Bi-Annual Environmental Monitoring Report

Project Number: 44198 – KGZ
ADB Loan/Grant Number: L2869/G0294-KGZ
Reporting period: July - December 2017

Kyrgyz Republic: Power Sector Rehabilitation Project, Phase 1

Prepared by the Open Joint Stock Company Electric Power Plants, with the assistance of the Project Implementation Consultant (Fichtner GmbH & Co. KG –Energy, Germany) for the Kyrgyz Republic and the Asian Development Bank.

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Abbreviations

ADB	Asian Development Bank
CC	Construction Contractor
Db	Decibel(s)
EMP	Environmental Management Plan within IEE
EPP	Electric Power Plant Company
ERP	Emergency Response Plan
ES	Environmental Specialist
FOC	Fiber Optic Cable
GRM	Grievance Redress Mechanism
GIB	Gas Insulated Bus
HPP	Hydro Power Plant
H&S	Health and Safety
HSE	Health, Safety and Environment
kV	Kilovolt
IPID	Investment Projects Implementation Department within EPP
IPIU	Investment Projects Implementation Unit within EPP
IEE	Initial Environmental Examination
JOC	JOC Technical Engineering Co. Ltd
LV	Low Voltage
OHL	Overhead Line
PAM	Project Administration Manual
PCB	Polychlorinated Biphenyl
PIC	Project Implementation Consultant = FICHTNER
PIU	Project Implementation Unit within EPP for 'Power Sector Rehabilitation Project'
PIG	Project Implementation Group
ROV	Remotely Operated (underwater) Vehicle
SAEPF	State Agency of Environment Protection and Forestry
SF6	Sulphur Hexafluoride
SPS	Safeguard Policy Statement
SSEMP	Site Specific Environmental Management Plan
XLPE	Cross-Linked Poly Ethylene
WB	World Bank

1. Introduction

1.1. Project background

1. The backbone of Kyrgyz power generation is the Naryn River with its several hydropower plants (HPP) Kambarata 2, Toktogul, Kurpsai, Tash-Kumyr, Shamaldy-Say and Uch Kurgan.

2. Electricity demand in Kyrgyz Republic is highly seasonal with two thirds of domestic consumption taking place in autumn and winter. Although electricity generation capacity has nearly doubled since the Soviet era, load shedding is frequent. This is especially the case in winter, when hydropower output is limited due to low river discharge, while cuts arise from problems due to technical failures in the outdated generating equipment.

3. Hydroelectric generation from the Naryn Cascade is central to the present and future economic development of the Kyrgyz Republic, also with view on an electric power generation and transmission system regionally managed between the Central Asian Countries in future.

4. However, the future security of this electricity capability is to be doubted somehow because of the age of most of the named facilities. These facilities are over 50 years old, obsolete and many spare parts are no longer available.

1.2. Project Description of Phase 1

5. In order to sustain power generation at HPP Toktogul located near Kara-Kul city (*Picture 1*) in future, the Asian Development Bank (ADB) is financing the rehabilitation of this hydropower station. For this purpose, an Initial Environmental Examination (IEE) with Environmental Management Plan (EMP) was prepared in 2012 and a final up-date was done on 28.02.2015 reflecting the actual technical measures which have been tendered in three lots:

- Lot 1 - Underwater Inspection;
- Lot 2 - Electrical Equipment;
- Lot 3 - High Voltage Cables.

Picture 1. Location of Toktogul HPP in the scale of the country

6. A supplementary IEE to a fourth lot was prepared in July 2017 and approved by ADB on 12th of October 2017.

- Lot 4 – Supplementary Works Rehabilitation of 500 kV Transition Point and of Outdoor Switchgear at the Toktogul HPP 500 kV Substation.

7. Lot 1 - *Underwater Inspection* - was won by the Korean Consortium BSR Co. Ltd and Aquadron Inc. The works, successfully completed in November 2015, comprised the inspection of all submerged Hydraulic Steel Structures by means of an ROV, including the supply of a new ROV, which became the property of the Cascade of Toktogul HPP for future inspections of Toktogul HPP and of the other power plants.

8. Lot 2 - *Electrical Equipment* - was won by the Chinese Company JOC Technical Engineering Co., Ltd. These works include the refurbishment or replacement of following electrical components:

- Four new special SF_6 type generator circuit-breakers;
- Replacement of Main Transformers for Units 1, 2, 3 and 4;
- Replacement of the 6 kV switchgear with auxiliaries;
- Replacement of the 0.38 kV unit related switchgear with auxiliaries;
- Replacement of the 0.38 kV general station switchgear;
- Replacement of station auxiliary transformer 15.75/6.3 kV;
- Replacement of LV unit auxiliary transformer 15.75/0.42 kV;
- Replacement of bus ducts;
- New protection equipment and FOC for Line Protection (cable and OHL) between powerhouse and 500 kV switchyard.

The works are ongoing.

9. Lot 3 - *High Voltage Cables* - was won by the Korean Consortium of LS Cable and System & SM Powertech. These works comprise the replacement of all four oil-filled cable systems by new 500 kV XLPE cable systems and are ongoing;

10. Lot 4 – Supplementary Works *Rehabilitation of 500 kV Transition Point and of Outdoor Switchgear at the Toktogul HPP 500 kV Substation* - was won by the Turkish Company GENSER. It includes the rehabilitation of about 5 km cable channel between substation and powerhouse and the refurbishment of the 500 kV Transition Point. Contract negotiations were conducted and signed in December 2017.

11. This bi-annual Environmental Monitoring Report covers the construction/ rehabilitation period from July to December 2017.

1.3. Documents relevant for Environmental Safeguard

12. The following documents were prepared for the Project and include environmental safeguards:

- Initial Environmental Examination (IEE) for Rehabilitation of Toktogul HPP. ADB - TA-7704 (KGZ) Power Sector Rehabilitation Project, May 2012;
- Project Administration Manual (PAM) to Power Sector Rehabilitation Project, May 2012;
- Financing Agreement between Kyrgyz Republic and ADB of September 2012. Schedule 5, clauses 16 – 21;
- Appendix B of the Special Conditions of the Contract between Fichtner and EPP;
- Supplementary Initial Environmental Examination (IEE) for Rehabilitation of Toktogul HPP. ADB - TA-7704 (KGZ) Power Sector Rehabilitation: Rehabilitation of 500 kV Transition Point and of Outdoor Switchgear at the Toktogul HPP 500 kV Substation (Lot 4).

13. The IEE (Lot 1 – Lot 3) describing the required actions for the EMP performance monitoring and supervision has been approved by ADB and the latest up-dated version is published on the ADB Website (http://www.adb.org/sites/default/files/project-document/154930/44198-013-iee-02.pdf).

14. In April 2012, the national State Agency on Environmental Protection and Forestry (SAEPF) issued the environmental approval (No. 01-21/1083 dated 25th of April 2012) to the Project based on this IEE/EMP report (Annex 1).

15. The supplementary IEE to Lot 4 was approved by ADB on 12th of October 2017. At present, the study is submitted to the State Agency on Environmental Protection and Forestry (SAEPF) and is waiting for the national approval.

1.4. Status quo of the rehabilitation works

16. The status quo of the works in December 2017 is as follows:

- Rehabilitation works to Unit 3 have been completed. Unit 3 was connected to the grid again since 10th of August 2017;
- Unit 2 was energized and connected to the grid again in December 2017. All four units generated energy and power to the grid (Unit 2 was shut down for rehabilitation works on 21st of August 2017);
- The transformer for Unit 1 is currently located at the border between Kazakhstan and China. It is foreseen to transport this transformer to Talas this year and to store it there until March 2018. The transformer is expected to arrive at Toktogul HPP at the beginning of April 2018;
- The manufactured and tested transformer for Unit 4 is currently stored in China, ready for shipping;
- New 500 kV cables for Unit 1 and Unit 4 are already located on site. Two remaining drums with cables for Unit 4 are currently in the process of manufacturing and will be delivered right in time in 2018;
- There is a delay of the construction progress of a bit more than 1 month due to custom issues and a transportation delay, as well as smaller technical problems with the trucks transporting the main transformer T2.

1.5. Construction activities and project progress during the reporting period

Lot 2, Electrical Equipment:

17. The following activities were under implementation during the reporting period for Lot 2 works:

Table 1: Activities implemented during reporting period (July – December 2017) for Lot 2

#	Month, 2017	Activity
1	July	• Finalization of installation works for Unit 3 related equipment, including main transformer, generator circuit breaker, cooling system, auxiliary transformer and unit related LV switchgear.
2	August	• Testing and commissioning of Unit 3 related new equipment. The whole Unit 3 related system has been operational since 10th of August 2017 and has been connected to the grid again (*Picture 2*). • 21st of August 2017 shut down of Unit 2. • Dismantling of the main transformer T2 and associated installations, as well as other equipment included in the scope of Lot 2. • Storage of transformer oil in tanks at the oil storage site.
3	September	• Dismantling of Unit 2 related new equipment, such as main transformer T2 and associated installations, as well as generator circuit breaker, cooling system, auxiliary transformer and unit related LV switchgear. • The main transformer T2 is already on the way from the manufacturing company in China but got presently stopped at the border between China and Kazakhstan due to custom issues.
4	October	• Installation works of Unit 2 related equipment, included in the scope of Lot 2, in progress, except for main transformer T2. • Main transformer T2 was on the way, but stuck on its way in Kazakhstan.
5	November	• Main transformer T2 delivered to Toktogul HPP site in mid-November. • Installation works of Unit 2 related equipment, included in the scope of Lot 2, in progress, including main transformer T2. • Dismantling and installation of common LV switchgear, Section II and auxiliary transformer T-42 in progress.
6	December	• Dismantling and installation of common LV switchgear, Section I and auxiliary transformer T-41 in progress. • Finalization of works on Unit 2 (• Picture *4*, • Picture *5*). • Testing and commissioning of Unit 2 related new equipment. • Connecting Unit 2 to the grid. • All four units generate power during winter time.

Lot 3, High Voltage Cables:

18. The activities undertaken in the reporting period for Lot 3 are shown in Table 2:

Table 2: Activities implemented during reporting period (July - December 2017) for Lot 3

#	Month, 2017	Activity
1	July	• Finalization of installation of 500 kV cable Unit 3 and its sealing, and connection to Unit 3. • Delivery of 500 kV cables rolled up on drums (Picture 3).
2	August	• Delivery of all remaining 500 kV cables rolled up on drums[1]. • Commissioning of the 500 kV cable of Unit 3. The cable has been operational since 10th of August 2017. • Dismantling of the 500 kV cable of Unit 2. • Storage of oil in drums at the oil storage area. • Dismantling of brickwork at the Transition Point Phases A,B,C
3	September	• Dismantling of the old 500 kV cable of Unit 2. • Installation of the new 500 kV cable of Unit 2.
4	October	• Installation of the new 500 kV cable of Unit 2 and its accessories.
5	November	*Picture 7*)
6	December	• Connection of the 500 kV cables to the transformer. • Completion of the commissioning Unit 2 Cable Line 500 kV XLPE cable and 525 kV GIB

Picture 2: New main transformer T3 operational since August 2017 - Status for September 2017.

Picture 3: Cable drums for delivery of 500 kV cables - Status for September 2017.

Picture 4: Newly installed main transformer T2 - Status for December 2017.

Picture 5: New cooling system for T2 - Status for December 2017.

Picture 6: New 500 kV cables of Unit 2 - Status for December 2017.

Picture 7: Cable Joint of new 500 kV cable - Status for December 2017.

Lot 4: 500 kV Transition Point and Outdoor Switchgear

19. The Turkish Company GENSER won the tender to the 'Rehabilitation works of 500 kV Transition Point and Outdoor Switchgear'. Contract negotiations were in December 2017 and Contract was signed at the end of December 2017.

1.6. Actual project organization and environmental management team

20. The Investment Projects Implementation Department (IPID), one of EPP's departments, was specially assigned for implementing projects funded by international development organizations such as the World Bank (WB), the Asian Development Bank (ADB), etc.

21. Currently, IPID is implementing two different projects (including ADB project). Within IPID, EPP established a dedicated Project Implementation Group (PIG) for implementing concerned components of the "Power Sector Rehabilitation Project" in February 2013.

22. The structure of IPID is as follows:

- Head of IPID;
- Deputy Head of IPID;
  1) Project Implementation Group (PIG) "Toktogul HPP Rehabilitation";
- Head of PIG;
- Deputy Head of PIG;
- Senior financial specialist of PIG;
- Senior engineer of PIG;
- Interpreter of PIG;
- Procurement specialist of PIG "Toktogul HPP Rehabilitation Phase 2 Project" (individual consultant);
- Financial specialist/Accountant of PIG "Toktogul HPP Rehabilitation Phase 2 Project" (individual consultant);
- Environmental safeguards specialist of PIG "Toktogul HPP Rehabilitation Phase 2 Project" (individual consultant);

  2) PIG "At-Bashy HPP Reconstruction";
  3) PIG "Kambarata HPP second unit input"

23. The IPID will administer all consulting and procurement contracts on behalf of EPP. It is responsible for bid evaluation, contract award, construction supervision, and report to the Government and ADB.

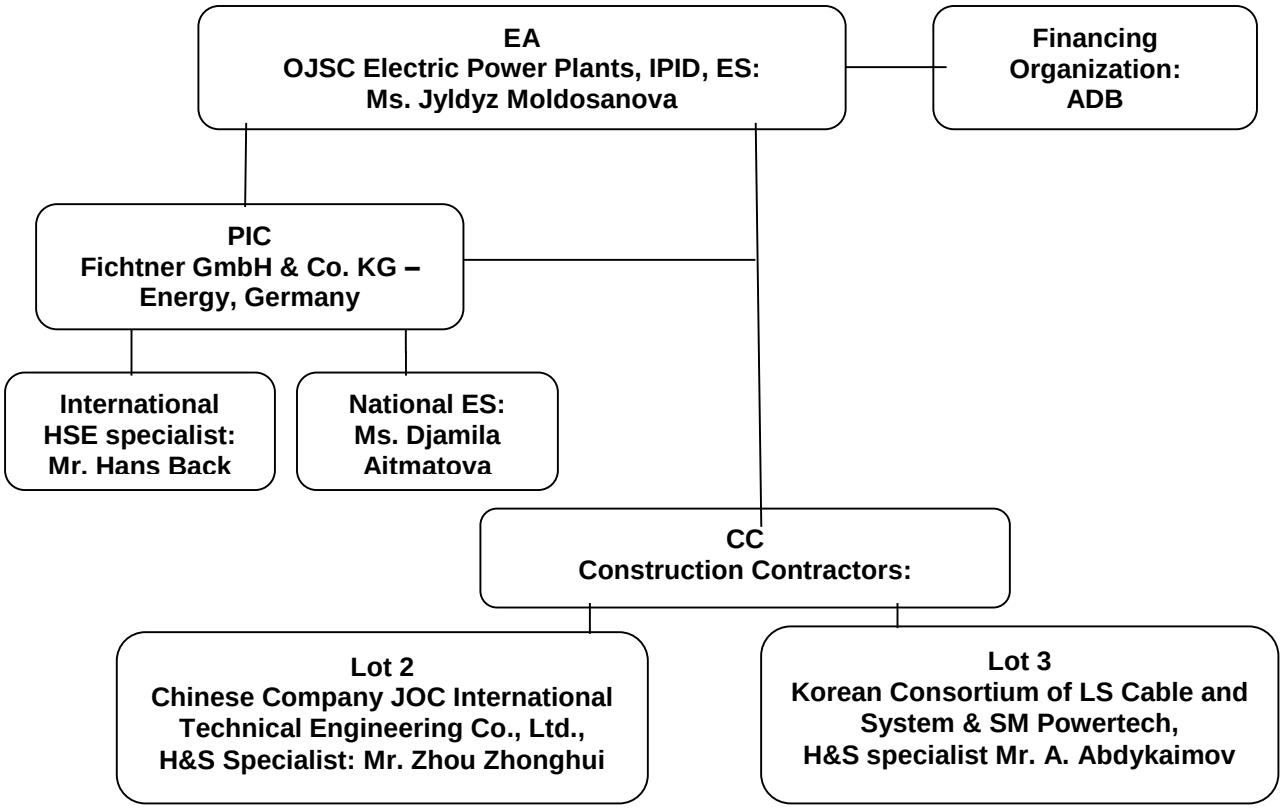
24. The IPID Head reports directly to the Deputy General Director of EPP. The IPID is the main point of contact for working communication between EPP and ADB. The IPID coordinates the consultants and contractors.

25. The IPID, assisted by the PIC, submits necessary project plans, tender evaluation reports, progress reports, applications for withdrawal of funds, and any other required reports to ADB and the Government.

26. Within EPP, a department named 'Service of Reliability and Safety' exists. It is the responsible department for dealing with all safety and health issues relevant for workers at the HPPs. Environmental aspects are not covered by this department. The headquarters of this Service are based at Bishkek with six people working in it. There are branches of this service established in the Oblasts. In Djalal-Abad Province three of them exist. The one at Kara-Kul is responsible for Toktogul HPP.

27. For construction, EPP as the responsible IPID for the Project, recruited Fichtner as PIC for Phase 1 of the Toktogul Rehabilitation Project (Project Management and Supervision of Toktogul HPP Component). In this sense, the national and international team of consultants assist EPP as project supervision consultant on the rehabilitation of Toktogul HPP.

28. The structure diagram of the agencies involved in the environmental management during implementation of Toktogul Rehabilitation Phase 1 Project is as follows:



Scheme 1: *Environmental management of the Power Sector Rehabilitation Project, Phase 1 (as on December 2017)*

1.7. Relationship between Contractors, Project Owner and Lender

29. It should be noted that the connection of the Client, Contractors and Lenders are characterized by their active and productive nature. There were many meetings of EPP/PIU/PIC staff with the construction contractors on site and in the EPP office conducted on the regular basis. Lots of issues were discussed by telephone and by email. The Contractors regularly provide their daily and weekly reports, which are reflected in PIU/PIC bi-annually and quarterly progress reports.

30. The connection of the Project/EPP/IPID/PIC personnel with ADB staff was implemented via regular meetings and discussions of arising issues by email and in person. The ABD staff provided advice and conducted monitoring over the Project activities.

2. Instrumental Environmental Monitoring

31. According to IEE/EMP, it is not planned to measure instrumentally parameters of water, air and noise. During the routine works, impacts being harmful to the environment are not expected to occur.

2.1. Water quality monitoring

32. No instrumental measurements of water quality are foreseen for this Project according to IEE/EMP. The Project does not impact water bodies as all works will be implemented at a safe distance to water sources.

2.2. Air quality monitoring

33. No instrumental measurements of air quality are foreseen for this Project according to IEE/EMP.

34. Significant dust emissions of works done during the reporting period did not occur. Exhausts from trucks transporting cement, gravel and concrete can be considered to be minimal and truck movements are restricted to Toktogul HPP (except for transportation of equipment to the site).

2.3. Noise and vibrations monitoring

35. A regular instrumental monitoring of noise and vibrations is not foreseen for this Project according to IEE/EMP. However, the construction contractor is obliged to take care that workers shall wear ear protectors when 85 dB(A) are exceeded.

2.4. Flora and fauna monitoring

36. According to the IEE/EMP, monitoring of flora and/or fauna is not foreseen for this Project. All works take place within the fenced area of Toktogul HPP or even within existing buildings. All access roads are already paved. Flora and fauna is not affected by the rehabilitation works.

3. Environmental Management

3.1. Environmental Safeguards Program

37. The aim to implement the environmental safeguard program is to ensure that the preparation, design, construction, implementation, operation and decommissioning of the Project and all Project facilities comply with (a) all applicable laws and regulations of the Beneficiary relating to environment, health and safety; (b) with the environmental safeguards requirement as set out in the SPS (ADB Safeguard Policy Statement, 2009); and (c) with all measures and requirements set forth in the IEE/EMP, and any corrective or preventative actions set forth in a Safeguards Monitoring Report.

38. The different obligations of the Beneficiary in this regard are given in the Financing Agreement between Kyrgyz Republic and ADB of September 2012 in Schedule 5, paragraphs 16 - 21.

3.2. The Environmental Management System (EMS), Site-Specific Environmental Management Plans (SSEMPs), and work plans.

3.2.1. Contractor's Health & Safety (H&S) Plan and SSEMPs

39. The following table identifies the status of environment documentation on the Project:

Table 3: Status of environment documentation on the Project

Management Plan	Status
Site-Specific EMP (SSEMP) for oil storage facility construction. Lot 3	Submitted on 03.11.2016 and **Approved** on 13.12.2016.
Site-Specific EMP (SSEMP) for dismantling and installation works of cable systems. Lot 3	Submitted on 20.01. 2017 and **Approved** on 31.03.2017.
Site-Specific EMP (SSEMP). Lot 2	Submitted on 12.12.2016 and **Approved** on 02.05.2017
Emergency Response Plan (ERP). Lot 3	Submitted on 21.12.2015 and **Approved** on 29.12.2015
H&S plan. Lot 3	Submitted on 18.05.2016 and **Approved** on 14.09.2016
H&S plan. Lot 2	Submitted on 06.03.2017 and **Approved** on 12.05.2017

40. H&S Plans for Lot 4 will be developed as the contract between EPP and designated Turkish contractor GENSER was signed at the end of December 2017.

3.2.2. Main mitigation measures implemented as stipulated in the IEE/EMP

41. As shown and discussed in previous semi-annually reports, the implementation of following main installations and processes is finalized:

- Erection of a proper oil storage area;
- Erection of a proper scrap metal storage area;
- Purchase of a PCB measuring device for EPP laboratory on site including teaching and training the use of it;
- The Grievance Redress Mechanism (GRM) is fully implemented.

42. The works mentioned above have been the precondition to fulfill some of the main requirements outlined in the IEE/EMP regarding waste management.

3.3. Site Inspections and Audits

43. Site inspections and audits in the reporting period are shown in Table 4 below:

Table 4: Site visits and audits in the reporting period

Organization	Purpose	Performed by	Date
EPP	Site audit of actual construction sites at Toktogul HPP	Environmental Specialist Ms J. Moldosanova	18.07.2017-20.07.2017.
EPP	Site audit of actual construction sites at Toktogul HPP	Environmental Specialist Ms J. Moldosanova	23.08.2017-24.08.2017.
PIC Fichtner	Site visit of actual construction sites at Toktogul HPP	PIC Fichtner: International ES Mr. H. Back; National ES Ms. D. Aitmatova	19.09.2017.
EPP	Site audit of actual construction sites at Toktogul HPP	Environmental Specialist Ms J. Moldosanova	06.10.2017-07.10.2017.
PIC Fichtner, EPP	Site visit of actual construction sites at Toktogul HPP	PIC Fichtner: International ES Mr. H. Back; National ES Ms. D. Aitmatova EPP: ES Ms. J. Moldosanova	05.12.2017.

3.4. Results from On-Site Inspections

On-Site Inspections July-August 2017

44. The July-August inspections were conducted by Ms Jyldyz Moldosanova, EPP PIU's environmental specialist. During the inspection construction sites outside and inside of the HPP were visited and oil test for PCB was conducted. The PCB oil testing information and photos are provided below in the relevant Section of the current EM Report. Mitigation measures and project activities were discussed with HS&E specialists from both contractors.

45. The visit showed that all the workers at the site wear PPE and strictly observe safety requirements. No any accident happened at sites.

Picture 8. Workers of Korean CC wearing PPE met relevant H&S requirements – August 2017.

46. During the inspection no serious non-compliances were found. The ones, which were found, were immediately corrected by the relevant HSE staff.

Picture 9. Workers of Chinese CC wearing PPE met the relevant H&S requirements, August 2017.

47. As planned, the pipeline for draining the cable oil in the barrel was installed. The oil from the cable was drained to the barrels via the transfer point. The selected way of the oil drain was reliable as it reduced the risks of oil spills and saved the time and effort of the workforce. No oil leaks took place and all the works passed sustainably (see below Picture 10). Drained oil from the cable line Unit 2 was stored in 185 l drums (total about 32,5 tons) at the oil storage area (Certificate of Acceptance is in Annex 2: Acceptance certificate of services dated 16 October 2017 to the Contract #34-20/408 of 12 October 2015).

Picture 10. Oil draining from Unit 2 Cable Line 500 kV of Toktogul HPP. Using of the pipeline for draining the cable oil in the barrel.

48. As planned the cable cut was stored in containers and placed temporarily at the Toktogul HPP outside storage protected area.

49. Scrap metal was temporarily stored at the scrap metal storage site intended for keeping parts of demounted power equipment and had already been completed before reporting period. According to SSEMP the scrap metal is planned to be sold out by the Client/EPP through its internal procedures. EPP internal procedures is in process. Scrap metals are stored safely until recycling.

50. Dismantling of brickwork at the Transition Point was implemented with health and safety and environmental compliances by Korean CC. The used heavy truck was in a good condition without oil leakage.

Picture 11. Dismantling of a brickwork at the Transition Point of Toktogul HPP and used heavy truck.

51. For appropriate management of construction waste during the Project, the Order #498 ‘‘On construction waste storage‘‘ was issued by the Cascade of Toktogul HPPs on 3rd of July 2017 (Annex 3). According to this Order, construction wastes are stored

at the special area of the storage #3 of the Toktogul HPPs by the Contractors (Picture 12).

Picture 12. Construction waste and scrap metal storage at the protected and fenced storage #3 of Toktogul HPP – Status for August 2017.

On-Site Inspections September-October 2017

52. The September inspection was conducted by Mr. Hans Back, PIC's international environmental consultant and the local environmental expert Ms. Djamila Aitmatova. The inspection was guided by Mr. Otar Gavasheli, Team Leader, and Mr. Abdylda Israilov, local engineer, both from the Project Implementation Consultant Fichtner.

53. Following responsible people from the contractors were interviewed:

- From the Korean Consortium of LS Cable and System & SM Powertech: Mr. A. Abdykaimov, HSE officer, and Mr. Lee Kyung Jin, General Manager of SM Powertech;
- From the Chinese Company JOC Technical Engineering Co., Ltd.: Mr. Zhou Zhuoping, Representative, and Mr. Zhou Zhonghuz, HSE Manager (*Picture 13*).

Picture 13. Meeting with the Chinese contractor.

54. For the time being, about 40 local people are working for the Korean contractor onsite including four women performing office work. Six Koreans are staying in the country for this project – three persons on site and three persons in Bishkek. All employees are living either at Kara-Kul (locals) or in hotels.

55. In September 2017, the Chinese contractor employed 30 people. 20 of them are locals from Kara-Kul. Three translators and seven Chinese employees are living in rented houses.

56. Neither the Korean nor the Chinese contractor has reported of any severe incident or even accident on the construction site. There have no complaints been raised so far, neither by workers nor by the population.

57. During the construction site visit no serious non-compliances have been found. The construction sites looked clean and well organized. Warning signs and instruction plates are in place (*Picture 14*).

Picture 14: Warning and instruction signs inside of Toktogul HPP of CC JOC – Status for September 2017.

58. Visited sites inside of Toktogul HPP demonstrated that all the safety requirements are met by the working personnel of the Construction Contractors. All the workers wear PPE during working at height, e.g. at the switchyard site workers are wearing and using harnesses (*Picture 15*, *Picture 16*).

59. No major oil pollution could be found due to the dismantling process of main and auxiliary transformers and 500 kV cables.

60. Oil from the main transformer T2 is now stored in tanks at the oil storage area and at the fenced storage site #3 of Toktogul HPP (*Picture 17*, *Picture 18*). According to EMP, oil from main transformers shall be reused. Oil can be refined on HPP Toktogul site.

61. The cable cut in pieces is temporarily stored in containers set at storage area of Toktogul HPP inside the fenced and protected area (*Picture 23*).Cut metallic tubes covering former 500 kV cables are prepared for recycling. (*Picture 20*).Wooden containers used for delivery of electrical equipment are temporarily stored near the scrap metal area (*Picture 21*).

Picture 15: Working at height at LV switchgear – Status for September 2017.

Picture 16: Workers are wearing and using proper harnesses – Status for September 2017.

Picture 17: Oil storage tank for transformer oil from main transformer T2 (black arrow). Cable oil from Unit 2 is stored in the blue drums - Status for September 2017.

Picture 18: Storage tanks for old transformer oil in the fenced storage area of Toktogul HPP - Status for September 2017.

Picture 19: Containers with cut pieces of cable of Unit 2 are stored temporarily along the access road to Toktogul HPP site -Status for September 2017.

Picture 20: Cut metallic tubes covering the former 500 kV cable to be prepared for recycling - Status for September 2017.

Picture 21: Temporary storage of empty wooden containers used for delivery of different equipment – Status for September 2017.

62. On-Site Inspection in October was conducted by EPP Environmental Specialist Ms Jyldyz Moldosanova. The SSEMPs implementations were inspected at site as well as the implementation of internal procedures for project works by the Cascade of Toktogul HPPs. SSEMPs were fully implemented by both Contractors. And internal procedures of Toktogul HPP administration are being conducted. Discussions on environment protection measures were provided with staff of the Contractors and HPP.

63. Workers from both Contractors wore PPE and implemented works according to health and safety requirements and regulations (*Picture 22*). Visiting sites inside of Toktogul HPP demonstrated that all the safety requirements are met by the working personnel of the Construction Contractors. The construction sites looked clean and well organized.

Picture 22. Laying of Cable XLPE at Toktogul HPP by Korean Contractor – Status for October 2017.

64. Dismantled cable 500 kV of Unit 2 was cut and put in containers with full implementation of environmental and health and safety requirements. Those containers were stored at fenced and protected storage #3 of Toktogul HPP outside of HPP until recycling along with previous containers with dismantled cable 500 kV of Unit 3 (*Picture 23*).

Picture 23. Metalic containers containing the dismantled cable line of Unit 2 of Toktogul HPP. Clean surrounding area – status for October 2017.

On-Site Inspection December 2017

65. In December 2017, beside Mr. Hans Back and Ms. Djamila Aitmatova (Fichtner) Ms Jyldyz Moldosanova from EPP ES joined the team. Mr. Abdylda Israilov, local permanent engineer from Fichtner, guided the site visit.

66. Following responsible people from the contractors have been interviewed:

- From the Korean Consortium of LS Cable and System & SM Powertech: Mr. Lee Kyung Jin, General Manager of SM Powertech, and Mr. Ermek Sooronbaev, site manager of the subcontractor.
- From the Chinese Company JOC Technical Engineering Co., Ltd.: Mr. Zhou Zhonghuz, H&S Officer, and Mr. Wei Bin, the Project Manager.

67. During the site visit no workers from the Korean contractor were onsite. Only some office staff was working. From 6th of December 2017 on 16 additional workers started the work again to connect the cables to the electrical system.

68. 34 men from the Chinese contractor JOC are working onsite at present (15 Chinese and 19 locals). Women are not employed.

69. Neither the Korean nor the Chinese contractor has reported of any severe incident or even accident. No any complaints have been raised so far, by workers or by the population.

The construction sites looked clean and well organized (

70. , *Picture 25*). Warning signs and instruction plates are in place.

The two transformers already have been replaced and stored inside the power house at the moment. Because of their heavy weight they have to be dismantled by EPP before transport (

71.).

Picture 24: Already replaced old transformer waiting for dismantling. Clean surrounding - Status for December 2017.

Picture 25. Clean construction site in the power house of Toktogul HPP - Status for December 2017.

72. Waste is segregated and stored in separate wooden containers (*Picture 27*, *Picture 27*).

Picture 26: Container for wooden waste and paper waste - Status for December 2017.

Picture 27: Container for scrap metal - Status for December 2017.

73. Four turbines are running, the fourth was connected to the grid on in December 2017. Thus, the power supply of the population is not restricted by rehabilitation works in winter, when the power demand is highest.

74. Visited sites inside of Toktogul HPP demonstrated that mostly safety requirements are met by the working personnel of the Construction Contractors. All workers wear helmets, warning vests and working shoes.

75. No major oil pollution could be found due to the dismantling process of main and auxiliary transformers and 500 kV cables.

76. According to EMP and EPP internal procedures, the cable oil in drums will be sent to Osh TPP for burning until March-April 2018.

77. All containers with the 500 kV cable cut in pieces are now stored at the HPP storage site #3 and waiting for being sold to a certified recycling company.

78. Metallic waste is also stored outside the scrap metal area near the oil storage site (*Picture 28*).

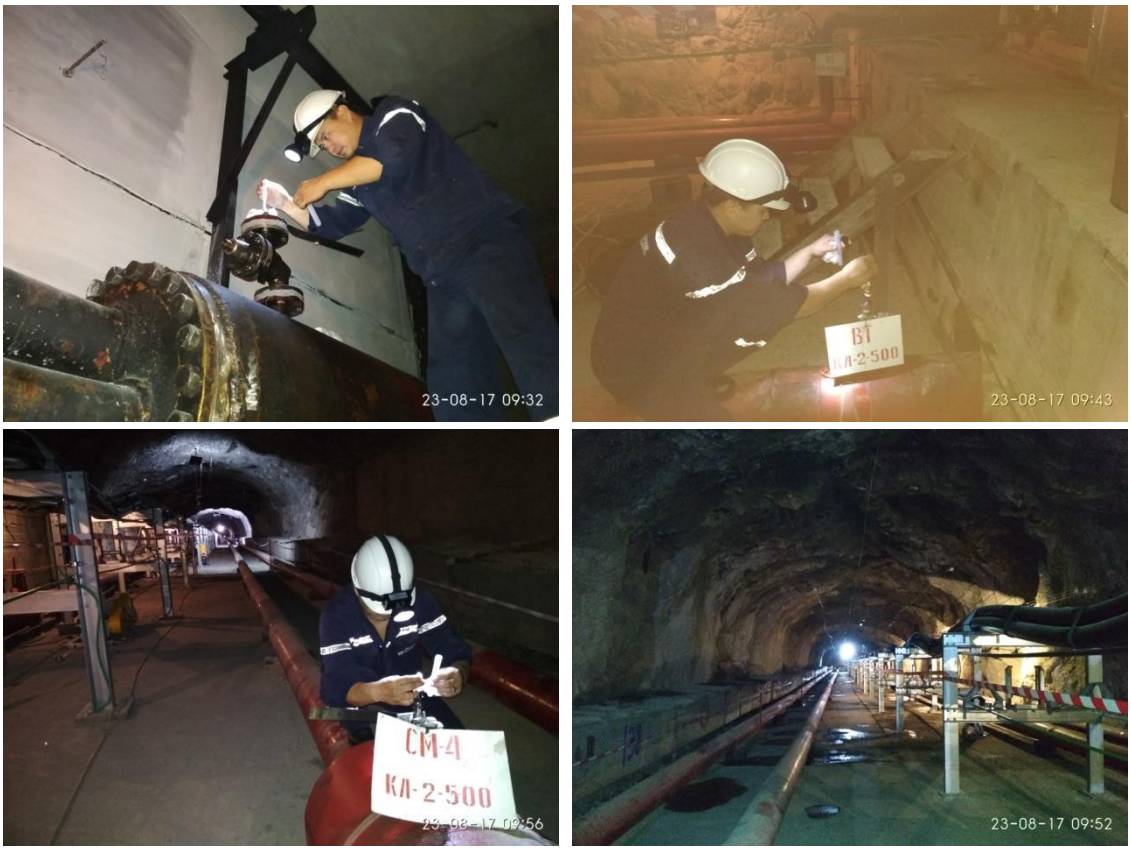
Picture 28: Scrap metal stored temporally kept at the storage area - Status for December 2017.

3.5. Oil testing for PCB

79. As identified in IEE and EMP of the Project, a quick test for PCB needs to be done before draining of oil-filled components. Cable and transformer oil test for PCB was implemented in August 23 before draining oil. Unit 2 related facilities were dismantled at reporting period.

80. During sampling the cable and transformer oil, the Cascade of Toktogul HPP Chemical laboratory personnel jointly with Ms Jyldyz Moldosanova took 8 samples from different points and equipment: four samples from Unit 2 main transformer (*Picture 29*) and four samples from Unit 2 cable line 500kV (*Picture 30*). Oil testing for PCB was made by L2000DX Analyzer (Picture 32).

Picture 29. Oil sampling from Unit 2 main transformer of Toktogul HPP



Picture 30. Oil sampling from Unit 2 Cable Line 500 kV of Toktogul HPP.

81. Oil samples were analyzed at the same day by L2000DX Analyzer at Chemical Laboratory of the Cascade of Toktogul HPP (*Picture 31*).

Picture 31. Cable and transformer oil samples ready for test by L2000 Analyzer DX.

82. All 8 samples were analyzed for PCB by the Chemical Laboratory of Cascade of Toktogul HPP personnel. Results (see below Table 5) confirmed the previous analyses made in 2014 presented in IEE set up to the Project.

Picture 32. Performing of oil test for PCBs by Toktogul HPP personnel.

Table 5. Results of the chemical analyses for PCBs in cable and transformer oil of Unit 2 oil filled equipment of Toktogul HPP (Analyzer L2000DX)

No	Location/equipment/points/code	Number according to Analyzer protocol	Results (ppm PCB)
1	Unit 2 T-2 main transformer tank	(№00010)	6,84
2	Unit 2 T-2 main transformer case (phase/live A)	(№00011)	9,72
3	Unit 2 T-2 main transformer case (phase/live B)	(№00012)	8,37
4	Unit 2 T-2 main transformer case (phase/live C)	(№00013)	10,5
5	Unit 2 Cable line-2 -500 СРМ	(№00014)	6,46
6	Unit 2 Cable line-2 -500 ВТ (Upper point of the cable line)	(№00015)	3,09
7	Unit 2 Cable line -2-500 СМ-4	(№00016)	1,31
8	Unit 2 Cable line -2-500 ППфВ (Transition point)	(№00017)	3,24

Picture 33. The automatically generated reports of the analyses made by L2000DX.

83. The PCB concentrations in all samples were below 50 µg/kg. Thus, these **oils can be considered to be free of PCB** and no specific measures in handling or disposing them are needed. The consolidated automatically generated report is attached in Annex 4.

84. It is required to mention that the same oil test for PCB was performed in first half-year of 2017 when Unit 3 oil containing facilities were dismantled. That oil result

showed also that cable and transformer oil were free of PCB (PSRP Bi-annual Environmental Monitoring Report covering period January – June 2017 https://www.adb.org/sites/default/files/project-documents/44198/44198-013-emr-en.pdf).

Additional Scope of Work

85. In January 2017, Lot 4 to the Power Rehabilitation Project 'Additional Secondary Electrical Equipment at the Toktogul HPP 500 kV Switchyard' has been approved by ADB. It is considered that potential environmental impacts of Lot 4 are mainly covered by the IEE to the overall Project.

86. For this additional work a supplementary IEE report was developed and submitted to ADB for approval on 14th of August 2017. Special attention in this study was directed to the handling of asbestos containing material. ADB approved the report on 12th of October 2017. The report has been submitted by EPP to the State Agency of Environment Protection and Forestry for national approval.

3.6. Non-compliance Notices

87. The Chinese contractor designated some areas where ear plugs have to be worn. The HSE officer was informed about this fact and requested to take immediate measures. The HSE officer and the site manager have been prompted to take care that all workers shall wear ear plugs in these noisy areas at any time.

88. One worker was found to work with a noisy grinding machine within an area designated as high noise area without ear protecting devices. The HSE officer and the site manager were informed about this fact and corrective measures have been taken immediately.

3.7. Corrective Action Plan

89. In order to comply with the EMP, EPP/ADB agreements as well as ADB and national environmental safeguard requirements, the following corrective actions shall be implemented (**Table 6**):

Table 6: Corrective Action Plan

#	Issue	Action required	Due Date as given in last bi-annual report	Status / New Due Date	Responsible for implementa-tion/ monitoring
1.	Additional rehabilitation measures at 500 kV switchyard and cable duct	For the time being none		Suppl. IEE report approved by ADB, and further submitted for national approval	EPP, PIC
2.	Construction waste from civil works	Issued an Order #498 dated 03/07/0217 "On construction waste management" by Toktogul HPP administration. Measures of construction wastes storage (concrete, asbestos containing material) will be identified in environmental monitoring plan of CC/Lot 4.	Latest before start of civil works to Lot 4	Latest before start of civil works to Lot 4	EPP/ PIC

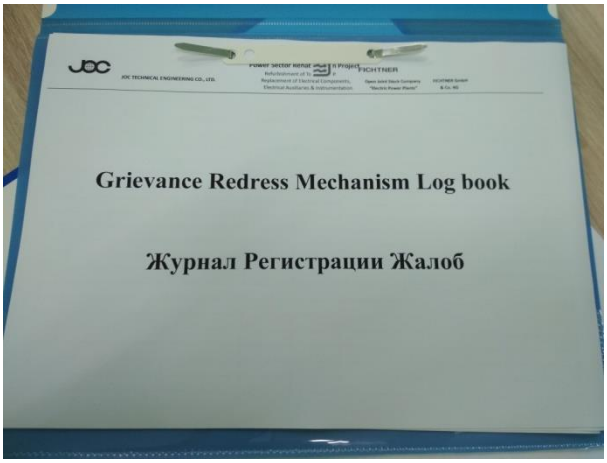
#	Issue	Action required	Due Date as given in last bi-annual report	Status / New Due Date	Responsible for implementa-tion/ monitoring
3.	General survey of the slope at the road, 1 km from the HPP's checkpoint regarding possibility of rock fall	Contact with relevant expert community and field trip to the Site	March 2017, before arrival of the trucks with transformer from China	The slope at the road is under daily survey of the PIC and EPP staff. Fallen rocks are removed immediately.	PIC
4.	Analyze oil from the equipment to be replaced for PCB	Analyzes are done if needed	April-May 2017	Implemented in August 2017	EPP, PIC
5.	Emptying drums and tanks for further storage of oil being removed until April 2018	For the time being, almost all storage drums and tanks are filled with old oil from 500 kV cables and transformers being replaced. Drums and tanks have to be emptied to create new empty space for oil.		April 2018	EPP

3.8. Grievance Redress Mechanism

90. ADB's safeguard policies require that any persons, who may undergo under the adverse effects of the Project activities, must be informed in advance about possibilities of making complaints through Grievance Redress Mechanism (GRM), if the Project activity generates any negative impact on their health or create certain inconveniences for their livelihoods. GRM was developed within the scope for preparing the IEE and EMP. This GRM shall be maintained during the whole duration of the Project's implementation. It describes the mechanism how to redress the affected peoples' (AP) grievances in a timely and effective manner. Details of the GRM can be found in the up-dated IEE to the Project. The former GRM has been completely replaced by a GRM applicable for all ADB projects in the Kyrgyz Republic.

91. GRM now is fully implemented. All the required awareness-raising materials were distributed among the local people and the GRM Log Book was arranged.

92. Both Korean and Chinese Construction Contractors have GRM Log Books at sites (*Picture 34*). There have no complaints been raised so far, neither by workers nor by the population. GRM log books are filled up appropriately.



Picture 34. Compliance Books in the field offices of the Construction Contractors and are easily accessible.

3.11. Conclusions

● The construction sites look clean and well organized. All construction areas out of Toktogul HPP building are monitored on constant basis by video camera. Fire-protection and first aid means are complete and in compliance.

● Construction Contractor LS&SM Power Tech Co. is implementing SSEMP/EMP requirements on relevant level: all construction materials, dismantled pipes from cable, liquid and other materials are stored relevantly, on impervious basis. Equipment of Contractor is in good status, no any spills or leakages were observed. Workers are very well equipped by PPE. Warning signs and information boards were properly placed.

● HS instructions are going on daily basis. Workers receive additionally milk as a prevention of risks for health.

● Environmental documentation of this Contractor is in order; complaints log book is in place. Contractor submits to EPP environmental monitoring reports every month and check-lists every week.

● Contractor submits to EPP environmental monitoring reports every month and check-lists every week. No records about accidents on construction sites were made.

● Construction Contractor JOC mostly fulfils the requirements of EMP/SSEMP: environmental documentation is in order; workers equipped by PPE, work areas are fenced. HS instructions are going on daily basis. In some cases violations of health and safety rules were detected. Immediate corrective measures have been taken. Workers are equipped by PPE. Warning signs and information boards were properly placed. No major oil spills could be detected. Waste is handled properly.

● Contractor submits to EPP environmental monitoring reports every month and check-lists every week. No records about accidents on construction sites were made.

ANNEXES

Annex 1: The environmental approval on IEE developed for the Project Phase 1, issued by SAEPF

КЫРГЫЗ РЕСПУБЛИКАСЫНЫН
ӨКМӨТҮНӨ КАРАШТУУ КУРЧАП
ТУРГАН ЧӨЙРӨНҮ КОРГОО
ЖАНА ТОКОЙ ЧАРБАСЫ
МАМЛЕКЕТТИК АГЕНТТИГИ

720001, Бишкек ш., Токтогул көч. 228
тел.: (996-312) 35-27-27, факс: 35-31-02

ГОСУДАРСТВЕННОЕ АГЕНТСТВО
ОХРАНЫ ОКРУЖАЮЩЕЙ
СРЕДЫ И ЛЕСНОГО ХОЗЯЙСТВА
ПРИ ПРАВИТЕЛЬСТВЕ
КЫРГЫЗСКОЙ РЕСПУБЛИКИ

720001, г. Бишкек, ул. Токтогула, 228
тел.: (996-312) 35-27-27, факс: 35-31-02

25.04 2012 г. № 01-21/1083

ОАО «Электрические станции»

Государственное агентство охраны окружающей среды и лесного хозяйства при Правительстве Кыргызской Республики рассмотрев представленный отчет о предварительной экологической оценке (ПЭО) проекта АБР «Реабилитация сектора энергетики КР» сообщает.

Зона реализации проекта находится в Джалал-Абадской области.

Проектом предусмотрено провести следующие реабилитационные работы на Токтогульской ГЭС:

- Реабилитация периферийных отделов генераторов;
- Замена четырех выключателей генератора, работающих на масле современными выключателями SF6;
- Замена четырех заполненных маслом кабелей на 500 кВ длиной приблизительно в 1 150 метров каждый. Эти кабели содержат все вместе приблизительно 250 000 литров старого отработанного кабельного масла, от которого нужно освободиться;
- Возобновление противопожарной системы главных трансформаторов. Старая система основана на системе распыления с использованием воды для того, чтобы охладить систему. Она будет заменена системой, с использованием N_2 (газообразный азот), который вдувается в трансформаторы при пожаре.

При реализации проекта предполагаемые воздействия на окружающую среду могут быть связаны с:

- Откачкой старого масла и кабельной бумаги, пропитанной маслом, возможно содержащей ПХД;
- Удаление стали, меди, керамики и других отходов.

Все мероприятия по реабилитации будут производиться в пределах зданий и сооружений электрических станций.

В рамках ПЭО разработано План мероприятий по охране окружающей среды (ПМООС). В этом плане предусмотрены проведение мониторинга и

принятие мер по сокращению воздействия на окружающую среду во время реабилитационных работ.

Отходы металлолома сдаются в ГП «Темир», а отходы промасленной бумаги и 250 000 литров отработанного кабельного масла в результате замены кабеля на 500 кВ. сдаются в Ошскую ТЭЦ.

Все меры по уменьшению воздействия во время реабилитационных работ должны быть осуществлены подрядчиком согласно природоохранного законодательство Кыргызской Республики.

ОАО «Электрические станции» регулярно поводить мониторинг выполнения предложенных мер по уменьшению воздействия на окружающую среду во время всего периода реализации проекта.

Рассмотрев представленные материалы, Государственное агентство охраны окружающей среды и лесного хозяйства при Правительстве КР согласовывает представленный отчет о предварительной экологической оценке (ПЭО) проекта АБР «Реабилитация сектора энергетики КР».

Директор **С.Атаджанов**

УГЭЭиП
568 986

Informal Translation

Annex 1. The environmental approval on IEE developed for the Project Phase 1, issued by SAEPF

State Agency on
Environmental Protection and Forestry under the
Government of Kyrgyz Republic
720001, 228 Toktogul str., Bishkek
Ph.: +(996-312) 35-27-27; Fax: +(996-312) 35-31-02

25.04.2012 #01-21/1083

JSC "Electric Power Plants"

The State Agency on Environmental Protection and Forestry under the Government of the Kyrgyz Republic having observed the submitted inception report on the Initial Environmental Examination (IEE) of ABD project "Rehabilitation of the power sector of KR", would like to inform.

Project implementation zone is located in Djalal-Abad oblast.

It is envisioned by the project to implement the following rehabilitation works at Toktogul HPP:

- Rehabilitation of the periphery sectors of generators;
- Replacement of four oil operated generator circuit breakers by the modern SF6 circuit breakers;
- Replacement of four oil-filled 500 kV cables of a length of approx. 1,150 m each. These cables contain all together about 250,000 l of old oil that has to be disposed of;
- Renewing of the fire fighting system of the main transformers. The old system is based on a sprinkler system using water for cooling and will be replaced by a system using N_2 (gaseous nitrogen) that is blown into the transformers in case of fire to quench it.

Possible impacts on environment, during the project implementation can be related with:

- Disposal of old oil and oil impregnated paper possibly containing PCB;
- Disposal of steel, copper, ceramics and other wastes;

All rehabilitation measures will be implemented within the facilities and building constructions of the EPP.

An Environmental Management Plan (EMP) has been developed within the IEE. The Plan envisages monitoring and mitigation measures during rehabilitation works.
Metal scrap wastes are disposed at "Temir" State Enterprise, while oil paper wastes and 250,000 l of old cable oil, caused by 500 kV cable replacements, are disposed at Osh TPP.
All mitigation measures during rehabilitation works shall be implemented by the contractor in accordance with the legislation on Environmental Protection of the Kyrgyz Republic.
Joint Stock Company Electric Power Plants shall regularly conduct monitoring of the proposed impact mitigation measures in full duration of the project implementation period.
After observation of the submitted materials, the State Agency on Environmental Protection and Forestry within the Government of KR reconciles the submitted report on the Initial Environmental Examination (IEE) of ABD project on "Rehabilitation of the power sector of the Kyrgyz Republic".

Director S.Atadjanov

УГЭЭиП
568 986

Annex 2: Acceptance certificate of services dated 16 October 2017 to the Contract #34-20/408 of 12 October 2015

« Утверждаю»
Главный инженер КТГЭС
_____ Кадинов Т.Р.
«16» 10 2017г.

Акт

Приема-передачи услуг к договору № 34-20/408 от 12.10.2015 года.

Мы, нижеподписавшиеся, :
Атагараев У.М. – начальник ЭЦ ТГЭС

Жедигеров Н.И . - зам. нач. ПТО КТГЭС.

Курбанов Н.О. –старший мастер УОО ЭЦ

Парк Донги - представитель подрядной организации, руководитель контроля качества.

Арзыбаев Э.С. - представитель подрядной организации, специалист по контролю качества.

Аскарова Н.К. - представитель подрядной организации бухгалтер.

Составили настоящий акт о том, что « Замена электрических компонентов, электрических вспомогательных систем и КИП» по договору № 34-20/408 от 12.10.2015 года выполнена в частичном объеме (слив кабельного масла из КЛ-2 перед демонтажем).

На основании инструкции по эксплуатации силовых кабельных линий 500 кВ ТГЭС на КЛ -2 кабельное масло составляет: 58000 (пятьдесят восемь тысячи) литров, это в тоннах составляет 49,59; по факту субподрядной организацией « Биор + » слито кабельное масло в количестве – 32,57тн., из них:

1) 16 пл. ЦРММ(маслохранилище) -160 бочек по 185 л.(емкости « Биор + »), слитое масло составляет: 29600 л. = 25308 тн.
2) 1 емкости 8,5м3 = 7,267 тн.

Суммарное количество кабельного масла составляет: 32,575 тн.

Подписи:

Атагараев У.М

Жедигеров Н.И.

Курбанов Н.О.

Парк Донги

Арзыбаев Э.С.

Аскарова Н.К.

Informal translation

Annex 2: Acceptance certificate of Cascade of Toktogul HPPs dated 16 of October 2017 to the Contract #34-20/408 of 12 October 2015

"Affirming"
Chief engineer of the Cascade of Toktogul HPPs
/signature/ Kadinov T.R.
"16" 10 2017

Acceptance Certificate

of services to the agreement #34-20/408 dated 12.10.2015.

We, undersigned:

Atagaraev U.M. – Head of Electrical Department of THPP
Zhedigerov N.I. – Deputy head Production & Technical Department of Cascade of THPPs
Kurbanov N.O. – Senior master of Electrical Department of THPP
Park Dongi – Contractor's representative, Head of quality control
Arzybaev N.K. - Contractor's representative, Specialist on quality control
Askarova N.K. - Contractor's representative, Accountant.

and compiled an act, that "Replacement of Electrical Components, Electrical Auxiliaries & Instrumentation" according to the agreement №34-20/408 dated 12.10.2015 is done partially (draining of cable oil from Cable line of Unit 2 before dismantling).

Based on the Instruction on operation of 500 kV cable of THPP at cable line of Unit 2, the cable oil amounts is of: 58000 (fifty eight thousand) liters, or 49.59 in ton; but in fact, 32.57 ton of cable oil was drained by Subcontractor "Bior +", and out of them:

1) Area 16 Repair and Machine Shop (oil storage) – 160 barrels of capacity 185 liters (equipment of Bior+), drained oil is of 29600 l = 25308 ton
2) 2 tank 8,5 m3 = 7,267 ton.

The total amount of cable oil is: 32.575 t.

Signatures:	/signed/	Atagaraev U.M.
	/signed/	Zhedigerov N.I.
	/signed/	Kurbanov N.O.
	/signed/	Park Dongi
	/signed/	Arzybaev N.K.
	/signed/	Askarova N.K.

Annex 3. The Order #498 dated 03.07.2017 “On construction waste management”

КАСКАД ТОКТОГУЛЬСКИХ ГЭС

ПРИКАЗ

«03» 04 2017 г. № 498 г. Кара-Куль

«Об организации сбора
строительного мусора»

На период реконструкции и модернизации Токтогульской ГЭС, накапливаетс строительный мусор в разных местах Токтогульской ГЭС. В городскую свалку вывс строительного мусора запрещается.

В целях охраны окружающей среды и на вывоз строительного мусора в перио реконструкции ТГЭС

ПРИКАЗЫВАЮ:

1. Начальнику ТГЭС Конурбаеву Т.Д.
1.1. На территории склада №3 (Бывшая ГСС) организовать специально отведенное мест для сбора строительного мусора.
1.2. Требовать у подрядчиков работающих в проекте «Реабилитация Токтогульской ГЭС вывозить строительный мусор на специально отведенное место.
1.3. Назначить ответственного за сбора и хранение строительного мусора.
2. Контроль за исполнением данного приказа возлагается на заместителя директора г реконструкции Токтогульской ГЭС Сооронбаева Ч.С.

Директор А.К.Кушубаков

Жедигерову
взять на контроль
04.07.17г.

Рассылка: Д, Зам.дир.,ПТО, СНТБ, ТГЭС, ОМТС, СРМО, ОКС и КО.
18. Жедигеров Н.

Informal translation

Annex. 3. The Order #498 “On construction waste management” dated 03.07.2017.

THE CASCADE OF TOKTOGUL HPPs

THE ORDER

‘’03’’07.2017. #498 Kara-Kul

“On Construction Waste Management”

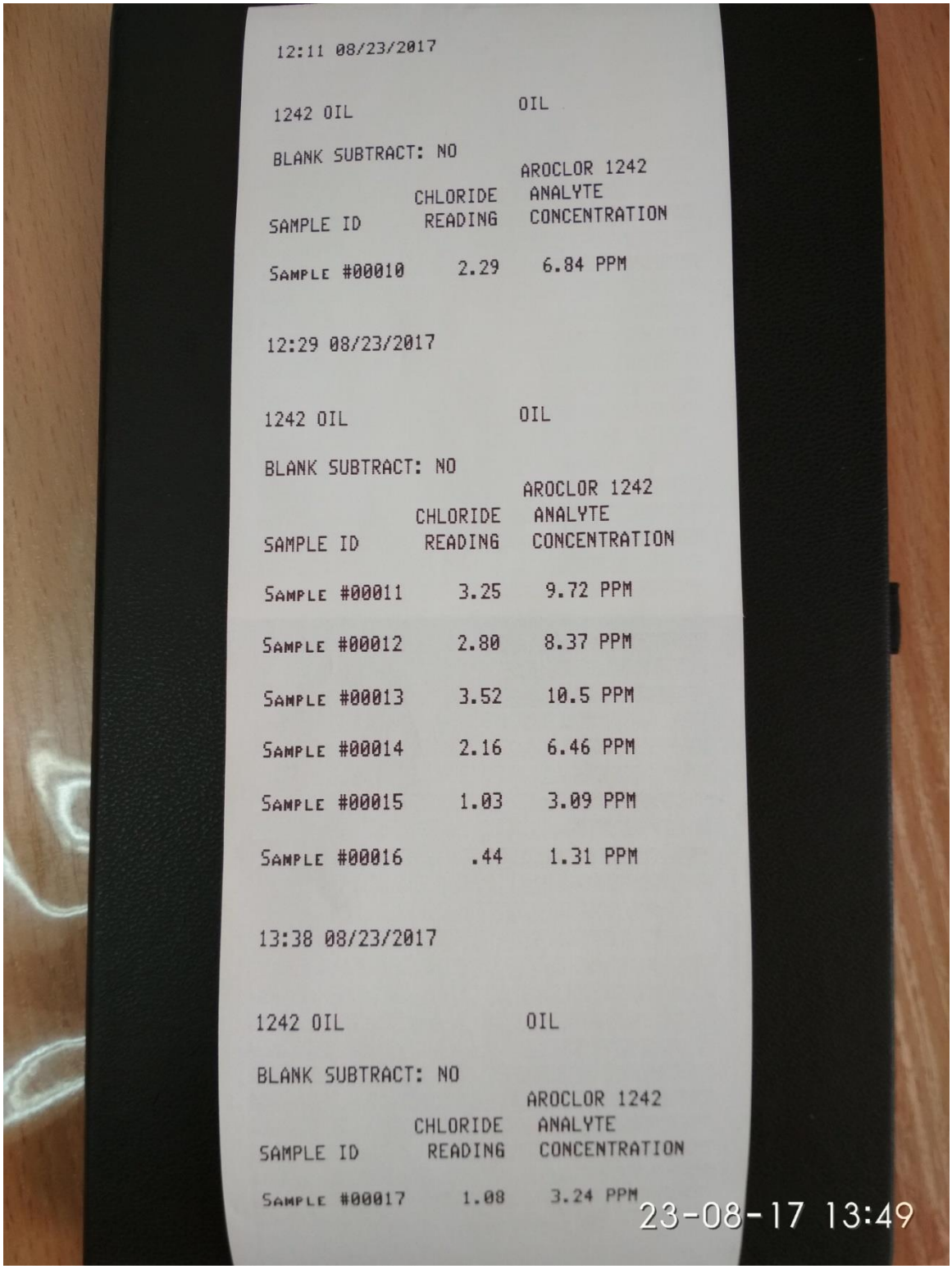
During reconstruction and modernization period of Toktogul HPP, construction waste accumulates at different areas of Toktogul HPP. It is prohibited to remove the construction waste at the city landfill.
With the aim of environment protection and for removal of construction waste at reconstruction of Toktogul HPP period:

I ORDER:

1. To the Head of Toktogul HPP Mr Konurbaev T.D.
   1.1. To organize a special area for construction waste storage at the territory of the storage #3 (previous GSS).
   1.2. To require contractors involved in Rehabilitation of Toktogul HPP Project to remove construction wastes at the special area.
   1.3. To assign a person responsible for storage of construction wastes.
2. Control over the implementation of this Order performance is assigned for Deputy Director of Rehabilitation of Toktogul HPP Mr Sooronbaev Ch.S.

Director /signed/ A.K.Kushubakov

Annex 4. Automatically generated report (protocol) of the oil analyses for PCBs made at the Analyzer L2000DX.



12:11 08/23/2017

1242 OIL OIL

BLANK SUBTRACT: NO

SAMPLE ID	CHLORIDE READING	AROCLOR 1242 ANALYTE CONCENTRATION
Sample #00010	2.29	6.84 PPM

12:29 08/23/2017

1242 OIL OIL

BLANK SUBTRACT: NO

SAMPLE ID	CHLORIDE READING	AROCLOR 1242 ANALYTE CONCENTRATION
Sample #00011	3.25	9.72 PPM
Sample #00012	2.80	8.37 PPM
Sample #00013	3.52	10.5 PPM
Sample #00014	2.16	6.46 PPM
Sample #00015	1.03	3.09 PPM
Sample #00016	.44	1.31 PPM

13:38 08/23/2017

1242 OIL OIL

BLANK SUBTRACT: NO

SAMPLE ID	CHLORIDE READING	AROCLOR 1242 ANALYTE CONCENTRATION
Sample #00017	1.08	3.24 PPM

23-08-17 13:49