Ministry of Energy and Mine
Electricite Du Laos

DESIGN AND CONSTRUCTION SUPERVISION SERVICES

FOR

NAM NGUM 1 HYDROPOWER STATION EXPANSION PROJECT

JICA Loan No. : LS-P
Consultant Services Contract No. : EDL/NN1 XP-001
Construction Works Contract No. : EDL/NN1 XP-002

NIPPON KOEI J-POWER LCG

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I. Overview

1. On-going Construction Activities

Lot 1: Civil Works

The report covers the result of environmental monitoring from January 2020 to March 2020.

The on-going construction sites during the reporting period are shown in Table 1-1.

Table 1-1 On-going Construction Sites, Lot 1

Item	Monitoring Site	Working			Remarks
		01	02	03	
1.	Area H (Contractor's Camp)	✓	✓	✓	
2.	Area A (Contractor's Temporary Work Area)	✓	✓	✓	
3.	Disposal Area	-	-	-	Not available on the existing disposal area
4.	Access to the Site	✓	✓	✓	
5.	Power House and Tailrace	✓	✓	✓	
6.	Intake and Penstock	✓	✓	✓	

Main construction activities during this period are as follows:

Item No.1: Area H (Contractor's Camp)

- Construction of the camp's facilities was completed, such as: accommodation, kitchen, shower, toilet, clinic, landscape work, drainage system, etc…

Item No.2: Area A (Contractor's Temporary Work Area)

- Site Office has been operating from September 2017
- Rebar shop, Laboratory has been operating their activities
- Fabrication of steel structure
- Compressive Strength test of shotcrete
- Rock and soil testing
- Site Clinic has been operating from November 2017 with a standby doctor
- Preparation work for Hydro Mechanical Works

Item No.3: Disposal Area

- There are no any activities at disposal area

Item No.4: Access to the Site

- Transportation of construction materials to site

Item No.5: Power House and Tailrace

- Concrete work at Powerhouse and Tailrace Area
- Demolition work of existing powerhouse wall
- Lifting work by using 65t crane and tower crane
- Monitoring work at Powerhouse and Tailrace Area
- Installation work of draft tube gate guide frame

Item No.6: Intake and Penstock

- Installation of penstock pipe and connection pipe
- Lifting work at dam top by using 150t crane

Lot 2: Installation of Electric and Mechanical Equipment

Monitoring at construction site and related facilities has re-started since January, 2020 with the commencement of the Lot 2 construction phase. The report covers the result of environmental monitoring from January 2020 to March 2020.

The on-going construction sites during the reporting period are shown in Table 1-2.

Table 1-2 On-going Construction Sites, Lot 2

Item	Monitoring Site	Working			Remarks
		01	02	03	
1.	Area J (Contractor's Camp)	-	-	✓	Return to site since Sep 2019
2.	Area J (Contractor's Temporary Work Area/Office/Stockyards)	✓	✓	✓	Site office is use the existing house, ware house has completed construction
3.	Power House	✓	✓	✓	

Main construction activities during this period are as follows:

Item No.1: Area J (Contractor's Camp)

- The Contractor's camp and related facilities such as accommodation, kitchen, shower, and toilet are under preparation when man power return to construction site since September 2019.

Item No.2: Area J (Contractor's Temporary Work Area/ Office/Stockyards)

- The Contractor's temporary work area, office, stockyards
  Stock yard, and ware house has been completed since June 19 and all sites has been operated up to present

  Fabricated workshop has been install in this area since January 2020

Item No.3: Power House

- Welding accuracy additional flange color
- painting and assembly the girder
- Inspection assembly bracing join bolt nut of the girder.
- Construction and safety at work at construction site.
- Installation crane girder.
- Inspection stopper at Lot1 and handover to Lot 2.
- install rail on top of girder, shim plate, tightening clamp
- Contractor Lot 2 installs the rail alignment upstream and downstream insert shim plate, screw the bolt clamp on the rail.
- Shim plate insert completed.
- Install the clamp for connecting SDL electric crane cable.
- Install draft tube segment 4-3-2.
- Install draft tube elbow and draft tube cone

2. Environmental Mitigation Measures Applied on Site

Lot 1: Civil Works

Item No.1: Area H (Contractor's Camp)

- Flora and Fauna
  - Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting, trading of wildlife or collecting timber
  - Prohibit species introduction by all personnel in Contractor's employees
- Water Pollution/Poor Hygiene
  - Install good drainage and septic tank in comply with 4.14.2 Waste Water Control on the Building Category C in National Environmental Standard and 14.4 Waste Water Control standards from toilet No.81/GOV issue date: 21/2/2017
- Waste
  - Make an arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard at designated points for the contracted garbage service to collect and no waste to be dumped or incinerated on site
  - Prohibit the use of herbicide or incineration on site

- Health
  - Set up mobile clinic system in the contactor's office and Contractor's labor
  - Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
  - Conduct information, education and communication campaigns to all the staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted diseases (STD) or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.

Item No.2: Area A (Contractor's Temporary Work Area)

- Water Pollution/Poor Hygiene
  - Neutralize cleaning water generated from laboratory by constructing settlement ponds s in comply with the standard on pH in 4.14 Waste Water Control on General Factory, National Environmental Standards No.81/GOV issue date: 21/2/2017
- Air
  - Spray water to reduce air-born dust
  - Equip safety gears against dust such as glasses, goggles or masks
- Waste
  - Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
  - Make an arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard at designated points for the contracted garbage service to collect
  - Store hazardous materials at designated place, keep record and dispose of at designated place
- Health
  - Install first aid kit in place and set up the clinic at the Contractor's office
  - Assign ambulance car in the office
  - Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Item No.3: Disposal Area

- Flora and Fauna
  - Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting, trading of wildlife or collecting timber
  - Prohibit species introduction by all personnel in Contractor's employees
- Air Pollution
  - Sprinkle water to reduce air-born dust
  - Equip safety gears against dust such as glasses, goggles or masks
- - Water Pollution
  - Well-drained and let in tidy, safe and stable condition
- Waste
  - No waste shall be dumped or incinerated and no water of any kind shall be deposited in any water courses

Item No.4: Access to Site

- Air Pollution
  - Maintain vehicles in good condition to minimize exhaust emissions
  - Cover load carrying platform properly when carrying fine construction materials or earth/sand
- Social Infrastructure
  - Limit loading capacity depends upon local conditions such as restriction on bridges
  - Repair and restore of public or private roads, bridges damaged by the Contractor

Item No.5: Power House and Tailrace

- Water
  - Maintain water quality at the downstream of the construction site in comply with 4.10 Category 3 Surface Water Standards in National Environmental Standards No.81/GOV, issue date 21/2/2017
  - Construct hygienic human waste disposal system such as mobile toilets and transport accurate urine from the site regularly
  - Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
  - Make an arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard at designated points for the contracted garbage service to collect
  - Store hazardous materials at designated place, keep record and dispose of at designated place
- Health
  - Install first aid kit in place
  - Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Item No.6: Intake and Penstock

- Water
  - Monitor water quality at the upstream of the intake in comply with 4.10 Category 3 Surface Water Standards in National Environmental Standards No.81/Gov., issue date 21/2/2017
- Waste
  - Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
  - Make an arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard at designated points for the contracted garbage service to collect
  - Store hazardous materials at designated place, keep record and dispose of at designated place
- Health
  - Install first aid kit in place

- Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Lot 2: Installation of Electric and Mechanical Equipment

Item No.1: Area J (Contractor's Camp)

- Flora and Fauna
  - Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting, trading of wildlife or collecting timber
  - Prohibit species introduction by all personnel in Contractor's employees
- Water Pollution/Poor Hygiene
  - Ensure good sanitation including latrines and install good drainage and septic tank in comply with 4.14.2 Waste Water Control on the Building Category C in National Environmental Standard and 14.4 Waste Water Control standards from toilet No.81/GOV issue date: 21/2/2017
  - Provide a potable water supply in complying with Article 9 in Decision on the Management of Quality Standards for Drinking Water and Household Water Supply No.1371/MoH 2005
- Waste
  - Designate temporary disposal site for waste generated from worker's camp and make an arrangement to collect the waste by the authorized company regularly
  - Use of herbicide or incineration is prohibited for site clearing Disposed of organic waste at a designated dumping site regulated by local authorities No waste shall be dumped or incinerated and no water of any kind shall be deposited in any water courses
  - On completion of the works, restore the site satisfied by the Engineer
- Health
  - Install first aid kids in place
  - Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
  - Conduct information, education and communication campaigns to all the staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted diseases (STD) or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.

Item No.2: Area J (Contractor's Temporary Work Area/ Office/Stockyards)

- Water Pollution
  - Ensure good sanitation including latrines and install good drainage and install septic tank in comply with 4.14. 2 Water Pollution control standards, Table 14.2 Category C Waste Water Control on Building in National Environmental Standards No.832/MONRE 2017
- Waste
  - Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
  - Designate temporary disposal site for waste generated from stockyard and office and make an arrangement to collect the waste by the authorized company regularly

- Store hazardous materials at designated place, keep record and dispose of at designated place
- On completion of the works, restore the site satisfied by the Engineer

Item No.3: Power House

- Waste
  - Designate temporary disposal site for waste generated from construction site and make an arrangement to collect the waste by the authorized company regularly
- Water Pollution
  - Ensure good sanitation including latrines and install good drainage and install septic tank and transport accumulated waste in the septic tank form the site for further treatment

II. Water Sampling

Lot 1: Civil Works

Background:

In January, February and March 2020 the water sampling was carried out of 3 locations with 6 samples, namely at Area H (WSP 1-1, WSP1-2 and WSP 1-3) downstream of the power house and tailrace construction site (WSP 3) and Upstream of intake (WSP4-1 and WSP 4-2).

The designated water sampling site, its required parameters and the water sampled sites during the reporting period are shown in Table 1.

Table 2-1 Water Sampling Site, Its Parameters and Water Sampled Sites between January and March 2020

Item	No. in the Location Map	Monitoring Site	Water Sampling Site	Required Parameters	Water Sampled			Remarks
					January	February	March	
1	WSP1-1	Area H (Contractor's Camp) Discharge point to the environment	✓	BOD_5,COD, pH	✓	✓	✓	At the worker's toilet including waste water from toilets and bathing inside of the engineer's dormitory
	WSP1-2		✓	BOD_5,COD, pH	✓	✓	✓	At the engineer's kitchen
	WSP1-3		✓	BOD_5,COD, pH	✓	✓	✓	At the worker's kitchen
2	WSP2	Area A (Contractor's Temporary Work Area) Discharge point to the environment	✓	-	-	-	-	No waste water sampling point because waste in the septic tank is vacuumed out and transported from the site by the authorized

								company
3	-	Disposal Area	-	-	-	-	-	Sampling not required
4	-	Access to the Site	-	-	-	-	-	
5	WSP3-1	Power House and Tailrace Surface from 20% in total depth	✓	BOD_5,COD, pH, DO	✓	✓	✓	Monthly
			✓	T-N, T-P, Cadmium (Cd), Lead (Pb), Copper (Cu), Cyanide (CN-)	-	✓	-	3 times per year, Normally in the dry season, transition, and rainy season
	WSP3-2	Power House and Tailrace Discharge point to the environment	✓	-	-	-	-	Sampling not required because accumulated urine is collected and transported from the site
6	WSP4-1	Intake and Penstock 0.5m from water surface	✓	BOD_5,COD, pH, DO	✓	✓	✓	Monthly
			✓	T-N, T-P, Cd, Pb, Cu, CN-*	-	✓	-	3 times per year in the dry season, transition, and rainy season
	WSP4-2	Intake and Penstock 1m from the bottom	✓	BOD_5,COD, pH, DO	✓	✓	✓	Monthly
			✓	T-N, T-P, Cd, Pb, Cu, CN-*	-	✓	-	3 times per year in the dry season, transition, and rainy season
7	WSP5-1	Middle of the Reservoir 0.5m from water surface	✓	BOD_5,COD, pH, DO T-N, T-P, Cd, Pb, Cu, CN-*	-	-	-	Only for the preconstruction survey
	WSP5-2	Middle of the Reservoir 50% of total depth	✓		-	-	-	
	WSP5-3	Middle of the Reservoir 1m from the bottom	✓		-	-	-	
8	WSP6	Upstream of the Reservoir Surface from 20% in total depth	✓		-	-	-	

Result

The result of water sampling is shown in Table 2-2 and the location of the sampling site is shown in Figure 2-1. The official record is attached in Appendix 1.

In January: The water sampling of this month was conducted on January 27, 2020. The water quality motoring locations were conducted at three locations; 1.) Area H Contractor's Camp (WSP01-1, WSP01-2 and WSP 1-3), in this area is waste water sampling, so sample was taken at the outlet point before discharge waste water to natural pond, 2.), Down Stream of Power House (WSP03) and 3.) Before Intake (WSP04-1, WSP04-2), the surface water were sample for monitor. Applied parameters for the sampling were pH, CoD, BOD_5 and DO.

The result of water quality at Area H Contractor's Camp

During the week inspection was Vietnamese New Year, so almost of worker off site, there were 6 people staying in camp, therefore waste water was less,

At the WSP01-1 all parameter are decrease and lower than last month, they are satisfied with national standard, COD = 36.6 mg/l and BOD_5.=5.1 mg/l, pH=8.0 and DO=5.7 mg/l

At the WSP01-2 all monitoring parameter also under national standard, but results are increase a little bit, The COD, BOD_5 , pH and DO are 30.3 mg/l, 11.2 mg/l, 8.2 and 5.7 mg/l respectively.

At the WSP01-3, the figure of BOD_5 = 10.0 mg/l, COD=16.4 mg/l, pH=8 , DO=5.8 mg/l, all of them lower than last month, and they are satisfied with the national standard,

At WSP 03 - Downstream of powerhouse WSP3 surface water, COD and BOD5 could not detected, it mean surface water is clean, pH=7.9 and DO=6.5 mg/l, all of them are satisfied the national standard

At WSP 04 at the upstream in front of Intake, there are 2 layers of reservoir that monitoring the COD, BOD_5 , pH and DO;

The result of layer 1 WSP04-1 (1 meter depth from surface) are pH=8.6, COD=1.26 mg/l, BOD_5 could not detected, and DO=9.7 mg/l, all monitoring parameters are satisfied the national standard and

The result of layer 2 WSP04-2 (42 m depths from surface) pH=8.3 and DO=4.9 mg/l, and both of COD and BOD_5 are not detected in this month, all of them are under National standard

In February: The water sampling was conducted on February 26, 2020. The locations of water quality motoring were the same as the previous month as 1) Area H Contractor's Camp (WSP01-1, WSP01-2, WSP01-3), 2.) Downstream of Power House (WSP03,) Before Intake (WSP04-1, WSP04-2). Applied parameters for the sampling were pH, CoD, BOD5 and DO, beside that in February 2020 was taken more water sampling to monitoring additional heavy metal parameter in dry season, they are T-N, T-P, Cd, Pb, Cu, CN in the river and reservoir (WSP03, WPS04-1 and WSP04-2)

At the WSP01-1, water quality results in February 2020, COD was 63.7 mg/L and BOD_5 was 21.6 mg/l. both of them were higher than result in January, but they were not exceeding the standard value. The higher value of COD and BOD_5 result due to the increasing when compare to January 2020. As the result of workers came back to work after Vietnamese New Year. pH was 6.9 and DO was less than 4.95 mg/l.

At the WSP01-2 in Area H, both of COD and BOD_5 were higher than result of last month, COD= 39.3 mg/L, BOD_5 = 17.5 mg/L, pH = 8.2 and DO = 7.20 mg/l, Both pH and DO were good condition, so All parameters were complied with the National Environmental Standard values.

At WSP01-3 in Area H, COD was higher than last month, it is 10.0 mg/l, BOD_5 was 16.4 mg/l, both parameters were higher than the result in January 2020, pH was 7.4 and DO was 6.40 mg/l. however All parameters were complied with the National Environmental Standard values.

At the WSP3 downstream of power house, water was taken sampling 2.5 meter depth from surface of river, COD =6.24 mg/l and BOD_5 = 1.2 mg/l both parameters were slightly higher than the result of last month. pH was 7.1 and DO 6.5 mg/l. All parameters value was complied with the Standard

At the WSP04-1 (0.5 m below water surface)The water quality of reservoir before the

intake, at the point, pH =7.3. COD = 2.50 mg/l; BOD5 was less than 1.00 mg/l, and DO = 8.30 mg/l. All parameters were complied with Standard values.

At the WSP04-2 (38.0 m below water surface), pH = 7.3, COD = 6.24 mg/l and BOD5 = 1.10 mg/l. DO= 4.00 mg/l. All parameters were complied with National Environmental Standard values.

In February 2020, additional parameters of heavy metal were monitored. The water quality results of WSP03, WSP04-1 and WSP04-2 in dry season for the parameters: Cadmium, Copper, Cyanide, Lead, TP and in February 2020 were not detected. The value of TN at WSP4-1 was less than 5.0 mg/l, but there is no standard of TN in National standard. The result of February 2020 is to confirmed that there is no contaminate of Cadmium, Copper, Cyanide, Lead, TP and TN both in upstream and downstream of Nam Ngum Dam

In March: The water sampling was conducted on March 24, 2020. The locations of water quality motoring were the same as the previous month as 1) Area H Contractor's Camp (WSP01-1, WSP01-2, WSP01-3), 2.) Downstream of Power House (WSP03, WSP3a for additional), and 3.) Before Intake (WSP04-1, WSP04-2). Applied parameters for the sampling were pH, CoD, BOD_5 and DO

At the WSP01-1 in the Area H, Water quality results in March 2020, COD was 122 mg/L, it's nearly over the standard, and BOD_5 was 46.5 mg/l, it's higher than February and it's exceed the standard. However pH=7.7 and DO=1.2 mg/l are below the standard, due to the increasing when compare to February 2020. As the result of weak of treatment waste water before discharge to nature pond, so the contractor hurry to refill the chemical to treat waste water in the septic tank then COD and BOD_5 have to reduce in next month result

At the WSP01-2 in Area H, All of pH, DO, COD and BOD_5 were better than result of last month (February 2020), COD= 34.9 mg/L, BOD5 = 11.4 mg/L, pH = 7.4 and DO = 6.7 mg/l, so All parameters were complied with the National Environmental Standard values.

At the WSP01-3 in Area H, COD was 44.9 mg/l, BOD5 was 27.3 mg/l, both parameters were higher than the result in February 2020, pH was 7.3 and DO was 4.5 mg/l (less than February 2020). However All parameters were complied with the National Environmental Standard values.

At the WSP3 downstream of powerhouse, water level depth at the point of sampling is 12 meters, then the depth of water sampling is 2.2 meters from surface of river, the result of COD =1.25 mg/l and BOD5< 1 mg/l , both parameters were slightly lower than the result of last February. pH was 7.4 and DO 8.1 mg/l both of them were better than last month. All parameters value were complied with the Standard

At the WSP04-1 (0.5 m below water surface) water quality of reservoir before the intake, at the point of water sampling was 40 meter depth, and, pH =7.7, COD could not detects; BOD_5 was less than 1.00 mg/l, and DO = 8.10 mg/l. All parameters were complied with Standard values.

At the point WSP04-2 (38.0 m below water surface), pH = 7.7, COD could not detected and BOD_5 less than 1 mg/l. DO = 3.8 mg/l. All parameters were complied with National Environmental Standard values.

Figure 1 Location of Water Sampling on WSP1-1, 1- 2, 1-3, 3 and 4

Source: Monthly Environmental and Social Monitoring Report in January, February and March 2020, prepared by the Engineer

Water sampling result are summarized in the table below:

Table 2-2 Water Sampling Result January to March 2020

Item No.	Monitoring Site	01	02	03	01	02	03	01	02	03	01	02	03
(No.in Location Map)		BOD_5 mg/l			COD mg/l			pH			DO mg/l		
1	Area H (Contractor's Camp)												
(WSP1-1)		5.1	21.6	**46.5**	36.6	63.7	122	8.0	6.9	7.7	5.7	4.95	1.2
(WSP1-2)		11.2	17.5	11.4	30.3	39.3	34.9	8.2	7.4	7.4	7.2	6.40	6.7
(WSP1-3)		10.0	27.3	27.3	16.4	52.4	44.9	8.0	7.4	7.3	5.8	4.80	4.5
Lao National Standard Waste water		≤40			≤125			5.5-8.5			NA		
5	Power House and Tailrace												
(WSP3')		ND	1.2	<1	ND	6.24	1.25	7.9	7.1	7.4	6.5	6.50	6.4
WSP3'-a		-	-	-	-	-	-	-	-	-	-	-	-
6	Intake and Penstock											-	
(WSP4-1)		ND	<1.0	<1	1.26	2.5	ND	8.6	7.3	7.7	9.7	8.30	8.1
(WSP4-2)		ND	1.1	<1	ND	6.24	ND	8.3	7.3	7.7	4.9	4.00	**3.8**
Lao National Standard*[3] Surface water		≤1.5			7-10			5-9			>4		

Note:
NA=Not available
Section4. Table: 10 Surface Water Standards in National Environmental Standards No.81/GOV 2017, on the category C
Section4. Table 14.2 Waste Water Control on the Building Category C in National Environmental Standard No.81/GOV, Date: 21/2/2017
Section4. Table: 14.4 Waste Water Control standards from toilet No.81/GOV, Date: 21/2/2017
Source: Monthly Environmental Monitoring Report October, November and December 2019, (HAZAMA ANDO CORPORATION and Innogreen Engineering Co., Ltd

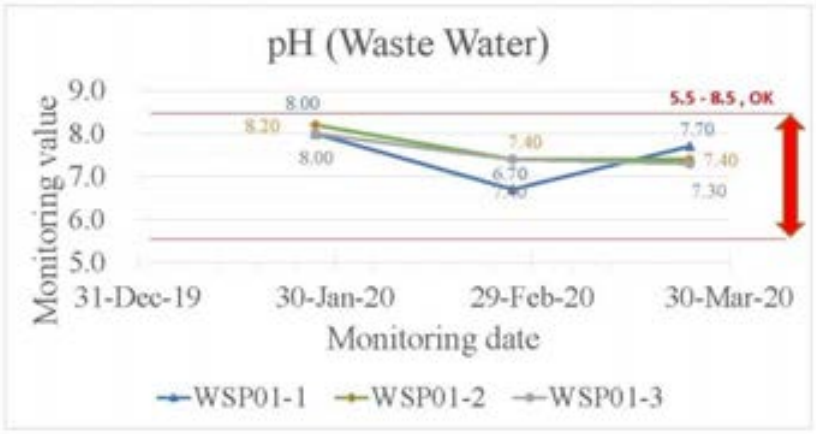

Figure 2 Chart of pH from January to March 2020 at WSP 01-1, 01-2 and 01-3 of Waste water

Figure 3 Chart of COD from January to March 2020 at WSP 01-1, 01-2 and 01-3 of Waste water

Figure 4 Chart of BOD_5 from January to March 2020 at WSP 01-1, 01-2 and 01-3 of Waste water

Figure 5 Chart of DO from January to March 2020 at WSP 01-1, 01-2 and 01-3 of Waste water

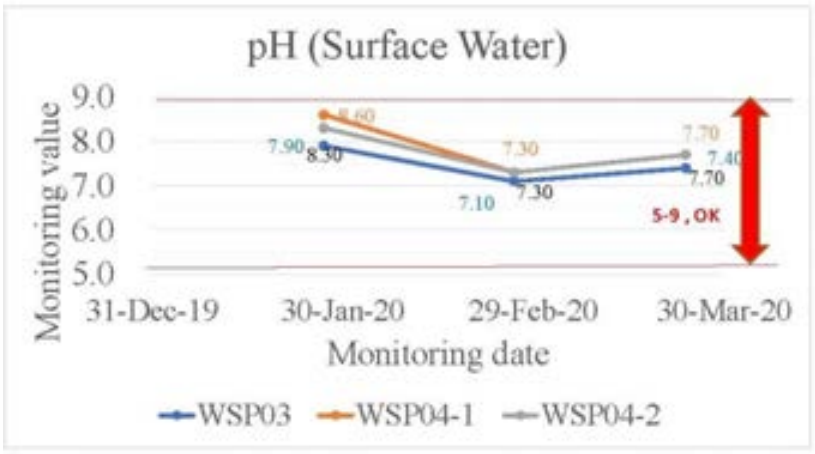

Figure 6 Chart of pH from January to March 2020 at WSP 03 and WSP 04 for surface water

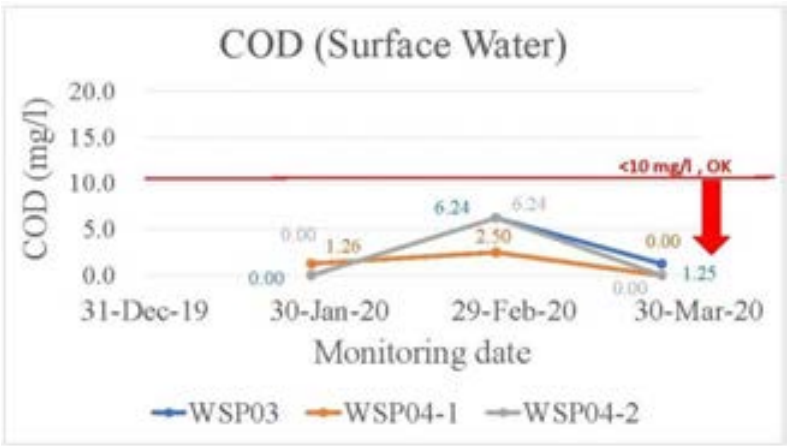

Figure 7 Chart of COD from January to March at WSP 03 and WSP 04 for surface water

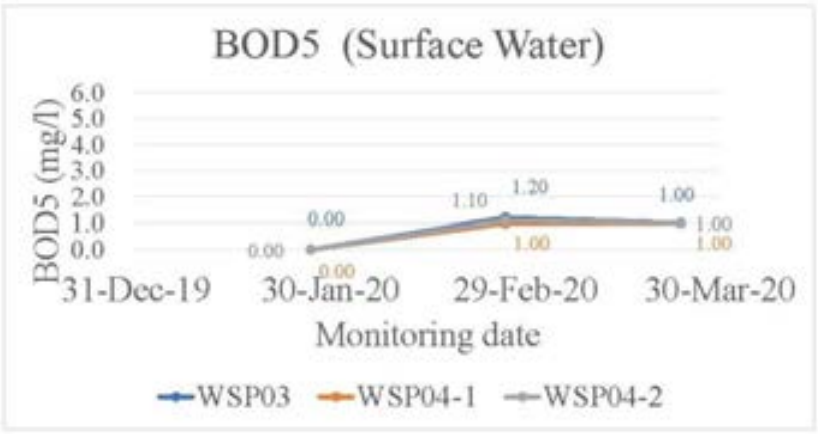

Figure 8 Chart of BOD_5 from January to March 2020 at WSP 03 and WSP 04 for surface water

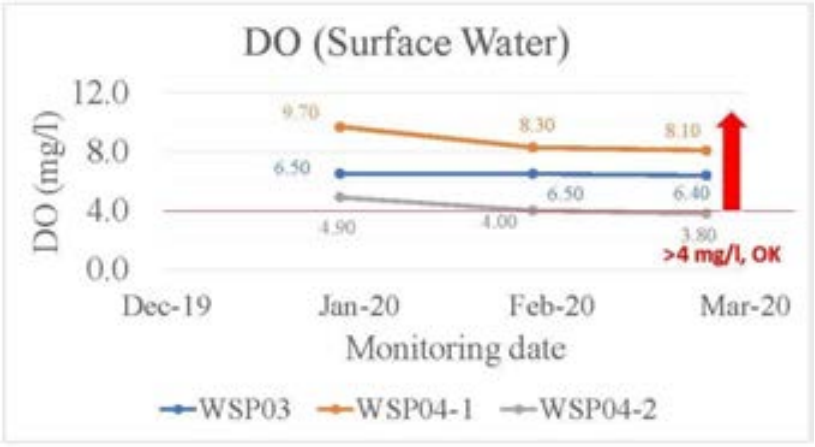

Figure 9 Chart of DO from January to March 2020 at WSP 03 and WSP 04 for surface water

Lot 2: Installation of Electric and Mechanical Equipment

Background

In the mitigation plan of contractor, Water sampling is planned at Area J. The water sampling location will be selected at the discharge point from the sediment pond, but the waste water was not discharge to natural pond, so it's not available to getting waste water sampling in this area

The plan of monitoring site for water sampling is shown in Table 2-3 and the location map of the sampling sites will show figure 8

Table 2-3 Monitoring Sites plan for Water Sampling

Item	No. in the Location Map	Monitoring Site	Water Sampling Site	Required Parameters	Water Sampled in the last month	Water Sampled in this month	Remarks
1.	WSP01-1	Area J (Contractor's Camp) Discharge point to the environment	✓	BOD_5	-	-	Discharged point of the treated water from bathing and kitchen of the employees' accommodation
	WSP01-2		✓	BOD_5	-	-	Discharge point of the treated water from toilets of the employees' accommodation

Item	No. in the Location Map	Monitoring Site	Water Sampling Site	Required Parameters	Water Sampled in the last month	Water Sampled in this month	Remarks
2.	WSP 02	Power House and Tailrace	-	-	-	-	No sampling required

The waste water sampling will be taken when the contractor cannot manage waste water only staying the sediment pond.

Figure 10 Location of Water Sampling on WSP01-1, 01- 2, and WSP02 of Lot 2
Source: Google Map

III. Site Inspection

Lot 1: Civil Works

Site inspection was carried out on 27 January, 25 February and 24 March of 2020; all construction sites has been operated.

Raised issues in January, February and March 2020 are shown in Table 3-1, Table 3-2 and Table 3-3 respectively. The detail of the inspection result is attached in Appendix 2-1. The result in the reporting period using JICA form is attached in Appendix 2-2.

Result

- **Waste water management**

  Area H is used to be the Contractor worker's camp, they are bedroom, 2 kitchens, Mechanical workshop and 14 permanent toilets and separate bathing area for workers, and private toilet in the bed room of engineer, all waste water from toilet is directly connect to the septic tank, waste water from kitchen and bath room have been discharged to the sediment pond before discharge to natural pond,

  In January 2020, there is no problem at WSP1-1 (the labor's toilet), WSP1-2 and WSP1-3, during monthly site inspection in January 2020 is Vietnamese New Year, they were offsite about 2 weeks, so there were 6 people who stayed in the camp, that's why amount of waste water was decrease and was not difficult to management. There for the waste water testing results were in good condition

  In February 2020, the worker has been return to work on site regularly, there is around 76 people of staff staying the camp, then amount of waste water is increase from previous month, the waste water testing result in this month were worse than January 2020, but they (pH, COD and BoD_5) were still under the national standard.

  March 2020 the amount of staff who were still in the camp were the same from

previous, At the WSP1-1, Waste water from septic tanks of labor's public toilet was not good condition at the discharge point to natural pond, especially BoD_5 was a little bit higher than standard, then the Contractor prom to take action to improve the waste water quality before discharge to natural pond by used the chemical to fill in the septic take to treat waste water, however the other parameters (pH, COD and DO) were still under national stand. But at the point WSP1-2 and WSP1-3 were regularly remove grease and waste from the filter trap in the sediment pond, so the result of all parameter were good condition before discharge to natural pond

Area A is used to be the Contractor's office, Laboratory, Rebar workshop, Mechanical workshop and they have been set up the 6 rooms permanent toilet in this area. Waste water from toilet has discharge to the septic tank only, and waste water from laboratory is discharge to the sediment pond to reduce pH value before reuse by taken water after filter to spray in the yard to reduce dust emission, so this site has no waste water discharge to natural pond.

January 2020 is good management, so there is no waste water sampling taken in this site

February and March 2020 there was problem with waste water from the concrete work at the power house construction work, because the Contractor has been discharge waste water from mixture truck and cleaning concrete pump in front of the Area A and flow a little bit to the river without dilute from sediment pond

Powerhouse, the contractor installation 2 mobile toilets for pees only near the construction site. The waste water from mobile toilet has keeping in the bucket, and it was removed from the site to the designation place when it was full at the area H, and asking to use permanent toilet with EDL's Gen, so there is no waste water discharge to natural

January, February and March 2020 is good management, so there is no waste water sampling taken in this site

Intake and Penstock, the contractor has been renovate 2 existing toilets for engineer and labor respectively, there is no waste water discharge to river

January, February and March 2020 is good management, so there is no waste water sampling taken in this site

- **Waste Management**

Area H, Construction waste from power house was damping to this area first, then it was separated by labor to remove from site by local authority, beside that garbage bins have been installed in the area H,

January 2020 there is problem in solid waste was around the bank of natural pond, because of win blow garbage bin fall down and there in no labor enough to keep clean during vacation of Vietnamese

February 2020 Construction waste from power house site was staying in the area H for long time; because of no labor for separate them, so the local authority could not move them to designation place

March 2020, the area H is good management on waste

Area A The Contractor has been installed the garbage bin in the office, fabrication workshop, Lab, toilet and relaxing place for staff.

January and March 2020 Waste was incinerated in the area A, so it prohibited to cleaning site by this method

February 2020 the waste in this area was good management

Powerhouse, The Contractor provides garbage bin in anywhere for labors, however in the relaxing place at the tailrace site was no garbage bin, so in February and

March 2020 was problem with solid waste on ground in this location

- **Dust control**

  In January, February and March 2020 all sites have been keep cleaned, according to this period there is no excavation work, then Contractor is available to keep clean on site and apply mitigation measures to control dust along the access road, and Area A has been practiced

- **Sanitation**

  The Contractor is good management in sanitation

  In the Area A has been constructed permanent toilet and separated men and women part, and there is no problem on sanitation

  At the Powerhouse and tailrace, there is very limited area for install mobile toilet, so the Contractor has been install only mobile toilet for urine which is designed not to discharge waste water to open drainage. The contractor has kept urine in the bucket and transport from the site when it's full. Beside that the workers also use public toilets in the EDL Gen's office.

  At the intake and penstock, there is no working team on the dam rest during January to March, there is only loading some material on intake field, so it does not spent for long time to working in this area, however there is 2 permanent existing public toilets has been renovated for service in this area, Therefore no waste water is discharged to the river or reservoir.

Table 3-1 Raised Issues from January 2020 and the State of Taken Countermeasures as of February, 2020 Lot 1

Location	Issues	Raised Issues in January 2020	Result of Site re inspection in February, 2020	
			Status As of February 2019	Requested Action to Be Taken by the Next Inspection
Area H (Contractor's Employees' Camp)	- Sanitation	- Repair waste water pipe at the labor bathing room	V	Confirmed
	- Waste Water Management	- Waste water at the location WSP1-1 and WSP1-3 BOD_5 and COD need to improve quality before discharge to natural pond	V	Confirmed,
	- Solid Waste management	- Solid waste should not dumping at around the natural pond bank	V	Confirmed
Area A	- Solid Waste management	- Prohibits for site cleaning	V	Confirmed
Batching plan	- Waste water management	- Clean sediment pond regularly	NI	**Not Confirmed**
		- Reduce pH in the sediment pond before discharge to natural	NI	**Not Confirmed**

V: Confirmed
NI: Need Improvement

Table 3-2 Raised Issues from February 2020 and the State of Taken Countermeasures as of March 2020 Lot 1

Location	Issues	Raised Issues in February 2020	Result of Site re inspection in March 2020

			Status As of March 2020	Requested Action to Be Taken by the Next Inspection
Area H (Contractor's Employees' Camp)	- Waste management	- Construction waste separated should regularly practice on site	V	Confirmed
Area A (Contractor office, Laboratory, workshop)	- Waste water management	- Waste water from cleaning concrete pump should discharge to designation place	NI	**Not Confirmed**
Power house and tailrace	- Waste Management	- Solid waste should not through on ground around the relaxing place at the tailrace area	V	Confirmed
Batching Plant	- Waste water	- Sediment pone need to improve - Sediment pond should improve all sludge inside and renovate the existing pond	NI NI	**Not Confirmed** **Not Confirmed**

V: Confirmed
NI: Need Improvement

Table 3-3 Raised Issues from March 2020 and the State of Taken Countermeasures as of May, 2020

Lot 1 (offsite in April 2020, because of Covid19 disease)

Location	**Issues**	**Raised Issues in March 2020**	**Result of Site re inspection in May, 2020**	
			Status As of May 2020	**Requested Action to Be Taken by the Next Inspection**
Area H (Contractor's Employees' Camp)	- Flora and Fauna	- More Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or fishing in the natural pond	V	Confirmed
	- Health	- Based on the virus Covid 19 situation effected in Laos, the contractor should provide knowledge and enough hand cleaning gel to labor -	V	Confirmed
Area A (Contractor office, lab, Ware house, Rebar shop)	- Waste water management	- Waste water from cleaning concrete pump should discharge into designation place (Do not discharge in front of Area A)	V	Confirmed
	- Waste management	- Garbage should keeping in the garbage bin, so the contractor should announce to man labor keep clean in the site (at relaxing area on site) - No allowance incineration for site cleaning	V V	Confirmed Confirmed

Location	Issues	Raised Issues in March 2020	Result of Site re inspection in May, 2020	
			Status As of May 2020	Requested Action to Be Taken by the Next Inspection
Power House	- Waste management	- Solid waste should not through in the working area	V	Not Confirmed
		- The contractor should announce labor keep clean inside the construction site	V	Confirmed
Batching Plant	- Waste water management	- Improve sediment pond	NI	**Not Confirmed**
		- Reduce pH in the sediment pond in cleaning and applying neutralization agent (not toxic type) regularly	NI	**Not Confirmed**
		- Chemical for mixing concrete should keeping in good condition and taking action cleaned immediately when it's leaking	NI	**Not Confirmed**

V: Confirmed
NI: Need Improvement

Lot 2: Installation of Electric and Mechanical Equipment

The contractor has been re-start working on site regularly from September, and accommodation has been completed accommodation for the Contractor's employees, office, stockyards etc), power house has been installed the steel girder and extension the existing power house

and action are summarized in Table 3-4 and the detail of the inspection result is attached in Appendix 2-3 and the result in using JICA Form is attached in Appendix 2-4.

Table 3-4 Raised Issues from January 2020 and the State of Taken Countermeasures as of February 2020 Lot 2

Location	Issues	Raised Issues in January	Result of Site re inspection in February, 2020	
			Status As of February 2020	Requested Action to Be Taken by the Next Inspection
Area J (Contractor employee's camp)	- Health awareness	- Awareness program on HIV/AIDS and health shall be organized as soon as possible	NI	**Not Confirmed**

V: Confirmed
NI: Need Improvement

Table 3-5 Raised Issues from February 2020 and the State of Taken Countermeasures as of March 2020 Lot 2

Location	Issues	Raised Issues in February	Result of Site re inspection in March, 2020	
			Status As of March 2020	Requested Action to Be Taken by the Next Inspection

Location	Issues	Raised Issues in February	Result of Site re inspection in March, 2020	
			Status As of March 2020	Requested Action to Be Taken by the Next Inspection
Area J (Contractor employee's camp)	- Health awareness	- Awareness program on HIV/AIDS and health shall be organized as soon as possible	NI	**Not Confirmed**

V: Confirmed
NI: Need Improvement

Table 3-6 Raised Issues from March 2020 and the State of Taken Countermeasures as of May 2020

Lot 2(offsite in April 2020, because of Covid19 disease)

Location	Issues	Raised Issues in February	Result of Site re inspection in March, 2020	
			Status As of March 2020	Requested Action to Be Taken by the Next Inspection
Area J (Contractor employee's camp)	- Health awareness	- Awareness program on HIV/AIDS and health shall be organized as soon as possible	NI	**Not Confirmed**

V: Confirmed
NI: Need Improvement

IV. Health Awareness / Training Program

Lot 1: The health awareness program is to be organized in every 6 months throughout construction phase. It has been organized on Sexually Transmitted Diseases (STD) – or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular and Dengue-Malaria fever prevention at the contractor's meeting room in April 2018, November 2018 and May 2019, and this month (December 2019) the contractor was organize on December 14, 2019 with HIV/AIDS awareness. There are 6 Japanese, 5 Pilipino, 107 Vietnamese and 99 Lao, in totally 217 people. The health awareness program was organized in morning time while normal safety meeting before work.

Table4- 1Summary of Organized Health Awareness/Training Program Lot 1

No.	Date	Topics	Number of participants
1	April 10, 2018	Sexually Transmitted Diseases (STD)	27
2	November 26, 2018	Dengue fever prevention contains, and Malaria fever prevention contains:	35
3	May 31, 2019	Health care and significant disadvantage of drinking alcohols and drugs	24
4	December 14, 2019	HIV/AIDS awareness	217
5	February 7, 2020*	Covid19 Virus awareness	All staff in project (Employer, Engineer, and Contractor)

Remarks: * Organized by project owner

Lot 2: The construction has been starting more than 6 month, and then the health awareness program is requested to organize in every 6 months. So far, it has not been organized yet. The Contractor shall organize the program ASAP, and the PMU is requested to organize the workshop as topic of Covid19 disease and malaria and dengue fever instead of Sexually Transmitted Diseases (STD) HIV in the 1st workshop in this year

Appendix 1 Official Record on Water Sampling and Testing result Lot 1

Official Record on Water Sampling and Testing result on January 2020

Field note on site January 27, 2020

Sheet of water quality record in the file

Company: Innogreen — Sampling date: 27 / 01 / 2020

Received Date*: ..... — Request No.*: .....

Sample No.*	Sampling point	Time	pH	Do	Water Temp (°C)	Air Temp (°C)	Water depth (m)	Sampling depth (m)	Water sample aspect									Environment conditions in the sampling point
									color	odor		solids		solids aspect		turbid	clear	
										have	no have	little	much	suspended	seattable			
	WSP 1-1	9:45	8.03		23.0	24			Lightly		✓		✓		✓	✓		Sunny
	WSP 2	10:25	12.04		22.9	25			Gray		✓		✓	✓	✓	✓		〃
	WSP 1-2	13:35	8.19		26.5	33			Gray		✓		✓		✓	✓		〃
	WSP 1-3	13:45	8.04		26.9	31			Gray		✓		✓		✓	✓		〃
	WSP 3	12:25	7.85		26.2	29	19	3.6	Lightly		✓						✓	〃
	WSP 4-1	15:10	8.55		26	25	45	0.5	Lightly		✓						✓	〃
	WSP 4-2	15:20	8.31		24.7	25	45	42	Lightly		✓						✓	〃

*For sampling reception officer in the laboratory

Recorded by: Keoudone (27/01/20)

examined / appproved by ..... (...../...../.....)

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-1
	Date		27/01/2020
	Time		09:45
	Location	Labor Camp	
	Coordinate	E	240735 E
		N	2050199 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	24˚C	
4	Water temperature	23˚C	

Sampling Location Map

PAL
ACCREDITED LABORATORY
ISO/IEC 17025

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	:	W6301006
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	:	6302-001
Sampling Source	:	Waste Water	Sample No.	:	W63010031
Sample Name	:	WSP 1-1	Sampling Date	:	27/01/2020
Sampling By	:	Customer	Sampling Time	:	09:45
Sampling Method	:	Grab	Received Date	:	28/01/2020
Tested Date	:	28/01/2020-04/02/2020	Reported Date	:	04/02/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	5.10	40	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	36.6	-	10.0
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	5.70	-	0.30
pH		SM 2017:4500-H^{+} B: Electrometric	8.0	5.5-8.5	-

Physical Appearance: 1. Sample : Yellow, SS

2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Waste Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF

2. LOD = Limit Of Detection

**Out of Accreditation Scope

Examined By .....
(Technical Manager)
04/02/2020

Approved .....
(Top Management)
04/02/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-2
	Date		27/01/2020
	Time		13:35
	Location	Labor Camp	
	Coordinate	E	240813 E
		N	2050163 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Gray	
3	Air temperature	33˚C	
4	Water temperature	26.5˚C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
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TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	:	W6301006
Address	:	Songsavang Village, Keosadom District, Vientiane Province, Lao PDR	Report No.	:	6302-002
Sampling Source	:	Waste Water	Sample No.	:	W63010032
Sample Name	:	WSP 1-2	Sampling Date	:	27/01/2020
Sampling By	:	Customer	Sampling Time	:	13:35
Sampling Method	:	Grab	Received Date	:	28/01/2020
Tested Date	:	28/01/2020-04/02/2020	Reported Date	:	04/02/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	11.2	40	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	30.3	-	10.0
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	7.20	-	0.30
pH		SM 2017:4500-H^{+} B: Electrometric	8.2	5.5-8.5	-

Physical Appearance: 1. Sample : Slightly, SS

2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Waste Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF

2. LOD = Limit Of Detection

**Out of Accreditation Scope

Examined By .....
(Technical Manager)
04/02/2020

Approved By .....
(Top Management)
04/02/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-3
	Date		27/01/2020
	Time		13:45
	Location	Labor Camp	
	Coordinate	E	240731 E
		N	2050170 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Gray	
3	Air temperature	31˚C	
4	Water temperature	29.9˚C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
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TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	:	W6301006
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	:	6302-003
Sampling Source	:	Waste Water	Sample No.	:	W63010033
Sample Name	:	WSP 1-3	Sampling Date	:	27/01/2020
Sampling By	:	Customer	Sampling Time	:	13:45
Sampling Method	:	Grab	Received Date	:	28/01/2020
Tested Date	:	28/01/2020-04/02/2020	Reported Date	:	04/02/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	10.0	40	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	16.4	-	10.0
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	5.80	-	0.30
pH		SM 2017:4500-H^{+} B: Electrometric	8.0	5.5-8.5	-

Physical Appearance: 1. Sample : Slightly, SS

2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Waste Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF

2. LOD = Limit Of Detection

**Out of Accreditation Scope

Examined By .....
(Technical Manager)
04/02/2020

Approved By .....
(Top Management)
04/02/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 3
	Date		27/01/2020
	Time		14:25
	Location	Powerhouse (Down Stream)	
	Coordinate	E	240908 E
		N	2050622 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	29˚C	
4	Water temperature	26.2˚C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
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TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	:	W6301006
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	:	6302-004
Sampling Source	:	Surface Water	Sample No.	:	W63010034
Sample Name	:	WSP 3	Sampling Date	:	27/01/2020
Sampling By	:	Customer	Sampling Time	:	14:25
Sampling Method	:	Grab	Received Date	:	28/01/2020
Tested Date	:	28/01/2020-04/02/2020	Reported Date	:	04/02/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	ND	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	ND	7-10	1.00
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	6.50	4.0	0.30
pH		SM 2017:4500-H^{+} B: Electrometric	7.9	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Surface Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF
2. LOD = Limit Of Detection
**Out of Accreditation Scope

Examined By .....
(Technical Manager)
04/02/2020

Approved By .....
(Top Management)
04/02/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 4-1
	Date		27/01/2020
	Time		15:10
	Location	Nam ngum 1 reservoirs	
	Coordinate	E	241218 E
		N	2050700 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	25˚C	
4	Water temperature	26˚C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
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TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	:	W6301006
Address	:	Songsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	:	6302-005
Sampling Source	:	Surface Water	Sample No.	:	W63010035
Sample Name	:	WSP 4-1	Sampling Date	:	27/01/2020
Sampling By	:	Customer	Sampling Time	:	15:10
Sampling Method	:	Grab	Received Date	:	28/01/2020
Tested Date	:	28/01/2020-04/02/2020	Reported Date	:	04/02/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	ND	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	1.26	7-10	1.00
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	9.70	4.0	0.30
pH		SM 2017:4500-H^{+} B: Electrometric	8.6	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Surface Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF
2. LOD = Limit Of Detection
ND = Not Detected
**Out of Accreditation Scope

Examined By .....
(Technical Manager)
04/02/2020

Approved By .....
(Top Management)
04/02/2020

REPORTED TESTS REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 4-2
	Date		27/01/2020
	Time		15:30
	Location	Nam ngum 1 reservoirs	
	Coordinate	E	241218 E
		N	2050700 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	25˚C	
4	Water temperature	24.7˚C	

Sampling Location Map

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TEST REPORT

		Request No.	: W6301006
Customer	: Nam Ngum1 Hydropower Station Expansion Project	Report No.	: 6302-006
Address	: Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR		
Sampling Source	: Surface Water	Sample No.	: W63010036
Sample Name	: WSP 4-2	Sampling Date	: 27/01/2020
Sampling By	: Customer	Sampling Time	: 15:30
Sampling Method	: Grab	Received Date	: 28/01/2020
Tested Date	: 28/01/2020-04/02/2020	Reported Date	: 04/02/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	ND	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	ND	7-10	10.0
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	4.90	4.0	0.30
pH		SM 2017:4500-H⁺ B: Electrometric	8.3	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Surface Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF
2. LOD = Limit Of Detection
**Out of Accreditation Scope

Examined By ....
(Technical Manager)
04/02/2020

Approved By ....
(Top Management)
04/02/2020

REPORTED TESTS REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

Official Record on Water Sampling and testing result on February 2020

Field note on February 25, 2020

Sheet of water quality record in the file

Company.....

Sampling date 25/2/2020

Received Date*.....

Request No.*.....

Sample No.*	Sampling point	Time	pH	Do	Water Temp (°C)	Air Temp (°C)	Water deep (m)	Sampling deep (m)	Water sample aspect									Environment conditions in the sampling point
									color	odor		solids		solids aspect		turbid	clear	
										have	no have	little	much	suspended	seattable			
1	WSP1-2	09:30	7.39		25.0	27			light orang		✓	✓		✓	✓	✓	clear	Sunny
2	WSP1-3	9:40	7.45		25.9	29			light orang		✓			✓		✓	clear	Sunny
3	WSP1-1	10:00	6.92		21.8	28			light orang		✓	✓		✓	✓	·		Sunny
4	WSP3	14:05	7.11		26.3	30	11	2.5	light		✓						✓	Sunny
5	WSP2-1	15:05	7.28		28.3	31	44	0.5	light		✓						✓	Sunny
6	WSP4-2	15:30	7.26		25.4	32	44	~~3~~ 38	light		✓				✓		✓	Sunny

*For sampling reception officer in the laboratory

Recorded by Mr. Santhamith 25/2/2020

examined / approved by ..... (...../...../.....)

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-1
	Date		25/02/2020
	Time		10:00
	Location	Labor Camp	
	Coordinate	E	240735 E
		N	2050199 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Light orange	
3	Air temperature	28˚C	
4	Water temperature	24.8˚C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

ACCREDITED LABORATORY
ISO/IEC 17025

TESTING
No.0162

TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	:	W6302005
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	:	6303-014
Sampling Source	:	Waste Water	Sample No.	:	W63020020
Sample Name	:	WSP 1-1	Sampling Date	:	25/02/2020
Sampling By	:	Customer	Sampling Time	:	10:00
Sampling Method	:	Grab	Received Date	:	26/02/2020
Tested Date	:	26/02/2020-11/03/2020	Reported Date	:	11/03/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand*	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	21.6	40	0.30
Chemical Oxygen Demand	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	63.7	-	10.0
Dissolved Oxygen*	mg/L	SM 2017:4500-O D: Azide Modification	4.95	-	0.30
pH*		SM 2017:4500-H^{+} B: Electrometric	6.9	5.5-8.5	-

Physical Appearance: 1. Sample : Slightly, SS
2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark:
1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Waste Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF
2. LOD = Limit Of Detection
ND = Not Detected
* Parameter Not Accredited ISO/IEC 17025:2005

Examined By .....
(Technical Manager)
11/03/2020

Approved By .....
(Top Management)
11/03/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-2
	Date		25/02/2020
	Time		09:30
	Location	Labor Camp	
	Coordinate	E	240813 E
		N	2050163 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Light orange	
3	Air temperature	27 °C	
4	Water temperature	25.0 °C	

Sampling Location Map

PAL

ACCREDITED LABORATORY ISO/IEC 17025

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TEST REPORT

		Request No.	: W6302005
Customer	: Nam Ngum1 Hydropower Station Expansion Project	Report No.	: 6303-015
Address	: Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR		
Sampling Source	: Waste Water	Sample No.	: W63020021
Sample Name	: WSP 1-2	Sampling Date	: 25/02/2020
Sampling By	: Customer	Sampling Time	: 09:30
Sampling Method	: Grab	Received Date	: 26/02/2020
Tested Date	: 26/02/2020-11/03/2020	Reported Date	: 11/03/2020

Parameter	Unit	Standard Method	Result	Standard[/1]	LOD[/2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	17.5	40	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	39.3	-	10.0
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	6.40	-	0.30
pH		SM 2017:4500-H^+ B: Electrometric	7.4	5.5-8.5	-

Physical Appearance: 1. Sample : Yellow, SS
2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Waste Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF

2. LOD = Limit Of Detection

ND = Not Detected

**Out of Accreditation Scope

Examined By .... (Technical Manager) 11/03/2020

Approved By .... (Top Management) 11/03/2020

Phanthamit Analytical Lab Co.,Ltd

REPORTED TESTS REFER TO SUBMITTED SAMPLES ONLY
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WITHOUT THE WRITTEN APPROVAL LABORATORY

Page 1 of 1

FM-LAB-[illegible]

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-3
	Date		25/02/2020
	Time		90:40
	Location	Labor Camp	
	Coordinate	E	240731 E
		N	2050170 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Light orange	
3	Air temperature	28˚C	
4	Water temperature	25.9˚C	

Sampling Location Map

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 3
	Date		25/02/2020
	Time		14:05
	Location	Powerhouse (Down Stream)	
	Coordinate	E	240908 E
		N	2050622 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	30°C	
4	Water temperature	26.3°C	

Sampling Location Map

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No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

ACCREDITED LABORATORY
ISO/IEC 17025

TEST REPORT

			Request No.	:	W6302005
Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Report No.	:	6303-017
Address	:	Sengsavang Village, Keosdom District, Vientiane Province, Lao PDR			
Sampling Source	:	Surface Water	Sample No.	:	W63020023
Sample Name	:	WSP 3	Sampling Date	:	25/02/2020
Sampling By	:	Customer	Sampling Time	:	14:05
Sampling Method	:	Grab	Received Date	:	26/02/2020
Tested Date	:	26/02/2020-11/03/2020	Reported Date	:	11/03/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	1.20	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	6.24	7-10	1.00
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	6.50	4.0	0.30
pH		SM 2017:4500-H$^+$ B: Electrometric	7.1	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.5 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Surface Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF
2. LOD = Limit Of Detection
ND = Not Detected
**Out of Accreditation Scope

Examined By .....
(Technical Manager)
11/03/2020

Approved By .....
(Top Management)
11/03/2020

PAL
ACCREDITED LABORATORY ISO/IEC 17025

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TEST REPORT

		Request No.	: W6302005
Customer	: Nam Ngum1 Hydropower Station Expansion Project	Report No.	: 6303-017
Address	: Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR		
Sampling Source	: Surface Water	Sample No.	: W63020023
Sample Name	: WSP 3	Sampling Date	: 25/02/2020
Sampling By	: Customer	Sampling Time	: 14:05
Sampling Method	: Grab	Received Date	: 26/02/2020
Tested Date	: 26/02/2020-11/03/2020	Reported Date	: 11/03/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Cadmium #	mg/L	SM 2017:3500 by ICP-OES	ND	0.003	0.02
Copper #	mg/L	SM 2017:3500 by Atomic Absorption Spectrometer	ND	1.5	0.01
Cyanide #	mg/L as HCN	SM 2017:4500-CN⁻ :Distillation, Colorimetric	ND	0.07	0.008
Lead #	mg/L	SM 2017:3500 by ICP-OES	ND	0.01	0.005
Phosphorus #	mg/L as P	SM 2017:4500-P: Ascorbic Acid	ND	-	0.01
Total Nitrogen #	mg/L as N	SM 2017:4500-N: Calculation	ND	-	1

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Surface Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF

2. LOD = Limit Of Detection

ND = Not Detected

Parameter tested by Eastern Thai Consulting 1992 Co.,Ltd

Examined By .... (Technical Manager) 11/03/2020

Approved By .... (Top Management) 11/03/2020

REPORTED TESTS REFER TO SUBMITTED SAMPLES ONLY
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WITHOUT THE WRITTEN APPROVAL LABORATORY

FM-LAB-[illegible]

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 4-1
	Date		25/02/2020
	Time		15:05
	Location	Nam ngum 1 reservoirs	
	Coordinate	E	241218 E
		N	2050700 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	31°C	
4	Water temperature	28.3°C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

ACCREDITED LABORATORY
ISO/IEC 17025

TEST REPORT

			Request No.	:	W6302005
Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Report No.	:	6303-018
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR			
Sampling Source	:	Surface Water	Sample No.	:	W63020024
Sample Name	:	WSP 4-1	Sampling Date	:	25/02/2020
Sampling By	:	Customer	Sampling Time	:	15:05
Sampling Method	:	Grab	Received Date	:	26/02/2020
Tested Date	:	26/02/2020-11/03/2020	Reported Date	:	11/03/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	< 1.00	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	2.50	7-10	1.00
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	8.30	4.0	0.30
pH		SM 2017:4500-H^{+} B: Electrometric	7.3	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid

2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Surface Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF

2. LOD = Limit Of Detection
ND = Not Detected
**Out of Accreditation Scope

Examined By .....
(Technical Manager)
11/03/2020

Approved By .....
(Top Management)
11/03/2020

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

ACCREDITED LABORATORY
ISO/IEC 17025

TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	:	W6302005
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	:	6303-018
Sampling Source	:	Surface Water	Sample No.	:	W63020024
Sample Name	:	WSP 4-1	Sampling Date	:	25/02/2020
Sampling By	:	Customer	Sampling Time	:	15:05
Sampling Method	:	Grab	Received Date	:	26/02/2020
Tested Date	:	26/02/2020-11/03/2020	Reported Date	:	11/03/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Cadmium #	mg/L	SM 2017:3500 by ICP-OES	ND	0.003	0.02
Copper #	mg/L	SM 2017:3500 by Atomic Absorption Spectrometer	ND	1.5	0.01
Cyanide #	mg/L as HCN	SM 2017:4500-CN :Distillation, Colorimetric	ND	0.07	0.008
Lead #	mg/L	SM 2017:3500 by ICP-OES	ND	0.01	0.005
Phosphorus #	mg/L as P	SM 2017:4500-P: Ascorbic Acid	ND	-	0.01
Total Nitrogen #	mg/L as N	SM 2017:4500-N: Calculation	< 5	-	1

Physical Appearance: 1. Sample : Slightly Turbid

2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Surface Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF

2. LOD = Limit Of Detection

ND = Not Detected

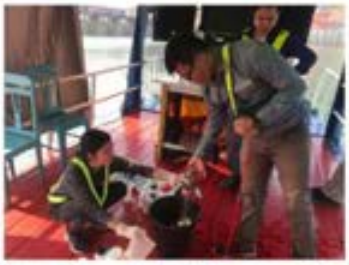
Parameter tested by Eastern Thai Consulting 1992 Co.,Ltd

Examined By .....
(Technical Manager)
11/03/2020

Appeoved by .....
(Top Management)
11/03/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 4-2
	Date		25/02/2020
	Time		15:30
	Location	Nam ngum 1 reservoirs	
	Coordinate	E	241218 E
		N	2050700 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	31˚C	
4	Water temperature	25.4˚C	

Sampling Location Map

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Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TEST REPORT

			Request No.	:	W6302005
Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Report No.	:	6303-019
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR			
Sampling Source	:	Surface Water	Sample No.	:	W63020025
Sample Name	:	WSP 4-2	Sampling Date	:	25/02/2020
Sampling By	:	Customer	Sampling Time	:	15:30
Sampling Method	:	Grab	Received Date	:	26/02/2020
Tested Date	:	26/02/2020-11/03/2020	Reported Date	:	11/03/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	1.10	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	6.24	7-10	1.00
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	4.00	4.0	0.30
pH		SM 2017:4500-H^{+} B: Electrometric	7.3	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid

2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Surface Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF

2. LOD = Limit Of Detection

ND = Not Detected

**Out of Accreditation Scope

Examined By .....
(Technical Manager)
11/03/2020

Appeoved By .....
(Top Management)
11/03/2020

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

ACCREDITED LABORATORY ISO/IEC 17025

TEST REPORT

Customer	: Nam Ngum1 Hydropower Station Expansion Project	Request No.	: W6302005
Address	: Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	: 6303-019
Sampling Source	: Surface Water	Sample No.	: W63020025
Sample Name	: WSP 4-2	Sampling Date	: 25/02/2020
Sampling By	: Customer	Sampling Time	: 15:30
Sampling Method	: Grab	Received Date	: 26/02/2020
Tested Date	: 26/02/2020-11/03/2020	Reported Date	: 11/03/2020

Parameter	Unit	Standard Method	Result	Standard [/1]	LOD [/2]
Cadmium #	mg/L	SM 2017:3500 by ICP-OES	ND	0.003	0.02
Copper #	mg/L	SM 2017:3500 by Atomic Absorption Spectrometer	ND	1.5	0.01
Cyanide #	mg/L as HCN	SM 2017:4500-CN :Distillation, Colorimetric	ND	0.07	0.008
Lead #	mg/L	SM 2017:3500 by ICP-OES	ND	0.01	0.005
Phosphorus #	mg/L as P	SM 2017:4500-P: Ascorbic Acid	ND	-	0.01
Total Nitrogen #	mg/L as N	SM 2017:4500-N: Calculation	ND	-	1

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.8 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Surface Water

SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF

2. LOD = Limit Of Detection

ND = Not Detected

Parameter tested by Eastern Thai Consulting 1992 Co.,Ltd

Examined By ....
(Technical Manager)
11/03/2020

Approved By ....
(Top Management)
11/03/2020

REPORTED TESTS REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

FM-LAB-[illegible]

Official Record on Water Sampling and testing result on March 2020

Field note on site March 24, 2020

Sheet of water quality record in the file

Company: Innogreen CO.,LTD

Sampling date: 24/03/2020

Received Date*:

Request No.*:

Sample No.*	Sampling point	Time	pH	Do	Water Temp (°C)	Air Temp (°C)	Water depth (m)	Sampling depth (m)	Water sample aspect								Environment conditions in the sampling point
									color	odor		solids		solids aspect		turbid	clear	
										have	no have	little	much	suspended	seattable			
1	WSP 1-2	9:25	7.81		27.2	34			Gray		✓		✓		✓	✓		cloud
	WSP 1-1	9:40	7.33		27.6	34			Gray	✓			✓		✓		✓	cloud
	WSP 1-3	9:55	7.18		27.8	34			Gray		✓		✓		✓	✓		cloud
	WSP 02	10:10	11.52		96.9	33					✓		✓	✓	✓		✓	cloud
	WSP 03	13:55	8.95		96.9	32	12	2.2	Lightly									
	WSP A-1	15:15	8.46		29.4	32	40	0.5	Lightly		✓	✓			✓	✓	✓	sunny
	WSP A-2	15:05	[illegible]		26.4	32	40	35	Lightly		✓	✓			✓		✓	sunny

*For sampling reception officer in the laboratory

Recorded by: Keoudone 24/03/2020

examined / appproved by ..... (...../...../.....)

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-1
	Date		24/03/2020
	Time		09:40
	Location	Labor Camp	
	Coordinate	E	240735 E
		N	2050199 N
Weather		Previous date	Sunny
		Measure date	Cloud
1	Odor	Unacceptable	
2	Color	Gray	
3	Air temperature	34˚C	
4	Water temperature	27.4˚C	

Sampling Location Map




Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Donggalone Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TESTING
No.0102

TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Report No.	: WA303006	
Address	:	Songsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	: 6303-069	
Sampling Source	:	Waste Water	Sample No.	: WA303033	
Sample Name	:	WSP 1-1	Sampling Date	: 24/03/2020	
Sampling By	:	Customer	Sampling Time	: 09:40	
Sampling Method	:	Grab	Received Date	: 25/03/2020	
Tested Date	:	25/03/2020-30/03/2020	Reported Date	: 30/03/2020	

Parameter	Unit	Standard Method	Result	Standard*	LOD*
Biochemical Oxygen Demand*	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	46.5	40	0.30
Chemical Oxygen Demand	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	122	-	10.0
Dissolved Oxygen*	mg/L	SM 2017:4500-O D: Azide Modification	1.20	-	0.30
pH*		SM 2017:4500-H$^+$ B: Electrometric	7.7	5.5-8.5	-

Physical Appearance: 1. Sample : Yellow, SS
2. Container : Normal [PE 1.0 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Waste Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF
2. LOD = Limit Of Detection
* Parameter Not Accredited ISO/IEC 17025:2005

Examined By _____
(Technical Manager)
30/03/2020

Approved By _____
(Top Management)
30/03/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-2
	Date		24/03/2020
	Time		09:25
	Location	Labor Camp	
	Coordinate	E	240813 E
		N	2050163 N
Weather		Previous date	Sunny
		Measure date	Cloud
1	Odor	Acceptable	
2	Color	Gray	
3	Air temperature	34˚C	
4	Water temperature	27.2˚C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Report No.	:	6303-070
Address	:	Sengsavang Village, Keosdom District, Vientiane Province, Lao PDR			
Sampling Source	:	Waste Water	Sample No.	:	WS030034
Sample Name	:	WSP 1-2	Sampling Date	:	24/03/2020
Sampling By	:	Customer	Sampling Time	:	09:25
Sampling Method	:	Grab	Received Date	:	25/03/2020
Tested Date	:	25/03/2020-30/03/2020	Reported Date	:	30/03/2020

Parameter	Unit	Standard Method	Result	Standard*	LOD*
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	11.4	40	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	34.9	-	10.0
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	6.70	-	0.30
pH		SM 2017:4500-H+ B: Electrometric	7.4	5.5-9.5	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.0 L, PE 0.5 L, G 0.5 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Waste Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF
2. LOD = Limit Of Detection
**Out of Accreditation Scope

Examined By .....
(Technical Manager)
30/03/2020

Approved By .....
(Top Management)
30/03/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 1-3
	Date		24/03/2020
	Time		09:55
	Location	Labor Camp	
	Coordinate	E	240731 E
		N	2050170 N
Weather		Previous date	Sunny
		Measure date	Cloud
1	Odor	Acceptable	
2	Color	Gray	
3	Air temperature	34˚C	
4	Water temperature	27.8˚C	

Sampling Location Map

Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Donggalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TESTING
No.0162

TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Request No.	: W6303006	
Address	:	Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR	Report No.	: 6303-071	
Sampling Source	:	Waste Water	Sample No.	: W6303035	
Sample Name	:	WSP 1-3	Sampling Date	: 24/03/2020	
Sampling By	:	Customer	Sampling Time	: 09:55	
Sampling Method	:	Grab	Received Date	: 25/03/2020	
Tested Date	:	25/03/2020-30/03/2020	Reported Date	: 30/03/2020	

Parameter	Unit	Standard Method	Result	Standard[1]	LOD[2]
Biochemical Oxygen Demand*	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	27.3	40	0.30
Chemical Oxygen Demand	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	44.8	-	10.0
Dissolved Oxygen*	mg/L	SM 2017:4500-O D: Azide Modification	4.50	-	0.30
pH*		SM 2017:4500-H$^+$ B: Electrometric	7.3	5.5-8.5	-

Physical Appearance: 1. Sample : Slightly, SS
2. Container : Normal [PE 1.0 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Waste Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF
2. LOD = Limit Of Detection
* Parameter Not Accredited ISO/IEC 17025:2005

Examined By .....
(Technical Manager)
30/03/2020

Approved By .....
(Top Management)
30/03/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 3
	Date		24/03/2020
	Time		13:55
	Location	Powerhouse (Down Stream)	
	Coordinate	E	240908 E
		N	2050622 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	lighty	
3	Air temperature	32˚C	
4	Water temperature	26.9˚C	

Sampling Location Map




Phanthamit Analytical Lab Co., Ltd.
No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TEST REPORT

Customer	:	Nam Ngum1 Hydropower Station Expansion Project	Report No.	:	6303-072
Address	:	Sengsavang Village, Keosadoa District, Vientiane Province, Lao PDR			
Sampling Source	:	Surface Water	Sample No.	:	W6303006
Sample Name	:	WSP 3	Sampling Date	:	24/03/2020
Sampling By	:	Customer	Sampling Time	:	13:55
Sampling Method	:	Grab	Received Date	:	25/03/2020
Tested Date	:	25/03/2020-30/03/2020	Reported Date	:	30/03/2020

Parameter	Unit	Standard Method	Result	Standard*	LOD*
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B: 5-Day BOD test, Azide Modification	< 1.00	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C: Closed Reflux, Titrimetric	1.25	7-10	1.00
Dissolved Oxygen	mg/L	SM 2017:4500-O D: Azide Modification	6.40	4.0	0.30
pH		SM 2017:4500-H+ B: Electrometric	7.4	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.0 L, PE 0.5 L, G 0.5 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017 Standard for Surface Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017, APHA, AWWA, and WEF
2. LOD = Limit Of Detection
**Out of Accreditation Scope

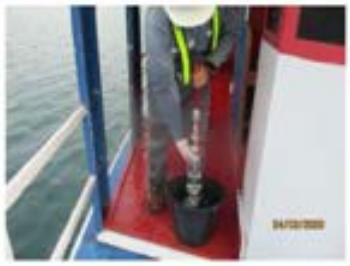
Examined By _____
(Technical Manager)
30/03/2020

Approved By _____
(Top Management)
30/03/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 4-1
	Date		24/03/2020
	Time		15:15
	Location	Nam ngum 1 reservoirs	
	Coordinate	E	241218 E
		N	2050700 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	32˚C	
4	Water temperature	29.4˚C	

Sampling Location Map






Phanthamit Analytical Lab Co., Ltd.
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TEST REPORT

Customer	: Nam Ngum1 Hydropower Station Expansion Project	Report No.	: W6303006	
Address	: Songsavang Village, Keosdom District, Vientiane Province, Lao PDR	Report No.	: 6303-073	
Sampling Source	: Surface Water	Sample No.	: W6303007	
Sample Name	: WSP 4-1	Sampling Date	: 24/03/2020	
Sampling By	: Customer	Sampling Time	: 13:15	
Sampling Method	: Grab	Received Date	: 25/03/2020	
Tested Date	: 25/03/2020-30/03/2020	Reported Date	: 30/03/2020	

Parameter	Unit	Standard Method	Result	Standard*	LOD*
Biochemical Oxygen Demand	mg/L	SM 2017,5210 B: 5-Day BOD test, Azide Modification	< 1.00	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017,5220 C: Closed Reflux, Titrimetric	ND	7-10	1.00
Dissolved Oxygen	mg/L	SM 2017,4500-O D: Azide Modification	8.10	4.0	0.30
pH		SM 2017,4500-H$^+$ B: Electrometric	7.7	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.0 L, PE 0.5 L, G 0.5 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Surface Water
SM: Standard Methods for the Examination of Water and Wastewater, 23rd Edition, 2017,
APHA, AWWA, and WEF
2. LOD = Limit Of Detection
ND = Not Detected
**Out of Accreditation Scope

Examined By .....
(Technical Manager)
30/03/2020

Approved By .....
(Top Management)
30/03/2020

Nam Ngum1 Hydropower Station Expansion Project			
Water Samples	Water samples Code		WSP 4-2
	Date		24/03/2020
	Time		15:05
	Location	Nam ngum 1 reservoirs	
	Coordinate	E	241218 E
		N	2050700 N
Weather		Previous date	Sunny
		Measure date	Sunny
1	Odor	Acceptable	
2	Color	Lightly	
3	Air temperature	32˚C	
4	Water temperature	26.4˚C	

Sampling Location Map

PAL
ACCREDITED LABORATORY ISO/IEC 17025

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No. 122, Unit 5, Dongpalane Thong Village, Sisattanak District,
Vientiane Capital, Lao PDR.
Tel: +856-21-263962 E-mail: info@phanthamit.com

TEST REPORT

		Request No.	: W6303006
Customer	: Nam Ngum1 Hydropower Station Expansion Project	Report No.	: 6303-074
Address	: Sengsavang Village, Keoudom District, Vientiane Province, Lao PDR		
Sampling Source	: Surface Water	Sample No.	: W63030018
Sample Name	: WSP 4-2	Sampling Date	: 24/03/2020
Sampling By	: Customer	Sampling Time	: 13:05
Sampling Method	: Grab	Received Date	: 25/03/2020
Tested Date	: 25/03/2020-30/03/2020	Reported Date	: 30/03/2020

Parameter	Unit	Standard Method	Result	Standard [1]	LOD [2]
Biochemical Oxygen Demand	mg/L	SM 2017:5210 B. 5-Day BOD test, Azide Modification	< 1.00	-	0.30
Chemical Oxygen Demand**	mg/L	SM 2017:5220 C. Closed Reflux, Titrimetric	ND	7-10	10.0
Dissolved Oxygen	mg/L	SM 2017:4500-O D. Azide Modification	3.80	6.0	0.30
pH		SM 2017:4500-H[+] B. Electrometric	7.7	5.0-9.0	-

Physical Appearance: 1. Sample : Slightly Turbid
2. Container : Normal [PE 1.0 L, PE 0.5 L, G 0.3 L]

Remark: 1. Lao Environmental Standard, Ministry of Natural Resources Environment, No 81, Date 07/02/2017
Standard for Surface Water
SM: Standard Methods for the Examination of Water and Wastewater, 23[rd] Edition, 2017,
APHA, AWWA, and WEF
2. LOD = Limit Of Detection
**Out of Accreditation Scope

Examined By ____________ (Technical Manager) 30/03/2020

Approved By ____________ (Top Management) 30/03/2020

Phanthamit Analytical Lab Co.,Ltd

REPORTED TESTS REFER TO SUBMITTED SAMPLES ONLY
THIS REPORT SHALL NOT REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL LABORATORY

Page 1 of 1

Appendix 2-1 Site-specific Monitoring Form of January 2020

Table on the Issues Raised from Last Month (December 2019) and Confirmed Action Taken, Lot 1 by the Contractor in This Month (January 2020)

Issues raised from last month (December 2019)		
Location	**Issues**	**Action taken**
Area H	- The Contractor should prepare kitchen for local labor, and waste water should discharge at previous location.	Confirmed, because the local labors who stays in the camp have been terminate
	- Reduce BoD5 and CoD value at the WSP1-1 before discharge to natural	**Not confirmed**, the contractor has to more improve the situation.
	- Repair bunker to block waste water at the labor kitchen WSP1-3 (see photo 5)	Confirmed, Has been improve as comment
Area A	- Waste water from concrete pump and mixer truck after casting concrete should discharge at designation place.	Confirmed
Batching plant	- Clean sediment pond regularly	Confirmed
	- Improve the waste water treatment pond	**Not Confirmed**
	- Reduce pH in the sediment pond in cleaning and applying neutralization agent (not toxic type) regularly	**Not Confirmed**
	- Mixer concrete truck should not discharge waste water in the project area	Confirmed

Table on the Issues Raised from This Month (January 27, 2020)

The result of monthly monitoring on January 2020, it was found environment issues need to be improved as summarized in table below:

Issues raised from this month	
Location	**Issues**
Area H	- Waste shall not be dumped around the bank of water sources - Reduce BoD5 and CoD value at the WSP1-1 and WSP1-3 before discharge to natural pond - Regularly remove the construction waste after separate in the camp - Repair the waste water pipe from bathing room to Sediment pond
Area A	- Prohibit incineration for site clearing - Improve sand bag for filter in the sediment pond that preserve the waste water from the lab
Batching plant	- Clean sediment pond regularly - Improve the waste water treatment pond - Reduce pH in the sediment pond in cleaning and applying neutralization agent (not toxic type) regularly

Appendix 2-1

Date: January 27, 2020

Monitored by:

Bounpanh THEPPHAVONG

Area H (Contractor's Camp/Stockyard)

Potential Impact

- Flora and Fauna, Water, Waste, Health, Communal Diseases

Proposed Mitigation Measures

① Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or collecting timber

② Prohibit species introduction by all personnel in Contractor's employees

③ Ensure good sanitation including kitchens and latrines and install good drainage and septic tank in comply with National Environmental Standards No.81/MONRE 2017

④ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company

⑤ Prohibit the use of herbicide or incineration for site clearing

⑥ No waste shall be dumped or incinerated on site and no waste of any kind shall be deposited in any water sources

⑦ Install first aid kits in place

⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

⑨ Conduct information, education and communication (IEC) campaigns to all the site staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted Diseases (STD) – or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.

⑩ On completion of the works, restore the site satisfied by the Engineer

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Conformed	
③	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	**Confirmed** for Result of **December** 2019 WSP 1-1 (West side septic tank from worker's toilets and engineer's toilets/bathing water from dormitory) both of BoD_5 and CoD have been worse than last month, and they were not satisfied with the standard **BOD_5 = 99.8 mg/l, COD=215 mg/l**, pH 7.3, DO<0.3 mg/l WSP1-2 (East side Septic tank for outside toilets and engineer's kitchen) the condition is good and better than last month, and they are still satisfied the standard BOD_5 = 6,55 mg/l, COD=16.7 mg/l, pH 7.1, DO=6.1 mg/l, WSP1-3 (middle, at the worker's kitchen) all parameters were higher than last month, but they are under the national standard **BOD_5 =56.6 mg/l,** COD= 117 mg/l, pH 6.7, DO=2.8 mg/l This month water sampling was conducted on January 27, 2020 and the results will review in next month	Contractor has been taken action on this matter by filling bacteria and regularly cleaning bathing area and toilet to reduce COD and BOD_5 Contractor has been taken action on this matter by filling bacteria and regularly cleaning bathing area and toilet to reduce COD and BOD_5 See photo 1 and Photo 2 waste water sampling at discharging point at WSP1-1 in Area H
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	**Not Confirmed**	See photo 3 and 4 Garbage should not trough at the river bank
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	Every month	Confirmed	

⑨	Training /Awareness Programs	Every 6 months	Confirmed	The health awareness program was carried out on April 10, 2018 on the topic Sexually Transmitted Diseases (STD) November 26, 2018 on the topic Dengue fever prevention contains, and Malaria fever prevention contains: May 31, 2019 on the topic Health care and significant disadvantage of drinking alcohols and drugs December 14, 2019 on the topic HIV/AIDS awareness
⑩	Visual Inspection	On completion of the works, restore the site satisfied by the Engineer	Not applicable	

Date: January 27, 2020

Monitored by:

Bounpanh THEPPHAVONG

Area A (Construction Contractor's Temporary Work Area)

Potential Impact

- Water, Air, Waste, Health

Proposed Mitigation Measures

① Neutralize cleaning water generated from concrete batching plant, laboratory, workshop by constructing settlement ponds, and purify water from toilets within pH 5-9, COD less than 125mg/l and BOD5 less than 40mg/l in comply with 4.14.2 Waste Water Control on Building in National Environmental Standards No.81/MONRE 2017

② Spray water to reduce air-born dust

③ Equip safety gears against dust such as glasses, goggles or masks

④ Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place

⑤ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly

⑥ Store hazardous materials at designated place, keep record and dispose of at designated place

⑦ Install first aid kits in place

⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

⑨ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	See photo 6 sand bag for filter in the sediment pond should replace by new one for good effected on filter

	Review water quality check-up result	Every month	Confirmed	Waste water from laboratory was treated at sediment pond and then diluted for spraying out at the entrance of Area A. It was not discharged to the ditch or natural water source
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	Mobile clinic on site is operate
⑧	Visual Inspection	Every month	Confirmed	
⑨	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not applicable	

See photo 5 No incinerate for site clearing

Date: January 27, 2020

Monitored by:

Bounpanh THEPPHAVONG

Access to the Site (Transporting Construction Materials)

Potential Impact

-Air, Social Infrastructure

Proposed Mitigation Measures

① Maintain vehicles in good condition to minimize exhaust emissions

② Cover load carrying platform properly when carrying fine construction materials or earth/sand
③ Limit loading capacity depends upon local conditions such as restriction on bridges

④ Repair and restore of public or private roads, bridges damaged by the Contractor

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual inspection	Monthly	Confirmed	
②	Visual inspection	Monthly	Confirmed	
③	Visual inspection	Monthly	Confirmed	
④	Visual inspection	Monthly	Confirmed	

Access road to site is regularly cleaned after finished work, see photo 7 and 8

Date: January 27, 2020

Monitored by:

Bounpanh THEPPHAVONG

Power House and Tailrace

Potential Impact

- Water, Waste, Health

Proposed Mitigation Measures

① Maintain water quality at the downstream of the construction site in comply with 4.10 Surface Water Standards Category B in National Environmental Standards No. 8/MONRE 2017

② Construct hygienic human waste disposal system such as mobile toilets and install septic tank in comply with 4.14.2 Category 3 Waste Water Control in National Environmental Standards No. 8/MONRE 2017

③ Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place

④ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly

⑤ Store hazardous materials at designated place, keep record and dispose of at designated place

⑥ Install first aid kits in place

⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality check-up result	pH, BOD and COD Every month except T-N, T-P, Cadmium, Lead, Copper and Cyanide once in a dry season, rainy season and in-between dry and	**Confirmed** Result in December 2019 At WSP 3 pH=8.2, COD=1.22 mg/l, BOD_5=1.05 mg/l, DO=7.05 mg/l	

		rainy reason	Water sampling in this month was conducted on January 27, 2020 the result will be reviewed in the monitoring report of next month (February 2020)	See photo 9, 10
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	

Date: January 27, 2020

Monitored by:

Bounpanh THEPPHAVONG

Intake and Penstock

Potential Impact

- Water, Waste, Health

Proposed Mitigation Measures

① Monitor water quality at the intake site in the reservoir

② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place

③ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly

④ Store hazardous materials at designated place, keep record and dispose of at designated place

⑤ Install first aid kits in place

⑥ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality check-up result	Every month except T-N, T-P, Cadmium, Lead, Copper and Cyanide once in a dry season, rainy season and in-between dry and rainy reason	**Confirmed** Result in December 2019 WSP4-1 pH=8.2 , COD=3.68 mg/l, BOD_5=0.85 mg/l, DO=7.6 mg/l WSP4-2 pH=7.9 , the water sampling of this month of COD,	WSP04-1 is 0.5 m depth from surface

			BOD_5 are not available to be representative of sample, because of water sampling is not the sample layer and conditioning from previous time, so the result is not correct. Water sampling in this month was conducted on January 27, 2019 and result will be reviewed in Next month (January 2020)	WSP04-2 is 42 m depth from surface But in the sediment layer (Water sampling is include mud and rotten leave inside the sediment See photo 11, 12
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	

Date: January 28, 2020

Monitored by:

Bounpanh THEPPHAVONG

Batching Plant

Potential Impact

- Water, Waste, Health

Proposed Mitigation Measures

① Monitor water quality (pH) at the treatment pond

② Keep clean the open ditch between the batching plant and the treatment pond

③ Clean up the sludge containing concrete in the treatment pond and the sedimentation pond regularly

④ Spray water on the ground to control dust from stock piles and trucks, especially in a dry season

⑤ Prohibit any dumping of concrete residual outside of the concrete factory

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality checkup result	Every month	**Not Confirmed,** pH= 13.33 measured on site	Waste water after treat was using for spraying the field
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	See photo 13, 14
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	

Note: pH is high, so the contractor shall be use the Acid Neutralizers to reduce pH

Photos on monthly environmental monitoring January 2020

Area H (the Contractor's Camp/Stockyard) 1

Photo 1 Water sampling at Treated Waste Water tank at discharge Point (WSP1-1)

Photo 2 Water sampling at (WSP1-1)

Area H (the Contractor's Camp/Stockyard) 2 and Area A

Photo 3 Garbage should not trough along the river bank

Photo 4 Construction waste need to remove from site regularly

Area A (the Contractor's Laboratory/ Office/Workshop/Stockyard)

Photo 5 Prohibit incineration for site clearing

Photo 6 Sand bag for filter should be improved

Appendix 2-1 Site-specific Monitoring Form of February 2020

Table on the Issues Raised from Last Month (January 2019) and Confirmed Action Taken by the Contractor, Lot1 in This Month (February 2019)

Issues raised from last month (January 2020)		
Location	**Issues**	**Action taken**
Area H	- Waste shall not be dumped around the bank of water sources	Confirmed
	- Reduce BoD5 and CoD value at the WSP1-1 and WSP1-3 before discharge to natural pond	Confirmed
	- Regularly remove the construction waste after separate in the camp	**Not confirmed**
	- Repair the waste water pipe from bathing room to Sediment pond	Confirmed
Area A	- Prohibit incineration for site clearing	Confirmed
	- Improve sand bag for filter in the sediment pond that preserve the waste water from the lab	Confirmed
Batching plant	- Clean sediment pond regularly	Confirmed
	- Improve the sediment pond	**Not confirmed**
	- Reduce pH in the sediment pond in cleaning and applying neutralization agent (not toxic type) regularly	**Not confirmed**

Table on the Issues Raised from This Month (February 2019), Lot 1

The result of monthly monitoring on 25 of February 2019 was found an environment issue need to be improved as summarized in table below:

Issues raised from this month	
Location	**Issues**
Area H	- Should regularly remove the construction waste after separate in the camp
Area A	- Waste water from cleaning concrete pump should discharge into designation place (Do not discharge in front of Area A)
Power house	- Please provide garbage bin at the relaxing place - Solid waste should not through in the working area

Issues raised from this month	
Location	**Issues**
Batching plant	- Improve sediment pond - Reduce pH in the sediment pond in cleaning and applying neutralization agent (not toxic type) regularly

Appendix 2-1

Date: February 25, 2020

Monitored by:

Bounpanh THEPPHAVONG

Area H (Contractor's Camp/Stockyard)

Potential Impact

- Flora and Fauna, Water, Waste, Health, Communal Diseases

Proposed Mitigation Measures

① Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or collecting timber

② Prohibit species introduction by all personnel in Contractor's employees

③ Ensure good sanitation including kitchens and latrines and install good drainage and septic tank in comply with National Environmental Standards No.81/MONRE 2017

④ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company

⑤ Prohibit the use of herbicide or incineration for site clearing

⑥ No waste shall be dumped or incinerated on site and no waste of any kind shall be deposited in any water sources

⑦ Install first aid kits in place

⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

⑨ Conduct information, education and communication (IEC) campaigns to all the site staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted Diseases (STD) – or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.

⑩ On completion of the works, restore the site satisfied by the Engineer

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Conformed	
③	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	**Confirmed** for Result of **January 2020** WSP 1-1 (West side septic tank from worker's toilets and engineer's toilets/bathing water from dormitory) this month all parameter were satisfied with the standard BOD_5 = 5.1 mg/l, COD=36.6 mg/l, pH 8, DO=5.7 mg/l WSP1-2 (East side Septic tank for outside toilets and engineer's kitchen) the condition is stilling good and they are still satisfied the standard BOD_5 = 11.2 mg/l, COD=30.3 mg/l, pH=8.2, DO=7.2 mg/l, WSP1-3 (middle, at the worker's kitchen) all parameters were better than last month, and they are under the national standard BOD_5 =10.0 mg/l, COD= 16.4 mg/l, pH 8.0, DO=5.8 mg/l This month water sampling was conducted on February 25, 2020 and the results will review in next month	Contractor has been taken action on this matter by regularly cleaning bathing area and toilet to reduce COD and BOD_5 Contractor has been taken action on this matter by filling bacteria and regularly cleaning bathing area and toilet to reduce COD and BOD_5 See photo 1 and Photo 2 waste water sampling at discharging point at WSP1-1 in Area H
④	Visual Inspection	Every month	**Not Confirmed**	See photo 3
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	See photo 4
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	Every month	Confirmed	

⑨	Training /Awareness Programs	Every 6 months	Confirmed	The health awareness program was carried out on April 10, 2018 on the topic Sexually Transmitted Diseases (STD) November 26, 2018 on the topic Dengue fever prevention contains, and Malaria fever prevention contains: May 31, 2019 on the topic Health care and significant disadvantage of drinking alcohols and drugs December 14, 2019 on the topic HIV/AIDS awareness
⑩	Visual Inspection	On completion of the works, restore the site satisfied by the Engineer	Not applicable	

Date: February 25, 2020

Monitored by:

Bounpanh THEPPHAVONG

Area A (Construction Contractor's Temporary Work Area)

Potential Impact

- Water, Air, Waste, Health

Proposed Mitigation Measures

① Neutralize cleaning water generated from concrete batching plant, laboratory, workshop by constructing settlement ponds, and purify water from toilets within pH 5-9, COD less than 125mg/l and BOD5 less than 40mg/l in comply with 4.14.2 Waste Water Control on Building in National Environmental Standards No.81/MONRE 2017

② Spray water to reduce air-born dust

③ Equip safety gears against dust such as glasses, goggles or masks

④ Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place

⑤ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly

⑥ Store hazardous materials at designated place, keep record and dispose of at designated place

⑦ Install first aid kits in place

⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

⑨ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	See photo 6 Sediment pond has been improved

	Review water quality check-up result	Every month	Confirmed	Waste water from laboratory was treated at sediment pond and then diluted for spraying out at the entrance of Area A. It was not discharged to the ditch or natural water source
②	Visual Inspection	Every month	Confirmed	A few time per day to prevent dust emission See photo 5
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	Mobile clinic on site is operate
⑧	Visual Inspection	Every month	Confirmed	
⑨	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not applicable	

Waste water from cleaning concrete pump should discharge at designation place

Waste water should not directly discharge Nam Ngum river in front of the area A,

Waste water should not directly discharge Nam Ngum river in front of the area A,

Date: February 25, 2020

Monitored by:

Bounpanh THEPPHAVONG

Access to the Site (Transporting Construction Materials)

Potential Impact

-Air, Social Infrastructure

Proposed Mitigation Measures

① Maintain vehicles in good condition to minimize exhaust emissions

② Cover load carrying platform properly when carrying fine construction materials or earth/sand

③ Limit loading capacity depends upon local conditions such as restriction on bridges

④ Repair and restore of public or private roads, bridges damaged by the Contractor

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual inspection	Monthly	Confirmed	
②	Visual inspection	Monthly	Confirmed	
③	Visual inspection	Monthly	Confirmed	
④	Visual inspection	Monthly	Confirmed	

Access road to site is regularly cleaned after finished work, see photo 7 and 8

Date: February 25, 2020

Monitored by:

Bounpanh THEPPHAVONG

Power House and Tailrace

Potential Impact

- Water, Waste, Health

Proposed Mitigation Measures

① Maintain water quality at the downstream of the construction site in comply with 4.10 Surface Water Standards Category B in National Environmental Standards No. 8/MONRE 2017

② Construct hygienic human waste disposal system such as mobile toilets and install septic tank in comply with 4.14.2 Category 3 Waste Water Control in National Environmental Standards No. 8/MONRE 2017

③ Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place

④ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly

⑤ Store hazardous materials at designated place, keep record and dispose of at designated place

⑥ Install first aid kits in place

⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality check-up result	pH, BOD and COD Every month except T-N, T-P, Cadmium, Lead, Copper and Cyanide once in a dry season, rainy season and in-between dry and rainy reason	**Confirmed** Result in January 2020 At WSP 3 pH=7.9, COD=ND mg/l, BOD_5=ND mg/l, DO=6.5 mg/l Water sampling in this month was conducted on February 25, 2020 the result will be reviewed in the monitoring report of next month (March 2020)	See photo 9, 10
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	**Not Confirmed**	See photo 10 Garbage should not through in the working area
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	

Date: February 25, 2020

Monitored by:

Bounpanh THEPPHAVONG

Intake and Penstock

Potential Impact

- Water, Waste, Health

Proposed Mitigation Measures

① Monitor water quality at the intake site in the reservoir

② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place

③ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly

④ Store hazardous materials at designated place, keep record and dispose of at designated place

⑤ Install first aid kits in place

⑥ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality check-up result	Every month except T-N, T-P, Cadmium, Lead, Copper and Cyanide once in a dry season, rainy season and in-between dry and rainy reason	**Confirmed** Result in January 2020 WSP4-1 pH=8.6 , COD=1.26 mg/l, BOD_5=ND mg/l, DO=9.7 mg/l WSP4-2 pH=8.3 , COD=ND mg/l, BOD_5=ND mg/l, DO=4.9	WSP04-1 is 0.5 m depth from surface

			mg/l Water sampling in this month was conducted on February 25, 2020 and result will be reviewed in Next month (March 2020)	WSP04-2 is 38 m depth from surface See photo 11, 12
②	Visual Inspection	Every month	Confirmed	See photo 13, 14
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	

Date: February 26, 2020

Monitored by:

Bounpanh THEPPHAVONG

Batching Plant

Potential Impact

- Water, Waste, Health

Proposed Mitigation Measures

① Monitor water quality (pH) at the treatment pond

② Keep clean the open ditch between the batching plant and the treatment pond

③ Clean up the sludge containing concrete in the treatment pond and the sedimentation pond regularly

④ Spray water on the ground to control dust from stock piles and trucks, especially in a dry season

⑤ Prohibit any dumping of concrete residual outside of the concrete factory

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality checkup result	Every month	**Not Confirmed,** pH= 13.13 measured on site	Waste water after treat was using for spraying the field
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	See photo 15, 16
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	

Note: pH is high, so the contractor shall be use the Acid Neutralizers to reduce pH

Photos on monthly environmental monitoring February 2020

Area H (the Contractor's Camp/Stockyard) 1

Photo 1 Water sampling at Treated Waste Water tank at discharge Point (WSP1-1)

Photo 2 pH checking on site at (WSP1-1)

Area H (the Contractor's Camp/Stockyard) 2 and Area A

Photo 3 Garbage still keeping on site

Photo 4 Garbage from the lake bank has removed

Area A (the Contractor's Laboratory/ Office/Workshop/Stockyard)

Photo 5 Water spraying on field to prevent dust emission

Photo 6 Sediment pond at the lab has been improved

Appendix 2-1 Site-specific Monitoring Form of March 2020

Table on the Issues Raised from Last Month (February 2020) and Confirmed Action Taken by the Contractor in This Month (March 2020)

Issues raised from this month (February 2020)		
Location	**Issues**	**Action taken**
Area H	- Should regularly remove the construction waste after separate in the camp	- Confirmed
Area A	- Waste water from cleaning concrete pump should discharge into designation place (Do not discharge in front of Area A)	- **Not confirmed**
Power house	- Please provide garbage bin at the relaxing place - Solid waste should not through in the working area	- Confirmed - Confirmed
Batching plant	- Improve sediment pond - Reduce pH in the sediment pond in cleaning and applying neutralization agent (not toxic type) regularly	- **Not confirmed** - **Not confirmed**

Table on the Issues Raised from This Month (March 2020)

The result of monthly monitoring on 24 and 25 of March 2020 was found an environment issue need to be improved as summarized in table below:

Issues raised from this month	
Location	**Issues**
Area H	- More Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or fishing in the natural pond - Based on the virus Covid 19 situation effected in Laos, the contractor should provide knowledge and enough hand cleaning gel to labor
Area A	- Garbage should keeping in the garbage bin, so the contractor should announce to man labor keep clean in the site (at relaxing area on site) - No allowance incineration for site cleaning - Waste water from cleaning concrete pump should discharge into designation place (Do not discharge in front of Area A)
Power house	- Solid waste should not through in the working area - The contractor should announce labor keep clean inside the construction site
Batching plant	- Improve sediment pond - Reduce pH in the sediment pond in cleaning and applying neutralization agent (not toxic type) regularly - Chemical for mixing concrete should good condition keeping and hurry cleaning when it's leaking

Appendix 2-1

Date: March 24, 2020

Monitored by:

Bounpanh THEPPHAVONG

Area H (Contractor's Camp/Stockyard)

Potential Impact

- Flora and Fauna, Water, Waste, Health, Communal Diseases

Proposed Mitigation Measures

① Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or collecting timber

② Prohibit species introduction by all personnel in Contractor's employees

③ Ensure good sanitation including kitchens and latrines and install good drainage and septic tank in comply with National Environmental Standards No.81/MONRE 2017

④ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company

⑤ Prohibit the use of herbicide or incineration for site clearing

⑥ No waste shall be dumped or incinerated on site and no waste of any kind shall be deposited in any water sources

⑦ Install first aid kits in place

⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

⑨ Conduct information, education and communication (IEC) campaigns to all the site staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted Diseases (STD) – or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.

⑩ On completion of the works, restore the site satisfied by the Engineer

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	**Not Confirmed**	
②	Visual Inspection	Every month	Conformed	
③	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	**Confirmed** for Result of **February 2020** WSP 1-1 (West side septic tank from worker's toilets and engineer's toilets/bathing water from dormitory) this month all parameter were satisfied with the standard and however it's quite higher than last month BOD_5 = 21.6 mg/l, COD=63.7 mg/l, pH=6.9, DO=4.95 mg/l WSP1-2 (East side Septic tank for outside toilets and engineer's kitchen) the condition is stilling good and they are still satisfied the standard but it's higher than last month BOD_5 = 17.5 mg/l, COD=39.3 mg/l, pH=7.4, DO=6.4 mg/l, WSP1-3 (middle, at the worker's kitchen) all parameters were better than last month, and they are under the national standard BOD_5 =27.3 mg/l, COD= 52.4 mg/l, pH=7.4, DO=4.8 mg/l All water sampling in area H are satisfied the national standard, but they are higher than last month, so the contractor should improve the situation. This month water sampling was conducted on March 24, 2020 and the results will review in next month	Contractor has been taken action on this matter by regularly cleaning bathing area and toilet to reduce COD and BOD_5 Contractor has been taken action on this matter by filling bacteria and regularly cleaning bathing area and toilet to reduce COD and BOD_5 See photo 1 and Photo 2 waste water sampling at discharging point at WSP1-1 in Area H
④	Visual Inspection	Every month	Confirmed	See photo 3
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	See photo 4
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	Every month	Confirmed	

⑨	Training /Awareness Programs	Every 6 months	Confirmed	The health awareness program was carried out on April 10, 2018 on the topic Sexually Transmitted Diseases (STD) November 26, 2018 on the topic Dengue fever prevention contains, and Malaria fever prevention contains: May 31, 2019 on the topic Health care and significant disadvantage of drinking alcohols and drugs December 14, 2019 on the topic HIV/AIDS awareness For the next workshop is under preparing
⑩	Visual Inspection	On completion of the works, restore the site satisfied by the Engineer	Not applicable	

Date: March 24, 2020
Monitored by:
Bounpanh THEPPHAVONG

Area A (Construction Contractor's Temporary Work Area)

Potential Impact

- Water, Air, Waste, Health

Proposed Mitigation Measures

① Neutralize cleaning water generated from concrete batching plant, laboratory, workshop by constructing settlement ponds, and purify water from toilets within pH 5-9, COD less than 125mg/l and BOD5 less than 40mg/l in comply with 4.14.2 Waste Water Control on Building in National Environmental Standards No.81/MONRE 2017
② Spray water to reduce air-born dust
③ Equip safety gears against dust such as glasses, goggles or masks
④ Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
⑤ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly
⑥ Store hazardous materials at designated place, keep record and dispose of at designated place
⑦ Install first aid kits in place
⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑨ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	See photo 6 Sediment pond has been improved
	Review water quality check-up result	Every month	Confirmed	Waste water from laboratory was treated at sediment pond and then diluted for spraying out at the entrance of Area A. It was not discharged to the ditch or natural water source .
②	Visual Inspection	Every month	Confirmed	A few time per day to prevent dust emission See photo 5
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	**Not Confirmed**	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	Mobile clinic on site is operate
⑧	Visual Inspection	Every month	Confirmed	

⑨	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not applicable	

Waste water from cleaning concrete pump should discharge at designation place

 Waste water should not directly discharge Nam Ngum river in front of the area A,	 Waste water should not directly discharge Nam Ngum river in front of the area A,

Date: March 24, 2020
Monitored by:
Bounpanh THEPPHAVONG

Access to the Site (Transporting Construction Materials)

Potential Impact
-Air, Social Infrastructure

Proposed Mitigation Measures
① Maintain vehicles in good condition to minimize exhaust emissions
② Cover load carrying platform properly when carrying fine construction materials or earth/sand
③ Limit loading capacity depends upon local conditions such as restriction on bridges
④ Repair and restore of public or private roads, bridges damaged by the Contractor

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual inspection	Monthly	Confirmed	
②	Visual inspection	Monthly	Confirmed	
③	Visual inspection	Monthly	Confirmed	
④	Visual inspection	Monthly	Confirmed	

Access road to site is regularly cleaned after finished work, see photo 7 and 8

Date: March 24, 2020
Monitored by:
Bounpanh THEPPHAVONG

Power House and Tailrace

Potential Impact
- Water, Waste, Health

Proposed Mitigation Measures
① Maintain water quality at the downstream of the construction site in comply with 4.10 Surface Water Standards Category B in National Environmental Standards No. 8/MONRE 2017
② Construct hygienic human waste disposal system such as mobile toilets and install septic tank in comply with 4.14.2 Category 3 Waste Water Control in National Environmental Standards No. 8/MONRE 2017
③ Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
④ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly
⑤ Store hazardous materials at designated place, keep record and dispose of at designated place
⑥ Install first aid kits in place
⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality check-up result	pH, BOD and COD Every month except T-N, T-P, Cadmium, Lead, Copper and Cyanide once in a dry season, rainy season and in-between dry and rainy reason	**Confirmed** Result in February 2020 At WSP 3 pH=7.1, COD=6.24 mg/l, BOD_5=1.2 mg/l, DO=6.5 mg/l the result of additional parameter as heavy metal are: Cadmium, Copper, Cyanide, Lead, TP, TN are not detected The result is under national standard. Water sampling in this month was conducted on March 24, 2020 the result will be reviewed in the monitoring report of next month (April 2020)	See photo 9, 10

②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	**Not Confirmed**	See photo 10 Garbage should not through in the working area
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	

Date: March 24, 2020
Monitored by:
Bounpanh THEPPHAVONG

Intake and Penstock

Potential Impact
- Water, Waste, Health

Proposed Mitigation Measures
① Monitor water quality at the intake site in the reservoir
② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
③ Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting points and collected by the authorized company regularly
④ Store hazardous materials at designated place, keep record and dispose of at designated place
⑤ Install first aid kits in place
⑥ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality check-up result	Every month except T-N, T-P, Cadmium, Lead, Copper and Cyanide once in a dry season, rainy season and in-between dry and rainy reason	**Confirmed** Result in February 2020 WSP4-1 pH=7.3 , COD=2.5 mg/l, BOD_5<1 mg/l, DO=8.3 mg/l Cd, Cu, Cy, Pb, TP are not detected and TN is less than 5 mg/l WSP4-2 pH=7.3 , COD=6.24 mg/l, BOD_5=1.10 mg/l, DO=4.0 mg/l this month for all additional heavy metal in dry season Cd, Cu, Cy, Pb, TP and TN are not detected Water sampling in this month was conducted on March 24, 2020 and result will be reviewed in Next month (April 2020)	WSP04-1 is 0.5 m depth from surface WSP04-2 is 38 m depth from surface See photo 11, 12

②	Visual Inspection	Every month	Confirmed	See photo 13, 14
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	

Date: March 25, 2020
Monitored by:
Bounpanh THEPPHAVONG

Batching Plant

Potential Impact

- Water, Waste, Health

Proposed Mitigation Measures

① Monitor water quality (pH) at the treatment pond
② Keep clean the open ditch between the batching plant and the treatment pond
③ Clean up the sludge containing concrete in the treatment pond and the sedimentation pond regularly
④ Spray water on the ground to control dust from stock piles and trucks, especially in a dry season
⑤ Prohibit any dumping of concrete residual outside of the concrete factory

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Review water quality checkup result	Every month	**Not Confirmed,** pH= 12.32 measured on site	Waste water after treat was using for spraying the field
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	See photo 15, 16
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	

Note: pH is high, so the contractor shall be use the Acid Neutralizers to reduce pH, this month is lower than last month

Photos on monthly environmental monitoring March 2020

Area H (the Contractor's Camp/Stockyard) 1

Photo 1 Water sampling at Treated Waste Water tank at discharge Point (WSP1-1)

Photo 2 pH checking on site at (WSP1-1)

Area H (the Contractor's Camp/Stockyard) 2 and Area A

Photo 3 Man power should not fishing in the natural pond

Photo 4 Remove fishing equipment from the natural pond

Area A (the Contractor's Laboratory/ Office/Workshop/Stockyard)

Photo 5 Water spraying on field to prevent dust emission

Photo 6 no allowance incineration for site cleaning on site

MONITORING FORM IN A CONSTRUCTION PHASE

Period: between January 2020 and March 2020
Monitored by: Mr. Bounpanh Thepphavong

1． Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring item	Monitoring results during report period
Responses/Actions to Comments and Guidance from Government Authorities	No Government authority comment on the environment issue

2． Mitigation Measures

[Construction Phase]

Location:

ⓐ: Area H (Contractor's employees' camp)
ⓑ: Area A (Contractor's Temporary Work Area)
ⓒ: Disposal Area
ⓓ: Access to the Site
ⓔ:Construction of Intake and Penstock
ⓕ: Construction of Power House and Tailrace

Location		Construction Started		
		January (01)	February (02)	March (03)
ⓐ	Area H (Contractor's employees' camp)	V	V	V
ⓑ	Area A (Contractor's Temporary Work Area)	V	V	V
ⓒ	Disposal Area	-	-	-
ⓓ	Access to the Site	V	V	V
ⓔ	Construction of Intake and Penstock	V	V	V
ⓕ	Construction of Power House and Tailrace	V	V	V

- Flora and Fauna

Monitoring item	Measure-ment point	Monitoring Frequency	Implementation Schedule	Monitoring result during report period
Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting, trading of wildlife or collecting timber	ⓐ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed **March 2020 Not Confirmed**
	ⓒ			January 2020 NA February 2020 NA March 2020 NA
Prohibit species introduction by all personnel in Contractor's employees	ⓐ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed **March 2020 Not Confirmed**
	ⓒ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed

- Air Quality（Emission Gas / Ambient Air Quality）

Monitoring item	Measure-ment point	Monitoring Frequency	Implementation Schedule	Monitoring result during report period
Maintain vehicles in good condition	ⓓ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
Sprinkle water to control dust / Cleaning by water or sweeping along the access road to powerhouse	ⓑ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed February　2020 Confirmed
	ⓒ			January 2020 NA February 2020 NA March 2020 NA
	ⓓ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
Respiratory protection for worker at	ⓑ	Monthly	Throughout	January 2020 Confirmed

site as necessary			construction works	February 2020 Confirmed March 2020 Confirmed
	ⓒ			January 2020 NA February 2020 NA March 2020 NA
Cover load-carrying platform properly when carrying fine construction materials or earth/sand	ⓓ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed

- Social Infrastructure

Monitoring item	Measure-ment point	Monitoring Frequency	Implementation Schedule	Monitoring result during report period
Limit loading capacity depends upon local conditions such as restriction on bridges	ⓓ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
Repair and restore of public or private roads, bridges damaged by the Contractor	ⓓ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed *No damage by contractor*

- Water Quality

Monitoring item	Measure-ment point	Monitoring Frequency	Implementation Schedule	Monitoring result during report period
Ensure good sanitation including kitchens and latrines and install good drainage and install septic tank	ⓐ	Monthly	Throughout construction works	January and February 2020 Confirmed WSP01-1, WSP 01-2, WSP01-3: all CoD, BOD_5 and pH are satisfied the environmental standard March 2020 WSP 01-1 **Not Confirmed** BoD_5 is not satisfied with the standards, but other parameter is under the standards WSP 01-2 and WSP01-3: all of CoD, BOD_5 and pH were satisfied the environmental standard
	ⓑ			January, February and March 2020 Confirmed Water sampling in this site were not available, there is only pH checking in sediment pond at the concrete Lab to see the value before spraying the yard to prevent dust emission.
	ⓕ			January, February and March 2020 Confirmed Waste water sampling in this site is not available. No waste water from toilet or kitchen discharge to the river. the contractor has been installed mobile toilet (temporary urine place only) and keeping waste water in safety bucket then remove of site the construction site to designation place when it's full

Apply counter measures such as installing settling basin, using pH adjuster or installing grease trap on controlling pH, COD and BOD_5 as appropriate	ⓐ	Monthly	Throughout construction works	January , February and March 2020 Confirmed Contractor is apply the filter at the drainage of waste water sediment pond And all parameters are under national standards
	ⓑ			**January, February and March 2020** Confirmed, no kitchen on site and No waste water discharge to outside
	ⓔ			**January, February and March 2020** Confirmed No kitchen on site, and renovated 2 existing toilets for site office, but the project has monitoring the natural water from reservoir (the upstream) to see the water status as WSP 04-1 and 04-2 : .
	ⓕ			**January, February and March 2020** Confirmed No kitchen on site, and asking to used EDL Gen's public toilet
Monitor water quality on T-N, T-P, Cadmium, Lead, Copper, Cyanide	ⓒ	Once in a dry season, rainy season and in-between dry and rainy season	Throughout construction works	January 2020 Confirmed. No heavy metal monitoring in this month February 2020 Confirmed At WSP04-1, T-P, Cadmium, Lead, Copper, Cyanide could not Detect and T-N<5 mg/l At WSP 04-2 T-P, T-N Cadmium, Lead, Copper, Cyanide could not Detect March 2020, Confirmed No heavy metal monitoring in this month
	ⓕ			January 2020 Confirmed. No heavy metal monitoring in this month February 2020 Confirmed At WSP 03 T-P, T-N Cadmium, Lead, Copper, Cyanide could not Detect March 2020, Confirmed No heavy metal monitoring in this month

- Water Sampling

Item	Unit	Measured Value			Country's Standards*	Remarks (Measurement Point, Frequency, Method, etc.)
		01	02	03		
BOD_5	mg/l	5.10	21.6	**46.5**	≦40	Monthly, ⓐ-1-1 at Discharge Point to the Environment (natural pond)
		11.2	17.5	6.4		Monthly, ⓐ-1-2 at Discharge Point to the Environment (natural pond)
		10.0	27.3	**27.3**		Monthly, ⓐ-1-3 at Discharge Point to the Environment (natural pond)
		-	-	-	≦40	Monthly, ⓑ at Discharge Point to the Environment (No waste water discharge to outside
		ND ND	<1.0 1.10	<1.0 <1.0	≦1.5	Monthly, ⓒat Upstream of Intake surface water and bottom layer of water
		N	1.2	<1.0	≦1.5	Monthly, ⓕat Downstream of Power House
		-	-	-	≦40	Monthly, ⓕ at Discharge Point from the Septic Tank
pH		8.0	6.9	7.7	5.5-8.5	Monthly, ⓐ-1-1 at Discharge Point to the Environment (natural pond)
		8.2	7.4	7.4		Monthly, ⓐ-1-2 at Discharge Point to the Environment (natural pond)
		8.0	7.4	7.3		Monthly, ⓐ-1-3 at Discharge Point to the Environment (natural pond)
		-	-	-		Monthly, ⓑ at Discharge Point to the Environment
		8.8 8.3	7.3 7.3	7.7 7.7	5.0-9.0	Monthly, ⓒat Upstream of Intake surface water and bottom layer of water
		7.9	7.1	7.4	5.0-9.0	Monthly, ⓕat Downstream of Power house
COD	mg/l	36.6	63.7	122	≦125	Monthly, ⓐ1-1 at Discharge Point to the Environment (natural pond)
		30.3	39.3	34.9		Monthly, ⓐ 1-2 at Discharge Point to the Environment (natural pond)
		16.4	52.4	44.9		Monthly, ⓐ 1-3 at Discharge Point to the Environment
		-	-	-		Monthly,ⓑ
		1.26 ND	2.50 6.24	ND ND	≦7-10	Monthly,ⓒat Upstream of Intake surface water and bottom layer of water
		ND	6.24	1.25	≦7-10	Monthly,ⓕat Downstream of Power house
DO	mg/l	9.70 4.90	8.30 4.00	8.10 **3.80**	>4	Monthly,ⓒ at Upstream of Intake surface water and bottom layer of water
		6.50	6.50	6.40		Monthly,ⓕ at Downstream of Power House
T-N	mg/l	-	**<5.0**	-	≦1	No monitoring on this period ⓒ at Upstream of Intake surface water and bottom layer of water
		-	ND	-		No monitoring on this period ⓕ at Downstream of Power House
T-P	mg/l	-	ND	-	≦0.1	No monitoring on this period ⓒ at Upstream of Intake surface water and bottom layer of water
		-	ND	-		No monitoring on this period ⓕ at Downstream of Power House
Cadmium	mg/l	-	ND	-	≦0.003	No monitoring on this period ⓒ at Upstream of Intake surface water and bottom layer of water
		-	ND	-		No monitoring on this period ⓕ at Downstream of Power House
Lead	mg/l	-	ND	-	≦0.01	No monitoring on this period ⓒ at Upstream of Intake surface water and bottom layer of water
		-	ND	-		No monitoring on this period ⓕ at Downstream of Power House
Copper	mg/l	-	ND	-	≦1.5	No monitoring on this period ⓒ at Upstream of Intake surface water and bottom layer of water
		-	ND	-		No monitoring on this period ⓕ at Downstream of Power House
Cyanide	mg/l	-	ND	-	≦0.07	No monitoring on this period ⓒ at Upstream of Intake surface water and bottom layer of water
		-	ND	-		No monitoring on this period ⓕ at Downstream of Power House

***National Environmental Standards, 2017 MONRE except T-N and T-P in Guideline on Water Quality of Living Environment Protection in Japan 1971**

- Waste

Monitoring item	Measure-ment point	Frequency	Implementation phase	Monitoring result during report period
Make arrangement to sort out organic waste and recyclable waste such as paper, cans, thins, bottles, cardboard, polythene at collecting point and collected by the authorized company	ⓐ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
	ⓑ			January 2020 Confirmed February 2020 Not Confirmed March 2020 Confirmed
	ⓒ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
	ⓕ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
Prohibit the use of herbicide or incineration for site clearing	ⓐ	Monthly	Throughout construction works	January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
Disposed of construction waste such as waste soil and concrete aggregate from construction site as designated place	ⓐ	Monthly	Throughout construction works	January 2020 Confirmed, But construction waste from site has been damping at the contractor's camp first, then separated before remove to designation place by local authority February 2020 Confirmed, But construction waste from site has been damping at the contractor's camp first, then separated before remove to designation place by local authority March 2020 Confirmed, But construction waste from site has been damping at the contractor's camp first, then separated before remove to designation place by local authority
	ⓑ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
	ⓒ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
	ⓕ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
Store hazardous materials at designated places, keep record and dispose of at designated place	ⓐ	Monthly	Throughout construction works	January 2020 Confirmed, no hazardous waste on site February 2020 Confirmed, no hazardous waste on site March 2020 Confirmed no hazardous waste on site
	ⓑ			January 2020 Confirmed, no hazardous waste on site February 2020 Confirmed, no hazardous waste on site March 2020 Confirmed

				no hazardous waste on site
	ⓔ			January 2020 Confirmed, no hazardous material February 2020 Confirmed, no hazardous material March 2020 Confirmed
	ⓕ			January 2020 Confirmed, no hazardous material February 2020 Confirmed, no hazardous material March 2020 Confirmed
No waste shall be dumped or incinerated on site. no waste of any kind shall be deposited in any water sources	ⓐ	Monthly	Throughout construction works	January 2020 **Not Confirmed** February 2020 Confirmed March 2020 Confirmed Contractor has been dumping construction waste in the contractor's camp area for temporary
	ⓑ			January 2020, **Not Confirmed**, February 2020 Confirmed, March 2020 **Not Confirmed**

-Health

Monitoring item	**Measure-ment point**	**Frequency**	**Implementation phase**	**Monitoring result during report period**
Install first aid kits in place	ⓐ	Monthly	Throughout construction stage	**January 2020** Confirmed medicine cabinet setting at the office and first Aid kits box have been setup on construction site **February 2020** Confirmed, February 7, 2020 Covid19 disease has been organized for all staff And medicine cabinet setting at the office and first Aid kits box have been setup on construction site **March 2020** Conformed, Confirmed, medicine cabinet setting at the office and first Aid kits box have been setup on construction site
	ⓑ			**January 2020** Conformed, the mobile clinic has been setup on site, including the Ambulance car **February 2020** Conformed, February 7, 2020 Covid19 disease has been organized for all staff the mobile clinic has been setup on site, including the Ambulance car **March 2020** Conformed, the mobile clinic has been setup on site, including the Ambulance car
	ⓒ			**January 2020** Conformed, the

				first aid kits box has been setup on construction site, including the Ambulance car service at the site **February 2020** Conformed, the first aid kits box has been setup on construction site, including the Ambulance car service at the site **March** Conformed, the first aid kits box has been setup on construction site, including the Ambulance car service at the site
	ⓕ			**January 2020** Conformed, first aid kits box has been installed on site, beside that the mobile clinic has been setup in contractor office, including the Ambulance car **February 2020** Conformed, first aid kits box has been installed on site, beside that the mobile clinic has been setup in contractor office, including the Ambulance car **March2020** Conformed, first aid kits box has been installed on site, beside that the mobile clinic has been setup in contractor office, including the Ambulance car
Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes	ⓐ	Monthly	Throughout construction stage	January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
	ⓑ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
	ⓒ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed
	ⓕ			January 2020 Confirmed February 2020 Confirmed March 2020 Confirmed

- Communal Diseases

Monitoring item	Measure-ment point	Frequency	Implementation phase	Monitoring result during report period
Conduct information ,education and communication (IEC) campaigns to all the site staff and labor (including all the contractor's employees, all subcontractors)	ⓐ	Every 6 months	Throughout construction stage	Confirmed April 10, 2018 by the topic Sexually Transmitted Diseases (STD), there are 27 people attended. November 26, 2018 by the topic Dengue fever prevention contains,

				and Malaria fever prevention contains:, there are 35 participants May 31, 2019 by the topic of Health care and significant disadvantage of drinking alcohols and drugs, there are 24 people attended December 14, 2019 by the topic HIV/AIDS awareness and there are 217 staffs attended February 7, 2020 by the topic Covid19 diseases All staff in project (Employer, Engineer, and Contractor)

-Restoration of the Site

Monitoring item	Measure-ment point	Frequency	Implementation phase	Monitoring result during report period
Restore the site properly on completion of work	ⓐ	Once	On completion of construction works	On completion of the work
	ⓑ			On completion of the work
	ⓒ			On completion of the work

Appendix 2-3 Site-specific Monitoring Form of January 2020, Lot 2

❖ **Review result of the Action Taken by the Contractor on the issues from the Last Month (December 2019)**

Joint site re inspection was conducted by the PMU, the Engineer and the Contractor on December 28, 2019., this time is Vietnamese holiday, so almost of labors has taken holiday, so there is a few labor who is safety the labor camp,

After inspecting at on-going construction sites and related facilities, it was confirmed that requested actions for improvement from last month's inspection were taken at all sites. The inspection result is summarized in Table 7

Issues Raised from Last Month (December 2019) and Action taken (Lot 2)

Location	Issues	Action taken
Contractor's camp	- Garbage should not dumping back side of the kitchen	- Confirmed
Contractor's Camp	- Awareness program on HIV/AIDS and health shall be organized as soon as possible	- **Not confirmed**

❖ **The Result of the Monthly Inspection in this month (January 2020)**

The issues raised from this month are summarized in Table 8 and the detail of the inspection result is attached in Appendix 4.

Issues Raised from this Month (January 2020) (Lot 2)

Location	Issues
Office and Contractor's Camp	- Awareness program on HIV/AIDS and health shall be organized as soon as possible

Appendix 2-3
Date: January 28, 2020
Monitored by: Bounpanh Thepphavong

Area J (Contractor's Camp)

Potential Impact

- Flora and Fauna, Water, Waste, Health, Communal Diseases

Proposed Mitigation Measures

① Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or collecting timber
② Prohibit species introduction by all personnel in Contractor's employees
③ Ensure good sanitation including kitchens and latrines and install good drainage and septic tank in comply with National Environmental Standards No.8/MONRE 2017
④ Designate temporary disposal site for waste generated from contractor's camp and make an arrangement to collect the waste by the authorized company regularly
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ No waste shall be dumped or incinerated on site and no water of any kind shall be deposited in any water courses
⑦ Install first aid kids in place
⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑨ Conduct information, education and communication (IEC) campaigns to all the site staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted Diseases (STD) – or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.
⑩ On completion of the works, restore the site satisfied by the Engineer

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not Applicable	No waste water discharge to outside, stay in septic tank
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	

⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	Every month	Confirmed	
⑨	Training /Awareness Programs	Every 6 months	**Not Confirmed** (% of staff covered)	Should be organized as soon as possible
⑩	Visual Inspection	On completion of the works, restore the site satisfied by the Engineer	Not Applicable	

Date: January 28, 2020
Monitored by: Bounpanh Thepphavong

Area J (Construction Contractor's Temporary Work Area/Stockyard/Office)

Potential Impact
- Water, Waste

Proposed Mitigation Measures
① Ensure good sanitation including latrines and install good drainage and install septic tank in comply with 4.14. 2 Water Pollution control standards, Table 14.2 Category C Waste Water Control on Building in National Environmental Standards No.832/MONRE 2017
② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
③ Designate temporary disposal site for waste generated from stockyard and office and make an arrangement to collect the waste by the authorized company regularly
④ Store hazardous materials at designated place, keep record and dispose of at designated place
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ Install first aid kids in place
⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑧ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not applicable	Waste water sill keeping in the septic tanks
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not Applicable	

Date: January 28, 2020
Monitored by: Bounpanh Thepphavong

Construction Contractor's Office at Power House

Potential Impact

- Water, Waste

Proposed Mitigation Measures

① Ensure good sanitation including latrines and install good drainage and install septic tank in comply with 4.14. 2 Water Pollution control standards, Table 14.2 Category C Waste Water Control on Building in National Environmental Standards No.832/MONRE 2017
② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
③ Designate temporary disposal site for waste generated from stockyard and office and make an arrangement to collect the waste by the authorized company regularly
④ Store hazardous materials at designated place, keep record and dispose of at designated place
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ Install first aid kids in place
⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑧ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not Applicable	No waste water discharge to outside
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	No hazardous waste during this time
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not Applicable	

Date: January 28, 2020
Monitored by: Bounpanh Thepphavong

Installing Electric/Mechanical Equipment in Powerhouse

- Waste

Proposed Mitigation Measures

① Designate temporary disposal site for waste generated from construction site and make an arrangement to collect the waste by the authorized company regularly
② Ensure good sanitation including latrines and install good drainage and install septic tank and transport accumulated waste in the septic tank from the site

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Confirmed	Using existing toilets at EDL-gens office

Appendix 2-3 Site-specific Monitoring Form of February 2020, Lot 2

❖ **Review result of the Action Taken by the Contractor on the issues from the Last Month (January 2020)**

Joint site re inspection was conducted by the PMU, the Engineer and the Contractor on February 26, 2020.

After inspecting at on-going construction sites and related facilities, it was confirmed that requested actions for improvement from last month's inspection were taken at all sites. The inspection result is summarized in Table 7

Table 1 Issues Raised from Last Month (January 2020) and Action taken (Lot 2)

Location	Issues	Action taken
Office and Contractor's Camp	- Awareness program on HIV/AIDS and health shall be organized as soon as possible	- **Not Confirmed** No action from contractor

❖ **The Result of the Monthly Inspection in this month (February 2020)**

The issues raised from this month are summarized in Table 8 and the detail of the inspection result is attached in Appendix 4.

Table 2 Issues Raised from this Month (February 2020) (Lot 2)

Location	Issues
Office and Contractor's Camp	- Awareness program on HIV/AIDS and health shall be organized as soon as possible

Date: February 26, 2019
Monitored by: Bounpanh Thepphavong

Area J (Contractor's Camp)

Potential Impact

- Flora and Fauna, Water, Waste, Health, Communal Diseases

Proposed Mitigation Measures

① Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or collecting timber
② Prohibit species introduction by all personnel in Contractor's employees
③ Ensure good sanitation including kitchens and latrines and install good drainage and septic tank in comply with National Environmental Standards No.8/MONRE 2017
④ Designate temporary disposal site for waste generated from contractor's camp and make an arrangement to collect the waste by the authorized company regularly
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ No waste shall be dumped or incinerated on site and no water of any kind shall be deposited in any water courses
⑦ Install first aid kids in place
⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑨ Conduct information, education and communication (IEC) campaigns to all the site staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted Diseases (STD) – or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.
⑩ On completion of the works, restore the site satisfied by the Engineer

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not Applicable	No waste water discharge to outside, stay in septic tank
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	Every month	Confirmed	

⑨	Training /Awareness Programs	Every 6 months	**Not Confirmed** (% of staff covered)	Should be organized in March, 2020 (next month)
⑩	Visual Inspection	On completion of the works, restore the site satisfied by the Engineer	Not Applicable	

Date: February 26, 2019
Monitored by: Bounpanh Thepphavong

Area J (Construction Contractor's Temporary Work Area/Stockyard/Office)

Potential Impact
- Water, Waste

Proposed Mitigation Measures
① Ensure good sanitation including latrines and install good drainage and install septic tank in comply with 4.14. 2 Water Pollution control standards, Table 14.2 Category C Waste Water Control on Building in National Environmental Standards No.832/MONRE 2017
② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
③ Designate temporary disposal site for waste generated from stockyard and office and make an arrangement to collect the waste by the authorized company regularly
④ Store hazardous materials at designated place, keep record and dispose of at designated place
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ Install first aid kids in place
⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑧ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not applicable	Waste water sill keeping in the septic tanks
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not Applicable	

Date: February 26, 2019
Monitored by: Bounpanh Thepphavong

Construction Contractor's Office at Power House

Potential Impact

- Water, Waste

Proposed Mitigation Measures

① Ensure good sanitation including latrines and install good drainage and install septic tank in comply with 4.14. 2 Water Pollution control standards, Table 14.2 Category C Waste Water Control on Building in National Environmental Standards No.832/MONRE 2017
② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
③ Designate temporary disposal site for waste generated from stockyard and office and make an arrangement to collect the waste by the authorized company regularly
④ Store hazardous materials at designated place, keep record and dispose of at designated place
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ Install first aid kids in place
⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑧ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not Applicable	No waste water discharge to outside
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	No hazardous waste during this time
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not Applicable	

Date: February 26, 2019
Monitored by: Bounpanh Thepphavong

Installing Electric/Mechanical Equipment in Powerhouse

- Waste

Proposed Mitigation Measures

① Designate temporary disposal site for waste generated from construction site and make an arrangement to collect the waste by the authorized company regularly
② Ensure good sanitation including latrines and install good drainage and install septic tank and transport accumulated waste in the septic tank from the site

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Confirmed	Using existing toilets at EDL-gens office

Appendix 2-3 Site-specific Monitoring Form of March 2020, Lot 2

❖ **Review result of the Action Taken by the Contractor on the issues from the Last Month (February 2020)**

Joint site re inspection was conducted by the PMU, the Engineer and the Contractor on March 24, 2020.

After inspecting at on-going construction sites and related facilities, it was confirmed that requested actions for improvement from last month's inspection were taken at all sites. But the situation is the same last month; the inspection result is summarized in Table 7

Table 3 Issues Raised from Last Month (February 2020) and Action taken (Lot 2)

Location	Issues	Action taken
Office and Contractor's Camp	- Awareness program on HIV/AIDS and health shall be organized as soon as possible	- **Not Confirmed** Pending the health organization and staff coming more in site

❖ **The Result of the Monthly Inspection in this month (March 2020)**

The issues raised from this month are summarized in Table 8 and the detail of the inspection result is attached in Appendix 4. However inspection team has been comment on site to improve the site condition when fast appear on site (See in the inspection photo)

Table 4 Issues Raised from this Month (March 2020) (Lot 2)

Location	Issues
Office and Contractor's Camp	- Awareness program on HIV/AIDS and health shall be organized as soon as possible - Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes

Date: March 25, 2019
Monitored by: Bounpanh Thepphavong

Area J (Contractor's Camp)

Potential Impact

- Flora and Fauna, Water, Waste, Health, Communal Diseases

Proposed Mitigation Measures

① Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting trading of wildlife or collecting timber
② Prohibit species introduction by all personnel in Contractor's employees
③ Ensure good sanitation including kitchens and latrines and install good drainage and septic tank in comply with National Environmental Standards No.8/MONRE 2017
④ Designate temporary disposal site for waste generated from contractor's camp and make an arrangement to collect the waste by the authorized company regularly
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ No waste shall be dumped or incinerated on site and no water of any kind shall be deposited in any water courses
⑦ Install first aid kids in place
⑧ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑨ Conduct information, education and communication (IEC) campaigns to all the site staff and labor (including all the Contractor's employees, all Subcontractors) concerning the risks, dangers and impact and appropriate avoidance behavior with respect to, of Sexually Transmitted Diseases (STD) – or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular.
⑩ On completion of the works, restore the site satisfied by the Engineer

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not Applicable	No waste water discharge to outside, stay in septic tank
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	Every month	**Not Confirmed**	

⑨	Training /Awareness Programs	Every 6 months	**Not Confirmed** (% of staff covered)	On pending staff and health organization
⑩	Visual Inspection	On completion of the works, restore the site satisfied by the Engineer	Not Applicable	

Date: March 25, 2019
Monitored by: Bounpanh Thepphavong

Area J (Construction Contractor's Temporary Work Area/Stockyard/Office)

Potential Impact
- Water, Waste

Proposed Mitigation Measures
① Ensure good sanitation including latrines and install good drainage and install septic tank in comply with 4.14. 2 Water Pollution control standards, Table 14.2 Category C Waste Water Control on Building in National Environmental Standards No.832/MONRE 2017
② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
③ Designate temporary disposal site for waste generated from stockyard and office and make an arrangement to collect the waste by the authorized company regularly
④ Store hazardous materials at designated place, keep record and dispose of at designated place
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ Install first aid kids in place
⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑧ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not applicable	Waste water sill keeping in the septic tanks
②	Visual Inspection	Every month	Confirmed	But
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not Applicable	

Date: March 25, 2019
Monitored by: Bounpanh Thepphavong

Construction Contractor's Office at Power House (not necessary use in this time)

Potential Impact
- Water, Waste

Proposed Mitigation Measures
① Ensure good sanitation including latrines and install good drainage and install septic tank in comply with 4.14. 2 Water Pollution control standards, Table 14.2 Category C Waste Water Control on Building in National Environmental Standards No.832/MONRE 2017
② Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place
③ Designate temporary disposal site for waste generated from stockyard and office and make an arrangement to collect the waste by the authorized company regularly
④ Store hazardous materials at designated place, keep record and dispose of at designated place
⑤ Prohibit the use of herbicide or incineration for site clearing
⑥ Install first aid kids in place
⑦ Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes
⑧ On completion of the works, restore the site properly

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
	Review water quality check-up result	Every month	Not Applicable	No waste water discharge to outside
②	Visual Inspection	Every month	Confirmed	
③	Visual Inspection	Every month	Confirmed	
④	Visual Inspection	Every month	Confirmed	No hazardous waste during this time
⑤	Visual Inspection	Every month	Confirmed	
⑥	Visual Inspection	Every month	Confirmed	
⑦	Visual Inspection	Every month	Confirmed	
⑧	Visual Inspection	On completion of the works restore the site satisfied by the Engineer	Not Applicable	

Date: March 25, 2019
Monitored by: Bounpanh Thepphavong

Installing Electric/Mechanical Equipment in Powerhouse

- Waste

Proposed Mitigation Measures

① Designate temporary disposal site for waste generated from construction site and make an arrangement to collect the waste by the authorized company regularly
② Ensure good sanitation including latrines and install good drainage and install septic tank and transport accumulated waste in the septic tank from the site

Items	Parameter to be Monitored	Frequency	Result	Remarks
①	Visual Inspection	Every month	Confirmed	
②	Visual Inspection	Every month	Confirmed	Using existing toilets at EDL-gens office

Photo on Inspection March 25, 2020

Contractor Office
 First Aid kit box has been preparing for staff
Labor's Contractor Camp
 First Aid kit box and more information of COVID 19 virus have been preparing for labor

Water stagnant from rain should discharge from the field within 3 days to avoid mosquito breeding

Appendix 2-4

MONITORING FORM IN A CONSTRUCTION PHASE

Period: between January 2020 and March 2020
Monitored by: Mr. Bounpanh Thepphavong

1. Responses/Actions to Comments and Guidance from Government Authorities and the Public

Monitoring item	Monitoring results during report period
Responses/Actions to Comments and Guidance from Government Authorities	No Government authority comment on the environment issue

2. Mitigation Measures

[Construction Phase]

Location:

ⓐ: Area J (Contractor's employees' camp) ⓑ: Area J (Contractor's Temporary Work Area/Office/Stockyards)
ⓒ: Installing Electric and Mechanical Equipment at Power House

Location		Construction Started		
		January	February	March
ⓐ	Area J (Contractor's employees' camp)	✓	✓	✓
ⓑ	Area J (Contractor's Temporary Work Area)	✓	✓	✓
ⓒ	Installing Electric and Mechanical Equipment at Power House	✓	✓	✓

Note:

- Flora and Fauna

Monitoring item	Measure-ment point	Monitoring Frequency	Implementation Schedule	Monitoring result during report period
Instruct all personnel in Contractor's employees not to intrude into the forest land for hunting, trading of wildlife or collecting timber	ⓐ	Monthly	Throughout construction works	**January, February and March 20** Confirmed The contractor has been notice to all workers on site
Prohibit species introduction by all personnel in Contractor's employees	ⓐ	Monthly	Throughout construction works	**January, February and March 20** Confirmed The contractor has been notice to all workers on site

- Water Quality (Result of Visual Inspection)

Monitoring item	Measure-ment point	Monitoring Frequency	Implementation Schedule	Monitoring result during report period
Ensure good sanitation including kitchens and latrines and install good drainage and install septic tank	ⓐ ⓑ ⓒ	Monthly	Throughout construction works	**January, February and March 20** Confirmed No waste water discharge to natural water source, there for there in no waste water sampling necessary
	ⓑ	Monthly		**January, February and March 20** Confirmed All waste water discharge to septic tank, so No waste water discharge to natural water source, there for there in no waste water sampling

				necessary
	ⓒ	Monthly		**January, February and March 20** Confirmed Contractor is used public toilet of EDL's Gen office, So all waste water discharge to septic tank only,

- Water Sampling*

Base on the lay out plan of the construction site and man labor camp, the location has been selected

Item	Unit	Measured Value			Country's Standards **	Remarks (Measurement Point, Frequency, Method, etc.)
		01	02	03		
BOD_5	mg/l	-	-	-	≦40	Monthly, ⓐ 1-1 at Discharge Point to the Environment
		-	-	-		Monthly, ⓐ 1-2 at Discharge Point to the Environment
		-	-	-		Monthly, ⓐ 1-3 at Discharge Point to the Environment

* No water sampling in this period, because there is only the permanent house that use to be contractor's office and

**National Environmental Standards, 2017 MONRE

- Waste

Monitoring item	Measure-ment point	Frequency	Implementation phase	Monitoring result during report period
Designate temporary disposal site for waste generated from worker's camp and make an arrangement to collect the waste by the authorized company regularly	ⓐ	Monthly	Throughout construction works	**January , February and March 2020,** Conformed
	ⓑ			**January , February and March 2020,** Conformed
	ⓒ			**January , February and March 2020,** Conformed
Prohibit the use of herbicide or incineration for site clearing	ⓐ	Monthly	Throughout construction works	**January , February and March 2020,** Conformed Local authority taking waste in regularly, 2 times in a week
No waste shall be dumped or incinerated and no water of any kind shall be deposited in any water courses	ⓐ	Monthly	Throughout construction works	**January, February and March 20** Confirmed, All waste has been corrected and removed outside by local authority
Dispose of construction waste such as waste soil and concrete aggregate from construction site at designated place	ⓑ	Monthly	Throughout construction works	**January, February, March 20**: No waste dumping on site,
Store hazardous materials at designated places, keep record and dispose of at designated place	ⓑ	Monthly	Throughout construction works	January, February, March 20 Confirmed

-Health

Monitoring item	Measure-ment point	Frequency	Implementation phase	Monitoring result during report period
Install first aid kits in place	ⓐ	Monthly	Throughout construction stage	**January, February and March 2020,** Confirmed, First Aid kit box keeping at the office and construction site
Eliminate stagnant water to prevent breeding particularly of the malaria, filarial and dengue causing mosquitoes	ⓐ	Monthly	Throughout construction stage	**January and February** Confirmed, **March 2020** **Not confirmed**

- Communal Diseases

Monitoring item	Measure-ment point	Frequency	Implementation phase	Monitoring result during report period
Conduct information ,education and communication (IEC) campaigns to all the site staff and labor (including all the contractor's employees, all subcontractors)	ⓐ	Every 6 months	Throughout construction stage	**January, February and March 2020**, **Not Confirmed** And Now it's under preparing.

-Restoration of the Site

Monitoring item	Measure-ment point	Frequency	Implementation phase	Monitoring result during report period
Restore the site properly on completion of work	ⓐ	Once	On completion of construction works	Not applicable
	ⓑ			Not applicable