AES MONG DUONG POWER CO., LTD.

MONG DUONG 2 BOT COAL FIRED POWER PLANT

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ENVIRONMENTAL MONITORING REPORT FOR MONG DUONG 2 BOT COAL FIRED POWER PLANT

OCTOBER - 2023

HA NOI, NOVEMBER– 2023

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Invested by:

AES MONG DUONG POWER CO., LTD.

Implemented by:

BACH KHOA ENVIRONMENTAL AMICABLE TECHNOLOGY, JSC. (BKEST)

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Nguyễn Ngọc Việt

HA NOI, NOVEMBER - 2023

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GENERAL INTRODUCTION

ON MONG DUONG 2 BOT COAL FIRED POWER PLANT

Mong Duong 2 BOT Coal Fired Power Plant is one of two thermal power plant projects. It locates in Mong Duong Electricity Power Centre and has construction site that locates near No. 18A national route. The distance from Mong Duong thermal power plant to Ha Long city is about 50 km and to Cam Pha commune about 18 km in the North East. Mong Duong Electricity Power Centre locates in zone 3, Mong Duong ward, Cam Pha commune, Quang Ninh province. This position lies near Mong Duong estuary and along Luong Gac (Gac Channel). This is an advantage for not only transporting materials by waterway to construction site but also installing cooling water system for two factories. Along South East coast of Electricity Power Centre is range of low mountain. In Luong Gac, there is coal port and chemical store belong Bai Tu Long Coal Company. The plant has total capacity about 1240MW (including two sets of machinery with average capacity is 620MW) with total investment about 2 billion USD. Construction stage was started since September 15th, 2011 and is scheduled supplying commercial electricity for each set of machinery.

- No. 1 set of machinery was operated on March 4th, 2015 with capacity 600MW.
- No. 2 set of machinery was operated on April 22nd, 2015 with capacity 600MW. Total capacity is 1200MW.

Area of plant is 81,822 ha. Plant is built in zone 3, Mong Duong ward, Cam Pha commune, Quang Ninh province. Boundary of plant: by the East: beside Binh Minh port; by the South: beside rivulet; by the West: beside Mong Duong 1 thermal power plant; by the North: beside the road which leads to plant and Mon Duong river. The location to build project has many advantages in transferring material by waterway, constructing, investigating, exploiting, and operating plant.

The location of Mong Duong Electricity Power Centre including Mong Duong 2 BOT Coal Fired Power Plant project and general plan of Centre is shown in **Figure 1.1**

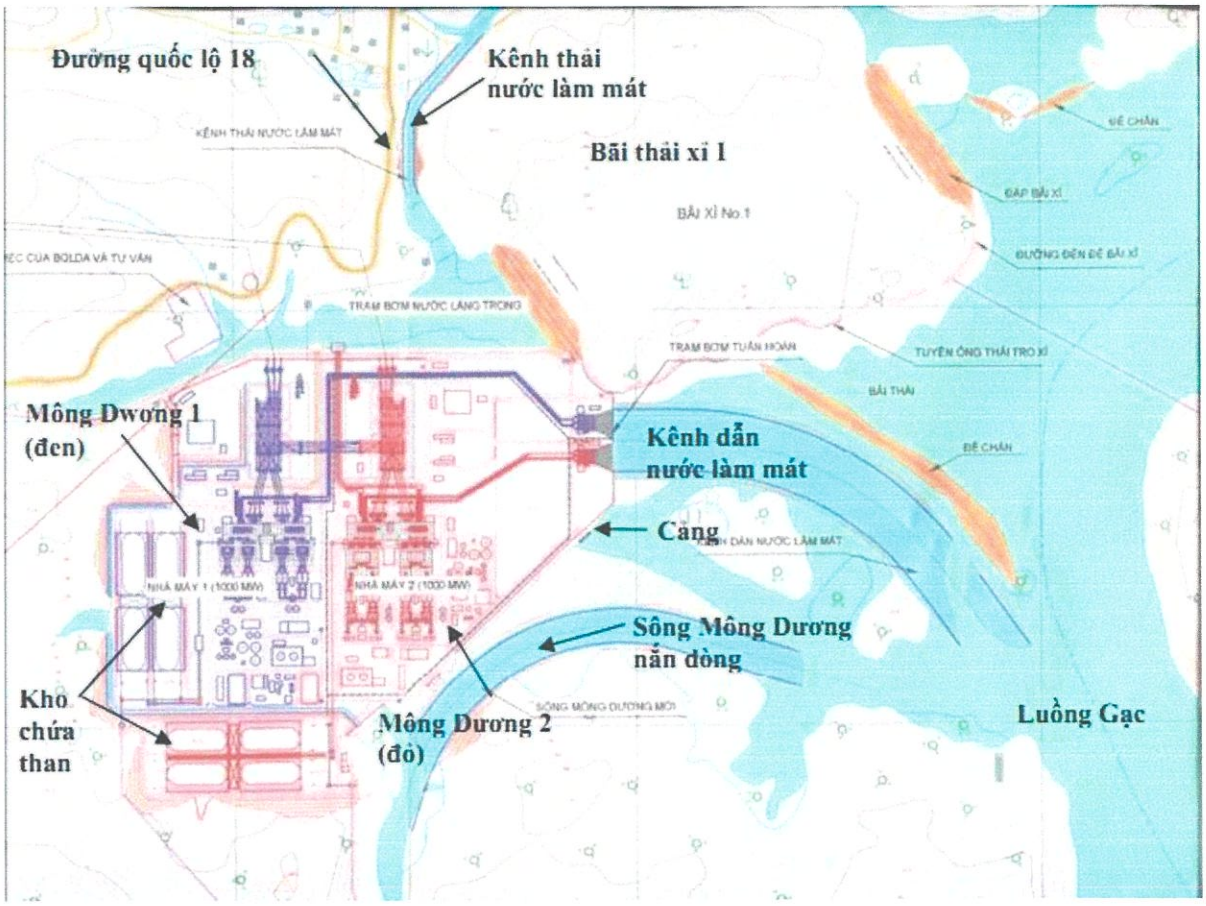


Figure 1.1. Mong Duong 2 BOT Coal Fired Power Plant location

Mong Duong 2 BOT Coal Fired Power Plant project is built after Mong Duong Electricity Power Centre completing infrastructures (leveling platform, converting flow of Mong Duong river, completing water collection system, water discharge system to cool, ash dumps…). The works within project include:

+ Infrastructure of thermal power plant: including generator, primary transformer and ancillary works;

+ The operator, warehouse, workshop;

+ Piping, cooling pump system of general channel from Luong Gac river to Electricity Power Centre.

+ Sewage piping system from plant to Luong Gac canal

+ Channel discharges cooling water into general discharge system of Electricity Power Centre

+ Piping system leads oil from oil receiving point;

+ Slag treating system includes pump station and pump system, which leads slag to general slag, discharged pool of Electricity Power Centre

+ Coal warehouse (about 15 days);

+ Construction treats wastewater;

+ Private road;

+ Fire preventing and fighting system;

+ Temperatureorary and fixed accommodation;

+ The drainage system within plant.

+ Port that receive oil and limestone

+ Slag landfill

The categories used together with Mong Duong 1 Thermal Power Plant are shown in the following table:

Table 1.1. The categories of Mong Duong 2 BOT Coal Fired Power Plant are used together with Mong Duong 1 Thermal Power Plant in Mong Duong Electricity Power Centre

No.	Categories	Description
1	All area of centre	Mong Duong 2 plant account for 50%
2	Coal receiving region	Using conveyer to transport coal in centre
3	Cooling water supplying channel	This construction is built by EVN. Connection point is pump station in the East of project
4	Cooling water discharging channel	This construction is built by EVN. It locates in the North of project
5	Fresh water supplying system	This construction is built in the North - West by EVN.
6	500 KV connection line	This construction is built by EVN. Mong Duong 2 connection structure inside the distribution station
7	110 KV power supply line for testing in factory	This construction is built by EVN. Mong Duong 2 connected at self-substation to the point inside the
8	Road	At primary road of Mong Duong 2.
9	FO oil and limestone receiving port	Only used by Mong Duong 2. Area is 0.57 ha
Source: AES-VCM Mong Duong Power Co. Ltd., October, 2014		

All general categories of construction are completed and put in use

CHAPTER I. PLAN OF ENVIRONMENTAL MONITORING PROGRAM IN MONG DUONG 2 BOT COAL FIRED POWER PLANT IN 2023

The environmental monitoring program in October 2023 is the 104th monitoring time in operation stage of plant. The main purpose is to show the judge about environment status of plant during operation stage. Environmental monitoring program are performed to make report on periodic environment quality of Mong Duong 2 BOT Coal Fired Power Plant. This program ensures environmental management object of Mong Duong 2 BOT Coal Fired Power Plant project to meet the requirements of national environmental protection laws and AES company during operation stage. The detailed objects are shown as following parts:

I.1. The purpose of monirtoring program

The purpose of monitoring program is to evaluate the environmental quality, to examine the pollution level of each environmental component and to collect continuous data to serve environmental management works for Mong Duong 2 BOT Coal Fired Power Plant and Mong Duong Electricity Power Centre.

In detail:

- ✓ Components, polluted sources, concentration/contents/intensity of pollutants
- ✓ The impact of environmental agents/pollutants
- ✓ Forecasting changes in the levels and effects of these agents
- ✓ Information to managers, namely management board of Mong Duong thermal power plant to take measures in order to mitigate or prevent the harmful effects of environmental pollution caused by the operation of the plant

Besides, this environmental monitoring program is also followed the requirements of approved EIA report of Mong Duong 2 BOT Coal Fired Power Plant (2007), wastewater discharge permit No 1494/GP-BTNMT (21st July 2014) and permit for completing environmental protecting construction No 42/GXN-TCMT (21st April 2015).

I.2. Environmental monitoring parameters and frequency in 2023

All the environmental monitoring parameters are selected typically for each environmental component.

For Mong Duong 2 BOT Coal Fired Power Plant, monitoring parameters selecting for 104th (October 2023) monitoring time are strictly complied with EIA report and based on the fact operating stage of the factory.

Main monitoring parameters and frequency are seen in table below:

Table 1.2. Environmental parameters and frequency

No	Item	Term of work	Location	Frequency requirement			Monitoring parameters	Reference Standard	Final frequency	Sampling Quantity
				ADB EIA	MONRE EIA	Permit				
1	Water environment	Cooling water	CW1, CW2, CW3				Temperature, pH; Color; COD; BOD_5; TSS; As, Hg, Pb, Cd, Cr (III), Cr (VI), Cu, Zn, Ni, Mn, Fe, Mineral Oil & grease, F^-; H_2S; Total N&P; Residue Chlorine; NH_4^+; Coliform	QCVN 40:2011/ BTNMT	Monthly	03
		Industrial waste water (WW1)	From the discharge point into the coolant channels		-		Temperature, pH; Color; COD; BOD_5; TSS; As, Hg, Pb, Cd; Cr(III), Cr(VI), , Cu, Zn, Ni, Mn, Fe, Mineral Oil & grease, F^-; H_2S; Total N&P; Residue Chlorine; NH_4^+; Coliform	QCVN40:2011/ BTNMT	Monthly	01 sample

I.3. Monitoring positions

All the environmental monitoring positions are selected by the fact situation of the plant and are followed by the proposed program from EIA report that is approved in permit No 803/QĐ-BTNMT (22nd May 2007), demand of monitoring in operating period is built in Social and Environment Management System - SEMS, wastewater discharge permit No 1494/GP-BTNMT (21st July 2014) and permit for completing environmental protecting construction No 42/GXN-TCMT (21st April 2015).

The survey was conducted before sampling to examine the monitoring points by GPS-Silva-21802-901, Sweden. The coordinates are listed as in **Table 1.3** follows:

Table 1.3. The coordinates of monitoring points 104th time in Mong Duong 2 BOT Coal Fired Power Plant

Environmental Aspect	No	Location	X	Y
WATER ENVIRONMENT				
Cooling water (3 positions)	CW1	Intake point of cooling water	21°04'32.6"N	107°21'18.5"E
	CW2	Discharge point into the cooling water channel	21°04'28.3"N	107°20'57.1"E
	CW3	Discharge point to common Mong Duong Power complex channel	21°04'42.4"N	107°21'03.1"E
Industrial waste water	WW1	Discharge point into the Cooling water channel	21°04'31.1"N	107°21'04.4"E

I.4. Environmental monitoring method and equipment/instruments

Main environmental monitoring methods are:

- ✓ Surveying, collecting data, sampling, on-field measurement;
- ✓ Sampling, preservation and measurement on-field and laboratory in compliance with current Vietnamese standards, circulars and regulations;
- ✓ Data processing and evaluation, statistical method in comparison to QCVN/TCVN and the world.

Methods for measurements, sampling and preservation; equipment/instruments are as in **Table 1.4 and Table 1.5**

Table 1.4. Method for measurement, sampling and preservation

No	Environmental components	Name/ number of sampling and measurement methods	Equipment / LOD
WASTEWATER		TCVN 6663-1:2011; TCVN 5999:1995; TCVN 6663-3:2016; TCVN 8880:2011	
1.	Temperature	TCVN 4557:1988	From 4 - 50°C
2.	pH	TCVN 6492:2011	From 2 – 12

Table 1.5. Analytical methods in the Laboratory

No	Environmental components	Name/ number of analytical methods	MDL/LOD
WASTEWATER			
3.	Color (pH=7)	TCVN 6185: 2015	5.0 Pt -Co
4.	BOD_5 (20^OC)	TCVN 6001–1:2008	1.0 mg/L
5.	COD	SMEWW 5220 C:2017	2.0 mg/L
6.	Total suspended solid (TSS)	TCVN 6625 : 2000	2.0 mg/L
7.	Arsenic (As)	EPA 200.8	0.001 mg/L
8.	Mercury (Hg)	EPA 200.8	0.001 mg/L
9.	Lead (Pb)	EPA 200.8	0.0005 mg/L
10.	Cadmium (Cd)	EPA 200.8 TCVN 6193:1996	0.0005 g/L 0.016 mg/L
11.	Chrome VI	TCVN 6658:2000	0.006 mg/L
12.	Chrome III	EPA 200.8 TCVN 6658:2000	0.006 mg/L
13.	Copper (Cu)	EPA 200.8 TCVN 6193:1996	0.001 mg/L 0.05 mg/L
14.	Zinc (Zn)	EPA 200.8 TCVN 6193:1996	0.005 mg/L 0.03 mg/L
15.	Nickel (Ni)	EPA 200.8	0.001 mg/L
16.	Manganese (Mn)	EPA 200.8	0.0015 mg/L
17.	Iron (Fe)	EPA 200.8	0.005 mg/L
18.	Mineral Oil	SMEWW 5520B&F:2017	0.3 mg/L

No	Environmental components	Name/ number of analytical methods	MDL/LOD
19.	Fluoride (F-)	SMEWW 4500-F^- .B&D:2017	0.03 mg/L
20.	Sulfide (calculated by H_2S)	TCVN 6637:2000	0.03 mg/L
21.	Total Nitrogen	TCVN 6638:2000	3.0 mg/L
22.	Total phosphorus	TCVN 6202: 2008	0.01 mg/L
23.	Residual Chlorine	TCVN 6225 – 3:2011	0.2 mg/L
24.	Ammonium (calculated by N)	SMEWW 4500-NH_4^+-F:2017	0.03 mg/L
		TCVN 6179-1:1996	0.03 mg/L
25.	Coliform	TCVN 6187-2:1996	3 MPN/100mL

Notes:

- *TCVN: Viet Nam standards*
- *AS/NZS: Australian/New Zealands Standards*
- *EPA: Environment Protection Agency*
- *SMEWW: Standard Method for The Examination of Water and Waste Water*

CHAPTER II. RESULTS AND ASSESSMENT

The 104th environmental monitoring time in operation time of Mong Duong 2 plant was implemented on 20/10/2023 with 03 cooling water samples, 01 industrial wastewater sample. The monitoring results are shown in the following sections.

II.1. Water environment

Water samples are monitored including wastewater, and detailed water sampling locations as **Table 2.1** below:

Table 2.1. The points of water sampling 104th environmental monitoring

Environmental Aspect	No	Location	X	Y
WATER ENVIRONMENT				
Cooling water (3 positions)	CW1	Intake point of cooling water	21°04'32.6"N	107°21'18.5"E
	CW2	Discharge point into the cooling water channel	21°04'28.3"N	107°20'57.1"E
	CW3	Discharge point to common Mong Duong Power complex channel	21°04'42.4"N	107°21'03.1"E
Industrial waste water	WW1	Discharge point into the Cooling water channel	21°04'31.1"N	107°21'04.4"E

Evaluating the results of environmental monitoring of water as the following sections:

II.1.1. Wastewater

Wastewater of the plant in the 104th monitoring program includes 03 samples of cooling water, and 01 of industrial wastewater.

a. Industrial wastewater

The influent industrial wastewater includes irregular wastewater, regular wastewater, and oil contaminated wastewater. The capacity of industrial wastewater treatment system is 110 m^3/h. The sample WW1 was taken at the discharge point into the cooling water channel. At the monitoring time, the industrial wastewater treatment system operates normally. The detailed monitoring points are below:

WW1: From discharge point to cooling water chanel

The result shows that all the parameters of industrial wastewater are lower than QCVN 40:2011/BTNMT column B. Comparing with the GVC-AES-TKV - Standards of BOT Mong Duong 2 BOT Coal Fired Power Plant about permitted limit of industrial wastewater, all parameter meet allowed standard. This demonstrates that the industrial wastewater treatment system works extremely well.

b. Cooling water

In order to estimate the quality of cooling water supply for plant and also discharging cooling wastewater, cooling water was taken at 03 positions at 03 intake points of cooling water, discharge point into the cooling water channel and discharge point to common Mong Duong power complex channel. The detailed positions:

- CW1: Intake point of cooling water
- CW2: Discharge point into the cooling water channel
- CW3: Discharge point to common Mong Duong Power complex channel

According to the design of cooling water system as well as the characteristics of the cooling water, two parameters that need to be tightly controlled are temperature and residual chlorine. In addition, the quality of the cooling wastewater is compared with QCVN 40:2011/BTNMT - National technical regulation on industrial wastewater. Due to the characteristics of the cooling water does not contain many polluted factors so the monitoring results therefore also reflect the fact that the monitoring parameters are achieved strictly allowed standard of the plant - GVC-AES-TKV- Standards of BOT Mong Duong 2 BOT Coal Fired Power Plant of the permitted limit value of cooling water. Monitoring the temperature of the cooling water after discharging into the environment is also quite important to ensure that the cooling water does not affect the aquatic environment.

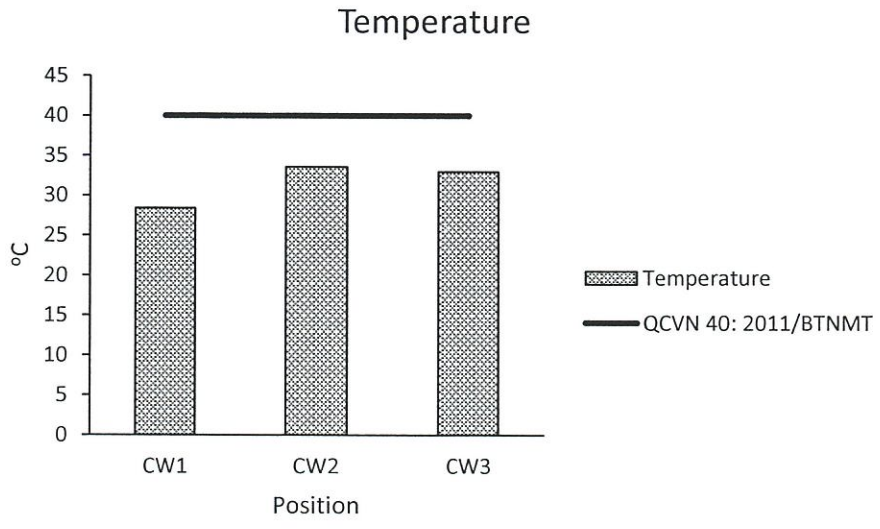


Figure 2.1. The chart of Temperature in cooling water samples

CHAPTER III. CONCLUSION AND RECOMMENDATION

III.1. Conclusion

The 104th Environmental monitoring program in operation stage of Mong Duong 2 BOT Coal Fired Power Plant was conducted in October 2023, the sampling locations were approved according to plan, the environmental monitoring factors includes: industrial wastewater, cooling water. Based on the results of environmental monitoring, the assessment of environmental quality in the area of the plant in operation stage as follows:

Wastewater

Wastewater of the plant in the 104th monitoring time includes 01 industrial wastewater sample. In which, parameters of industrial wastewater are smaller than allowed standard (QCVN 40:2011/BTNMT), and GVC-AES-TKV: The standard of Mong Duong 2 BOT Coal Fired Power Plant about permitted limit of industrial wastewater.

Cooling water

Monitoring results of the cooling water samples showed that all the monitoring parameters are allowed to the standards of QCVN 40:2011/BTNMT and GVC-standard AES-TKV- Standards of Mong Duong 2 BOT Coal Fired Power Plants of the permitted limit value of cooling water.

III.2. Recommendation

Based on the monitoring results of the 104th (October 2023) monitoring time in operation stage in Mong Duong 2 BOT Coal Fired Power Plant, the monitoring team and implementing units give some recommendations to the management board of Mong Duong 2 BOT Coal Fired Power Plant and the contractor at the plant as follows:

Continue implementation of environmental monitoring activities periodically with the noise component, ambient air, wastewater, surface water, ecological environment according to plan, the roadmap setting out in the region during the operation stage of Mong Duong 2 BOT Coal Fired Power Plant. This is to detect early signs of environmental pollution due to the impact of the plant through each stage or other events affecting the region.

Continue and expand the assessment of the impact of plant's operations to the surrounding residential area. Especially we should focus on evaluating expansion and more detailed assessment of environmental ambient air, surface water area. Study and estimate the impact of 2 plants to people's living. Beside the influence of environment, it is need to assess the social impact on population in Mong Duong 2 BOT Coal Fired Power Plant area.

Providing updated information about the environment for the local area and building contractors to have plans for dealing with pollution as well as minimize the polluting activity to the regional environment.

APPENDIX

APPENDIX 1. APPLICATION OF QA/QC IN MONITORING PROGRAM

APPENDIX 2. IMAGES OF MONITORING ACTIVITIES ON FIELD

APPENDIX 3. MAP OF SAMPLING AREAS

APPENDIX 4. THE MONITORING RESULTS

APPENDIX 1. APPLICATION OF QA/QC PROGRAM FOR ENVIRONMETAL MONITORING IN MONG DUONG 2 BOT COAL FIRED POWER PLANT

Applying QA/QC program for environmental monitoring Mong Duong 2 phase operation in October 2023

1. QA/QC in the design of environmental monitoring program

Activities to ensure quality in the design of environmental monitoring program for Mong Duong 2 BOT Coal Fired Power Plant are summarized in **Table 4.1** follows (compare current status with the requirements of Circular 10/2021/TT-BTNMT on 30/6/2021, Ministry of Natural Resources and Environment guiding the quality assurance and quality control in environmental monitoring).

Table 4.1. Summary of quality assurance activities in the design of environmental monitoring program in Mong Duong 2 BOT Coal Fired Power Plant

No.	Activities	Current status in comparison to the requirements of Circular 10	Note
1	Determine the objectives of monitoring program	+	
2	Design the environmental monitoring program	+	Monitoring in cooling water, wastewater in the plant
2.1.	Compliance with environmental protection programs and national strategies	+	
2.2.	To comply with the technical guidance, procedures and regulations for each environmental component	+	Circular 10/2021/TT-BTNMT of Ministry of Environment and Resources: Technical Regulation on environmental monitoring
2.3.	Follow all steps in design environmental monitoring program	+	

Note: (+) full (-) not enough

2. QA/QC on field monitoring

The activities on field can be classified as follows:

- ✓ QA/QC in direct measurement on field (this activity can be operated independently out of other activities);
- ✓ QA/QC in sampling, sample pretreatment, samples preservation;

In this environmental monitoring program for Mong Duong 2 Power Plant, QC samples were carried out include: *On field blank sample (code: QCHT). This is defined as the small sample of handled clean material, which is stored, transported and analyzed in laboratory similar to real samples. These QC samples are used to control contamination in the sampling process.*

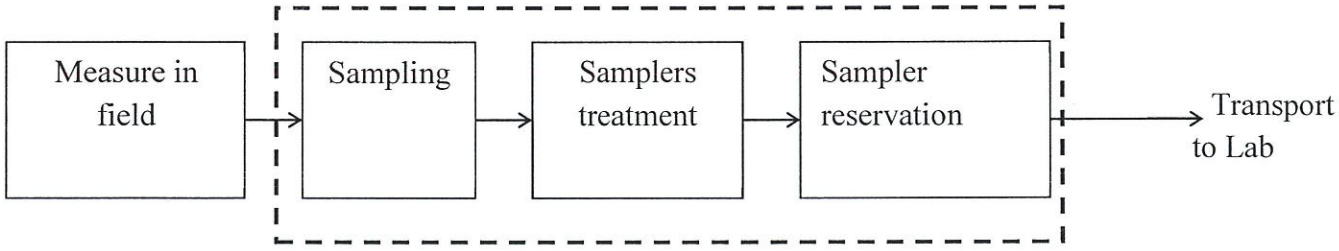
On-field blanks for wastewater are COD and TSS.

- ✓ QA/QC in transporting samples to the laboratory

QC sample was choosen transportation blank sample (code: QCVC). QCVC is a small sample of the clean material transporting and researching with true samples in the same environment, the preservation and analysis of laboratory parameters as true sample. This QC sample types are used to control contamination during transporting samples.

Transportation blanks sample for waste water: TSS and COD

QC sample at the laboratory (code: QCPTN) is replicate analyzed for the same above parameters.



Activities to quality assurance in the field of monitoring are summarized in **Table 4.2** follows:

Table 4.2. The current status of quality assurance and quality control activities on field (Mong Duong 2 BOT Coal Fired Power Plant)

No.	Activities	Current status in comparison to the requirements of Circular 10	Notes
1	**Environmental Monitoring on field**	+	Followed the plan
1.1.	Determination of environmental parameters	+	Represent for each environmental component, based on proposed report of EIA
1.2.	Analytical method	+	Current Vietnamese standards (TCVN)
1.3.	On-field environmental facilities and equipment	+	Periodically maintenance and calibration
1.4.	Chemicals, standards	+	Prepare before going to the field
1.5.	Personnel	+	Assign members of performing each items
1.6.	Data processing and reporting	+	
1.7.	Quality control	-	Applied QC samples for 02 parameters in wastewater, not for all parameters.
2.	**Sampling, samples pre-treatment and preservation on field**	+	Followed current Vietnamese standards (TCVN)
2.1.	Quality assurance	+	

No.	Activities	Current status in comparison to the requirements of Circular 10	Notes
2.1.1.	Determination of sampling site	+	Representative for the area, followed the surveyed results
2.1.2.	Assurance of monitoring parameters	+	Followed the plan
2.1.3.	Assurance of sampling time and frequency	-	Followed the plan, some changes in accordance to train schedule
2.1.4.	Sampling methods, samples pre-treatment and preservation	+	Followed current Vietnamese standards (TCVN)
2.1.5.	Equipment and instruments	+	Periodical maintenance and calibration
2.1.6.	Personnel	+	Group work
2.1.7.	Sample containers	+	Cleaned and sterilized
2.1.8.	Chemicals	+	
2.1.9.	On-field sampling minutes	+	
2.2.	Quality control	-	Applied QC samples for 02 parameters in wastewater samples, not for all parameters
3.	**Sample transportation to laboratory**	+	
3.1.	Quality assurance	+	
3.1.1.	Sample transportation	+	

No.	Activities	Current status in comparison to the requirements of Circular 10	Notes
3.1.2.	Sample delivery	+	Using delivery minute
3.2.	Quality control	-	Applied QC samples for 02 parameters in wastewater, not for all parameters

Notes: **(+) full** **(-) not enough**

3. Quality assurance and quality control (QA/QC) in laboratory

3.1. QA in laboratory

ISO/IEC 17025-2005 gives management requirements and technical requirements for the operation QA/QC laboratory. Here are the management requirements:

1. Organization.
2. Quality system.
3. Document control.
4. Review of requests, proposals and contracts.
5. Subcontracting of tests and calibrations.
6. Procurement services and supplies.
7. Service to customers.
8. Complaints (or suggestions).
9. Control testing and/or calibration mismatch
10. Remedies.
11. Precautions.
12. Control of records.
13. Internal assessment.
14. Review of leadership.

The technical requirements include:

1. General requirements.
2. Personnel.

3. Facilities andenvironmental conditions.
4. Test methods, calibration and approvedmethods.
5. Devices.
6. Traceabilityof measurement.
7. Sampling.
8. Sample managementand calibration.
9. Quality assurancetest resultsand calibration
10. Report the results.

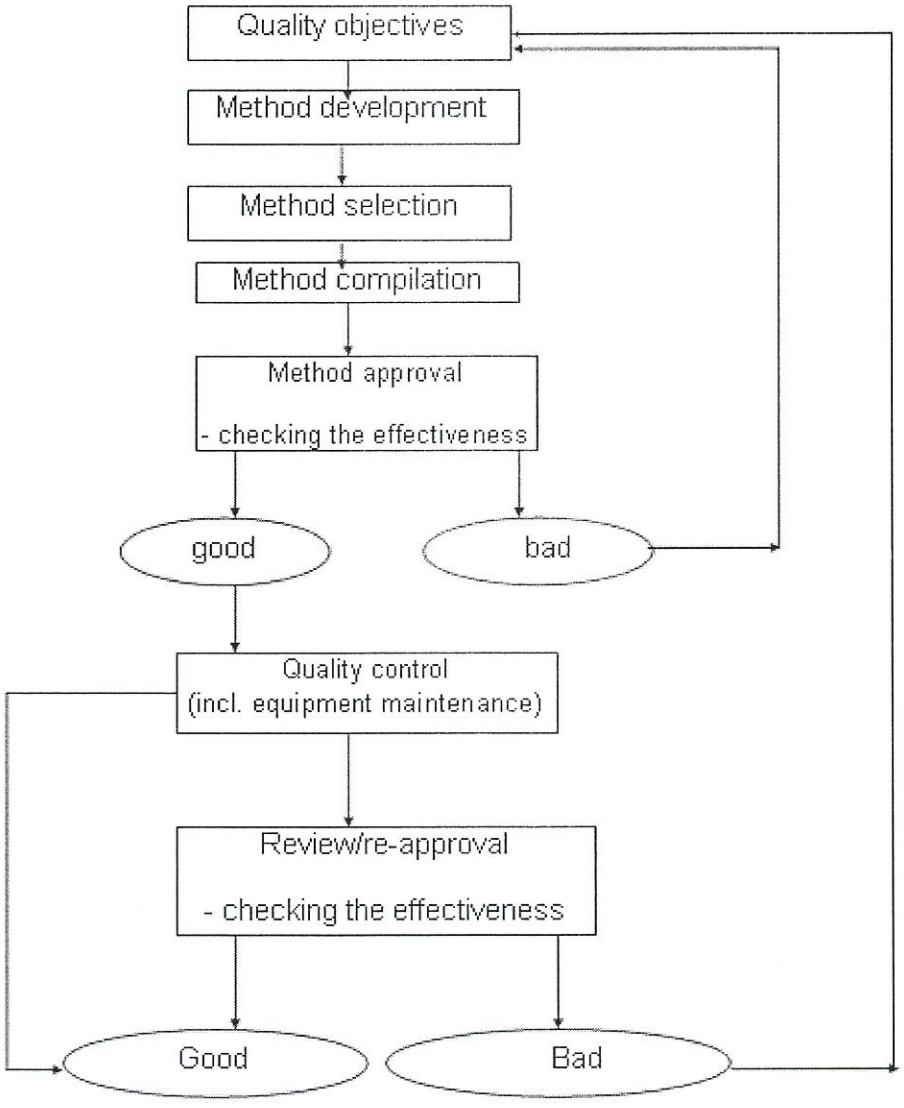


Figure 4.1. QA/QC in lab (ISO/IEC 17025:2005)

Table 4.3. The current status of quality assurance and quality control activities at the laboratory

No	Activities	Current statusin comparison to the requirements of Circular 10	Notes
4.	**QA/QC at the laboratory**	+	According to the laboratory regulations (ISO/IEC 17025 VILAS No 406 of R & D laboratory – Institute for Environmental Science and Technology)
4.1.	Management requirement	+	-as above-
4.1.1.	Determine the laboratory organization, appoint the duty and responsibility for each staff	+	-as above-
4.1.2.	Document system	+	-as above-
4.1.3.	Internal evaluation	+	-as above-
4.1.4.	Periodical review the quality management system and laboratory operation to ensure the effectiveness and continuous	+	-as above-
4.2.	Technical requirement	+	-as above-
4.2.1.	Quality assurance (analytical method, method selection, and method approval)	+	-as above-
	Facilities and equipment (calibration, labelling, maintenance)	+	-as above-
	Inter-laboratory comparison	+	-as above-
	Environmental condition	+	-as above-
	Sample management	+	-as above-
	Data quality assurance	+	-as above-
4.2.2.	Quality control	+	-as above-
	Using QC samples	+	-as above-

No	Activities	Current statusin comparison to the requirements of Circular 10	Notes
	Develop the QC accepted criteria	+	-as above-
5.	**QA/QC in data processing and reporting**	+	-as above-
5.1.	Environmental Monitoring data processing and management	+	Using software issued by Ministry of Natural resources and environment
5.1.1.	Documents related to monitoring process needed to update	+	According to the laboratory regulations (ISO/IEC 17025 VILAS No 406 of R & D laboratory – Institute for Environmental Science and Technology)
5.1.2.	Store all document related to monitoring process	+	Followed the form issued by Ministry of Natural Resources and Environment
5.1.3.	Check, calculate and process all data from the field and/or laboratory	+	According to the laboratory regulations (ISO/IEC 17025 VILAS No 406 of R & D laboratory – Institute for Environmental Science and Technology)
5.2.	Reporting	+	-as above-
5.2.1.	Phase report needed to ensure the accuracy and honest	+	-as above-
5.2.2.	Review the reports	+	-as above-
5.2.3.	Report submitting	+	Submit to client and save the data

b. (QC) in Lab

QC samples include:

Table 4.4. On-field blank samples (water)

Type of sample	Code	TSS (mg/L)		COD (mg/L)	
		% value ≤2	% value ≥2	% value ≤2	% value ≥2
QCHT: on-field blank samples	CW2_0	100	0	100	0
	WW1_0	100	0	100	0

d. Duplicate sample analytical results

Selected QC samples were duplicates in Lab (QCPTN) with parameters of TSS, COD in water. In detail:

Table 4.5. % RPD of QC duplicate samples (water)

No	Code	% RPD	
		COD	TSS
1.	CW2_1	12,8	15,1
2.	WW1_1	13,7	16,2

QA/QC activity was conducted fully as design in monitoring program; therefore, the above results shown rather good with the expected quality target of the laboratory within RPD ±20% (meet the requirements of the Lab).

e. Evaluation on completed monitoring data

Completed monitoring data is evaluated by percent of full data in comparison to the expected data in inital plan.

Formula using for percent of completed data as bellows:

$$C = \frac{V}{T} \times 100(\%)$$

In which:

- C: % of completed data
- V: number of acceptable samples
- T: total samples in beginning plan

Here C ≥ 95% is acceptable.

In this monitoring program (October 2023), there are 03 cooling water samples, 01 industrial wastewater sample. There are total 4 samples

Therefore:

$$C = \frac{V}{T} \times 100(\%) = \frac{4}{4} \times 100(\%) = 100\%$$

This result is ensured the completed data in this monitoring program of October 2023.

APPENDIX 2. IMAGES OF MONITORING ACTIVITIES ON FIELD

Figure 4.2. Sampling water in Mong Duong 2 BOT Coal Fired Power Plant

APPENDIX 4: THE MONITORING RESULTS