Initial Environmental Examination

July 2015

UZB: Northwest Region Power Transmission Line Project

Contents

TABLES

FIGURES

Glossary

ADB	Asian Development Bank
AH	Affected Household
CO	Carbon Monoxide
CO_2	Carbon Dioxide
DMC	Developing Member Country
EA	Executing Agency
EMF	Electromagnetic Field
EMoP	Environmental Monitoring Plan
EMP	Environmental Management Plan
FTO	Fulfilled (Used) Technical Oil
HC	Hydrocarbon
H&S	Health and Safety
IEE	Initial Environmental Examination
IFC	International Finance Corporation
IUCN	International Union for Conservation of Nature
CCGT	Combined Cycle Gas Turbine
CB	Circuit breaker
GOST	State Technical Design Code
GRM	Grievance Redress Mechanism
HPP	Hydro Power Plant
HV	High Voltage
IPS	Interconnected Power System
Khokimiyat	Regional (municipal or district level) government authority
kV	Kilovolt (1,000 volts)
LARF	Land Acquisition and Resettlement Framework
LARP	Land Acquisition and Resettlement Plan
M	Million, mega
Makhalla	A community of neighbors, which is based on full independence and self-governance
MPA	Maximum Potential Concentration
MVA	Megavolt ampere (1 million volt-amperes)
MW	Mega-watt (1 million watts)
NO_x	Nitrogen Oxides
OHL	Overhead line
PMC	Project Supervision and Management Consultant
PMU	Project Management Unit
PPE	Personal Protective Equipment
PPTA	Project Preparatory Technical Assistance
ROW	Right-of-way
SF-6	Sulfur hexafluoride
SCNP	State Committee for Nature Protection
SNR	Sanitary Norms and Rules
SPS	Safeguard Policy Statement
SS	Electrical substation
SwS	Switching Station
TL	Transmission Line

TPP	Thermal Power Plant
UE	State Joint Stock Company Uzbekenergo

This environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.

A. EXECUTIVE SUMMARY

INTRODUCTION

1. The purpose of this report is to present the findings of an Initial Environmental Examination (IEE) of the proposed Northwest Region Power Transmission Line Project as part of the Project Preparatory Technical Assistance (PPTA). IEE has been prepared on behalf of Uzbekenergo by PPTA Consultant for the Asian Development Bank, as such it is in a full ownership of Uzbekenergo.

2. The main objective of the Project Preparatory Technical Assistance (PPTA-8618UZB) is to prepare the Northwest Power Transmission Project (the Project) for processing for ADB financing and establishing if the investment project is economically, financially, and technically feasible, and socially and environmentally acceptable. The PPTA consultants shall undertake necessary due diligence for processing the loan for the Project and to assist the Executing Agency in preparing the detailed Project specification and outlining of the bidding documents.

3. Under the Asian Development Bank procedures, the Project is classified **Category B** which means a proposed project whose impacts are site specific, few if any of which are irreversible, and where in most cases mitigation measures can be designed more readily than for Category A projects. Proposed Category B projects require an Initial Environmental Examination (IEE).The IEE is performed in accordance with ADB's Safeguard Policy Statement (SPS, 2009).

DESCRIPTION OF THE PROJECT

4. The proposed Project consists of the following main components:

- Construction of 363.9 km, 220 kV single-circuit/double circuit overhead transmission line (OHL) between Takhiatash Thermal Power Plant (TPP) and Khorezm substation and between Khorezm SS and V-1 node (SwS Sarimay/SwS Ellikkala);
- Expansion/rehabilitation of the substation at Takhiatash TPP, expansion/rehabilitation of 220/110 kV Khorezm substation, and construction of a new 220 kV substation located near V-1 node; and
- Support for Institutional Development, Capacity Building, and Project Management: including consultancy services for operational improvement, capacity building, and project supervision and management.

5. The objectives of the Northwest Region Power Transmission Line Project (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.

6. 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.

7. The Project (OHL and substations) is located in the western – south-western provinces of Karakalpakstan and Khorezm of the Republic of Uzbekistan, near the border of Turkmenistan.

8. The implementation of the Project is scheduled to start in 2015 and last for 48 months.

DESCRIPTION OF THE ENVIRONMENT

Climate

9. The Project area belongs to the Central Asian zone of deserts and semi-deserts with sharp continental climate. The main features of the climate are: low rainfall, hot and dry summer and short but cold winter.

10. Annual maximum air temperature is 45 ˚C and minimum -27 ˚C. Annual average precipitation is 97-117 mm depending on the location.

Topography, geology and seismicity

11. The main geological and geomorphological features along the OHL alignment are alluvial deposits of the Amu Darya valley and southern slopes of Sultan-Uvaistag Mountains. The Amu Darya valley deposits are mostly loam, clay, sand and sandy loam.

12. The flat bottomland plain of Amu Darya valley consists of low and high bottomlands which are separated by a berm with height up to 20 m. The overall width of the bottomland varies between a few hundred meters and 2-3 kilometers.

13. The sandy massif along the southern slopes of Sultan-Uvaistag Mountains consists of ridges and hummock of sand. The foothill plain of the mountain is composed of gravel and sandy soils.

14. Depending on the location, the salinity of the soil may be even 14,000 mg/kg consisting of water-soluble salts. Extent of salinization of the same area quickly changes: on the background of the not saline parts there are spots of weak, average and strong salinization. Formation of spotty salinization is often connected with roughness of a relief of the irrigated area.

15. Soils are polluted not only by salts, but also by chemical fertilizers and pesticides.

16. The OHL alignment is located on a seismic area. Project area belongs to seven-point zone of seismicity (SNIP-11-81, KMK 2.01.03-96 and Amendment No. 1).

Surface water

17. The dominant surface water element throughout the whole OHL route is the Amu Darya River which is a permanent natural stream flow. Amu Darya River often changes the dynamic axle during the flood, there are cases of washing off the river bank of 150-200 meters to the left or right.

18. For the last 5 years water flow rate at Kipchak (the closest monitoring point to Takhiatash at the Amu Darya River) discharge was lower than long-time average annual (663 m^3/s) and amounted to 509 m^3/s. Average depth of the river is 6-7 meters and width 16-42 meters. Average flow velocity is 1.1-1.2 m/s.

19. Chemical composition of the river water is formed to a large degree under the impact of contaminants coming to the river on the territory of Turkmenistan, agricultural flows and waste waters of factories in Drujba, Turtkul, Urgench and Mangit cities. Water of Amu Darya

River is characterized by high turbidity. Long-time average monthly water turbidity fluctuates from 0.24 kg/m^3 in January to 5.1 kg/m^3 in May.

20. The largest artificial surface water object is Shimam-yab canal which starts from the Amu Darya River. The width of the canal is 10-13 m and depth 2.0 m. Worth mentioning is also Andreev canal which starts from Shimam-yab canal. Its width is 10 m and depth 2 m.

21. Beside the canals, there is an extensive collector and irrigation network in the project area. The OHL alignment crosses 79 channels and 126 collectors. The quality of water in channels is similar to Amu Darya River water.

Groundwater

22. The upper deposit combining the underground reservoir over Paleogene part of section contains ground porous-fissured water, main feed source of which is water inflow from Amu Darya and inflow seepage of water from irrigation network. Within the area the groundwater table declines from southeast of the Amu Darya River to the north - northwest. Groundwater occurs at depths ranging from 0.2 m to 3.8 m.

23. Interstratal pore water is confined in the Upper Cretaceous depositions of lower hydrogeological deposition. This deposition consists of sand and sandstone which contains interstratified mineralized water.

24. Groundwater is saline and has strong sulfate aggressiveness to concrete.

Wildlife

25. Fauna of the territory is varied. The most notable of the mass of desert animals are various reptiles, rodents and small insects crawling on the ground. All in all there are up to 400 species of vertebrates.

26. There are more than 50 types of fish in Aral Sea basin. Withdrawing water for agricultural activity and construction of number of dams and canals has negatively impacted on the fishes. Around 10 types of fish are included into Uzbekistan book as a rare species. Among them are big and small Pseudosaphirhynchus Kaufmanni, Barbus Brachycephalys and Aral Acipenser Nudiventus.

Forests and vegetation

27. On the vast territory of the Republic of Karakalpakstan, which includes the lower course and delta of the Amu Darya River, the adjacent sand and gypsum Kyzylkum deserts, the Ustyrt plateau and the Aral Sea, there are about 1,000 species of higher plants.

28. Vegetation especially in the sands and takyrs covers the area in early spring with a solid cover of sand sedge and other plants. Various types of wormwood and Salsola shrub also find here favourable conditions for their development. Thus, upon occurrence of favourable moisture conditions observed in early spring, sands are covered with quite diverse and abundant vegetation, the main and most typical representatives being sand sedge— Carex physodes, Haloxylon, Salsola, Calligonum and other shrubs. In addition, there is common annual Salsola vegetation including Xerophilous Andhalophilic herbaceous annual plants of the goosefoot (Chenopodiaceae) family.

29. The TL will traverse through a forested area, managed by Leskonkhoz, on both sides of the Amur Darya River near Khorezm SS. Trees that follow under right of way on that area belong to Forestry departments of Karakalpak and Khorezm region. A common tree species of both sites of the river are Thuranga (Populus euphratica).

30. The surface of Amu Darya delta is utilized for agriculture (cotton sowing, corn, lucerne, rice and water melon crop).

Protected areas

31. There are three protected areas on the territory of Karakalpakstan:

- Low Amu Darya biospheric reserve (established in 2011) – in accordance with IUCN classification belongs to Category I.
- Saygachiy preserve (1991) – Category IV.
- Sudochue Lake (1991) - Category IV.

32. The closest protected area to the project is Low Amydarya biospheric reserve which locates on the territory of Amudarya and Beruniy districts of Republic Karakalpakstan around 75 km on the south-east from Takhiatash city. The minimum distance of the OHL to northern border of the reserve is about 200 m.

33. There are 167 plant species in the Reserve of which two are in the Red Book of the Republic of Uzbekistan. The most known is Tugai or riparian forest. The fauna includes: 26 species of fish, 2 species of amphibians, 13 species of reptiles, more than 91 species of birds and 15 species of mammals. Among species listed in the IUCN Red Book and the Red Book of the Republic of Uzbekistan are: Fish – 5, birds – 4, mammals – 1.

34. It is likely that historical monuments will not be disturbed by the Project but there is a possibility that fragments of historical artifacts may be found during excavation works.

Economic development

35. The OHL route of 220 kV passes through two administrative territorial units of Uzbekistan - the Republic of Karakalpakstan (population 1.4 million people) and the Khorezm region (population 1.59 million people).

36. The alignment of the OHL passes the following communities and settlements starting from Takhiatash Power Plant: Naymankul (Tashaul), Makhramaul, Naymantuba, Hojakol, Kuralpa, Buston, Kyngyldaul, Mekhnatkashfrom, Naymanyab, Ashiklar, Uygur, Sabirbeg, Sariturangi, Eski-Kiyat, Hasaul, Karayantak, Gazavatbuyi, Khorezm, Katchalli, Killavit, Chandyrkiyat, Navkhas, Obod, Kushanda, Mashinachilik, Saburzan, Kungirot, Chamankum, Zarbdor, Balykchi, Nukus and Ellikkala.

37. The main branches of agriculture of the Republic of Karakalpakstan are grain-growing (production of wheat and rice), cotton breeding, animal husbandry and silkworm breeding. Main industrial sectors are: metal working, power industry, textile and food.

38. The main part of the population in Khorezm region is occupied in agriculture (more than 20 %), industrial production (5.5 %), construction (more than 6 %), sphere of trade and public catering (6 %), transport and communication (2.5 %) and education (about 10 %).

FORECASTING ENVIRONMENTAL IMPACTSAND MITIGATION MEASURES

39. The Project's impacts take place during the following phases: preconstruction, construction, operation, and maintenance and decommissioning. Furthermore, potential impacts may occur during emergency and accident situations.

40. Overall findings of the IEE show that the Project may have minor adverse environmental impacts (low magnitude). The minor impacts that are identified can be mitigated or managed in such a way that they are acceptable.

41. After the Project has been implemented, the positive impacts are obvious and consist in a much more reliable power supply in Uzbekistan.

Preconstruction

42. Potential impacts during Preconstruction can be divided in two major groups: impacts during surveying and soil investigation, and land acquisition issues.

43. Potential impacts during field works are the following:

- impact on plants and vegetation
- soil disturbance/erosion
- noise and vibrations
- air pollution
- soil contamination
- littering
- temporary restrictions in land use

44. All impacts can be managed by using proper mitigation measures. Impacts will be minimized by avoiding driving in areas where tracks are easily formed, using new vehicles and machinery, maintaining them properly, choosing drilling points carefully and using adsorbent mats in case of spills. Littering will be avoided by giving proper instructions to workers.

45. For permanent use of OHL altogether 13.32 ha of land will be needed. Land acquisition of agricultural lands is 4.35 ha. Temporary impacts include 536 ha of which 159 ha is agricultural land. The total amount of affected households is 169.

46. Temporary and permanent restrictions in land use will be minimized by selecting the location of OHL alignment carefully to avoid primary agricultural land, timing of the activities outside crop harvesting periods, selecting only a few access roads and compensating Affected Households.

Construction

47. During construction works the impact on Physical Resources (loss of land resources, topography, hydrology and use of natural raw materials). Mitigation measures will be careful planning of the location of base camps, access roads and other working areas avoiding populated and sensitive areas, timing of works and reuse of excavated soil material.

48. Impact on Environmental Resources (air quality, noise, surface water and groundwater quality, soils, forest) can be avoided partially by minimizing the removal of vegetation, rehabilitation of disturbed land, proper maintenance of vehicles and machinery and proper waste management practices.

49. Ecological Resources (terrestrial and aquatic ecology and wildlife) may be affected temporarily. The Nature Reserve of Baday – Tugay is situated 200 metres from the OHL alignment at the nearest point. The actual impact on animals living in the Nature Reserve area is minor. Mitigation measures will be working only during day time, installation of bird rejectors on towers, replanting of vegetation and use of silt ponds near surface water. Blasting works will not be done along the Reserve.

50. Impacts on Human Environment (Health & Safety, agriculture, socio-economics, cultural and archaeological sites, traffic and transport) will occur during construction period. Most impacts concerning Health and safety will be mitigated by training and use of personal protective equipment. Disturbances in agriculture will be avoided by locating access roads along field borders and performing construction works after crop harvesting. There are not any known archaeological sites along the OHL alignment. Archaeological findings may occur during excavation works but works will be stopped and relevant authorities contacted immediately if historical artifacts are found.

51. Traffic disturbances will be avoided by avoiding highly populated areas, using proper traffic signs and avoiding road blockage.

52. Construction of OHL and sub-stations will generate possibilities of local employment as a number of laborers will be required during the construction. All construction activities will be done by Uzbek companies.

53. The solid waste generation will be mainly at the location of tower erection sites and substations. Waste types will include e.g. scrap metal, wood, oils and lubricants, pieces of welding electrodes, small amount of concrete and domestic waste. Waste will be collected and disposed of in compliance with applicable regulations and rules. Special attention is given to transformer oil and used batteries. Sanitation water will be collected and treated properly. Dry closets will be used.

Operation and maintenance

54. Once the substations and OHL are operational, there will be little activities which may cause environmental impacts. The main impacts are noise, electric field, soil contamination, bird deaths and Health & Safety issues.

55. Noise will be avoided by careful planning of the structures. Soil contamination can be avoided by careful execution of maintenance works, especially oil change of transformers, and proper waste management practices. Bird rejectors will be used on towers to reduce bird kills. Health & Safety training will be organized for workers.

Decommissioning

56. During decommissioning of old structures, special attention will be paid to waste management and Health & Safety issues (especially transformer oil and used batteries). Waste will be separated and reused or recycled as much as possible. H&S training will be organized to workers.

ANALYSIS OF ALTERNATIVES

57. Regarding V-1 node substation there were two initial alternatives for its location. An alternative where substation was planned to be constructed in Sarimay was rejected and new location in Ellikkala was chosen. In Ellikkala there were three alternative sites and the final site selection was based on the small amount of needed grading and levelling works.

58. As a result of initial investigations, three potential route alternatives for OHL were identified: First Right Bank Option V-1, Second Right Bank Option V-2 and Left Bank Option V-3. A selection criterion was prepared and alternatives were evaluated based on chosen criteria.

59. Thus, two of these alternative routes (V-2 and V-3) were eliminated from detailed consideration because they were found to be unsuitable for the development of the new transmission line due to such critical factors as geographic location and potential for significant social and economic effects, and only OptionV-1 was determined suitable for detailed consideration.

60. A new alternative for the OHL was developed during the IEE process. Due to the proximity of the Low Amu Darya Biosphere Reserve, a new routing further north was considered. However, based on the findings of IEE, Option V-1 was found out to have only minor and manageable impacts on Nature Reserve and there is no actual need for new routing.

INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

61. Uzbekenergo is the executing agency for the Project. Uzbekenergo has established a full-time PMU. The PMU will administer all consulting and procurement contracts on behalf of Uzbekenergo. It will be responsible for preparing project plans, bid evaluation reports, progress reports, applications for withdrawal of funds, and any other required reports to ADB.

62. For the project management and supervision purposes, a separate Project Supervision and Management Consultant (PMC) shall be employed, procured under the ADB procedures. PMC will be responsible for overall oversight of the project implementation and performance of the Contractor for the duration of the construction period or within the period which shall be stated in the corresponding consultancy contract.

63. PMC, among others, will be responsible for preparation of bid evaluation reports, progress reports, proper implementation of the EMP, EMoP, SEMP (Site-specific EMP) by the respective Contractor and shall prepare all corresponding reports to PMU/Uzbekenergo and ADB.

64. PMC shall have Environmental/Social Safeguard Specialist (International and Local), who will be responsible for the revision and update of the EMP, EMoP, SEMP, if required, shall have an effect on those which will be prepared by the Contractor, and prepare all necessary reports acceptable to Uzbekenergo/PMU and ADB. For the this particular project SEMP shall be required and PMC's Environmental/Social Safeguard Specialist shall request the Contractor to prepare all relevant SEMPs, shall oversee these will be implemented, monitor on a regular basis, and prepare reports.

65. Uzbekenergo will have overall responsibilities to implement EMP and LARP as Executing Agency. It will provide budgets for implementation. PMU will hire Safeguards Specialist and Resettlement Expert for implementation and monitoring of EMP and LARP.

66. To ensure that project would not be generating a negative impact to the overall environment quality, an Environmental Monitoring Plan (EMoP) has been prepared. The monitoring activities of the project include e.g. site supervision, verification of permits, monitoring of water quality, soil, noise and air. Monitoring of the quality of water, soil, air and noise during the construction stage shall be a responsibility of the Contractor. PMU's Safeguards Specialist altogether with PMC's Environmental/Social Safeguard Specialist shall supervise the Contractor in terms of compliance to the EMP. The environmental monitoring report prepared by PMC and submitted to the PMU will include the results of regular environmental monitoring.

67. During the pre-construction and construction phase, the Contractor should ensure that activities like handling of earth works, clearing work, access road construction and putting proper traffic signals, is done properly to have minimum impact, in accord with applicable local regulations and standards. This in turn should be monitored by the Safeguards Specialist from PMU.

68. Most of the mitigation measures will be presented in Temporary Pedestrian and Traffic Management Plan, Waste Management Plan, Emission and Noise Control Plan and Health and Safety Plan which will be prepared before construction activities begin. The implementation of these plans will be the responsibility of the Contractor.

PUBLIC CONSULTATION AND DISCLOSURE

69. The Public Consultations (PCs) were held on March 16-18, 2015 in Karakalpakstan (Nukus city) and Khorezm region (Urgench city and Urgench district) under the auspices of Uzbekenergo and local khokimiyats. The following representatives participated in the PCs: AHs, makhalla, water users' association, environmental protection, farmers' association, power supply network, forestry, cadastre and District Khokimiyat. The venues of consultations were chosen in accordance with considerations of Uzbekenergo and local Khokimiyats. The PCs aimed to provide key questions and consultations regarding concerns from AHs on: (a) Environmental impacts of project implementation; (b) Mitigation measures and activities; and (c) Grievance redress mechanism (GRM).

70. A one-page leaflet containing a major information on the project's scope, possible environmental impacts and mitigation measures to be taken, were disseminated to the leaders of makhallas, who in turn distributed the leaflets to community leaders of other neighboring makhallas and community outreach centers which are open to all households not just along the line route, but the whole population of the most of parts of the districts of Republic of Karakalpakstan and Khorezm region, i.e. project area.

71. Statements confirming understanding of the essence of the project, its scope and impacts, also non-denial by all households thereof, living in the project area were received, thus proving the endorsement by the population.

FINDINGS AND RECOMMENDATIONS

72. This Initial Environmental Examination was carried out during the planning stage of the Project. The potential environmental impacts were assessed in a comprehensive manner. The report provides a picture of all potential impacts associated with the Project's phases; preconstruction, construction, use and maintenance and decommissioning. Both OHL and substations are covered.

73. The overall impact on the environment will be typical of any construction project. The major concerns are noise, dust, and air emissions from heavy equipment used to construct the foundation, install the towers and string the conductors. Potential increase in soil erosion and turbidity of surface water from heavy equipment movement in right of way and excavation of the foundations could be properly addressed by compacting the soil, retaining and reusing the topsoil for sodding, and building, where necessary, of siltation basin or covering the soil stock pile or building of silt barrier. Even though the Project construction period is estimated at 48 months and will cover 363.9 km, the impact on the environment is minimal.

74. By proper selection of the OHL route, resettlement of existing residence is not needed.

75. Land will be acquired both temporarily and permanently. The land that will be permanently acquired for the OHL is the portion used for OHL foundations. Part of this land is currently used for agriculture. The impacts of land acquisition has been studied and assessed. Land acquisition and resettlement plan has been prepared. A compensation strategy to Affected Households is developed and an implementation plan prepared.

76. Special attention is needed at the forest areas around the second crossing of Amu Darya River to avoid any unnecessary cutting of trees. Replanting may be used as a mitigation method.

77. Hazardous waste (PCB containing oil and batteries) procedures shall be carefully planned and relevant norms and guidelines followed.

78. Waste Management, Pedestrian and Traffic Management, Health and Safety and Emission and Noise Control plans shall be prepared before preconstruction phase begins so that these can be implemented as soon as the Project starts.

79. For the Project, the rehabilitation/construction of the substations and the construction of OHL, an Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) have been developed. These plans shall be integral part of the tender documents to the Project. The mitigation and monitoring measures shall be contractually enforceable clauses and relate to the bill of quantities and technical specifications.

CONCLUSIONS

80. As a result of overall findings of this IEE it is concluded that the Project has only minor adverse environmental impacts (low magnitude). The minor impacts that are identified can be mitigated or managed in such a way that they are acceptable. Hence Environmental Impact Assessment (EIA) for this Project is not required.

81. The proposed Northwest Region Power Transmission Project is feasible and sustainable option for power transmission from environmental and socioeconomic points of view. Implementation of Environmental Mitigation Plan, Environmental Monitoring Plan and Land Acquisition and Resettlement Plan is required. The EMP should be reviewed at the detailed design stage and throughout the Project.

B. INTRODUCTION

82. The objective of this report is to present the findings of an Initial Environmental Examination (IEE) of the proposed Northwest Region Power Transmission Line Project. IEE has been prepared by international Safeguard Specialist and local Environmental Experts in framework on Technical Assistance (TA-8618UZB) on behalf of Uzbekenergo for the Asian Development Bank.

83. The proposed Project forms part of the strategic investments plans of transmission network development, consisting of the following main components:

- Construction of 338.7 km, 220 kV single-circuit overhead transmission line (OHL) between Takhiatash Thermal Power Plant (TPP) and Khorezm substation and between Khorezm SS and V-1 node (SwS Sarimay/SwS Ellikkala);
- Expansion/rehabilitation of the substation at Takhiatash TPP, expansion/rehabilitation of 220/110 kV Khorezm substation, and construction of a new 220 kV substation located near V-1 node; and
- Support for Institutional Development, Capacity Building, and Project Management: including consultancy services for operational improvement, capacity building, and project supervision and management.

84. The main objective of the Project Preparatory Technical Assistance (PPTA) is to prepare the Northwest Power Transmission Project (the Project) for processing ADB financing and establishing if the investment project is economically, financially, and technically feasible, and socially and environmentally acceptable. The PPTA consultants shall undertake necessary due diligence for processing the loan for the Project and to assist the Executing Agency in preparing the detailed Project specification and outlining of the bidding documents.

85. The due diligence will cover technical, economic, financial, governance and environmental and social impact aspects.

86. The environmental due diligence is to be performed in accordance with ADB's Safeguard Policy Statement (SPS, 2009).

C. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

87. In accordance with the Appendix 2 Item 13 to the order of the Cabinet of Ministers of the Republic of Uzbekistan dd. 31.12.2001, No. 491, 'Power Transmission Lines of Republic and Interstate Value' refers to first category of Environmental Impact (high risk impact).

88. Under the Asian Development Bank procedures, the Project is classified Category B which means a proposed project whose impacts are site specific, few if any of which are irreversible, and where in most cases mitigation measures can be designed more readily than for Category A projects. Proposed Category B projects require an Initial Environmental Examination (IEE).

89. IEE complies with the Republic of Uzbekistan environmental laws and regulations, international conventions and protocols that Uzbekistan has signed and ratified. The relevant policies, laws and administrative structure applicable directly or indirectly to this IEE are enumerated in the following.

a. Environmental laws, regulations and instructions

90. The regulative basis is established in the field of environmental protection and environmental management in Uzbekistan which is fixed in the clauses 50 and 55 of the Constitution of Uzbekistan. Also 13 enforcements and 55 regulations were enacted in the field of environmental planning.

91. Uzbekistan has joined 13 international and regional ecological agreements and conventions, including: Atmospheric air pollution prevention, Preserving the biodiversity, Climate change, Desertification, Hazardous emissions prevention and ozone layer depletion prevention, Cross border water flows and sites of wetlands (Ramsard Convention).

92. The main national laws and enactments applicable to this project from the environmental point of view are presented in the following paragraphs.

93. On nature protection, 1992; states legal, economic and organizational basis for conservation of the environment and rational use of natural resources. Its purpose is to ensure balanced reactions between man and nature, protection of the environmental system, and to guarantee the rights of the population to a clean environment. According to legislation of the Republic of Uzbekistan, the Cabinet of Ministries, State Nature Protection Committee (SNPC) and local government bodies are responsible for implementing state laws on environment protection and management and the use of natural resources.

94. On protection and use of flora, 1997; regulates protection and usage of flora growing in natural condition, as well as in cultivation and its reproduction and conservation of gene pool of wild plants. The Cabinet of Ministries, local government bodies and special authorized agencies implement the law. SNPC and Head Department of Forestry under the Ministry of Agricultural and Water Resources are the special authorized agencies in flora protection and its usage. The Cabinet of Ministries, SNPC, local government bodies and Head Department of Forestry are responsible for implementing on the national level the administration of the law.

95. On atmosphere protection, 1996; describes regulations on atmosphere protection and its objectives. It specifies standards, quality and deleterious effect norms, requirements on fuels and lubricants, production and operation of vehicles and other transport means and equipment, ozone layer protection requirements, obligations of enterprises, institutions and organizations toward atmospheric protection, and compensations for damages from atmospheric pollution. The Cabinet of Ministries, SNPC and local government bodies are responsible for implementing the law.

96. On conserved nature territory, 2004; regulates relations in organization, protection and use of conserved territories, and management of protected nature territories. The law specifies the categories and management of conserved territories such as integrated (landscape) wildlife reservations, nature parks, state natural objects, areas for protection, conversion and restoration of certain natural and manmade objects and complexes. SNPC and local government bodies are responsible for implementing state control and protection of conserved nature territory and its usage.

97. On solid wastes, 2002; the principal objective of this law is to prevent negative effects of solid wastes on people's lives and health, as well as on the environment, reduce waste generation, and encourage rational use of waste reduction techniques in household activities. The law regulates the procedures for treating solid waste and defines the authorities of various institutions involved in solid waste management. The law also stipulates the rules for transporting solid waste and provides market base incentives for efficient treatment of solid waste. The Cabinet of Ministries, SCNP, Ministry of Health, Uzbek Agency 'Uzkomunhizmat', Agency on supervision for safe operation in the industry and mines inspectorate are responsible for implementing the law.

98. On environmental expertise, 2000; the law specifies the purposes, objectives and types of environmental expertise. The law defines the qualifications, duties and obligations of environmental experts. The State Nature Protection Committee (SCNP) has overall responsibility for implementing this legislation through the Departments of Environmental Expertise and the Provincial branches of SCNP.

99. During the Environmental Impact Assessment the following instructions and related documents were used:

- The order of the Cabinet of Ministers of the Republic of Uzbekistan; On approval of the order for Environmental Impact Assessment, No. 491, 31.12.2001.
- Instructions for inventory of the substances polluting atmospheric air and determination of air emission standards for enterprises of Uzbekistan, Reg. #1553, Ministry of Justice, 2006
- Instructions for calculating the concentration of pollutants emitted in the air from industrial enterprises (OND-86)
- Sanitary Norms and Rules (SNR) on the Effects of electric field generated by overhead power transmission lines of alternating current on industrial frequency, 1984
- Sanitary Norms and Rules (SNR) on Noise Protection, 2.01.08-96, State Committee for Architecture and Construction of the Republic of Uzbekistan, 1996
- Sanitary Norms and Rules (SNR) on Maximum allowed concentrations of contaminants in the air of populated areas of Uzbekistan, No. 0015-94
- Hygienic requirements and quality standards of open water, PHR No. 0056-96, 1996

b. Institutional framework for Environmental Assessment

100. State Committee for Nature Protection of the Republic of Uzbekistan (SCNP) is specially authorized supreme and coordinating authority, exercising state control and interdisciplinary governance of nature protection as well as use and reproduction of natural resources. SNPC is subordinate and accountable to the Oliy Majlis (Parliament) of the Republic of Uzbekistan.

101. The tasks allocated to SCNP by the law 'On Environmental Impact Assessment' are as follows:

- manage and monitor compliance with the State's Environmental Impact Assessment procedures
- review and approve of Environmental Impact Assessments
- monitor implementation of conditions specified in the Environmental Impact Assessment approval
- control over the execution of the state environmental expertise.

c. Asian Development Bank and International Guidelines

102. IEE conforms to the following policies, procedures and guidelines of the Asian Development Bank:

- Safeguard Policy Statement, 2009
- Manual F1/BP of 2010, Safeguard Policy Statement
- Manual F1/OP of 2010, Safeguard Review Process

103. ADB Safeguard policies are generally understood to be operational policies that seek to avoid, minimize, or mitigate adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the development process.

104. ADB's SPS sets out the policy objectives, scope and triggers, and principles for three key safeguard areas:

(i) Environmental safeguards,
(ii) Involuntary resettlement safeguards, and
(iii) Indigenous Peoples safeguards.

105. All three safeguard policies involve a structured process of impact assessment, planning, and mitigation to address the adverse effects of projects throughout the project cycle. The safeguard policies require that (i) impacts are identified and assessed early in the project cycle; (ii) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and (iii) affected people are informed and consulted during project preparation and implementation. The policies apply to all ADB-financed projects, including private sector operations, and to all project components. The internal procedural requirements are detailed in the Operations Manual sections and involve similar implementation processes as follows: (i) screening and scoping of the main issues start as soon as potential projects for ADB financing are identified and continue throughout the project cycle; (ii) impacts are assessed, safeguard plans summarizing mitigation measures, monitoring program, and institutional arrangements are prepared, and arrangements are made to integrate safeguards into project design and implementation; (iii) affected people are consulted during project preparation and implementation and information is disclosed in a

form, manner, and language accessible to them; and (iv) safeguard plans are disclosed to the general public and the information is updated at various stages in the project cycle.

106. ADB's safeguard policies require that both ADB's and Developing Member Country's (DMC) safeguard requirements are complied with.

107. IEE conforms also to the International Finance Corporation (IFC) of the World Bank Group General Guidelines on Environmental, Health and Safety (2007), and specific guidelines on Environmental, Health and Safety for Electric Power Transmission and Distribution (2007).

D. DESCRIPTION OF THE PROJECT

a. Objectives and content of project

108. The objectives of the Northwest Region Power Transmission Line Project (the Project) are as follows: (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.

109. The Project will result in an erection of newly built high-voltage transmission assets and reconstruction/expansion of existing ones to secure power supply from Takhiatash TPP to the North-Western region and other regions of Uzbekistan, as well as the implementation of institutional changes in the state power utility company Uzbekenergo responsible for power transmission in Uzbekistan.

110. The existing Takhiatash TPP is the only power station located in the lower Amu Darya River, generating and supplying energy to consumers of Nukus, the capital of the Republic of Karakalpakstan and to the Takhiatash city, with 730 MW of installed capacity and with 630 MW of available capacity supplies power into both: local network at 110 kV with maximum capacity limited to 163 MW and the 220 kV power transmission network by two 220 kV OHLs:

- The first one: one circuit 220 kV OHL «Takhiatash TPP – Khorezm SS - V1» mostly runs through the territory of Turkmenistan and is constructed with an aluminum steel wire of minimal cross-section for this voltage – 240 mm^2.
- The second one: one circuit 220 kV OHL «Takhiatash TPP – Beruni SS –Khorezm SS» with wire of cross-section 300 mm^2.

111. On the stretch Khorezm SS-V1-V2-V3-Zaravshan SS, the North-West power node is connected to the UPS of Uzbekistan with only one single circuit 220 kV OHL. The capacity of this interconnection is limited to 140-160 MW. Due to this limitation the excess production of TPP can hardly be exported and the Takhiatash TPP must accommodate its production to the highly variable local demand. This situation determines the operation of the Thermal Plant in two regimes, according to the high and low demand, which leads to a technical wear and aging of generation blocks and makes the operation of the power plant economically inefficient. On the other hand, this 220 kV OHL cannot be put out of operation for repair or maintenance works because this will lead to cutting North-Western node off the power system.

112. The Project is aimed to strengthen energy security by constructing a new domestic transmission line without passing through any other country. The Central Asian Power System was established during the Soviet era from the 1960s without taking into account geographical borders between the countries. Today it complicates operation, maintenance and repair of the

lines situated on the territory of neighbor country as any works require permissions of foreign authorities for people and materials transportation, maintenance works, etc., although the transmission assets belong to Uzbekistan. The difficulty to maintain the existing transmission line from Takhiatash TPP to Khorezm SS, which passes through Turkmenistan, causes frequent and prolonged outages which brings down production rate, and hampers development of small-scale businesses.

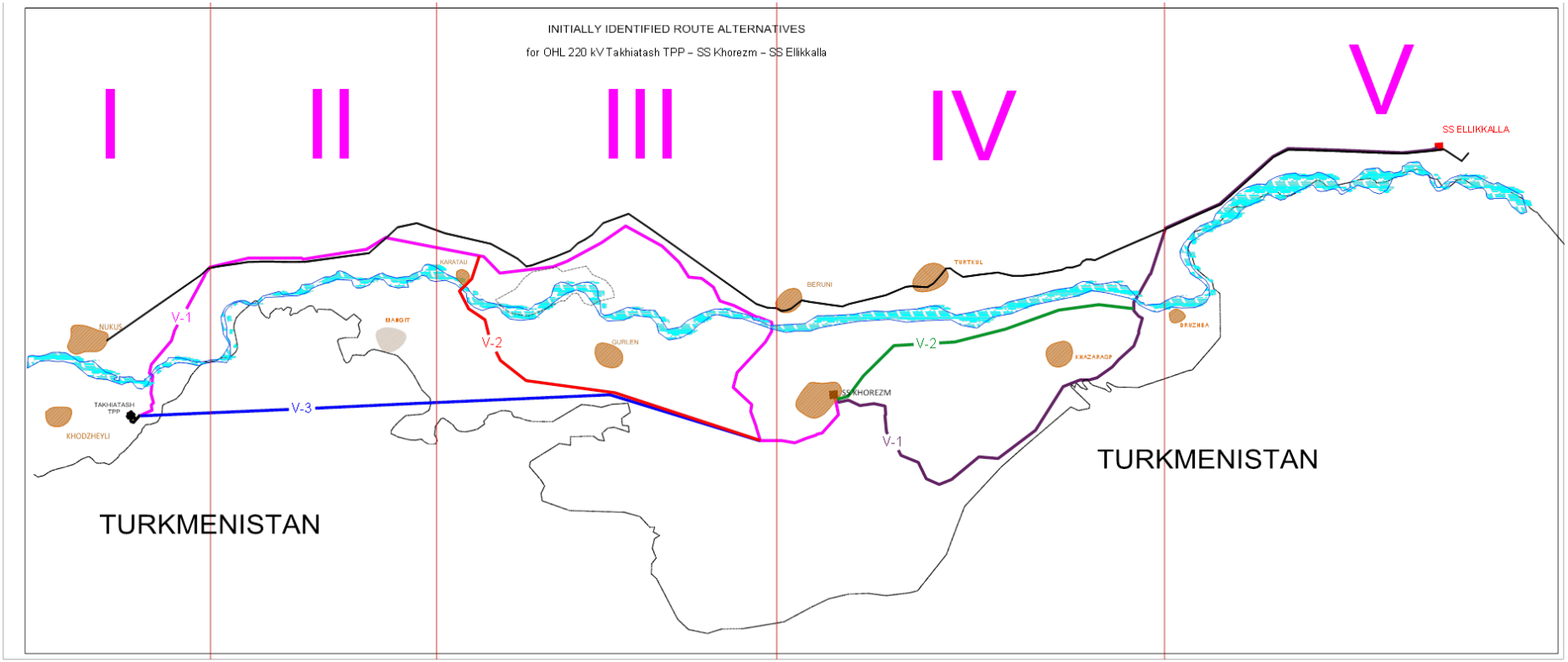
b. Project location

113. The Project (OHL and substations) is located in the western – south-western provinces of Karakalpakstan and Khorezm province of the Republic of Uzbekistan, near the border of Turkmenistan.

114. 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.

115. Initially identified route alternatives for OHL are presented in Figure 1.

Figure 1.Identified route alternatives for OHL 220 kV Takhiatash TPP- Khorezm SS – Ellikkala SS



c. Project Components

i. Takhiatash TPP – Khorezm SS section

116. Detailed map of the proposed route for this section is given in Annex 2.

117. 1st section of the route from Takhiatash TPP to Khorezm SS crosses: 1 TL 220 kV, 12 TL 110 kV, 43 TL 10 kV, 5 TL 35 kV, 6 TL 6 kV, 5 TL 0,4 kV, 5 communication lines, 37 highways, 6 gas pipelines (including twice - main "Bukhara-Urals"), 8 underground pipelines, 2 underground conduits, 39 channels, 76 collectors and twice the Amu Darya River, a crushed stone production pit and 2 railway lines (including "Turtkul - Nukus" - twice).

118. Existing 220 kV OHL at Beruni SS at the exit of Takhiatash TPP is of double circuit design, allowing installation of the second circuit in the future. It is proposed to utilize the double circuit section at the exit of Takhiatash TPP for the new OHL Takhiatash - Khorezm-2. From the end of the existing double circuit section (tower № 19) it will be constructed a new double circuit section till angle 11, which will be used for the considered line and in the future for the planned OHL Takhiatash – Beruny-2. New double circuit OHL runs from the end of existing double circuit section (tower № 19) to the selected crossing over AmuDarya River (angles 8-9).

119. After crossing the river, at angle 11, the double circuit section ends and the line continues as single circuit 220 kV OHL. It is envisaged that the OHL Takhiatash – Khorezm-2 and the future Takhiatash - Beruny-2 run in parallel till angles 23-24 and after angle 24 their routes split.

120. After angle24 the new 220 kV OHL Takhiatash - Khorezm crosses the existing 110 kV OHL and then goes in parallel to Beruni collector from the northern side. The OHL crosses the collector at the angle 28 and heads to the south avoiding existing settlements and crossing existing 35-110 kV OHLs. It passes by Beruni SS at the angles 33-36 and approaches existing 220 kV OHL Beruni SS – Khorezm SS. Going in parallel from angle 36 to angle 40, it approaches the existing crossing of AmuDarya River. Crossing point for the new line is selected at the distance of 60m down the river from the existing one (angles 40-41). After the crossing, the route runs in parallel with the existing 220 kV OHL up to angle 43. From angle 43 to angle 46 the route forcedly deviates from the existing OHL avoiding the existing residential buildings. The line crosses existing 220 kV OHL, railway and two gas pipelines Bukhara-Ural at the angles 46-47-48. On the section from angle 49 to angle 54 the parallel routing with the existing 220 kV OHL Beruny –Khorezm is impossible due to the existence of densely built-up area and canal network situated along the route. From the angle 54 to angle 56 the line runs along the 220 kV OHL Beruni - Khorezm. It crosses two branch lines of Bukhara-Ural main gas pipeline and the 220 kV OHL Khorezm-V1 between angles 55-56.

121. At 160 meters from the tower № 15 of the existing 220 kV OHL Beruni-Khorezm, the angle 56 is installed, from which the line passes on the free circuit of the double circuit section of 220 kV OHL Beruny - Khorezm and reaches Khorezm SS, using free circuit of the existing 220 kV OHL Khorezm-Beruni in its initial section (14 supports) that has double circuit design.

122. Route to 220 kV switchyard 500 kV Ellikkala SS from Khorezm SS will exit from a new bay of the expansion part of 220 kV Khorezm SS switchyard.

123. The length of 220 kV Takhiatash TPP-Khorezm SS section of the line is 197.8 km.

ii. Khorezm SS – Ellikkala SS section

124. Detailed map of the proposed route for this section is given in Annex 3.

125. 2nd section of the route from Khorezm SS to Ellikkala SwS crosses: 1 TL 220 kV, 6 TL 110 kV, 8 TL 10 kV, 1 TL 35 kV, 2 TL 6 kV, 5 TL 0.4 kV, 4 communication lines, 41 highways, 3 gas pipelines, 1 underground pipeline, 1 conduit, 40 channels, 50 collectors (including a collector of Mityanov - twice) and the Amu Darya River, 2 lakes, the saline soil area and 2 railway lines.

126. 220 kV OHL route starts from the new bay at the south-eastern side of open switchyard 220 kV at Khorezm SS.

127. From the angle tower 1, installed at 35 meters from the receiving portal, the line crosses Khorezm-Urgench railway passing along Khorezm SS. Section of angles 2-6 of the route runs between isolated residential buildings scattered over the territory of Katchalli, Killavit, Chandirkiyat settlements and crosses Mityanov collector. At the angle 6 the route turns south-east and heads toward the corridor of existing three 110 kV OHLs: L-Khazarasp-I, L-Khazarasp-II, L-KS3. To the north of Obod settlement at the turn of indicated 110 kV OHLs, the angle 7 is installed. From this angle the line goes southward to the place where 110 kV OHL KS3 splits from the common corridor of lines running to the south. Here, the described route crosses two 110 kV OHLs going to Khazarasp by the angles 8-9.

128. From the angle 9 the line passes in bundle with the existing 110 kV OHL KS3 from the eastern side of Palvan-Gazavat canal. Before the canal, at the angles 10-11, the route crosses 110 kV OHL KS3. This crossing is required because of the lack of space at the eastern side due to the presence of residential buildings situated in Sevgan settlement and 110kV OHL passing closely to the western boundaries of Jamiyat settlement. From the angle 11 the route goes in the 110 kV OHL KS3 corridor, on its western side in south-west direction. 1 km to the north of Kushanda settlement, at the angle 12, the route turns to the south to pass by the settlement from the eastern side. After passing by the settlement the route turns at the angle 13 to pass between Mashinachilik (in the west) and Saburzan (in the east) settlements. In the area of the last turn of the existing 110 kV OHL KS3, before entering KS3 SS, at the angle 14 the route crosses the 110 kV OHL KS3, passes through the cultivated land and crosses 35 kV OHL L-Bagat. To the west-east of MTF territory the angle 15 is installed.

129. From angles 15 to angle 18 the route goes through Kungirot settlement and passes by avoiding Chamankum settlement. Angle 18 is located to the south of Zarbdor settlement; from here, by the angles 18-20 the route goes round Bukhara-Ural main gas pipeline. From the angle 20 to the angle 25 the route goes along the state border of Uzbekistan and Turkmenistan. Near the angle 22 the route crosses two single circuit and one double circuit 110 kV OHLs outgoing from Khazarasp SS towards Turkmenistan.

130. The section from angle 23 to angle 25, the route crosses collector Ozerniy twice, thus avoiding crossing Uzunkul Lake. Here from the angle 25 the route goes east avoiding residential buildings scattered along the cultivated lands. At the angle 28 the route turns north-east and approaches Pitnyak-Loop 343 railway crossing it by the angles 29-30. At the angle 30, the route goes round Balikchi settlement from its south-eastern side and approaches the crosspiece of Gazli-Nukus - Bukhara-Ural gas pipelines. 100 meters to the south from the crosspiece the angle 31 is spotted. Further, at the angles 31-33, the route passes round the gas pipeline and GDP located on the left bank of Left-bank main canal. After passing round the gas

pipeline the route approaches the crossing over Amu-Darya River. The crossing point was selected at 130 meters up the river from the railway bridge. The river crossing is implemented by the angles 34-35.

131. From the angle 35, the route goes along the mentioned above gas pipeline, which is crossed further by the angles 36-37. After crossing the gas pipeline, the route runs north-east approaching A-380 motor road and crosses it by the angles 38-39. At the angle 39, the route turns south-east, along the A-380 motor road up to Nukus settlement, to the north-east from which a site for the new 500/220 kV Ellikkala SS is selected.

132. In front of 500/220 kV Ellikkala SS, the angle 46 is installed, from which the line will enter 220 kV OS from the north-western side.

133. The length of 220 kV OHL Khorezm SS-220 kV switchyard of 500 kV SS Ellikkala is 151.9 km.

iii. Tie-in Connections of the Existing OHL Khorezm SS – V-1 to Ellikkala SS

134. As the existing V-1 SS cannot be expanded and is of difficult access, direct connection Ellikkala SS – V-1 is not considered, and, in order to connect the new SS to the transmission network, it is proposed to cut the existing OHL Khorezm SS – V-1 and construct correspondent tie-in connections of the line into the new 220 kV switchyard. Taking into account the fact that existing 220 kV OHL Khorezm SS - V-1 mostly runs through the territory of Turkmenistan it can only be cut in the last span, near of its entry into V-1 SS (on the territory of Uzbekistan). Thus, the route will cross the existing 220 kV OHL, going from V-1 SS to V-2 SS. Then, crossing motor roads and gas pipelines it comes to the indicated location of 220 kV switchyard at 500kV Ellikkala SS. The length of the route is 7.1 km (double circuit, in total 14.2 km).

iv. Technical Characteristics of the Line

135. Technical design of transmission lines in Uzbekistan is regulated by state technical design code (GOST) which is of compulsory implementation in all transmission assets projects. Characteristics of towers, tower foundations, wires, ground wires, insulators and even coupling fittings are standardized by the GOST. This code is inherited from the Soviet era and has practically not changed since then. All the transmission assets, existing in Uzbekistan, were designed and constructed according these technical standards. These technical design standards applied in Uzbekistan are adequate and provide for necessary safety, reliability and service life of assets.

136. These standards are not identic to the ones used in European practice. In general, they provide for more robustness and reliability. For instance, according to GOST 25-30 % more steel is used for the metallic structures of towers than for the similar structures in Europe. For precast concrete foundations manufactured according GOST it is used about 40-50 % more concrete than in Europe. From the economic point of view, application of European technical design standards, probably, would permit to achieve significant cost savings but as they cannot be applied in Uzbekistan they cannot be considered.

137. At the newly built double circuit section from the angle 1 to angle 11 it is proposed to use standard double-circuit self-supporting galvanized steel towers of type U220-2t (racks +5;

+9, +14m) as angle/tension towers. As suspension towers it was considered to apply standard galvanized steel towers of type P220-2t (with rack +5m).

138. Then, starting from the angle 11, where the line is of single-circuit design, standard galvanized steel towers of type U220-3t (racks +5; +9, +14m) are used as angle towers and standardized galvanized steel towers of type P220-3t are proposed for intermediate/suspension towers. The drawings of the proposed types of towers for double and single circuit sections are given in Annex 4.

139. According to best international practice it is advisable the use of galvanized tower structures, as this treatment significantly prolongs useful life of the structures and ensures its best condition. The galvanized steel structures are especially desirable in areas with major industrial pollution, areas with salt or elevated moisture. In the detailed Project design all elements of galvanized structures of the towers must be specified in terms of design and dimensions.

140. Steel towers are installed on precast reinforced concrete foundations according to the standardization, slope – in case of angle/tension towers, as well as on specially designed foundations, where necessary. Anti-corrosion protection of reinforced concrete components is designed in accordance with the salinity occurred due to bitumen mastic or bitumen mastic with special textile bundling.

141. In accordance to the line route characteristics, main technical characteristics of the projected HV 220 kV transmission line are tentatively defined as presented in Table 1.

Table 1. Main Technical Characteristics of 220 kV OHL Takhiatash TPP –Khorezm SS – V1

№	Characteristics	220 kV OHL Takhiatash TPP –Khorezm SS	220 kV OHL Khorezm SS –220 kV switchyard of Ellikkala SS
1	**Line length**	186.8km	151.9 km
2	**Wire type and cross-section**	Aluminium steel 400	Aluminium steel 400
3	**Suspension towers**	Self-supported lattice galvanized steel structure, one stand, types П 220-2т (double-circuit), П 220-3т (single-circuit)	Self-supported lattice galvanized steel structure type П 220-3т (single-circuit)
4	**Strained / angle towers**	Self-supported lattice steel tower, one stand, types У220-3т (single-circuit) with supports +5; +9; +14м, У220-2т (double-circuit) with supports +5; +9; +14м	Self-supported lattice steel tower, one stand, type У220-3т (single-circuit) with supports +5; +9; +14м
5	**Foundations for suspension towers**	Prefabricated reinforced-concrete foundations, type Ф5-4	Prefabricated reinforced-concrete foundations, type Ф5-4
6	**Foundations for strained / angle towers**	Prefabricated reinforced-concrete slope foundations, type Ф5-АМ	Prefabricated reinforced-concrete slope foundations, type Ф5-АМ
7	**Towers total quantity, units**	667	540
8	**Foundations total quantity, units**	2,672	2,160

142. These are typical standard technical solutions commonly used for the construction of similar lines, proposed by the Consultant on base on the information available at the time of preparing the report and in order to assess the economic cost of the lines. An exact definition of the type of towers, its location, the elements of lines used and the exact route will be made on the stage of detailed project design.

143. The detailed basic design of the 220 kV transmission line diversions are currently being developed by "Sredazenergosetproject" (Project Design Institute), in accordance with currently applicable standards and regulations (GOST). It is expected that all projected lines will be relatively similar to existing ones. In the detailed design of the lines the meteorological conditions, hydrological and geological characteristics (incl. seismicity) of the route shall be taken into account.

144. All recommended solutions are in full compliance with the actual applicable rules and regulations ensuring OHL safe operation in Uzbekistan.

v. Expansion and Rehabilitation of SS 220 kV Khorezm

145. The Khorezm substation became operational in 1969. The substation has been in operation for 45 years. Types of taken out of production equipment of all range of voltages suggest its technical unsuitability and necessity of its replacement with modern ones. Growing

number of connections made the initial wiring scheme of 220 kV open switchyard unsuitable and requires its reconfiguration.

146. For the expansion of the 220 kV switchyard footprint a spare place on the side of OHL Beruny will be used. This will require moving of the fence and the access road. On the available space 5 new bays will be constructed. The existing busbars can be preserved with necessary extensions. Their connection will require only several hours and can be performed during a week-end when the load is minimal.

vi. Construction of 220 kV Switchyard of Ellikkala SS

147. The site for 500/220 kV Ellikkala SS was selected instead of 220 kV V-1 switching station (Sarimay settlement) in the area of location of existing V-1 SS. Field inspection had been performed by the specialist of Sredazelectrosetproject, and as a result three alternate locations of new 500/220 kV Ellikkala SS were selected (see Annex 6).

1) The first site is located 800m northward from Sarimay settlement. This area has pit-and-mount and sandy relief but also gas pipelines Bukhara-Ural on the south. On the north side of intended site 220 kV OHL V1-V2 runs as well as water line going in parallel to 220 kV OHL. Due to existence of above mentioned utility systems, the line entries will be substantively complicated.
2) The second possible location of the SS site is situated 1.5km north-westward from Bukhara-Ural and Gazli-Nukus pipelines joint. This location is suitable due to existence of large area. Among shortcomings there is its hard rocky ground that would complicate the construction process.
3) The third alternative location was selected to the North-East of Nukus settlement on the opposite side of A-380 road. This area is relatively plain surface compound of fine-grained sand. This will significantly reduce the volume of grading and levelling works during SS construction. This area has also good access for projected OHLs from North-West, North-East and South-East.

148. The third option was selected as the optimal one.

vii. Expansion of Switchyard 220 kV at Takhiatash TPP

149. 220 kV and 110 kV outdoor switchyards kV of the substation of Takhiatash TPP are configured as a "two main busbars and a transfer busbar system." This wiring scheme is standard, appropriate and normally used on 220 kV voltage level and is not typical for 110 kV, but does not constitute any problem as it is more than required for this level and does not compromise in any way the security and reliability of SS operation.

150. Considering the construction of two new blocks of 250 MW each and necessity of evacuation of generated power, an expansion of the substation of Takhiatash TPP is necessary. According to SS layout there is space for expansion. The existing wiring scheme is appropriate and does not need to be changed.

151. The scope of this Project considers only the first phase of Takhiatash TPP rehabilitation and includes connection of the first CCGT to 110 kV switchyard, extension of 220 kV switchyard and replacement of obsolete equipment as it does not guarantee safe operation of the SS with new connections.

152. Installation of a new 250 MVA 110 kV transformer for the first CCGT will be performed on a spare space at minimum distance from 110 kV switchyard. A new bay at the 110 kV switchyard, connected to a busbar through a new circuit breaker (1CB 110 kV), will be constructed for the transformer. The connection will require only several hours and can be performed during a week-end when the load is minimal.

153. Projected expansion of 220 kV switchyard will also be implemented on a free space within substation TPP territory and will not require dismantling of any existing bays. After completion of construction and installation works the busbars extensions will be connected to existing busbars of 220 kV switchyard, which will require only a short interruption during the weekend, when the load is minimal. Replacement of the worn-out equipment at 220 kV switchyard will be carried out sequentially bay per bay in compliance with safety rules. This will not require disconnection of any feeders as they will work under a temporary connection scheme. The new battery system will be installed in free room of the control building and after that the reconnection performed.

154. The construction of additional 220 kV OHL taking off power from Takhiatash TPP will require change of position and reconnection of the existing lines to avoid physical crossing of the lines. During the rehabilitation of the Takhiatash 220 kV open switchyard it is necessary to reconnect the existing lines and envisage connection of new overhead lines which are under construction or planned (namely Karakalpakstan I and II, Khorezm II and Beruni II).

d. Associated Facilities

155. Currently, according to its structure and organization, Uzbekenergo does not subcontract any services. All the maintenance work is done by Uzbekenergo´s staff. At Takhiatash TPP the own electric maintenance personnel performs the scheduled preventive and corrective maintenance. In the case of major breakdowns repairs are carried out by hired staff. In Khorezm substation the maintenance activities, including capital repairs, are performed by the own crew, formed of 5 people from substation´s staff. They have necessary technical means and materials and spare parts stock for maintenance. In case of new substation Ellikkala the maintenance of the substation equipment shall also be performed by substation staff.

156. In view of the increased volume of maintenance works after the project implementation and number of maintenance personnel it is advisable to organize a maintenance center at Khorezm substation with a centralized warehouse to meet the needs of the North-Western transmission system because the rehabilitated and constructed substations will have HV equipment of similar technologies. This will permit to reduce necessary stock of spare parts and the cost of immobilized value. Routine maintenance will be done by own staff of each substation and most important work could be done with support of core team based in the substation Khorezm. The substations will share the heavy technical machinery such as cranes, telescopic arms with basket, etc. in order to not duplicate the technical means.

E. DESCRIPTION OF THE ENVIRONMENT

a. Physical resources

i. Climate and atmosphere

157. The OHL route goes through the plain terrain of Amu Darya River valley. Elevation points do not exceed 200 meters. In terms of climatic conditions, the area belongs to the Central Asian zone of deserts and semi-deserts with sharp continental climate. The main features of the climate are: low rainfall, hot and dry summer, short but cold winter.

158. The region environmental conditions assessment is based on observations data obtained from the weather stations and regional map of ice-slick and wind zonation of the territory of Uzbekistan. The main characteristics from three separate meteorological stations (Takhiatash, Urgench and Tuyamuyun) are presented in Table 2. Takhiatash represents the first section of the OHL alignment (the westernmost part), Urgench is located in the middle part of the line and Tuyamuyun at the last section of the line.

159. From technical point of view it can be noted that thickness of glaze layer (frequency – every 10 years) is 10 mm (2nd region).Air temperature of glaze-forming is -5˚C and wind speed at the moment of glaze-forming is 14 m/s.

Table 2. Climatic characteristics

Parameter	Takhiatash	Urgench	Tuyamuyun	Overall
Air temperature				
Annual average(˚C)	13.6	13.6	14.5	
Maximum(˚C)	45	43.5	43.6	
Minimum(˚C)	-26.8	-25.5	-25.2	
Annual average precipitation (mm)	110	117	97	
Maximum soil surface temperature (˚C)	62	67	71	
Minimum soil surface temperature (˚C)	-30	-27	-28	
Predominant wind direction	NE, N, E		E, N, NE	
Average annual wind velocity (m/s)	2.3		1.9	
Maximum wind velocity (m/s)				29
Maximum snow depth (m)				0.2
Depth of soil freezing (m)				0.7
Duration of snow cover (d)				20
Average annual number of thunderstorms (d)				5-6

160. The territory along the OHL alignment is for the most part agricultural land. There are not any large sources of air emissions (industry). However, traffic creates harmful emissions and locally concentrations of NO_2 and benzo(a)pyrene exceeds maximum permissible concentrations (MPC) by 1.5-2 times. The concentrations of soot, CO, HC and SO_2 are lower than MPC (TeploenergoProjekt, Impact Assessment on Environment from Construction of TL 220 kV 'Takhiatash TPP – SS Khorezm – SwS Sarimay (SwS Ellikkala)', 2015).

161. Due to the quality of surface soil and high speed winds, the concentration of dust may reach 9 times MPC. Wind speed of around 5 m/s may cause dust levels of 2-3 times MPC.

ii. Topography, geology and seismicity

162. The area of location of Khiva, Nukus, Beruni and Urgench is coincided with current bottom land of Amu Darya River and alluvial flat of Sarykamysh cycle. In respect of geomorphology the routes of OHL 220 kV that are being considered are laid within the delta of Amu Darya River from the mountains Sultan-Uvaistag with alluvial bench, Kyzyl Kum sand and slope of Pitnyak butte. In general the whole study area, excluding mountain slopes is called Khorezm oasis.

163. The OHL alignment is located on a seismic area. Project area belongs to seven-point zone of seismicity (SNIP-11-81, KMK 2.01.03-96 and Amendment No. 1).

164. Amu Darya delta has almost even surface. The delta area consists of river erosion remnants, knolls, lakes, berms of irrigation network channels, separate sandy massifs, salt marshes and swampy depressions. Soil types are takyr-like soil and alkali soil. Type of terrain is erosion-accumulative.

165. On the flat bottomland plain of current Amu Darya valley stand low and high bottomland, between which there is a berm with height up to 20m. The width of the bottom land strip is from a few hundred meters to 2-3 km. The bottomland is characterized by a flat surface with an altitude of 95-98 m.

166. Undulating alluvial plain of Sarykamysh cycle has developed in the valley of the Amu Darya River. Separated from the more ancient surface of Akchadarya cycle by explicitly expressed berm with height of 1.5 – 2.0 m. The valley has a width of 8-10 km from the general slope to the north. The absolute heights of the surface are 95-100 m. The surface of plain is complicated by irrigation and drainage network.

167. The district of the cities Khiva, Beruni, Nukus and Urgench is characterized by the deposits of the Upper Neogene and Quaternary down to exploration depth (up to 80 m).

168. The study area is characterized by meadow oasis soils of the desert zone. Desert climate and irrigation moisture regimes impact on salinization susceptibility of the soil. Irrigated agriculture has significantly changed the soil. It has completely lost the gray soil profile structure. Soil is affected by salinization and continues to undergo the precipitation of salts from the Aral Sea. As a result, the chloride-sulfate type of salinity was formed on the area. The reaction of soil solution is slightly alkaline: soil and ground have 8-9 pH.

169. Depending on the location, the salinity of the soil may be even 14,000 mg/kg consisting of water-soluble salts (including SO_4^{2-} 4,500 mg/kg, Cl 3,800 mg/kg). Extent of salinization of the same area quickly changes: on the background of the not saline parts there are spots of weak, average and strong salinization. Formation of spotty salinization is often connected with roughness of a relief of the irrigated area.

170. Soils are polluted not only by salts, but also by chemical fertilizers and pesticides. Loss of natural quality of lands because of salinity has led to decrease in productivity by 1.5-2.0 times.

Upper Pliocene

171. Upper Neogene continental deposits are the most widespread in the study area. The section, generally, comprises of sandstone with clay layer and rarely, sands. Sandstone is yellow-grey, clay is dark brown and solid. Upper Pliocene deposits within the study area are uncovered at the depth of 47.4-54.8 m from the surface of earth. Their penetrated thickness up to impermeable clay vary from 6.0 to 20.2 meters.

Quaternary deposits

172. Quaternary deposits are widespread within outlined area. They occur everywhere on the eroded surface of the Neogene deposits and presented mainly by alluvial formations of Amu Darya River. The thickness of Quaternary layer is less than 55 m.

173. Sarykamish group (QIII-IV sr);
The deposits of this age build up the first terrace above flood-plain of Amu Darya River and occur on the eroded surface of Pre-Quaternary crustal rock. Soil types are sand, sand clay and clay loam. The thickness of sand is 40-50 m. Top of the section is presented with brown and light-brown clay loam and sand clay, average and hard with grey sand layer, thickness is 4-8.5 m in some places up to 10.5m. Total thickness of Sarykamish deposits is 47-54 m.

174. Amu Darya group (QIV am);
Recent deposits of Amu Darya group are evolved in Amu Darya River valley building up the living flood plain (low and high).The section is presented by politic grey sand, occurring in Pre-Quaternary crustal rock, upper part of section sand clay and clay loam with the thickness of up to 5 m. Total thickness of Amu Darya deposits is up to 100 m.Lacustrine and swamp deposits, presented by alternation of sand, loamy sand clay, clay loam and clay with layers and sockets of fine sand and charred remains of plants are referred to current Amu Darya deposits. The thickness of the deposits is up to 10 m.

iii. Surface water

175. The dominant surface water element throughout the whole OHL route is the Amu Darya River which is a permanent natural stream flow. Amu Darya River often changes the dynamic axle during the flood, there are cases of washing off the river bank of 150-200 meters to the left or right. Currently, the Amu Darya River runs along the right bank.

176. According to the GlavHydromet, for the last 5 years water flow rate at Kipchak (the closest monitoring point to Takhiatash at the Amu Darya River) discharge was lower than long-time average annual (663 m^3/s) and amounted to 509 m^3/s. Average depth of the river is 6-7 meters and width 16-42 meters. Average flow velocity is 1.1-1.2 m/s. Chemical composition of the river water is formed to a large degree under the impact of contaminants coming to the river on the territory of Turkmenistan, agricultural flows and waste waters of factories in Drujba, Turtkul, Urgench and Mangit cities. Water of Amu Darya River is characterized by high turbidity. Long-time average monthly water turbidity fluctuates from 0.24 kg/m^3 in January to 5.1 kg/m^3 in May.

177. The chemical composition of the river water is the following: Chemical Oxygen Demand COD 27.17 mg O_2/dm^3, Oxygen 8.99 mg O_2/dm^3 and nitrites 0.001 mg/dm^3 (0.05 MPC). Pollution of the river by ammonium and nitrate nitrogen, heavy metals (copper,

chrome, zinc, iron), oil products and organochloride pesticides are within norm. Quality of water corresponds to class III for moderately polluted waters.

178. The largest artificial surface water object is Shimam-yab canal which starts from the Amu Darya River. The width of the canal is 10-13 m and depth 2.0 m. Canal is used generally from February to September inclusive. Maximum flow capacity reaches to 10-12 m^3/s (July, August) and minimum flow 0.5-1.2 m^3/s (February).

179. Andreev canal starts from Shimam-yab canal. Its width is 10 m and depth 2 m.

180. Beside the canals, there is an extensive collector and irrigation network in the district. The OHL alignment crosses 79 channels and 126 collectors. The quality of water in channels is similar to Amu Darya River water.

River Crossings, Hydrologic conditions and criteria

181. At this design stage, crossing sites of the 220 kV OHL routes through the Amu Darya River are under consideration. Projected line intercrosses the river in three points. All three crossings are located downstream from the Tuya-Muya dam: the first at a distance of 200-210 km, the second at 85 km and the third at 15 km.

182. Aerial maps of river-crossing sites are attached in Annex 5.

183. This whole area of the river belongs to the lower reaches of the Amu Darya River, where the river flows hundreds of kilometers on the flat part of Karakum and Kyzyl Kum. This part of the river has a broad, often vaguely determined valley and the low floodplain river banks. Bottom, floodplain and riverbank are mostly composed of easily eroded river alluvium (sandy loam, sand). Constrictions due to rock outcrops are extremely rare, short in length and often already occupied with built structures (bridges, overhead lines, pipelines and dams, etc.).

184. Routine deformation regime is in direct proportion to the geological features of its constituent species. Geological section presents fine-grained gray sand, lying on Pre-Quaternary rocks. Total depth of Amu Darya deposits reaches 60-100 meters. The average sediment grain size is of 0.019 mm. Non-blurry speed for such sand is less 0.5 m/s. At a water flow equal to 300 m^3/s in Amu Darya River the flow speed is greater than 0.5 m/s. Therefore, on the Amu Darya River any water flow is riverbed forming.

185. Deformation processes in the river occur dramatically and quickly, covering both the mainstream and the banks. Deformation of the bed and banks occurs constantly, during flooding is much worse and has especial intensity at the recession of flood. Bank erosion on the Amu Darya is enormous and fast. For this reason on the Amu Darya River bank protection works, such as embankment dams, traverse dikes are continuously implemented.

186. Besides, long sections of the river are part of natural border between Uzbekistan and Turkmenistan. So, the set of places suitable for the high voltage line crossing is very limited and was very conditioned by the above circumstances.

187. The following criteria were applied for choice of river crossing points:

- Width of the riverbed in the point of crossing;
- Geology of the ground forming the banks and floodplain;
- Definition, firmness and stability of the riverbanks;

- Existence of protections against deformation and variations of riverbed and banks;
- Possibility to regulate the water level to facilitate the construction works.

188. At the crossings of the Amu Darya River it is tentatively recommended to apply, by analogy with existing crossings, standard angle towers of increased height of type U330-2 + 14 without two lower beams. Other types of conventional towers with necessary modifications can also be considered. For towers foundations it is recommended to use pile foundations of the pipe with a diameter of 1,220 mm and a length of 35 m and a wall thickness of 15 mm, filled with reinforcing cages and then with concrete.

First River Crossing

189. The first river crossing of the OHL route will be located 6.5 km upstream from dam site of the Takhiatash hydroelectric complex. River cross of the existing Takhiatash TPP – Beruni single circuit OHL is located 5.5 km downstream from the selected crossing point. This part of the river has a straight channel of 300-350 m width, banks height 1.5-2.0 m, have slight traces of the flood. Analysis of previous years images of the surveyed reach of the river (30-40 years) shows the riverbanks erosion is negligible, indicating that the stability of channel processes. On the right bank, the first line of protection dam embankment runs along the river at only 100 m from the bank, on the left bank at 180-200 meters from the river there is a channel that is a protective dike from floodwaters. At this site it is recommended to carry out the installation of the angle/tension double circuit towers behind the protection dam on the right bank and behind the canal on the left bank (the span between towers would be 770-780 meters). Installation of the intermediate towers in the riverbed forming zone (between the dam and the canal) will require the use of piled foundations. The proximity of the dam will allow control of the water flow and temporarily reduction of water level to facilitate the construction work.

Second river crossing

190. The second river crossing of the 220 kV OHL Takhiatash TPP - Khorezm SS will be located 60-100 m downstream from existing river crossing of the 220 kV OHL Beruni – Khorezm, designed by JSC Sredazenergosetproekt in 1996-1997. It will be located 85 km downstream from the Tuya-Muya dam and 4.6 kilometers below the new bridge on the highway Beruni-Khorezm (crossing Chahysh). In 1980-81 on the studied reach of the river along the main embankment dams a number of traverse dams were built on both sides of the river to assure riverbed stable position. Traverse dams are straight dams, built of local soil and connecting end wall (of large stones 2-3 m in diameter) with the original bank or front line dam embankment.

191. On the surveyed reach of the river there are following guiding dams built to give the riverbed a more stable position: on the left bank - six, on the right bank - thirteen. Taking into account the existence of these protective structures, the decision of choice of the crossing point of the existing 220 kV SS Beruni - SS Khorezm on this reach was made in 1996. Currently the dam located on the right bank 300 m upstream from the OHL (№122) and another one situated 140 m downstream from it (№124) present signs of erosion of their end walls (dams are washed away for 9-16 m and 8-12 m respectively) and the right bank of the river floodplain directly in the point of crossing of the existing overhead line, where the intermediate towers are situated, is washed away for a depth of 70-80 m. Since the towers foundations are made on piles emplaced on a depth of 32 m, the towers maintain their stability. To provide the protection of the projected OHL the construction of a new traverse dam 70-80 m above the

crossing of the existing overhead line Beruni SS - Khorezm SS is required. Maximum river depth in the target area is 18 m and the maximum depth of dams reaches 24 meters.

192. The floodplain has 1,300 m width in the point of the line crossing, so the installation of intermediate towers on piled foundations (similar to those of the existing 220 kV OHL Beruni SS – Khorezm SS) is necessary with a span of 600-700 m. The width of the riverbed in the crossing point is 600 m at the time of the survey.

Third River Crossing

193. It is proposed that the third river crossing of 220 kV OHL Khorezm SS – V1 will be located 135 m upstream from a new Turtkul-Khazarasp railway bridge, which is situated 15.5 km downstream from the Tuya-Muyun dam. The relative proximity of the dam will help to facilitate the construction works regulating the water flow.

194. The width of the riverbed in the area of crossing is 500-600 m. 100 m upstream from the proposed crossing point the riverbed widens sharply to a width of 800-1,000 m. The riverbed in the selected point is relatively straight. The left bank height is of 10-12 m, the right bank is of 1.0 – 1.5 meters height smoothly transforming into the floodplain. At 140-150 m from the river bank a dike embankment is situated. The length of the dam along the right bank from the bridge and upstream is 320 m.

195. For crossing the Amu Darya River at this site, it is recommended to install tension/ angle towers located on the left bank 200-250 m from the edge of the high bank and on the right bank at 60-100 m behind the protective dam embankment. The anchor span will be 1,000-1,100 m. If necessary, the intermediate suspension tower will be installed on the left high bank at 40 m from the edge on a regular foundation, on the right bank the intermediate tower must be installed on pile foundations, where there are no dams. Assumed span length between intermediate towers is 650 – 700 m.

iv. Groundwater

196. In terms of supply, circulation and distribution of groundwater, the hydrogeological processes are determined by geological structure, the composition of aqueous rocks, current physiographic and climatic features of the area on the one hand and human activity in changing environmental conditions on the other hand.

197. The study area is part of a complex of Amu Darya Artesian Basin. Hydrogeological investigations have revealed the presence of two deposits, characterized by different kind of hydrogeological conditions. Thick stratum of Paleogene clays and marls separates the upper floor from the lower one.

198. The upper deposit combining the underground reservoir over Paleogene part of section contains ground porous-fissured water, main feed source of which is water inflow from Amu Darya and inflow seepage of water from irrigation network.

199. Upper water-tight stratum (Neogene-Quaternary) contains Paleogene clay and marl occurring at depth of 64.0-73.0 m from ground surface.

200. Interstratal pore water is confined in the Upper Cretaceous depositions of lower hydrogeological deposition. This deposition consists of sand and sandstone which contains interstratified mineralized water with dry residue from 3.2 g/l to 72.4 g/l.

201. The upper hydrogeological deposition consists of Quaternary and Neogene deposits. The groundwater in Quaternary deposits coincides with weak durable sandstones and sand of Neogene age. Absence of aged aquitard separating unconsolidated Quaternary deposits from Neogene rocks enables this aquifer to be 85 m thick.

202. The main source of supply of ground water of the area is water from Amu Darya River. The river constantly supplies ground water causing hydraulic gradient flow radially outwards from the riverbed. Additional supply of ground water is obtained at the expense of filtration losses from irrigation canals, irrigation fields and to a lesser extent due to infiltration of atmospheric precipitation.

203. Within the area the groundwater table declines from southeast of the Amu Darya River to the north northwest.

204. According to the information of monitoring observations of Khorezm hydro-mode station, the maximum level of groundwater is registered in May and August. During vegetation irrigation period the variation curve of the groundwater level has wavy character with peak rise level, coinciding with individual waterings.

205. After the cessation of vegetation watering and closing of the canal in October, the ground water level gradually decreases, and in December and January reaches minimum. Groundwater occurs at depths ranging from 0.2 m to 3.8 m.

206. According to longstanding observations annual average amplitude of ground water fluctuations is 1.65 m.

207. Pumping out of wells indicate the significant abundance of water of alluvial deposits. When pumping from a test well the flow 18.2 l/s at lowering 9.31 m was obtained. Average value of filtration rate of alluvial sand is 23.08 m/day. Average flow velocity of the layer is 1216.8 m/day. The degree of mineralization of ground water varies within 0.58 to 8.61 g/l. By nature the water salinity is caused by sodium sulfate and sodium chloride.

208. Aquifer system of Upper Pliocene deposits occurs on top of Upper Pliocene aquiclude (clay and siltstones). The complex contains 2-3 permeable layers of sandstones and sands, with pressurized water. The thickness of Upper Pliocene sands, sandstones and clays separating them reaches 100 meters, underlain by rocks of different ages of Miocene, Paleogene and Cretaceous.

209. Interstratified water of Upper Pliocene underground reservoirs has significant head (20-70 m). Piezometric surface is set lower than ground water levels. In northwest direction the decreasing of piezometric head is recorded, difference between ground water levels and interstratified water increases (to the south 3.5 m; to the northwest up to 15-18 m). According to the pumping test data, the main feature of chemical composition of Neogene interstratified water is that the sodium chloride is predominant and the concentration of sodium sulfate is small. Solid residue is 1.3-21.2 g/l for lower levels in the range of 70-90 m and 1.5-30.2 g/l in the range of 30-60 m. Well rates at test pumping have not exceeded 0.7 l/s at reduced groundwater head levels of up to 14 m. Permeability of sandstones varies from 0.009 to 0.36 m/day.

210. Low discharge of groundwater (500-1,500 m^3/ha) and arid climate leads to the salt accumulation. The evaporation is 10-12 times greater than rainfall rate (the evaporation rate is 2,000-2,500 mm/year). Salt, brought by ground water, accumulates in the soil horizon. For example in Takhiatash, which has the high groundwater level (1-2 m or less from the surface), the capillary rise of water brings it near the surface and evaporative concentration of salts is very high.

211. Groundwater is saline and has strong sulfate aggressiveness to concrete in case ordinary cement is used.

b. Ecological resources

i. Wildlife

212. Fauna of the territory is varied. There are up to 400 species of vertebrates. The most notable of the mass of desert animals are various reptiles, rodents and small insects crawling on the ground. Arachnids, lizards, snakes, birds and mammals are common. Examples of wildlife are mesh lizard, sand boa, arrow-snake, gazelle, tolai hare, redtailed sandwort, yellow gopher, gray hamster, light polecat, shell-covered steppe tortoise, quill-protected porcupine, fox, long-eared and Brandt‘s hedgehogs.

213. There are more than 50 types of fish in Aral Sea basin. Withdrawing water for agricultural activity and construction of number of dams and canals has negatively impacted on the fishes. Around 10 types of fish are included into Uzbekistan book as a rare species. Among them are big and small Pseudosaphirhynchus Kaufmanni, Barbus Brachycephalys and Aral Acipenser Nudiventus.

ii. Forests and vegetation

214. On the vast territory of the Republic of Karakalpakstan, which includes the lower course and delta of the Amu Darya River, the adjacent sand and gypsum Kyzylkum deserts, the Ustyrt plateau and the Aral Sea there are about 1,000 species of higher plants. The natural conditions of the area have defined the development of arid vegetation communities. Precipitation in winter and spring has led to the fact that plants have adapted to its effective use for the development of biological and soil processes. Therefore, vegetation especially in the sands and takyrs covers the area in early spring with a solid cover of sand sedge and other plants. Various types of wormwood and Salsola shrub also find here favourable conditions for their development. Thus, upon occurrence of favourable moisture conditions observed in early spring, sands are covered with quite diverse and abundant vegetation, the main and most typical representatives being sand sedge— Carex physodes, Haloxylon, Salsola, Calligonum and other shrubs. In addition, there is common annual Salsola vegetation including Xerophilous Andhalophilic herbaceous annual plants of the goosefoot (Chenopodiaceae) family.

215. Most of these plants have an extended growing season: Their shoots appear in early spring; the plants slowly grow and bloom throughout the spring and summer, their ripening only occurring in fall. Very few species of the annual goosefoot family have a short growing season, ending their life cycle shortly after the ephemerae. The most common are annual Salsola species (turcomanica, crassa), Halimocnemis (karelinii, molissima, sclerosperma, etc.), Suaeda, Petrosimonia, Gamanthus (gamocarpus) and some other species. Wild trees like Turangi, Haloxylon Cerkez and Yulgun grow in the area of the project.

216. The surface of Amu Darya delta is utilized for agriculture (cotton sowing, corn, lucerne, rice and water melon crop).

217. The TL will traverse through a forested area, managed by Leskonkhoz, on both sides of the Amur Darya River near Khorezm SS. Trees that follow under right of way on that area belong to Forestry departments of Karakalpak and Khorezm region. A common tree species of both sites of the river are Thuranga (Populus euphratica).

218. Forest area (managed by Department of Forestry) on the territory of the Republic of Karakalpakstan covers 24,738 hectares and on the territory of Khorezm region 23,807 hectares covered by Thuranga trees.

219. In the Khorezm Region, P. euphratica is the predominant tree species in natural tugai forests where it withstands periodical waterlogging. Populus euphratica is remarkably salt tolerant once established. Despite these advantages, P. euphratica seems only partly suitable for the afforestation of degraded soils, since it is also known for its vulnerability and high mortality at an early age

iii. Protected areas

Nature protection areas

220. There are three protected areas on the territory of Karakalpakstan:

- Low Amu Darya biospheric reserve (established in 2011) – in accordance with IUCN classification belong to category I.
- Saygachiy preserve (1991) – Category IV.
- Sudochue Lake (1991) - Category IV.

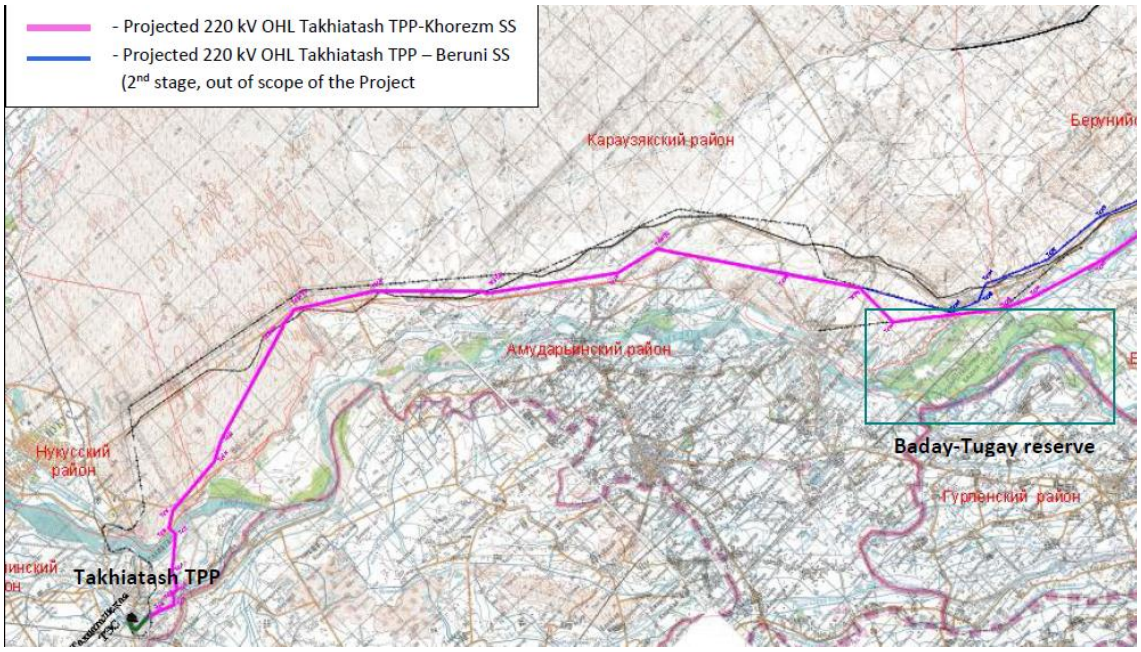
221. The closest protected area to the project is Low Amydarya biospheric reserve which locates on the territory of Amu Darya and Beruniy districts of Republics Karakalpakstan around 75 km on the south-east from Takhiatash city. The minimum distance of the OHL to northern border of the reserve is about 200 m, see Figure 2.

222. The Low Amu Darya Biosphere Reserve with a total area of 68,717.8 ha is established based on closing the Baday – Tugay State Reserve and the transfer of its 6,462.1 ha land to the State Biosphere Reserve as well as on land plots of the Kipchat forestry, Amu Darya region and Beruni forestry, Beruni region, with a total area of 5,106.2 ha. Thus, the conservation area is 11,568.3 ha.

223. The territory of the Low Amu Darya State Biosphere Reserve is picturesque and has a high level of biological diversity of the flood-plain forest. In addition, the largest areas of flood-plain forests of the Republic of Uzbekistan are on the lower Amu Darya River and should be regarded as a natural reserve of unique flora and fauna. Currently, in the Low Amu Darya State Biosphere Reserve floodplain forests two types of Asiatic poplars: Heterophyllous poplar (Populus diversifolia) and blue-gray poplar (Populus pruinosa) as well as two types of oleasters: Elaeagnus ongustifolia and Elaeagnus orientalis are the major tree species. Forage vegetation is more diverse and there are good stocks of plants such as: Karelinia, Alhagi, Halostachys, liquorice, and several types of tamarisk that grow in the additionally included floodplain forests Taldyk– Tugay and Nazarkhan.

224. There are 167 plant species in the Reserve of which two are in the Red Book of the Republic of Uzbekistan. The fauna includes: 26 species of fish, 2 species of amphibians, 13 species of reptiles, more than 91 species of birds, 15 species of mammals including the Amu Darya pheasant, the jackal, the jungle cat, and the wild boar. Among species listed in the IUCN Red Book and the Red Book of the Republic of Uzbekistan are: Fish – 5, birds – 4, mammals – 1: Big Amu Darya shovelnose, pike chub, ostroluchka (Capoetobrama kuschakewitschi), white-eye (Abramis sapa), Aral barbell (Barbus brachycephalus), marsh harrier, great and small white heron, pygmy cormorant, and Bukhara deer (Cervus elaphus bactrianis).

Figure 2. Location of Baday-Tugay Natural Reserve (marked with green color)



Cultural heritage

225. Karakalpakstan locates in historical area of Ancient Khorezm. There are a number of historical monuments: Gyaur Kala (4th-3rd centuries, BC), Toprak-Kala (3rd-2nd centuries, BC), Ayaz-Kala (4th-2nd centuries, BC), Kyzyl-Kala (3rd-2nd centuries, BC) as well as architectural ensembles of the later period, such as the mausoleum of Naridzhan-Bobo (14th century) and the unique Maslumhan-Sulu Mausoleum (14th-17th centuries). Fragments of ancient inscriptions, which are considered the oldest in Uzbekistan, have been found during archaeological excavations of Koi-Krilgan-Kala.

226. The closest historical monuments to the City of Takhiatash are remains of Mizdakhan city and the Mausoleum Mazlumhon Suluv. Mizdahkan consists of the remains of a major medieval town, located 8 km west of the city Khodjeyli.

227. It is likely that historical monuments will not be disturbed by the Project but there is a possibility that fragments of historical artifacts may be found during excavation works.

c. Economic development

228. The OHL route of 220 kV passes through two administrative territorial units of Uzbekistan - the Republic of Karakalpakstan and the Khorezm region.

229. The alignment of the OHL passes the following communities and settlements starting from Takhiatash Power Plant: Naymankul (Tashaul), Makhramaul, Naymantuba, Hojakol, Kuralpa, Buston, Kyngyldaul, Mekhnatkashfrom, Naymanyab, Ashiklar, Uygur, Sabirbeg, Sariturangi, Eski-Kiyat, Hasaul, Karayantak, Gazavatbuyi, Khorezm, Katchalli, Killavit, Chandyrkiyat, Navkhas, Obod, Kushanda, Mashinachilik, Saburzan, Kungirot, Chamankum, Zarbdor, Balykchi, Nukus and Ellikkala.

Karakalpakstan

230. The total area of the Republic of Karakalpakstan is 165,600 square kilometers. The population of Karakalpakstan is 1.4 million people. The main nationalities are Uzbeks (32.8 %) and Karakalpaks (32.1 %). About 48 % of the population lives in rural areas. The agriculture is considered one of the leading branches of the national economy of Karakalpakstan.

231. The main branches of agriculture of the Republic of Karakalpakstan is grain-growing (production of wheat and rice), cotton breeding, animal husbandry and silkworm breeding. Main industrial sectors are: metal working, power industry, textile and food.

232. Over the past few years growth of industrial production in fuel, chemical and petrochemical industry and metallurgy is observed. Growth in fuel industry is explained by an increase in production of gas and fuels and lubricants in the chemical and petrochemical industry and in chemical industry by commissioning of Kungrad soda plant that produces a new type of product —soda ash.

Khorezm region

233. The total area of the Khorezm region is 6,300 square kilometers.

234. The population is 1.59 million people. The main part of the population is occupied in agriculture (more than 20 %), industrial production (5,5 %), construction (more than 6 %), sphere of trade and public catering (6 %), transport and communication (2,5 %) and education (about 10 %).

235. Number of registered enterprises with foreign investments in the region is 29. These are operating in textile, food and chemical industry and production of construction materials, trade as well as services sector.

236. The region possesses well developed communication networks. The total length of the railroads is 128.7 km, highways 2,265 km. In the city of Urgench there is an international airport which has possibility to accept various types of cargo and passenger planes. From the airport charter flights to Moscow and Paris are carried out.

237. The city of Urgench is connected by the highway, crossed by the OHL route, with Khiva - one of the most ancient cities of our planet which 2,500-year anniversary was widely celebrated by world community in 1997. Historic center of Khiva, in particular fortress Ichan-

Kala, is included to the world heritage of UNESCO. There are many architectural monuments: khan palaces, mosques, madrasah, mausoleums and minarets.

238. In several kilometers from the regional center settles down historical monument - the pise-walled fortress of the XVII century of Ulli-Hovli (The big yard), restoration of which is finished recently in accordance with regional program of development of the tourism sphere for 2013-2015. As a result of the carried-out works Ulli-Hovli became a full-fledged tourist complex where it is possible to get acquainted with folk customs and traditions. The complex includes a mill and a farm with camels, horses and poultry. In the year 2014 Ulli-Hovli received over 1,000 foreign tourists; this year this indicator is expected to be increased in not less than twice.

F. SCREENING OF POTENTIAL IMPACTS AND MITIGATION MEASURES

239. The Project's impacts take place during the following phases: preconstruction, construction, operation, and maintenance and decommissioning. Furthermore, potential impacts may occur during emergency and accident situations. Main impacts and mitigation measures are presented in the following.

a. Preconstruction activities

240. Potential impacts during Preconstruction activities are the following:

- impact on plants and vegetation
- soil disturbance/erosion
- noise and vibrations
- air pollution
- soil contamination
- littering
- temporary restrictions in land use
- resettlement and change of land use

i. Surveying and soil investigation

241. Surveying activities have only a very minor impact on environment. A small group of surveyors will move along the OHL using all terrain motor vehicles where applicable. Some sections of the line are not accessible by car and these sections will be accessed by foot.

242. Soil exploration team will conduct soil sampling and drilling to find out geotechnical properties of tower sites. Depending on the site heavy machinery may be needed. The overall impact to environment is minor.

243. Both surveying team and soil exploration team may have to cut branches to clear out surveying lines and exploration sites. Machinery may cause some local destruction of grasses and other small plants. As a mitigation measure survey team may relocate the position of their survey equipment in to areas where cutting of branches is not necessary.

244. Soil is disturbed in case vehicles cause tracks. Bare ground is prone to erosion. During soil sampling and geotechnical drillings soil is removed from the ground but the amount is

small, usually under 10 litres. The investigation holes will be filled with soil material and finally an identifying mark is put into the hole. Mitigation measure to be used is to avoid driving in areas where tracks are easily formed.

245. Vehicles and drilling machinery produces emissions to the air, noise and vibrations. Emissions consist of exhaust fumes and dust. Depending on the type of motor emissions are mainly CO, CO_2, NO_X, HC (unburned hydrocarbons) and fine particles (especially diesel motors). Mitigation method is to use as new vehicles and machinery as possible and to use catalysators. Machinery and vehicles are to be checked regularly to decrease emission levels. Motors should be turned off whenever possible.

246. Dust is formed mainly from moving vehicles. The amount of traffic is low and the impact of dust local. As a mitigating method, drivers should keep the speed reasonably low.

247. Vibrations are caused by drilling. The impact is very local and short-term. Hammering should be avoided near houses and other sensitive structures.

248. Noise is limited to moving vehicles and drilling. Noisy activities are short-term and impact local. There will be very limited presence of population being exposed to noise generated during the preconstruction phase. Machines and vehicles (especially the condition of mufflers) are to be checked regularly to decrease noise level. Noisy activities shall be done only during daytime. Workers should use hearing protective devices when working near noisy equipment.

249. Soil contamination may be caused by spills and leakages from vehicles and machinery (fuel, oil). The amount of fuel and oil used during surveying and investigations is limited and the size of tanks and oil spaces is quite small. In case a fuel tank breaks, the maximum amount of spilled fuel is 100-200 litres. Light components of the fuel evaporate rapidly and heavier components will not migrate deep into the ground. Soil contamination is bordered to a small area.

250. As mitigation method for accidental spills and leakages adsorbent mats or other suitable material should be available to adsorb leaking fuel or oil. Contaminated soil should be removed as soon as possible and taken in an appropriate place.

251. Littering will be eliminated by giving instructions to workers. The target is that all waste material will be collected and taken back to proper waste collecting sites.

ii. Land acquisition

252. For the expansion of the 220 kV switchyard at Khorezm a spare place on the side of OHL Beruny will be used. This will require moving of the fence and the access road. In practice land acquisition need is minimal.

253. The new Ellikkala substation is located to the North-East of Nukus settlement on the opposite side of A-380 road. This area is relatively plain surface compound of fine-grained sand. This will significantly reduce the volume of grading and levelling works during SS construction. Since this site is new, it has to be acquired. The need for land area is small and it will be allocated from state reserve land.

254. Considering the construction of two new blocks of 250 MW each and necessity of evacuation of generated power, an expansion of the substation of Takhiatash TPP is necessary. According to SS layout there is space for expansion. The existing wiring scheme is appropriate and does not need to be changed. The free space is currently wasteland and adjacent to the power plant.

255. For the OHL, the land acquired will be grouped in two categories; land for temporary use and land for permanent use. The former consists of land used for temporary access roads, base camps for workers and equipment and material storage. Temporary land areas will be cleared and restored to its original uses subject to some constraint directly under the OHL.

256. For permanent use of OHL less than 2,000 m^2 of land/line km will be needed, altogether 13.32 ha. A summary of permanent and temporary land acquisition impacts is presented in Table 3. Land acquisition of agricultural lands is 4.35 ha and the amount of affected households 169.

Table 3. Summary of total land acquisition impacts

Sections	Tension Towers	Suspension Towers	Permanent Impact (ha)			Temporary Impact (ha)			Total number of AHs
			Total	AHs	State enterprises, reserve, forest and other land	**Total**	AHs	State enterprises, reserve, forest and other land	
Karakalpakstan	41	1,062	**7.45**	1.55	5.90	**245.94**	50.81	195.13	**36**
Khorezm	61	784	**5.87**	2.80	3.07	**290.07**	107.92	182.15	**133**
TOTAL	**102**	**1,846**	**13.32**	**4.35**	**8.97**	**536.01**	**158.73**	**377.28**	**169**

257. About 40 % of the temporary alignment corridor will be trough state reserve land and 32 % trough farm land owned by AHs.

258. All Involuntary Resettlement and Land Acquisition impacts and related compensations are studied in a separate Land Acquisition and Resettlement Framework (LARF) and Land Acquisition and Resettlement Plan (LARP).

b. Construction activities, impacts and mitigation measures

i. Expansion and Rehabilitation of SS 220kV Khorezm

259. Expansion works include moving a fence and access road, construction of five new bays and replacement of two old transformers. The current SS has also 120 units of batteries which will be changed during construction.

260. The main environmental impacts during the expansion and rehabilitation works are noise, dust and air pollutant emissions from the construction equipment. Minor spills and leakages may occur from vehicles and machinery and from transformers when they are replaced. Transformer oil may cause also health and safety hazards to workers. Loss of topsoil may occur in limited areas. Littering and dumping of waste may occur if not properly managed. Use of natural raw materials is also noticed and that issue will be handled more under Overhead Transmission Line.

261. Noise levels are similar to a normal building construction site. All construction operations are limited to day time. Noise is generated by moving vehicles, earthmoving equipment and working machines. It should be noted that implosive methodology (creates high intensity noise) is not used for splicing high voltage conductors. Conventional method using hydraulic compression will be utilized. Noisy activities are short-term and impact local. There will be very limited presence of population being exposed to noise generated during the preconstruction phase. Machines and vehicles are to be checked regularly to decrease noise level (especially the condition of mufflers). Workers should use hearing protective devices when working near noisy equipment.

262. Dust may be generated during excavation and earth moving works. Also traffic may cause dusting. However, excavation and earth moving works are short-term and dusting can be prevented by wetting the surface of the ground whenever dust is formed. The speed of vehicles should be kept low.

263. The vehicles and machinery which is used during construction period will generate air emissions. The amount of emissions is within accepted limits (see Paragraph iv; Impact on air quality). Emissions consist of exhaust fumes. Depending on the type of engine emissions are mainly CO, CO_2, NO_X, HC (unburned hydrocarbons) and fine particles (especially diesel motors). Mitigation method is to use as new vehicles and machinery as possible and to use catalysators. Machinery and vehicles are to be checked regularly to decrease emission levels. Motors should be turned off whenever possible.

264. Soil contamination may be caused by spills and leakages from vehicles and machinery (fuel, oil). The amount of fuel and oil used during construction works is limited and the size of tanks and oil spaces is quite small. In case a fuel tank breaks, the maximum amount of spilled fuel is 100-200 litres. Light components of the fuel evaporate rapidly and heavier components will not migrate deep into the ground. Soil contamination is bordered to a small area. As a mitigation method for accidental spills and leakages adsorbent mats or other suitable material should be available to adsorb leaking fuel or oil. Contaminated soil should be removed as soon as possible and taken in an appropriate place.

265. SS Khorezm has two old transformers (manufactured in 1969 and 1991) which will be replaced. Oil in old transformers contain most probably toxic chemical called PCB. Oil of the newer transformer has been changed about 5 years ago and used again in several other transformers around the site. Transformer oil should be sampled and analysed in laboratory to check if it contains PCB. All PCB containing oil should be removed and waste oil managed properly. A special instruction should be written for the replacement of the oil.

266. Collection, temporary storage and disposal of the used transformer oil should be done according to the developed normative documents and 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. Accordingly, the oil from the equipment of the whole old station needs to be immediately removed and managed properly during the demolishment.

267. For temporary storage of used oil Uzbekenergo should provide space where the Contractor shall construct a proper storage facility. This area shall be sealed and surrounded with a concrete bund to exclude soil/groundwater pollution even if the tanks are leaking.

Storage area shall be roofed to minimize corrosion of the tanks. For oil storage special tanks shall be used. Construction cost should be included in Contractor's contract sum.

268. Delivery of the Fulfilled (Used) Technical Oils (FTO) to points of replacement of technical oils or directly to special points of collecting FTO is carried out by consumers of technical oils.

269. Storage of FTO since the moment of discharge from the working system of the engine, machinery and other mechanisms consuming technical oils is carried out in tanks, but no more than six months.

270. Tanks for collecting, storage and transportation of FTO have to meet the following requirements:

- to have labels the size not less than A4 format with an inscription: "The fulfilled technical oils", with the indication of FTO group
- to consist of the materials excluding chemical interaction with the fulfilled technical oils;
- not to have the damages allowing leakage of FTO;
- to be densely corked;
- not to be placed on the open soil in places of collecting and storage of FTO;
- to have available calibration tables for large-tonnage tanks according to requirements of the established standards.

271. It should be noted that when installing new transformers, the insulating oil shall comply with the international standard IEC 60296 and shall be free from PCB. The reference method is IEC 61619. While the detection limit for a single peak is 0.1 mg/kg in accordance with the Stockholm Agreement, it is recommended to install transformers with zero contain of PCB.

272. High-voltage Elegas circuits will be installed at Substations. Application norms of the high voltage automatic Elegas circuit require that environmental conditions have to comply with the norms specified in MEK 62271-100 the General Technical Standard Requirements on the High-voltage circuit and to the Equipment of Management, namely:

a. Environmental temperature: -30 ºC ~ +45 ºC ;
b. Height above sea level: not above 2000 m ;
c. Wind speed: not above 34 m/s ;
d. Daily temperature drop: not more than 25 ºC ;
e. Intensity of sunlight: less than 1000 W/m^2 ;
f. Average of monthly humidity: 90 % ;
g. Earthquake force on a scale of Medvedev-Sponyera-Karniko: 9 points
h. Frosting thickness: not more than 20 mm ;
i. Air pollution level: II, III, IV according to GOST 9920-89 ;
j. Favorable conditions of the environment for installation, lack of danger of fire and explosion; lack of chemical corrosion and destroying concussions.

273. User's manual should be provided by the manufacturer and stored at the sites where Elegas circuits are used.

274. The change of the batteries should be carefully planned to ensure safety of the workers and appropriate waste management procedures.

275. Uzbekenergo/SS Khorezm will take full responsibility in utilization of old batteries in accordance with local norms (SanPiN 3183-84). Utilization procedure is as follows: Batteries are opened, inner toxic acid is neutralized by caustic soda, neutralized liquid is discharged into special pit. Metal part of old batteries is delivered to special organization on gathering nonferrous metal. SS Khorezm receives payment for the delivered metal (in accordance with delivered volume).

276. When batteries are replaced the following norm shall be conformed: SanPiN 3183-84 Order of accumulation, transportations, neutralizations and burials of toxic industrial wastes No. 3183-84. (Appendix No. 2 "The limit content of toxic particles in industrial wastes, causing reference of this waste to materials on toxicity" No. 3170-84.), dd. December 29, 1984 N 3183-84.

277. Proper waste management procedures will be put in place to avoid littering and dumping of waste. These include waste bins and recycling of waste. Waste material which cannot be recycled or reused should be taken to a legal waste management facility.

278. During site clearance and levelling works topsoil layer will be removed. To avoid loss of this more fertile layer of top soil it should be stored separately and used for site landscaping and gardening where possible.

ii. Expansion of Switchyard 220 kV at Takhiatash TPP

279. Expansion of the SS at the Takhiatash TPP includes the installation of a new 250 MVA 110 kV transformer. It will be performed on a spare space at minimum distance from 110 kV switchyard.

280. Potential environmental impacts are similar than at the Khorezm site even though the scale of construction activities is bigger at Takhiatash. For detailed description of impacts and mitigation methods refer to paragraphs under Khorezm.

iii. Construction of 220 kV Switchyard of Ellikkala SS

281. The construction site of switchyard at Ellikkala is situated to the North-East of Nukus settlement on the opposite side of A-380 road. This area is relatively plain surface compound of fine-grained sand. This will significantly reduce the volume of grading and levelling works during SS construction.

282. Potential environmental impacts are similar than at the Khorezm and Takhiatash sites even though the scale of construction activities is bigger at Ellikkala. For detailed description of impacts and mitigation methods refer to paragraphs under Khorezm.

iv. Overhead Transmission Line

283. The potential environmental impacts during the construction activities of the OHL can be categorized as follows:

- Impact on Physical Resources

    - Loss of land resources
    - Impact on topography
    - Impact on hydrology
    - Use of natural raw materials
- Impact on Environmental Resources
    - Impact on air quality
    - Impact on noise levels and vibrations
    - Impact on surface water quality
    - Impact on ground water quality
    - impact on soils
- Impact on Ecological Resources
    - Forests
    - Terrestrial ecology
    - Wild life
    - Aquatic ecology
- Impact on Human Environment
    - Health and safety
    - Agriculture
    - Socio-economics
    - Resettlement and rehabilitation
    - Cultural and archaeological sites
    - Traffic and transport
- Waste Disposal
    - Solid waste disposal
    - Liquid waste disposal

284. The impacts of the project activities on various environmental attributes and their mitigation methods are discussed in subsequent sections.

Loss of land resources

285. Temporary withdrawal of land resources will be done to ensure enough space for storage of materials, disposal sites, and labour camps for human resource and for construction of temporary access roads to avoid environmental impact and public inconvenience. Also the worksites need enough space around them. These locations must comply with the local laws and regulations and need approval from authorities to utilise these facilities.

286. It has been approximated that a total of 543 hectares of land will be temporarily taken for these activities. Permanent loss of land resources will be about 40 hectares. This area will be used for OHL supports.

287. The prevailing land use under the planned OHL is pasture in the Republic of Karakalpakstan and arable land (mainly cotton fields) in Khorezm region, about 66 % and 35 % respectively.

288. It is important that selection of temporary lands is at least 500 m away from highly populated areas, water bodies, natural flow paths, agricultural lands, important ecological habitats and residential areas. Removal of trees and green cover vegetation should be minimised during preparation of access road and other facilities.

289. The overall loss of land resources is considerably smaller than the total area under the OHL. The temporary lands required by the OHL will be cleared and restored to its original uses subject to some constraint for lands directly under the OHL. It is allowed to grow small trees and shrubs on the area. Detailed specifications exist for the types of plants allowed and their planting distances and size of the plants. New vegetative layer controls also erosion effectively.

290. If crops are damaged by access of workers to the towers or by construction activities compensation payment shall be done to farmers.

291. Temporary and permanent loss of land resources will be reduced by using the existing access roads as much as possible.

Impact on topography

292. The changes in topography will occur due to excavation and levelling works in connection to foundation of towers and construction of access roads. Filling and cutting works are needed to level the tower sites and road lines. All in all the amount of leveling works is not extensive. The impact on topography will be minor.

293. As a mitigation method new access roads should be planned as much as possible along contour lines.

Impact on hydrology

294. OHL will cross the River Amu Darya at three points. Towers will be placed on the banks of the river, so they are not situated in the river channel. Thus towers do not have an effect on the river hydrology.

295. At the second crossing point new dam will be constructed. There are already dams built to give the riverbed a more stable position: on the left bank - six, on the right bank - thirteen. Traverse dams are straight dams, built of local soil and connecting end wall (of large stones 2-3m in diameter) with the original bank or front line dam embankment.

296. To provide the protection of the projected OHL the construction of a new traverse dam 70-80 m above the crossing of the existing overhead line Beruni SS - Khorezm SS is required. Maximum river depth in the target area is 18 m and the maximum depth of dams reaches 24 meters.

297. It is likely that dam construction will not be part of the Northwest Region Power Transmission Line Project.

298. The construction of a new traverse dam will not cause any hydrological impacts on the river course.

Use of natural raw materials

299. A total amount of soil which will be excavated under the supports of OHL (foundation) is about 362,000 m^3. All excavated material will be used for strengthening of the tower foundations and for access roads. The use of natural raw materials excavated from other areas will thus be minimized.

300. It is calculated that the following amounts of natural raw materials will still be needed for construction works: gravel 636 m^3, loam 861 m^3, sand 5,235 m^3, crushed stone 855 m^3 and sand-gravel mixture 178 m^3.

301. Soil materials are purchased from commercial organizations and it is not yet known where the extraction areas are located. Adverse environmental impacts are thus indirect. Mitigation method would be to choose a company to deliver materials which is known to follow sustainability principles.

Impact on air quality

302. During the construction phase vehicles like trucks, cranes and other work machines will be used. Emissions from exhaust gases will affect air quality. The movement of vehicles will cause also dust emissions. A tentative list of main vehicles and machinery used during the construction works and types of fuels they are using is presented in Table 4.

303. The most significant gaseous emissions are particulate matter, carbon monoxide, nitrogen dioxide and hydrocarbons. Other components are e.g. soot, sulfur dioxide and oxidized hydrocarbons.

304. The amount of the main emissions is presented in Table 5. According to dispersion calculations, the maximum concentration of all emissions listed in Table 5 do not exceed the approved levels for enterprises located in Khorezm region and in the Republic of Karakalpakstan.

305. Welding and painting will cause also small amounts of emissions but these are easily dispersed.

306. The use of explosives in rocky areas creates short term concentration of NO_2 and dust with excess of the approved quotas. CO emissions at explosions will create insignificant concentration.

Table 4. List of main vehicles and machinery used during construction works

Type of vehicle or equipment	Type of fuel	Quantity
Auto hydraulic ram, lifting height 12 - 35 m	diesel	6
Vehicle GAZ-66 and GAZ-53	diesel	5
Ramp vehicle load-carrying ability 5 t and 8 t	petrol	4
Lift-truck, 5 t	diesel	2
Bulldozer, 128 kW	diesel	1
Bulldozer, 59 kW	diesel	1
Bulldozer, 79 kW	diesel	1
Mobile compressor with internal combustion engine	diesel	3
Automobile cranes, 6 - 16 t	diesel	6
Caterpillar crane, 16 t	diesel	1
Wheel-mounted crane, 25 t	diesel	1
Water-jetting vehicle, 6000 l	diesel	3
Off-road vehicle, load-carrying capacity up to 8 t	diesel	2
Crawler tractor 59, 79, 96, 132 kW	diesel	6
Pneumatic-tyred tractor 59 kW	diesel	2
Crawler-mounted excavator single-bucket,0.65 m^3	diesel	2
Mobile powerstation, 2 kW	diesel	2

Table 5. Calculated main emissions

Emission	MPC mg/m^3	Danger class	Total emissions to atmosphere t/y	% of contribution to listed emissions
Nitrogen dioxide	0.085	2	7,682	8.65
Sulphur dioxide	0.5	3	2,388	2.69
Nitrogen oxide	0.6	3	1,247	1.40
Carbon oxide	5	4	16,453	18.52
Inorganic dust	0.3	3	48,820	54.95
Soot	0.15	3	2,708	3.05
Hydrocarbons	1	4	9,537	10.74
Total			88,835	100.00

307. Mitigation method for the emissions is to use as new vehicles and machinery as possible and to use catalysators. Machinery and vehicles are to be checked regularly to decrease emission levels. Motors should be turned off whenever possible.

308. Water sprinkling will be used to reduce dust emissions. There will be a water-jetting vehicle available. It is planned to execute two watering rounds per day on the roads during the hot season.

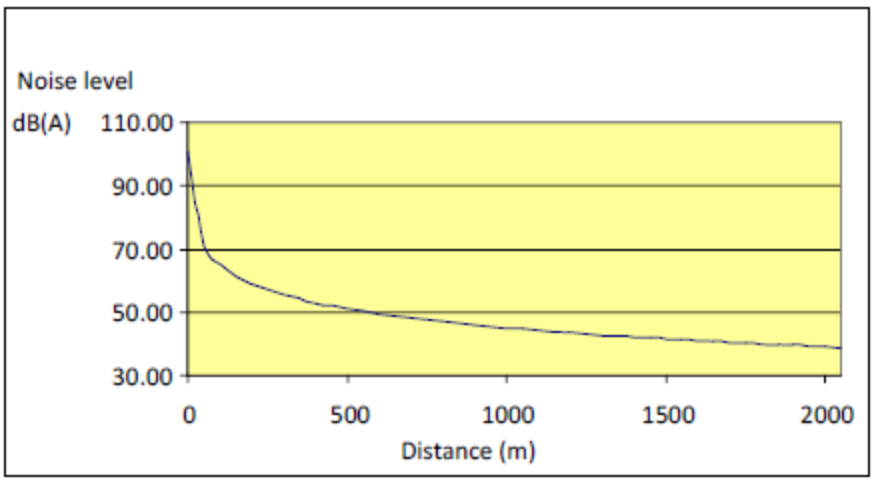
Impact on noise levels and vibrations

309. One of the main impacts of the construction is noise. The major sources of noise are movement of vehicles transporting workers and equipment to the construction sites. At the sites, work machines are also causing noise and some phases of construction, like piling of the foundation of the towers at the river crossing sites and explosive works at rocky areas. The major work is expected to be carried out during day time. The noise produced during the construction works will have negligible impact on the residents around the most part of the transmission line because there are not any houses nearby. On the other hand, urban areas exist also along the line and in those cases residents will be disturbed. The noise level appear louder on open areas but these are usually scarcely habitated.

310. According to measurements of noise levels at different construction sites the following maximum noise levels can be predicted: Drilling machine 102 dB(A), Loader 92 dB(A), Pneumatic tool 99 dB(A), Grader 105 dB(A), Truck 90 dB(A), Crawler tractor 98 dB(A), Generator 100 dB(A) and Backhoe 101 dB(A).

311. The graph presented in Figure 3 shows the noise level variation from the noisiest equipment (105 dB(A)) with distance from the source.

Figure 3. Noise level variation with distance from the source (Takhiatash Power Plant efficiency improvement project, EIA, gasNatural fenosa, May 2013)



The noise level on the border of residential development in some areas may exceed IFC Noise level guideline and national standard value of 55 dB(A) (daytime) during some construction activities. The noise level is temporary in nature and the contractor will be required to post advance notice for those activities so the neighboring areas will be properly informed and the

neighboring areas could accordingly adjust their working schedule. The actual distances to houses are regulated by the technical standards of Uzbekistan and will be taken into account in the detailed project planning and will be respected during construction of the OHL.

312. Noise from working machines will be in accordance with local legislation: Resolution of the Cabinet of Ministers of the Republic of Uzbekistan on the Approval of Rules of Protection of Objects of Electronetwork Economy, dd. May 17, 2010, No. 93, P.11 and SanR&N No.0267-09 Sanitary standards and Rules on Ensuring Admissible Noise in Rooms of Residential, Public Buildings and in the territory of the Housing Estate, dd. June 19, 2009.

313. The impact of noise is temporary in nature but it will disturb locally also wild animals. The effect on the Baday - Tugay nature reserve is explained in detail under the title Impact on terrestrial ecology and wildlife.

314. In order to reduce noise emission, the following criteria should be adapted:

- Construction and decommissioning activities which cause excessive noise will be programmed for normal working hours. As a rule, the operation of heavy equipment shall be conducted in the time span 7am-7pm only, unless otherwise agreed with local residents (enforce speed limits, and restrict operation hours through roadside villages and settlements). All events used during start up activities will be adequately silenced to avoid excessive noise.
- For machine and personnel movement on site: - When site operations begin, verify that construction vehicles have undergone the corresponding technical inspections. For any vehicle with mechanical engine, transmission, body and any other element capable of producing sounds and vibrations and, in particular, the silencing of exhaust gases, must be in good operating condition. - All the equipment, which generates excessive noise, such as compressor and jackhammers shall be enclosed to prevent noise nuisance. -As far as possible, drivers of all the vehicles on site should adapt their speed so as to reduce noise. -Workers should be informed of measures for minimizing noise emissions.
- For the loading and unloading: -Sand, brickbats, gravel etc. should be carried out low and as close as possible to the ground. -Site activities should be scheduled so as to avoid combined action of several equipment types that cause high noise levels over prolonged periods.

315. Admissible noise level in the living area, both inside and outside the buildings (SanR&N No.0267-09); and general EHS IFC guideline (2007) standards) are presented in Table 6.

Table 6. Admissible noise levels in the living areas

Type of area	Sound level, dB(A)
Residential areas (inside) (SanR&N No.0267-09):	
Day time	40
Night time	30
Residential areas (outside) (SanR&N No.0267-09 and IFC EHS general guidelines (2007)):	
Day time	55
Night time	45
Industrial areas (IFC EHS general guidelines (2007))	70

316. Hearing protection devices shall be handed out to all workers who work or visit at areas with high noise level. Workers are obliged to wear ear protectors where 85 dB(A) are exceeded.

317. To reduce the harmful impact of noise and vibrations, blasting of rock will not take place near the Baday – Tugay reserve and near any densely populated areas. Installation of tower foundations along the reserve will be done using an excavator and drilling machine if needed. Noise from drilling machine during the work will be in accordance with local legislation. Noise from drilling machine will be around 75 dB(A) inside the driver's cabin. Accordingly, noise outside of the cabin would be around 80 dB(A). Taking into account the minimum distance (200 m) from the reserve area, noise reaching the area would be much lower and cause no disturbance to wildlife.

Impact on surface water quality

318. The turbidity level of the river water will increase temporarily during the construction of dams and foundations of towers at the river crossing sites. The length of the influence zone depends on the particle size of suspended solids, current speed and average depth of the river.

319. Increased turbidity may, in worst scenario, decrease the productivity of the reservoir, collapse of the locally developed biotopes, deaths of organisms in larval stage and disturbances of food supply at all trophic levels. There is not any recognized spawning or feeding areas of fishes near the river crossing sites.

320. Besides the possible increase of turbidity of the river water, the construction of OHL will not have any major impact on the quality of surface water in the area. Contamination of river water and irrigation canal water may result due to spills of oil, fuel and some other chemicals at the sites (mainly from work machines).

321. Mitigation method to minimize the amount of turbidity is mainly correct timing of the works (to be executed during low water period and outside of the spawning period). In case excavated foundations pits are filled with water and it is pumped away, water should be

pumped first to a silt pond and only after the water has cleared further on to river, irrigation canal or other suitable place.

322. As a mitigation method for accidental spills and leakages, adsorbent mats or other suitable material should be available to adsorb leaking fuel or oil. Contaminated soil should be removed as soon as possible and taken in an appropriate place to avoid surface water pollution.

323. Adequate sanitary facilities for the construction workers shall be provided in order to avoid any surface water contamination. It is supposed that dry toilets will be used.

Impact on groundwater quality

324. The construction of OHL will not have any major impact on the quality of ground water in the area. Groundwater contamination may take place if chemical substances and oily waste is leached by precipitation of water and percolate to the groundwater table. For OHL construction activity, large amounts of chemical substances are not supposed to be used. Oil, grease and fuel releases from vehicles and work machines as well as spoil from construction and other construction related activities, may cause groundwater contamination. Contamination risk is more severe during rainy periods.

325. To avoid any risks of groundwater contamination all vehicles and work machinery should be maintained in proper condition. Waste oil should be collected properly and disposed to the approved location.

326. As a mitigation method for accidental spills and leakages, adsorbent mats or other suitable material should be available to adsorb leaking fuel or oil. Contaminated soil should be removed as soon as possible and taken in an appropriate place to avoid groundwater pollution.

Impact on soils

327. Project activities include excavation and some cut and fill operations and removal of green cover vegetation. This will enhance soil erosion during the rainy season.

328. During site clearance and levelling works topsoil layer will be removed. To avoid loss of this more fertile layer of top soil it should be stored separately and reused for site landscaping and gardening where possible.

329. The amount of excavated soil is about 300 m3 under each support tower. The overall area of one excavation needed for the foundation of a support tower is very small. Soil material is used on site as cover material.

330. Soil materials are purchased also from commercial organizations and it is not yet known where the extraction areas are located. Adverse environmental impacts are thus indirect. Mitigation method would be to choose a company to deliver materials which is known to follow sustainability principles.

331. Erosion is prevented by minimizing any removal of trees and green cover vegetation. Revegetative measures should be applied where appropriate.

Impact on forests

332. The main impact on forests will be noticed near the second crossing of Amur Darya River where natural tugai forests exist. Territory that fall under construction of TL (right of way) makes 3.64 hectares covered by forestry vegetation, which is 0.015 % of total forest area in the Republic of Karakalpakstan. On the territory of Khorezm, 1.5 hectares of forest area falls under the TL, which is 0.0063 % of total forest area.

333. The most ideal action to minimize harmful impacts on the forests from all points of view (environmental, social and economic) is cutting of tree tops. However, the applicability of this action is to be considered by the Contractor (from the point of applicability of construction activities) and approved by the local district administration. As for the area where cutting of tree tops is not possible, trees would be replanted at different area. Area for replantation to be confirmed with local district administration. In the case that above stated actions are seen to be unrealistic for accomplishment due to justified reasons from the Contractor and approval of district administration, action for cutting down of all trees that follow under construction is to be applied. Procedure of these specific actions falls under resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On increase of the control for rational usage of biological resources, import and export from Uzbekistan" dd. October 28th 2004, No. 508, pp. 10-12, 16-17. All above mentioned scenarios are considered in Environmental Management Plan (EMP) as all of them require special labor and machinery.

334. A special permission to cut down trees may be obtained as follows:

- On withdrawal from environment of the rare and plant species being under the threat of disappearance included in the Red Book of the Republic of Uzbekistan — to be acquired from the State Nature Protection Committee of the Republic of Uzbekistan (Goskompriroda);
- On other types of use — respectively from the State Nature Protection Committee, Head department of forestry at the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, public authorities on sites, the agricultural enterprises, establishments and the organizations.

335. For obtaining special permission the following documents shall be submitted:

- An application for special use with the indication of object, place, terms and ways of use;
- A consent of land owners, land users or public authorities, where the action would take place;
- A document confirming payment for use of objects of flora.

336. Permissions to special use of objects of flora or reasonable refusals are presented to applicants within 15 days from the date of submitting of application. The permission for special use of objects of flora describes: the juridical or physical person who will carry out the work; object (types), volumes (quantity) of use, place and terms of use. Permissions to special use of objects of flora cannot be performed by other bodies, changes aren't allowed. To withdraw permissions to use of objects of flora, in case of violation of nature protection legislation, can be done only by authorized state nature protection and forest department inspectors.

337. The state control of protection, use and reproduction of objects of flora is carried out by local state authorities and State Nature Protection Committee in the order established by the legislation.

Impact on terrestrial ecology and wildlife

338. The closest protected area to the project is Low Amydarya biospheric reserve which locates on the territory of Amu Darya, Beruniy district of Republics Karakalpakstan around 75 km on the south-east from Takhiatash city. The OHL locates about 200 m from the northern border of the reservoir at the closest.

339. According to article No. 47 of the Law of the Republic of Uzbekistan "On Protected Natural Territories" No. 710-П dd. 03.12.2004, the perimeter of the secured zones of reserves is defined along with its origination and establishment.

340. Explosive works will not be carried out along the reserve. Construction of tower foundations will be done by excavator and drilling machine if found necessary.

341. Noise caused by construction works and potentially affecting animals living in the reserve was assessed based on calculations. It could be concluded that construction work may cause temporary low magnitude negative acoustic impact on fauna in the reserve. Noise level may slightly exceed standard value of 55 dB(A), given for residential areas, in a small area of the reserve locating closest the OHL (200 m). There are not any specific guidelines for noise in nature reserve areas. Guidelines for sensitive areas usually consist of hospitals, schools etc. and accepted noise levels vary between 35 and 55 dB(A) during daytime. Trees in the reserve will act as an effective noise barrier and the level of noise rapidly diminishes when entering deeper into the reserve area. All construction works will be limited to day time. The use of noisiest equipment will be avoided near the reserve. It should be noted that there are only one tower at the distance of 200 m from the reserve and one at the distance of 300 m.

342. The OHL route doesn’t affect any land occupied with valuable crops, reserves or wildlife areas. The main types of land where the route passes are pastures and arable land, agricultural fields and not agricultural land. Crowns of the high decorative trees will be in some areas cut. Fruit trees will not be cut. Damage to other types of wood vegetation is expected around the second crossing of Amur Darya River where tugai forests exist. Impacts and their mitigation methods are presented more closely in previous paragraph Impact on forests.

343. Levels of influence of electric and magnetic components created by OHL 220 kV of electromagnetic fields are within admissible norms. Impact of electromagnetic fields on fauna and population will be identified by Project in accordance with "Sanitary standards and rules during the work with sources of electromagnetic fields and radio frequencies" No. 0269-09, approved by Chief state health officer of the Republic of Uzbekistan B. I. Niyazmetov. 2009.

344. Special efforts will be put on place to prevent any negative impacts on the reserve area. Rerouting possibilities of the line can be examined if found necessary.

345. Tugay trees planted at Baday-Tugay Reserve serve as vacation spots and feeding troughs for migrating birds. Towers and cables are designed up to best practices to minimize birds’ collision and electrocution. For preventing the nesting and landing of birds on 220 of kV lines, the project provides installation of bird-rejecters on traverses of supports and mesh caps

on the top ends of centrifugal pillars. Bird collisions with the lines are possible causing deaths and injuries of birds. The cables will be equipped with bird reflectors to increase their visibility and farther rescue bird collisions. Bird monitoring will be ensured on the OHL operation phase to verify effectiveness of mitigation and to define the need for additional measures.

346. The removal of vegetation from the construction areas may cause some erosion and have a minor impact on local ecology. Revegetation will be done where appropriate.

Impact on aquatic ecology

347. The proposed transmission line will cross over the River Amu Darya at three points. Towers will be placed on the banks of the river, so they are not situated in the river channel and will not have an impact on aquatic ecology.

348. At the first river crossing point water level may be temporarily lowered in the river to facilitate the construction work more effectively. The impact on aquatic ecology is minor.

349. At the second crossing point new dams will be constructed. These dams are meant for erosion protection purposes and they are located parallel to the river channel. The construction of these dams will not cause any long-term impacts on aquatic ecology. However, turbidity of the river water may rise temporarily.

350. Increased turbidity may, in worst scenario, decrease the productivity of the reservoir, collapse of the locally developed biotopes, deaths of organisms in larval stage and disturbances of food supply at all trophic levels. There is not any recognized spawning or feeding areas of fishes near the river crossing sites.

351. Mitigation method to minimize the amount of turbidity is mainly correct timing of the works (to be executed during low water period and outside of the spawning period). In case excavated foundations pits are filled with water and it is pumped away, water should be pumped first to a silt pond and only after the water has cleared further on to river, irrigation canal or other suitable place.

Health and safety

352. Health and safety impacts will be in terms of risk of accidents. Necessary training regarding safety aspects should be provided to the workers. Personal protective gear like helmets, safety gloves, mufflers etc. will be provided during construction work. First aid facilities will be made available.

353. Project activities may create accidental damage also to general public. Therefore, Contractor should take necessary action to enhance the safety of the public during the construction, e.g. installation of warning signs to particular locations such as transverse points of local road network by transmission lines. Blasting works near densely habitated areas should be avoided.

354. Levels of influence of electric and magnetic components created by OHL 220 kV of electromagnetic fields are within admissible norms.

Agriculture

355. Permanent and temporary loss of agricultural land occurs due to towers in the field area in several locations. Total area of permanent acquisition of agriculture land is 4.35 ha and temporary acquisition 158.73 ha. The total number of AHs is 118 (permanent land acquisition) and 169 (temporary land acquisition). The overall long term impact on agriculture is small and AHs will be compensated for their losses.

356. All details of Land Acquisition are discussed in detail in separate LARF and LARP.

357. The main type of arable land where the OHL route passes consists of cotton fields. On arable land temporary and permanent access roads will be located along the field borders to minimize the disturbance for cultivation. On irrigated arable land construction works are performed after crop removal.

Socio-economics

358. Construction of OHL and sub-stations will generate possibilities of local employment as a number of laborers will be required during the construction. All construction activities will be done by Uzbek companies. The exact number of local workers will be decided by the Contractor who will be chosen for the project implementation.

359. The implementation of the project has a positive impact on national and local socio-economics.

Resettlement and rehabilitation

360. For the construction of transmission overhead line temporary land acquisition is required. Total area of agriculture land which will be needed temporarily is 158.73 ha and number of AHs 169. However, there is not any resettlement involved in the project and rehabilitation is not needed.

Cultural and archaeological sites

361. There are no known archaeological, historical or cultural sites or objects along the route alignment. Hence the impacts on these sites are not envisaged.

362. In case archaeological findings, like fragments of historical artifacts, are found during the construction work, working is stopped and relevant authorities contacted.

Traffic and transport

363. Construction work of OHL will cause increase in traffic both locally and regionally. Local traffic consists of vehicles working at the sites and along the line. Areal traffic includes movement of vehicles to and from the sites and line as well as transportation of construction materials to the sites.

364. The OHL route will cross 78 highways, generally regional value, and a couple of times larger highway of interrepublican value; A-380 Urgench-Khiva.

365. Traffic congestions may occur when large pieces of equipment are transported.

366. During the construction phase, traffic disturbance needs to be minimized by avoiding high-density areas, using proper traffic signs, ensuring proper access roads and avoiding road blockage. Speed limits should be followed at the main roads and put in place at access roads.

Solid waste disposal

367. The solid waste generation will be at the location of tower erection sites. Waste types will include e.g. scrap metal, wood, pieces of welding electrodes, small amount of concrete and domestic waste. Anticipated waste types belong to classes 1, 3, 4 and 5. Examples of waste types in different classes are e.g. luminescent lamps (1st class), municipal solid waste (4th class) and reinforced concrete (5th class).

368. Waste will be collected and disposed of in compliance with applicable regulations and rules. The Contractor is responsible for organizing collection and temporary storage of waste. All waste materials which can be recycled or reused will be handled separately.

369. The labour camps at the sites of tower erection will be temporary. Appropriate services for solid waste and sanitation waste will be organized. Provision of adequate washing and toilet facilities should be made obligatory. Toilets will be dry toilets.

Liquid waste disposal

370. There will not be large amounts of chemical waste generated at the construction sites. Waste oil may be generated a small amount. Other liquid waste types are organic solvents and small amount of sanitation water.

371. Liquid waste will be handled, collected and stored in a proper way and delivered to licensed location where it will be disposed of in compliance with applicable regulations and rules.

372. Sanitation water will be collected and treated properly. Dry closets will be used.

c. Operation and maintenance

373. Once the substations and OHL are operational, there will be little activities which may cause environmental impacts. The main impacts are presented in the following.

374. Any construction works under the OHL is forbidden.

375. Transformers may cause humming noise which increases the current noise level a little bit at the SS sites which are expanded. At Takhiatash the Power plant itself is a major noise producer and that is why transformer humming will be a minor subject. Also at Khorezm there already are quite many transformers, so the noise level is going to be increased only slightly.

376. The new SS at Ellikkala will form a new source of noise. However, there are not any permanent habitation nearby.

377. The noise of OHL is caused by corona discharge on the wires. All structures will be designed in such a way that corona discharge is avoided as much as possible. However, irregularity on the wire surfaces from mechanical damage, pollution and precipitation will increase the possibility for corona discharge. On the long run corona noise will occur especially during a downpour. In very old OHLs, the corona noise can still be heard even in clear weather.

378. Based on the experiences from other OHLs, it can be said that the expected corona noise will be well below guideline values.

379. Another impact from OHL is exposure to electric field. The design of the OHL compares favorably with the IFC guidelines. The Uzbek standard for exposure to electric field is similar to the IFC guidelines.

380. The OH line will be periodically inspected for structural soundness of the foundation and the towers. Special inspection may be carried out after unusual events such as earthquakes, strong wind and heavy flooding. In rare instances, conductors may break and new one must be installed. As part of personnel safety, the electricity supply will have to be temporarily suspended until repair works are done.

381. The area under OHL can be used for grazing which helps also maintenance works because of the vegetation cover is kept short. Herbicides shall not be used, especially in the environmentally sensitive area, e.g. in the forested areas near the Khorezm SS due to the risk of polluting Amur Darya river.

382. Spillages or leakages of transformer oil may occur due to accidents especially during maintenance works. Transformer oil has a long life span, even over 15 years, so oil is not changed very often. Transformers are normally located within secure and impervious areas to prevent further damages.

383. Use of Eleigas in circuit breakers may cause emissions to air. Personnel should be trained by the supplier of circuit breakers and user's manuals should be placed at relevant sites. Regular monitoring of emissions needs to be organized.

384. Transmission cables may cause bird deaths when birds do not see the cables and they crash on them. The project provides installation of bird-rejecters on traverses of supports and mesh caps on the top ends of centrifigured firms to prevent nesting.

385. In terms of occupational health and safety, personnel working at the OHL area and substations have to undergo safety and accident prevention training before they are assigned to work in such environment. Training should be repeated regularly.

d. Decommissioning procedures

386. In connection with this Project old substations are not abandoned, only some old equipment is replaced with new ones. When old transformers are removed the following steps should be followed.

387. From the health and safety point of view, all power supply should be stopped and connections cut off physically.

388. Proper disposal of waste materials of dismantling should be followed: materials that can be recycled (metals, old batteries etc.) will be transported to correspondent collection and storage sites, non-recyclable materials are to be transferred to landfill as appropriate.

389. There is a risk of accidental discharges of hazardous substances as oils, fats and/or fuel in machinery, as well as dielectric mineral oils, during the dismantlement of power transformers. These discharges are unlikely to happen due to the existence of specific preventive measures for handling these substances. In any case, if a discharge occurs, immediate excavation of the affected soil will be carried out and will be managed according the current regulations.

390. In order to manage any accidental discharge of the transformer oil, there is a concrete pool under the transformer. This pool is designed to collect any fluid that may be spilled from the transformer and channel it through its own slope first, and a then through a line pipe to an emergency dielectric fluid containment tank. During rehabilitation this tank has to be emptied and the oil correctly disposed.

391. For temporary storage Uzbekenergo should provide space where the Contractor shall construct a storage for used oil. This area shall be sealed and surrounded with a concrete bund to exclude soil/groundwater pollution even if the tanks are leaking. Storage area shall be roofed to minimize corrosion of the tanks. For oil storage special tanks shall be used. These tanks shall be double walled and fitted with suitable possibilities to take out the oil for reuse purposes. Construction cost should be included in Contractor’s contract sum.

392. Transformer oil is drained in a similar manner than during maintenance. Oil has to be analyzed in laboratory to check possible presence of PCB and TCB. If PCB/TCB is found, oil should be handled with special care and dispose it to designated areas. Oil which is proven to not contain any PCB/TCB will also be delivered to authorized facility. It should be noted that used transformer oil has been reused all over SS Khorezm site and remains of oil should be removed where applicable. Special instructions for the removal should be written.

393. Collection, temporary storage and disposal of the used transformer oil should be done according to the developed normative documents and 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.

394. Transformer and other accessories that could be contaminated with oil are packed and transported in such a way that oil may not leak out of the container to authorized facility for dismantling. Clean metal scrap will be separated and transported to reuse. Other solid waste is separated if possible (wood etc.) and transported to reuse or final disposal.

395. The soil in the area of removed transformer should be sampled for contamination. If contamination is found, a remediation plan will be prepared and soil will be remediated.

396. When old batteries are replaced the following order shall be conformed: SanPiN 3183-84 Order of accumulation, transportations, neutralizations and burials of toxic industrial wastes No. 3183-84. (Appendix No. 2 "The limit content of toxic particles in industrial wastes, causing reference of this waste to materials on toxicity" No. 3170-84.), dd. December 29, 1984 N 3183-84.

397. At the moment it is not known if old transmission overhead line will be partially demolished. In case of demolition, all solid waste should be separated (scrap metal, cables etc.) and transported to reuse or to be recycled or final disposal if reuse/recycling is not possible. Along the route, all waste will be cleaned and transported to suitable facilities. Concrete bases of the towers will be removed as well if applicable. Concrete can be crushed and recycled within the limits of waste management legislation.

398. During substations rehabilitation the worn-out equipment that exhausted its service life will be dismantled and replaced. According to experience of European countries in similar situations, the dismantled equipment which are in acceptable technical condition can be re-used for spare parts for the similar high-voltage equipment which still remains in service and suffers problems of spare parts supply (the equipment and spare parts are not manufactured any more, the manufacture does not exist, etc.). Even if there is no problem of spare parts, re-use of dismantled equipment will permit to reduce repair cost.

G. ANALYSIS OF ALTERNATIVES

a. Substation alternatives

399. Regarding V-1 node, at the moment it is served by a regional 220 kV substation V-1, to which two existing 220 kV lines from Takhiatash TPP are connected. According to Uzbekenergo, there is no possibility of area expansion of the existing substation, besides this SS does not belong to Uzbekenergo and is of difficult access. Thus, the construction of a new substation near the V-1 seemed to be necessary. Regarding the characteristics, configuration and exact location of the substation two alternatives were considered.

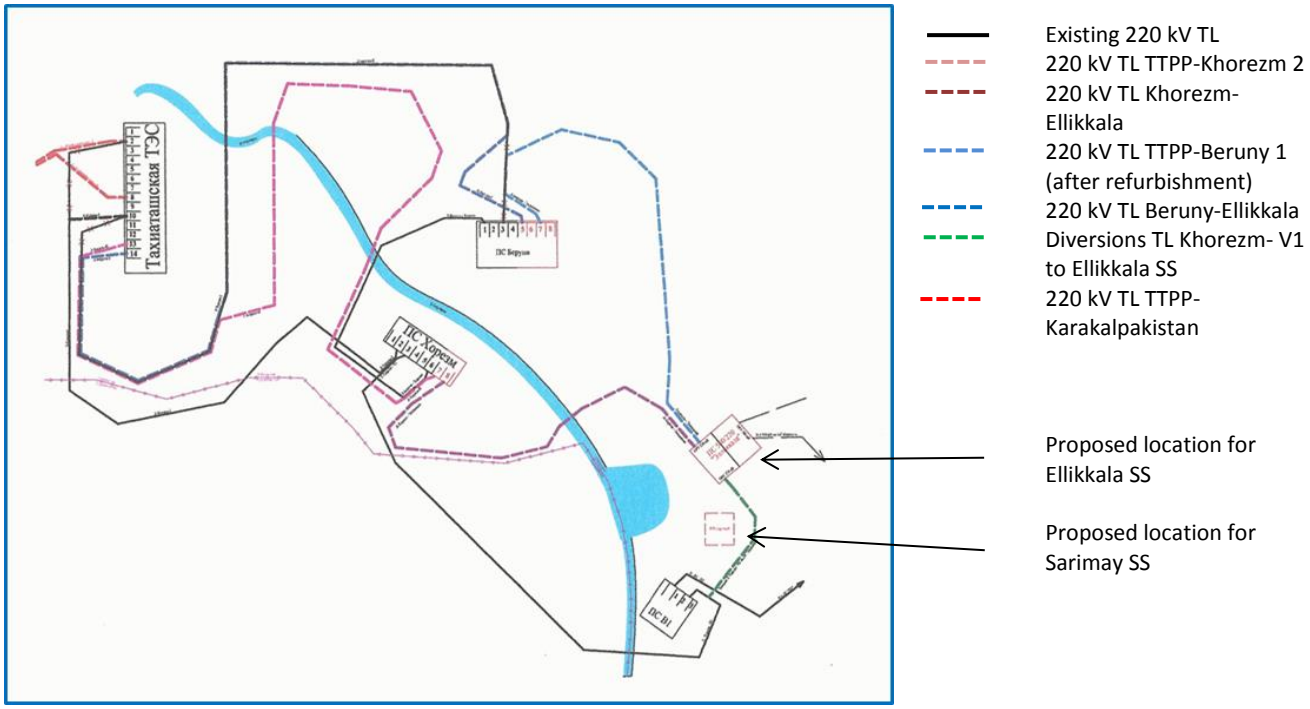
400. Alternative 1: Construction of a new switching substation near SS V-1 (220 kV Sarimay SS). As it was mentioned before, North-Western part of the power system of Uzbekistan is characterized by long power transmission distances, thus sectionalizing of the lines is necessary. Newly built substation will be connected by the projected 220 kV overhead transmission line to Khorezm SS, and in the future to Beruni SS and to Zaravshan SS by a planned for construction new 220 kV OHL V1-V2-V3-Zaravshan SS.

401. Alternative 2: Change of the initially planned location of the 220/500 kV Ellikkala SS, moving it near V-1 node. As said before, the North-Western connected to the IPS of Uzbekistan with one 220 kV transmission line of cross-section 240 and 300 and throughput capacity limited to 150-160 MW. On the other hand the node has two important power generation sources (Takhiatash TPP and Tuya-Muyun HPP), generation enough electricity to be exported to other regions of the country. In view of these circumstances the Consultant considers advisable, besides of further development of 220 kV network, the future elevation of the voltage level of the node network up to 500 kV in order to provide reliable and quality connection with the integrated power system and reduce transmission losses.

402. After analysis of these two alternatives, the Consultant considered as optimal and fully corresponding to the transmission system development plans the second option. On 08.10.2014 National Technical Committee of SJSC “Uzbekenergo” approved the proposed change of 220/500 kV Ellikkala substation location and its construction near V-1 node instead of initially projected switching station.

403. New site for 220/500 kV SS is shown in the Figure 4 below together with the proposed site for Sarimay SS.

Figure 4. Proposed locations of the V-1 node substation



404. It was initially planned to locate the 220/500 kV Ellikkala SS site at the north of the power node, between 220kV Beruni SS and 110 kV Turtkul SS, at the distance of 23 and 43 km respectively. In that case the length of 500 kV OHL from 500kV Ellikkala SS up to 500 kV Karakul SS was 365 km, and to projected 500 kV Muruntau SS – 336 km. Close investigation in situ, conducted by the engineering institute, showed that the previously selected site doesn't meet the requirements. Thus, new location site for the Ellikkala SS was needed.

405. Based on field inspection that was performed by the specialist of Sredazelectrosetproject, three alternate locations of new 500/220 kV Ellikkala SS were selected (see Annex 6).

- The first site is located 800m northward from Sarimay settlement. This area has pit-and-mount and sandy relief but also gas pipelines Bukhara-Ural on the south. On the north side of intended site 220 kVOHL V1-V2 runs as well as water line going in parallel to 220 kV OHL. Due to existence of above mentioned utility systems, the line entries will be substantively complicated.
- The second possible location of the SS site is situated 1.5km north-westward from Bukhara-Ural and Gazli-Nukus pipelines joint. This location is suitable due to existence of large area. Among shortcomings there is its hard rocky ground that would complicate the construction process.
- The third alternative location was selected to the North-East of Nukus settlement on the opposite side of A-380 road. This area is relatively plain surface compound of fine-grained sand. This will significantly reduce the volume of grading and

levelling works during SS construction. This area has also good access for projected OHLs from North-West, North-East and South-East.

406. The third option was selected as the optimal one.

b. OHL alternatives

i. Transmission Line Routing Criteria

407. As part of the alternatives analysis process, an established set of route selection criteria was applied in order to identify and compare potential routes for the new 220 kV transmission lines between Takhiatash TPP substation and Khorezm SS and between Khorezm SS and V-1 node. Transmission line routing criteria are subordinated to the following overarching goals:

- The selection of cost-effective and technically feasible solutions to achieve the required transmission system reliability improvements and to interconnect the specified substations and power nodes; and
- The avoidance, minimization, or mitigation of adverse environmental, cultural, and economic effects.

408. The following transmission line route selection objectives were applied to identify potential transmission line route alternatives:

- Comply with all statutory requirements and regulations;
- Maximize the reasonable, practical and feasible use of existing linear corridors (e.g., transmission line, highways, railroads);
- Minimize adverse effects to sensitive environmental resources;
- Minimize adverse effects to significant cultural resources (archaeological and historical);
- Minimize adverse effects on land use, economic and social impact;
- Maintain public health and safety;
- Achieve a reliable, operable and cost-effective solution.

409. These objectives were achieved through maximum completion of the criteria presented in Table 7 when assessing different routing alternatives.

410. While designing a new transmission line, first of all its endpoints are determined. The projected 220 kV transmission line had necessarily to interconnect Takhiatash TPP substation, Khorezm SS and V-1 node that are the backbone of the North-Western power node on the way of power evacuation from Takhiatash TPP. Takhiatash and Khorezm substations belong to Uzbekenergo and have enough foot print for the necessary expansion.

411. As a result of these initial investigations, three potential route alternatives, presented in Figure 1, were identified and then evaluated for the proposed 220 kV facilities. For convenience of description the line location area is divided into five zones as shown in the Figure 1.

Table 7. Transmission line route selection criteria

Routing criteria	Description
Route Placement within Uzbekistan State Borders	For reasons of energy security it is critical to trace the line route entirely on Republic of Uzbekistan territory. Thereby, it is taken into account that on some parts the border follows the riverbed and on other parts on the left bank of Amu Darya the width of the territory of Uzbekistan is from 5 to 60 km.
Availability of Existing ROWs for the New Lines to Follow	The potential collocation of the 220 kV transmission facilities along existing ROWs where linear uses are already established (e.g., transmission lines, highways, railroads) is a primary routing consideration. An entirely new 220 kV overhead line route would require a minimum X-meter-wide ROW. The placement of the same new 220 kV transmission line on an existing corridor (parallel to existing transmission lines) may require a lesser expansion of an existing ROW or may not require any additional ROW at all, providing that the existing ROW is wide enough and has sufficient unused space of free circuit infrastructure for the new 220 kV transmission line.
Engineering Considerations	Whether on existing or new ROWs, the terrain and location of the transmission line route and constructability issues must be considered since both may have a significant impact on cost and effects on environmental resources. Among the constructability factors considered is the ability to avoid or minimize the location of structures within constructively complicated reliefs, environmentally sensitive areas such as wetlands, intersection of natural and engineered barriers such as rivers, existing OHLs, water collectors, irrigation facilities, etc.
Avoidance or Minimization of Conflicts with Developed Areas	Where possible, it is preferable to avoid conflicts with residential, commercial, and industrial land uses such as homes, businesses and public buildings. It is also necessary to minimize an impact on agricultural lands (farms, cotton fields, etc.): land withdrawal for transmission line siting and land use limitations in ROW and sanitary and security zone.
Avoidance of Environmental Resource Effects	In accordance with environmental protection policies, the avoidance of new or expanded corridors through sensitive environmental resource areas such as natural reserves, parks, wildlife areas, and wetlands is desired.
Accessibility	An overhead line must be accessible to both construction and maintenance equipment. Although access along the entire overhead line route is typically not needed, vehicular access to each structure location from some access point is required.
Selection of Optimal Points for River Crossing	For the assessment of river crossing points the following factors were taken into account: width of the Amu Darya River, process of deformation of the Amu Darya riverbed and banks, presence of dams to regulate water level, accessibility for construction and maintenance.

ii. First Right Bank Option (V-1)

412. At its exit from the Takhiatash TPP in zone I the route uses the free chain of the existing 220 kV OHL Takhiatash TPP – Beruni SS, which is of double circuit design. It crosses the river 6-7 km upstream from the dam of the Takhiatash hydroelectric complex and 5.5 km downstream from the river crossing of the existing Takhiatash TPP – Beruni OHL.

413. On the right bank of the river at the end of zone I the route joins on the north side the corridor of the highway along which there are no obstacles to bypass such as residential areas. At the end of zone II the route crosses the road and heads to the south. It continues on the right bank of the river as on the left bank there are densely populated areas with towns and disseminated villages. The largest city Mangit, the most important at regional level, would require the diversion of the route towards the river.

414. In zone III the route circumvents the State Natural Reserve Bugay-Tugay from the north, bypasses Beruni SS and approaches the existing 220 kV OHL Beruni-Khorezm. Going in parallel it crosses the river 60 m downstream from the existing crossing of mentioned line and

continues in parallel with the existing line. Further the route deviates from the existing line route passing by densely built-up area and irrigation canal network, approaches again the OHL Beruni-Khorezm and enters the Khorezm SS using the free circuit of the double circuit section of 220kV OHL Beruny – Khorezm.

415. In zone IV the route goes in bundle with the existing 110 kV OHLs and crosses Amu Darya 130 meters up the river from the railway bridge, which is 15 km downstream from the Tuya-Muyun dam.

iii. Second Right Bank Option (V-2)

416. In zones I and II this option follows the same route as Variant 1. In zone III near Karatau settlement it deviates from the route 1, approaches and crosses the river thus bypassing the Bugay-Tugay natural reserve from the east. The river crossing point near Karatau meets the criteria and the river width is even less than at crossing point near the existing OHL Beruni-Khorezm.

417. Nevertheless, the left bank section of zone III after the river crossing presents important difficulties. It is a densely populated area with large areas of agricultural plantations (cotton and wheat), which are of strategic importance for Uzbekistan, a dense network of irrigation canals, low voltage level lines that would require raising towers of the projected line to avoid crossing them, dense local road network and extensive communications infrastructure. In addition the width of Uzbekistan territory on the left bank varies from 8-52 km which does not give much space for maneuvering and bypassing.

418. At the end of zone III the route follows the same route as option 1: approaches again the OHL Beruni-Khorezm and enters the Khorezm SS using the free circuit of the double circuit section of 220 kV OHL Beruny – Khorezm.

419. After Khorezm SS in zone IV the route goes shorter way than Variant I, closer to Amu-Darya River and bypasses Khazarasp settlement from the north. This area is densely populated and extensively cultivated too, so the OHL construction would have potentially strong social and economic impact.

420. The route crosses the river at the same point as Variant I, approaches the highway and goes to the projected site of Ellikkala SS coinciding with V-1.

421. The option had to be eliminated from detailed consideration due to its high potential social and economic impact.

iv. Left Bank Option (V-3)

422. The Takhiatash TPP is located on the left bank of the river, near the border with Turkmenistan. The route of variant 3 (V-3 on the scheme) almost entirely goes on the left bank or Amu Darya and crosses the river only at one point between Khazarasp and Druzhba settlements.

423. From the technical and economic points of view it would be the best routing as it is the shortest, will the least number of river crossings, thus the most economic one. However, the left bank option had to be discarded from further consideration because of its geographic location. Atshort distance from the Takhiatash TPP the border with Turkmenistan approaches the river and follows it on a stretch of approximately 50 km, on other parts the border passes at a distance of few kilometers from the river. This makes impossible the line routing on the left bank without passing through the territory of Turkmenistan, which is unacceptable for energy security reasons.

424. Comparative analysis of route alternatives is given in the Table 8 below. Critical values are marked with orange.

Table 8. Comparative analysis of route alternatives

Criteria	Level of fulfillment (Yes/No or Low/Medium/High		
	V-1	V-2	V-3
Route Placement within Uzbekistan State Borders	YES	YES	NO
Availability of Existing ROWs for the New Lines to Follow	HIGH	MEDIUM	LOW
Engineering Considerations	MEDIUM	HIGH	HIGH
Avoidance or Minimization of Conflicts with Developed Areas	HIGH	LOW	HIGH
Avoidance of Environmental Resource Effects	MEDIUM	MEDIUM	MEDIUM
Accessibility	HIGH	HIGH	LOW
Selection of Optimal Points for River Crossing	MEDIUM	HIGH	HIGH

425. Thus, two of these alternative routes (V-2 and V-3) were eliminated from detailed consideration because they were found to be unsuitable for the development of the new transmission line due to such critical factors as geographic location and potential for significant social and economic effects, and only Variant 1 was determined suitable for detailed consideration.

426. The final detailed line routing was determined after field reconnaissance and closer investigation on a basis of available geological and hydrological studies.

c. New alternative to avoid negative environmental impacts

427. A new alternative for the OHL was developed during the IEE-process. Due to the proximity of the Low Amu Darya Biosphere Reserve, a new routing should be considered. New route would be located further north consisting of the part of the OHL approximately between angles 23-28.

H. ENVIRONMENTAL MANAGEMENTAND MONITORING PLAN

a. Environmental Management and Monitoring Plan

428. Environmental Management Plan (EMP) was prepared for the project that describes the anticipated impacts, monitoring requirements, and development of mitigation measures with respect to the following stages: (i) pre-construction, (ii) construction, (iii) operation and maintenance, and iv) decommissioning. Detailed, site-specific mitigation measures and monitoring plans (SEMP) will be developed and implemented during the project implementation phase by the Contractor.

429. The EMP for the project is attached as Annex 7, which identifies feasible and cost-effective measures to be taken to reduce potential significant, adverse impacts to acceptable levels. Here, proper mitigation measures are proposed for each potential impact, including details on responsible parties for implementation of mitigation measures and supervision.

430. In the following summary Table 9 the extent of impact is given under the precondition the mitigation measures are implemented as recommended. These mitigation measures are given in a separate column in this table. These measures are then repeated in the Environmental Management Plan (Annex 7) where among others the responsibilities for implementation of these measures are given.

431. In addition to the EMP, to ensure that project would not be generating a negative impact to the overall environment quality, an Environmental Monitoring Plan (EMoP) has been prepared. The monitoring activities of the project include e.g. site supervision, verification of permits, monitoring of water quality, soil, noise and air. Monitoring of the quality of water, soil, air and noise during the construction stage is a responsibility of the PMU. PMU and PMC's Safeguards Specialist will supervise the Contractor. The semi-annual Environmental Monitoring Report submitted by the PMU will include the results of environmental monitoring.

432. During the pre-construction and construction phase, the Contractor should ensure that activities like handling of earth works clearing work, access road construction and putting proper traffic signals, is done properly to have minimum impact. This in turn should be monitored by the Safeguards Specialists from PMU and PMC.

Table 9. Summary of Environmental Impacts

Environmental attribute	Potential impacts	Nature of impact	Magnitude			Mitigation measures
			Low	Medium	High	
Preconstruction phase						
Environmental resources						
Soil	Soil erosion due to tracks which may be formed, investigation holes. Soil contamination due to spills.	Direct and indirect/Local/ Reversible	X			To avoid driving in areas where tracks are easily formed. Filling the holes with soil material. Adsorbent mats available. Removal of contaminated soil.
Air quality	Increase of emissions and dust	Direct/Local/ Irreversible	X			To use new vehicles and machinery, proper maintenance, use of catalysators. Turn off motors when possible. Low speed driving.
Noise and vibrations	Noise due to drilling and driving	Direct/Local/ Irreversible	X			Regular maintenance of vehicles and equipment, use of exhaust silencers. Working only during daytime. To use personal protective devices.
Ecological resources						
Terrestrial vegetation	Loss of vegetation, cutting of branches	Direct/Local/ Reversible	X			Selection of drilling points, moving of survey equipment.
Human environment						
Land use	Temporary and permanent restrictions in land use	Direct/Local/ Reversible and irreversible	X			Detailed planning of OHL corridor to avoid prime agricultural land. Preconstruction and construction activities after crop harvesting. Selection of few access roads. Compensation to Affected Households.
Waste disposal	Littering	Direct/Local/ Reversible	X			Instructions to workers.
Land acquisition	Permanent loss of agriculture land or other productive use of land, resettlement.	Direct/Local/ Irreversible	X			Compensation to Affected Households. Detailed planning of OHL corridor location to avoid settlements and prime agriculture land.

Environmental attribute	Potential impacts	Nature of impact	Magnitude			Mitigation measures
			Low	Medium	High	
Construction phase						
Physical resources						
Land resources	Temporary and permanent restrictions in land use	Direct/Local/ Reversible and irreversible	X			Construction activities after crop harvesting. Selection of few access roads. Compensation to Affected Households.
Topography	Change in the surface features	Direct/Local/ Irreversible	X			Construction of new access roads along contour lines.
Hydrology	Impact on water flow in River Amu Darya	Direct/Local/ Irreversible	X			Construction of towers on dry land. Location of new traverse dam on the bank of the river.
Natural raw materials	Excavation of natural raw materials	Indirect/Local/ Irreversible	X			Reuse of excavated soil from tower foundations. Choice of the producer using sustainability criteria.
Environmental resources						
Soil	Erosion and contamination of soil.	Direct and indirect/Local/ Reversible	X			Minimize removal of vegetation. Rehabilitation of disturbed land. Adsorbent mats for spills. Removal of contaminated soil.
Surface and groundwater	Contamination of surface and groundwater due to spills or inproper waste handling. Increased turbidity of surface water.	Direct and indirect/Local/ Reversible	X			Adsorbent mats for spills. Removal of contaminated soil. Careful handling and storage of fuels and chemicals. Proper maintenance of vehicles and machinery. Proper waste mangement practices. Correct timing of construction works near the river, use of silt ponds.
Air quality	Increase of emissions and dust	Direct/Local/ Irreversible	X			To use new vehicles and machinery, proper maintenance, use of catalysators. Turn off motors when possible. Low speed driving. Water sprinkling on dusty surfaces.
Noise and vibrations	Noise due to traffic and working equipment, noise and vibrations due to blasting of rock	Direct/Local/ Irreversible	X			Regular maintenance of vehicles and construction equipment, use of exhaust silencers. Working only during daytime. To use personal protective devices. To apply protection zones to habitation when blasting works are done.

Environmental attribute	Potential impacts	Nature of impact	Magnitude			Mitigation measures
			Low	Medium	High	
Ecological resources						
Terrestrial vegetation	Loss of vegetation	Direct/Local/ Reversible	X			Replanting. To avoid cutting of trees.
Terrestrial fauna	Disturbances to animals	Direct/Local/ Reversible	X			Working only during daytime. Installation of bird rejectors on towers. To avoid blasting works near Natural Reserve areas.
Aquatic ecology	Increased turbidity	Direct/Local/ Reversible	X			Timing of construction works near the river, use of silt ponds.
Human environment						
Land use/acquisition	Temporary and permanent restrictions in land use	Direct/Local/ Reversible and irreversible	X			Construction activities after crop harvesting. Selection of few access roads. Compensation to Affected Households.
Waste disposal	Littering, contamination of soil, ground and surface water, health and safety hazards	Direct/Local/ Reversible	X			Proper waste management practices: waste separation,, recycling, reuse, proper storage and disposal. Special procedures for PCB and TCB containing oil and used batteries. Use of dry toilets.
Health and safety	Occupational health issues, accidents	Direct/Local/ Reversible and irreversible	X			H&S training for workers. Provision of personal protective gear. Use of warning signs. To avoid blasting works near habitation. Analyses and removal of PCB/TCB containing oil, preparation of instructions for removal.
Socio-economics	Job opportunities. Beneficial impacts from the improvement of transmission line network.	Direct and indirect/Local and regional		X		N/A
Cultural sites	Archeological findings may be destroyed	Direct/Local/ Irreversible	X			Construction works are stopped if historical artifacts are found. Consultation of relevant authorities.
Traffic and transport	Increased traffic and traffic jams, increased accidents	Direct/Local/ Reversible	X			Ensure proper access roads, avoidance of high-density areas. Use of proper traffic signs and speed limits.

Environmental attribute	Potential impacts	Nature of impact	Magnitude			Mitigation measures
			Low	Medium	High	
Operation and maintenance						
Environmental resources						
Noise	Noise from transformers and corona discharge (wires)	Direct/Local/ Irreversible	X			Careful planning of the structures.
Electric field	Impact on health	Direct/Local/ Irreversible	X			To follow the national and IFC guidelines.
Soil	Soil contamination due to spills	Direct/Local/ Reversible	X			Careful execution of maintenance works of transformers. Installation of transformers on impervious area.
Ecological resources						
Terrestrial fauna	Bird deaths	Direct/Local/ Irreversible	X			Use of bird rejectors on towers.
Human environment						
Health and safety		Direct/Local/ Reversible and irreversible	X			H&S training for maintenance personnel.
Decommissioning						
Environmental resources						
Soil	Soil contamination due to spills		X			Adsorbent mats available. Removal of contaminated soil. Special care when handling PCB containing oil.
Human environment						
Waste disposal	Littering, contamination of soil, ground and surface water.	Direct/Local/ Reversible	X			Proper waste management practices: waste separation, recycling, reuse, proper storage and disposal. Special procedures and instructions for PCB/TCB containing oil (analyses, removal) and used batteries.
Health and safety	Occupational health issues, accidents	Direct/Local/ Reversible and irreversible	X			H&S training for workers. Provision of personal protective gear. Use of warning signs.

433. A comprehensive table of environmental concerns, performance indicators and monitoring details (Environmental Monitoring Plan) is presented in Annex 8.

b. Environmental Management Budget

434. The Consultant produced a complete detailed financial assessment of all the components of the Project. Mercados EMI has been collecting information (on overall Project costs) and performing engineering analysis on their breakdown, having developed a database, which is usually utilized to give advice for preliminary budget planning, along with budgeting of the EMP.

435. The preliminary cost estimate for Environmental Management is **250,000 USD** including monitoring and supervision of EMP. It should be noted that, according to the local regulations and standards for the preparation of the projects, detailed and more precise costs estimates and budget for the EMP shall be defined in the Feasibility Study Report, prepared in accordance with local legislation, which in turn shall be an integral part of the bidding documents.

c. Unanticipated Environmental Impacts

436. Where unanticipated environmental and/or social risks and impacts become apparent during project implementation that were not considered in the IEE, EMP and LARP, PMC shall immediately inform PMU/Uzbekenergo for further informing ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan being taken. If found necessary the environmental assessment and EMP shall be updated or a new environmental assessment and EMP shall be prepared by PMC to assess the potential impacts, evaluate alternatives, and outline mitigation measures and resources to address those impacts.

d. Reporting of Environmental Monitoring Results

437. As per ADB's Safeguards Policy Statement 2009, ADB requires the borrower to prepare and deliver environmental monitoring reports.

438. Uzbekenergo shall ensure that any actual or potential breach of compliance with the measures and requirements set forth in the EMP and LARP are reported promptly after becoming aware of the breach.

439. It's anticipated that the Contractor's Environmental Safeguard Specialist will constantly monitor construction process in terms of compliance with environmental safeguards on the sites (in accordance with EMP) and submit monthly Safeguard Monitoring Reports to PMC. Based on those reports, PMC will prepare monthly and quarterly Safeguard Monitoring Reports (Environmental Monitoring Report and LARP Implementation Report) including the progress of the implementation of the Environmental Management Plan (EMP) and submit to PMU. These reports shall contain all discrepancies from the EMP and LARP and list all HSE relevant incidents and accidents that occur during the implementation of construction measures. Monthly and Quarterly Safeguards Monitoring Reports (or other ad hoc reports when required) shall be delivered to relevant local and regional authorities when requested.

440. Based on these monthly reports and on own construction site audits the PMC together with PMU will prepare semi-annual performance and monitoring reports (Safeguards Monitoring Reports: Environmental Monitoring Report and LARP Implementation Report) and submit them to ADB. Relevant information from such reports to affected persons should be disclosed promptly upon submission. The purpose of these reports is to verify whether sound environmental management practices are applied and set environmental targets are achieved, and LARP implementation realized. In case the implementation of EMP and/or LARP measures is not satisfactory, external monitoring expert will recommend actions to enhance environmental and social compliance.

441. Semi-annual Safeguards Monitoring Reports shall be submitted also to local SCNP, as requested by the central SCNP, by PMU.

442. Environmental Monitoring Report should include comments of observed performance indicators defined in EMP with indicating locations, describing conducted activities on EMP implementation during construction works.

443. LARP Implementation Report should include comments on proposed actions presented in LARP.

444. The format for the semi-annual Safeguards Monitoring Reports will be prepared during project implementation by the Safeguards Specialist (PMU) in accordance with template recommended by Consultant and approved by PMU. The format may have to be refined during implementation to incorporate all monitoring findings and lessons learned.

445. The Contractor has the responsibility to report PMU and PMC monthly of performance against EMP and SEMP. These reports may be based on Project Engineer's worksite diaries. In case of incidents, accidents and deviations from EMP, the Contractor should report to PMU and PMC immediately.

446. To ensure public disclosure and maintain the right of involvement on decisions and control of the appropriate implementation of the EMP and monitoring, representatives of relevant nongovernmental organizations and other stakeholders should work in close cooperation with other parties and should be entitled to receive semi-annual reports as a minimum requirement.

I. INSTITUTIONAL ARRANGEMENTS

Project Institutional Framework

447. Uzbekenergo is the Executing Agency for the Transmission Project. Uzbekenergo has established a full-time Project Management Unit (PMU) headed by the Project Director. The PMU will administer all consulting and procurement contracts on behalf of Uzbekenergo. It will be responsible for preparing project plans, bid evaluation reports, progress reports, applications for withdrawal of funds, and any other required reports to ADB.

448. PMU will hire Environmental Safeguards Specialist who will be responsible for the following:

(i) Ensure that project each bidding documentation and contract document particularly for construction transmission line, sub-stations, and other civil works associated with project, includes environmental requirement as stated in the EMP;

(ii) Work closely with PMC to update EMP if necessary, and disseminate to the relevant parties to ensure implementation of updated EMP;

(iii) Assist to Consultant in organizing trainings on EMP implementation and topics;

(iv) Monitor the implementation of EMP and prepare environmental monitoring reports for semiannual submission to ADB;

(v) Coordinate with the Nature Protection Committee, the Environmental Engineer of Nature Protection Department within Uzbekenergo, and relevant civil society organizations, if any, to undertake joint monitoring at least 2 times/year during the construction phase prior to preparing the semiannual environmental monitoring reports.

(vi) Work closely with Contractor's Supervisor (Project Engineer), monitor (cross check) and supervise the Contractor in implementing EMP.

(vii) Organize conducting of air, water, soil quality analysis and EMF measurements if found necessary;

(viii) Monitor implementation of GRM. Organize mediation meetings between the complainers and the Contractor.

(viii) Work closely with PMC's Environmental Safeguard Specialist in order to ensure that EMP is implemented by the Contractor.

449. PMU will hire also a Resettlement Specialist who will be responsible for the follow-up of the LARP.

450. Uzbekenergo will recruit a Project Supervision and Management Consultant (PMC) who will assist PMU in EMP implementation. PMC's tasks are to review existing designs, supervise the works of the suppliers and Contractors and ensure successful commissioning. The PMC will be responsible for review of the designs and will assist the PMU in planning, as well as developing and implementing comprehensive project management plans, to ensure the most efficient, timely, and economical implementation of the project.

451. For the environmental and social monitoring of the project implementation, PMC will include also Environmental and Social Safeguard Specialists (international and local) whose specific tasks include the following:

- Revision and update of EMP, EMoP and SEMP
- Reporting to Uzbekenergo/PMU, ADB
- review of the results of the PMU Environmental Safeguards Specialist's monitoring of Contractor's performance against the requirements of the EMP

452. Moreover, in terms of environmental protection, social and H&S issues during project implementation the PMC's Environmental Safeguard Specialists will be responsible for the following:

(i) oversee the Project tender evaluation process to ensure that appropriate commitments regarding environmental and social safeguards are included in tender documents and tenders;

(ii) Ensure that the Environmental Management and Monitoring Plans (EMP, SEMP and EMoP) for the project submitted by the Contractor are adequate and are in accordance with the initial environmental examination (IEE);
(iii) Identify any problem areas during project implementation, proposing remedial action report of any outstanding issues to the executing agency;
(iv) Coordinate safety measures between live components in operation and components under construction. Giving advice and, when required, provide training to the executing agency on safety planning and safety measures.

453. A Resettlement Specialist will be hired also to PMC to follow the implementation of LARP and to report to PMU.

454. The implementation of EMPs has to be carried specifically following the Project implementation schedule. Contractor and its Project Engineer will be responsible for ensuring compliance with the requirements of the IEE and EMP's implementation on the construction sites. Moreover, Contractor must prepare a Site Specific EMP (SEMP) which covers mitigation actions needed during different stages of the Project in different sites in detail.

455. The Contractor shall also ensure that all subcontractors similarly comply with EMP.

456. The Contractor is responsible to prepare separately the following plans: Temporary Pedestrian and Traffic Management Plan, Waste Management Plan, Emission and Noise Control Plan, Waste Management Plan, and Health & Safety Plan.

457. The Project Engineer's field books, construction log book, minutes of the weekly meetings, and periodic reports are important documentation on the implementation of the EMPs. Also Project Engineer is responsible for conducting necessary water, air, soil quality monitoring during construction site.

458. ADB and the project owner may perform field inspections from time to time to check the implementation of the EMPs but they could not be expected to be on the construction site all the time. ADB and the project owner requires periodic reporting on the implementation of the EMPs.

Institutional Framework for Environmental Control

459. The parties accomplishing environmental control are:

- Specially authorized government bodies, public authorities – regarding the state environmental control;
- Bodies of the public and economic board – regarding departmental environmental control;
- Legal entities (economic entities) – regarding production environmental control;
- Non-government non-profit organizations, self-government institutions of citizens, other institutes of civil society, mass media and citizens – regarding public environmental control.

- The Cabinet of Ministers of the Republic of Uzbekistan provides realization of a uniform state policy in the field of environmental control, claims and realizes state programs in this area.

460. Specially authorized government bodies in the field of environmental control are: The Nature Protection Committee of the Republic of Uzbekistan (Goskompriroda), Ministry of Health of the Republic of Uzbekistan, the State inspectorate for supervision of geological studying of a subsoil, safe operation in the industry, mining and household sector under the Cabinet of Ministers of the Republic of Uzbekistan, the Ministry of Internal Affairs of the Republic of Uzbekistan, the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan, the State Committee of the Republic of Uzbekistan on land resources, geodesy, cartography and the state cadastre.

461. Specially authorized government bodies in the field of environmental control shall:

- perform the state environmental control and inter-industry control in the field of environmental protection, use and reproduction of natural resources in interaction with state governing bodies, and also with non-government non-profit organizations, self-government institutions of citizens, other institutes of civil society, mass media and citizens;
- give methodical help and assistance to non-government non-profit organizations, self-government institutions of citizens, other institutes of civil society, mass media and citizens in implementation of public environmental control;
- provide creation of effective system of supervision and the early prevention, identification of emergency situations which can lead to environmental pollution, to irrational use of natural resources, and also create threat to life and health of citizens.

462. The tasks allocated to SCNP by the law 'On Environmental Impact Assessment' are as follows:

- manage and monitor compliance with the State's Environmental Impact Assessment procedures
- review and approve of Environmental Impact Assessments
- monitor implementation of conditions specified in the Environmental Impact Assessment approval
- control over the execution of the state environmental expertise.

463. The rights of non-government non-profit organizations, other institutes of civil society and mass media in the field of public environmental control are the following:

- to inform specially authorized government body in the field of environmental control about the revealed violation of requirements of the nature protection legislation;
- to send to law enforcement agency the message on the revealed offense in activity of the legal entity and citizen, rejection of measures for elimination of an offense by them;
- to appeal with the claim to court in connection with illegal actions (decisions) of the official and citizen interfering implementation of public environmental control.

464. The rights of self-government institutions of citizens in the field of public environmental control are:

- to form in settlements, kishlaks and auls, remote from the regional center, the administrative commission on consideration, including, cases of administrative offenses for violations of the property rights to natural resources, violations of the rules of protection of water resources, non-compliance with requirements for protection of atmospheric air, violation of nature protection requirements during the transporting, placement, utilization, burial of household waste;
- to make proposals in appropriate authorities on accountability of officials for non-execution or inadequate execution of the decisions of self-government institutions of citizens made on environmental issues and environmental protections.

465. The rights of citizens in the field of public environmental control are the following:

- to inform specially authorized government bodies in the field of environmental control on the violation of requirements of the nature protection legislation found by them.

466. The rights of the public inspector of environmental control are:

- to carry out supervision over observance by legal entities and individuals of the nature protection legislation;
- to prepare the appeal of self-government institutions of citizens for the legal entity and individual with the requirement about elimination of violations of the requirements of the nature protection legislation revealed at implementation of public environmental control on minimization of the harm caused to environment, with the warning of deterioration of an ecological situation;

467. Coordination of activity and methodological management in the field of public environmental control is performed by "The Ecological Movement of Uzbekistan" (resides in the Parliament). "The Ecological Movement of Uzbekistan":

- to carry out coordination of activities of the non-government non-profit organizations operating in the sphere of environmental protection and also renders assistance and the methodical help to other institutes of civil society, to mass media and citizens in implementation of public environmental control.

468. The forms of realization of results of the state, departmental and industrial environmental control can be:

- issue of the instructions to the legal entity and individuals about elimination of the revealed violations of requirements of the nature protection legislation;
- pronouncement of the resolution on restriction or temporarily interrupt of economic or other activity of the legal entity (economic entity) for the term of no more than ten working days in connection with violation of requirements of the nature protection legislation by them;
- an appeal to the court with claims for restriction, suspension of the economic or other activity of the legal entity (economic entity) making harmful effects on health or conditions of accommodation of people, on natural resources, the protected natural territories or creating threat of emergence of such impact on term more than ten days, and at impossibility of elimination of the reasons of harmful effects - on termination or changing of the profile of such activity, and

also about indemnification (damage) caused to environment or its separate objects and health of citizens;
- directing the issue to law enforcement agencies, proposals to the head of the subordinated organization and the legal entity respectively about accountability of the persons violating requirements of the nature protection legislation;
- publication of results of the state environmental control in mass media and provide the state governing bodies, specially authorized government bodies in the field of environmental control, non-government non-profit organizations, self-government institutions of citizens, and also citizens, the information on conditions and changes in environment, forecasts, use of natural resources, influence of factors of environment on health of citizens and the taken measures for elimination of consequences of negative processes.

469. Duties of the responsible persons accomplishing industrial environmental control are:
- to make up the result of check by act (certificate) one copy of which to submit to the head of the legal entity;
- to observe the term of carrying out and review frequency according to the plan schedule of control of the legal entity;
- not to create an obstacle for functioning of the organization;
- to provide observance of the state, trade and other secrets;
- to take the responsive measures provided by the legislation in cases of identification of violations of requirements of the nature protection legislation.

470. Disputes in the field of the organization and implementation of environmental control are resolved in the order established by the legislation. The legal entities and individuals found guilty in violation of the law about environmental control, bear responsibility in accordance with the established procedure.

J. GRIEVANCE REDRESS MECHANISM

471. During the Project construction, operation, abandonment and emergencies affected households could suggest relief or complain to the authorities to remove the source of their problem and to seek compensation if necessary. A grievance mechanism will be available to allow any affected party appealing any disagreeable decision, practice or activity. Affected households will be fully informed of their rights and of the procedures for addressing complaints whether verbally or in writing.

472. Grievance Redress Mechanism is in accordance with the law of the Republic of Uzbekistan “On Ecology control”, dd. 12.11.2013.

473. The AHs will have the right to file complaints and queries on any aspect of environmental impact in their area. The UE will ensure that grievances and complaints on any aspect are addressed in a timely and satisfactory manner.

474. The National law on the appeals of individuals and legal entities (Republic of Uzbekistan Law on the appeals of individuals and legal entities, №3РУ-378, 03.12.2014) obliges

state authorities to deal with appeals and provides clear framework to handle the case. This law has recently replaced previous Law on the appeals of citizens and gives the right for individuals and legal entities to file appeals. The appeals can be in the form of applications, proposals and complaints and submitted in three ways: oral, written and digital format.

475. A Grievance Redress Mechanism should be developed for the Project. The Grievance Redress Mechanism (GRM) will be secured by web based Single Portal (The Single interactive state services portal www.my.gov.uz). The Single portal is designed to facilitate and empower people to access online public services by using modern information technology. The main objectives of the Single portal are:

- Enabling people to file appeals directly to government agencies;
- Integration of the people with other projects in the field of information and communication technologies;
- Improving the efficiency of people interaction with public authorities;
- Reduction and elimination of bureaucratic obstacles and barriers for people when applying to public authorities;
- Assist in the further development of "e-government" and the introduction of modern information technologies to public administration.

476. All possible avenues are made available to the AHs to resolve their grievances at the project level. However, AHs are free to address their complaints to the courts at any time and not only after using the GRM. Under the proposed project level grievance mechanism, AHs may appeal any decision, practice or activity connected with environmental impact taking place from the construction of TL.

477. All AHs will be informed of the procedures they can follow to seek redress.

478. The PMU of the UE will establish a simple and accessible GRM. The GRM provides a number of avenues and levels for grievance resolution and appeals process. The main objective behind project specific grievance mechanism is to ensure timely and user-friendly solution to the complaints received from the AHs. However, the Project GRM does not prevent any AH to approach the governmental legal system to resolve their complaints at any stage of the grievance redress process. The AHs can address their complaints to the courts at any time and not only after using the GRM.

479. Level 1 (Mahalla / Village Assembly). Under this project grievance redress mechanism, complaints can be submitted to the makhalla, village assembly of citizens, farmer councils or directly to UE. The makhalla/village assembly will try to resolve or clarify the issue within 15 days. Unresolved issues will be referred to the Nature Protection Committee.

480. Level 2 (Nature Protection Committee – district inspector). The inspector will try to resolve or clarify the issue within 15 days. Unresolved issues will be referred to the PMU.

481. Level 3 (North-West Main Power Network - NWMPN). NWMPN will be the entry point for receiving complaint or known as a Grievance Focal Point (GFP). In case, complaint is submitted to the GFP, the GFP will establish a contact with the UE and its PMU, makhalla and other bodies such as village assembly of citizens, farmers councils of which AH are members and will try to resolve the issue within 15 days.

482. Level 4 (Project Management Unit). The UE through its PMU on a regular basis (weekly) and as per immediate request will check with the GFP whether any complaint is received by GFP. The PMU, on receipt of a complaint from GFP or any other local bodies, will immediately take the following actions:

(i) Will inform the complainant within 5 days;
(ii) Inform ADB office both resident mission and HQ;
(iii) If required, establish complaint handling team with members Head of PMU, representatives from the UE, District Khokimiyat, Land Resources and Cadastral Department, and Mahalla or Village Assembly of Citizens or/and Farmer's Councils, or/and Women's Association.

483. The team will be headed by one of the UE management staff designated for handling grievances of the project.

(i) The team will consult the complainant and gather complainant's concerns;
(ii) The team will also take advise from independent valuator (in case of grievances related to valuation);
(iii) All complaints will be resolved in 15 days, and in case additional details are required, a maximum of 30 days will be used to resolve and close the complaint;
(iv) If complaint is not resolved by Project Grievance Mechanism Team, the PMU will inform ADB and District Khokimiyat regarding the issue.

484. Level 5 (District or Provincial Khokimiyat). If a grievance is not resolved within 30 days, the complainants or her/his representative can submit its complaint to the district or Provincial Khokimiyat. The district or Provincial Khokimiyat will also have 15 calendar days to resolve the complaint.

485. Level 6 (Court). If the complaint is still unresolved, the complainant can submit his/her complaint to the appropriate court of law.

486. The PMU will be responsible for recording the complaint, the step taken to address grievance, minute of the meetings, and preparation of a report for each complaint. The complaint handling process will be reported to ADB through the quarterly project implementation report.

K. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

487. Three consultation meetings with the Affected Households (AHs) have been organized during Project preparation. Apart from the AHs, the participants in these public consultations included representatives of villages, District Khokimiyat, makhalla, water users' association, environmental protection, farmers' association, power supply network, forestry and land cadastre.

488. The key objectives of the consultations were to discuss: (a) Environmental impacts of project implementation; (b) Mitigation measures and activities; and (c) Grievance redress mechanism (GRM). The venue of the consultations and information about participants are summarized in Table 10.

Table 10.Summary of Consultation Meetings

Meeting	Locations	Number of participants	Participants
1	Karakalpakstan, Nukus City Khokimiyat	48	Affected Households, Representatives of District Khokimiyat, makhalla, water users' association, environmental protection inspection, farmers' association, power supply network, forestry, land cadastre.
2	Khorezm province, Urgench city, office of province branch of Uzbekenergo	42	Affected Households, Representatives of District Khokimiyat, makhalla, water users' association, environmental protection inspection, farmers' association, power supply network, forestry, land cadastre.
3	Khorezm province, Urgench District Khokimiyat	72	Affected Households, Representatives of District Khokimiyat, makhalla, water users' association, environmental protection inspection, farmers' association, power supply network, forestry, land cadastre.

489. During the consultation meetings the participants raised important questions. The questions/queries were related to various environmental impacts of project implementation that might affect their households as well as entitlements, mitigation measures, some out of topic questions on compensation payments. Furthermore, meeting included discussion of GRM. Table 11 below presents the main queries raised and the responses.

490. The pictures of PCs and list of participants of the PCs are given in the Annex 9.

491. One page leaflets with Project information were disseminated via Makhalla representatives who earlier took part in Public Consultations. Leaflets included summary of project environmental impacts and EMP. As a result, communities were informed about the project, its environmental impacts and EMP; communities provided their understanding and agreed with the importance of the project for the whole area and had no objections for the planned activities.

492. Uzbekenergo is required to disclose IEE in local language for the stakeholders and public to meet the SPS requirements. A link of disclosure shall be sent to ADB.

Table 11.Main questions raised during the PCs

Queries	Responses
How long will be the distance between towers and distance to the nearest household?	All distances will be in accordance with norms (distance between towers 150-250 m, distance to the nearest household more than 25 m measured horizontally from a notional vertical plane at the outermost conduction wire). Actual distance will be clarified during detailed planning.
Could you please explain the process of cutting of trees?	Cutting down of the trees that fall under construction site would be in accordance with legislation, i.e. first to make an assessment of those trees, take an approval from local Khokimiyat. If trees belong for example to Forestry, compensations from Uzbekenergo to Forestry would take place before start of the construction.
What will be in case route needs to pass through cotton fields, what would be done with cotton?	Such cases would take place after harvesting; construction company would be instructed on this. In case of emergencies, all compensations would be covered by Uzbekenergo.
When construction of TL will start?	The construction commencement is planned for Q3 2016, although it's subject to change.
Would the towers installed close to households make influence/inference on mobile phones, TVs and other technical devices?	No. Tests showed no influence on technical devices.
Are all TL corners clear and is it 100% sure that our household buildings will not be broken?	All corners are clear and TL project is designed such that no buildings will be destroyed.
Would construction activities make impact on drinking water and soil of our households?	No. Construction activities would not make impact on pollution of water and soil. The Contractor will take appropriate measures to mitigate any impact thereto.

L. FINDINGS AND RECOMMENDATIONS

493. This Initial Environmental Examination was carried out during the planning stage of the Project. The potential environmental impacts were assessed in a comprehensive manner. The report provides a picture of all potential impacts associated with the Project's phases; preconstruction, construction, use and maintenance and decommissioning. Both OHL and substations are covered.

494. The overall impact on the environment will be typical of any construction project. The major concerns are noise, dust, and air emissions from heavy equipment used to construct the foundation, install the towers and string the conductors. Potential increase in soil erosion and turbidity of surface water from heavy equipment movement in right of way and excavation of the foundations could be properly addressed by compacting the soil, retaining and reusing the topsoil for sodding, and building, where necessary, of siltation basin or covering the soil stock pile or building of silt barrier. The Project construction period is estimated at 48 months and considering the project will cover 338.7 km, the impact on the environment is minimal.

495. By proper selection of the OHL route, resettlement of existing residence is not needed.

496. Land will be acquired both temporarily and permanently. The land that will be permanently acquired for the OHL is the portion used for OHL foundations. Part of this land is currently used for agriculture. The impacts of land acquisition has been studied and assessed. Land acquisition and resettlement plan has been prepared. A compensation strategy to Affected Households is developed and an implementation plan prepared.

497. If the existing land use is grassland and used for grazing, continued usage in this manner is encouraged as it will reduce the need for herbicides to control undergrowth and potential fire hazards. In areas where the existing land use is for gardens, the continued use is also encouraged subject to restriction on the type of plants, height, pruning, and clearances from the conductors.

498. Special attention is needed at the forest areas around the second crossing of Amu Darya River to avoid any unnecessary cutting of trees. Replanting may be used as a mitigation method.

499. Hazardous waste (PCB containing oil and batteries) procedures shall be carefully planned and relevant norms and guidelines followed.

500. It is recommended that plans such as Waste Management, Pedestrian and Traffic Management, Health and Safety and Emission and Noise Control will be prepared before preconstruction phase begins so that these can already be implemented as soon as the Project starts.

501. For the Project, the rehabilitation/construction of the substations and the construction of OHL, an Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) has been developed. These plans shall be integral part of the tender documents to the Project. The mitigation and monitoring measures shall be contractually enforceable clauses and relate to the bill of quantities and technical specifications.

M. CONCLUSIONS

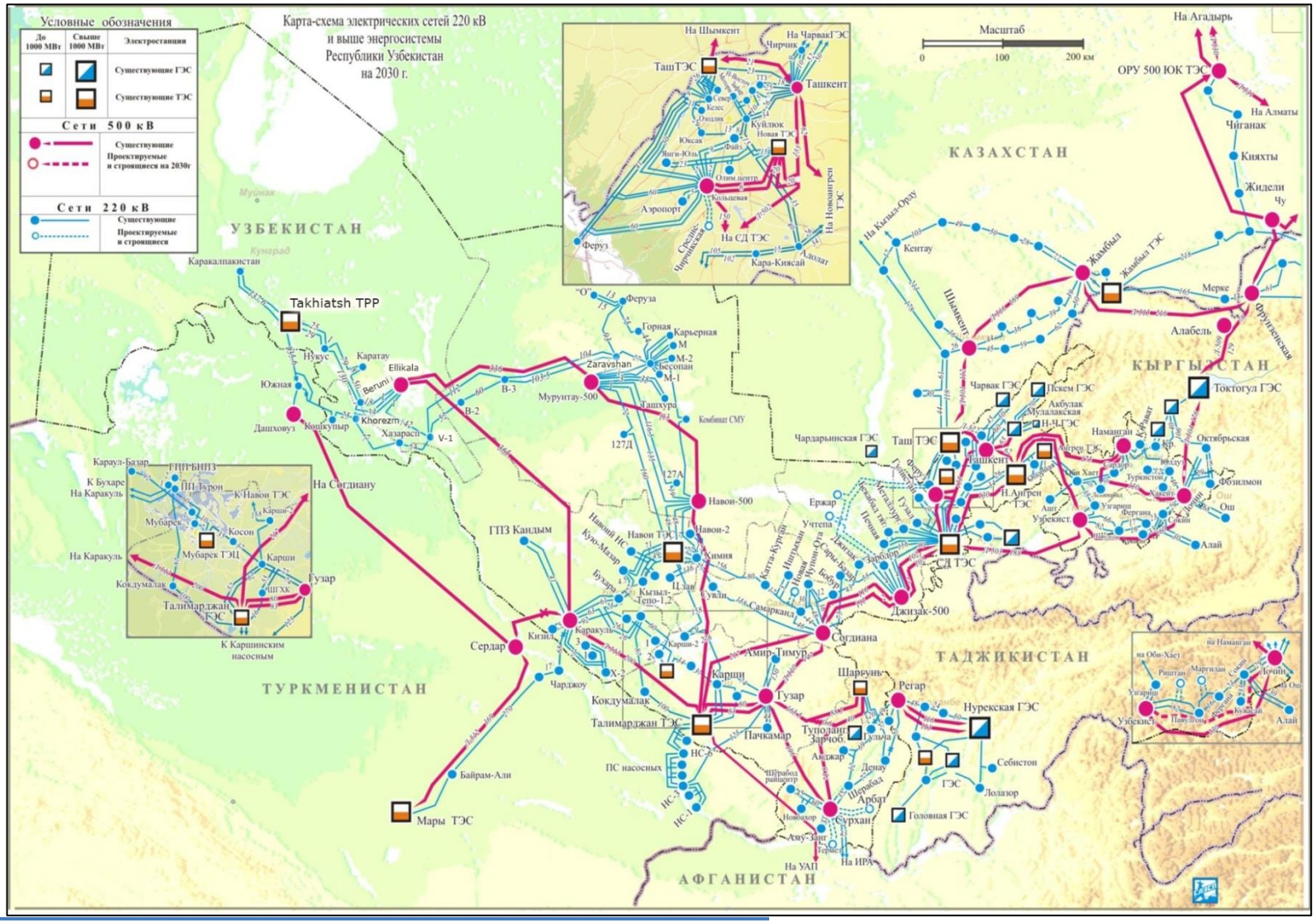
502. As a result of overall findings of this IEE it is concluded that the Project has only minor adverse environmental impacts (low magnitude). The minor impacts that are identified can be mitigated or managed in such a way that they are acceptable.

503. During the operation phase, the positive impacts are obvious and consist in a much more reliable power supply in Uzbekistan.

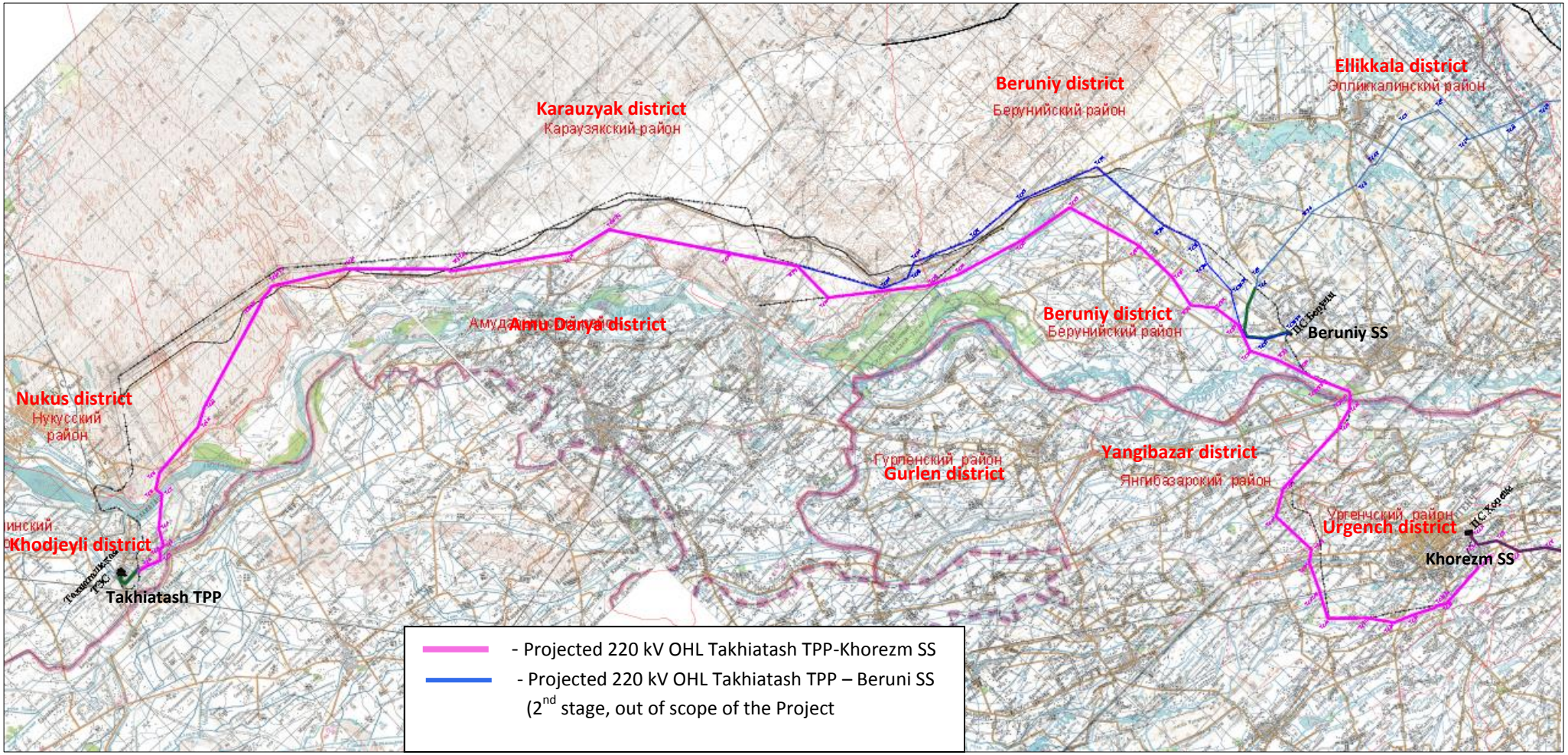
504. The proposed Northwest Region Power Transmission Project is feasible and sustainable option for power transmission from environmental and socioeconomic points of view. Implementation of Environmental Mitigation Plan, Environmental Monitoring Plan and Land Acquisition and Resettlement Plan is required. The EMP should be reviewed at the detailed design stage and throughout the Project.

ANNEXES

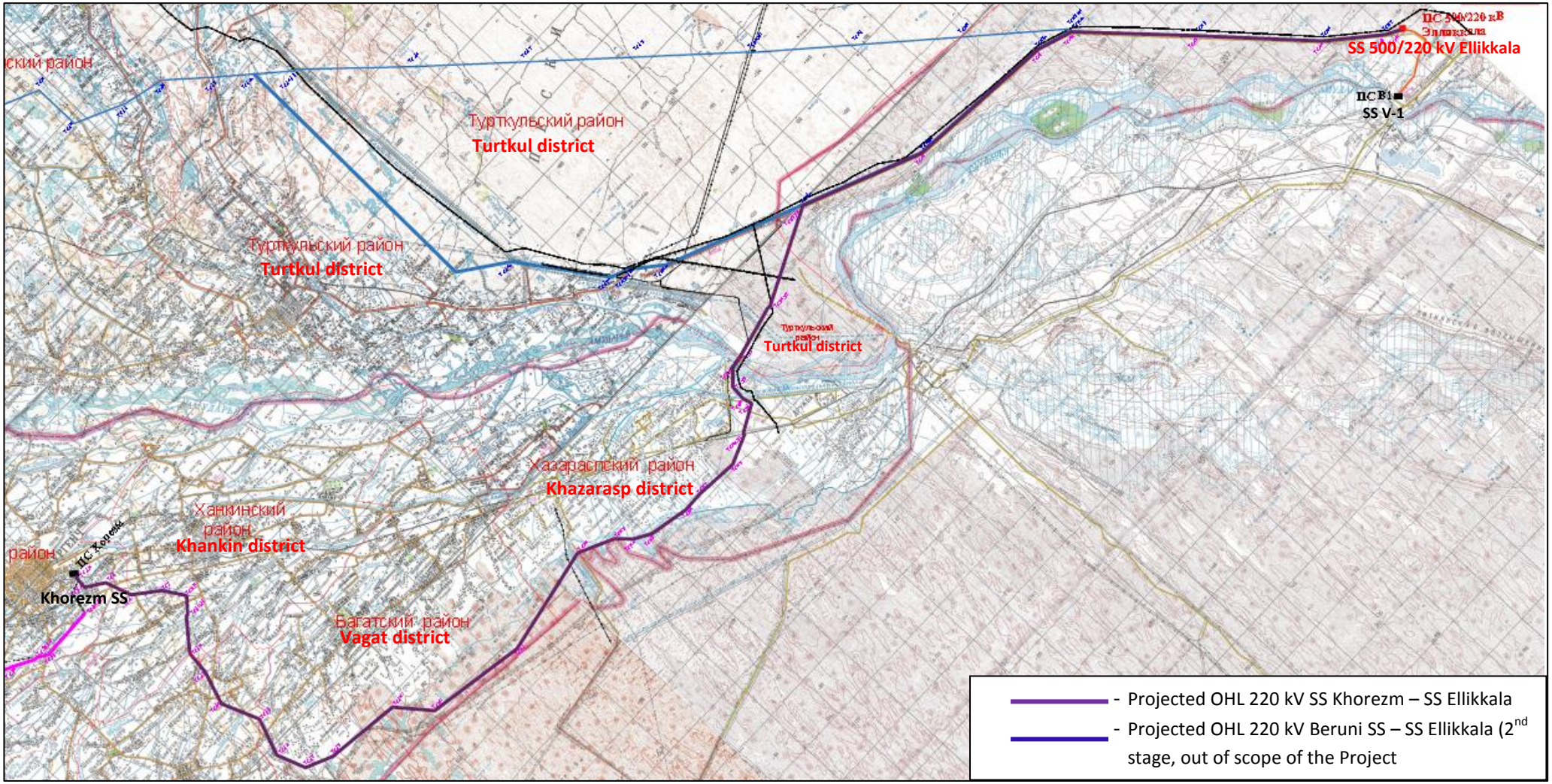
Annex 1. Transmission system of Uzbekistan with projected development till 2030



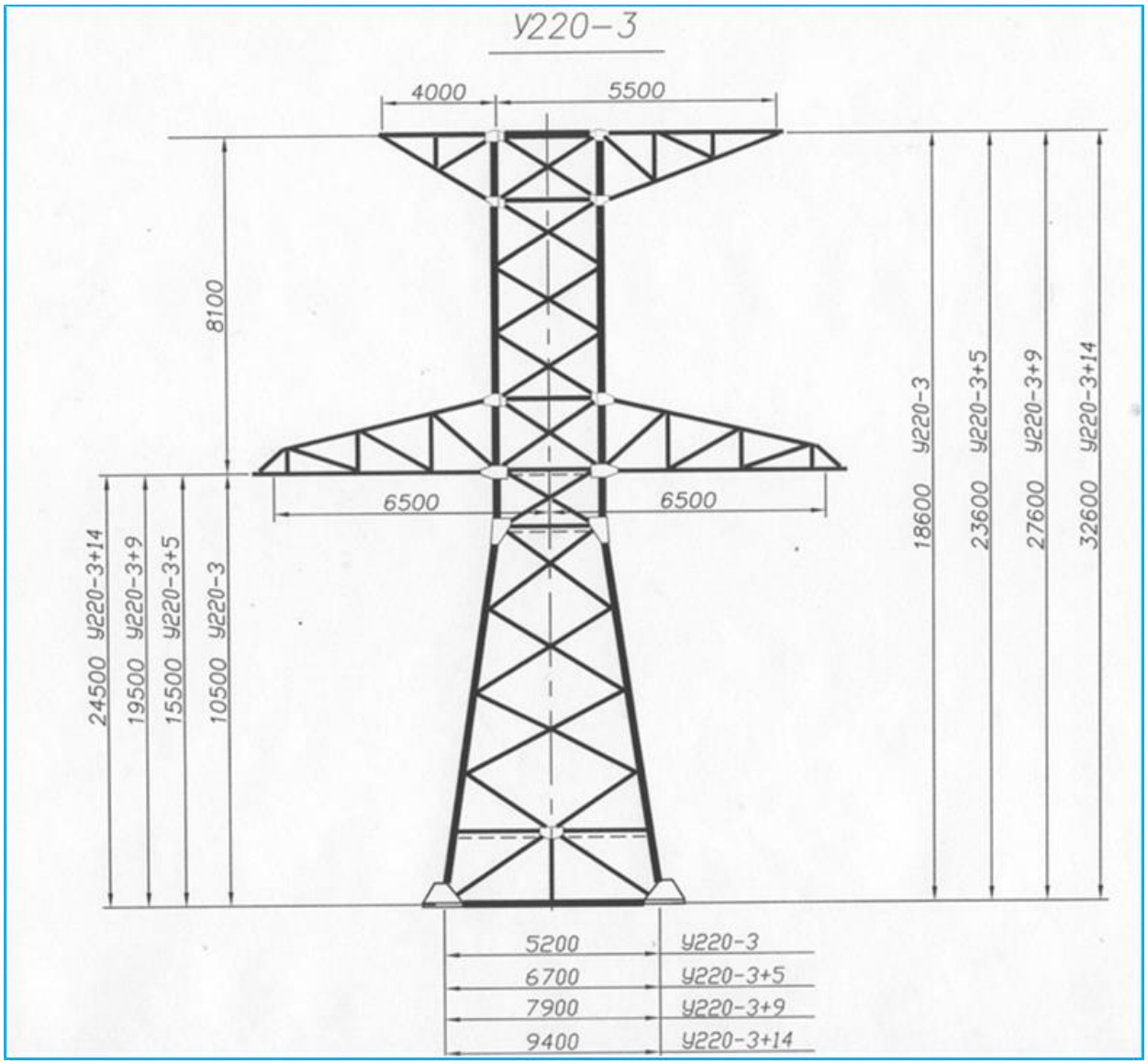
Annex 2. Proposed route of 220 kV transmission line Takhiatash TPP – Khorezm SS



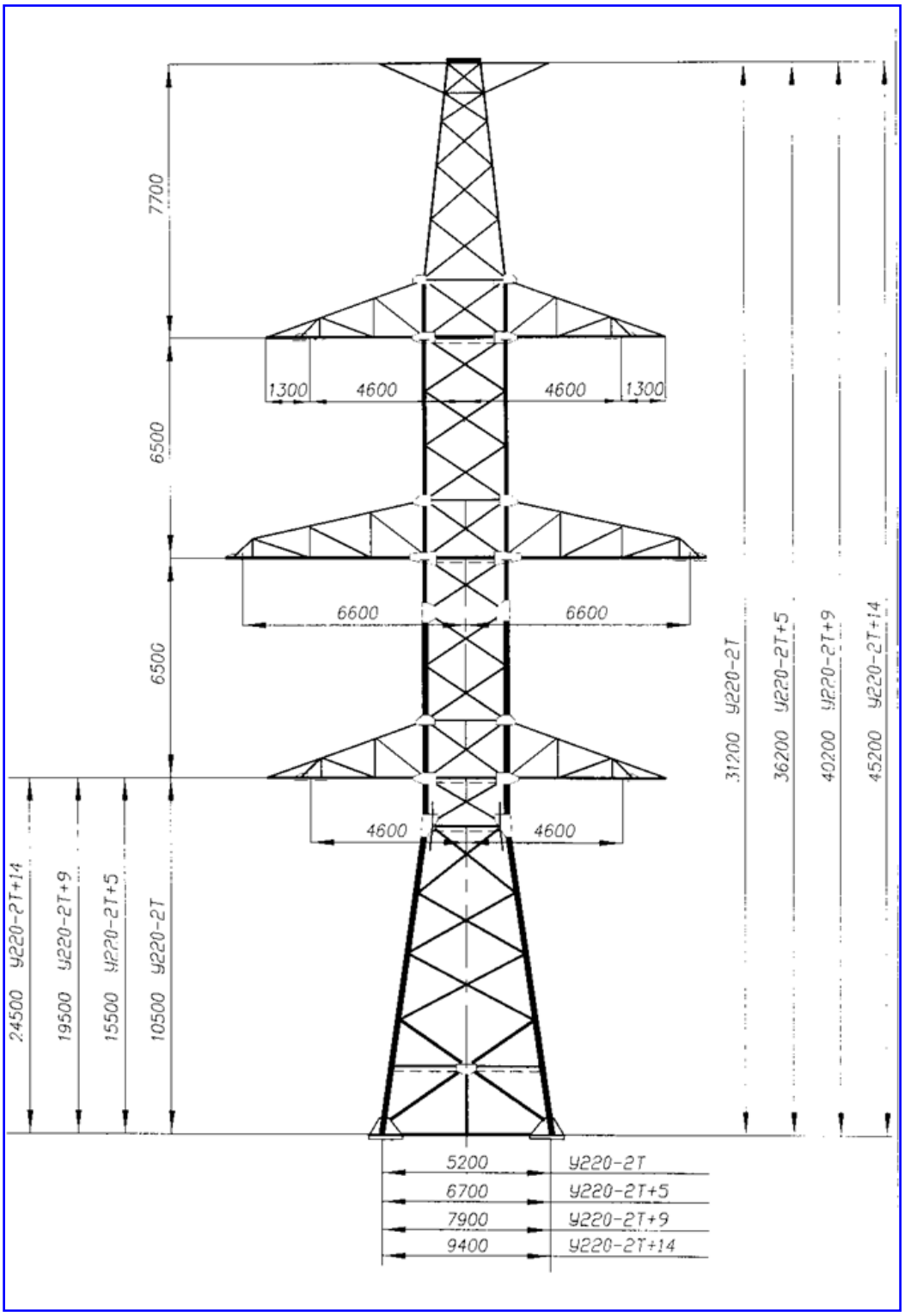
Annex 3. Proposed route of 220 kV transmission line Khorezm SS – Ellikkala SS



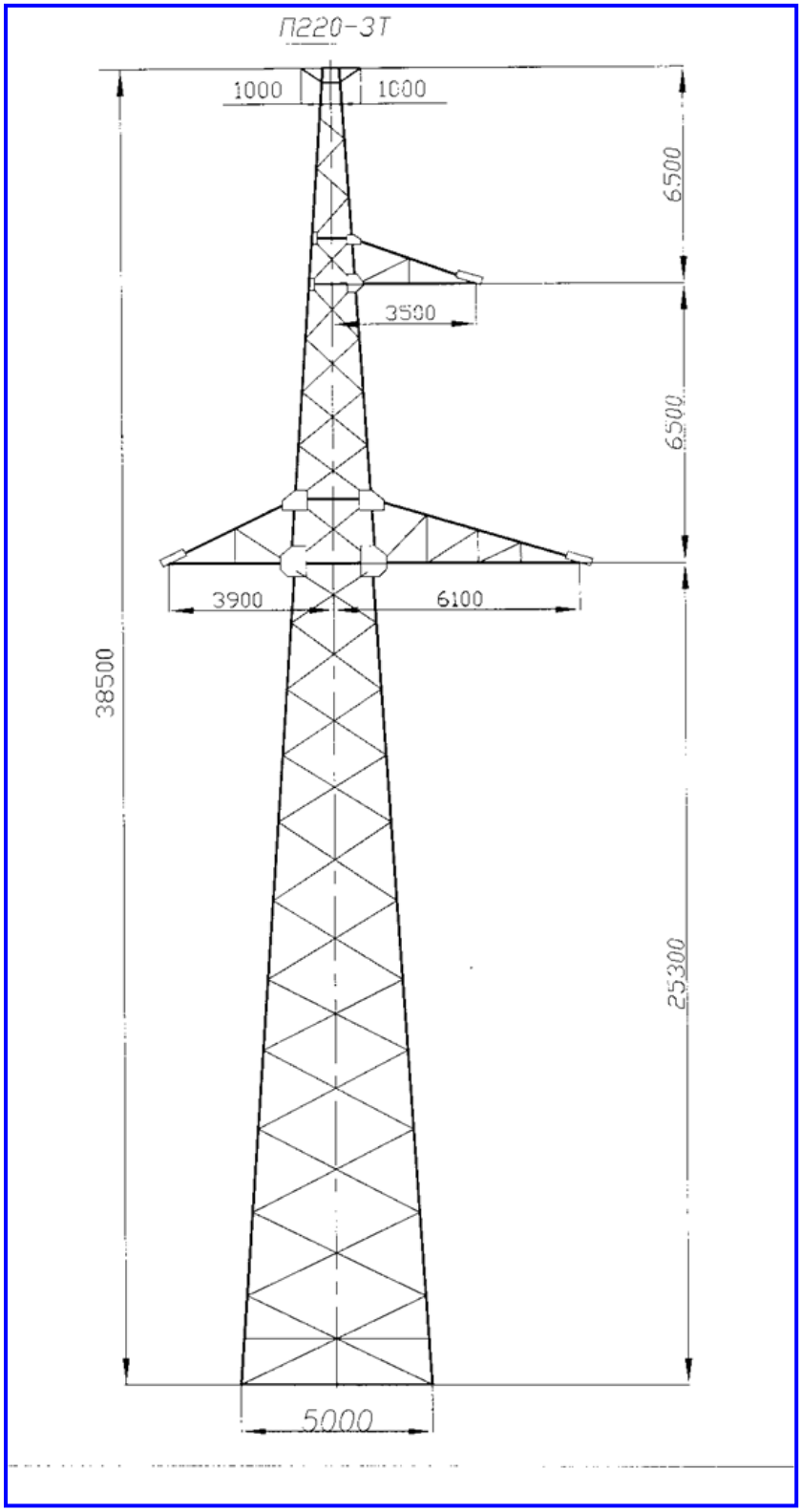
Annex 4. Drawings of towers, proposed for OHL



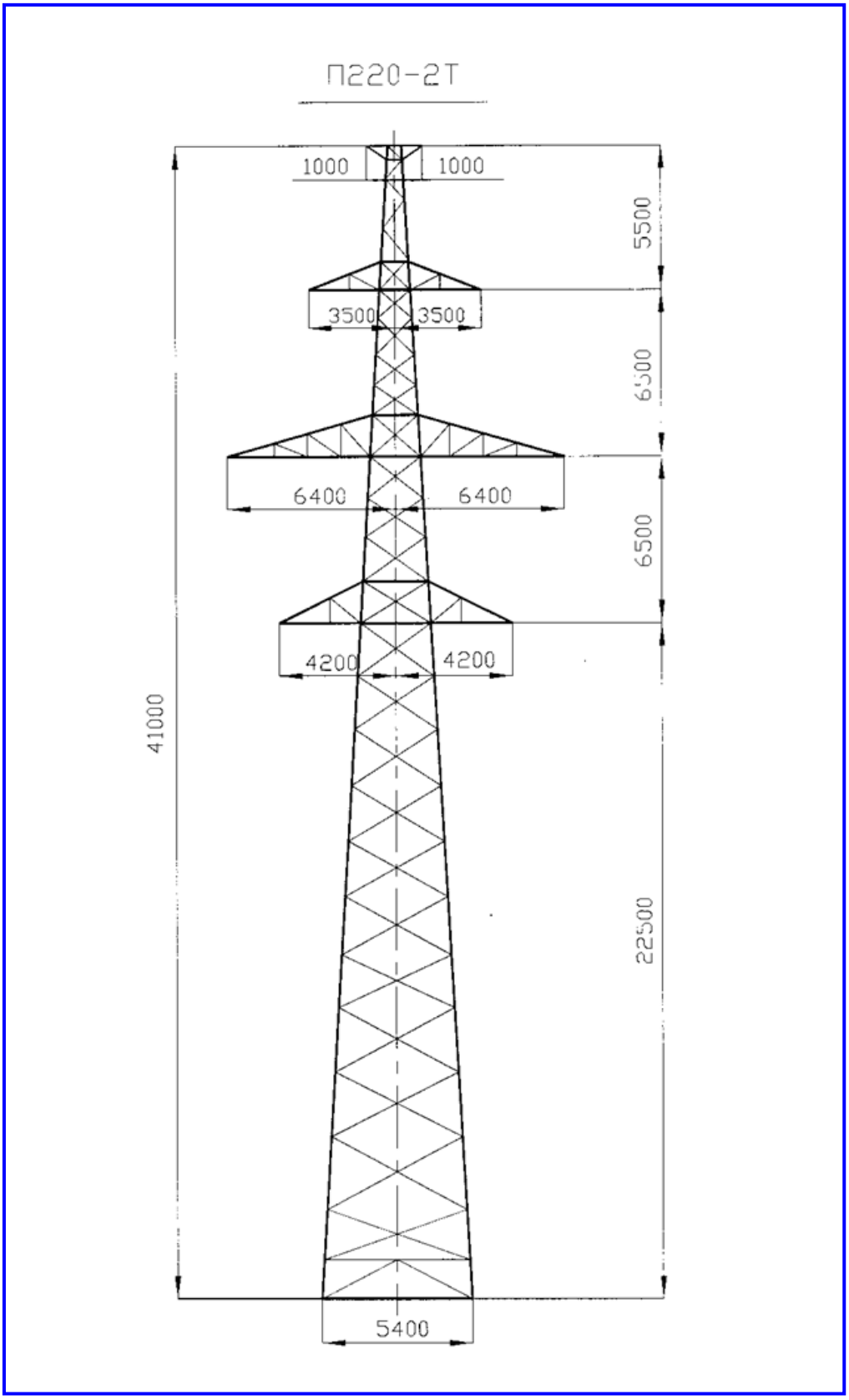
Angle/tension tower for single circuit section, type U220-3t



Angle/tension tower for double circuit section of the line, type U220-2T

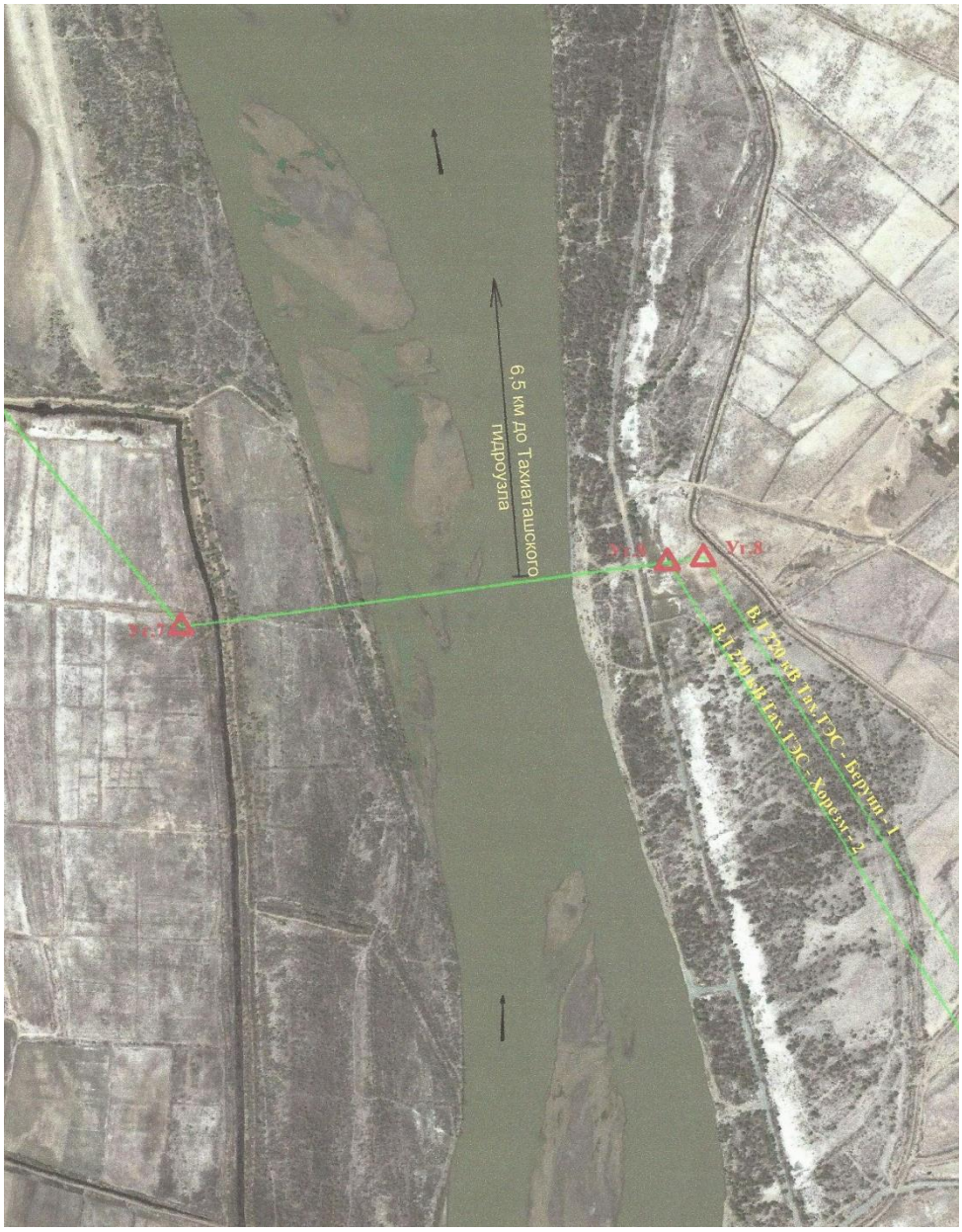


Alignment/suspension tower for single circuit section of the line, type P220-3T



Alignment/suspension tower for double circuit section of the line, type P220 – 2T

Annex 5. River crossings

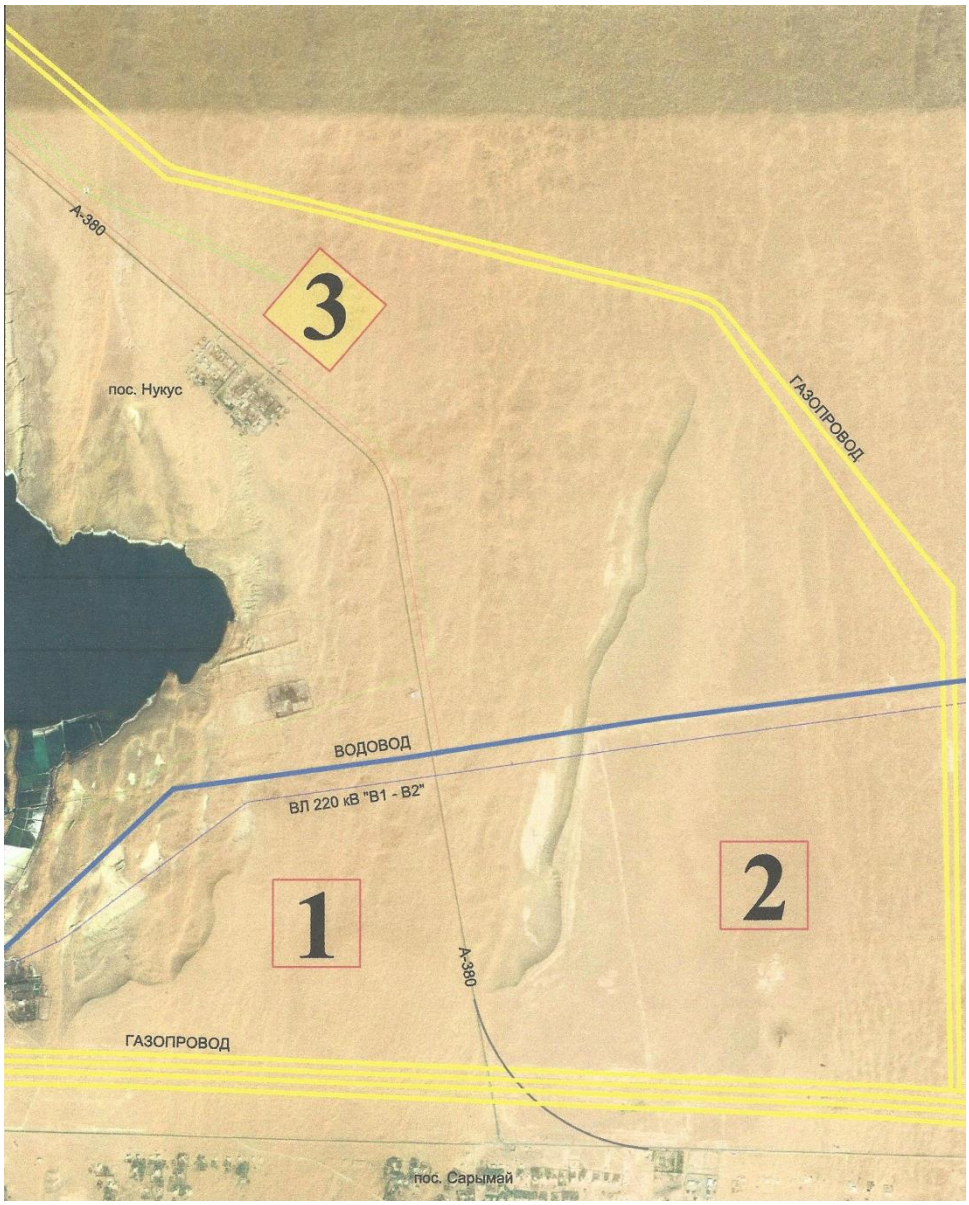


First river crossing of Amu-Darya River near Takhiatash TPP

Second river crossing of Amu-Darya River near Khorezm SS

Third river crossing of Amu-Darya River near

Annex 6. Proposed location for SS Ellikkala



Annex 7. 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 - Occupational Hazards, accidents	- 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 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	- Survey Team supervisor	- Included in Project's cost
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	- Uzbekenergo with PMU Safeguards Specialists	- Included in Project's cost

		and agriculture land		
CONSTRUCTION				
Substations				
Site clearance and levelling works	- Loss of topsoil	- Conserve and stock top soil separately for use in site landscaping	- Contractor	- Part of good practices
	- Increase in suspended solids and turbidity in receiving drainage systems	- Compact and cover excavated material stock pile especially during the rainy season	- ditto	- ditto
		- Add a silting basin at the end of the main drain prior to discharge.	- ditto	- ditto
	- Increase in air pollution from suspended particulates from soil carried and left on the road by trucks used in construction	- Wet or cover the excavated soil pile and dusty construction materials such as sand, lime etc. during the dry season to reduce dust	- ditto	- ditto
		- Wet the work area and other areas with exposed surfaces to reduce dust	- ditto	- ditto
		- Wash all truck wheels before leaving the site and all construction trucks should be properly covered while on transit	- ditto	- ditto
	- Grease and oil from leaks and spillage affecting the water quality and soil contamination	- 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	- ditto	- ditto
	- Noise from heavy equipment	- Fence the work area. All equipment should be provided with mufflers and noise reduction equipment	- ditto	- ditto
		- 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.	- ditto	- ditto
		- 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).	- ditto	- ditto
	- Items of archaeological or cultural significance accidentally discovered during earth moving and construction	- Provide personnel involved in earth moving and excavation one or two hour seminar on protocol to follow if 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	- PMU with participation from third parties	Cost included in Project budget

		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	- All equipment used must comply with the Uzbek emission laws.	- Contractor	- Good practices
	- Grease and oil from leaks and spillage affecting the water quality and soil contamination	- 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	- ditto	- ditto
	- Noise from heavy equipment	- All equipment should be provided with mufflers and noise reduction equipment	- ditto	- ditto
		- 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.	- ditto	- ditto
		- 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).	- ditto	- ditto
		- Preparation of Emission and Noise Control Plan.	- ditto	- ditto
	- Increase of traffic congestion in the construction area especially heavy transformers and equipment are delivered and installed	- Coordinate with the local authorities to reroute traffic and assign special personnel to direct the traffic. Preparation of Temporary Pedestrian and Traffic Management Plan.	- PMU and Contractor with participation from third parties	- ditto Cost included in Project budget
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).	- Uzbekenergo/PMU	- Good practices Storage and recycling of batteries: 30,000-50,000 USD
		- Transformer oil from old transformers and all oil from all equipment of SS Khorezm will be removed by Contractor and send to authorized organization for further utilization.	- Contractor	Analyses of oil: 500 USD/sample
		- 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.	- ditto	Transformer oil waste storage and handling 1,200 USD/ton
		- Construction of proper storage site for used oil.	- ditto	Cost included in Project budget
		- Change of batteries according to specific instructions	- ditto	
		- Preparation of Waste Management Plan	- Contractor	
Construction	- Soil contamination, health and safety	- Immediate change of PCB containing oil from <u>all</u>	- Uzbekenergo/PMU	- Good practices

	hazards caused by PCB containing transformer oil	transformers - Installation of new transformers without PCB containing oil, insulating oil shall comply with international standard IEC 60296		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	- Proof of age will be required prior to employment. Supervisors are to check the work done by women.	- Contractor with PMU Safeguard Specialist	- Good practices
	- Spread of contagious and communicable diseases by outside workers	- 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 check up.	- ditto	- ditto
	- Accidents, hazards and other work area related concerns	- 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.	- Contractor	- ditto
		- 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.	- ditto	- ditto
		- Workers should be properly briefed on proper work conduct, chain of command and responsibilities, and action to take during an emergency.	- ditto	- ditto
		- Key personnel will be trained on first aid. Periodic drills will be carried out.	- ditto	- ditto
		- Teams and personnel with good safety record will be properly acknowledged.	- ditto	- ditto Cost included in Project budget
Health and	- Emissions to air from circuit breakers	- Environmental conditions have to answer the norms	- Uzbekenergo/PMU	- Good practice

safety	(Eleigas)	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		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	- Good practice - ditto - ditto - ditto - ditto - ditto - ditto
Foundation works	- Construction of the foundation will disturb the soil causing erosion and loss of fertile topsoil.	- Mimimize removal of vegetation. - Topsoil will be segregated to sod and 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.	- Contractor - ditto - ditto - ditto	- Good practice - 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	- 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.	- Contractor - ditto	- Good practice - ditto

	river water.	- 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.	- ditto - Contractor - 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 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	- Uzbekenergo - State Natural Protection Committee and Ministry of Agriculture	- Revegetation 13,000-20,000 USD/hectare
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. - Use of herbicides should be avoided. -	- Contractor - ditto	- Good practice - ditto -

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 be properly collected, packed and stored in a secure place if there are no disposal facilities for toxic and hazardous wastes	- ditto - Contractor - ditto - ditto	- Standard good practice - ditto - ditto
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 - Ditto/PMU	- 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 foundations and access roads	- Accidental discovery of cultural and archaeologically significant objects	- Apply the chance find procedure described in 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	- PMU	- Standard good practice

		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 personnel may be given first aid training and a first aid kit must be available at all times in the work site.	- 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
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 - Contractor	- 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	- Temporary and permanent acquisition of	- Proper appraisal of income loss and timely compensation	- Uzbekenergo with PMU	- Included in

Acquisition	the land from the land owners and its uses	- OHL line properly selected to avoid houses, other structures and agriculture land - Selection of only a few access roads - Construction activities after crop harvesting period	Safeguards Specialists - Contractor - ditto	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 (Eleigas)	- 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
Maintenance	- Routine maintenance to check the condition of the towers, structures and equipment - Occupational and health safety risks	- Use of PPE - Care in handling and isolating equipment to be inspected	- Uzbekenergo and substation management	- Standard 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, reflectors 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 (linear distance) and 25 m from the outermost conductor wire measured horizontally from a notional vertical plane at the wire.	- Uzbekenergo and OHL management with third party involvement	- Standard design of OHL
Maintenance	- Health and Safety risks related to inspection and maintenance of the towers, foundations and conductors	- Personnel involved in 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.	- Uzbekenergo and OHL management and maintenance personnel	- Standard 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 management facility	- Substation management	- Up to 1,000 USD per year per ton - Included in SS operation cost
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 hazardous disposal facility and in the absence of such facility to a secured storage.	- Uzbekenergo and OHL management	- 1,000 USD per year per ton
EMERGENCY AND ACCIDENTS				
Substations				
	- Fire	- Fire and smoke sensor, firefighting 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	- Substation management - ditto - ditto - Substation management and local authorities - Substation management	- Standard design practice - ditto - ditto - ditto - 100 USD per drill

		and other emergency		
OHL				
	- Tower collapse from weakening of structure such as erosion of foundations	- Periodic examination of the tower foundation and structure	- OHL management	- Standard good practices
		- If needed remedial measures to improve the foundation support; erosion control	- ditto	- Extent of damage not known
		- Use of materials that are less susceptible to erosion, degradation or rusting	- OHL design engineers	- Standard good practice
		- Clear the road right of way for emergency crew.	- OHL management	- ditto
		- Prevent houses and other incompatible land uses from being built near the transmission lines right of way.	- OHL and local land use officials	- ditto
		- When tower collapses, immediately terminate power supply.	- OHL management	- ditto
		- Isolate the collapsed section so that the loads are not shifted to the other towers that may result to failure of those towers.	- ditto	- ditto
		- Establish the cause of the failure and reroute the replacement OHL to a more stable site.	- Uzbekenergo and OHL management	- ditto

Annex 8. Environmental Monitoring Plan

ENVIRONMENTAL CONCERN	PERFORMANCE INDICATOR and ACTIVITIES	FREQUENCY TO MONITOR	TIMING TO CHECK	LOCATION	RESPONSIBILITY
PRE-CONSTRUCTION					
In general, ensure that mitigation activities are implemented and executed	Mitigation activities are implemented and executed. All mitigation activities are presented in Chapter F and Annex 7.	Regularly	Throughout the Project Phase	All project sites	PMC as described in Chapter I Institutional arrangements
Review of Mitigation Measures	Mitigation Matrix (EMP) reviewed	During detailed design (later monthly to cover any unidentified impacts)	By completion of detailed design	All project sites and OHL alignment	PMC as described in Chapter I Institutional arrangements
Soil erosion and contamination	Land clearing, vegetation removal, spills; Team report and log book, field inspection	Bimonthly	During field work	All project sites and OHL alignment	Contractor, Survey team supervisor
Air quality	Condition of vehicles and machinery; field inspection	Once	During field work	Random	Contractor, Survey team supervisor
Noise and vibrations	Condition of vehicles and machinery; field inspection	Once	During field work	Random	Contractor, Survey team supervisor
Waste management	Briefing and training for Contractor staff completed	Once	Before field work execution	N/A	PMC
Land acquisition	Land acquisition and resettlement plan implemented	Ongoing	Throughout the Project	All project sites and OHL alignment	PMU/PMC as described in Chapter I Institutional arrangements
Institutional strengthening	Environmental Safeguards Specialists and Resettlement Expert employed to PMU	Once	Before Project implementation	N/A	Uzbekenergo
Institutional strengthening	Environmental Safeguards Specialists and Resettlement Expert employed to PMC	Once	Before Project implementation	N/A	PMU/PMC
CONSTRUCTION					
Substations					
In general, ensure that mitigation activities are implemented and executed	Mitigation activities are implemented and executed. All mitigation activities are presented in Chapter F and Annex 7.	Regularly	Throughout the Project Phase	All project sites	PMC as described in Chapter I Institutional arrangements

Review of Mitigation Measures	Mitigation Matrix (EMP) reviewed to cover any unidentified impacts	Monthly	Throughout the Project	All project sites	PMC as described in Chapter I Institutional arrangements
Briefing and Training	1. Briefing to Contractor completed 2. Training for Contractor's employees completed	Once	Before construction areas are opened up	N/A	1. PMC
Plans to control environmental impacts	1. Temporary Pedestrian and Traffic Management Plan 2. Waste Management Plan 3. Emission, Noise and Vibrations Control Plan 4. Health & Safety Plan 5. Instructions for removal of transformer oil	Once	One month before construction sites are opened up	All project sites	All: PMC
Soil erosion and contamination	1. Contractor's employees instructed and trained 2. Waste Management Plan implemented 3. Land clearing, vegetation removal, spills; field inspection, construction log book, minutes of the construction meetings	1. Once 2. Monthly 3. Monthly	1. Prior to construction 2. Prior to construction, update monthly 3. During construction	All project sites	PMC as described in Chapter I Institutional arrangements
Air quality	1. Emission, Noise and Vibrations Control Plan implemented 2. Condition of vehicles and machinery; field inspection	Monthly	1. Prior to construction, update monthly 2. During construction	All project sites	PMC as described in Chapter I Institutional arrangements
Noise and vibrations	1. Emission, Noise and Vibrations Control Plan implemented 2. Condition of vehicles and machinery; field inspection	Monthly	1. Prior to construction, update monthly 2. During construction	All project sites	PMC as described in Chapter I Institutional arrangements
Waste management	Waste Management Plan implemented	Monthly	Prior to construction, update monthly	All project sites	PMC as described in Chapter I Institutional arrangements
Health and Safety	Health & Safety Plan implemented	Once	Prior to construction	All project sites	PMC

Social impacts	Land acquisition and resettlement plan implemented	Ongoing	Throughout the Project + 2 years after Project finalization	All project sites	PMC as described in Chapter I Institutional arrangements
OHL					
In general, ensure that mitigation activities are implemented and executed	Mitigation activities are implemented and executed. All mitigation activities are presented in Chapter F and Annex 7.	Regularly	Throughout the Project Phase	All project sites	PMC as described in Chapter I Institutional arrangements
Review of Mitigation Measures	Mitigation Matrix reviewed to cover any unidentified impacts	Monthly	Throughout the Project Phase	OHL alignment	PMC as described in Chapter I Institutional arrangements
Briefing and Training	1. Briefing to Contractor completed 2. Training for Contractor's employees completed	Once	Before construction areas are opened up	OHL alignment	1. PMC
Plans to control environmental impacts	1. Temporary Pedestrian and Traffic Management Plan 2. Waste Management Plan 3. Emission, Noise and Vibrations Control Plan 4. Health & Safety Plan	Once	One month before construction areas are opened up	OHL alignment	PMC
Soil erosion and contamination	1. Contractor's employees instructed and trained 2. Waste Management Plan implemented 3. Land clearing, vegetation removal, spills; field inspection, construction log book, minutes of the construction meetings	1. Once 2. Monthly 3. Monthly	1. Prior to construction 2. Prior to construction, update monthly 3. During construction	OHL alignment	PMC as described in Chapter I Institutional arrangements
Topography	Changes in landscape	Monthly	During construction	OHL alignment	PMC as described in Chapter I Institutional arrangements
Air quality	1. Emission, Noise and Vibrations Control Plan implemented 2. Condition of vehicles and machinery; field inspection	Monthly	1. Prior to construction, update monthly 2. During construction	OHL alignment	PMC as described in Chapter I Institutional arrangements

Noise and vibrations	1. Emission, Noise and Vibrations Control Plan implemented 2. Condition of vehicles and machinery; field inspection	Monthly	1. Prior to construction, update monthly 2. During construction	OHL alignment	PMC as described in Chapter I Institutional arrangements
Water Quality	The amount of suspended solids in surface water	Weekly/monthly	During construction	OHL alignment, especially at river crossing sites	PMC as described in Chapter I Institutional arrangements
Ecological Resources	Land clearing, habitat destruction; field inspection	Monthly	During construction	OHL alignment	PMC as described in Chapter I Institutional arrangements
Ecological Resources	Revegetation	Monthly	During construction + 2 years after Project finalizing	OHL alignment	PMC as described in Chapter I Institutional arrangements
Waste management	Waste Management Plan implemented	Monthly	Prior to construction, update monthly	OHL alignment	PMC as described in Chapter I Institutional arrangements
Health and Safety	Health & Safety Plan implemented	Once	Prior to construction	OHL alignment	PMC as described in Chapter I Institutional arrangements
Social impacts	Land acquisition and resettlement plan implemented	Ongoing	Throughout the Project + 2 years after Project finalization	OHL alignment	PMC as described in Chapter I Institutional arrangements
OPERATION AND MAINTENANCE					
Substations					
Noise and emissions	1. Company's Environmental Management System and related instructions implemented 2. Routine maintenance program implemented 3. Use of sulfur hexafluoride circuit breakers which have low noise level compared with air or oil circuit breakers 4. Construction of flanks or blank blind to contain the noise	Ongoing	During operation and maintenance	Substations	Uzbekenergo, sub-station management

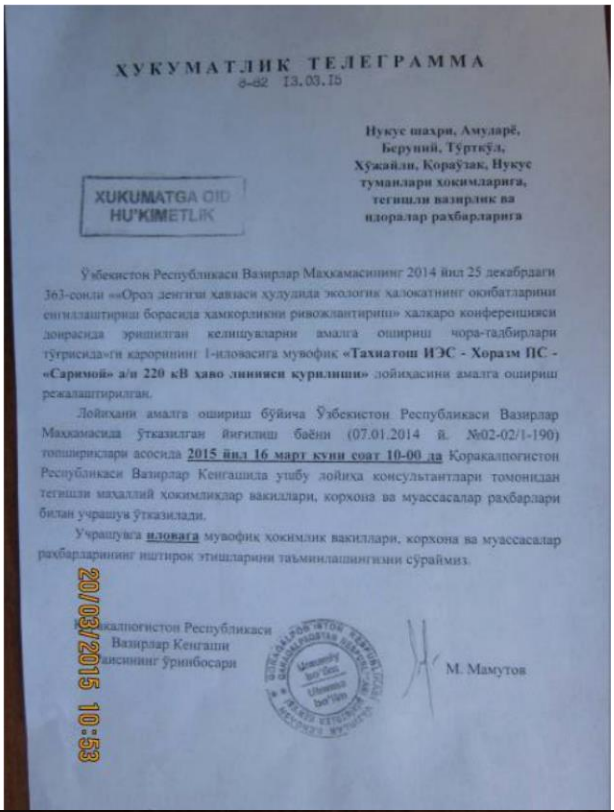
	5. Monitoring of emissions to air (Eleigas)				
Soil contamination	Company's Environmental Management System and related instructions implemented (e.g. oil change)	Ongoing	During operation and maintenance	Substations	Uzbekenergo, sub-station management
Waste management	Company's Environmental Management System and related instructions implemented (e.g. oil change)	Ongoing	During operation and maintenance	Substations	Uzbekenergo, sub-station management
Health and Safety	Company's H&S plan implemented	Ongoing	During operation and maintenance	Substations	Uzbekenergo, sub-station management
OHL					
Noise	1. Company's Environmental Management System and related instructions implemented 2. Routine maintenance program implemented 3. Replacement of worn conductors	Ongoing	During operation and maintenance	OHL alignment	Uzbekenergo, OHL management
Ecological Resources	Reported bird kills	Ongoing	During operation and maintenance	OHL alignment	Uzbekenergo, OHL management
Waste management	Company's Environmental Management System and related instructions implemented	Ongoing	During operation and maintenance	OHL alignment	Uzbekenergo, OHL management
Health and Safety	1. Company's H&S plan implemented 2. Good engineering practices 3. EMF measured	1. Ongoing 2. Ongoing 3. Yearly	During operation and maintenance	1. OHL alignment 2. OHL alignment 3. OHL alignment, near villages	1 & 2 Uzbekenergo, OHL management 3. Ditto with third party involvement
DECOMMISSIONING as part of the construction Project					
Substations					
In general, ensure that mitigation activities	Mitigation activities are implemented and executed.	Regularly	Throughout the Project Phase	All project sites	PMU/PMC as described in Chapter I Institutional

are implemented and executed	All mitigation activities are presented in Chapter F and Annex 7.				arrangements
Plans to control environmental impacts	1. Temporary Pedestrian and Traffic Management Plan 2. Waste Management Plan 3. Emission and Noise Control Plan 4. Safety Plan	Once	One month before decommissioning sites are opened up	All project sites	PMC
Soil	1. Waste Management Plan submitted 2. Waste Management Plan implemented	Monthly	1. Prior to decommissioning 2. Update monthly	All project sites	PMC as described in Chapter I Institutional arrangements
Air quality, noise	1. Emission and Noise Control Plan implemented 2. Condition of vehicles and machinery; field inspection	Monthly	1. Prior to decommissioning, update monthly 2. During decommissioning	All project sites	PMC as described in Chapter I Institutional arrangements
Waste management	1. Waste Management Plan submitted 2. Waste Management Plan implemented	Monthly	1. Prior to decommissioning 2. Update monthly	All project sites	PMC as described in Chapter I Institutional arrangements
Health and Safety	1. Health & Safety Plan submitted 2. Health & Safety Plan implemented	1. Once 2. Ongoing	1. One month before decommissioning starts 2. Update monthly	All project sites	PMC as described in Chapter I Institutional arrangements
OHL					
In general, ensure that mitigation activities are implemented and executed	Mitigation activities are implemented and executed. All mitigation activities are presented in Chapter F and Annex 7.	Regularly	Throughout the Project Phase	All project sites	PMC as described in Chapter I Institutional arrangements
Plans to control environmental impacts	1. Temporary Pedestrian and Traffic Management Plan 2. Waste Management Plan 3. Emission and Noise Control Plan 4. Safety Plan	Once	One month before decommissioning sites are opened up	OHL alignment	PMC
Soil	1. Waste Management Plan submitted 2. Waste Management Plan implemented	Monthly	1. Prior to decommissioning 2. Update monthly	OHL alignment	PMC as described in Chapter I Institutional arrangements

Air quality, noise	1. Emission and Noise Control Plan implemented 2. Condition of vehicles and machinery; field inspection	Monthly	1. Prior to decommissioning, update monthly 2. During decommissioning	OHL alignment	PMC as described in Chapter I Institutional arrangements
Waste management	1. Waste Management Plan submitted 2. Waste Management Plan implemented	Monthly	3. Prior to decommissioning 4. Update monthly	OHL alignment	PMC as described in Chapter I Institutional arrangements
Health and Safety	1. Health & Safety Plan submitted 2. Health & Safety Plan implemented	1. Once 2. Ongoing	1. One month before decommissioning starts 2. Update monthly	OHL alignment	PMC as described in Chapter I Institutional arrangements
EMERGENCY AND ACCIDENTS					
Substations					
Safety hazards	1. Security Plan implemented 2. Company's H&S plan implemented 3. Good Engineering Practices	Ongoing	During operation and maintenance	Substations	Uzbekenergo, sub-station management
OHL					
Safety hazards	1. Security Plan implemented 2. Company's H&S plan implemented 3. Good Engineering Practices	Ongoing	During operation and maintenance	OHL alignment	Uzbekenergo, OHL management

Annex 9. Pictures of the PCs and list of participants of PCs

16.03.2015_Karakalpakstan_Session-1



ХУКУМАТЛИК ТЕЛЕГРАММА
8-82 13.03.15

XUKUMATGA OID
HU'KIMETLIK

Нукус шахри, Амударё, Беруний, Тўрткўл, Хўжайли, Қораўзак, Нукус туманлари хокимларига, тегишли вазирлик ва идоралар рахбарларига

Ўзбекистон Республикаси Вазирлар Махкамасининг 2014 йил 25 декабрдаги 363-сонли ««Орол денгизи хавзаси худудида экологик халокатнинг оқибатларини енгиллаштириш борасида хамкорликни ривожлантириш» халқаро конференцияси доирасида эришилган келишувларни амалга ошириш чора-тадбирлари тўғрисида»ги қарорининг 1-иловасига мувофиқ **«Тахиатош ИЭС - Хоразм ПС - «Саримой» а/и 220 кВ хаво линияси қурилиши»** лойихасини амалга ошириш режалаштирилган.

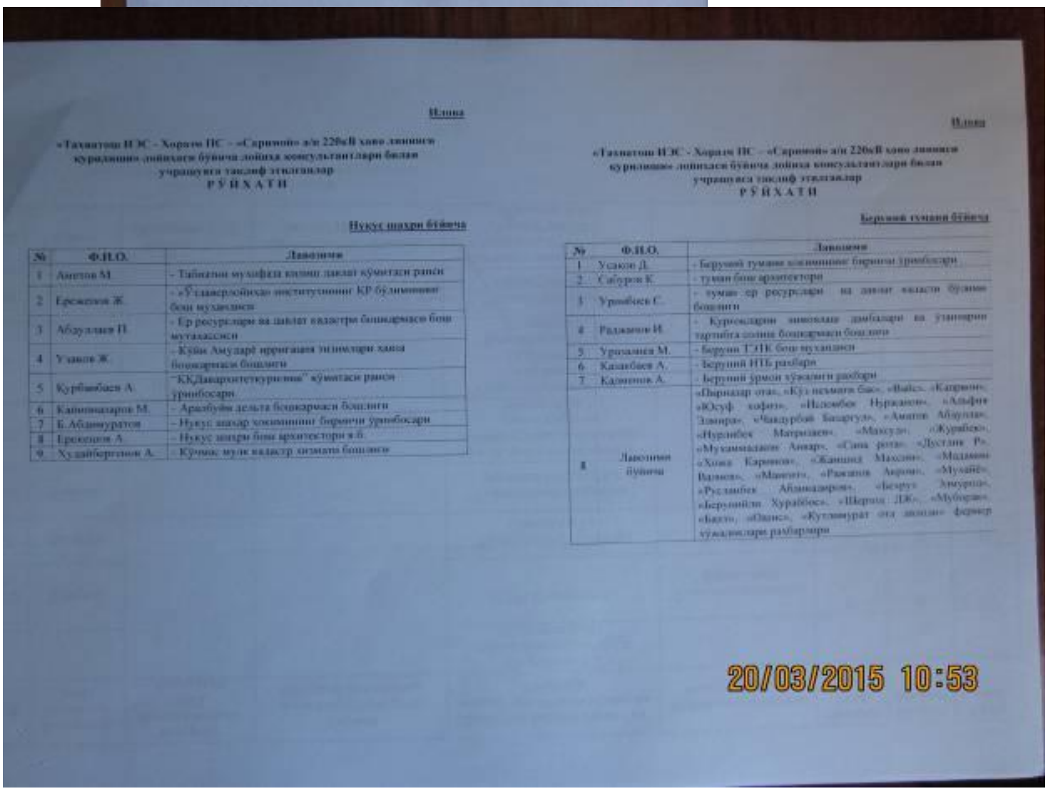
Лойихани амалга ошириш бўйича Ўзбекистон Республикаси Вазирлар Махкамасида ўтказилган йиғилиш баёни (07.01.2014 й. №02-02/1-190) топшириқлари асосида **2015 йил 16 март куни соат 10-00 да** Қорақалпоғистон Республикаси Вазирлар Кенгашида ушбу лойиха консультантлари томонидан тегишли махаллий хокимликлар вакиллари, корхона ва муассасалар рахбарлари билан учрашув ўтказилади.

Учрашувга **иловага** мувофиқ хокимлик вакиллари, корхона ва муассасалар рахбарларининг иштирок этишларини таъминлашингизни сўраймиз.

Қорақалпоғистон Республикаси
Вазирлар Кенгаши
Раисининг ўринбосари

М. Мамутов

20/03/2015 10:53



Илова

«Тахиатош ИЭС - Хоразм ПС - «Саримой» а/и 220кВ хаво линияси қурилиши» лойихаси бўйича лойиха консультантлари билан учрашувга таклиф этилганлар
Р Ў Й Х А Т И

Нукус шахри бўйича

№	Ф.И.О.	Лавозими
1	Аметов М.	- Табиатни муҳофаза қилиш давлат қўмитаси раиси
2	Ережепов Ж.	- «Ўздаверлойиха» институтининг ҚР бўлимининг бош мутахассиси
3	Абдуллаев П.	- Ер ресурслари ва давлат кадастри бошқармаси бош мутахассиси
4	Узаков Ж.	- Қуйи Амударё ирригацияя тизимлари хавза бошқармаси бошлиғи
5	Курбанбаев А.	"ҚҚДавархитектқурилиш" қўмитаси раиси ўринбосари
6	Каипназаров М.	- Аралбўйи дельта бошқармаси бошлиғи
7	Б.Абдимуратов	- Нукус шахар хокимининг биринчи ўринбосари
8	Ережепов А.	- Нукус шахри бош архитектори в.б.
9	Худайбергенов А.	- Кўчмас мулк кадастр хизмати бошлиғи

Илова

«Тахиатош ИЭС - Хоразм ПС - «Саримой» а/и 220кВ хаво линияси қурилиши» лойихаси бўйича лойиха консультантлари билан учрашувга таклиф этилганлар
Р Ў Й Х А Т И

Беруний тумани бўйича

№	Ф.И.О.	Лавозими
1	Усаков Д.	- Беруний тумани хокимининг биринчи ўринбосари
2	Сабуров К.	- туман бош архитектори
3	Урунбоев С.	- туман ер ресурслари ва давлат кадастри бўлими бошлиғи
4	Раджапов И.	- Курилишларни [illegible] ва уларнинг тартибга солиш бошқармаси бошлиғи
5	Урazалиев М.	- Беруний ТЭТК бош мухандиси
6	Казакбаев А.	- Беруний НТБ рахбари
7	Калимов А.	- Беруний ўрмон хўжалиги рахбари
8	Лавозими бўйича	«Пирназар ота», «Кўз нематги бас», «Вайс», «Капрон», «Юсуф хофиз», «Исломбек Нуржанов», «Альфия Замира», «Чакдурбой Базаргул», «Аманов Абдулла», «Нурнибек Матрзаев», «Максуд», «Журабек», «Мухаммадали Анвар», «Сана ота», «Дустлик Р», «Хожа Каримов», «Жанин Махсим», «Мадамин Вазиев», «Манғит», «Рахимов Акром», «Мулайё», «Русланбек Абдикадиров», «Бехруз Анвурон», «Берунийли Хурайбоса», «Шерзод ДЖ», «Мубораk», «Бахт», «Оазис», «Кутлимурат ота авлоди» фермер хўжаликлари рахбарлари

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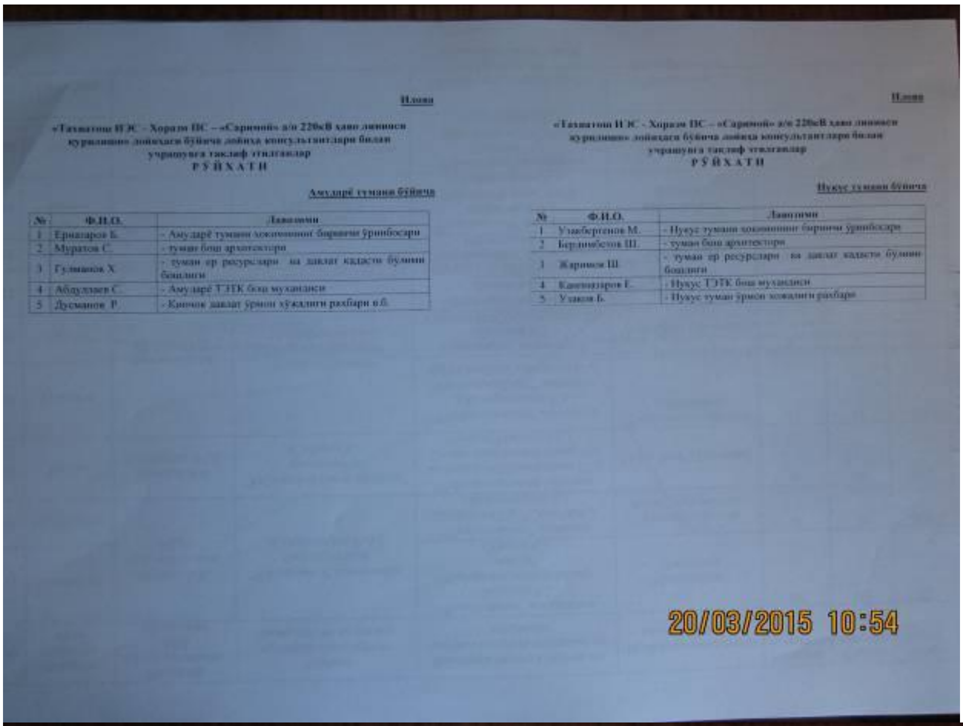


Илова

«Тахиатош ИЭС - Хоразм ПС – «Саримой» п/с 220кВ ҳаво линияси қурилиши» лойиҳаси бўйича лойиҳа консультантлари билан учрашувга таклиф этилганлар
РЎЙХАТИ

Амударё тумани бўйича

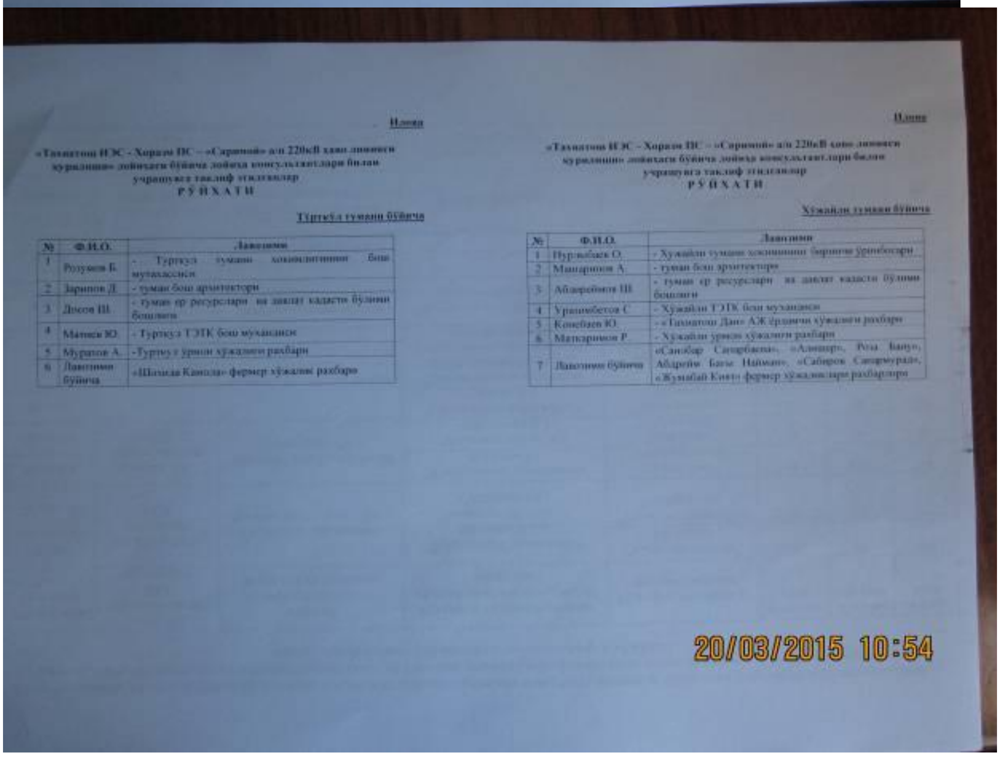
№	Ф.И.О.	Лавозими
1	Ернazаров Б.	- Амударё тумани ҳокимининг биринчи ўринбосари
2	Муратов С.	- туман бош архитектори
3	Гулманов Х.	- туман ер ресурслари ва давлат кадастри бўлими бошлиги
4	Абдуллаев С.	- Амударё ТЭТК бош муҳандиси
5	Дусманов Р.	- Кипчок давлат ўрмон хўжалиги раҳбари в.б.

Илова

«Тахиатош ИЭС - Хоразм ПС – «Саримой» п/с 220кВ ҳаво линияси қурилиши» лойиҳаси бўйича лойиҳа консультантлари билан учрашувга таклиф этилганлар
РЎЙХАТИ

Нукус тумани бўйича

№	Ф.И.О.	Лавозими
1	Узакбергенов М.	- Нукус тумани ҳокимининг биринчи ўринбосари
2	Бердимбетов Ш.	- туман бош архитектори
3	Жаримов Ш.	- туман ер ресурслари ва давлат кадастри бўлими бошлиги
4	Камиллзаров Г.	- Нукус ТЭТК бош муҳандиси
5	Узаков Б.	- Нукус туман ўрмон хожалиги раҳбари



Илова

«Тахиатош ИЭС - Хоразм ПС – «Саримой» п/с 220кВ ҳаво линияси қурилиши» лойиҳаси бўйича лойиҳа консультантлари билан учрашувга таклиф этилганлар
РЎЙХАТИ

Тўрткўл тумани бўйича

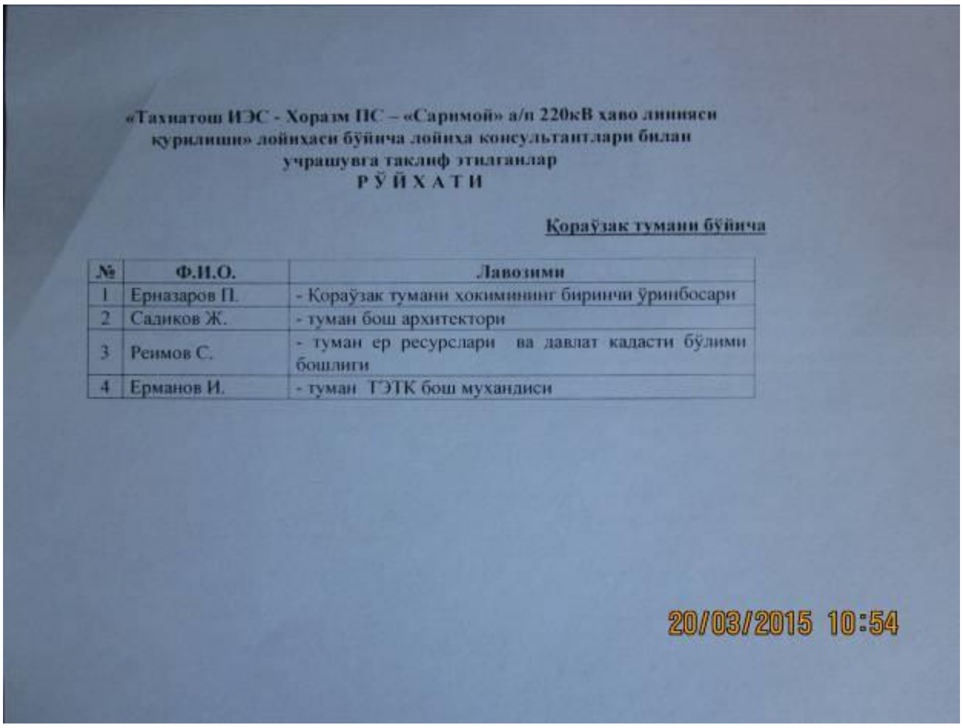
№	Ф.И.О.	Лавозими
1	Розуманов Б.	- Тўрткўл тумани ҳокимлигининг бош мутахассиси
2	Зарипов Д.	- туман бош архитектори
3	Дусов Ш.	- туман ер ресурслари ва давлат кадастри бўлими бошлиги
4	Матиев Ю.	- Тўрткўл ТЭТК бош муҳандиси
5	Муратов А.	- Тўрткўл ўрмон хўжалиги раҳбари
6	Лавозими бўйича	«Шахида Камола» фермер хўжалиги раҳбари

Илова

«Тахиатош ИЭС - Хоразм ПС – «Саримой» п/с 220кВ ҳаво линияси қурилиши» лойиҳаси бўйича лойиҳа консультантлари билан учрашувга таклиф этилганлар
РЎЙХАТИ

Хўжайли тумани бўйича

№	Ф.И.О.	Лавозими
1	Нурлыбаев О.	- Хўжайли тумани ҳокимининг биринчи ўринбосари
2	Машарипов А.	- туман бош архитектори
3	Абдирейимов Ш.	- туман ер ресурслари ва давлат кадастри бўлими бошлиги
4	Уразимбетов С.	- Хўжайли ТЭТК бош муҳандиси
5	Конебаев Ю.	- «Тахиатош Дан» АЖ ёрдамчи хўжалиги раҳбари
6	Маткаримов Р.	- Хўжайли ўрмон хўжалиги раҳбари
7	Лавозими бўйича	«Санжар Санарбаева», «Алишер», Роза Бану», Абдрейим Баги Найман», «Сабиров Сапармурад», «Жумабай Кият» фермер хўжаликлари раҳбарлари

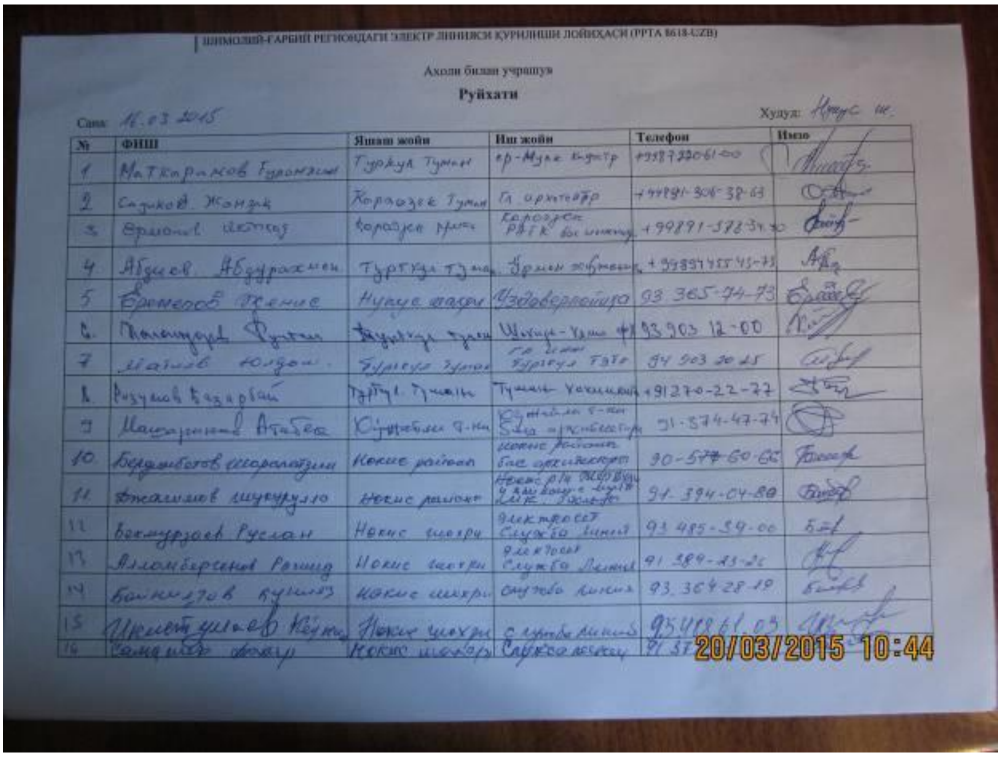


«Тахиатош ИЭС - Хоразм ПС – «Саримой» а/п 220кВ хаво линияси қурилиши» лойиҳаси бўйича лойиҳа консультантлари билан учрашувга таклиф этилганлар

Р Ў Й Х А Т И

<u>Қораўзак тумани бўйича</u>

№	Ф.И.О.	Лавозими
1	Ерназаров П.	- Қораўзак тумани хокимининг биринчи ўринбосари
2	Садиков Ж.	- туман бош архитектори
3	Реимов С.	- туман ер ресурслари ва давлат кадастри бўлими бошлиги
4	Ерманов И.	- туман ТЭТК бош мухандиси



ШИМОЛИЙ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИҲАСИ (PPTA 8618-UZB)

Ахоли билан учрашув

Руйхати

Сана: 16.03.2015

Худуд: Нукус ш.

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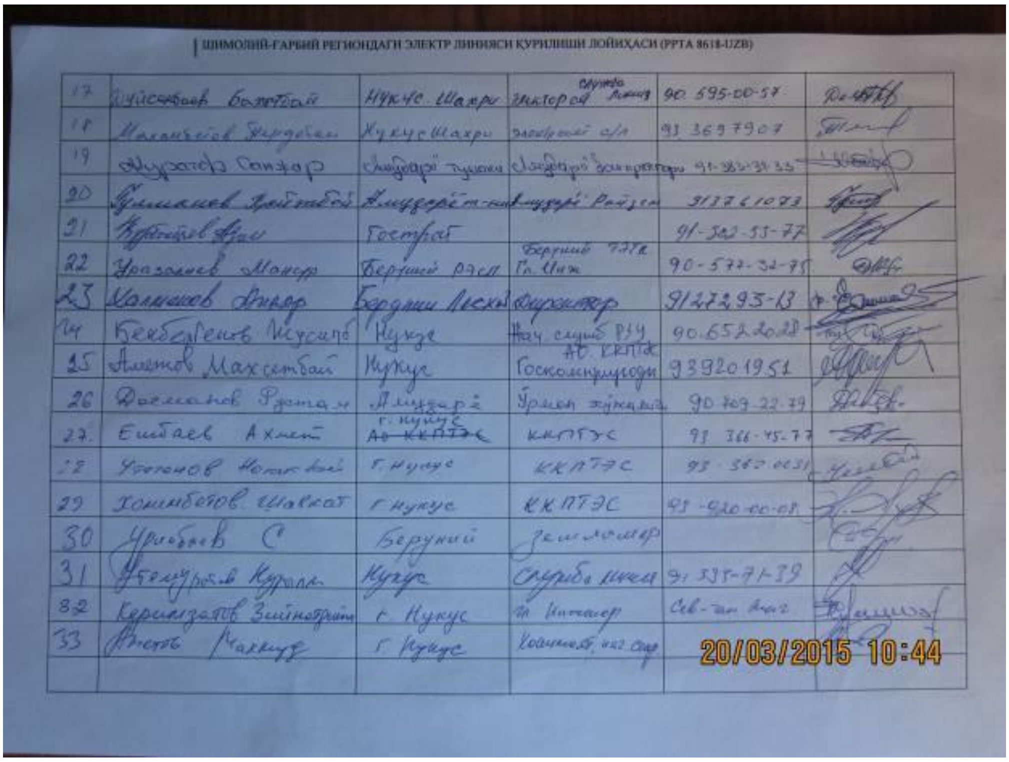
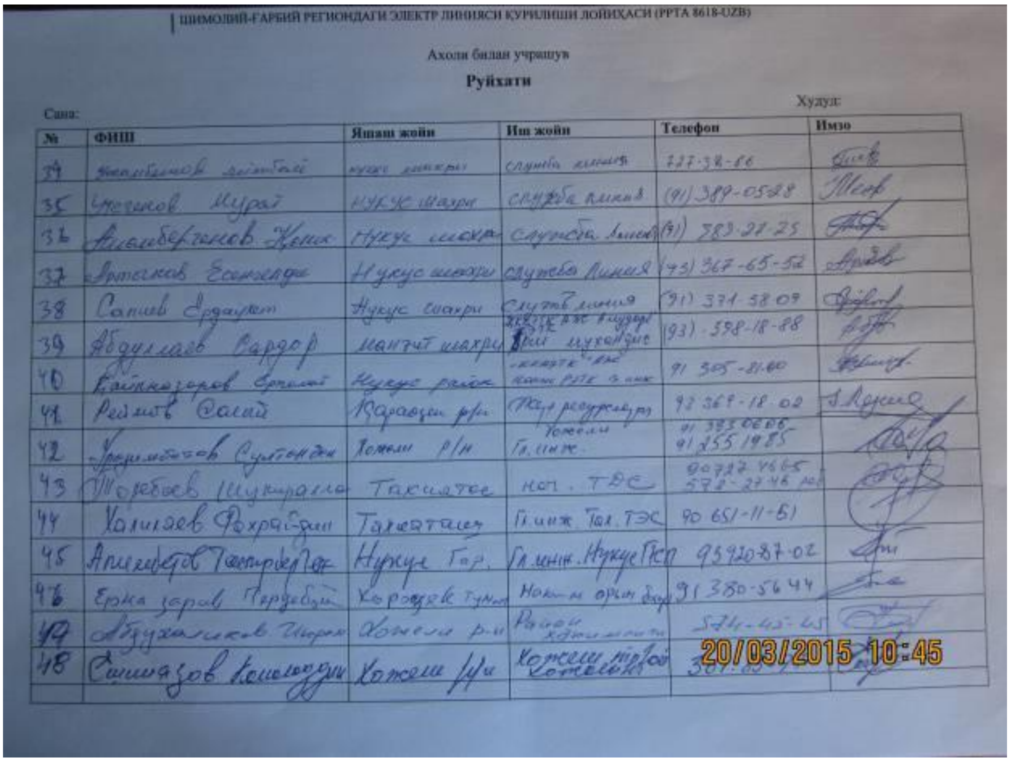
2	Садиков Жанзак	Корагзек Туман	Гл. архитектор	+99891-306-38-63	[illegible]
3	Ерманов [illegible]	Кораузек [illegible]	Корозуек РЭТК бос инженер	+99891-378-34-[illegible]	[illegible]
4	Абдиев Абдурахмон	Турткул туман	[illegible]	+99897455 45-73	[illegible]
5	Ерменов Эжение	Нукус шахри	Узоверпостира	93 365-74-73	[illegible]
6	[illegible]	[illegible]	[illegible]	93 903 12-00	[illegible]
7	Маткев Юлдош	Турткул Туман	Гл. инж. Турткул ТЭТК	94 503 20 25	[illegible]
8	Рузумов Базарбай	Турткул Тумани	Туман хокимияти	+91270-22-77	[illegible]
9	[illegible]	[illegible]	[illegible]	91-374-47-74	[illegible]
10	Бердимбетов [illegible]	Нокис районы	Бас архитектор	90-577 60-65	[illegible]
11	[illegible] шукурулло	Нокис районы	[illegible]	91-394-04-80	[illegible]
12	Бекмурзаев Руслан	Нокис шахри	Электросет Служба линий	93 485-39-00	[illegible]
13	Алламберганов Рашид	Нокис шахри	Электросет Служба Линий	91 389-23-26	[illegible]
14	Байназаров [illegible]	Нокис шахри	Служба линии	93 364 28-19	[illegible]
15	[illegible]	Нокис шахри	Служба линий	93 418 61 03	[illegible]
16	Самандов [illegible]	Нокис шахри	Служба линии	91 37[illegible]	



ШИМОЛИЙ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИҲАСИ (PPTA 8618-UZB)

17	[illegible]	Нукус Шахри	Инспектор службы линий	90 595-00-57	[signature]
18	[illegible]	Нукус Шахри	[illegible]	93 3697907	[signature]
19	[illegible]	[illegible]	[illegible]	91-383-39-33	[signature]
20	[illegible]	[illegible]	[illegible]	9137 61073	[signature]
21	[illegible]	Гостраст		91-362-55-77	[signature]
22	Уразымбет Манер	Беруний РЭС	Беруний ТЭТЕ Гл. Инж	90-577-32-75	[signature]
23	[illegible]	[illegible]	директор	9127293-13	[signature]
24	Бекбергенов Юсуп	Нукус	Нач. служб РЭУ	90.6522028	[signature]
25	Алетов Максетбай	Нукус	АО. ККПТЭ Госкомприроды	939201951	[signature]
26	[illegible]	Амударё	[illegible]	90 709-22-79	[signature]
27	Ешбаев Ахмет	г. Нукус ~~АО ККПТЭС~~	ККПТЭС	93 366-45-77	[signature]
28	[illegible]	г. Нукус	ККПТЭС	93 - 362-0031	[signature]
29	Хожимбетов Шаукат	г. Нукус	ККПТЭС	93 -920-00-08	[signature]
30	[illegible] С	Беруний	землемер		[signature]
31	[illegible]	Нукус	Служба линий	91 335-71-39	[signature]
32	Кериязов Зийнатдин	г. Нукус	[illegible]	[illegible]	[signature]
33	[illegible]	г. Нукус	[illegible]		

20/03/2015 10:44



ШИМОЛИЙ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИҲАСИ (PPTA 8618-UZB)

Ахоли билан учрашув

Руйхати

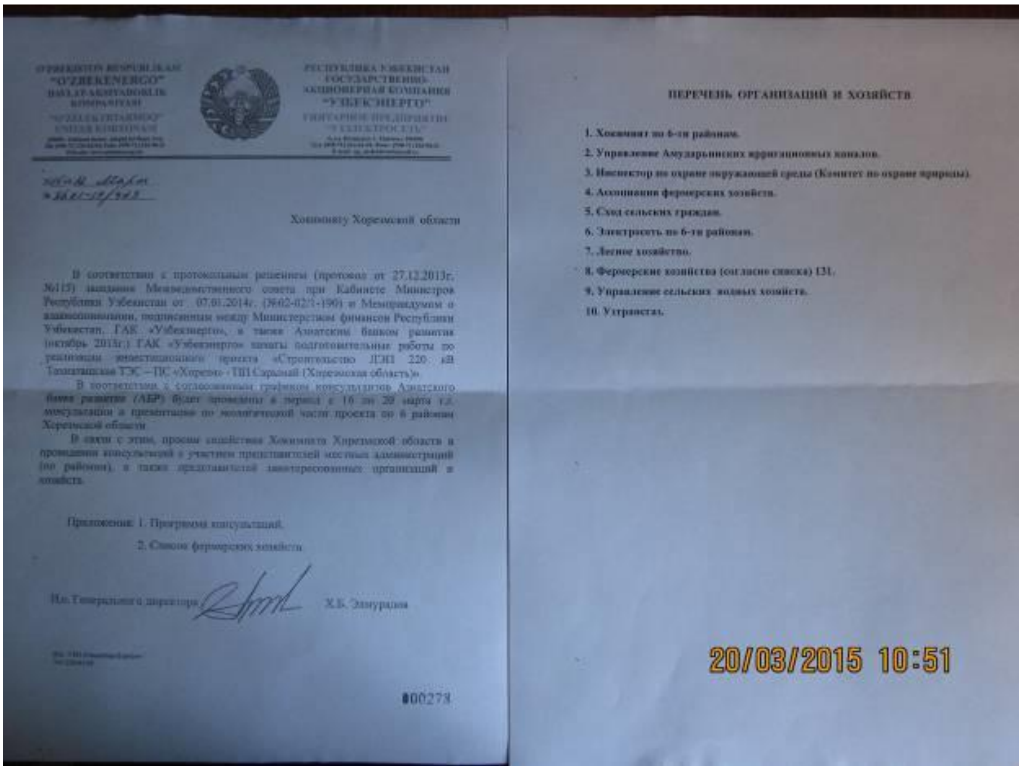
Сана: Худуд:

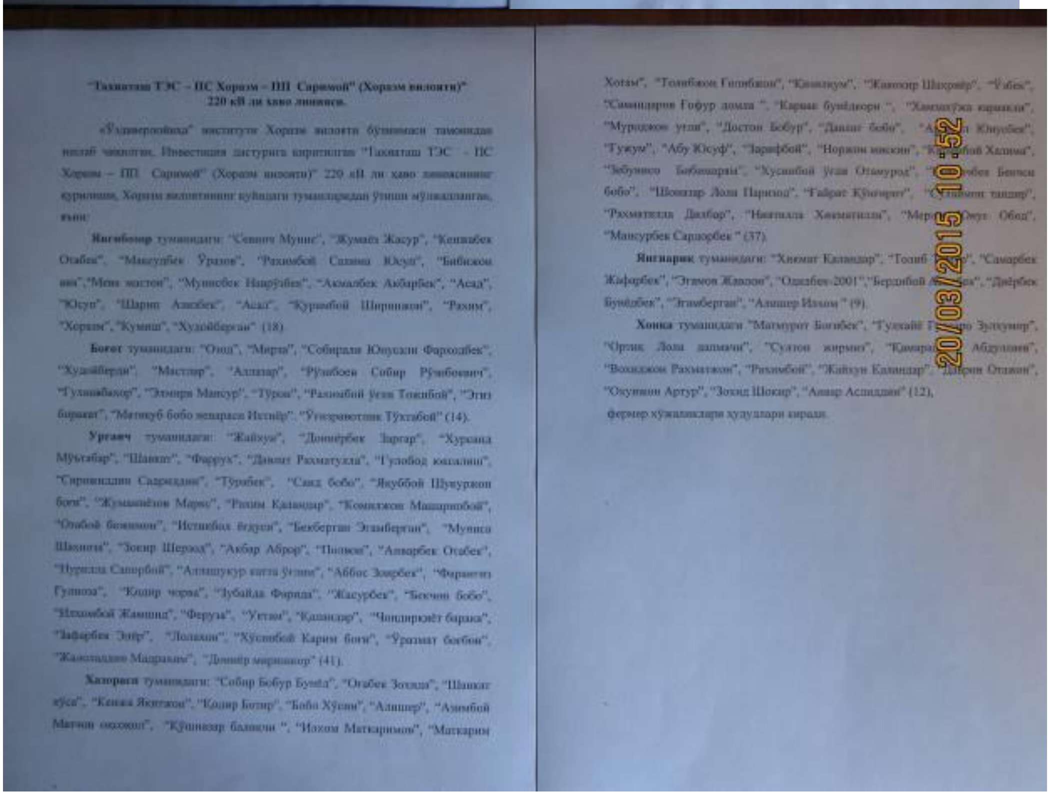
№	ФИШ	Яшаш жойи	Иш жойи	Телефон	Имзо
34	[illegible]	Нукус шахри	служба линий	727-38-86	[signature]
35	[illegible] Мурат	Нукус шахри	служба линий	(91) 389-0528	[signature]
36	[illegible]	Нукус шахри	служба линий	(91) 383-27-25	[signature]
37	[illegible]	Нукус шахри	служба линий	(93) 367-65-52	[signature]
38	Сапиев Ердаулет	Нукус шахри	служба линий	(91) 371-58 09	[signature]
39	Абдуллаев Бардор	Манғит шахри	[illegible]	(93) -378-18-88	[signature]
40	[illegible]	Нукус район	[illegible]	91 305-81-80	[signature]
41	Реимов Салай	Қараөзек р/н	[illegible]	93 369-18-02	[signature]
42	[illegible]	Хожели р/н	Хожели Гл. инж.	91 3330606 91 255 1985	[signature]
43	[illegible]	Тахиатас	нач. ТЭС	90727 4665 572-27-46	[signature]
44	Халилаев [illegible]	Тахиаташ	Гл. инж. Тах. ТЭС	90 651-11-51	[signature]
45	[illegible]	Нукус гор.	Гл. инж. Нукус ТЭП	9592087-02	[signature]
46	[illegible]	Қораўзек туман	[illegible]	91 380-56 44	[signature]
47	[illegible]	Хожели р-н	Район хокимияти	574-45-45	[signature]
48	[illegible]	Хожели р/н	Хожели [illegible]	[illegible]	[signature]

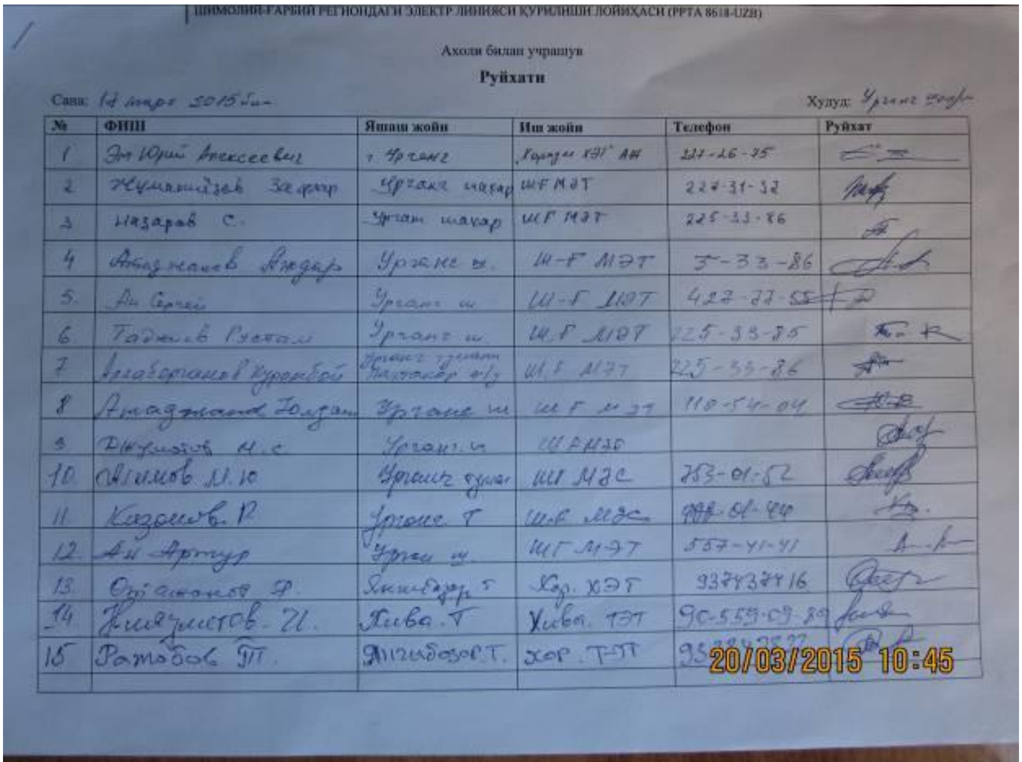
20/03/2015 10:45

17.03.2015_Khorezm_Session-2

18.03.2015_Khorezm_Session-3


Хокимияту Хоремской области
Приложение: 1. Программа консультаций.
2. Список фермерских хозяйств
Х.Б. Элмурадов
ПЕРЕЧЕНЬ ОРГАНИЗАЦИЙ И ХОЗЯЙСТВ
1. Хокимият по 6-ти районам.
2. Управление Амударьинских ирригационных каналов.
3. Инспектор по охране окружающей среды (Комитет по охране природы).
4. Ассоциация фермерских хозяйств.
5. Сход сельских граждан.
6. Электросеть по 6-ти районам.
7. Лесное хозяйство.
8. Фермерские хозяйства (согласно списка) 131.
9. Управление сельских водных хозяйств.
10. Уztрансгаз.
20/03/2015 10:51


"Тахиаташ ТЭС – ПС Хоразм – ПП Саримой" (Хоразм вилояти)"
220 кВ ли хаво линияси.
20/03/2015 10:52



ШИМОЛИЙ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИҲАСИ (PPTA 8618-UZB)

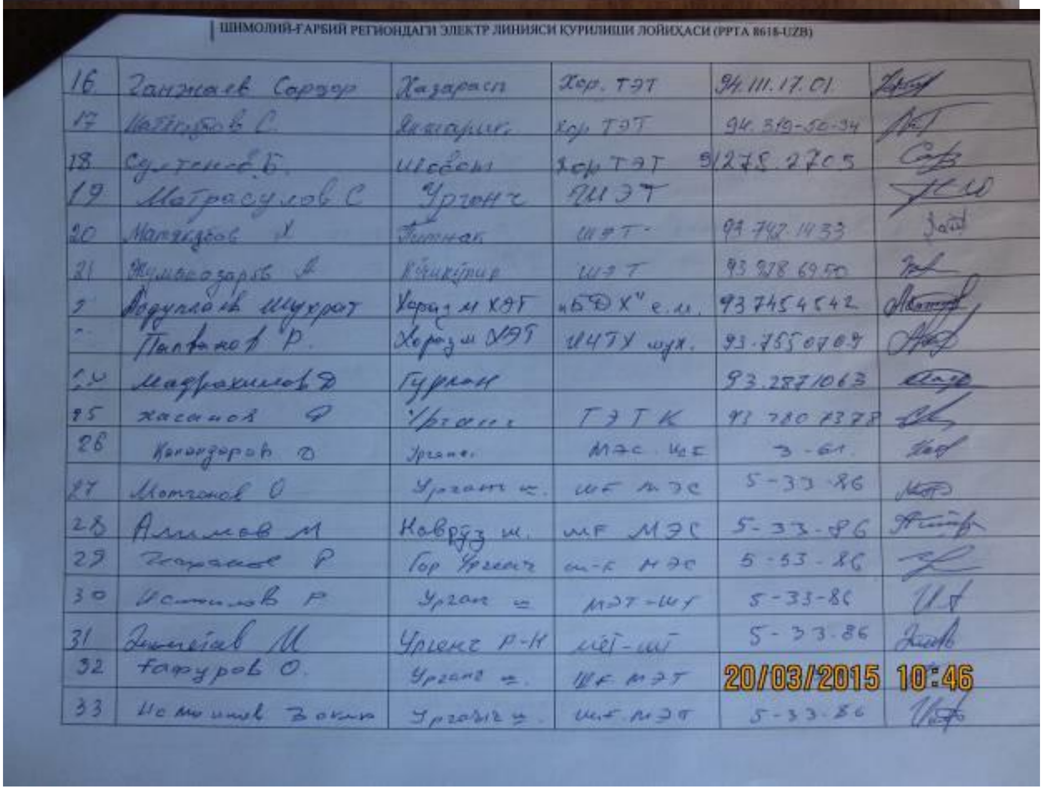
Аҳоли билан учрашув

Руйхати

Сана: 14 март 2015 йил   Ҳудуд: Урганч шаҳар

№	ФИШ	Яшаш жойи	Иш жойи	Телефон	Руйхат
1	Эн Юрий Алексеевич	г. Урганч	Хоразм ХЭТ АЖ	227-26-75	
2	Жуманиёзов Зафар	Урганч шаҳар	ШҒ МЭТ	227-31-32	
3	Назаров С.	Урганч шаҳар	ШГ МЭТ	225-33-86	
4	Атажанов Айдар	Урганч ш.	Ш-Г МЭТ	5-33-86	
5.	Ан Сергей	Урганч ш	Ш-Г МЭТ	427-77-55	
6	Таджиев Рустам	Урганч ш.	Ш.Г МЭТ	225-33-85	
7	[illegible] Курбонбой	[illegible]	Ш.Г МЭТ	225-33-86	
8	Ахмаджанов Юлдаш	Урганч ш	Ш Г МЭТ	110-54-04	
9	Джумаев Н.С	Урганч ш	ШҒМЭС		
10	Алимов М.Ю	Урганч туман	Ш МЭС	253-01-52	
11	Казаков Р	Урганч Т	Ш.Г МЭС	[illegible]-01-44	
12	Ан Артур	Урганч ш.	ШГ МЭТ	557-41-41	
13	[illegible]	Янгибозор т	Хор. ХЭТ	93743 7416	
14	[illegible]	Хива. Т	Хива. ТЭТ	90-559-09-89	
15	Раҳбобов П.	Янгибозор Т.	Хор. ТЭТ	93[illegible]	

20/03/2015 10:45



ШИМОЛИЙ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИҲАСИ (PPTA 8618-UZB)

16	Ганжаев Сардор	Хазарасп	Хор. ТЭТ	94.111.17.01	
17	[illegible] С.	Хазарасп	Хор. ТЭТ	94.319-50-34	
18	Султонов Б.	Шовот	Хор. ТЭТ	91275.2705	
19	Матрасулов С	Урганч	ТИЭТ		
20	Матякубов Х	Питнак	ШЭТ	93 742 1433	
21	Жумабозоров А	Кўшкўпир	ШЭТ	93 328 6950	
[illegible]	Абдуллаев Шухрат	Хоразм ХЭТ	«БЭХ» е.м.	937454542	
[illegible]	Палванов Р.	Хоразм ХЭТ	ИЧТУ шух.	93.7550709	
24	Махрахимов Д	Гурлан		93.2871063	
25	Хасанов Ф	Урганч	ТЭТК	93 780 7378	
26	Кенангоров О	Урганч	МЭС ШГ	3-61	
27	Матчанов О	Урганч ш.	ШГ МЭС	5-33-86	
28	Алимов М	Наврўз м.	ШГ МЭС	5-33-86	
29	[illegible] Р	Гор Урганч	Ш-Г МЭС	5-53-86	
30	Исманов Р	Урганч ш.	МЭТ-ШГ	5-33-86	
31	[illegible] М	Урганч Р-Н	МЭТ-ШГ	5-33-86	
32	Гафуров О.	Урганч ш.	ШГ МЭТ		
33	Исманов Захир	Урганч ш.	Ш.Г МЭТ	5-33-86	

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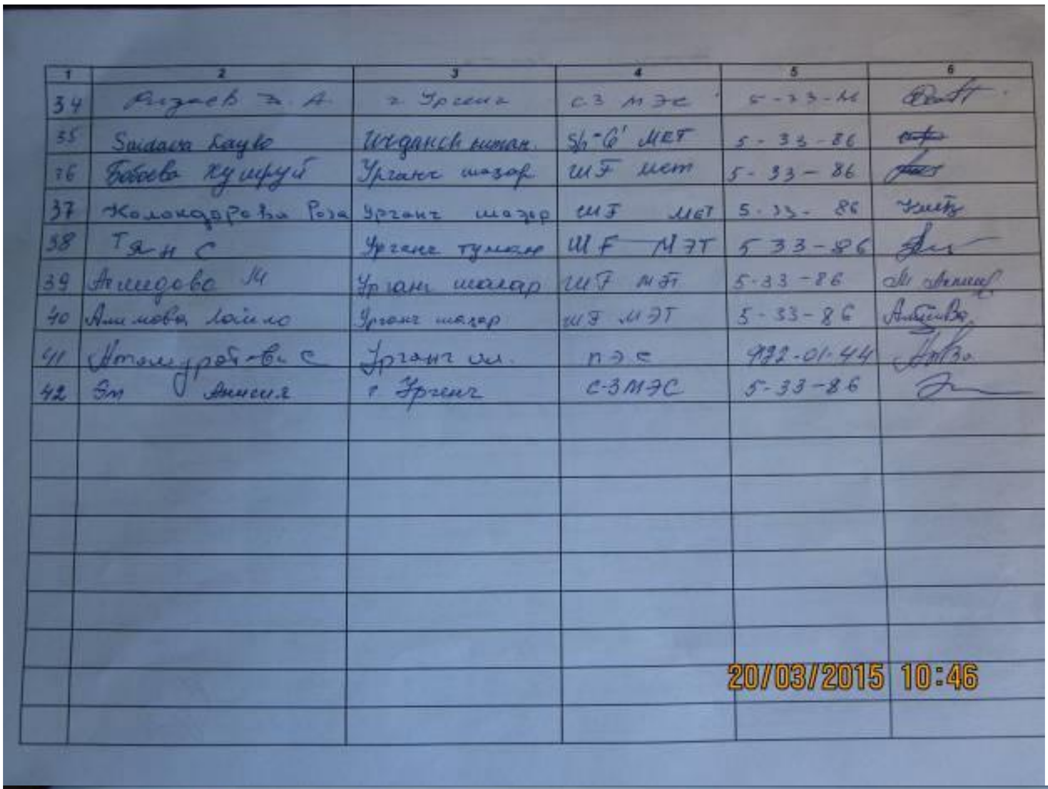
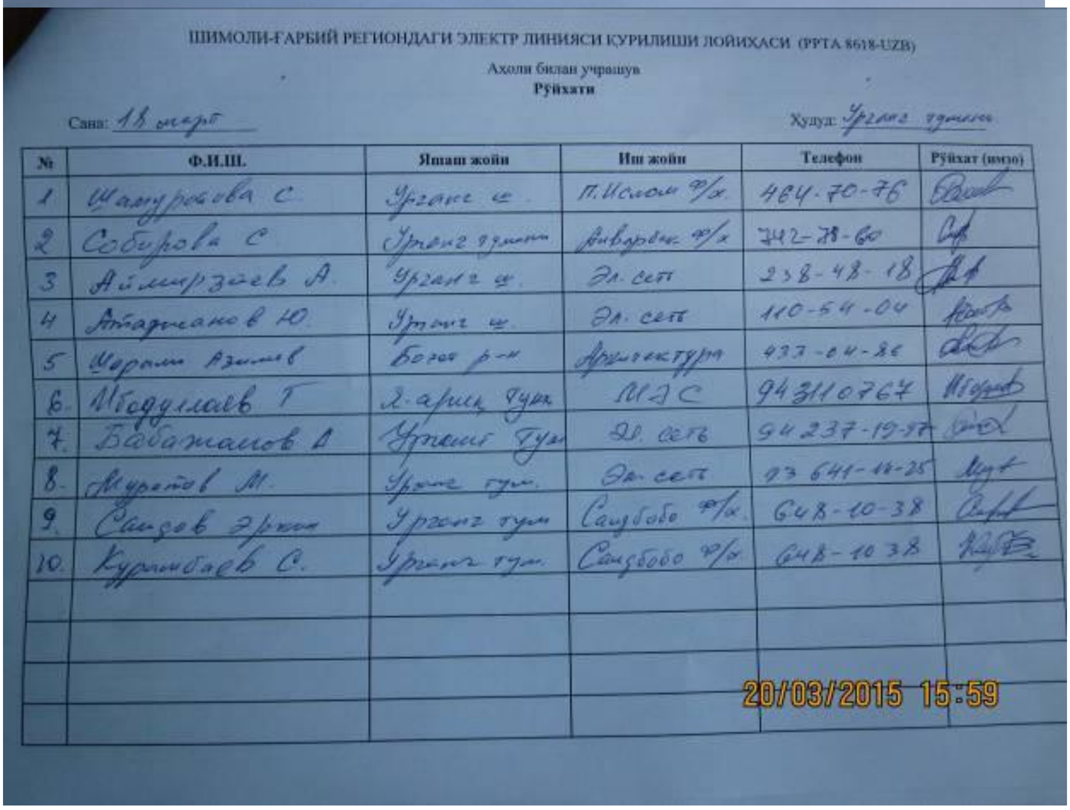


1	2	3	4	5	6
34	Ризаев З. А.	г. Ургенч	СЭ МЭС	5-33-86	
35	Saidova Xayro	Urganch shahar	ShG' MET	5-33-86	
36	Бобоева Хуршуд	Урганч шахар	ШF мет	5-33-86	
37	Холондорова Роза	Урганч шахар	ШF МЕТ	5-33-86	
38	Тян С	Урганч тумани	ШF МЭТ	5-33-86	
39	Ахмедова М	Урганч шахар	ШF МЭТ	5-33-86	
40	Аминова Лайло	Урганч шахар	ШF МЭТ	5-33-86	
41	Атамуродова С	Урганч ш.	ПЭС	992-01-44	
42	Эм Анисия	г. Ургенч	С-З МЭС	5-33-86	



ШИМОЛИ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИХАСИ (PPTA 8618-UZB)

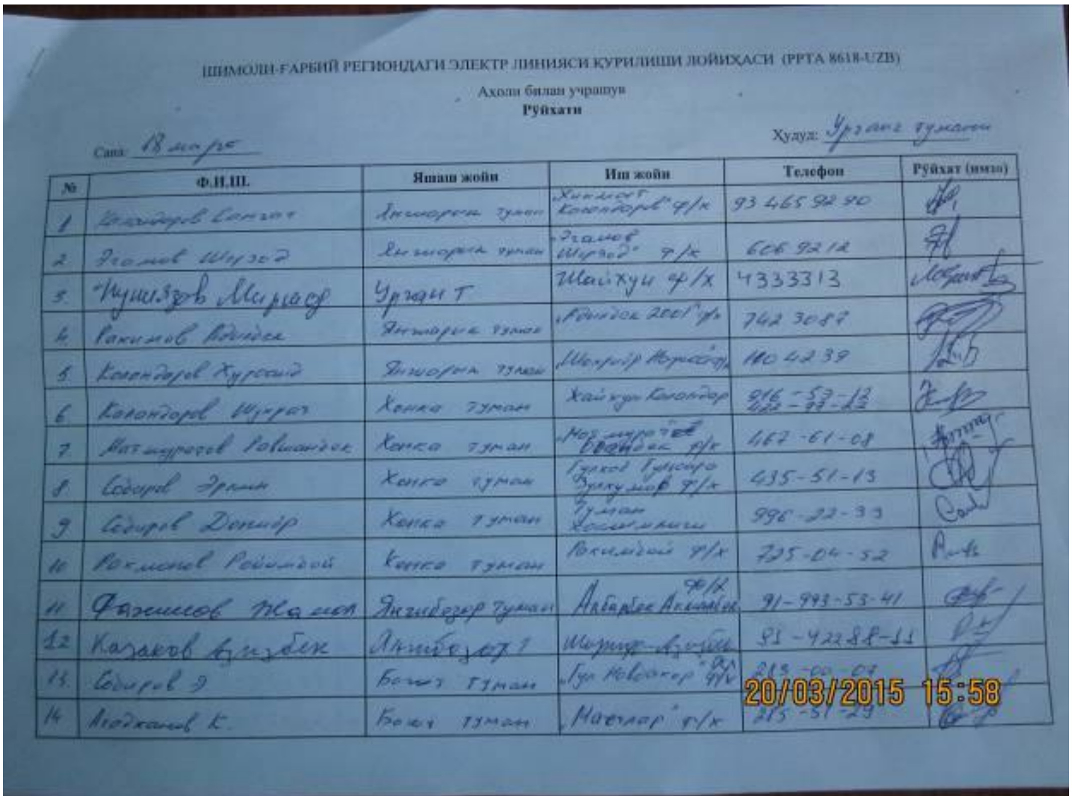
Ахоли билан учрашув

Рўйхати

Сана: 18 март

Худуд: Урганч тумани

№	Ф.И.Ш.	Яшаш жойи	Иш жойи	Телефон	Рўйхат (имзо)
1	Шамуродова С	Урганч ш.	П. Ислом ф/х	464-70-76	
2	Собирова С	Урганч тумани	Ашхобод ф/х	742-78-60	
3	Аймирзаев А.	Урганч ш.	Эл. сеть	238-48-18	
4	Атаджанов Ю.	Урганч ш.	Эл. сеть	110-54-04	
5	Шорахим Азимов	Богот р-н	Архитектура	437-04-86	
6	Абдуллаев Г	Я. ариқ тум.	МЭС	943110767	
7	Бабажанов А	Урганч Тум	Эл. сеть	94 237-19-97	
8	Муратов М.	Урганч тум.	Эл. сеть	93 641-16-25	
9	Саидов Эркин	Урганч тум	Саидбобо ф/х	648-10-38	
10	Курамбаев С.	Урганч тум.	Саидбобо ф/х	648-10 38	



ШИМОЛИ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИҲАСИ (PPTA 8618-UZB)

Аҳоли билан учрашув

Рўйхати

Сана: 18 марта

Ҳудуд: Урганч тумани

№	Ф.И.Ш.	Яшаш жойи	Иш жойи	Телефон	Рўйхат (имзо)
1	Каландаров Санжар	Янгиариқ туман	Хонақот Каландаров ф/х	93 465 92 90	
2	Эгамов Шерзод	Янгиариқ туман	Эгамов Шерзод ф/х	606 92 12	
3	Кушназаров Мирасф	Урган Т	Шайхун ф/х	4333313	
4	Рахимов Ахмадха	Янгиариқ туман	Ойдиол 2001 ф/х	742 3087	
5	Каландаров Хуршид	Янгиариқ туман	Шахрий Норматов	110 4239	
6	Каландаров Шухрат	Хонка туман	Хайкули Каландар	916-53-12 422-93-13	
7	Матмуратов Равшанбек	Хонка туман	Матмурат Бобонбек ф/х	467-61-08	
8	Бобуров Эркин	Хонка туман	Гулкол Гулсифо Эркинов ф/х	435-51-13	
9	Собиров Донибр	Хонка туман	Туман Хокимлиги	996-22-33	
10	Рахмонов Рейимбой	Хонка туман	Рахимбой ф/х	725-04-52	
11	Фазилов Жамол	Янгибозор туман	Акбарбек Акмалбек ф/х	91-993-53-41	
12	Казаков Азизбек	Янгибозор т	Шерзод Азизбек	91-42288-11	
13	Собиров Э	Боғот туман	Гул Навбахор ф/х	213-00-07	
14	Атажанов К.	Боғот туман	Матлар ф/х	215-51-29	

№	Ф.И.Ш.	Яшаш жойи	Иш жойи	Телефон	Рўйхат (имзо)
15	Курбанов М.	Боғот туман	Музо ф/х	703-43-49	
16	Гузибоев Ж.	Боғот туман	Эльмира Мансур ф/х	233-17-26	
17	Матмуратов М.	Боғот туман	Электросеть	922-10-09	
18	Такабаев Б	Урганч р-н	Жасурбек ф/х	516-23-34	
19	Уразметов О	— " —	Кодир 2. ф/х	435-20-19	
20	Сапаров М	Урганч р-н	Саидбоб ф/х	648-10-38	
21	Машарипов В Р	— " —	К.Машарипов ф/х	937-88-05	
22	Ан Артур	Урганч ш.	ШГМЭТ	557-41-4[illegible]	
23	Атажанов А	Урганч ш.	Эл Сеть	469-76-53	
24	Попов Нат. Вас.	г. Ургенч	Транс газ.	922-15-09	
25	Бердиев Камол.	г. Ургенч	Транс Газ.	577-60-66	
26	Рўзибоев Ғайрат	Урганч шаҳар	Ўзгипрозем Хор.	раб. 513-18-55	
27	Курязов Дилшод	Урганч шаҳар	Ўзгипрозем Хор.	513-18-55	
28	Рахимов Votirbek	Урганч шаҳар	Ўзгипрозем Хор.	513-18-55	
29	Камолов З.Р.	Урганч шаҳар	Ўзгипрозем Хор.	513-18-55	
30	Атаджанов Ш. М.	г. Ургенч	ПЭС	93 751-01-65	
31	Гафуров Ғайрат	Хазорасп	Архитектура	362-3325-[illegible]	

ШИМОЛИ-ҒАРБИЙ РЕГИОНДАГИ ЭЛЕКТР ЛИНИЯСИ ҚУРИЛИШИ ЛОЙИҲАСИ (PPTA 8618-UZB)

Ахоли билан учрашув

Рўйхати

Сана: 18-март Худуд: Урганч [illegible]

№	Ф.И.Ш.	Яшаш жойи	Иш жойи	Телефон	Рўйхат (имзо)
1	Жуманиязова Р.	Янгибозор р/н	Кенжабой бобо ф/х	93 284 45 59	
2	Жаманов И.	Янгиарик тум.	А. Инамов ф/х	93 653 11 99	
3	Эгамов М.	Янгиарик тум.	Эгамберган ф/х	93 754 42 01	
4	Мадримов Б.	Урганч р-н	Фаррух ф/х	94 115 00 30	
5	Довлетов К.	[illegible]	[illegible]	93-754-22-96	
6	[illegible] У.	Урганч шахри	[illegible] 725	922-55-01	
7	Раджабов Д.	Урганч Тум.	Эл. [illegible]	605-97-79	
8	Сапаров С.	Янгиарик	КЕМБАЦО	93-922-51-71	
9	Сапаев Р.	Янгиарик р-н	Б. Ашурбек ф/х	559-36-74	
10	Курбонниёзов Д.	Урганч ш.	Дониёрбек Зафар ф/х	746-04-05	
11	Содиков Ю.	Янгиарик	Тошботтемур	756-49-75	
12	Жабборов З.	Хонка р-н	З. Шокир ф/х	90 557-27-67	
13	Атажанов Р.	Хонка р-н	З. Каландаров ф/х	90 438-36-84	
14	Матниёзов Ойбек	Хонка р-н	С. Жирмиз ф/х	93 282-68-02	
15	Сапаев Ф.	Хонка ЭС	Хонка ЭС	606-83-36	
16	Тожиев Арзу	Хоразмрегион	Хоразмрегион	22-5-69-70	
17	Бекчанов Р.	Урганч р-н	Бексонбобо ф/х	93-486-56-06	
18	Аннаев И.	Богот р-н	Олмазор ф/х	93-282-01-79	
19	Рўзибоев У.	Богот р-н	Р. С. Рўзибоев ф/х	93-468-44-94	
20	Сапаров Ч.	Богот р-н	С. Ани Ю. Ан	ф/х 744-49-53	
21	Рахмонов У.	— //—	Элёзбаркамол ф/х	91-384-46 58	
22	Бердимуродов Э.	— //—	Хокимият	93-743-01-87	
23	Абдиримов Ш.	Хонка тум.	Эл. Сеть	22-533-86	
24	Ниёзов Шерзод	Хазорасп т.	Эл. Сеть	428-92-80	
25	Рўзметов Собир	Урганч тум.	Эл. сеть	22-533-86	
26	Хасанов Ф.	Урганч тум.	Эл. сеть	795-79-10	
27	Матназаров Х.	Урганч тум.	Эл. сеть	22-533-86	
28	Сабуров Р.	Урганч ш.	Эл. сеть	468-24-09	
29	Рахимов Р.	Урганч тум.	Эл. сеть	94-111-37-76	
30	Бакиев М.	Урганч тум.	Эл. сеть	22-533-86	
31	Жуманиязов Р.	Урганч шах	Эл. сеть	430-73-81	