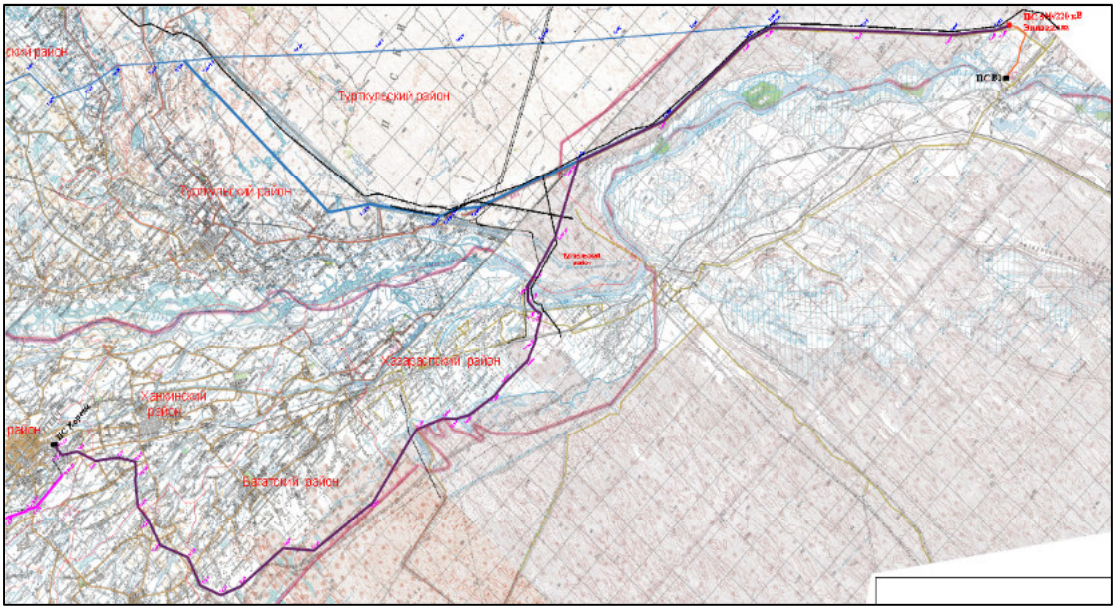
7. The project is classified as category B for the environment under ADB's Safeguard Policy Statement (2009). Project implementation period: 2016-2019.
8. The Project follows ADB's strategy for Uzbekistan which includes focus on energy efficiency and reliable power supply. It is also consistent with ADB's Strategy 2020 and ADB Energy Policy (2009) by promoting energy efficiency and energy for all.
9. Locations of the TLs and substations to be constructed and rehabilitated/extended under the Project are highlighted in the map 1 and map 2 below:

MAP 1: PROPOSED ROUTE OF 220 KV TRANSMISSION LINE TAKHIATASH TPP – KHOREZM SS



- Projected 220 kV OHL Takhiatash TPP - Khorezm SS
- Projected 220 kV OHL Takhiatash TPP – Beruni SS (2nd stage, out of scope of the Project

MAP 2: PROPOSED ROUTE OF 220 KV TRANSMISSION LINE SS KHOREZM – SS SARYMAY



- Projected OHL 220 kV SS Khorezm – SS Sarymay
- Projected OHL 220 kV Beruni SS – SS Sarymay (2nd stage, out of scope of the Project)

B. Progress of Project Implementation During January-December 2016 Period

10. 9 November 2016, the local interagency tender commission approved the Bidding Document and announced a tender for the Package No.1, 5 lots (Procurement of Goods for Sub-Station Equipment). The deadline for bid submission is 25 January 2017.
11. Advanced payment was made for the consulting company Fichtner (Germany) on December 2016.
12. Uzbekenergo will start the construction works for the two substations, access roads, perimeter fence, wells, and raw water supply facilities in 2017 Q3.
13. Construction of transmission lines between Takhiatash TPP and 220 kV Khorezm substation (197,7 km) and between Khorezm and V1 node (166,1 km) will be started in 2018.
14. These construction works are outside of the EPC Contract.
15. Agreement will be signed between IA (Uzbekenergo) and construction companies (MU-4, Elektrotarmoqqurilish) and will be agreed with ADB in April 2017. After ADB's approval and signing of the Agreement construction works will be commenced approximately in June 2017.

1.2 Associated Facilities

16. Existing roads will be used for the project. New road (with lengths of 2 km), perimeter fence, wells, and raw water supply facilities to Sarimay substation will be constructed in 2017 Q3. For this reason environmental due diligence will be conducted by IA and due diligence report will be prepared before commencement of construction activities.

1.3 Changes in project organization and environmental management team

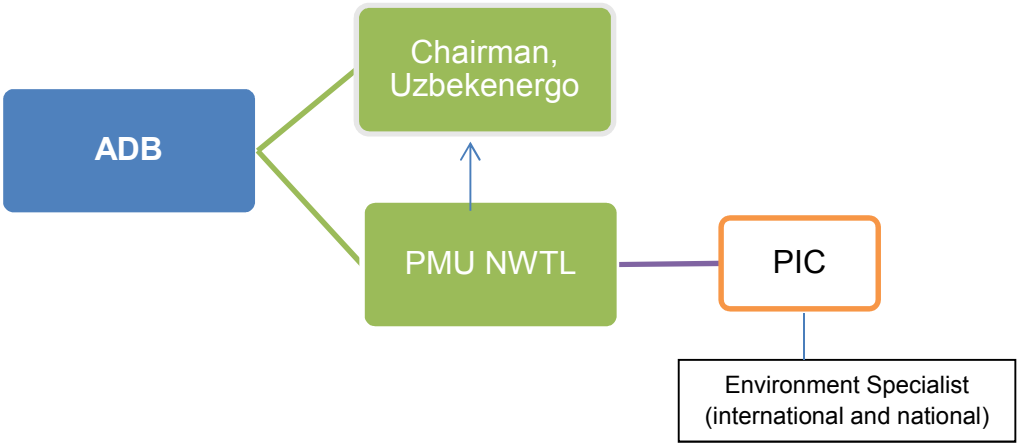
17. *Engineering, Procurement and Construction (EPC) Contractor* - The contract for the EPC Contractor has not yet awarded by Uzbekenergo. The EPC Contractor is expected to have their Environment Specialist(s) to ensure the implementation of the mitigation measures identified in the environmental management plan (EMP) of the IEE, preparation of site-specific EMP, environmental monitoring, and to provide technical support in the grievance redress mechanism.

18. *Project Implementation Consultant (PIC)* - The contract with the PIC was signed on June 2016. Mobilization of the Fichtner GmbH & Co. KG's specialists will be on the second part of January.
19. The PIC will supervise and monitor the project implementation including the construction and commissioning works, and build the institutional capacity of Uzbekenergo. The PIC includes Environment Specialists (international and national) as part of their team to oversee the overall implementation of environmental management plan, environmental monitoring, and compliance to the environmental requirements of ADB. PIC Environmental Specialist will prepare the environmental monitoring reports required by ADB, monitor the environmental compliance of the EPC Contractor.

20. *PMU NWTL* - There is Acting Manager, procurement specialist etc. It was some changes at the PIU staff. Now there is no environmental specialist at the PMU NWTL. This position was restricted.

21. The Project management organizational structure is given in **Figure 1 below**.

Figure 1: Project Management Organizational Structure



PART II - ENVIRONMENTAL MONITORING PLAN

22. No baseline environmental measurements were done for the Project during the preparation of IEE. Prior to the start of civil works, the EPC will conduct baseline environmental quality measurements (i.e., ambient air quality, noise level, water quality, etc.). Sampling stations will be determined during the detailed design and once the contract of the EPC Contractor will be awarded.

23. Baseline monitoring data are given in IEE prepared in April 2015. Permanent environmental monitoring will be started immediately after the commencement of the civil works.

PART III – ENVIRONMENTAL MANAGEMENT

3.1 The environmental management system (EMS), site-specific environmental management plan (SSEMP), and work plans

24. **Annex 1** presents the environmental management plan (EMP) for the construction of the Project based on the IEE (April 2015) posted in the ADB website prior to the approval of ADB's Management to finance the Project. The environmental impacts of the project are expected to be insignificant, site-specific, and manageable through mitigation and monitoring measures. Most of the environmental impacts of the project take place during the construction of the transmission lines, and expansion and rehabilitation of related substations and switchyards.

25. Potential environmental impacts during the construction activities include limited impacts on (i) land, hydrology, and soil erosion at river crossing; (ii) forest ecology due to tree cutting in a

forested area; (iii) air quality; (iv) noise near the Low Amu Darya Biosphere Reserve; (v) waste generation and disposal; (vi) transformer oil and battery management; (vii) traffic; and (viii) health and safety of workers and local communities. Impacts during the operation al phase are related to the electromagnetic field and the health and safety of operators at substations. The EMP specifies adequate mitigation measures and monitoring plans to cover these impacts.

26. Consequently, Site-Specific EMP (SSEMP) will be prepared before commencement of civil works. SSEMP will be discussed with the EPC Contractor once the contract has been awarded and then approved by the PIU.

3.2 Site Inspections and Audit

27. Not yet applicable.

3.3 Non-Compliance Notices

28. Not yet applicable.

3.4 Corrective Action Plans

29. Not yet applicable.

3.5 GRIEVANCE REDRESS MECHANISM

30. PMU NWTL will finalize the grievance redress mechanism (GRM) as soon as the EPC Contractor is mobilized. GRM will ensure a process of receiving and resolving complaint(s) promptly from persons affected by the Project. Based on the requirements of SPS 2009, the GRM will be a process that is understandable, transparent, gender-responsive, culturally-appropriate, and easily accessible to affected persons without cost and retribution.

31. Broadly, the GRM will consist of a grievance redress committee (GRC) that will continue to function from construction until the operation phase. GRC will consist of representatives from the EPC Contractor (during construction), local government unit, designated environmental staff of PMU NWTL, and witness of the complainant (or a third party representative for the complainant). PMU NWTL will ensure the representation of women in the GRC.

32. GRC will convene once a month to resolve complaint (if any) within 30 days from the date of receipt and will keep a record indicating the name of complainant and nature of complaint, status of resolving the complaint, decisions or actions undertaken, and the date the decision was effected. Records on grievances will be summarized and included in the environmental monitoring reports to be submitted by PMU NWTL twice a year to ADB during construction phase and annually during operation phase.

33. PMU NWTL will disclose the grievance redress procedure to Project stakeholders such as the contact person and details on how and where to contact them, how to file a grievance, and the time for the GRC to resolve the concerns. PMU NWTL will review GRM implementation regularly to assess the effectiveness of the process and to examine the ability to address grievances.

34. During the reporting period complaints have not been fixed.

PART IV - ACTION PLAN FOR THE NEXT REPORTING PERIOD

35. Assuming the award of contract for the EPC Contractor, the following is planned for the next reporting period:

- Obtain special permission from local authorities for:
  • Use with the indication of object, place, terms and ways of use –Q2 2017;
  • A consent of land owners, land users or public authorities, where the action would take place –Q2 2017;
  • A document confirming payment for use of objects of flora – Q2 2017.
- Set-up GRM and identify members of GRC - Q2 2017;
- Prepare site-specific environmental management plan (SSEMP) - Q3 2017;
- Prepare stakeholders' consultation plan during construction phase (this will include disclosure of the GRM) - Q3 2017;
- Environmental due diligence will be conducted by IA and due diligence report will be prepared before commencement of construction activities – Q2 2017;
- Hazardous waste (PCB containing oil and batteries) procedures will be carefully planned and prepared during pre-construction activities – Q2 2017;
- Prepare temporary storage facilities for the hazardous wastes before the release of the old equipment – Q2 2017;
- Waste Management, Pedestrian and Traffic Management, Health and Safety and Emission and Noise Control plans shall be prepared before preconstruction phase – Q2 2017.

ANNEXES

Annex 1 – Environmental Management Plan

PHASES/ ACTIVITIES	IMPACTS	MITIGATING MEASURES	RESPONSIBLE PARTIES	COST
PRE CONSTRUCTION				
Substations and OHL				
Surveying	- Removal of branches and other obstructions - Loss of vegetation, erosion - Air emissions - Soil contamination due to spills - Occupational Hazards, accidents	- Impact is very low, branches will re-grow, move location of survey equipment - Avoid removing grass and shrubs, avoid driving in areas where tracks are easily formed - Use new vehicles, use catalysators, turn off engines when possible - Adsorbent mats, removal of contaminated soil - Provide proper PPE, training and supervisions	- Survey Team supervisor	- Included in Project's cost
Soil exploration	- Trimming of shrubs, drilling holes on the ground - Loss of vegetation, erosion - Littering - Air emissions (exhaust gases, dust) - Noise generation - Soil contamination due to spills	- Soil sample is very small and shrubs removed will regenerate; fill sampling holes - Avoid removing grass and shrubs, avoid driving in areas where tracks are easily formed - Instructions to workers - Use new vehicles and machinery, proper maintenance, use catalysators, turn off engines when possible, watering construction site to reduce dust. - Noisy equipment and activities should be done only at daytime and if it is not possible, prior notice should be given to the	- Survey Team supervisor	- Included in Project's cost

	- Occupational Hazards, accidents	neighboring areas. - Admissible noise level into the living area, both inside and outside the buildings (SanR&N No.0267-09); and general EHS IFC guideline (2007) standards). - Adsorbent mats, removal of contaminated soil - Provide PPE, training and supervision		
Land Acquisition	- Temporary and permanent removal of the land from the land owners and its uses	- Proper appraisal of income loss and timely compensation - OHL line properly selected to avoid houses, other structures and agriculture land	- Uzbekenergo with PMU Safeguards Specialists	- 235 000 USD (includes land acquisition compensations for all project phases) - Included in Project's cost
CONSTRUCTION				
Substations				
Site clearance and levelling works	- Loss of topsoil - Increase in suspended solids and turbidity in receiving drainage systems - Increase in air pollution from suspended particulates from soil carried and left on the road by trucks used in construction	- Conserve and stock top soil separately for use in site landscaping - Compact and cover excavated material stock pile especially during the rainy season - Add a silting basin at the end of the main drain prior to discharge. - Wet or cover the excavated soil pile and dusty construction materials such as sand, lime etc. during the dry season to reduce dust - Wet the work area	- Contractor - ditto - ditto - ditto - ditto - ditto - ditto - ditto - ditto - ditto	- Part of good practices - ditto - ditto - ditto - ditto - ditto - ditto - ditto - ditto - ditto

	- Grease and oil from leaks and spillage affecting the water quality and soil contamination - Noise from heavy equipment - Items of archaeological or cultural significance accidentally discovered during earth moving and construction	and other areas with exposed surfaces to reduce dust - Wash all truck wheels before leaving the site and all construction trucks should be properly covered while on transit - Periodic check up and maintenance of equipment especially oil seals, proper training and supervision of persons operating the equipment to report leaks, adsorbent mats, removal of contaminated soil - Fence the work area. All equipment should be provided with mufflers and noise reduction equipment - Noisy equipment and activity should be done only at daytime and if it is not possible prior notice should be given to the neighboring areas. - Admissible noise level into the living area, both inside and outside the buildings (SanR&N No.0267-09); and general EHS IFC guideline (2007) standards). - Provide personnel involved in earth moving and excavation one or two hour seminar on protocol to follow if	- PMU with participation from third parties	Cost included in Project budget

		items of possible cultural significance are discovered. Coordinate with local archeological authorities. In the meantime, the area where the item is discovered is cordoned and construction activities suspended until the experts from archaeological department have given their opinion or procedure on how to proceed with the work.		
Site works and construction	- Increase of air pollutants such as PM2.5, sulfur dioxide, nitrogen oxides from heavy trucks - Grease and oil from leaks and spillage affecting the water quality and soil contamination - Noise from heavy equipment - Increase of traffic congestion in the construction area especially	- All equipment used must comply with the Uzbek emission laws. - Periodic check up and maintenance of equipment especially oil seals, proper training and supervision of persons operating the equipment to report leaks, adsorbent mats, removal of contaminated soil - All equipment should be provided with mufflers and noise reduction equipment - Noisy equipment and activity should be done only at daytime and if it is not possible prior notice should be given to the neighboring areas. - Admissible noise level into the living area, both inside and outside the buildings (SanR&N No.0267-09); and general EHS IFC	- Contractor - ditto - ditto - ditto - ditto - ditto - ditto - PMU and Contractor with participation from third parties	- Good practices - ditto - ditto - ditto - ditto - ditto - ditto Cost included in Project budget

	heavy transformers and equipment are delivered and installed	guideline (2007) standards). - Preparation of Emission and Noise Control Plan. - Coordinate with the local authorities to reroute traffic and assign special personnel to direct the traffic. Preparation of Temporary Pedestrian and Traffic Management Plan.		
Construction	- Soil contamination, health and safety hazards caused by improper change procedures and waste management of batteries and transformer oil	- Uzbekenergo/SS Khorezm takes full responsibility in utilization of old batteries (in accordance with local norms SanPiN 3183-84). - Analyses of PCB/TCB in transformer oil, removal of all PCB/TCB containing oil according to special instructions, temporary storage according to norms, delivery of used oil to legal waste management facility. - Collection, delivery and disposal of the used transformer oil to be done according to the developed normative documents and Resolution of the Cabinet of Ministers of the Republic of Uzbekistan No. 258 dd. 04.09.2012. - Construction of proper storage site for used oil. - Change of batteries according to specific instructions	- Uzbekenergo /PMU - Contractor together with Substation management - ditto - ditto - ditto - Contractor	- Good practices Storage and recycling of batteries: 30,000-50,000 USD Analyses of oil: 500 USD/sample Transformer oil waste storage and handling 1,200 USD/ton Cost included in Project budget

		- Preparation of Waste Management Plan		
Construction	- Soil contamination, health and safety hazards caused by PCB containing transformer oil	- Immediate change of PCB containing oil from all transformers - Installation of new transformers without PCB containing oil, insulating oil shall comply with international standard IEC 60296	- Uzbekenergo /PMU	- Good practices Cost included in Project budget
Construction	- Overall Waste Management	- Preparation of Waste Management Plan - A waste management hierarchy that consider prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes should be considered. Final disposal must be undertaken in an environmentally sound manner.	- Contractor	- Good practices Cost included in Project budget
Health and safety	- Employment of minors and women for unsuitable task - Spread of contagious and communicable diseases by outside workers - Accidents, hazards and other work area related concerns	- Proof of age will be required prior to employment. Supervisors are to check the work done by women. - Limit outside workers by giving locals priority in employment. External workers hired must have proper medical examination prior to employment. New workers will be properly briefed on the basics of how common communicable and contagious diseases are spread, symptoms and effects. The Contractor will retain a physician who could be contacted or would give the personnel regular	- Contractor with PMU Safeguard Specialist - ditto - Contractor - ditto - ditto - ditto	- Good practices - ditto - ditto - ditto - ditto

		check up. - Develop a Health and Safety Management Plan (H&S Plan) to the construction activities and implement the resulting Health and Safety Management System (HSMS). Specific issues: handling of oil and batteries, working under high voltage conditions. - PPE, first aid kit, and alarm system should be provided and used in the construction activity. “NO PPE NO WORK” policy should be properly implemented. - Workers should be properly briefed on proper work conduct, chain of command and responsibilities, and action to take during an emergency. - Key personnel will be trained on first aid. Periodic drills will be carried out. - Teams and personnel with good safety record will be properly acknowledged.	- ditto	- ditto Cost included in Project budget
Health and safety	- Emissions to air from circuit breakers (Eleigas)	- Environmental conditions have to answer the norms specified in MEK 62271-100 the General Technical Standard Requirements on the High-voltage circuit and to the Equipment of Management - User’s manual should be provided to sites	- Uzbekenergo /PMU	- Good practice Cost included in Project budget
OHL				

Foundation works	- Noise from the construction of the tower foundations is the most important impact. The impacts could vary depending on the soil structure. In weak soil, such as in alluvial deposits in valley beds, piling may have to be carried out. Compressor and power tools will be needed for hard rock surfaces. Also blasting may be needed. Heavy equipment coming and entering the area can cause noise and ground vibrations.	- Noisy operations such as piling, rock breaking using power equipment and cement mixing should be limited to daytime operation when working close to residential areas. - Piling and rock breaking should be minimized during the spring months when birds, fish, and other animals are breeding. The noise could affect their breeding patterns as well as the survival of the young animals. - When operating close to villages, the noisy equipment should only be operated during daytime and if it is not possible the village residents should be given advance notice of the activity. Such activity should not last longer than two consecutive days. - Admissible noise level into the living area, both inside and outside the buildings (SanR&N No.0267-09); and general EHS IFC guideline (2007) standards). - Use of protection zones when blasting works are done (densely habitated areas). - No blasting along Nature Reserve Areas - Preparation of Emission and Noise Control Plan	- Contractor - ditto - ditto - ditto - ditto - ditto - ditto - ditto - ditto - ditto	- Good practice - ditto - ditto - ditto - ditto - ditto - ditto - ditto - ditto
Foundation works	- Construction of the foundation will disturb the soil causing	- Mimimize removal of vegetation. - Topsoil will be segregated to sod and	- Contractor - ditto	- Good practice - ditto

	erosion and loss of fertile topsoil.	restore after backfilling the foundation area. - Other excavated materials must be stored in a pile, properly compacted and wetted regularly to reduce any dust. - Most of the excavated materials will be used to backfill the foundation and any excess material will be used to raise the ground level around the foundations.	- ditto - ditto	- ditto - ditto
Foundation works	- Construction of the foundation at river crossings would require special procedure because of the high water table. New traverse dam will also be constructed which may cause increased turbidity of the river water.	- Construction of towers on dry land (design work). - The water removed during excavation must be pumped to a silt pond after which the water is then discharged to the drainage or irrigation canal only when the water has cleared. - Detailed planning of the traverse dam construction. - Execution of the works during low water table period. - Foundations may require sulfate resistant cement to prevent corrosion and premature failure of the foundation.	- PMU - Contractor - PMU - Contractor - PMU	- Good practice - ditto - ditto - ditto - ditto Cost included in Project budget
Foundation works and construction	- At the second river crossing OHL will pass through forest area, trees will be either cut totally or only tree tops are cut or trees are replanted	- Cutting of tree tops to be applied if it is applicable with the Contractor from the point of construction activities. Where cutting of tree tops is not applicable, trees to be replanted at different area. If both	- Uzbekenergo - State Natural Protection Committee and Ministry of Agriculture	- Revegetation 13,000-20,000 USD/hectare

		are not possible, cutting down of trees should be applied. Confirmation should be gained from local district administration for any action. - For cutting down of all trees the Project should obtain a special permission from the State Natural Protection Committee		
Construction of roads for accessibility	- The right of way for the construction equipment, personnel and materials may require clearing of the shrubs and grassland which may cause erosion. Use of herbicides may cause health risks.	- Minimize removal of vegetation, grasses and shrubs should preferably be cleaned manually. - If herbicides need to be used to clean the right of way, herbicides that are classified as persistent organic pollutant under Stockholm Convention on Persistent Organic Pollutant must be avoided. - Workers must be properly trained on the uses of the herbicides and provided with proper PPE, and the antidote must be available. Supervisors and key personnel must undergo training on first aid procedure. - Empty herbicide containers must be properly collected, and stored in a secure place for later disposal	- Contractor - PMU - ditto - Contractor	- Good practice - ditto - Cost for conducting training is included in Supervision Contract and partly covered by Uzbeke-nergo's health and safety department - cost for secured storage 1,000 USD

		when a toxic and hazardous waste facility is available.		
Construction	- Air pollutant discharge from the equipment used during OHL and access road construction.	- While the cumulative emission over one year of construction work is high, when the emission is distributed over time, length of the OHL at 338 km and operating width of around 200 m, the overall impact on the air quality is negligible at a fraction of a microgram/cubic meter - Contractor will be required that emissions and noise level of all his equipment and machinery used in the OHL construction must conform to the Uzbek environmental standard. - Use of new vehicles and machinery, proper maintenance, use of catalysators, turn off engines when possible, low speed driving - Spent materials such as welding rods, empty paint containers, and solvent containers must	- Contractor - ditto - ditto	- Standard good practice - ditto - ditto

		be properly collected, packed and stored in a secure place if there are no disposal facilities for toxic and hazardous wastes		
Construction	- Surface and groundwater pollution and soil contamination due to spills and improper waste handling	- Careful handling and storage of fuels and chemicals, proper maintenance of vehicles and machinery - Proper waste management practices: waste separation, recycling, reuse and disposal. Special procedures for PCB containing oil. Use of dry toilets. - Preparation of Waste Management Plan - Adsorbent mats for spills, removal of contaminated soil - Complying with the resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On Adoption of Provision on the Order of Delivery, Collection, Implementation of Calculations, Storage and Transportation of the Fulfilled Technical Oils", dd. September 4, 2012, No. 258	- Contractor	- Standard good practice
Construction of foundations and access roads	- Change in the surface features (levelling, excavation of natural raw materials)	- Construction of new access roads along contour lines - Reuse of excavated soil from tower foundations and road alignments, choice of the producer of natural raw materials using sustainability criteria	- Contractor - ditto	- Standard good practice
Construction of	- Accidental discovery of	- Apply the chance find procedure described in	- PMU	- Standard good practice

foundations and access roads	cultural and archaeologically significant objects	the previous section in the construction of substations. Chances of finding important object in a particular tower site is low because of the very small area required for the foundations but cumulatively the area is large as it stretches some 338 km and may involve more than 1,200 towers.		
Health and safety	- Occupational health and safety risks	- Apply Health and Safety Management Plan (H&S Plan) to the construction activities and implement the Health and Safety Management System (HSMS). - Workers must be provided with PPE, e.g. during welding, proper welding protective mask, gloves, and clothes - Workers must be properly briefed on construction safety, protocol, and procedures especially on the use of PPE. Supervisors must enforce strongly the "NO PPE NO WORK" requirement. - Supervisors must constantly check that their workers are following the proper health and safety procedure and instill disciplinary measures to those who ignore it - Good workers who contribute to safety and health must be duly recognized. - Foremen and key	- Contractor - ditto - ditto - ditto - ditto - ditto	- Standard good practices - ditto - ditto - Cost for conducting training is included in Supervision Contract and partly covered by Uzbek-energo's health and safety department

		personnel may be given first aid training and a first aid kit must be available at all times in the work site.		
Health and safety	- Health threats from communicable and infectious diseases especially those borne by migrant workers may be a problem.	- Workers must be required to present medical and health certificates prior to employment. - Workers must be given an hour or two briefing on personal hygiene and spread of communicable and infectious diseases and their symptoms and effects. - The project will retain a licensed doctor to attend to the health needs of the works.	- Contractor - ditto - Uzbekenergo	- Standard good practice - ditto - covered by Uzbekenergo's health and safety department
Social issues	- OHL construction work is spread over a wide distance and the workers have possibility of interacting with local communities that could result in personal conflicts and possibly impacting the project.	- Hire local residents as much as possible. - Brief migrant workers on local customs and tradition which they must respect. - If there are sites of important customary values, the project engineer must engage the local residents on the proper procedure for them to proceed with their work. - Project will retain a community liaison officer knowledgeable on the local customs and traditions.	- PMU and Contractor - ditto - ditto - PMU	- Good practice - ditto - ditto - 500 USD/month
Land Acquisition	- Temporary and permanent removal of the land from the land owners and its uses	- Proper appraisal of income loss and timely compensation - OHL line properly selected to avoid houses, other structures and agriculture land - Selection of only a few	- Uzbekenergo with PMU Safeguards Specialists - Contractor - ditto	- 235,000 USD (includes land acquisition compensations for all project phases) - Included in

		access roads - Construction activities after crop harvesting period		Project's cost
OPERATION AND MAINTENANCE				
Substations				
Operation	- Transformer and equipment noise	- Use of sulfur hexafluoride circuit breakers which have low noise level compared with air or oil circuit breakers - Construction of flanks or blank blind to contain the noise.	- Uzbekenergo and substation management	- Standard good practice
Operation	- Evaporation of mineral oil in transformers, which is estimated at 0.11 g/day or roughly a liter every three months, is very low	- No mitigating measures		
Operation	- Emissions to air from circuit breakers (Eligas)	- Supplier should provide training for personnel, user's manual should be placed at relevant sites, monitoring should be organized.	- Uzbekenergo and substation management	- Standard good practice - Training included in Project's cost
Operation and maintenance	- Electric shock causing death or injury	- Security fences around sites - Establishment of warning signs - Careful design of maintenance works - Training	- Uzbekenergo and substation management	- Standard good practice
Operation and maintenance	- Improper waste management practices causing littering and surface water, groundwater and soil contamination	- Proper waste management practices: waste separation, recycling, reuse, proper storage and disposal. Special procedures for hazardous waste.	- Uzbekenergo and substation management	- Standard good practice
Maintenanc	- Routine	- Use of PPE	- Uzbekenergo	- Standard

e	maintenance to check the condition of the towers, structures and equipment - Occupational and health safety risks	- Care in handling and isolating equipment to be inspected	and substation management	good practice
Maintenance	- Oil spills (oil is changed every 15 years) causing soil contamination and surface water and groundwater pollution	- Old oil is drained to a pan to prevent spillage. - Old oil is placed in drums for disposal in cement plant or toxic and hazardous waste treatment facility. Normally THW handling facilities pay for the disposal of mineral oil as it contains very high heating value.	- Uzbekenergo and substation management	- Standard good practices - Included in SS operation cost - Normally cement plants will pay for spent oil
OHL				
Operation	- Corona noise from the conductor especially after a rain, natural deterioration of the conductor or premature deterioration of the conductor wires from pollution	- Proper design of the wire tension to prevent corona discharge - Replacement of worn conductors	- Uzbekenergo and OHL management	- Part of OM cost
Operation	- Bird kill in transmission lines	- Installation of apparatus to scare the birds such as barbed nails, tridents, noise springs, etc.	- Uzbekenergo and OHL management	- Standard design of OHL
Operation	- Electromagnetic field may cause health risks	- EMF in nearest residential area should not exceed IFC and Uzbek regulations. - Proper distance from the houses. For the 220 kV line at least 44 m from the conductor wire.	- Uzbekenergo and OHL management with third party involvement	- Standard design of OHL
Maintenanc	- Health and	- Personnel involved in	- Uzbekenergo	- Standard

e	Safety risks related to inspection and maintenance of the towers, foundations and conductors	inspection and maintenance of the transmission lines must be properly trained. - They must always use the proper PPE. - Exercise care when working with live wires to prevent electrocution.	and OHL management and maintenance personnel	good practices
Maintenance	- Maintenance of the right of way	- Grazing and other organic means to control grasses would be preferred. - Use of herbicides should be avoided -	- Uzbekenergo and OHL management and maintenance personnel	- Part of OM cost
Maintenance	- Improper waste management practices causing littering and surface water, groundwater and soil contamination	- Proper waste management practices: waste separation, recycling, reuse, proper storage and disposal. Special procedures for hazardous waste.	- Uzbekenergo and OHL management and maintenance personnel	- Part of OM cost
DECOMMISSIONING				
Substations				
Health and safety	- Occupational Health and Safety risks	- Disconnect power to major equipment	- Substation management	- Standard good practices
Oil spillage	- Removal of mineral oil and Disposal	- Drain transformer oil, store for long term storage if toxic and hazardous wastes disposal facilities are not available. - Consider using cement plants for THW disposal subject to Uzbek laws and regulations.	- Substation management - ditto	- 1,000 USD per year per cubic meter of storage - Zero to some income
Transformer oil	- Removal of transformer oil and Disposal	- Analyses of oil for PCB/TCB - Removal of all PCB/TCB containing oil according to special instructions - Delivery to legal waste	- Substation management	- Up to 1,000 USD per year per ton - Included in SS operation cost

		management facility		
Remediation	- Soil Analysis and Remediation	- Soil in the area will be sampled for contamination from hydrocarbons, other common chemicals used in the substation that could be insignificant on day to day basis but with long operation of the substation could accumulate in the soil, such as trichloroethylene (TCE).	- Substation management, and third party participation	- Cost is site and case specific - Included in SS operation cost
OHL				
Waste	- Removal of Conductors, Towers and Foundation	- Ensure that all waste is recycled when possible - Good waste management practices - Cleaning of trash and other waste after decommissioning	- Uzbekenergo and OHL management	- Standard good practice
Health and safety	- Occupational health and safety risk	- Ascertain that all conductors to be removed have been isolated and decommissioned. - Workers must check all conductors and accessories for live load prior to handling them. - Personnel must wear appropriate PPE and supervisors must strictly enforce the safety procedure.	- Uzbekenergo and OHL management	- Standard good practice
Hazardous waste	- Contamination with PCB/TCB	- Transformers and electrical equipment decommissioned must be checked for contamination with PCB/TCB. If there are equipment contaminated, those equipment must be properly packed and sent to a toxic and	- Uzbekenergo and OHL management	- 1,000 USD per year per ton

		hazardous disposal facility and in the absence of such facility to a secured storage.		
EMERGENCY AND ACCIDENTS				
Substations				
	- Fire	- Fire and smoke sensor, fire fighting equipment, use of fire proof outlets, ventilation equipment - Grounding of equipment, provision of interlock, and automatic power cut off - Equipment are properly labeled and procedures defined in case of fire such as isolation of other equipment - External support such as the local fire department and civil defense offices - Drills and exercises to test personnel preparedness for fire and other emergency	- Substation management - ditto - ditto - Substation management and local authorities - Substation management	- Standard design practice - ditto - ditto - ditto - 100 USD per drill
OHL				
	- Tower collapse from weakening of structure such as erosion of foundations	- Periodic examination of the tower foundation and structure - If needed remedial measures to improve the foundation support; erosion control - Use of materials that are less susceptible to erosion, degradation or rusting - Clear the road right of way for emergency crew. - Prevent houses and other incompatible land uses from being built near the transmission lines right of way. - When tower collapses,	- OHL management - ditto - OHL design engineers - OHL management - OHL and local land use officials - OHL management - ditto - Uzbekenergo	- Standard good practices - Extent of damage not known - Standard good practice - ditto - ditto - ditto - ditto

		immediately terminate power supply. - Isolate the collapsed section so that the loads are not shifted to the other towers that may result to failure of those towers. - Establish the cause of the failure and reroute the replacement OHL to a more stable site.	and OHL management	