Date: 5th April 2019

Environmental Monitoring Report No. 11

A) Description: Air Quality, Water Quality, Noise/Sound and Vibration Observation

B) Date of Monitoring: 4th April 2019

C) Location: Xe Kum Kam Project Site

D) Measurer: Mr. Vincent Fayloga (Contractor)
Mr. Vilasack Vongsombut (Contractor)
Mr. Lakhonekham (Contractor)

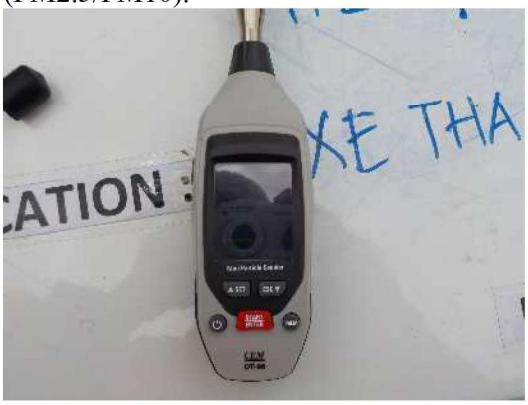
E) Attended by: Mr. Yuji IWATSUKI (Consultant)

F) Type of Measuring Tools used:

1. For Air Quality Monitor:

Name & Model: Mini-Particle Counter, CEM DT-96
Features: Mini-Particle Counter PM2.5 PM10 Handheld Detector Particle Monitor Professional Dust Air Quality Monitor.

- The determination of suspend particle concentration in the air of the weight method (PM2.5/PM10).



2. For Gas Emission Measurement:

Type: Gas Detector Tube System with Gas Aspirating Pump, Brand: KITAGAWA-Japan
List of "Kitagawa" Precision Detector Tubes Used:

Tube No.	Measuring Range	Gas to be Measured
1. 103SG	0.5 ~ 25ppm	Sulphur Dioxide (SO_2)
2. 106SC	1 ~ 50ppm	Carbon Monoxide (CO)
3. 117SD	0.1 ~ 1.0ppm	Nitrogen Dioxide (NO_2)

Type of Tools used: Aspirating Pump for Gas Detector Tube, Model: KITAGAWA AP-20

3. **For Water Quality Monitor, PH Measurement:**
   Name & Model: PH Meter, PH-201, with PH Electrode Model: PE-11, Range: 0~14 pH
   With Standard Buffer Solution PH 7.00

4. **For Water Quality Monitor, Turbidity Measurement:**
   Name & Model: Turbidity Meter, TU-2016, Range: 0.00~50.00 NTU, 50~1,000 NTU
   With Standard Solution for Calibration:
   - 0 NTU standard solution and 100 NTU standard solution

5. **For Noise Monitor, Sound Level Measurement:**
   Name & Model: Sound Level Meter, TM-102,
   Measuring Level Range: A Weighting: 30 ~ 130dB and C Weighting: 35 ~ 130dB

6. For Vibration Monitor, Vibration Level Measurement:

Name & Model: Vibration Level Meter, Type 3233 with Acceleration Pick up Type 7833, Features:

- 5 arbitrarily selected values of maximum and minimum values for hour rate vibration levels (Lx) can be measured at one time.
- Power average level (Leq) can be measured. Wide range of linearity 75dB.
- Environmental vibration required for occupational health can be measured.

G) Environmental Monitoring Results

1. Ambient Air Quality Observation

Item	Location	Measurement Points	Unit	Measured Value	Remarks
Suspended Particle Matter	Xe Kum Kam Bridge	A1 side	µg/m³	PM2.5= 7 / PM10= 15	USA PM2.5<35µg/m³ PM10<150µg/m³ *24 hours Test
		A2 side	µg/m³	PM2.5= 5 / PM10=12	
Sulfur Dioxide (SO_2)	Xe Kum Kam Bridge	A1 & A2 side	ppm	No detected	USA <0.25 ppm (STEL)
Carbon Monoxide (CO)	Xe Kum Kam Bridge	A1 & A2 side	ppm	No detected	USA <25 ppm JPN <50 ppm
Nitrogen Dioxide (NO_2)	Xe Kum Kam Bridge	A1 & A2 side	ppm	No detected	USA <0.2 ppm

2. Ambient Water Quality Observation

Item	Location	Measurement Points	Unit	Measured Value	Remarks
pH	Xe Kum Kam River	Upstream side Downstream side	pH pH	8.0 7.9	Country's Standard: 6~9.5 pH
Turbidity	Xe Kum Kam River	Upstream side Downstream side	NTU NTU	15.1 5.0	Compare Values

3. Noise and Vibration Measurement

Item	Location	Measurement Points	Unit	Measured Value	Remarks
Noise Level	Xe Kum Kam Bridge	A1 side	dB	Fast A: 89.3 (max)	Country's Standard: Below 115dB content of noise
		A2 side	dB	Fast A: 79.6 (max)	
Vibration Level	Xe Kum Kam Bridge	A1 side	dB	Lv10-Z: 53.8 (max)	Japan Standard: Below 75dB
		A2 side	dB	Lv10-Z: 55.3 (max)	

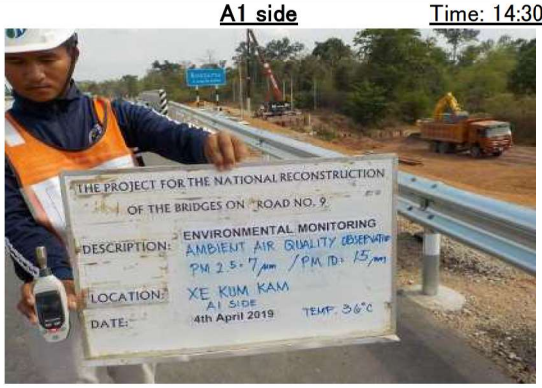
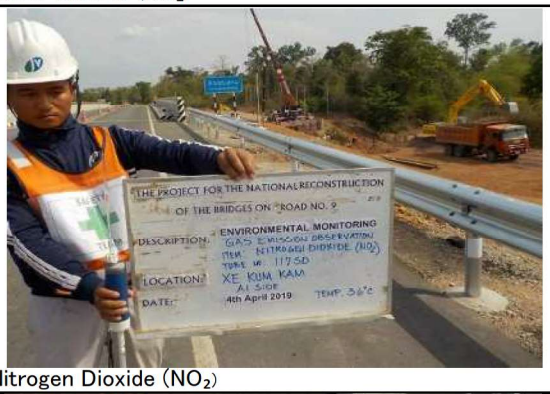
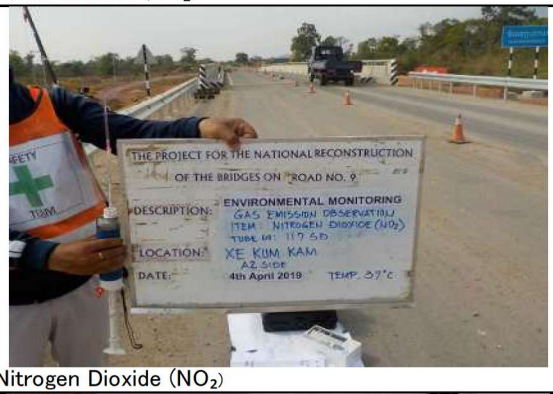
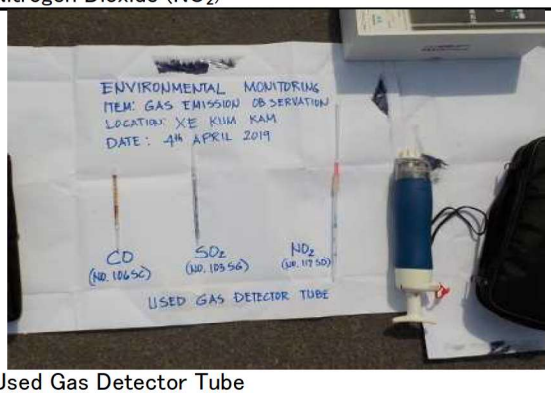
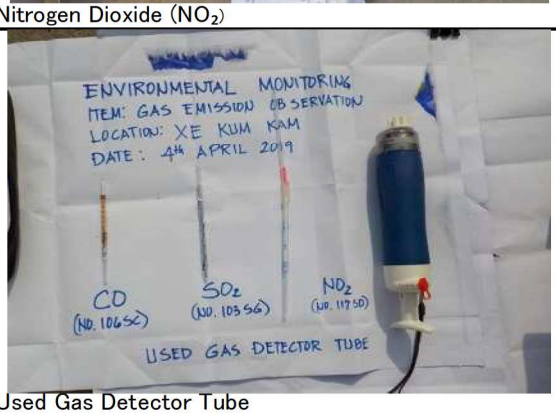
H) Time and Weather Conditions of Observation

Measurement Points	Date of Measurement	Time of Measurement	Weather Condition	Temperature
XKK-A1	04 April 2019	14:30pm	Sunny	36°C
XKK-A2	04 April 2019	15:30pm	Sunny	37°C
XKK-Upstream	04 April 2019	16:00pm	Sunny	35°C (Water Temp: 31°C)
XKK-Downstream	04 April 2019	16:30pm	Sunny	35°C (Water Temp: 31°C)

Environmental Monitoring Photo Report

Air Quality (Emission Gas/Ambient Air Quality)

Location: Existing Xe Kum Kam Bridge Date: 04 April 2019

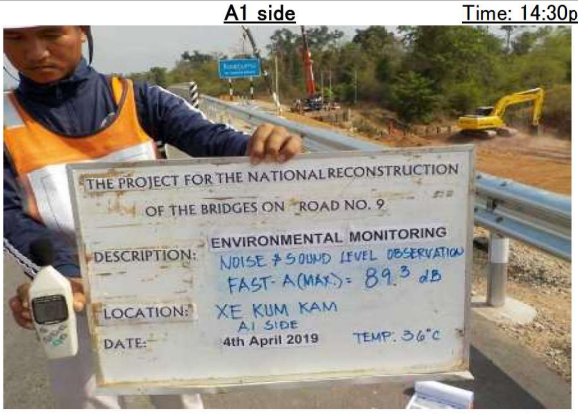
A1 side Time: 14:30pm	A2 side Time: 15:30pm
 1. Particulate Matter, PM2.5 and PM10	 1. Particulate Matter, PM2.5 and PM10
 2. Carbon Monoxide (CO)	 2. Carbon Monoxide (CO)
 3. Sulfur Dioxide (SO_2)	 3. Sulfur Dioxide (SO_2)
 4. Nitrogen Dioxide (NO_2)	 4. Nitrogen Dioxide (NO_2)
 5. Used Gas Detector Tube	 5. Used Gas Detector Tube

Environmental Monitoring Photo Report

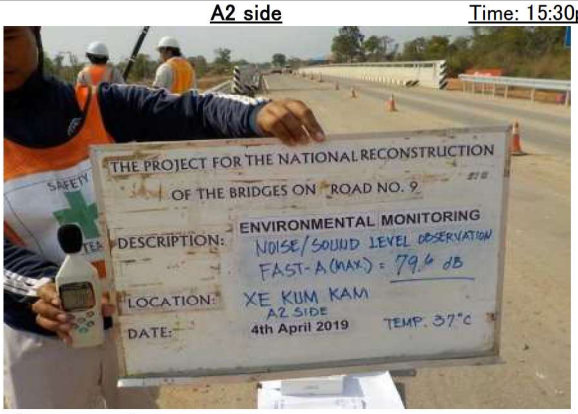
Location: Xe Kum Kam Bridge

Date: 04 April 2019

A1 side Time: 14:30pm

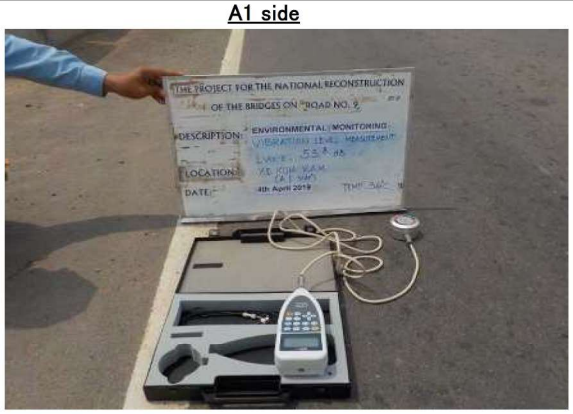


A2 side Time: 15:30pm



1. Noise Measurement (Noise Level)

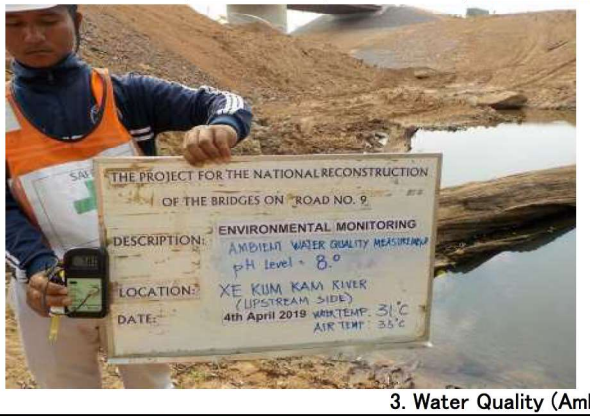
A1 side



A2 side

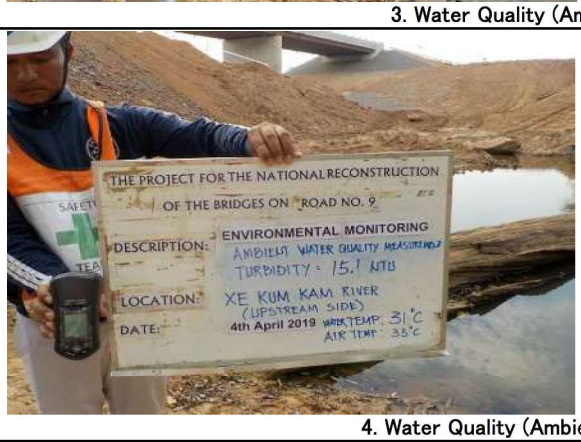
2. Vibration Measurement (Vibration Level)

Upstream side Time: 16:00pm



Downstream side Time: 16:30pm

3. Water Quality (Ambient Water Quality, pH)



4. Water Quality (Ambient Water Quality, Turbidity)

Date: 25th April 2019

Environmental Monitoring Report No. 12

A) Description: Air Quality, Water Quality, Noise/Sound and Vibration Observation

B) Date of Monitoring: 24th April 2019

C) Location: Xe Tha Mouak Project Site

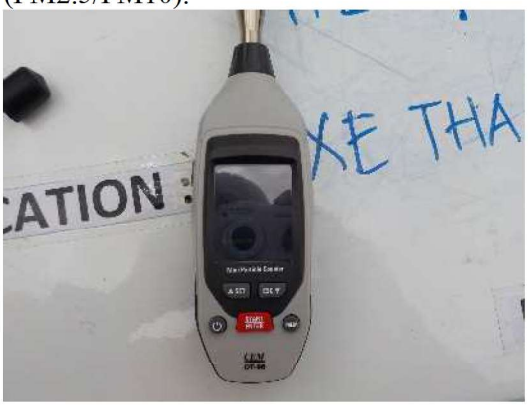
D) Measurer: Mr. Vincent Fayloga (Contractor)
Mr. Vilasack Vongsombut (Contractor)
Mr. Lakhonekham (Contractor)

E) Attended by: Mr. Yuji IWATSUKI (Consultant)

F) Type of Measuring Tools used:

1. For Air Quality Monitor:
Name & Model: Mini-Particle Counter, CEM DT-96
Features: Mini-Particle Counter PM2.5 PM10 Handheld Detector Particle Monitor Professional Dust Air Quality Monitor.

- The determination of suspend particle concentration in the air of the weight method (PM2.5/PM10).



2. For Gas Emission Measurement:
Type: Gas Detector Tube System with Gas Aspirating Pump, Brand: KITAGAWA-Japan
List of "Kitagawa" Precision Detector Tubes Used:

Tube No.	Measuring Range	Gas to be Measured
1. 103SG	0.5 ~ 25ppm	Sulphur Dioxide (SO_2)
2. 106SC	1 ~ 50ppm	Carbon Monoxide (CO)
3. 117SD	0.1 ~ 1.0ppm	Nitrogen Dioxide (NO_2)

Type of Tools used: Aspirating Pump for Gas Detector Tube, Model: KITAGAWA AP-20

3. **For Water Quality Monitor, PH Measurement:**
   Name & Model: PH Meter, PH-201, with PH Electrode Model: PE-11, Range: 0~14 pH
   With Standard Buffer Solution PH 7.00

4. **For Water Quality Monitor, Turbidity Measurement:**
   Name & Model: Turbidity Meter, TU-2016, Range: 0.00~50.00 NTU, 50~1,000 NTU
   With Standard Solution for Calibration:
   - 0 NTU standard solution and 100 NTU standard solution

5. **For Noise Monitor, Sound Level Measurement:**
   Name & Model: Sound Level Meter, TM-102,
   Measuring Level Range: A Weighting: 30 ~ 130dB and C Weighting: 35 ~ 130dB

6. For Vibration Monitor, Vibration Level Measurement:

Name & Model: Vibration Level Meter, Type 3233 with Acceleration Pick up Type 7833,
Features:

- 5 arbitrarily selected values of maximum and minimum values for hour rate vibration levels (Lx) can be measured at one time.
- Power average level (Leq) can be measured. Wide range of linearity 75dB.
- Environmental vibration required for occupational health can be measured.

G) Environmental Monitoring Results

1. Ambient Air Quality Observation

Item	Location	Measurement Points	Unit	Measured Value	Remarks
Suspended Particle Matter	Xe Tha Mouak Bridge	A1 side	µg/m³	PM2.5= 14 /PM10= 27	USA PM2.5<35µg/m³ PM10<150µg/m³ *24 hours Test
		A2 side	µg/m³	PM2.5= 8 /PM10= 17	
Sulfur Dioxide (SO_2)	Xe Tha Mouak Bridge	A1 side	ppm	No detected	USA <0.25 ppm (STEL)
		A2 side	ppm	No detected	
Carbon Monoxide (CO)	Xe Tha Mouak Bridge	A1 side	ppm	No detected	USA <25 ppm JPN <50 ppm
		A2 side	ppm	No detected	
Nitrogen Dioxide (NO_2)	Xe Tha Mouak Bridge	A1 side	ppm	No detected	USA <0.2 ppm
		A2 side	ppm	No detected	

2. Ambient Water Quality Observation

Item	Location	Measurement Points	Unit	Measured Value	Remarks
pH	Xe Tha Mouak River	Upstream A1 side Upstream A2 side	pH pH	8.2 8.1	Country's Standard: 6~9.5 pH
		Downstream A1 side Downstream A2 side	pH pH	8.2 8.2	
Turbidity	Xe Tha Mouak River	Upstream A1 side Upstream A2 side	NTU NTU	19.5 14.0	Compare Values
		Downstream A1 side Downstream A2 side	NTU NTU	19.9 19.1	

3. Noise and Vibration Measurement

Item	Location	Measurement Points	Unit	Measured Value	Remarks
Noise Level	Xe Tha Mouak Bridge	A1 side	dB	Fast A: 78.5 (max)	Country's Standard: Below 115dB content of noise
		A2 side	dB	Fast A: 90.2 (max)	
Vibration Level	Xe Tha Mouak Bridge	A1 side	dB	Lv10-Z: 48.1 (max)	Japan Standard: Below 75dB
		A2 side	dB	Lv10-Z: 50.0 (max)	

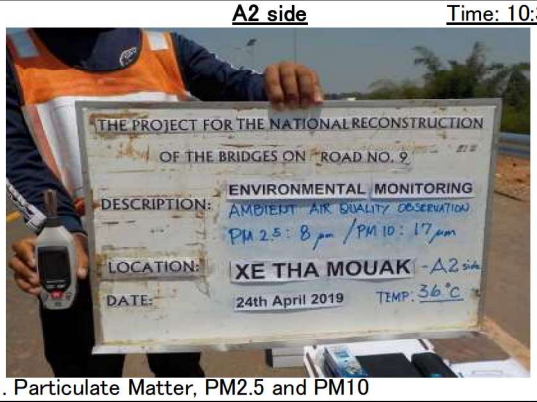
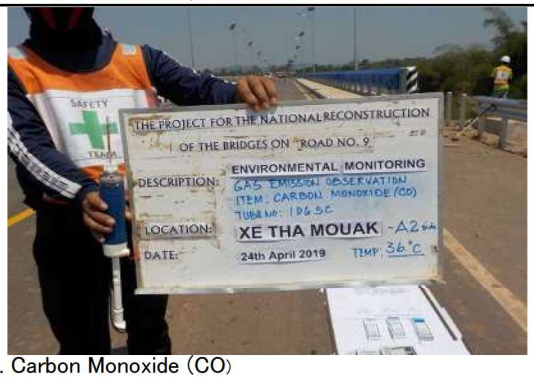
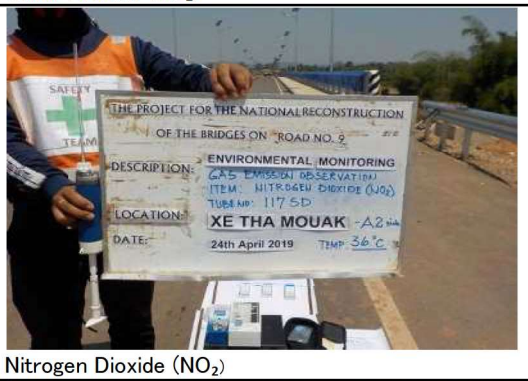
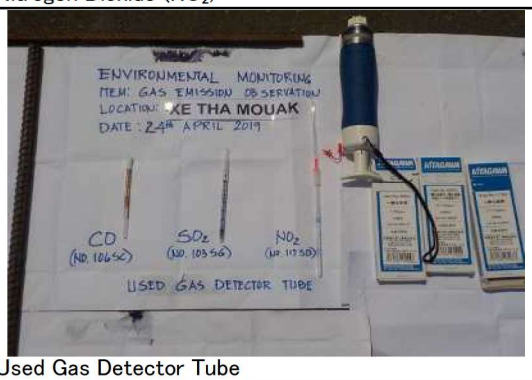
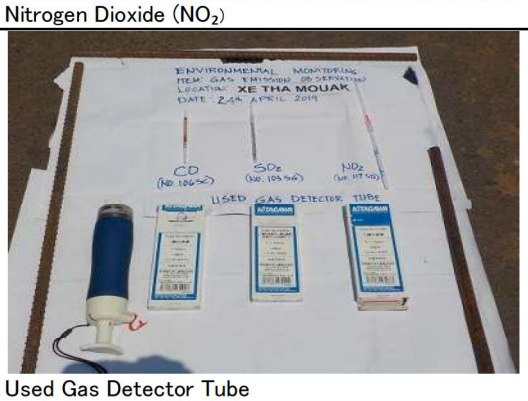
H) Time and Weather Conditions of Observation

Measurement Points	Date of Measurement	Time of Measurement	Weather Condition	Temperature
A1	24 April 2019	10:00am	Sunny	36°C
A2	24 April 2019	10:30am	Sunny	36°C
Upstream	24 April 2019	11:00am	Sunny	Air: 36°C Water: 33°C
Downstream	24 April 2019	11:30am	Sunny	Air: 36°C Water: 34°C

Environmental Monitoring Photo Report

Air Quality (Emission Gas/Ambient Air Quality)

Location: Existing Xe Tha Mouak Bridge Date: 24 April 2019

A1 side Time: 10:00am	A2 side Time: 10:30am
	
1. Particulate Matter, PM2.5 and PM10	1. Particulate Matter, PM2.5 and PM10
	
2. Carbon Monoxide (CO)	2. Carbon Monoxide (CO)
	
3. Sulfur Dioxide (SO_2)	3. Sulfur Dioxide (SO_2)
	
4. Nitrogen Dioxide (NO_2)	4. Nitrogen Dioxide (NO_2)
	
5. Used Gas Detector Tube	5. Used Gas Detector Tube

Location: Existing Xe Tha Mouak Bridge Date: 24 April 2019

A1 side Time: 10:00am

A2 side Time: 10:30am

1. Noise Measurement (Noise Level)

A1 side

A2 side

2. Vibration Measurement (Vibration Level)

Upstream A-1 side Time: 11:00am

Upstream A-2 side Time: 11:00am

3. Water Quality (Ambient Water Quality, pH)

4. Water Quality (Ambient Water Quality, Turbidity)

Downstream A-1 sideTime: 11:30am

Downstream A-2 sideTime: 11:45am

5. Water Quality (Ambient Water Quality, pH)

6. Water Quality (Ambient Water Quality, Turbidity)