M.O.G.E.

MPRL E&P

Environmental Monitoring Report

October 2019 to March 2020

for Redevelopment and Enhanced Oil Recovery (EOR) Programme

MPRL E&P Pte Ltd.

Contents

Acronym	Definition
ALARM	Advancing Life and Regenerating Motherland
ALARP	As Low As Reasonably Practicable
ASRs	Air Sensitive Receivers
BMI	Body Mass Index
CSR	Corporate Social Responsibility
EIA	Environmental Impact Assessment
ECC	Environmental Compliance Certificate
ECD	Environmental Conservation Department
EMP	Environmental Management Plan
EOR	Enhanced Oil Recovery
FOM	Field Operations Manager
GAP	Good Agriculture Practice
GOCS	Gas and Oil Collection Station
WBG	World Bank Group
WHO	World Health Organization
IFC	International Finance Corporation
JSA	Job Safety Analysis
KAP	Knowledge, Attitude and Practice
LPG	Liquefied Petroleum Gas
NEQEG	National Environmental Quality Emission Guideline
NSRs	Noise Sensitive Receivers
OGM	Operational Grievance Mechanism
PME	Powered Mechanical Equipment
RTA	Road Traffic Accident
SOP	Standard Operating Procedure
UN	United Nations
VDC	Village Development Committee
NDWG	National Drinking Water Guideline
EPA	United States Environmental Protection Agency

1.0 Executive Summary

MPRL E&P is undertaking production enhancement operations in Mann Field for nearly 25 years while improving field production and environmental management practices. It is also taking responsibilities for the implementation of the Environmental Management and Monitoring Programs in the Mann field.

This environmental monitoring report covers the activities and progress of the performance of environmental implementation and monitoring during the six month period from October 2019 to March 2020. It includes all the data from the monitoring activities, progress of the environmental measures in accordance with the Environmental Management Plan (EMP), and corrected actions based on comments from ECD, and challenges in actual operations. EMP together with its 8 sub plans are implemented as per schedule.

Based on the environmental monitoring data collected by a third-party contractor, there is no significant change compared to the baseline data taken in 2015. Some noteworthy facts of the monitoring results are as follows:

1. Most parameters of the air quality are well within the NEQEG guidelines but the mean $PM_{2.5}$ and SO_2 are slightly higher than the national guidelines in some locations. However, these values are not significantly increased from baseline data from 2015.
2. It is important to note that nearby human activities were observed during the measurement of both air and noise quality. Thus, it is planned to log the human activities at the next monitoring exercise to identify the root causes of increased measurements.
3. The field operations still maintain the achievement of zero discharged of produced water since 24 August 2017.
4. Due to COVID-19 pandemic, few parameters for surface, ground and waste water are not able to tested. However, when the crisis is over, all the parameters will be monitored as committed and will be described in the next bi annual reports.

Also, this report presents an overview of the CSR initiatives that have been implemented over the last six months (October 2019 to March 2020) in our communities around Mann Field in an effort to manage our social impacts in a mutually beneficial way.

During the third and fourth quarters of the fiscal year 2019-2020, a total of 6 community investment initiatives have been executed in Mann Field, to contribute to local development and wellbeing of the communities. All of the forecasted community infrastructure development has been completed in Mann Field. MPRL E&P organized 5 vocational skills trainings for the communities during the first and second quarters of the fiscal year 2019-2020, namely 'Ready-to-Eat Food Products Making Training, GYB-SYB Training, Horticulture Training, Professional Soap Making Training and Small-scale Commercial Mushroom Cultivation Training'. The sixth and last vocational training, 'Refresher Course for Handmade Bag Making Training' was organized in November 2019, with the support of Young Women Christian Association (YWCA).

Not only did MPRL E&P organize the vocational empowerment for the locals, but also the community livelihood development programs such as monthly agricultural, livestock, and breeding knowledge sharing sessions organized with the support of the Department of Agriculture (Minbu) and Department of Livestock, Breeding and Veterinary for the local farming communities and for those who are interested to start the business regarding livestock and breeding. Mobile clinic program for the medically underserved communities, mainly focusing on the elderly people who are over the age of 65 and children under 5. Additionally, the capacity building trainings for Village Development Committees (VDCs) and Community Volunteers were also organized to enhance the leadership and project-management skills.

To promote the greener, healthier and cleaner environment in Mann Field, Trash Hero Minbu clean-up activities, and the awareness raising sessions on the topics of waste reduction, use of plastics and recycling for school children and community households were organized. With three-wheeled cargo bike supported by the CSR program of MPRL E&P, the full-scale community-led waste management program has been rolled out in Mann Field communities that fall outside of Minbu Municipal area. The community-led waste management program raises awareness on the importance of proper waste management for a better environment and sustainable development, and to motivate all concerned to take collective actions on proper waste management.

Through the merit of the educational partnership between MPRL E&P's CSR Program and No. 5 Industrial Training Centre (ITC) (Magway), three students from the surrounding communities in Mann Field have successfully completed their 11-month studies in the areas of skills they are interested in.

Timely and regular engagement with our key stakeholders is a cornerstone in MPRL E&P's CSR programs in Mann Field. MPRL E&P engages stakeholders at field level, community level, local and regional levels to ensure a two-way communication channel exists. To enable local communities to have their say and ensure impact associated with operations affecting the environment and surrounding communities are solicited, monitored, and effectively addressed, the effective functioning of the Mann Field Operational Grievance Mechanism (OGM), social management audit and regular stakeholder engagement activities in Mann Field are well established along with the business operations at Mann Oil Field and its surrounding communities.

An awareness raising campaign on COVID-19 was also staged by MPRL E&P's CSR Team for the 14 surrounding villages in Mann Field and in Minbu Township in cooperation with Department of Public Health (Minbu) and Community Volunteers. As the COVID-19 outbreak evolves, the Mobile Clinic was suspended starting from April 1, 2020 to contain the spread of COVID-19 until the situation improves.

2.0 Project Description and Production information

The Mann Field, discovered in 1970 by MOGE, currently includes 674 wells of which 301 were producing as of February 2020 while the remaining wells were shut-in. The total produced oil and associated gas from the Production Enhancement Project is14.7 MMbbls, including 9 MMbbls above the normal decline curve, and 16.6 Bcf gas as of February 2020.

2.1 Mann Field Operation Status

Under the PCC, MPRL E&P is undertaking a re-development operations activity of the Mann Field to improve the environmental performance of the operations.

The operation activity includes:

Infill well drillings – due to current decline of the field, MOGE and MPRL E&P have been drilling infill wells in main Mann Field areas close to currently producing wells and outside of surrounding communities, however no infill well activity during the last six months.

Deepening Wells – to deepen tens to hundreds of foot from existing well bore by drilling, no activity of deepening well during the six months.

Chemical Treatment - to ensure that oil is maximized from the reservoir by using small amount of chemical such as paraffin dispersant, paraffin inhibitor, and non-chemical GreenZyme.

Remedial and work over operations – maintain oil production by servicing such as swabbing and bailing of producing wells;

Improvement of Pumping Unit – pumping units will be / have been repaired to reduce the likelihood of spills to the surrounding areas.

Refurbishments of the Gas and Oil Collecting Stations (GOCS), Flow Pipes and Drain Pits – to ensure health and safety to surrounding communities and reduce the risk of spills.

Rehabilitation of Shut-in Wells – sealing off shut-in wells to avoid contamination of surrounding and restoring surrounding areas to resemble original state.

Re-perforations will be undertaken for better control of the well.

Development of Produced Water Management System – produced water will be injected into shut in wells.

2.2 Current Operations Summary

2.2.1 Remedial and work over operations within six months

(October 2019 to March 2020)

No.	Service	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Total
		Frequecy of Activites						
1	Pump Service	16	9	11	14	15	13	78
2	Raise Up PSD & Pump Service	2	1				1	4
3	Fishing & Lower down Pump Setting Depth			1				1
4	Bump Valve	1	2	5	1			9
5	Re-space out Pump & Bump Valve (RSBV)						2	2
6	Scraping & Bailing	5		2				7
7	Swabbing, Bailing & Change Tubing	3	3	7	6	2	4	25
8	Clean out Bottom				3			3
9	Clean Out Bottom for Casing Swabbing	2	3	3	2	3	2	15
10	Bailing & Change Tubing		7				5	12
11	Check Bottom Hole Assembly & Bailing					3		3
12	Change Tubing			1	2	4	2	9
13	Fishing & Pump Service		2			1	2	5
14	Fishing Operations				2			2
15	Greenzyme Treatment			1			1	2
16	Recover Bottom Hole Assemly		1	1	2	2		6
17	Recover Sucker Rod String					1		1
18	Additional Perforation					1	1	2
19	Pumping Test	1	1	1	2	1	1	7
	Total Serviced Wells (Monthly)	**30**	**29**	**33**	**34**	**33**	**34**	**193**

Figure. 1: Remedial and work over operations activities

2.2.2 Mobile Power Generator Register Lists in Mann Field

No.	Unit Name	Engine type	Hose Power	Units
1	P-100	3408 CAT	365 HP	1
2	P-82	3306 CAT	270 HP	1
3	P-75	Cummins N855-P235	235 HP	1
4	P-70	Cummins N855-P250	250 HP	1
5	P-69	Cummins N855-P250	250 HP	1
6	P-65	Detroit 6V71	260 HP	1
7	Tractor		50 HP	4
8	Crane	Nissan RD8	365 HP	1
9	Loader	CAT	85 HP	1
10	Forklift	CAT	160 HP	1
11	Wheel Loader	CAT	200 HP	1
12	Grader	CAT	200 HP	1
13	Bull Dozer	CAT	275 HP	1
14	Mud Pump	CAT	350 HP	1
15	OPI Mud Pump	Detroit	365 HP	1
16	Main Mud Pump	Detroit	439 HP	1
17	Power Swivel	CAT	173 HP	1
18	Power Pack	F6L912	63 HP	2
19	Welding Machine	Deutz	25 HP	2
20	Compressor	CAT	85 HP	1
21	Vehicle			30

Figure. 2: Mobile Power Generator Register Lists

3.0 Environmental Management Organization

MPRL E&P is committed to providing resources essential to the implementation and control of the EMP. Resources include the appropriate human resources and specialized skills. The structure for the organization responsible for environmental management and implementation of the EMP is depicted in Table 1.0.

Table 1.0: Environmental Management Organization Roles and Responsibilities

Position	Responsibility
MPRL E&P	
General Manager	Oversee and coordinate all activities pertaining to the Project; ultimately responsible for environmental issues. Ensure delivery by the asset of its environmental, and operational targets. Ensure effective communication with all stakeholders.
Field Operations Manager	Technical aspects of the Project including contractor supervision during operations. Responsible for the execution of the Emergency Response Plan including the Oil Spill Contingency Plan.
Construction Manager	Technical aspects of the Project including subcontractor supervision during Project implementation.
HSE Officer (HSE Coordinator)	Ensuring that the Project and subcontractors operate in accordance with applicable regulatory environmental requirements and plans. Monitor implementation of environmental protection measures, and assist with technical input into oil spill response requirements.
Environmental Officer	Responsible for the implementation of EMP and ensure that environmental regulatory requirements are met with the National Environmental Quality Emission Guideline (NEQEG). Monitor implementation of environmental protection measures. Ensure environmental monitoring and inspections/audits are undertaken as per the requirements of the EMP.
CSR Field Coordinator (Community Liaison Officer)	Liaise with local communities, farmers and government regulators on the Project's behalf. Implement environmental awareness and education programmes with communities.
HSE Manager	Ensure that environmental regulatory requirements are met and that EMP requirements are properly implemented.

The Field Operations Manager has control over strategic project aspects and interaction with subcontractor staff where project activities take place.

The HSE Officer is monitoring the implementation of health, Safety and Environmental protection measures, including tracking, inspection, reporting and assisting with technical input into emergency response procedures and implementing as per the EMP.

The Environmental Officer is responsible for implementing the EMP and supervising contractors during the monitoring activities in the operations and preparing for the environmental monitoring report.

CSR Field Coordinator whose role is the continuation of liaisons with the local community.

HSE Manager is to ensure that environmental regulatory requirements are met and that EMP requirements are properly implemented.

4.0 Environmental Management Plan

The Environmental Management Plan (EMP) is to ensure full compliance with the Project's policies and with mitigation, monitoring and other commitments made in the EIA Report. While the EMP was treated as a high-level framework document, it was linked to several detailed management plans as described below which were developed to lay out the specifications for compliance with specific environmental elements.

These management plans mention in detail the management and mitigation measures required to be implemented, the time frame and responsibilities for their implementation, detailed training requirements, inspections/audits to check implementation, and reporting requirements in the EIA report. These management plans are presented below with details mentioned in the EIA report. MPRL E&P is implementing and monitoring as per the schedule planned.

- Waste Management Plan
- Emergency Response Plan
- Spill Response Plan
- Fire Risk Management Plan
- MEDEVAC Procedures
- Health and Hygiene Management Plan
- Transportation Management Procedures
- Environmental Monitoring Plan

4.1 Waste Management Plan

The objectives of the Waste Management Plan are to:

- Ensure waste is managed in a controlled and environmentally sound manner;
- Comply with all statutory and contractual requirements concerning the management of waste;
- Ensure resources are recovered where possible and safe to do so, for re-use and recycling; and
- Ensure appropriate recording and tracking for all waste generated.

The WMP has been implemented during the operation phases. Waste streams are divided into four categories:

- Hazardous recyclable;
- Hazardous non-recyclable;
- Non-hazardous recyclable; and
- Non-hazardous non-recyclable.

The key steps in the waste management process are:

- Waste is segregated into hazardous, general and recyclable waste within suitable bins that are clearly labelled;
- Bins/drums are sent to approve disposal location. Each bin/drum is labelled with the waste type clearly written;
- Each waste bin/drum sent is included on the backload manifest; and
- Waste transportation is recorded in the waste database

4.1.1 Waste Implementation and Action Progress

Figure. 3: Waste Management Compound

4.1.2 Existing Solid Waste System

The solid waste management system in MPRL E&P mainly includes waste collection, segregation, and recycling continues to play a minimal role at present. 3Rs (reduction, reuse and recycle) were developed.

In Mann Field, waste segregation was implemented involving sorting and separating waste on the basis of its characteristics. Waste materials were segregated at source by providing colored and marked (with universal symbols and writing in English and Burmese) bins for storing waste as follows:

- Green – General Waste
- Yellow – Recycle Waste
- Red – Hazardous Waste
- Black – Non-Hazardous Waste
- Blue – Paper

Bins were placed in all GOCS, offices, warehouses, workshops, construction sites, base camp, and clinics. No waste collection bin would be allowed to overflow before it is emptied, and waste storage receptacles would be replaced promptly, in the event of damage. A sufficient number of bins were placed for each type of waste at waste collection points, depending on the variety and quantity of the waste expected from the location.

Waste of any description will not be stored permanently or for prolonged periods of time at the Waste Management Compound. The following procedures have been applied to the temporary storage arrangements for all waste:

- The waste are properly stored in the designated area and separated from other materials/substance storage.
- The facilities are clearly identified with each Identified area (like: Recycle Area; Hazardous Area...).

4.1.3 Solid Waste Management in MPRL E&P

Figure 4: Waste Management Flow Chart

The management of waste is a key component in a business. All the waste produced is recorded. MPRL E&P is monitoring and implementing compliance with the National Emission Quality Guideline and industry best practices.

According to our within 6-month self-monitoring records, from Oct 2019 to Mar 2020, the composting process is produced about 520 Kg. This process is very fast in the summer but in the rainy season the composting bacteria not work best under neutral conditions. So, MPRL E&P has planned to use the Bokashi need to speed up the composting process in the rainy season.

Figure 5: Composting Process

Figure 6: Composting with plantation in WCM

Recycling materials such as glass, paper and cardboard, plastics bottles, and metals, 2727 Kg are collected and sold out to the third party. Recycling materials are collected and separately from general waste.

Figure 7: Recycle Waste in WMC

General waste 4000 Kg collection from all area in the Mann Field operations during one year and temporary storage at Waste Management Compound. Field team managed cleaning and disposing the general waste by using Jambo bags and dispensed to designated area.

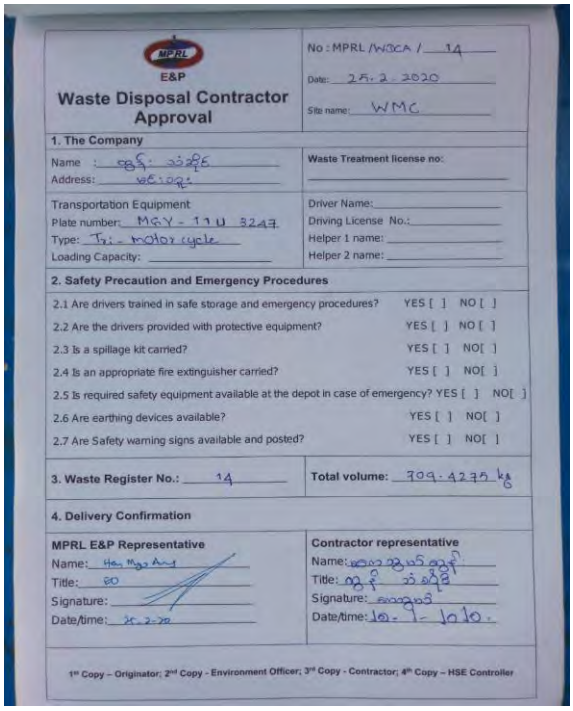
Figure 8: General waste storage in WMC

Figure 9: Cleaned and dispensed to designated area

The Waste have been re-selected, packed and stored at the Waste Recycle storage area. Recycle waste is disposed of by an approved third party.

Recycle waste have registered using the "Waste Register" form including specific details as to the type and quantity of waste.

Recycle Waste which is going to be sent to a selected third party for adequate disposal have to be monitored using the "Waste Disposal Contractor Approval" form which was approved by the Field Manager and / or site HSE Officer.



E&P

Waste Disposal Contractor Approval

No : MPRL/WDCA/ 14

Date: 25.2.2020

Site name: WMC

1. The Company

Name :

Address:

Waste Treatment license no:

Transportation Equipment

Plate number: MGY - 1111 3247

Type: ဘိုင်ဆိုင်ကယ်

Loading Capacity:

Driver Name:

Driving License No.:

Helper 1 name:

Helper 2 name:

2. Safety Precaution and Emergency Procedures

2.1 Are drivers trained in safe storage and emergency procedures? YES [ ] NO [ ]

2.2 Are the drivers provided with protective equipment? YES [ ] NO [ ]

2.3 Is a spillage kit carried? YES [ ] NO [ ]

2.4 Is an appropriate fire extinguisher carried? YES [ ] NO [ ]

2.5 Is required safety equipment available at the depot in case of emergency? YES [ ] NO [ ]

2.6 Are earthing devices available? YES [ ] NO [ ]

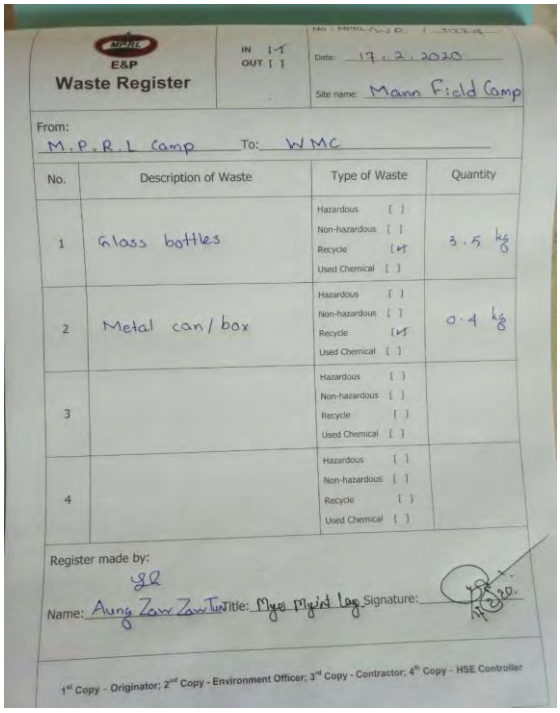
2.7 Are Safety warning signs available and posted? YES [ ] NO [ ]

3. Waste Register No.: 14 **Total volume:** 709.4275 kg

4. Delivery Confirmation

MPRL E&P Representative	Contractor representative
Name: Ko Myo Aung	Name:
Title: SO	Title:
Signature:	Signature:
Date/time: 25.2.20	Date/time: 10.1.2020

1st Copy – Originator; 2nd Copy - Environment Officer; 3rd Copy - Contractor; 4th Copy – HSE Controller



E&P

Waste Register

IN [ ]

OUT [ ]

Date: 17.2.2020

Site name: Mann Field Camp

From: M.P.R.L Camp To: WMC

No.	Description of Waste	Type of Waste	Quantity
1	Glass bottles	Recycle [✓]	3.5 kg
2	Metal can / box	Recycle [✓]	0.4 kg
3			
4			

Register made by:

Name: Aung Zaw Zaw Tun Title: Myo Myint Lay Signature: 17.2.20

1st Copy - Originator; 2nd Copy - Environment Officer; 3rd Copy - Contractor; 4th Copy - HSE Controller

Figure 10: Waste disposal Forms

Hazardous waste, 602 Kg are collected from all work related area and properly storage at Waste Management Compound. Now preparing work order process with GOLDEN DOWA ECOSYSTEM for adequate disposal method.

Figure 11: Hazardous waste storage in WMC

Figure 11A: Hazardous waste storage in WMC

4.1.4 Monthly Waste Monitoring Progress

	2017	2018	2019	2020
General Waste	272 Kg	360 Kg	538 Kg	268 Kg
Hazardous Waste	4059 Kg	790 Kg	1198 Kg	18.5 Kg
Recycle Waste	1069 Kg	1415 Kg	3079 Kg	2080 Kg
Composting	1910 Kg	1783 Kg	1437 Kg	172 Kg
Organic Waste	10128 Kg	7910 Kg	7405 Kg	900 Kg

Figure 12: Waste Register in WMC

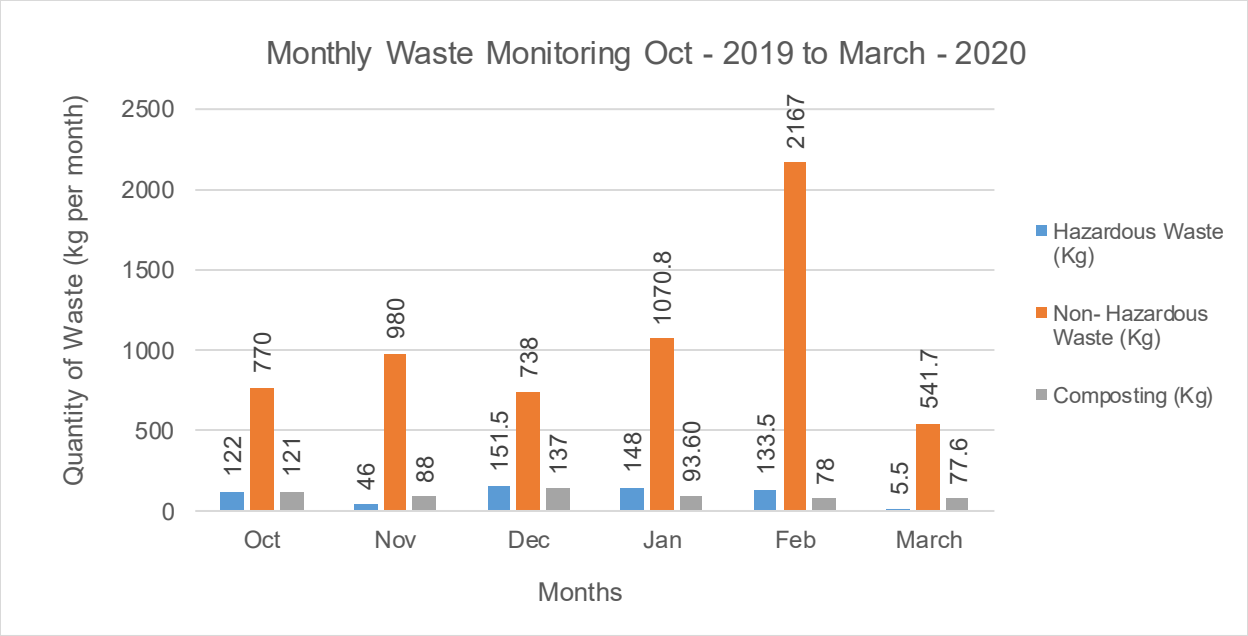


Figure 13: Monthly Waste Monitoring (Oct 2019 to March 2020)

4.2 Emergency Response Plan

MPRL E&P has developed plans and procedures to identify the potential for and response to environmental accidents and health and safety emergency situations and for preventing and mitigating any potentially adverse environmental and social impacts that may arise. The plans included to: notification procedures; an emergency response organization with personnel properly trained on their roles and responsibilities; having adequate and appropriate emergency response equipment readily available to respond to minor incidents; and having the capability to quickly request additional assistance.

MPRL E&P is implementing and managing emergency situations from the Project activities in Mann Field. The Emergency Response Plan (ERP), which also covers fire risk management, includes:

- Emergency Response Plan
- Spill Manage Plan
- Medical emergencies including medevac procedures;
- Natural disaster (e.g. flood, cyclone, earthquakes) related emergencies;
- Fire and electrical related emergencies

MPRL E&P is conduction the drill exercise together with MOGE and MPRL E&P team as per above mentioned plans.

- Fire Drill at GOCS-3 together with MOGE and Minbu District Fire Brigade (20th Oct 2019)
- "Stop Work Drill" Conducted at GOCS (25th November 2019)
- Fire Drill and Man Down Drill" Conducted at Warehouse (3rd December 2019)
- "Earthquake Drill" Conducted at Vantage Tower (20th December 2019)
- Spill Drill conducted at M-513 (29th January 2020)

MOGE & MPRL E&P invited local fire brigade, Minbu Township and performed drill exercise to get all team member familiar with fire outbreak situation and crews to be able to handle in accordance with the planned fire emergency response procedure and also to build strong relationship with local authority bodies.

Figure 14: Drill exercise with MOGE & local brigade

Figure 15: Drill exercise in warehouse

Figure 16: Drill exercise in Workshop

Figure 17: Drill exercise in Office Tower

Figure 18: Spill drill exercise with MOGE & MPRL E&P

4.3 Drill Monitoring Plan

With the observations from those drill exercises, corrective actions have been recorded and implemented for further improvement. MPRL E&P is submitting monthly reporting of the field operations activity to MOGE.

4.4 Implementation of Health and Hygiene Management

As a part of promoting safety culture at all levels of organization, conducted the Weight Management Campaign Period.

As the first quarter of FY 2019-20 (August ~ December) has been planned as the weight management period, the HSE team has been liaising with the field team to implement necessary control arrangements for the prevention overweight and prevented additional weight gained.

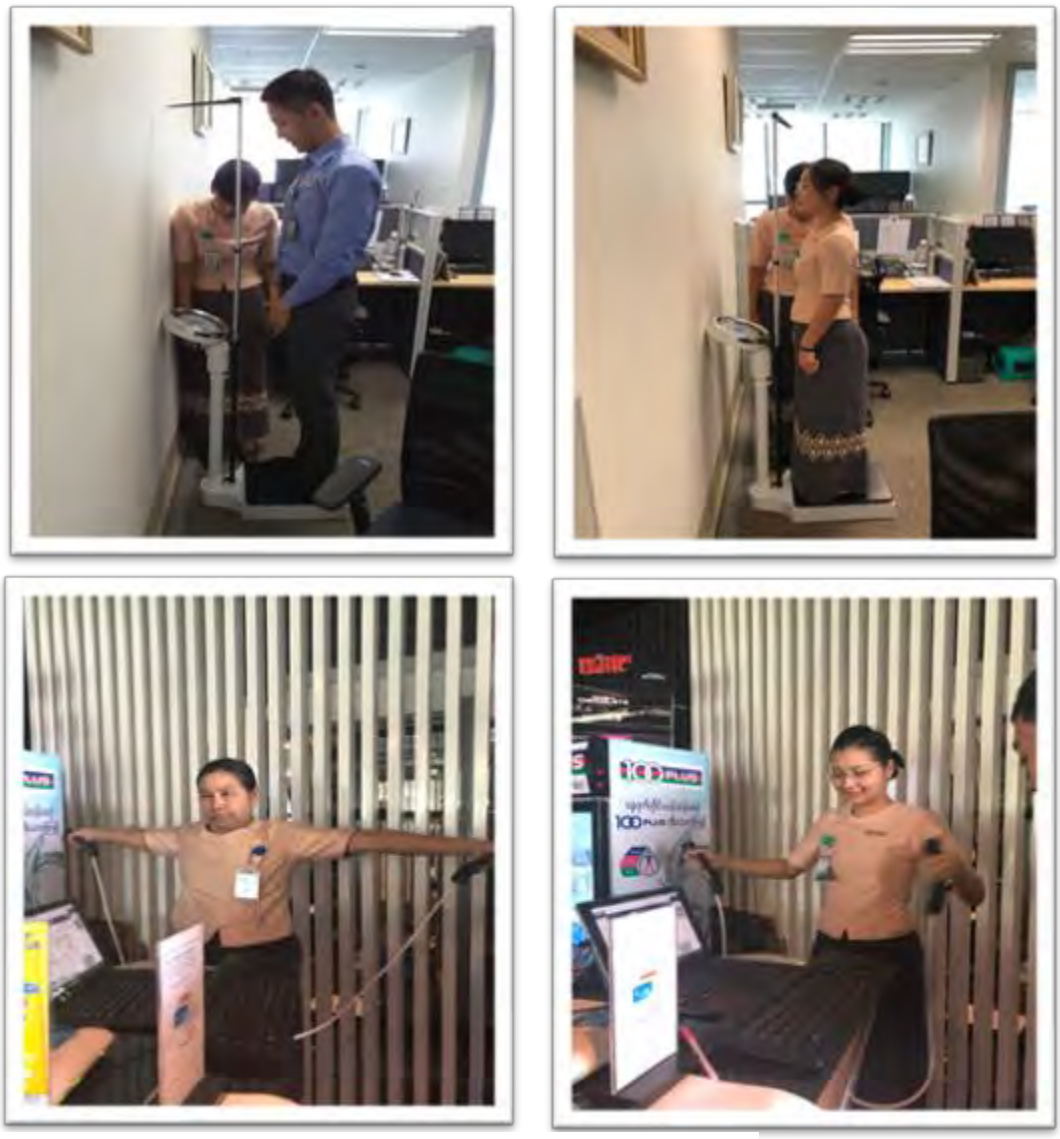


Figure 19: Weight Management Campaign

Figure 19(A): Weight Management Campaign

Figure 19(B): Weight Management Campaign

4.5 MEDEVAC Procedures

The purpose of medical evacuation is to allow field crew and the field management team the opportunity to secure essential medical emergency procedures and to refresh and correct procedures to be familiar at all times in case of emergency of any kind of injury and incident in the operations.

Team conducted the Men down Drill on Oct & Dec 2019.

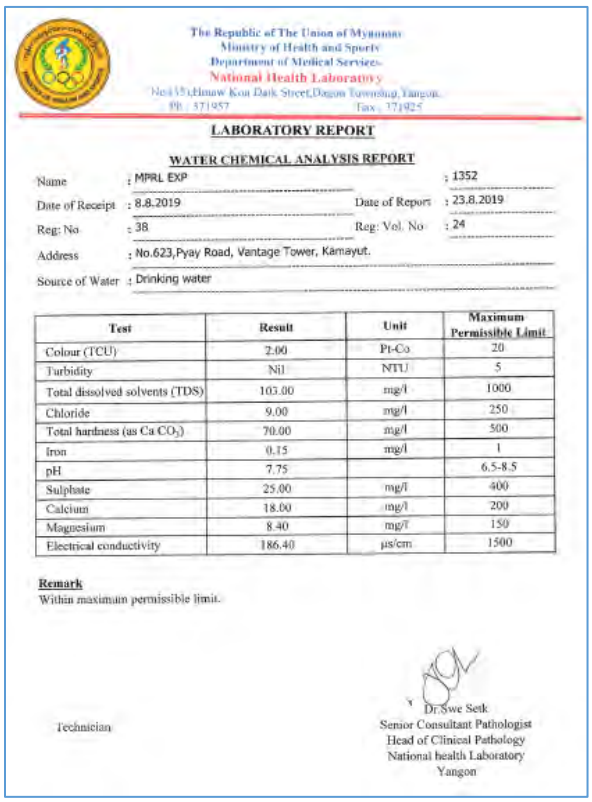
Figure 20: Medical Evacuation Drill

Figure 20(A): Medical Evacuation Drill

4.6 Monitoring of Camp Water Quality

In the base camp, MPRL E&P installed a purified drinking water machine (RO System) for drinking and food preparation to cover enough consumption for all staff who are living in the base camp. The team is monitoring water quality quarterly and perform hygiene inspections and audits by the site doctor and HSE team as per the planned schedule.

Figure 21: Purify Drinking Water Machine for the base camp



The Republic of The Union of Myanmar
Ministry of Health and Sports
Department of Medical Services
National Health Laboratory
No.(35),Hmaw Kon Daik Street,Dagon Township,Yangon.
Ph : 371957 Fax : 371925

LABORATORY REPORT

WATER CHEMICAL ANALYSIS REPORT

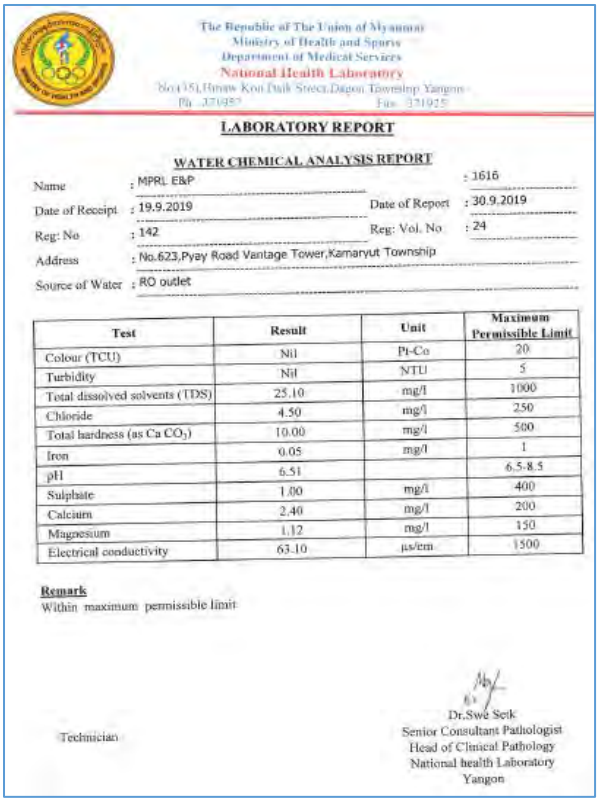
Name : MPRL EXP : 1352
Date of Receipt : 8.8.2019 Date of Report : 23.8.2019
Reg: No : 38 Reg: Vol. No : 24
Address : No.623,Pyay Road, Vantage Tower, Kamayut.
Source of Water : Drinking water

Test	Result	Unit	Maximum Permissible Limit
Colour (TCU)	2.00	Pt-Co	20
Turbidity	Nil	NTU	5
Total dissolved solvents (TDS)	103.00	mg/l	1000
Chloride	9.00	mg/l	250
Total hardness (as Ca CO_3)	70.00	mg/l	500
Iron	0.15	mg/l	1
pH	7.75		6.5-8.5
Sulphate	25.00	mg/l	400
Calcium	18.00	mg/l	200
Magnesium	8.40	mg/l	150
Electrical conductivity	186.40	µs/cm	1500

Remark
Within maximum permissible limit.

Technician

Dr.Swe Seik
Senior Consultant Pathologist
Head of Clinical Pathology
National health Laboratory
Yangon



The Republic of The Union of Myanmar
Ministry of Health and Sports
Department of Medical Services
National Health Laboratory
No.(35),Hmaw Kon Daik Street,Dagon Township Yangon
Ph : 371957 Fax : 371925

LABORATORY REPORT

WATER CHEMICAL ANALYSIS REPORT

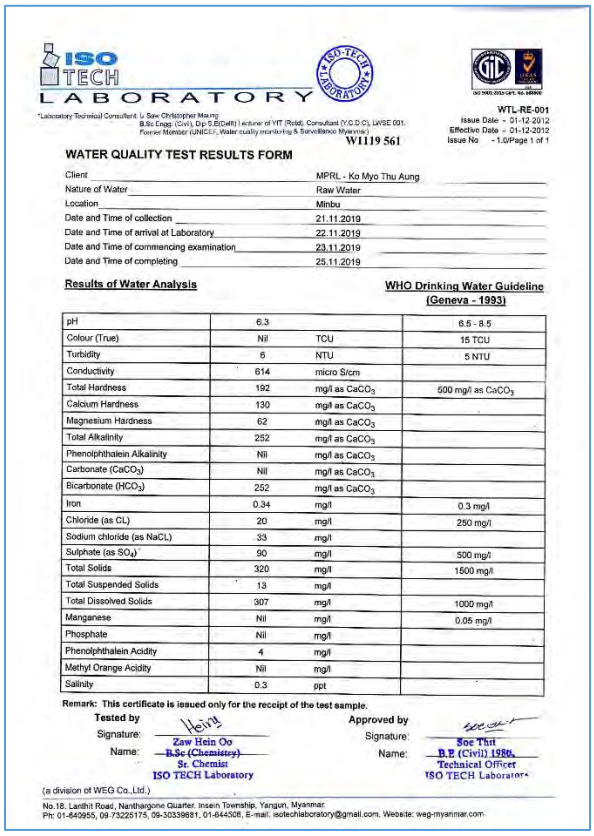
Name : MPRL E&P : 1616
Date of Receipt : 19.9.2019 Date of Report : 30.9.2019
Reg: No : 142 Reg: Vol. No : 24
Address : No.623,Pyay Road Vantage Tower,Kamaryut Township
Source of Water : RO outlet

Test	Result	Unit	Maximum Permissible Limit
Colour (TCU)	Nil	Pt-Co	20
Turbidity	Nil	NTU	5
Total dissolved solvents (TDS)	25.10	mg/l	1000
Chloride	4.50	mg/l	250
Total hardness (as Ca CO_3)	10.00	mg/l	500
Iron	0.05	mg/l	1
pH	6.51		6.5-8.5
Sulphate	1.00	mg/l	400
Calcium	2.40	mg/l	200
Magnesium	1.12	mg/l	150
Electrical conductivity	63.10	µs/cm	1500

Remark
Within maximum permissible limit

Technician

Dr.Swe Seik
Senior Consultant Pathologist
Head of Clinical Pathology
National health Laboratory
Yangon



ISO TECH LABORATORY

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 1

W1119 561

WATER QUALITY TEST RESULTS FORM

Client : MPRL - Ko Myo Thu Aung
Nature of Water : Raw Water
Location : Minbu
Date and Time of collection : 21.11.2019
Date and Time of arrival at Laboratory : 22.11.2019
Date and Time of commencing examination : 23.11.2019
Date and Time of completing : 25.11.2019

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	6.3		6.5 - 8.5
Colour (True)	Nil	TCU	15 TCU
Turbidity	6	NTU	5 NTU
Conductivity	614	micro S/cm	
Total Hardness	192	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness	130	mg/l as $CaCO_3$	
Magnesium Hardness	62	mg/l as $CaCO_3$	
Total Alkalinity	252	mg/l as $CaCO_3$	
Phenolphthalein Alkalinity	Nil	mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)	Nil	mg/l as $CaCO_3$	
Bicarbonate (HCO_3)	252	mg/l as $CaCO_3$	
Iron	0.34	mg/l	0.3 mg/l
Chloride (as CL)	20	mg/l	250 mg/l
Sodium chloride (as NaCL)	33	mg/l	
Sulphate (as SO_4)	90	mg/l	500 mg/l
Total Solids	320	mg/l	1500 mg/l
Total Suspended Solids	13	mg/l	
Total Dissolved Solids	307	mg/l	1000 mg/l
Manganese	Nil	mg/l	0.05 mg/l
Phosphate	Nil	mg/l	
Phenolphthalein Acidity	4	mg/l	
Methyl Orange Acidity	Nil	mg/l	
Salinity	0.3	ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
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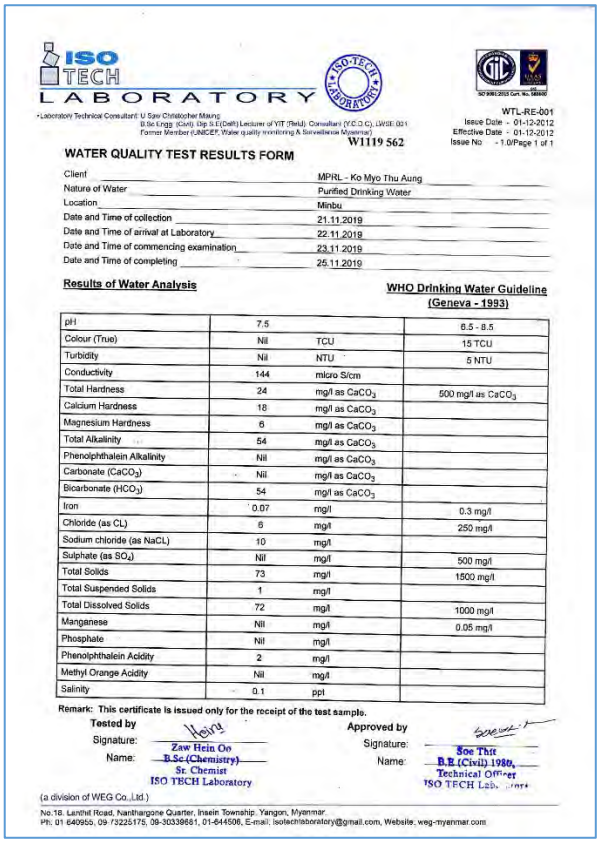
No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-30339681, 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com



ISO TECH LABORATORY

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 1

W1119 562

WATER QUALITY TEST RESULTS FORM

Client : MPRL - Ko Myo Thu Aung
Nature of Water : Purified Drinking Water
Location : Minbu
Date and Time of collection : 21.11.2019
Date and Time of arrival at Laboratory : 22.11.2019
Date and Time of commencing examination : 23.11.2019
Date and Time of completing : 25.11.2019

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	7.5		6.5 - 8.5
Colour (True)	Nil	TCU	15 TCU
Turbidity	Nil	NTU	5 NTU
Conductivity	144	micro S/cm	
Total Hardness	24	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness	18	mg/l as $CaCO_3$	
Magnesium Hardness	6	mg/l as $CaCO_3$	
Total Alkalinity	54	mg/l as $CaCO_3$	
Phenolphthalein Alkalinity	Nil	mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)	Nil	mg/l as $CaCO_3$	
Bicarbonate (HCO_3)	54	mg/l as $CaCO_3$	
Iron	0.07	mg/l	0.3 mg/l
Chloride (as CL)	6	mg/l	250 mg/l
Sodium chloride (as NaCL)	10	mg/l	
Sulphate (as SO_4)	Nil	mg/l	500 mg/l
Total Solids	73	mg/l	1500 mg/l
Total Suspended Solids	1	mg/l	
Total Dissolved Solids	72	mg/l	1000 mg/l
Manganese	Nil	mg/l	0.05 mg/l
Phosphate	Nil	mg/l	
Phenolphthalein Acidity	2	mg/l	
Methyl Orange Acidity	Nil	mg/l	
Salinity	0.1	ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Lab.

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Figure 22: Drinking water parameter results

5.0 Environmental Monitoring Plan

Monitoring will be conducted to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts.

As a minimum, the following monitoring on the physical environment will be undertaken:

Physical Environment Monitoring

- Ambient air quality;
- Noise;
- Groundwater quality;
- Surface water quality and
- Soil quality.

Monitoring will be undertaken during the following periods of the EOR and re-development program activities:

- At least two weeks before the construction activities for baseline data collection.

- Monthly monitoring for the first three months during both the construction and operation phase. After the three month period, a review should be conducted to determine whether the collected data indicates an impact has occurred beyond what has been predicted within the EIA. Should no higher impacts be observed, monitoring can be reduced to a six-monthly or yearly programme. Should higher impacts be observed, monitoring should continue and appropriate actions be taken to alleviate the impacts with an aim to prevent any further impacts from occurring.

After first monitoring report with a three-month survey during the six-month period, no higher impacts are observed from the existing operations, however after conducted the air quality and the results shown some monitoring point occurred CO, PM2.5 and SO2 value is still higher than based line value compared with May 2015 survey results.

Field operation activities were minimizing the frequency of the services in operation to reduce the impact of air quality. However, road construction was constructed the concrete access road G-20 from main gate to in front of the warehouse about (2.8) km. Another tar road constructed for the villages approximately 800 meters in the Mann field. Due to the construction of the road and human activity such as motorbikes, it may occur the value of air quality of CO, PM2.5, and SO2 are still higher than NEQEG value.

Figure 23: G-20 Concrete road construction in Mann Field

Figure 23 A: G-20 Concrete road construction in Mann Field

Also, a program of regular monitoring of the gaseous composition of the vented gas and regular air quality monitoring at selected ASRs were implemented as per monitoring commitment plan. Most of the vent gas wells were measured and gas volume was not measurable (zero value) and minimize impacts to air quality caused by the venting which is an existing operation in the Mann Field.

As per EIA commitments, MPRL E&P was conducting Environmental monitoring activities that started from July 2019 to September 2019 (three months) and submitted the monitoring report to the Environmental Conservation Department (ECD) on 29 October 2019. This is the second time conducting of monitoring survey after six months as per the environmental monitoring plan.

5.1 Ambient Air Quality

5.1.1 Ambient Air Monitoring Station

Table 2.0: Ambient Air Quality and Noise Monitoring Stations

Monitoring Stations	GPS Coordinates	Sampling Date (Baseline)	Sampling Date (Monitoring)
Z1AQN	20˚19' 39.0'' N 94˚49' 18.4'' E	8 – 9 May 2015	5 – 6 Feb 2020
Z2AQN	20˚15' 40.6'' N 94˚50' 08.0'' E	7 – 8 May 2015	6 – 7 Feb 2020
Z3AQN	20˚13' 21.5'' N 94˚51' 19.6'' E	6 - 7 May, 2015	3 – 4 Feb 2020
Z4AQN	20˚11' 41.9'' N 94˚52' 32.4'' E	6 - 7 May 2015	4 – 5 Feb 2020

5.1.2 Monitoring Parameters and Equipment

Sampling and analysis of ambient air pollutants was conducted accordingly to the guidelines of NEQEG. The Haz-Scanner EPAS Wireless Environmental Perimeter Air Station was used to collect Ambient Air Monitoring data, which is a portable monitor that records real time data that directly logged the ambient air quality measurements as well as climatological data. The air quality parameters and meteorological data collected in the survey are listed in below table 3.0.

5.1.3 Monitoring Parameters

Table 3.0: Air Monitoring Parameter

Parameters		Unit	Method and Duration
Air Quality			*In situ* reading for 24-hour
Sulfur dioxide (SO_2)		ppm	
Carbon monoxide (CO)		ppm	
Nitric oxide (NO)		ppm	
Nitrogen dioxides (NO_2)		ppm	
Particulate matter < 2.5 µm ($PM_{2.5}$)		mg/m^3	
Particulate matter < 10 µm (PM_{10})		mg/m^3	
Meteorological Data			
Relative Humidity (R.H.)		%	
Temperature		°C	
Wind speed		kph	
Wind direction		-	

5.1.4 Air Monitoring Location Map

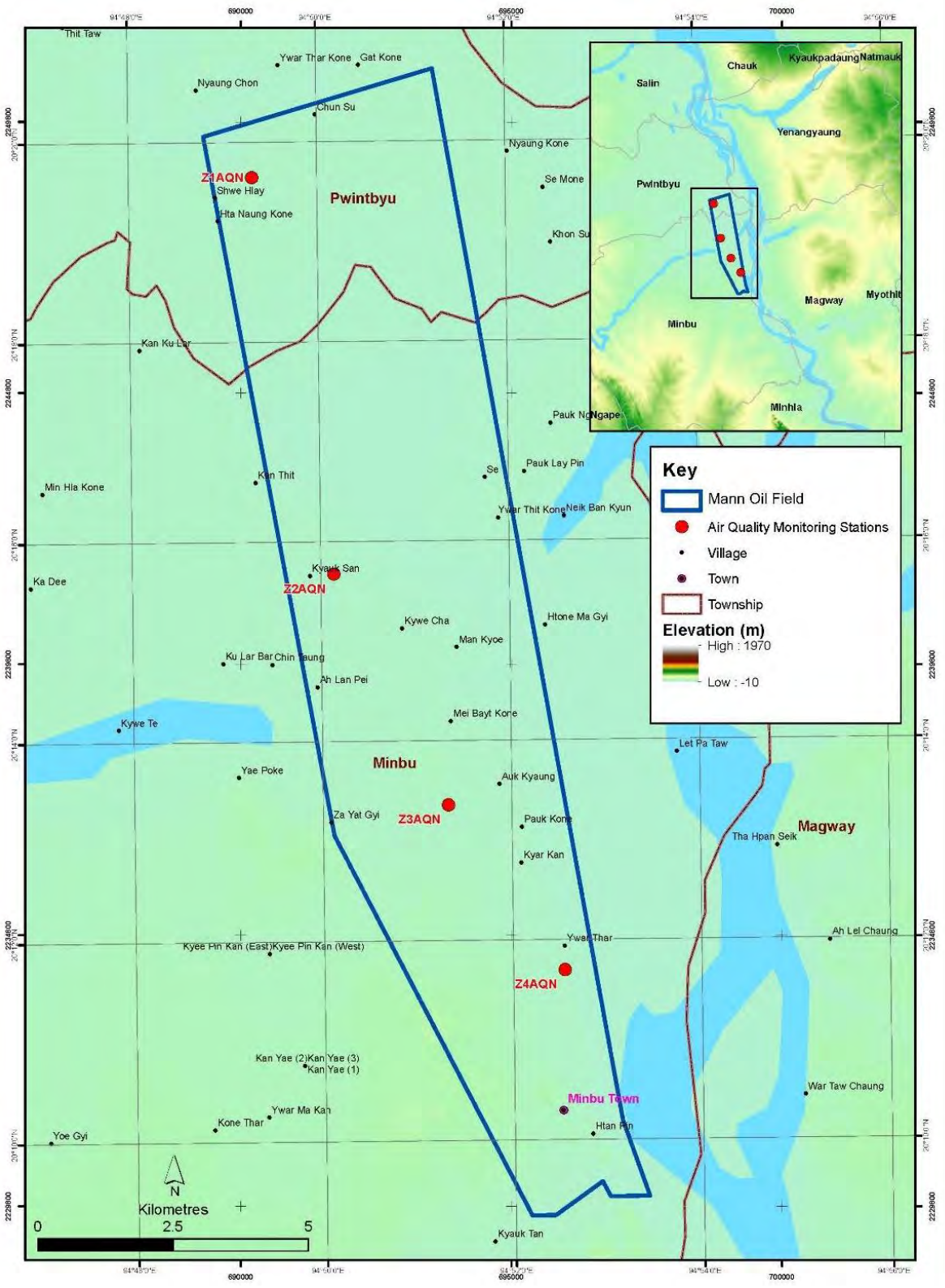


Figure 24: Locations of Air and Noise Monitoring Stations

Figure 25: Station - Z1AQN (Air & Noise Monitoring)

Figure 26: Station – Z2AQN (Air & Noise Monitoring)

Figure 27: Station – Z3AQN (Air & Noise Monitoring)

Figure 28: Station – Z4AQN (Air & Noise Monitoring)

5.1.5 Air Monitoring Results

Table 4.0: Summary of Air Quality Monitoring Results (Feb – 2020)

Parameters	Monitoring Stations (Baseline-May-2015)				Monitoring Stations (Feb-2020)			
	Z1AQN	Z2AQN	Z3AQN	Z4AQN	Z1AQN	Z2AQN	Z3AQN	Z4AQN
CO (ppm)	0.14	0.11	0.05	0.13	**0.22**	**0.15**	**0.15**	**0.35**
NO_2 (ppm)	0.10	0.10	0.03	0.09	0.09	0.06	**0.04**	0.06
NO (ppm)	0.31	0.07	<0.01	0.14	-	-	-	-
$PM_{2.5}$ (ppm)	0.04	0.03	0.02	0.03	0.02	0.03	0.02	0.02
PM_{10} (ppm)	0.05	0.04	0.04	0.04	0.03	0.04	0.04	0.03
SO_2 (ppm)	0.02	0.03	<0.01	0.01	**0.22**	0.01	0.01	**0.04**
Tem (℃)	30.7	29.0	31.5	27.1	24.68	23.98	24.54	20.56
Relative Humidity (%)	61	61	56	55	52.40	52.45	51.40	58.44
Wind Speed (m/s)	0	0.015	0.081	0.85	0.42	0.52	0.50	0.63
Wind Direction	-	South West	South East	South East	-	South West	South East	South East
Assessment Criteria: National Environmental Emission Guideline Value								
	O_3	NO_2	$PM_{2.5}$	PM_{10}	SO_2			
24-hr	-	-	25 µg/m^3	50 µg/m^3	20 µg/m^3			
8-hr	100 µg/m^3	-	-	-				
1-hr	-	200 µg/m^3	-	-	-			

Most of the parameters are under guideline values and some parameters are showing environmental improvements.

The PM 2.5 value at the points of Z1AQN, Z3AQN, and Z4AQN are within NEQEG in February 2020 except point Z2AQN. In May'2015 baseline data, Z1, Z2, Z4 were above the NEQEG guideline value. But the results at Z2 is the same as the 2015 baseline data. The seeing results at Z1 and Z4 in February 2020 are pointing that there was environmental progress and mitigation of pollutions.

For SO2, all 4 points results we monitored based on 2015 baseline findings and shows over the NEQEG. In detail, at the points at Z1AQN, Z3AQN and Z4AQN are slightly greater than 2015 based line values, but Z2AQN has a lower value than based line. In real situations, Z1AQN and Z2AQN are far away from the field activities and lies beside the roads and closely within the residential areas. It may be the human activities that make high results of the CO, PM 2.5, and SO2 value. We encountered some activities such as threshing and winnowing, firing trash, road construction, making donations, etc. at the time of monitoring.

However, in the next monitoring, detailed record of human activities around the measurement locations in a log bock during the reading period. This activity log book will be submitted together with the next monitoring report.

5.2 Noise

The aim of baseline noise monitoring is to establish the background level at nearby Noise Sensitive Receivers (NSRs).

5.2.1 Methodology

Four noise monitors were set up to measure background noise levels for 24 hours at the identified NSRs, which was the same location and monitoring period as per the ASRs. The surrounding environment of the noise quality monitoring stations is shown in Table 5.0. These survey points were chosen to represent baseline noise levels at NSRs within the wider Mann Field area as per EIA report.

5.2.2 Noise Monitoring Location

Table 5.0: Noise Monitoring Stations

Sampling Point	GPS Coordinates	Description	Land use
Z1AQN	20° 19' 39.0'' N 94° 49' 18.4'' E	Located at southwestern part of Pauk Su village, Pwint Phyu Township.	Residential
Z2AQN	20° 15' 40.6'' N 94° 50' 08.0'' E	Located at eastern part of Kyauk San village, near monastery compound.	Residential
Z3AQN	20° 13' 21.5'' N 94° 51' 19.6'' E	In the MPRL E&P office compound, south of staff housing, well No.521 also located nearby.	Commercial
Z4AQN	20° 11' 41.9'' N 94° 52' 32.4'' E	Located at eastern part of Minbu Town, close to the western bank of the Ayeyarwady River	Bare ground

The 24-hour baseline noise monitoring was conducted by using the portable sound meter (Lutron, SL-0423SD, unit: dB). The noise level (L_{Aeq}) was measured and recorded at a ten-minute interval and averaged at an hourly and daily (i.e. 24-hour) interval using the following formula:

L_{Aeq} = 10*LOG10 (AVERAGE (10^((RANGE)/10)))

Table 6.0: NEQEG Noise Level Parameters

Receptor	One hour LAeq (dBA)[a]	
	Daytime 07:00 – 22:00 (10:00 - 22:00 for Public holidays)	**Night Time 22:00 – 07:00 (22:00 - 10:00 for Public holidays)**
Residential, institutional, educational	55	45
Industrial, commercial	70	70

an Equivalent continuous sound level in decibels

5.2.3 Baseline Noise Measurements

The results of baseline noise monitoring are summarized in Table 6. The NEQEG was adopted to evaluate the measured noise levels in the area which was in the vicinity of existing oil and gas operations (Table 5). The results of noise monitoring showed that the hourly and daily noise levels at all monitoring stations were generally well below the standard as stipulated in the NEQEG guidelines, and it thus appeared that the existing oil-producing facilities were operated in an environmentally acceptable manner concerning noise emissions.

Notes: By the monitoring survey results,

At the day time, the point only at Z2AQN has a higher value than NEQEG in 2015 monitoring results. But in 2020, we see the point Z3AQN only is over. That point is situated beside the G-20 concrete main road and all vehicles of community are widely used.

At night time, we can see the results at Z2AQN, Z3AQN, and Z4AQN are over the NEQEG in both 2015 and 2020.

Coincidently where we do our monitoring at Z2AQN, Z3AQN and Z4AQN, heard sounds from the donations/festivals and also that points were located near the housings and access roads.

5.2.4 Noise Monitoring Result

Table 7.0: Hourly LA_{eq} Values at the Designated Noise Monitoring Stations

Monitoring Time	Stations (Baseline-May-2015)				Stations (Feb-2020)			
	Z1AQN	Z2AQN	Z3AQN	Z4AQN	Z1AQN	Z2AQN	Z3AQN	Z4AQN
6:00-7:00	**72**	83	58	50	52	56	64	60
7:00-8:00	48	76	50	46	52	59	65	61
8:00:9:00	44	74	54	52	54	56	62	55
9:00-10:00	43	72	53	45	50	55	65	56
10:00-11:00	68	56	49	45	46	52	61	58
11:00-12:00	45	68	49	52	43	53	60	49
12:00-13:00	45	74	55	41	43	51	57	52
13:00-14:00	45	47	47	39	42	49	57	51
14:00-15:00	56	47	48	39	43	47	62	56
15:00-16:00	43	46	63	52	47	44	50	52
16:00-17:00	47	52	63	45	45	47	50	52
17:00-18:00	49	50	65	52	53	45	49	50
18:00-19:00	48	66	66	51	51	49	59	50
19:00-20:00	50	63	50	54	51	57	59	50
20:00-21:00	59	52	56	51	49	53	58	50
21:00-22:00	54	49	47	64	46	52	58	50
Day LA_{eq}	51	60	54	48	48	52	59	53
22:00-23:00	49	50	41	52	46	50	58	49
23:00-24:00	44	50	75	55	45	49	58	49
24:00-1:00	42	63	42	53	44	48	58	49
1:00-2:00	42	59	44	51	43	48	57	49
2:00-3:00	42	49	41	60	44	49	57	50
3:00-4:00	43	50	41	60	44	48	57	50
4:00-5:00	43	60	57	60	47	50	58	47
5:00-6:00	47	62	58	57	48	53	59	49
Night LA_{eq}	44	55	50	56	45	**49**	**58**	**49**

At the day time, the point only at Z2AQN has a higher value than NEQEG in 2015 monitoring results. But in 2020, we see the point Z3AQN only is over. That point is situated beside the G-20 concrete main road and all vehicles of community are widely used.

At night time, we can see the results at Z2AQN, Z3AQN, and Z4AQN are over the NEQEG in both 2015 and 2020.

Coincidently where we do our monitoring at Z2AQN, Z3AQN and Z4AQN, heard sounds from the donations/festivals and also that points were located near the housings and access roads.

For the next noise monitoring report, it would be reported together with a detailed logbook for the surrounding status of human activities.

5.3 Surface Water Quality

5.3.1 Methodology

To characterize the surface water quality within the Project Area, surface water sampling was carried out at four locations in May-2015, July 2019, August 2019, September 2019 and February 2020. Details of sampling locations are presented in below table 8.0. The surrounding environment of the surface water sampling location is shown in Figure 29. These survey points were chosen to represent baseline water quality at WSRs within the wider Mann Field area where the Project will be implemented.

5.3.2 Locations of Surface Water Monitoring Stations

Table 8.0: Surface Water Monitoring Stations

Sampling Location	Coordinates	Description	Sampling Date	Monitoring Date
Z1SW-1	20°19'47.67"N 94°49'6.88"E	Mone Chaung, near Pauk Su village.	9 May 2015	6 Feb 2020
Z1SW-2	20°19'57.80"N 94°49'10.19"E	Mone Chaung, about 320 m downstream of Z1SW-1	9 May 2015	6 Feb 2020
Z2SW-1	20°15'29.55"N 94°50'1.86"E	Mann Chaung, near Kyauksan village.	7 May 2015	6 Feb 2020
Z2SW-2	20°15'33.13"N 94°50'3.93"E	Mann Chaung, about 120 m downstream of Z2SW-1	7 May 2015	6 Feb 2020
Z3SW-1	20°14'46.51"N 94°51'0.27" E	Mann Chaung, near Kywegya village	6 May 2015	5 Feb 2020
Z3SW-2	20°14'45.74"N 94°51'1.87"E	Mann Chaung, about 50 m downstream of Z3SW-1	6 May 2015	5 Feb 2020
Z4SW-1	20°11'41.31"N 94°52'41.11"E	Near west bank of Ayeyarwady river, Minbu Township.	6 May 2015	5 Feb 2020
Z4SW-2	20°11'38.80"N 94°52'42.50"E	Ayeyarwady river, about 90 m downstream of Z4SW-1	6 May 2015	5 Feb 2020

5.3.3 Location Map for Surface Water

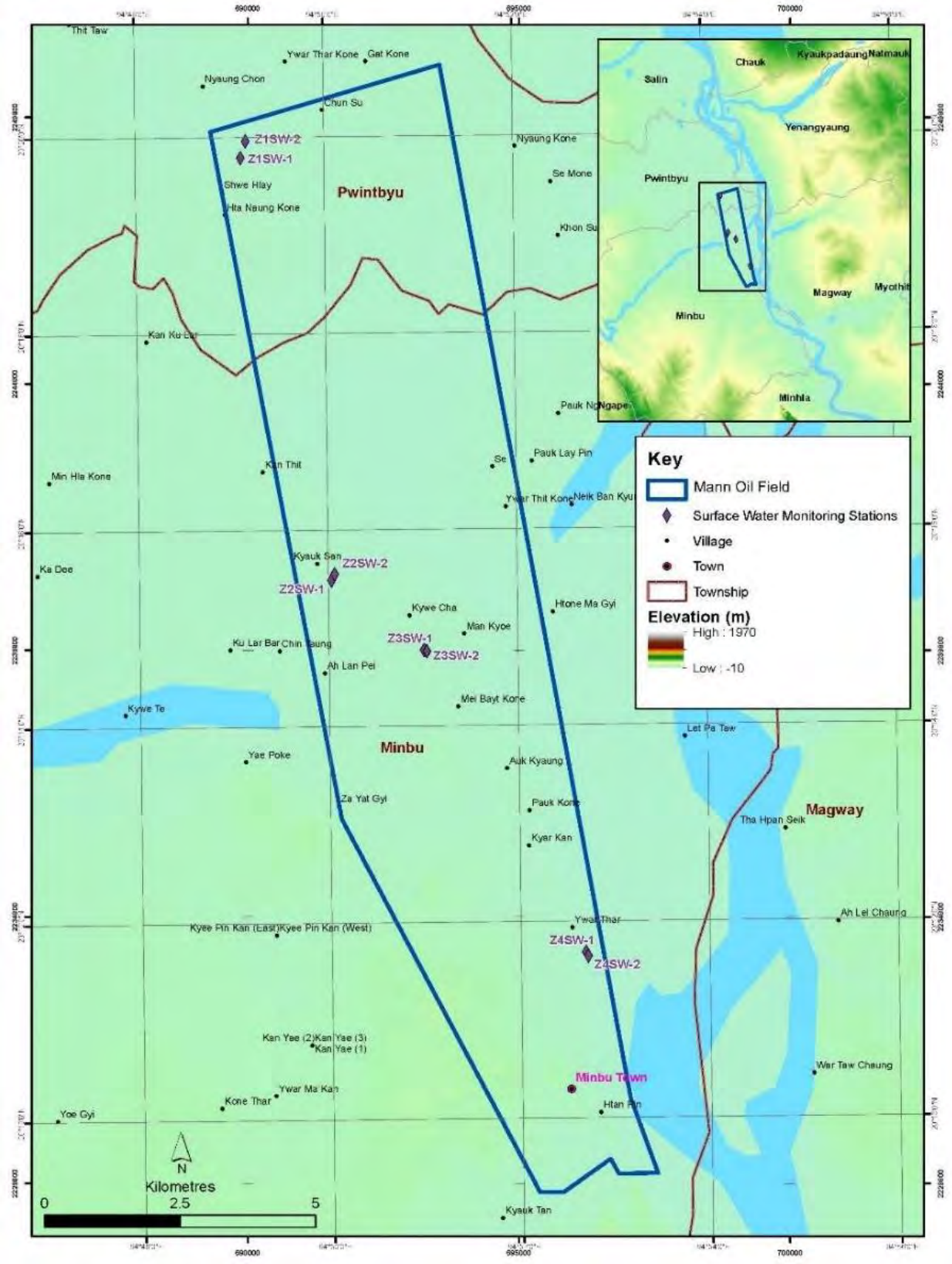


Fig 29: Sampling Locations for Surface Water Quality

5.3.4 Sampling Procedures

Water samples were taken by WaterMark® Vertical PVC Water Bottle with Case, 2.2 Litre (Water Sampler) and collected in sterilized sample containers. All sampling was in strict accordance with recognized standard procedures. The parameters for *in situ* measures included pH, temperature, dissolved oxygen (DO), electrical conductivity (EC), turbidity and surface water samples that were concurrently collected. Two samples were taken at each sampling location. Samples were then stored at 4 ºC for transportation to laboratory analyses under chain-of-custody procedures. The parameters for laboratory analyses were listed in Table 8. Laboratory analysis of samples was undertaken by Ecological Laboratory. Equipment for surface water sampling is shown in Table 9.

Table 9.0: Parameters for laboratory Analyses of Baseline Surface Water Monitoring

Parameters	Unit
BOD_5	mg/L
COD	mg/L
Total Suspended Solids	mg/L
Total Nitrogen	mg/L
Total Phosphorus	mg/L
Total Coliform Bacteria	-
Oil and Grease	mg/L
Heavy Metals	-

Table 10.0: Equipment for Surface Water Sampling

Equipment	Brand	Model
Multi parameter (water quality)	HANNA	-
pH meter	HANNA	HI 98129
WaterMark® Vertical PVC Water Bottle with Case, 2.2 Litre (Water Sampler)	USA	-

5.3.5 Surface Water Results

Mann Field is located at the northwest of Minbu District, Magway Region. Mann Field Area is elongated running north-south, at the west of Ayeyarwady River. The total length of lower Ayeyarwady River Basin is 690 km with a total catchment area of 95,600 km^2 and annual surface water of 85.80 km^3. Results of surface water quality monitoring are summarized in *Table 10*.

A total of eight (8) surface water sampling was conducted and mentioned the results to compare the NEQEG guideline, WHO, EPA, and NDWG. According to the sampling results in table 10, most water parameters were found to be within all three compared standards guidelines except E.coli, Arsenic, Barium, Boron, Total Chromium, fluoride, Selenium and Uranium are not available testing in the lab due to COVCID-19 pandemic situation. These parameter results will be presented in the next monitoring report

Station: Z1SW-1

Station: Z1SW-2

Station: Z2SW-1

Station: Z2SW-2

Figure 30: Surface Water Sampling Location (February 2020)

Station: Z3SW-1

Station: Z3SW-2

Station: Z4SW-1

Station: Z4SW-2

Figure 30(A): Surface Water Sampling Location (February 2020)

5.3.6 Result summary of surface water quality

Table 11.0: Result Summary of Surface Water Quality Monitoring (Feb-2020)

Item/Sample Name	Baseline Data Sample Locations (May-2015)				Sample Locations for Monitoring (Feb-2020)				NEQEG Standard	WHO Standard	EPA Standard	NDWG (Myanmar) 2019
	Z1SW-1	Z1SW-2	Z2SW-1	Z2SW-2	Z1SW-1	Z1SW-2	Z2SW-1	Z2SW-2				
Date /Time	9/5/15 09:22	9/5/15 09:45	7/5/15 11:09	7/5/15 11:22	6/2/20 09:41	6/2/20 10:00	6/2/20 01:41	6/2/20 01:28				
Weather	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny				
Transparency	High	High	High	High	High	High	High	High				
Temp _Water (˚C)	30.89	30.82	34.72	35.43	22.4	23.2	26.6	26.4				
pH	7.82	7.82	8.21	8.27	7.58	7.94	7.74	7.67	6-9	-	-	6.5-8.5
DO (mg/l)	6.56	6.61	14.6	15.25	7.28	6.98	7.31	7.30	-	-	-	-
EC (µs)	352	350.1	611.2	588.7	0.428	0.430	0.351	0.352	-	-	-	-
Turbidity (FNU)	16	13.4	18.5	20.9	<5	<5	<5	<5	-	-	-	-
Color	20	20	Nil	Nil	0	0	0	0	-	-	-	-
Alkalinity	137	136	209	209	540	330	320	420	-	-	-	-
Hardness	127	128	144	133	190	140	120	140	-	-	-	-
BOD_5 (mg/l)	14	14	12	12	3.5	3.6	<3	3.5	50	-	-	-
COD (mg/l)	32	32	32	32	<30	<30	<30	<30	250	-	-	-
Total Nitrogen (mg/l)	<2	<2	11	4	<5	<5	<5	<5	10	-	10	-
Total Phosphorus (mg/l)	0.061	0.026	0.039	0.030	0.13	0.15	0.12	0.1	0.5	-	-	-
Oil and grease (mg/l)	<1	<1	<1	2	6	5	3	4	10	-	-	-
TSS (mg/l)	40	34	23	18	0	0	0	0	50	-	-	-
E. coli (CFU/100mL)	-	-	-	-	TBA	TBA	TBA	TBA	0	0	0	0
Total Coliforms (CFU/100mL)	-	-	-	-	TBA	TBA	TBA	TBA	400	-	-	0
Arsenic (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	100	10	100	50
Barium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.7	2	-
Boron (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	2.4	-	2.4
Total Chromium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.05	0.1	-
Fluoride (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	1.5	4	1.5	1.5
Selenium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	-	0.05	0.04
Uranium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.03	-	0.03

Table 11.0(A): Result Summary of Surface Water Quality Monitoring (Feb-2020)

Item/Sample Name	Baseline Data Sample Locations (May-2015)				Sample Locations for Monitoring (Feb-2020)				NEQEG Standard	WHO Standard	EPA Standard	NDWG (Myanmar) 2019
	Z3SW-1	Z3SW-2	Z4SW-1	Z4SW-2	Z3SW-1	Z3SW-2	Z4SW-1	Z4SW-2				
Date /Time	6/5/15 12:08	6/5/15 12:35	6/5/15 15:22	6/5/15 15:51	5/2/20 09:02	5/2/20 09:17	5/2/20 07:37	5/2/20 07:20				
Weather	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny				
Transparency	High	High	Medium	Medium	High	High	High	High				
Temp _Water (˚C)	37.66	37.62	31.55	31.18	22.1	21.9	20.6	20.5				
pH	8.1	8.11	7.73	7.65	6.13	6.41	7.28	7.25	6-9	-	-	6.5-8.5
DO (mg/l)	11.33	11.52	7.12	7.15	6.60	7.01	6.23	5.2	-	-	-	-
EC (µs)	711.8	705.7	153	152.5	0.419	0.365	0.223	0.228	-	-	-	-
Turbidity (FNU)	7.1	7	25	43.7	10	11	19	18	-	-	-	-
Color	5	10	45	55	40	43	114	109	-	-	-	-
Alkalinity	238	237	58	58	158	152	109	105	-	-	-	-
Hardness	144	150	58	50	130	140	60	90	-	-	-	-
BOD_5 (mg/l)	10	10	14	16	<3	3.2	<3	<3	50	-	-	-
COD (mg/l)	32	32	32	32	<30	<30	<30	<30	250	-	-	-
Total Nitrogen (mg/l)	3	9	19	18	12	5	<5	<5	10	-	10	-
Total Phosphorus (mg/l)	0.047	0.051	0.071	0.031	0.08	0.1	0.07	0.14	0.5	-	-	-
Oil and grease (mg/l)	5	7	<1	<1	4	4	5	3	10	-	-	-
TSS (mg/l)	7	13	124	138	0	3	19	16	50	-	-	-
E. coli (CFU/100mL)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	0	0	0	0
Total Coliforms (CFU/100mL)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	400	-	-	0
Arsenic (mg/l)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	0.1	0.05	0.1	0.05
Barium (mg/l)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	-	0.7	2	-
Boron (mg/l)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	-	2.4	-	2.4
Total Chromium (mg/l)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	-	0.05	0.1	-
Fluoride (mg/l)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	1.5	4	1.5	1.5
Selenium (mg/l)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	-	-	0.05	0.04
Uranium (mg/l)	-	-	-	-	*TBA*	*TBA*	*TBA*	*TBA*	-	0.03	-	0.03

TBA – The value to be available on next monitoring report. (Due to COVID-19 Pandemic, test result was not available in this report)

- Myanmar National Quality Emission Guidelines, 2015 - Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (general application)
- World Health Organization (WHO), Guidelines for Drinking-Water Quality, Fourth Edition Incorporating the First Addendum, Annex 3: Chemical summary tables.
- United States Environmental Protection Agency (EPA), National Primary Drink Water Regulations & National Secondary Drinking Water Regulation, 2009.
- *Myanmar National Drinking Water Guideline, 2019*

5.4 Groundwater Quality

5.4.1 Methodology

To access groundwater quality in the Project Area, a total of four existing residential wells (dug wells and drilled/ tube wells) were sampled. The sampling locations were selected to represent the spatial extent and sensitive receivers in the residential areas of Minbu and Pwint Phyu. A total of two replicate groundwater samples were collected by Alpha horizontal water sampler at each location. Immediately after collection, the samples were transferred to labelled sample containers containing the necessary preservatives prepared by the laboratory. Samples were then stored at 4 ºC for transportation to laboratory analyses under chain-of-custody procedures. The parameters for assessing the groundwater quality are the same as those for the surface water quality monitoring in Table 11. Details of groundwater sampling location are presented in Table 12. The surrounding environment of groundwater sampling is presented in Figure 31.

5.4.2 Groundwater Sampling Locations at Mann Field

Table 12.0: Groundwater Monitoring Stations

Sampling Location	Coordinates	Description	Baseline Date	Sampling Date
Z1GW-1	20°19'40.01"N 94°49'18.27"E	Tube well in Pauk su village, Pwint Phyu Township	9 May 2015	6 Feb 2020
Z1GW-2	20°19'45.22"N 94°49'20.51"E	Tube well in Pauk su village, Pwint Phyu Township	9 May 2015	6 Feb 2020
Z2GW-1	20°15'38.43"N 94°49'59.29"E	Tube well in Kyauk san village, Minbu Township	7 May 2015	6 Feb 2020
Z2GW-2	20°15'39.50"N 94°50'5.51"E	Tube well in Kyauk san village, Minbu Township	7 May 2015	6 Feb 2020
Z3GW-1	20°15'5.35"N 94°50'54.52"E	Tube well in Kywe gya village, Minbu Township	6 May 2015	5 Feb 2020
Z3GW-2	20°15'6.44"N 94°50'53.77"E	Tube well in Kywe gya village, Minbu Township	6 May 2015	5 Feb 2020
Z4GW-1	20°11'37.92"N 94°52'29.67"E	Well in Shwe war gone ward, Minbu Township.	6 May 2015	5 Feb 2020
Z4GW-2	20°11'29.50"N 94°52'27.85"E	Well in Shwe war gone ward, Minbu Township.	6 May 2015	5 Feb 2020

5.4.3 Groundwater Sampling Locations

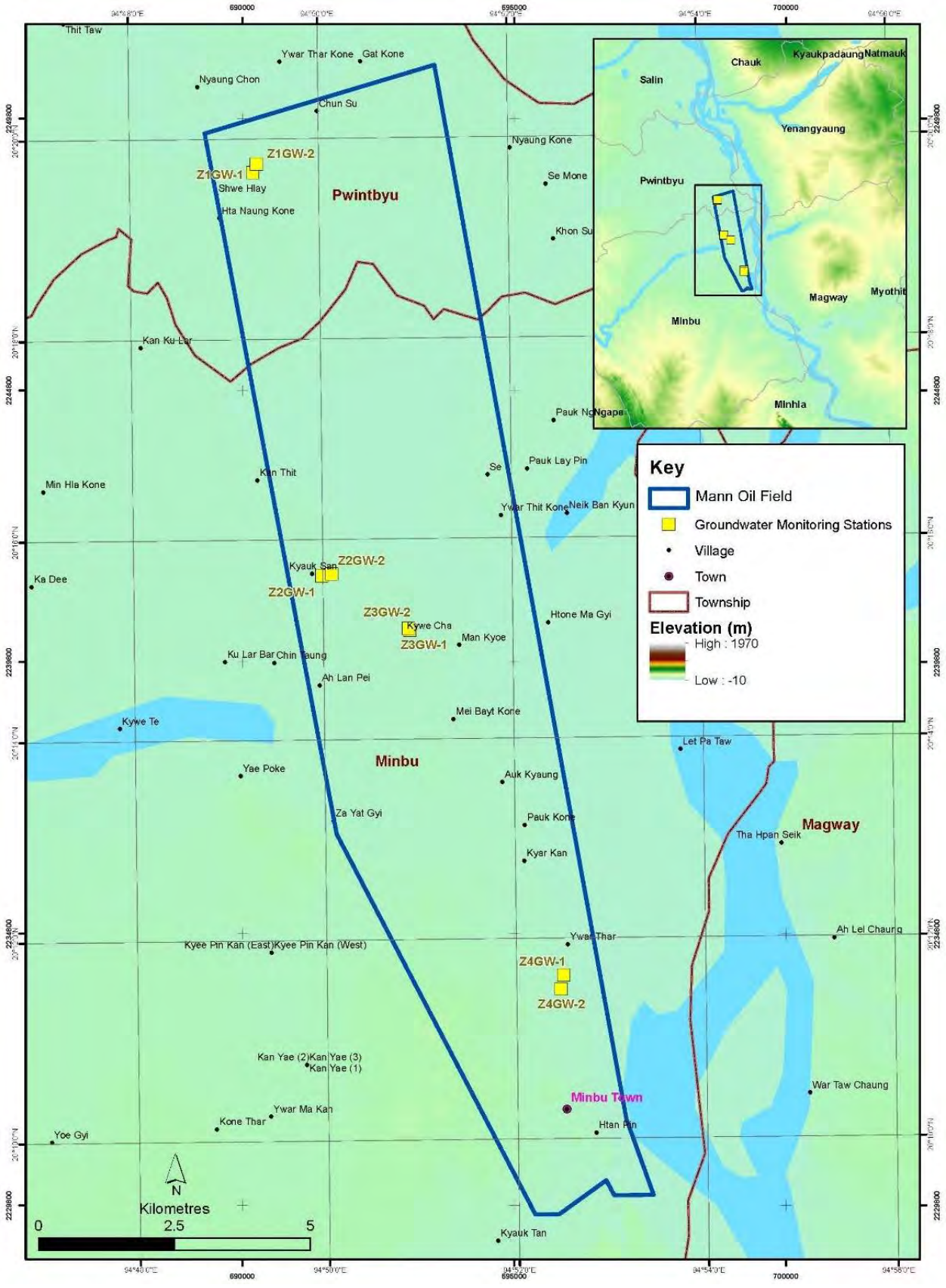


Figure 31: Surrounding Environment of Groundwater Sampling Locations

Station: Z1GW-1

Station: Z1GW-2

Station: Z2GW-1

Station: Z2GW-2

Station: Z3GW-1

Station: Z3GW-2

Station: Z4GW-1

Station: Z4GW-2

Figure 32: Ground Water Sampling Locations (Feb 2020)

(Station: Z4GW-1) Well in Shwe War Gone Ward, Minbu, and this well is not available to use in current condition due to public waste disposing to the well. So it is not available to measure on this point.

A total of eight (8) groundwater sampling was conducted and mentioned the results to compare the NEQEG guideline, WHO, EPA, and NDWG. According to the sampling results in table 11, most water parameters were found to be within all three compared standards guidelines except E.coli, Arsenic, Barium, Boron, Total Chromium, Fluoride, Selenium and Uranium are not available testing in the lab due to COVCID-19 pandemic situation. These parameter results will be presented in the next monitoring report.

In accordance with the commitments in the table 8.3 of the approved EIA report, these parameters will be measured in the next 3 consecutive monitoring activities in order to identify the impacts from the operation. If no higher impacts were observed, the necessity of monitoring these parameters will be reconsidered for the next monitoring activities.

5.4.4 Groundwater Quality Results

Table 13: Result Summary of Ground Water Quality Monitoring (Feb-2020)

Item/Sample Name	Baseline Data Sample Locations (May-2015)				Sample Locations for Monitoring (Feb-2020)				NEQEG Standard	WHO Standard	EPA Standard	NDWG (Myanmar) 2019
	Z1GW-1	Z1GW-2	Z2GW-1	Z2GW-2	Z1GW-1	Z1GW-2	Z2GW-1	Z2GW-2				
Date /Time	9/5/15 10:49	9/5/15 11:22	7/5/15 10:20	7/5/15 10:40	6/2/20 09:09	6/2/20 10:20	6/2/20 01:02	6/2/20 01:10				
Weather	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny				
Transparency	High	High	High	High	High	High	High	High				
Temp _Water (˚C)	28.78	30.11	33.11	35.03	25.7	27.8	31.0	31.7				
pH	6.92	6.93	6.85	7.09	7.25	7.35	7.38	7.58	6-9	-	-	6.5-8.5
DO (mg/l)	2.51	2.75	1.1	2.25	2.82	8.25	7.41	7.02	-	-	-	-
EC (µs)	669	778.1	1097.7	805.3	0.5	0.655	0.928	0.642	-	-	-	-
Turbidity (FNU)	0.5	0.3	0.2	0.1	<5	<5	<5	<5	-	-	-	-
Color	Nil	10	Nil	Nil	0	0	0	0	-	-	-	-
Alkalinity	256	296	359	294	510	790	560	420	-	-	-	-
Hardness	281	316	130	64	230	230	140	120	-	-	-	-
BOD_5 (mg/l)	10	12	8	10	<3	4.2	<3	<3	50	-	-	-
COD (mg/l)	32	32	32	32	<30	<30	<30	<30	250	-	-	-
Total Nitrogen (mg/l)	<2	4	4	<2	<5	<5	<5	<5	10	-	10	-
Total Phosphorus (mg/l)	0.038	0.194	0.104	0.245	0.27	0.46	0.13	0.3	2	-	-	-
Oil and grease (mg/l)	<1	<1	<1	<1	3.0	5.0	4.0	5.0	10	-	-	-
TSS (mg/l)	<5	<5	<5	<5	0	0	0	0	50	-	-	-
E. coli (CFU/100mL)	-	-	-	-	TBA	TBA	TBA	TBA	0	0	0	0
Total Coliforms (CFU/100mL)	-	-	-	-	TBA	TBA	TBA	TBA	400	-	-	0
Arsenic (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	0.1	0.05	0.1	0.05
Barium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.7	2	-
Boron (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	2.4	-	2.4
Total Chromium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.05	0.1	-
Fluoride (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	1.5	4	1.5	1.5
Selenium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	-	0.05	0.04
Uranium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.03	-	0.03

Table 13(A): Result Summary of Ground Water Quality Monitoring (Feb-2020)

Item/Sample Name	Baseline Data Sample Locations (May-2015)				Sample Locations for Monitoring (Feb-2020)				NEQEG Standard	WHO Standard	EPA Standard	NDWG (Myanmar) 2019
	Z3GW-1	Z3GW-2	Z4GW-1	Z4GW-2	Z3GW-1	Z3GW-2	Z4GW-1	Z4GW-2				
Date /Time	6/5/15 11:04	6/5/15 11:30	6/5/15 14:32	6/5/15 14:48	5/2/20 10:05	5/2/20 09:45	5/2/20 07:37	5/2/20 08:00				
Weather	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny				
Transparency	High	High	Medium	High	High	High	Medium	High				
Temp _Water (˚C)	36.12	35.57	31.77	31.67	29.6	29.5	-	24.4				
pH	6.68	6.63	6.95	7.22	7.47	6.78	-	7.4	6-9	-	-	6.5-8.5
DO (mg/l)	2.9	2.29	1.44	3.41	6.00	6.29	-	8.02	-	-	-	-
EC (µs)	1498.3	1198.7	5060.4	7740.8	2.076	1.076	-	5.985	-	-	-	-
Turbidity (FNU)	4.9	4.6	0.5	1	<5	<5	-	<5	-	-	-	-
Color	5	10	Nil	Nil	0	0	-	0	-	-	-	-
Alkalinity	354	279	462	624	350	500	-	1150	-	-	-	-
Hardness	246	222	539	639	130	220	-	470	-	-	-	-
BOD_5 (mg/l)	10	14	8	10	<3	<3	-	3.2	50	-	-	-
COD (mg/l)	32	32	32	32	<30	<30	-	<30	250	-	-	-
Total Nitrogen (mg/l)	4	73	4	63	<5	<5	-	<5	10	-	10	-
Total Phosphorus (mg/l)	0.239	0.168	0.251	0.042	0.12	0.21	-	0.3	2	-	-	-
Oil and grease (mg/l)	<1	<1	<1	<1	3.0	3	-	6.0	10	-	-	-
TSS (mg/l)	<5	<5	<5	<5	0	0	-	0	50	-	-	-
E. coli (CFU/100mL)	-	-	-	-	TBA	TBA	TBA	TBA	0	0	0	0
Total Coliforms (CFU/100mL)	-	-	-	-	TBA	TBA	TBA	TBA	400	-	-	0
Arsenic (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	0.01	0.05	0.01	0.05
Barium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.7	2	-
Boron (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	2.4	-	2.4
Total Chromium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.05	0.1	-
Fluoride (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	1.5	4	1.5	1.5
Selenium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	-	0.05	0.04
Uranium (mg/l)	-	-	-	-	TBA	TBA	TBA	TBA	-	0.03	-	0.03

TBA – The value to be available on next monitoring report. (Due to COVID-19 Pandemic, test result was not available in this report)

- Myanmar National Quality Emission Guidelines, 2015 - Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (general application)
- World Health Organization (WHO), Guidelines for Drinking-Water Quality, Fourth Edition Incorporating the First Addendum, Annex 3: Chemical summary tables.
- United States Environmental Protection Agency (EPA), National Primary Drink Water Regulations & National Secondary Drinking Water Regulation, 2009.
- *Myanmar National Drinking Water Guideline, 2019*

5.5 Soil Quality

5.5.1 Methodology

The soil sampling locations were chosen as close as practicable to the existing oil wells within Mann Field. For safety reasons, underground utilities inspection was conducted at the proposed borehole location jointly with the staff from MOGE before soil sampling. Details of the monitoring location are shown in Table 12 and illustrated in Figure 32. The surrounding environment of the soil sampling stations and soil condition are shown in Table 13. These survey points were also chosen to represent baseline soil quality within the wider Mann Field area where the Project will be implemented.

5.5.2 Baseline Soil Sampling Locations

Table 14: Soil Monitoring Stations

Sampling Station	Replicate	Coordinates	Description	Baseline Sampling Date	Sampling Date
Z1S	1	20°19'45.30"N 94°49'13.99"E	At west of Pauk su village, Pwint Phyu Township	6 – 9 May 2015	4 Feb 2020
	2	20°19'45.38"N 94°49'21.05"E	At Pauk su village, Pwint Phyu Township	6 – 9 May 2015	4 Feb 2020
Z2S	1	20°15'41.70"N 94°50'8.41"E	In the paddy field located at the east of Kauk san village, Minbu Township	6 – 9 May 2015	4 Feb 2020
	2	20°15'40.05"N 94°50'10.40"E	At east of Kauk san village, Minbu Township	6 – 9 May 2015	4 Feb 2020
Z3S	1	20°13'22.04"N 94°51'19.59"E	In the compound of MPRL E&P office, Minbu Township	6 – 9 May 2015	4 Feb 2020
	2	20°13'2.60"N 94°51'14.86"E	In the compound of MPRL E&P office, Minbu Township	6 – 9 May 2015	4 Feb 2020
Z4S	1	20°11'41.31"N 94°52'39.20"E	Near western bank of Ayeyarwady River, north of Minbu Town	6 – 9 May 2015	4 Feb 2020
	2	20°11'45.77"N 94°52'38.30"E	Near western bank of Ayeyarwady River, north of Minbu Town	6 – 9 May 2015	4 Feb 2020

5.5.3 Location Map for Soil Monitoring

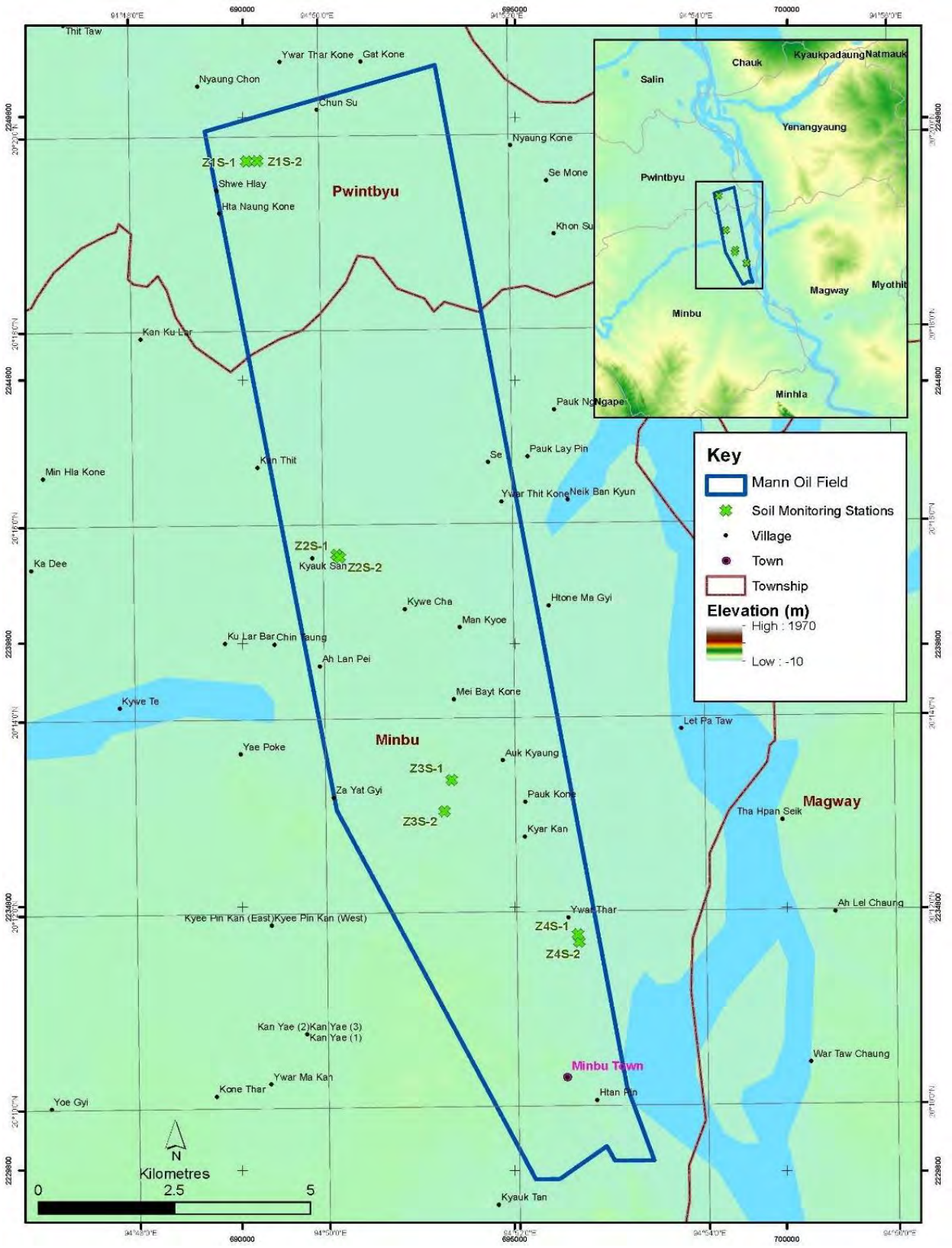


Figure 33: Locations of Soil Monitoring Stations

5.5.4 Sampling Methodology and Equipment

All soil boring/ excavation and sampling were undertaken by means of dry rotary drilling method. A total of two (2) replicate samples were collected for laboratory analyses for each sampling area. Parameters for laboratory analyses included:

- pH;
- Arsenic (As);
- Lead (Pb);
- Cadmium (Cd);
- Copper (Cu);
- Zinc (Zn);
- Manganese (Mn); and
- Iron (Fe).

In the course of the survey, sampling procedures, sample preservation and sample analysis were all recommended in the standard operating procedure of Myanmar NEQEG.U.S. In soil sampling, the standard agricultural sampler (Soil Auger) was applied. The sampler is a stainless steel tube that is sharpened on one end and fitted with a long, T-shaped handle. This tube is approximately three inches in diameter. To refrain from contamination, about 20 – 30 cm of topsoil was removed by the sampler before sampling. Then the sample was taken and collected in a clean plastic bag. Chemical preservation of samples was not applied because it is generally not recommended by the standard method. Samples were cooled in an ice box which temperature was under 4°C. Samples were protected from sunlight to minimize any potential chemical reaction. Soil texture and colour were also recorded upon sampling.

Station: Z1S-1

Station: Z1S-2

Station: Z2S-1

Station: Z2S-2

Station: Z3S-1

Station: Z3S-2

Station: Z4S-1

Station: Z4S-2

Figure 34: Soil Sampling Location (Feb 2020)

5.5.5 Results Summary of Soil Quality

Table 14: Results Summary of Soil Quality Monitoring (Feb 2020)

Parameter	Unit	Baseline Data Sampling Station (May-2015)								Sample Location for Monitoring Station (Feb-2020)								Dutch Standard 2000
		Z1S-1	Z1S-2	Z2S-1	Z2S-2	Z3S-1	Z3S-2	Z4S-1	Z4S-2	Z1S-1	Z1S-2	Z2S-1	Z2S-2	Z3S-1	Z3S-2	Z4S-1	Z4S-2	
pH	-	6.8	6.8	6.7	6.7	6.8	6.8	6.9	6.9	7.2	7.5	6.8	7.1	7.7	7.1	6.5	7.6	–
Arsenic	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	<0.005	<0.005	<0.005	<0.005	0.03	<0.005	<0.005	<0.005	55
Lead	mg/kg	115	120	135	130	120	124	137	135	7.2	<5	<5	<5	<5	<5	5	<5	530
Cadmium	mg/kg	0.009	0.008	0.009	0.007	0.007	0.007	0.006	0.007	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	12
Copper	mg/kg	105	99	110	115	90	95	85	88	9	12	8	9	5	6	8	8	190
Zinc	mg/kg	75	80	72	69	65	70	75	78	0.27	0.06	0.05	0.05	0.34	0.39	0.30	0.33	720
Manganese	mg/kg	30	32	38	35	28	25	31	30	0.07	0.07	0.06	0.06	0.10	0.13	0.12	0.14	–
Iron	mg/kg	4850	4790	4900	4930	4870	4950	4700	4690	13.10	13.62	13.35	12.22	8.94	9.03	12.48	13.26	–
Soil Texture	-	Silty clay	Silty clay	Silty sand	Silty sand	Silty sand	Silty sand	Sandy silt with minor clay	Sandy silt with minor clay	-	-	-	-	-	-	-	-	–
Soil Color	-	Grey	Grey	Yellowish brown	Yellowish brown	Yellowish brown	Yellowish brown	Yellowish grey	Yellowish grey	-	-	-	-	-	-	-	-	–

Note: In general, the soil in the sampling locations is sandy and was previously disturbed by agricultural activities. As there is no relevant national guideline or IFC standard to assess the soil quality, the Dutch Standard 2000 is adopted for evaluation, and all the measured parameters meet the assessment criteria.

N.D. = Not Detected

6.0 Monitoring for Discharge of Treated Wastewater and Runoff

6.1 Base Camp Water Discharge

Domestic-type wastewater and sewage are under managing in the existing operational phase. Based on the camp water consumption monitoring results, the sewage and wastewater generation rate is up to about 10,000 liters per day of sanitary wastewater generated from the base camp within the Mann Field which can accommodate 140 workers.

Water consumption is monitored by using the water flow meter in the base camp, workshop, warehouse, and downhole workshop. In the meantime, the team is fully aware of the consumption of water to reduce the volume of water consumption.

Figure 35: Monitoring with water flow meter

Sanitary wastewater and domestic wastewater are implemented as per the mitigation plan.

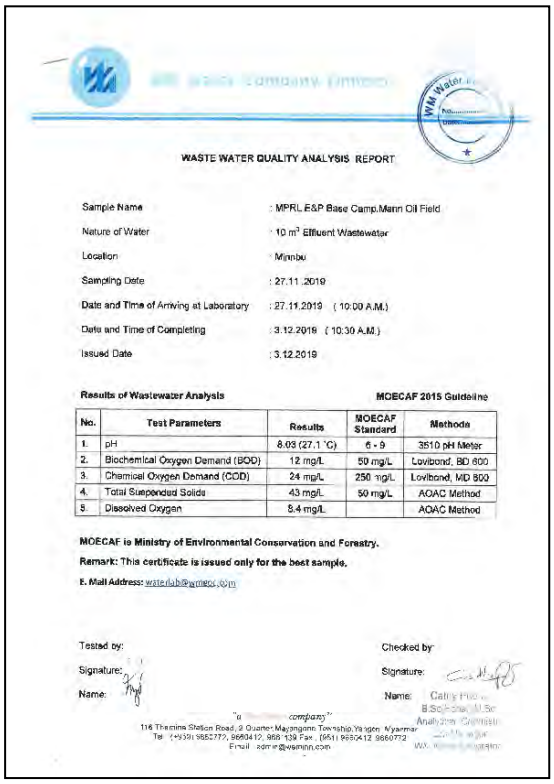
- Sanitary wastewater is collected in the septic holding tanks in the main camp and a retained licensed firm periodically cleans and services the septic holding tanks. Currently sanitary wastewater is collected in the concrete pit and there is no discharge outside.
- MPRL E&P was installed the waste water treatment unit to treat sanitary wastewater properly to meet NEQEG guideline. Field team is implementing to monitor the discharge water parameter quarterly basics.
- Stormwater run-off is routed to a pond to remove silt particles before discharge via storm drain.
- Surface runoff from potential sources of contamination prevented.
- All drainage facilities and sediment control structures inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit removed regularly.
- Runoff from areas without potential sources of contamination minimized (e.g. by minimizing the area of impermeable surfaces) and the peak discharge rate will be reduced (e.g. by using vegetated swales and retention ponds).
- Oil water separators and grease traps have been constructed and maintained as appropriate at refuelling facilities, workshops, parking areas, fuel storage and containment areas.

- The discharge point of treated sewage effluent to surface water (location not confirmed based on existing project design) will be located where there is adequate assimilative capacity of the surface waters.

Figure 36: Sewage System in Base Camp

Figure 37: Bio-Filtration Unit

Figure 38: Storage Concrete pit



WASTE WATER QUALITY ANALYSIS REPORT

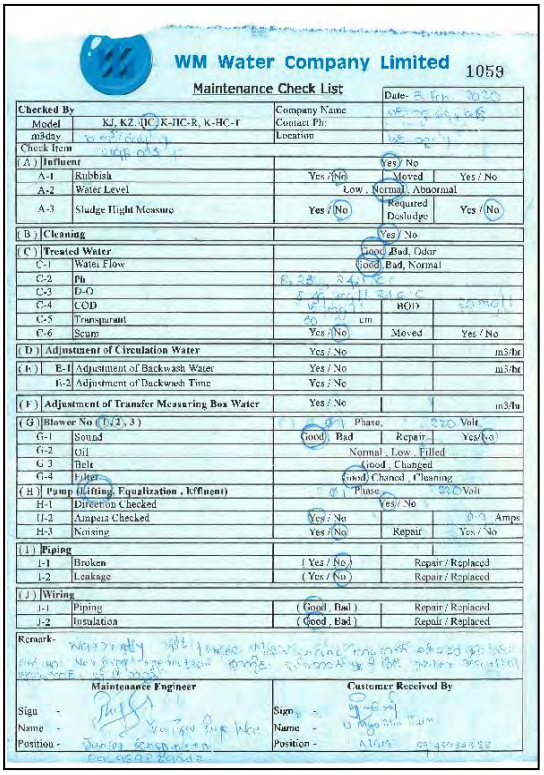
Sample Name : MPRL E&P Base Camp,Mann Oil Field
Nature of Water : 10 m³ Effluent Wastewater
Location : Myinbu
Sampling Date : 27.11.2019
Date and Time of Arriving at Laboratory : 27.11.2019 (10:00 A.M.)
Date and Time of Completing : 3.12.2019 (10:30 A.M.)
Issued Date : 3.12.2019

Results of Wastewater Analysis — MOECAF 2015 Guideline

No.	Test Parameters	Results	MOECAF Standard	Methods
1.	pH	8.03 (27.1 °C)	6 - 9	3510 pH Meter
2.	Biochemical Oxygen Demand (BOD)	12 mg/L	50 mg/L	Lovibond, BD 600
3.	Chemical Oxygen Demand (COD)	24 mg/L	250 mg/L	Lovibond, MD 600
4.	Total Suspended Solids	43 mg/L	50 mg/L	AOAC Method
5.	Dissolved Oxygen	5.4 mg/L		AOAC Method

MOECAF is Ministry of Environmental Conservation and Forestry.
Remark: This certificate is issued only for the test sample.
E. Mail Address: waterlab@gmail.com

Tested by: Signature: Name:
Checked by: Signature: Name:



WM Water Company Limited 1059
Maintenance Check List

Checked By — Company Name — Model KJ, KZ, JC, K-JC-R, K-HC-1 — Contact Ph: — m3/day — Location — Date: 3 Feb 2020

Check Item

(A)	Influent		Yes / No		
A-1	Rubbish	Yes / No	Moved	Yes / No	
A-2	Water Level	Low, Normal, Abnormal			
A-3	Sludge Hight Measure	Yes / No	Required Desludge	Yes / No	
(B)	Cleaning		Yes / No		
(C)	Treated Water	Good, Bad, Odor			
C-1	Water Flow	Good, Bad, Normal			
C-2	Ph	8.38			
C-3	D-O	5.44 mg/l 31.6°C			
C-4	COD	71 mg/l	BOD	23 mg/l	
C-5	Transparant	50 cm			
C-6	Scum	Yes / No	Moved	Yes / No	
(D)	Adjustment of Circulation Water	Yes / No			m3/hr
(E)	E-1 Adjustment of Backwash Water	Yes / No			m3/hr
	E-2 Adjustment of Backwash Time	Yes / No			
(F)	Adjustment of Transfer Measuring Box Water	Yes / No			m3/hr
(G)	Blower No (1, 2, 3)	Phase, 220 Volt			
G-1	Sound	Good, Bad	Repair	Yes/No	
G-2	Oil	Normal, Low, Filled			
G-3	Belt	Good, Changed			
G-4	Filter	Good, Chanced, Cleaning			
(H)	Pump (Lifting, Equalization, Effluent)	Phase, 220 Volt			
H-1	Direction Checked	Yes / No			
H-2	Ampere Checked	Yes / No			0.7 Amps
H-3	Noising	Yes / No	Repair	Yes / No	
(I)	Piping				
I-1	Broken	(Yes / No)	Repair / Replaced		
I-2	Leakage	(Yes / No)	Repair / Replaced		
(J)	Wiring				
J-1	Piping	(Good, Bad)	Repair / Replaced		
J-2	Insulation	(Good, Bad)	Repair / Replaced		

Remark: Normally Operated

Maintenance Engineer	Customer Received By
Sign -	Sign -
Name -	Name -
Position - Junior Engineer	Position - Admin

Figure 39: Discharge waste water (Sewage) test report (Base Camp)

Sr.	Analysis	Results	Units	NEQEG Guideline	Remarks
1	pH	7.2	S.U	6.0 ~ 9.0	Normal
2	Temperature	30.2	˚C		
3	Total Suspended Solids	6	mg/l	50	Normal
4	BOD_5	23	mg/l	30	Normal
5	COD	71	mg/l	125	Normal
6	Total Phosphorus	0.5	mg/l	2	Normal
7	Oil and Grease	7	mg/l	10	Normal
8	Total Nitrogen	<5	mg/l	10	Normal-
9	Turbidity (FNU)	0.75		-	
10	Electrical conductivity (EC)	TBA		-	
11	total coliform bacteria	TBA		400	

Note, Due to the COVID-19 Pandemic, EC and total coliform bacteria results will be available in next monitoring report.

Figure 39(A): Discharge waste water (Sewage) test parameters

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00277 **Date** : 15-01-20

Client Information

Client Name : MPRL E&P Pte Ltd
Organization : MPRL E&P Pte Ltd
Client ID : LC-12-001
Registration Date & Time : 09-01-20 10:20AM
Contact :
Testing Purpose : Monitoring

Sample Information

Sample ID : WS-20-00275
Sample Name : Waste Water Pit-2
Sample Type / Source : Grey Water(Waste)
Sampling Date & Time : 08-01-20 10:22AM
Sample Location : MPRL E&P Base Camp, Min Bu, Magwe Division
Latitude :
Longitude :

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Emission Standard	Remarks
1	pH	7.2	S.U	6.0 - 9.0 (d)	Normal
2	TSS	6	mg/L	≤50 (d)	Normal
3	BOD5	23	mg/L	≤50 (d)	Normal
4	COD	71	mg/L	≤250 (d)	Normal
5	Total Phosphorous	0.5	mg/L	≤ 2 (d)	Normal
6	Oil & Grease	7	mg/L	≤10 (d)	Normal
7	Total Nitrogen	<5	mg/L	-	-

"ND"= Not Detected	"LOD"= Lower limit of detection	"-" = No Reference Standard
Tested by	Checked by	Approved by
Daw [illegible] Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory ALARM

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

Figure 40: Sewage discharge water monitoring results (Base Camp)

Figure 41: Monitor waste water discharge parameters

6.2 Hydro test water

In Mann field warehouse, team used to perform the hydro test for the tubing in the designated pressure test area. Field team reduced and minimized the usage of water volume by using recycled water with zero discharge.

Figure 42: Recycle water usage system with zero discharge

Figure 43: Recycle water back to main storage concrete pit

6.3 Use of chemicals for EOR

During the EOR operation, chemicals will be injected into the wells to alter the property of oil for enhanced recovery in the EIA report. The chemicals that may be used for the Project included alkaline and polymers. The injection of chemicals into the well may cause groundwater contamination and indirectly affecting community health.

In Mann Field, MPRL E&P applied the GreenZyme to inject to the formation that does not expose nor discharge to the environment. According to the approved work program, MPRL E&P injected GZ into the two producing wells namely M-49 and M-24 in this fiscal year 2019-20. Hence, there is no environmental issue since the injection project had been conducted according to the standard operating procedure by protecting not to spill to the environment.

GreenZyme® is not a chemical but a biological liquid enzyme which is a kind of environmentally friendly fluid. It is a protein-based non-living catalyst, which facilitates the completion of biological reactions, to enhance crude oil recovery from most oil wells, both onshore and offshore. EOR GreenZyme® is produced by a proprietary process, which involves impregnating a high protein nutrient soup, with the DNA of selectively cultured microbes. The final product contains enzymes associated with the oil-eating microbe's DNA. Nearly all-living microbes are made inert at the end of the manufacturing process.

6.4 Produced Water Management

MPRL E&P to minimize environmental impact to Zero Discharge in produced water management. The team recording milestones on achievements of Zero Discharge on produced water management was implemented on 24 August 2017.

MPRL E&P is undertaking to inject all produced water (100%) to the shut-in wells by using **5** units of injection pumps to meet guideline levels in NEQEG for Onshore Oil and Gas Development.

Figure 44: Produced water management process

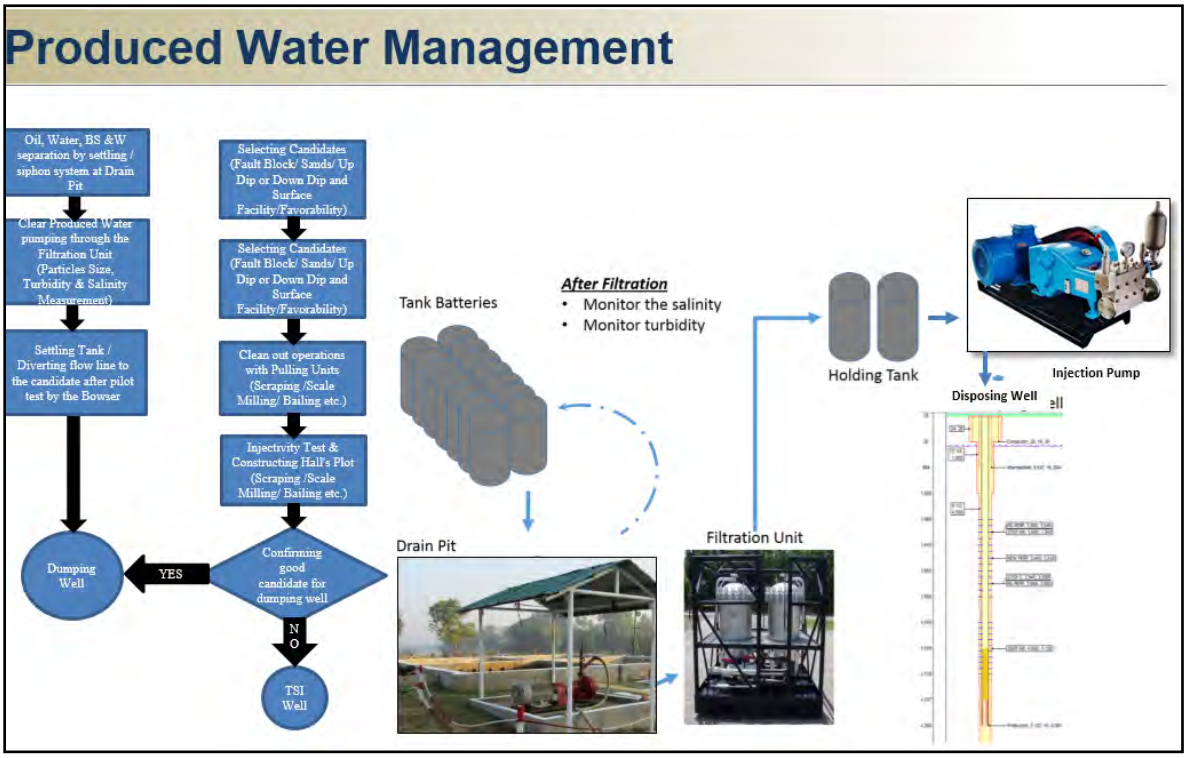


Figure 44(A): Produced water management process

Figure 45: Injection well for produced water

Figure 46: Produced water Injection pump

As per the table 8.3 Environmental And Social Monitoring Program of the approved EIA report, it is committed to test the waste waters from the discharged points. However, all the produced water from the GOCs are being disposed back into the formation and thus there is no discharged to the environment. Again, there is no discharge from the hydrotest activities and also from shut in wells.

Therefore, waste water monitoring will be continued with the parameters committed in table 8.3 of the approved EIA report on the treated discharged water of the base camp.

6.5 Monitoring for solid waste (Sludge Management)

Produced water generated from everyday production about 1450 BBL per day in the Mann Field. Produced water typically contains a mixture of inorganic (dissolved salts, trace metals, suspended particles) and organic (dispersed and dissolved hydrocarbons, organic acids) compounds. Produced water generates sludge due to the compound sediments, and improper discharge sludge may cause potential impacts on the receiving environment (i.e. soil, surface water, and groundwater) and community health as well as terrestrial and aquatic ecological resources.
Dried sludge, 5000 Kg (estimated weight) are temporary storage at Waste Management Compound and we have planned to construct the temp storage area in the Sludge management compound and also will perform a pilot test with Bioremediation process. Currently, all sludge is proper storage in concrete pits.

Figure 47: Sludge Storage Pits

Figure 48: Sludge Management Compound

All sludge collected are in proper storage in concrete pits to meet the guideline levels in NEQEG for Onshore Oil and Gas Development.

7.0 Gas Venting Monitoring

As per the gas venting monitoring program, MPRL E&P's technical team is monitoring and measuring by using an Echo Meter to check for gas volume. Based on the results, if the gas volume is significantly higher than the previous measurement volume, use the orifice meter to confirm the gas volume measured by 24 hours. The team connected to the gas line after confirming gas volume is enough to collect to the existing facility of the gas supply lines to the LPG plant.

As per the planned monitoring program, the team randomly selected the three wells and measured by using an orifice meter on the wells as follows;

7.1 Location of the gas venting wells

Table 15: Gas Venting well locations

Well No	Location	Gas Volume	Date
M 311	N 20˚13' 16.04" E 94˚51' 21.95"	0 – MMCFD	19 Oct 2019
M 16	N 20˚13' 23.74" E 94˚51' 12.32"	0 – MMCFD	18 Nov 2019
M 264	N 20˚12' 48.08" E 94˚51' 19.13"	0 – MMCFD	13 Dec 2019
M 205	N 20˚13' 9.10" E 94˚51' 17.88"	0 – MMCFD	8 Jan 2020

Gas Volume Measurement (Orifice Meter) Well - 311

Date – 19 October 2019 Gas Volume – 0 MMCFD

Gas Volume Measurement (Orifice Meter) Well - 16

Date – 18 November 2019 Gas Volume – 0 MMCFD

Gas Volume Measurement (Orifice Meter) Well - 264

Date – 13 December 2019Gas Volume – 0 MMCFD

Figure 49: Gas volume monitoring

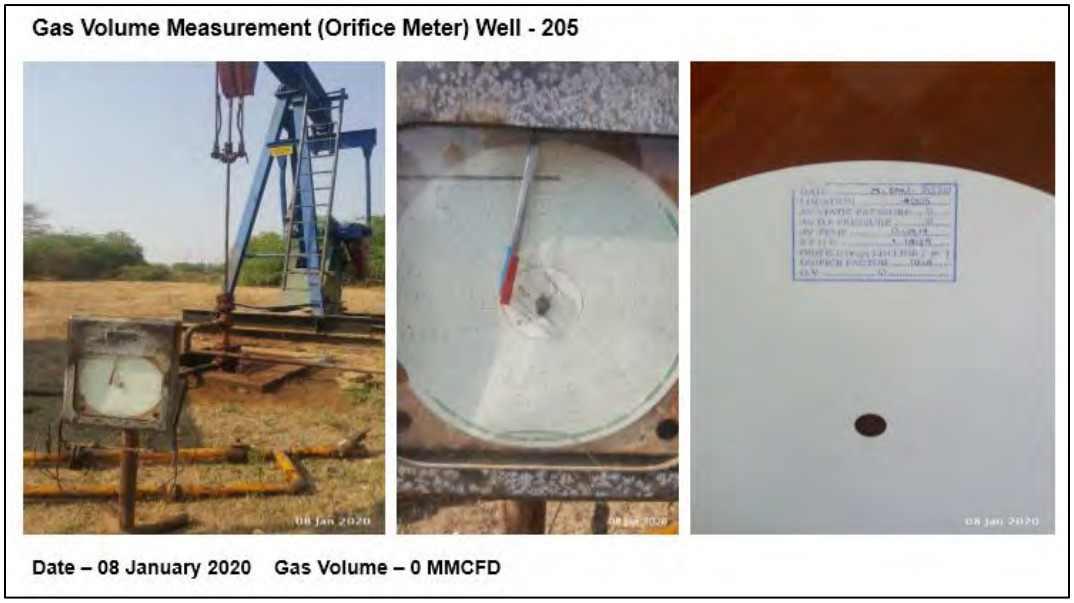


Figure 49(A): Gas volume monitoring

7.2 Monitoring for Hydrogen Sulphide (H_2S)

Table 16: H2S monitoring location

Sr. No:	Well No.	Date	Measurement Time	H_2S (PPM)	CO (PPM)	O_2 (%)	LEL (%)
1	M-52	21-Feb-20	15:00	0	0	20.9	0
2	M-413	21-Feb-20	15:30	0	0	20.9	0
3	M-61	21-Feb-20	14:45	0	0	20.9	0
4	M-356	21-Feb-20	16:58	0	0	20.9	0
5	M-368	21-Feb-20	16:25	0	0	20.9	0
6	M-508	21-Feb-20	16:35	0	0	20.9	0

Measurement duration – 30 second / Guideline Value – Hydrogen Sulphide 5 mg/ Nm^3 c

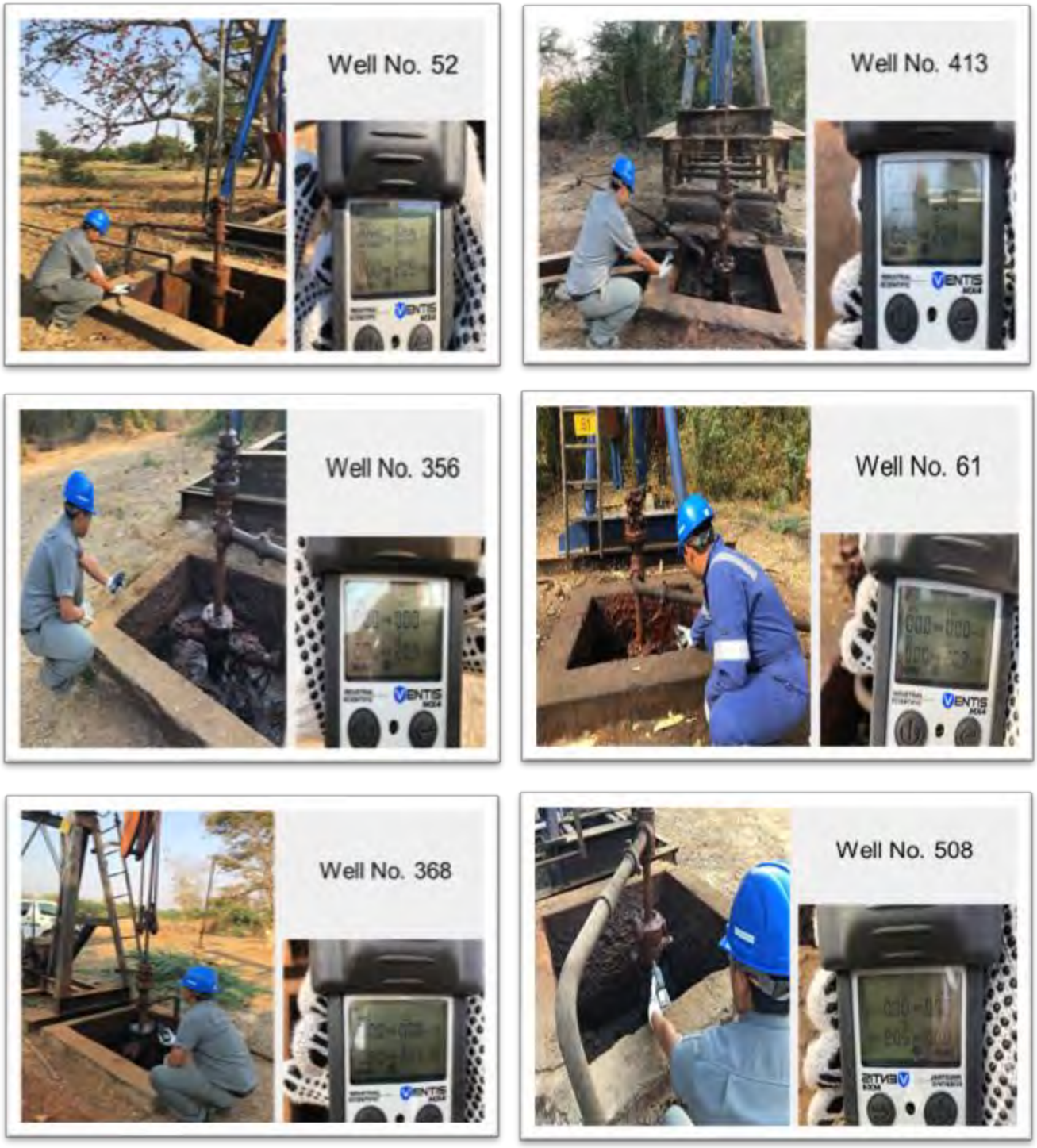


Figure 50: H2S Monitoring Wells

As per the reservoir nature, the gas volume will be slightly going down but there is a significant increase of gas volume after perforation the well # 657. However team is continually monitoring the gas volume by using the Echo meter for every vent well, which will measure the orifice meter and collect to the LPG supply lines if currently there is no additional impact due to gas venting and H2S to the environment.

8.0 HSE Summary Report

"There were 8 number of incidents from October 2019 to March 2020. Consisting ONE restricted workday case, ONE first aid case, ONE road traffic accident, TWO fire incidents, and THREE oil spill occurrences.

The main contributing factor of THREE oil spill cases was found as the environmental factor in common, i.e. public community, thief, and the low temperature in the winter season. However, the other factors contributed to their occurrences involves inadequate inspection and maintenance program, poor field security management and inadequacy in awareness promotion to the public or local community.

Meanwhile, injury-related incidents and road traffic accidents of third party vehicles were caused mainly by human failure i.e. not following the standard operating procedure and the fatigue as human nature respectively.

When analyzing the fire incidents it was revealed that one was operationally related as it occurred during cooking operation and the other was assumed due to the lack of awareness of the local community on the hazards of hydrocarbon.

In conclusion, the following have been drawn out as lessons learned based on these accidents to prevent similar occurrences in the future.

- All crews to adhere to the Standard Operation Procedures without tolerance.
- Public community to be more educated in order to raise their awareness level.
- Proper planned preventive maintenance on the industry assets to be implemented as per plan.
- Field security management is a key factor to be reinforced to eliminate or reduce the likelihood of majority of accidents such as spill, theft and fire, etc.
- Contractor management to be more stringent"

Figure 51: HSE Statistics

Table 17.0 Analysis of Incidents in Mann Field

Analysis of Incidents							
Date	Type of Incident	Type of Loss	Site of Injury (Only for Injurious Accidents)	Task associated with Accident	Causes of the Incident	People, Procedure, Process, Material, Method, Machine, Equipment, Environment	Root Cause of Incident (Only Refer to RCA Handbook)
29.10.19	(RWC) Restricted Work Case	Bodily Injured	Left Finger	Changing V-Belt of Pumping Unit	Influence of Alcohol Poor Visibility Inadequate procedure Inadequate provision of proper facilities Incorrect type of PPE used	People	
19.11.19	Oil Spill	Environmental Impact 0.25 BBL of crude oil	Nil	Public / Community	Bullock cart trampled over old clamp Due to weak of concrete casting strength for long time and change the positon of clamp at leak point of production flow line.	Environment (Public community)	
13.12.19	Fire	Fire extinguisher	Nil	Public / Community	Assumption made to: lack of public awareness on the hydrocarbon fire	Environment (Public community)	
13.12.19	First Aid	Bodily Injured	Right Leg	Positioning wireline unit manually	Unable to control the load during manual handling Insufficient observation of hazards and perception of risk during manual handling activity	Procedure	
23.12.19	Oil Spill	Environmental Impact 0.5 BBL of crude oil	Nil	Transferring of crude oil through piping	Built up of paraffin inside flow line (winter season) Increased pressure in the flow line Not considering of process behavioral changes during previous repair. Using substandard sealing material for previous repair.	Environment (Winter) Process Process Method	
31.12.19	Oil Spill	Environmental Impact 0.75 BBL of crude oil	Nil	Transferring of crude oil through piping	Built up of paraffin inside the flow line (winter season) Increased pressure in the flow line Not considering of process behavioral	Environment (Winter) Process Process Method Environment	

					changes during previous repair. Using substandard sealing material for previous repair. Initial deterioration caused by thief	(Public community)	
17.1.2020	Fire	Fire Blanket (1 ea.) 5 kg ABC Fire Extinguisher (1 ea.)	Nil	Cooking	Did not close gas valve or switch when leaving from kitchen. Did not assign second man or unattended cooking fire. Gas stove switch is loosen condition. Lack of pressure gas regulator at all gas stoves.	People Procedure Equipment	Not follow the procedure Lack of Supervision Lack of Maintenance
21.1.2020	(RTA) Road Traffic Accident	Third party property (vehicle damage)	Nil	Transportation of Mann Field Crew	Assumption made to: driver's light drowse	People	Poor safety management of third party Inconsistency in following the commitments as agreed by third party

8.1 HSE Training

As a part of promoting safety culture at all levels of organization, HSE team conducted the following trainings:

- Health, Safety & Environment Knowledge Sharing Session
- Weight Management Awareness sessions
- JSA and Risk Assessment Training
- Environmental Monitoring Report Awareness Training
- First Aid Training
- Environmental Awareness Training
- Delivering Toolbox Talk Effectively Training
- Permit To Work Training
- Manual Handling training
- Occupational Hazards Associated with Workplace training
- Effective Usage of PPE Awareness training
- Defensive Driving Technique refresh training

Figure 52: HSE Training

Figure 53: HSE Training

To develop HSE culture, the monthly HSE best performance award was given in Mann Field consistently and the Safe Driver of The Fiscal Year 2019-20 awarded to 3 drivers in the Yangon Office.

Figure 54: HSE Performance Awards to staffs

Figure 55: HSE Performance Awards to staffs

As per EIA commitment, MOGE & MPRL E&P conducted 1st Biannual CSR & HSE Performance Progress Update Meeting to all stakeholders for the Environmental Monitoring Report (April ~ September 2019) on 29th October 2019. A total of 33 participants.

Figure 56: EMP report presentation to stakeholder

8.2 HSE Day in Mann Field

MPRL E&P Group of Companies believes "Safety" is everyone's business. That is why every person at the Group of Companies' work place makes safety awareness their number one priority, while taking personal ownership of his or her own safety and the safety of others.

Everyone at MPRL E&P Group of Companies shall follow our (12) Golden HSE Rules which comes from a detailed study of fatal and serious accidents in our industry. The lessons learned from those accidents have been turned into a few simple rules which, if properly followed, will help to keep all of us safe.

Following our Golden HSE Rules helps us to achieve a perfect HSE day, every day.

Our people often work in demanding roles and extreme conditions. They may have many different hazards to manage, whether at onshore & offshore locations, construction work in remote locations, during the transport of personnel, equipment and products. We all know that hazards can lead to fatalities or can leave an injured person with a lifelong disability, so treat every hazard with respect. Whatever we do, we must always ensure that we can operate safely before we start work.

Our goal is to keep our people and the environment in which we work, safe and healthy.

Figure 57: HSE Days movement photos (30 December 2019)

Figure 57(A): HSE Days movement photos (30 December 2019)

8.3 HSE Audit

HSE bi-annual Audit for the fiscal year of 2019- 2020 was conducted on 10th and 11th of September 2019, to determine the level of health and safety performance in Mann Field operation against the criteria as mentioned in the MPRL E&P approved procedures, MRPL E&P HSEMS and international best practices. The audit includes the following activities:

The audit includes the following activities:

1. Reviewing Standard Operating Procedures & JSAs
2. Reviewing the effectiveness in the implementation on previous HSE audit findings
3. Searching potential hazards onsite for both obvious and hidden gaps and substandard practices
4. Reviewing HSE documentation system.
5. Reviewing Preventive & Maintenance Program (Plan Vs Actual)

The primary objective of the audit is to achieve continuous improvements in the HSE management system to ensure the worksite continues to provide a safe and healthy environment for staff, members of the surrounding community, and also sustainability to the environment.

This report presents the findings and recommendations for the Mann Oil Field as following order:

1. Updating the progress of action taken on previous audit findings
2. Outstanding previous audit finding
3. Highlighting the improved areas
4. New findings for future improvement
5. Review of Mann Field HSE documentation
6. Review of Preventive & Maintenance Program
7. Outcome of staff interview
8. Conclusion

Figure 58: HSE Site Audit Photos

8.4 ECC Audit & Site Inspection by ECD team

Magway Environmental Conservation Department, conducted the ECC audit in Mann Field. ECD team was checking the documentation of the EIA report, CCC certificate, NEQEG guideline, and implementation of an environmental management plan with progress started from 23 December to 24 December 2019 in Mann Field. ECD team setting up Hz-scanner and measured air quality at 24hrs at Z3AQN.

ECD team inspected the status of monitoring progress, waste management compound, GOCS, Workover operations, and the proper disposal of produced water management & solid waste. The team inspected the implementation of CSR activities progress in the villages, the status of the mobile clinic, and the status of MPRL E&P's Operational Grievance Mechanism.

Figure 59: Documentation Audit (ECC) in the office

Figure 60: Site Audit with ECD team

Figure 60(A): Site Audit with ECD team

မကွေးတိုင်းဒေသကြီး၊ မင်းဘူးမြို့နယ်၊ မန်းရေနံမြေရှိ ရေနံထိန်းသိမ်းမှုအစီအစဉ်တိုးမြှင့်ခြင်းနှင့် ပြန်လည်အထွက်တိုးရေးဆောင်ရွက်ခြင်းလုပ်ငန်းအတွက် MPRL E&P Pte Ltd. ၏ Z3AQN တည်နေရာတွင် လေအရည်အသွေးတိုင်းတာမှုအား ၂၃-၁၂-၂၀၁၉ ရက်နေ့ ၁၃:၅၀ နာရီမှ ၂၄-၁၂-၂၀၁၉ ရက်နေ့ ၁၃:၅၀ ထိ Haz-Scanner (EPAS) ဖြင့်တိုင်းတာခဲ့မှုရလဒ်များ

No.	Parameters	Averaging Period	Results/ Z3AQN µg/m^3	Guideline Value µg/ m^3	Remark
1	PM_{10}	24-hour	46.75	50	
2	$PM_{2.5}$	24-hour	32.04	25	Above NEQEG
3	NH_3	24-hour	1.34	-	
4	CO	24-hour	0.097	-	
5	H_2S	24-hour	0.011 mg/Nm^3	5 mg/Nm^3	
6	CH_4	24-hour	0	-	
7	NO_2	1-hour	124.18	200	
8	O_3	8-hour daily	11.86	100	
9	RH	24-hour	65.69%	-	
10	Temp	24-hour	69.77 °F	-	

Figure 61: Air Monitoring Results (ECD)

8.5 Review for Environmental Monitoring Data Results

MPRL E&P conducted a review team meeting for the environmental monitoring report with MOGE & ECD (Magway) as per the ECC requirement in the MOGE office in Mann Field. HSE Manager presented the preparation of monitoring survey report progress with the results compared with baseline data after receiving the second monitoring survey results. He also mentioned the ECC requirement for the monitoring report preparation as per the following requirements:

- Commitment of environmental monitoring program
- Implementation of progress of Environmental Management Plan
- $PM_{2.5}$ and SO2 value is higher than NEQEG
- Oil and Grease value is higher than based line value
- Difficulties encountered in the implementation of EMP
- Non-compliances of EMP
- Self-monitoring report
- Summary of Incidents and achievement of HSE practices

8.6 Team Discussing and Recommendation

- EMP is implementing as per planned schedule and no challenges encountered.
- Air monitoring $PM_{2.5}$ & SO_2 values is higher than NEQEG since on based line survey 2015
  - Optimize the operations with minimum impact to air quality
  - Record with logbook for human activities in next monitoring report.
  - Awareness to community for the air pollution of $PM_{2.5}$ & SO_2

In addition to recording the human activities, as recommended by ECD, it is planned to conduct a broader study on change in human settlement over time together with the environmental awareness sessions at the nearby villages in a convenient period after the COVID-19 pandemic.

Figure 62: Review meeting with ECD & MOGE

ECD (Magway) advised that MPRL E&P need to conduct data analyzing of human activities for the source of impact which is not operational related issue.

8.7 Implementation of ECD Comments

MPRL E&P Pte Ltd. ၏ ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြည့်စစ်ဆေးမှု အစီရင်ခံစာ တွင်တင်ပြထားသည့်အချက်များနှင့်စပ်လျဉ်း၍ မြန်မာ့ရေနံနှင့်သဘာဝဓါတ်ငွေ့လုပ်ငန်း မှတစ်ဆင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၏ ၂၅-၂-၂၀၁၉ ရက်စွဲပါစာအမှတ် အီးအိုင်အေ-၂/ရေနံ(၃၇၆/၂၀၁၉)ဖြင့်အကြောင်းကြားစာပါအချက်များအပေါ် အောက်ပါ အတိုင်းကြပ်မတ်ဆောင်ရွက်သွားမည်ဖြစ်ပါကြောင်းအစီရင်ခံ တင်ပြအပ်ပါသည်။

(က) လေထုအရည်အသွေးဆိုင်ရာ Parameter များဖြစ်သည့် $PM_{2.5}$ နှင့် SO_2 တို့၏ ရလဒ်များအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်၏ သတ်မှတ်ချက်အတွင်းရှိရေး စောင့်ကြပ်ကြည့်ရှုသွားရန်၊

- ရေနံအထွက်တိုးစီမံကိန်း အကောင်အထည်ဖော်ဆောင်ရွက်မှုကို အရှိန်အဟုန်မြှင့် ဆောင်ရွက်ခြင်းနှင့်အတူ လုပ်ငန်းလည်ပတ်မှုကြောင့် ပတ်ဝန်းကျင် လေအရည်အသွေး ထိခိုက်မှုအနည်းဆုံးဖြစ်အောင် အကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိပါသည်။ $PM_{2.5}$ နှင့် SO_2 value တို့သည် ၂၀၁၅ ခုနှစ် မေလ အတွင်း ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာအတွက် တိုင်းတာစစ်ဆေးခြင်းပြုလုပ်စဉ်က (NEQEG) ၏ သတ်မှတ်ထားသော စံချိန်စံညွှန်းများထက် အချို့နေရာများတွင် ကျော်လွန်နေကြောင်း တွေ့ရှိတင်ပြခဲ့ပြီးဖြစ်ပါသည်။ MPRL E&P အနေဖြင့် ၂၀၁၉ ခုနှစ် ဇွန်၊ ဇူလိုင်၊ ဩဂုတ်လ တိုင်းတာချက်များနှင့် ယခု ၂၀၂၀ ခုနှစ် ဖေဖော်ဝါရီလ တိုင်းတာမှု ရလဒ်များမှာ ၂၀၁၅ ခုနှစ်တိုင်းတာခဲ့သော ရလဒ်များနှင့် နှိုင်းယှဉ်ပါက အခြေအနေအချို့ တိုးတက်လာကြောင်း တွေ့ရှိခဲ့ရပါသည်။ ပူးတွဲတင်ပြပါပုံများအရ တိုင်းတာသည့် Z1AQN နေရာသည် ရေနံ အထွက်တိုးစီမံကိန်း လုပ်ဆောင်မှုများနှင့် (12 km)ခန့် ဝေးကွာသောနေရာတွင် တည်ရှိသောကြောင့် စီမံကိန်းမှစွန့်ထုတ်သော လေထုညစ်ညမ်းမှု ဖြစ်နိုင်ခြေနည်းပါးသည်ကိုလည်းကောင်း၊ မုန်းချောင်း တစ်လျှောက် စိုက်ပျိုးရေးဖြစ်ထွန်းမှုကြောင့် လူနေအိမ်ခြေတိုးတက်

များပြားလာခြင်း၊ ထင်းမီးသွေးလောင်စာအပြင် ထော်လာဂျီ/ဆိုင်ကယ်/ထွန်စက်/မီးစက် အစရှိသည်တို့ သုံးစွဲမှုများပြားလာခြင်း၊ ကောက်ပဲသီးနှံရိတ်သိမ်းခြွေလှေ့ခြင်း နှင့် စိုက်ပျိုးရေးအခြေပြုစက်မှုလုပ်ငန်းများစသည့် လူတို့လုပ်ဆောင်မှုများမှလည်းကောင်း လေထုညစ်ညမ်းစေသည့်ဓါတ်ငွေ့ CO၊ CO_2 ၊SO_2 အညွှန်းကိန်းများမြင့်တက်စေနိုင်ပါသည်။ မိမိတို့ပတ်ဝန်းကျင်အရည်အသွေး စစ်ဆေးတိုင်းတာခြင်းလုပ်ငန်း ဆောင်ရွက်သည့်အချိန်နှင့်နေရာတို့တွင် တိုက်ဆိုင်စွာဖြင့် လမ်းပြုပြင်ခြင်း၊ အမှိုက်မီးရှို့ခြင်း၊ မီးလှုံခြင်း၊ ထမင်းဟင်းချက်ခြင်း၊ ကောက်ပဲသီးနှံခြွေလှေ့ခြင်း၊ စက်ယန္တရား/ မော်တော်ယာဉ်/မော်တော်ဆိုင်ကယ် အသုံးပြုမှုများပြားခြင်း အစရှိသည်တို့ ကြုံတွေ့ခဲ့ရပါသည်။

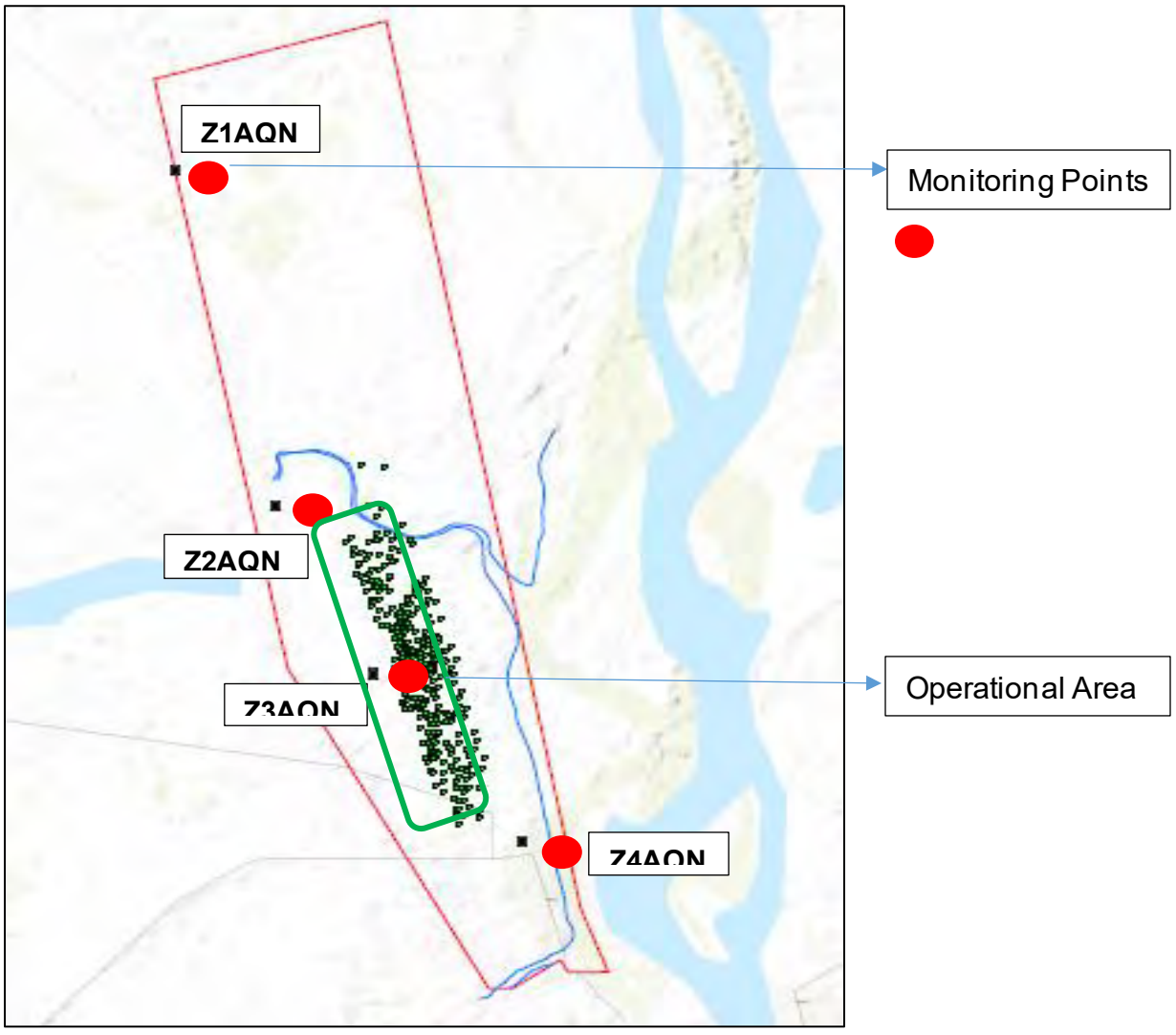


Figure 63: Z1AQN location is 12 km away from the operational area

Figure 64: Z1AQN location is located near the villages & main roads

သို့သော် MPRL E&P အနေဖြင့် ၂၀၁၅ ခုနှစ်မှ ယနေ့အထိ စီမံကိန်းထိစပ်ရေယာအတွင်း တိုးတက်လာသည့်လူဦးရေ၊ လူမှုစီးပွါးဖွံ့ဖြိုးတိုးတက်မှု၊ အသက်မွေးဝမ်းကျောင်းပုံစံ၊ စက်ယန္တရား/မော်တော်ယာဉ်/မော်တော်ဆိုင်ကယ်ပမာဏ ၊နေ့စဉ်သုံးစွဲသည့် စွမ်းအင်အရင်းအမြစ်အမျိုးအစား၊ အခြေခံအဆောက်အဦ တိုးတက်မှု၊ ရာသီကာလအလိုက် ဆောင်ရွက်တတ်သည့်ဓလေ့ အစရှိသည်တို့ကို သက်ဆိုင်ရာ ဌာနများ၏ အကူအညီရယူကာ သတ်မှတ်စံချိန်စံညွှန်းထက် ကျော်လွန်မြင့်တက်စေသည့် အကြောင်းရင်းများကို စနစ်တကျ လေ့လာသုံးသပ်သွားရန် နှင့် စီမံကိန်းနှင့်ထိစပ်ကျေးရွာများသို့သွားရောက်ကာ လေထုညစ်ညမ်းမှု အပါအဝင် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး အသိပညာပေး အစီအစဉ်များကို ရှေ့ဆက်ဆောင်ရွက်မည့်အစီအစဉ်၌ ထည့်သွင်း ရေးဆွဲထားပြီးဖြစ်ကာ Covid-19 ရောဂါဖြစ်ပွားမှု ကင်းစင်သွားသည့် အချိန်တွင် စတင် အကောင်အထည်ဖော် ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။

(ခ) ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်တွင် တိုင်းတာမည်ဟု ဖော်ပြပါရှိသော ရေထု အရည်အသွေး (မြေပေါ်မြေအောက်ရေ) ဆိုင်ရာ Parameter များကို ပြည့်စုံစွာတိုင်းတာရန်၊

- MPRL E&P အနေဖြင့်ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်တွင် တိုင်းတာမည်ဟု ဖော်ပြပါရှိသော ရေထုအရည်အသွေး (မြေပေါ် မြေအောက်ရေ) ဆိုင်ရာ Parameter များအနက် နိုင်ငံအတွင်းရှိ ဓါတ်ခွဲခန်းများ ဆောင်ရွက်ပေးနိုင်သည့် Parameter များအားလုံးကို ပြည့်စုံစွာတိုင်းတာ ဆောင်ရွက်သွားမည်ဖြစ်ပါသည်။

(ဂ) မြေပေါ်ရေ အရည်အသွေးများအား အိမ်နီးချင်းနိုင်ငံများ၏ မြေပေါ်ရေ အရည်အသွေး သတ်မှတ်စံချိန်စံညွှန်းများနှင့် နှိုင်းယှဉ်ရန်၊

MPRL E&P အနေဖြင့် တိုင်းတာရရှိသည့် မြေပေါ်ရေအရည်အသွေးများအား အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်ပါ သတ်မှတ် စံချိန်စံညွှန်းများ (Myanmar National Quality Emission Guidelines, 2015 – Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (general application) နှင့်သာမက

- World Health Organization (WHO), Guidelines for Drinking-Water Quality, Fourth Edition Incorporating the First Addendum, Annex 3: Chemical summary tables.
- United States Environmental Protection Agency (EPA), National Primary Drink Water Regulations & National Secondary Drinking Water Regulation, 2009.
- *Myanmar National Drinking Water Guideline, 2019*

တို့၏စံသတ်မှတ်ချက်များနှင့်ပါနှိုင်းယှဉ်ကိုးကားထည့်သွင်းဖော်ပြထားပါသည်။

(ဃ) စွန့်ပစ်ရေ အရည်အသွေးကို ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၌ တိုင်းတာမည်ဟု ဖော်ပြပါရှိသော သတ်မှတ်နေရာများအတိုင်း စွန့်ပစ်ရေ အရည်အသွေးဆိုင်ရာ Parameter များကိုတိုင်းတာရန်၊

- MPRL E&P အနေဖြင့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်၌ တိုင်းတာမည်ဟု ဖော်ပြပါရှိသော သတ်မှတ်နေရာများအတိုင်း စွန့်ပစ်ရေ အရည်အသွေးဆိုင်ရာ Parameter များကို Environmental Action Plan နှင့် Environmental Monitoring Plan ရေးဆွဲကာ ပုံမှန်တိုင်းတာစစ်ဆေးလျက်ရှိပါသည်။ ရေဆိုးသန့်စင်သည့် Biofiltration Unit မှထွက်ရှိလာသော သန့်စင်ပြီးရေကိုလည်း ပုံမှန် တိုင်းတာစစ်ဆေးလျက်ရှိပါသည်။ ထို့ပြင် ရေနံထုတ်လုပ်မှုမှ ထွက်ရှိလာသော ဆားငံရည် (Produced Water) များနှင့် စွန့်ပစ်ရေတို့အား သတ်မှတ်နေရာများတွင် ပတ်ဝန်းကျင်ထိခိုက်မှု မရှိစေရန် စနစ်တကျစွန့်ပစ်ပါမည်ဟု ကတိကဝတ်ပေးထားသည့်အတိုင်း တွင်းဟောင်းများ အတွင်းသို့ စနစ်တကျ ပြန်လည်စွန့်ပစ်သောနည်းစနစ်ဖြင့် ဆက်လက် အကောင်အထည်ဖော်ဆောင်ရွက်လျက်ရှိပါသည်။

Sr.	Analysis	Results	Units	NEQEG Guideline	Remarks
1	pH	7.2	S.U	6.0 ~ 9.0	Normal
2	Temperature	30.2	˚C		
3	Total Suspended Solids	6	mg/l	50	Normal
4	BOD_5	23	mg/l	30	Normal
5	COD	71	mg/l	125	Normal
6	Total Phosphorus	0.5	mg/l	2	Normal
7	Oil and Grease	7	mg/l	10	Normal
8	Total Nitrogen	<5	mg/l	10	Normal-
9	Turbidity (FNU)	0.75		-	
10	Electrical conductivity (EC)	TBA		-	
11	total coliform bacteria	TBA		400	

Figure 65: Discharged waste water result parameter

(c) ဆူညံသံသက်ရောက်မှုရလဒ်သည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်၏ သတ်မှတ်ချက်ထက်ကျော်လွန်နေပါသောကြောင့် သတ်မှတ်ချက်အတွင်းရှိရေး ဆောင်ရွက်သွားရန်၊

- ပတ်ဝန်းကျင်ဆိုင်ရာ စောင့်ကြည့်စစ်ဆေးမှု အစီရင်ခံစာအတွက် ဆူညံသံတိုင်းတာစစ်ဆေးခြင်းဆောင်ရွက်သည့်အချိန်တွင် အဆိုပါ နေရာအနီးတစ်ဝိုက်၌ လမ်းဖောက်လုပ်ခြင်း၊ တရားပွဲကျင်းပခြင်း၊ စက်ယန္တရားများ လုပ်ကိုင်ဆောင်ရွက်ခြင်း၊ အသံချဲ့စက်ဖွင့်ခြင်း စသည်တို့ကြုံတွေ့ခဲ့ရသည့်အပြင် တိုင်းတာသည့်နေရာများသည် လူနေအိမ်ခြေများနှင့် နီးကပ်ခြင်း၊ ဆိုင်ကယ်၊မော်တော်ယာဉ် စသည်သွားလာသည့် လမ်းနံဘေးတွင် တည်ရှိခြင်းတို့သည်လည်း အကြောင်းတစ်ချက်အဖြစ် ပါဝင်နေပါသည်။ နောင်တိုင်းတာသည့်အခါတွင် တိုင်းတာသည့်နေရာအနီးဖြတ်သန်း လုပ်ကိုင်တွေ့ရှိချက်များကို အချိန်ပြည့် အသေးစိတ်စောင့်ကြည့်မှတ်တမ်းတင်သွားမည်ဖြစ်ပြီး ရေနံအထွက်တိုးစီမံကိန်း အကောင်အထည်ဖော် ဆောင်ရွက်ရာတွင် လုပ်ငန်းကြောင့် ဖြစ်ပေါ်လာမည့် ဆူညံသံသက်ရောက်မှုရလဒ်များကို သတ်မှတ်လမ်းညွှန်ချက်အတွင်း ရှိစေရန် ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

(စ) အတည်ပြုပြန်ကြားပြီးဖြစ်သော ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) အစီရင်ခံစာပါ အချက်များအား ဆက်လက်၍ လိုက်နာအကောင်အထည်ဖော် ဆောင်ရွက်သွားမည်ဖြစ်ကြောင်း အစီရင်ခံတင်ပြအပ်ပါသည်။

M.O.G.E.

MPRL E&P

OGM Operational Grievance Mechanism

&

CSR Corporate Social Responsibility

9.0 Operational Grievance Mechanism (OGM)

MPRL E&P is the first company in Myanmar to establish and use an Operational Grievance Mechanism (OGM) that is based on the UN Guiding Principles on Business and Human Rights. Our OGM has been successfully deployed and used in Mann Oil Field for the past 5 years and is based on a model that leverages the support of volunteers from our local communities with whom we work hand in hand. The Operational Grievance Mechanism (OGM) completes the Mann Field Social Management Plan. Tools and sustainable business practices such as our OGM builds trust between us and our local communities; trust which enables us to maintain a robust social license to operate.

9.1 OGM At-A-Glance: Key Performance Indicators

Figure 66: Key Performance Indicators of OGM: September 2014 – March 2020 (Cumulative)

Figure 67: Key Performance Indicators of OGM: April 2019 – September 2019

14	Number of Cases Filed
14	Number of Cases Addressed
1	Average Time to Acknowledgement (days) Target 1- 3 days
7	Average Time to Feedback (days)Target 14 days
9	Average Duration to Closure (days) Target 30 days
100	% Satisfied with the Process (Target 50%)
98	% Satisfied with the Outcome (Target 50%)

Figure 68: Key Performance Indicators of OGM: October 2019 – March 2020

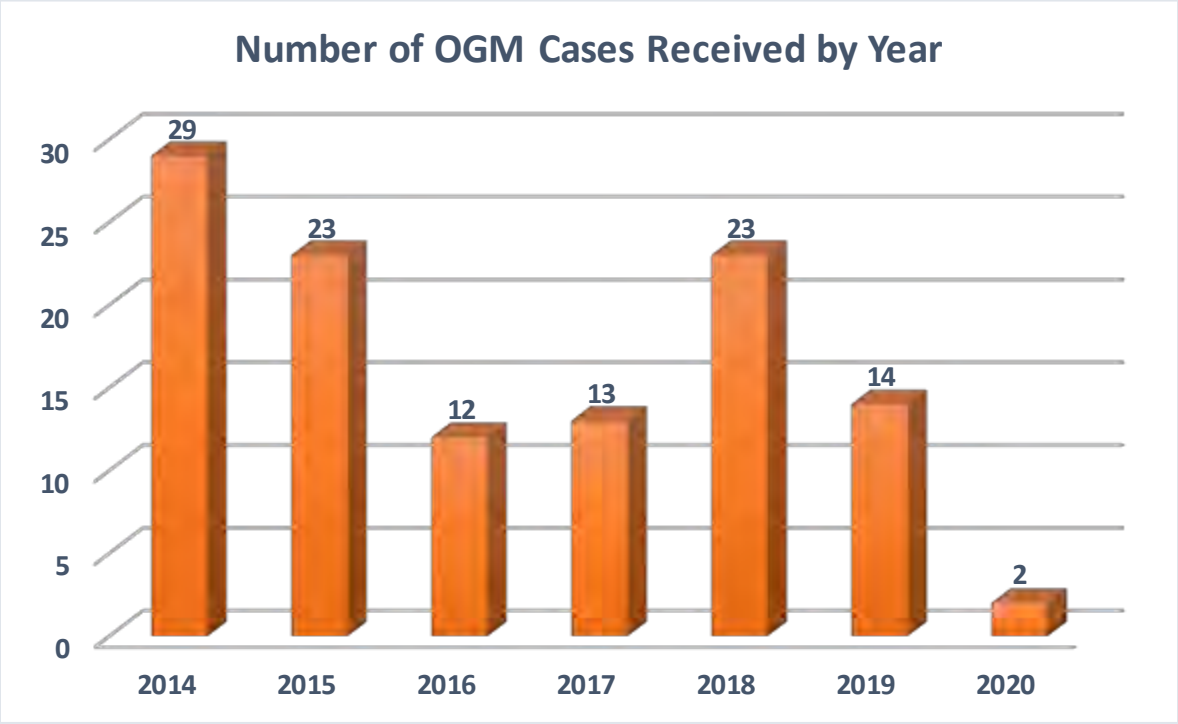


Figure 69: OGM Cased Received by Fiscal Year

9.2 Awareness Raising

Providing a safe platform for project-affected communities to access and lodge complaints and concerns is important in building trust. A good understanding of, and confidence in the functioning of the OGM is important for the communities in order to voice their concerns directly to the company, instead of turning to third parties, enabling us to detect and mitigate business risks effectively and the Operational Grievance Mechanism (OGM) completes the Mann Field Social Management Plan. The annual OGM awareness raising campaign has been planned for this fiscal year for the fourth year in a row.

MPRL E&P has been organizing OGM awareness raising campaign for four years in a row since 2016. This year marks the fifth year we have implemented the OGM at Mann Oil Field. The CSR team always keep awareness actionable and strive to achieve the underlying goal of this campaign - Improved engagement between MOGE, MPRL E&P and the surrounding communities of Mann Oil Field. The CSR Open Day was held at Mann Oil Field on 2nd November together with OGM Awareness Raising Campaign at Mei Bayt Kone School. Eleven groups of school children performed in the OGM Theme Song and four groups of Field Operations team members entertained the audience. All CSR activities of MPRL E&P implemented in Mann Field were showcased at the event. Free flow soft drinks and vegetable fritters were served as staff donation.

The Knowledge, Attitude and Practice (KAP) survey was conducted to determine the awareness levels on OGM; to explore the satisfaction level of complainants; and to identify process improvements required.

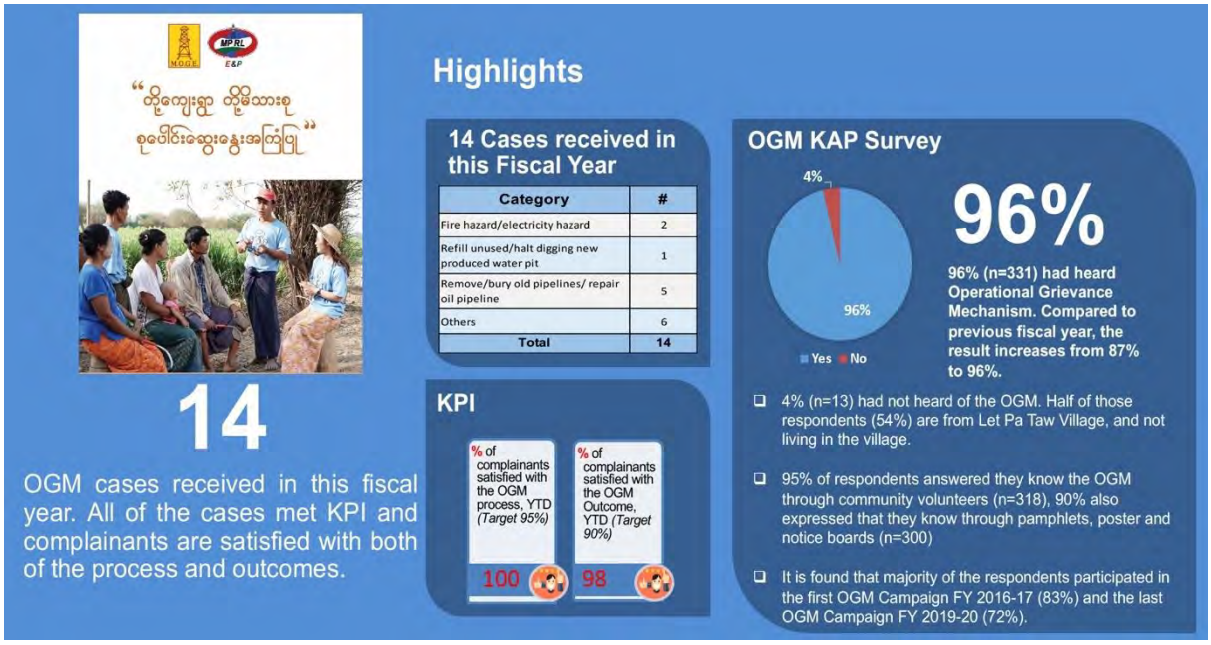


Figure 70: Results of KAP Survey


CSR လုပ်ငန်းများဖြစ်ပြီး နှင့်
အကြံပြုဆွေးနွေးခြင်းကဏ္ဍဖြင့်တင်ဆေးအစီအစဉ်
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Figure 71: CSR Open Day & OGM Awareness Raising Campaign at Mann Field

9.3 Grievances Received in FY 2019-2020 (All cases met the KPIs.)

No.	Case Number	Date Received	Concerns	Category	Action Taken	Duration between Receipt and Closed (Days)	Satisfaction with Process
1	201906/01	19 June 2019	Farmer from Kyar Kan Village asked to remove an old concrete block and pipeline that crossed his farm.	Remove/bury old pipelines/ repair oil pipeline	Field CSR Team reported this case to MOGE GM (Mann) during the Friday Technical Meeting. The oil pipeline is currently in use so it cannot be removed but the old concrete block was removed by MOGE on 25th June. Field team met with the farmer and closed the case on 25th June 2019.	7	Complainant was satisfied with the process and the feedback given. It took 7 days between receiving and closing of grievance.
2	201906/02	28 June 2019	Farmer asked to remove a barbed wire fence that enclosed the waste pit and landfill the waste pit.	Refill unused/halt digging new produced water pit	CSR field team and technical team made an inspection first and reported this case to MOGE GM (Mann) on 1st July 2019. Responded by MOGE GM (Mann), any complaint relating to the earth pit will not be accepted as it was compensated. The CSR team explained this condition to the farmer and he was happy with the feedback.	4	The complainant was satisfied with the process and the feedback was given. The case closed on 2nd July.
3	201907/01	2 July 2019	Farmer asked to remove the oil pipeline and 4 concrete blocks in his farm.	Remove/bury old pipelines / repair oil pipelines	The oil pipeline is currently in use and could not be removed. But the four concrete blocks were removed by the MOGE Construction Department on 19th July 2019.	17	The complainant was satisfied with the process and the feedback given. It took 17 days between receiving and closing of grievance.

4	201907/02	21 July 2019	A villager reported an electrical shock in the farm near GOCS-2.	Fire hazard/electricity hazard	The CSR field team reported this case to the MOGE Electric Department. The concerned department of MOGE took action immediately and repaired the electrical shock on the same day.	1	The complainant was satisfied with the process and the outcome. The case closed on 22nd July 2019.
5	201907/03	29 July 2019	U Toe Toe Aung from Mei Bayt Kone Village reported a power line that connects well #328 fell in his yard and could cause an electrical shock.	Fire hazard/electricity hazard	MPRL E&P's Field Operations team and MOGE's Electrical Department took immediate action and repaired the falling power line on the day of reporting.	1	The complainant was satisfied with the immediate response from MPRL E&P. The case was closed on 30th July 2019.
6	201908/01	5 August 2019	U Toe Naing Soe from Kyar Kan Village reported to remove an old concrete block that was in his farm through an OGM form. He mentioned the existence of concrete blocks made it difficult to cultivate.	Others	MOGE's Construction Department removed the concrete blocks. Now, the farmer is able to cultivate his farms. CSR field team closed the case on 23rd Aug 2019.	18	The complainant was satisfied with the process and outcome. It took 18 days between the receipt and closing the complaint.
7	201908/02	16 August 2019	U Win Shein from Mei Bayt Kone Village suggested that the community investments in Mann Field should be considered and provided based on the farmland areas lost and confiscated for Mann Oil Field project.	Others	CSR Field team explained to the complainant about MPRL E&P's CSR strategies, our CI approach and the needs assessment process.	7	The complainant was satisfied with the explanation from the CSR field staff. The case was closed on 23rd August 2019.
8	201909/01	9 September 2019	On 9th September, Ko Win Zaw Min from Auak Kyaung village reported that shrubs have fallen onto his farm. He requested to remove this.	Others	MPRL E&P field team resolved the case on the same day. Field CSR team met with the farmer and closed the case on that day.	1	The complainant was satisfied with the process and outcome.

9	201910/01	09 October 2019	On 9th Oct 2019, U Myo Min Latt from Man Kyo Village reported that an old pipeline (from well #431) which crossed his farm and caused the difficulty in ploughing. He requested to remove or bury the pipeline if it is not in use.	Remove/ bury old pipelines	MPRL E&P's Field Operations Team made an inspection and found out that the pipeline is planned to be used in the future. CSR field team visited the farmer on 10th October and explained the situation.	1	The complainant is satisfied with the explanation and the case was closed the same day.
10	201910/02	10-Oct-2019	U Myint Han from Man Kyoe Village reported an OGM case on 10th October. He requested to bury a pipeline that crossed his farms which is difficult for bullock cart passing.	Remove/bury old pipelines	U Thura Win, Senior Engineer from MPRL E&P and the team made an inspection and buried the pipeline in the same day.	7	Due to Thadingyut holidays, the case was closed on 17th October. The complainant was satisfied with the process and the result. All KPIs met.
11	201911/01	19-Nov-2019	MPRL E&P field operation team found a small oil patch at the pipeline connected to Well No. 622. The damaged area needed soil replacement due to the oil spills.	Remove/bury old pipelines / repair oil pipelines	CSR field team informed the farmer and village administrator immediately, and explained the condition. MPRL E&P field team repaired the pipeline and refilled the damage soil on the same day.	3	The farmer was satisfied with the action. The case was closed on 22nd November. It took three days between receipt and closing of complaint.
12	201912/01	12-Dec-2019	U Kyaw Tun from Kyee Pin Kan-2 reported to remove old concrete oil waste pit in his farm. He mentioned that it makes him difficult to grow crops.	Others	CSR field team reported this case to Mann GM on Friday Technical Meeting. GM assigned U Aung Si Thu Than to take an inspection and report back. On 20th Dec, Friday Technical Meeting, GM decided to remove the waste pit. The CSR field team closely monitored the case to take action on time and closed within the timeframe.	21	This case was closed on 2nd January 2020.

13	202001/01	30-Jan-2020	U Than Soe from Auk Kyaung village requested to remove the two unused electric poles in his compound.	Others	Field CSR team reported the case to Mann GM on Friday Technical Meeting. Mann GM assigned Electrical Department to make an inspection and report to him. On 10th Feb 2020, MOGE team removed the two unused electric poles and field CSR team closed the case on that day.	11	The complainant was satisfied with the process and the result. All KPIs were met.
14	202003/01	19-Mar-2020	On 19th March, Daw Ohn Kyin from Auk Kyaung village reported to remove a water pipeline that crossed her compound.	Others	Field CSRFC made a visit to the complainant for photo record and initial inspection in the same day. She also took a recommendation letter from the village administrator to make sure if the pipeline is in use or not. The case was reported to Mann GM on 20th March at Friday Technical Meeting. After U Aung Lwin from MOGE Electrical Department made an inspection, they decided to remove the water pipeline. Water pipeline was removed on 26th March 2020 and the case was closed on that day.	7	The complainant was satisfied with the process and the result. All KPIs were met.

Table 18.0: Grievances Received in FY 2019-2020 (All cases met the KPIs.)

10.0 Corporate Social Responsibility

MPRL E&P is fully aware of the fact that business operations do not happen in a vacuum and that it is accountable to multiple stakeholders with a range of interest and influences on its business operations and business conduct. The CSR and Communications Department assists the company in developing and implementing a sustainability strategy that emphasizes shared value creation through regular consultations with host communities and prioritizing mutually beneficial investment projects.

In the light of the potential role the energy industry can play in order to contribute to sustainable development of the country, our CSR programs are aspired to the UN's Sustainable development goal concerning creating sustainable communities and contributing to local development.

For many lower middle-income economies including Myanmar, agriculture remains central to the development efforts, and is a key sector contributing to the gross domestic product (GDP). Despite the sector's importance, food security and poverty continue to be major challenges in many parts of the rural Myanmar. In this regard, MPRL E&P intends to support the improvement of the local agricultural sector to address these challenges along with the host community and relevant stakeholders.

10.1 Community Investment Initiatives

Our community investment initiatives aim to engage with and support local communities where we operate.

We do this through:

- Having an effective functioning Grievance Mechanism
- Investing in sustainable livelihoods (education, healthcare, capacity development, and vocational skills)
- Improving well-being (improved access to water, sanitation, hygiene, health, nutrition, and safety culture etc.
- Partnerships with local groups

10.2 Key Highlights of CSR Work Program (FY 2019-2020)

FY 2019-2020 has been a super busy year for MPRL E&P's CSR and Communications Team. MPRL E&P has implemented new livelihood development initiatives for the communities, especially for smallholder farmers, women's groups and youth in Mann Field, and also promoted their general well-being and satisfaction with our presence there through provision of basic health care services and a waste management system. We have reached a 100% satisfaction rate with the process and a 96% awareness level with regard to the Operational Grievance Mechanism (OGM) in Mann Field. This should not have been possible without the continuous support and involvement of our key stakeholders - MOGE (Mann Field), Communities, Local Authorities, Members of Parliament and many others, whereby we are very proud of our collective achievements. that have contributed to the local development and our relentless pursuit of socially responsible business practices.

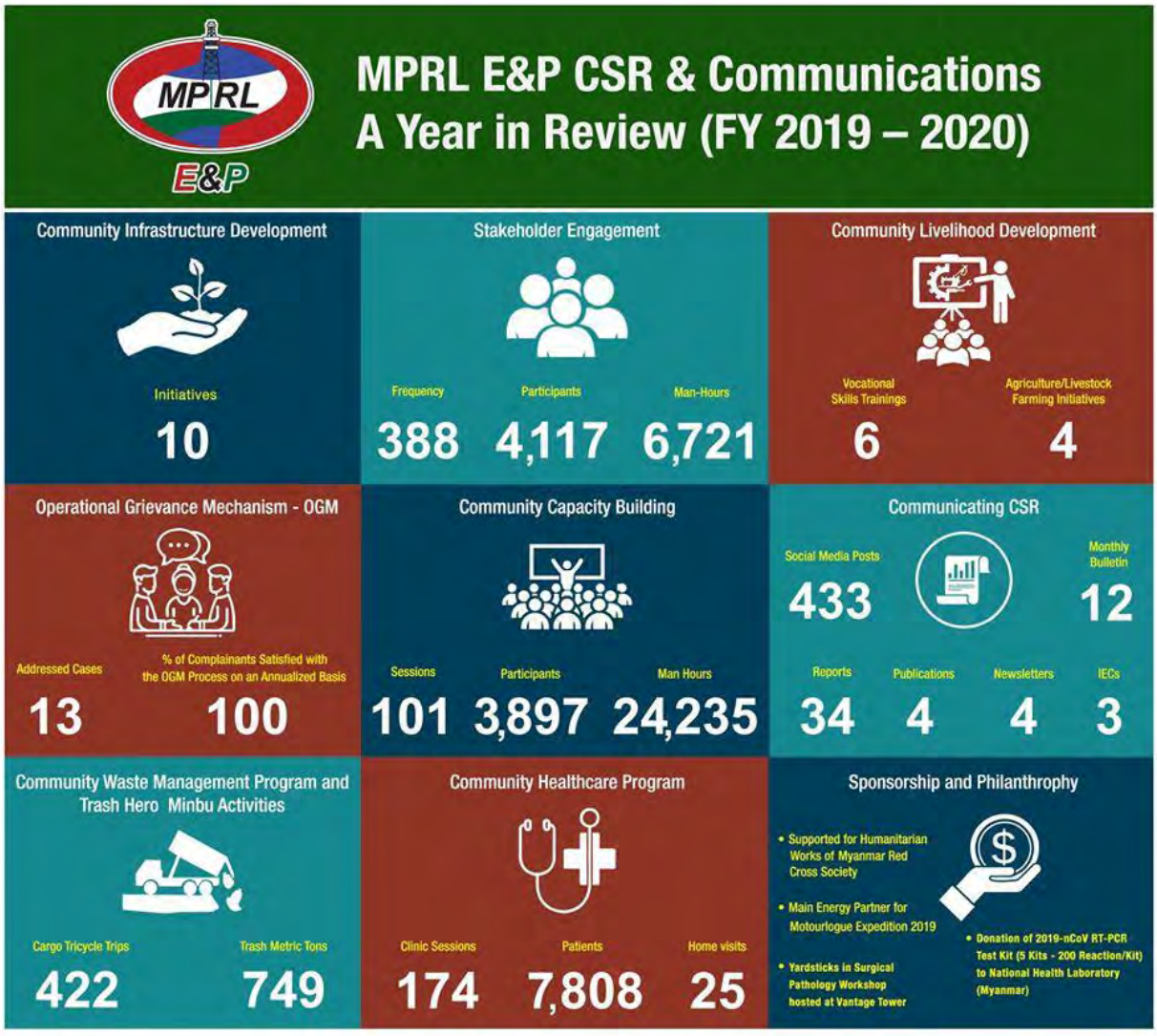


Figure 72: Key Highlights of CSR Work Program (FY 2019-2020)

10.3 Our Key Objectives

MPRL E&P is committed towards enhancing and improving the lives of the Mann Field communities, of which major livelihood activity is farming, and helping them achieve self-reliance. MPRL E&P, in line with these CSR objectives, aims to implement a range of livelihood development initiatives in Mann Field, and in this regard, its CSR Program has supported vocational education opportunities and agriculture and livestock activities for youth, women and farming households in Mann Field.

10.4 Our Approach

MPRL E&P intends to contribute to sustainable development of our host communities and improvement in livelihood opportunities in Mann Field. The company does this through establishing local and regional partnerships and investing in sustainable vocational skills development and livelihood development.

Our approach on CI projects is bottom-up, community-led and through partnerships with communities and local stakeholders. Conducting an assessment is the first step and a great opportunity to use community based participatory approaches, further involving community members and increasing community capacity. Through regular needs assessment activities with the communities, we have identified existing gaps regarding knowledge and access to improved seeds in order to take the agricultural productivity of the community to a new level.

10.5 Community Infrastructure Development

MPRL E&P ensures that community infrastructure in the Mann Field communities are provided in appropriate locations, responds to current needs, and remains adaptable to the needs of an evolving community. MPRL E&P's community infrastructure development focuses around strengthening local capacity to address the need for infrastructure by involving local communities, by increasing the efficiency in terms of how infrastructure is planned, designed, implemented and maintained, and relying to the extent possible on locally available resources. MPRL E&P's CSR & Communications Department have supported ten community investment initiatives in FY 2019-2020.

10.6 Livelihood Development Programs

10.6.1 Vocational Skills Development

As part of CSR initiatives, MPRL E&P has provided a series of vocational training for the sustainable livelihood development of the Mann Field Communities since FY 2017-2018 in collaboration with relevant stakeholders and organizations. Over the three fiscal years, a total of 15 types of trainings based on job market analysis and preferences have been delivered to a total of 315 trainees from Mann Field as shown in the table below.

No.	Fiscal Year	Type of Training	# of Trainees
1	FY 2017-2018	Value-Added Food Making Training	27
2		Soap Making Training	21
3		Pigeon pea value-added products making training	29
4		Sewing Training	20
5	FY 2018-2019	Welding Training	27
6		Bamboo Handicrafts Making Training	17
7		Hand-made Bag Making Training	12
8		Basic Electrical Repair Training	31
9		Bamboo-based Product Making Refresher Course	12
10	FY 2019-2020	Ready-to-Eat Food Products Making Training	19
11		Start and Improve Your Business (SIYB) Training	16
12		Horticulture Training	41
13		Professional Soap Making Training	3
14		Mushroom Cultivation Training	20
15		Refresher Course of Fabric Bag Making	20
Total			**315**

Table 19.0: Vocational trainings in FY 2017-2018, FY 2018-2019 and FY 2019-2020

10.6.2 Agricultural Initiatives

As Mann Field area is located in the Central Dry Zone of Myanmar, the majority cash crops are chickpeas, sesames and other oil crops, but most of the farmers lack access to quality seeds. Improved crop varieties can be purchased through Government and private companies, however accessibility and availability has been a major issue for the farmers in the communities.

In order to help overcome this problem, MPRL E&P has partnered with the Department of Agriculture in Minbu, Magway Region to help improve productivity of the farmers by providing knowledge sharing sessions on the use of the GAP (Good Agricultural Practices) system, systematic use of soil, chemical fertilizers, natural fertilizers, pesticides and selecting region-suited seeds.

Following the knowledge sharing sessions, MPRL E&P's CSR team and farmers discussed together developing model chickpea and sunflower farms and organizing field days. Then MPRL E&P has supported development of model farms growing chickpeas and sunflowers, and organized field days for a group of farmers from neighboring communities as the first steps. During the field days to the model farms, the farmers studied how chickpeas can be grown based on the GAP system, safe use of pesticides and how to make organic pesticides at home. They also studied the use of gypsum, comparison of wet season peanut seeds, and wet season sesame plantations. It is hoped that the farming communities will be able to integrate knowledge on the GAP and practical learning to increase their agricultural productivity, and improve their living standards.

After these field-based learning sessions, MPRL E&P engaged with the farmers who are interested to apply modern sowing techniques with improved chickpea seeds during FY 2018-2019. A total of eight farmers from four villages have participated in these activities. After the farmers completed sowing the seeds, MPRL E&P facilitated field learning sessions with the neighboring farmers to compare the differences between the traditional way and modern techniques. Most of the farmers were well aware of the improvements, and have shown their interest to use the new methods in their next crop season. The figure below shows the increase in the number of farmers who have sown improved chickpea seeds during the two fiscal years.

No.	Village	# of farmers FY 18 - 19	# of farmers FY 19 - 20	% Increase in each village
1	Chin Taung	3	14	367%
2	Kywe Cha	1	5	400%
3	Lay Eain Tan	3	4	33%
4	Man Kyoe	1	6	500%
5	Mei Bayt Kone	-	4	-
Total		8	33	313%

Table 20.0: Number of Farmers who have sown improved chickpea seeds

10.6.3 Horticulture Training

MPRL E&P believes provision of horticulture trainings for the local farmers in Mann Field will enable them to adopt sustainable horticultural practices that preserve local ecosystems and promote socio-economic development. In February 2019, MPRL E&P supported a group of 59 farmers to participate in a field day organized by East-West Seed and Netherlands' Government for learning opportunities on chemical-free vegetable production, importance of good seeding and proper fertilization for optimum crop yields.

Following this, many of the farmers requested us to arrange technical trainings for horticulture. Therefore, in July 2019, the CSR team organized a training on growing tomatoes and chilies, both of which are popular vegetables with year-round demands, in collaboration with a technician from East-West Seed with a particular focus on upgrading the traditional ways of horticulture to the modern ones for optimum crop yields and sustainability.

In order to monitor and support these agriculture and horticulture activities, MPRL E&P recruited a Community Liaison whose main responsibilities are to work closely with the Department of Agriculture (Minbu) for awareness raising purposes, and to facilitate between farmers and technical persons for tackling the difficulties farmers are facing.

One of the MPRL E&P's approaches is to partner with relevant local stakeholders on community investment activities. In this regard, we have collaborated with the Department of Agriculture (Minbu) and Department of Livestock Breeding and Veterinary for technical knowledge support to the farming communities in Mann Field.

10.7 Monitoring Plans

MPRL E&P monitors the progress of the vocational trainees, and conducts review meetings with all the trainees to ensure continuous improvements and cross learning on a regular basis. For the agriculture and horticulture activities, the CSR field team will monitor on a seasonal basis according to the crops individual farmers are growing. During the crop seasons, the Community Liaison will observe closely each and every step of the farming activities.

Photo Records of Community Livelihood Development

Figure 73: Senior Management visiting Daw San May's Farm

11.0 Success Stories from Mann Field

11.1 Success Story (1)

Daw San May is a 61-year-old farmer living in Kyar Kan Village with her family of 7 people. While she works on her farms, her husband works at a ship.

She attended the horticulture training on tomatoes and chilies provided at the Shwe Twin Kyaung Monastery. The hands-on training was organized by MPRL E&P's CSR Program in cooperation with U Aung Ko Latt from East West Seed Company Limited. After the completion of the training, with the support of seeds from MPRL E&P and materials from the East West Seed Company Limited, she started to grow tomatoes on 15 September 2019.

At first there was difficulty getting water, and as a result a well was drilled. Initially, she never thought about drilling a well because the land was not supposed to produce fresh water. However, with the encouragement of the CSR Team, the well was drilled and it happened to produce fresh water! Also seedlings were damaged due to unfamiliarity with the techniques when first growing the plantations. Later things improved.

Previously, broadcast seeding method was traditionally used to grow tomatoes. As a result, the plants grow unevenly, and there are losses at the harvest time. There are also other challenges such as high labour cost to clearing weeds, labour scarcity, and heavy rainfall.

An advantage of this current system is losses during harvest and irrigation are minimized as it makes use of the planting beds. The black color of the planting beds absorbs perspirations, and therefore, the irrigation time is reduced from once in a week to once in ten days. Even when it rains, the planting beds would not collapse, and the roots do not become rotten. Other advantages include water conservation, easy harvest, efficient fertilization, easy caring, and cost effectiveness as some materials can be stored for future use such as stakes.

At present, the plants are growing strongly as they can absorb plenty of air, and they produce good harvests. Although the current harvest time is long, the plants do not show signs of slowing down and continue to blossom. Of course, this exceeds the grower's initial expectations.

This year Daw San May has grown .25 acre of tomatoes. Next year, she aims for 1 full acre. She believes she is successful in her first endeavor through close cooperation, supervision and monitoring by U Aung Ko Latt, Community Liaison U Win Ko and CSR Field Coordinator Daw Zin Mar Myint.

Her return on investment is between 7 lakhs to 10 lakhs after capitalizing 3 lakhs. In addition, she is growing onions and eggplants on a small scale.

She expresses her thanks to MPRL E&P, U Aung Ko Latt from East West Seed Company Limited and CSR Field Staff for the training, technical and other supports provided.

Figure 74: Daw San May's Farm

11.2 Success Story (2)

Ko Nay Zaw is a 35-year-old farmer living in Chin Taung Village with his family. Previously he grew paddy and sesames. He had some experience growing mushroom on his own too. Then he attended the training provided by MPRL E&P's CSR Program on mushroom cultivation. He made contact with the trainer U Myo Min Thein, and ordered the mushroom spawn. His mushroom cultivation business started off on 30 October 2019.

His first capital investment which was supported by MPRL E&P's CSR Program on the Pearl Oyster mushroom farm was over MMK 270,000. Over these two months, he has collected MMK 150,000 in return. In the first delivery of mushroom spawn, there was some damage because of the long transport routes. In the second delivery, the location was close and losses were reduced. The advantages are connections with customers, and due to the mushroom model farm, interested people as many as over 20 people came to observe.

The mushroom farm is like a six-month-piggybank, and there is a daily income. Being a home-based business, Ko Nay Zaw does not have to leave his home and the family can provide necessary supports as well, saving labour costs. He chose to grow the Pearl Oyster mushroom for being a type of mushroom that promotes health, and at the same time, he has started to grow Straw mushroom and Cloud Ear Fungus.

Figure 75: Ko Nay Zaw's Mushroom Model Farm

11.3 Success Story (3)

U Aung San Myint is a 52-year-old farmer from Man Gyoe Village who grows tomatoes, chickpeas and sunflowers.

In the past, he used to grow tomatoes using the traditional method. After attending the horticulture training on tomatoes and chilies, he was interested in trying out the newly learnt cultivation method. Therefore, he worked hard on his farm with the assistance of his laborers to create planting beds and use plastic mulch as the new method suggested. Despite initial difficulties, he made it, and the results have been cost reduction and high yields.

The cost to clear weeds from the plantations used to cost as much as 6 lakhs, and now it has been reduced to one tenth. The cost to set down the plastic mulch is just over 60,000 kyats. It can help keep pests away, and thus save expenses on pesticides. As the method likens to an organic one, the vegetables produced will promote good health and prevent cancers for the consumers. U Aung San Myint has observed that weeds no longer grow in the area where the plastic mulch has been set down, and he will repeat the method in next season. The total expenditures for the farm was 7 lakhs, and up to now he has earned over 30 lakhs. He is expecting another 5 lakhs in coming months.

He ensures attending the monthly knowledge sharing activities facilitated by MPRL E&P's CSR Program and the Department of Agriculture (Minbu) to increase his knowledge and learning capacity alongside other farmers. U Aung San Myint is thankful for all the supports he has received in developing his livelihood activities.

Figure 76: Ko Aung San Myint's Farm

Figure 77: Monthly Agricultural Knowledge Sharing Sessions held in Collaboration with Department of Agriculture (Minbu) for Mann Field Communities

Figure 78: Knowledge Sharing on Animal Husbandry in Collaboration with Livestock, Breeding and Veterinary Department (Minbu)

Figure 79: Monitoring Sunflower and Chickpea Harvesting and Collecting the Yield Data

12.0 Community Capacity Building

One of the key objectives of the Village Development Committee (VDC) is to assist and monitor community investment activities in order to have sustainable long-term impact. VDCs are responsible to not only identify problems in the village, but also to create an environment where the community feels confident raising problems or concerns with committee members. Following this, the VDCs should have the capacity to help solve these problems. To facilitate and empower the VDCs to carry out their responsibilities in an effective manner, there is a need to build the capacity of committee members and a series of trainings have been conducted for the Village Development Committees (VDCs) of Mann Field Communities. One-to-one mentoring sessions for community volunteers are also conducted to strengthen their capacity and self-confidence as well as understand their challenges and work out solutions together.

Figure 80: Monthly Coordination Meeting and Knowledge Sharing with Community Volunteers from the surrounding (14) Communities

Figure 81: Knowledge Sharing Sessions for Village Development Committees

Figure 82: CSR Knowledge Sharing Session to Interns at Mann Field

12.1 Quarterly Meetup with Vocational Trainees

As part of CSR initiatives, MPRL E&P has provided a series of vocational training for the sustainable livelihood development of the Mann Field Communities according to the fiscal years. After the vocational trainings were completed, the CSR team of MPRL E&P has conducted the regular Monitoring and Evaluation sessions through periodic meetup with former vocational training to access their improvements. Yesterday, CSR team members made a quarterly meetup with former vocational trainees including the soap making trainees, the welding trainees, the bamboo-based handicrafts making trainees, the handbag making trainees, the food making trainees and the basic electrical trainees to learn the efforts they made so far, challenges faced and opportunities in place and a total of 40 trainees were present at the meetup.

Figure 83: Refresher Course on Fabric Bag Making in collaboration YWCA


Figure 84: Quarterly Meetup with Former Vocational Trainees

12.2 Community Needs Assessment

In preparation of CSR initiatives and planning for the fiscal year 2020-2021, the CSR & Communications department of MPRL E&P has conducted a joint needs assessment, with the support of the Field Operations Team and in collaboration with Myanma Oil and Gas Enterprise (MOGE) Mann and Local Authorities in the surrounding 14 communities of Mann Field. The joint needs assessment was carried out with the aim of identifying and accessing the needs of Mann Field communities and developing CSR work programs for the period of April 2020 to September 2021.











Figure 85: Joint Needs Assessment for CSR Work Programs Development

13.0 Community-led Waste Management

A community-led waste management program implemented at Mann Oil Field is one of the first of its kind for Mann Field communities, being launched by a group of enthusiastic community volunteers with the support of MPRL E&P (CSR program). MPRL E&P has provided a three-wheeled cargo bike, worth a total of MMK 3,474,919 including installation cost, to roll out a full-scale community-led waste management program in Mann Field communities that fall outside of the Minbu Municipal area. Our aims are to raise awareness on the importance of proper waste management for a better environment and sustainable development, and to motivate all concerned to take collective actions on proper waste management, and to transport the waste to the designated waste pit in Minbu.

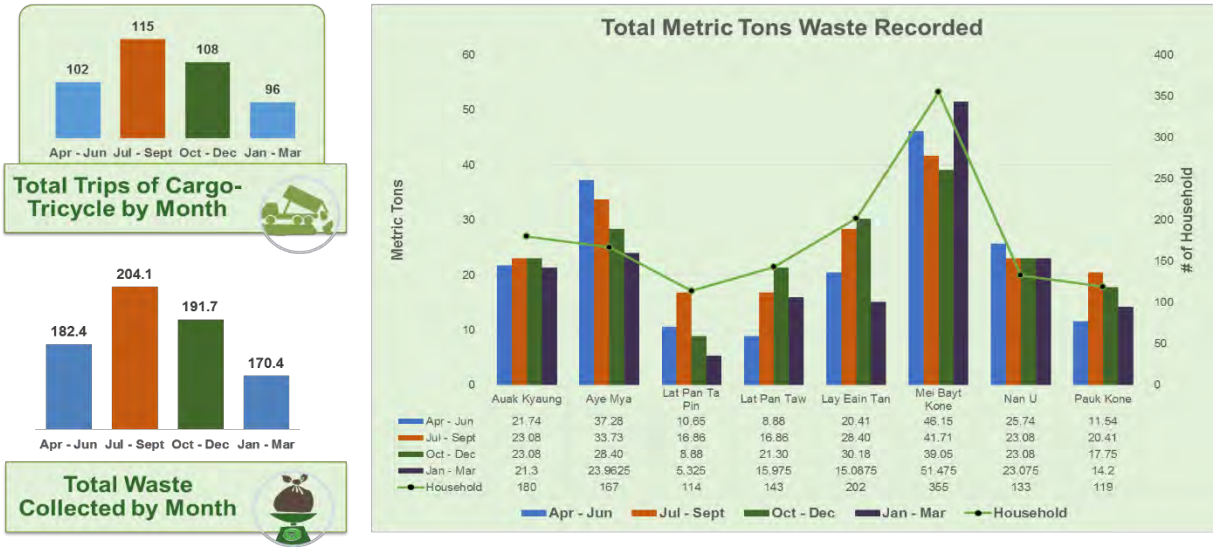


Figure 86: Community Waste Collected and Disposed at Minbu Landfill

Figure 87: Garbage Truck Collecting Waste on Collecting Schedule

13.1 Awareness Raising on Environmental Management

Teaching children what it means to be environmentally aware is important. Children, as early as possible, should be aware of the environmental issues we are facing today. MPRL E&P's CSR team conducts a series of environmental awareness sessions for school children, as well as for community members, as part of community-led waste management. The CSR Field Support Staff has provided environmental awareness sessions for school children to cultivate environmental awareness. We have used teaching materials (story books) produced by Spectrum - Sustainable Development Knowledge Network and plan to provide a few sets each to schools in Mann Field to improve their environmental knowledge.

Figure 88: Knowledge Sharing Sessions on Waste Management for Mann Field Communities

Figure 89: Clean Village Winner "Let Pan Ta Pin Village" Awarded at the CSR Open Day at Mann Field

13.2 Trash Hero Minbu Chapter Meetup

In January 2020, the country coordinator of Trash Hero Myanmar visited Mann Oil Field to meet and greet with Trash Hero Minbu and had a friendly discussion on current waste management system run by community volunteers, challenges they encounter, and other experiences shared by the community members. Then, the Trash Hero Coordinator visited the school in Lay Eain Tan Village and observed the products made from waste plastics by students.

Figure 90: Trash Hero Myanmar Coordinator met with Trash Hero Minbu Chapter

14.0 Community Healthcare Program

MPRL E&P's Mobile Clinic Program is focused on providing the most vulnerable with quality health care and prevention education for Mann Field communities. A pilot project was initiated in September of 2018, and the clinic is open at Chin Taung village on Mondays, Lay Eain Tan village on Thursdays and Let Pan Ta Pin village on Fridays. A health care assistant from Pauk Kone village has been recruited to assist field camp doctors in running the clinic smoothly and efficiently.

In this fiscal year, Field Camp Doctor visit frail older people in Mann Field communities, not only when a patient has a problem, but also unsolicited. The home visit is mainly friendly and focuses on the wellbeing and social context of the patient, and an extended community healthcare service is provided under MPRL E&P's CSR program. In addition, a home visit program was also introduced in this fiscal year for 25 frail elderly people in the communities.

Number of Patients (1st April – 20th March 2020)

Village	Session	Male	Female	Total
Chin Taung	50	397	1,269	1,666
Lay Eain Tan	51	601	1,685	2,286
Let Pan Ta Pin	51	602	1,255	1,857
Kyar Kan	38	391	1,608	1,999
Total	**190**	**1,991**	**5,817**	**7,808**

Camp Doctors' Contribution Hours (Jul '19 – Mar '20)

In-charge Doctor	No. of Clinic Sessions	No. of Hours	No. of Patients
Dr. Myint Wai	72	123	2,955
Dr. Nyi Win	79	143	3,308
Total	**151**	**266**	**6,263**

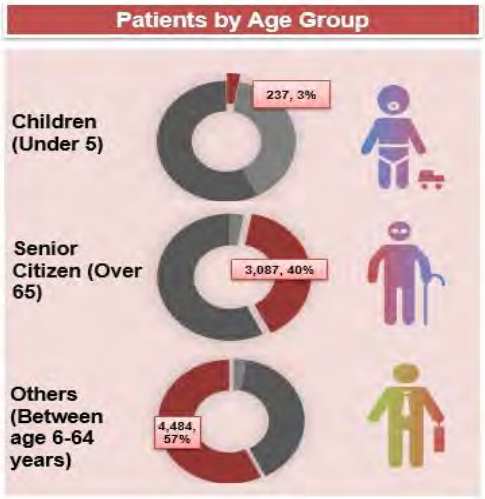


Figure 91: Patients by Age Group

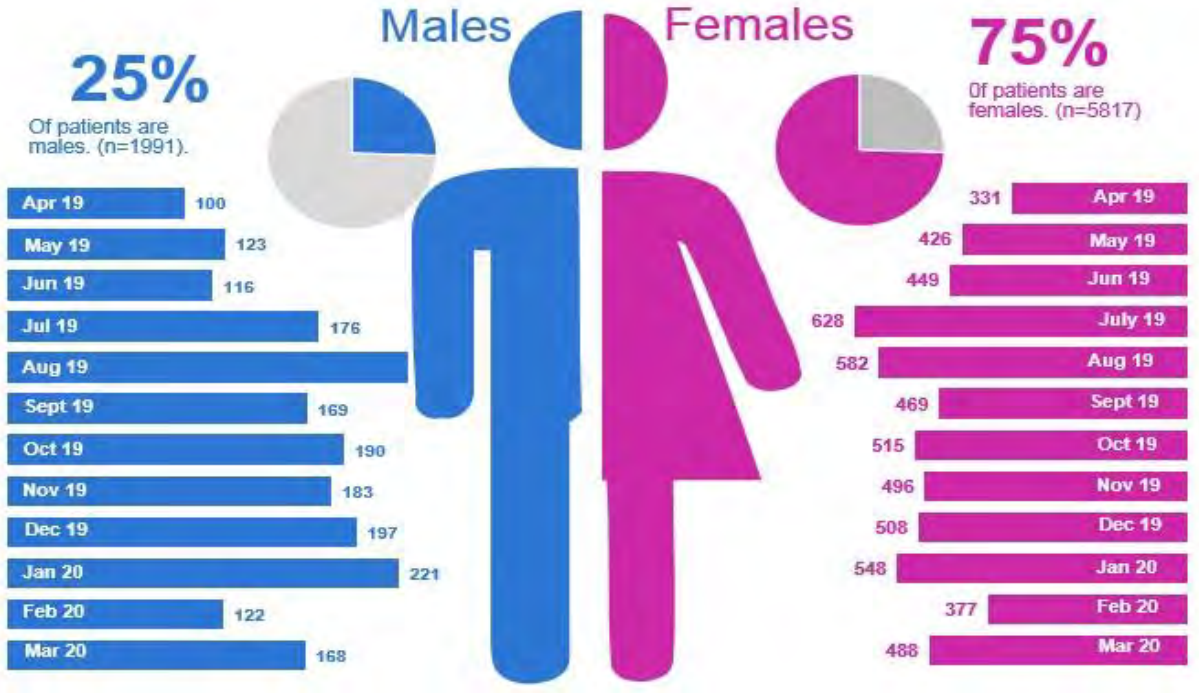


Figure 92: Number of Patients visited the Mobile Clinic in FY 2019-2020

14.1 Communities Perceptions on Mobile Clinic Program

A continuous process of monitoring and evaluation is always an important tool for determining the result of the project and for effective planning of future project. Thus, on the 1st and 2nd week of December 2019, face-to-face doorstep interview of 158 respondents was conducted. The purpose of this survey is to assess patient expectations and experiences within the health care facilities and determine patient satisfaction levels.

The survey population consists of the patients regardless of ages and village administrators, village development committees and community volunteers. 120 patients were selected randomly from four clinic sites (30 patients per clinic). 35 respondents of VAs, VDCs and volunteers were included in this survey is to know their perception on this mobile clinic service. All respondents were interviewed by trained community volunteers with the supervision of CSR Field Coordinator.

The objectives were to evaluate the effectiveness of mobile clinic program for underserved populations who living in Mann Field communities. In addition, it aimed to know the opinion of two Camp Doctors on this mobile clinic as they have to volunteer a lot of their time in on-duty period and to assess the performance of health care assistant. The survey covered the following areas:

- Patients' general satisfaction on mobile clinic program,
- Patients access to mobile clinic service time and location,
- Recommendation for better mobile clinic program, and
- Communities' perceptions on mobile clinic program.

Figure 93: Mobile Clinic Program for Mann Field Communities

Figure 94: Satisfaction Survey Conducted for Mobile Clinic Program

15.0 Partnership in Technical and Vocational Education

With the worldwide objective to scale up the offer on TVET programs responding to the needs of the labor market, the national governments are seeking for close alliances of collaboration with the private sector, on macro and micro level, where possible. As a step forward in our CSR initiatives, three male students from the surrounding communities in Mann Field have been accepted and enrolled at the No. 5 Industrial Training Centre in Magway with the support of MPRL E&P. The launching of the educational partnership with No. (5) Industrial Training Centre Magway this fiscal year 2019-2020 is a new CSR initiative for youth in Mann Field.

After mapping out the possibility of this initiative, an announcement was made to the communities in Mann Field that applications were being accepted from community members who have passed their Matriculation Examinations with the recommendation of Community Volunteers and Village Administrators, and with the financial support of MPRL E&P. After thoroughly checking the 7 applications received, applications are submitted to the Head of No. (5) Industrial Training Centre Magway to go through their selection process which was very competitive - only 170 out of more than 600 applicants will be accepted. Three out of seven applications were green lighted and enrolled successfully. The training period is 11 months and MPRL E&P has provided enrollment fees and monthly stipends to ensure the 3 students are able to make the best of their studies without financial burden. They have finished their studies and completed the program in March 2020.

Mg Zay Yar Phyo (Mann Kyoe Village)

Mg Myat Thu Maung (Pauk Kone)

Mg Yarzar Aung (Mann Kyoe)

Congratulations to our fresh graduates of No. 5 Industrial Training Centre (ITC-Magway). MPRL E&P CSR team assists in job networking for youth from Mann Field Communities.

The three male students shared their knowledge on how to prepare for entrance exam in the years to come, skill and attitudes trained, outlines of school discipline, and the theoretical and practical experiences in specific subjects at Auk Kyaung village and a total of (45) participants including parents and interested youths attended the session.

For next intake, 15 applicants submitted the applications and the entrance exam is planned to be held in April initially and now expected to be held in May due to COVID-19 circumstances which affect the program starting time, initially set in the middle of May.

Figure 95: Sharing Session by Three Students from No. 5 Industrial Training Centre (ITC-Magway) on their Campus Life and Field of Studies to the Local Youth

16.0 Stakeholder Engagement and Information Disclosure

Stakeholder engagement is the first key step in determining issues that are material to us. It gives us insight into the perspectives of our stakeholders, and what they deem important in the context of their partnership with us. We engage and receive feedback from a diverse range of stakeholders with the intention to improve our performance and drive long-term sustainability. Starting from this fiscal year, MPRL E&P has started reporting CSR progress to the Magway Region Government through quarterly reports in the Myanmar language and to the Highest Levels of Government through biannual reports as part of a broader "stakeholder engagement" strategy. Improvements to ensure appropriate systems and processes are in place to support stakeholder engagement programs. The disclosure workshop was held in October 2019 to present biannual CSR progress and environmental monitoring activities to the ECD (Magway), Township Authorities, Village Administration and Communities.

The CSR Monthly Bulletin is produced and posted onto the notice boards within communities to update community investment initiatives implemented in Mann Field.

Figure 96: Quarterly CSR Progress Review Meeting with the Community at Mann Field

Figure 97: Bi-annual CSR Progress Review Meeting in Nay Pyi Taw

Figure 98: Bi-annual CSR Progress Update Meeting & Disclosure on Environmental Monitoring Activities

Figure 99: Site Visit by Magway Environmental Conservation Department to Learn about MPRL E&P's CSR Initiatives



CSR


MOBILE


MOBILE

Figure 100: Two-day Knowledge Sharing Workshop on Corporate Social Responsibility for MOGE Managers and Assistant Mangers from Onshore Operating Fields and Site Visits to MPRL E&P's CSR Projects

16.1 Community Meeting at Mann Field

Effective two-way communication by listening to the voices of stakeholders and understanding their outlooks plays a fundamental role to get a social license to operate for a company. In 2019, MPRL E&P's Senior Management and executives met with village administrations, village development committees, community volunteers and the local community in Mann Field two times, the first time in May 2019 and the second time in January 2020, and had a friendly and open discussion about the initiatives of the CSR Programs and how to face and tackle the challenges hand in hand. This meeting opens the door for the community to express their ideas and views towards CSR Programs of the company and exchange views on sustainable development for the community.

Figure101: Community Meeting held at Mann Oil Field and Site Visits organized to Model Farms

Figure 102: Monthly CSR Bulletin posted for Communicating CSR

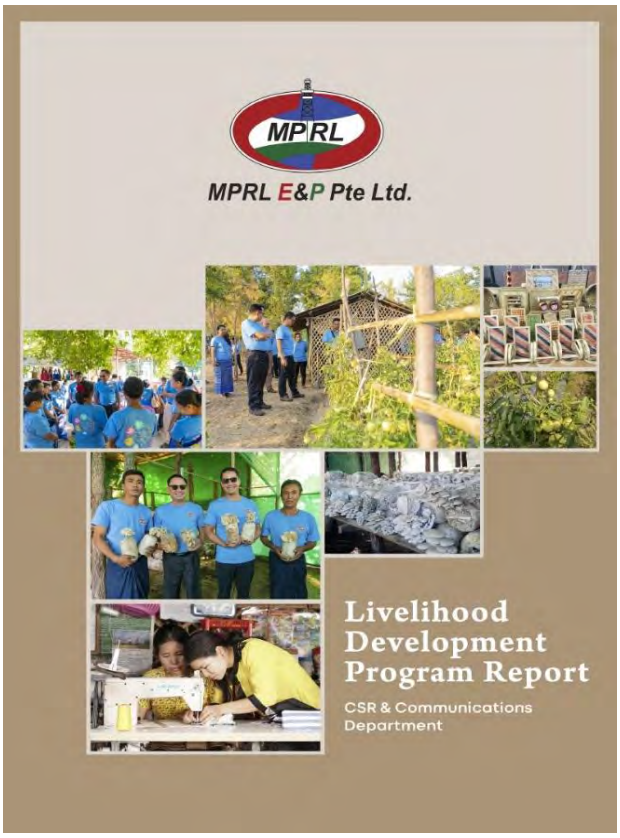
Figure 103: COVID-19 Prevention and Awareness Raising in Collaboration with Department of Public Health (Minbu) – Mann Field

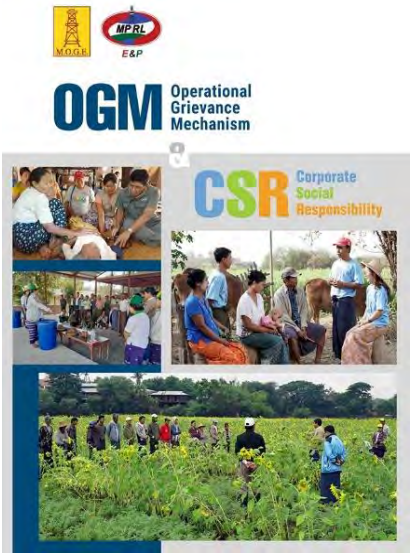
Figure 104: COVID-19 Prevention and Awareness Raising – Mann Field

Figure 105: COVID-19 Prevention and Awareness Raising in Collaboration with Department of Public Health (Minbu) – Minbu Township

Figure 106: "**Nammadar**" and "**May Nant Thar**" Women Groups making Fabric Masks, Tool Bags and Hand Sanitizer Gel and Liquid Handwashing Soaps

Figure 107: Donation of Non-Contact Digital Laser Infrared Thermometers to Community Health Centers in Mei Bayt Kone and Man Kyoe Villages





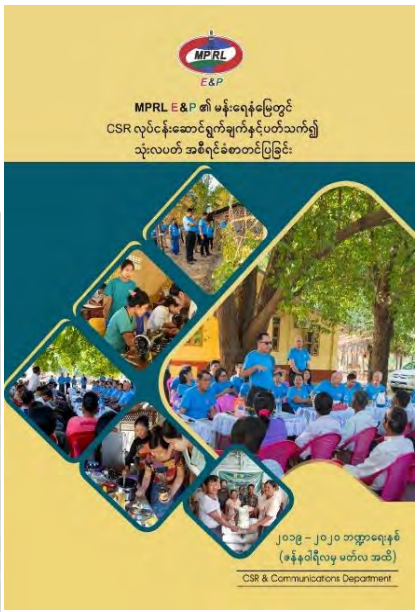


Figure 108: Publications of the Year

Figure 109: Materiality Workshop with CSR Asia (an ELEVATE company)

18.0 Conclusion

This environmental monitoring report is the second submission after receiving the ECC in March 2019. During this one-year period, all the social and environmental commitments were fulfilled as per the EIA and ECC requirements. Air quality and noise level in some locations were out of the national guideline due to human activities but these parameters are not significant deviated from the baseline data. This indicates that the Mann Field operations have no significant impacts on the surrounding environment. Future plans are developed to identify the impacts from the human activities together with the conducting environmental awareness sessions to the community together with ECD and MOGE to minimize the environmental impacts when the current COVID-19 pandemic is over.

19.0 Annex

19.1 HSE Audit Report (Annex A)

19.2 ECD Audit Report (annex B)

19.3 Environmental Monitoring Survey Results (Annex C)

Bi Annual HSE Audit Report
Annex - A

MPRL E&P Pte Ltd.

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MEMORANDUM

To : GXM / CXM / DCM / DTXM

Reviewed by : PEM / FOM / HSEM

Display needs to be revised.

Noted & Done

From : HSE Department

Date : 16th October 2019

Total Pages : (35) Including This Page

Cc : HSE Department

Subject : **Mann Field HSE Bi-annual Audit – September 2019**

We are hereby submitting our findings and recommendations from the Mann Field HSE bi-annual audit for your review and comment.

On 10th to 11th September 2019, HSE team conducted the bi-annual HSE audit of fiscal year 2019~2020 in Mann Field. The audit team consisted of the following Personal:

1. U Nay Myo Aung (HSE Manager)
2. U Sithu Zeya (Assistant HSE Manager)
3. U Aung Ko Ko Oo (Assistant HSE Controller)
4. U Zay Yar Aung (M&AS Assistant HSE Supervisor -Transportation)

Yours respectfully

16/10/2019

Aung Ko Ko Oo
Assistant HSE Controller
MPRL E&P Pte Ltd.

EO.194
22/10

Mann Field HSE Bi-Annual Audit Report (2019~2020)

MPRL E&P Pte Ltd.

Prepared By:	Reviewed By	Acknowledged By:
16/10/2019	16/10/19	
U Aung Ko Ko Oo	U Nay Myo Aung	U Myo Min Thein
AHSEC	HSEM	Acting FOM

Contents

Introduction

HSE bi-annual Audit for fiscal year of 2019- 20 was conducted on 10th and 11th of September 2019, to determine the level of health and safety performance in Mann Field operation against the criteria as mentioned in the MPRL E&P approved procedures, MRPL E&P HSEMS and international best practices.

The audit includes the following activities:

1. Reviewing Standard Operating Procedures & JSAs
2. Reviewing the effectiveness in the implementation on previous HSE audit findings
3. Searching potential hazards onsite for both obvious and hidden gaps and substandard practices
4. Reviewing HSE documentation system.
5. Reviewing Preventive & Maintenance Program (Plan Vs Actual)

The primary objective of the audit is to achieve continuous improvements in HSE management system to ensure the worksite continues to provide a safe and healthy environment for staff, members of the surrounding community and also sustainability to the environment.

This report presents the findings and recommendations for the Mann Oil Field as following order:

1. Updating the progress of action taken on previous audit findings
2. Outstanding previous audit finding
3. Highlighting the improved areas
4. New findings for future improvement
5. Review of Mann Field HSE documentation
6. Review of Preventive & Maintenance Program
7. Outcome of staff interview
8. Conclusion

1. Updating the progress of action taken on previous audit findings

1.1 Observed that emergency spill kit training conducted to all concern parties.

1.2 Observed that the underground gas valve area has been barricaded by using hard barrier with proper warning sign posted at GOCS – 5.

1.3 Observed that the construction of additional concrete pad for paraffin cleaning work at the paraffin cleaning area was completed. However the area has many bushes and needs to be cleaned and warning sign laid down on the ground needs to be reinstalled. See the Figure 10




Observation	Recommendations	Risk / Priority Level	Action Parties	Target Date
Bushes around paraffin cleaning area	• Need to clean the area	L	Team Leader	Done on 13-Sept-19
Warning sign laid down on the ground	• Need to reinstall	P-1	Team Leader	Done on 13-Sept-19

1.4 Observed that the sludge management compound displayed with visible signage to indicate the capacity of each concrete pit.

1.5 Observed that proper earth clamp was installed at the bowser tank vehicles for grounding and bounding to eliminate static electricity as protection system for oil transfer operation.

2. Highlighting The Improved areas

2.1 As a good practice and improvement, provision of HSE information board, emergency layout plan and PPE requirement for the difference tasks of operation found at Mann field warehouse compound.

2.2 As a good practice and improvement in morning Tool Box Talk meeting, observed that the crews actively participated in the meeting and shared their own experiences effectively. Congratulations to all crews in Mann Field.

MEAS drivers.

2.3 As part of EAP implementation, the construction of concrete pits in order to achieve zero discharge of waste water from Down Hole work shop compound was completed 94 % at the time of the audit.

2.4 As a good practice and improvement, the pumping unit was fenced and barricaded which is closed to the community area, it can prevents potential harm to people or animal from entering into the dangerous area, as a risk reduction and mitigation measure.

2.5 As a good practice and improvement, the discharge valves from the flow line of the GOCS-5 relocated closed to the walkway. This completely reduced and mitigated the risk of accessing to the dangerous area which has a high potential of falling from height, Moreover, the selected control method follows the priority of the hierarchy of control measures, the engineering control. Audit team appreciated for the improvement of implementation.

3. New finding for future improvement

GOCS - 1

3.1 Observed that side openings edge without guard or protection at GOCS-1 along the tank battery walkway which has potential of falling hazard.

Observation	Recommendations	Risk Level	Action Parties	Target Date
Unguarded openings edge without protection	• Recommended to install barrier chain to prevent fall from height.	M	SP / TL	31-Oct-2019

3.2 Observed that same standby 50kg trolley type extinguisher was deteriorated at its hose (flexible rubber hoses) and also the extinguisher was expired manufacture's warranty at GOCSs.

Observation	Recommendations	Priority Level	Action Parties	Target Date
50 kg extinguishers	• To replace with new fire extinguisher	P2	HSE Dept	50% replace in end of April 2020 and next 50 % replace in end of April 2021

3.3 Observed that, there was no earthling system for grounding and bounding to eliminate static electricity as protection system while oil transferring operation or fuel filling operation.


Observation	Recommendations	Priority Level	Action Parties	Target Date
Lack of earthing protection system	• To install clamp and wiring for grounding and bounding system	P1	W/H	Done on 11-Sept-19

3.4 Observed that the insulation of hydraulic hoses were worn out in one of the pulling unit.



Observation	Recommendations	Risk Level	Action Parties	Target Date
The condition of hose insulation was unfavorable	• To replace the poor condition hose on regular basis as per manufacturer's recommendation. It should be set in the Preventive and Maintenance Program.	M	Field operation	Done on 08-Oct-19

3.5 Observed that the produced water injection operation area without providing safety signs and unattended operator due to the insufficient man power.

Observation	Recommendations	Risk Level	Action Parties	Target Date
Safety signs	• To be provided with safety warning signs and notification for any high pressure operation.	H	Field operation	Done on 01-Oct-19
Unattended Operation	• Watch man must be standby at all time during high pressure operation.	H	Field operation	Done on 01-Oct-19

3.6 The audit team found that Down-Hole workshop structure and ceiling condition were unsatisfactory as it can collapse during severe earthquake or strong wind. Moreover, audit team observed the room as insufficient lighting and ventilation for the working area.

Observation	Recommendations	Priority Level	Action Parties	Target Date
Unsafe structure condition	• To coordinate with MOGE to have the down-hole work shop structure repaired as necessary.	P1	Field operation	Facilities of MOGE and On-Going
Insufficient lighting and ventilation system	• To install additional lighting and ventilation (both fresh air and exhaust) for safety and healthy workplace.	P1	Field operation	Lighting installation was Done on 20-Sept-19 Ventilation system 31-10-19

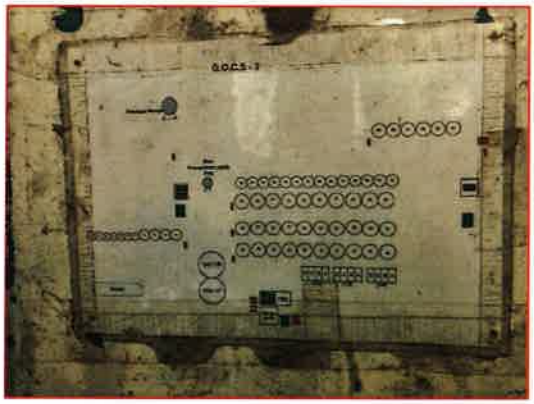
3.7 The audit team found that storage of hazardous and plastic wastes found excessive in waste management compound.

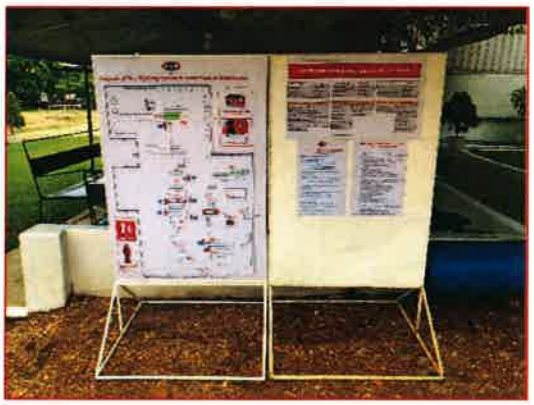
Observation	Recommendations	Priority Level	Action Parties	Target Date
Excessive storage of hazardous and plastic waste	• Recycle items to sell to third party • For Hazards waste, to check the volume and weight. Find out proper discharge point with minimum cost impact.	P1	Field operation / HSE Dept	✓ Done On Sept-2019

3.8 Observed that there was no training program either for new staff or refresh the existing crew to get them familiar with all the emergency provisions for the kitchen. E.g. emergency gas shut off procedure, proper use of fire blanket and fire extinguisher, etc.

Observation	Recommendations	Priority Level	Action Parties	Target Date
Training Program	• To establish the training program for kitchen staff • Training records to be documented and properly kept. • To install emergency remote gas shut off (ball valve) outside the kitchen and to be labelled as "Emergency Gas Shut Off Valve" properly.	P1	Field operation / HSE Dept	Done On 09-Oct-2019

3.9 Observed that there was update layout plan for all GOCS, workshop and Camp area need to be updated as lead example in the warehouse.





Observation	Recommendations	Priority Level	Action Parties	Target Date
Layout plan and emergency Contact	• Layout plant and emergency contact for all GOCS, Workshop and Camp area need to be updated as arranged in warehouse	P1	Field operation / HSE Dept	All GOCS were Done On 07-Oct-2019 Workshop & Base Camp 31-Oct-19

3.10 Observed that SHSEO currently using their own personnel phone number for communication purposes on site, which can be changed from time to time.

Observation	Recommendations	Priority Level	Action Parties	Target Date
SHSEO Emergency contact	• To provide SHSEO with designated phone number via which they can be contacted by any field employee.	P1	Field operation / HSE Dept	31-Oct-2019

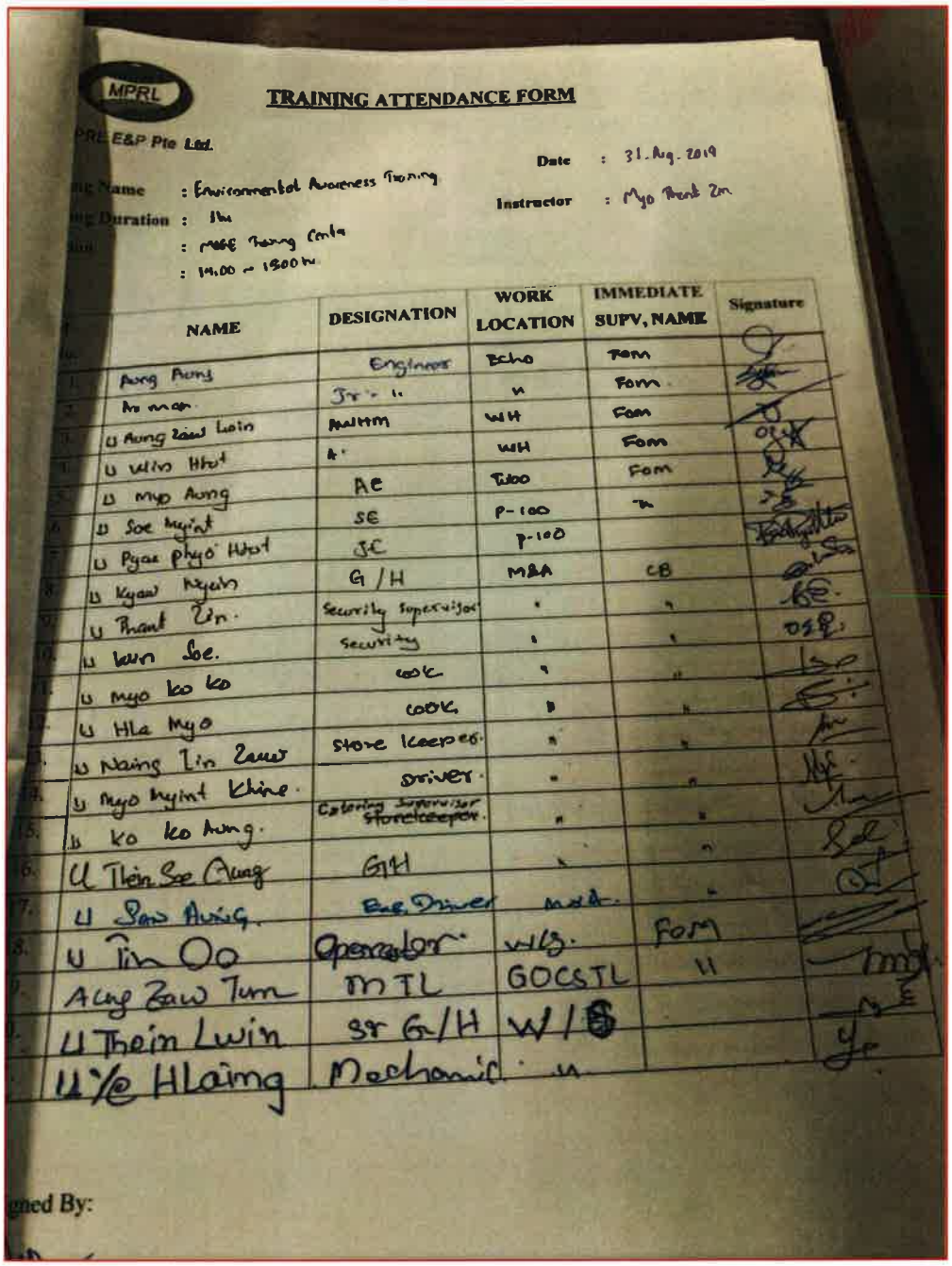
3.11 Observed that poor road condition, GOCS-4 (M-507 to 653 along the way and Access road to Thein Kone, near (M-542 and Tube well 1002) due to rain water erosion.

MOGE Construction Department already filled with red soil by grader.

4. Review of Mann Field HSE Documentation

4.1 HSE Training Record

Training records (attendance sheets) found as per yearly planned schedule and hard copies of attendance found as evidence.



MPRL

TRAINING ATTENDANCE FORM

PRL E&P Pte Ltd.

Training Name : Environmental Awareness Training
Training Duration : 1hr
Venue : MPRE Training Centre
Time : 14.00 ~ 15.00 hr

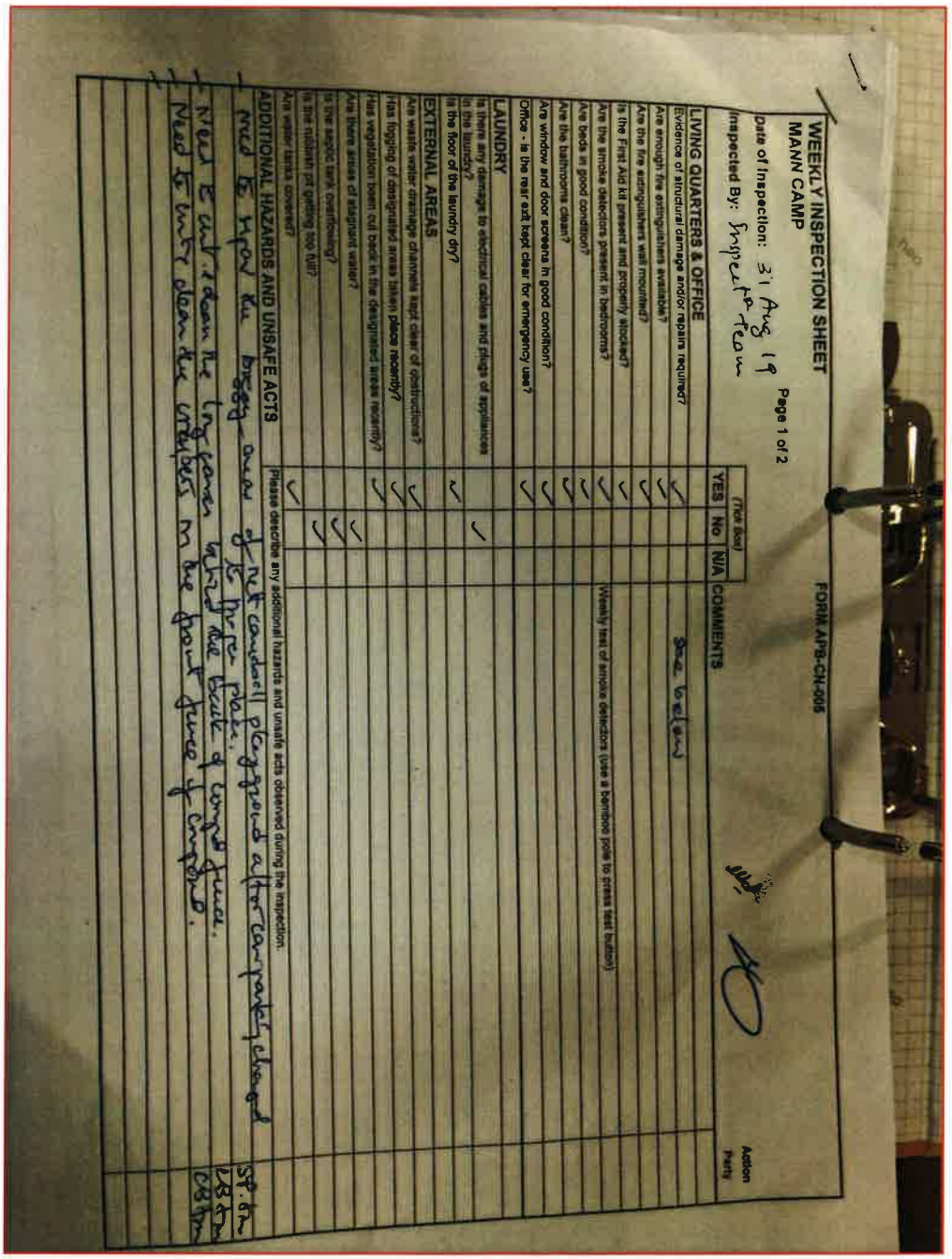
Date : 31.Aug.2019
Instructor : Myo Thant Zin

	NAME	DESIGNATION	WORK LOCATION	IMMEDIATE SUPV. NAME	Signature
1	Aung Aung	Engineer	Echo	Fam	
2	Ko Maw	Jr. "	"	Fam	
3	U Aung Zaw Lwin	Admin	WH	Fam	
4	U Win Htut	"	WH	Fam	
5	U Myo Aung	AE	Tuoo	Fam	
6	U Soe Myint	SE	P-100	"	
7	U Pyae Phyo Htut	JE	P-100		
8	U Kyaw Kyein	G/H	M&A	CB	
9	U Thant Zin.	Security Supervisor	"	"	
10	U Win Soe.	Security	"	"	
11	U Myo Ko Ko	cook	"	"	
12	U Hla Myo	cook	"	"	
13	U Naing Lin Zaw	Store keeper	"	"	
14	U Myo Myint Khine	Driver	"	"	
15	U Ko Ko Aung.	Catering Supervisor Storekeeper	"	"	
16	U Thein Soe Aung	G/H	"	"	
17	U Saw Aung.	Eng. Driver	M&A	"	
18	U Tin Oo	Operator	W/S	Fam	
19	Aung Zaw Tun	MTL	GOCSTL	"	
20	U Thein Lwin	Sr G/H	W/S		
21	U Ye Hlaing	Mechanic	"		

gned By:

4.2 Inspection Records

Weekly cross inspection records were found as an evidence.



WEEKLY INSPECTION SHEET

MANN CAMP

FORM AFB-CH-005

Page 1 of 2

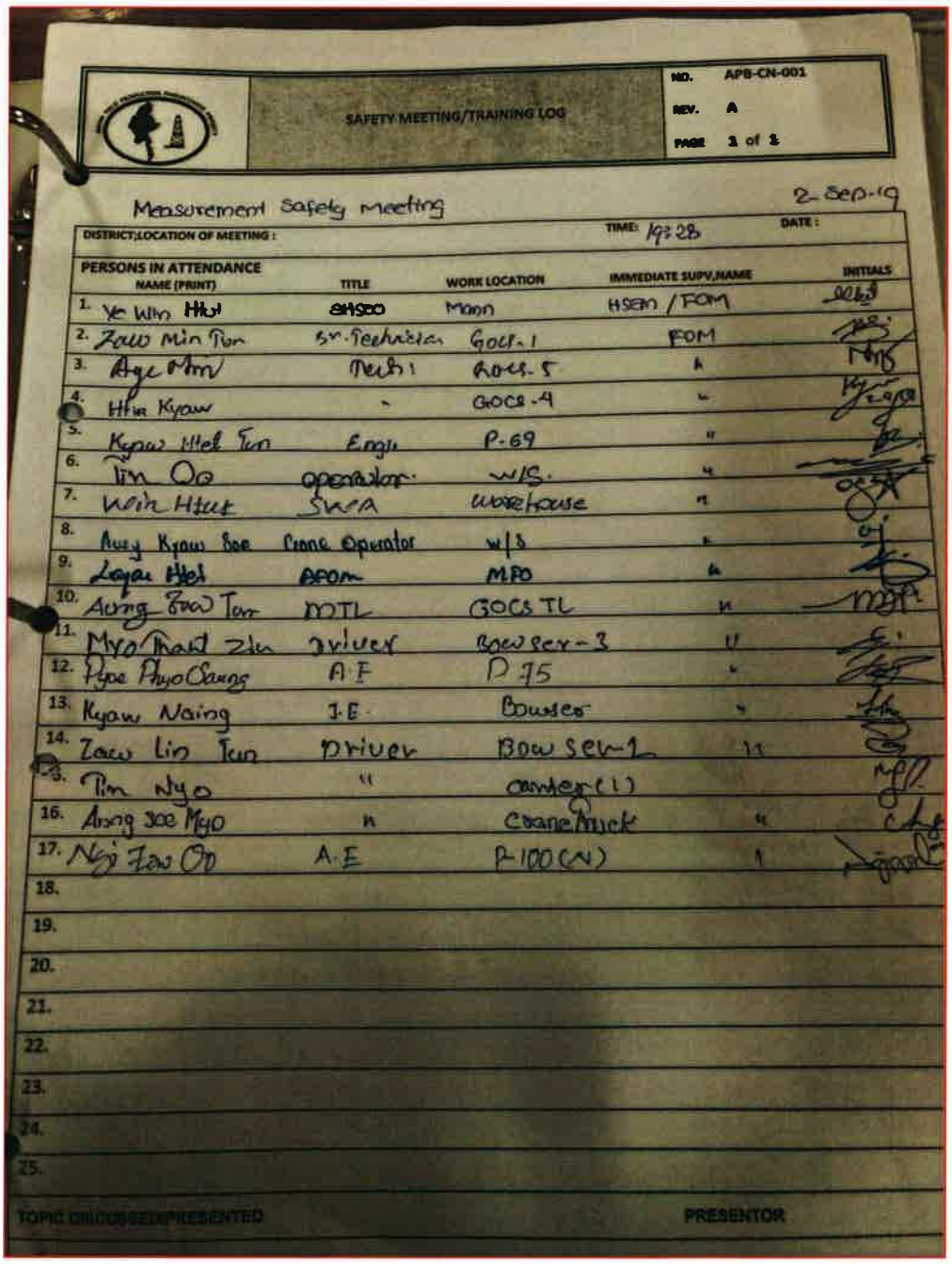
Date of Inspection: 31 Aug 19

Inspected By: Engineering Team

	(Tick Box)				
	YES	No	NA	COMMENTS	Action Party
LIVING QUARTERS & OFFICE					
Evidence of structural damage and/or repairs required?			✓	See below	
Are enough fire extinguishers available?	✓				
Are the fire extinguishers wall mounted?	✓				
Is the First Aid kit present and properly stocked?	✓				
Are the smoke detectors present in bedrooms?	✓			Weekly test of smoke detectors (use a bamboo pole to press test button)	
Are beds in good condition?	✓				
Are the bathrooms clean?	✓				
Are window and door screens in good condition?	✓				
Office - is the rear exit kept clear for emergency use?	✓				
LAUNDRY					
Is there any damage to electrical cables and plugs of appliances in the laundry?		✓			
Is the floor of the laundry dry?	✓				
EXTERNAL AREAS					
Are waste water drainage channels kept clear of obstructions?	✓				
Has flogging of designated areas taken place recently?	✓				
Has vegetation been cut back in the designated areas recently?		✓			
Are there areas of stagnant water?		✓			
Is the septic tank overflowing?		✓			
Is the rubbish pit getting too full?		✓			
Are water tanks covered?	✓				
ADDITIONAL HAZARDS AND UNSAFE ACTS	Please describe any additional hazards and unsafe acts observed during the inspection.				
Need to know the boggy area of the camp and parking should be kept clear. Need to clear the bushes around the block of single tents. Need to clear the undergrowth in the front area of camp.					SP. Gn 28 Aug 19 CB Tm

4.3 HSE Meeting Records

Meeting records were found as evidences with proper filing.



SAFETY MEETING/TRAINING LOG

NO. APB-CN-001
REV. A
PAGE 1 of 1

Measurement Safety Meeting — 2-Sep-19

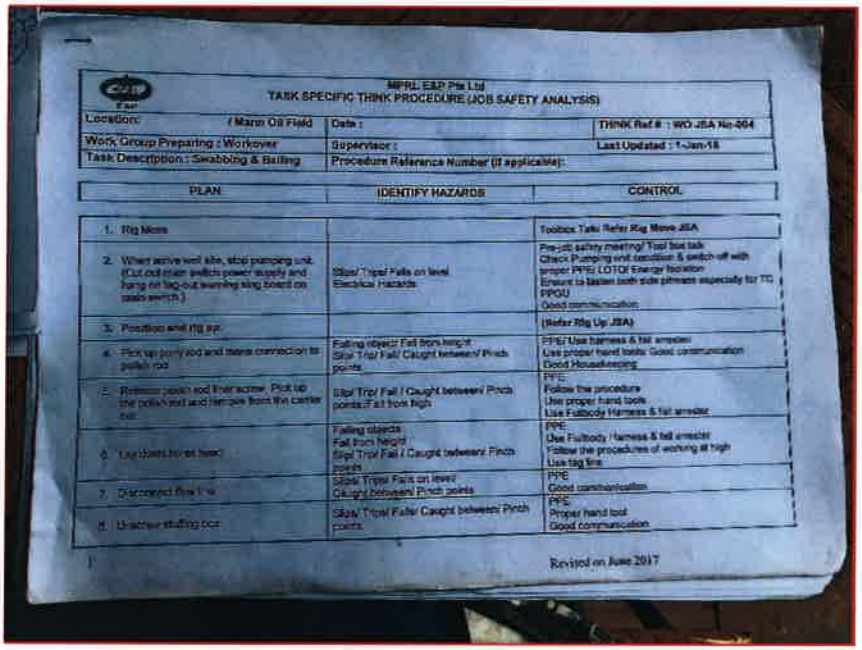
DISTRICT;LOCATION OF MEETING : — TIME: 17:28 — DATE :

PERSONS IN ATTENDANCE NAME (PRINT)	TITLE	WORK LOCATION	IMMEDIATE SUPV.NAME	INITIALS
1. Ye Win Htut	SHSEO	Mann	HSEM / FOM	
2. Zaw Min Tun	Sr. Technician	GOCS-1	FOM	
3. Aye Mon	Tech	GOCS-5	"	
4. Htin Kyaw	"	GOCS-4	"	
5. Kyaw Htet Tun	Engr.	P-69	"	
6. Lin Oo	operator	W/S.	"	
7. Win Htut	SHEA	Warehouse	"	
8. Aung Kyaw Soe	Crane Operator	W/S	"	
9. Lagu Htet	AFOM	MFO	"	
10. Aung Zaw Tun	MTL	GOCS TL	"	
11. Myo Thant Zin	Driver	Bowser-3	"	
12. Hpoe Phyo Sang	A.F	D 75	"	
13. Kyaw Naing	I.E.	Bowser	"	
14. Zaw Lin Tun	Driver	Bowser-1	"	
15. Tin Nyo	"	canter (1)		
16. Aung Soe Myo	"	Crane Truck	"	
17. Nyi Zaw Oo	A.E	P-100 (N)	"	
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				

TOPIC DISCUSSED/PRESENTED — PRESENTOR

4.4 Standard Operating Procedures (SOP) & Job Safety Analysis (JSA)

SOP and JSA was found that implemented and follow the as per procedure.

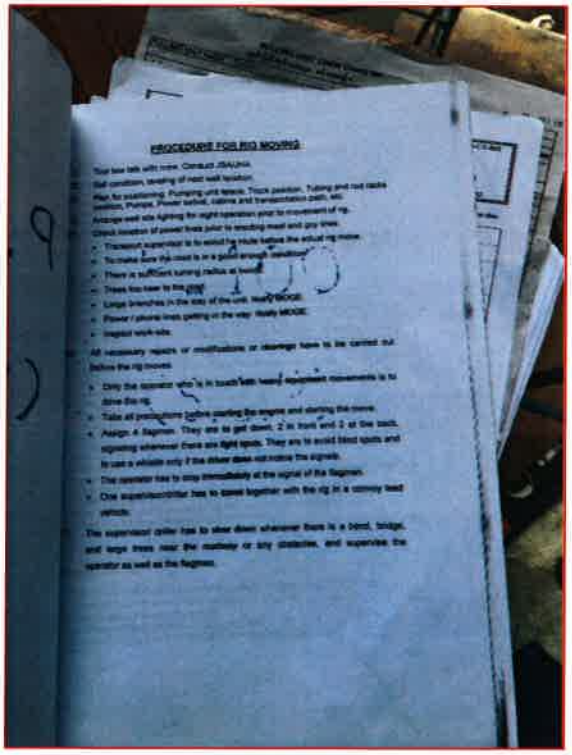


MPRL E&P Pte Ltd
TASK SPECIFIC THINK PROCEDURE (JOB SAFETY ANALYSIS)

Location: / Mann Oil Field	Date :	THINK Ref # : WO JSA No-004
Work Group Preparing : Workover	Supervisor :	Last Updated : 1-Jan-18
Task Description : Swabbing & Bailing	Procedure Reference Number (if applicable):	

PLAN	IDENTIFY HAZARDS	CONTROL
1. Rig Move		Toolbox Talk: Refer Rig Move JSA
2. When active well site, stop pumping unit. (Cut out main switch power supply and hang on tag-out warning sing board on main switch.)	Slips/ Trips/ Falls on level Electrical Hazards	Pre-job safety meeting/ Tool box talk Check Pumping unit condition & switch off with proper PPE/ LOTOF Energy Isolation Ensure to liaison both side pitmans especially for TC PPGU Good communication
3. Position and rig up		(Refer Rig Up JSA)
4. Pick up pony rod and make connection to polish rod	Falling objects/ Fall from height Slip/ Trip/ Fall/ Caught between/ Pinch points	PPE/ Use harness & fall arrester Use proper hand tools/ Good communication Good Housekeeping
5. Remove polish rod liner screw. Pick up the polish rod and remove from the carrier bar	Slip/ Trip/ Fall / Caught between/ Pinch points /Fall from high	PPE Follow the procedure Use proper hand tools Use Fullbody Harness & fall arrester
6. Lay down to rat hole	Falling objects Fall from height Slip/ Trip/ Fall / Caught between/ Pinch points	PPE Use Fullbody /harness & fall arrester Follow the procedures of working at high Use tag line
7. Disconnect flow line	Slips/ Trips/ Falls on level Caught between/ Pinch points	PPE Good communication
8. Unscrew stuffing box	Slips/ Trips/ Falls/ Caught between/ Pinch points	PPE Proper hand tool Good communication

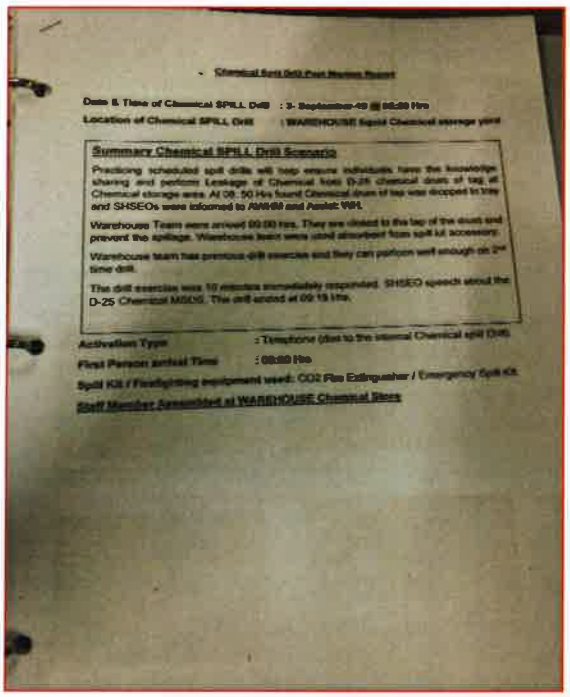
Revised on June 2017



PROCEDURE FOR RIG MOVING

4.5 Emergency Drill Record

Drill records (evidences sheets) found as per set KPI.



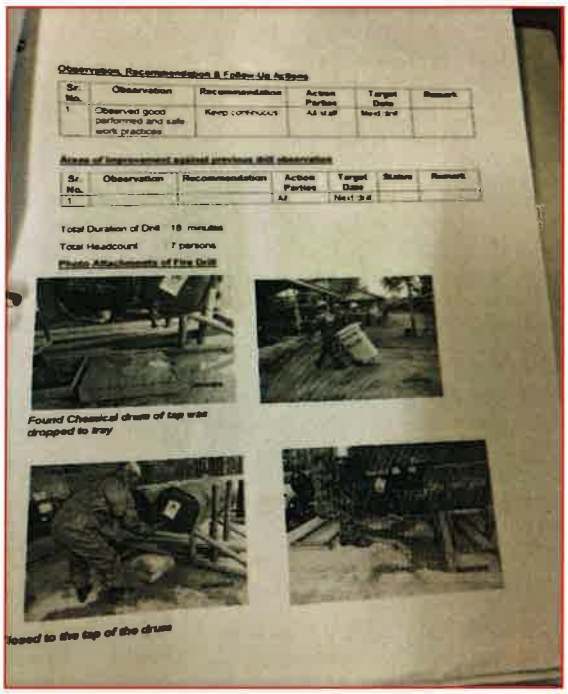
Summary Chemical SPILL Drill Scenario

Practicing scheduled spill drills will help ensure individuals have the knowledge sharing and perform Leakage of Chemical from D-25 chemical drum of tag at Chemical storage area. At 08: 50 Hrs found Chemical drum of tag was dropped to tray and SHSEOs were informed to AMWM and Assist: WH.

Warehouse Team were arrived 09:00 hrs. They are divided to the tap of the drum and prevent the spillage. Warehouse team were used absorbent from spill kit accessory.

Warehouse team has previous drill exercise and they can perform well enough on 2nd time drill.

The drill exercise was 10 minutes immediately responded. SHSEO speech about the D-25 Chemical MSDS. The drill ended at 09:15 Hrs.



Observation, Recommendation & Follow Up Actions

Sr. No.	Observation	Recommendation	Action Parties	Target Date	Remark
1	Observed good performed and safe work practices	Keep continuous	All staff	Next drill	

Areas of improvement against previous drill observation

Sr. No.	Observation	Recommendation	Action Parties	Target Date	Status	Remark
1			All	Next drill		

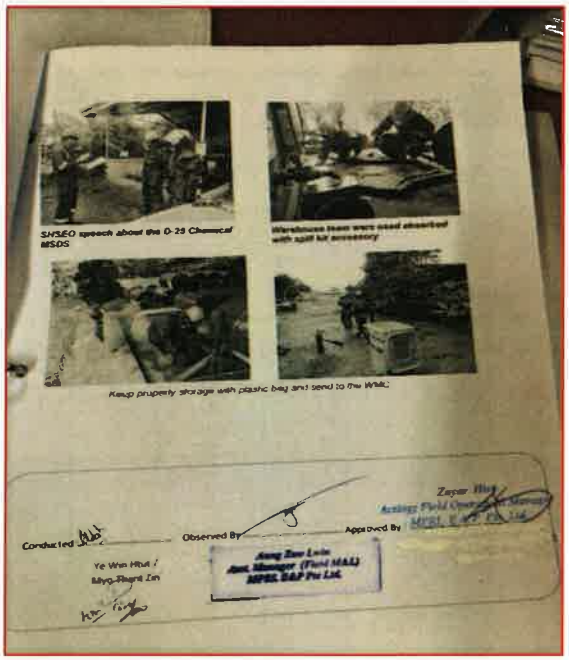
Total Duration of Drill 18 minutes

Total Headcount 7 persons

Photo Attachments of Fire Drill

Found Chemical drum of tap was dropped to tray

losed to the tap of the drum



SHSEO speech about the D-25 Chemical MSDS

Warehouse team were used absorbed with spill kit accessory

Keep properly storage with plastic bag and send to the WML

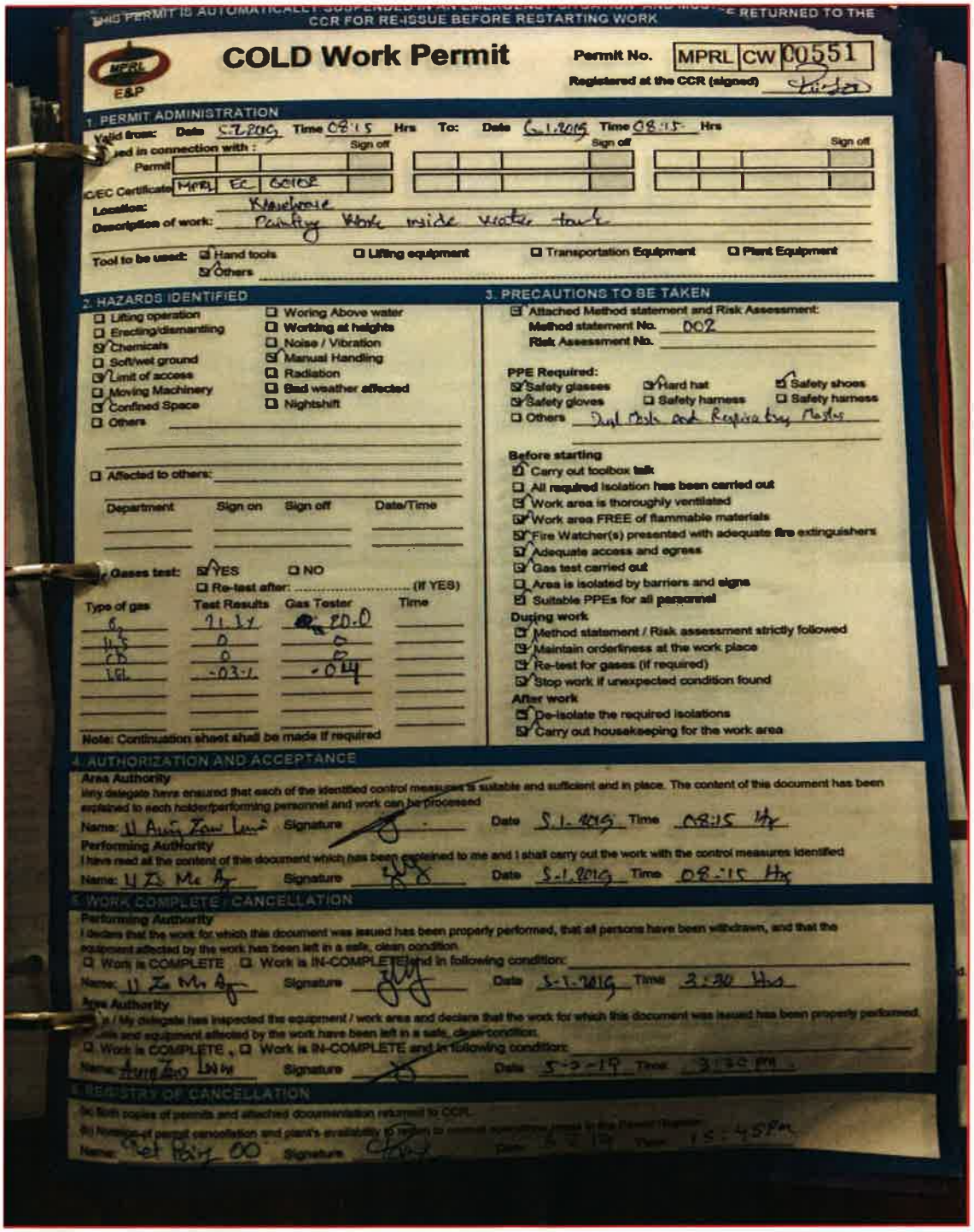
Conducted By: Ye Win Htut / Myo Myint Lin

Observed By:

Approved By: Aung Zaw Linn, Asst. Manager (Field HSE), MPRL E&P Pte Ltd.

4.6 Permit to Work System (PTW)

Permit to work records (evidences sheets) found as safety copies and register file.



COLD Work Permit

Permit No. MPRL CW 00551

1. PERMIT ADMINISTRATION

Valid from: Date 5.1.2015 Time 08:15 Hrs To: Date 6.1.2015 Time 08:15 Hrs

Location: Kuantan

Description of work: Painting Work inside water tank

Tool to be used: Hand tools; Others

2. HAZARDS IDENTIFIED

Lifting operation; Erecting/dismantling; Chemicals; Soft/wet ground; Limit of access; Moving Machinery; Confined Space; Others

Working Above water; Working at heights; Noise / Vibration; Manual Handling; Radiation; Bad weather affected; Nightshift

Affected to others:

Department	Sign on	Sign off	Date/Time

Gases test: YES NO

Re-test after: ..... (If YES)

Type of gas	Test Results	Gas Tester	Time
O_2	21.1%	20.0	
H_2S	0	0	
CO	0	0	
LEL	-03-1	-04	

Note: Continuation sheet shall be made if required

3. PRECAUTIONS TO BE TAKEN

Attached Method statement and Risk Assessment:

Method statement No. 002

Risk Assessment No.

PPE Required:

Safety glasses; Hard hat; Safety shoes; Safety gloves; Safety harness; Safety harness; Others Dust Mask and Respiratory Master

Before starting

Carry out toolbox talk; All required isolation has been carried out; Work area is thoroughly ventilated; Work area FREE of flammable materials; Fire Watcher(s) presented with adequate fire extinguishers; Adequate access and egress; Gas test carried out; Area is isolated by barriers and signs; Suitable PPEs for all personnel

During work

Method statement / Risk assessment strictly followed; Maintain orderliness at the work place; Re-test for gases (if required); Stop work if unexpected condition found

After work

De-isolate the required isolations; Carry out housekeeping for the work area

4. AUTHORIZATION AND ACCEPTANCE

Area Authority

Name: U Aung Zaw Lwin Signature Date 5.1.2015 Time 08:15 Hr

Performing Authority

I have read all the content of this document which has been explained to me and I shall carry out the work with the control measures identified

Name: U Zo Me Aung Signature Date 5.1.2015 Time 08:15 Hr

5. WORK COMPLETE / CANCELLATION

Performing Authority

I declare that the work for which this document was issued has been properly performed, that all persons have been withdrawn, and that the equipment affected by the work has been left in a safe, clean condition.

Work is COMPLETE; Work is IN-COMPLETE and in following condition:

Name: U Zo Me Aung Signature Date 5-1-2015 Time 3:30 Hrs

Area Authority

I / My delegate has inspected the equipment / work area and declare that the work for which this document was issued has been properly performed, tools and equipment affected by the work have been left in a safe, clean condition.

Work is COMPLETE ; Work is IN-COMPLETE and in following condition:

Name: Aung Zaw Lwin Signature Date 5-1-15 Time 3:30 PM

6. REGISTRY OF CANCELLATION

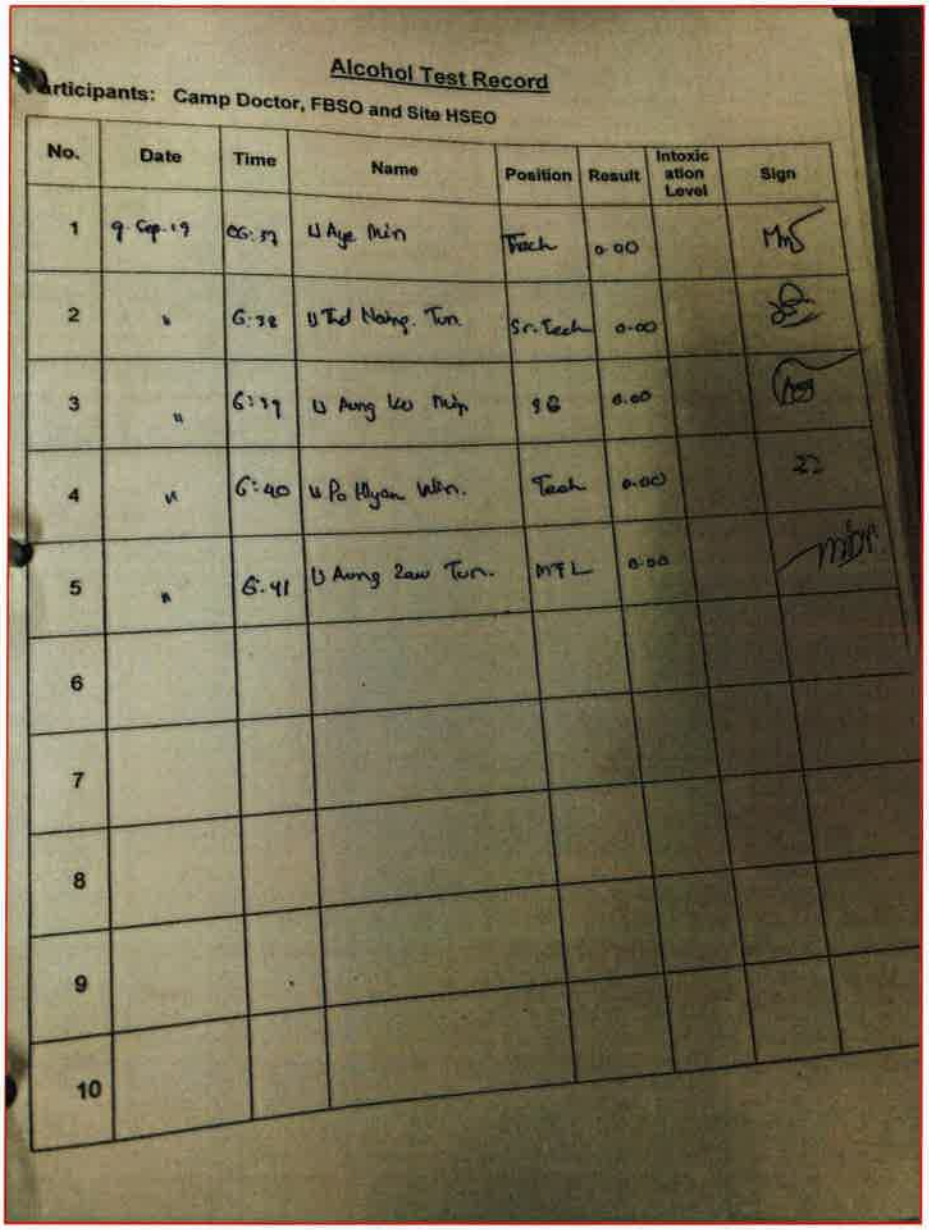
(a) Both copies of permits and attached documentation returned to CCR.

(b) Notification of permit cancellation and plant's availability to return to normal operations issued by the Permit Receiver

Name: Tet Paing Oo Signature Date 5.1.15 Time 15:45 Pm

4.7 Records of Alcohol Testing

Alcohol testing records kept as soft copies and found as evidences.



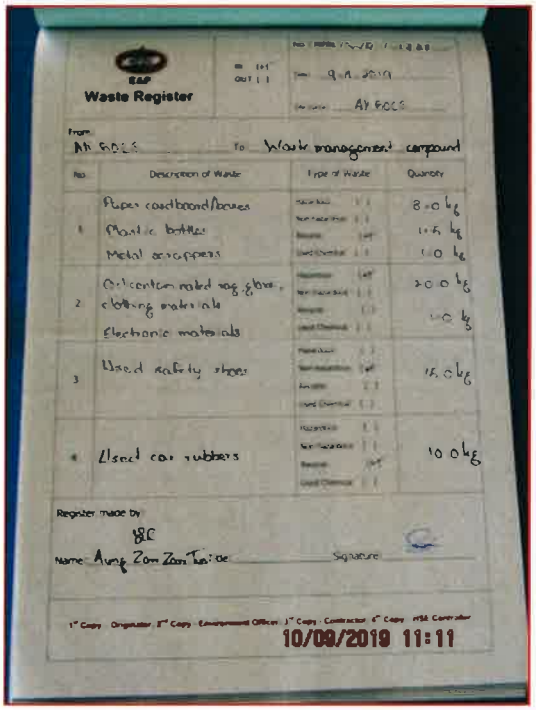
Alcohol Test Record

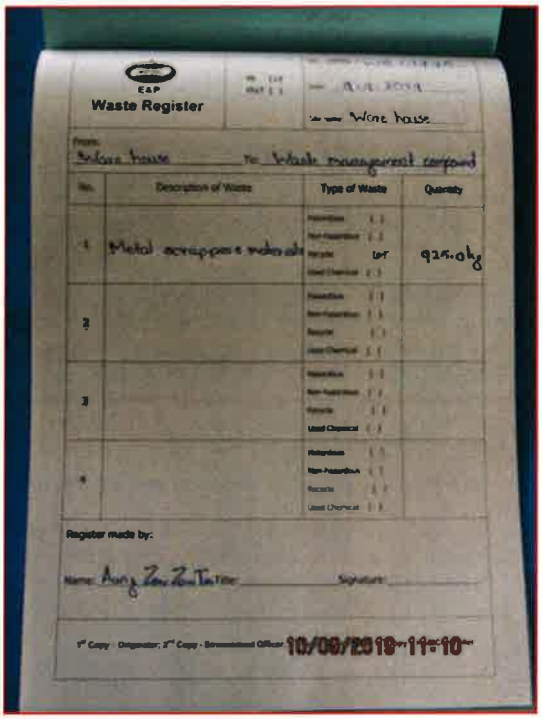
Participants: Camp Doctor, FBSO and Site HSEO

No.	Date	Time	Name	Position	Result	Intoxication Level	Sign
1	9 Sep. 19	06:37	U Aye Min	Tech	0.00		
2	"	6:38	U Tha Naing Tun	Sr. Tech	0.00		
3	"	6:39	U Aung Lin Min	SE	0.00		
4	"	6:40	U Po Htyan Win.	Tech	0.00		
5	"	6.41	U Aung Zaw Tun.	MTL	0.00		
6							
7							
8							
9							
10							

4.8 Waste Disposal Records at Waste Management Compound

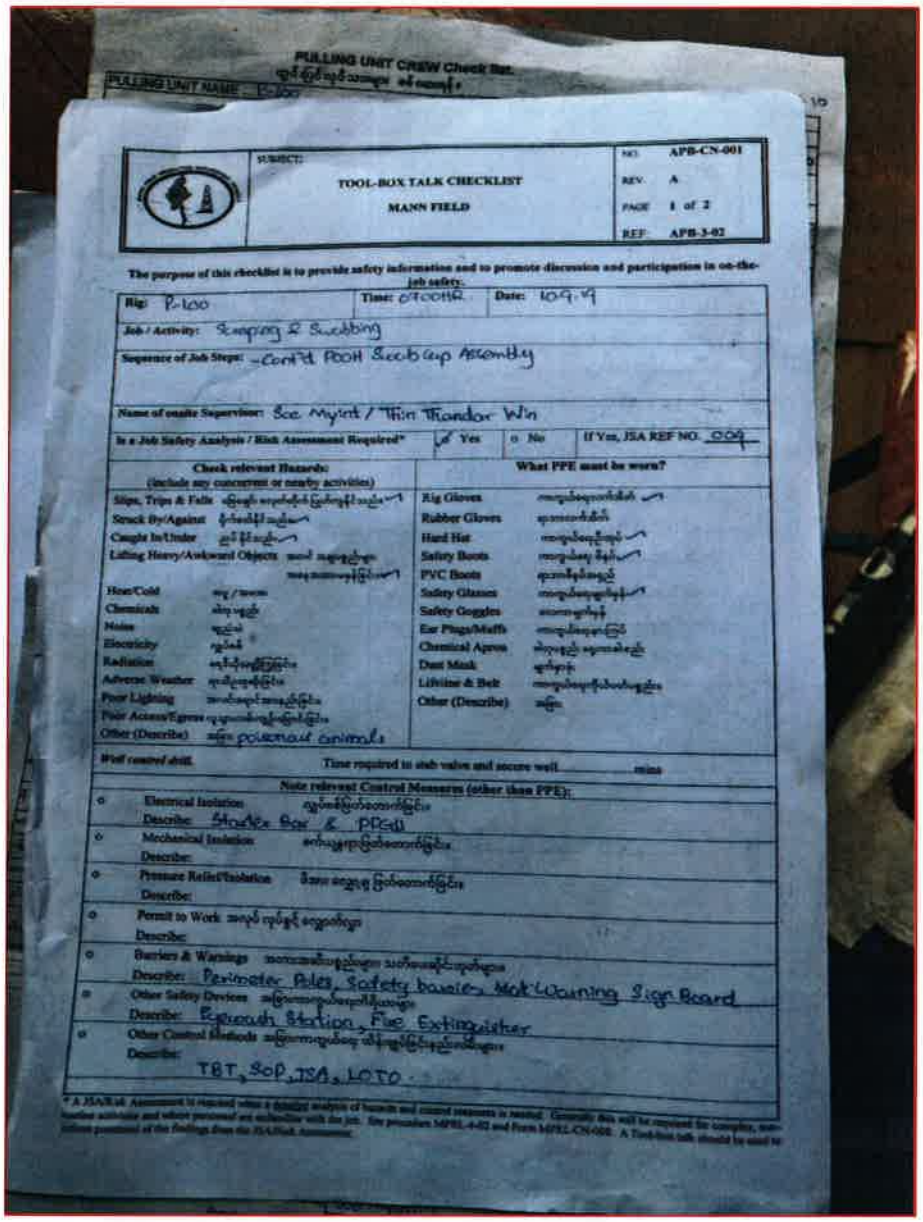
Waste disposal records found at waste management compound and recorded on daily basis.





4.9 Toolbox Talk Meeting Records

Toolbox talk records found as evidence.



PULLING UNIT CREW Check list

PULLING UNIT NAME: P-100

SUBJECT: TOOL-BOX TALK CHECKLIST
MANN FIELD

NO: APB-CN-001
REV: A
PAGE: 1 of 2
REF: APB-3-02

The purpose of this checklist is to provide safety information and to promote discussion and participation in on-the-job safety.

Rig: P-100 Time: 07:00HR Date: 10.9.19

Job / Activity: Keeping & Swabbing

Sequence of Job Steps: -Cont'd POOH Swab up Assembly

Name of onsite Supervisor: See Myint / Thin Thandar Win

Is a Job Safety Analysis / Risk Assessment Required* ☑ Yes ☐ No If Yes, JSA REF NO. 004

Check relevant Hazards: (include any concurrent or nearby activities)

- Slips, Trips & Falls
- Struck By/Against
- Caught In/Under
- Lifting Heavy/Awkward Objects
- Heat/Cold
- Chemicals
- Noise
- Electricity
- Radiation
- Adverse Weather
- Poor Lighting
- Poor Access/Egress
- Other (Describe): poisonous animals

What PPE must be worn?

- Rig Gloves
- Rubber Gloves
- Hard Hat
- Safety Boots
- PVC Boots
- Safety Glasses
- Safety Goggles
- Ear Plugs/Muffs
- Chemical Apron
- Dust Mask
- Lifeline & Belt
- Other (Describe)

Well secured shut: Time required to stab valve and secure well ____ mins

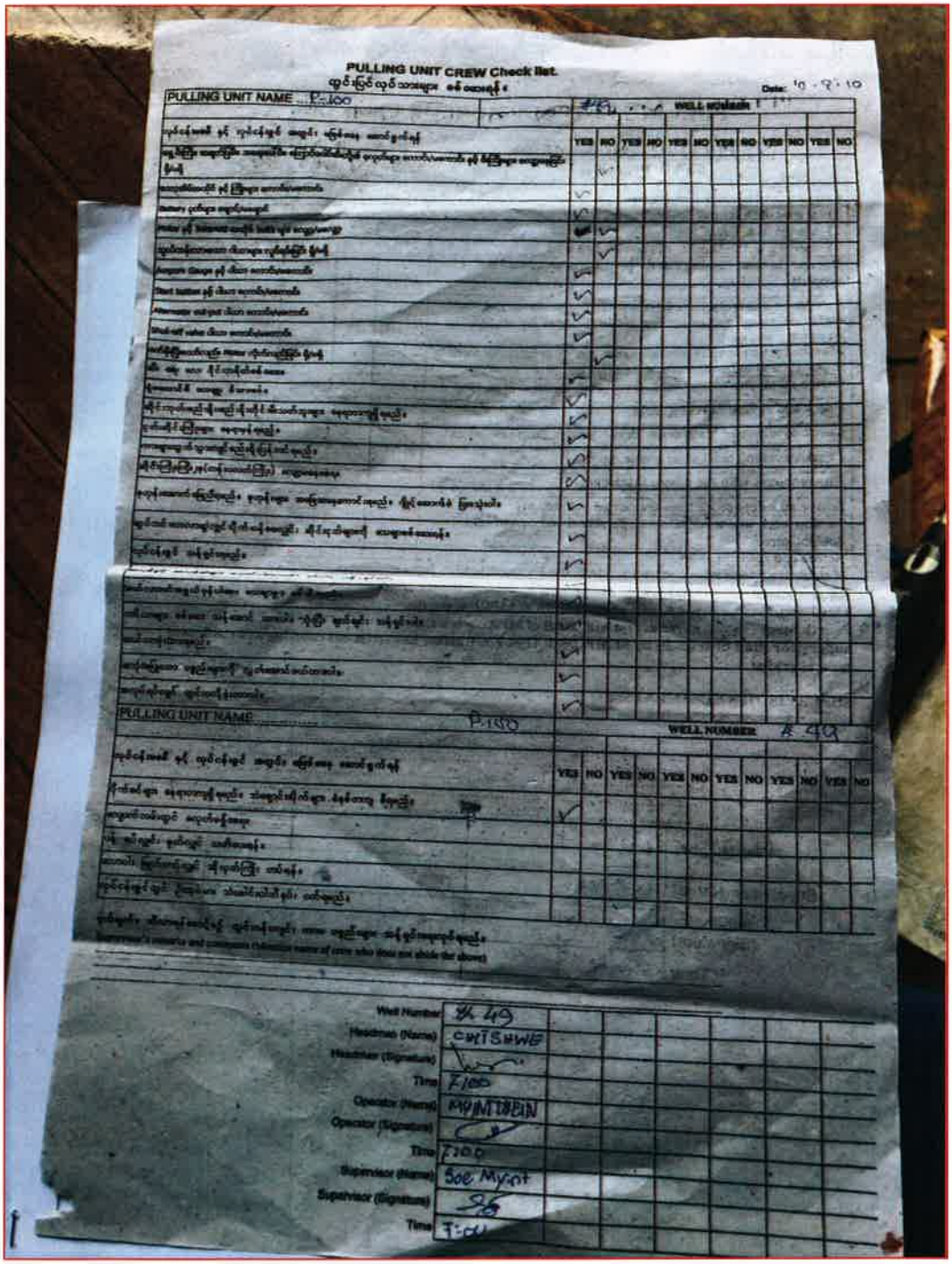
Note relevant Control Measures (other than PPE):

- Electrical Isolation — Describe: Master Box & PPRU
- Mechanical Isolation — Describe:
- Pressure Relief/Isolation — Describe:
- Permit to Work — Describe:
- Barriers & Warnings — Describe: Perimeter Poles, Safety barrier, Mak'Warning Sign Board
- Other Safety Devices — Describe: Eyewash Station, Fire Extinguisher
- Other Control Methods — Describe: TBT, SOP, JSA, LOTO.

* A JSA/RA Assessment is required when a detailed analysis of hazards and control measures is needed. Generally this will be required for complex, non-routine activities and where personnel are unfamiliar with the job. See procedure MPEL-4-02 and Form MPEL-CN-008. A Toolbox talk should be used to inform personnel of the findings from the JSA/RA Assessment.

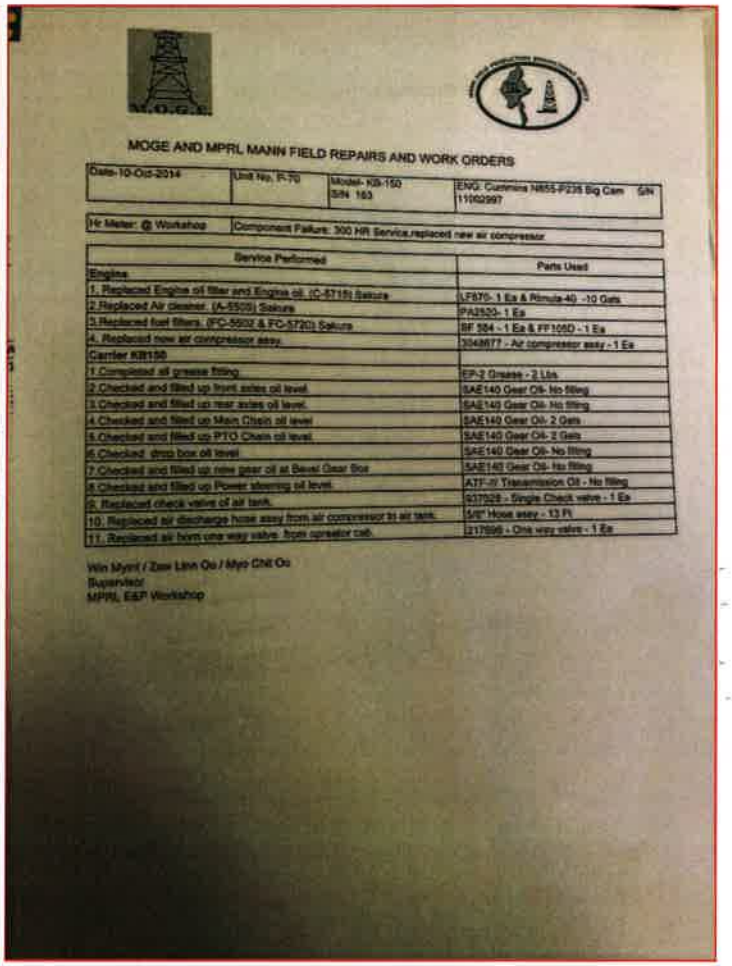
4.10 Pulling Unit Daily Inspection Records

Records found as evidence and completion of documentation was satisfactory. Congratulated filed for this practice and keep up the good practice.



5. Review of Preventive & Maintenance Program

Audit team checked the PM schedule of MPRL E&P workshop and Downhole workshop. Observed that team performed as per planned schedules in place at respective workshops and updated accordingly. Congratulated field team for this practice and keep it up the practice consistently.



MOGE AND MPRL MANN FIELD REPAIRS AND WORK ORDERS

Date- 10-Oct-2014	Unit No. R-70	Model- KB-150 S/N 163	ENG: Cummins N855-P235 Big Cam S/N 11002997
Hr Meter: @ Workshop	Component Failure: 300 HR Service,replaced new air compressor		

Service Performed	Parts Used
Engine	
1. Replaced Engine oil filter and Engine oil. (C-5715) Sakura	LF670- 1 Ea & Rimula-40 -10 Gals
2.Replaced Air cleaner. (A-5505) Sakura	PA2920- 1 Ea
3.Replaced fuel filters. (FC-5502 & FC-5720) Sakura	BF 504 - 1 Ea & FF105D - 1 Ea
4. Replaced new air compressor assy.	3048877 - Air compressor assy - 1 Ea
Carrier KB150	
1.Completed all grease fitting	EP-2 Grease - 2 Lbs
2.Checked and filled up front axles oil level	SAE140 Gear Oil- No filling
3.Checked and filled up rear axles oil level	SAE140 Gear Oil- No filling
4.Checked and filled up Main Chain oil level	SAE140 Gear Oil- 2 Gals
5.Checked and filled up PTO Chain oil level	SAE140 Gear Oil- 2 Gals
6.Checked drop box oil level	SAE140 Gear Oil- No filling
7.Checked and filled up rear gear oil at Bevel Gear Box	SAE140 Gear Oil- No filling
8.Checked and filled up Power steering oil level	ATF-II Transmission Oil - No filling
9. Replaced check valve of air tank.	937529 - Single Check valve - 1 Ea
10. Replaced air discharge hose assy from air compressor to air tank.	5/8" Hose assy - 13 Ft
11. Replaced air horn one way valve from operator cab.	217898 - One way valve - 1 Ea

Win Myint / Zaw Linn Oo / Myo Chit Oo
Supervisor
MPRL E&P Workshop

6. Staff Interview

During the period of HSE audit, crews were randomly selected and interviewed to evaluate their safety awareness level, the level of understanding on the standard operating procedures and necessary control measures as mentioned in the respective JSAs and familiarity with emergency response plan. (See Below Figures)

7. M&AS Workshop and Vehicles

7.1 Training

To reduce the transportation accidents / road traffic accidents (RTA) and to recognize the safe behaviour of drivers, M&A AHSE Supervisor conducted Drivers' Behaviour Change Program to Mann Field M&AS Drivers of MPRL E&P Transportation Services. ✓

7.2 Safety Briefing and Alcohol

Audit team participated in Daily Morning Tool Box Talk and Safety Breifing led by M&AS Camp Boss as well as surprise alcohol test conducted. ✓

7.3 Observations and Recommendations

7.3.1 Found that unprotected saw dust container from rain water.

Before

After

Observation	Recommendations	Priority Level	Action Parties	Target Date
• unprotected saw dust container from rain water	• To make cover for Sand and Saw Dust container.	P2	CB	Done on 11-Sept-19

7.3.2 The inspection team found that the oil leakage from power steering box of fuel bowser (4A/ 8307) as repeated finding from last inspection. Workshop supervisor and Mechanic should repair before the occurrence of oil leakage and need to inspect regularly.

Observation	Recommendations	Priority Level	Action Parties	Target Date
Oil leakage from power steering box of fuel bowser (4A/8307)	• Need to check and repair	P2	CB	Done on 16-Sept-19

7.3.3 Inspection team observed that deterioration of hose (flexible rubber hoses become rigid) on a fire extinguisher belonging to M&A vehicle (8A/7104).

Observation	Recommendations	Priority Level	Action Parties	Target Date
Deterioration of fire extingusher hose M&AS Vehicle (8A/7104)	• Need to check and replace	P2	CB	Done on 11-Sept-19

7.4 Good Improvements at Mann M&AS Workshop Compound and Vehicles

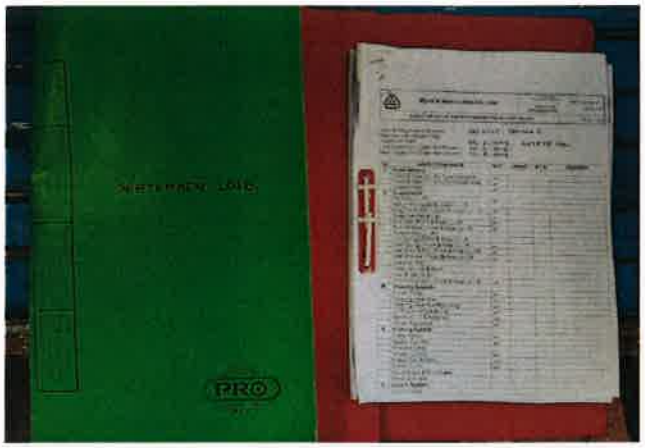
The Inspection team, we appreciated for the good practices and improvements of HSE standard at M&AS workshop compound and vehicles as updating the on previous inspection findings as below figures.

Good housekeeping at workshop

Segerated Waste Bins

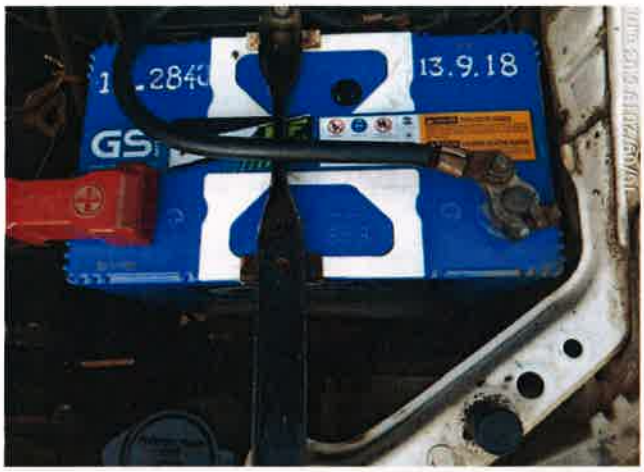
Good housekeeping and Tools arrangement inside workshop

Neat and tidy M&A base camp and motor bike stand.



Inspection records of Vehicles

Inspection Photo



Good practices as recorded replacement date on battery and complete drives' daily vehicle checklists.

8. Conclusion

As to summarize and conclude this bi-annual HSE audit report, audit team observed that improvement in documentation, practices, follow the procedure (SOP/JSA), crew awareness in safety and environment in Mann Field operation. However some areas included in this report for further improvement on which field team should focus and take necessary action in the aspects of health, safety and environment in Mann Field.

Risk Estimation and Evaluation on Each Finding

As a team based approach risk assessment, estimation of risk on each finding is carried out by HSE department by using the risk matrix below.

		Consequence (Severity)			
		None	Minor	Serious	Major
Likelihood	Improbable	1	2	3	4
	Low	2	4	6	8
	Medium	3	6	9	12
	High	4	8	12	16

After having estimation of risk level on each finding, HSE team evaluated and decided the risk level (High / Medium / Low) of each finding with reference to the following matrix.

Severity level	Definition
H - High	A high weakness is one, which is essential to be brought to the attention of the senior management team. This should also include any otherwise medium weakness, which is a repeat finding from a previous report.
M - Medium	A medium weakness could result in a perceptible and undesirable effect on achievement of HSE objectives.
L - Low	A low weakness has no major HSE impact at the process level but its correction will assure greater effectiveness/efficiency in the process concerned.

REMARK: Some of the findings were observed and included in the report as areas for improvement only where risk estimation is not applied. However, priority is set for each of those findings.

Magway ECD (Audit Report)
Annex - B

ပတ် ဝန်း ကျင် ထိန်း သိမ်း ရေး ဦး စီး ဌာ န
ညွှန် ကြား ရေး မှူး ရုံး
မ ကွေး တိုင်း ဒေ သ ကြီး - မ ကွေး မြို့
စာ အ မှတ်၊ ၁/ ခ/ ၁ (၁၂) (၂၂ /၂၀၂၀)
ရက်စွဲ ၂၀၂၀ ပြည့်နှစ် ဖေဖော်ဝါရီလ ၇ ရက်

သို့

ညွှန်ကြားရေးမှူးချုပ်
ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
နေပြည်တော်

အကြောင်းအရာ။ **ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA)၊ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း (IEE)၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်(EMP) အတည်ပြုပြီး စီမံကိန်းလုပ်ငန်းများနှင့် ပတ်သက်၍ ကွင်းဆင်းစစ်ဆေးထားမှုများ တင်ပြခြင်း**

ရည် ညွှန်း ချက်။ ပတ်ဝန်းကျင်ထိန်းရေးဦးစီးဌာန (ဦးစီးရုံးချုပ်)၏ ၂၇-၁၂-၂၀၁၉ ရက်စွဲပါ၊ စာအမှတ်၊ ထိန်းချုပ်/ စစ်ဆေးရေး-၄/ (၅၅၅/ ၂၀၁၉)

၁။ အကြောင်းအရာပါကိစ္စနှင့်ပတ်သက်၍ ပြည်ထောင်စုဝန်ကြီးရုံး၏ ခွင့်ပြုချက်ဖြင့် အတည်ပြုပြီး ဖြစ်သော စီမံကိန်းလုပ်ငန်းများ၏ အစီရင်ခံစာပါ အလေးထားလိုက်နာဆောင်ရွက်ရမည့် အချက်များကို လိုက်နာအကောင်အထည်ဖော်ဆောင်ရွက်စေရေးအတွက် ကွင်းဆင်းစစ်ဆေးရန် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန (ဦးစီးရုံးချုပ်) မှ ရည်ညွှန်းပါစာဖြင့် အကြောင်းကြားလာပါသည်။

၂။ သို့ဖြစ်ပါ၍ မကွေးတိုင်းဒေသကြီး၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနအနေဖြင့် မကွေးတိုင်းဒေသကြီးအတွင်းရှိ ရည်ညွှန်းပါစာအရ ၂၀၁၉ ခုနှစ် ဒီဇင်ဘာလကုန်အထိ အတည်ပြုစီမံကိန်းများ ကွင်းဆင်းဆောင်ရွက်ထားမှုအခြေအနေအား သိရှိနိုင်ပါရန် ပူးတွဲပါအတိုင်း ပေးပို့အစီရင်ခံတင်ပြအပ်ပါသည်။

(ဝင်းကိုကို)
လက်ထောက်ညွှန်ကြားရေးမှူး
တာဝန်ခံအရာရှိ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန
မကွေးတိုင်းဒေသကြီး

မိတ္တူကို

သယံဇာတ၊ သဘာဝပတ်ဝန်းကျင်၊ လျှပ်စစ်နှင့် စွမ်းအင်ဝန်ကြီး၊ မကွေးတိုင်းဒေသကြီး အထွေထွေမန်နေဂျာ၊ မြန်မာ့ရေနံနှင့်သဘာဝဓာတ်ငွေ့လုပ်ငန်း၊ မန်းရေနံမြေ၊ မကွေးတိုင်းဒေသကြီး

MPRL E&P Pte.Ltd, မန်းရေနံမြေ၊ မကွေးတိုင်းဒေသကြီး

ရုံးလက်ခံ၊ မျှောစာတွဲ

မကွေးတိုင်းဒေသကြီး၊ မင်းဘူးမြို့နယ်၊ မန်းရေနံမြေရှိ ရေနံထိန်းသိမ်းမှုအစီအစဉ်တိုးမြှင့်ခြင်းနှင့် ပြန်လည်အထွက်တိုးရေးဆောင်ရွက်ခြင်း လုပ်ငန်းအတွက် MPRL E&P မှ တင်ပြအတည်ပြုချက် ရရှိထားသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) နှင့်ပတ်သက်၍ မြေပြင်ကွင်းဆင်းစစ်ဆေးတွေ့ရှိချက်များ

စဉ်	အစီရင်ခံစာပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	ကွင်းဆင်းစစ်ဆေး တွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
၁။	စီမံကိန်းဆောင်ရွက်မှုလုပ်ငန်း			
	ရှိရင်းစွဲ ရေနံတွင်းများမှ ရေနံထုတ်လုပ်မှု တိုးတက်ရေးအတွက် Injection Wells ဆောင်ရွက်မှု အခြေအနေ	Injection Wells ကို တွင်းအမှတ် ၁၃၂၊ ၁၉၇၊ နှင့် ၂၇၉၊ ၆၂၇၊ ၆၂၉ တို့တွင် ဆောင်ရွက်ထားကြောင်းစိစစ်တွေ့ရှိရပါသည်။	Injection Wells များဆောင်ရွက်ရာတွင် ပတ်ဝန်းကျင် ညစ်ညမ်းမှုမရှိစေရေး အလေးထားဆောင်ရွက်သွားရန်။	
	ရေနံတွင်းတူးခြင်းမှ ထွက်ရှိလာသော ရွံ့များကိုဆောင်ရွက်ထားရှိမှု အခြေအနေ	ရေနံတွင်းတူးခြင်းမှ ထွက်ရှိလာသော ရွံ့များကို သိုလှောင်ကန်များဖြင့် ယာယီသိုလှောင်ထားပြီး အဆိုပါရွံ့များကို လျော့နည်းစေရေးနှင့် ပတ်ဝန်းကျင် ညစ်ညမ်းမှုမရှိစေရေးတို့အတွက် စွန့်ပစ်မည့် အစီအစဉ်အား ရေးဆွဲရန် ဆောင်ရွက်လျက်ရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ရေနံတွင်းတူးခြင်းမှ ထွက်ရှိလာသော ရွံ့များကို ယာယီသို လှောင်ထားမှုအား လျော့နည်းစေရန် သင့်တော်သော အစီအစဉ်တစ်ခုရေးဆွဲချမှတ်၍ ဆောင်ရွက်သွားရန်။	
၂။	စွန့်ပစ်ပစ္စည်းများစီမံခန့်ခွဲမှု			
	စွန့်ပစ်ပစ္စည်းများကို စွန့်ပစ်မှု အရင်းအမြစ်ပေါ် မူတည်ပြီး အရောင်ခွဲခြားသတ်မှတ်ထားသော အမျိုက်ပုံးများတွင် ယေဘုယျအမှိုက်၊ ပြန်လည်	စွန့်ပစ်ပစ္စည်းများကို General Waste၊ Hazardous Waste၊ Recycle Waste၊ Composting နှင့် Organic Waste ဟူ၍ ၅ မျိုးခွဲခြားကာ အရောင်ခွဲခြားထားသော	ဆက်လက်ဆောင်ရွက်သွားရန်။	

စဉ်	အစီရင်ခံစာပါ လိုက်နာ ဆောင်ရွက်ရမည့် အချက်များ	ကွင်းဆင်းစစ်ဆေး တွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ် ချက်
	အသုံးပြုနိုင်သောအမှိုက်၊ အန္တရာယ် ဖြစ်စေသောအမှိုက်နှင့် အော်ဂဲနစ် အမှိုက်များအဖြစ် ခွဲခြား စွန့်ပစ်ရန်။	အမှိုက် ပုံး ၅ ပုံးဖြင့် ခွဲခြားစွန့်ပစ်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။		
	ဆွေးမြေ့နိုင်သော အော်ဂဲနစ် အမှိုက်များကို ဆွေးမြေ့စေသောနည်းကို အသုံးပြု၍ မြေဩဇာ နှင့် မြေဆီလွှာအဖြစ် အသုံးပြုရန်။	ဆွေးမြေ့နိုင်သော အော်ဂဲနစ်အမှိုက်များကို ဆွေးမြေ့စေသောနည်းကို အသုံးပြု၍ သဘာဝ အသီး အနှံများ၊ ပန်းပင်များ စိုက်ပျိုးရာတွင် အသုံးပြုထားကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	
	အန္တရာယ်ဖြစ်စေသော အမှိုက်များကို စနစ်တကျစွန့်ပစ်ပြီး ခွင့်ပြုချက် ရရှိထားသောကန်ထရိုက်တာမှသိမ်းဆည်းရန်။ ကန်ထရိုက်တာမှ သိမ်းဆည်းခြင်း မပြု နိုင်သောအမှိုက်များကို Concrete bunker ဖြင့် မြေအောက်သို့ နစ်မြုပ်ရန်။	Hazardous Waste များကို Waste Management Compound နှင့် Sludge Management Compound များတွင် ယာယီ စုပုံထားရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။	စုပုံထားရှိသော အန္တရာယ်ဖြစ်စေနိုင်သည့် အမှိုက်များကို ခွင့်ပြုချက်ရရှိထားသော ကန်ထရိုက်တာမှ သိမ်းဆည်းစေရန်နှင့် ကန်ထရိုက်တာမှ သိမ်းဆည်းခြင်း မပြုနိုင်သော အမှိုက်များကို Concrete bunker ဖြင့် မြေအောက်သို့ နစ်မြုပ်ရန်။	
	ပြန်လည် အသုံးပြုနိုင်သော အမှိုက်များကို ခွင့်ပြုချက်ရရှိထားသော ကန်ထရိုက်တာမှ သိမ်းဆည်းရန်။	ပြန်လည်အသုံးပြုနိုင်သော အမှိုက်များ(ပုလင်းခွံများ၊ ကားတာယာများ)ကို ပြန်လည်အသုံးပြုလိုသူများထံသို့ သင့်တော်သော ဈေးနှုန်းဖြင့်ရောင်းချကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	

စဉ်	အစီရင်ခံစာပါ လိုက်နာ ဆောင်ရွက်ရမည့် အချက်များ	ကွင်းဆင်းစစ်ဆေး တွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ် ချက်
	စီမံကိန်းဝန်ထမ်းများအား အမှိုက်များ စီမံခန့်ခွဲမှုနည်းစနစ်ကို သင်တန်းပို့ချ ပေးရန်။	စီမံကိန်းဝန်ထမ်းများအား အမှိုက်များ စီမံခန့်ခွဲမှုနည်းစနစ်ကို သင်တန်းပို့ချကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	
၃။	စွန့်ပစ်ရေများစီမံခန့်ခွဲမှု			
	Downhole equipment ရေနုံသုံး ပစ္စည်းများကို ပြုပြင်ဆောင်ရွက်ခြင်း လုပ်ငန်းများကို သတ်မှတ်နေရာတွင် သာ ဆောင်ရွက်ခြင်းနှင့် ရေဆိုးထွက် ပေါက်များအားတားဆီးထိန်းသိမ်းခြင်း။	Downhole equipment ရေနုံတွင်းသုံးပစ္စည်း များကို ပြုပြင်ဆောင်ရွက်ခြင်းလုပ်ငန်းများကို သီးသန့်နေရာ သတ်မှတ်ဆောင်ရွက်ထား ကြောင်းနှင့် ပြုပြင်ခြင်းမှထွက်လာသော ရေ ဆိုးများကို အနည်ထိုင်ကန် အဆင့်ဆင့်ဖြင့် အနည်ထိုင်စေကြောင်းစိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	
	ရေနုံတူးဖော်ခြင်းမှ ထွက်ရှိလာသော ရေများကို ဆောင်ရွက်ထားရှိမှု	ရေနုံတူးဖော်ခြင်းမှ ထွက်ရှိလာသော ရေများ ကို သိုလှောင်ကန်အဆင့်ဆင့်ဖြင့် အနည်ထိုင် စေ၍ ရရှိလာသော ရေများကို ရေစစ်ကိရိ ယာတွင် ဖြတ်သန်းစီးဆင်းစေကာ Injection Wells များအတွင်းသို့ ပြန်လည်ထည့်သွင်း ခြင်းဖြင့် ပတ်ဝန်းကျင်သို့ စွန့်ထုတ်ခြင်း မရှိ ကြောင်း စိစစ်တွေ့ရှိရပါသည်။	Injection Wells များအတွင်းသို့ ထည့် သွင်းရာတွင် သက်မှတ်စံချိန်စံညွှန်းနှင့် အညီ ဖြစ်စေရေး အလေးထား လုပ် ဆောင်ရန်။	

စဉ်	အစီရင်ခံစာပါ လိုက်နာ ဆောင်ရွက်ရမည့် အချက်များ	ကွင်းဆင်းစစ်ဆေး တွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
၄။	အရေးပေါ်အစီအစဉ်များအတွက် ဆောင်ရွက်ထားရှိမှု			
	စီမံကိန်းတွင် လူထုအသိပေးခြင်း၊ တုန့်ပြန်ခြင်းတို့ ပါဝင်သော တိကျသော ဆီယိုဖိတ်ခြင်းတုန့်ပြန်မှု အစီအစဉ် (Spill Response Plan) ကို အကောင်အထည်ဖော်ရန်။	ဆီယိုဖိတ်ခြင်းတုန့်ပြန်မှုအစီအစဉ် (Spill Response Plan) ကို စီမံချက်များ ရေးဆွဲချမှတ်ထားပြီး ဆီယိုဖိတ်မှုရှိနိုင်သော နေရာများတွင် Spill Resposnse Equipments များထားရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆီယိုဖိတ်မှုမရှိစေရေးနှင့် ယိုဖိတ်မှုများရှိလာပါက လုပ်ဆောင်ရမည့် ဆီယိုဖိတ်ခြင်း တုန့်ပြန်မှုအစီအစဉ်ပါ အချက်အလက်များနှင့်အညီ အလေးထား လုပ်ဆောင်သွားရန်။	
	အရေးပေါ်အခြေအနေဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများကို အလုပ်သမားများအား သင်ကြားပေးရန်။	အရေးပေါ်အခြေအနေဆိုင်ရာ လုပ်ထုံး လုပ်နည်းများကို အလုပ်သမားများအား သင်ကြားပေးခြင်းကို တစ်လလျှင် တစ်ကြိမ်ဆောင်ရွက်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	
	ရေနံတူးဖော်ထုတ်လုပ်ခြင်းမှယိုဖိတ်ရေနံများအား ဆောင်ရွက်ထားရှိမှု	ရေနံတွင်းများမှ ယိုဖိတ်လာသော ရေနံများကို စုစည်းရန်အတွက် ဆောင်ရွက်ထားရှိသော ကန်များမှာ အကာအရံများ ဆောင်ရွက်ထားမှု မရှိသည့်အတွက် အမှိုက်များ ရှိနေခြင်း၊ တိရစ္ဆာန်များပြုတ်ကျသေဆုံးမှုများ ရှိနေကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဒေသခံများနှင့်နီးကပ်လျှက်ရှိသော ယိုဖိတ် ရေနံစုဆောင်းကန်များအား လုံခြုံသော အကာအရံများ ထားရှိဆောင်ရွက်ရန်။	
	ဆီသိုလှောင်ရုံများ ဆောင်ရွက်ထားမှု အခြေအနေ	လုပ်ငန်းသုံးယာဉ်များအတွက် ဒီဇယ်များကို Warehouse ဧရိယာအတွင်းရှိ Tank တစ်ခုလျှင် ဒီဇယ် ဂါလံ (၃၀၀၀) ဆံ့သော Tank (၂)	ဆီသိုလှောင်ရုံများ ကြံ့ခိုင်မှု ရှိ/ မရှိအား ပုံမှန်စစ်ဆေး၍ ဆီအသုံးပြုရာတွင် ပတ်ဝန်းကျင်သို့ ဖိတ်စင်မှုမရှိစေရေး	

စဉ်	အစီရင်ခံစာပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	ကွင်းဆင်းစစ်ဆေး တွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
		ခုဖြင့် သိုလှောင်ထားပြီး အဆိုပါ Tank များမှ ဆီယိုဖိတ်မှုများရှိလာပါက ပတ်ဝန်းကျင်ညစ်ညမ်းမှုမရှိစေရန် ကွန်ကရီကန်များဖြင့် ကာရံထားကြောင်း စိစစ်တွေ့ရှိရပါသည်။	အလေးထားလုပ်ဆောင်ရန်။	
၅။	မီးဘေးအန္တရာယ်ကာကွယ်ရေးအစီအစဉ်ဆောင်ရွက်ထားရှိမှု			
	ရေနံတွင်းများအနီး(သို့မဟုတ်)သင့်တော်သောနေရာများတွင် မီးလောင်မှုထိန်းချုပ်နိုင်မည့်ပစ္စည်းများထားရှိရန်။	ရေနံသိုလှောင်ကန်များ၊ ဆီသိုလှောင်ကန်များ၊ ရုံးအဆောက်အဦများတွင် မီးသတ်ဆေးဗူးများထားရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။	မီးသတ်ဆေးဗူးများအပြင် သဲပုံး/ရေပုံးများ အလုံအလောက်ထားရှိရန်။	
	မီးဘေးအန္တရာယ်သင်တန်းနှင့် တုန့်ပြန်ခြင်းအလေ့အကျင့်ကို ဆောင်ရွက်ရန်။	မီးဘေးအန္တရာယ် သင်တန်းကျင်းပခြင်းနှင့် ဇာတ်တိုက်လေ့ကျင့်ခြင်းတို့ကို တစ်လျှင်တစ်ကြိမ်ဆောင်ရွက်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	
	ဆေးလိပ်သောက်သုံးသည့်နေရာ သတ်မှတ်ဆောင်ရွက်ရန်။	ဆေးလိပ်သောက်သုံးသည့်နေရာများအား ရုံးအဆောက်အဦများ၊ စတိုနှင့် လုပ်ငန်းဆောင်ရွက်သည့် နေရာများတွင် သီးခြားနေရာ တစ်ခုအဖြစ်သတ်မှတ် ဆောင်ရွက်ထားကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	

စဉ်	အစီရင်ခံစာပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	ကွင်းဆင်းစစ်ဆေး တွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
၆။	စီမံကိန်းကြောင့်ထိခိုက်ခံစားရသော ဒေသခံများအတွက် ဆောင်ရွက်ထားရှိမှု			
	စီမံကိန်းကြောင့်ထိခိုက်ခံစားရသော ဒေသခံများအတွက် ဒေသဖွံ့ဖြိုးရေး လုပ်ငန်းများ ဆောင်ရွက်ထားရှိမှု	စီမံကိန်း၏ နီးစပ်ကျေးရွာ ၁၄ ရွာနှင့် နီးစပ်သောစာသင်ကျောင်း ၁၁ ကျောင်းတို့တွင် ကျောင်းပရိဘောဂများ၊ ကျောင်းသုံးပစ္စည်းများ ဝယ်ယူဖြည့်တင်းခြင်း၊ ခြံစည်းရိုး၊ ရေကန်နှင့် ရေသန့်စက်များ တည်ဆောက်ပေးခြင်း၊ ရေကျော် ကွန်ကရစ်လမ်းခင်းပေးခြင်းနှင့် စီမံကိန်းဝန်ထမ်းများအပြင် ခြင်ထောင်၊ လေးအိမ်တန်း၊ လက်ပံတစ်ပင်နှင့် ကြာကန်ကျေးရွာများတွင် ကျေးရွာသူ/ ကျေးရွာသားများအား အခမဲ့ဆေးကုသခြင်း အစီ အစဉ်များကို အပတ်စဉ် ဆောင်ရွက်ပေးကြောင်းနှင့် ဆောင်ရွက်ပြီးစီးမှုအခြေအနေများကို သက်ဆိုင်ရာမြို့နယ်အုပ်ချုပ်ရေးမှူး၊ဒေသခံ၊ ဌာနဝန်ထမ်းများ၊ လွှတ်တော်ကိုယ်စားလှယ်တို့နှင့် ၆ လ လျှင် တစ်ကြိမ် တွေ့ဆုံရှင်းလင်း တင်ပြကြောင်းစိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	
	စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသော ဒေသခံများအတွက် ဒေသဖွံ့ဖြိုးရေး	စီမံကိန်းကြောင့်ထိခိုက်ခံစားရသော ဒေသခံများအတွက် ဒေသဖွံ့ဖြိုးရေး လုပ်ငန်းများ	စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသော ဒေသခံများအတွက် ဒေသဖွံ့ဖြိုးရေး	

စဉ်	အစီရင်ခံစာပါ လိုက်နာ ဆောင်ရွက်ရမည့် အချက်များ	ကွင်းဆင်းစစ်ဆေး တွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
	လုပ်ငန်းများ ဆောင်ရွက်ထားရှိမှု အစီရင်ခံစာ တင်ပြမှု	ဆောင်ရွက်ထားရှိမှု အစီရင်ခံစာကို မြန်မာ့ ရေနံနှင့် သဘာဝဓာတ်ငွေ့လုပ်ငန်းသို့ (၃) လလျှင် တစ်ကြိမ် ရေးဆွဲတင်ပြကြောင်း စိစစ်တွေ့ရှိ ရပါသည်။	လုပ်ငန်းများ ဆောင်ရွက်ထားရှိမှု အစီရင်ခံစာကိုပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန (ရုံးချုပ်) နှင့် မကွေးတိုင်း ဒေသကြီးညွှန်ကြားရေးမှူးရုံးသို့ မိတ္တူ ပေးပို့ရန်။	
၇။	ပိတ်သိမ်းပြီးရေနံတွင်းများအား ဆောင်ရွက်ထားရှိမှု			
	ပိတ်သိမ်းပြီးရေနံတွင်းများဆောင်ရွက်ထားရှိမှု	ပိတ်သိမ်းပြီးသော ရေနံတွင်းများမှာကျေးရွာများနှင့် နီးကပ်လျှက်ရှိပြီး သီးသန့်နေရာအဖြစ် သတ်မှတ်ထားခြင်းမရှိပဲ ဒေသခံများမှ နွားချည်တိုင်အဖြစ် အသုံးပြုလျှက်ရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဒေသခံများနှင့်နီးကပ်ပြီး လုပ်ငန်းဆောင်ရွက်ခြင်းမရှိတော့သော ရေနံတွင်းဟောင်းများအား သီးသန့်အကာအရံများနှင့် သတိပေး ဆိုင်းဘုတ်များ ထားရှိဆောင်ရွက်ရန်။	

(စစ်ဆေးခံသူ)

လက်မှတ် -

အမည် - ဦးနေမျိုးအောင်

ရာထူး - HSE Manager

ကုမ္ပဏီလီမိတက် - MPRL E&P

(စစ်ဆေးသူ)

လက်မှတ် -

အမည် - ဦးဝင်းကိုကို

ရာထူး - လက်ထောက်ညွှန်ကြားရေးမှူး

ဌာန - ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန၊ မကွေးတိုင်းဒေသကြီး

မကွေးတိုင်းဒေသကြီး၊ မင်းဘူးမြို့နယ်၊ မန်းရေနံမြေရှိ ရေနံထိန်းသိမ်းမှုအစီအစဉ်တိုးမြှင့်ခြင်းနှင့် ပြန်လည်အထွက်တိုးရေးဆောင်ရွက်ခြင်း လုပ်ငန်းအတွက် MPRL E&P မှ တင်ပြအတည်ပြုချက် ရရှိထားသည့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) အစီရင်ခံစာပါ စောင့်ကြပ်ကြည့်ရှု စစ်ဆေးခြင်း အစီအစဉ်နှင့် ပတ်သက်၍ မြေပြင်ကွင်းဆင်းစစ်ဆေးတွေ့ရှိချက်များ

စဉ်	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်ပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီရင်ခံစာပါ စစ်ဆေးတွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
၁	မြေပေါ်ရေအရည်အသွေး	မြေပေါ်ရေအရည်အသွေး တိုင်းတာမှုရလဒ်များအရ အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) တွင် TSS(mg/l) အား 50 mg/l သတ်မှတ်ထားသော်လည်း ၂၀၁၉ ဇူလိုင်လ၏ Z4SW-1 တွင် 198 mg/l နှင့် Z4SW-2 တွင် 206 mg/l, ၂၀၁၉ ခုနှစ် ဩဂုတ်လ၏ Z1SW-2 တွင် 64 mg/l, Z3SW-1 တွင် 98 mg/l, Z4SW-1 တွင် 161 mg/l, Z4SW-2 တွင် 162 mg/l, ၂၀၁၉ ခုနှစ် စက်တင်ဘာလ၏ Z2SW-1 တွင် 262 mg/l, Z3SW-1 တွင် 135 mg/l, Z3SW-2 တွင် 191 mg/l, Z4SW-1 တွင် 200 mg/l, Z4SW-2 တွင် 203 mg/l အစရှိသဖြင့် သတ်မှတ်စံနှုန်းထက် ကျော်လွန်နေခြင်းနှင့် ၂၀၁၉ ခုနှစ် စက်တင်ဘာလ တိုင်းတာမှုတွင်လည်း Oil and grease ၏ 10 mg/l သတ်မှတ်ချက်အား Z2SW-1, Z2SW-2, Z3SW-1, Z3SW-2, Z4SW-1, Z4SW-2 တို့တွင် ကျော်လွန်နေကြောင်း	ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ပထမ(၃)လဆက်တိုက် စောင့်ကြပ်ကြည့်ရှုမှုသည် လက်ရှိပတ်ဝန်းကျင် အခြေအနေတိုင်းတာမှုရလဒ်များထက် ကျော်လွန်ပါက စောင့်ကြပ်ကြည့်ရှုမှုကို ဆက်လက်ဆောင်ရွက်၍ အဆိုပါထိခိုက်မှုများကို လျော့ချစေရေး အစီအမံများချမှတ်ဆောင်ရွက်မည်ဖြစ်ကြောင်း ကတိကဝတ်ပြုထားသည်နှင့် အညီ စောင့်ကြပ်ကြည့်ရှုခြင်းကို ဆက်လက် လုပ်ဆောင်၍ သတ်မှတ်စံနှုန်းများထက်ကျော်လွန်မှုမရှိစေရန် အစီအမံများချမှတ် ဆောင်ရွက်ရန်။	

စဉ်	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်ပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီရင်ခံစာပါ စစ်ဆေးတွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
		စီစစ်တွေ့ရှိရပါသည်။		
၂	မြေအောက်ရေအရည်အသွေး	မြေအောက်ရေအရည်အသွေးတိုင်းတာမှုရလဒ်များအရ ၂၀၁၉ ခုနှစ် ဇူလိုင်လ၏ BOD_5 (mg/l) တွင် Z1GW-1, Z3GW-2, Z4GW-1, Oil and Grease (mg/l) တွင် Z1GW-2, ၂၀၁၉ ခုနှစ် စက်တင်ဘာလ၏ BOD_5(mg/l) တွင် Z1GW-1, Z3GW-1, Z3GW-2, Oil and Grease (mg/l) တွင် Z2GW-2, Z3GW-1 တို့တွင် လိုက်နာဆောင်ရွက်မည့် WHO Drinking Water Quality Standard များထက်ကျော်လွန်နေကြောင်း စီစစ်တွေ့ရှိရပါသည်။	စီမံကိန်း၏ လုပ်ငန်းဆောင်ရွက်ခြင်းကြောင့် ပတ်ဝန်းကျင်အပေါ် ညစ်ညမ်းမှု မဖြစ်ပေါ်စေရေးအတွက် အဆိုပြု စီမံကိန်းမှ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာပါ လိုက်နာဆောင်ရွက်ရန် ကတိပြုထားသော စံချိန်စံညွှန်းများထက် ကျော်လွန်မှု မရှိစေရေး အလေးထားလုပ်ဆောင်ရန်။	
၃	မြေအရည်အသွေး	မြေအရည်အသွေးတိုင်းတာမှုရလဒ်များအရ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာပါ လိုက်နာဆောင်ရွက်ရန် ကတိပြုထားသည့် Dutch Standard 2000 ပါ စံချိန်စံညွှန်းများထက်ကျော်လွန်ခြင်းမရှိကြောင်း စီစစ်တွေ့ရှိရပါသည်။	သတ်မှတ်စံချိန်စံညွှန်းများထက်ကျော်လွန်မှုမရှိစေရန် ဆက်လက်လုပ်ဆောင်သွားရန်။	
၄	လေအရည်အသွေး	လေအရည်အသွေးတိုင်းတာမှုရလဒ်များအရ ၂၀၁၉ ခုနှစ် ဇူလိုင်လ၏ $PM_{2.5}$(ppm) တွင် Z1AQN, Z2AQN တို့သည် NEQEG	ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ကတိကဝတ်ပြုထားသည့်အတိုင်း NEQEG ထက်ကျော်	

စဉ်	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်ပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီရင်ခံစာပါ စစ်ဆေးတွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
		ပါ 0.025 ppm ထက်ကျော်လွန်နေခြင်း၊ ၂၀၁၉ ခုနှစ် ဩဂုတ်လ၏ SO_2(ppm) တွင် Z1AQN, Z2AQN, Z3AQN, Z4AQN စသည့်နေရာအားလုံးနှင့် ၂၀၁၉ ခုနှစ်စက်တင်ဘာလ၏ SO_2(ppm) တွင် Z1AQN, Z3AQN, Z4AQN စသည့်နေရာ(၃)ခုတွင် NEQEG ပါ 0.02 ppm ထက်ကျော်လွန်နေကြောင်း စိစစ်တွေ့ရှိရပါသည်။	လွန်မှုမရှိစေရန် အစီအစဉ်များ ချမှတ်ဆောင်ရွက်ရန်။	
		လေအရည်အသွေးတိုင်းတာမှုအား မကွေးတိုင်းဒေသကြီးပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာနမှ Haz-Scanner ဖြင့် Z3AQN တည်နေရာတွင် တိုင်းတာခဲ့ရာ ရလဒ်များမှာ နောက်ဆက်တွဲ (ဂ) အတိုင်းဖြစ်ပါသည်။ တိုင်းတာမှုရလဒ်များအရ $PM_{2.5}$ သည် NEQEG ပါ စံနှုန်းထက် ကျော်လွန်နေကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ကတိကဝတ်ပြုထားသည်နှင့်အညီ NEQEG ထက်ကျော်လွန်မှုမရှိစေရန် အစီအစဉ်များ ချမှတ်ဆောင်ရွက်ရန်။	
၅	ဆူညံသံ	ဆူညံသံတိုင်းတာမှုတွင် ၂၀၁၉ ခုနှစ် စက်တင်ဘာလတိုင်းတာမှု ရလဒ်များအရ တိုင်းတာမှုတည်နေရာများဖြစ်သော Z1AQN ၏ နေ့အချိန်၊ ညအချိန်များနှင့် Z4AQN ၏ နေ့အချိန်	စီမံကိန်း၏ လုပ်ငန်းဆောင်ရွက်ခြင်းကြောင့် ပတ်ဝန်းကျင်အပေါ် ညစ်ညမ်းမှု မဖြစ်ပေါ်စေရေးအတွက် အမျိုးသား ပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး	

စဉ်	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်ပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီရင်ခံစာပါ စစ်ဆေးတွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
		တိုင်းတာမှု ရလဒ်များသည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) ပါ စံချိန်စံညွှန်းများထက် ကျော်လွန်နေကြောင်း စိစစ်တွေ့ရှိရပါသည်။	(ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) ပါ စံချိန်စံညွှန်းများထက် ကျော်လွန်မှု မရှိစေရေး အလေးထားလုပ်ဆောင်ရန်။	
၆	သန့်စင်ထားသောလုပ်ငန်းသုံးရေများ စွန့်ပစ်မှု	စီမံကိန်းမှထွက်ပေါ်လာသော လုပ်ငန်းသုံးရေများ၊ ရေနံပိုက်များ သန့်စင်ခြင်းမှ ထွက်ပေါ်လာသော စွန့်ထုတ်ရေများကို အနည်စစ်ကန် အဆင့်ဆင့်ဖြင့် အနည်ထိုင်စေ၍ ရရှိလာသော ရေများကို ရေနံတွင်းများထဲသို့ ပြန်လည်ထည့်သွင်းခြင်း၊ ရေနံပိုက်များသန့်စင်ရာတွင် ပြန်လည်အသုံးပြုခြင်းလုပ်ငန်းများ လုပ်ဆောင်ခြင်းဖြင့် စွန့်ထုတ်ရေလုံးဝ မရှိစေရန် ဆောင်ရွက်လျှက်ရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။	စီမံကိန်းများ အသုံးပြုသော လုပ်ငန်းသုံးရေများအား စွန့်ပစ်ပါက ပတ်ဝန်းကျင် ညစ်ညမ်းမှုမရှိစေရေးအတွက် သတ်မှတ် စံချိန်စံညွှန်းများနှင့်အညီ စွန့်ပစ်ခြင်းအား ဆောင်ရွက်သွားရန်။	
၇	လေထုအတွင်း ဓာတ်ငွေ့ထုတ်လွှတ်မှု	စောင့်ကြပ်ကြည့်ရှုမှုအစီရင်ခံစာပါ တိုင်းတာမှုမှတ်တမ်းများအရ ရေနံတွင်း (၇) တွင်းအား ကျပန်းရွေးချယ်တိုင်းတာရာတွင် (H_2S)	လေထုအတွင်းသို့ ဓာတ်ငွေ့များ ထုတ်လွှတ်မှုမရှိစေရေး ဆက်လက်ဆောင်ရွက်သွားရန်။	

စဉ်	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီအစဉ်ပါ လိုက်နာဆောင်ရွက်ရမည့် အချက်များ	စောင့်ကြပ်ကြည့်ရှုခြင်း အစီရင်ခံစာပါ စစ်ဆေးတွေ့ရှိချက်များ	ဆောင်ရွက်ရန် ကျန်ရှိသည့် အချက်များ	မှတ်ချက်
		ဓာတ်ငွေ့များ လေထုအတွင်းသို့ ထုတ်လွှတ်မှုမရှိကြောင်း စိစစ်တွေ့ရှိရပါသည်။		
၈	စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသော ဒေသခံများအတွက် ဆောင်ရွက်ထားမှု အခြေအနေ	စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသော ဒေသခံများအတွက် ဒေသဖွံ့ဖြိုးရေးလုပ်ငန်းများ၊ ကျန်းမာရေးစောင့်ရှောက်မှုများ၊ စွမ်းဆောင်ရည်မြှင့်သင်တန်းများဆောင်ရွက်ခြင်းအတွက် ၂၀၁၉ ခုနှစ် ဖေဖော်ဝါရီလမှ ဩဂုတ်လအထိ စုစုပေါင်း ၃၄,၂၉၂,၃၃ အမေရိကန် ဒေါ်လာ သုံးစွဲပြီးဖြစ်ကြောင်း စိစစ်တွေ့ရှိရပါသည်။	ဆက်လက်ဆောင်ရွက်သွားရန်။	

(စစ်ဆေးခံသူ)

လက်မှတ် -
အမည် - ဒေါ်နေမျိုးရေမ
ရာထူး - Area manager
ကုမ္ပဏီလိပ်စာ - MPRL E&P

(စစ်ဆေးသူ)

လက်မှတ် -
အမည် - ဦးဝင်းကိုကို
ရာထူး - လက်ထောက်ညွှန်ကြားရေးမှူး
ဌာန - ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန၊ မကွေးတိုင်းဒေသကြီး

မကွေးတိုင်းဒေသကြီး၊ မင်းဘူးမြို့နယ်၊ မန်းရေနံမြေရှိ ရေနံထိန်းသိမ်းမှုအစီအစဉ်တိုးမြှင့်ခြင်းနှင့် ပြန်လည်အထွက်တိုးရေး ဆောင်ရွက်ခြင်းလုပ်ငန်းအတွက် MPRL E&P Pte Ltd. ၏ Z3AQN တည်နေရာတွင် လေအရည်အသွေးတိုင်းတာမှုအား ၂၃-၁၂-၂၀၁၉ ရက်နေ့ ၁၃:၅၀ နာရီမှ ၂၄-၁၂-၂၀၁၉ ရက်နေ့ ၁၃:၅၀ ထိ Haz-Scanner (EPAS) ဖြင့်တိုင်းတာခဲ့မှုရလဒ်များ

No.	Parameters	Averaging Period	Results/ Z3AQN µg/m^3	Guideline Value µg/ m^3	Remark
1	PM_{10}	24-hour	46.75	50	
2	$PM_{2.5}$	24-hour	32.04	25	Above NEQEG
3	NH_3	24-hour	1.34	-	
4	CO	24-hour	0.097	-	
5	H_2S	24-hour	0.011 mg/Nm^3	5 mg/Nm^3	
6	CH_4	24-hour	0	-	
7	NO_2	1-hour	124.18	200	
8	O_3	8-hour daily	11.86	100	
9	RH	24-hour	65.69%	-	
10	Temp	24-hour	69.77 °F	-	

Monitoring Results (Feb 2020)
Annex - C

ပတ်ဝန်းကျင်ရေးရာဓာတ်ခွဲခန်း
Ecological Laboratory

စိမ်းလန်းအမိမြေဖွံ့ဖြိုးတိုးတက်ရေးအသင်း (Advancing Life and Regenerating Motherland, ALARM)

Reference Number/ စာအမှတ်: EL-R /281

Date / နေ့စွဲ: 24 February, 2019

Air Analysis Report /လေတိုင်းတာ စစ်ဆေးမှု အစီအရင်ခံစာ

Air Analysis Info / လေတိုင်းတာမှု အချက်အလက်

လေတိုင်းသည့်နေရာ Sample site:	Z1AQN	လေနမူနာအမှတ်စဉ်Sample I.D.	286	
နေရာ (မြို့နယ်) Location (township)	Located at southwestern park of Pauk Su Village , Pwint Phyu Township	လက်တီတွဒ် Latitude	N 20° 19′ 39.0″	
		လောင်ဂျီတွဒ် Longitude	E 094° 49′ 18.4″	
နေရာ (တိုင်းပြည်နယ်) Location (Region / state)	Magway Region	နည်းစဉ် Method	HAZ-SCANNER ™ Model-EPAS	
		စက် တည် အမြင့်(မြေပြင်မှ) Station height (above ground)	Ground	
တိုင်းတာလိုသူ အမည် Name of customer:	MPRL E&P Pte Ltd	စတင်တိုင်းတာသည့်ချိန် (နေ့၊အချိန်) log on time (Date,Time)	5.2.20	6:15 PM
တိုင်းတာသည့်နေ့စွဲ Air Sampling Testing Date	5.2.2020	တိုင်းတာပြီးသည့်အချိန်(နေ့၊အချိန်) log off time (Date,Time)	6.2.20	6:15 PM
ဆက်သွယ်ရန် လိပ်စာ/ဖုန်း Contact Address/phone	-	တိုင်းတာမှု ကြာချိန် Logging Duration (hours)	24 hours	

Air sampling result / လေထုတိုင်းတာစမ်းသပ်ချက်အဖြေ

စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period		ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၁	နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် Nitrogen dioxide	0.093	ppm	1	year hour	*40 µg/m³ * 200 µg/m³	1-year 1-hour
၂	Particulate matter PM 10	0.038	mg/m3	24	year hours	*20 µg/m³ * 50 µg/m³	1-year 24-hour
၃	Particulate matter PM 2.5	0.021	mg/m3	24	year hours	* 10 µg/m³ * 25 µg/m³	1-year 24 hour
၄	ဆာလဖာဒိုင်အောက်ဆိုဒ် Sulfur Dioxide	0.228	ppm	10	hours mins	* 20 µg/m³ * 500 µg/m³	24-hour 10 minute
၅	ကာဗွန်ဒိုင်အောက်ဆိုဒ် Carbon dioxide	224.65	ppm	24	hour hours	NG	-
၆	ကာဗွန်မိုနောက်ဆိုဒ် Carbon monoxide	0.226	ppm	24	hour hours	NG	-

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စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period		ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၇	ဟိုက်ဒရိုကာဗွန် Hydrocarbon	7.77	ppm	24	hours	NG	-
၈	မီသိန်း Methane	83.12	ppm	24	hours	NG	-
၉	ရေဒီယိုသတ္တိကြွ Atomic Radiation	16.73	CPM	24	hours	NG	-
၁၀	အပူချိန် Temperature	24.68	°C	24	hours	NG	-
၁၁	Volatile Organic Compound (VOC)	0.0004	ppm	24	hours	NG	-
၁၂	လေတိုက်နှုန်း Wind Speed	0.42	m/s	24	hours	NG	-
၁၃	လေတိုက်ရာအရပ် Wind Direction	163.98	Deg	24	hours	NG	-
၁၄	စိုထိုင်းဆ Relative Humidity	52.40	RH%	24	hours	NG	-

* Myanmar Environmental Quality Emission Guideline 2015 NG= No Guideline

မှတ်ချက်။ ။တိုင်းတာသည့်ကြာချိန်သည် သတ်မှတ်စံနှုန်းအချိန်ထက်နည်းပါက အများဆုံးတိုင်းတာခဲ့သည့်အချိန်၏ ပျမ်းမျှရလဒ်ကိုသာဖော်ပြထားပါသည်။

သတ်မှတ်စံနှုန်းအချိန်ထက် ပိုရှိတိုင်းတာထားသောအရည်အသွေးများအတွက် သတ်မှတ်အချိန် ပျမ်းမျှရလဒ်များ၏ အများဆုံးရလဒ်တစ်ခုသာဖော်ပြထားပါသည်။

တိုင်းတာတွက်ချက်သူ
Analyzed by
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Mobile Lab Technician
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ALARM

စစ်ဆေးသူ
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Reference Number/ စာအမှတ်: EL-R /282

Date / နေ့စွဲ: 24 February, 2020

Air Analysis Report /လေတိုင်းတာ စစ်ဆေးမှု အစီအရင်ခံစာ

Air Analysis Info / လေတိုင်းတာမှု အချက်အလက်

လေတိုင်းသည့်နေရာ Sample site:	Z2AQN.	လေနမူနာအမှတ်စဉ်Sample I.D.	287	
နေရာ (မြို့နယ်) Location (township)	Located at eastern part of Kyauk San , Fire station compound, near monastery compound, Mann Oil Field, Minbu Township	လက်တီတွဒ် Latitude	N 20° 15′ 40.6″	
		လောင်ဂျီတွဒ် Longitude	E 094° 50′ 08.0″	
နေရာ (တိုင်းပြည်နယ်) Location (Region / state)	Magway Region	နည်းစဉ် Method	HAZ-SCANNER ™ Model-EPAS	
		စက် တည် အမြင့်(မြေပြင်မှ) Station height (above ground)	Ground	
တိုင်းတာလိုသူ အမည် Name of customer:	MPRL E&P Pte Ltd	စတင်တိုင်းတာသည့်ချိန် (နေ့၊အချိန်) log on time (Date,Time)	6.2.20	7:15 PM
တိုင်းတာသည့်နေ့စွဲ Air Sampling Testing Date	6.2.2020	တိုင်းတာပြီးသည့်အချိန်(နေ့၊အချိန်) log off time (Date,Time)	7.2.20	7:15 PM
ဆက်သွယ်ရန် လိပ်စာ/ဖုန်း Contact Address/phone	-	တိုင်းတာမှု ကြာချိန် Logging Duration (hours)	24 hours	

Air sampling result / လေထုတိုင်းတာစမ်းသပ်ချက်အဖြေ

စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period		ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၁	နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် Nitrogen dioxide	0.062	ppm	1	year hour	*40 µg/m^3 * 200 µg/m^3	1-year 1-hour
၂	Particulate matter PM $_{10}$	0.048	mg/m3	24	year hours	*20 µg/m^3 * 50 µg/m^3	1-year 24-hour
၃	Particulate matter PM $_{2.5}$	0.032	mg/m3	24	year hours	* 10 µg/m^3 * 25 µg/m^3	1-year 24 hour
၄	ဆာလဖာဒိုင်အောက်ဆိုဒ် Sulfur Dioxide	0.016	ppm	10	hours mins	* 20 µg/m^3 * 500 µg/m^3	24-hour 10 minute
၅	ကာဗွန်ဒိုင်အောက်ဆိုဒ် Carbon dioxide	103.96	ppm	24	hour hours	 NG	 -
၆	ကာဗွန်မိုနောက်ဆိုဒ် Carbon monoxide	0.153	ppm	24	hour hours	 NG	 -

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စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period		ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၇	ဟိုက်ဒရိုကာဗွန် Hydrocarbon	6.34	ppm	24	hours	NG	-
၈	မီသိန်း Methane	83.17	ppm	24	hours	NG	-
၉	ရေဒီယိုသတ္တိကြွ Atomic Radiation	16.78	CPM	24	hours	NG	-
၁၀	အပူချိန် Temperature	23.98	°C	24	hours	NG	-
၁၁	Volatile Organic Compound (VOC)	0.00023	ppm	24	hours	NG	-
၁၂	လေတိုက်နှုန်း Wind Speed	0.52	m/s	24	hour hours	NG	-
၁၃	လေတိုက်ရာအရပ် Wind Direction	214.07	Deg	24	hour hours	NG	-
၁၄	စိုထိုင်းဆ Relative Humidity	52.45	RH%	24	hour hours	NG	-

* Myanmar Environmental Quality Emission Guideline 2015 NG= No Guideline

မှတ်ချက်။ ။တိုင်းတာသည့်ကြာချိန်သည် သတ်မှတ်စံနှုန်းအချိန်ထက်နည်းပါက အများဆုံးတိုင်းတာခဲ့သည့်အချိန်၏ ပျမ်းမျှရလဒ်ကိုသာဖော်ပြထားပါသည်။

သတ်မှတ်စံနှုန်းအချိန်ထက် ပိုမိုတိုင်းတာထားသောအရည်အသွေးများအတွက် သတ်မှတ်အချိန် ပျမ်းမျှရလဒ်များ၏ အများဆုံးရလဒ်တစ်ခုသာဖော်ပြထားပါသည်။

တိုင်းတာတွက်ချက်သူ
Analyzed by
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Mobile Lab Technician
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ALARM

စစ်ဆေးသူ
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Reference Number/ စာအမှတ်: EL-R /279

Date / နေ့စွဲ: 24 February, 2020

Air Analysis Report /လေတိုင်းတာ စစ်ဆေးမှု အစီအရင်ခံစာ

Air Analysis Info / လေတိုင်းတာမှု အချက်အလက်

လေတိုင်းသည့်နေရာ Sample site:	Z3AQN	လေနမူနာအမှတ်စဉ်Sample I.D.	284	
နေရာ (မြို့နယ်) Location (township)	In the MPRL E&P Office Compound, south of staff housing, well No.521 also located nearby. Mann Oil Field, Minbu Township	လက်တီတွဒ် Latitude	N 20° 13′ 21.5″	
		လောင်ဂျီတွဒ် Longitude	E 094°51′ 19.6″	
နေရာ (တိုင်းပြည်နယ်) Location (Region / state)	Magway Region	နည်းစဉ် Method	HAZ-SCANNER ™ Model-EPAS	
		စက် တည် အမြင့်(မြေပြင်မှ) Station height (above ground)	Ground	
တိုင်းတာလိုသူ အမည် Name of customer:	MPRL E&P Pte Ltd	စတင်တိုင်းတာသည့်ရိုန် (နေ့၊အချိန်) log on time (Date,Time)	3.2.2020	4:15 PM
တိုင်းတာသည့်နေ့စွဲ Air Sampling Testing Date	3.2.2020	တိုင်းတာပြီးသည့်အရိုန်(နေ့၊အချိန်) log off time (Date,Time)	4.2.2020	4:15 PM
ဆက်သွယ်ရန် လိပ်စာ/ဖုန်း Contact Address/phone	-	တိုင်းတာမှု ကြာရိုန် Logging Duration (hours)	24 hours	

Air sampling result / လေထုတိုင်းတာစမ်းသပ်ချက်အဖြေ

စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period		ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၁	နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် Nitrogen dioxide	0.049	ppm	1	year hour	*40 µg/m³ * 200 µg/m³	1-year 1-hour
၂	Particulate matter PM 10	0.043	mg/m³	24	year hours	*20 µg/m³ * 50 µg/m³	1-year 24-hour
၃	Particulate matter PM 2.5	0.026	mg/m³	24	year hours	* 10 µg/m³ * 25 µg/m³	1-year 24 hour
၄	ဆာလဖာဒိုင်အောက်ဆိုဒ် Sulfur Dioxide	0.012	ppm	10	hours mins	* 20 µg/m³ * 500 µg/m³	24-hour 10 minute
၅	ကာဗွန်ဒိုင်အောက်ဆိုဒ် Carbon dioxide	144.65	ppm	24	hour hours	NG	-
၆	ကာဗွန်မိုနောက်ဆိုဒ် Carbon monoxide	0.158	ppm	24	hour hours	NG	-

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စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period	ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၇	ဟိုက်ဒရိုကာဗွန် Hydrocarbon	4.25	ppm	24 hours	NG	-
၈	မီသိန်း Methane	12.13	ppm	24 hours	NG	-
၉	ရေဒီယိုသတ္တိကြွ Atomic Radiation	17.80	CPM	24 hours	NG	-
၁၀	အပူချိန် Temperature	24.54	°C	24 hours	NG	-
၁၁	Volatile Organic Compound (VOC)	0.0016	ppm	24 hours	NG	-
၁၂	လေတိုက်နှုန်း Wind Speed	0.50	m/s	24 hours	NG	-
၁၃	လေတိုက်ရာအရပ် Wind Direction	210.64	Deg	24 hours	NG	-
၁၄	စိုထိုင်းဆ Relative Humidity	51.40	RH%	24 hours	NG	-

* Myanmar Environmental Quality Emission Guideline 2015 NG= No Guideline

မှတ်ချက်။ ။တိုင်းတာသည့်ကြာချိန်သည် သတ်မှတ်စံနှုန်းအချိန်ထက်နည်းပါက အများဆုံးတိုင်းတာခဲ့သည့်အချိန်၏ ပျမ်းမျှရလဒ်ကိုသာဖော်ပြထားပါသည်။

သတ်မှတ်စံနှုန်းအချိန်ထက် ပိုမိုတိုင်းတာထားသောအရည်အသွေးများအတွက် သတ်မှတ်အချိန် ပျမ်းမျှရလဒ်များ၏ အများဆုံးရလဒ်တစ်ခုသာဖော်ပြထားပါသည်။

တိုင်းတာတွက်ချက်သူ
Analyzed by
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ALARM

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Reference Number/ စာအမှတ်: EL-R /280

Date / နေ့စွဲ: 24 February, 2019

Air Analysis Report /လေတိုင်းတာ စစ်ဆေးမှု အစီအရင်ခံစာ

Air Analysis Info / လေတိုင်းတာမှု အချက်အလက်

လေတိုင်းသည့်နေရာ Sample site:	Z4AQN	လေနမူနာအမှတ်စဉ်Sample I.D.	285	
နေရာ (မြို့နယ်) Location (township)	Located at eastern part of Minbu Town, close to the western bank of Ayeyarwady River, Mann Oil Field, Minbu Township	လက်တီတွဒ် Latitude	N 20° 11′ 41.9″	
		လောင်ဂျီတွဒ် Longitude	E 094° 52′ 32.4″	
နေရာ (တိုင်းပြည်နယ်) Location (Region / state)	Magway Region	နည်းစဉ် Method	HAZ-SCANNER ™ Model-EPAS	
		စက် တည် အမြင့်(မြေပြင်မှ) Station height (above ground)	Ground	
တိုင်းတာလိုသူ အမည် Name of customer:	MPRL E&P Pte Ltd	စတင်တိုင်းတာသည့်ရိုန် (နေ့၊အချိန်) log on time (Date,Time)	4.2.20	4:50 PM
တိုင်းတာသည့်နေ့စွဲ Air Sampling Testing Date	4.2.2020	တိုင်းတာပြီးသည့်အချိန်(နေ့၊အချိန်) log off time (Date,Time)	5.2.20	4:50 PM
ဆက်သွယ်ရန် လိပ်စာ/ဖုန်း Contact Address/phone	-	တိုင်းတာမှု ကြာချိန် Logging Duration (hours)	24 hours	

Air sampling result / လေထုတိုင်းတာစမ်းသပ်ချက်အဖြေ

စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period		ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၁	နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် Nitrogen dioxide	0.062	ppm	1	year hour	*40 µg/m^3 * 200 µg/m^3	1-year 1-hour
၂	Particulate matter PM $_{10}$	0.038	mg/m3	24	year hours	*20 µg/m^3 * 50 µg/m^3	1-year 24-hour
၃	Particulate matter PM $_{2.5}$	0.023	mg/m3	24	year hours	* 10 µg/m^3 * 25 µg/m^3	1-year 24 hour
၄	ဆာလဖာဒိုင်အောက်ဆိုဒ် Sulfur Dioxide	0.048	ppm	10	hours mins	* 20 µg/m^3 * 500 µg/m^3	24-hour 10 minute
၅	ကာဗွန်ဒိုင်အောက်ဆိုဒ် Carbon dioxide	152.69	ppm	24	hour hours	NG	-
၆	ကာဗွန်မိုနောက်ဆိုဒ် Carbon monoxide	0.355	ppm	24	hour hours	NG	-

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ပတ်ဝန်းကျင်ရေးရာဓာတ်ခွဲခန်း
Ecological Laboratory

စိမ်းလန်းအဓိမြေဖွံ့ဖြိုးတိုးတက်ရေးအသင်း (Advancing Life and Regenerating Motherland, ALARM)

စဉ် No.	အရည်အသွေး Parameter	ရလဒ် Results	ယူနစ် Unit	ပျမ်းမျှကာလ Avg. Period		ထုတ်လွှတ်မှုစံနှုန်း Guideline Value	ပျမ်းမျှကာလ Avg. Period
၇	ဟိုက်ဒရိုကာဗွန် Hydrocarbon	4.24	ppm	24	hours	NG	-
၈	မီသိန်း Methane	12.84	ppm	24	hours	NG	-
၉	ရေဒီယိုသတ္တိကြွ Atomic Radiation	17.83	CPM	24	hours	NG	-
၁၀	အပူချိန် Temperature	20.56	°C	24	hours	NG	-
၁၁	Volatile Organic Compound (VOC)	0.0012	ppm	24	hours	NG	-
၁၂	လေတိုက်နှုန်း Wind Speed	0.63	m/s	24	hours	NG	-
၁၃	လေတိုက်ရာအရပ် Wind Direction	184.18	Deg	24	hours	NG	-
၁၄	စိုထိုင်းဆ Relative Humidity	58.44	RH%	24	hours	NG	-

* Myanmar Environmental Quality Emission Guideline 2015 NG= No Guideline

မှတ်ချက်။ ။တိုင်းတာသည့်ကြာချိန်သည် သတ်မှတ်စံနှုန်းအချိန်ထက်နည်းပါက အများဆုံးတိုင်းတာခဲ့သည့်အချိန်၏ ပျမ်းမျှရလဒ်ကိုသာဖော်ပြထားပါသည်။

သတ်မှတ်စံနှုန်းအချိန်ထက် ပိုမိုတိုင်းတာထားသောအရည်အသွေးများအတွက် သတ်မှတ်အချိန် ပျမ်းမျှရလဒ်များ၏ အများဆုံးရလဒ်တစ်ခုသာဖော်ပြထားပါသည်။

တိုင်းတာတွက်ချက်သူ
Analyzed by

Sa Aung Thet Oo
Mobile Lab Technician
Ecological Laboratory
ALARM

စစ်ဆေးသူ
Checked by

Dr. Aye Ayn Vin
Laboratory In-Charge
Ecological Laboratory
(ALARM)

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Monitoring Time	Noise Stations (February 3.2.2020 to 7.2.2020)			
	Z1AQN	Z2AQN	Z3AQN	Z4AQN
6:00-7:00	52	56	64	60
7:00-8:00	52	59	65	61
8:00:9:00	54	56	62	55
9:00-10:00	50	55	65	56
10:00-11:00	46	52	61	58
11:00-12:00	43	53	60	49
12:00-13:00	43	51	57	52
13:00-14:00	42	49	57	51
14:00-15:00	43	47	62	56
15:00-16:00	47	44	50	52
16:00-17:00	45	47	50	52
17:00-18:00	53	45	49	50
18:00-19:00	51	49	59	50
19:00-20:00	51	57	59	50
20:00-21:00	49	53	58	50
21:00-22:00	46	52	58	50
Day L_{Aeq}	47.9375	51.5625	58.5	53.25
22:00-23:00	46	50	58	49
23:00-24:00	45	49	58	49
24:00-1:00	44	48	58	49
1:00-2:00	43	48	57	49
2:00-3:00	44	49	57	50
3:00-4:00	44	48	57	50
4:00-5:00	47	50	58	47
5:00-6:00	48	53	59	49
Night L_{Aeq}	45.125	49.375	57.75	49

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0003 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-003
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z1SW1
Sample/Site Name	:	Mone Creek, Near the Pauk Su Village, Pwint Phyu Township
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Pwint Phyu

Detail Sampling Information

Latitude	:	N 20°19'47.67	Sampling/Testing Date & Time	:	6.2.2020 / 9:41 AM
Longitude	:	E 94°49'06.88			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.58	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	22.4	°C	-	< +3* [d]	-
3	Total Dissolved Solids	223	mg/L	≤500[b]	≤2000 [d]	-
4	Electrical Conductivity	0.428	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	7.28	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00395 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00382
Sample Name : **Z1SW-1**
Sample Type / Source : **Raw**
Sampling Date & Time : **06-02-20**
Sample Location : **Mone Chaung, near Pauk Su Village**
Latitude : **20°19' 47.67'N**
Longitude : **94°49' 6.88'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.4**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**<5**	**FAU**	≤5 (b)	Clear
3	Apparent Colour	**0**	**HU**	-	-
4	Alkalinity	**540**	**mg/L**	-	-
5	Hardness	**190**	**mg/L**	≤500 (c)	-
6	BOD5	**3.5**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.13**	**mg/L**	-	-
10	Oil & Grease	**6**	**mg/L**	-	-
11	TSS	**0**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0004 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E& P Pte (Mann Oil Field)
Client ID	:	LC-01-004
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z1SW2
Sample/Site Name	:	Mone Creek, Near the Pauk Su Village, Pwint Phyu Township
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Pwint Phyu

Detail Sampling Information

Latitude	:	N 20°19'57.80	Sampling/Testing Date & Time	:	6.2.2020 / 10:00 AM
Longitude	:	E 94°49'10.19			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.94	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	23.2	°C	-	< +3*[d]	-
3	Total Dissolved Solids	223	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	0.430	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	6.98	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00396 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00383
Sample Name : **Z1SW-2**
Sample Type / Source : **Raw**
Sampling Date & Time : **06-02-20**
Sample Location : **Mone Chaung, about 320 m downstream of Z1SW-1**
Latitude : **20°19' 57.80'N**
Longitude : **94°49' 10.19'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.4**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**<5**	**FAU**	≤5 (b)	Clear
3	Apparent Colour	**0**	**HU**	-	-
4	Alkalinity	**330**	**mg/L**	-	-
5	Hardness	**140**	**mg/L**	≤500 (c)	-
6	BOD5	**3.6**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.15**	**mg/L**	-	-
10	Oil & Grease	**5**	**mg/L**	-	-
11	TSS	**0**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Laboratory In-Charge Ecological Laboratory (ALARM)

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ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0007 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-007
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z2SW1
Sample/Site Name	:	Mann Creek, Near the Kyauk San Village, Minbu Township
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°15'29.55	Sampling/Testing Date & Time	:	6.2.2020 / 1:41 PM
Longitude	:	E 94°50'01.86			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.74	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	26.6	°C	-	< +3*[d]	-
3	Total Dissolved Solids	183	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	0.351	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	7.31	mg/L	-	-	-

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Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Htun Aye Win Laboratory Incharge Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00397 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00384
Sample Name : **Z2SW-1**
Sample Type / Source : **Raw**
Sampling Date & Time : **06-02-20**
Sample Location : **Mann Chaung, near Kyauksan Village**
Latitude : **20°15' 29.55'N**
Longitude : **94°50' 1.86'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.3**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**<5**	**FAU**	≤5 (b)	Clear
3	Apparent Colour	**0**	**HU**	-	-
4	Alkalinity	**320**	**mg/L**	-	-
5	Hardness	**120**	**mg/L**	≤500 (c)	-
6	BOD5	**<3**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.12**	**mg/L**	-	-
10	Oil & Grease	**3**	**mg/L**	-	-
11	TSS	**0**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Kyaw Lwin Laboratory In-Charge Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0008 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-008
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z2SW2
Sample/Site Name	:	Mann Creek, Near the Kyauk San Village, Minbu Township
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°15' 33.13	Sampling/Testing Date & Time	:	6.2.2020 / 1:28 PM
Longitude	:	E 94°50'03.93			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.67	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	26.4	°C	-	< +3*[d]	-
3	Total Dissolved Solids	183	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	0.352	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	7.30	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00398 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00385
Sample Name : **Z2SW-2**
Sample Type / Source : **Raw**
Sampling Date & Time : **06-02-20**
Sample Location : **Mann Chaung, about 120 m, Downstream of Z2SW-1**
Latitude : **20°15' 33.13'N**
Longitude : **94°50' 3.93'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.3**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**<5**	**FAU**	≤5 (b)	Clear
3	Apparent Colour	**0**	**HU**	-	-
4	Alkalinity	**420**	**mg/L**	-	-
5	Hardness	**140**	**mg/L**	≤500 (c)	-
6	BOD5	**3.5**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.1**	**mg/L**	-	-
10	Oil & Grease	**4**	**mg/L**	-	-
11	TSS	**0**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. [illegible] Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0011 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-011
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z3SW1
Sample/Site Name	:	Mann Creek, near the Kywegya Village, Minbu Township
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°14'46.51	Sampling/Testing Date & Time	:	5.2.2020 / 9:02 AM
Longitude	:	E 94°51'0.27			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	6.13	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	22.1	°C	-	< +3* [d]	-
3	Total Dissolved Solids	220	mg/L	≤500[b]	≤2000 [d]	-
4	Electrical Conductivity	0.419	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	6.60	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Kyaw Thu Sein Assistant Technician Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00379 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **06-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00374
Sample Name : **Z3SW-1**
Sample Type / Source : **Raw**
Sampling Date & Time : **05-02-20**
Sample Location : **Mann Chaung near Kywegyi Village**
Latitude : **20°1446.51N**
Longitude : **94°510.27E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.3**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**10**	**FAU**	≤5 (b)	Turbid
3	Apparent Colour	**40**	**HU**	-	-
4	Alkalinity	**158**	**mg/L**	-	-
5	Hardness	**130**	**mg/L**	≤500 (c)	-
6	BOD5	**<3**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**12**	**mg/L**	-	-
9	Total Phosphorous	**0.08**	**mg/L**	-	-
10	Oil & Grease	**4**	**mg/L**	-	-
11	TSS	**6**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Myo Win Laboratory In-Charge Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0012 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-012
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z3SW2
Sample/Site Name	:	Mann Creek, near the Kywegya Village, Minbu Township
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°14' 45.74	Sampling/Testing Date & Time	:	5.2.2020 / 9:17 AM
Longitude	:	E 94°51'01.87			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	6.41	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	21.9	°C	-	< +3*[d]	-
3	Total Dissolved Solids	190	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	0.365	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	7.01	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078
Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00380 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **06-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00375
Sample Name : **Z3SW-2**
Sample Type / Source : **Raw**
Sampling Date & Time : **05-02-20**
Sample Location : **Mann Chaung about 50 M Downstream of Z3SW-1**
Latitude : **20°14'45.741N**
Longitude : **94°51'1.87 E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	0.3	mS/cm	≤2.5 (b)	Normal
2	Turbidity	11	FAU	≤5 (b)	Turbid
3	Apparent Colour	43	HU	-	-
4	Alkalinity	152	mg/L	-	-
5	Hardness	140	mg/L	≤500 (c)	-
6	BOD5	3.2	mg/L	-	-
7	COD	<30	mg/L	-	-
8	Total Nitrogen	5	mg/L	-	-
9	Total Phosphorous	0.1	mg/L	-	-
10	Oil & Grease	4	mg/L	-	-
11	TSS	3	mg/L	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw Myat Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0014 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-014
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z4SW1
Sample/Site Name	:	Near western bank of Ayeyarwady river, North of Minbu Township
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°11'41.31	Sampling/Testing Date & Time	:	5.2.2020 / 7:37 AM
Longitude	:	E 94°52'41.11			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

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Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.28	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	20.6	°C	-	< +3*[d]	-
3	Total Dissolved Solids	116	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	0.223	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	6.23	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Kyaw Thu Sein Assistant Technician Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00381 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **06-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00376
Sample Name : **Z4SW-1**
Sample Type / Source : **Raw**
Sampling Date & Time : **05-02-20**
Sample Location : **Near West Bank of Ayeyarwaddy River Minbu Tsp**
Latitude : **20°14' 46.51" N**
Longitude : **94°52' 41.11' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.2**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**19**	**FAU**	≤5 (b)	Turbid
3	Apparent Colour	**114**	**HU**	-	-
4	Alkalinity	**109**	**mg/L**	-	-
5	Hardness	**60**	**mg/L**	≤500 (c)	-
6	BOD5	**<3**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.07**	**mg/L**	-	-
10	Oil & Grease	**5**	**mg/L**	-	-
11	TSS	**19**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aung Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0015 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E& P Pte (Mann Oil Field)
Client ID	:	LC-01-015
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z4SW2
Sample/Site Name	:	Ayeyarwady river, about 90 m downstream of Z4SW-1
Water Type / Source	:	Surface Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°11′ 38.80	Sampling/Testing Date & Time	:	5.2.2020 / 8:00 AM
Longitude	:	E 94°52′42.50			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.25	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	20.5	°C	-	< +3* [d]	-
3	Total Dissolved Solids	117	mg/L	≤500[b]	≤2000 [d]	-
4	Electrical Conductivity	0.228	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	5.2	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00382 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **06-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00377
Sample Name : **Z4SW-2**
Sample Type / Source : **Raw**
Sampling Date & Time : **05-02-20**
Sample Location : **Ayeyarwaddy River about 90 M Downstream Z4SW-1**
Latitude : **20°11' 38.80' N**
Longitude : **94°52' 42.50'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.2**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**18**	**FAU**	≤5 (b)	Turbid
3	Apparent Colour	**109**	**HU**	-	-
4	Alkalinity	**105**	**mg/L**	-	-
5	Hardness	**90**	**mg/L**	≤500 (c)	-
6	BOD5	**<3**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.14**	**mg/L**	-	-
10	Oil & Grease	**3**	**mg/L**	-	-
11	TSS	**16**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0001 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-001
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z1GW1
Sample/Site Name	:	Tube well located in Pauk Su village, Pwint Phyu Township
Water Type / Source	:	Well Water
Sample/Site Location	:	Mann Field , Pwint Phyu

Detail Sampling Information

Latitude	:	N 20°19'40.01	Sampling/Testing Date & Time	:	6.2.2020 / 9:09 AM
Longitude	:	E 94°49'18.27			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.25	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	25.7	°C	-	< +3*[d]	-
3	Total Dissolved Solids	296	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	0.569	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	2.82	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00399 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00386
Sample Name : **Z1GW-1**
Sample Type / Source : **Ground**
Sampling Date & Time : **06-02-20**
Sample Location : **Tube well in Pauk Su Village, Pwint Phyu Tsp**
Latitude : **20˚19' 40.01'N**
Longitude : **94˚49' 18.27'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	0.5	mS/cm	≤2.5 (b)	Normal
2	Turbidity	<5	FAU	≤5 (b)	Clear
3	Apparent Colour	0	HU	-	-
4	Alkalinity	510	mg/L	-	-
5	Hardness	230	mg/L	≤500 (c)	-
6	BOD5	<3	mg/L	-	-
7	COD	<30	mg/L	-	-
8	Total Nitrogen	<5	mg/L	-	-
9	Total Phosphorous	0.27	mg/L	-	-
10	Oil & Grease	3	mg/L	-	-
11	TSS	0	mg/L	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0002 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E& P Pte (Mann Oil Field)
Client ID	:	LC-01-002
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z1GW2
Sample/Site Name	:	Tube well located in Pauk Su village, Pwint Phyu Township
Water Type / Source	:	Well Water
Sample/Site Location	:	Mann Field , Pwint Phyu

Detail Sampling Information

Latitude	:	N 20°19'45.22	Sampling/Testing Date & Time	:	6.2.2020 / 10:20 AM
Longitude	:	E 94°49'20.51			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.35	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	27.8	°C	-	< +3* [d]	-
3	Total Dissolved Solids	341	mg/L	≤500[b]	≤2000 [d]	-
4	Electrical Conductivity	0.655	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	8.25	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078

Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00400 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00387
Sample Name : **Z1GW-2**
Sample Type / Source : **Ground**
Sampling Date & Time : **06-02-20**
Sample Location : **Tube well in Pauk Su Village, Pwint Phyu Tsp**
Latitude : **20°19' 47.67'N**
Longitude : **94°49' 6.88'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.6**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**<5**	**FAU**	≤5 (b)	Clear
3	Apparent Colour	**0**	**HU**	-	-
4	Alkalinity	**790**	**mg/L**	-	-
5	Hardness	**230**	**mg/L**	≤500 (c)	-
6	BOD5	**4.2**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.46**	**mg/L**	-	-
10	Oil & Grease	**5**	**mg/L**	-	-
11	TSS	**0**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Laboratory Technician Ecological Laboratory (ALARM)

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0005 Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-005
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z2GW1
Sample/Site Name	:	Tube well located in Kyauk san village, Minbu Township
Water Type / Source	:	Well Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°15'38.43	Sampling/Testing Date & Time	:	6.2.2020 / 1:02 PM
Longitude	:	E 94°49'59.29			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.38	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	31.0	°C	-	< +3* [d]	-
3	Total Dissolved Solids	483	mg/L	≤500[b]	≤2000 [d]	-
4	Electrical Conductivity	0.928	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	7.41	mg/L	-	-	-

"ND" = Not Detected "LOD" = Lower limit of detection " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078

Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00401 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00388
Sample Name : **Z2GW-1**
Sample Type / Source : **Ground**
Sampling Date & Time : **06-02-20**
Sample Location : **Tube well in Kyauk San Village, Minbu Tsp**
Latitude : **20°15' 38.43'N**
Longitude : **94°49' 59.29'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	0.9	mS/cm	≤2.5 (b)	Normal
2	Turbidity	<5	FAU	≤5 (b)	Clear
3	Apparent Colour	0	HU	-	-
4	Alkalinity	560	mg/L	-	-
5	Hardness	140	mg/L	≤500 (c)	-
6	BOD5	<3	mg/L	-	-
7	COD	<30	mg/L	-	-
8	Total Nitrogen	<5	mg/L	-	-
9	Total Phosphorous	0.13	mg/L	-	-
10	Oil & Grease	4	mg/L	-	-
11	TSS	0	mg/L	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. [illegible] Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0006 Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-006
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z2GW2
Sample/Site Name	:	Tube well located in Kyauk san village, Minbu Township
Water Type / Source	:	Well Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°15'39.50	Sampling/Testing Date & Time	:	6.2.2020 / 1:10 PM
Longitude	:	E 94°50'05.51			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.58	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	31.7	°C	-	< +3* [d]	-
3	Total Dissolved Solids	334	mg/L	≤500[b]	≤2000 [d]	-
4	Electrical Conductivity	0.642	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	7.02	mg/L	-	-	-

"ND" = Not Detected "LOD" = Lower limit of detection " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00402 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **10-02-20**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00389
Sample Name : **Z2GW-2**
Sample Type / Source : **Ground**
Sampling Date & Time : **06-02-20**
Sample Location : **Tube well in Kyauk San Village, Minbu Tsp**
Latitude : **20°15' 39.50'N**
Longitude : **94°50' 5.51'E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	0.4	mS/cm	≤2.5 (b)	Normal
2	Turbidity	<5	FAU	≤5 (b)	Clear
3	Apparent Colour	0	HU	-	-
4	Alkalinity	420	mg/L	-	-
5	Hardness	120	mg/L	≤500 (c)	-
6	BOD5	<3	mg/L	-	-
7	COD	<30	mg/L	-	-
8	Total Nitrogen	<5	mg/L	-	-
9	Total Phosphorous	0.3	mg/L	-	-
10	Oil & Grease	5	mg/L	-	-
11	TSS	0	mg/L	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Myint Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0009 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-009
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z3GW1
Sample/Site Name	:	Tube well located in the Kywegya Village, Minbu Township
Water Type / Source	:	Well Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°15'5.35	Sampling/Testing Date & Time	:	5.2.2020 / 10:05 AM
Longitude	:	E 94°50'54.52			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.47	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	29.6	°C	-	< +3*[d]	-
3	Total Dissolved Solids	1080	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	2.076	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	6.00	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078

Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00383 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00378
Sample Name : **S3GW-1**
Sample Type / Source : **Ground**
Sampling Date & Time : **06-02-20**
Sample Location : **Tube Well in Kywe Gya Village, Minbu Tsp**
Latitude : **20°15' 5.35'N**
Longitude : **94°50' 54.52' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	2	mS/cm	≤2.5 (b)	Normal
2	Turbidity	<5	FAU	≤5 (b)	Clear
3	Apparent Colour	0	HU	-	-
4	Alkalinity	350	mg/L	-	-
5	Hardness	130	mg/L	≤500 (c)	-
6	BOD5	<3	mg/L	-	-
7	COD	<30	mg/L	-	-
8	Total Nitrogen	<5	mg/L	-	-
9	Total Phosphorous	0.12	mg/L	-	-
10	Oil & Grease	3	mg/L	-	-
11	TSS	0	mg/L	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Laboratory In-Charge Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0010 | Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-010
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z3GW2
Sample/Site Name	:	Tube well located in Kyauk san village, Minbu Township
Water Type / Source	:	Well Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°15'06.44	Sampling/Testing Date & Time	:	5.2.2020 / 9:45 AM
Longitude	:	E 94°50'53.77			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	6.78	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	29.5	°C	-	< +3*[d]	-
3	Total Dissolved Solids	560	mg/L	≤500[b]	≤2000[d]	-
4	Electrical Conductivity	1.076	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	6.29	mg/L	-	-	-

"ND" = Not Detected | "LOD" = Lower limit of detection | " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078

Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00384 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose :

Sample Information

Sample ID : WS-20-00379
Sample Name : **Z3GW-2**
Sample Type / Source : **Ground**
Sampling Date & Time : **06-02-20**
Sample Location : **Tube Well in Kywe Gya Village , Minbu Tsp**
Latitude : **20°15' 6.44' N**
Longitude : **94°50' 53.77' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	**0.9**	**mS/cm**	≤2.5 (b)	Normal
2	Turbidity	**<5**	**FAU**	≤5 (b)	Clear
3	Apparent Colour	**0**	**HU**	-	-
4	Alkalinity	**500**	**mg/L**	-	-
5	Hardness	**220**	**mg/L**	≤500 (c)	-
6	BOD5	**<3**	**mg/L**	-	-
7	COD	**<30**	**mg/L**	-	-
8	Total Nitrogen	**<5**	**mg/L**	-	-
9	Total Phosphorous	**0.21**	**mg/L**	-	-
10	Oil & Grease	**3**	**mg/L**	-	-
11	TSS	**0**	**mg/L**	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw Myat Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. [illegible] Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Sampling/Field Testing Result Report

Report Number : EL-FR / 0013 Date :February 9, 2020

Client Information

Client Name	:	MPRL Co.Ltd
Organization	:	MPRL E&P Pte (Mann Oil Field)
Client ID	:	LC-01-013
Contact	:	
Testing Purpose	:	Monitoring

Sample/Site Information

Sample ID	:	Z4GW2
Sample/Site Name	:	Well located in the Shwe war gone ward, Minbu Township
Water Type / Source	:	Well Water
Sample/Site Location	:	Mann Field , Minbu

Detail Sampling Information

Latitude	:	N 20°11'29.50	Sampling/Testing Date & Time	:	5.2.2020 / 8:00 AM
Longitude	:	E 94°52'27.85			
Type of Sampling	:	Grab	Collecting Method	:	Collecting Vessels and Sampler
			Filtration Status	:	Not Filter
Mixing Method	:	None	Filling Method	:	Fully Filled with no air space
Sample Volume	:	1 L	Container Type	:	Plastic and Glass
Water Odor	:	No odor	Sterilization Status	:	Not
Water Color	:	Normal	Preservation Method	:	Cooled in Ice-Box & Chemical
Raining Condition	:	No Rain	Preservation Chemicals	:	HCl (5%) / -

Field Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.

This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameter	Results	Unit	Drinking Standard	Emission Standard	Remark
1	pH	7.40	S.U	6.5 – 8.5[b]	6.0 – 9.0[d]	-
2	Temperature	24.4	°C	-	< +3* [d]	-
3	Total Dissolved Solids	9208	mg/L	≤500[b]	≤2000 [d]	-
4	Electrical Conductivity	5.985	mS/cm	≤2.5[b]	-	-
5	Dissolved Oxygen	8.02	mg/L	-	-	-

"ND" = Not Detected "LOD" = Lower limit of detection " - " = No Reference Standard

Tested by		Approved by
Zaw Winn Kyaw Assistant Technician (II) Ecological Laboratory ALARM		Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Tsp., Yangon. Tel: 01-503301, 01-503302, 09-407496078

Email: aelab@alarmmyanmar.org , websites: www.alarmmyanmar.org

ALARM Ecological Laboratory
Water Testing Result Report

Report Number : EL-WR-20-00385 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : WS-20-00380
Sample Name : **Z4GW-2**
Sample Type / Source : **Ground**
Sampling Date & Time : **06-02-20**
Sample Location : **Well in Shwe War Gone Ward, Minbu Tsp**
Latitude : **20°11' 29.50" N**
Longitude : **94°52' 27.85" E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Drinking Standards	Remarks
1	Conductivity	1	mS/cm	≤2.5 (b)	Normal
2	Turbidity	<5	FAU	≤5 (b)	Clear
3	Apparent Colour	0	HU	-	-
4	Alkalinity	1150	mg/L	-	-
5	Hardness	470	mg/L	≤500 (c)	-
6	BOD5	3.2	mg/L	-	-
7	COD	<30	mg/L	-	-
8	Total Nitrogen	<5	mg/L	-	-
9	Total Phosphorous	0.3	mg/L	-	-
10	Oil & Grease	6	mg/L	-	-
11	TSS	0	mg/L	-	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Laboratory Incharge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory
Soil Testing Result Report

Report Number : EL-WR-20-00387 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Mornitoring**

Sample Information

Sample ID : SS-20-00016
Sample Name : **Z1S-1**
Sample Type / Source : **Soil Sample**
Sampling Date & Time : **06-02-20**
Sample Location : **At West of Pauk Su Village, Pwint Phyu Tsp**
Latitude : **20˚19'45.30' N**
Longitude : **94˚49' 13.99' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	**7.2**	**S.U**	-	-
2	Lead	**<5**	**mg/kg**	≤300 (d)	-
3	Cadmium	**<0.5**	**mg/kg**	≤ 39 (d)	-
4	Copper	**9**	**mg/kg**	≤ 1500 (d)	-

"ND"= Not Detected | "LOD"= Lower limit of detection | "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory	Ecological Laboratory

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Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory

Soil Testing Result Report

Report Number : EL-WR-20-00388 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : SS-20-00017
Sample Name : **Z1S-2**
Sample Type / Source : **Soil Sample**
Sampling Date & Time : **06-02-20**
Sample Location : **At Pauk Su Village, Pwint Phyu Tsp**
Latitude : **20°19' 45.38' N**
Longitude : **94°49' 21.05' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	**7.5**	**S.U**	-	-
2	Lead	**<5**	**mg/kg**	≤300 (d)	-
3	Cadmium	**<0.5**	**mg/kg**	≤ 39 (d)	-
4	Copper	**12**	**mg/kg**	≤ 1500 (d)	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aye Aye Win Laboratory In-Charge Ecological Laboratory (ALARM)

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Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory
Soil Testing Result Report

Report Number : EL-WR-20-00389 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : SS-20-00018
Sample Name : **Z2S-1**
Sample Type / Source : **Soil Sample**
Sampling Date & Time : **06-02-20**
Sample Location : **In the Paddy Field Located at the East Kauk San Village, Minbu Tsp**
Latitude : **20°15' 41.70' N**
Longitude : **94°50' 8.41' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	6.8	S.U	-	-
2	Lead	<5	mg/kg	≤300 (d)	-
3	Cadmium	<0.5	mg/kg	≤ 39 (d)	-
4	Copper	8	mg/kg	≤ 1500 (d)	-

"ND"= Not Detected | "LOD"= Lower limit of detection | "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory	Daw Lin Myat Myat Aung Lab. Technician I	Dr. Aung Myin Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Soil Testing Result Report

Report Number : EL-WR-20-00390 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : SS-20-00019
Sample Name : **Z2S-2**
Sample Type / Source : **Soil Sample**
Sampling Date & Time : **06-02-20**
Sample Location : **At the East Kauk San Village, Minbu Tsp**
Latitude : **20°15' 40.05' N**
Longitude : **94°50' 10.40' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	7.1	S.U	-	-
2	Lead	<5	mg/kg	≤300 (d)	-
3	Cadmium	<0.5	mg/kg	≤ 39 (d)	-
4	Copper	9	mg/kg	≤ 1500 (d)	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. [illegible] Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org website: www.alarmmyanmar.org

ALARM Ecological Laboratory
Soil Testing Result Report

Report Number : EL-WR-20-00391 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : SS-20-00020
Sample Name : **Z3S-1**
Sample Type / Source : **Soil Sample**
Sampling Date & Time : **06-02-20**
Sample Location : **In the Compound of MPRL E&P Office Minbu TSp**
Latitude : **20°13' 22.04' N**
Longitude : **94°51' 19.59' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	7.7	S.U	-	-
2	Lead	<5	mg/kg	≤300 (d)	-
3	Cadmium	<0.5	mg/kg	≤ 39 (d)	-
4	Copper	5	mg/kg	≤ 1500 (d)	-

"ND"= Not Detected | "LOD"= Lower limit of detection | "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. [illegible] Laboratory In-Charge Ecological Laboratory (ALARM)

Building A-2, Kan Street, Hlaing Township, Yangon, Myanmar.Tel: 01-503301, 01-503302, 09 407496078
Email: aelab@alarmmyanmar.org| website: www.alarmmyanmar.org

ALARM Ecological Laboratory
Soil Testing Result Report

Report Number : EL-WR-20-00392 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : SS-20-00021
Sample Name : **Z3S-2**
Sample Type / Source : **Soil Sample**
Sampling Date & Time : **06-02-20**
Sample Location : **In the Compound of MPRL E&P Office Minbu TSp**
Latitude : **20°13' 2.60' N**
Longitude : **94°51' 14.86' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	**7.1**	**S.U**	-	-
2	Lead	**<5**	**mg/kg**	≤300 (d)	-
3	Cadmium	**<0.5**	**mg/kg**	≤ 39 (d)	-
4	Copper	**6**	**mg/kg**	≤ 1500 (d)	-

"ND"= Not Detected | "LOD"= Lower limit of detection | "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory	Dr. Aung Win Laboratory In-Charge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Soil Testing Result Report

Report Number : EL-WR-20-00393 **Date** : 26-02-20

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : SS-20-00022
Sample Name : **Z4S-1**
Sample Type / Source : **Soil Sample**
Sampling Date & Time : **06-02-20**
Sample Location : **Near Western Bank of Ayeyarwaddy River Norht of Minbu Tsp**
Latitude : **20°19'45.30' N**
Longitude : **94°49' 13.99' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	**6.5**	**S.U**	-	-
2	Lead	**5**	**mg/kg**	≤300 (d)	-
3	Cadmium	**<0.5**	**mg/kg**	≤ 39 (d)	-
4	Copper	**8**	**mg/kg**	≤ 1500 (d)	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. Aung Win Laboratory Incharge Ecological Laboratory (ALARM)

ALARM Ecological Laboratory
Soil Testing Result Report

Report Number : EL-WR-20-00394 **Date : 26-02-20**

Client Information

Client Name : **MPRL E&P Pte Ltd**
Organization : **MPRL E&P Pte Ltd**
Client ID : **LC-12-001**
Registration Date & Time : **05-02-20** **3:01PM**
Contact : **9449001927**
Testing Purpose : **Monitoring**

Sample Information

Sample ID : SS-20-00023
Sample Name : **Z4S-2**
Sample Type / Source : **soil sample**
Sampling Date & Time : **06-02-20**
Sample Location : **Near Western Bank of Ayeyarwaddy River Norht of Minbu Tsp**
Latitude : **20°11' 45.77' N**
Longitude : **94°52' 38.30' E**

Testing Results

This laboratory analysis report is based solely on the sample submitted by the client unless client took our sampling service.
This report shall not be reproduced except in full, without written approval of the laboratory

Sr.	Quality Parameters	Results	Units	Compose Standards	Remarks
1	pH	**7.6**	**S.U**	-	-
2	Lead	**<5**	**mg/kg**	≤300 (d)	-
3	Cadmium	**<0.5**	**mg/kg**	≤ 39 (d)	-
4	Copper	**8**	**mg/kg**	≤ 1500 (d)	-

"ND"= Not Detected "LOD"= Lower limit of detection "-" = No Reference Standard

Tested by	Checked by	Approved by
Daw May Myat Khine Lab. Technician II Ecological Laboratory ALARM	Daw Lin Myat Myat Aung Lab. Technician I Ecological Laboratory ALARM	Dr. [illegible] Laboratory In-Charge Ecological Laboratory (ALARM)

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ဇမြ

RESULT

Sample No.		1278/19-20
Job No.		J-1278
Sample Marked.		Z1S1
Iron as Fe	(%)	13.10
Zinc as Zn	(%)	0.27
Manganese as Mn	(%)	0.07
Arsenic as As	(mg/kg)	<0.005

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only.*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Daw Htike Htike Oo

Checked by: Dr. Khin Aye Tue

FOR
Technical Director: U Win Khaing Moe

Our Reference: SS3

Date: 3.3.2020

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ငမြ

RESULT

Sample No.		1279/19-20
Job No.		J-1279
Sample Marked.		Z1S2
Iron as Fe	(%)	13.62
Zinc as Zn	(%)	0.06
Manganese as Mn	(%)	0.07
Arsenic as As	(mg/kg)	<0.005

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Daw Htike Htike Oo

Checked by: Dr. Khin Aye Tue

FOR
Technical Director: U Win Khaing Moe

Our Reference: 553

Date: 3-3-2020

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ဇမ္ဗု

RESULT

Sample No.		1280/19-20
Job No.		J-1280
Sample Marked.		Z2S1
Iron as Fe	(%)	13.35
Zinc as Zn	(%)	0.05
Manganese as Mn	(%)	0.06
Arsenic as As	(mg/kg)	<0.005

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only.*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Checked by: Dr. Khin Aye Tue

Daw Htike Htike Oo

FOR
Technical Director: U Win Khaing Moe

Our Reference: SS3

Date: 3-3-2020

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ငမြ

RESULT

Sample No.		1281/19-20
Job No.		J-1281
Sample Marked.		Z2S2
Iron as Fe	(%)	12.22
Zinc as Zn	(%)	0.05
Manganese as Mn	(%)	0.06
Arsenic as As	(mg/kg)	<0.005

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Daw Htike Htike Oo

Checked by: Dr. Khin Aye Tue

FOR

Technical Director: U Win Khaing Moe

Our Reference: SS3

Date: 3-3-2020

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ငမြ

RESULT

Sample No.		1282/19-20
Job No.		J-1282
Sample Marked.		Z3S1
Iron as Fe	(%)	8.94
Zinc as Zn	(%)	0.34
Manganese as Mn	(%)	0.10
Arsenic as As	(mg/kg)	0.03

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only.*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Daw Htike Htike Oo

Checked by: Dr. Khin Aye Tun

FOR
Technical Director: U Win Khaing Moe

Our Reference: 553

Date: 3-3-2020

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ဇမြ

RESULT

Sample No.		1283/19-20
Job No.		J-1283
Sample Marked.		Z3S2
Iron as Fe	(%)	9.03
Zinc as Zn	(%)	0.39
Manganese as Mn	(%)	0.13
Arsenic as As	(mg/kg)	<0.005

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only.*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Daw Htike Htike Oo

Checked by: Dr. Khin Aye Tue

Technical Director: U Win Khaing Moe

Our Reference: 553

Date: 3-3-2020

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ငမြ

RESULT

Sample No.		1284/19-20
Job No.		J-1284
Sample Marked.		Z4S1
Iron as Fe	(%)	12.48
Zinc as Zn	(%)	0.30
Manganese as Mn	(%)	0.12
Arsenic as As	(mg/kg)	<0.005

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only.*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Daw Htike Htike Oo

Checked by: Dr. Khin Aye Tue

Technical Director: U Win Khaing Moe FOR

Our Reference: SS3

Date: 3-3-2020

Analysis Report

THE GOVERNMENT OF THE REPUBLIC OF THE UNION OF MYANMAR
MINISTRY OF EDUCATION
DEPARTMENT OF RESEARCH AND INNOVATION
ANALYSIS DEPARTMENT
No.(6) KABA AYE PAGODA ROAD, YANGON

Reference: MPRL E&P Pte Ltd

Sample: ၄၆

RESULT

Sample No.		1285/19-20
Job No.		J-1285
Sample Marked.		Z4S2
Iron as Fe	(%)	13.26
Zinc as Zn	(%)	0.33
Manganese as Mn	(%)	0.14
Arsenic as As	(mg/kg)	<0.005

Not a Certificate of Conformance
စံချိန်စံညွှန်းကိုက်ညီကြောင်းထောက်ခံချက်မဟုတ်ပါ

Remark: *Results valid for the received sample only*

Method/ Equipment used: Arthur I Vogel, Indian Standard, F.A.A.S

Tested by: Daw Khin Thida Myo

Checked by: Dr. Khin Aye Tue

Daw Htike Htike Oo

Technical Director: U Win Khaing Moe

Our Reference: SS3

Date: 3-3-2020

Build through Excellence
Lead with Integrity

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