Environmental Monitoring Report

Project Number: 46058
July–December 2016

People's Republic of China: Qinghai Delingha Concentrating Solar Thermal Power Project

Semi-annual environmental monitoring report for July–December 2016

Prepared by the CGN Delingha Solar Energy Co. Ltd. for the People's Republic of China and the Asian Development Bank (ADB).

Asian Development Bank

Environmental Monitoring Report

5th Semi-Annual Report
December 2016

People's Republic of China: Qinghai Delingha Concentrating Solar Thermal Power Project

Prepared by CGN DELINGHA SOLAR ENERGY CO. LTD. for the People's Republic of China and the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 30 Dec, 2015)

Currency Unit	-	CNY
CNY 1.00	=	$ 0.1542
$ 1.00	=	CNY 6.486

ABBREVIATIONS

ADB – Asian Development Bank
ASL – above sea level
CGN – China General Nuclear Power Group
CHP – combined heat and power
CGN – China General Nuclear Power Holding Corporation
CGN-DSE – China General Nuclear Delingha Solar Energy Co. Ltd.
CNY – Chinese yuan
CSC – construction supervision company
CSP – concentrating solar power
DI – design institute
DNI – direct normal irradiance
EA – executing agency
EHS – environment, health and safety
EIA – environmental impact assessment
EMP – environmental management plan
EMS – environmental monitoring station
EMU – environmental management unit
EPB – Environmental Protection Bureau
FSR – feasibility study report
GDP – gross domestic product
GHG – greenhouse gas
GRM – grievance redress mechanism
HTF – heat transfer fluid
IA – implementing agency
IEE – initial environmental examination
IT – interim yarget
LFR – linear fresnel reflector
MEP – Ministry of Environmental Protection
MSDS – material safety data sheet
NDRC – National Development and Reform Commission
PPCU – project public complaint unit
PPE – personnel protective equipment
PPTA – project preparatory technical assistance
PRC – People’s Republic of China
SCA – solar collector assembly
SCE – solar collection element

SEDC – Solar Energy Development Co., Ltd.
SPS – Safeguard Policy Statement, ADB
TA – technical assistance
TES – thermal energy storage
WHO – World Health Organization

WEIGHTS AND MEASURES

BOD5 – biochemical Oxygen demand, five days
cm – centimeter
CO2 – carbon dioxide
COD – chemical oxygen demand
dB(A) – A-weighted sound pressure level in decibels
DO – dissolved oxygen
DOD – dissolved oxygen deficit
GJ – gigajoule
ha – hectare
kcal – kilocalories
kg – kilogram
km – kilometer
kWh – kilowatt-hour
m – meter
m/s – meters per second
m^3 – cubic meters
mg/l – milligrams per Liter
mg/m3 – Milligrams per cubic meter
MW – megawatt
NO2 – nitrogen dioxide
NOx – nitrogen oxides
oC – degrees celsius
pH – a measure of the acidity or alkalinity of a solution
PM10 – particulate matter smaller than 10 micrometers
SO2 – sulfur dioxide
TN – total nitrogen
TSP – total suspended particulates

NOTE

I. In this report, "$" refers to US dollars.

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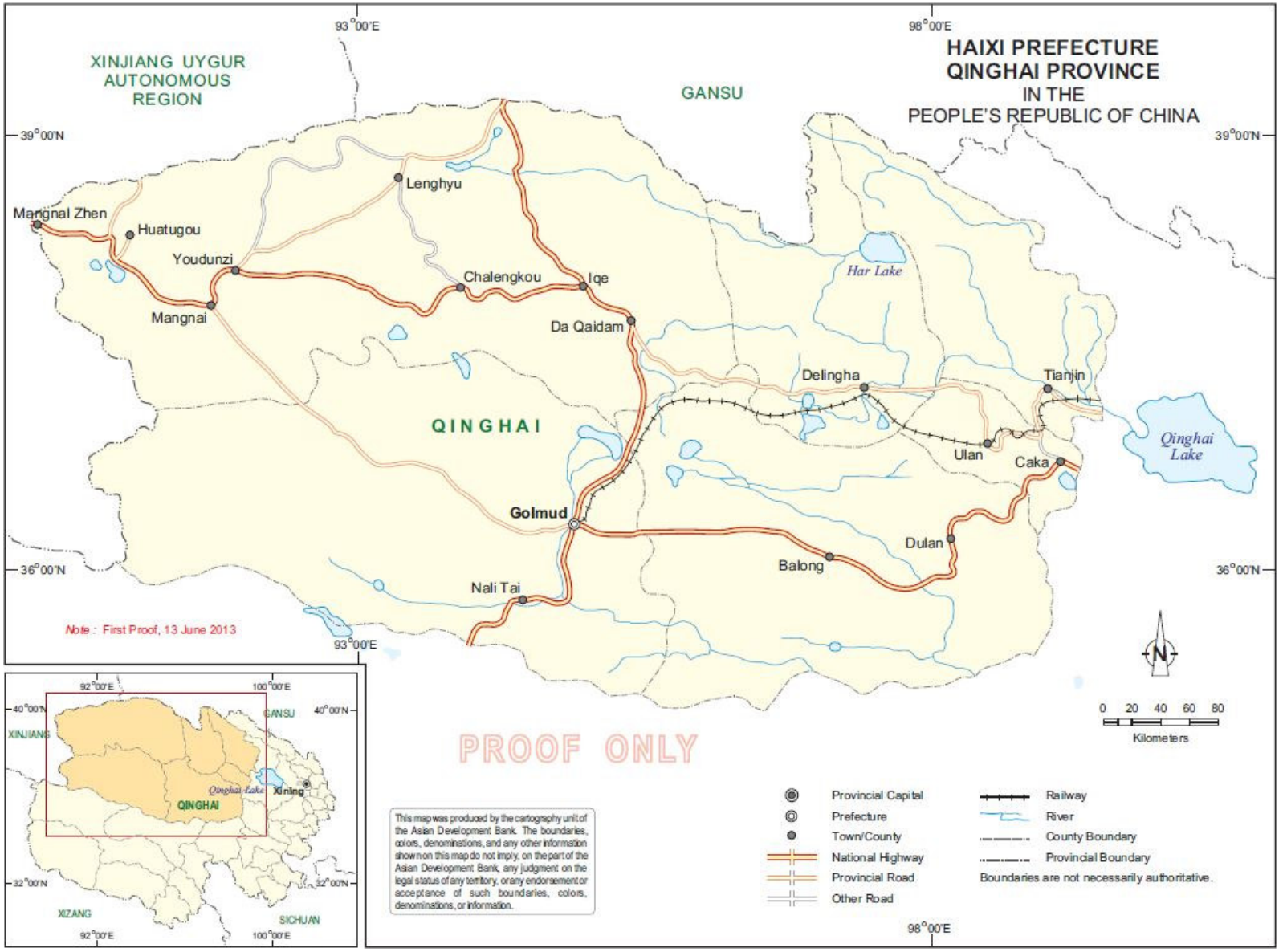
BASIC PROJECT INFORMATION

ADB Loan No.	Loan 3075-PRC
Project Title	Qinghai Delingha Concentrating Solar Thermal Power Project
Borrower	People's Republic of China
Executing Agency	CGN SOLAR ENERGY DEVELOPMENT CO.LTD.
Implementing Agency	CGN DELINGHA SOLAR ENERGY CO.LTD.
Total Estimated Cost	$384,609,851
ADB Loan	$150,000,000
Counterpart Financing	¥1,055,355,000
Loan Approval Date	23 January 2014
Loan Agreement Signed Date	23 January 2014
ADB Loan Effectiveness Date	23 January 2014
Project Complete Date	30 November 2017
Original Loan Closing Date	31 MAY 2018
Exchange Rate	6.486
Date of Latest ADB Loan Review Mission	20 Sept 2014
Type of This Report	Semi-annual Environmental Monitoring Report
Period Covered by This Report	1 July 2016 to 31 December 2016


PROOF ONLY
QINGHAI PROVINCE
IN THE
PEOPLE'S REPUBLIC OF CHINA
92°00'E
100°00'E
38°00'N
34°00'N
XINJIANG UYGUR AUTONOMOUS REGION
GANSU
QINGHAI
XIZANG ZIZHIQU
SICHUAN
Mangnai Zhen
Huatugou
Lenghyu
Youdunzi
Chalengkou
Iqe
Mangnai
Da Qaidam
Golmud
Delingha
Har Lake
Qilian
Obo
Datong R.
Cetar
Qingshizoi
Menyuan
Tianjin
Gangca
Qinghai Lake
Haiyan
Datong
Huzhu Tuzu Zizhixian
XINING
Ulan
Caka
Heimahe
Huangyuan
Ping'an
Ledu
Tuzu Zizhixian
Daotanghe
Gonghe
Hualong
Dulan
Balong
Nali Tai
Daheba
Xunhua
Huang River
Wenquan
Tongren
Qumar Heyan
Budongquan
Qumar R.
Gyaring Lake
Huashixia
Tongde
Zekög
Ngoring Lake
Madoi
Golog Maqen
Zhiqu R.
Qidugou
Wuli
TuoTuo Heyan
Zhidoi
Qingshuihe
Darlag
Jigzhi
Kulankhor
Wenquan
Xiwu
Yushu
Baima
Nangqen
Provincial Capital
City/Town
National Highway
Provincial Road
Other Road
Railway
River
County Boundary
Provincial Boundary
Boundaries are not necessarily authoritative.
Note : First Proof, 6 May 2013
N
0 20 40 60 80 100
Kilometers
This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.


HAIXI PREFECTURE
QINGHAI PROVINCE
IN THE
PEOPLE'S REPUBLIC OF CHINA
XINJIANG UYGUR AUTONOMOUS REGION
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93°00'E
98°00'E
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36°00'N
Mangnai Zhen
Huatugou
Youdunzi
Mangnai
Lenghyu
Chalengkou
Iqe
Da Qaidam
Har Lake
Delingha
Tianjin
Qinghai Lake
Ulan
Caka
Golmud
Dulan
Balong
Nali Tai
Note : First Proof, 13 June 2013
PROOF ONLY
0 20 40 60 80
Kilometers
Provincial Capital
Prefecture
Town/County
National Highway
Provincial Road
Other Road
Railway
River
County Boundary
Provincial Boundary
Boundaries are not necessarily authoritative.
This map was produced by the cartography unit of the Asian Development Bank. The boundaries, colors, denominations, and any other information shown on this map do not imply, on the part of the Asian Development Bank, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries, colors, denominations, or information.
92°00'E
100°00'E
40°00'N
32°00'N
XINJIANG
GANSU
Qinghai Lake
Xining
QINGHAI
XIZANG
SICHUAN

I. INTRODUCTION

A. Background

1. This report is the 5th environmental monitoring report of the Qinghai Delingha Concentrating Solar Thermal Power Project, covering the period between July 2016 and December 2016. It is prepared by CGN DELINGHA SOLAR ENERGY CO.LTD.

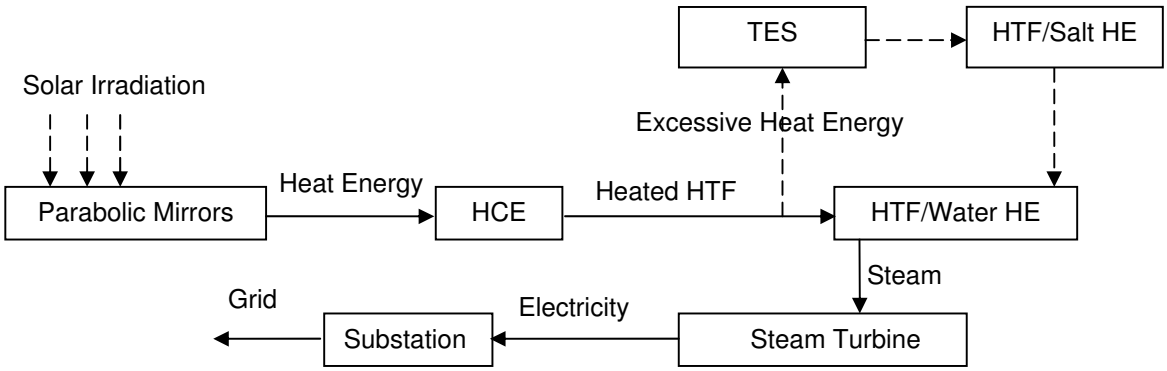
2. This environmental monitoring report is prepared in accordance with the project environmental management plan and environmental monitoring framework.

B. Project summary

3. The concentrating solar thermal power (CSP) project will construct (i) 621,300 m2 of solar field area with 190 solar collector loops; (ii) one 50 MW steam turbine; (iii) two molten salt-tanks with seven hours thermal energy storage capacity; and (iv) a natural gas fired heater for startup, anti-freezing protection for HTF. Air cooling system will be adopted for the steam condensing system to conserve water.

4. CSP technologies generate electricity in a similar way to conventional power stations by using steam to drive a turbine. The fundamental principle of CSP technologies is to collect the energy carried by sunrays, allowing a heat transfer fluid (HTF) to absorb the collected energy and then converting the thermal energy into electricity. Excessive energy will be stored in molten salt tanks and will be used when sunrays are insufficient to generate energy. The process of energy conversion in a CSP plant is illustrated in Figure 1.

Figure 3-1: Major Components of a CSP Plant



Note: HCE = heat collection element, HE = heat exchanger, HTF = heat transfer fluid, TES = thermal energy storage.

5. The parabolic trough solar collector system is designed to concentrate the sunrays via parabolic curved solar reflectors (mirrors) onto a thermally efficient linear receiver (absorber tubes). The receiver is located in the optical focal line of the collector. The receiver consists of a specially coated absorber tube embedded in an evacuated glass envelope. Synthetic thermal oil is used as heat transfer fluid (HTF) and is circulated in the absorber tubes. The HTF will be

heated to approximately 400°C by the sunrays. Heat exchangers will transfer the collected solar energy to water and this process continues until the temperature of the water is heated sufficiently to generate steam. After pre-heater, evaporator, and super-heater, superheated stream will be used to run a conventional steam turbine generating kinetic energy and converting it into electrical energy. The cooled HTF will be circulated back to absorber tubes. The exhaust steam leaving the turbine is transported to a condenser, which cools the steam and form water. Then, the water is returned to the heat exchanger. This cycle is repeated.

C. Implementation Organization

6. This project is construction of a concentrating solar thermal plant in Delingha, Qinghai Province, the People's Republic of China (PRC). China General Nuclear Power Holding Co., Ltd. (CGN) is the executing agency (EA) for the project. A project leading group was established under the CGN and is responsible for directing the project and providing policy guidance during project implementation. China General Nuclear Delingha Solar Energy Co., Ltd. (CGN-DSE) is the implementation agency (IA).

7. The EA holds the final responsibility of EMP implementation and EMP reporting. It provides guidance to the IA, coordinate with other governmental agencies as necessary, and submit EMP monitoring reports to ADB semi-annually during construction and annually during operation of the project.

8. The IA is responsible for implementing the EMP, which nominates a qualified environmental manager to undertake effective environmental management activities specified in the EMP. The IA forms an environmental management unit (EMU), which consists of a leader and an appropriate number of staff to coordinate environmental issues with the contractor, CSC and CGN. The EMU will be supported by environment consultants and supervised by the local EPB.1The IA is responsible for implementing mitigation measures and EMP monitoring. The IA prepares and submits the EMP monitoring reports to the EA who will review the reports and submit them to ADB.

9. Environmental engineers of a construction supervision company (CSC) contracted by IA are responsible for the daily internal inspection, monitoring, and evaluation of mitigation measures at the construction site. Contractors are responsible for implementing relevant mitigation measures during construction specified in the EMP supported by the CSC.

10. The local EPB and Environment Monitoring Station (EMS) under the EPB will ensure in compliance with the PRC's environmental standards and regulations through regular and random environmental compliance monitoring and inspection during construction and operation. The EMS will conduct environmental compliance monitoring and inspection at least semiannually on behalf of the EPB.

11. ADB is responsible for reviewing the overall environmental performance of the project. ADB will also disclose the EMP monitoring reports on its website. ADB will review the semiannual and annual EMP performance reports submitted by the EA, and conduct due diligence of environment issues during the project review missions. If the EA and IA fail to meet safeguards requirements described in the EMP, ADB will seek corrective measures and advise the EA and IA on items in need of follow-up actions.

[1] Haixi Prefecture's EPB

II. IMPLEMENTATION PROCESS

A. Overall Project Implementation Progress

12. Enclosing wall construction has been completed. The power island was started at July of 2015.

B. Detailed Engineering Progress

13. Detailed geological survey work has started since November 2014 and it was finished in January 2015. Preliminary design work has commenced since November 2014, which was completed in February 2015. Table below provides detailed progress.

Table 1.Summary of Engineering Progress

Project Components	Detailed Description of Work	Contractor/ Implementer	Implementation Status
I. Site Preparation			
	Detailed geological survey work and preliminary design work has commenced since November 2014	Environmental science research and design institute of Qinghai province	Finished
II. Civil Works			
A. SF Civil Works			
	It was started at Oct. of 2016. The construction will be finished at May of 2017.	Joint Venture of Beijing Shouhang IHW Resources Saving Technology Co.,Ltd. And Shandong Electrical Power Construction No.2 Company	Ongoing
B. BOP Civil Works			
	It was started at July of 2015. The construction basement will be finished at June of 2016.	Northwest engineering corporation limited	Finished
C. HTF/TES			
	It was started at April of 2016. The construction will be finished at June of 2017.	Shandong Sunway Petrochemical Engineering share Co., Ltd.	Ongoing
III. Earth Works			
1.Site treatment	land leveling work	Changsha Construction Engineering Group and HENAN installation group co., Ltd	Finished Start :July of 2014, Complete: 15 December of 2014
	Enclosing wall construction	Changsha Construction Engineering Group and HENAN installation group co., Ltd	Finished Start :Jan of 2015, Complete: May of 2015

Project Components	Detailed Description of Work	Contractor/ Implementer	Implementation Status
IV. Equipment Installation			
	It was started at March of 2016. The installation will be finished at December of 2017.	Northwest engineering corporation limited	Ongoing

C. Project Cost Associated with the Environmental Management Plan

14. The estimated total budgets for environmental mitigation and monitoring are as follows:
i) Mitigation cost during construction is estimated at CNY7.85 million or $1.3 million;
ii) Annual operating cost for environmental protection is CNY3.68 million or $594,000;
iii) Monitoring cost during construction is estimated at CNY225,000 or $35,000;
iv) Estimated annual monitoring cost during operation is CNY570,000 or $92,000; and
v) The estimated budget for capacity building is CNY70,000 or $11,000.

15. The total environmental investment of the Project of CNY 17.519 million ($ 1.99 million) is allocated, which accounts 0.63% of the total project investment. During this reporting period, As the project just finished the Enclosing wall construction, total cost of CNY400,000 was spent for Enclosing wall construction, which included costs for solid wastes disposal, spraying water on construction site and earth/material handling routes where fugitive dust.

III. IMPLEMENTATION OF THE ENVIRONMENTAL MANAGEMENT PLAN

A. Background

16. The EMP was developed aligning with the ADB safeguards statement policy (2009) and environmental impact assessment (EIA) report of the Qinghai Delingha CSP project approved by the Qinghai EPB on 28 December 2012. The EMP was agreed between the ADB and CGN as a part of the loan agreement.

B. Loan Covenants

17. The loan covenants of the project stipulate the following agreements on environmental safeguards. Table below provides the compliance status of environment related project covenants during this reporting period.

Table 2.Environment Related Project Agreements and Compliance Status

Environment Related Project Agreements	Compliance Status
CGN, CGN-SEDC and CGN-DSE shall ensure, and cause other involved agencies to ensure, that the preparation, design, construction, implementation, operation and decommissioning of the Project, and that all Project facilities comply with (a) all applicable laws and regulations of the Borrower relating to environment; (b) the environmental safeguards; and (c) all measures and requirements set forth in the IEE, the EMP, and any corrective or preventative actions (i) set forth in a Safeguards Monitoring Report, or (ii) as subsequently agreed between ADB and CGN.	Complied

CGN, CGN-SEDC and CGN-DSE shall ensure that the provisions of the IEE, and EMP as well as any requirements under the Safeguards Policy Statement also apply to the portion of the Project to be financed by CGN, CGN-DSE and EXIM.	Complied
CGN, CGN-SEDC and CGN-DSE shall make available necessary budgetary and human resources to fully implement the EMP.	Complied
CGN, CGN-SEDC and CGN-DSE shall ensure that all bidding documents and works contracts contains provisions that require contractors to (a) comply with the measures relevant to the contractor set forth in the IEE and the EMP(to the extent they concern impacts on respective affected people under Environmental Safeguards during construction), and any corrective or preventative actions (i) set forth in a Safeguards Monitoring Report, or (ii) as subsequently agreed between ADB and CGN; (b) make available a budget for all such environmental and social measures; (c) provide CGN-DSE with a written notice of any unanticipated environmental, resettlement or social risks or impacts that arise during construction, implementation or operation of the project that were not considered in the IEE, and the EMP; and (d) reinstate pathways and other local infrastructure to at least their pre-Project condition as soon as possible and no later than the completion of construction.	Complied. IEE report is one of attachment of the contract. All the requirements of IEE are included in the contract and require contractor to implement.
CGN, CGN-SEDC and CGN-DSE shall do, or cause to be done, the following: (a) submit Safeguards Monitoring Reports to ADB in respect of implementation of and compliance with Environmental Safeguards and the EMP, annually during construction and the implementation of the Project and the EMP until the issuance of ADB's Project completion report unless a longer period is agreed in the EMP; and disclose relevant information from such reports to respective affected people under Environmental Safeguards, Involuntary Resettlement Safeguards and Indigenous Peoples Safeguards promptly upon submission; (b) if any unanticipated environmental and/or social risks and impacts arise during construction, implementation or operation of the Project that were not considered in the IEE, and the EMP, promptly inform ADB of the occurrence of such risks or impacts, with detailed description of the event and proposed corrective action plan; and (c) report any actual or potential breach of compliance with the measures and requirements set forth in the EMP promptly after becoming aware of the breach.	Complied.
CGN, CGN-SEDC, CGN-DSE, and EXIM shall ensure that no proceeds of the loan are used to finance any activity included in the list of prohibited investment activities provides in appendix 5 of the safeguards policy statement.	Complied

18. The following environmental provisions were included in contracts with Northwest engineering corporation limited, which is:

CGN and CGN-SEDC have signed the ENV agreements with all the subcontractors in accordance with the contacts. The contractors include Northwest engineering cooperation

limited. In the agreement, all the ENV responsibilities and obligations have been clarified. The measures include, but are not limited to,

(a) Employer has to provide qualified earplug to employee to avoid the damage to ear when they are working under the circumstance over 85db.

(b) Employer has to provide qualified mask to employee to avoid the damage to respiratory system when working under the dusty circumstance

(c) All the subcontractors have to take measures to use sewage system effectively to avoid to pollute the environment.

(d) All the subcontractors should take measures to prevent oil leakage in accordance with main contractor's ENV requirements.

(e) All the employer should buy assurance for the employee in case of any injury of Employee.

C. Implementation of Environmental Management and Monitoring Plan

19. During this reporting period, the following structure for the project health, safety, and environment (HSE) organization was established. The current members of the project HSE organization are four members from CGN-DSE; Four member from Beijing Huaxia supervision Co., Ltd.; Four members from contractors. Detailed information on the HSE members are tasks are described in table below.

Name	Title/Role at the Project HSE	Company	Tasks
Ma chunlei	HSE manager	CGN-DSE	Responsible for all the HSE issues in the project
Wang ke	HSE manager	CGN-DSE	Responsible for the HSE issues in his own field
Yan zhaoping	HSE engineer	CGN-DSE	Responsible for the HSE issues in his own field
Gao zhizhen	HSE manager	CGN-DSE	Responsible for the HSE issues in his own field
Yu gang	HSE manager	Beijing huaxia supervision Co., Ltd.	Responsible for the HSE issues in his own field
Tang xiangyu	HSE engineer	Beijing huaxia supervision Co., Ltd.	Responsible for the HSE issues in his own field
He zheng	HSE engineer	Beijing huaxia supervision Co., Ltd.	Responsible for the HSE issues in his own field
Liu suixin	HSE engineer	Beijing huaxia supervision Co., Ltd.	Responsible for the HSE issues in his own field
Yang jinwei	HSE manager	Northwest engineering corporation limited	Responsible for the HSE issues in his own field
Mu hongzhou	HSE manager	Shandong Sunway Petrochemical Engineering share Co., Ltd.	Responsible for the HSE issues in his own field
Kong qingyi	HSE manager	Joint Venture of Beijing Shouhang IHW Resources Saving Technology Co.,Ltd. And Shandong Electrical Power Construction No.2 Company	Responsible for the HSE issues in his own field
Yang shuai	HSE manager	Joint Venture of Beijing Shouhang IHW Resources Saving Technology Co.,Ltd. And Shandong Electrical Power Construction No.2 Company	Responsible for the HSE issues in his own field

20. The EMP indicates the roles and responsibilities of institutions involved in project. Table 3 summarizes the roles and responsibilities of institutions and the progress of their actions in regard to the EMP.

Table 3.Summary of Institutional Arrangement and Actions Taken by Institutions

Roles and Responsibilities	Actions Taken Up To the End of Reporting Period
China General Nuclear Power Holding Co., Ltd. (CGN) (EA) • The executing agency • Hold a final responsibility on the overall implementation of the EMP and EMP monitoring; • Provide advice and guidance to the IA; • Review EMP monitoring reports and submit them to ADB.	The health, safety and environment (HSE) department of CGN provided advice and guidance to the IA in regards to environmental performance during this reporting period, reviewed this environmental monitoring report, and submitted it to ADB.
Project Leading Group • Direct the project and provide guidance during project implementation; • Review project implementation progress and take additional measures if necessary.	A Project Leading Group was established including team leader/team member/responsibility, The leader is project manager named Liu dayong, and the team members include site manager named Ding hongliang, HSE manager and QC/QA manager Ma chunlei etc..The summary number is 11 persons. Leader is in charge of the project, and achieves the project goals .All team members should assistant the leader to achieve the project goals, and are responsible for their own fields. The project holds meeting in the end of every month. The number of meeting hold is 6 times. Agenda of safety meeting: ▪ Areas of risk on site ▪ Site Safety accidents and near-misses ▪ Site Safety statistics ▪ Compliance achieved for the corrective action plan (CAP) ▪ Current site safety issues at site ▪ Request for method statements / Risk assessments ▪ Look ahead to future site works ▪ Review of safety incidents from other sites. ▪ Review of any related CGNSEDC safety communications
China General Nuclear Delingha Solar Energy Co., Ltd.(CGN-DSE) (IA) • Establish EMU; • Provide supervision to contractor and CSC, • submit monthly report to the EA on the implementation of the EMP; • Work with design institutes and the tendering company in preparing bidding documents to ensure environmental protection provisions are included in them; • Submit semiannual EMP monitoring reports to the EA and ADB; • Hire environmental consultants.	EMU has been established including four members. EMU provides daily supervision to contractor and CSC, submits monthly environment report to the EA, and works with design institutes and the tendering companies in preparing bidding documents with environmental protection requirements. This is fifth time to submit semi-annual environmental monitoring reports to the EA and ADB.

Construction supervision companies (CSCs) • Responsible for the daily inspection, monitoring, and evaluation of the implementation of EMP mitigation measures at construction site.	Beijing huaxia supervision Co., Ltd. is hired as a CSC. It has four supervisors including 1 HSE supervisor, who are responsible for the daily inspection, monitoring, and evaluation of the implementation of EMP mitigation measures such as solid waste/wastewater/dust control at construction site.
Contractors • Responsible for implementing mitigation measures on a daily basis according the contract conditions. • Responsible for implementing mitigation measures on a daily basis according the contract conditions. • Responsible for implementing mitigation measures on a daily basis according the contract conditions.	Northwest engineering corporation limited is the Contractor for BOP. The company is responsible for implementing mitigation measures on a daily basis according the contract conditions and EMP requirements. Shandong Sunway Petrochemical Engineering share Co., Ltd. is the Contractor for HTF/TES. The company is responsible for implementing mitigation measures on a daily basis according the contract conditions and EMP requirements. Joint Venture of Beijing Shouhang IHW Resources Saving Technology Co.,Ltd. And Shandong Electrical Power Construction No.2 Company is the Contractor for SF. The company is responsible for implementing mitigation measures on a daily basis according the contract conditions and EMP requirements.
Environmental Monitoring Stations (EMS) • Conduct EMP monitoring and provide data to the IA	The local Environmental Monitoring Station will conduct EMP monitoring upon the commencement of civil work。 The third party named Xi'an jingcheng monitoring technology Co., Ltd. is the designated company for monitoring.
A loan implementation environmental consultant • Provide technical assistance to the EA and the IA for implementing the EMP; • Provide training to the staff of the CGN, IA, contractor and CSC; and • Assist the IA in preparing semiannual and annual environmental reports.	A loan implementation environmental consultant has not been engaged.
Local EPB • Inspect the facilities during construction and operation to ensure compliance with the PRC requirements; Enforce applicable environmental laws and regulations.	IA has communicated with local EPB named Environmental Protection Administration of Delingha city according with the EMP requirements to inspect the facilities timely during construction and operation to ensure compliance with the PRC requirements. The inspection was taken in March 2015, and the result is good.
Local EMS • Conduct environmental compliance monitoring according to the PRC requirement.	IA has communicated with local EMS named Xi'an jingcheng monitoring technology CO.,LTD, according with the EMP requirements to inspect the Monitoring Parameter once a month during construction and operation to ensure compliance with the PRC requirements, and the data are below the standard values.

D. Implementation of Mitigation Measures

21. The EMP lists measures, including pollution control and mitigation measures for environmental assurance during the project construction and operation. Table 4 presents the EMP during project implementation and the summary of actions taken to mitigate environmental adverse impacts of the project during this reporting period.

Table 4:The Environmental Management Plan (EMP) and the Implementation Status of the EMP

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
A. Pre-construction Phase					
Design Mitigation facilities and measures	Land acquisition	The combined land acquisition and ethnic minority development plan was prepared in accordance with relevant law in the PRC and ADB's SPS. Each household will be compensated with the amount that is equivalent to three times of the annual average net household income. In addition to compensation, the affected people are entitled to receive (i) employment opportunities during construction and operation of the project, (ii) portable solar photovoltaic power generation sets, (iii) high insulation yurt (nomad tent), and (iv) trainings on employment skills and grassland management.	IA	CGN	Land acquisition has been completed; Land expropriation compensation has been paid.
	Project's site and routes selection	The site of CSP plant and the layout will be reconfirmed to avoid or minimize potential adverse impacts on the surrounding environments and communities.	DI and IA	CGN	The site of CSP plant and the layout has reconfirmed by the government department named Environmental Protection Administration of Delingha city, and the result is that this project meets environment requirements, adverse impacts on the surrounding environments and communities are under control.
	Including mitigation measures and monitoring program in engineering designs	Environmental mitigation measures identified in the IEE and the domestic EIA will be incorporated in the engineering design document and bidding document for the project, and will be included in contract documents for civil constructions and equipment installations. All contractors shall be required to strictly comply with the EMP. EMP monitoring will be incorporated into the engineering design to ensure that environmental impacts are closely monitored.	DI	CGN, IA, local EPB	At the engineering design phase, environmental mitigation measures were discussed and incorporated. The bidding document and contract documents for civil constructions and equipment installations included the provisions that all contractors shall be required to strictly comply with the EMP.
	Fire hazards	Fire protection system will be incorporated in the design of the project.	DI and IA	Local EPB, CGN	Fire protection system is incorporated in the design of the power island project. It was done

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
					from July of 2015. And expected to complete at Oct. of 2017.
Bidding and Contracting	Bidding and contract document preparation	Incorporate environmental mitigation measures indicated in the EMP in bidding documents and construction contracts for the project.	DI and IA	CGN, Local EPB	EMP requirements are included in bidding and contract document
Grievance Redress Mechanism	Establishment of operational GRM	Establish a Project Public Complaints Unit (PPCU) in IA's office; provide training for PPCU members and GRM access points; Disclose the PPCU's phone number, fax, address, and email to the public.	IA	CGN, Local EPB	Project Public Complaints Unit (PPCU) in IA's Delingha project site office has established, Designated person is Mr. Ma chunlei, phone number (+8613159511992), it has been disclosed to the public through site information boards.
Training	Training for the site staff to prevent polluting environment	Provide environmental awareness and capacity training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and potential identification of archaeological artifacts.			Environmental training has been taken by IA before the start of the work. Totally 16 times training, and 243 persons was trained during July to December of 2016. The new employee can work on site after training. Workers on site should accept the EMP training in accordance with the project HSE training plan. The training contents include the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and solid waste control. Contractor's site staff have tool box meeting training daily to ensure that they are adequate to carry out the designated task. The HSE engineer or team leader explained and clarified the HSE precautions according to the daily tasks in the tool box meeting, and all the
		Project Manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. No operator shall be permitted to operate critical mechanical equipment without having proper certification. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.	IA and CSC	CGN, Local EPB	

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
					participators should sign on the records. All staffs can execute and meet the requirements.
B. Construction Phase					
Soil	Soil erosion and contamination due to construction activities	Minimize active open excavation areas during trenching activities and use appropriate compaction techniques for the construction; The contractor should, prior to the commencement of earthworks, determine the average depth of topsoil. The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks including the building footprints, working areas and storage areas. Topsoil will be reused where possible to rehabilitate disturbed areas. Care will be taken not to mix topsoil and subsoil during stripping. Removed topsoil should be transported to a designated landfill site or used onsite for landscaping as required. Ensure that the minimum area of soil is exposed to potential erosion at any one time. Limit construction and material handling activities during periods of rains and high winds. Assess and estimate storm water runoff and prepare a storm water drainage system accordingly to minimize soil erosion. Build temporary detention pond to control topsoil runoff. Stabilize all earthwork disturbance areas within 14 days after earthwork. Plant native trees and grass in the CSP plant to control soil erosion and properly slop or re-vegetate disturbed surfaces. Properly store petroleum products, chemicals and	Contractors, CSCs	IA, Local EPB, IA	The Contractors take environment protection actions to minimize soil erosion and contamination activities in accordance of EMP requirements. During this reporting period, the project just finished Enclosing wall construction and all the related activities are conformance to requirements. The protection measures include drainage measures, temporary protection on the slope, watering timely, leveling timely etc.

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		hazardous materials on impermeable surface. Use best management practices to prevent spill of oil and chemical to avoid pollution. Any planned paving or vegetating of the area will be done as soon as the materials are removed to protect and stabilize the soil.			
		Appropriately set up temporary construction camps and storage areas to minimize land area required and impact on soil erosion; Build concrete dikes with sealed surfaces underneath storage tanks containing HTF and hazardous materials. The dike walls must be high enough to contain 110% of the total volume of the storage tanks. Contaminated soil by HTF and/or other hazardous chemicals must be contained and disposed off-site by a third party with proper certification. Remove all construction wastes from the site and transport them to designated spoil disposal site in Delingha. Provide spill cleanup measures and equipment at the construction site. Contractors will be required to develop contingency plans for control of oil and other dangerous substances to prevent soil contamination.			
Wastewater	Surface and groundwater contamination from construction wastewater, and domestic water	Areas where construction equipment is being washed will be equipped with water collection basins and sediment traps. Wastewater from construction activities will be collected in sedimentation tanks, retention ponds, and filter tanks to remove silts and oil. Make sure the storm water channels or natural water	Contractors, CSC	IA, Local EPB, CGN	At present, concrete batching station site is equipped with water collection basins and sediment traps. The construction wastewater, after sedimentation, was used as the spraying water for fugitive dust control on the construction site. The domestic wastewater from workers camp is

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		path ways are not blocked. The construction wastewater, after sedimentation, will be used as the spraying water for fugitive dust control on the construction site. Adequate sanitary facilities and ablutions must be provided for construction workers. The domestic wastewater from workers camp, after septic treatment, will be utilized for watering vegetation, both planted and natural.			equipped with water collection basins and is cleaned up monthly by local designated agency during the project life cycle. The related activities are conformance to requirements.
Noise	Noise from construction, machinery operation, and transportation activities	Ensure that noise levels from equipment and machinery conform to the PRC standard of GB12523-2011, and properly maintain construction vehicles and machineries to minimize noise. Locate sites for rock crushing, concrete-mixing, and similar activities at least 1 km away from sensitive areas. Machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum. Place temporary signs or noise barriers around noise sources during construction, if necessary. Vehicles transporting construction materials or wastes shall slow down and stop honking when passing through or nearby environmentally sensitive locations, such as residential communities, schools and hospitals. Construction activities, and particularly the noisy ones, are to be contained to reasonable hours during the day and early evening. Provide noise personnel protective equipment (PPE) to workers.	Contractors, CSC	IA, local EPB	The project just completed Enclosing wall construction, the noise from equipment and machinery was main noise resource, and was no more than 60db in the daytime, and below 50db at night. The area where this CSP project located is a depopulated zone, so it has no influence on surrounding community. The noise complied with the standard GB12523-2011 etc. Vehicles transporting construction materials or wastes shall slow down and stop honking when passing through or nearby environmentally sensitive locations, such as residential communities, schools and hospitals. Construction activities will be done only in the day from 9 AM to 6 PM. The related activities are conformance to requirements.
Vibration	Vibration generating by compacting and rolling	Prohibit pilling and compaction operations at night	Contractors, CSC	IA and local EPB	Yes, the related activities are conformance to requirements. Contractors are prohibited to

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
					working at night
Ambient Air	Fugitive dust generated by construction activities worsens ambient air quality	Spray water on construction sites and earth/material handling routes where fugitive dust is being generated. Keep transport vehicles at low speed in the construction site to reduce fugitive dust generation. Stop the construction activities during strong windy days. Cover materials during truck transportation, in particular, the fine material, to avoid spillage or dust generation Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighboring areas.	Contractors, CSC	IA, local EPB	The contractors have water truck to spray recycled water on construction sites, earth/material handling areas and routes every day. Construction materials (sand, gravel, and rocks) and spoil materials are transported trucks covered with tarpaulins. Storage piles are at least 30m downwind of the nearest human settlements. All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) are well maintained and not emit dark, smoky or other emissions in excess of the limits.
	Air emission from vehicles and construction equipment	Store petroleum or other harmful materials in appropriate places and cover to minimize fugitive dust and emission.	Contractors, CSC	IA, Local EPB	The related activities are conformance to requirements. Petroleum, diesel, paint and other harmful materials are stored in the designated place where the HSE signs and protection measures are in place. Anyone who closes to the storage place must wear proper PPE and work in accordance with the procedures.
Solid Waste	Solid waste from construction activities	Establish temporary storage for solid wastes away from water bodies or other environmental sensitive areas, and regularly haul solid waste to an approved and designed landfill in De lingha; All rubble must either be used on site as part of the existing development, or must be taken off the reserve and disposed off at the landfill facility in De lingha. Rubble must not be dumped on site but must be placed within a bin for regular removal.	Contractors, CSC	IA, Local EPB	A temporary storage has been established for solid wastes on site. , Separate hazardous waste from general waste and regularly haul solid waste by local authority designated agency to an approved and designed landfill in Delingha city. The waste on site should be deposited in the corresponding waste storage

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		Provide appropriate waste storage containers at construction sites. Recycle the construction waste and excavating waste as much as possible and the rest construction waste will be transported to an approved landfill. Hire a qualify contractor to remove all non-hazardous wastes from site to approved waste disposal site, according to appropriate domestic procedures. Hold contractors responsible for proper removal and disposal of any significant residual materials, wastes, and contaminated soils that remain on the site after construction. Strictly prohibit any waste incineration at or near construction site.			place where signs and leakage prevention measures are in place. Environment supervisor should contact with the local authority designated agency before it is full. .
Chemicals and Hazardous Material	Hazardous and polluting materials from construction activities	Prepare and implement a protocol for the handling and disposal of hazardous materials during construction including a spill prevention and emergency plan. Build storage facilities for fuels, oil, chemicals and other hazardous materials will be within secured areas on impermeable surfaces, and provided with dikes. Vehicles and equipment will be properly staged in designated areas to prevent contamination of soil and surface water from chemicals and other hazardous materials. Vehicle, machinery and equipment maintenance and refueling will be properly carried out so that spilled materials do not seep into the soil. Oil traps will be provided for service areas and parking areas; and fuel storage and refilling areas will be located	Contractors, CSC	IA, Local EPB	Only few paints and fuels are stored in the warehouse within secured areas on impermeable surfaces. The warehouse is in good ventilation on the top and at the bottom, and together with good waterproof and shading measures. The outside of warehouse will be provided with 6 pieces of fire extinguishers and fire sandboxes. The contractors established emergency plan and exercised it again in December 2016. Vehicles and equipments were properly staged in designated areas to prevent contamination of soil and surface water from chemicals and other

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		at least 300 m from drainage structures and important water bodies. Suppliers of chemicals and hazardous materials must hold proper licenses. They shall follow proper protocol for transferring fuel and the Operation Procedures for Transportation, Loading and Unloading of Dangerous or Harmful Goods of JT 3145-91.			hazardous materials. Vehicle, machinery and equipment maintenance and refueling was properly carried out so that spilled materials did not seep into the soil. The related activities are conformance to requirements.
Flora and Fauna	Protection of vegetation, re-vegetation of disturbed areas; planting and compensatory planting trees and grass	Preserve existing vegetation where no construction activity is planned, or temporarily preserve vegetation where activity is planned for a later date. The construction activities will be implemented within the land acquisition scope, minimize the damage to the nearby land. Properly backfill, compact, and re-vegetate piping/cable trenches after construction. Remove shrubs only as a last resort if they impinge directly on permanent structures. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses. Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species. Enhance awareness on protection of and prohibition to hunt wild animals, construction workers are forbidden to hunt wild animals in the construction and surrounding areas, in accordance with PRC's Law on Wildlife Protection. Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live.	Contractors, CSC	IA, Local EPB	The construction activities will be implemented within the land acquisition scope, Minimize activity to damage the nearby land, such as excavating in accordance with construction drawings, protecting the slope, and spraying recycled water to minimize dust etc. Remove shrubs only as a last resort if they impinge directly on permanent structures. All natural areas impacted during construction were rehabilitated with locally indigenous grasses. Construction activities were planned carefully so as not to interfere with the calving and lambing season for most animal species. Training for all new staff working on site which includes basic HSE knowledge and precautions was completed at July to August of 2015, and the normal training which includes updated HSE knowledge and skills according to the project progress is ongoing, Hunting wild animals were prohibited in the construction and

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
					surrounding areas, in accordance with PRC's Law on Wildlife Protection. The related activities are conformance to requirements.
	Greening facilities for the plant site	Vegetate the CSP plant wherever possible.	Contractors, CSC	IA	Yes
Community Disturbance and Safety	Public safety around the construction site	Implement safety measures around the construction sites to protect the public, including warning signs to alert the public to potential safety hazards, and barriers to prevent public access to construction sites.	Contractors, CSC	IA, Local Public Transportation Bureau	The project entrance was secured by guards and barrier so that only authorized personnel can have access to premise.
Occupational health and safety	Health damage and accidents during construction activities	Identify and minimize the causes of potential hazards to workers. Implement safety measures and work procedures and provide first aid facility onsite. Workers should be thoroughly trained on occupational health and safety during construction, especially for using potentially dangerous equipment. Provide preventive and protective measures, including modification, substitution, or elimination of hazardous conditions. Contractors must ensure that all equipment is maintained in a safe operating condition. The Contractors will take all the necessary precautions against the spreading of disease. Material stockpiles or stacks, such as, pipes must be stable and well secured to avoid collapse and possible injury to site workers. Provide appropriate personal protective equipment (PPE) to workers to minimize risks, including ear protection, hard hats and safety boots. Post adequate signage in risk areas.	Contractors, CSC	IA, Local EPB, CGN	The contractors have established procedure to identify hazards and risk assessment, implement safety measures and work procedures and provided first aid facility onsite. Preventive and protective measures such as providing proper PPE, compiling HSE procedures, inspecting and monitoring the machines and facilities, and rectifying the hazards and risks on site etc were carefully taken by contractors, Appropriate personal protective equipment (PPE) has been provided to all workers to minimize risks, including ear protection, hard hats and safety boots. Adequate signage in risk areas where the petroleum, paint and diesel are stored, fire working place, high working place, distribution boards, and excavation areas etc has been installed. Hold toolbox meeting

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		Provide procedures for limiting exposure to high noise or heat working environments in compliance with PRC noise standards for construction sites (GB12523-2011). Provide training to workers on the storage, handling and disposal of hazardous wastes. Provide emergency prevention, preparedness, and response arrangements and training to workers. Hold safety meetings with staff before each shift.			daily.
Physical Cultural Resources	Relics may be damaged if proper precaution is not taken.	Establish and conduct chance-find procedures for physical cultural resources Relics destroying, damaging, defacing, concealing or otherwise interfering will be strictly prohibited in accordance with PRC regulations. If a new site is unearthed, work should be stopped immediately and the IA and local cultural relic bureau will be promptly notified; construction will resume only after a thorough investigation and with the permission of the appropriate authority.	Contractors, CSC	IA and CGN	The contractors have established a procedure to reflect the issue. During the reporting period, there was no any relic founded.
C. Operation Phase					
Dust	Fugitive dust will be generated by strong wind and affect local air quality	Use recycled water to the plant area to suppress dust emission. Use mirror washing water to suppress dust from solar collection field.	IA	Local EPB	Not applicable.
Noise	Noise from steam generator system, power generation equipment, additional heating, pump and cooling equipment may impact workers' hearing	Implement restricted access, and provide PPEs such as earmuffs and earplugs to personnel who work in high noise generating areas. The latest technology incorporating maximum noise mitigating measures for the CSP plant components will be used. All plant and equipment, including vehicles, will be properly maintained in order to minimize noise	IA	Local EPB	Not applicable.

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		generation.			
Solid Wastes	Waste generated from the CSP plant and worker	No permanent on-site solid waste disposal will be allowed. All structures and/or components replaced during maintenance activities are recycled as much as possible. None-recyclable parts will be disposed at an designated waste disposal site in Delingha. General waste will be recycled if possible or disposed properly to an appropriate designated landfill facility. All wastes will be routinely collected by appropriately licensed waste management companies for reuse, recycling or final disposal in a licensed waste facility. Waste handling, collection and disposal operations are managed and controlled by a waste management contractor No burning of wastes will be permitted at the plant site.	IA	Local EPB	Not applicable.
HTF	HTF handling needs special care to protect workers and environment	HTF will be transported in spill proof container. HTF will be stored in designated areas with impermeable surfaces and protective dikes. Fire protection and control procedures will be implemented in HTF storage area.	IA	Local EPB	Not applicable.
	HTF leakage may cause soil and water pollution and human health problems.	HTF system is equipped with automatic pressure monitoring devices. HTF leakage will be automatically detected and alarmed in the control system. The ullage system should be operated at all time when the plant is in operation. Concrete dikes with enough capacities should be built around the ullage system and other HTF tanks, such as HTF expansion tank, to contain HTF in case of accident.	IA	Local EPB	Not applicable.

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		Emergency response plan for HTF leakage will be developed and performed by properly trained staffs. Fire protection system is in place in order to quickly respond to the leakage.			
	HTF waste is hazardous waste and cause environmental pollution if not treated properly.	Contaminated soil from HTF will be temporarily stored onsite with impermeable surface. HTF waste should be stored using spill proof tanks and treated as hazardous material. An identified and certified 3rd party hazardous waste management entity will be contracted before the operation of the plant and they will be responsible for the transportation and treatment of the HTF waste according application laws and regulations of the PRC.	IA	Local EPB	Not applicable.
Chemicals and Hazardous Materials	Hazardous materials or chemicals can lead to soil and water pollution and risks to human health.	All toxic, hazardous, or harmful materials including petroleum products, solvents and chemicals used for water treatment must be transported in spill proof tanks with filling hoses and nozzles in working order, and stored in designated areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained from affecting soil, surface water or groundwater systems. Material safety data sheets (MSDSs) will be posted for all hazardous materials. Oil absorbents will be readily accessible in marked containers. Good housekeeping procedures will be established to avoid the risk of spills. Spills will be dealt with immediately, and personnel will be trained and tasked with this responsibility. Identify and maintain a register of all activities that involve the handling of potentially hazardous	IA	Local EPB	Not applicable.

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		substances, as well as devise and supervise the implementation of protocols for the handling of these substances. This will include all fuels, oils,grease, lubricants, and other chemicals. Workers should be properly trained before handling hazardous wastes and have the requisite PPE. Store hazardous waste temporarily in closed containers away from direct sunlight, wind, water and rain in secure designated areas with impermeable surfaces and protective dikes such that spillage or leakage will be contained. Oil sludge will be collected and disposed by licensed contractors on as needed basis. Separate hazardous waste from general waste and all hazardous waste will be contracted to the identified and certified contractor for transporting and disposal.			
	Hazardous waste may cause pollution to environment and health issues to workers.	Ensure that care is taken at all times to ensure the impact of spillage of oils and other hazardous substances to be limited, and it will be cleaned up immediately.			
Wastewater	Water pollution and reuse in CSP	Wastewater from the chemical treatment facility will be pre-treated before discharging to the onsite wastewater treatment plant (WWTP) for further treatment. Wastewater collected from other parts of the CSP plant will also be sent to the onsite WWTP. Treated water from WWTP will be used for watering plants and dust suppression onsite. All runoff water from workshops, vehicles washing areas and other equipment will be collected and send to the onsite WWTP for treatment. Ensure that solid waste collection and sanitation is	IA	Local EPB	Not applicable.

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		managed effectively in order to avoid any chances of ground and surface water pollution. Oil contaminated water will be directed to the WWTP, which is equipped with an oil/water separator. All vehicle loading/unloading points will be within a bounded area to minimize the potential impact of spills to pollute water. Any run-off that is discharged from the site must be uncontaminated and meet standards for discharge.			
Occupational health and safety	HTF maypresent health and safety risks to workers in case of accidental release	Occupational heat and safety procedures, including fire prevention and control, will be developed and workers will be trained regularly. The general arrangement is designed in strict compliance with relevant standards, featuring fire compartments based on fire-resisting levels of process units and buildings to satisfy requirement on fire-prevention space. Storage tank area is surrounded by ring-shaped fire passages for fire-fighting vehicles. Fire compartments are set up based on the fire risk and fire-resisting buildings/structures, including fire-proof doors and windows. A fire-alarm system will be installed and tested regularly to make sure if functions properly. The process control system contains an out-of-limit alarm to ensure all hazardous materials under safety control at all time. PPE, including goggles, gloves, safety shoes, will be provided to workers.	IA	Local EPB, local LB, local fire station	Not applicable.
	Natural gas and other flammable gas are fire hazards	Naked fire, hot surface, electric sparks, electrostatic spark and ignition sources like impulsive force and friction shall be strictly controlled, especially near HTF,			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		nitrogen gas and natural gas. Control measures will also be strictly taken to ensure the discharge, exhaust and safety relief of flammable fuels in an enclosed system. The fire monitoring system will be installed to ensure safety in production and operation and provide early warning to plant personnel. Important monitoring areas must have a combustible gas test detector of catalytic combustion kind which are able to make an acousto-optic alarm, and a poisonous gas test detector of electrochemistry kind capable of making an acousto-optic alarm.			
	Molten salt tanks are very hot and it may present some burn hazardous to workers	Unauthorized personnel should not be around the molten salt storage tanks. Authorized personnel must have PPE at all times to prevent burn hazards.			
Emergency Response Plan	HTF, other hazardous chemicals, and gas may create health risks to worker and pollute the environment	An emergency response plan will be prepared before the plant is operational and the plan must meet the requirements according to National Environmental Emergency Plan (24 January 2006) and relevant laws, regulations and standards. Procedures for responding to different types of emergency situations will be identified in the response plan. Emergency exercises will be conducted and they should include different emergency scenarios. **Training requirements.** Appropriate operating and maintenance employees will be trained to ensure that they are knowledgeable of the requirements of the written emergency response procedures. Training will be provided as follows:	IA	Local EPB and Local Fire Department	Not applicable.

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		II. Initial training to all employees before the CSP plant is put in operation; III. When new equipment, materials, or processes are introduced. IV. When emergency response procedures have been updated or revised. **Annual emergency simulation.** Exercise of simulated emergencies will be conducted at least annually. Simulated emergencies exercises should be documented. **Receiving notification of a possible emergency.** When a supervisor receives a report of a possible emergency situation, he/she should obtain at least the following information from the reporting person: V. Name of person reporting emergency; VI. Nature of Emergency - leak, fire, interruption of service if leak, place where odor is present, how long has odor been noticed. VII. Details of emergency: location, amount, how long has the odor been noticed, what actions have been taken, etc. VIII. Leaks or other emergencies require prompt investigation. **Immediate on-site action.** The first responder will assess the nature of the report.			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		This assessment should include the status of the emergency, an estimation of how the incident might progress, and an evaluation of the manpower, equipment, and materials needed to adequately cope with the situation. If there is a strong odor or any measurable reading of gas detected inside a structure, IX. Clear the building of all occupants; X. Eliminate potential ignition sources. XI. Localize or isolate the problem and shut off gas as needed. XII. Determine the extent of the hazardous area and establish a restricted area. The responding supervisor shall determine the extent of the emergency and inform the dispatcher of the condition at the site. If emergency procedures are put into effect, the supervisor should select a location and establish an emergency command post. The responding supervisor will assign one person to remain at the command post to maintain communications until the emergency is over. When necessary, the command post will be coordinated with the local emergency responders.			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		When local emergency responders are involved, they will be in charge of incident.			
		The responding supervisor will make himself known to fire and/or police department officials, or other authority having jurisdiction, and will remain with them during the emergency.			
		All employees reporting to the scene of the emergency will report to the command post for identification and instructions.			
		Key personnel will be alerted, and it will be their responsibility to keep the emergency personnel under their supervision informed and available for emergency call out.			
		When a system failure cannot be made safely by normal procedures, emergency shutdown procedures should be implemented.			
		Reduce system pressure or segmenting a section before repair procedures are implemented.			
		Well trained and qualified personnel will be dispatched			

Category	Potential Impacts and Issues	Mitigation Measures and/or Safeguards	Responsibility		Implementation Status
			Implemented by	Supervised by	
		to monitor system pressure and repair work. **Communication with Public Officials.** When an emergency resulting in a hazard to the public safety occurs, the local fire department, police, the city medical emergency center and other relevant public officials should be notified. An emergency call list will be prepared and make it available at the plant control room.			

DI = design institute, EIA = environment impact assessment, EMP = environment monitoring plan, EMS = environment monitoring station, EPB = environment protection bureau, GRM = grievance redress mechanism, CSP =concentrated solar thermal plant, IA = implementing agency, km = kilometer, LB = labor bureau, m = meter, mg = milligram, m^3 = square meter, PRC = the People's Republic of China, SO_2 = sulfur dioxide.

IV. ENVIRONMENTAL MONITORING

22. This section presents the progress of environmental monitoring framework in details and the summary of environmental monitoring results.

A. Implementation of Environmental Monitoring Program

23. An environment monitoring plan (see Table 6) is developed to monitor the environmental impacts of the project, particularly assessing (i) the extent and severity of actual environmental impacts against the predicted impacts and baseline data collected before the project implementation, (ii) performance or effectiveness of environmental mitigation measures or compliance with pertinent environmental rules and regulations, (iii) trends in impacts, (iv) overall effectiveness of EMP implementation, and (v) the need for additional mitigation measures and corrective actions if non-compliance is observed. The EMP monitoring plan covers air, wastewater, solid waste, and noise parameters during construction as well as operation of the project.

24. The project environmental monitoring plan describe the standard monitoring methods, detection limits, and the standard code for each monitoring parameter (see Table 5).

a. Wastewater

25. Wastewater collection basins and sediment traps are equipped in concrete batching station area. The construction wastewater, after sedimentation, has been used as the spraying water for fugitive dust control on the construction site. The domestic wastewater from workers camp is equipped with water collection basins and is cleaned up timely by local environment monitoring station .The water quality data of the project area is monitored pH, SS, oil by the Xi'an jingcheng monitoring technology Co., Ltd., during construction phase monthly.

b. Ambient air

26. The ambient air quality data of the project area is monitored monthly. The contractors have water trucks to spray water on construction sites and earth/material handling routes every day. Construction materials (sand, gravel, and rocks) and spoil materials are transported trucks covered with tarpaulins. Storage piles are at least 30m downwind of the nearest human settlements. All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) are well maintained and not emit dark, smoky or other emissions in excess of the limits.

c. Noise

The noise from equipment and machinery was main noise resource, and was no more than 60db in the daytime, and below 50db at night. The area where this CSP project locate depopulated zone, so it has the noise have no influence on surrounding community. The noise complied with the standard GB12523-2011 etc. The noise data of the project area will be monitored by Xi'an jingcheng monitoring technology Co., Ltd..

d. Construction spoil disposal

Spoils are safely disposed and managed with minimum environmental damage because the Environmental Protection Administration of Delingha has inspected the site and gave a good result in Oct 2015. Designated temporary areas where set up HSE signs for spoil disposal on site and re-use of excavated materials for landfill.

1**Table 5: Monitoring Parameters and Methods**

Media	Monitoring Parameter	Method (Standard No.)	Standard Limit
Air	TSP (mg/m^3)	Gravimetric (GB/T15432-1995)	0.30
	PM_{10} (mg/m^3)	Gravimetric with specific sampler (HJ/T93-2003)	0.15
	NO_x (mg/m^3)	Saltzman Method (GB/T15435-1995)	0.12
Noise	Equivalent Continuous A Sound (Leq)	Acoustimeter Method (GB12524-90)	60 (day)/ 50 (night)
Surface water	pH value	Glass electrode method (GB6920-86)	6-9
	COD_{Mn}(mg/L)	Permanganate index (GB11914-89)	6
	Petroleum (mg/L)	Infrared spectra photograph (GB/T16488-1996)	0.05
	SS (mg/L)	Gravimetric method (GB11901-89)	250
	Total coliforms (no./L)	Membrane filter (GB/T575.12-2006)	10,000

COD = chemical oxygen demand, mg/L = milligram per liter, mg/m^3 = milligram per cubic meter, PM_{10} = particulate matter smaller than 10 micrometers, SS = suspended solid, TSP = total suspended particulate.
Source: PRC standards.

Table 6: ENVIRONMENTAL MONITORING PLAN

Subject	Parameter	Location	Frequency	Implemented by	Supervised by	Implementation Status
A. Construction Phase						
Wastewater generated from construction	Inspection of wastewater mitigation measures (water collection basins and sediment traps, etc.)	The construction site	Waste water effluent sites, Daily	Contractors, CSC,	IA and CGN	Accepted Done on 16/12/2016-17/12/2016
	pH, SS, oil	The construction site	One sampling each day each time, monthly	Local EMS	IA, Local EPB	Accepted Done on 16/12/2016-17/12/2016

Subject	Parameter	Location	Frequency	Implemented by	Supervised by	Implementation Status
Ambient air	Ambient air monitoring; Inspection of dust mitigation measures (water spraying, cover transport vehicles, etc); and Inspection of maintenance and condition of vehicles and construction equipment.	The construction site and nearby areas	Monthly; Daily when there are construction activities.	IA, Contractors, CSCs	IA, Local EPB	Accepted Done on 16/12/2016-22/12/2016
Noise	Leq dB(A)	All sensitive receivers nearby construction site	Monthly: a day each time and two samples; once during daytime, once during nighttime.	IA, Contractors, CSCs	Local EPB	Accepted Done on 16/12/2016-17/12/2016
Construction spoil disposal	Spoil waste	Construction waste disposal sites.	At the onsite of construction; Once a year; and once after completion of spoil disposal	Local EPB	CGN	Accepted
B. Operation Phase						
Noise from CSP	Leq dB(A)	1m outside of the CSPs' boundary	Monthly	IA	Local EPB, CGN	Not applicable
Wastewater and sludge from CSP[a]	Quantity generated and discharged, SS, BOD	Discharging point	Monthly	IA	Local EPB, CGN	Not applicable
Solid waste	Solid waste generated from the plant	Waste disposal site	Monthly	IA	Local EPB	Not applicable
Leakage of hazardous Materials and Wastes	Leakage of the HTF and natural gas	CSP	Real time control	IA	Local fire station, local EPB, CGN	Not applicable

CNY = Chinese yuan, CSC = construction supervision company, CSP = concentrated solar thermal plant,dB = decibel, EMS = environment monitoring station, EPB = environment protection bureau, IA = implementing agency, Leq = equivalent continuous noise level, NO_2 = nitrogen dioxide, pH = potential hydrogen, PM = particulate matter, SO_2 = sulfur dioxide.

[a]During the detailed engineer designing phase, all the features of the wastewater facility will be confirmed. Based on the confirmation, the monitoring location and frequency will be reviewed and revised if necessary.

Source: Domestic environment assessment report and TA consultants estimate.

监 测 报 告

Monitoring Report

西安京诚检测技术有限公司

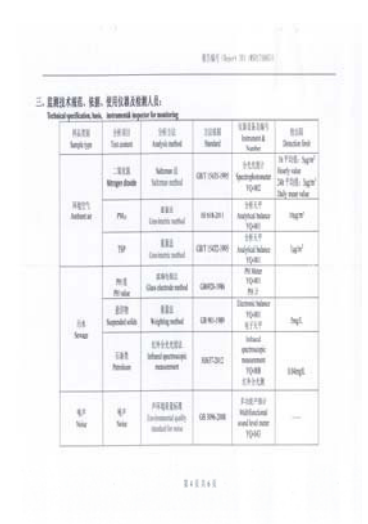
（加盖报告专用章）

Page 1: Monitoring Report

Page2: Ambient Air Monitoring

Page3: Ambient Air and Wastewater Monitoring

Page 4: Noise Monitoring



Page 5: Monitoring Standards

Page 6: Monitoring Statistical Table

Page 7: Attachment

V. GREIVANCE REDRESS MECHANISM

27. A project-level grievance redress mechanism (GRM) was developed in accordance with the ADB's SPS requirement so to receive and facilitate resolution of affected person's concerns and complaints about the project's environmental performance during construction as well as operation phase of the project. The project GRM includes a procedure for receiving grievances, recording/ documenting key information, and evaluating and responding to the complainants in a reasonable period of time. Any concerns raised through the GRM will need to be addressed promptly and transparently.

28. A fundamental goal of the GRM is to solve problems early at the lowest level. Therefore, the IA, through the person assigned to receiving, recording and documenting grievances, will attempt to address grievances at the first instance and in a pro-active manner to preclude elevating grievances to higher level.

29. Procedures and time frames for GRM are described as follows (also see Figure 2):

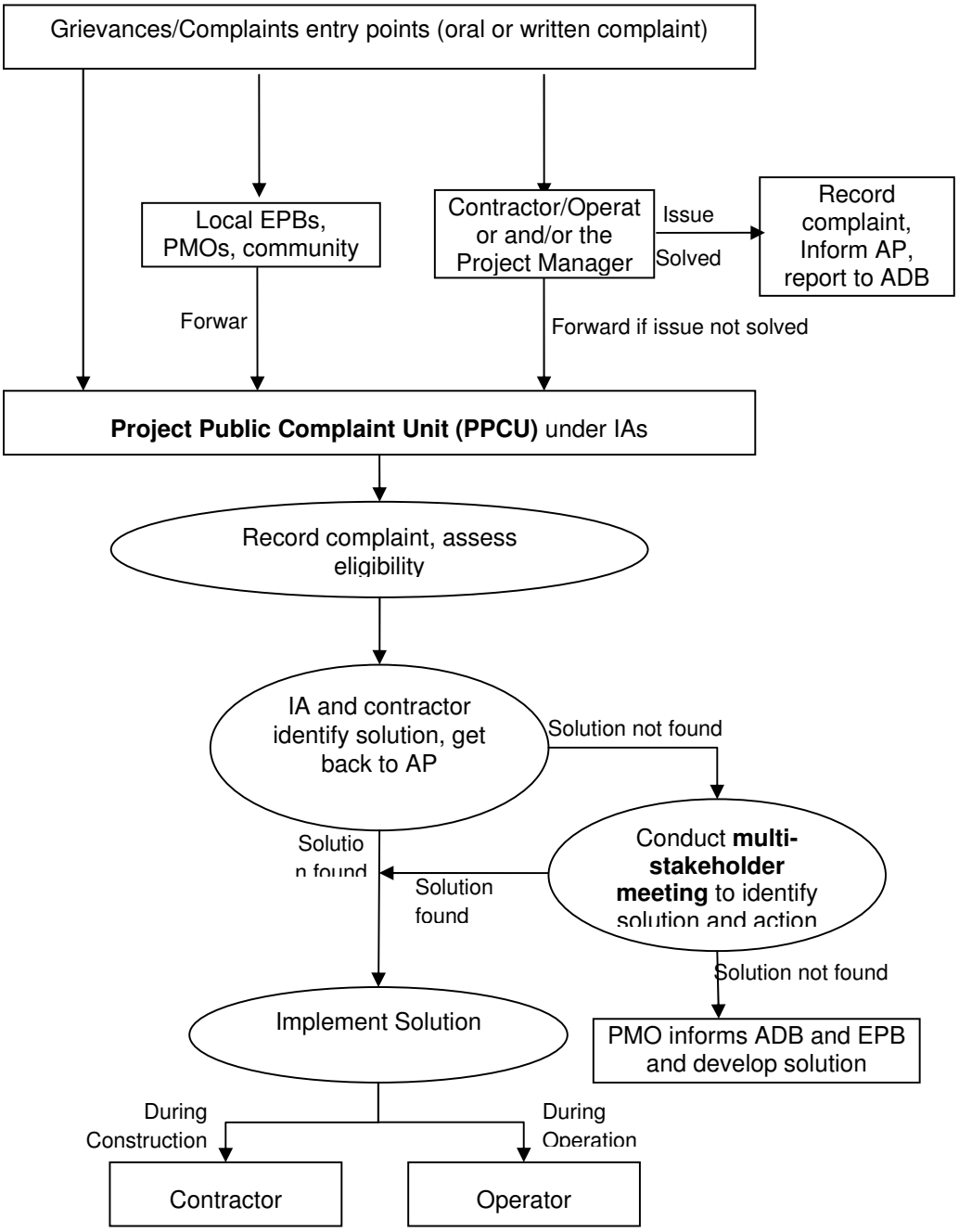
Step 1: If a concern arises, the affected person tries to resolve the issue of concern directly with the contractor/operator and/or the project manager. The contractor/operator and/or the project manager shall provide a response within seven working days. If the concern is resolved successfully, no further follow-up is required. Yet, the contractor/operator and/or the project manager shall record any complaint and actions taken to resolve the issues and report the results to ADB residence mission office in the PRC;

Step 2: If no solution is found, the PPCU must properly assess the eligibility of the complaint, identify a solution, give a clear reply within 14 working days, and timely convey to the complainant and to the implementing agency, or contractor the suggested solution. The contractor, during construction, and the implementing agency, during operation, shall implement the redress solution and convey the outcome to the PPCU within seven working days;

Step 3: If no solution is identified by the PPCU or if the complainant is not satisfied with the suggested solution under Step 2, the PPCU will organize, within two weeks, a multi-stakeholder hearing (meeting) where all relevant stakeholders, including the complainant, the IA, contractor/operator, and local EPB will be invited. The meeting will aim to find in a solution acceptable to all, and identify responsibilities and an action plan. The contractor during construction and the IA during operation will implement the agreed-upon redress solution and convey the outcome to the PPCU within seven working days;

Step 4: If the multi-stakeholder hearing process is not successful, the PPCU, through the IA, will inform the EA and provincial EPB accordingly. The EA with the consultation from the EPB and ADB will deliver alternative approaches to resolve the issues.

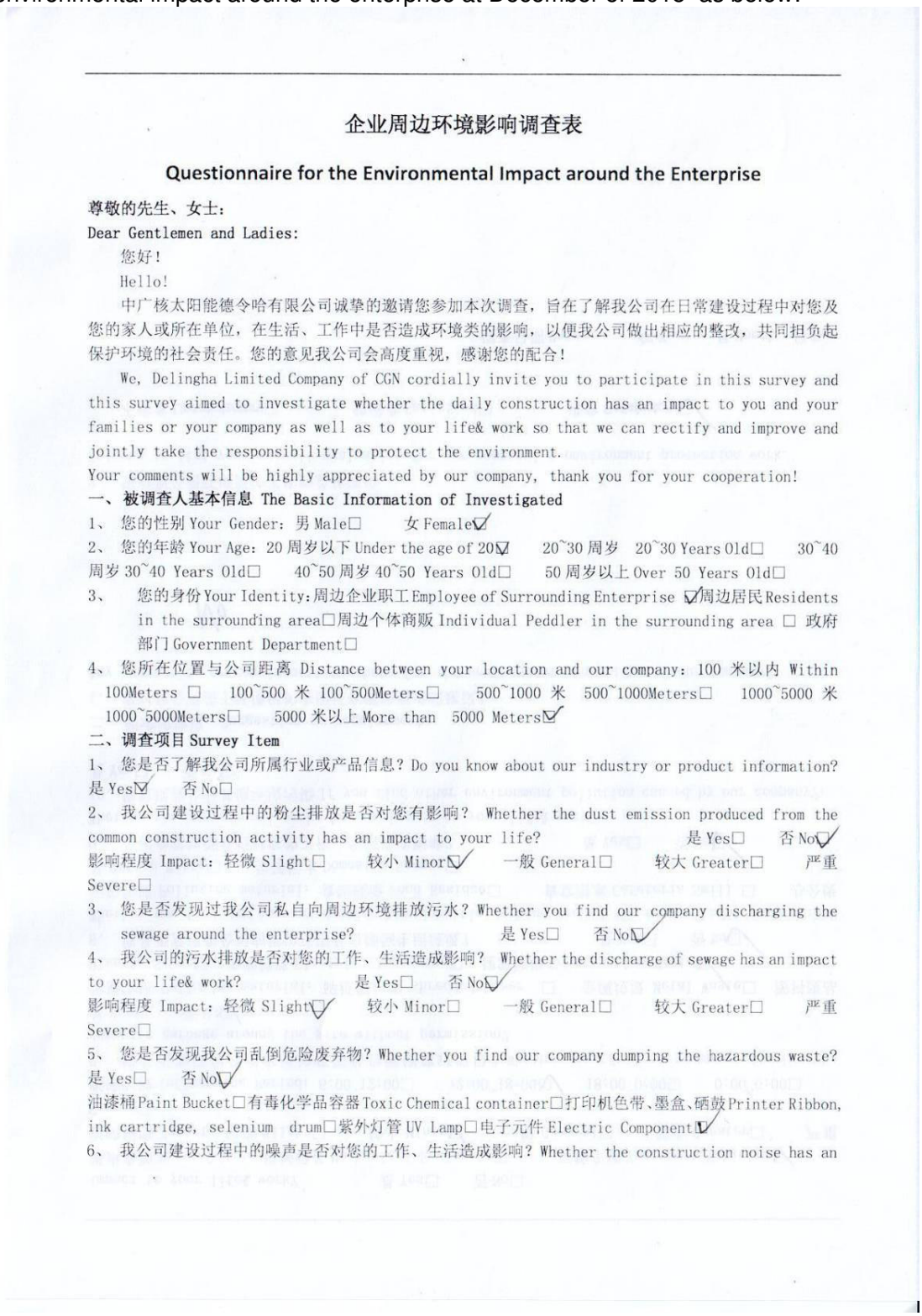
Figure 2: Project-Level GRM



ADB = Asian Development Bank, AP = affected person, EA = executing agency, EPB = environmental protection bureau, IA = implementation agency.

30. Mr. Ma chunlei, has been designated as a focal person of the project GRM. His contact number is +8613159511992. His contact information has been posted on site information

boards. During this reporting period, no complaint was received. We had Questionnaire for the environmental impact around the enterprise at December of 2015 as below:



企业周边环境影响调查表

Questionnaire for the Environmental Impact around the Enterprise

尊敬的先生、女士：

Dear Gentlemen and Ladies:

您好！

Hello!

中广核太阳能德令哈有限公司诚挚的邀请您参加本次调查，旨在了解我公司在日常建设过程中对您及您的家人或所在单位，在生活、工作中是否造成环境类的影响，以便我公司做出相应的整改，共同担负起保护环境的社会责任。您的意见我公司会高度重视，感谢您的配合！

We, Delingha Limited Company of CGN cordially invite you to participate in this survey and this survey aimed to investigate whether the daily construction has an impact to you and your families or your company as well as to your life& work so that we can rectify and improve and jointly take the responsibility to protect the environment.

Your comments will be highly appreciated by our company, thank you for your cooperation!

一、被调查人基本信息 The Basic Information of Investigated

1、 您的性别 Your Gender：男 Male□ 女 Female☑

2、 您的年龄 Your Age：20 周岁以下 Under the age of 20☑ 20~30 周岁 20~30 Years Old□ 30~40 周岁 30~40 Years Old□ 40~50 周岁 40~50 Years Old□ 50 周岁以上 Over 50 Years Old□

3、 您的身份 Your Identity：周边企业职工 Employee of Surrounding Enterprise ☑周边居民 Residents in the surrounding area□周边个体商贩 Individual Peddler in the surrounding area □ 政府部门 Government Department□

4、 您所在位置与公司距离 Distance between your location and our company：100 米以内 Within 100Meters □ 100~500 米 100~500Meters□ 500~1000 米 500~1000Meters□ 1000~5000 米 1000~5000Meters□ 5000 米以上 More than 5000 Meters☑

二、调查项目 Survey Item

1、 您是否了解我公司所属行业或产品信息？Do you know about our industry or product information? 是 Yes☑ 否 No□

2、 我公司建设过程中的粉尘排放是否对您有影响？ Whether the dust emission produced from the common construction activity has an impact to your life? 是 Yes□ 否 No☑

影响程度 Impact：轻微 Slight□ 较小 Minor☑ 一般 General□ 较大 Greater□ 严重 Severe□

3、 您是否发现过我公司私自向周边环境排放污水？Whether you find our company discharging the sewage around the enterprise? 是 Yes□ 否 No☑

4、 我公司的污水排放是否对您的工作、生活造成影响？ Whether the discharge of sewage has an impact to your life& work? 是 Yes□ 否 No☑

影响程度 Impact：轻微 Slight☑ 较小 Minor□ 一般 General□ 较大 Greater□ 严重 Severe□

5、 您是否发现我公司乱倒危险废弃物？Whether you find our company dumping the hazardous waste? 是 Yes□ 否 No☑

油漆桶 Paint Bucket□有毒化学品容器 Toxic Chemical container□打印机色带、墨盒、硒鼓 Printer Ribbon, ink cartridge, selenium drum□紫外灯管 UV Lamp□电子元件 Electric Component☑

6、 我公司建设过程中的噪声是否对您的工作、生活造成影响？Whether the construction noise has an

impact to your life& work? 是 Yes☐ 否 No☑

噪声来源 Noise Sauce：机械设备 Mechanical Equipment☐ 运输车辆 Transport Vehicles☐

影响程度 Impact：轻微 Slight☐ 较小 Minor☐ 一般 General☐ 较大 Greater☐ 严重 Severe☐

影响时段 Influencing Period：6:00~12:00☐ 12:00~18:00☐ 18:00~0:00☐ 0:00~6:00☐

7、 您是否发现我公司向周边范围私自倾倒建筑垃圾？Whether you find our company dumping the domestic garbage around the site without permission?

是 Yes☐ 否 No☑

污染物质 Polluting material：碎纸屑、尘 shredded Paper ☐ 金属垃圾 Metal Waste☐ 塑料废品 Plastic Scrap☐ 电器线路 Electric Apparatus☐ 建筑垃圾 Construction Waste☐

8、 您是否发现我公司向周边范围私自倾倒生活垃圾？ 是 Yes☐ 否 No☑

Whether you find our company dumping the domestic garbage around the site without permission?

污染物质 Polluting material：食物残渣 Food Residue☐ 食堂泔水 Cafeteria Swill ☐ 办公废品 Office Waste☐ 生活污水 Domestic Sewage☐

9、 公司食堂油烟是否对您的工作、生活造成影响？ 是 Yes☐ 否 No☑

Whether the canteen oil smoke has an impact on your life& work?

10、您发现我公司其他环境污染 If you find other environment pollution caused by our company?：

是 Yes☐ 否 No☑

二、 要求或建议：Suggestion or requirement:

1、 您对我公司关于环境保护方面还有哪些要求或建议？

Any suggestion or requirement you have for the environment protection of our company?

2、 您对我公司环境保护工作的总体评价

Welcome to list your overall evaluation for our company’s environment protection work.

不满意 Unsatisfactory☐ 较满意 Satisfied☐ 满意 Satisfactory☑

调查日期 Date: 年 Year 月 Month 日 Day

VI. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

The IA invited deputy director of Qinghai Development and Reform Commission (DRC) and other officers to CSP project site. The site manager introduced this project program and positive environmental benefits. Qinghai DRC indicated that, the government will support this project strongly. In addition, the IA monthly communicates with many departments of Qinghai government, nearby communities keruke town government to introduce this project program and positive environmental benefits at Oct of 2015. The public welcome this project to build at the Delingha. We had Questionnaire for the environmental impact around the enterprise at December of 2015, there is no complaint handling until now, the IA keeps good cooperation and communication with local communities.

31. The project information including the project layout drawing, process flow diagram, values and signification of project, project HSE goals etc is disclosed for public, sign boards is provided on-site to guide public understanding that CSP project will bring positive environmental benefits locally as well as globally by generating electrical power with zero emission solar energy and clean natural gas instead of by traditional coal-fired power plants. The project will save 70,000 tons of standard coal or 122,554 tons of raw coal annually. The associated annual avoided emission of CO2 154,446 tons.

Project information including the project layout drawing, process flow diagram, values and signification of project, project HSE goals etc

VII. INSTITUTIONAL STRENGTHENING AND TRAINING

32. To strengthen the capacity of the EA and IA for EMP implementation, the following training programs were developed. The training topics, contents, estimated budgets and number of participants are listed in Table 7. Environmental consultants will be responsible for developing training materials and providing training along with technical experts. However, during this reporting period, the site entering HSE training was conducted, all of the new workers on site have accepted the HSE training and pass the examination. The same job will be done in the future, and the normal training for workers on site will be done by HSE engineer according to the progress of project.

Table 7: Institutional Strengthening and Training Program

Training	Attendees	Trainers	Contents	Times	Period (days)	Number of Person
ADB's and PRC's environmental laws, regulations and policies	IA, contractors	Environmental consultant	ADB's safeguard policy statement Project applicable PRC's environmental laws, policies, standards	3	1	20

			and regulations International environmental management practice in civil constructions			
Grievance Redress Mechanism	IA, Local EPB, residential communities, and Stakeholders	Environmental consultant	GRM structure, responsibilities, and timeframe Types of grievances and eligibility assessment	2	1	15
Implementation of environment monitoring plan	IA, contractor, CSC	Environmental consultant	Impacts and mitigation measures during construction and operation Monitoring and auditing mechanism Reporting requirements Corrective actions for EMP	2	1	30
International good practices of operating CSP plant	IA	Environmental consultant	Environmental, health and safety issues associated with CSP and best practices of operation and maintenance of CSP and new solar energy technologies	2	2	30
		Total		**9**	**5**	**95**

ADB = Asian Development Bank, CSC = construction supervision company, GRM = grievance redress mechanism, IA = implementing agency, PRC = People's Republic of China.

VIII. KEY ENVIRONMENTAL ISSUES

A. Key Issues Identified

None

B. 1Action Taken to mitigate key environmental issues

None

C. Action Required

None

IX. CONCLUSIONS

33. As the project just finished the Enclosing wall construction, there is no environmental issue in this stage.

34. Any adverse environmental impacts associated with the project are prevented, reduced, minimized.

35. With the implementation of the mitigation measures defined in the IEE, the adverse impacts are reduced to acceptable levels, and zero environment incident at present.