JFE MYANMAR Coated Steel

JFE MYANMAR Coated Steel Co., Ltd.

ENVIRONMENTAL QUALITY MONITORING REPORT FOR MANUFACTURING OF METALLIC COATED STEEL STRIP AND PAINTED STEEL STRIP OF JFE MYANMAR COATED STEEL CO., LTD. IN THILAWA SPECIAL ECONOMIC ZONE B (OPERATION STAGE)

December 2024

Myanmar Koei International Ltd.

JFE MYANMAR Coated Steel Co., Ltd.

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Document Certification

Environmental Quality Monitoring Report for manufacturing of metal coated steel stripe and painted steel stripe of JFE Myanmar Coated Steel Co., Ltd. in Thilawa SEZ Zone B was prepared by MYANMAR KOEI INTERNATIONAL LIMITED. The undersigned hereby certify that the monitoring data presented in this report have been accurately obtained and validated under the prevailing environmental conditions at the time of monitoring.

MYANMAR KOEI INTERNATIONAL LIMITED

Signature	:	
Name	:	Khin Maung Thane
Designation	:	Deputy General Manager
EIA Licence No.	:	EIA-AC 090/2024

JFE MYANMAR Coated Steel Co.,Ltd.

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CHAPTER 1: OUTLINES AND SUMMARY OF MONITORING PLAN

1.1 General

JFE MYANMAR Coated Steel Co., Ltd is the manufacturing of metallic coated steel strip and painted steel strip. The project is located at Lot No. BC1, Zone B, Thilawa Special Economic Zone, Yangon, Myanmar. The environmental monitoring report has been prepared for JFE MYANMAR Coated Steel Co., Ltd by Myanmar Koei International Ltd (MKI).

JFE MYANMAR Coated Steel Co., Ltd has a responsibility to carry out regular monitoring for manufacturing of metallic coated steel strip and painted steel strip factory in accordance with the approved Environmental Impact Assessment (EIA) report and Environmental Monitoring Plan (EMoP). JFE MYANMAR Coated Steel Co., Ltd has implemented monitoring of various environmental items with the specified time frame to know the environmental conditions in and around the area. The detail description of the project is shown in Table 1.1-1.

Table 1.1-1 Project Description

Item	Description
Name of Project Proponent	JFE MYANMAR Coated Steel Co., Ltd
Type of Project	Manufacturing of metallic coated steel strip and painted steel strip
Location	Lot No. BC1, Zone B, Thilawa Special Economic Zone, Yangon, Myanmar
Total Production Capacity	Phase 1: - Up to 100,000 tonnes per annum of painted steel strip from imported metallic coated feed Phase 2: - Up to 180,000 tonnes per annum of metallic coated strip, of which, up to 100,000 tonnes will be painted
Total Production Days in December 2024	6 days
Total Output Tons (painted steel strip) in December 2024	664.281 tonnes
Total Project Area	77,800 square meters (19.22 Acre)
Total Production Area	3,440 square meters (0.85 Acre)
Contact Person	Ms. Khaing Cho Khant Senior Environmental Engineer, Manufacturing
Email and Telephone	kkhant@jfemeranti.com +95 9-950683557

Source: JFE MYANMAR Coated Steel Co., Ltd

1.2 Outlines of Monitoring Plan

To assess the impact on the manufacturing of painted steel strip of JFE MYANMAR Coated Steel factory to the surrounding environment, ambient air quality, outdoor noise and vibration level, indoor air quality, workplace noise and vibration level and emission monitoring had been monitored from 3 December to 4 December, 2024 as follows:

Table 1.2-1 Outline of the Field Survey

Ambient Air Quality	Survey Parameter	1) CO, 2) CO_2, 3) NO_2, 4) $PM_{2.5}$, 5) PM_{10}, 6) Ozone, 7) SO_2, 8) Wind Speed and 9) Wind Direction
	Survey Period	3– 4 December, 2024
	Number of Survey	at one point and 24 consecutive hours for one day
	Location	1 Point (Inside and south of the JFE MYANMAR Coated Steel factory compound, which is nearest place to the sensitive receptors).
Outdoor Noise Level	Survey Parameter	L_{Aeq} (dB)
	Survey Period	3 – 4 December, 2024
	Number of Survey	at one point and 24 consecutive hours for one day
	Location	1 Point (Inside and south of the JFE MYANMAR Coated Steel factory compound, which is nearest place to the sensitive receptors).
Outdoor Vibration Level	Survey Parameter	L_{v10} (dB)
	Survey Period	3 – 4 December, 2024
	Number of Survey	at one point and 24 consecutive hours for one day
	Location	1 Point (Inside and south of the JFE MYANMAR Coated Steel factory compound, which is nearest place to the sensitive receptors).
Indoor Air Quality	Survey Parameter	$PM_{2.5}$, PM_{10} and VOC
	Survey Period	3 December 2024
	Number of Survey	$PM_{2.5}$, PM_{10} and VOC: at two points and two hours/point
	Location	$PM_{2.5}$, PM_{10} and VOC: 2 Points 1) Coater-A and 2) Coater-B
Workplace Noise Level	Survey Parameter	L_{Aeq} (dB)
	Survey Period	3 December 2024
	Number of Survey	at three points and one hour/point
	Location	3 Points: 1) Near Coater-A, 2) Entry Accumulator and 3) Near Quality Control Laboratory
Workplace Vibration Level	Survey Parameter	L_{v10} (dB)
	Survey Period	3 December 2024
	Number of Survey	at three points and one hour/point
	Location	3 Points: 1) Near Coater-A, 2) Entry Accumulator and 3) Near Quality Control Laboratory)
Emission Monitoring	Survey Parameter	NOx
	Survey Period	3 December 2024
	Number of Survey	at two points and one hour/point
	Location	2 Points: 1) Regenerative Thermal Oxidizer (RTO) Stack and 2) Chemical Drier Stack

Source: Myanmar Koei International Ltd.

CHAPTER 2: FIELD SURVEY

2.1 Ambient Air Quality

The survey of ambient air quality, AQ-1, has been monitored south corner inside of the JFE MYANMAR Coated Steel factory compound, which is nearest place to the sensitive receptors. Ambient air quality and meteorology survey have been conducted for 24 hours continuously to know the current air quality of the project area. Table 2.1-1 shows the outline of the ambient air quality monitoring.

Table 2.1-1 Outlines of Ambient Air Quality Monitoring

Survey Period	Survey Item	Parameters	Number of Point	Duration	Survey Methodology
3 December – 4 December, 2024	Ambient Air Quality	CO, NO_2, $PM_{2.5}$, PM_{10}, Ozone and SO_2	1 point (AQ-1)	24 Hours	On site measurement by Haz-Scanner Environmental Perimeter Air Station (EPAS)

Source: Myanmar Koei International Ltd.

2.1.1 Survey Items

The parameters for ambient air quality survey were CO, CO_2, NO_2, $PM_{2.5}$, PM_{10}, Ozone and SO_2 and the parameters for meteorology survey were wind speed and wind direction.

2.1.2 Survey Location

The location of ambient air quality monitoring point is shown in Table 2.1-2 and Figure 2.1-1.

Table 2.1-2 Location of Air Quality Monitoring

Survey Point	Coordinates	Description of Survey Point
AQ-1	N: 16°39'57.38", E: 96°17'8.57"	South of the JFE MYANMAR Coated Steel factory compound, which is nearest place to the sensitive receptors

Source: Myanmar Koei International Ltd.

Source: Google Earth

Figure 2.1-1 Location of Ambient Air Quality Monitoring Point

AQ-1

AQ-1 is located south corner inside of the JFE MYANMAR Coated Steel factory compound, which is nearest place to the sensitive receptors. The surrounding area are SIAM Gas Battery Myanmar Ltd. in the southwest, RK Yangon Steel factory in the southeast, vacant lands and Thilawa Development Road in the east and northeast, Phalan monastery and Phalan village in the south.

2.1.3 Survey Period

Ambient air quality and meteorology survey were conducted 24 hours from 3 December 2024 – 4 December 2024.

2.1.4 Survey Method

Survey of meteorology and ambient air quality (CO, CO_2, NO_2, $PM_{2.5}$, PM_{10}, Ozone and SO_2) were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner EPAS was used to collect ambient air pollutants. The EPAS measures automatically every one minute and directly reads and records onsite for CO, CO_2, NO_2, $PM_{2.5}$, PM_{10}, Ozone and SO_2. The equipment of meteorological and ambient air quality survey is shown in Figure 2.1-2.

Source: Myanmar Koei International Ltd.

Figure 2.1-2 Status of Ambient Air Quality Monitoring Point at AQ-1

2.1.5 Survey Results

The daily average value of ambient air quality monitoring results of CO, CO_2, NO_2, $PM_{2.5}$, PM_{10}, Ozone and SO_2 are described in Table 2.1-3. Comparing with the guideline values of CO, CO_2, NO_2, $PM_{2.5}$, PM_{10}, Ozone and SO_2 prescribed in final EIA report for JFE MYANMAR Coated Steel Co., Ltd (referred to Section 2.2.1, Air Quality, Table 2.2-2), 24 hours average concentration of CO, CO_2, NO_2 and Ozone were lower than the target value. Moreover, the results of $PM_{2.5}$, PM_{10} and SO_2 were also lower than the target value and interim target value of WHO Air Quality Guideline, 2021.

There is no guideline value for CO_2 and no country has a specific rule for outdoor CO_2 levels for ambient air quality monitoring. The average global CO_2 level is usually between 400 and 420 ppm (719.84 and 755.83 mg/m^3). International groups like the World Meteorological Organization (WMO) and the National Oceanic and Atmospheric Administration (NOAA) monitor these levels. Countries agree to reduce CO_2 emissions to mitigate climate change through the Paris Agreement, instead of setting standards for ambient CO_2. 24 hours average concentration of CO_2 at the monitoring point was lower than the average global CO_2 level.

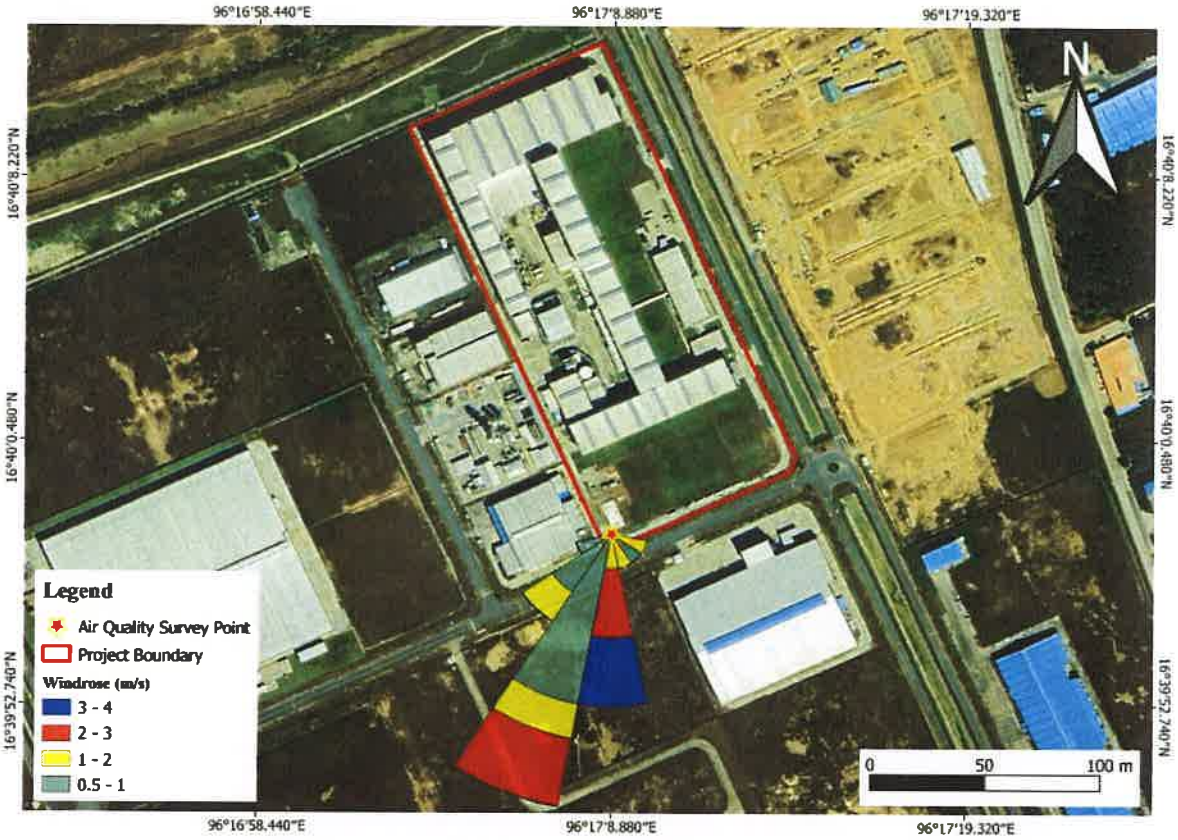
Table 2.1-3 Ambient Air Quality Survey Result (Daily Average)

Date 3 ~ 4 December, 2024	CO mg/m^3	CO_2 mg/m^3	NO_2 mg/m^3	$PM_{2.5}$ mg/m^3	PM_{10} mg/m^3	Ozone mg/m^3	SO_2 mg/m^3
Result	0.005 (24-hr Avg)	1.574 (24-hr Avg)	0.084 (24-hr Avg)	0.020 (24-hr Avg)	0.027 (24-hr Avg)	0.072 (8-hr Max)	0.017 (24-hr Avg)
Target Value[2)]	10.26 (24-hr Avg)	NG	0.1 (24-hr Avg)	0.025 (24-hr Avg)	0.05 (24-hr Avg)	0.1 (8-hr Max)	0.02 (24-hr Avg)
WHO[3)] (Interim Target Value)	-	NG	-	0.050 (24-hr Avg)	0.100 (24-hr Avg)	-	0.050 (24-hr Avg)

Note:
1) Target value is referred to the final EIA report for JFE MYANMAR Coated Steel Co., Ltd (Oct, 2019)
a. (Ozone, mg/m^3) = 8-hr maximum duration for Ozone concentration is from 11:00 to 19:00.
2) WHO (AQGi) - World Health Organization Air Quality Guideline, 2021
The target value of CO, NO_2 and SO_2 were converted from ppm units to mg/m^3. The conversion equation are as follows;
a. (CO, mg/m^3) = (CO, ppm) * (Molecular Weight of CO (28)) / 24.45 at 25°C and 1 atm condition.
b. (NO_2, mg/m^3) = (NO_2, ppm) * (Molecular Weight of NO_2 (46)) / 24.45 at 25°C and 1 atm condition
c. (SO_2, mg/m^3) = (SO_2, ppm) * (Molecular Weight of SO_2 (64)) / 24.45 at 25°C and 1 atm condition.
Source: Myanmar Koei International Ltd.

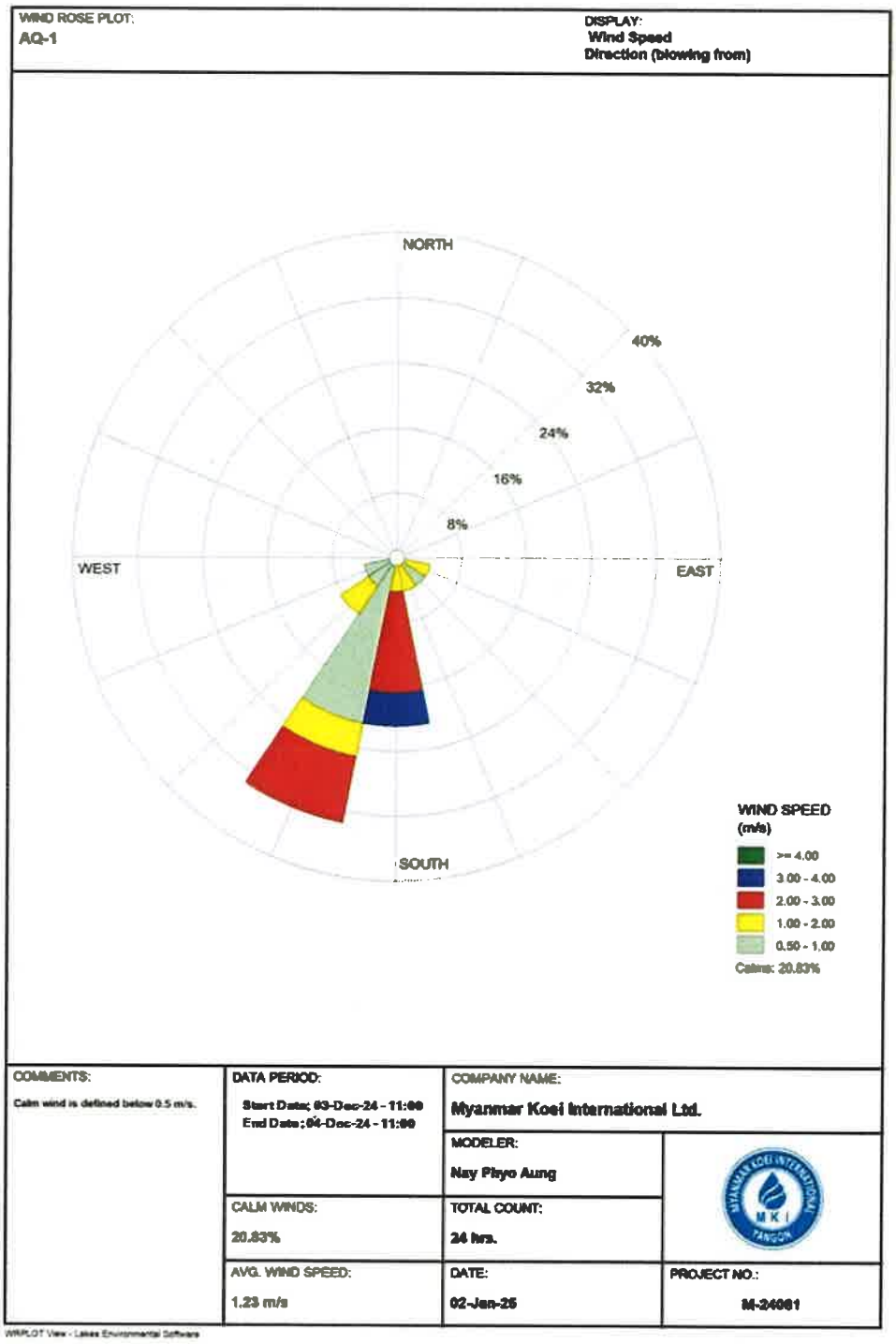
Wind direction and wind speed were measured at AQ-1. Hourly average values of measured wind direction and wind speed data are described in Appendix-1. Frequency of wind direction at AQ-1 and its wind rose diagram are described in Figure 2.1-3 and Figure 2.1-4. According to the wind rose analysis, the prevailing wind direction during monitoring was South-Southwest (SSW) and the least frequency wind direction were East-Southeast (ESE), South-Southeast (SSE) and West-Southwest (WSW). During the monitoring period, while the maximum wind speed was 3.1 m/s, the average speed is 1.23 m/s. The calm wind is 20.83 %, whereas the calm wind is defined below 0.5 m/s. As the average wind speed is higher than the defined calm wind, it is assumed that the wind was light air during the monitoring period.

According to the summary of wind direction at AQ-1, most of the prominent wind were blowing from Southwest (SW) quadrants.



Source: Myanmar Koei International Ltd.

Figure 2.1-3 Wind Status at AQ-1



Source: Myanmar Koei International Ltd.

Figure 2.1-4 Wind Rose Diagram of AQ-1

The vehicle usage record of JFE MYANMAR Coated Steel factory during ambient air quality monitoring period is shown in Table 2.1-4.

Table 2.1-4 Vehicle Usage Record During Ambient Air Quality Monitoring Period

Date	Vehicle type	Quantity	Total
3 December, 2024	JFE MYANMAR Coated Steel Ferry	16	38
	JFE MYANMAR Coated Steel Rental Car	8	
	Visitor' Car	12	
	Employee' Car	2	
4 December, 2024	JFE MYANMAR Coated Steel Ferry	18	44
	JFE MYANMAR Coated Steel Rental Car	8	
	Visitor' Car	16	
	Employee' Car	2	

Source: JFE MYANMAR Coated Steel Co., Ltd

2.2 Outdoor Noise and Vibration Level

The survey of outdoor noise and vibration level at NV-1 was conducted within the JFE MYANMAR Coated Steel factory compound. Outdoor noise and vibration level monitoring was conducted 24 hours for survey point to know the outdoor noise and vibration level near the JFE MYANMAR Coated Steel factory. Table 2.2-1 shows the outline of the outdoor noise and vibration level monitoring.

Table 2.2-1 Outlines of Outdoor Noise and Vibration Level Monitoring

Survey Date	Survey Item	Parameters	Number of Points	Duration	Survey Methodology
3 – 4 December, 2024	Outdoor Noise Level	L_{Aeq}(dB)	1 (NV-1)	24 hours	On-site measurement by "Rion NL-42 sound level meter"
3 – 4 December, 2024	Outdoor Vibration Level	L_{v10} (dB)	1 (NV-1)	24 hours	On-site measurement by "Vibration Level Meter- VM-53A"

Source: Myanmar Koei International Ltd

2.2.1 Survey Items

The outdoor noise and vibration level monitoring items are shown in Table 2.2-2.

Table 2.2-2 Survey Parameters for Outdoor Noise and Vibration Level

No.	Item	Parameter
1	Outdoor Noise	A-weighted loudness equivalent (L_{Aeq})
2	Outdoor Vibration	Vibration level, vertical, percentile (L_{v10})

Source: Myanmar Koei International Ltd.

2.2.2 Survey Location

The location of outdoor noise and vibration level points is shown in Table 2.2-3. The detail of survey point is described below. The location of the outdoor noise and vibration monitoring points is shown in Figure 2.2-1.

Table 2.2-3 Location of Outdoor Noise and Vibration Monitoring Station

Survey Point	Coordinates	Description of Monitoring Point
NV-1	N: 16°39'57.39", E: 96°17'8.56"	South of the factory compound

Source: Myanmar Koei International Ltd.

Source: Google Earth

Figure 2.2-1 Location of Outdoor Noise and Vibration Level Monitoring Point

NV-1

NV-1 is located at the south corner inside the factory compound which is the nearest place to the sensitive receptors. The surrounding area are SIAM Gas Battery Myanmar Ltd. in the southwest, RK Yangon Steel factory in the southeast, vacant lands and Thilawa Development Road in the east and northeast, Phalan monastery and Phalan village in the south.

2.2.3 Survey Period

Outdoor noise and vibration level monitoring were conducted 24 hours from 3 December 2024 – 4 December 2024.

2.2.4 Survey Method

Outdoor noise level was measured by "Rion NL-43 sound level meter" and automatically recorded every 10 minutes on a memory card. The outdoor vibration level meter, VM-55 (Rion Co. Ltd., Japan), accompanied by a 3-axis accelerometer PV-83C (Rion Co. Ltd.), was placed on solid soil ground. Vertical vibration (Z axis), L_{v10}, was measured every 10 minutes within the adaptable range of (10-70) dB at NV-1 recorded on a memory card.

The measurement period of outdoor noise and vibration was 24 hours for survey point. The status of the noise and vibration level monitoring on NV-1 is shown in Figure 2.2-2.

Source: Myanmar Koei International Ltd.

Figure 2.2-2 Status of Outdoor Noise and Vibration Level Monitoring at NV-1

2.2.5 Survey Results

Outdoor Noise Level Monitoring Results

Outdoor noise monitoring results are separated daytime (7:00 AM to 7:00 PM), evening time (7:00 PM to 10:00 PM), and night time (10:00 PM to 7:00 AM), time frames respectively for NV-1. Outdoor noise measurements was carried out for one location on a 24-hour basis. The monitoring results are summarized in Table 2.2-4. Hourly outdoor noise level (LA_{eq}) monitoring results at NV-1 is shown in Table 2.2-5 and Figure 2.2-3 shows the results of outdoor noise level (LA_{eq}) at NV-1. Comparing with the target value of outdoor noise level in operation stage prescribed in final EIA report for JFE MYANMAR Coated Steel Co., Ltd. (referred to Section 2.2.3 Noise, Table 2.2-13), all results were under the target values.

Table 2.2-4 Results of Outdoor Noise Level (LA_{eq}) Monitoring at NV-1

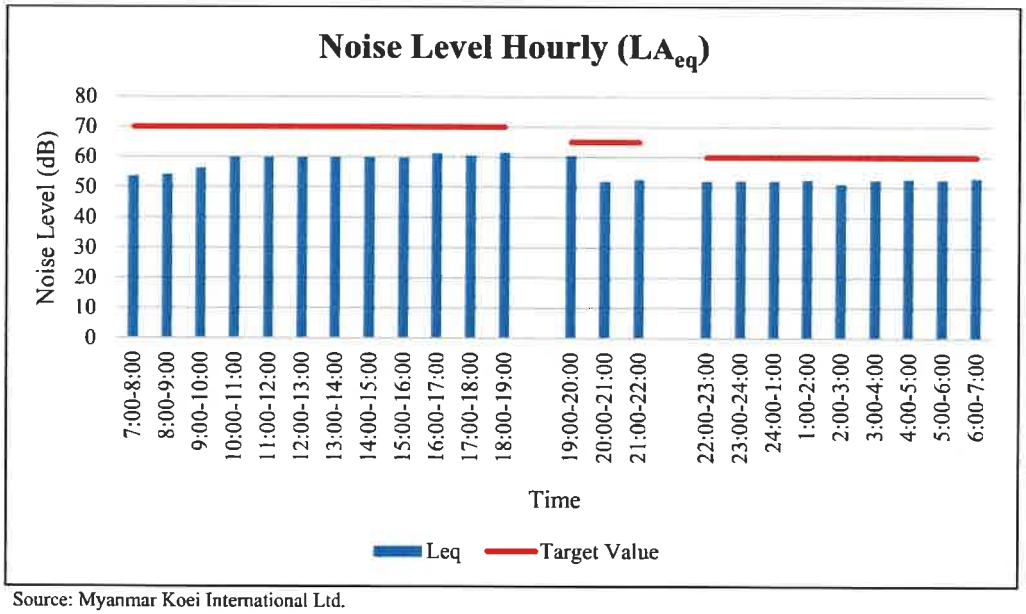
Date	(Commercial and Industrial areas) Equivalent Noise Level (LA_{eq}, dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
3 December 2024 - 4 December 2024	59	57	52
Target Value	70	65	60

Note: Target value is referred to the final EIA report for JFE MYANMAR Coated Steel Co., Ltd
Source: Myanmar Koei International Ltd.

Table 2.2-5 Hourly Outdoor Noise Level (LA_{eq}) Monitoring Results at NV-1

Date	Time	Hourly Result LA_{eq} (dB)	Interval Result LA_{eq} (dB)	Target Value LA_{eq} (dB)
3 December 2024 – 4 December 2024	7:00-8:00	54	59	70
	8:00:9:00	54		
	9:00-10:00	56		
	10:00-11:00	60		
	11:00-12:00	60		
	12:00-13:00	60		
	13:00-14:00	60		
	14:00-15:00	60		
	15:00-16:00	60		
	16:00-17:00	61		
	17:00-18:00	61		
	18:00-19:00	61		
	19:00-20:00	60	57	65
	20:00-21:00	52		
	21:00-22:00	53		
	22:00-23:00	52	52	60
	23:00-24:00	52		
	24:00-1:00	52		
	1:00-2:00	52		
	2:00-3:00	51		
	3:00-4:00	52		
	4:00-5:00	53		
	5:00-6:00	52		
	6:00-7:00	53		

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.2-3 Results of Outdoor Noise Levels (LA_{eq}) Monitoring at NV-1

Outdoor Vibration Level Monitoring Results

Outdoor vibration monitoring results are separated daytime (7:00 AM to 7:00 PM), evening time (7:00 PM to 10:00 PM) and night time (10:00 PM to 7:00 AM) time frames respectively for NV-1. Outdoor vibration measurement was carried out for one location on a 24-hour basis. The results of outdoor vibration level (L_{v10}) monitoring at NV-1 are shown in Table 2.2-6. Results of hourly outdoor vibration level monitoring for NV-1 are summarized in Table 2.2-7 and Figure 2.2-4 shows the results of vibration level (L_{v10}) at NV-1. By comparing with the target vibration level in operation stage in final EIA report for JFE MYANMAR Coated Steel Co., Ltd. (referred to Section 2.2.4 Vibration, Table 2.2-14), all results were under the target values.

Table 2.2-6 Results of Outdoor Vibration Level (L_{v10}) Monitoring at NV-1

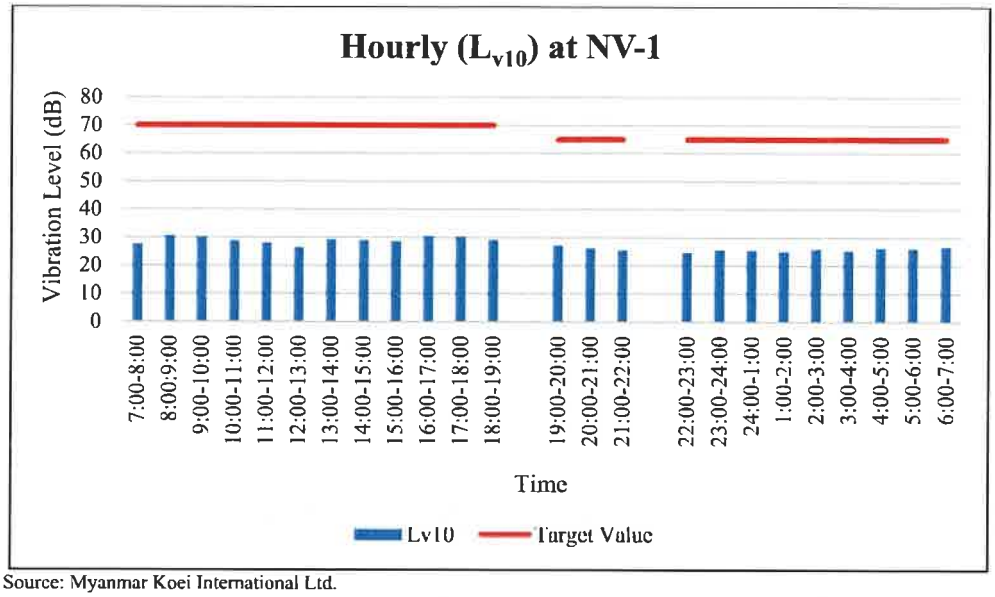
Date	(Office, Commercial facilities, and Factories) Equivalent Vibration Level (L_{v10}, dB)		
	Day Time (7:00 AM – 7:00 PM)	Evening Time (7:00 PM – 10:00 PM)	Night Time (10:00 PM – 7:00 AM)
3 December 2024 - 4 December 2024	29	26	26
Target Value	70	65	60

Note: Target value is referred to the final EIA report for JFE MYANMAR Coated Steel Co., Ltd.
Source: Myanmar Koei International Ltd.

Table 2.2-7 Results of Hourly Outdoor Vibration Level (L_{v10}) Monitoring at NV-1

Date	Time	Hourly Result L_{v10} (dB)	Interval Result L_{v10} (dB)	Target Value
3 December 2024 – 4 December 2024	7:00-8:00	28	29	70
	8:00-9:00	31		
	9:00-10:00	30		
	10:00-11:00	29		
	11:00-12:00	28		
	12:00-13:00	26		
	13:00-14:00	29		
	14:00-15:00	29		
	15:00-16:00	29		
	16:00-17:00	31		
	17:00-18:00	30		
	18:00-19:00	29		
	19:00-20:00	27	26	65
	20:00-21:00	26		
	21:00-22:00	25		
	22:00-23:00	25	26	60
	23:00-24:00	26		
	24:00-1:00	25		
	1:00-2:00	25		
	2:00-3:00	26		
	3:00-4:00	25		
	4:00-5:00	26		
	5:00-6:00	26		
	6:00-7:00	27		

Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.2-4 Results of Outdoor Vibration Level (L_{v10}) Monitoring at NV-1

The vehicle usage record of JFE MYANMAR Coated Steel factory during the outdoor noise and vibration monitoring period is shown in Table 2.2-8.

Table 2.2-8 Vehicle Usage Record During Outdoor Noise and Vibration Monitoring Period

Date	Vehicle type	Quantity	Total
3 December, 2024	JFE MYANMAR Coated Steel Ferry	16	38
	JFE MYANMAR Coated Steel Rental Car	8	
	Visitor' Car	12	
	Employee' Car	2	
4 December, 2024	JFE MYANMAR Coated Steel Ferry	18	44
	JFE MYANMAR Coated Steel Rental Car	8	
	Visitor' Car	16	
	Employee' Car	2	

Source: JFE MYANMAR Coated Steel Co., Ltd

2.3 Indoor Air Quality

The survey of indoor air quality has been monitored at two locations, Coater-A and Coater-B inside the JFE MYANMAR Coated Steel factory. Indoor air quality has been conducted for two hours to know the current indoor air quality of the JFE MYANMAR Coated Steel factory. Table 2.3-1 shows the outline of the indoor air quality monitoring.

Table 2.3-1 Outlines of Indoor Air Quality Monitoring

Survey Period	Survey Item	Parameter	Survey Location	Number of Point	Duration	Survey Methodology
3 December, 2024	Indoor Air Quality	$PM_{2.5}$, PM_{10} and VOC	Coater-A and Coater-B	2 points	2 hours/ point	On site measurement by Haz-Scanner Environmental Perimeter Air Station (EPAS)

Source: Myanmar Koei International Ltd.

2.3.1 Survey Item

The parameters for indoor air quality monitoring were $PM_{2.5}$, PM_{10} and VOC.

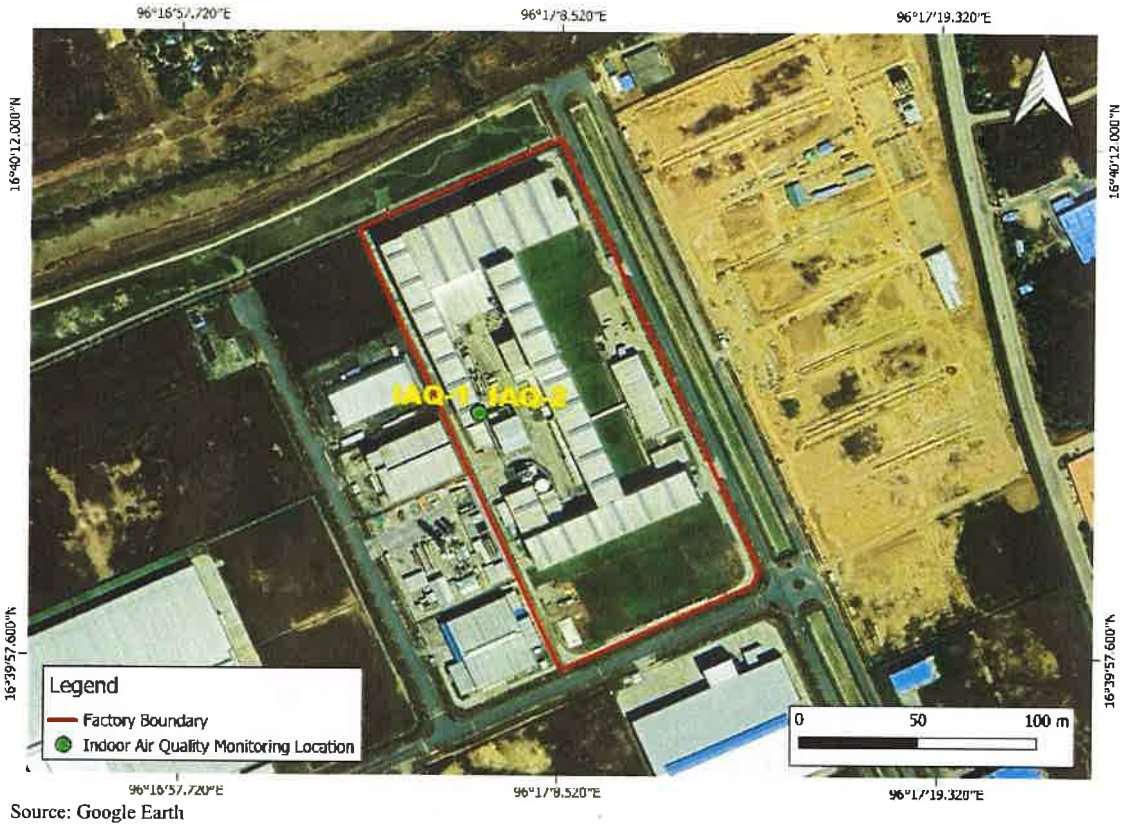
2.3.2 Survey Location

The location of indoor air quality monitoring point is shown in Table 2.3-2. The detail of the monitoring point is described below. The location of the indoor air quality monitoring point is shown in Figure 2.3-1.

Table 2.3-2 Location of Indoor Air Quality Monitoring

Survey Point	Coordinates	Description of Monitoring Point
Indoor Air Quality	16°40'4.49"N, 96°17'6.22"E	Two locations, Coater-A and Coater-B inside the compound of JFE factory.

Source: Myanmar Koei International Ltd.



Source: Google Earth

Figure 2.3-1 Location of Indoor Air Quality Monitoring Point

IAQ-1

IAQ-1 is located outside the Coater A room in the Coil Painting Line (CPL) building of JFE MYANMAR Coated Steel factory, and it is located near to the walkway platform.

IAQ-2

IAQ-2 is located outside the Coater B room in the Coil Painting Line (CPL) building of JFE MYANMAR Coated Steel factory, and it is located near to the walkway platform.

2.3.3 Survey Period

Indoor air quality monitoring was conducted two hours per point (total 2 points) on 3 December 2024.

2.3.4 Survey Method

Survey of indoor air quality ($PM_{2.5}$ and PM_{10}) was conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner EPAS was used to collect indoor air pollutants. The EPAS measures automatically every one minute and directly reads and records onsite for $PM_{2.5}$ and PM_{10}.

Survey of volatile organic compound (VOC) was conducted by using Aeroqual-500 series with VOC sensor (0-25 ppm range). VOC sensor (0-25 ppm range) was chosen because the measurement was conducted in indoor production area. The detailed information of VOC sensors with different ranges are described in the Table 2.3-3. Aeroqual-500 series equipment was set up and placed at height of 1.5m which is the breathing level relative to the average human height. The equipment measures automatically every five minutes and the data was recorded and logged into PC on real time basis.

The status of indoor air quality monitoring for $PM_{2.5}$, PM_{10} and VOC are shown in Figure 2.3-2 and Figure 2.3-3.

Table 2.3-3 Detailed Information of VOC Sensors

Gas	Range (ppm)	Minimum Detection Limit	Resolution	Response Times	Operating Conditions		Application Type
					Temp	RH	
VOC	0-25	0.1	0.1	60	0-40C	10-90%	ENV, IAQ

ENV = Outdoor Environmental Monitoring, IAQ = Indoor Air Quality
Source: Myanmar Koei International Ltd.

Figure 2.3-2 Status of Indoor Air Quality Monitoring at Coater-A

Figure 2.3-3 Status of Indoor Air Quality Monitoring at Coater-B

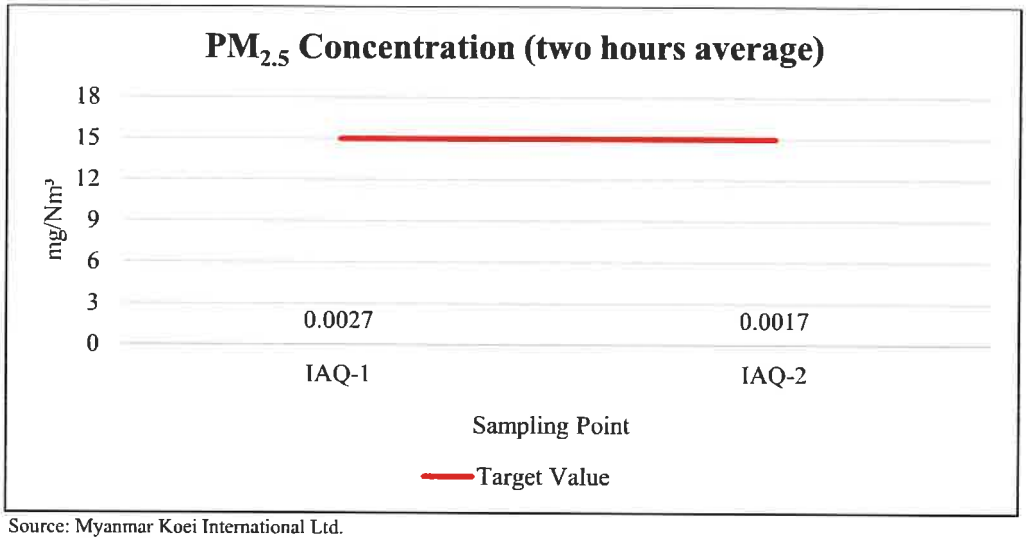
2.3.5 Survey Results

The two hours average value of indoor air quality monitoring results of $PM_{2.5}$ and PM_{10} are described in Table 2.3-4 and VOC is described in Table 2.3-5. There is no guideline value for indoor air quality for $PM_{2.5}$ and PM_{10} in Myanmar's EQEG guideline. Therefore, the values of $PM_{2.5}$ and PM_{10} were compared with The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S. However, the value of VOC was compared with the final EIA report for JFE MYANMAR Coated Steel Co., Ltd. (referred to Section 2.2.1, (2) Air Emission Level, Table 2.2-4). The two hours average concentration of $PM_{2.5}$ and PM_{10} were lower than the guideline value and the two hours average concentration of VOC was lower than the target value at Coater-A and Coater-B. Figure 2.3-4 to Figure 2.3-7 showed the results of $PM_{2.5}$, PM_{10} and VOC for indoor air quality monitoring.

Table 2.3-4 Indoor Air Quality Monitoring Results of $PM_{2.5}$ and PM_{10} (Two Hour Average)

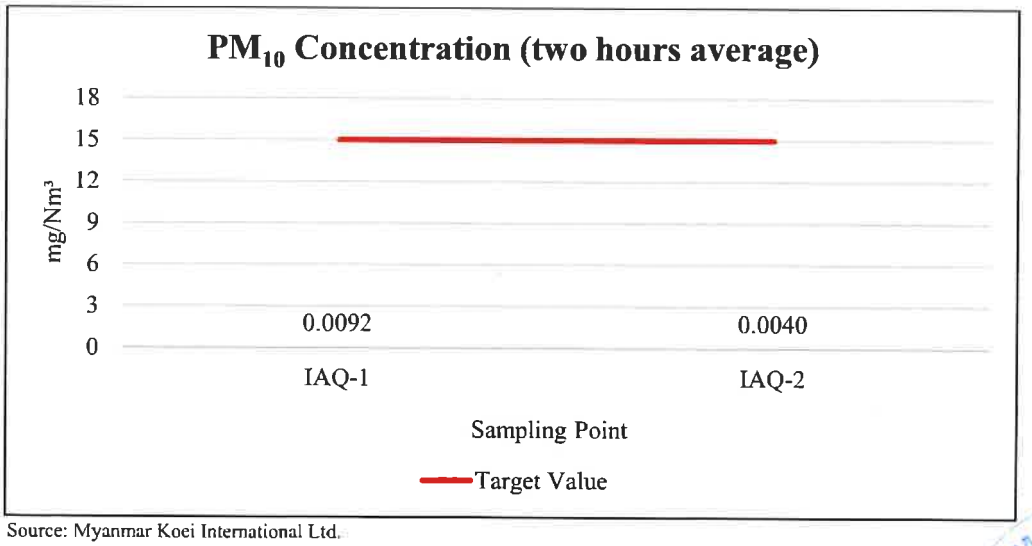
Date	Time	Survey Point	Survey Location	$PM_{2.5}$	PM_{10}
				(mg/m^3)	(mg/m^3)
3 December, 2024	10:30 ~ 12:29	IAQ-1	Coater-A	0.0027	0.0092
3 December, 2024	13:00 ~ 14:59	IAQ-2	Coater-B	0.0017	0.0040
Target Value				**15**	**15**

Note:
1) The value of $PM_{2.5}$ and PM_{10} are two hours average. All results are lower than the target value.
2) The value of $PM_{2.5}$ and PM_{10} were converted to mg/m^3 from $\mu g/m^3$ at 25°C, 1 atm condition
3) Target value is referred to the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S.
(Link: https://www.cdc.gov/niosh/pel88/dusts.html)
Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.3-4 Results of Indoor Air Quality Monitoring ($PM_{2.5}$)



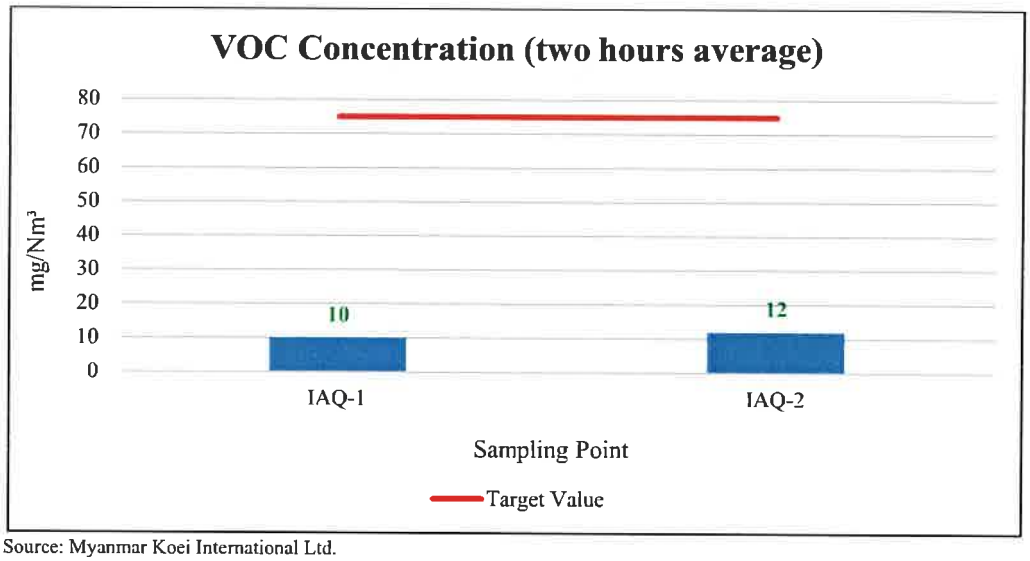
Source: Myanmar Koei International Ltd.

Figure 2.3-5 Results of Indoor Air Quality Monitoring (PM_{10})

Table 2.3-5 Indoor Air Quality Monitoring Results of VOC (Two Hour Average)

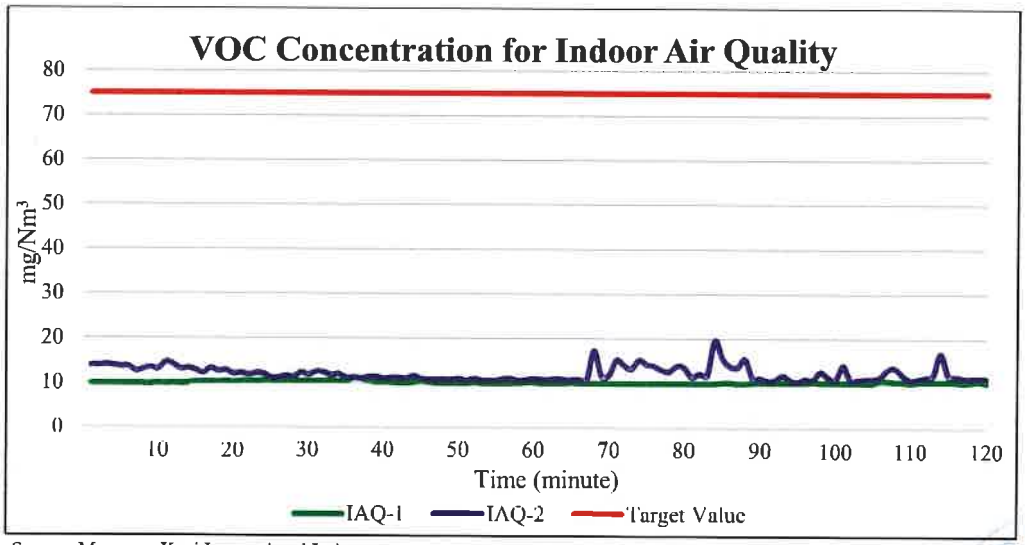
Date	Time	Survey Point	Survey Location	Relative Humidity (%)	Temperature (°C)	VOC (mg/Nm³)
3 December, 2024	20:15 ~ 22:14	IAQ-1	Coater-A	72.1	30.8	10
3 December, 2024	18:00 ~ 19:59	IAQ-2	Coater-B	57.7	34.4	12
Target Value				-	-	**75**

Note:
1) The value of VOC is two hours average. All results are lower than the target value.
2) The value of VOC was converted to mg/Nm³ from ppm.
3) Target value is referred to the final EIA report for JFE MYANMAR Coated Steel Co., Ltd.
Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.3-6 Results of Indoor Air Quality Monitoring (VOC)



Source: Myanmar Koei International Ltd.

Figure 2.3-7 Results of Indoor Air Quality Monitoring (VOC)

The operating activities of JFE MYANMAR Coated Steel Co., Ltd. during the indoor air quality monitoring period is shown in Table 2.3-6.

Table 2.3-6 Operating activities for Indoor Air Quality Monitoring

Monitoring Location	Operating activities	Working Hours	Man-power
Coater-A	**Inside Pulpit** – Operators monitor and control HMI for production. **Inside Coater Room** – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint. **Outside Coater Room** – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.	3 shifts per day	4 persons per shift
Coater-B	**Inside Pulpit** – Operators monitor and control HMI for production. **Inside Coater Room** – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint. **Outside Coater Room** – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.	3 shifts per day	3 persons per shift

Source: JFE MYANMAR Coated Steel Co., Ltd.

2.4 Workplace Noise and Vibration Level Monitoring

The survey of workplace noise and vibration level, WNV-1, WNV-2 and WNV-3, have been monitored inside the JFE MYANMAR Coated Steel factory which is the nearest place to near coater-A, entry accumulator and near quality control laboratory. Workplace noise and vibration level monitoring have been conducted one hour for each survey point to know the occupational noise and vibration level inside the JFE MYANMAR Coated Steel factory. Table 2.4-1 shows the outline of the workplace noise and vibration level monitoring.

Table 2.4-1 Outlines of Workplace Noise and Vibration Level Monitoring

Survey Date	Survey Item	Parameters	Number of Points	Duration	Survey Methodology
3 December, 2024	Workplace Noise Level	L_{Aeq}(dB)	1 (INV-1)	1 hour/ point	On-site measurement by "Rion NL-42 sound level meter"
3 December, 2024	Workplace Noise Level	L_{Aeq}(dB)	1 (INV-2)	1 hour/ point	On-site measurement by "Rion NL-42 sound level meter"
3 December, 2024	Workplace Noise Level	L_{Aeq}(dB)	1 (INV-3)	1 hour/ point	On-site measurement by "Rion NL-42 sound level meter"
3 December, 2024	Workplace Vibration Level	L_{v10} (dB)	1 (INV-1)	1 hour/ point	On-site measurement by "Vibration Level Meter- VM-53A"
3 December, 2024	Workplace Vibration Level	L_{v10} (dB)	1 (INV-2)	1 hour/ point	On-site measurement by "Vibration Level Meter- VM-53A"
3 December, 2024	Workplace Vibration Level	L_{v10} (dB)	1 (INV-3)	1 hour/ point	On-site measurement by "Vibration Level Meter- VM-53A"

Source: Myanmar Koei International Ltd.

2.4.1 Survey Items

The noise and vibration level survey items are shown in Table 2.4-2.

Table 2.4-2 Survey Parameters for Noise and Vibration Level

No.	Item	Parameter
1	Noise	A-weighted loudness equivalent (L_{Aeq})
2	Vibration	Vibration level, vertical, percentile (L_{v10})

Source: Myanmar Koei International Ltd.

2.4.2 Survey Location

The location of the workplace noise and vibration level points are shown in Table 2.4-3. The detail of each survey point is described below. The location of the workplace noise and vibration monitoring points are shown in Figure 2.4-1.

Table 2.4-3 Location of Noise and Vibration Monitoring Station

Survey Point	Coordinates	Description of Monitoring Point
WNV-1	N: 16°40'4.50", E: 96° 17'6.14"	Near Coater-A which is inside the JFE MYANMAR Coated Steel factory
WNV-2	N: 16°40'7.17", E: 96° 17'4.90"	Entry Accumulator which is inside the JFE MYANMAR Coated Steel factory
WNV-3	N: 16°40'8.22", E: 96° 17'4.87"	Near Quality Control Laboratory which is inside the JFE MYANMAR Coated Steel factory

Source: Myanmar Koei International Ltd.

Source: Google Earth

Figure 2.4-1 Location of Workplace Noise and Vibration Level Monitoring Points

WNV-1

WNV-1 is located inside the Coil Painting Line (CPL) building of JFE MYANMAR Coated Steel factory which is the nearest place to the Coater-A.

WNV-2

WNV-2 is located inside the Coil Painting Line (CPL) building of JFE MYANMAR Coated Steel factory which is the nearest place to the entry accumulator.

WNV-3

WNV-3 is located inside the Coil Painting Line (CPL) building of JFE MYANMAR Coated Steel factory which is the nearest place to the quality control laboratory.

2.4.3 Survey Period

Workplace noise and vibration level monitoring were conducted one hour for each point on 3 December 2024.

2.4.4 Survey Method

Workplace noise level was measured by "Rion NL-43 sound level meter" and automatically recorded every 10 minutes on a memory card. Workplace vibration level meter, VM-55 (Rion Co. Ltd., Japan),

accompanied by a 3-axis accelerometer PV-83C (Rion Co. Ltd.), was placed on solid soil ground. Vertical vibration (Z axis), L_{v10}, was measured every 10 minutes within the adaptable range of (10-70) dB at INV-1, (10-70) dB at INV-2 and (10-70) dB at INV-3 recorded on a memory card.

The measurement period of workplace noise and vibration were one hour for each survey point. The status of the workplace noise and vibration level monitoring on WNV-1, WNV-2 and WNV-3 is shown in Figure 2.4-2, Figure 2.4-3 and Figure 2.4-4.

Figure 2.4-2 Status of Workplace Noise and Vibration Level Monitoring Near Coater-A

Figure 2.4-3 Status of Workplace Noise and Vibration Level Monitoring at Entry Accumulator

Figure 2.4-4 Status of Workplace Noise and Vibration Level Monitoring Near Quality Control Laboratory

2.4.5 Survey Results

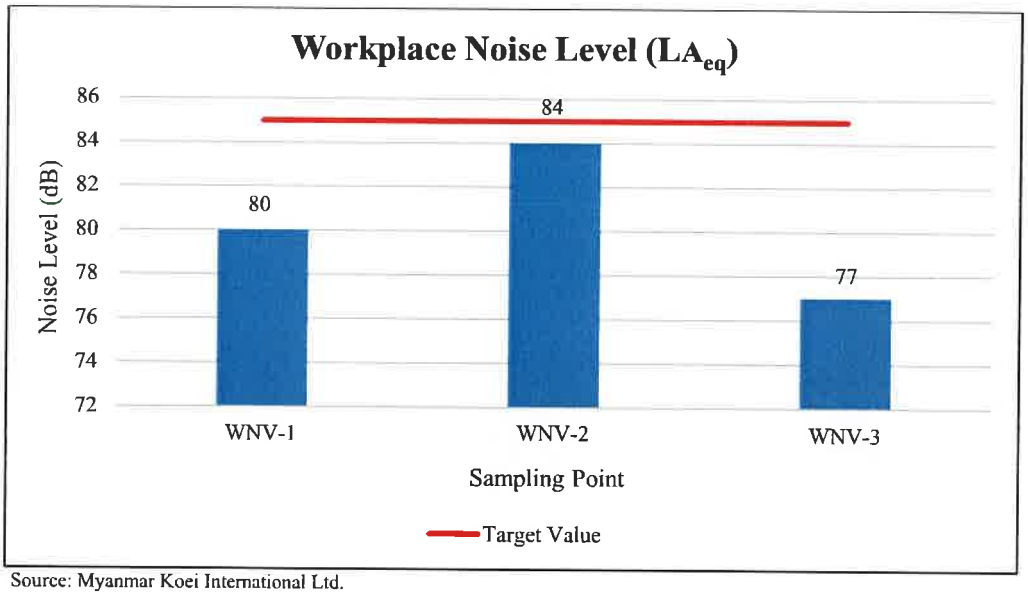
Workplace Noise Level Monitoring Results

The one hour average value of workplace noise level monitoring results of WNV-1, WNV-2 and WNV-3 are described in Table 2.4-4. The values of WNV-1, WNV-2 and WNV-3 were compared with The National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S. The one hour average concentration of WNV-1, WNV-2 and WNV-3 were lower than the guideline value near coater-A, entry accumulator and near quality control laboratory. Figure 2.4-5 and Figure 2.4-6 showed the results of WNV-1, WNV-2 and WNV-3 for workplace noise level monitoring.

Table 2.4-4 Results of Workplace Noise Level (LA_{eq}) Monitoring

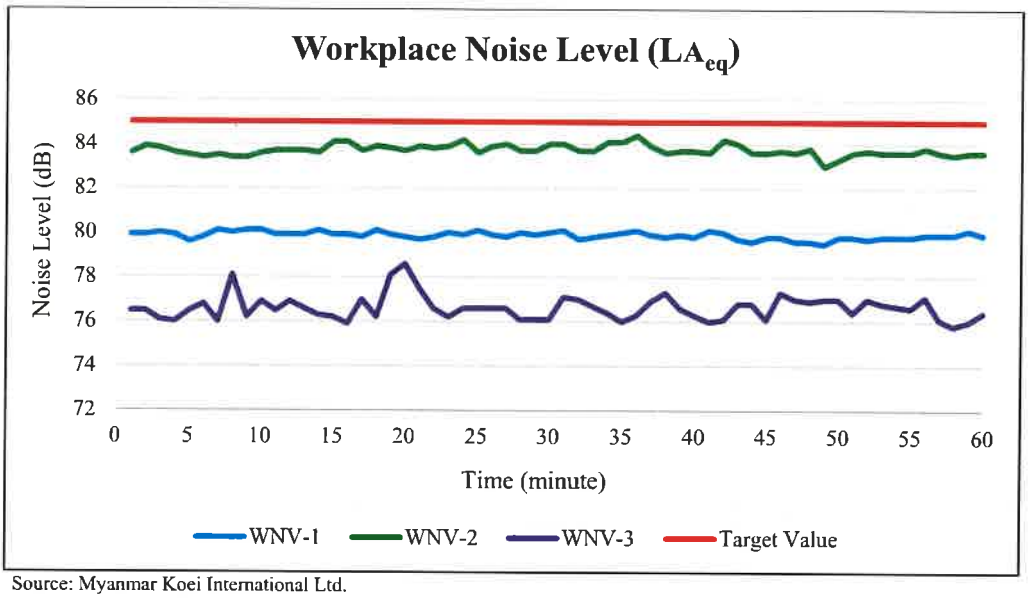
Date	Time	Survey Point	Location	LA_{eq}, dB
3 December, 2024	10:25 ~ 11:24	WNV-1	Near Coater-A	80
3 December, 2024	11:30 ~ 12:29	WNV-2	Entry Accumulator	84
3 December, 2024	12:40 ~ 13:39	WNV-3	Near Quality Control Laboratory	77
Target Value				**85**

Note: 1) The value of LA_{eq} is one hour average. All results are lower than the guideline value.
2) Target value is referred to the National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention (CDC), U.S (June, 1998).
Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.4-5 Results of Workplace Noise Level (LA_{eq}) Monitoring



Source: Myanmar Koei International Ltd.

Figure 2.4-6 Results of Workplace Noise Level (LA_{eq}) Monitoring

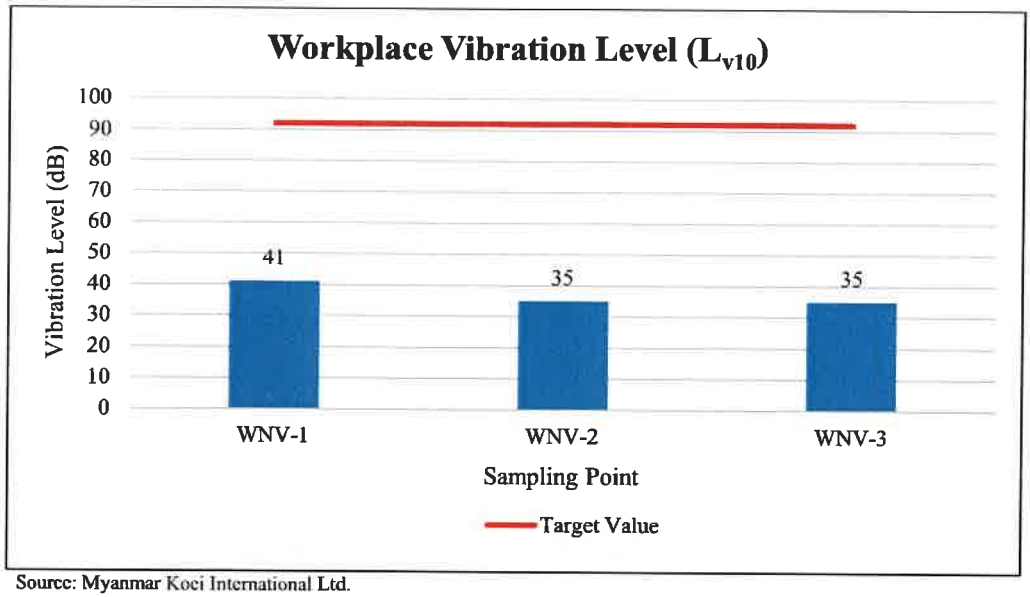
Workplace Vibration Level Monitoring Results

The one hour average value of workplace vibration monitoring results of WNV-1, WNV-2 and WNV-3 are described in Table 2.4-5. The values of WNV-1, WNV-2 and WNV-3 were compared with the Australia Technical Guideline value. The one hour average concentration of WNV-1, WNV-2 and WNV-3 were lower than the guideline value near coater-A, entry accumulator and near quality control laboratory. Figure 2.4-7 and Figure 2.4-8 showed the results of WNV-1, WNV-2 and WNV-3 for workplace vibration level monitoring.

Table 2.4-5 Results of Workplace Vibration Levels (L_{v10}) Monitoring

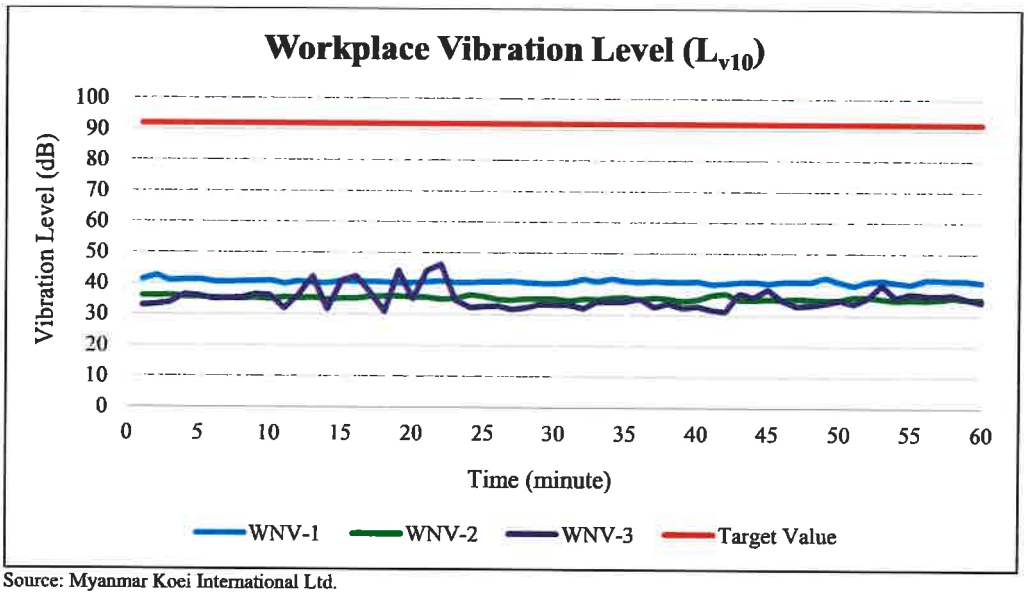
Date	Time	Survey Point	Location	L_{v10} (dB)
3 December, 2024	10:25 ~ 11:24	WNV-1	Near Coater-A	41
3 December, 2024	11:30 ~ 12:29	WNV-2	Entry Accumulator	35
3 December, 2024	12:40 ~ 13:39	WNV-3	Near Quality Control Laboratory	35
Target Value				**92**

Note:
1) The value of L_{v10} is one hour average. All results are lower than the guideline value.
2) Target value is referred to the Australia Technical Guideline Value.
(Link: Assessing vibration: a technical guideline (nsw.gov.au))
Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.4-7 Results of Workplace Vibration Level (L_{v10}) Monitoring



Source: Myanmar Koei International Ltd.

Figure 2.4-8 Results of Workplace Vibration Level (L_{v10}) Monitoring

The operating activities of JFE MYANMAR Coated Steel factory during the workplace noise and vibration monitoring period is shown in Table 2.4-6.

Table 2.4-6 Operating activities for Workplace Noise and Vibration Monitoring

Monitoring Location	Operating activities	Working Hours	Man-power
Coater-A	**Inside Pulpit** – Operators monitor and control HMI for production. **Inside Coater Room** – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint. **Outside Coater Room** – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.	3 shifts per day	4 persons per shift
Coater-B	**Inside Pulpit** – Operators monitor and control HMI for production. **Inside Coater Room** – Operators use respirators, goggles, and earmuffs to set coater equipment setting, to check viscosity and prepare paint. **Outside Coater Room** – This is a walkway platform. Operators use half-masks, goggles, and earmuffs to walk from coater room to pulpit during production. Operators walk through this area less than a minute.	3 shifts per day	3 persons per shift
Entry Accumulator	Coil feeding and stitching operations are controlled by control room operators. No working activities in near entry accumulator.	3 shifts per day	2 persons per shift
Near Quality Control Laboratory	Quality Control members conduct the quality checks on the painted product from the line. **Inside Quality Control Lab -** Two persons conduct Quality Control lab test. **Outside Quality Control Lab -** It is not a working area, used for walkway during production.	3 shifts per day	3 persons per shift

Source: JFE MYANMAR Coated Steel Co., Ltd.

2.4.6 Control for Noise Exposure

The Hierarchy of Control

The hierarchy of control can be used to determine how to implement feasible and effective controls. This approach groups actions by their likely effectiveness in reducing or removing the noise hazard.

Elimination: In most cases, the preferred approach is to eliminate the source of hazardous noise.

Substitution: When elimination is not possible, the substitution of loud equipment for quieter equipment may be the next best alternative to protect workers from hazardous noise.

Engineering Controls: Engineering controls require physical changes to the workplace such as redesigning equipment to eliminate noise sources and constructing barriers that prevent noise from reaching a worker.

Administrative Controls: Engineering control is not possible to remove the hazard through the use of administrative controls. Employers may change an employee's work schedule to avoid too much noise.

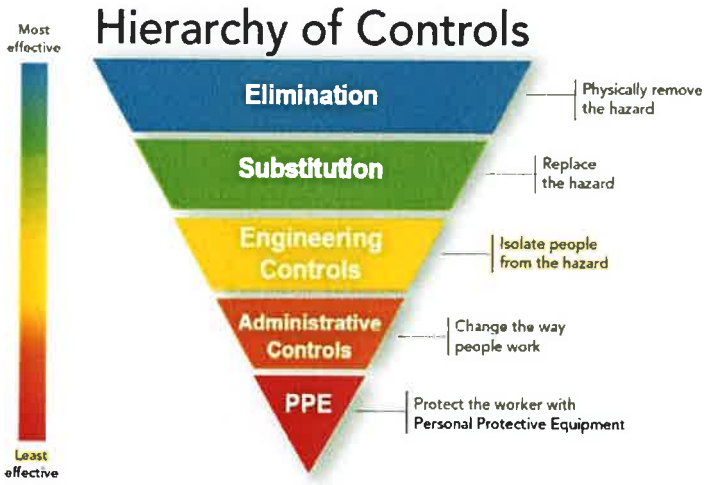
Personal Protective Equipment (PPE): The last option in the hierarchy of control PPE is generally less effective than elimination, substitution, and engineering controls because they rely on human actions to reduce noise. Personal protective equipment (PPE) for hearing protection is shown in Table 2.4-7.

Table 2.4-7 Personal Protective Equipment (PPE) for Hearing Protection

	HPD with ear shells (ear muffs) Also called earmuffs, headphones, or ear shells, it can either be assembled on an industrial safety helmet or worn independently. It is positioned around the ear, and is connected by a hoop or headband passing overhead. It is reusable. It is advisable to change the ear pads every year to ensure effective blocking of noise.
	Earplugs with hoop/headband It is worn either at the ear canal or is placed within. The earplugs are connected by a plastic band (hoop) which holds them together.
	The standard earplug The pre-formed/pre-molded earplug is made of silicone, rubber, etc. It can be inserted into the ear without prior shaping.
	The carplug that must be shaped by the user is generally malleable and made of compressible foam. It will thus be shaped by the employee prior to being placed in the ear canal. This type of earplug is generally disposable.
	The personalized molded earplug (customized) Made from an impression of the employee's ear, this hearing protector is made of silicone or acrylic resin. New technologies now allow for full digital manufacturing of these hearing protectors, offering an accuracy of about 100µ. A passive acoustic filter helps select the attenuation level to meet the needs of the wearer.

Source: HearingProTech.com

The hierarchy of controls are show in Figure 2.4-9.



Source: The National Institute for Occupational Safety and Health (NIOSH)

Figure 2.4-9 Hierarchy of Controls

2.5 Emission Monitoring

The survey of emission monitoring has been monitored inside the compound of JFE MYANMAR Coated Steel factory. Emission monitoring has been conducted to know the current emission level of the project area. Table 2.5-1 shows the outline of the emission monitoring.

Table 2.5-1 Outlines of Emission Monitoring

Survey Period	Survey Item	Parameters	Number of Point	Duration	Survey Methodology
3 December, 2024	Emission Monitoring	NO_x	2 points	1 hour/ point	On site measurement by "PG 350 Horiba Portable Gas Analyzer"

Source: Myanmar Koei International Ltd.

2.5.1 Survey Items

The parameter for emission monitoring was NO_x.

2.5.2 Survey Location

The emission monitoring measurement equipment, "PG-350 Horiba Portable Gas Analyzer" was set up at Regenerative Thermal Oxidizer (RTO) Stack and Chemical Drier Stack. The detail location of emission monitoring points is described in Table 2.5-2 and the location of emission monitoring points are shown in the Figure 2.5-1.

Table 2.5-2 Location of Emission Air Quality Monitoring Point

Survey Point	Coordinates	Description of Survey Point
EM-1	16°40'5.04"N, 96°17'6.35"E	Regenerative Thermal Oxidizer (RTO) Stack
EM-2	16°40'5.39"N, 96°17'6.17"E	Chemical Drier Stack

Source: Myanmar Koei International Ltd.

Source: Myanmar Koei International Ltd.

Figure 2.5-1 Location of Emission Monitoring Point

2.5.3 Survey Period

Emission monitoring was conducted on 3 December, 2024.

2.5.4 Survey Method

Survey of emission monitoring (NO_x) was conducted by following the analysis principle of the PG-350 Horiba Portable Gas Analyzer as shown in Table 2.5-3. The equipment was used to collect emission air pollutants, and it measured automatically every one minute and directly read and recorded onsite for NO_x. The status of emission monitoring is shown in Figure 2.5-2 and Figure 2.5-3.

Table 2.5-3 Analytic Method for Emission Monitoring

No.	Parameter	Method
1	NO_x	Cross-Flow Modulation Chemiluminescence Detection Method

Source: Myanmar Koei International Ltd.

Figure 2.5-2 Status of Emission Monitoring at Regenerative Thermal Oxidizer (RTO) Stack

Figure 2.5-3 Status of Emission Monitoring at Chemical Drier Stack

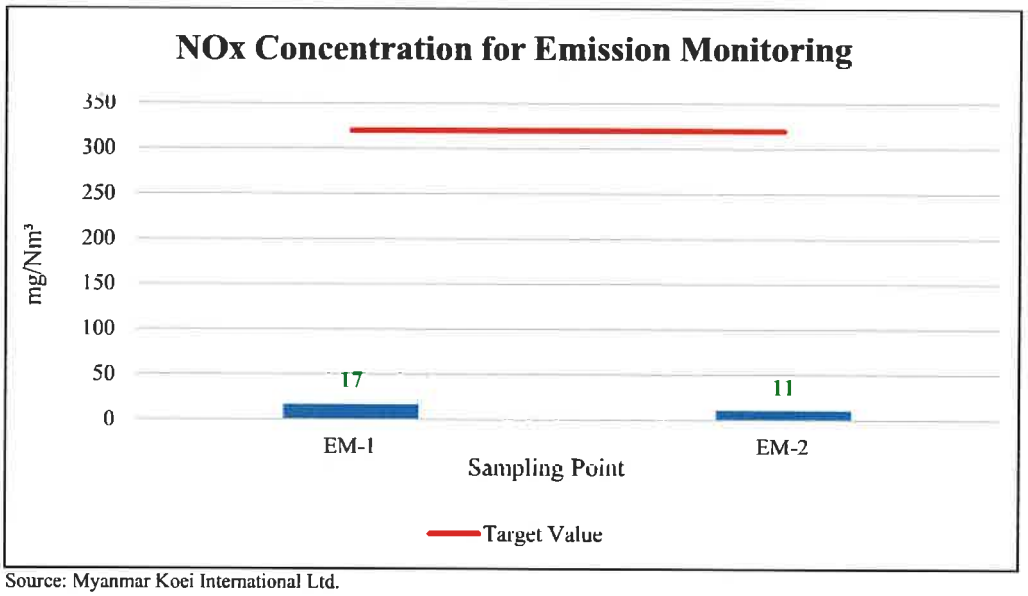
2.5.6 Survey Results

The one hour average value of emission monitoring results of NO_x are described in Table 2.5-4. The value of NO_x was compared with the final EIA report for JFE MYANMAR Coated Steel Co., Ltd. (referred to Section 2.2.1, (2) Air Emissions Level, Table 2.2-7). The one hour average concentration of NO_x was lower than the target value at Regenerative Thermal Oxidizer (RTO) Stack and Chemical Drier Stack.

Table 2.5-4 Emission Monitoring NO_x Result

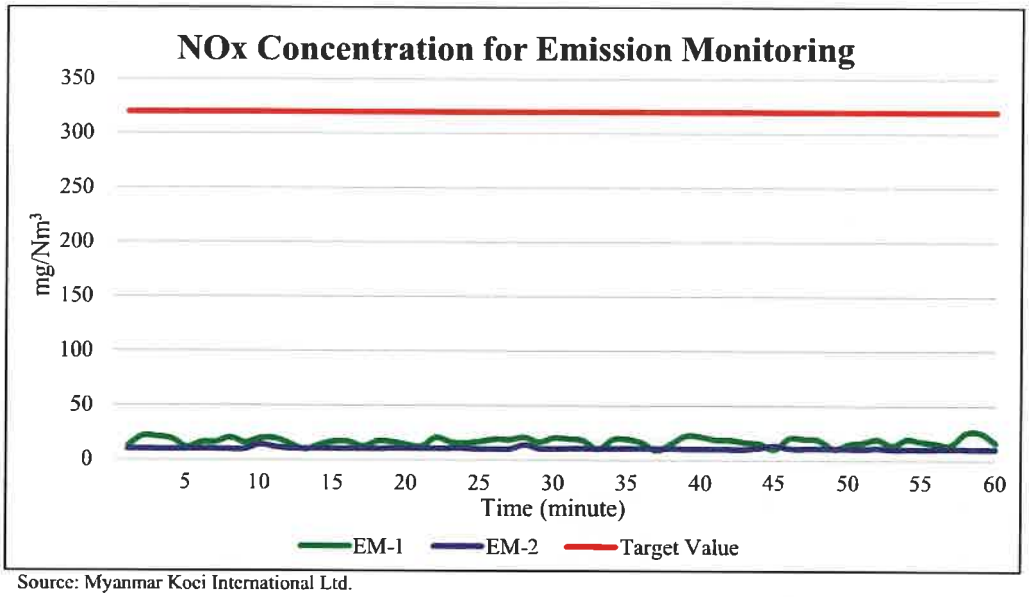
Date	Time	Survey Point	Location	Temperature (°C)	NO_x (mg/Nm^3)
3 December, 2024	12:40 ~ 13:39	EM-1	Regenerative Thermal Oxidizer (RTO) Stack	149.2	17
3 December, 2024	19:15 ~ 20:14	EM-2	Chemical Drier Stack	154.2	11
Target Value				-	**320**

Note:
1) The value of NO_x is one hour average. All results are lower than the guideline value.
2) The value of NO_x was converted to mg/Nm^3 from ppm.
3) The target value is referenced to the Final EIA report for JFE MYANMAR Coated Steel Co., Ltd.
Source: Myanmar Koei International Ltd.



Source: Myanmar Koei International Ltd.

Figure 2.5-4 Results of Emission Monitoring



Source: Myanmar Koei International Ltd.

Figure 2.5-5 Results of Emission Monitoring

The operating activities of JFE MYANMAR Coated Steel during the emission monitoring period is shown in Table 2.5-5.

Table 2.5-5 Operating activities for Emission Monitoring

Monitoring Location	Operating activities	Working Hours	Man-power
Regenerative Thermal Oxidizer (RTO) Stack	Oven Exhaust Fumes has been treated in RTO to convert flue gases upstream of RTO stack. After passing through two heat exchangers, these flue gases has been vented into atmosphere through RTO stack by RTO Exhaust Fan. Only one or two persons perform start up and shutdown of RTO. RTO operation is controlled by control room. No person is needed to attend at RTO stack during production.	3 shifts per day	No working activities at the stack itself during production.
Chemical Drier Stack	Gases in Chemical drying oven has been vented into atmosphere through Chemical Dyer Stack by Chemical dryer Exhaust Fan. Only one or two persons perform start up and shutdown of chemical dryer. Chemical Dryer operation is controlled by control room. No person is needed to attend at Chemical Dryer stack during production.	3 shifts per day	No working activities at the stack itself during production.

Source: JFE MYANMAR Coated Steel Co., Ltd.

CHAPTER 3: CONCLUSION AND RECOMMENDATIONS

Air Quality

The result of 24 hours average air quality of CO, CO_2, NO_2, $PM_{2.5}$, PM_{10}, Ozone and SO_2 are under the target value at AQ-1. Thus, there are no impacts from the operating activities of JFE MYANMAR Coated Steel Factory to the surrounding environment.

Noise and Vibration Level

The results of noise and vibration level for NV-1 is lower than the target levels. Thus, there are no impacts from the operating activities of JFE MYANMAR Coated Steel Factory to the surrounding environment.

Indoor Air Quality

The results of indoor air quality of $PM_{2.5}$, PM_{10} and VOC at Coater-A and Coater-B were lower than the target value. Thus, there are no impacts from the operating activities of JFE MYANMAR Coated Steel Factory to the surrounding environment.

Workplace Noise and Vibration Level

The results of workplace noise and vibration level at near Coater-A, entry accumulator and near quality control laboratory were lower than the NIOSH guideline value. However, the results of workplace noise level at near Coater-A (WNV-1) and entry accumulator (WNV-2) were close to the NIOSH guideline value and the result of workplace noise level at near quality control laboratory was lower than the target value. Therefore, the standard earplug must be used when working in WNV-1, WNV-2 and WNV-3.

The results of workplace vibration level at near Coater-A, entry accumulator and near quality control laboratory were lower than the target value. Thus, there are no impacts from the operating activities of JFE MYANMAR Coated Steel Factory to the workplace environment.

Emission Monitoring

The results of emission monitoring of NO_x at Regenerative Thermal Oxidizer (RTO) Stack and Chemical Drier Stack were lower than the target value. Thus, there are no impacts from the operating activities of JFE MYANMAR Coated Steel Factory to the surrounding environment.

In conclusion of this environmental survey, periodical monitoring will be necessary to grasp the surrounding environmental conditions and to show the compliance status in the operation phase of the JFE MYANMAR Coated Steel Factory. Once enough environmental data is collected, the mitigation measures for environmental management will be considered in the future, as necessary.

Date	Time	CO	CO_2	NO_2	$PM_{2.5}$	PM_{10}	O_3	SO_2	Wind Speed	Wind Direction	
		mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	mg/m³	m/s	Deg.	Direction
		Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly	Hourly
3 December, 2024	11:00 ~ 11:59	0.003	2.064	0.082	0.010	0.015	0.049	0.020	2.59	189	S
3 December, 2024	12:00 ~ 12:59	0.004	1.800	0.030	0.007	0.016	0.085	0.021	2.79	197	SSW
3 December, 2024	13:00 ~ 13:59	0.006	1.800	0.040	0.006	0.010	0.109	0.024	2.99	188	S
3 December, 2024	14:00 ~ 14:59	0.006	1.620	0.024	0.009	0.013	0.110	0.027	3.10	187	S
3 December, 2024	15:00 ~ 15:59	0.004	1.800	0.049	0.012	0.016	0.122	0.022	2.78	191	S
3 December, 2024	16:00 ~ 16:59	0.004	1.800	0.095	0.030	0.041	0.073	0.019	2.03	205	SSW
3 December, 2024	17:00 ~ 17:59	0.009	1.440	0.127	0.034	0.064	0.013	0.023	1.17	194	SSW
3 December, 2024	18:00 ~ 18:59	0.006	1.440	0.139	0.044	0.068	0.012	0.027	0.71	146	SE
3 December, 2024	19:00 ~ 19:59	0.005	1.440	0.131	0.046	0.060	0.011	0.028	0.37	133	SE
3 December, 2024	20:00 ~ 20:59	0.018	1.440	0.127	0.029	0.037	0.011	0.019	0.36	144	SE
3 December, 2024	21:00 ~ 21:59	0.004	1.440	0.120	0.031	0.041	0.012	0.016	0.49	227	SW
3 December, 2024	22:00 ~ 22:59	0.004	1.440	0.117	0.040	0.048	0.011	0.010	0.66	226	SW
3 December, 2024	23:00 ~ 23:59	0.005	1.440	0.112	0.035	0.041	0.011	0.015	0.29	125	SE
4 December, 2024	0:00 ~ 0:59	0.006	1.440	0.103	0.023	0.026	0.011	0.011	0.35	143	SE
4 December, 2024	1:00 ~ 1:59	0.005	1.440	0.089	0.015	0.019	0.011	0.012	0.71	207	SSW
4 December, 2024	2:00 ~ 2:59	0.004	1.440	0.083	0.009	0.011	0.010	0.015	0.83	212	SSW
4 December, 2024	3:00 ~ 3:59	0.003	1.440	0.080	0.006	0.007	0.010	0.013	0.75	208	SSW
4 December, 2024	4:00 ~ 4:59	0.005	1.440	0.081	0.006	0.008	0.009	0.011	0.52	193	SSW
4 December, 2024	5:00 ~ 5:59	0.004	1.440	0.081	0.009	0.012	0.008	0.013	0.77	208	SSW
4 December, 2024	6:00 ~ 6:59	0.004	1.710	0.085	0.018	0.029	0.009	0.014	0.72	242	WSW
4 December, 2024	7:00 ~ 7:59	0.004	1.620	0.088	0.009	0.014	0.010	0.013	1.57	216	SW
4 December, 2024	8:00 ~ 8:59	0.003	1.440	0.069	0.019	0.024	0.023	0.014	1.95	187	S
4 December, 2024	9:00 ~ 9:59	0.004	1.440	0.039	0.021	0.027	0.050	0.015	1.70	148	SSE
4 December, 2024	10:00 ~ 10:59	0.004	1.980	0.024	0.006	0.010	0.051	0.014	1.20	119	ESE

Max	0.018	2.064	0.139	0.046	0.068	0.122	0.028
Avg	0.005	1.574	0.084	0.020	0.027	0.035	0.017
Min	0.003	1.440	0.024	0.006	0.007	0.008	0.010

JFE MYANMAR Coated Steel Co.,Ltd.

APPENDIX-2 8-HOUR OZONE RESULTS

Date	Time			O_3 (8-hr)
				mg/m³
3 December, 2024	11:00	~	18:59	0.072
3 December, 2024	12:00	~	19:59	0.067
3 December, 2024	13:00	~	20:59	0.057
3 December, 2024	14:00	~	21:59	0.045
3 December, 2024	15:00	~	22:59	0.033
3 December, 2024	16:00	~	23:59	0.019
3 December, 2024	17:00	~	00:59	0.012
3 December, 2024	18:00	~	01:59	0.011
3 December, 2024	19:00	~	02:59	0.011
3 December, 2024	20:00	~	03:59	0.011
3 December, 2024	21:00	~	04:59	0.011
3 December, 2024	22:00	~	05:59	0.010
3 December, 2024	23:00	~	06:59	0.010
4 December, 2024	00:00	~	07:59	0.010
4 December, 2024	01:00	~	08:59	0.011
4 December, 2024	02:00	~	09:59	0.016
4 December, 2024	03:00	~	10:59	0.021

Max	0.072
Min	0.010

APPENDIX-3 CERTIFICATE OF CALIBRATION

Calibrate Report

Product	Air Quality Monitoring Station	**Model**	AQM – 09
Quantity	1 pc	**Cali Date**	30/05/2024
Device No.	OC20200624484529		
Appearance	□ Clean □ Non Corrosive □ No Damage		
Gas Type	O_3: ppb NO_2: ppb, SO_2: ppb, CO_2: ppm, CO: ppm, TVOC:ppm PM10: μg/m³, PM2.5: μg/m³, TSP: μg/m3 Wind veloci: m/s Wind direct: ° Atmospheric: hpa Temperature and humidity: °C/%RH		
Accuracy	± 3%F.S		
Resolution	1 ppb 0.1ppm		
Response Time	≤ 30S		
Survey Range	O_3:0-2000ppb, NO_2:0-2000ppb, SO_2:0-2000ppb, CO_2:0-2000ppm CO:0-2000ppm, TVOC:0-50 ppm PM2.5:0-1000 μg/m3, PM10:0-1000 μg/m3 , TSP: 0-1000 μg/m3 Wind veloci: m/s Wind direct: ° Atmospheric: hpa Temperature and humidity: °C/%RH		
Signal Output Mode	RS485 Modbus or 4G LTE		
Detection Method	Diffusion or Pumping Type		
Power Supply Voltage	AC 220V/50Hz		
Power Dissipation	≤ 20W		
Testing Condition	Temperature : 32.7℃ Humidity : 64%RH		
Calibration Gas	O_3, NO_2, SO_2, CO_2 CO,TVOC		
Cali Gas Test	1. O_3: Cali gas concentration: 2000ppb Inspect concentration: 1992ppb		
	2. NO_2: Cali gas concentration: 1260ppb Inspect concentration: 1262ppb		
	3. SO_2: Cali gas concentration: 1200ppb Inspect concentration: 1201ppb		
	4. CO_2: Cali gas concentration: 421ppm Inspect concentration: 280ppm		
	5. CO: Cali gas concentration: 100ppm Inspect concentration: 97.8ppm		
	6. PM2.5: measured value: 47μg/m3 PM10: measured value:50μg/m3		
	7. Air PR 1005 hpa		
	8. TSP measure value: 19μg/m³		
	9. Win speed measured value: 1.4m/s Wind direction measured value:319		
Test Result	Qualified		
Remark			

Quality Judgment:

Company : Henan Oceanus Import & Export Co.,Ltd

Date : 30/05/2024

NANOVA Co., Ltd.
Medical Scientific Industrial

SYSTEM HEALTH CHECK REPORT

Imformation

Instrument---------- Haz-scanner
Model---------- EPAS
Serial number---------- 918189
Unit Sensor---------- CO,NO2,O3,NO,SO2,PM10
PM2.5,T & RH,WS/WD,SLRR
Customer---------- Myanmar Koei International CO., LTD.
Date---------- 2024 September

Check List

Physical Check---------- OK
Supply Voltage Check---------- OK
PM 10,PM2.5 Air Flow Check---------- OK
SLRR,T & RH,WS/WD sensor Check---------- OK
NO,SO2 Sensor Health Check---------- Moderate
CO,NO2,O3 Sensor Health Check---------- Still Good
Lithium Battery Voltage Check---------- weak
Data Logging Check---------- OK
Data Downloading Check---------- OK

Recommend

To replace new acid gas scrubber every 6 months.
To replace internal filters every 6 months.
To perform factory calibration or in-field calibration every 12 months.

Performed by
Phoe Saw Htoo
Technical Service Engineer
NANOVA CO.,LTD

Approved by
Myo Oo
Technical Service Manager
NANOVA CO.,LTD

Yangon : 22-A, Shan Yeikthar Street, Sanchaung Township, Tel: +95 (1) 230 4901, 230 4902
Nay Pyi Taw : Za / 30, Ziwaka Say Sine Tan, Tha Phay Khone, Pyinmana. Tel:067 810 8083
Mandalay : 153 - B, 73 Street, Between 33x34, Chanaye Tharzan Township.Tel:09 430 66668
contact@nanovapteltd.com , website: www.nanova-scientific.com
Helpline: 09 421 360000, 09 451 360000

JFE MYANMAR COATED STEEL Co.,Ltd.

MYANMAR KOEI INTERNATIONAL LTD.
Consulting Engineers
No. 38A, 1st Floor, Grand Pho Sein Condo, Pho Sein Road, Tamwe Township, Yangon, Myanmar. Tel: +95 1 9648814

Calibration Record

Project Name: JFE Myanmar Coated Steel (M24081)

Calibration Date: December 2, 2024

No.	Instrument (Brand, Model)	Sensor/Probe	Calibration Equipment	Unit	Calibration Index	Before Calibration	After Calibration	Remark
1.	Sound Level Meter (RION NL-43) Sr.No.00230104	Sound Level	NC-74 Sound Calibrator	dB	94	93.1	94.0	Completed.
2.	Sound Level Meter (RION NL-42) Sr.No.00546217	Sound Level	NC-74 Sound Calibrator	dB	94	92.7	94.0	Completed
3.	Vibration Level Meter (RION VM-53A) Sr.No.00546766	Vibration Level	-	-	-	-	-	Service Report (June 7, 2024)
4.	Vibration Level Meter (RION VM-55) Sr.No.00627370	Vibration Level	-	-	-	-	-	The date of manufacturer certification (June 2023) *

* As factory calibration is not feasible, parallel monitoring of the vibration meters VM53A (Sr.No.00546766) and VM55 (Sr.No.00627370) was performed. The difference between the results is less than 1 dB and hence VM55 (Sr.No.00627370) can be functioned well.

Calibrated by

Saw Law Ban Ko Gyi
Environmental Expert

Checked by

Ye Tun Oo
Environmental Expert / Assistance Manager

JFE MYANMAR Coated Steel Co., Ltd.

RION 3-20-41 Higashimotomachi, Kokubunji, Tokyo 185-8533, Japan
RION Co.,Ltd. Phone:+81-42-359-7898 https://www.rion.co.jp

To Myanmar Koei International Ltd.

Issuing Date: June 7, 2024

Service Report

Dear Sir/Madame,

We are glad to inform you that following check/adjustment, repair and calibration have been carried out on your instrument:

VM-53A, Vibration level meter
Serial Number: 00546766
Option: PV-83C (S/No.: 49854)

Your Declaration: Calibration with test report, calibration certificate, and traceability flow chart is required.

Our Judgement: It was time to replace the backup battery.
The sub LCD was blurred.

Our Treatment: Replacement of the backp battery and the sub LCD.
Check and calibration.
Attachment of test report, calibration certificate, and traceability flow chart.

The instrument works well now, the followings show the check results:

Check & adjustment:	Good
General:	Good

RION CO., LTD.

Y. Sato

Manager

aeroqual

Aeroqual Limited
460 Rosebank Road, Avondale, Auckland 1026, New Zealand.
Phone: +64-9-623 3013 Fax: +64-9-623 3012
www.aeroqual.com

Calibration Certificate No. 71693

Calibration Date: 27 Feb 2024 09:08

Model: VOC 0-25 ppm

Serial No: VM–2305102-056

Environmental Conditions

Temperature 26.5 °C

Relative Humidity 31.9 %

Measurements

Calibration Standard /ppm	0.0	10.0	20.0	0.0
AQL Sensor (Mean) /ppm	0.0	10.0	19.5	0.0
AQL Sensor (Std. Dev) /ppm	0.000	0.000	0.000	0.000

*The Mean and Standard Deviation are calculated from three consecutive readings.

Calibration Standard

This sensor was calibrated against a certified mixture of isobutene in synthetic air diluted with zero air using mass flow controllers with calibrations traceable to the National Institute of Standards and Technology (NIST).

QC Approval: **Takao Yamasaki**

Date: **27 Feb 2024**

JFE MYANMAR Coated Steel Co.,Ltd.

AMTT Co., Ltd.

Solutions for Medical, Science & Laboratory Technology

CALIBRATION CERTIFICATE

Equipment Data — Date : 09/08/2024

Equipment	Protable Gas Analyzer
Model	PG-350
Serial No.	36EG0SYR
Manufacturer	Horiba Co.,Ltd

Customer Record

Country/City :	Myanmar / Yangon
customer Address:	Myanmar Kori International Ltd
Telephone No:	

Testing Program

Test Parameter	Display	Status	Remark
Initialization	Good	OK	-
Operation and Functioning	Good	OK	-

Calibration

Ambient Temp & Humidity	25°C / 60%				
Calibrator Gas	SO2 = 2400ppm, CO2 = 24%, O2 = 16%, NOx = 2000ppm, CO = 4000ppm				
Linearity (+2.0%)	Calibration Parameter				
	NOx(ppm)	SO2(ppm)	CO (ppm)	CO2 (%)	O2 (%)
	1999.9	2399.0	3999.9	23.6	15.6
	2001.0	2398.0	4001.0	23.8	15.9
	2003.0	2398.0	4002.0	23.6	16.1
AVG	2001.3	2398.3	4001.0	23.7	15.9
Repeatibility (CV%)	0.0008	0.0002	0.0003	0.0049	0.0159
Accuracy	-0.6496	0.0695	-0.0242	1.4085	0.8403
Accessories	1. User Manual				
Calibration Procedure	(1) Zero calibration with (N2) (2) Span calibration with (Standard calibraton gas)				
Judgement	PASS ☑		FAIL ☐		

This is to certify that the above Portable Gas Analyzer has been calibrated on 09/08/2024 and it should again on 09/08/2025 .

Performed By	Checked By
Htein Lin Han	Mar Mar Khaing
Date 09.08.2024	Date 09.08.2024

Head Office

No.242, Upper Pazundaung Street, Sat San Ward,, Mingalar Taung Nyunt Township, Yangon, Myanmar.

Tel. : (+951) 9000613-9000614-9000621, Fax. : (+951) 9000613,9000614

Email : info@pacific-aa.com, Website : www.amttgrp.com

JFE MYANMAR Coated Steel Co.,Ltd.

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်အစိုးရ

The Government of the Republic of the Union of Myanmar

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဝန်ကြီးဌာန

Ministry of Natural Resources and Environmental Conservation

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန

Environmental Conservation Department

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းလိုင်စင် (ပုဂ္ဂိုလ်)

Environmental Impact Assessment License (Individual)

ဦးခင်မောင်သိန်း၊ ၁၂/ ရကန(နိုင်)၀၆၁၉၈၁ အား **တွဲဖက်အကြံပေးပုဂ္ဂိုလ်** အဖြစ် လုပ်ကိုင်ဆောင်ရွက်ရန် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ငန်းလိုင်စင်ကို ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ပြုလုပ်သည့် တတိယပုဂ္ဂိုလ် သို့မဟုတ် အဖွဲ့အစည်း လုပ်ငန်းလိုင်စင်ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းနှင့် အညီ ဤဝန်ကြီးဌာန၏ အတည်ပြုချက်ဖြင့် ထုတ်ပေးလိုက်သည်။

It is hereby issued that **U Khin Maung Thane, 12/YaKaNa(N)061981** has fulfilled the requirements for obtaining an Environmental Impact Assessment License to conduct as an **Associate Consultant** under the Licensing Procedure for the Third Persons or Organizations Undertaking Initial Environmental Examination and Environmental Impact Assessment, approved by the Ministry of Natural Resources and Environmental Conservation.

လေ့လာဆန်းစစ်ခွင့်ရှိသည့် ကျွမ်းကျင်မှုနယ်ပယ်များမှာ အောက်ပါအတိုင်းဖြစ်သည်-

The areas of expertise, eligible to be conducted, are as follows:

1. **အထွေထွေပတ်ဝန်းကျင်စီမံခန့်ခွဲခြင်း (General Environmental Management)**
2.
3.
4.
5.

လိုင်စင်နံပါတ် License Number	: EIA-AC 090/2024
ထုတ်ပေးသည့် ရက်စွဲ Date of Issue	: 30-4-2024
ကုန်ဆုံးသည့် ရက်စွဲ Date of Expiry	: 29-4-2027

(သိန်းတိုး)

ညွှန်ကြားရေးမှူးချုပ်