

**Environmental Impact
Assessment for the Re-
development and Enhanced Oil
Recovery (EOR) Programme of
the Mann Field, Myanmar**

EIA Report

September 2018

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**Environmental Impact Assessment Report in regards to the
Re-development and Enhanced Oil Recovery Programme of the
Mann Field, Myanmar
(the EIA including EMP)**

With reference to the captioned EIA, which was prepared and finalized by Environmental Resources Management (ERM) – Hong Kong, Limited in accordance with the Environmental Conservation Law, Rules and Procedures under the instructions of Ministry of Natural Resources and Environmental Conservation dated on February 27, 2015 and revised on November 5, 2017.

Intending to be legally bound hereby and financially liable to the Ministry of Natural Resources and Environmental Conservation hereunder, we:

Endorse and confirm to Ministry of Natural Resources and Environmental Conservation.

- a. The accuracy and completeness of the EIA;
- b. Confirm and undertake to Ministry of Natural Resources and Environmental Conservation that the EIA has been prepared in strict compliance with applicable Environmental Conservation Law, Rules and Procedures including Environmental Impact Assessment Procedure: Paragraph 63 (2015), Oil and Petroleum Products law (2017) and Social Security Law (2012); and
- c. Confirm and undertake to Ministry of Natural Resources and Environmental Conservation that the project company established by MPRL E&P in respect of the Re-development and Enhanced Oil Recovery Programme of the Mann Field, Myanmar shall at all times comply fully with: (i) any and all commitments and obligations as set forth in the EIA, and (ii) any and all plans and the various components thereof, including without limitation, impact avoidance, mitigation, and remediation measures, and with respect to both (i) and (ii), including but not limited to such commitments, obligations, plans and measures as relate to the development, construction, commissioning, operation and maintenance of the project, and any circumstance in which work done or to be done, or services performed or to be performed, in connection with the project's development, construction, commissioning, operation and maintenance is carried out or intended or required to be carried out by any contractor, subcontractor or other party.

The issuance of this confirmation and undertaking has been duly authorized by all necessary corporate actions and a copy of the resolution of the Board of Directors authorizing it and the power of attorney explicitly granting signing authorization to the individual who has signed below are attached as schedules hereto.

Yours sincerely,

U Myo Tin
General Manager

copy : Managing Director, MOGE

Environmental Impact Assessment for the Re-development and Enhanced Oil Recovery (EOR) Programme of the Mann Field, Myanmar

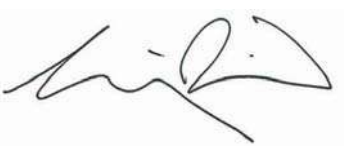
EIA Report

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Client:		Project No:			
MPRL E&P		0267078			
Summary:		Date:			
<p>This document presents the EIA Report for the re-development and enhanced oil recovery (EOR) programme of the Mann Field, Myanmar.</p>		11 September 2018			
		Approved by:			
					
		Craig A Reid			
		Partner			
1	EIA Report	JT	JT	CAR	11/09/18
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p> <p>This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.</p>		<p>Distribution</p> <p><input type="checkbox"/> Public</p> <p><input type="checkbox"/> Government</p> <p><input checked="" type="checkbox"/> Confidential</p>			



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1.1 INTRODUCTION

MPRL E&P Pte Ltd (MPRL E&P) operates the Mann Field under a Performance Compensation Contract (PCC). Under the PCC, MPRL E&P is re-vitalizing the field with new technologies and methods to enhance production and improve the environmental performance of the oil field operations (“the Project”). This will be achieved with the support of the Myanmar Oil and Gas Enterprise (MOGE).

In this connection, MPRL E&P has commissioned **Environmental Resources Management** (ERM), supported by local specialists **Resource and Environment Myanmar** (REM), to undertake an Environmental Impact Assessment (EIA) in order to develop an Environmental Management System (EMS) for the Project which will cover a programme of re-development and enhanced oil recovery (EOR) to enhance and ensure sustainability of the Mann Field in accordance with the *Environmental Impact Assessment (EIA) Procedures* (“the Procedures”).

The overall purpose of the Study is to complete a robust EIA to meet requirements of the *EIA Procedures* for the EIA to be approved by the Ministry of Natural Resources and Environmental Conservation (MONREC).

1.2 POLICY AND REGULATORY FRAMEWORK

The EIA Procedure for Myanmar was promulgated on 29th December 2015. The procedures were prepared by the MONREC, formerly called the Ministry of Environmental Conservation and Forestry (MOECF), along with the support of an EIA Review Team Committee comprising the members of relevant union ministries, union attorney general’s office, three city development committees and Non-governmental Organisations (NGOs) and technical support by experts from the Asian Development Bank Greater Mekong Region – Environment Operations Centre (ADB GMS-EOC).

Under the EIA Procedure, there is a requirement for the undertaking of an IEE or an EIA in order to obtain an ECC for certain development projects. This process is elaborated further in *Section 3* of this EIA, along with a complete list of laws related to environmental and social issues and hence relevant to the EIA Study for the proposed Project.

1.3 PROJECT DESCRIPTION AND ALTERNATIVES

The Mann Field is located in Central Myanmar in the northwest of Magwe Division. The field is about 16 km long and 1.5 km wide, covering an area of ~82 km² within Block MOGE 2. The Project Site is illustrated in *Figure 1.1*.

The Mann Field, discovered in 1970 by MOGE, currently includes 672 wells of which 305 were producing as of December 2017 while the remaining wells were shut-in. The total produced oil and associated gas from the Production Enhancement Project is 13.2 MMbbls, including 8 MMbbls above the normal decline curve, and 13.7 Bcf gas as of December 2017. Location of all the existing 672 wells are shown in *Figure 1.1*.

In order to enhance the performance of existing oil field, MPRL E&P is planning to undertake enhanced oil recovery (EOR) using chemical injections to access reserves that were previously unattainable due to geology or expense, or when primary and secondary recovery techniques have been exhausted. It involves the use of long-chained molecules called polymers to aid mobility and the reduction of surface tension to increase production. Various typical chemicals used are biocides, detergents and water softeners to ensure that oil is maximized from the reservoir. The concentrations of these chemical additives are very low in concentration and will be recycled by continuous re-injection to minimize the impacts to environment. Locations of the potential wells that are being considering for the EOR programme are shown in *Figure 1.2* and the potential number is 305 wells.

In addition, MPRL E&P is undertaking a re-development programme of the Mann Field to improve the environmental performance of the operations. The programme involves infill well drillings, deepening wells, remedial and work over operations, improvement of pumping units, refurbishments of the Gas and Oil Collection Station, rehabilitation of shut-in wells, re-perforations of well as well as development of produced water management system.

A total of 50 workers will be used for construction while 500 workers will be used for operation which are existing workers of the Mann Field. No additional workforce will be required for the construction and operation activities of the re-development programme. As such, no additional labour camps will be required.

As part of the Project design phase, consideration was given to potential alternatives; such as the use of different types of chemicals for the EOR programme and options of construction of new facilities versus improvement / refurbishment of existing facilities. The option to not go ahead with the Project was also considered, however, it is expected that the environmental performance of the oil field operations will not be improved without the Project.

1.4

BASELINE CONDITIONS

An overview of environmental baseline features for Mann Field is presented in the EIA Study. The main parameters described include:

- Physical environment, including climate and meteorology, geology, noise, air, surface water, groundwater and soil quality; and

- Biological environment, including terrestrial habitats as well as the associated flora and fauna including avifauna, butterflies, herpetofauna, mammals and aquatic fauna.

Information on the above parameters has been collected through desktop review of publicly available information. Primary data collection has also been undertaken in May 2015 to establish the baseline physical and biological environment of the Project Area. The baseline data obtained have been used to characteristic the Project Area and informed the assessment of potential environmental impacts from the proposed re-development and EOR activities at Mann Field.

In addition, baseline socio-economic and health data were presented in the EIA Report. This involves secondary data review as well as primary data collection during the site visit in January 2018 using a number of questionnaires and 698 household surveys in 14 villages of Mann Field area. The 14 villages included Man Gyo, Chin Taung, Kwe Cha, Lay Eain Tan, Lat Pan Taw, Nan Oo, Auak Kyaung, Lat Pan Ta Pin, Pauk Kone, Aye Mya, Mei Bayt Kone, Ywar Thar, Makyee Chaung and Kyar Kan. Livelihood of the communities were mainly from government services, small scale trading, causal / temporary labor as well as agriculture.

1.5 PUBLIC CONSULTATION AND DISCLOSURE

During the EIA, stakeholder engagement has been conducted with various relevant stakeholders.

These meetings helped the Project to gather information to fill in the data gaps and informed the impact assessment in the EIA Report. Consultation involved face-to-face meetings during the EIA Phase with a range of stakeholders. The date, time, location, stakeholder and purpose of each meeting is provided in *Table 1.1*.

Key concerns raised were related to air quality, noise, water quality as well as soil quality issues from the Project, which are assessed in *Section 6* with mitigation measures proposed. Responses to land compensation issues and CSR programme were responded to directly by MOGE / MPRL E&P during the meetings.

Table 1.1 Consultation Meetings undertaken in January 2018

Date, time, location	Stakeholder	Purpose of Engagement
8 January, 2018, MOGE Office	General Manager	<ul style="list-style-type: none"> • Meeting for invitation to the departments and organizations
8 January, 2018, Man Gyo	Villagers	<ul style="list-style-type: none"> • Public Consultation Meeting • Undertake 92 household surveys.
9 January, 2018, Chin Taung	Villagers	<ul style="list-style-type: none"> • Public Consultation Meeting • Undertake 16 household surveys.
9 January, 2018, Kwe Cha	Villagers	<ul style="list-style-type: none"> • Public Consultation Meeting • Undertake 31 household surveys.

Date, time, location	Stakeholder	Purpose of Engagement
9 January, 2018, Lay Eain Tan	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 53 household surveys.
9 January, 2018, Lat Pan Tapin	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 28 household surveys.
10 January, 2018, Nan Oo	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 30 household surveys.
10 January, 2018, Auak Kyaung	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 59 household surveys.
10 January, 2018, Lat Pan Taw	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 36 household surveys.
10 January, 2018, Pauk Kone	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 30 household surveys.
11 January, 2018, Aye Mya	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 47 household surveys.
11 January, 2018, Mei Bayt Kone	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 74 household surveys.
11 January, 2018, Ywar Thar	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 82 household surveys.
12 January, 2018, MOGE Office Hall	Parliament member, MOGE, FD, ECD, Labor Association, MPRL E&P, GAD, CSRs, Village Tract Leaders	<ul style="list-style-type: none"> Stakeholder Consultation
12 January, 2018, Makye Chaung	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 45 household surveys.
12 January, 2018, Kyar Kan	Villagers	<ul style="list-style-type: none"> Public Consultation Meeting Undertake 72 household surveys.

1.6

IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PLAN

During the impact assessment, potential impacts have firstly been identified through a systematic scoping process whereby the activities (both planned and unplanned) associated with the Project have been considered with respect to their potential to interact with environmental resources or receivers. Interactions which may generate potentially significant environmental impacts ranging from those associated with the construction phase (e.g. disturbance to terrestrial habitats and physical environment during drilling activities), operation phase (e.g. disturbance to terrestrial habitats and residential sensitive receivers due to improper disposal of solid and liquid wastes) as well as accidental events (e.g. spillage) at the Mann Field.

The potentially significant environmental impacts are further assessed in the EIA Study, with appropriate mitigation and enhancement measures recommended for alleviating potential negative impacts or enhancing potential positive impacts from the Project. With proper implementation of the mitigation measures, it is predicted that the potential environmental and impacts causing by the EOR and re-development activities of at Mann Oil Filed would be of **Negligible, Minor or Moderate** significance.

Cumulative impacts refer to the additional impacts that may be generated by other developments or activities in the vicinity of the Project Area that when added to the impacts of the proposed EOR and redevelopment activities at Mann Field combine to cause a greater impact. Such impacts may arise due to spatial overlap in an impact (e.g. overlap in spatial extent of air or water quality changes) or temporal overlap (e.g. noise impacts caused by construction activities at the same time from different sources). Within the Mann Field, according to publicly available information, no other projects will be constructed or operated concurrently with the proposed EOR and redevelopment programme. As such, cumulative impacts with other concurrent projects are not expected to occur.

The EIA Study for the EOR and re-development programme in the Mann Field compiled with the requirements of the Myanmar EIA Procedure (2015). The EIA demonstrates that MPRL E&P understands the environment and social setting in which they are operating and has properly assessed the key potential environmental and social impacts associated with the proposed Project. A Project-specific, dedicated Environmental Management Plan (EMP) has been developed to manage impacts associated with the Project and ensure legislative compliance and standards of good practice during the Project in the Mann Field. Provided that the recommended mitigation measures are properly implemented, it is expected that the environmental and social impacts of the proposed Project would be managed by MPRL E&P in an acceptable manner.

The EIA concludes that **no Major** impacts are anticipated from this Project and all impacts have been properly mitigated to be as low as reasonably practical.

The EIA Report with the executive summary in Myanmar and English will be disclosed on MPRL E&P's website. Hard copies of the EIA Report will be provided upon request at MPRL E&P's offices in Yangon as well as in the Mann Field.

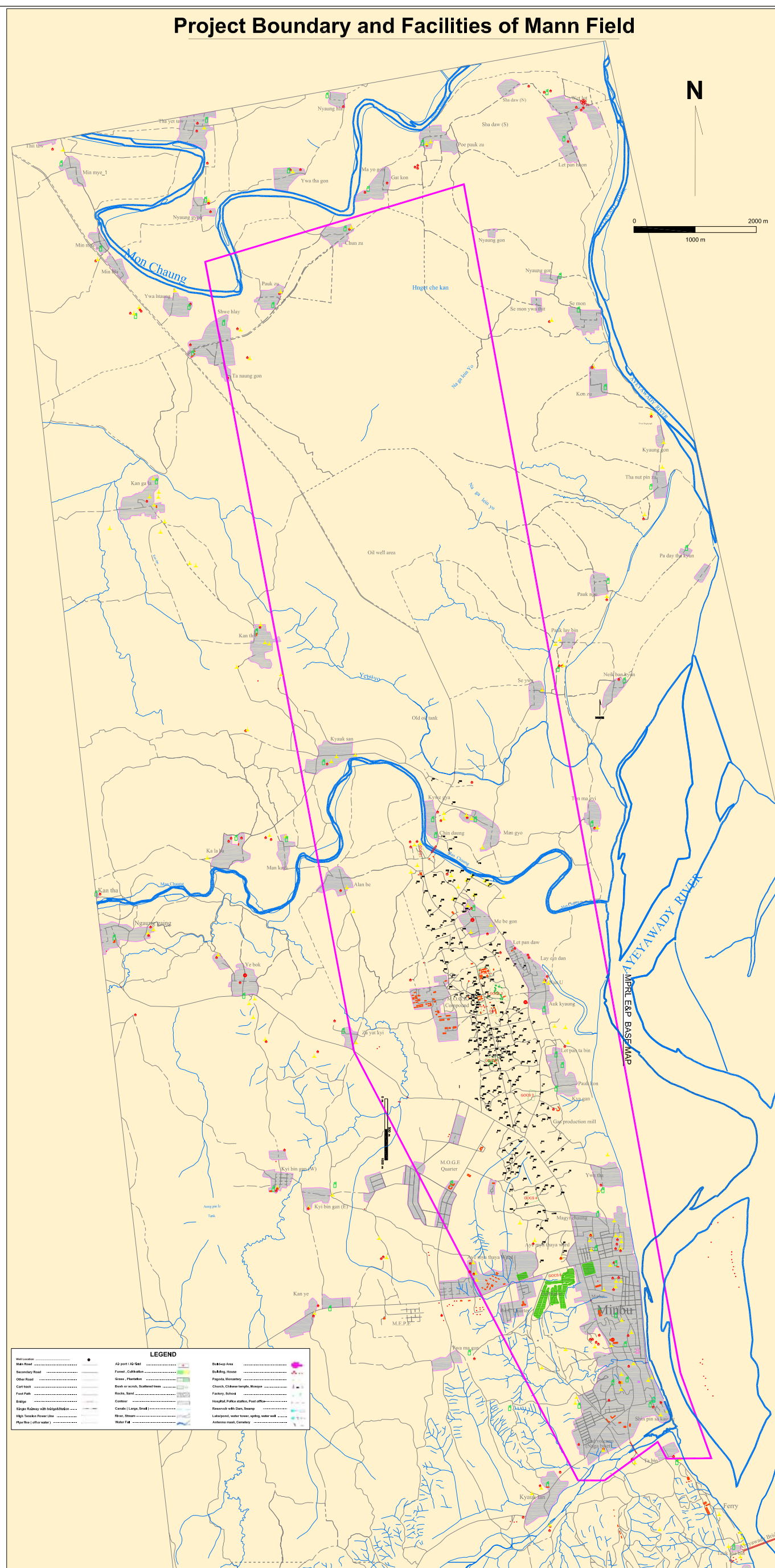


Figure 1.1

Project Boundary and Facilities of Mann Field including Locations of Existing Wells

2.1

PROJECT OVERVIEW

MPRL E&P Pte Ltd (MPRL E&P) operates the Mann Field under a Performance Compensation Contract (PCC). Under the PCC, MPRL E&P is re-vitalizing the field with new technologies and methods to enhance production and improve the environmental performance of the oil field operations (“the Project”). This will be achieved with the support of the Myanmar Oil and Gas Enterprise (MOGE).

The location of the Mann Field is shown in *Figure 1.1*.

MPRL E&P has commissioned **Environmental Resources Management (ERM)-Hong Kong, Limited**, along with Myanmar national environmental consultant **Resource and Environment Myanmar (REM)**, to undertake the Environmental Impact Assessment (EIA) for the Project.

This document is the EIA Report for the proposed Project in the Mann Field.

2.2

IMPACT ASSESSMENT OBJECTIVES

The objective of the EIA Study is to complete a robust environmental and social assessment for the Project in compliance with the Myanmar EIA Procedure (2015). Specifically, the objectives of the EIA are:

- To review the potential interactions between the proposed Project activities and the key environmental and social receptors and resources.
- To identify the potentially sensitive environmental, social and health components of the baseline.
- To identify and evaluate potential environmental, social and health Project impacts.
- To recommend mitigation or enhancement measures to remove, reduce or avoid potential adverse impacts.
- To provide a Project specific Environmental Management Plan (EMP). This EMP will also cover social impacts.
- To summarise public consultation and disclosure activities related to the Project.

2.3

PRESENTATION OF THE PROJECT PROPONENT

The proponent of the Project is MPRL E&P Pte Ltd.

MPRL E&P is an independent oil and gas exploration and production company, headquartered in Yangon with operations in various offshore and onshore blocks in Myanmar. Further information about the company is available at the website <http://mprlexp.com/>.

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2.4

PRESENTATION OF THE ENVIRONMENTAL AND SOCIAL EXPERTS

The key ERM environmental and social consultants that conducted the EIA Study are presented in *Table 2.1*.

Table 2.1 *Environmental and Social Consultants for the Project*

Name	Organisation	Academic Experience	Years' Experience	Area of Expertise	Registration Status
Craig A. Reid	ERM	BSc (Honours)	20	Ecology and Biodiversity	Registered Under ERM Hong Kong (Certificate No. 0016) and Individually (Certificate No. 0053)
Rebecca Summons	ERM	MSc	8	Ecology and Biodiversity	Registered Under ERM Hong Kong (Certificate No. 0016) and Individually (Certificate No. 0053)
Myat Mon Swe	ERM	M.Eng.	>10	Socio-economic Facilitation of Meeting	Registered Individually (Certificate No. 0069) Registration Application to be submitted to ECD under ERM Hong Kong
Tom Glenwright	ERM	PhD	16	Water Pollution Control, Modeling for Water Quality, Ground water and Hydrology	Registered Under ERM Hong Kong (Certificate No. 0016)

Name	Organisation	Academic Experience	Years' Experience	Area of Expertise	Registration Status
Stuart Mackenzie	ERM	BSc	10	Waste Management	Registered Under ERM Hong Kong (Certificate No. 0016)
Piers Touzel	ERM	MBA	15	Facilitation of meeting, Socio-Economy, Land use	Registered Under ERM Hong Kong (Certificate No. 0016)
Edmund Taylor	ERM	MSc	5	Air Pollution Control, Modelling for Air Quality	Registered Under ERM Hong Kong (Certificate No. 0016)
Man Ping To (Mandy To)	ERM	MSc	20	Noise and Vibration	Registered Under ERM Hong Kong (Certificate No. 0016)
Herve Bonnel	ERM	M.En	19	Risk Assessment and Hazard Management	Registered Under ERM Hong Kong (Certificate No. 0016)
Laurence Genee	ERM	MSc	20	Risk Assessment and Hazard Management, Legal Analysis	Registered Under ERM Hong Kong (Certificate No. 0016)
Wai Hang Ng (Nicci Ng)	ERM	M.A	10	Other (GIS)	Registered Under ERM Hong Kong (Certificate No. 0016)

Name	Organisation	Academic Experience	Years' Experience	Area of Expertise	Registration Status
Chi Hung Wan (Frank Wan)	ERM	MSc	30	Geology and Soil, Archaeology	Registered Under ERM Hong Kong (Certificate No. 0016)
U Win Naing Tun	REM	MSc	>20	Social	Registered Under REM (Certificate No. 0002)

2.5

STUDY LIMITATIONS

This EIA is based on the Project description obtained from MPRL E&P at the time of the Study. Any future changes to the Project description, upon which this report is based or additional relevant information revealed as Project design, equipment and service procurement proceed may affect the analysis, assessment and conclusions contained in this report. Should significant changes occur, they would be the subject of further study to verify that the conclusions of this EIA do not change and to determine whether any additional mitigation, management or monitoring measures are warranted.

2.6

REPORT STRUCTURE

The remainder of this report is structured as follows:

- *Section 3:* the institutional framework for the Project.
- *Section 4:* the Project description and alternatives selection.
- *Section 5:* the environmental and social baseline.
- *Section 6:* the impact assessment including the adopted methodology and proposed mitigation measures.
- *Section 7:* the cumulative impact assessment.
- *Section 8:* the Project's public consultation and disclosure activities.
- *Section 9:* the Environmental Management Plan.

This section provides the relevant legal and policy context in Myanmar including the following:

- MPRL E&P's corporate policies relating to health, safety and the environment.
- Policy and Legal Framework; including:
 - Myanmar EIA legislation, other relevant Myanmar legislation; and
 - International conventions, standards and guidelines relevant to the Project.
- Institutional Framework of the Project Proponent and Myanmar; including the requirements of the Production Sharing Contract (PSC).
- Environmental and/or Health standards related to the Project.

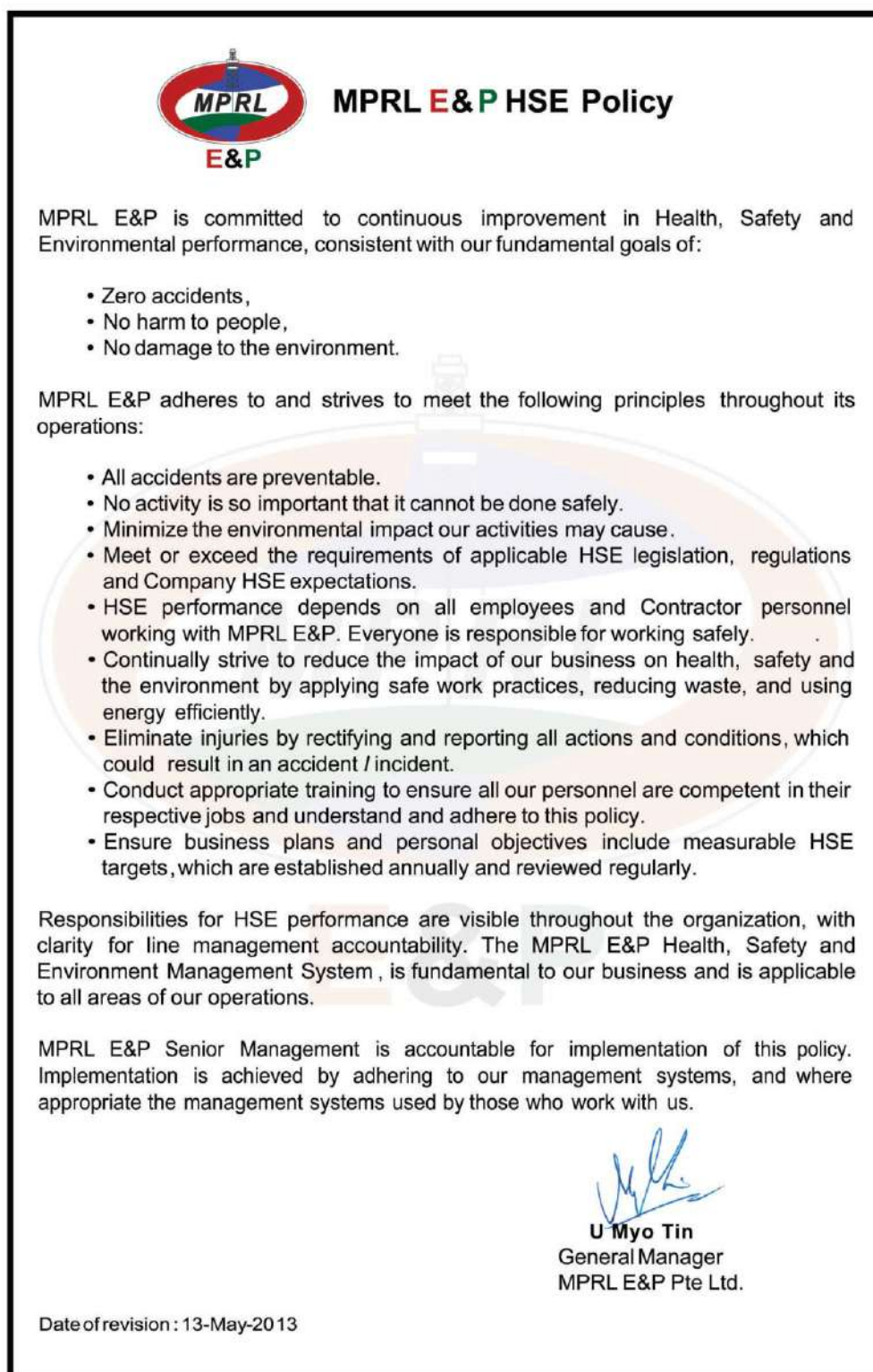
3.1

CORPORATE HSE POLICY

MPRL E&P has adopted a comprehensive HSE Management System. This system is an important and integral part of the company's overall management system and is shown in *Figure 3.1* below. This EIA Study is conducted in accordance with MPRL E&P's environmental guidelines which require the Project to follow the fundamental goals of:

- Zero accidents;
- No harm to people; and
- No damage to environment.

Figure 3.1 MPRL E&P's HSE Policy



Apart from the HSE policy, MPRL E&P also has in place an environmental policy as well as a corporate responsibility policy and a human rights policy, as can be seen in the following *Figures 3.2-4*.

Figure 3.2 MPRL E&P Environmental Policy

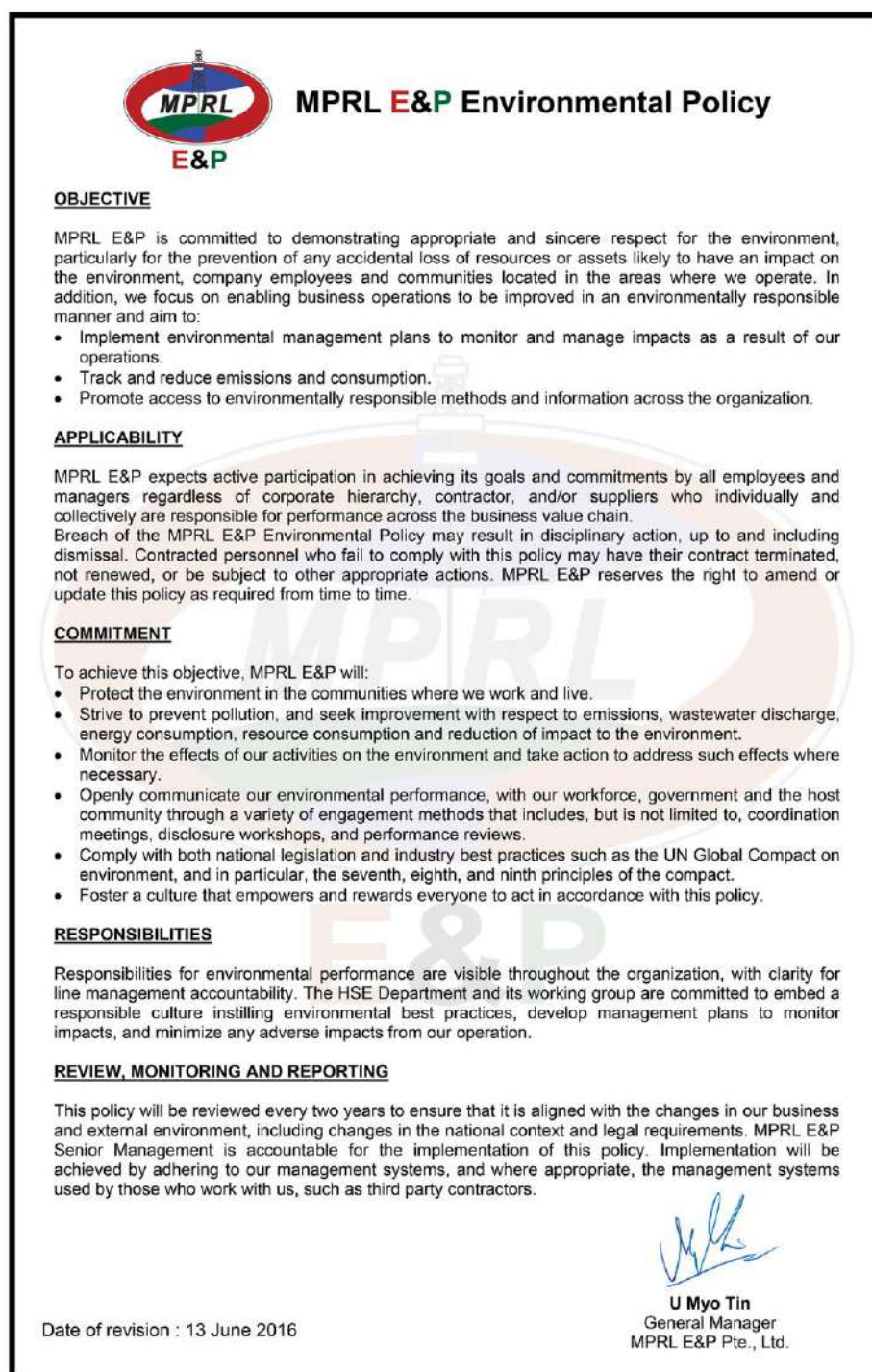


Figure 3.3 MPRL E&P Corporate Responsibility Policy



MPRL E&P Pte Ltd.

CORPORATE RESPONSIBILITY POLICY

MPRL E&P's policy is to be a responsible investor in the long term development of the host nation, by conducting business operations to the highest standards.

Our goal is to be honest and conduct business with integrity with the people we work with, which can include but is not limited to, local communities, business partners, and governments, and to maintain respect for cultural, national, and religious diversity.

Company directors, personnel and contractors are responsible for ensuring strict compliance with this policy, and specifically to:

- Respect individuality and diversity of all employees, treating them fairly and without discrimination
- Commit to equal opportunity in all aspects of employment and encouragement in diversity
- Stimulate personal growth of all employees through promotion of creativity and teamwork
- Provide a safe secure, worker friendly environment that promotes career opportunities for self-development
- Ensure compliance with MPRL E&P Environmental, Health & Safety Policy by all personnel involved in our activities
- Provide a clear direction on key CSR initiatives, policies, performance data and targets
- Contribute to the sustainable development of communities through active engagement and dialog
- Support selected development of projects in health, education, cultural and civic activities
- Maintain high ethical standards and support transparency in all of our activities
- Encourage our partners and stakeholders to observe and uphold similar standards wherever possible

U Mae Myint
Chief Executive Officer

Figure 3.4 MPRL E&P Human Rights Policy



MPRL E&P Pte Ltd.

HUMAN RIGHTS Policy Statement

MPRL E&P conducts business operations to the highest standard of ethics respecting and protecting internationally recognized Human Rights during the process. We endeavor to protect and promote Human Rights by coordinating with all stakeholders within our sphere of influence.

Human Rights abuses will not be tolerated nor encouraged in all projects undertaken by the company. This Human Rights Policy Statement is applicable to every operation acknowledging the rights of employees and the rights of local communities.

Community Rights:

MPRL E&P strongly encourages employees, contractors, Non Governmental Organization and governmental bodies to address the rights of communities surrounding our operations, through active engagement and dialog:

- Continuous community consultation and needs assessments are conducted to identify the needs of the community and concerns, enabling us to examine ways to proactively address them;
- We recognize and respect the culture and rights of indigenous peoples and endeavor to promote the practice of their traditions and customs; and
- We recognize communities' right to an essential, free, and full development highlighting our commitment to promoting community empowerment and improvement through sustainable development.

Employee Rights:

- We provide safe, secure, and worker friendly environment;
- We are an equal opportunities employer;
- We positively stimulate personal growth of our employees through promotion of creativity and teamwork;
- We do not use any forced or compulsory labor;
- We do not discriminate against race, religion, gender, age, sexual orientation, religion, nationality or ethnicity; and
- All employees have the right to join trade unions, where such rights are recognized by law.

U Moe Myint
Chief Executive Officer

Matters pertaining to Health, Safety and Environmental (HSE) requirements are generally under the jurisdiction of the ministries and state-owned enterprises in the oil and gas sector. Key ministries/ agencies / state-owned enterprises that have jurisdiction over HSE matters in oil and gas operations include the following:

- Ministry of Natural Resources and Environmental Conservation (MONREC);
- Ministry of Agriculture, Livestock and Irrigation;
- Ministry of Labour, Immigration and Population;
- Ministry of Electricity and Energy (MOEE);
- Myanma Oil and Gas Enterprise (MOGE); and
- Myanmar Investment Commission (MIC).

Laws relating to environmental and social issues of the Oil and Gas Sector and hence their relevance to the EIA study for the proposed Project are included in *Table 3.1*. MPRL E&P committed to follow these laws including but not limited to the Protection and Preservation of Ancient Monument Law (2015) as well as the Protection and Preservation of Antique Object Law (2015).

Table 3.1 *Commitments related to Laws, Rules and Regulations to be complied by MPRL E&P*

Sources of Related Laws, Rules and Regulations	Relevant Articles	Commitments
The Constitution of the Republic of the Union of Myanmar, 2008	Article 37 (a)(b) , 45, 390	<p>The Constitution of the Union of Myanmar is the supreme law of the country and has provisions regarding the protection of the environment in Myanmar.</p> <p>The Project Proponent commits to comply as these three Articles in the Constitution provide a basis for legalizing and institutionalizing environmental health impact assessment and social impact assessment. There stipulates that</p> <ul style="list-style-type: none"> • The Union is the ultimate owner of all lands and all natural resources above and below the ground, above and beneath the water and in the atmosphere in the Union; The Union shall enact necessary law to supervise extraction and utilization of State owned natural resources by economics forces; • The Union shall protect and conserve natural environment.

		<ul style="list-style-type: none"> • Every citizen has the duty to assist the Union in carrying out the following matters: (a)preservation and safeguarding of cultural heritage; (b)environmental conservation; (c)striving for development of human resources; (d)protection and preservation of public property.
Environmental Conservation Law, (The Pyidaungsu Hluttaw Law No. 9/2012)	Clause 7(o), 14,15, 29	<p>The Project Proponent commits to comply as there prescribes</p> <ul style="list-style-type: none"> • That the Ministry (MONREC) has the right to manage a proponent to provide compensation for environmental impact and contribute funds and need for prior permission from the Ministry for the business that have been categorized for causing impact on the environmental quality and right to issuing permit with terms and conditions relating to environmental conservation after scrutinizing. • To treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards for causing a point source of pollution. • That the owner or occupier of any business, material or place which causes a point source of pollution have to install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it has to be arranged to dispose the wastes in accord with environmentally sound methods. • For not to violate any prohibition contained in the rules, notifications, orders, directives and procedures under the Environmental Conservation Law.
Environmental Conservation Rules, (notification no. 50/2014)	Rule 69(a) (b)	<p>The Project Proponent commits:</p> <ul style="list-style-type: none"> • Not to emit, cause to emit, dispose, cause to dispose, pile and cause to pile, by any means, the pollutants and the hazardous waste or hazardous material stipulated by notification under the Law and any of these rules at any place which may affect the public directly or indirectly. • Not to carry out to damage the ecosystem and the natural environment which is changing due to such system, except for carrying out with the permission of the Ministry for the interest of the people.
Environmental Impact Assessment Procedure, (notification no 616/2015)	Clause 102(a)(b),103, 104, 105, 106, 107, 108, 110, 113, 115, 117	<p>The EIA Procedure sets out the procedures for completing an IEE, EIA and/or EMP in Myanmar. This includes information on project categorization, responsibilities of project developers and ministries, EIA review, monitoring and auditing, among other issues.</p>

		<p>The Project Proponent (Project Proponent) commits to bear full legal and financial responsibility:</p> <ul style="list-style-type: none"> • For his actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project; and • To support programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts until PAPs have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project <p>For EMP, The Project Proponent commits to comply</p> <ul style="list-style-type: none"> • to implement the EMP, all Project commitments, and conditions, and • for liability to ensure that all contractors and subcontractors of the Project comply fully with all applicable Laws, the Rules, this Procedure, the EMP, Project commitments and conditions when providing services to the Project. • For his responsibility, and to fully and effectively implement the requirements set forth in ECC, applicable Laws, Rules, EIA Procedure and standards. • Project commitments and conditions when providing services to the Project and inform the Ministry with detailed information as to the propose project's potential adverse impacts. <p>For monitoring and reporting, The Project Proponent(the Project Proponent) commits to comply:</p> <ul style="list-style-type: none"> • To notify and identify in writing to the Ministry, providing detailed information as to the proposed Project's potential Adverse Impacts. • To engage in continuous, proactive and comprehensive self-monitoring of the Project and activities related thereto, all Adverse Impacts, and compliance with applicable laws, the Rules, this EIA Procedure, standards, the ECC, and the EMP during all phases of the Project (pre-construction, construction, operation, decommissioning, closure and post-closure). • to notify and identify in writing to the Ministry for any breaches of his obligations or other performance failures or violations of the ECC and EMP as soon as reasonably possible and in any event, in respect of any breach which would have a serious impact
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		<p>or where the urgent attention of the Ministry is or may be required, to undertake within not later than twenty-four (24) hours, and in all other cases within seven (7) days of the Project Proponent becoming aware of such incident.</p> <ul style="list-style-type: none"> • to submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry. • to submit the monitoring report within ten (10) days of completing a monitoring report and the information to be included. • To make a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, (except as may relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Project offices within ten (10) days of completing • To submit a digital copy of a monitoring report within ten (10) days of receiving such request via email or as may otherwise be agreed upon with the requestor for the request of any organization or person. <p><i>For the purposes of monitoring and inspection, the event of emergency,</i> The Project Proponent commits to</p> <ul style="list-style-type: none"> • grant the ministry and/or its representatives, at any time during normal working hours, access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed; • grant, from time to time as and when the Ministry may reasonably require, the Ministry access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed. • grant full and immediate access to the Ministry at any time as may be required by the Ministry in the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements. • Ensure that the Ministry's rights of access can extend to access by the Ministry to the Project's contractors and subcontractors. <p><i>For the Conditions and Revisions to Conditions prescribed in Environmental Compliance Certificate,</i> The Project Proponent commits to commence the implementation of the Project strictly in accordance with the conditions attached to the ECC and including the EMP,</p>
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		within such time as may be prescribed by the Ministry upon receipt of the written approval from the relevant authority.
National Environmental Quality (Emissions) Guidelines, (notification no. 615/2015)		The Project Proponent commits to comply the NEQ guidelines and its setting out for emission standards for air, noise and effluent discharges for oil and gas operations. The Project Proponent considers this emissions standards in its environment impact assessment and environmental management plan.
National Environmental Policy, 1994		<p>Under this policy, the main environmental body was the NCEA. Prior to the establishment of MONREC, environmental conservation was undertaken by various ministries and departments. In 1990, the NCEA was established to advise the government on environmental policy, to act as a focal point and as a coordinating body for environmental affairs and to promote environmentally sound and sustainable development. The NCEA's main mission is to ensure sustainable use of environmental resources and to promote environmentally sound practices in industry and other economic activities, objectives and mandates.</p> <p>The Project Proponent commits to comply and implement the project as per this policy requirement.</p>
Myanmar Investment Law, 2016	Clause (50)(d), (51), (65),	<p>The Project Proponent commits to comply</p> <ul style="list-style-type: none"> • The stipulation to register the land lease contract at the office of Registry of Deeds in accordance with the Registration Act. • The mentioning for appointment, replacement, providing for the employment of staff and workers, ensuring to comply the entitlements and rights in the labor laws and rules, settling dispute regarding HR issues. • Stipulation: <ul style="list-style-type: none"> (a). To respect and comply with the customs, traditions and traditional culture of the ethnic groups in the Union; (e). To inform to the Commission if it is found that natural mineral resources or antique objects and treasure trove are not related to the investment permitted; (f). Not to make any significant alteration of topography or elevation of the land on which is entitled to lease or to use, without the approval of the Commission; (g). To abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage; (h). To list and keep proper records of books of account and financial

		<p>statement and necessary financial matters relating to the investments performed by permit or endorsement in accordance with internationally and locally recognized accounting standards;</p> <p>(j). To pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directive and so forth during the period of suspension of investment for a credible reason;</p> <p>(k). To pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease or death due to the work;</p> <p>(l). To supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar;</p> <p>(m). To respect and comply with the labor laws;</p> <p>(n). To have the right to sue and to be sued in accordance with the laws;</p> <p>(o). To pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement;</p> <p>(p). To allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment;</p> <p>(q). To take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.</p>
Myanmar Investment Rules, 2017	Clause 202, 203, 206, 212,	<p>The Project Proponent commits:</p> <ul style="list-style-type: none"> • To comply with all terms and conditions in the permit and other applicable laws when the investment is carried out. • To fully assist while negotiating with the Authority for settling the grievances of the local community that have been effected due to Investments.

		<ul style="list-style-type: none"> To appoint expert foreigner as senior manager, technical and operational expert or advisor according to subsection (a) of the section 51 of the Law. To obtain the permit or tax exemption or relief to insure the relevant insurance out of the following types of the insurance at any insurance business entitled to carry out insurance business within the Union based on the nature of the business: Property and Business Interruption Insurance; Engineering Insurance; Professional Liability Insurance; Bodily Injury Insurance; Marine Insurance; or Workmen Compensation Insurance; Life Insurance; Fire Insurance.
The Import and Export Law, 2012	Clause 7	The Project Proponent, as a license holder, commits to comply not to violate the conditions contained in the license.
The Forest Law (2018)	Clause12	<p>The Forest Law is enacted by Pyihtaungsu Hluttaw in September, 2018. It empowers, to declare for the reserved forest for the maintaining a sustained yield of the forest produce, to manage the forest land.</p> <p>The Project Proponent commits to comply the stipulation</p> <ul style="list-style-type: none"> (a). For requiring prior approval from the Ministry if desirous to implement the development work or economic project within a forest land and forest covered land. (c). Whoever desirous to undertake as in sub-section (a), has to comply the Environmental Conservation Law and the stipulations from respective Laws.
The Forest Rules (1995)	Clause 27, 3	<p>The Project Proponent commits to comply:</p> <ul style="list-style-type: none"> Not to cut, mark, lop, perforate or damage by fire or any other means the teak and any reserved trees grown in the forest land and the land at the disposal of the government except for doing so with permission. Not to fell, cut or dissect the trees which are not reserved trees for commercial purpose in the forest area and land at the disposal of the government, to make firewood or charcoal, without the permission of the State, division or district forest office.
Conservation of Water Resources and Rivers Law (2006)	Clause (10), (11)(a), (19),	<p>The Project Proponent commits to comply prohibitions for the following activities:</p> <ul style="list-style-type: none"> "No person shall anchor the vessels where vessels are prohibited from anchoring in the rivers and creeks. No person shall dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk.

		<ul style="list-style-type: none"> No one shall dispose of any substance into the river creek that may cause damage to waterway or change of watercourse from the bank or vessel." <p>The empowerment of this Law is provided to the Ministry of Transport for controlling navigation of vessels in the rivers and creeks as well as communicating with local and foreign government and organizations for conservation of water resources, rivers and creeks. Also, to carry out conservation works for water resources, rivers and creeks, in accordance with the relevant international conventions, regional agreements and bilateral agreements for environmental conservation.</p>
The Protection of Biodiversity and Conservation Areas Law 2018	Clause 39 (d) (e),	<p>The Project Proponent commits to comply the stipulation that there may be charge with fine or imprisonment or both if finds guilty of</p> <ul style="list-style-type: none"> using dynamite or explosive chemicals, electrolyzing, destroying water flow or poisoning water, intentionally pollutes the soil, water, air in the conservation area; Disposing or handling chemical waste and poisoning materials in the conservation area.
Law on Protecting New Species of Plants (2016)		<p>The Project Proponent commits to comply the stipulation for the right and protect the right of the new species growers for causing any impact to environment and biodiversity.</p>
The Protection and Preservation of Cultural Heritage Regions Law, 1998	Clause 13, 15, 22	<p>The State Peace and Development Council Law enacted this law by Law No. 9/ 98 on the date of 10 September, 1998. The Ministry of Culture may, with the approval of the Government issue notification for the protection of cultural heritage areas are categorized as following kinds of zones / region:</p> <p>a) Ancient monumental zone;</p> <p>b) Ancient site zone.</p> <p>The Project Proponent commits:</p> <ul style="list-style-type: none"> To apply for prior permission and must abide by provisions of existing laws for certain land-based construction works. To comply the stipulation for the person desirous of carrying out construction works to abide by the provisions of other existing laws and also apply in accordance with the stipulations to the Department to obtain prior permission under this law. To conform to conditions prescribed by the Ministry of Culture for Buildings in cultural heritage region.
The Protection and Preservation of Antique Objects Law (2015)	Clause 12, 13	<p>The Project Proponent commits to comply the stipulation:</p> <ul style="list-style-type: none"> For person who finds any object which has no owner or custodian, needs to inform the relevant Ward or village-tract administrator if he knows or it seems reasonable to assume that the said object is an antique object. For a procedure to inform and the responsibility to inspect whether it is a real

		ancient monument or not and keep or cause to protect as may be necessary in accordance with the stipulation
The Protection and Preservation of Ancient Monuments Law (2015)	Clause 12, 13, 15, 20	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> • For a person who finds an ancient monument over one hundred years old under the water or above ground to promptly inform the relevant Ward or Village-Tract Administrative Office. • For procedure to inform and the responsibility to inspect whether it is a real ancient monument or not and keep or cause to protect as may be necessary in accordance with the stipulation. • To apply prior permission from the Department before searching for and extracting oil and gas or constructing pipelines. • For prohibitions not to damage ancient monuments including using machinery which causes vibration and discharging chemical substance.
Myanmar Fire Force Law, 2015	Clause 25	<p>The Project Proponent commits:</p> <ul style="list-style-type: none"> • to obtain the opinion of the Fire Services Department for the purpose of fire precaution and prevention, when laying down plans for construction for town, village and downtown or village development plans. • To comply the stipulations for the factory, workshop, highway bus, airport, jetty, hotel, motel, guest house, collective-owned building, market, work-site or business exposed to fire hazard of the owner or manager; <ul style="list-style-type: none"> (a). Not fail to form the reserve fire brigade (b). Not fail to provide materials and apparatuses for fire safety; in conformity with the directive of the Fire Services Department.
Prevention from Danger of Hazardous Chemical and Associated Material Law (Pyidaungsu Hluttaw Law No 28/2013)	Clause 8, 13, 15, 16, 17, 20, 22, 23, 27	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> • For Any person, who wants to do the business of chemical and associated materials, to apply to the central body for the acquisition of the license, attached with the management plan for the environmental conservation in accord with the stipulations". • For License holder to apply to the central supervising body in accord with the stipulation for the relevant chemicals and associated materials using for his chemicals and associated materials business" for a certificate. • For the registered certificate holder to abide by the regulations contained in the registered certificate and follow the order and directives issued from time to time by the central supervising body".

		<ul style="list-style-type: none"> • For the duties and powers of the central supervising board. • For the requirements: <ul style="list-style-type: none"> (a). before works, license holder to be inspected by the relevant supervising and inspection team for safety and machinery/equipment check and (b). The persons who are discharging the duty to be asked to attend foreign training or preventative trainings conducted by government departments and organizations. • For license holders to <ul style="list-style-type: none"> (a). follow the license regulations, (b). follow directives on safe handling and shall ask workers to strictly follow (c). shall provide necessary safety equipment and issue free personal protective equipment to workers, (d). provide training in occupational safety (e). determine the hazard to the environment, people and animals (f). provide fit for work medical check-up and keep records (g). send permission letter to Department of Township Administration if the chemicals and associated material are permitted to store (h). acquire in advance guidance and agreement from fire service department if using inflammable materials or explosives (i). transport only the permitted amount of chemicals in accordance with prescriptive stipulations (j). obtain approval of central supervising body if transporting chemical and associated material from the permitted region to any other region (k). abide and operate in accordance with related environmental laws to avoid impacts and damage to the environment. • For the license holder to have insurance in accordance with stipulations in case of compensation is required for losses related to people, animals and environment. • For the registered certificate holder to apply for using chemical which are not in the registered list. • For the license holder: <ul style="list-style-type: none"> (a). To classify the hazard level of chemicals and related substances in advance (b). To show Material Safety Data Sheet and warning signage (c). To provide safety equipment, personal protective equipment and training on their use (d). To possess, transport, store, use and discharge chemicals and related materials in accordance with stipulations,
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		(e). Not to import or export chemicals and related materials banned by the central supervising board.
Prevention from Danger of Hazardous Chemical and Associated Material Rule (notification No 85/2015-2016)	Clause 61 (a)	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> For organizations and license holders who store the chemical and related substances to abide by the following facts for safety: <ol style="list-style-type: none"> installing the fire protection system in building to be stored in accordance with prescribed provisions of the Department of Fire Brigade and being the building which is constructed to correspond for storing the chemical and related substances; sticking the warning sign according to hazard class, and keeping the safety equipment at the stored places; storing only after checking certainly to the chemical and related substances which are kept completely with the pictogram, and packing system by the importers and possessors; To be safe, for the user of chemical and related substances: <ol style="list-style-type: none"> To use only the registered restricted or conditional chemical and related substances; Not to use the unregistered, without labeled, unknown, damaged or expired chemical and related substances;
Underground Water Act, 1930		<p>The underground water act is enacted on the date of 21st June in 1930 whereas it is expedient to conserve and protect underground sources of water supply in the Union of Myanmar.</p> <p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> for prohibition from sinking of a tube for the purpose of obtaining underground water except under and in accordance with the terms of a license granted by the water officer. For the powers of Township Officer or sub-divisional officer to close a license tube after exercising jurisdiction over the local area concerned and the expense of such closure shall be recoverable from the owner of the tube as if it were an arrear of land-revenue.
Myanmar Insurance Law (1993)	Clause 15, 16	<p>Myanmar Insurance is established under this Law as a legal entity having perpetual succession, capable of suing and being sued in its own name.</p> <p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> For compulsory requirement for owners of motor vehicles to have Third Party Liability Insurance with Myanma Insurance For compulsory requirement for organizations operating as an enterprise which may cause damage to life and

		property of the public or may pollute the environment to have General Liability Insurance with the Myanmar Insurance.
Third-Party Liability insurance Rules (notification no.64/2003)	Clause 3(a) (b)	<p>The Project Proponent commits to comply the stipulations for the motor vehicles using in project:</p> <ul style="list-style-type: none"> • To compulsorily insured with the Myanmar Insurance against third-party liability for having his vehicle. • To pay the premium charged by the Myanmar Insurance to it or the organization authorized thereby on registration of his motor vehicle or renewal of the registration.
The Law On Standardization (2014)		<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> • For the smoothness of technology transfer and invention, utilizes the standardization to reduce the technological barriers for the trade and supportive for the development international free trade zone and for the development of Myanmar economy and social, • For empowering Ministry to organize the council for setting up the policy, guideline and to implement to practice the national standard in respective production and service.
Motor Vehicle Law (2015)	Chapter 1, 2(v)	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> • for reducing environmental pollution caused by motor vehicles • for the right of the Department to issue directives, the standards, guidelines for the purposes of importing, manufacturing, assembling, maintaining to be safe in accident and environment conservation. • For taking actions to conserve the green environment and the reduction in pollution of air, water, land and noises caused by motor vehicles.
The Farmland Act 2012	Clause 30 (a) (b)	<p>The Project Proponent commits to comply the stipulations for empowering</p> <ul style="list-style-type: none"> • to utilize the farmland for other purposes in the interest of the public in respect of the application:- <ol style="list-style-type: none"> 1. The Central Farmland Management Body to give permission to utilize the paddy land for other purposes, with the recommendation of the Region or State Farmland Management Body; 2. The respective Region or State Government shall give permission to utilize the farmland for other purposes except paddy land, with the recommendation of the Region or State Farmland Management Body;
Vacant, Fallow and Virgin Land	Clause 16, 19	The Project Proponent commits to comply the stipulation

Management Act 2012, (Pyidaungsu Hluttaw Law No.10 of 2012)		<ul style="list-style-type: none"> for Person who is granted the right to use the vacant, fallow and virgin lands to comply the following conditions: <ol style="list-style-type: none"> Land granted will use for the purpose granted and in relation to economic enterprise; To carry out to be completed within four years from the date of grant according to the purpose granted (can revise by the Central Committee for losing time due to natural disaster and unstable security conditions; Not to mortgaged, giving, sold, leasing or otherwise transferred or divided without the permission of the Cabinet of the Union Government; To fully pay the land revenue; To comply the conditions prescribed by the Central Committee Prohibit to explore other natural resources below and above ground except the purpose granted; To surrender the natural resources found in the authorized land and the Government being desirous of extracting the same on a commercial resumes the area required therefrom. For the Central Committee to resume the area required in the authorized land, if one of the following situation arises:- <ol style="list-style-type: none"> If ancient culture heritage are found in the authorized land; If infrastructure project or Special project are desired to be constructed on the authorized land, in the interest of the State; Except the permitted minerals , if other natural resources are found in the authorized land which are permitted for production of mining; If natural resources are found in the authorized land which are permitted for the purposes described in Section4, Sub-section (a),(b), and (d);
Freshwater Fisheries Law, 1991,	Clause36, 40, 41	The Project Proponent commits: <ul style="list-style-type: none"> Not to erect, construct place, maintain or arrange any obstruction such as a dam, bank or weir in a freshwater fisheries waters without the permission of the Department. Not to cause harassment of fish and other aquatic organisms or pollution of the water in a freshwater fisheries water. Not to alter the quality of water, volume of water or the water -course in a leasable fishery, reserved fishery and creeks contiguous thereto or in water-courses.
The Law Relating to Aquaculture, 1989	Clause 29(b)	The Project Proponent commits to comply the stipulation:

		<ul style="list-style-type: none"> For deterring transport by water and flow or pollution or mean to happen that at the territory of fishing area.
Public Health Law, 1972	Clause 3, 5	<p>The Project Proponent commits to cooperate with the authorized person or organization in line with the stipulations</p> <ul style="list-style-type: none"> To abide by any instruction or stipulation for public health. To accept any inspection, anytime, anywhere if it is needed.
The Protection and Prevention of Communicable Disease Law, 1995	Clause 3(a), 9, 11	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> For the Department of Health to carry out immunizations and health education activities related to communicable diseases For all responsible persons to prepare report for an outbreak of a communicable disease to the nearest Health Officer. For Health Officer to undertake investigations and medical examinations to prevent the control the spread of Principal Epidemic Disease.
The Control of Smoking and Consumption of Tobacco Product Law, 2006	Clause 9(a-d),	<p>The Project Proponent commits to comply the stipulation:</p> <ul style="list-style-type: none"> For the person-in-charge <ul style="list-style-type: none"> (a) To keep the caption and mark referring that it is a non-smoking area, (b) To arrange the specific place (c) To supervise and carry out measures so that no one shall smoke at the non-smoking area (d) To accept the inspection when the supervisory body comes to the place for which he is responsible.
The Petroleum Rules (1937)	Clause 3, 4	<p>The Project Proponent commits to comply the stipulations for</p> <ul style="list-style-type: none"> The import, transport or store of any petroleum that cannot be made save in accordance to the rules. The needs and exemptions from licenses and authorizes for the testing of petroleum by the President of the Union and rules that might issue rules on that regard.
The Petroleum and Petroleum Product Law, 2017	Clause 7, 9, 10, 11	<p>The Project Proponent commits to comply the stipulations for empowering:</p> <p>(a). To the Ministry of Commerce to function relating to:</p> <ul style="list-style-type: none"> (e) (a)issuing licenses relating to import and export (c) determining procedures and conditions related to import and export (f) prohibition not to import or export from the other places except from the places stipulated for import or export; (g) determining procedures, and conditions relating to import or export; <p>(b). To the Ministry of Transport and Communications to carry out the following functions relating to any petroleum and petroleum product</p>

		<ul style="list-style-type: none"> (a) issuing licenses relating to refining, transit, transport by pipeline, sale and distribution, inspection, and testing; issuing joint license or compound license for carrying out more than a type of business activities; (d) taking action, as necessary, in accordance with the existing laws if it occurs spill or accident in carrying out import, export, transport, and sale and distribution of petroleum and petroleum product by water; (e) determining standard and quality of receptacles for transport, and procedures and conditions for the pipelines; <p>(c). To the Ministry of Transport and Communications to carry out the following functions relating to any petroleum and petroleum product</p> <ul style="list-style-type: none"> (a) issuing license for the right to store for the storage tanks and warehouses; (b) issuing transport permit for the vehicles, vessels and barges that shall carry any petroleum and petroleum product; (d) if it occurs environmental impacts in carrying out petroleum and petroleum product business activities, taking action, as necessary, in accordance with the existing laws of on-site inspection <p>(d). For stating warning sign of danger or if not possible writing to be displayed on all receptacles containing any dangerous petroleum and petroleum product.</p>
The Oilfields Act (1918) (amended in 2010)		<p>This act provides clarification on activities within the oil and gas industry, and provides the Government with the power to define and alter limits of any notified oilfield. In addition, the Government may make rules for regulating all matters connected with many operations related to the extraction of oil and/or gas.</p> <p>The Project Proponent commits to comply guidance and issues prescribed such as for preventing oil and gas wastes, reporting of fires, accidents and other occurrences and regulating the collection and disposal of both oil and gas.</p>
Oilfields (Labor & Welfare) Act (1951) (amended in 1953)		<p>The act provide for the prevention of waste of oil or gas and also the prevention of environmental pollution by petroleum operations. There mentions wide range of protection measures for O&G workers, covering health, safety and worker welfare issues. It also covers working hours, holidays and extensive prescriptions on employing children as well as setting up an inspection.</p>

		<p>The Project Proponent commits to comply the stipulations</p> <ul style="list-style-type: none"> For the labors' working hours: Higher physical danger risk establishment (e.g. an oil rig): 8 hours/day or 40 hours/week, Medium physical danger risk establishment (e.g. factory, oilfield, open mine): 8 hours/day or 44 hours/week. If factory work is part of a continuous process (i.e. technical reasons): admissible 48 hours/week, 10 hours a day Max. 6 days/week (i.e. Sunday = weekly holiday). For Overtime: 2x normal pay rate. Work on weekly holiday = alternative day off within a period of 2 months. In Practice: No specific rules for offshore workers except in old law – oilfields act. Workers in industrial zones work around 11 hours a day, 6 days a week. Many in oilfields the same, but more dangerous jobs, 40/ week.
Explosives Substances Act (1908)		<p>The Project Proponent commits to comply the stipulations</p> <ul style="list-style-type: none"> For any person who unlawfully and maliciously causes, by any explosive substance, an explosion of a nature likely to endanger life or to cause serious injury to property, whether any injury to person or property has been actually caused or not, to be punished with transportation for life or any shorter term, to which a fine may be added, or with imprisonment for a term which may extend ten years, to which a fine may be added.
Industrial Use Explosive Substance Law (Law no.17/2018)	Clause 19 (a)	<p>The Project Proponent commits to comply the prohibition</p> <ul style="list-style-type: none"> Not to import, transport, store, make, use, hold, transfer the industrial explosive substances without any approval in accordance with this law.
Employment and Skill Development Law, 2013	Clause 5, 14, 15	<p>The Project Proponent commits to comply the stipulation</p> <p>(a). For the agreement, training and probation period as prescribed in:</p> <ol style="list-style-type: none"> If the employer has appointed the employee to work for an employment, the employment agreement shall be made within 30 days. But it shall not be related with government department and organization for a permanent employment. If pre training period and probation period are stipulated before the appointment the said trainee shall not be related with the stipulation of sub-section (1). <p>(b). For particulars to be included in the employment agreement:</p> <ol style="list-style-type: none"> the type of employment; the probation period; wage, salary;

		<ol style="list-style-type: none"> 4. location of the employment; 5. the term of the agreement; 6. working hour; 7. day off, holiday and leave; 8. overtime; 9. meal arrangement during the work hour; 10. accommodation; 11. medical treatment; 12. ferry arrangement to worksite and travelling; 13. regulations to be followed by the employees; 14. if the employee is sent to attend the training, the limited time agreed by the employee to continue to work after attending the training; 15. resigning and termination of service; 16. termination of agreement; 17. the obligations in accord with the stipulation of the agreement; 18. the cancellation of employment agreement mutually made between employer and employee; 19. other matters; 20. specifying the regulation of the agreement, amending and supplementing; 21. Miscellaneous. <p>(c). For the worksite regulations contained in the employment agreement to be in compliance with any existing law and the benefits of the employee not to be less than those of the any existing law.</p> <p>(d). For the employment agreement, the Ministry can issue the notification for paying the stipulated compensation to the employee by the employer, if the work is completed earlier than the stipulated period or the whole work or any part of it have to be terminated due to unexpected condition or the work has to be terminated due to various conditions.</p> <p>(e). For the employment agreement made under sub-section (a) to be related with daily wage workers, piece rate workers who are appointed temporarily in the government department and organization.</p> <p>(f). For the worksite regulations and benefits contained in the employment agreement mutually made between the employer and employee or among the employees to be amended as necessary, in accord with the existing law.</p> <p>(g). For the employer to send a copy of the employment agreement made between the employer and employee, to the relevant employment and labor exchange office within the stipulated period and to get the approval of it.</p> <p>(h). For the employment agreement made before the enforcement of this law has to be confirmed up to the end of the term of the original agreement.</p>
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		<ul style="list-style-type: none"> To carry out the training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present. to carry out the training for each work or compounding the work individually or group-wise by opening on-job training, training systematically at worksite, sending outside training and training by using information technology system, for arranging the training program to enhance the employment skill of the workers; For appointing the youths of 16 years as apprentice, to arrange the training for technology relating to the employment systematically in accord with the regulations prescribed by the skill development team. For the employer of the industry and service business to put in to the fund monthly as put in fees without fail for the total wages of the subordinates and the supervisors' salary for not less than 0.5%; (b) To put in money paid under sub-section (a) not to be deducted from the wage and salary of the employees.
The Factories Act , 1951 (Amended in 1953, 1954, 1962, 2016)		<p>The Project Proponent commits to comply the provisions for the requirement</p> <ul style="list-style-type: none"> For permits for some chemicals. For all factories to have proper pollution control measures such as air pollution, sewage and wastewater treatment system.
The Settlement of Labor Dispute Law, 2012	Clause 38, 39, 40, 51	<p>The Pyidaungsu Hluttaw hereby had enacted this Law for safeguarding the right of workers or having good relationship between employer and workers and making peaceful workplace or obtaining the rights fairly, rightfully and quickly by settling the dispute of employer and worker justly.</p> <p>The Project Proponent commits to comply:</p> <ul style="list-style-type: none"> Not to fail to negotiate and coordinate in respect of a complaint within the prescribed period without sufficient cause Not to alter the conditions of service of workers involved in disputes prior to investigation by tribunals For no party to strike or lock-out without negotiation, conciliation and arbitration by Arbitration Body. For the employer if commits acts without sufficient cause, to be liable to pay full compensation to workers as determined by Arbitration Body or Tribunal.
The Workmen's Compensation Act, 1923 (amended in 1955, 1957, 2005)	Clause 3	<p>The Workmen's compensation act had been promulgated in 1923, amended in 1955, 1957, 2005,</p> <p>The Project Proponent commits to comply the stipulations:</p>

		<ul style="list-style-type: none"> • For the payment by certain classes of employers to their workmen of compensation for injury by accident. • For the liability for compensation of employer's, amount of compensation, compensation to be paid when due and penalty for default, method of calculating wages, review, commutation of half-monthly payments, payment of a lump sum amount, distribution of compensation, compensation not to be assigned, attached or charged, notice and claim, power to require from employers statements regarding fatal accidents, reports of fatal accidents and serious bodily injuries, medical examination, contracting, remedies of employer against stranger, compensation to be first charge on assets transferred by employer, special provisions relating to masters and seamen. • For any updating for revising the monetary amount as per the amendment law.
Labor Organization Law, 2011	Clause 17, 18, 19, 20, 21, 22	<p>This Law was enacted, to protect the rights of the workers, to have good relations among the workers or between the employer and the worker, and to enable to form and carry out the labor organizations systematically and independently.</p> <p>The Project Proponent commits to comply the stipulations as there mentions:</p> <ul style="list-style-type: none"> • That Labor Organizations are free to organise and negotiate workers rights if not meeting labour laws. • That Labour Organisations may demand re-appointment of worker if cause of dismissal is related to labour organisation membership or activities or not conform with labour laws.. • That Labour Organisations have the right to send representatives to conciliation tribunals. • That Labour Organisations have the right to participate and discuss workers rights and interests with government and employers • That Labour Organisation have the right to participate in collective bargaining in accordance with labour laws. • That Labour Organisation may take collective actions in accordance with the relevant procedures, regulations and law.
Minimum Wages Law, 2013	Clause 12 (a-e), 13 (a-g)	<p>This Law was enacted to meet with the essential needs of the workers, and their families, who are working at the commercial, production and service, agricultural and livestock breeding businesses and with the purpose of increasing the capacity of the workers and for the development of competitiveness.</p> <p>The Project Proponent commits to comply the stipulations:</p>

		<ul style="list-style-type: none"> For the employer not to pay wage less than the minimum wage stipulated, do not have the right to deduct any other wage; For the employer to inform rates of minimum wage relating to the business, allow the entry and inspection of the inspection officer, give the sick worker holiday for medical treatment in accord with stipulation and give holiday for the matter of funeral of the family of worker without deducting from the minimum wage.
Payment of Wages Law, 2016	Clause 3, 4, 5, 9, 10, 14	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> That salaries are to be paid at the end of the month or, depending on the size of the employing enterprise, between 5-10 days before the end of the month. The employer is permitted and required to withhold income tax and social security payments. Other deductions, e.g. for absence, may only be withheld in accordance with the law. For the employer (a) to pay for salary either Myanmar Kyats or Foreign Cash permitted by National Bank of Myanmar. When delivery the salary (b) If the employer needs to pay the other opportunities or advantages, he can pay cash together with other materials according employee's attitude. For finishing the contract, employer need to pay the salary (not more than one month) to employees. For the permanent worker, need to pay per monthly. If more than 100 employees, need to pay within the 5 days from the end of month. If fire the employees, need to pay salary within two days after fire. When employee dies due to the accident, need to pay money as an insurance to employee's family within two days. For the employer to report to the Department with evidence of payment at later date agreed with the employee if the employer has difficulties to pay wages on time because of significant events (e.g. natural disaster), and For any deducting from the salary due to the employees' absence, the total cut salary not to be more than 50 % of his salary. For overtime work, to allow the presiding overtime rate as set by the Law.
Social Security Law, 2012	Clause 11 (a)(b), 15(a), 18(b), 48(a), 49(a)(b), 51(a)(b), 53(a), 54(a)(b), 75	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> For compulsory registration for social security system and benefits, the following establishments can be applied if they employ minimum number of workers and above determined by the Ministry of Labor

		<p>in co-ordination with the Social Security Board:</p> <ol style="list-style-type: none"> i. production industries doing business whether or not they utilize mechanical power or a certain kind of power, works of production, repairing or services, or engineering works, mills, warehouses, establishments; ii. Government departments, Government organizations and regional administrative organizations doing business; iii. development organizations; iv. financial organizations, v. companies, associations, organizations and their subordinate departments and branch offices doing business; vi. shops, commercial establishments, public entertaining establishments; vii. Government departments and Government organizations doing business or transport businesses owned by regional administrative body, and transport businesses carried out with the permission of such department, body or in joint venture with such department or body; viii. construction works carried out for a period of one year and above under employment agreement; ix. works carried out with foreign investment or citizen investment or joint ventured businesses; x. works relating to mining and gemstone contained in any existing law; xi. works relating to petroleum and natural gas contained in any existing law; xii. ports and out-ports contained in any existing law; xiii. works and organizations carried out with freight handling workers; xiv. Ministry of Labor and its subordinate departments and organizations; xv. Establishments determined by the Ministry of Labor from time to time, in co-ordination with the Social Security Board and with the approval of the Union Government; that they shall be applied with the provisions of compulsory registration for Social Security System and benefits contained in this Law. <ul style="list-style-type: none"> • For provisions of compulsory registration under sub-section (a) to continue to be applied by this Law even though any of the following situations occurs if it continues to carry out such work: <ol style="list-style-type: none"> i. carrying out work by employing under stipulated minimum number of workers but more than one worker; ii. changing the employer or changing the type of business.
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		<ul style="list-style-type: none"> • For the Social security fund, to include the funds for health and social care, family assistant, invalidity benefit, superannuation benefit and survivors' benefit, unemployment benefit, other social security fund for social security system of compulsory registration and contribution stipulated by the Ministry of labor, other social security fund and social security housing plan fund. • That the employer can deduct contributions to be paid by worker from his wages together with contribution to be paid by him and pay to the social security fund and in such case he can incur the expense. • For the employer to effect insurance by registering for employment injury benefit insurance system contained in section 45 at the relevant township social security office and pay contribution to employment injury benefit fund in accord with stipulations in order that workers applied to provisions of compulsory registration may obtain the employment injury benefits. • For the inapplicability to the Workmen's compensation act. • For the employer (a) to pay contribution monthly to Employment Injury Benefit Fund at the rates stipulated under section 50. Moreover he shall also bear the expenses for paying as such; (b) to pay defaulting fee stipulated under section 88, in addition to the contribution if fails to contribute after effecting insurance for employment injury benefit. • For the employers and workers (a) to co-ordinate with the Social Security Board or insurance agency in respect of keeping plans for safety and health in order to prevent employment injury, contracting disease and decease owing to occupation and in addition to safety and educational work of the workers and accident at the establishment; • For the employer (a) to report to the relevant township social security office immediately if a serious employment accident occurs to his insured worker. There shall not be any delay without sufficient cause to report as such. (b) A team of officers and other staff who inspect the establishments, if it is found out the employment injury, death, and contracting disease, shall report to the relevant township social security office in accord with the stipulations. • For keeping records of work and lists.
Law protecting Ethnic Right, 2015	Clause 5	<p>The Project Proponent commits to comply the stipulations</p> <p>For the Equal right between the Ethnic living in Myanmar. It enacted that if an ethnic loose the right, he can complain to the Regional or</p>

		<p>State Government to get the equal chance and find the equal right.</p> <p>That project matters shall be informed, coordinated and undertaken in consultation with ethnic groups if projects are in areas with ethnic groups.</p> <p>The Project Proponent also commits to comply the Succeeding laws to protect the right of Myanmar national</p> <p>Monogamy Law (2015): Concerning all those who are living in Myanmar, Myanmar Citizens who live outside of Myanmar, and foreigners who marry Myanmar citizens while living in Myanmar for preventing misconducting marriages.</p> <p>Buddhist Women Special Marriage Law (2015): Concerning the marriage between Buddhist Woman and other religious man. There prescribed the legal procedure, the conditions to be complied by non-Buddhist husband, the customs for dividing property when divorcing.</p> <p>Religious Conversion Law (2015): This is enacted for the freedom to convert from one religion to another, or a person without a religion has the freedom to convert to a religion. There prohibited to apply for a religious conversion with an intent to insult, disrespect, destroy, or abuse a religion.</p> <ul style="list-style-type: none"> • Population Control Healthcare Law (2015); This is for alleviate poverty, provide adequate quality healthcare, and ensure that family planning improves maternal and child health in the country. This Empowers region or state government that concerned with the special zone for healthcare to form region or state population control healthcare group to implementing the task as per the directives of the Ministry and region or state government and the Union Territory Governing body.
Leaves and Holidays Act, 1951	Clause 4.	<p>The Project Proponent commits to comply the stipulations:</p> <ul style="list-style-type: none"> • For employee to be granted to pay public holidays as announced by the Government in the Myanmar Gazette. On average, Myanmar has 26 public holidays per year, depending on the date of the variable holidays. • For additional rules to apply in accordance with other laws, such as the Social Security Law (2012) for employees contributing to the Social Security Fund. • To grant earned leave with average wages or average pay for a period of ten consecutive days by his employer during the subsequent period of twelve months to every employee who has completed a

		period of twelve months continuous service.
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3.2.1 *EIA Procedure*

The Myanmar EIA Procedure (dated 29 December 2015) set out the requirements for development, assessment and subsequent monitoring of an EIA. The requirements to conduct an EIA are outlined in the Environment Conservation Law (2012) and Environment Conservation Rules (2014). In addition, the EIA Procedures are supported by the draft Administrative Instruction which sets out a proposed format and content for reports.

The full EIA Process undertaken for the Project is shown in *Figure 3.5*. This Project is currently in the EIA Investigation and Reporting Phase which is discussed in detail below.

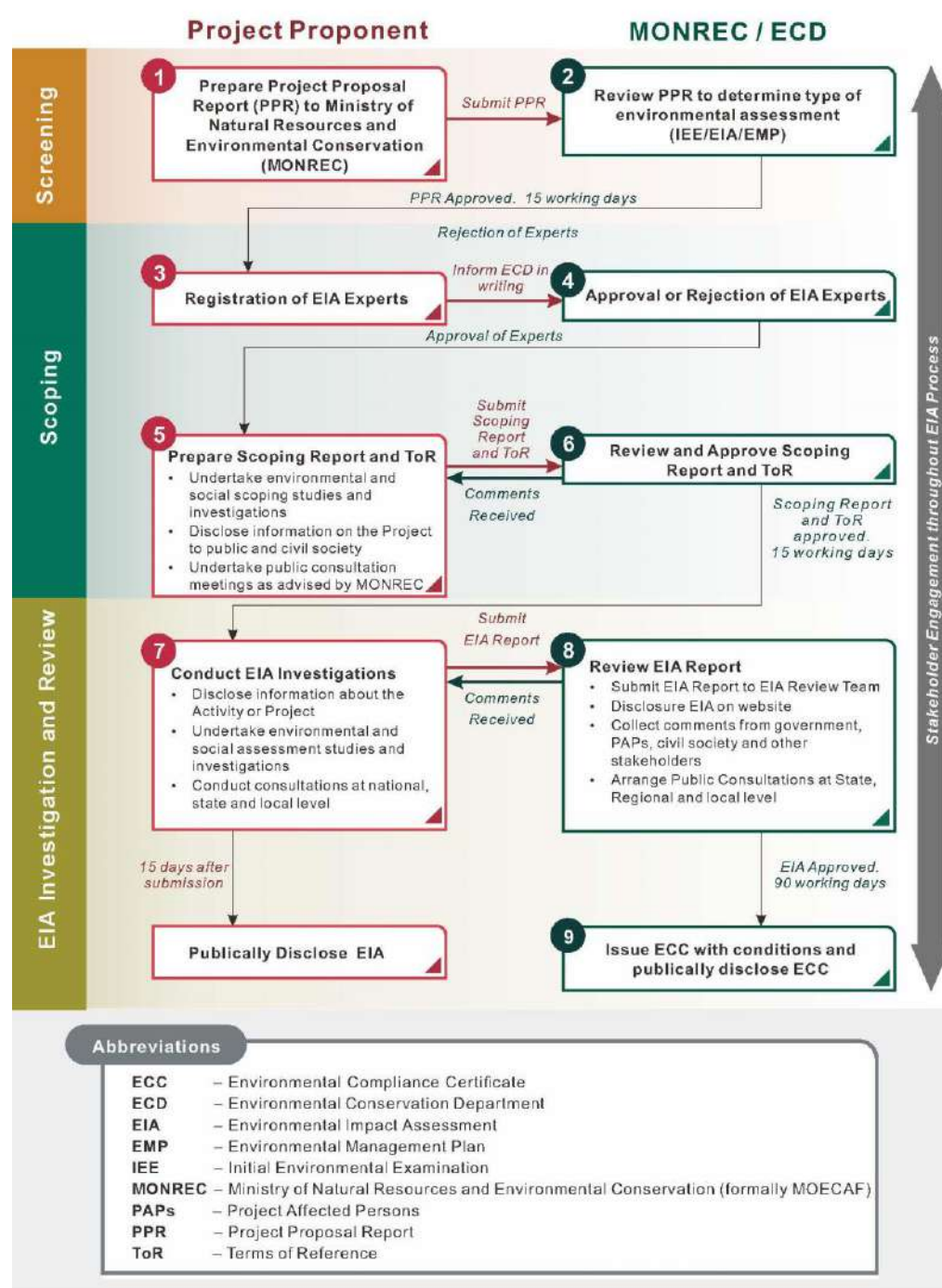
EIA Study and Report Preparation

MPRL E&P undertook a systematic assessment of the proposed activities. Screening was conducted as part of the assessment to identify all potential environmental risks. A summary of the screening and the preliminary identified environmental and social impacts was submitted to MONREC and MOGE in the form of a Project Proposal Report. MONREC used this document to decide whether the Project required an IEE or an EIA Study would be required. For this Project, an EIA Study was undertaken

After screening, a scoping phase was conducted to further identify the potential impacts of the Project, and likely Project Affected Peoples / Communities and to identify potential mitigation measures. The Scoping Report contained the Terms of Reference for the EIA Report which outlined the scope and studies necessary as part of the EIA Phase.

The subsequent EIA Report (this Report) has been prepared to address all potential adverse environmental and social impacts and propose appropriate mitigation measures. The report includes the results of public consultations and addresses public concerns when assessing impacts, designing mitigation measures and selecting monitoring parameters. The EIA report will be submitted to MONREC and MOGE.

Figure 3.5 EIA Process in Myanmar



3.2.2 Environmental and Social Standards

With the release of the Myanmar EIA Procedure in December 2015, the National Environmental Quality (Emissions) Guidelines (NEQEG) was also enacted. The NEQEG provide the basis for regulation and control of noise and air emissions and effluent discharges from projects in order to prevent pollution and protect the environment and public health. The NEQEG are

noted to be the similar to that recommended by the IFC General EHS Guidelines (2007) (World Bank Group, 2007) and the IFC sector specific 2017 Environmental, health, and safety guidelines for onshore oil and gas development.

Air Emissions / Noise and Vibration

The air and noise emission parameters are taken from *Section 1.1* and *Section 1.3* of the NEQEG and shown in *Tables 3.2* and *3.3* respectively.

Table 3.2 *NEQEG Air Emissions Parameters*

Parameter	Averaging Period	Guideline Value $\mu\text{g}/\text{m}^3$
Dichloromethane	24-hour	3,000
Nitrogen dioxide	1-year	40
	1-hour	200
Ozone	8-hour daily maximum	100
Particulate matter PM ₁₀ ^a	1-year	20
	24-hour	50
Particulate matter PM _{2.5} ^b	1-year	10
	24-hour	25
Sulphur dioxide	24-hour	20
	10-minute	500

a PM 10 = Particulate matter 10 micrometres or less in diameter

b PM 2.5 = Particulate matter 2.5 micrometres or less in diameter

Table 3.3 *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

^a Equivalent continuous sound level in decibels

NEQEG Effluent Discharge

Requirements on site run-off and wastewater discharges during the construction phase are provided in the NEQEG as detailed in *Table 3.4*. In addition, the NEQEG requires storm water runoff to be treated through an oil / water separation system able to achieve oil and grease concentration of 10 mg/l.

Table 3.4 *NEQEG on Effluent Discharge Levels for Sewage*

Parameter	Unit	Maximum Concentration
Biological oxygen demand	mg/l	30
Chemical oxygen demand	mg/l	125
Oil and grease	mg/l	10
pH	S.U. ^a	6-9
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

^a Standard unit

NEQEG on Emissions, Effluent and Waste Levels for Onshore Oil and Gas Activities

The NEQEG applies to emissions, effluent and waste generated from onshore oil and gas development including seismic exploration, exploratory and production drilling, development and production activities, transport activities including pipelines, other facilities (i.e. pump stations, metering stations, pigging stations, compressor stations, storage facilities), ancillary and support operations, and decommissioning. These are detailed in *Table 3.5* below.

Table 3.5 *NEQEG on Emissions, Effluent and Waste Levels for Onshore Oil and Gas Development*

Parameter	Guideline
Drilling fluids and cuttings	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline
Produced sand	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline
Produced water	Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline For discharge to surface waters or to land: – 5-day Biochemical oxygen demand 25 mg/l

Parameter	Guideline
	<ul style="list-style-type: none"> - Chemical oxygen demand 125 mg/l - Chlorides 600 mg/l (average), 1,200 mg/l maximum - Heavy metals (total) 5 mg/l^a - pH 6-9^b - Phenols 0.5 mg/l - Sulfides 1 mg/l - Total hydrocarbon content 10 mg/l - Total suspended solids 35 mg/l
Hydrotest water	<p>Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline</p> <p>For discharge to surface waters or to land:</p> <ul style="list-style-type: none"> - 5-day Biochemical oxygen demand 25 mg/l - Chemical oxygen demand 125 mg/l - Chlorides 600 mg/l (average), 1,200 mg/l maximum - Heavy metals (total) 5 mg/l - pH 6-9 - Phenols 0.5 mg/l - Sulfides 1 mg/l - Total hydrocarbon content 10 mg/l - Total suspended solids 35 mg/l
Completion and well work-over fluids	<p>Treatment and disposal in accordance with applicable standards provided in the IFC EHS Onshore Oil and Gas Development guideline</p> <p>For discharge to surface waters or to land:</p> <ul style="list-style-type: none"> - pH 6-9 - Total hydrocarbon content 10 mg/l
Storm water drainage	<p>Storm water runoff should be treated through an oil / water separation system able to achieve oil and grease concentration of 10 mg/l</p>
Cooling water	<p>The effluent should result in a temperature increase of no more than 3°C at edge of the zone where initial mixing and dilution take place; where the zone is not defined, use 100 meters from point of discharge</p>
Sewage	<p>Holding and discharge to municipal or centralized wastewater treatment systems or onboard treatment to achieve:</p> <ul style="list-style-type: none"> - 5-day Biochemical oxygen demand 30 mg/l - Chemical oxygen demand 125 mg/l - Oil and grease 10 mg/l - pH 6-9 - Total coliform bacteria 400/100 ml - Total nitrogen 10 mg/l - Total phosphorus 2 mg/l - Total suspended solids 50 mg/l -
Air emissions	<p>Achieve WHO ambient air quality guidelines, and apply the following guideline value to emissions:</p> <ul style="list-style-type: none"> - Hydrogen sulfide 5 mg/Nm³^c

a Heavy metals include: Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, Vanadium and Zinc

b Standard unit

c Milligrams per normal cubic meter at specified temperature and pressure

3.3 *INTERNATIONAL STANDARDS, GUIDELINES AND TREATIES/CONVENTIONS RELEVANT TO THE PROJECT*

In addition to national legislation, a range of international standards, including IFC Performance Standards (IFC PS) and the World Bank Guidelines will be considered for the Project. These standards are set to complement national legislation and ensure the Project is conducted under best practices in a way that minimises risks, impacts and ensures compliance and fair practices.

The following international guidelines and standards will be considered for the EIA Study of the Project:

- IFC PS (2012): The IFC PS represent the 'policy framework' for the EIA and sustainable environmental management for the Project, whereas the World Bank Group's EHS Guidelines provide guidance on general and industry best practice as well as recommended numerical limits for emissions to the atmosphere, noise, liquid and solid wastes, hazardous wastes, health and safety, and other aspects of industrial facilities and other types of development projects;
- World Bank Group (WBG) Environmental Health and Safety (EHS) General Guidelines (2007): The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs;
- WBG EHS Guidelines for Onshore Oil and Gas Development (2007); and
- Relevant international treaties to which Myanmar is a signatory, including those related to waste management and biodiversity conservation.

This section provides the detailed descriptions of re-development and EOR programme to be conducted within the Mann Field. Information provided in this section is based on those made available during preparation of this EIA Report.

4.1 OIL FIELD DETAILS

The Mann Field is located in Central Myanmar in the northwest of Magwe Division. The field is about 16 km long and 1.5 km wide, covering an area of ~82 km² within Block MOGE 2. The Mann Field is generally flat at ~60 m above sea level, with the southern and most of the southwestern part straddling low hills. The Project Site is illustrated in *Figure 1.1*. Coordinates of the Mann Field are provided in *Table 4.1* below.

Table 4.1 Block Mann Field Coordinates

Point	Latitude	Longitude
1	689303.42	2249525.16
2	693527.28	2250791.28
3	697062.53	2231386.30
4	697565.00	2229993.20
5	696839.00	2229985.00
6	696690.60	2230260.10
7	695826.40	2229635.30
8	695390.70	2229630.40
9	691733.26	2236632.30

The Mann Field, discovered in 1970 by MOGE, currently includes 672 wells of which 305 were producing as of December 2017 while the remaining wells were shut-in. The total produced oil and associated gas from the Production Enhancement Project is 13.2 MMbbls, including 8 MMbbls above the normal decline curve, and 13.7 Bcf gas as of December 2017.

Facilities and equipment maintained and managed by MPRL E&P include:

- A camp inclusive with accommodation and health caring facilities for ~+/- 150 staff (MPRL E&P) and office space for +/- 20 employees, MOGE's crews 180 & MOGE's staffs 816;
- One drilling rig, one workover rig and five pulling units;
- A warehouse, including all facilities for material planning, inventory control, loading and offloading facilities, transportation and tubular inspection;
- A workshop for repairing, rebuilding, overhauling and maintenance of drilling rigs, workover rigs, pulling units, rolling stock and ancillary

mechanical equipment, as well as installation, repair and maintenance of all motors, generators, lighting systems and electrical devices;

- A workshop with dedicated equipment and manpower to prepare well sites, construction of access to sites and maintenance of roads, construction of camps and special projects, such as the maintenance and upgrade of the GOCS's, construction of state-of-the-art cellars of producing wells, etc; and
- A workshop with dedicated equipment and manpower to repair downhole devices and equipment, as well as repair and maintenance of hoisting systems and masts of pulling units.

4.2 *ENHANCED OIL RECOVERY*

4.2.1 *General*

Crude oil development and production in oil reservoirs can include up to three distinct phases: primary, secondary and tertiary (or enhanced) recovery (*Figure 4.1*). During primary recovery, the natural pressure of the reservoir or gravity drive oil into the wellbore, combined with artificial lift techniques (eg pumps) which bring the oil to the surface. Secondary recovery techniques extend a field's productive life generally by additional energy, such as injecting water or gas, supplied to the oil reservoir to recovery more oil and gas. Typically by-products from oil are the associated gas and water which are waste streams to be managed at surface or re-injected into the reservoir. Treatment is recommended if re-injecting fluids back into the reservoir to ensure that no plugging or precipitation reactions occur in the formation.

Figure 4.1 Methods of Crude Oil Recovery

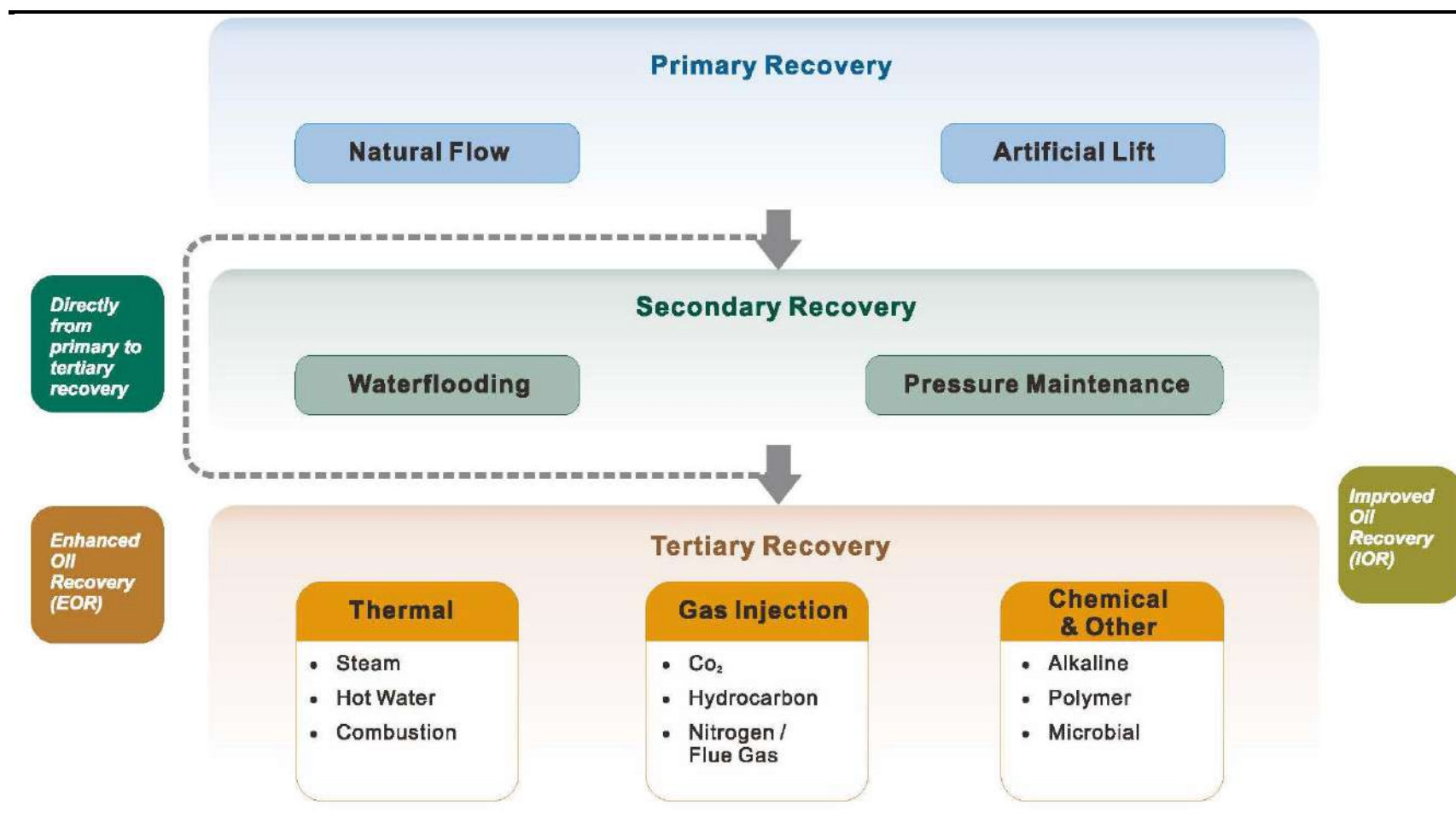
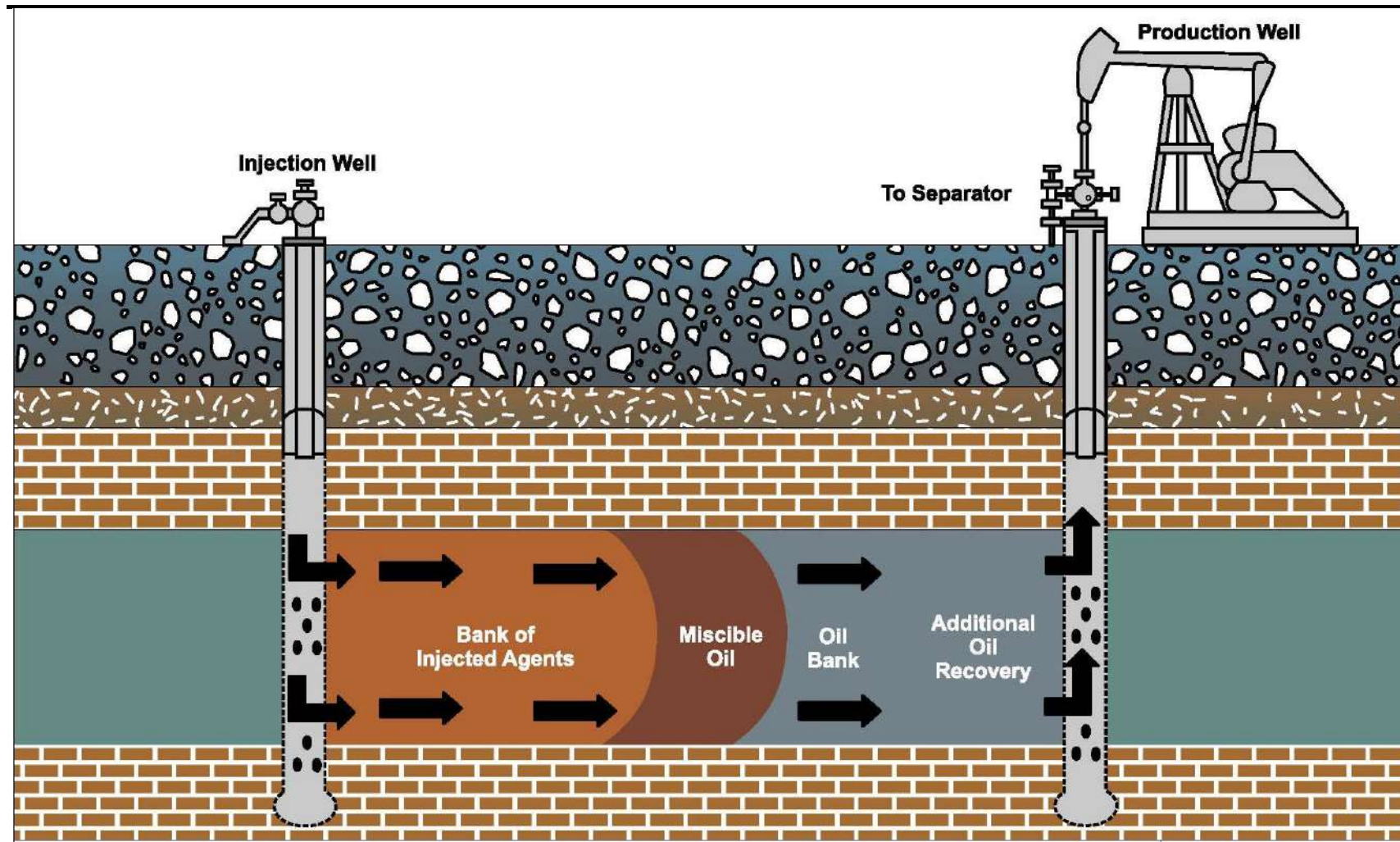


Figure 4.2 Schematic Diagram of Enhanced Oil Recovery (EOR)



To improve the performance of existing oil fields, tertiary recovery or EOR will be adopted to access reserves that were previously unattainable due to geology or expense, or when primary and secondary recovery techniques have been exhausted. EOR is chiefly concerned with affecting the mobility of the oil through the drilling process, late in the life span of the well. It primarily does this through the use of injecting fluids in the drilling process, such as steam, air, detergents, carbon dioxide or microbes, to recovery additional oil from the reservoir. There are three primary techniques of EOR:

- Gas injection: it involves the use of gases such as natural gas, nitrogen, or carbon dioxide (CO₂) in which a miscible displacement process maintains reservoir pressure and improves oil displacement by reducing the interfacial tension between oil and water.
- Thermal injection: it involves the introduction of heat to the reservoir to vaporize some of the oil by reducing oil viscosity and hence improving mobility ratio; and,
- Chemical injection: it involves the use of long-chained molecules called polymers to aid mobility and the reduction of surface tension to increase production.

Among the three methodologies of injection methods, chemical injection is only feasible according to the technical constraints and the existing facilities due to the following reasons.

- The main material requirement for the gas injection method is high pressure and volume of natural gas. Currently, the gas production from Mann Field which is around 2 MMcfd which are provided to the refinery for the production of liquefied petroleum gas (LPG). The production volume is inadequate for injecting to the formation. It will also require need large compressors to generate high pressure.
- Thermal injection requires heat energy which will consume large amount of natural gas. Due to the high demand of natural gas locally in Myanmar and the large amount requires for EOR, thermal injection is not considered technically and economically feasible.

Considering the above, EOR by means of chemical injection using alkaline and polymer are the proposed technique to be employed for the Mann Field. The concentrations of these chemical additives are very low in concentration and will be recycled by continuous re-injection to minimize the impacts to environment.

The schematic of the EOR work is presented in *Figure 4.2*.

Locations of the potential wells that are being considering for the EOR programme are shown in *Figure 4.3* and the potential number is 305 wells.

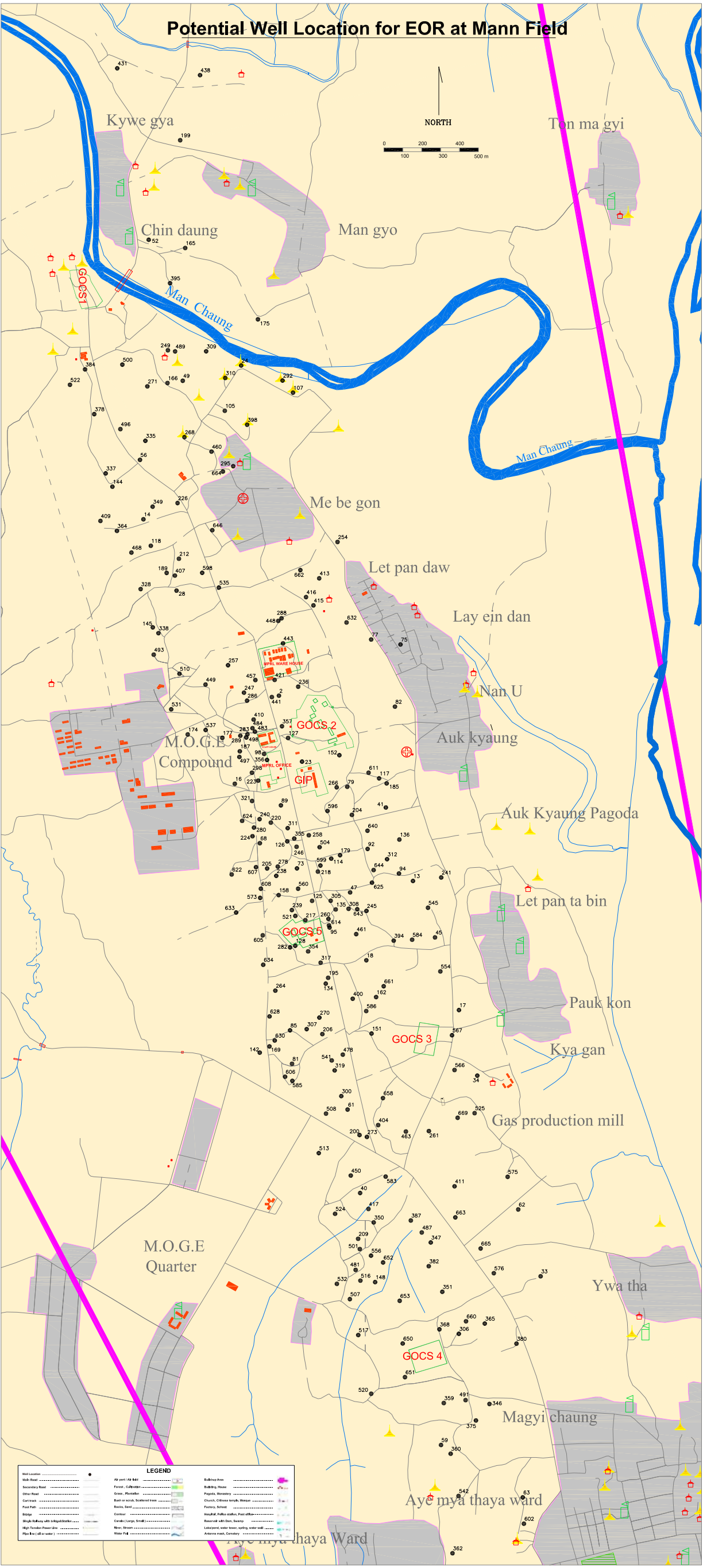


Figure 4.3

Potential Well Location for EOR at Mann Field

4.2.2

Construction

Additional facilities are necessary to be constructed for the enhanced recovery of oil from existing wells within the Mann Field. These will include injection wells and associated equipment, pipelines and chemical storage warehouses. Most of these additional facilities will be similar to those used in the existing routine oil field operation within the Mann Field, except for the injection wells and associated equipment used for chemical injection.

It is expected that the construction of these new facilities will mostly be undertaken on formed land where existing facilities are located. The construction activities will involve the use of Powered Mechanical Equipment (PME) such as generators, cranes, forklifts, rig and pulling units which would be the sources of air emission and noise. Ground breaking, excavation and drilling would be the major activities for the construction of the injection wells. Construction activities will also involve infill well drilling, deepening operations, pipe laying, welding, scaffolding and building of the chemical storage warehouses.

A total of 50 workers will be required for construction which are existing workers of the Mann Field. No additional workforce will thus be required for the construction activities. As such, no additional labour camps will be required.

4.2.3

Operations

During operation, it is expected that chemicals will be required to be transported to the oil field and stored in the chemical storage warehouse. Chemicals will be supplied to the injection wells through trucks. Chemicals will be imported from China / United States via Singapore.

Displacing agent (e.g. detergent in this Project) will be injected into the reservoirs via the injection wells for enhanced oil recovery. The displacing agent will interact with the reservoir rock/ oil system to create condition favourable for residual oil recovery by reducing the interfacial tension between the displacing agent and oil, increasing the capillary forces and water viscosity. Ultimately, oil viscosity reduced and then displaced to the production well for refinery process. The chemicals that will be used include alkaline and polymers. These are common chemicals used for EOR adopting chemical injections. Information regarding application and toxicity of these chemicals are shown in *Table 4.2* below.

Table 4.2 *Application and Toxicity of Chemicals that may be used for the EOR Process*

Chemical	Application	Dosage per event	Toxicological information	Biodegradable?
Alkaline (sodium hydroxide, sodium carbonate, sodium silicate or potassium hydroxide)	Alkaline chemical reacts with certain types of oils, forming surfactants inside the reservoir . Eventually, the surfactants reduce the interfacial tension between oil and water and trigger an increase in oil production.	27 lb. of alkali per barrel	To be capable of causing significant corrosive injury. Alkaline agents penetrate local tissue rapidly and deeply, causing liquefactive necrosis. Unlike acidic products, very little pain may be evident upon initial contact with an alkaline product, which may encourage further contact and ultimately result in more extensive exposures.	Not relevant for inorganic substances.
Polymer Hydrolyzed Polyacrylamides (HPAM) and Xanthan	The principal beneficial property of polymer solutions for use in flooding oil reservoirs is the aqueous solution's enhanced viscosity. Aqueous polymer solutions that are used for conformance improvement flooding normally exhibit non-Newtonian viscosity properties.	1,000mg/L and relative molecular weight of polymer is between 1.2×10^7 and 1.6×10^7 . Polymer dosage is 640PV.mg/L and injection rate is 0.14 PV/a. Injection-production well spacing is between 150meters and 175meters.	Skin contact: May cause skin irritation Skin Absorption: May be harmful if absorbed through the skin. Eye Contact: May cause eye irritation. Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled. Ingestion: May be harmful if swallowed.	Yes Breaks down after its intended purpose to result in natural byproducts such as gases (CO ₂ , N ₂), water, biomass, and inorganic salts.

During operation, gas venting will be undertaken at approximately 80 wells in the Mann Field. Venting is the controlled release of gases into the atmosphere in the course of oil and gas production operations. These gases may be natural gas or other hydrocarbon vapour, water vapour, and other gases, such as carbon dioxide, separated in the processing of oil or natural gas. In venting, the natural gases associated with the oil production are released directly to the atmosphere and not burned. In addition, under abnormal conditions, the control and safety systems must release gas to the emergency vent to prevent hazards to the employees or public.

Enhanced recovery operations would result in brines and chemically complex produced waters. In current level of environmental controls, the amount of chemical injected as part of the chemical treatment would be designed to be retained by adsorption, channelling and dilution in the petroleum reservoir. Chemicals dissolved in the produced brines will be reinjected into the reservoir. Chemicals dissolved in the oil will be transported to the refinery to be processed as a part of the crude oil. Produced water will be reinjected in shut in wells. Further descriptions of the wastewater management system are provided in *Section 4.3* below.

A total of 500 workers will be required for operation which are existing workers of the Mann Field. No additional workforce will thus be required for the operation activities. As such, no additional labour camps will be required.

4.3

RE-DEVELOPMENT OF MANN FIELD

Under the PCC, MPRL E&P is undertaking a re-development programme of the Mann Field to improve the environmental performance of the operations. This programme involves the following components:

- 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;
- Deepening Wells – to deepen tens to hundreds of foot from existing well bore by drilling;
- 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 (*Table 4.3*), etc.
- 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. Re-perforation creates a channel between the pay zone and the wellbore, causing oil and gas to flow to the wellbore easily. Before re-perforations are conducted, scrapping, bailing, and if necessary drilling, will be undertaken first to remove debris at the desired depth. During re-perforations, explosive materials contained in bullets will be used at the desired depth to create the perforations. The bullets will be imported, stored and handled by government approved supplier. Explosives that may be used in the bullet are categorized as follows and the type of explosive in the bullets will be depended on supplier's specifications:
 - Low explosives, for low combustion pressures and gunpowder is the most common example
 - High explosives, subdivided into primary high explosives (or initiator explosives) and secondary high explosives
 - Primary high explosives includes generally high-density compounds of metals and nitrogen
 - Secondary high Explosives are generally organic compounds of nitrogen and oxygen and including RDX ⁽¹⁾, HMX ⁽²⁾, PS (picryl sulfone), HNS (hexanitrostilbene), Composition B (60% RDX, 40% trinitrotoluene), Amoniumnitrate (fertilizer, also used in seismic operations)
- Development of Produced Water Management System – produced water will be injected into shut in wells.

Representative photos showing the facilities before and after improvement in the Mann Field are shown in *Figure 4.5*.

⁽¹⁾ RDX – Research Department Explosive, also known as cyclotrimethylenetrinitramine, is the organic compound with the formula (O₂NNCH₂). It is widely used as an explosive.

⁽²⁾ HMX - also called octogen, is a nitroamine high explosive, chemically related to RDX.

Table 4.3 *Application and Toxicity of Substances that may be used for the Chemical Treatment Process*

Chemical	Application	Dosage per event	Toxicological information	Biodegradable?
Paraffin Dispersant	To clean up down hole, flow lines and storage tank by enhancing the heavy oil flow such that the production for wells and pipelines can be increased.	Few gallons	Insufficient information. One of the major ingredient of this chemical is toluene which could lead to acute lethal effect on mammals at 5,100 ppm for LC ₅₀ and No Observed Adverse Effect Level (NOAEL) at 200 ppm	This product is considered relatively stable
Paraffin Inhibitor	Paraffin Inhibitor is used to improve the pumpability of a wide range of waxy crude oil. It acts as the solvent by blending with crude oil at a ratio of 25% of inhibitor to the annulus and socking for about 4-hour.	25 % of Paraffin Inhibitor for each portion of crude oil	Hazardous if material is swallowed. Avoid contact with eyes, skin and clothing. Need to wash thoroughly after handling.	This product is considered relatively stable. It will be inside the pore throat of formation depending on drilled depth which is far from ground water above.
Pour Point Depressant (PPD) (Airflow 1535)	PPD is a polymer to control wax crystal formation in order to improve oil flow performance. It will be applied in drip by the beam driven pump to the annulus continuously.	Control at low dosage depending on the crude oil and the desired pour point	Material is not thought to produce respiratory irritation, however, need to handle according to the MSDS procedures. It is diluted with crude oil operationally	This product is considered relatively stable. It will be inside the pore throat of formation depending on drilled depth which is far from ground water above.
Biological Liquid Enzyme	Application	Dosage per event	Toxicological information	Biodegradable?

Chemical	Application	Dosage per event	Toxicological information	Biodegradable?
GreenZyme	GreenZyme is a biological liquid enzyme. It is a protein-based non-living catalyst that is used to enhance production of oil in wells. It will be mixed with other additives (e.g. 2 % KCl, filtered water & mild acetic acid) and then inject into the well at low pressure by the injection pump.	Control at low dosage	Considered non-hazardous and relatively harmless	Yes

Figure 4.4 Waste Management Plan in Mann Field

Mann Field Solid Waste Management Flow Chart

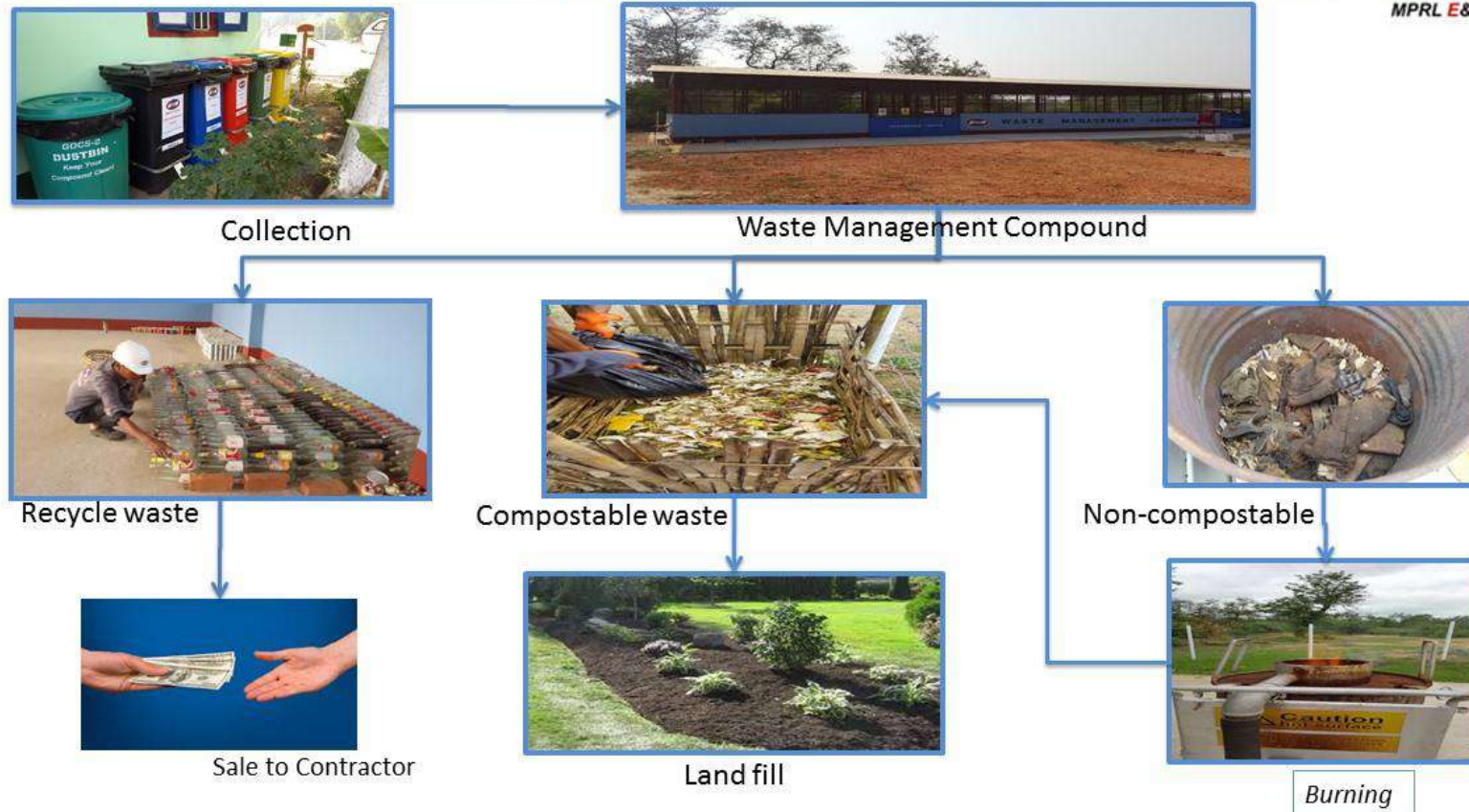


Figure 4.5 Proposed Re-development Activities in Mann Field



The re-development activities are expected to be mostly undertaken on formed land where existing facilities are located and will involve the use of PMEs which would be the sources of air emission and noise. Ground breaking, excavation and drilling would be the major activities for the construction of the dumping, infill drilling and deepen wells. Construction activities will also involve pipe laying, installation of the produced water management facilities and excavation of drain pits.

A total of 50 workers will be used for construction while 500 workers will be used for operation which are existing workers of the Mann Field. No additional workforce will be required for the construction and operation activities of the re-development programme. As such, no additional labour camps will be required.

4.4 RE-DEVELOPMENT AND EOR PROGRAMME

MPRL E&P planned to execute feasible EOR methods in Mann Field to maintain the production decline for following years. As the tentative schedule, field operation team will commence five (5) wells per annual by injecting produced formation water to selected wells. The candidate wells will be from current shut-off wells depend on the selection criteria such as sub-surface overview, well bore mechanical feasibility and accessibility. Those candidate wells are spreading throughout the Mann Field within the field boundary and the well selection process is ongoing.

The re-development programme is on-going activities of the Mann Field.

4.5 MATERIALS, EQUIPMENT, SUPPLIES & LOGISTICS

It is assumed that the majority of material, supplies and logistics necessary to undertake the programme of re-development and EOR are already available from the Mann Field with its existing operation which are listed in *Table 4.3* below. Transportation of labour and materials will mainly use trucks, buses or cars. Additional materials and equipment supplies will be imported from overseas and then delivered to Mann Field via the existing highways (e.g. Yangon-Mandalay Highway and Ayeyarwady Bridge). For river transport, the existing facility at Ywar Thar Foreshore will be used (*Figure 4.6*). New roads may be built and it is expected that these roads will have appropriate drainage. A traffic management plan will be developed to minimise the impact associated with road traffic.

Table 4.3 *Potential Plant Inventory for the Project*

Unit Name	Engine type	Quantity
GD-2 Drilling Rig	D379	3
P-100	3408 CAT	1
P-82	3306 CAT	1
P-75	Cummins N855-P235	1
P-70	Cummins N855-P250	1
P-69	Cummins N855-P250	1
P-65	Detroit 6V71	1
Tractor		4
35T mobile crane	Nissan RD8	1
Loader	CAT	1
Forklift	CAT	1
Wheel Loader	CAT	1
Grader	CAT	1
Bull Dozer	CAT	1
Circulation Mud Pump	CAT	1
OPI Mud Pump	Detroit	1
Main Mud Pump	Detroit	1
King Power Swivel	CAT	1
Power Pack	F6L912	2
Welding Machine	Deutz	2
Compressor	CAT	1
Vehicle		30

Figure 4.6 *Photo of Existing Bridge and Water Transport at Magway nearby Mann Field*



4.6 *CONSIDERATION OF ALTERNATIVES*

Consideration of Project options and alternatives is a fundamental requirement in the planning of any project as a means of avoiding or reducing

adverse environmental impacts and maximising or enhancing project benefits. Several options that have been / are considering for the Project include the following:

- No Project alternative has been considered - For the re-development programme, it is expected that the environmental performance of the oil field operations will not be improved without the Project. As such, it is considered necessary to undertake the re-development programme. The EOR and re-development programme will enhance the recovery of oil from the wells using chemical injections. Without the EOR and re-development programme, more extensive well operations, such as acquiring new 3D seismic survey data and drilling of more deep exploration wells, may be required to reach increase the same production level. This may lead to more significant environmental impacts when compared to the EOR and redevelopment programme.
- Use of chemicals for EOR programme – the chemicals selected are those commonly used for similar purpose and thus selected for the Project.
- Construction of new facilities versus improvement / refurbishments of existing facilities – under the re-development programme, it is proposed to improve / refurbish existing facilities as far as possible instead of constructing new facilities. Generally, improvement / refurbishments of existing facilities will involve less PMEs to be used, thus would have gaseous and noise emission reduced when compared to construction of new facilities. In addition, improvement / refurbishments of existing facilities will mostly be undertaken on formed land which will reduce the extent of direct loss of natural habitats.

Many of these options are of relevance to potential environmental impacts. Therefore, the relative impact of each option is required to be considered within the EIA Study in order to demonstrate that the impact is as low as reasonably practicable (ALARP).

This section provides information on the bio-physical baseline characteristics and conditions in the Project Area. The discussion is limited to the factors and environmental components that could have a direct impact on the Project, or which may be impacted by the Project. The baseline is presented as follows:

- Physical Environment; and,
- Biological Environment.

5.1 *SETTING THE STUDY LIMITS*

For the purposes of defining the Project Area, environmental components within the entire Mann Field, where the enhanced oil recovery and redevelopment activities will be carried out, have been considered as appropriate. Other environmental resources / components located further away from the block have also been described where relevant to this EIA.

5.2 *OBJECTIVES AND METHODOLOGY*

The objectives of the baseline review and data collection are as follows:

- To characterise the baseline environmental components of the Project Area which may potentially be affected by the Project activities;
- To provide baseline information for the assessment of potential impacts from the Project to the environmental components of the Project Area; and
- To provide baseline data before commencement of the Project which may be used for future monitoring of the Project impacts by comparing the baseline data within the impact monitoring (i.e. obtained during Project implementation) and post-project monitoring data (i.e. obtained after Project completion).

The information presented has been obtained through desktop research on secondary information and primary data collection through baseline field surveys. Baseline field surveys were conducted in May 2015 (wet season) within Mann Field. Detailed methodologies of the baseline field surveys are presented in the relevant sections under which the baseline findings are discussed.

The information provided in this section is based on a desktop review of published information and through review of available MPRL E&P, ERM and REM in-house literature. It is important to note that literature on the physical and biological environment of Myanmar are both limited spatially and temporally, and are arguably outdated in many areas / disciplines.

5.3.1 *Physical Environment*

Geography

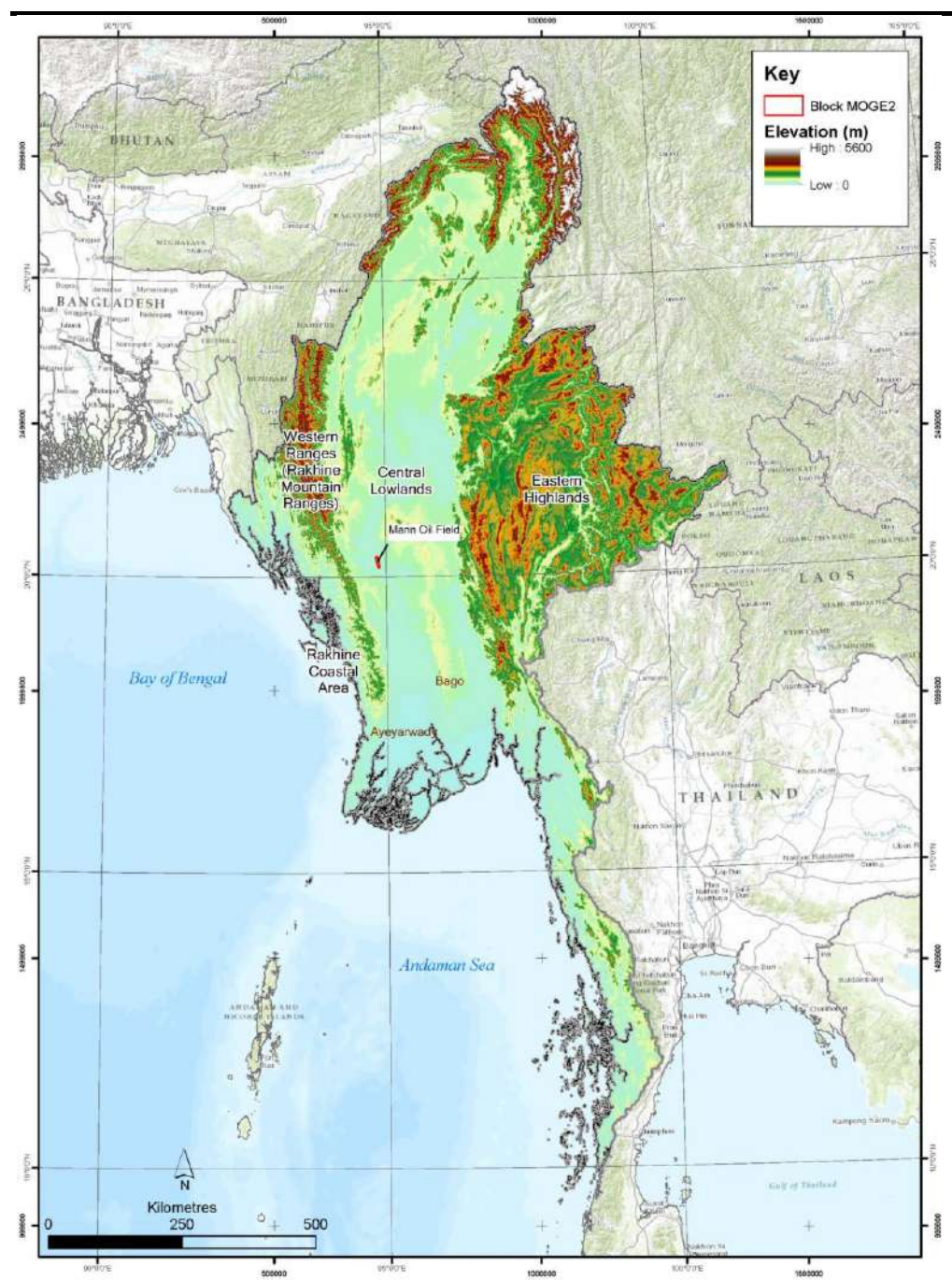
The main geographic features of Myanmar can be divided into four physiogeographic zones, characterized by elongated north-south trend regions (*Figure 5.1*). The four physiogeographic zones are:

- Rakhine Coastal Area;
- Western Ranges (Rakhine Mountain Ranges);
- Central Lowlands; and
- Eastern Highlands.

A major topographical feature of Myanmar is the Ayeyarwady River watershed. The Ayeyarwady Delta is considered very fertile and covers about 47,000 km². Hkakabo Razi, which is the highest peak in Southeast Asia at 5,881 m, is located in Myanmar. The Arakan Yoma range (a barrier between India and Myanmar) has peaks that range between 915 m and 1,525 m. Almost half of Myanmar is covered in forests that are comprised of teak, rubber, cinchona, acacia, bamboo, ironwood, mangrove, coconut and betel palm. The forests in the northern highlands are comprised of oak, pine and many varieties of rhododendron. There are many tropical fruits including citrus, bananas, mangoes and guavas in the coastal region.

The topography of Magway Division is generally undulating with the rolling topography, except for the Taungdwingyi. Mann Field is situated on the northern plunging end of the ~48 km long Mann-Minbu structure trend in the proved oil province of the Central Lowland where is a relatively low-lying terrain drained by the Ayeyarwady River and its major tributaries. The length and width of the producing area of Mann Field is about ~16 km and 1.6 km, respectively.

Figure 5.1 Myanmar's Geographic Zones



Climate and Meteorology

Myanmar is characterised by a dominant tropical monsoon climate. Seasons can generally be classified as into a cool dry season from December to April and a hot rainy season from May through November which is driven by the rainy southwest monsoon ⁽¹⁾. The southern part of Myanmar is the first part affected by the southwest monsoon starting in May and the entire country is experiencing the rainy season by the beginning of June. Climate variability

⁽¹⁾ Kye Baroang (2013) Background Paper No. 1 - Myanmar Bio-Physical Characterization: Summary of Findings and Issues to Explore.

within the country is largely controlled by topography which affects exposure to the southwest monsoon.

Mann Field is in the Magway Division which borders the Mandalay Region on the east, Sagaing Region on the north, Chin State and Rakhine State on the west and Bago Region on the south. The area of the Magway Division is ~44,820 km² and its capital is the Magway City ⁽¹⁾. The Mann Field covers an area of ~82 km². The area is generally flat, around 60 m above sea level, with the southern and most of the southwest part straddling low hills (*Figure 5.2*). The area is mostly covered by small (typically one acre) fields of bean, sesame, sunflower, groundnut crops and paddy fields where water is available for more than 3-4 months of the year. Fields and large swaths of ground are often left fallow and invaded by endemic thorny bushes. The soil is mostly sandy and interspersed with gravel. The southern boundary of the Mann Field lies below the city of Minbu where it terminates at mud volcanoes near the Sabwet Chaung.

Figure 5.2 *Photo of Geomorphology of Mann Field*



The Magway Division falls in the dry zone area of central Myanmar. It is being categorised as *Tropical Savanna Climate (Köppen climate classification Aw)*. The average temperature in Magway Division is 27.6 °C with the warmest month in April (average temperature 32.4 °C) and the coolest month in January (average temperature 22.0 °C) ⁽²⁾. Heavy rain falls in the summer particularly in the month of September with average rainfall of 145mm has been recorded in the region ⁽³⁾.

⁽¹⁾ <http://www.myanmars.net/myanmar/magway-division.htm>, accessed 21 Oct 2014

⁽²⁾ <http://en.climate-data.org/location/308/>

⁽³⁾ <http://en.climate-data.org/location/308/>

The average temperature and rainfall of the Magway Division are presented in *Figures 5.3*.

Summers in Minbu district including Pwint Phyu township and Saku are generally sweltering, humid and partly cloudy. For winters, they are generally of short duration but mostly clear. The Minbu area is generally dry year round. Over the course of the year, the temperature typically varies from 10°C to 36°C and average annual rainfall is 800 mm (in *figure 5.4*)

Figure 5.3 *Average Monthly Temperature and Rainfall Chart of Magwe, Myanmar (1982 – 2012) (Sources: <http://en.climate-data.org/location/308/>)*

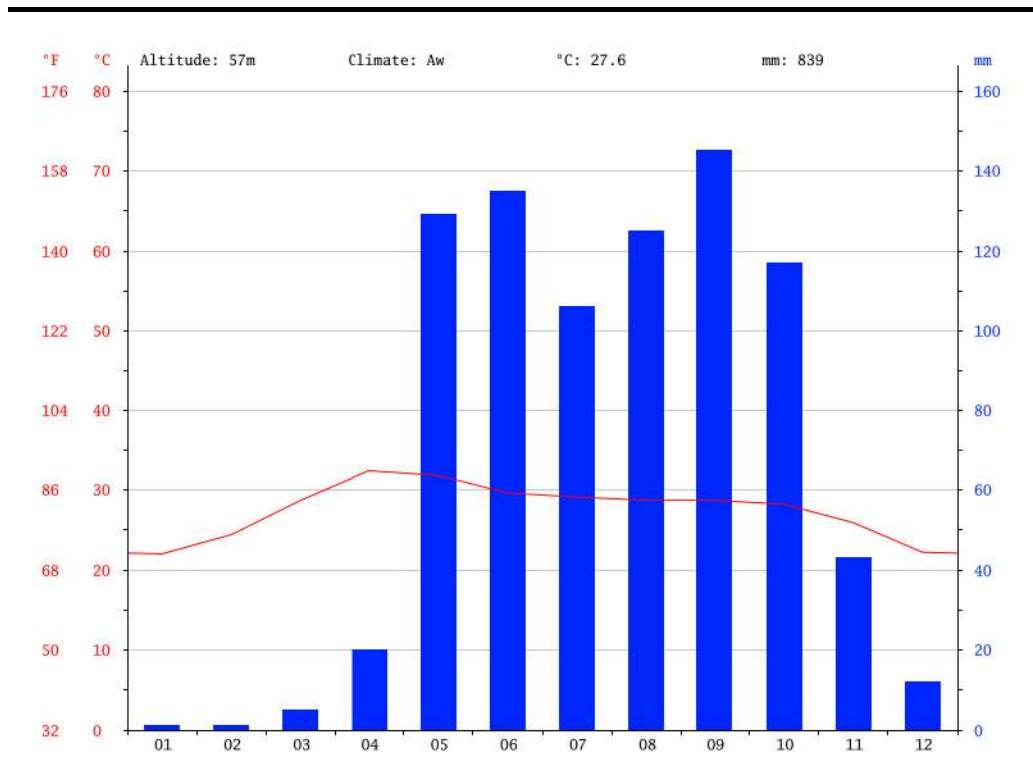
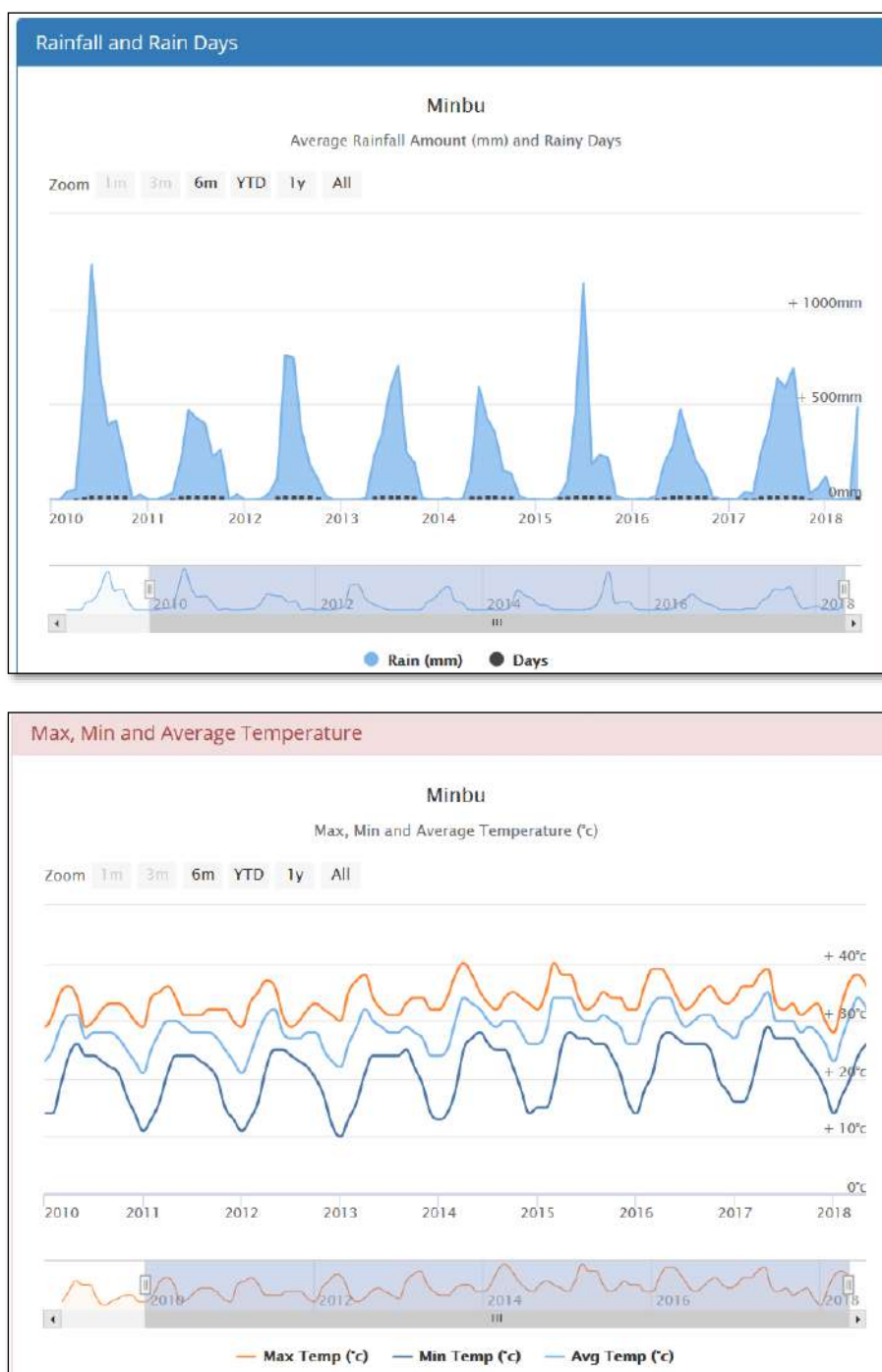


Figure 5.4 *Average Temperature and Annual Rainfall in Minbu (Source: www.worldweatheronline.com)*



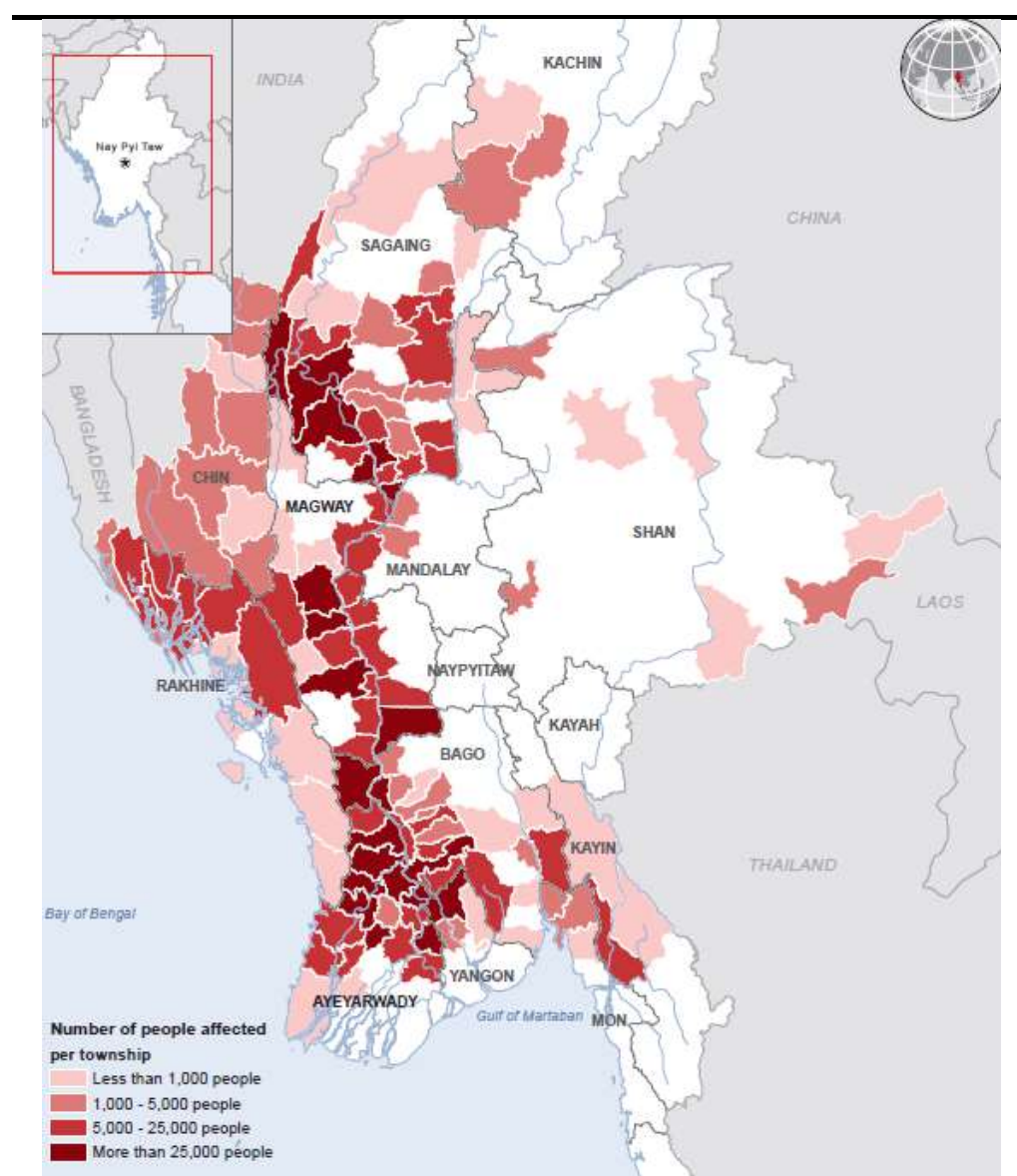
Tropical Cyclones and Flooding

A tropical cyclone is a tropical storm with rotating winds at speeds of greater than 119 km per hour. Myanmar is vulnerable to cyclones, which often originate in the Southern Andaman Sea and enter the Bay of Bengal. These cyclones can result in heavy rains, storms, and floods. There are two prominent cyclone seasons for the country, between April to May and October to December. Historically, cyclone-related disasters tend to occur every 3 to

4 years in this region and on average every ten years a major cyclone makes a landfall in Myanmar ⁽¹⁾.

While the available desktop information did not appear to indicate that the area of Mann Field is frequently affected by tropical cyclone, it should be noted that the Cyclone Komen which hit Myanmar in July 2015 has brought high winds and further heavy rain to several states and regions in Western and northern Myanmar, with twelve regions and states affected by flooding, including the northern and southern parts of Magway Division (Figure 5.5).

Figure 5.5 *Flood Affected Areas in July and August 2015 under the Impact of Cyclone Komen ⁽²⁾.*



- (1) Asian Disaster Reduction Centre, 2003. Theilen-Willige B., (2009) Natural Hazard Assessment of SW Myanmar – A contribution of remote sensing and GIS methods to the detection of areas vulnerable to earthquakes and Tsunami Cyclone Flooding. Science of Tsunami Hazards., Vol. 28 No. 2, page 108
- (2) http://reliefweb.int/sites/reliefweb.int/files/resources/Myanmar_Flood_Affected%20areas_20Aug2015.pdf

Climate Change Projections

Projected climate changes over Myanmar have been studied based on both General Circulation Model (GCMs) used in the Intergovernmental Panel on Climate Change (IPCC's) fourth assessment, and using dynamic downscaling with regional climate models forced by the GCMs ⁽¹⁾.

Myanmar has been witnessing changing weather events in almost every year during the last two three decades. These include the onset, withdrawal, duration and intensity of monsoon, and the frequency of the monsoon depressions ⁽²⁾. The frequency of hot days and nights is expected to increase, while the frequency of cold days/nights will decrease.

Earthquakes

A review of available literature has shown that Myanmar is seismologically unstable and vulnerable to earthquakes ⁽³⁾. Historic records show that at least 15 major earthquakes with magnitudes $M \geq 7.0$ have occurred in Myanmar in the last hundred years (*Figure 5.6*).

Historical records of earthquakes are noted for the Magway Division but not nearby area of Mann Field. The most recent earthquake in Magway Division with a magnitude of 5.4 is recorded on 21 July 2015 at Chauk, which is located > 60 km from the Mann Field.

Air Quality

Secondary data are not available on ambient air quality in the Project Area. The principal sources of emissions to the atmosphere in the immediate vicinity of the Project Area are likely to be from household fires for domestic purposes (i.e. heating and cooking) and exhaust emissions from road transportation and existing oil and gas activities.

Noise

Secondary data are not available on noise in the Project Area. However, the sources of noise pollution are likely to include the road traffic from the nearby main road and existing oil and gas operations.

Soil

The Land Use Division (LUD) of Myanmar Agricultural Service is responsible for carrying out soil surveys, producing soil maps and coordinating the research activities with related agencies for the introduction of soil conservation and land improvement practices. According to the soil analysis

⁽¹⁾ Intergovernmental Panel on Climate Change. IPCC Fourth Assessment Report (AR4), (2007), Climate Change: Synthesis Report

⁽²⁾ Tun Lwin, Khin and Cho Cho Shein., 2006. Hydrology and Meteorology report of Myanmar.

⁽³⁾ Theilen and Pararas-Carayannis (2009) *Op cite*

undertaken by LUD, Myanmar has altogether 24 different soil types which are related with adaptable crops.

The Magway Division, where Mann Field is located, is composed of sedimentary rocks of both Ayeyarwaddy and Bago Groups (*Figure 5.7*). High rates of soil erosion and reduced sediment delivery have contributed to a sedimentation problem throughout the Ayeyarwady River Basin. The sediment budget has broad effects upon several processes of soil erosion in the Ayeyarwady River Basin which are of serious concern. In addition, the Magway Division is located in dry zone area where soils have low fertility and declining levels of organic matter, potassium as well as nitrogen ⁽¹⁾. Available soil moisture holding capacity of the soils of Magway Division is low and with high level of evapo-transpiration, constitute a major constraint to crop growth during periods of low rainfall ⁽²⁾.

Surface Water Quality

The main source of surface water within Magway Division is noted to be the Ayeyarwady River which drains from northwest to southwest and then flows forwards the south. The Mann Field is located on the western boundary of the Ayeyarwady River with the tributaries flowing from west are Yaw, Salin and Mann (*Figure 5.8*). The principal sources of pollution to the Ayeyarwady River are expected to be potential water contamination from agriculture inputs, boat vessel emissions and surface run-off. Agricultural inputs, such as chemical fertilizers and pesticides, are increasingly distributed either partially or wholly by the private sector ⁽³⁾. The Project will also use the existing facility at Ywar Thar Foreshore of the Ayeyarwady River for river transport.

⁽¹⁾ http://archive.lib.cmu.ac.th/full/T/2008/agsys0508wz_ch3.pdf

⁽²⁾ <http://www.fao.org/docrep/010/ag120e/AG120E15.htm>

⁽³⁾ Kan Zaw, Nu Nu Lwin, KhinThida Nyein, and Mya Thandar, 2011. Agricultural Transformation, Institutional Changes, and Rural Development in Ayeyarwady Delta. Economic Research Institute for Asean and East Asia.

Figure 5.6 Earthquake Magnitude and Tectonic Plate Boundary in Myanmar

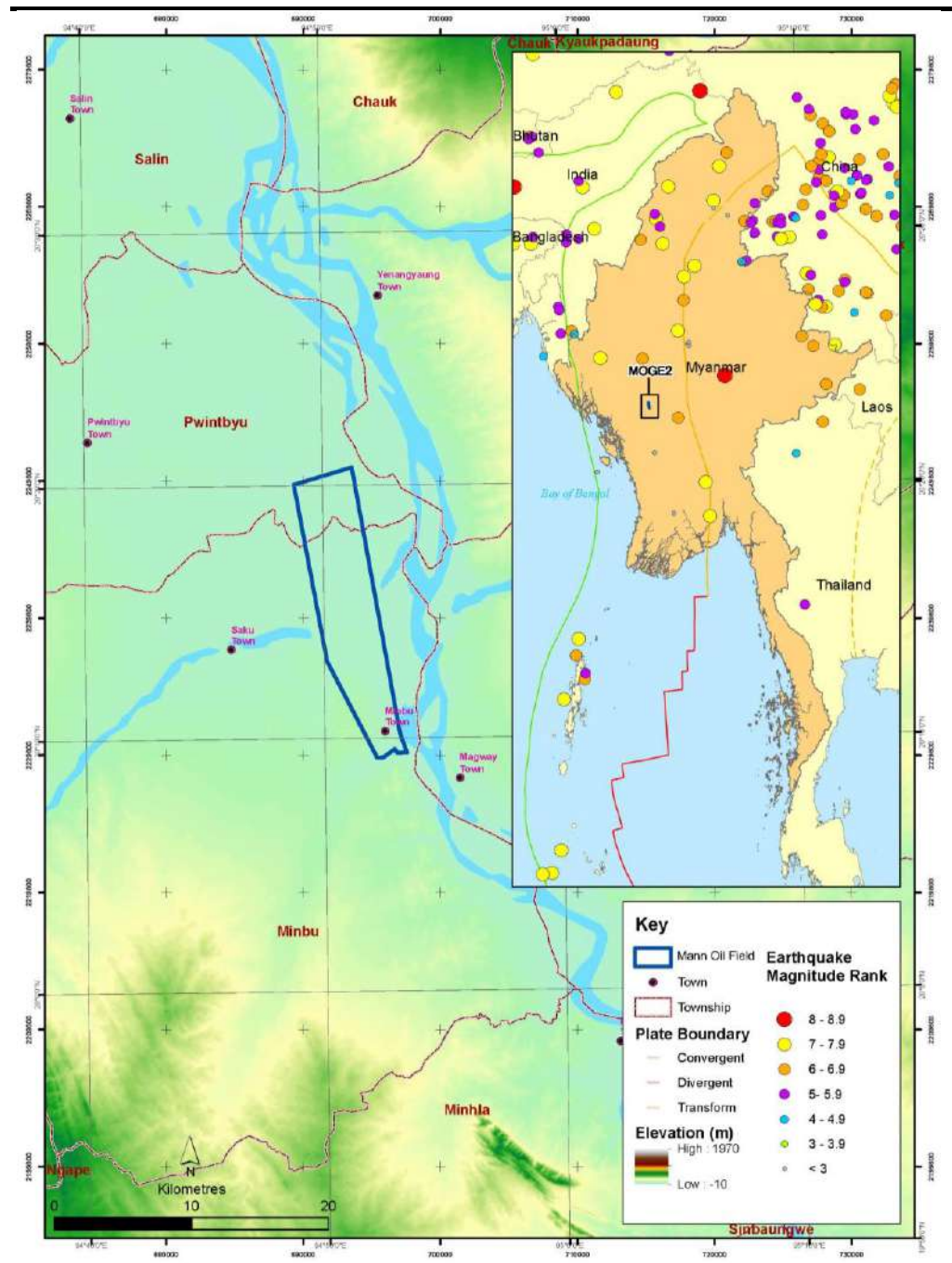
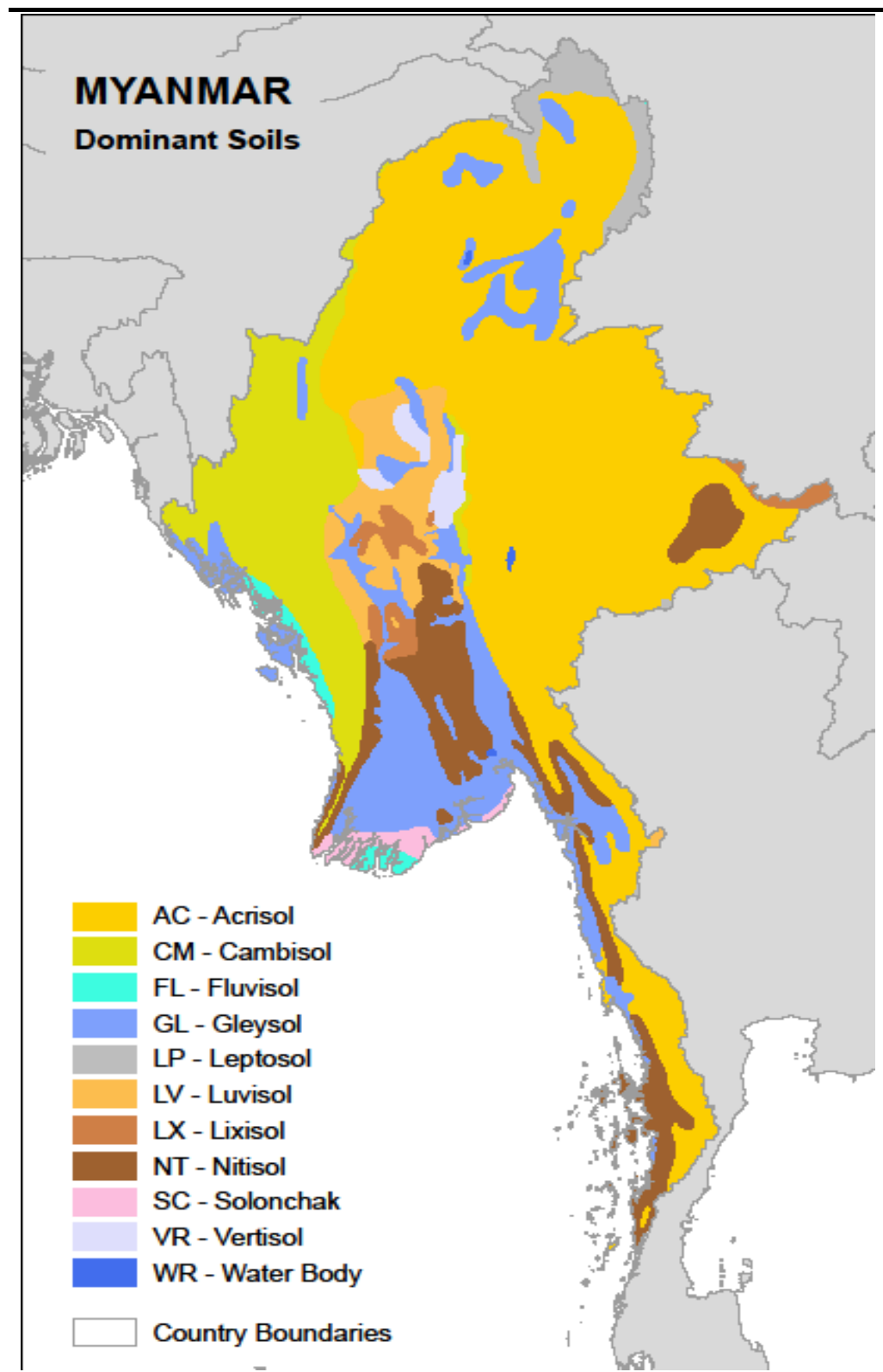


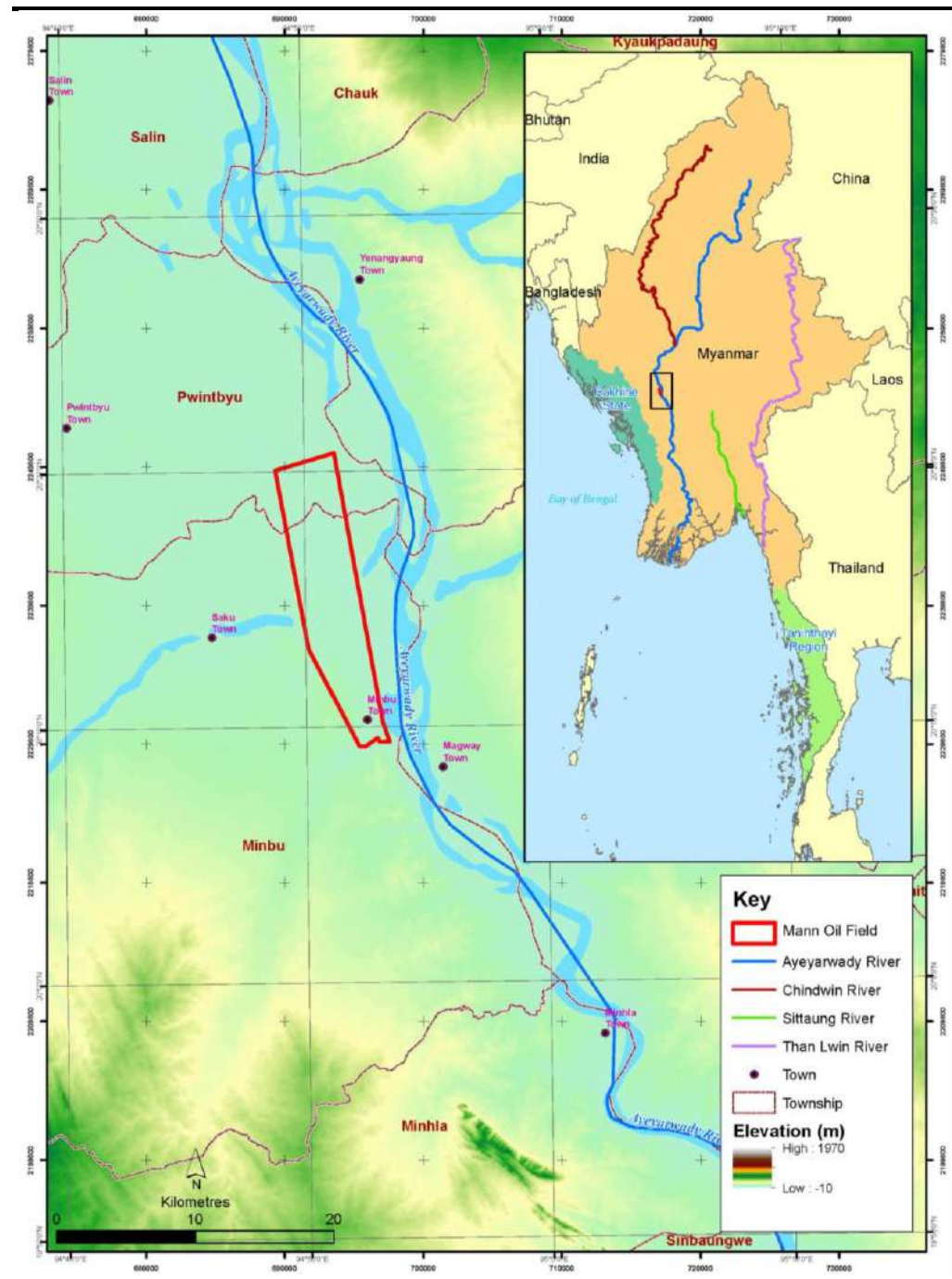
Figure 5.7 Soil Types and Distribution in Myanmar



Source: Reliefweb International (2014) ⁽¹⁾

⁽¹⁾ http://reliefweb.int/sites/reliefweb.int/files/resources/329CF8B14D479D85852574560063A495-2-fao_NTR_mmr080527.pdf accessed, 14 June 2014.

Figure 5.8 River Basin in Myanmar



In Myanmar groundwater resources have been estimated as 454 km³/year; but a large part of this water (about 443 km³/year) comprises the base flow of the rivers and is also accounted for as surface runoff ⁽¹⁾. It was estimated that 91% of the total water withdrawal in Myanmar comes from surface water and 9% from groundwater ⁽²⁾. Currently there is no single institution that is responsible for the overall management of national water resources in the public and private sectors.

The area of Mann Field is located within the Ayeyarwady River Basin which has the highest groundwater potential in Myanmar (*Figure 5.9*).

Groundwater in the region is dependent upon natural recharge from Ayeyarwady River. Villages within Mann Field reported the use of groundwater from deep tube wells and hand dug wells as water supply. Study in the Ayeyarwady Division, which is adjacent to Mann Field and also located within the Lower Ayeyarwady River Basin, has shown that arsenic contamination is a problem occurred in the groundwater of the basin ⁽³⁾. It was observed that 66.6 % of the groundwater samples from wells have arsenic levels of >50 µg/L, which is much higher than the World Health Organization (WHO) guideline value in drinking water (10µg/L) ⁽⁴⁾.

5.3.2 *Biological Environment*

Habitat

Myanmar is well endowed with forests and other natural resources. Forests cover about 40% of the total land area. There are also about 7,000 species of vascular plants, including over 1,600 species of climbers, 65 species of rattans, and around 850 species of orchids. Some 85 species of trees are identified as multiple-use timbers of premium quality ⁽⁵⁾. The central dry zone of Myanmar has very harsh climatic condition and only dry forests are naturally found. As trade develops in the region with an increase in population, the demand for forest products has increased steadily. Due to unsystematic extraction of timber and other forest products, forests have been deteriorating ⁽⁶⁾. Forest exploitation is controlled by law but the government allows rural communities to use various forest products (except protected plants and animal species) ⁽⁷⁾.

(1) FAO (2010), FAO's information system on water and agriculture, http://www.fao.org/nr/water/aquastat/countries_regions/myanmar/index.stm, accessed 19-06-2014

(2) FAO (2010), *Op cite*

(3) <http://www.bioline.org.br/pdf?hn06020>

(4) World Health Organization (2011) Guidelines for Drinking-water Quality. Fourth Edition.

(5) <http://documents.wfp.org/stellent/groups/public/documents/ena/wfp234780.pdf>, accessed 18 Oct 2014

(6) <http://www.moecaf.gov.mm/userpage2.aspx?mid=26>, accessed 22 Oct 2014

(7) <http://www.fao.org/docrep/005/ac648e/ac648e08.htm>, accessed 21 Oct 2014

Limited information is available for the habitat type within the Mann Field. However, it is expected that the majority of natural habitat has already been affected by the existing oil and gas operations.

Terrestrial and Aquatic Fauna

Limited baseline ecological information is available for the terrestrial and aquatic fauna groups within Mann Field. The Mann Field is located on the banks of the Ayeyarwady River, where Irrawaddy Dolphin (Ayeyarwady River subpopulation) has been reported to inhabit. The Irrawaddy Dolphin is a euryhaline species of oceanic dolphin found in discontinuous subpopulations near sea coasts and in estuaries and rivers in parts of the Bay of Bengal and Southeast Asia. In Myanmar, it is found in the Mekong, Ganga, Brahmaputra and Ayeyarwady rivers. The Irrawaddy Dolphin (Ayeyarwady River subpopulation) is regarded as Critically Endangered under the IUCN Red List (2015) ⁽¹⁾. The Ayeyarwady River is also home to a large diversity of animals, including about 43 fish species ⁽²⁾.

The Ayeyarwady delta is located to the southeast of the Mann Field and is rich in birds, especially from the end of the rainy season in September and October when a large number of migrant birds fly south from their breeding sites in Central Asia and Siberia to winter in Myanmar. Many of the waders make their way to the paddy plains, coastal mud flats and tidal creeks of the delta ⁽³⁾. Due to the migratory nature of the species, it is expected that some species normally found in the neighbouring delta may pass by or through the Project Site.

Protected & Environmentally Sensitive Areas

Information from the Istituto Oikos and BANCA (2011) ⁽⁴⁾ reported a total of 43 designated or proposed protected areas with IUCN categories existing in Myanmar. It should be noted that some of the locations are proposed as protected area without authorised designation (i.e. “soft” designation). None of these protected or environmentally sensitive areas lie within the Mann Field (Figure 5.9).

⁽¹⁾ The IUCN Red List of Threatened Species. Version 2015.2. <www.iucnredlist.org>..

⁽²⁾ <http://fish.mongabay.com/data/ecosystems/Irrawaddy.htm>, accessed 15 Oct 2014

⁽³⁾ <http://www.worldwildlife.org/ecoregions/im0116>, accessed 04 Oct 2014

⁽⁴⁾ http://www.istituto-oikos.org/files/download/2012/MyanmarProtectedAreas.Context_CurrentStatusandChallenges.pdf

Figure 5.9 Types of Aquifer in Myanmar

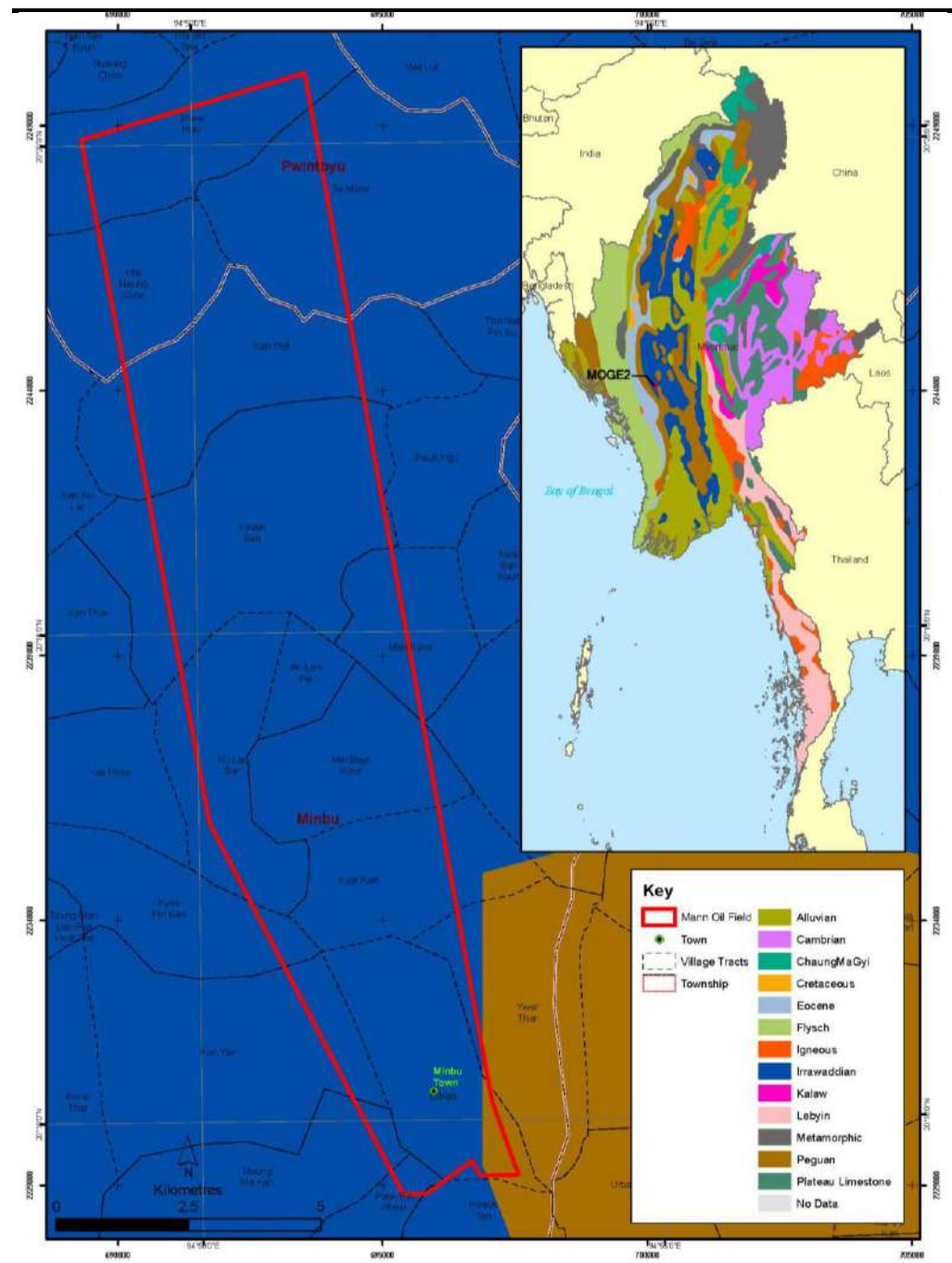
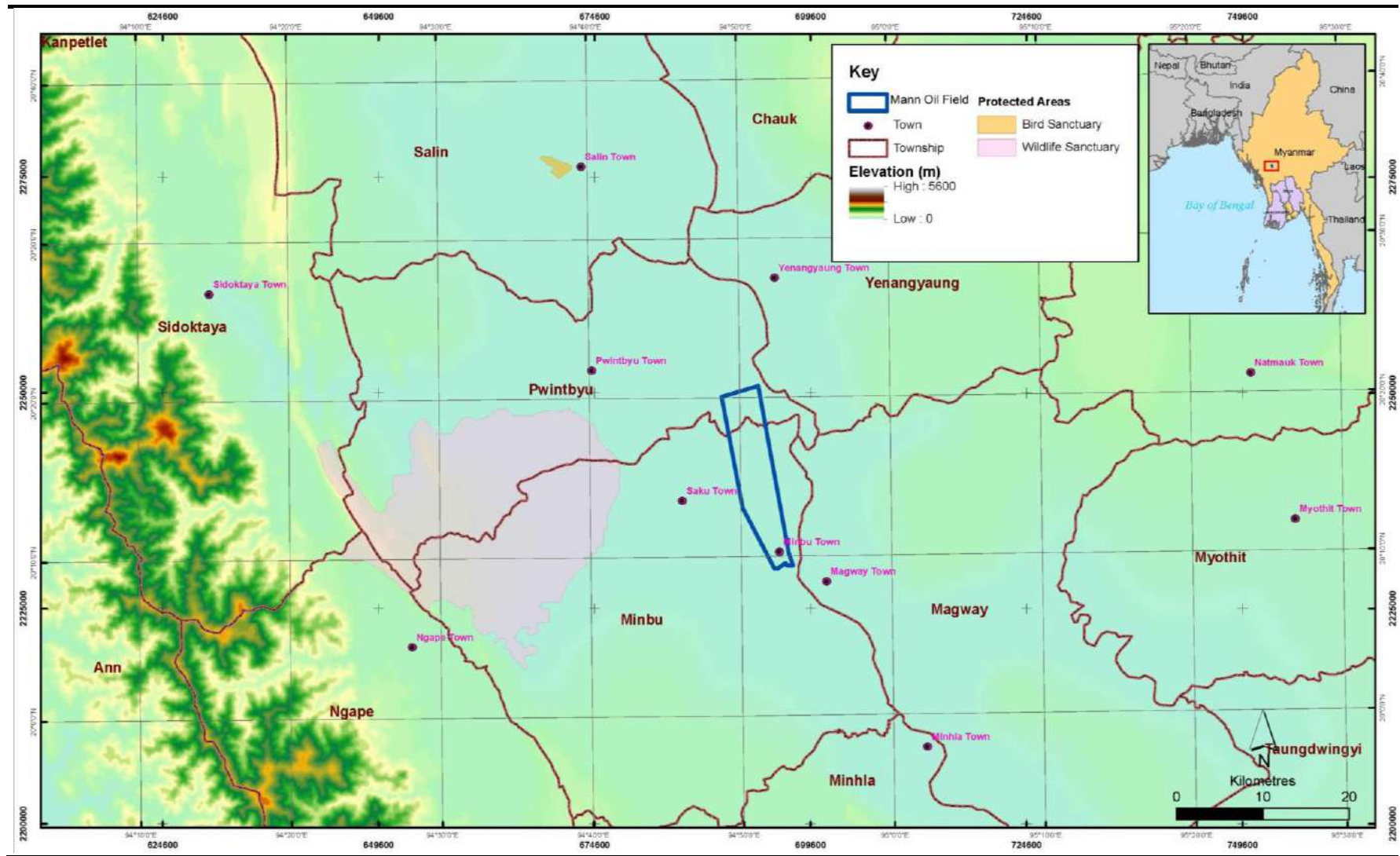


Figure 5.10 Protected Area in the Proximity of Mann Field



From the literature review of desktop information presented above, it is revealed that significant information gaps existed on the physical and biological environment within Mann Field. These data gaps would require to be filled in for the understanding of potentially significant impacts from the Project and derivation of appropriate mitigation measures to control such impacts to the environmental receptors. Thus, the baseline surveys of the following aspects were conducted prior to the commencement of the Project to address the key environmental issues:

Biological Environment

- Habitat mapping and vegetation surveys;
- Terrestrial fauna surveys, including avifauna (birds), mammals, herpetofauna (amphibians and reptiles) and butterflies; and
- Aquatic fauna.

Physical Environment

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

The methodology and findings of surveys for physical and biological environment are detailed in the following *Sections 5.4-5*.

5.4

BASELINE SURVEYS FOR PHYSICAL ENVIRONMENT

5.4.1

Air Quality

Methodology

Four air quality monitoring stations (Z1AQN, Z2AQN, Z3AQN and Z4AQN) were set up within the Mann Field. The designated monitoring stations are chosen to assess the potential impacts to the Air Sensitive Receivers (ASRs) in the Project Area. Details of the monitoring location are shown in *Table 5.1* and illustrated in *Figure 5.11*. The surrounding environment of the air quality monitoring stations is showed in *Figure 5.12*.

Table 5.1 *Ambient Air Quality 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 Ayeyarwady River	Bare ground

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 recorded 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 current survey are listed in *Table 5.2*.

Figure 5.11 Locations of Air and Noise Monitoring Stations

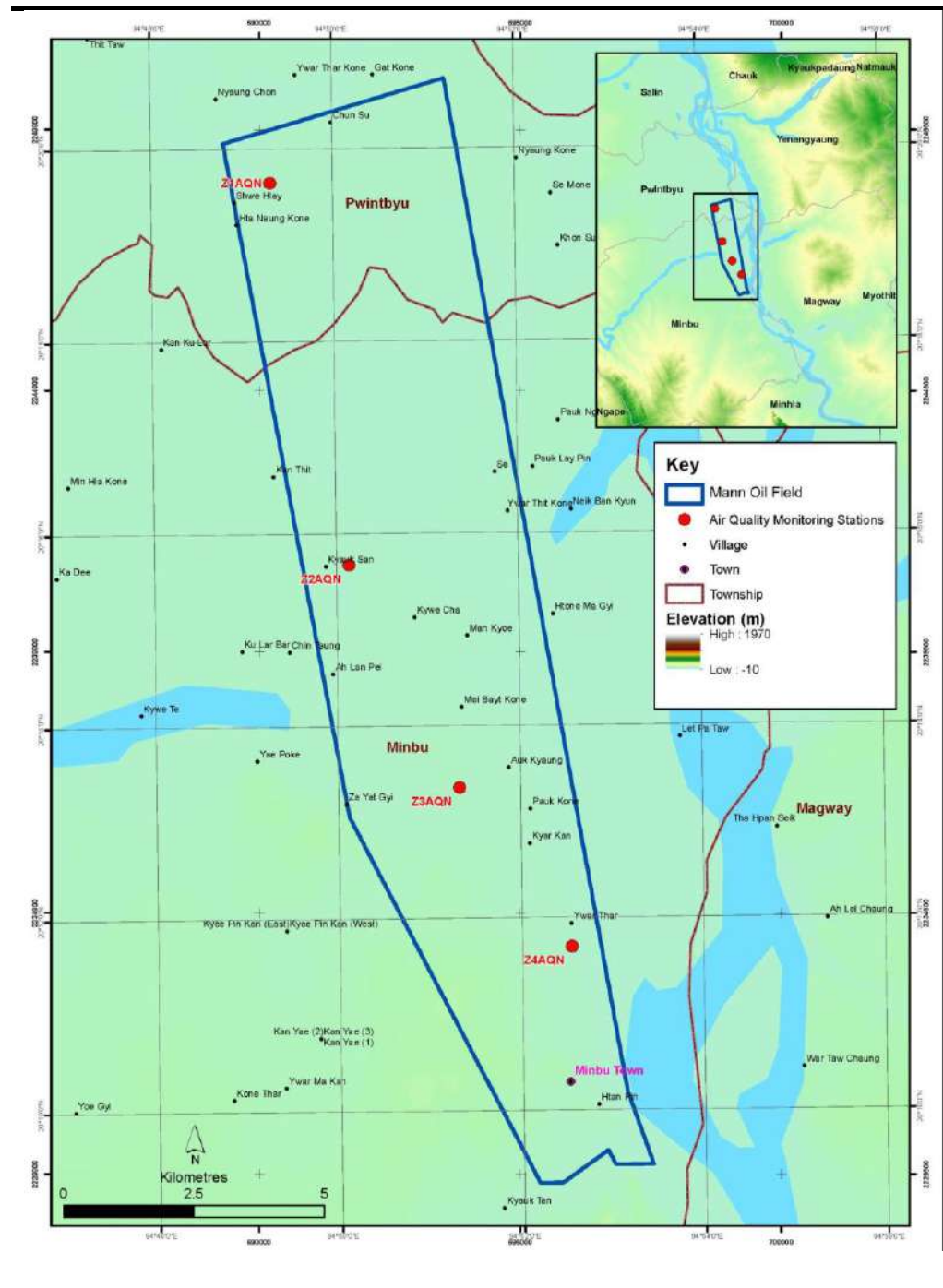


Figure 5.11a *Surrounding Environment of Ambient Air Quality and Noise Monitoring Stations*



↑ Station: Z1AQN



↑ Station: Z2AQN

Figure 5.11b *Surrounding Environment of Ambient Air Quality and Noise Monitoring Stations*



↑ Station: Z3AQN



↑ Station: Z4AQN

Table 5.2 *Parameters measured by the Haz-Scanner EPAS Wireless Environmental Perimeter Air Station*

Parameters	Unit	Method and Duration
<u>Air Quality</u>		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 (PM2.5)	mg/m ³	
Particulate matter < 10 μm (PM10)	mg/m ³	
<u>Meteorological Data</u>		
Relative Humidity (R.H.)	%	
Temperature	°C	
Wind speed	kph	
Wind direction	-	

Monitoring Period and Frequency

The ambient air quality and the meteorological data were collected at the four designated air quality monitoring station for 24-hour in May 2015. The sampling dates and hours are summarised in *Table 5.3*. These survey points were chosen to represent baseline air quality at ASRs within the wider Mann Field area where the Project will be implemented.

Table 5.3 *Sampling Dates for Ambient Air Quality and Meteorology*

Monitoring Station	Sampling Date
Z1AQN	8 – 9 May, 2015
Z2AQN	7 – 8 May, 2015
Z3AQN	6 – 7 May, 2015
Z4AQN	6 – 7 May, 2015

Baseline Air Quality Results

The monitoring results for air quality and meteorological information are summarized in *Table 5.4*.

The major dust sources in the monitoring period included activities at the existing oil production activities, nearby human activities and traffic emission. Most of the air quality parameters are well below the assessment criteria, except for the mean PM2.5 at Z1AQN, Z2AQN, Z4AQN and SO₂ at Z2AQN which are slightly higher than the NEQEG's 24-hour average and 1-hour average guideline values respectively in some occasions. It is useful to note that human activities (e.g. traffics, cooking by burning wood) nearby Z1AQN, Z2AQN and Z4AQN may lead to the higher PM2.5 level and SO₂ recorded there.

Table 5.4 Summary of Baseline Air Quality Monitoring Results in May 2015

Station	CO (ppm) (min - max)	NO2 (ppm) (min - max)	NO (ppm). (min - max)	PM2.5 (mg/m ³) (min - max)	PM10 (mg/m ³) (min - max)	SO2 (ppm) (min - max)	Temperature (°C) (min - max)	Relative Humidity (%) (min - max)	Wind Speed (m/s)	Wind Direction
Z1AQN	0.14	0.10	0.31	0.04	0.05	0.02	30.7	61	0	-
	(0.01- 0.25)	(0.04 - 0.19)	(<0.01 - 2.11)	(0.02 - 0.07)	(0.02 - 0.08)	(<0.01 - 0.1)	(23.3 - 32.3)	(28 - 90)		
Z2AQN	0.11	0.10	0.07	0.03	0.04	0.03	29.0	61	0.015	Southwest
	(<0.01 - 0.22)	(0.01- 0.35)	(<0.01 - 0.29)	(0.02 - 0.09)	(0.02 - 0.10)	(0.01 - 0.19)	(23.8 - 44.0)	(27 - 78)		
Z3AQN	0.05	0.03	< 0.01	0.02	0.04	< 0.01	31.5	56	0.081	Southeast
	(<0.01 - 0.26)	(<0.01 - 0.35)	(<0.01 - <0.01)	(<0.01 - 0.07)	(<0.01 - 0.08)	(<0.01 - <0.01)	(25 - 42.5)	(30 - 78)		
Z4AQN	0.13	0.09	0.14	0.03	0.04	0.01	27.1	55	0.85	Southeast
	(0.01-0.27)	(0.02 - 0.28)	(0.01 < 0.66)	(0.02 - 0.09)	(0.02 - 0.13)	(<0.01 - 0.11)	(24 - 40.5)	(29 - 81)		
Assessment criteria: NEQEG Value										
24-hr	-	-	-	0.025	0.05	-	-	-	-	-
1-hr	-	0.2 mg/m ³	-	-	-	0.02 mg/m ³	-	-	-	-

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

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. Details are shown in *Table 5.5* and illustrated in *Figure 5.10*. The surrounding environment of the noise quality monitoring stations is showed in *Figure 5.11*. These survey points were chosen to represent baseline noise level at NSRs within the wider Mann Field area where the Project will be implemented.

Table 5.5 **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 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 Ayeyarwady River	Bare ground

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

$$L_{Aeq} = 10 \cdot \text{LOG}_{10} (\text{AVERGAE} (10^{((\text{RANGE})/10)}))$$

Baseline Noise Measurements

The results of baseline noise monitoring are summarized in *Table 5.6*.

The NEQEG were adopted to evaluate the measured noise levels in the area which was in the vicinity of existing oil and gas operations (*Table 3.3*). 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 environmentally acceptable manner in relation to noise emissions. For station Z2AQN, exceedances of daytime and night time noise levels were observed from the NEQEG standards. According to *Figure 1.1*, station Z2AQN which is located in Kyaut San Village is not in the vicinity

of any Mann Field facilities. As such, the exceedances are not likely to be caused by the Mann Field operation and are likely to be due to noise from village and traffic activities.

Table 5.6 *Hourly L_{Aeq} Values at the Designated Noise Monitoring Stations*

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

5.4.3 *Surface Water Quality*

Methodology

Sampling Locations

To characterize the surface water quality within the Project Area, surface water sampling was carried out at four locations in May 2015. Details of sampling locations were presented in *Table 5.7* below and indicated in *Figure 5.12*. The surrounding environment of surface water sampling location is shown in *Figure 5.13*. These survey points were chosen to represent baseline water quality at WSRs within the wider Mann Field area where the Project will be implemented.

Figure 5.12 Locations of Surface Water Monitoring Stations

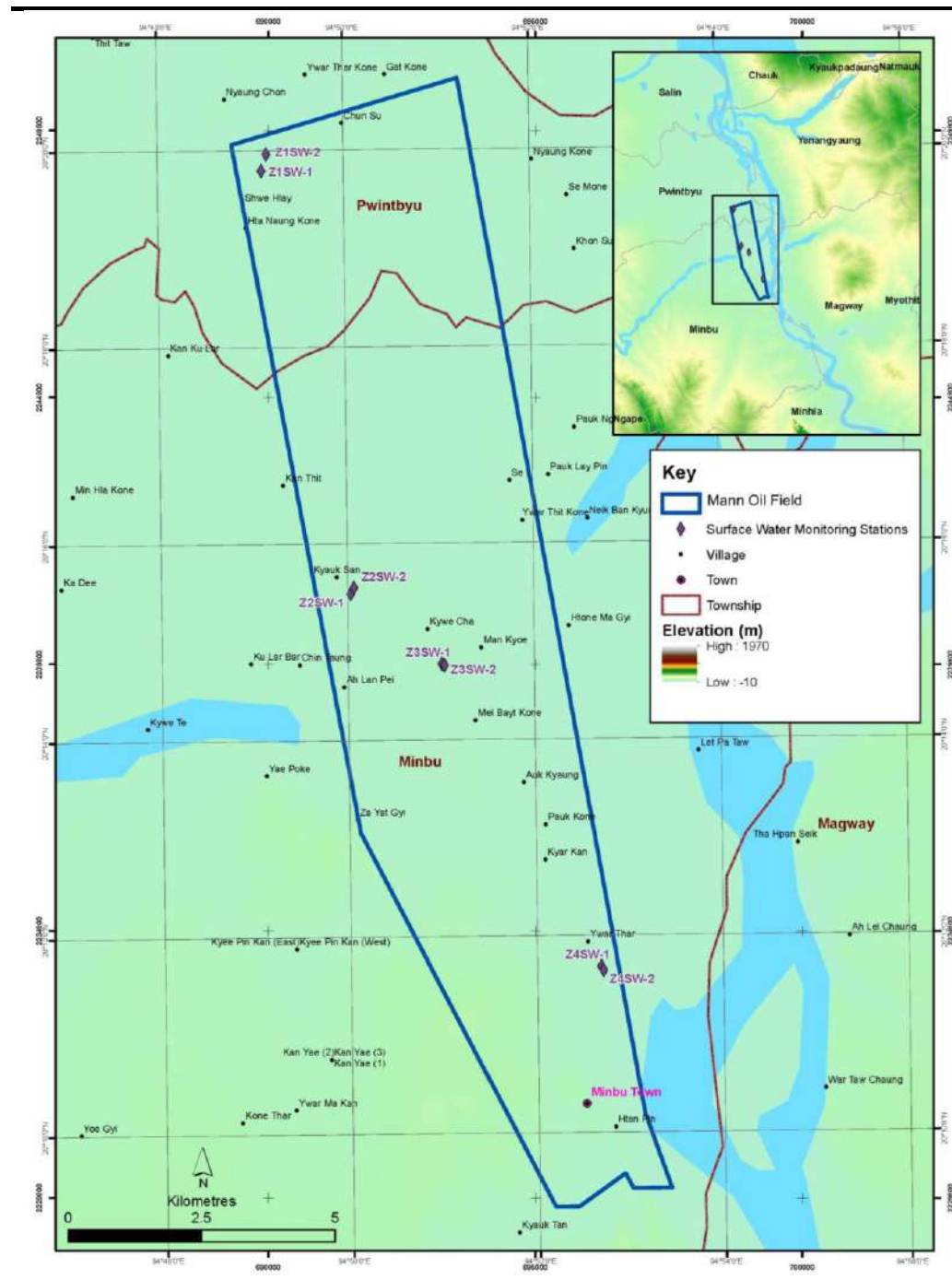


Figure 5.13a Surrounding Environment of Surface Water Sampling Locations



↑ Station: ZAW1-1



↑ Station: ZSW1-2

Figure 5.13b Surrounding Environment of Surface Water Sampling Locations



↑ Station: Z2SW-1



↑ Station: Z2SW-2

Figure 5.13c Surrounding Environment of Surface Water Sampling Locations



↑ Station: Z3SW-1



↑ Station: Z3SW-2

Figure 5.13d Surrounding Environment of Surface Water Sampling Locations



↑ Station: Z4SW-1



↑ Station: Z4SW-2

Table 5.7 **Sampling Locations for Surface Water Quality**

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

Sampling Procedures

Water samples were taken by Alpha horizontal 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), and turbidity and surface water samples were concurrently collected. Two samples were taken at each sampling location. Samples were then stored at 4 °C for transportation to laboratory analyses under chain-of-custody procedures. The parameters for laboratory analyses were listed in *Table 5.8*. Laboratory analysis of samples was undertaken by SGS (Thailand) Limited except for BOD₅ and COD which were measured by ISO Tech Laboratory. Equipment for surface water sampling is showed in *Table 5.9*.

Table 5.8 **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 Phosphorous	mg/L
Total Coliform Bacteria	
Oil and Grease	mg/L
Heavy Metals	

Table 5.9 **Equipment for Surface Water Sampling**

Equipment	Brand	Model
Multiparameter (water quality)	HANNA	-
pH meter	HANNA	HI 98129
Alpha Bottle (Water Sampler)	Wildlife Supply Company®	-

Baseline Surface Water Results

With reference to Figure 1.1, Mann Field is located at the northwest of Minbu District, Magway Region. Mann Field Area is elongated which running as 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 km² and annual surface water of 85.80 km³. Results of surface water quality monitoring are summarized in Table 5.10.

Apart from the total suspended solids (TSS), all the other parameters are complied with the NEQEG standard. The high TSS is recorded at Z4SW, located near the village Ywat Thar, which may represent high natural background turbidity level of river in the area.

Table 5.10 Result Summary of Surface Water Quality Monitoring

Item/Sample Name	Z1SW-1	Z1SW-2	Z2SW-1	Z2SW-2	Z3SW-1	Z3SW-2	Z4SW-1	Z4SW-2	NEQEG Standard
Date /Time	9/5/15 09:22	9/5/15 09:45	7/5/15 11:09	7/5/15 11:22	6/5/15 12:08	6/5/15 12:35	6/5/15 15:22	6/5/15 15:51	-
Weather	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	-
Transparency	High	High	High	High	High	High	Medium	Medium	-
Temperature _Water (C)	30.89	30.82	34.72	35.43	37.66	37.62	31.55	31.18	-
pH	7.82	7.82	8.21	8.27	8.1	8.11	7.73	7.65	6 - 9
DO (mg/l)	6.56	6.61	14.6	15.25	11.33	11.52	7.12	7.15	-
EC (µs)	352	350.1	611.2	588.7	711.8	705.7	153	152.5	-
Turbidity (FNU)	16	13.4	18.5	20.9	7.1	7	25	43.7	-
Colour	20	20	Nil	Nil	5	10	45	55	-
Alkalinity	137	136	209	209	238	237	58	58	-
Hardness	127	128	144	133	144	150	58	50	-
BOD5 (mg/l)	14	14	12	12	10	10	14	16	30
COD (mg/l)	32	32	32	32	32	32	32	32	125
Total Nitrogen (mg/l)	<2	<2	11	4	3	9	19	18	10
Total Phosphorus (mg/l)	0.061	0.026	0.039	0.030	0.047	0.051	0.071	0.031	2.0
Oil and grease (mg/l)	<1	<1	<1	2	5	7	<1	<1	10
TSS (mg/l)	40	34	23	18	7	13	124	138	50
*Note:									

5.4.4

Groundwater

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. These survey points were also chosen to represent baseline groundwater quality within the wider Mann Field area where the Project will be implemented.

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 °C 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 5.8*. Laboratory analysis of samples was undertaken by SGS (Thailand) Limited except for BOD₅ and COD which were measured by ISO Tech Laboratory. Details of groundwater sampling location are presented in *Table 5.11* and indicated on *Figure 5.14*. The surrounding environment of groundwater sampling is presented in *Figure 5.15*.

Table 5.11 *Groundwater Sampling Locations at Block Mann Field*

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

Baseline Groundwater Quality Monitoring Results

The aquifer within Mann Field is mainly Alluvian aquifer and Irrawaddian Aquifer and Peguan Aquifer (*Figure 5.8*). It is estimated that the groundwater potential in the lower Ayeyarwady region, where Mann Field is situated at, is approximately 153.25 km³ ⁽¹⁾ with about 1,298 tube wells within the Magway Division. Results of groundwater quality monitoring are summarized in *Table 5.12*. The level of BOD₅ exceeded the WHO Drinking Water Quality Standard at all stations which did not appear to indicate any contamination of concern since other parameters are complied with the standards.

(1) <http://danishwater.dk/wp-content/uploads/2013/09/Ministry-of-Agriculture-and-Irrigation-Department-of-Water-Resources-Utilization-Sustainable-Development-and-Management-of-Groundwater-in-Myanmar.pdf>

Table 5.12 Results Summary of Groundwater Quality Monitoring

Item/Sample Name	Z1GW-1	Z1GW-2	Z2GW-1	Z2GW-2	Z3GW-1	Z3GW-2	Z4GW-1	Z4GW-2	WHO Drinking Water Quality Standard
Date /Time	9/5/15 10:49	9/5/15 11:22	7/5/15 10:22	7/5/15 10:40	6/5/15 11:04	6/5/15 11:30	6/5/15 14:32	6/5/15 14:58	-
Weather	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	Sunny	-
Transparency	High	High	High	High	High	High	Medium	High	-
Temperature (°C)	28.78	30.11	33.11	35.03	36.12	37.57	31.77	31.67	-
pH	6.92	6.93	6.85	7.09	6.68	6.63	6.95	7.22	6.5-8.5
DO (mg/l)	2.51	2.75	1.1	2.25	2.9	2.29	1.44	3.41	-
EC (µs)	669	778.1	1097.7	805.3	1498.3	1198.7	5060.4	7740.8	-
Turbidity (FNU)	0.5	0.3	0.2	0.1	4.9	4.6	0.5	1	-
Colour	Nil	10	Nil	Nil	5	10	Nil	Nil	-
Alkalinity	256	296	359	294	354	279	462	624	-
Hardness	281	316	130	64	246	222	539	639	-
BOD5 (mg/l)	10	12	8	10	10	14	8	10	3
COD (mg/l)	32	32	32	32	32	32	32	32	250
Total Nitrogen (mg/l)	<2	4	4	<2	4	73	4	63	-
Total Phosphorus (mg/l)	0.038	0.194	0.104	0.245	0.239	0.168	0.251	0.042	-
Oil and grease (mg/l)	<1	<1	<1	<1	<1	<1	<1	<1	10
TSS (mg/l)	<5	<5	<5	<5	<5	<5	5	<5	-

Figure 5.14 Locations of Groundwater Monitoring Stations

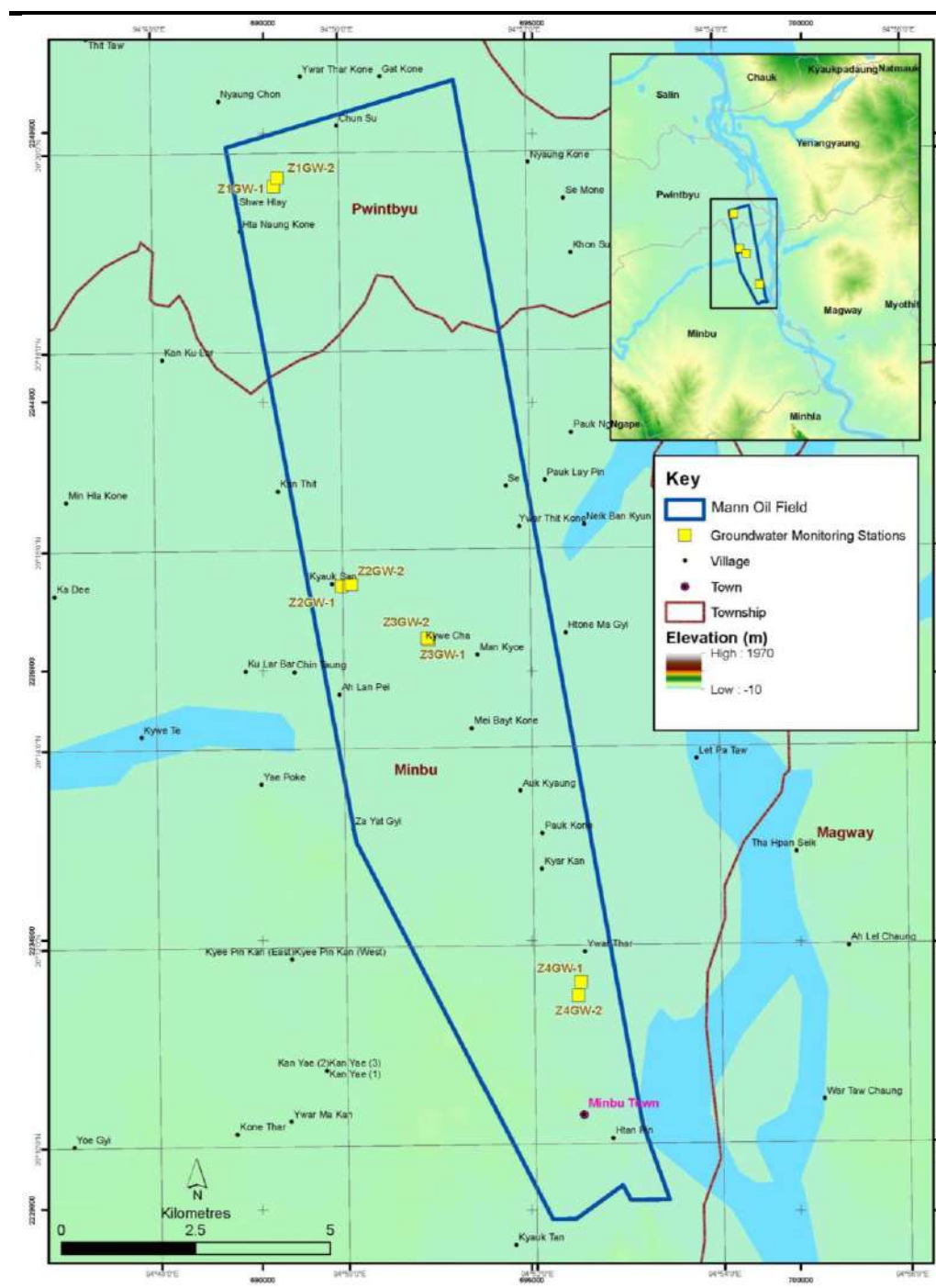


Figure 5.15a Surrounding Environment of Groundwater Sampling Locations



↑ Station: Z1GW-1



↑ Station: Z1GW-2

Figure 5.15b Surrounding Environment of Groundwater Sampling Locations



↑ Station: Z2GW-1



↑ Station: Z2GW-2

Figure 5.15c Surrounding Environment of Groundwater Sampling Locations



↑ Station: Z3GW-1



↑ Station: Z3GW-2

Figure 5.15d Surrounding Environment of Groundwater Sampling Locations



↑ Station: Z4GW-1



↑ Station: Z4GW-2

*Methodology*Soil Sampling Location

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 5.13* and illustrated in *Figure 5.16*. The surrounding environment of the soil sampling stations and soil condition are shown in *Figure 5.17*. These survey points were also chosen to represent baseline soil quality within the wider Mann Field area where the Project will be implemented.

Table 5.13 *Baseline Soil Sampling Locations in May 2015*

Sampling Station	Replicate	Coordinates	Description	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
	2	20°19'45.38"N 94°49'21.05"E	At Pauk su village, Pwint Phyu Township	6 – 9 May 2015
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
	2	20°15'40.05"N 94°50'10.40"E	At east of Kauk san village, Minbu Township	6 – 9 May 2015
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
	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
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
	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

Figure 5.16 Locations of Soil Monitoring Stations

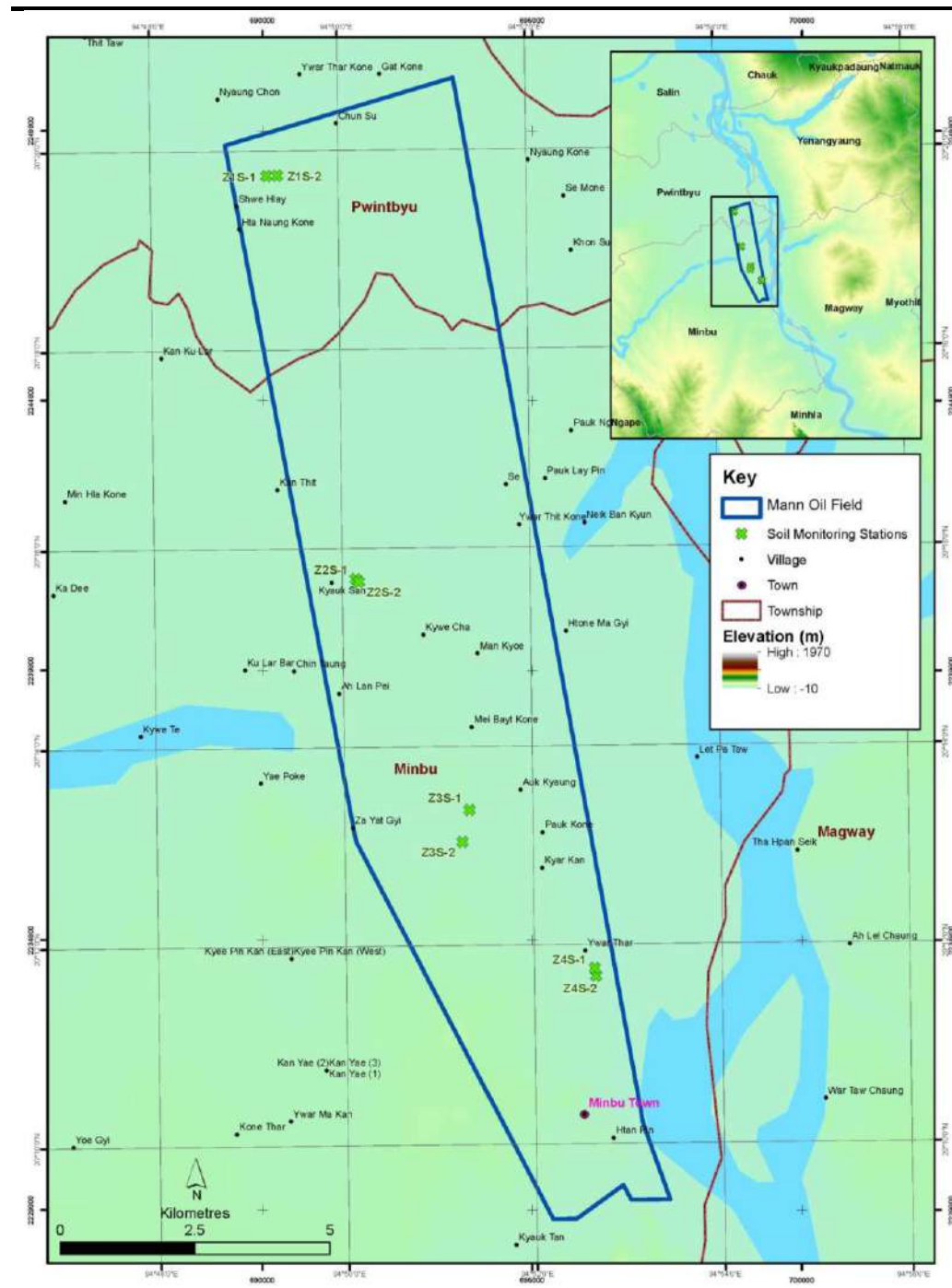


Figure 5.17a Surrounding Environment of Soil Sampling Locations



↑ Station: Z1S-1



↑ Station: Z1S-2

Figure 5.17b *Surrounding Environment of Soil Sampling Locations*



↑ Station: Z2S-1



↑ Station: Z2S-2

Figure 5.17c Surrounding Environment of Soil Sampling Locations



↑ Station: Z3S-1



↑ Station: Z3S-2

Figure 5.17d Surrounding Environment of Soil Sampling Locations



↑ Station: Z4S-1



↑ Station: Z4S-2

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. Laboratory analysis was undertaken by the geochemistry laboratory of the Applied Geology Department of the University of Yangon. 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 survey, sampling procedure, sample preservation and sample analysis recommended in standard operating procedure of Myanmar NEQEG. 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 inside diameter. To refrain from contamination, about 20 – 30 cm of top soil was removed by the sampler before sampling. Then sample was taken and collected in cleaned plastic bag. Chemical preservation of samples was not applied because it is generally not recommended by 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.

Baseline Soil Quality Results

The results of baseline soil quality monitoring are summarized in *Table 5.14*.

In general, the soil in the sampling locations is sandy in nature 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.

Table 5.14 Results Summary of Baseline Soil Quality Monitoring in May 2015

Parameter	Unit	Station								Dutch Standard 2000
		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	—
As	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	55
Pb	mg/kg	115	120	135	130	120	124	137	135	530
Cd	mg/kg	0.009	0.008	0.009	0.007	0.007	0.007	0.006	0.007	12
Cu	mg/kg	105	99	110	115	90	95	85	88	800
Zn	mg/kg	75	80	72	69	65	70	75	78	720
Mn	mg/kg	30	32	38	35	28	25	31	30	—
Fe	mg/kg	4850	4790	4900	4930	4870	4950	4700	4690	—
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 Colour	-	Grey	Grey	Yellowish brown	Yellowish brown	Yellowish brown	Yellowish brown	Yellowish grey	Yellowish grey	—
Note: N.D. = Not Detected										

5.5 BASELINE SURVEYS FOR BIOLOGICAL ENVIRONMENT – TERRESTRIAL ECOLOGY

This section describes the biological environment of the Project Area for the proposed EOR and redevelopment activities. The baseline information has been gathered by focussed baseline field surveys conducted during the wet season in May 2015. The discussion is limited to those biological components either recorded or likely to be found within the Project Area. These include the following:

- Habitats and Vegetation;
- Avifauna (Birds);
- Herpetofauna (Amphibians and Reptiles);
- Mammals;
- Butterflies; and
- Aquatic fauna.

Each of the above are discussed in turn below.

5.5.1

Habitats and Vegetation

Methodology

Field survey focusing on habitat and vegetation (including trees) within the Project Area was performed in May 2015 to establish the general terrestrial ecological profile of the Project Area. Habitats were mapped based on publicly available aerial photos and field ground-truthing. Representative areas of each habitat type were surveyed on foot. Plant species of each habitat type encountered and their relative abundance were recorded with special attention to rare or protected species.

Results

The area surveyed within the Project Area was found to comprise four (4) key habitat types, including agricultural land, developed area, shrubland and water bodies (including river, channelized watercourse and pond) (*Figure 5.18*). Sizes of these habitats are presented in *Table 5.15*. Agricultural land and developed area were the main habitat types within the Project Area, covering 82% and 12% of the Project Area, respectively. Overall, the main feature of the Project Area was that it was predominantly composed of human-modified habitats (i.e. agricultural land and developed area).

Table 5.15 *Areas (Total and Percentage) of Habitat Types recorded within the Project Area during the May 2015 Field Survey*

Habitat	Total Area within the Project Area (km ²)	Percent of Habitat in the Project Area (%)
Agricultural Land	66.90	82
Developed Area	9.60	12
Water bodies (river, channelized watercourse and pond)	4.22	5
Shrubland	0.94	1
TOTAL	81.66	100

A total of 60 plant species were recorded within the Project Area in shrubland, agricultural land and developed area (see *Annex A*). No plant species of recognised conservation interest were recorded within the Project Area. The photos of representative plant species recorded in Mann Field are shown in *Figure 5.19*.

The following sections present a description of the vegetation of each habitat type along with representative photos.

Figure 5.18 Identified Habitats at Mann Field

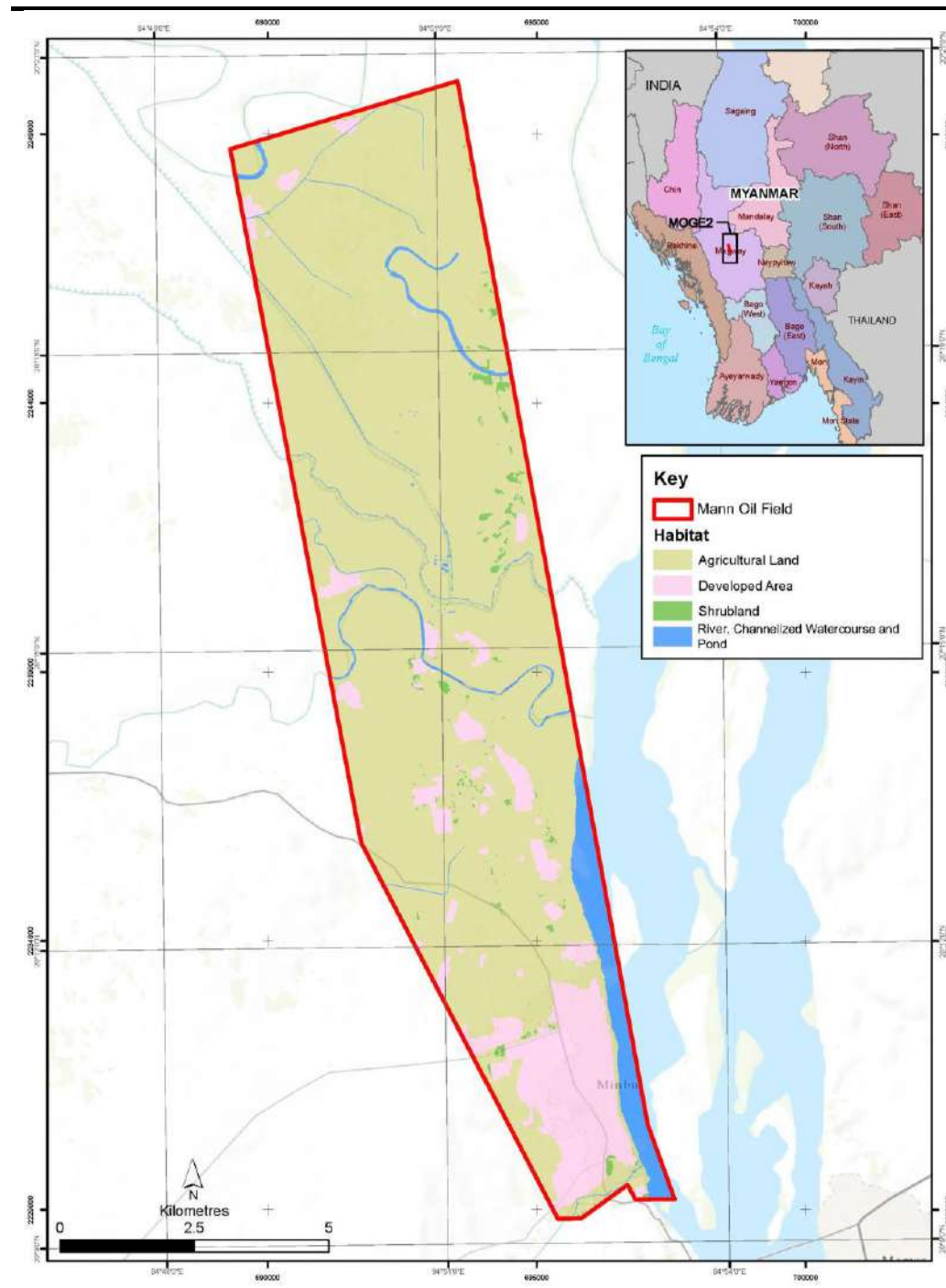


Figure 5.19a Photos of Representative Plant Species



Acacia chundra



Oryza sativa L.

Figure 5.19b *Photos of Representative Plant Species*



Carcia papaya L.

Shrubland

Shrubland is the habitat with the largest area within the Project Area which mainly occupied the eastern side (see Habitat Map in *Figure 5.18*). It covered approximately 1% of the Project Area (i.e. 0.94 km² within 81.66 km² of Project Area). Shrubland habitat was found to be restricted to the areas with high disturbance from human activities and deforestation.

Photographic record of the shrubland is shown in *Figure 5.20*. A total of 35 plant species were recorded in the shrubland, of which 24 were tree species (see *Annex A*). The dominant plant species recorded in the shrubland was *Acacia Chundra* which is a common herb belonging to family Mimosaceae. Plant species of recognised conservation interest was not recorded in the shrubland.

This habitat type is considered as with low ecological value / receptor sensitivity as most of shrubland habitats are already subject to human disturbance, such as cultivation activities and deforestation.

Figure 5.20 *Representative Photo of Shrubland Habitat Type*



Agricultural Land

Agricultural habitat was the largest habitat type found within the Project Area which occupied approximately 82% of the Project Area (see Habitat Map in *Figure 5.18*). This habitat was mainly restricted to low terrain areas and covered a total area of 66.90 km² within 81.66 km² of the Project Area. Agricultural land is regarded as modified habitat with low ecological value / receptor sensitivity.

Agricultural land is mainly paddy field cultivated with Asian Rice (*Oryza sativa* L; see *Annex A*). No tree species was found in this habitat. A total of 54 plant species were observed at the agricultural land with no plant species of recognised conservation interest found.

Representative photo of agricultural land is shown in *Figure 5.21* below.

Figure 5.21 *Representative Photo of Agricultural Land Habitat Type*



Developed Area

Developed area is mainly found in the southern and middle part of the Project Area, where the Mann Field is located. Developed area covered an area of 9.60 km² (see Habitat Map in *Figure 5.18*). The developed area is regarded as man-made, disturbed habitat with low ecological value / receptor sensitivity. A photographic record of developed area is shown in *Figure 5.22*.

A total of 36 plant species was found within the developed area of the Project Area (see *Annex A*). The plant species in the developed area was dominated by flowering tree of *Mangifera indica* L., *Azadirachta indica* A. Juss and herb *Musa sapientum* L. No plant species of recognised conservation interest was recorded within this habitat type.

Figure 5.22 *Representative Photo of Developed Area/ Village*



Water bodies (river, channelized watercourse and pond)

Water bodies recorded within the Project Area included river, channelized watercourse and pond. The Ayeyarwady River is the main river identified within the Project Area. Apart from Ayeyarwady River, two other rivers, Mann River and Mon River, were also located within the Project Area (*Figure 5.18*). The total area of the waterbodies recorded within the Project Area was estimated to be approximately 4.22 km². Vegetation record was not made for the water bodies as it was included in the record of adjacent habitats. Channelized watercourse and pond are regarded as a man-made habitat with low ecological value / receptor sensitivity. For the river, it is also considered as with low ecological value / receptor sensitivity without any species of recognised conservation interest recorded (please refer to findings on aquatic fauna species recorded in *Section 5.5.6* below).

A photographic record of river is shown in *Figure 5.23*.

Figure 5.23 *Representative Photo of Waterbodies*



5.5.2 *Avifauna (Bird)*

Methodology

The avifauna (bird) communities of each habitat types within the Project Area were surveyed using the qualitative transect count method. During the survey, all birds seen or heard from either sides of the transect were identified to species where possible with their relative abundance noted. Signs of breeding (eg nests, recently fledged juveniles) within the Project Area were also recorded, if any. Observations were made using binoculars and photographic records were taken, if possible. Special attention was paid to egretry, wetland dependent and migratory birds.

Results

A total of 45 bird species were recorded during the survey period within the Project Area (see *Annex B*). *Passer montanus*, *Passer domesticus*, *Acridotheres tristis*, *Columba livia*, *Hirundo rustica* were common bird species found in the Project Area. The abundance and species richness of bird was noted to be higher in agricultural land.

No bird species of recognised conservation interest was found within the Project Area. Photo records of identified bird species are shown in *Figure 5.24*.

Figure 5.24 Photo Records of Identified Bird Species



Little Egret (*Ardea alba*)



Spotted Dove (*Metopidius indicus*)

Methodology

Herpetofauna survey was conducted through direct observation and active searching in all habitat types in potential hiding places such as amongst leaf litter, inside holes, under stones and logs within the Project Area. Particular attention was given to water bodies. Auditory detection of species-specific calls was also used to survey frogs and toads. During the surveys, all reptiles and amphibians sighted and heard were recorded. Interviews were also conducted with villagers to gather information of the herpetofauna species they found within the Project Area.

Results

During the herpetofauna survey, three (3) amphibian species and nine (9) reptiles species were record within the Project Area through observation and interview (see *Annex C*). It is important to note, however, that data obtained through the interviews has not been verified through observation by the survey team. Photo records of identified herpetofauna are shown in *Figure 5.25*.

The species richness of herpetofauna was the highest in agricultural land within the Project Area. All species recorded are regarded as common and widespread species within no recognised conservation interest.

Figure 5.25 Photo Records of Identified Herpetofauna Species



Common sun skink *Eutropis multifasciata*



Garden lizard *Calotes versicolor*

Methodology

As most mammals often occur at low densities, all sightings, tracks, and signs of mammals (including droppings) were actively searched along the survey transects during the field survey. Interviews were also conducted with villagers to gather information of the mammal species they found within the Project Area.

Results

Six (6) mammal species were recorded within the Project Area through observation and interview (see *Annex D*). It is important to note, however, that data obtained through the interviews has not been verified through observation by the survey team. Amongst the recorded mammal species, all of them were considered to be common species within the Project Area with no recognised conservation interest. Mammal species was reported within all identified habitats of the Project Area (*Figure 5.26*).

Figure 5.26 *Photo Records of Identified Mammal Species*



5.5.5

Butterflies

Methodology

Butterflies at different habitats within the Project Area were surveyed using qualitative transect count method. Butterflies from either side of the survey transect were identified with their relative abundance noted.

Results

In total, 11 butterfly species were recorded within the Project Area (see *Annex E*). It was noted that the relative abundance of butterfly was higher in developed area and agricultural land while the species richness was the highest at agricultural land. No butterfly species of recognised conservation interest was found within the Project Area. Photo records of identified butterfly species are shown in *Figure 5.27*.

5.5.6

Aquatic Fauna

Methodology

Fishes were collected with the help of local fishermen within the Project Area by using local fishing gears (e.g. fish traps, gill nets etc) to obtain a qualitative species list. Fish species which could not be identified in the field were preserved in 10% formalin solution and sent to laboratory for later identification.

Planktonic and benthic species were also collected within the aquatic habitat of the Project Area using plankton nets and by sieving of sediment, respectively, to obtain a qualitative species list (*Figure 5.28*). Planktonic and benthic species which could not be identified in the field were preserved in 10% formalin solution and sent to laboratory for later identification.

Results

A total of 20 fish species were recorded from the aquatic habitats of the Project Area (see *Annex F*). Photo records of identified aquatic fauna species are shown in *Figure 5.29*. Commercially important fish species including Long Whisker Catfish (*Mystus gulio*) and Nile Tilapia (*Oreochromis niloticus*) were recorded within the Project Area. Amongst the recorded species, no species of conservation concern was recorded.

Six (6) zooplankton, 11 phytoplankton and three benthic species were identified from the collected samples (*Annex G*). All plankton and benthic species recorded are considered as common species and no species of recognised conservation interest was found.

Figure 5.27 Photo Records of Identified Butterflies Species



Danaus chrysippus



Catopsilia pyranthe

Figure 5.28 *Photo Records of Planktonic and Benthic Samplings*



Collecting Planktonic sample



Sieving benthic samples

Figure 5.29 Photo Records of Identified Aquatic Fauna Species



Mastacembelus unicolor



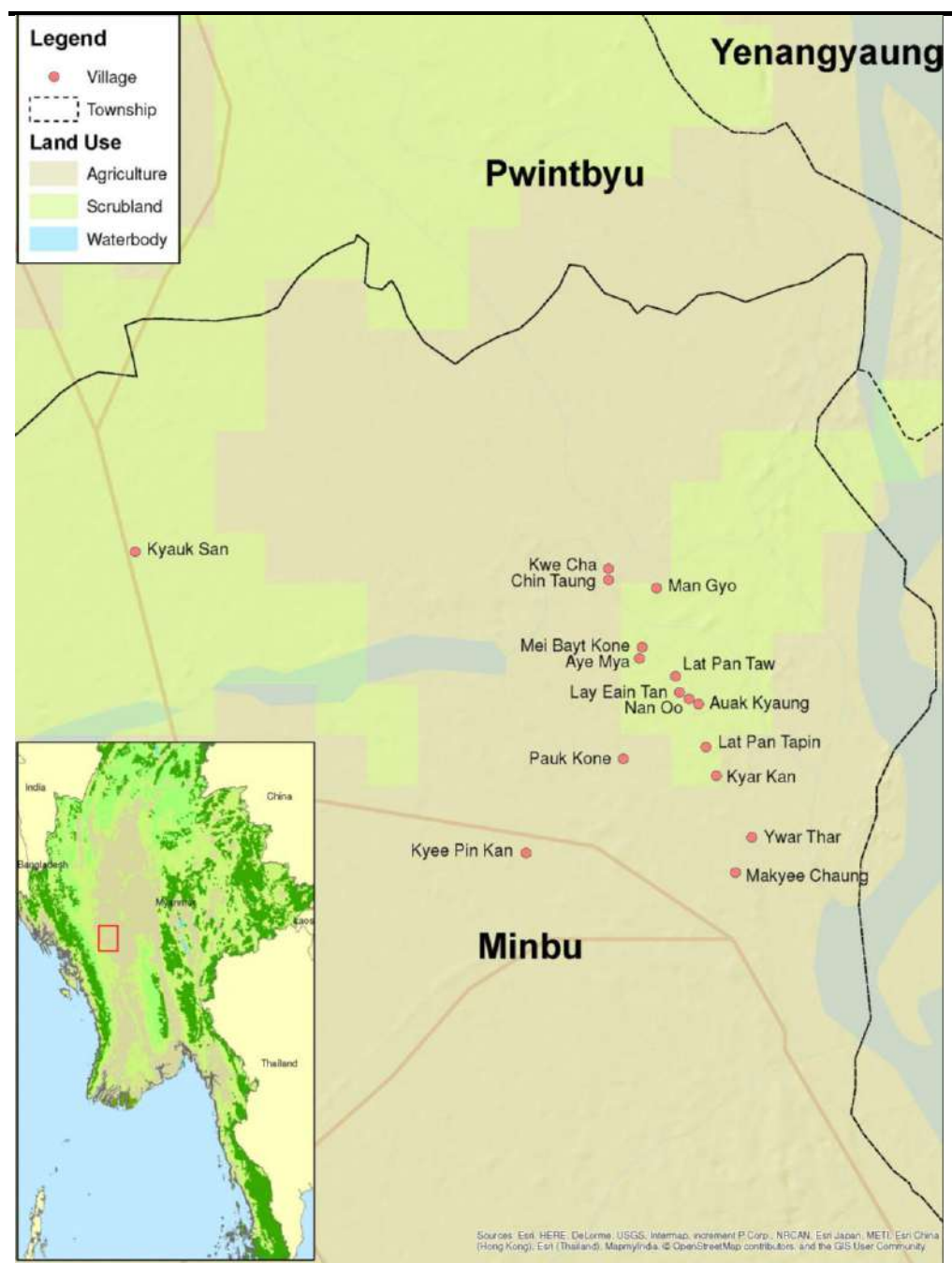
Clarias batrachus

The objective of this section is to ensure there is a robust social baseline for the Study Area against which the potential Project impacts can be assessed. The baseline information provided in this section is based on data collected from primary and secondary sources. Data collected covered demographics and population, livelihoods, income, infrastructure and utilities.

Primary data were collected during the site visit in January 2018 using a number of questionnaires and 698 household surveys in 14 villages of Mann Field area. The 14 villages included Man Gyo, Chin Taung, Kwe Cha, Lay Eain Tan, Lat Pan Taw, Nan Oo, Auak Kyaung, Lat Pan Ta Pin, Pauk Kone, Aye Mya, Mei Bayt Kone, Ywar Thar, Makyee Chaung and Kyar Kan (*Figure 5.30*)

Secondary sources include a desktop review of published information, supplemented with information provided by MPRL E&P and through review of available ERM in-house literature and including the Union of Myanmar Population and Housing Census (2015). These data sources have been supplemented by data provided from a variety of stakeholders, including government bodies, non-governmental organisations (NGOs) Civil Society Organisations (CSOs) and local communities.

Figure 5.30 *The villages within the Study Area*



5.6.1 *Overview of the Study Area*

Myanmar is divided administratively into seven Regions, seven States, and six self-administered zones. Magway Region, with its capital situated at Magwe, is one of the seven regions in Myanmar, which is further divided into six (5) districts and 26 townships. The Study Area from a social perspective covers Minbu Township of Magwe Region.

Magway Region is one of Myanmar's central Regions, sharing borders with Sagaing Region to the north, Mandalay Region to the east, Bago Region to the south and Rakhine and Chin States to the west. The area of the Magwe Region is 44,818.96 km². The total population of Magwe Region as recorded

by the Myanmar Census is 3,917,055 persons (as of 29 March 2014). The population of females in Magwe Region exceeds the population of males with a sex ratio of 88 (number of males for every 100 females). The population density in 2014 was ~91 persons per km². The majority of people live in areas classified by the GAD as “rural”; 85 out of 100 people.

Magway Region is reported to be comprised of the social groups such as Bamar, Karen/Kayin and Rakhine. Of these, the Bamars are reported to be the majority. In terms of religion, a majority of Buddhist, followed by Christians and Muslims, characterizes it. Magway Region is the primary oil producer of Myanmar and is sometimes referred to as the oil pot of Myanmar. In addition to petroleum, the Region also produces large quantities of edible oil.

Table 5.16 *Administrative and Demographic Profile of the Magway Region (Myanmar Census, 2014)*

Attribute	Magway
Districts	5
Townships	26
Wards	166
Village Groups	1539
Villages	4795
Total Population	3,917,055
Area (sq. km)	44,820
Population Density (persons per sq. km)	87.4
Rural Population %	70
Urban Population %	30

Source: The 2014 Myanmar Population and Housing Census (2015)

Minbu Township is a township of Minbu District in the Magway Region of Myanmar. The principal town is Minbu. Minbu is connected to the regional capital, Magway, by a 1.8 mile bridge; Ayeyarwedy Bridge (Magway). There are 7 wards and 67 village tracts in Minbu Township in the total area of 1664.6 km². Total population residing in Minbu Township is 188,182. Population density is 113 km².

5.6.2 Demographic

This section provide social and demographic characteristics of the households of the 14 villages surveyed.

- Size of Households: A normal households have a family size between 3-5 persons.
- Population: There was a total of 11,675 people in surveyed villages and average household size is 4.22 persons per household.
- Sex Ratio: Of the people interviewed in the survey households, the sex ratio was that 47 % are males, while 53% are females.

Table 5.17 *Demographics of the Villages in Mann Field (collected during Socia Surveys in January 2018)*

Village	Village Tract	Male	Female	Population	No. of household	Ethnicity
Man Gyo	Man Gyo	643	782	1425	374	100% Bamar
Chin Taung	Man Gyo	120	145	265	65	100% Bamar
Kwe Cha	Man Gyo	231	248	479	124	100% Bamar
Lay Eain Tan	Lat Pan Taw	394	362	756	210	100% Bamar
Lat Pan Taw	Lat Pan Taw	285	331	616	147	100% Bamar
Nan Oo	Mei Bayt Kone	532	437	969	168	100% Bamar
Auak Kyaung	Mei Bayt Kone	424	514	938	236	100% Bamar
Lat Pan Ta Pin	Lat Pan Taw	254	283	537	111	100% Bamar
Pauk Kone	Kyar Kan	228	258	486	119	100% Bamar
Aye Mya	Mei Bayt Kone	246	268	514	120	100% Bamar
Mei Bayt Kone	Mei Bayt Kone	602	703	1305	295	100% Bamar
Ywar Thar	Ywar Thar	633	694	1327	328	100% Bamar
Makyee Chaung	Makyee Chaung	318	409	727	180	100% Bamar
Kyar Kan	Kyar Kan	634	697	1331	286	100% Bamar
Total		5,544	6,131	11,675	2,763	-

5.6.3

Livelihood Profile of Villages

Table 5.18 below presents the livelihood profile of the 14 villages surveyed with more detailed information provided in the following section.

Table 5.18 *Livelihood Sources of 14 Villages Surveyed (% of number of HHs engaged)*

Type of Livelihood	Livelihood Source of villages
Agriculture	19%
Small Scale Trading (Shops, Stalls)	20%
Government Service	29%
Casual / Temporary Labor	22%
Handicraft	13%
Livestock	11%

Agriculture

Despite its proximity to the river, all villages are dry with sandy soil and farmers depend on rain to irrigate the sesame, groundnuts, green gram, black gram, sunflowers, pulses and cotton they grow. Paddy production is very limited. In some area, they used to have irrigated paddy fields by pumping water from the river. There is a good business by the production of Thanatkhar trees in Makyee Chaung village. Since the villagers produce mostly cash crops, households (HHs) buy the majority of the food they eat.

Most families rent tractors and equipment for ploughing and harvesting. Sowing, transplanting and weeding are done manually.

The use of chemical pesticides and fertilisers is widespread – 80% of the land-owning families reported using only chemical pesticides, while only 2% reported exclusive use of natural pesticides. 28% reported to use a combination of these two.

Figure 5.31 Farmland in Mei Bayt Kone village



Figure 5.32 Thanatkhar cultivation in Makyee Chaung village



Figure 5.33 *Bean cultivation in Pauk Kone village*



Employment and Occupation

Outside of agriculture and casual agricultural labour (19% of the HHs of all villages), 29% of the total HHs are Government Staffs. 13% of HH are engaged with handicraft for the production of bamboo basket, concrete pot, soap and shampoo. Small scale trading shops are developed in every villages and 20 % of the HH of 14 villages are shop owners.

Figure 5.34 Small Shop in Chin Taung Villaage



Figure 5.35 Local business; handicraft for making basket in Pauk Kone village



Figure 5.36 Local business; handicraft for making Concrete Pot in Kwe Cha village



Figure 5.37 Local business; making Shampoo in Mei Bayt Kone village



Livestock

Some villagers raise livestock including pigs, sheep, goats and cows. For those who are able to purchase or otherwise gain access to animals, livestock rearing makes an important contribution to their livelihoods. Animals provide a regular income and can be used as an asset to sell when times are

difficult or for important expenditures like donation. Some women like to raise livestock to supplement the family's income.

Figure 5.38 Livestock in Ywar Thar village



Figure 5.39 Livestock in Kyar Kan village



5.6.4

Land Usage

Of the 698 households surveyed in the 14 villages, the total agricultural land owned is 5,625 Acres. Man Gyo village owned the highest percentage of agricultural land followed by Mei Bayt Kone village. The average land holding size of the community is 2 acre on an average.

Auak Kyaung village, with 236 HHs, has the highest average residential landholding size of 0.64 acres. This is followed by Chin Taung where the average landholding size is 1.63 acres.

Table 5.19 *Land usage of the 14 villages of Mann Field*

Name of villages	Residential Area (Acre)	Public Building (Acre)	Religious Building (Acre)	Agriculture (Acre)	Forest (Acre)
Man Gyo	25	5	7	1575	0
Chin Taung	40	0	0	150	0
Kwe Cha	15	1	5	250	0
Lay Eain Tan	12	0	1	200	0
Lat Pan Taw	40	0	0	40	0
Nan Oo	6	0	0	80	0
Auak Kyaung	150	0	30	820	0
Lat Pan Ta Pin	11	0	0	350	0
Pauk Kone	15	0	0	150	0
Aye Mya	5	0	0	60	0
Mei Bayt Kone	10	0	0	1200	0
Ywar Thar	30	0	0	200	0
Makye Chaung	8	0	0	500	0
Kyar Kan	0	0	0	50	0
Total (Acre)	367	6	43	5625	0

5.6.5

Living Condition and Access to Public Services

Housing

There is a high level house of land ownership of the Mann Field area. 98% of the respondents have their own dwelling, with 90% of homes being built on wood and bamboo and 10% have homes with cement walls. For roofing purposes, thatch and metal roofing / corrugated iron sheets are the most commonly used materials.

Sanitation

100 % of the population have fly-proof latrine.

Water Usage

All respondents reported requirement of extra supply of potable water and water for other domestic needs in summer as the supplied water by MOGE pipeline is not adequate. All villages have water tanks that are filled from a pumping tube well donated by MOGE. Pipes run from these tanks to public distribution outlets to private homes.

MOGE distributed drinking water pumped from Ayeyarwady River to all villages. This water is used for drinking and household use. 85% of the households use MOGE pipeline taps and 4 % of the families use open wells and hand pumps for drinking water and households use.

Most of the open wells have now installed pumps to promote their capacities. The water management committees were formed in 2015 in Lay Eain Tan village to manage the water supply. Water quality of the ground water is considered good for drinking purposes. However, the tank water in Nan Oo village was prohibited to drink because of the high content of BOD.

Figure 5.40 *Water Tank donated by MOGE in Nan Oo Village*



Figure 5.41 Well for Domestic Use in Pauk Kone Village



Figure 5.42 Water Pump for Drinking Water from Ayeyarwady River



Energy

All villages are connected to the national grid except Lat Pan Ta Pin and Kwe Cha villages. Households also use solar energy, candle and kerosene for lighting.

89% of the villages are dependent on firewood as a source of fuel for cooking. 50% of HH are using electricity for cooking in the villages where there is electricity supply.

Connectivity

All villages have roads and street lighting. Roads are used by motorbikes and trucks. All those villages along the west bank of Ayeyarwady River are connected to the regional capital, Magway, by a 1.8 mile bridge. Most of the villagers are using boats for travelling along the Ayeyarwady River. Road quality is generally poor with all areas unpaved.

Financial Services

Currently, farmer has access to formal financial services through the Myanmar Agriculture Development Bank. For small-scale farmers with fewer than 10 acres, the MADB makes up to Kyat 100,000 to 150,000/acre available for paddy and Kyat 50,000/acre for other crops. The microfinance of PACT Myanmar and Save the Children has been provided to villagers with interest rate of 1.5 to 2.5% per month. Microfinance schemes have often been more suited to help households manage debt than for agricultural lending.

5.6.6

Socio-economic indicator

Education

Enrollment rate in primary education reached 100% in Man Gyo, Nan Oo, Mei Bayt Kone, Ywar Thar, MaKyee Chaing and Kar Kan village. The survey revealed that 13% of the population study at the university and 21% finish high school education. There are a large number of student finish middle school (sample average of 42%) and primary school (60%).

There is one high school in Mei Bayt Kone village which is accessed by neighboring villages. There is one Post Primary school in each of the other villages. Children in most villages have to commute between 10 minutes walking to reach these schools. Most of the playing ground are located near the schools but there is lack of facilities.

Table 5.20 *Education Level of 14 villages in Mann Field Area*

Village	Technical College/ University	Finish High School	Finish Middle School	Finish Primary School	Primary (Part)	No Schooling
Man Gyo	6%	60%	50%	100%	0%	0%
Chin Taung	16%	7%	5%	10%	12%	0%
Kwe Cha	6%	3%	50%	20%	0%	30%
Lay Eain Tan	2%	15%	70%	80%	0%	0%
Lat Pan Taw	1%	5%	30%	60%	0%	0%
Nan Oo	10%	10%	80%	100%	0%	0%
Auak Kyaung	18%	5%	50%	20%	0%	0%
Lat Pan Ta Pin	2%	2%	5%	15%	0%	0%
Pauk Kone	3%	7%	4%	15%	0%	0%
Aye Mya	6%	14%	16%	22%	14%	0%
Mei Bayt Kone	50%	70%	90%	100%	0%	0%
Ywar Thar	5%	10%	50%	100%	0%	0%
Makyee Chaung	75%	50%	50%	100%	0%	0%
Kyar Kan	25%	40%	40%	100%	0%	0%
Average	13%	21%	42%	60%	2%	2%

Income

The average annual per capital income of household surveyed in 14 villages was found to be between 250,000 to 540,000 Kyat.

Table 5.21 *Annual Income of HH in 14 villages of Mann Field*

Village	Village Tract	Average Annual Income
Man Gyo	Man Gyo	3,600,000
Chin Taung	Man Gyo	4,800,000
Kwe Cha	Man Gyo	3,300,000
Lay Eain Tan	Lat Pan Taw	4,500,000
Lat Pan Taw	Lat Pan Taw	3,500,000
Nan Oo	Mei Bayt Kone	4,200,000
Auak Kyaung	Mei Bayt Kone	3,000,000
Lat Pan Ta Pin	Lat Pan Taw	3,600,000
Pauk Kone	Kyar Kan	3,300,000
Aye Mya	Mei Bayt Kone	2,500,000
Mei Bayt Kone	Mei Bayt Kone	3,700,000
Ywar Thar	Ywar Thar	4,800,000
Makyee Chaung	Makyee Chaung	4,500,000
Kyar Kan	Kyar Kan	5,400,000

Gender Equity

Women perform much of the farm work including roles that determine productivity and quality of crops. Few women own land, relying instead on casual labor for their livelihoods, including ploughing, weeding and harvesting, depending on the crop. Land registration and access to credit are directed at heads of households, mostly men. Some women have to rely on small businesses like shops selling snacks and handicrafts. Men mainly worked in agriculture or in the oil field operation. Amongst men and women farm labors, women wages are lower than men. Men wages were reported to be Kyat 4,000 per day while for some women, wages were reported to be Kyat 3,000 per day.

Women-headed households account for about 5.8% of all households in 14 villages. It was founded that Man Gyo, Chin Taung and Lay Eain Tan have more than 10 % of households which were women-headed. Makyee Chaung and Mei Bayt Kone villages had fewer women-headed HH.

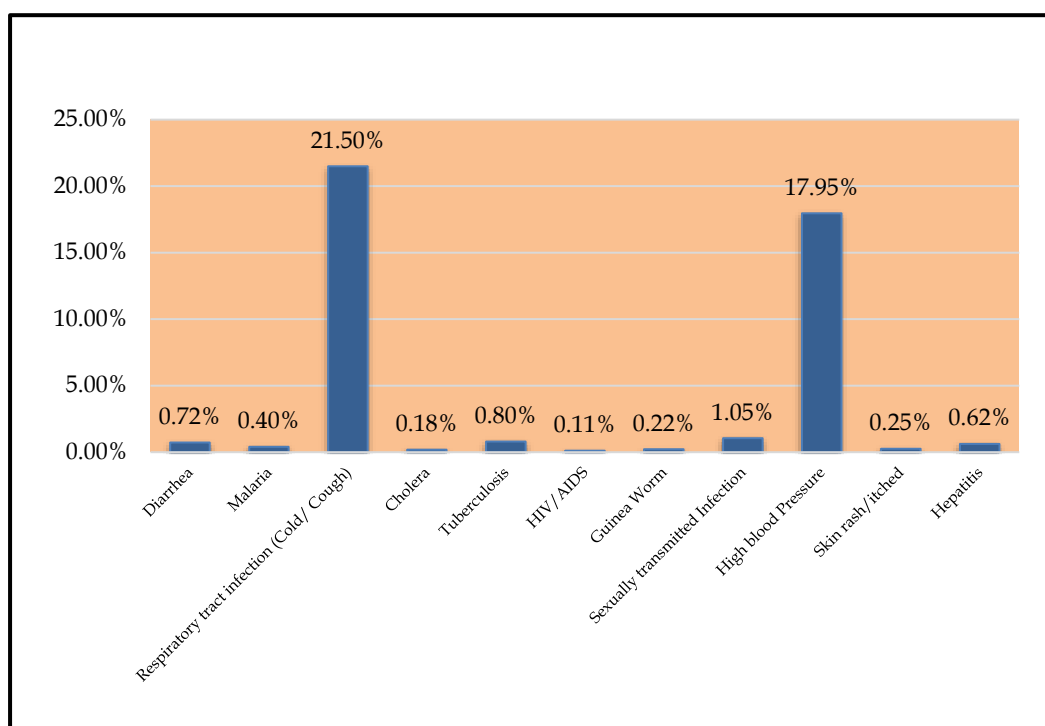
5.6.7

Public Health

Health Issue

Data collected shows that respiratory tract infection (cold/cough) is seasonal illness which is usually associated with tropical monsoon climate. There is high proportion of high blood pressure, at nearly 20% of the population surveyed. Proportion of sexually transmitted infection, diarrhea and tuberculosis are low at 1% of the population surveyed and other illness such as malaria, cholera, hepatitis and skin rash are lower than 1%.

Figure 5.43 Health Issues reported in Villages



The area is serviced by one township level hospital, located at Minbu, and MPRL E&P based camp within 2 km from the nearest village. Every village has midwife care by Township Department of Health for minor health cases and help for delivery. The distance to the Minbu Hospital is about 6 km from every villages and require an hour for access.

5.6.8 Health Care of MPRL E&P Workers

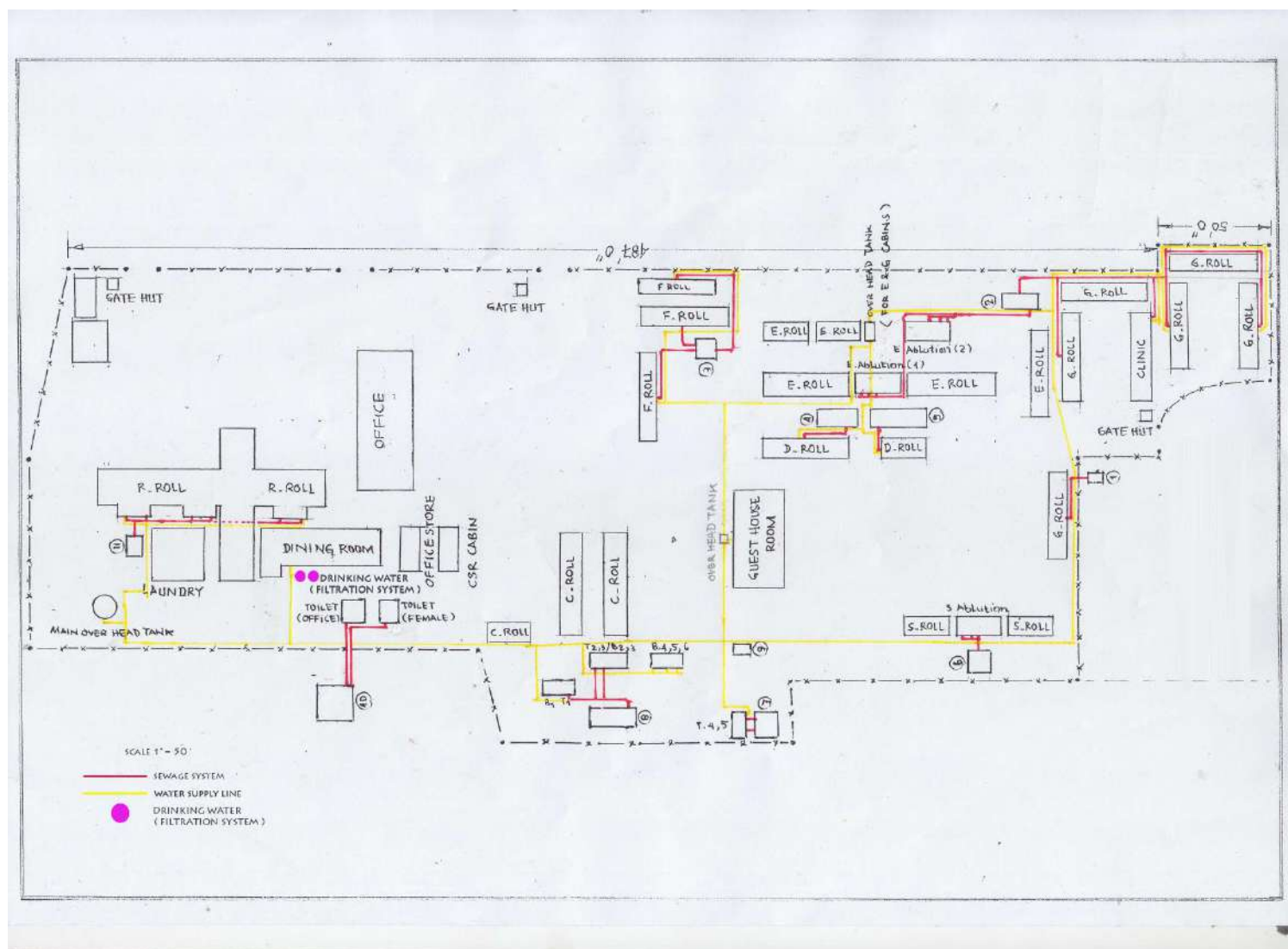
Given the remoteness of the Mann Field and the time taken to medivac a patient to a hospital with appropriate standards, all rotating personnel have to undergo a thorough medical examination before engaged to work at the Mann Field, and this should be repeated at 2 year intervals. MPRL E&P will describe the conditions and remoteness of the Mann Field to the medical examiner. The medical examiner will be required to assess whether the person is suitable for working in the Mann Field. Information will remain confidential between the employee and the medical examiner unless express written permission is given by the employee to make available this information to MPRL E&P.

MPRL E&P undertake to provide medivac facilities to all staff working on the MPRL E&P project in Mann Field. This facility is extended to sub-contracted personnel. This includes a field clinic at the worker base camp. Emergency treatment can be provided by MPRL medical staff at the field clinic, backed up by MEDIVAC support, if necessary. The MEDIVAC Plan is provided in *Annex H*.

MPRL E&P provide advice and resources on health through onsite medical and HSE personnel. The health and hygiene system of MPRL E&P which identify health risk and control measures related to general hygiene, heat stroke and heat exhaustion, diseases transmitted by insects and parasites, snake bites, land transportation etc are provide in *Annex H*.

Accommodation building and domestic water inclusive with drinking water and sewage system have been constructed in MPRL E&P camp (*Figure 5.44*).

Figure 5.44 Map of MPRL E&P Camp in Mann Oil Field



There is one known culture heritage site within the Study Area. This is an ancient pagoda named Tha Mok Da Giri, which is more than 130 years old in Auk Kyaung village, located around the Project Area and very close from the existing production wells. This pagoda is located on the top of a steep hill and is shown in *Figure 5.45* and is around 550 m from the potential well of EOR activities as shown in *Figure 5.46*. Due to the distance from the potential EOR well to the pagoda area, it is not expected that the EOR activities will affect this pagoda. There are neither ancient pagodas nor historical stone inscriptions which are conserved by the Department of Archaeology and National Museum in the Mann Oil Field area.

With Buddhism as the main religion of the people living in the 14 villages, every village has their monasteries. It is expected that the Project will not affect these monasteries since the Project are expected to be mostly undertaken on formed land where existing facilities are located.

Figure 5.45 *Location of Tha Mok Da Giri (Auk Kyaung Pagoda) in Auk Kyaung Village*

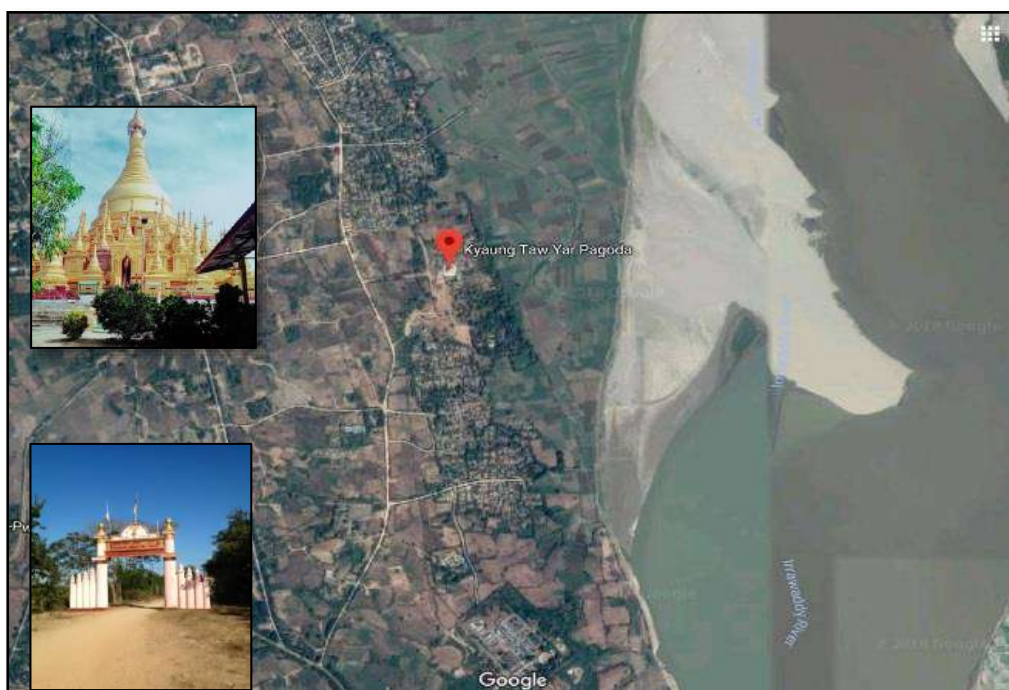


Figure 5.46 Nearest EOR Well Location to Pagoda

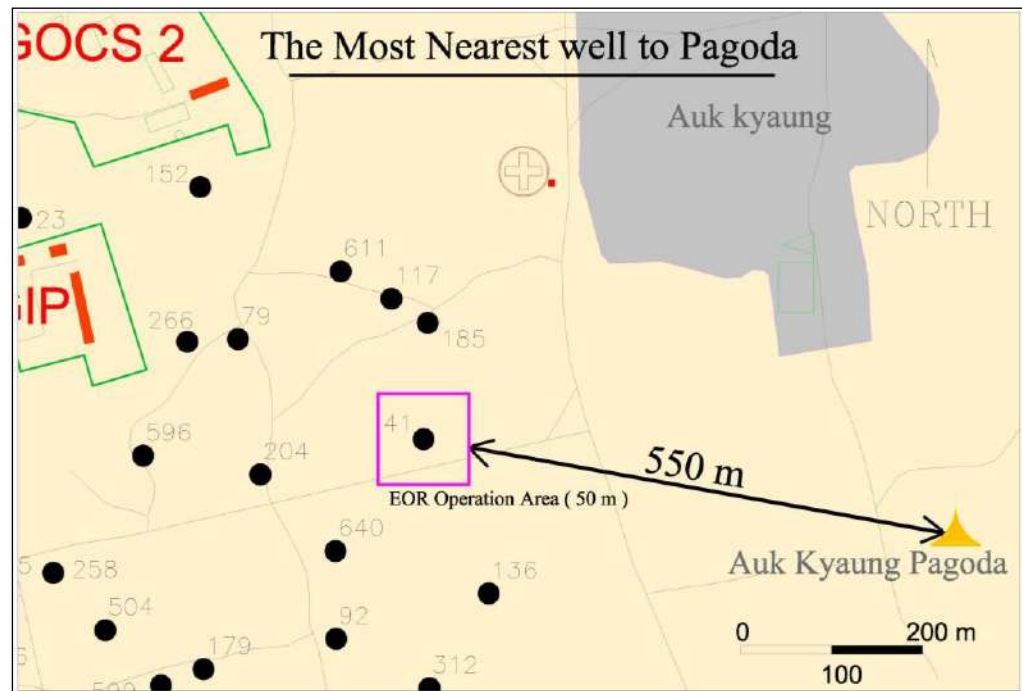


Figure 5.47 Monastery in Lat Pan Taw Village



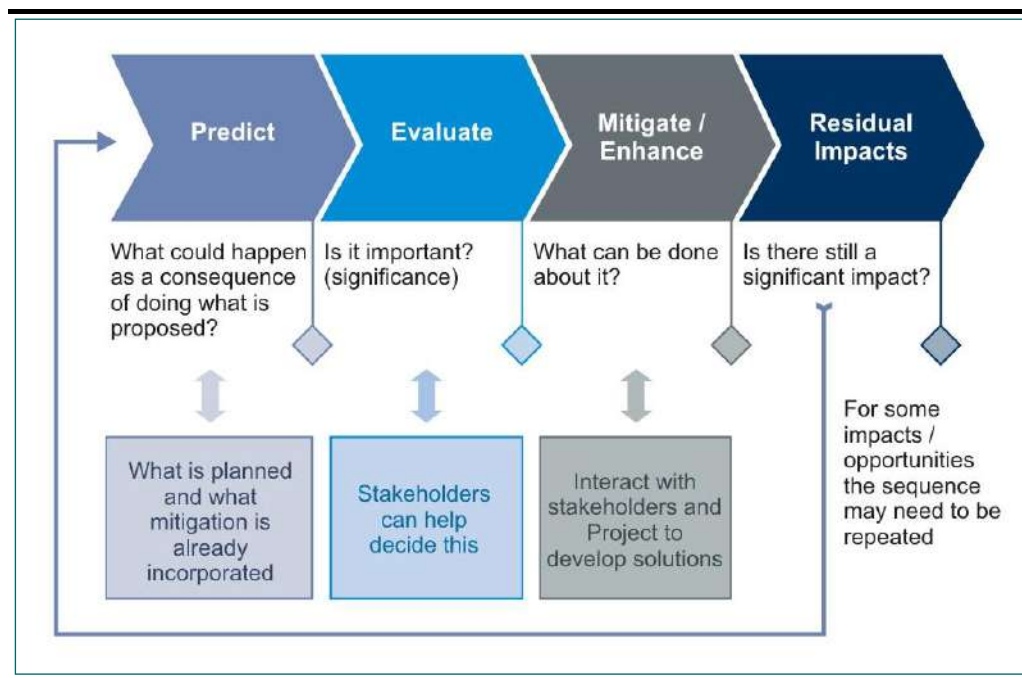
6.1

IMPACT ASSESSMENT METHODOLOGY AND APPROACH

Impact identification and assessment starts with scoping and continues through the remainder of the impact assessment process (IAP). The principal impact assessment (IA) steps are summarized in *Figure 6.1* and comprise:

- Impact prediction: to determine what could potentially happen to resources/receptors as a consequence of the Project and its associated activities.
- Impact evaluation: to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value and/or importance of the affected resource/receptor.
- Mitigation and enhancement: to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts.
- Residual impact evaluation: to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

Figure 6.6-1 *Impact Assessment Process*



Prediction of Impacts

Prediction of impacts is essentially an objective exercise to determine what could potentially happen to the environment as a consequence of the Project and its associated activities. This is essentially a repeat of the process

undertaken in scoping, whereby the potential interactions between the Project and the baseline environment are identified. In the impact assessment stage, these potential interactions are updated based on additional Project and baseline information. From these potential interactions, the potential impacts to the various resources/receptors are identified, and are elaborated to the extent possible. The diverse range of potential impacts considered in the IA process typically results in a wide range of prediction methods being used including quantitative, semi-quantitative and qualitative techniques.

Evaluation of Impacts

Once the prediction of impacts is complete, each impact is described in terms of its various relevant characteristics (e.g., type, scale, duration, frequency, extent). The terminology used to describe impact characteristics is shown in Table 6.1.

Table 6.1 *Impact Characteristic Terminology*

Characteristic	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect).	Direct Indirect Induced
Extent	The “reach” of the impact (e.g., confined to a small area around the Project Footprint, projected for several kilometres, etc).	Local Regional International
Duration	The time period over which a resource / receptor is affected.	Temporary Short-term Long-term Permanent
Scale	The size of the impact (e.g., the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc)	[no fixed designations; intended to be a numerical value]
Frequency	A measure of the constancy or periodicity of the impact.	[no fixed designations; intended to be a numerical value]

The definitions for the *type* designations are shown in Table 6.2. Definitions for the other designations are resource/receptor-specific, and are discussed in the resource/receptor-specific chapters.

Table 6.2 *Impact Type Definitions*

Designations (Type)	Definition
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g., influx of camp followers resulting from the importation of a large Project workforce).

The above characteristics and definitions apply to planned and unplanned events. An additional characteristic that pertains only to unplanned events is *likelihood*. The *likelihood* of an unplanned event occurring is designated using a qualitative scale, as described in Table 6.3.

Table 6.3 *Definitions for Likelihood Designations*

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions.
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur during normal operating conditions (i.e., it is essentially inevitable).

Once an impact's characteristics are defined, the next step in the impact assessment phase is to assign each impact a 'magnitude'. Magnitude is a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent
- Duration
- Scale
- Frequency

Additionally, for unplanned events only, magnitude incorporates the 'likelihood' factor discussed above.

Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. As discussed above, the magnitude designations themselves are universally consistent, but the definitions for these designations vary on a resource/receptor-by-resource/receptor basis, as further discussed in each of the resource/receptor-specific chapters. The universal magnitude designations are:

- Positive
- Negligible
- Small
- Medium
- Large

In the case of a *positive* impact, no magnitude designation (aside from 'positive') is assigned. It is considered sufficient for the purpose of the IA to

indicate that the Project is expected to result in a *positive* impact, without characterising the exact degree of positive change likely to occur.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation.

In addition to characterising the magnitude of impact, the other principal impact evaluation step is definition of the sensitivity / vulnerability / importance of the impacted resource/receptor. There are a range of factors to be taken into account when defining the sensitivity / vulnerability / importance of the resource/receptor, which may be physical, biological, cultural or human. Other factors may also be considered when characterising sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations vary on a resource/receptor basis. The universal sensitivity/vulnerability/importance designations are:

- Low
- Medium
- High

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the significance can be assigned for each impact. Impact significance is designated using the matrix shown in Figure 6.2.

Figure 6.2 *Impact Significances*

		Sensitivity/Vulnerability/Importance of Resource/Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor-specific considerations are factored into the assignment of magnitude and sensitivity/vulnerability/

importance designations that enter into the matrix. *Box 5.1* provides a context for what the various impact significance ratings signify.

It is important to note that impact prediction and evaluation take into account any embedded controls (i.e., physical or procedural controls that are already planned as part of the Project design, regardless of the results of the IA Process). An example of an embedded control is a standard acoustic enclosure that is designed to be installed around a piece of major equipment. This avoids the situation where an impact is assigned a magnitude based on a hypothetical version of the Project that considers none of the embedded controls.

Box 5.1 *Context of Impact Significances*

An impact of **negligible** significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of **minor** significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of **moderate** significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of **major** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

Identification of Mitigation and Enhancement Measures

Once the significance of an impact has been characterised, the next step is to evaluate what mitigation and enhancement measures are warranted. For the purposes of this IA, ERM has adopted the following Mitigation Hierarchy:

- **Avoid at Source; Reduce at Source:** avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).

- **Abate on Site:** add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).
- **Abate at Receptor:** if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).
- **Repair or Remedy:** some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- **Compensate in Kind; Compensate Through Other Means:** where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

Residual Impact Evaluation

Once mitigation and enhancement measures are declared, the next step in the IA Process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation and enhancement measures.

Management and Monitoring

The final stage in the IA Process is definition of the management and monitoring measures that are needed to identify whether: a) impacts or their associated Project components remain in conformance with applicable standards; and b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

A Environmental Management Plan, which is a summary of all actions which the Project Proponent has committed to executing with respect to environmental performance for the Project, is also included as part of the EIA report. The Environmental Management Plan includes mitigation measures,

compensatory measures and offsets and management and monitoring activities.

6.2

IDENTIFICATION OF POTENTIAL IMPACTS OF THE PROJECT

For the Project, potential impacts have been identified through a systematic process whereby the activities (both planned and unplanned) associated with the Project have been considered with respect to their potential to interact with environmental resources or receptors.

The results from the scoping process for the Project are presented in the Scoping Matrix in *Table 6.4*. The Scoping Matrix displays Project activities against resources/receptors, and supports a methodological identification of the potential interactions each Project activity may have on the range of resources/receptors within the Area of Influence for the Project. Entries in the matrix cells are coloured to indicate whether:

- An interaction is not reasonably expected (white);
- An interaction is reasonably possible but none of the resulting impacts are likely to lead to significant effects (grey);
- An interaction is reasonably possible and at least one of the resulting impacts is likely to lead to an effect that is significant (black); or
- An interaction will possibly lead to positive impacts (green).

For the purpose of the scoping exercise, Project activities are divided into the following phases:

- Construction phase;
- Operational phase; and
- Accidental events.

Table 6.4 Scoping Matrix for Project Activities

Project Activity/ Hazards	Physical						Biological					
	Ambient Air Quality	Ambient Noise	Ground Water Quality	Surface Water Quality	Soil	Landscape and Visual Character	Use of Natural Resources	Terrestrial Habitat	Terrestrial Flora	Terrestrial Fauna	Aquatic Habitat (freshwater)	Aquatic Flora & Fauna (freshwater)
Re-development and EOR activities												
Construction Phase												
Use of PMEs for installation of EOR facilities and re-development activities (General)												
Drilling activities (daylight hours)												
Labour, equipment and services supply												
Mobile Power Generation												
Excavation, site preparation / clearance & creation of additional access routes												
Improper disposal of solid waste												
Improper wastewater discharge												
Operational Phase												
Labour, equipment and services supply												
Mobile power generation												
Use of chemicals for EOR process												
Consumptive use of water resources for EOR process												
Venting												
Improper disposal of solid waste												
Improper disposal of wastewater and sludge												
Improved operations after re-development												
Accidental Events												
Chemical spill, well failure, reservoir leakage (include spillage due to flooding)												
Fires and explosions due to accidental events related to re-perforations												

- An interaction is not reasonably expected (white);
- An interaction is reasonably possible but none of the resulting impacts are likely to lead to significant effects (grey);
- An interaction is reasonably possible and at least one of the resulting impacts is likely to lead to an effect that is significant (black); or
- An interaction will possibly lead to positive impacts (green).

The prioritisation of impacts indicates that the majority of identified interactions of the re-development and EOR activities and the environment receptors are not expected to be significant. For activities predicted to have no significant impact (ie those in white in the Matrix), no detailed quantification or further assessment will be conducted under the EIA.

For activities where an interaction is reasonably possible but none of the resulting impacts would be considered likely to lead to significant effects, this evaluation recommends that they be reviewed and confirmed within the detailed EIA.

It is important to note that for those issues that have been scoped out of requiring further assessment in this EIA study, it is still essential that they still receive careful planning and consideration in line with international standard management procedures and general good practice for all project stages.

Those interactions which have the potential to generate **significant** impacts are:

Construction Phase

- Impacts from use of PMEs for installation of EOR facilities and re-development activities (general) on ambient air quality, ambient noise as well as terrestrial ecological resources (i.e. habitats and fauna);
- Impacts from drilling activities on ambient air quality, ambient noise, surface water quality, groundwater quality, soil quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna);
- Impacts from mobile power generation on terrestrial fauna;
- Impacts from excavation, site preparation / clearance & creation of additional access routes on terrestrial ecological resources (i.e. habitats, flora and fauna);
- Impacts from improper disposal of solid wastes on surface water quality, groundwater quality, soil quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna); and
- Impacts from improper wastewater discharge on surface water quality, groundwater quality, soil quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna).

Operational Phase

- Impacts from mobile power generation on terrestrial fauna;
- Impacts from consumptive use of surface water resources by EOR process on use of nature resources;
- Impacts from the use of chemicals for EOR process on soil quality, surface water quality, groundwater quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna); and,
- Impacts from improper disposal of solid wastes on surface water quality, groundwater quality, soil quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna); and
- Impacts from improper disposal of wastewater and sludge on surface water quality, groundwater quality, soil quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna).
- Impacts from gas venting activities on ambient air condition.
- Positive impacts of improved operations after re-development on all related physical and biological receptors.

Accidental Events

- Impacts from chemical spills, well failure and reservoir leakage on soil quality, surface water quality, groundwater quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna).
- Impacts from fires and explosions caused by the accidental events related to the use of explosive materials in re-perforation on air quality, ground water quality, surface water quality, soil quality, use of natural resources, terrestrial habitats and aquatic habitats as well as their associated flora and fauna.

This scoping study recommends that these above activities and potential impacts be given specific attention in the detailed EIA Study, including quantification of predicted impacts where possible. If impacts are confirmed to be of moderate or greater significance, mitigation, management and monitoring measures are required to ensure predicted impacts are maintained within ALARP levels.

It is, however, important to note that the identification of potential environmental impacts should continue throughout the planning and implementation of the Project. As Project concepts are further developed and their implementation planned, activities should continue to be screened to determine whether any change in circumstance (Project or baseline) could constitute a change in this evaluation.

Drawing on the outcomes of scoping, Sections 6.5-20 below present the assessment of the potential impacts to the environment associated with the EOR and redevelopment activities. The assessment is presented in the order of impacts as identified during scoping.

CONSTRUCTION PHASE

6.5 IMPACTS FROM USE OF PMEs FOR INSTALLATION OF EOR FACILITIES AND RE-DEVELOPMENT ACTIVITIES (GENERAL) ON AMBIENT AIR QUALITY, AMBIENT NOISE AS WELL AS TERRESTRIAL ECOLOGICAL RESOURCES (I.E. HABITATS AND FAUNA)

6.5.1 Source of Impact

During construction phase of the EOR and re-development programme, Powered Mechanical Equipment (PME) would be used to construct the EOR facilities (e.g. injection well) and for the re-development activities (e.g. improvement of pumping units). These PMEs would be the key sources of air emission and noise which may affect the environment as well as community health.

Exact locations where the EOR and re-development activities will be undertaken are not yet determined. It is expected that the construction activities will be carried out at existing facilities (e.g. wells and GOCS) within the Mann Field which are considered as developed area and are mostly remote from sensitive receiver locations. A small proportion of existing facilities are, however, relatively nearby residential area, guesthouse, MPRL E&P office, which are considered NSRs and ASRs of medium sensitivity. For air emission, exhaust gas from vehicles, generator and engines have the potential to affect nearby ASRs. The primary pollutants emitted from engines include Particulate matter (PM), Carbon monoxide, (CO), Nitrogen oxides (NO_x), Hydrocarbons (HC), and Volatile organic compounds (VOCs). Combustion of fossil fuels in stationary and mobile combustion sources will produce greenhouse gases (e.g. carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). In addition, noise from the PMEs may affect the NSRs and also lead to indirect impacts to terrestrial ecology due to disturbance of terrestrial habitat and associated fauna. Noise emissions and vibration from PMEs will have the potential to modify the movement and behaviour of terrestrial fauna. The most common response to disturbance is active avoidance of an area with associated ecological effects (e.g. move from an individual's territory, disturbance of breeding activities etc.). Affected fauna are likely to include the six (6) mammal species recorded during the baseline survey such as Gray squirrel and Myanmar hare (*Annex D*).

6.5.2 Existing/ In Place Controls

Existing / in place Measures to control/ reduce adverse impacts include:

- Construction activities carried out at existing facilities of the Mann Field which are developed area mostly away from sensitive receptors.
- Construction activities to be limited to daylight working hours.
- Well maintained equipment will be used.
- Noise suppression box will be fabricated over the engine for the PMEs being operated nearby the NSRs (e.g. villages).
- Appropriate PPE e.g. ear protection will be used for MPRL E&P personnel.
- Vegetation cutting by hand to minimise disturbance and degradation of the habitats.

It is assumed felling of large perennial vegetation (i.e. large trees which typically provide habitat for higher densities of terrestrial fauna) will be avoided.

6.5.3 *Significance of Impacts*

Noise

For the EOR programme, it is expected that the use of drilling rig for the construction of the injection wells would be the most significant noise source. For the re-development programme, rigid trucks are anticipated to be the key equipment used for improvement of the facilities (e.g. pumping units).

With the release of the Myanmar EIA Procedure in December 2015, NEQEG was also enacted. The NEQEG provide the basis for regulation and control of noise from projects in order to prevent pollution and protect the environment and public health. The NEQEG are noted to be the similar to that recommended by the IFC General EHS Guidelines (2007) (World Bank Group, 2007) and the IFC sector specific 2017 Environmental, health, and safety guidelines for onshore oil and gas development.

Noise emission parameters are taken from *Section 1.3* of the NEQEG and shown in *Table 3.3*. Ambient noise levels recorded during baseline survey at four representative locations during daytime (LA_{eq}) ranged from 49 dB to 61 dB and are generally complied with the standard, except for station Z2AQN for which exceedances of daytime and night time noise levels were observed. According to *Figure 1.1*, station Z2AQN which is located in Kyaut San Village is not in the vicinity of any Mann Field facilities (*Table 5.6*). As such, the exceedances are not likely to be caused by the Mann Field operation and are likely to be due to noise from village and traffic activities.

Noise levels associated with EOR and re-development activities at a works area have been calculated to illustrate indicative noise levels at varying distances away from the area (Table 6.5).

Table 6.5 *Calculated Noise Levels at 50m, 100m, 150m and 200m from EOR and Re-development Activities*

Equipment to NSR Separation Distance	Activities	Equipment	Noise Level, dB(A)	Assessment Criteria dB(A) ^(a)	Compliance
50m	Construction of infill well, deepening well, injection well for EOR programme	2 x Tracked hydraulic drilling rig (GD-2 Rig) and work over rig (P100 rig)	75	70	No
	Facilities improvement for the re-development programme	2x rigid trucks	72	70	No
100m	Construction of infill well, deepening well, injection well for EOR programme	1 x Tracked hydraulic drilling rig (GD-2 rig) or workover rig (P100 rig)	69	70	Yes
	Facilities improvement for the re-development programme	2x rigid trucks	69	70	Yes
150m	Construction of infill well, deepening well, injection well for EOR programme	1 x Tracked hydraulic drilling rig (GD-2 rig)	65	70	Yes
	Facilities improvement for the re-development programme	2x rigid trucks	65	70	Yes
200m	Construction of infill well, deepening well, injection well for EOR programme	1 x Tracked hydraulic drilling rig (GD-2 rig) or workover rig (P100 rig)	63	70	Yes
	Facilities improvement for the re-development programme	2x rigid trucks	63	70	Yes

Note:

(a) Ambient Noise Standards in Thailand

Based on the calculations, it is expected there is potential for small magnitude noise exceedance to occur if NSRs are located within about 100 m from the well. The significance of impact to such NSRs with medium sensitivity is assessed as **Minor**. For EOR and redevelopment at wells that are further than 100m from NSRs, noise levels would not be expected to exceed assessment criteria due to activities at the works site. The significance of impacts to NSRs would be considered as **Negligible**.

Table 6.6 *Assessment of Impacts on Ambient Noise Levels due to the use of PMEs during Construction*

Impact	Noise impact from the use of PME during construction phase.				
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term		Long-term	Permanent
Impact Extent	Local		Regional		International
Impact Scale	Noise levels are calculated to comply with noise criteria within about 100 m from the works area.				
Frequency	Daytime only throughout construction activity period at a works area.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low			Medium	High
Impact Significance	Negligible	Minor		Moderate	Major

Air

Potential impacts are likely to be small and limited to the works area and hence would be considered to be local, however, winds may potentially carry emissions into surrounding communities, if wells / GOCS selected for the EOR and re-development programme are nearby ASRs. The combination of a medium resource sensitivity and small impact magnitude will result in an overall **Minor** potential impact significance.

Table 6.7 *Assessment of Impacts on Ambient Air Quality due to the use of PMEs during Construction*

Impact	Air quality impact from the use of PMEs during construction phase.						
Impact Type	Direct		Indirect		Induced		
Impact Duration	Temporary		Short-term		Long-term		
Impact Extent	Local		Regional		International		
Impact Scale	Limited to the works area and hence would be considered to be local, however, winds may potentially carry emissions into surrounding communities.						
Frequency	Daytime only throughout construction activity period at a works area.						
Impact Magnitude	Positive		Negligible		Small		
					Medium		
Resource Sensitivity	Low		Medium			High	
Impact Significance	Negligible		Minor		Moderate		
					Major		

Terrestrial Ecological Resources

While disturbance effects have the potential to occur due to noise emission from PMEs during construction phase, they will be temporary in nature and local in scale as temporarily displaced terrestrial fauna will be expected to move back into an area once activities at a location have ceased. The impact magnitude is thus expected to be small. The sensitivity of terrestrial habitats and fauna is considered to be low as revealed from the baseline survey

findings with no species of recognised conservation interest recorded. In addition, fauna species presented at the works areas, which are mostly developed area, are expected to be well-adapted to disturbance due to the existing oil and gas operations. As such, provided that the existing/in place controls are followed, the impact of disturbance to terrestrial ecological resources due to noise emission from PME's is considered as of **Negligible** significance.

Table 6.8 *Assessment of Impacts on Terrestrial Ecological Resources (Habitat and Associated Fauna) due to the use of PME's during Construction*

Impact	Disturbances to terrestrial habitat and associated fauna from the use of PME's during construction phase.				
Impact Nature	Negative	Positive		Neutral	
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local	Regional		International	
Impact Scale	Exact extent of indirect affects unknown but considered local. Also, impact scale is expected to be small to fauna which should have adapted to disturbances by existing oil and gas activities.				
Frequency	Daytime only throughout construction activity period at a works area.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate		Major

6.5.4 *Additional Mitigation, Management and Monitoring*

Since the significance of impacts is considered negligible to minor with exiting control measures, additional measures are not considered necessary. However, as industrial best practices the following mitigation measures are recommended to be implemented:

- Regular maintenance of equipment such as lubricating moving parts, tightening loose parts and replacing worn out components.
- Shut down or throttled down between work periods for machines and construction plant items (eg trucks) that may be in intermittent use.
- Shut down generators, compressors, and other equipment when not in use.
- Reduce the number of equipment operating simultaneously as far as practicable.
- Orientate equipment known to emit noise strongly in one direction so that the noise is directed away from receptors as far as practicable.

- Implement control measures, eg erecting temporary noise barriers and deflectors, whenever applicable.

6.5.5 *Significance of Residual Impacts*

Provided that mitigation measures are followed, the residual impacts of the use of PME during construction on ambient noise levels, air quality and terrestrial ecological resources are expected to be **Negligible**.

6.6 *IMPACTS FROM DRILLING ACTIVITIES ON AMBIENT AIR QUALITY, AMBIENT NOISE, SURFACE WATER QUALITY, GROUNDWATER QUALITY, SOIL QUALITY AS WELL AS TERRESTRIAL AND AQUATIC ECOLOGICAL RESOURCES (I.E. HABITATS, FLORA AND FAUNA)*

6.6.1 *Source of Impact*

Drilling activities will be carried out for the installation of infill well, deepening well and injection wells under the EOR programme. Drilling will be carried out at existing well sites within the Mann Field which are considered as developed area and are mostly remote from sensitive receiver locations (please also refer to *Section 6.5* above for the description of the drilling activities). The use of PME during drilling activities will lead to potential impacts on air quality, noise and community health as well as terrestrial ecological resources which have been assessed in *Section 6.5* above and would thus not be further discussed in this section.

Drilling of infill wells and injection wells will generate cuttings and use drilling muds which are typically the largest waste stream during the construction phase of the EOR programme. Drill muds used for the EOR will be water based mud (WBM) and potassium chloride (KCl) polymer mud. It is estimated that 600 bbl of drilling mud and 36 bbl of cuttings will be generated from drilling of each well. Improper disposal of cuttings and drilling muds has the potential to contaminate surface waters, ground water and soil giving rise to potential impacts to community health as well as sub lethal or lethal effects to exposed aquatic organism or terrestrial fauna due to exposure to elevated salinity, total suspended solid and sedimentation levels as well as toxicity effects (i.e. such as from hydrocarbons and chemical additives). These potential impacts to surface water, ground water and soil quality as well as the terrestrial and aquatic resources are further assessed below.

6.6.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts from drilling muds and cuttings include:

- Proper implementation of MPRL E&P's Waste Management Plan (WMP) for the Mann Field.

- Drill muds used will be WBM and KCl polymer mud with negligible toxicity which will be recycled and treated for future use as far as possible. If disposal is required, follow *NEQEG for Onshore Oil and Gas Development*.

6.6.3 Significance of Impacts

The sensitivity of surface water, groundwater and soil quality is considered to be medium within the Mann Field as these resources are used by the community for drinking, irrigation and cultivation activities. Terrestrial and aquatic habitats as well as the associated flora and fauna are considered as of low sensitivity as revealed by the baseline survey findings.

On the assumption that the WMP will be properly implemented and WBM and KCl polymer mud with negligible toxicity will be used, the impact magnitude associated with the improper disposal of drilling muds and cuttings is considered to be small. The significance of impacts is thus ranked as **Minor** for surface water, groundwater and soil quality and **Negligible** for terrestrial and aquatic ecological resources.

Table 6.9 *Impacts from Drilling Activities (Drilling Muds and Cuttings) on Surface Water Quality, Ground Water Quality, Soil Quality, Terrestrial and Aquatic Habitats as well as their Associated Flora and Fauna*

Impact	Impacts on surface water quality, ground water quality, soil quality, terrestrial and aquatic habitats as well as their associated flora and fauna.				
Impact Nature	Negative		Positive		Neutral
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	Impact scale is expected to be small with negligible toxicity of the drilling muds and cuttings and their proper treatment and disposal under the WMP.				
Frequency	Occurred when there is drilling activity.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low			High	
Impact Significance	Negligible	Minor		Moderate	Major

6.6.4 Additional Mitigation, Management and Monitoring

Since the significance of impacts is considered negligible to minor with exiting control measures, additional measures are not considered necessary. However, as industrial best practices the following mitigation measures are recommended to be implemented:

- Careful selection of the fluid system. When selecting chemical additives, technical requirements, additive concentration, toxicity,

bioavailability and bioaccumulation potential should be taken into account to minimize environmental hazards to their use and disposal.

- Monitoring the concentration of heavy metal impurities (mainly mercury and cadmium) in barite stock in the fluid formulation, if used.
- Follow and monitor compliance of drilling fluids and cuttings treatment and disposal with *NEQEG for Onshore Oil and Gas Development*.
- Minimize the usage of surface water for the drilling fluid. Reused and recycle surface-water for the operations
- Well-planned drilling management team to drill wells with industry good practices

6.6.5 *Significance of Residual Impacts*

Provided that mitigation measures are followed, the residual impacts are expected to be Negligible.

6.7 *IMPACTS FROM MOBILE POWER GENERATION ON TERRESTRIAL FAUNA*

6.7.1 *Source of Impact*

Mobile power generators will be used during the construction phase of the EOR and re-development programme. These generators, which may present in nearby all works areas, will give rise to noise emissions and vibration which in turn will have the potential to modify the movement and behaviour of terrestrial fauna. The most common response to disturbance is active avoidance of an area with associated ecological effects (e.g. move from an individual's territory, disturbance of breeding activities etc.). Affected fauna are likely to include the six (6) mammal species recorded during the baseline survey, such as Gray squirrel and Myanmar hare.

6.7.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts will include:

- Specifications of power generator.
- Project activities limited to daylight hours.

6.7.3 *Significance of Impacts*

While disturbance effects have the potential to occur, they will be temporary in nature and local in scale as temporarily displaced terrestrial fauna will be expected to move back into an area once activities at a location have ceased. In addition, fauna species presented at the works areas, which are mostly developed area, are expected to be well-adapted to disturbance due to the

existing oil and gas operations. The impact magnitude is thus expected to be small. The sensitivity of terrestrial fauna is considered to be low as species of recognised conservation interest was not recorded during the baseline survey. Provided that the existing/in place controls are followed, the impact of disturbance to terrestrial fauna due to mobile power generation is ranked of **Negligible** significance.

Table 6.10 *Assessment of Impacts on Terrestrial Fauna due to Mobile Power Generation*

Impact	Impacts on terrestrial faun due to mobile power generation.				
Impact Nature	Negative		Positive		Neutral
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	Exact extent of indirect affects unknown but considered local. Also, impact scale is expected to be small to fauna which should have adapted to disturbances by existing oil and gas activities.				
Frequency	During daylight operation of generators.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor		Moderate	Major

6.7.4 *Additional Mitigation, Management and Monitoring*

The assessment indicates potential impacts associated with mobile power generations are expected to be negligible and hence no further mitigations are required.

6.7.5 *Significance of Residual Impacts*

The residual impact of mobile power generation to terrestrial fauna is expected to be **Negligible**.

6.8 *IMPACTS FROM EXCAVATION, SITE PREPARATION/CLEARANCE & CREATION OF ADDITIONAL ACCESS ROUTES ON TERRESTRIAL ECOLOGICAL RESOURCES (I.E. HABITATS, FLORA AND FAUNA)*

6.8.1 *Source of Impact*

Development of access routes for equipment and workforce may be required during construction phase of the Project to undertake the EOR and re-development activities at the works areas. The Project team may also need to undertake excavation and site clearance at the works areas. Direct impacts to terrestrial ecology associated with these activities will include habitat and vegetation loss within the footprint of the associated works area as well as potential loss of inactive or less mobile wildlife (e.g. herpetofauna) that are nesting in or inhabiting the affected area.

Apart from the above direct impacts, indirect impacts to terrestrial fauna may occur as a result of the linear constructions of access routes within forest habitat, such as shrubland of the Project Area. The linear construction of access routes can lead to detrimental ecological effects on wildlife populations due to creation of fragmentation and edge effects ⁽¹⁾. For instance, due to predator avoidance behaviours, some terrestrial fauna may have a tendency to stay away from access routes / works area which may impede movements across areas. On the other hand, linear constructions can facilitate movements of predators across areas which could change predator-prey relationships.

6.8.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts will include:

- On the basis that vegetation clearance for access routes will be undertaken using hand tools, it is assumed that felling of large perennial vegetation (i.e. large trees) will be avoided.
- Minimize footprint of access roads at the design stage (width of any new road should be less than 5 m).
- Induction training for personnel is recommended to include a mandatory segment on biodiversity. In this induction details of key requirements will be provided to include:
 - Outline vegetation clearance procedures including species and upper size limit of tree that can be felled.
 - What to do in the advent of disturbing fauna species (eg snakes) (both from an occupational safety and biodiversity perspective).

6.8.3 *Significance of Impacts*

Provided that the EOR and re-development programme will mostly be implemented at existing facilities which are developed area typically with low density of vegetation and fauna, direct impacts on terrestrial habitat and the associated fauna and flora are expected to be of small magnitude. Given that sensitivity of potentially affected habitats, fauna and flora are considered low with no species of recognised conservation interest recorded, the significance of impacts is ranked as **Minor**.

Works areas of the Project will mostly be located near / at existing facilities (i.e. developed area) with established access routes. As such, it is expected that construction of access routes for the Project would not be extensive and is not anticipated to affect fauna within the shrubland which are more

⁽¹⁾ Laurance, W., Goosem, M. and Laurance, S. (2009) Impacts of roads and linear clearings on tropical forests. Elsevier Ltd, doi:10.1016/j.tree.2009.06.009

susceptible to fragmentation and edging effects. In addition, fauna species presented at the works areas, which are mostly developed area, are expected to be well-adapted to disturbance due to the existing oil and gas operations. The potential indirect impacts to fauna as a result of fragmentation and edging effects would thus be of small magnitude. Sensitivity of terrestrial fauna is considered low with no species of recognised conservation interest recorded. Significance of potential indirect impacts to fauna is thus ranked as **Negligible**.

Table 6.11 *Assessment of Impacts of Direct Loss of Terrestrial Habitat, Flora and Fauna due to Excavation, Site Preparation / Clearance & Creation of Additional Access Routes.*

Impact	Impacts of direct loss of terrestrial habitat, flora and fauna.				
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term		Long-term	Permanent
Impact Extent	Local		Regional		International
Impact Scale	Small as EOR and re-development programme will mostly be implemented at existing facilities which are developed area typically with low density of vegetation and fauna.				
Frequency	Occur only during the construction phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor		Moderate	Major

Table 6.12 *Assessment of Indirect Impacts on Terrestrial Fauna due to Excavation, Site Preparation / Clearance & Creation of Additional Access Routes.*

Impact	Indirect impacts to terrestrial fauna.				
Impact Nature	Negative		Positive		Neutral
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term		Long-term	Permanent
Impact Extent	Local		Regional		International
Impact Scale	Fragmentation and edging effects would be of small scale as construction of access routes for the Project would not be extensive and is not anticipated to affect fauna within the shrubland which are more susceptible to fragmentation and edging effects. In addition, fauna are expected to be adapted to disturbance due to existing oil and gas operations.				
Frequency	Occur only during the construction phase.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor		Moderate	Major

6.8.4 *Additional Mitigation, Management and Monitoring*

The assessment indicates potential impacts are expected to be negligible and hence no further mitigations are required.

6.8.5 *Significance of Residual Impacts*

Provided that the mitigations are followed, the residual impact is expected to be **Negligible**.

6.9 *IMPACTS FROM IMPROPER DISPOSAL OF SOLID WASTES ON SURFACE WATER QUALITY, GROUNDWATER QUALITY, SOIL QUALITY AS WELL AS TERRESTRIAL AND AQUATIC ECOLOGICAL RESOURCES (I.E. HABITATS, FLORA AND FAUNA)*

6.9.1 *Source of Impact*

Activities during the construction phase will include structure assembly, transportation, temporary storage and civil construction. These construction activities will generate a variety of solid wastes which can be categorized based on their nature and the options for disposal, such as general construction waste (inert wastes, scrap metals/metal off-cuts, wood, cardboard, paper and some plastics) and general refuse (food residues, paper, used bottles and cans, packaging and broken furniture). The handling, storage, transport and disposal of these wastes has the potential to result in impacts to quality of surface water, groundwater, soil and community health as well as terrestrial and aquatic ecological sources in the event of inappropriate waste management.

Construction of the EOR facilities and the re-development activities may also generate hazardous waste such as oily rags, paints and chemicals. Hazardous wastes can pose serious environmental hazards without proper management plan during handling, storage, transportation and disposal.

The wastes types and volume are as follows:

- General Non-hazardous Waste: 50 kg per month
- Recyclable Non-hazardous Waste: 120 kg per month
- Hazardous Waste: 50 kg per month
- Organic Non-hazardous Waste: 650 kg per month

Potential impacts may include:

- Water quality impact if hazardous wastes are discharged to watercourses or from runoff from inappropriately stored hazardous waste;
- Soil quality impact in the form of contamination and impact to groundwater quality if hazardous wastes are disposed of to land or containers leak; and

- Indirect impacts to terrestrial and aquatic ecological sources due to deterioration of surface water, groundwater and soil quality.

6.9.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts will include those specified in MPRL E&P WMP for the Mann Field:

- Waste materials will be segregated at source of generation and properly stored in labelled color bins assigned for general waste, recyclable waste, hazardous waste and organic waste.
- The segregated wastes will be transported to the waste management compound daily for proper temporary storage. The waste management compound will be managed by an experienced environmental team.
- Recyclable wastes will be collected by an approved third party contractor.
- Compostable organic wastes will be treated by composting and the products will be used to fertilize and condition soil.
- Non-compostable wastes will be incinerated in properly designed mobile incinerator. The residual solids from incineration will be used for composting.
- Hazardous wastes will be collected for proper disposal by approved third party contractor. Hazardous wastes which cannot be collected by the contractor will be buried underground in concrete bunker.

6.9.3 *Significance of Impacts*

The impact magnitude is expected to be small given proper implementation of the wastes management measures. The resource/receptor sensitivity is considered medium for surface water, groundwater and soil quality and low for terrestrial and aquatic ecological resources. The impact significance is thus considered **Minor** for surface water, groundwater and soil quality and **Negligible** for terrestrial and aquatic ecological resources.

Table 6.13 *Assessment of Impacts from Solid Waste Disposal on Surface Water Quality, Ground Water Quality, Soil Quality, Terrestrial and Aquatic Habitats as well as their Associated Flora and Fauna*

Impact	Impacts on surface water quality, ground water quality, soil quality, terrestrial and aquatic habitats as well as their associated flora and fauna.				
Impact Nature	Negative		Positive		Neutral
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	Impact scale is expected to be small with proper WMP implementation.				
Frequency	Continuous during the construction phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low			Medium	High
Impact Significance	Negligible	Minor		Moderate	Major

6.9.4 *Additional Mitigation, Management and Monitoring*

Since the significance of impacts is considered negligible to minor with exiting control measures, additional measures are not considered necessary. However, as industrial best practices it is recommended that induction training for Project personnel should include the waste management system.

6.9.5 *Significance of Residual Impacts*

Provided the mitigations are followed, the residual impact of surface water quality, ground water quality, soil, terrestrial habitats and aquatic habitats and their associated flora and fauna in the Project Area is ranked as **Negligible**.

6.10 *IMPACTS FROM IMPROPER WASTEWATER DISCHARGE ON SURFACE WATER QUALITY, GROUND WATER QUALITY, SOIL, TERRESTRIAL HABITATS AND AQUATIC HABITATS AS WELL AS THEIR ASSOCIATED FLORA AND FAUNA*

6.10.1 *Source of Impact*

Domestic-type wastewater and sewage will arise from the construction workforce. With an assumed sewage generation rate of 0.19m³ per worker per day ⁽¹⁾, up to about 14 m³ of sanitary wastewater will be generated per day from the camp site within the Mann Field which can accommodate 70 workers. Discharged wastewater is generally characterized as having a high concentration of solids (suspended and dissolved), BOD and COD, nutrients (ammonia) and faecal coliform counts. Mis-management of sewage and

(1) EPD Hong Kong 2005. Technical Paper Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning. Available at:
http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/water/guide_ref/files/gesf.pdf

wastewaters would have the potential to result in contamination of surface water, ground water and soil, which may result in impacts to community health as well as localized ecological contamination and impacts to terrestrial and aquatic ecological resources.

Surface run-off from the construction site, particularly following heavy rains and during flooding, could have potential impacts on water quality of surface waters. Surface run-off from the site could contain high levels of SS. It may also contain contaminants washed out during rainstorms such as from accidentally spilled fuels (eg petroleum, gasoline and waste oil) or leaks from machinery (eg lubricants).

6.10.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts from wastewater discharge will include:

- Sanitary wastewater will be collected in the septic holding tanks to be located at the construction camp and a retained licensed firm will periodically clean and service the septic holding tanks.
- The discharge of treated sanitary wastewater should meet guideline levels in NEQEG as shown in *Table 6.14* as far as possible.

Table 6.14 *NEQEG on Effluent Discharge Levels for Sewage*

Parameter	Unit	Maximum Concentration
Biological oxygen demand	mg/l	30
Chemical oxygen demand	mg/l	125
Oil and grease	mg/l	10
pH	S.U. ^a	6-9
Total coliform bacteria	100 ml	400
Total nitrogen	mg/l	10
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50

^a Standard unit

- Storm water run-off will be routed to a pond to remove silt particles before discharge via storm drain.
- Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.
- Appropriate surface drainage will be designed and provided where necessary.

- Surface runoff from potential sources of contamination will be prevented.
- All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly.
- Runoff from areas without potential sources of contamination will be 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 will be installed and maintained as appropriate at refueling facilities, workshops, parking areas, fuel storage and containment areas, if any.
- 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.

6.10.3 *Significance of Impacts*

Provided that the existing mitigation measures are properly implemented, it is expected that impacts from wastewater discharge and surface run-off on surface water, groundwater and soil quality as well as terrestrial and aquatic ecological resources would be of **Negligible** to **Minor** significance.

Table 6.15 *Significance of Impacts on Water and Soil Quality and associated Terrestrial and Aquatic Ecological Resources from Wastewater Discharge and Surface Run-off*

Impact	Impacts from wastewater discharge and surface run-off on water and soil quality as well as the associated terrestrial and aquatic ecological resources.				
Impact Nature	Negative		Positive		Neutral
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	The impact is estimated to be point-based source from the Project Area.				
Frequency	Throughout the construction phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low			High	
Impact Significance	Negligible	Minor		Moderate	Major

6.10.4 *Additional Mitigation, Management and Monitoring*

The assessment indicates impacts from wastewater and sewage are expected to be negligible to minor, hence additional mitigation measures are not recommended.

6.10.5 *Significance of Residual Impacts*

With the implementation of in place controls, the residual impact of wastewater discharge is ranked as **Negligible to Minor**.

OPERATIONAL PHASE

6.11 *IMPACTS FROM MOBILE POWER GENERATION ON TERRESTRIAL FAUNA*

6.11.1 *Source of Impact*

During operation phase of the Project, mobile power generators will be used at the EOR and re-developed areas. The generators will give rise to noise emissions and vibration which in turn will have the potential to modify the movement and behavior of terrestrial fauna.

6.11.2 *Significance of Residual Impacts*

The mitigation measures and residual impact significance of mobile power generation to terrestrial fauna are as previously discussed in *Section 6.7*. The residual impact is expected to be of **Negligible** significance.

6.12 *IMPACTS FROM CONSUMPTIVE USE OF SURFACE WATER AND GROUNDWATER RESOURCES ON USE OF NATURE RESOURCES*

6.12.1 *Source of Impact*

EOE will require significant quantities of water over and above primary recovery methods and it has been estimated by other study that one (1) to six (6) barrels of fresh water / formation water is needed for each barrel of oil recovered ⁽¹⁾. Of the available EOR methods, chemical method adopted for the Project has generally been considered as having the greatest potential for adverse impacts on surface water and groundwater resources due to consumptive use because water consumed would be equal to or greater than other methods, such as thermal EOR method. The consumptive use of surface water and groundwater during the EOR process may result in a water shortage in the area for the local community. Due the site visit in May 2015, it is observed the well sites are generally closer to the groundwater wells than

⁽¹⁾ Mansoor Zeveidavianpoor and Madjid Jalilavi (2014) Qualitative Analysis of enhanced oil recovery: impacts on air, surface water and groundwater. International Conference on Chemical, Environment and Biological Sciences (CEBS-2014).

the rivers. As such, it is assumed that the consumptive use will mostly be on groundwater within the Mann Field.

6.12.2 *Existing/ In Place Controls*

The following measures will avoid unnecessary use of water for the EOR programme:

- Geological structure and reservoir studied to identify the target sands for EOR.
- Selection for the shut in wells and identify the communication of the subsurface structures.

6.12.3 *Significance of Impacts*

As discussed in *Section 5.3.1*, the Mann Field is located on the western boundary of the Ayeyarwady River which is the largest river in Myanmar. Other tributaries flowing from west to east within the Mann Field included Yaw, Salin and Mann. The river and tributaries are the key source of surface water in the Mann Field. For groundwater the Mann Field is located within the Ayeyarwady River Basin which has the highest groundwater potential in Myanmar. Water supply from the surface water and groundwater appeared to be sufficient, however, considering that large volume of surface water may be required of the EOR process using chemical injection as well as the sensitive use of water by the local community for drinking and agricultural purpose, the significance of the impacts is considered to be **Moderate**.

Table 6.16 *Assessment of Impacts due to Consumptive Use of Surface Water Resources*

Impact	Impacts due to consumptive use of surface water resources.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local	Regional		International	
Impact Scale	local community in the Project Area				
Frequency	Through the life of the project				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor	Moderate	Major	

6.12.4 *Additional Mitigation, Management and Monitoring*

For the purpose of minimizing the impacts on the surface water and groundwater due to consumptive use by the Project, only two water distribution systems (Kyauk Tan groundwater well and Mann creek pumping station) of MOGE will be used

6.12.5 *Significance of Residual Impacts*

The potential impacts on the source water for the project are likely to be **Minor**.

6.13 *IMPACTS FROM THE USE OF CHEMICALS FOR EOR PROCESS ON GROUNDWATER QUALITY*

6.13.1 *Source of Impact*

During the EOR operation, chemicals will be injected to the wells to alter the property of oil for enhanced recovery. 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. Information regarding application and toxicity of these chemicals are shown in *Table 4.2* in *Section 4.2.3*.

6.13.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts from use of chemicals on groundwater contamination include:

- The amount of chemical injected in a chemical treat would be as low as practicable and designed to be retained by adsorption, channelling and dilution in the petroleum reservoir.
- Precautionary measures should be developed and implemented to prevent loss of chemical fluids during the EOR process.

6.13.3 *Significance of Impacts*

Potential for ground water contamination resulting from chemical injections associated with EOR operations appears minimal which is supported by the lack of groundwater contamination problems associated with conventional water floods ⁽¹⁾. According to Zeveidavianpoor and Jalilavi (2014), only 74 groundwater injection problems resulted from operating 44,000 injection wells in Texas between 1960 and 1975 and only three (3) of these occurred during the last decade. Because EOR injection operations are similar to water floods, generally using the same injection wells in the same formations, an increase in the rate of ground water contamination is not expected for EOR injection using chemicals. However, given that chemical injections may occur daily during EOR operation, impacts from use of chemicals on groundwater quality are considered to be of **Moderate** significance.

(1) Mansoor Zeveidavianpoor and Madjid Jalilavi (2014) Qualitative Analysis of enhanced oil recovery: impacts on air, surface water and groundwater. International Conference on Chemical, Environment and Biological Sciences (CEBS-2014).

Table 6.17 *Assessment of Impacts on Water, Soil, Habitats, Flora and Fauna (Accidental Spillage and Leaks)*

Impact	Impacts from spills/leaks on water, soil, habitats, flora and fauna.				
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional	International	
Impact Scale	Impact scale is expected to be medium considering that groundwater contamination appears to be minimal from historical records and daily occurrence of chemical injections.				
Frequency	Daily throughout the EOR activities				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor	Moderate		Major

6.13.4 *Additional Mitigation, Management and Monitoring*

As an addition measures, it is recommended that a groundwater monitoring programme should be developed to monitor groundwater quality before, during the after the EOR activities. Should significant groundwater contamination be detected, appropriate remedial measures should be developed to mitigate such impact.

6.13.5 *Significance of Residual Impacts*

Provided that mitigations are in place, the residual impact is ranked as **Minor**.

6.14 *IMPACTS FROM IMPROPER DISPOSAL OF SOLID WASTES ON SURFACE WATER QUALITY, GROUNDWATER QUALITY, SOIL QUALITY AS WELL AS TERRESTRIAL AND AQUATIC ECOLOGICAL RESOURCES (I.E. HABITATS, FLORA AND FAUNA)*

6.14.1 *Source of Impact*

During the operation phase, the EOR activities and the operational workforce will generate a variety of solid wastes such as general refuse (food residues, paper, used bottles and cans, packaging and broken furniture) which is non-hazardous in nature. In addition, hazardous waste such as oily rags, paints and used chemicals may also be generated. Improper disposal of hazardous and non-hazardous wastes has the potential to contaminate surface water, ground water and soil with hydrocarbons or chemicals and indirectly affecting community health as well as the aquatic or terrestrial fauna.

The wastes types and volume are as follows:

- General Non-hazardous Waste: 50 kg per month
- Recyclable Non-hazardous Waste: 120 kg per month

- Hazardous Waste: 50 kg per month
- Organic Non-hazardous Waste: 650 kg per month

6.14.2 *Significance of Residual Impacts*

The mitigation measures and residual impact significance of improper disposal of solid wastes are as previously discussed in *Section 6.9*. The residual impact is expected to be of **Negligible** significance.

6.15 *IMPACTS FROM IMPROPER DISPOSAL OF WASTEWATER ON SURFACE WATER QUALITY, GROUND WATER QUALITY, SOIL, TERRESTRIAL HABITATS AND AQUATIC HABITATS AS WELL AS THEIR ASSOCIATED FLORA AND FAUNA*

6.15.1 *Source of Impact*

Domestic-type wastewater and sewage will arise from the operational workforce. With an assumed sewage generation rate of 0.19m³ per worker per day ⁽¹⁾, up to about 14 m³ of sanitary wastewater will be generated per day from the camp site within the Mann Field which can accommodate 70 workers. Surface run-off from the EOR and re-developed area, particularly following heavy rains and during flooding, could have potential impacts on water quality of surface waters through contamination and may lead to indirect impacts to community health. Please refer to *Section 6.10.1* for detailed discussion regarding potential impacts to wastewater discharge and surface run-off.

In addition to the above, produced water will be generated from the EOR activities. Produced water typically contains a mixture of inorganic (dissolved salts, trace metals, suspended particles) and organic (dispersed and dissolved hydrocarbons, organic acids) compounds and for the case of EOR residual chemical additives (e.g. scale and corrosion inhibitors). Improper discharge of produced water may cause potential impacts on the receiving environment (i.e. soil, surface water and ground water) and community health as well as terrestrial and aquatic ecological resources.

6.15.2 *Existing/ In Place Controls*

Please refer to *Section 6.10.2* for measures to control/ minimise adverse impacts from wastewater discharge and surface run-off.

For the produced water, existing / in place controls include:

- In order to reduce the concentration of chemicals in produced water, the amount of chemical injected in a chemical treat would be designed to be

(1) EPD Hong Kong 2005. Technical Paper Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning. Available at:
http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/water/guide_ref/files/gesf.pdf

retained by adsorption, channelling and dilution in the petroleum reservoir. Chemicals dissolved in the produced brines will be recycled through the brine treatment system and reinjected into the reservoir. Chemicals dissolved in the oil will be transported to the refinery to be processed as a part of the crude oil.

- Produced water to be injected in shut in wells should meet guideline levels in *NEQEG for Onshore Oil and Gas Development*.

6.15.3 *Significance of Impacts*

As discussed in *Section 6.10.3*, it is expected that impacts from wastewater discharge and surface run-off on surface water, groundwater and soil quality as well as terrestrial and aquatic ecological resources would be of **Negligible to Minor** significance provided that the existing mitigation measures are properly implemented.

Produced water will be produced daily during operation of the Project and would be required to be disposed of properly. It is expected that with proper design on the use of chemicals for the EOR process and appropriate management of the produced water and sludge, impacts from produced water would also be of **Minor to Moderate** significance on surface water, groundwater and soil quality as well as terrestrial and aquatic ecological resources.

Table 6.18 *Significance of Impacts on Water and Soil Quality and associated Terrestrial and Aquatic Ecological Resources from Wastewater Discharge and Disposal of Sludge*

Impact	Impacts from wastewater discharge, surface run-off and sludge disposal on water and soil quality as well as the associated terrestrial and aquatic ecological resources.				
Impact Nature	Negative		Positive		Neutral
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	The impact scale is expected to be medium for produced water and sludge due to the large volume generated daily.				
Frequency	Throughout the operation phase				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low			Medium	High
Impact Significance	Negligible	Minor	Moderate		Major

6.15.4 *Additional Mitigation, Management and Monitoring*

- Adequate well management during well completion activities to minimize water production.
- Recompletion of high water producing wells to minimize water production.
- Zone Isolation - use of downhole equipment separation techniques, where possible, and water shutoff techniques.
- Disposing produced water to shut in wells by using gravity method.
- Disposing produced water to shut in wells by using injection pump.
- Regarding produced water, it is recommended that produced water to be discharged in shut-in wells should meet guideline levels in *NEQEG for Onshore Oil and Gas Development* as shown in Table 6.19.

Table 6.19 *NEQEG for Onshore Oil and Gas Development (Produced Water Discharges)*

Pollutants	Guideline Values
Total hydrocarbon content (mg/L)	10
pH	6-9
BOD (mg/L)	25
COD (mg/L)	125
Phenols (mg/L)	0.5
Sulfides (mg/L)	1
Heavy metals (total) (mg/L)	5
Chlorides (average) (mg/L)	600
Chlorides (maximum) (mg/L)	1,200
Total Suspended Solids (mg/L)	35

6.15.5 *Significance of Residual Impacts*

With the implementation of additional mitigation, the residual impact of is ranked as **Negligible to Minor**.

6.16 *IMPACTS FROM GAS VENTING ACTIVITIES ON AMBIENT AIR CONDITION*

6.16.1 *Source of Impact*

During operation, gas venting will be undertaken at approximately 80 wells in the Mann Field. In venting, the natural gases associated with the oil and gas production are released directly to the atmosphere and not burned.

According to data on gas composition provided by MPRL E&P, gas vented from the well will comprise mostly of methane (CH₄) with negligible content of hydrogen sulfide (H₂S). Methane is non-toxic in nature. For H₂S, it is toxic, flammable, explosive and corrosive. These gaseous emissions have the potential to affect sensitive residential receptors.

The existing wells are located at various locations across the Mann Field in agricultural land or shrubland and are mostly remote from sensitive receiver locations. A small proportion of wells are relatively nearby existing MPRL office, which is considered as ASR of medium sensitivity. The wells that selected for venting will be planned based on the outcome of the geological studies, and good maintenance and operating strategies will be taking into account to keep gas venting volume as low as practicable.

6.16.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts on air.

- Activities carried out at existing well sites in the oil field which are mostly removed from the ASRs.
- Good maintenance and operating strategies will be taking into account to keep gas venting volume as low as practicable.
- Follow NEQEG for Onshore Oil and Gas Development for air emissions.
- Monitoring with Echo meter for the annulus gas volume on weekly basis, connect the line to LPG plant if the gas volume is acceptable.

6.16.3 *Significance of Impacts*

According to data provided by MPRL E&P, gas venting will be undertaken at a total of 80 wells. The estimated rate of gaseous emission is ~0.001 MMcfd per day from each well and thus only a small amount of ~0.08 MMcfd of gases will be emitted from venting per day from the 80 wells. Methane is the major component of the emissions which is non-toxic in nature. The amount of hydrogen sulfide, which is toxic, is negligible according to gas composition

data provided by MPRL E&P. As such, the magnitude of impact is considered as small. The existing wells are located at various locations across the Mann Field and are mostly remote from sensitive receiver locations. A small proportion of wells are relatively nearby existing MPRL office, which is considered as ASR of medium sensitivity.

The combination of a medium receptor sensitivity and small impact magnitude will result in an overall **Minor** potential impact.

Table 6.20 *Assessment of Impacts on Ambient Air Conditions during Venting*

Impact	Air impact from venting				
Impact Type	Direct		Indirect		Induced
Impact Duration	Temporary	Short-term		Long-term	Permanent
Impact Extent	Local		Regional		International
Impact Scale	Limited to the Project Area and hence would be considered to be local, however, winds may potentially carry emissions into surrounding communities.				
Frequency	Well venting period.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor		Moderate	Major

6.16.4 *Additional Mitigation, Management and Monitoring*

Since the significance of impacts is considered minor with exiting control measures, additional measures are not considered necessary. However, as industrial best practices the following mitigation measures are recommended to be implemented:

- Measures related to fire control should be strictly followed.
- Avoid venting or reduce the number of venting well as far as practicable.
- When new vents are to be installed, consideration should be given on toxic gas composition, wind direction, design of venting as well as location and distance from the ASRs to reduce the potential of pollutant dispersal to ASRs.
- Consider flaring instead of venting as far as possible.
- Implement a programme of regular monitoring of gaseous composition of the vented gas and regular air quality monitoring at selected ASRs to identify and properly respond to any unacceptable air quality impacts caused by the venting.

6.16.5 *Significance of Residual Impacts*

Provided that mitigation measures are followed, the residual impact of gas venting activities on air quality is expected to be **Minor**.

6.17 *POSITIVE IMPACTS OF IMPROVED OPERATIONS AFTER RE-DEVELOPMENT ON ALL RELATED PHYSICAL AND BIOLOGICAL RECEPTORS*

6.17.1 *Source of Impact*

As presented in *Section 4.3*, MPRL E&P is undertaking a re-development programme of the Mann Field to improve the environmental performance of the operations. This programme involves improvement of pumping unit, refurbishments of the GOCS, flow pipes and drain pits, rehabilitation of shut-in wells and development of produced water management system.

It is expected that after the re-development activities, positive impacts would occur to all related physical and biological receptors through reduction of risk of spill, reduction of gaseous and noise emissions, reinstatement of terrestrial habitats and proper waste management within the Mann Field (please refer to *Section 4.3* for detailed discussion regarding the potential positive impacts). This may also lead to positive impacts to community health.

6.17.2 *Existing/ In Place Controls*

There is no existing / in place controls for the potential positive impacts from the re-development activities.

6.17.3 *Significance of Residual Impacts*

Residual impact to the environment is expected to be **Positive** after the re-development activities.

ACCIDENTAL EVENTS

6.18 *IMPACTS FROM CHEMICAL SPILLS, WELL FAILURE AND RESERVOIR LEAKAGE ON SOIL QUALITY, SURFACE WATER QUALITY, GROUNDWATER QUALITY AS WELL AS TERRESTRIAL AND AQUATIC ECOLOGICAL RESOURCES (I.E. HABITATS, FLORA AND FAUNA).*

6.18.1 *Source of Impact*

During construction of the Project, the key source of accidental spills is expected to be accidental spillage from refuelling of machinery. Spills may also occur at fuel storage compound.

During operation of the EOR, accidental spillage of chemicals may occur at the point of storage (i.e. in chemical storage compound) or application (i.e. at injection wells). Accidental spillage of fuel may also occur from refuelling of machinery at the works area or at fuel storage compound.

Other than operational error, spillage of fuel and chemicals during both construction and operation may be caused by surface run-off from the EOR and re-developed area, particularly following heavy rains and during flooding.

In addition to the above, blowout is another potential accidental spillage event associated with the construction and operation of the Project at the well site. Blowout is regarded as a loss of well control due to kicks with potential for large volume well fluid release volumes to occur at the surface. Well fluids may be hydrocarbons but can also be formation (fresh or salty) water.

The above accidental events have the potential to contaminate surface water, ground water and soil as well as affect community health indirectly. Exposure to terrestrial and aquatic fauna or uptake of contaminants through plant roots could occur and could lead to direct lethal/non-lethal effects on vegetation and organisms.

6.18.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts of spills/leaks include:

- The Project has developed and implemented a detailed Spill Response Plan including community sensitization/notifications when required. The Project will maintain spill clean-up and response capability adequate for addressing spills for all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated and post remediation verification will be carried out.
- Implementation of spill response procedures including response teams and clean up tools & equipment.
- Refueling will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. Collection systems will be installed in these areas to manage any spills, fuels will be collected and either reused, treated by incineration or removed by a local contractor. Drip trays must be used when refueling and servicing vehicles or equipment, where it is not on a hard standing.
- Avoid construction of facilities (e.g. chemical storage compound) in a floodplain, whenever practical, and within a distance of 100 m of the normal high-water mark of a water body or a water well used for drinking or domestic purposes.
- Evaluating the risk of existing Underground Storage Tank (UST) to determine if upgrades are required for UST that will be continued to be used, including replacement with new systems or permanent closure of abandoned USTs. Ensuring that new USTs are sited away, as far as practicable, from groundwater wells, reservoirs and other source water

protection areas and floodplains, and maintained so as to prevent corrosion.

- Incorporation of siting and safety engineering criteria to prevent failures due to risks posed by flooding. All Project structures should be designed in accordance with engineering and design criteria mandated by site-specific flooding risks.
- Facilities, buildings, plants, and structures should be situated to minimize potential risks from flooding.
- Maintaining a list of external equipment, personnel, facilities, funding, expert knowledge, and materials that may be required to respond to emergencies. The list should include personnel with specialized expertise for spill clean-up, flood control and water treatment.
- The use of competent and well-trained workers for construction and operation.
- Well-planned, well-supervised and standard procedures will be used at the wells to maintain well control (eg management of mud weight).
- Implementation of maintenance and inspection procedures.

6.18.3 *Significance of Impacts*

Incidental small spills of fuels and chemicals are infrequent but do occur. Malfunction of handling systems and poor handling practices during transfers / refuelling / injection are the most common causes of small spills. These small spills are, however, rare due to the careful handling practices that will be implemented.

Large releases of hazardous materials from process equipment and storage compound are rare because those are designed and built specifically to prevent release. A major spill from well blowout is also unlikely with the in-place controls.

Overall, it is unlikely that a spill would occur and this has thus been factored into the assessment of impact significance.

Soil Quality

The potential of hazardous materials accidentally released to soil at the Project Area is low as the Project will be mostly constructed and operated on developed area. As such, soil exposure will be very limited during both construction and operation of the Project. If spill occurs on soil, the spread would be limited in spatial extent to the immediate surrounding. The overall magnitude of the impact is, however, considered to be medium in case of large scale spillage caused by blowout or flooding. Since the potentially

affected soils would be within the Project Area which is intended for industrial activities (e.g. not for agricultural use), sensitivity of the soil is considered to be Low.

The overall significance of potential negative impacts of spill on soil quality is considered to be **Minor**.

Surface Water and Groundwater Quality

Project activities with the potential to lead to accidental spills will generally be limited within the Project Site. The risk of a direct release to the surface water and groundwater is thus very unlikely. It is, however, possible that run-off from the Project Site could transport spilled materials on the ground to the surface water and groundwater depending on spill location and drainage patterns. The concentration of spilled materials released to surface water and groundwater is expected to be very low given the existing mitigation measures such as spill containment provided by bunded area at places where spills are more likely to occur (e.g. storage and handling areas of hazardous materials). The overall magnitude of the impact is, however, considered to be medium in case of large scale spillage caused by blowout or flooding. The sensitivity of surface water and groundwater quality is considered to be Medium due to the use of water by local community for drinking and irrigation.

The overall significance of potential negative impacts of spill on water quality is considered to be **Moderate**.

Terrestrial and Aquatic Habitats and associated Flora and Fauna

Sensitivity of terrestrial and aquatic habitats and their associated flora and fauna is considered low. Given that impacts of spills to soil and water quality are considered to be minor to moderate, the magnitude of indirect impacts to terrestrial and aquatic ecological resources is considered medium.

The overall significance of potential negative impacts of spill on terrestrial and aquatic ecological resources is considered to be **Minor**.

Table 6.21 *Assessment of Impacts on Water, Soil, Habitats, Flora and Fauna (Accidental Spillage and Leaks)*

Impact	Impacts from spills/leaks on water, soil, habitats, flora and fauna.				
Impact Type	Direct	Indirect		Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local	Regional		International	
Impact Scale	Potentially large for spills caused by flooding and well blowout.				
Frequency	Throughout the construction and operation period.				
Likelihood	Unlikely for large and small spills				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low	Medium		High	
Impact Significance	Negligible	Minor	Moderate		Major

6.18.4 *Additional Mitigation, Management and Monitoring*

- Carefully plan of drilling operation by identifying shallow hazards, using standard materials for well construction/modification, using standard drilling and well control standard operating procedures, and using proper drilling mud formulation with additives if necessary (well kill fluids, loss control and weighting agents).
- Undertake drilling with international best practice safety procedures.
- Test safety devices prior to start-up for function and integrity.
- Continuously monitor pressure in the well and recycled mud during drilling.
- Train employees on emergency procedures.
- Spill kits and shovels at well sites or appropriate locations for any accidental leakage of fuel or other hazardous substances during Project activities. It must be ensured that no such substance enters into groundwater or surface water resources.
- If emergency servicing of equipment is required in the field, spill kits and drip trays will be available.
- Any contaminated soil will be removed from site and disposed of in accordance with the WMP.
- The location, type and quantity of any fuel or chemical or mud spill will be reported to HSE coordinator immediately.
- Improve cellars with double cellars for new and reactivated wells.

6.18.5 *Significance of Residual Impacts*

With measures to manage accidental spill and leaks associated, it is considered the residual risk can be reduced to **Minor**.

6.19 *IMPACTS FROM FIRES AND EXPLOSIONS CAUSED BY THE ACCIDENTAL EVENTS RELATED TO THE USE OF EXPLOSIVE MATERIALS IN RE-PERFORATION ON AIR QUALITY, GROUND WATER QUALITY, SURFACE WATER QUALITY, SOIL QUALITY, LANDSCAPE AND VISUAL CHARACTER, USE OF NATURAL RESOURCES, TERRESTRIAL HABITATS AND AQUATIC HABITATS AS WELL AS THEIR ASSOCIATED FLORA AND FAUNA*

6.19.1 *Source of Impact*

Accidental events related to the use of explosive materials in re-perforation may lead to fire and explosions, potentially causing wide scale significant detrimental impacts. In addition, an increase in the number of people who smoke (ie workers) could increase the potential for ignition and uncontrolled fires in the Project Area. Due to the hot and dry climatic conditions that are prevalent in the year, vegetative habitat is dry and therefore fire hazard will typically be significant.

6.19.2 *Existing/ In Place Controls*

Measures to control/ minimise adverse impacts of impacts include:

- Assign designated smoking areas.
- Smoking is only allowed away from the well head of more than 100 feet, up wind, with appropriate ash trays to contain any hot ashes.

6.19.3 *Significance of Impacts*

Impacts from fire outbreaks have been evaluated to result in impacts of up to **Major** significance. This is mostly due to the fact that large habitat area could be lost and crops will be adversely impacted by such events if the event occurs in or in close proximity of agricultural habitat.

Table 6.22 *Assessment of Impacts on Air, Visual Character, Water, Soil, Habitats, Flora and Fauna (Fire)*

Impact	Impacts from fire and explosions on air, water, soil, habitats, flora and fauna.				
Impact Type	Direct		Indirect	Induced	
Impact Duration	Temporary	Short-term	Long-term		Permanent
Impact Extent	Local		Regional		International
Impact Scale	Potentially wide scale within the Project Area.				
Frequency	Could occur during period of re-perforation activity.				
Likelihood	Unlikely				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
Resource Sensitivity	Low		Medium		High
Impact Significance	Negligible	Minor	Moderate		Major

6.19.4 *Additional Mitigation, Management and Monitoring*

- As administered under the Emergency Preparedness Plan, a Fire Risk Management Plan will be developed including communications protocols and measures to control any fires that do arise.
- Fire control equipment should be located at the well site or appropriate locations.
- Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire.
- It will be of key importance that explosives used for re-perforation activities are kept in a safe manner and no uncontrolled explosions occur. Implement all required safety and management requirements relating to the transportation, storage and handling of explosives
- Misfired charges from re-perforation activities will be disabled and destroyed.
- Conduct fire training and response drills.

6.19.5 *Significance of Residual Impacts*

With measures to manage fire risk, it is considered the residual risk can be reduced to **Minor**.

6.20 COMMUNITY HEALTH AND SAFETY

6.20.1 *Potential Impacts*

Potential impacts on community health and safety may be caused by environmental impacts to air quality, noise, water quality and soil quality as discussed in *Sections 6.5, 6.6, 6.9, 6.10, 6.13, 6.14, 6.15, 6.17, 6.18 and 6.20* above. Public health and safety in relation to water quality and soil quality was a key concern of the villagers.

The Project is employing employ around 50 staff and 500 staff during the construction and operation phases, respectively, which are existing workforce for the Man Oil Field with no additional workers required. However, it is expected that contractors may be engaged for supply of equipment or services and disposal of wastes. Contractors' activities could be a nuisance to the local community if not properly managed, for example occupancy of public area for temporary storage of wastes if sited near the communities.

There is also the increased risk of vehicle collisions with local residents due to increased traffic traveling to and from the Project Site during both the construction and operation phases.

6.20.2 *Existing/ In-place Controls*

For potential impacts to community health and safety related to air quality, noise, water quality and soil quality, please refer to *Sections 6.5, 6.6, 6.9, 6.10, 6.13, 6.14, 6.15, 6.17, 6.18 and 6.20* for relevant mitigation measures.

For Project related traffic, road transport safety procedure for the Project is in-place which include no night time driving and speed limitation for vehicles in community areas. Loading / offloading of material and equipment are only allowed in daylight working hours. The Transportation Management Procedure is presented in *Annex H*.

6.20.3 *Impact Significance*

Traffic accidents represent the greatest risk for local communities in the vicinity of the Mann Field. The sensitivity is considered medium given that there is existing road traffic near the villages that local residents is expected to be accustomed to traffic during the construction and operation phase. The magnitude of the impact is likely to be medium. This impact is assessed as of **moderate** significance.

Table 6.23 *Assessment of Impacts on Community Health and Safety*

Impact	Impact on community health and safety during construction and operation				
Impact Nature	Negative	Positive		Neutral	
	Potential injury or death to humans or livestock would be a negative occurrence.				
Impact Type	Direct	Indirect		Induced	
	The impact could directly affect local residents and/or livestock.				
Impact Duration	Temporary	Short-term	Long-term	Permanent	
	Impact is expected to during the construction and operation phase.				
Impact Extent	Local	Regional		Global	
	Impact is limited to communities near the site.				
Impact Scale	N/A				
Impact Frequency	Equipment and vehicles will be operational almost continuously over the construction and operation period.				
Likelihood	Unlikely given that residents will be accustomed to vehicles in the area but certainly possible.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	The impact magnitude is potentially Medium .				
Receptor Sensitivity	Low	Medium		High	
	The receptor sensitivity is considered High .				
Significance	Negligible	Minor	Moderate	Major	
	The significance is likely to be Moderate .				

6.20.4 *Additional Mitigation and/or Management Measure*

- A Contractor EHS Management Plan will be developed to reduce potential impacts of contractors' activities to nearby communities.
- Enforcement of a speed limit for vehicles related to construction activities of the Project. During the construction phase, a speed limit of 40km/h shall be enforced.

6.20.5 *Significance of Residual Impacts*

The enforcement of speed limits for Project vehicles and other measures as presented above should reduce the likelihood of vehicle strikes and of health and safety issues to local communities such that the residual impact is of **minor significance**.

Cumulative impacts encompasses impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted. The IFC (2012) defines cumulative impacts as those generally recognised as important on the basis of scientific concerns and or concerns from Affected Communities ⁽¹⁾. Examples given include reduction of water flows in a watershed due to multiple withdrawals, increases in sediment load, increases in traffic congestion and accidents due to increases in vehicular traffic.

Cumulative impacts summarised in this section refer to the additional impacts that may be generated by other developments or activities in the vicinity of the Project Area that when added to the impacts of the proposed EOR and redevelopment activities combine to cause a greater impact. Such impacts may arise due to spatial overlap in an impact (eg overlap in spatial extent of air or water quality changes) or temporal overlap (eg noise impacts caused by construction activities at the same time from different sources).

Within the Mann Field, according to publicly available information no other projects will be constructed or operated concurrently with the proposed EOR and re-development programme. As such, cumulative impacts with other concurrent projects are not expected to occur.

For the existing operation of Mann Field, it is expected that the re-development programme will enhance the environmental performance of the existing production activities as presented in *Section 6.17* and thus unacceptable cumulative impacts are not expected to occur. For the EOR programme, it is expected it will be implemented mostly on formed land where existing facilities are located. The construction activities will involve the use of Powered Mechanical Equipment (PME) such as generators, cranes, forklifts, rig and pulling units which would be the sources of air quality and noise impacts as assessed in *Sections 6.5-6*. Given proper implementation of the mitigation measures as recommended in *Sections 6.5-6*, it is not expected that the EOR programme will lead to unacceptable cumulative impacts to air quality and noise. Solid waste and wastewater will also be handled properly according to the Waste Management Plan (*Annex H*) with no unacceptable cumulative impact expected.

A total of 50 workers will be required for construction of the EOR programme which are existing workers of the Mann Field. No additional workforce will thus be required for the construction activities. As such, no cumulative impacts are expected from the workers.

(1) IFC Performance Standards on Environmental and Social Sustainability, January 2012, International Finance Corporation, World Bank Group

This section provides the Environmental Management Plan (EMP) for the planning, construction and operation of the Project. This EMP provides the procedures and processes which will be applied to the Project activities to check and monitor compliance and effectiveness of the mitigation measures to which MPRL E&P has committed. In addition, this EMP is used to ensure compliance with statutory requirements and corporate safety and environmental policies.

The remainder of this EMP is structured as follows:

- *Section 8.1* defines the environmental policies of the Project as well as the related legal requirements and institutional arrangements.
- *Section 8.2* presents a summary of environmental impacts associated with the Project, the recommended mitigation measures and the key elements related to the implementation of these measures as well as the overall HSE system of the Project.
- *Section 8.3* presents the environmental monitoring plan for the Project.
- *Section 8.4* presents other detailed management plans which are related to this EMP.
- *Section 8.5* presents the emergency response plan for the Project.

8.1 PROJECT ENVIRONMENTAL POLICY AND INSTITUTIONAL ARRANGEMENT

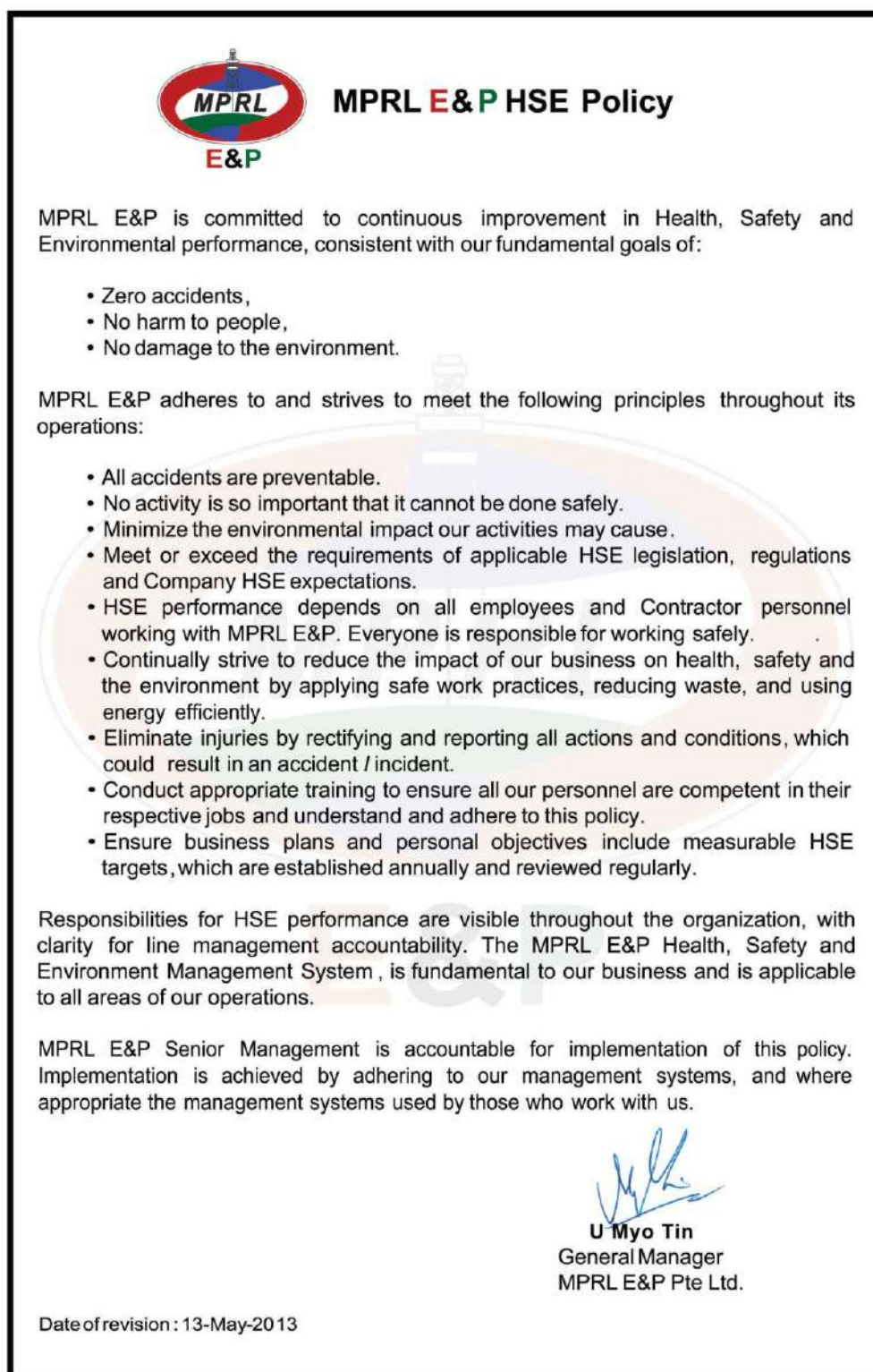
This section sets out the environmental policies which are relevant to the Project as well as the institutional arrangement.

8.1.1 Corporate Environmental Policy

MPRL E&P has adopted a comprehensive HSE Management System. This system is an important and integral part of the company's overall management system and is shown in *Figure 8.1* below. The Project will be required to follow the fundamental goals of::

- Zero accidents;
- No harm to people; and
- No damage to environment.

Figure 8.1 MPRL E&P's HSE Policy



Apart from the HSE policy, MPRL E&P also has in place an environmental policy as well as a corporate responsibility policy and a human rights policy, as can be seen in the following *Figures 8.2-4*.

Figure 8.2 MPRL E&P Environmental Policy

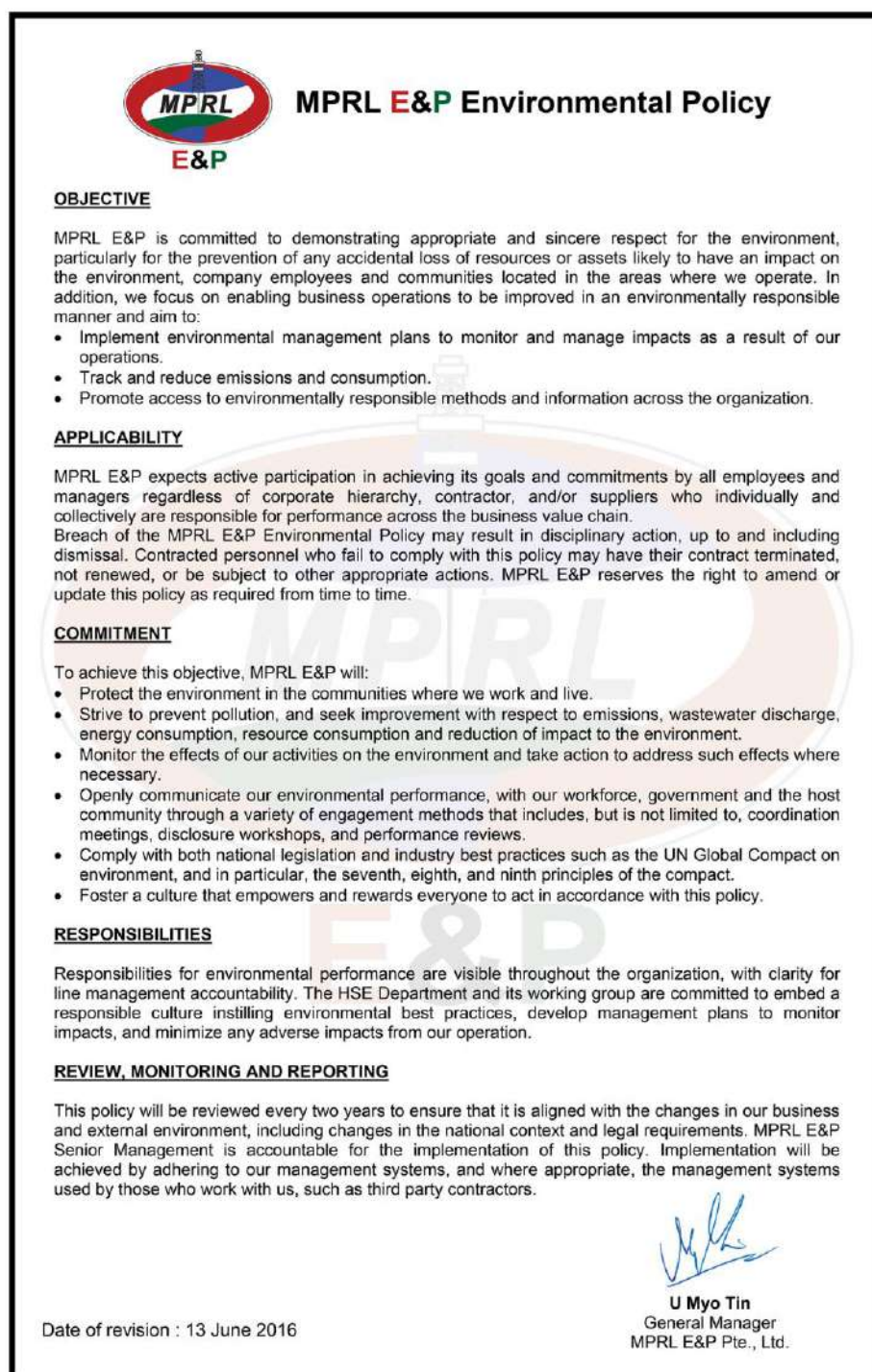


Figure 8.3 MPRL E&P Corporate Responsibility Policy



MPRL E&P Pte Ltd.

CORPORATE RESPONSIBILITY POLICY

MPRL E&P's policy is to be a responsible investor in the long term development of the host nation, by conducting business operations to the highest standards.

Our goal is to be honest and conduct business with integrity with the people we work with, which can include but is not limited to, local communities, business partners, and governments, and to maintain respect for cultural, national, and religious diversity.

Company directors, personnel and contractors are responsible for ensuring strict compliance with this policy, and specifically to:

- Respect individuality and diversity of all employees, treating them fairly and without discrimination
- Commit to equal opportunity in all aspects of employment and encouragement in diversity
- Stimulate personal growth of all employees through promotion of creativity and teamwork
- Provide a safe secure, worker friendly environment that promotes career opportunities for self-development
- Ensure compliance with MPRL E&P Environmental, Health & Safety Policy by all personnel involved in our activities
- Provide a clear direction on key CSR initiatives, policies, performance data and targets
- Contribute to the sustainable development of communities through active engagement and dialog
- Support selected development of projects in health, education, cultural and civic activities
- Maintain high ethical standards and support transparency in all of our activities
- Encourage our partners and stakeholders to observe and uphold similar standards wherever possible

U Mae Myint
Chief Executive Officer

Figure 8.4 MPRL E&P Human Rights Policy



MPRL E&P Pte Ltd.

HUMAN RIGHTS Policy Statement

MPRL E&P conducts business operations to the highest standard of ethics respecting and protecting internationally recognized Human Rights during the process. We endeavor to protect and promote Human Rights by coordinating with all stakeholders within our sphere of influence.

Human Rights abuses will not be tolerated nor encouraged in all projects undertaken by the company. This Human Rights Policy Statement is applicable to every operation acknowledging the rights of employees and the rights of local communities.

Community Rights:

MPRL E&P strongly encourages employees, contractors, Non Governmental Organization and governmental bodies to address the rights of communities surrounding our operations, through active engagement and dialog:

- Continuous community consultation and needs assessments are conducted to identify the needs of the community and concerns, enabling us to examine ways to proactively address them;
- We recognize and respect the culture and rights of indigenous peoples and endeavor to promote the practice of their traditions and customs; and
- We recognize communities' right to an essential, free, and full development highlighting our commitment to promoting community empowerment and improvement through sustainable development.

Employee Rights:

- We provide safe, secure, and worker friendly environment;
- We are an equal opportunities employer;
- We positively stimulate personal growth of our employees through promotion of creativity and teamwork;
- We do not use any forced or compulsory labor;
- We do not discriminate against race, religion, gender, age, sexual orientation, religion, nationality or ethnicity; and
- All employees have the right to join trade unions, where such rights are recognized by law.

U Moe Myint
Chief Executive Officer

8.1.2 Myanmar Regulatory Requirements

The policy and legislative framework is discussed in more detail in *Section 3*.

Laws relating to environmental and social issues within the oil and gas sector and hence their relevant relevance to the EIA Study for the proposed Project are included in *Table 3.1*.

8.2

SUMMARY OF IMPACTS AND MITIGATION MEASURES

Through the Project development and the EIA process, MPRL E&P has made commitments to actions to ensure or improve environmental performance. These commitments are not recommendations, but are binding commitments on the part of the Project.

A summary of the Project impacts and the committed mitigation measures are presented in *Table 8.1* below. Schedule and responsibility of implementation of these mitigation measures are identified as necessary. Additional details on the key elements for the overall environmental management of the Project are also presented below.

As part of the Project MPRL E&P have already spent close to USD1,300,000 to implement various mitigation measures at the Mann Field and the surrounding environs. It is expected that additional budget of ~USD200,000 (or higher) may be needed to implement any remaining mitigation measures necessary for the Project.

Table 8.1 Summary of the Key Impacts and Control/Mitigation Measures

Potential Impact/Issue	Control / Mitigation Measures	Significance of Residual Impacts	Monitoring	Timing/Frequency	Responsible Party	Related Plans
Environmental Impacts						
CONSTRUCTION PHASE						
Impacts from use of PMEs for installation of EOR facilities and re-development activities (general) on ambient air quality, ambient noise as well as terrestrial ecological resources (i.e. habitats and fauna)	<ul style="list-style-type: none"> Construction activities carried out at existing facilities of the Mann Field which are developed area mostly away from sensitive receptors. Construction activities to be limited to daylight working hours. Well maintained equipment will be used. Noise suppression box will be fabricated over the engine for the PMEs being operated nearby the NSRs (e.g. villages). Appropriate PPE e.g. ear protection will be used for MPRL E&P personnel. Vegetation cutting by hand to minimise disturbance and degradation of the habitats. It is assumed felling of large perennial vegetation (i.e. large trees which typically provide habitat for higher densities of terrestrial fauna) will be avoided. Regular maintenance of equipment such as lubricating moving parts, tightening loose parts and replacing worn out components. Shut down or throttled down between work periods for machines and construction plant items (eg trucks) that may be in intermittent use. Shut down generators, compressors, and other equipment when not in use. Reduce the number of equipment operating simultaneously as far as practicable. Orientate equipment known to emit noise strongly in one direction so that the noise is directed away from receptors as far as practicable. Implement control measures, eg erecting temporary noise barriers and deflectors, whenever applicable. 	Negligible	Inspection & Compliance Audit by MPRL E&P Compliance Department once a year	Design Phase & Implementation Phase	MPRL E&P General Manager; MPRL E&P HSE Coordinator	N/A
Impacts from drilling activities on ambient air quality, ambient noise, surface water quality, groundwater quality, soil quality as well as terrestrial and Aquatic ecological resources (i.e. habitats, flora and fauna)	<ul style="list-style-type: none"> Proper implementation of MPRL E&P's Waste Management Plan (WMP) for the Mann Field. Drill muds used will be WBM and KCl polymer mud with negligible toxicity which will be recycled and treated for future use as far as possible. If disposal is required, follow with NEQEG guide line. Careful selection of the fluid system. When selecting chemical additives, technical requirements, additive concentration, toxicity, bioavailability and bioaccumulation potential should be taken into account to minimize environmental hazards to their use and disposal. Monitoring the concentration of heavy metal impurities (mainly mercury and cadmium) in barite stock in the fluid formulation, if used. Follow and monitor compliance of drilling fluids and cuttings treatment and disposal with NEQEG for Onshore Oil and Gas Development. Minimize the usage of surface water for the drilling fluid. Reused and recycle surface-water for the operations Well-planed drilling management team to drill wells with industry good practices 	Negligible	Compliance Audit by MPRL E&P Compliance Department once a year	Design Phase	MPRL E&P General Manager; MPRL E&P HSE Coordinator	Waste Management Plan
			Inspection & Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Waste Management Plan; Environmental Monitoring Plan
Impacts from mobile power generation on terrestrial fauna	<ul style="list-style-type: none"> Specifications of power generator. Project activities limited to daylight hours. 	Negligible	Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	N/A

Potential Impact/Issue	Control / Mitigation Measures	Significance of Residual Impacts	Monitoring	Timing/Frequency	Responsible Party	Related Plans
Impacts from excavation, site preparation / clearance & creation of additional access routes on terrestrial ecological resources (i.e. habitats, flora and fauna)	<ul style="list-style-type: none"> On the basis that vegetation clearance for access routes will be undertaken using hand tools, it is assumed that felling of large perennial vegetation (i.e. large trees) will be avoided. Minimize footprint of access roads at the design stage (width of any new road should be less than 5 m). Induction training for personnel is recommended to include a mandatory segment on biodiversity. In this induction details of key requirements will be provided to include: <ul style="list-style-type: none"> Outline vegetation clearance procedures including species and upper size limit of tree that can be felled. What to do in the advent of disturbing fauna species (eg snakes) (both from an occupational safety and biodiversity perspective). 	Negligible	Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	N/A
Impacts from improper disposal of solid wastes on surface water quality, groundwater quality, soil quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna)	<ul style="list-style-type: none"> Waste materials will be segregated at source of generation and properly stored in labelled color bins assigned for general waste, recyclable waste, hazardous waste and organic waste. The segregated wastes will be transported to the waste management compound daily for proper temporary storage. The waste management compound will be managed by an experienced environmental team. Recyclable wastes will be collected by an approved third party contractor. Compostable organic wastes will be treated by composting and the products will be used to fertilize and condition soil. Non-compostable wastes will be incinerated in properly designed mobile incinerator. The residual solids from incineration will be used for composting. Hazardous wastes will be collected for proper disposal by approved third party contractor. Hazardous wastes which cannot be collected by the contractor will be buried underground in concrete bunker. Induction training for Project personnel should include the waste management system. 	Negligible	Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Waste Management Plan
Impacts from Improper Wastewater Discharge on Surface Water Quality, Ground Water Quality, Soil, Terrestrial Habitats and Aquatic Habitats as well as their Associated Flora and Fauna	<ul style="list-style-type: none"> Sanitary wastewater will be collected in the septic holding tanks to be located at the construction camp and a retained licensed firm will periodically clean and service the septic holding tanks. The discharge of treated sanitary wastewater should meet guideline levels in NEQEG. Storm water run-off will be routed to a pond to remove silt particles before discharge via storm drain. Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms. Appropriate surface drainage will be designed and provided where necessary. Surface runoff from potential sources of contamination will be prevented. All drainage facilities and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly. Runoff from areas without potential sources of contamination will be 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 will be installed and maintained as appropriate at refueling facilities, workshops, parking areas, fuel storage and containment areas, if any. 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. 	Negligible to Minor	Compliance Audit by MPRL E&P Compliance Department once a year	Design and Implementation Phase	MPRL E&P General Manager; MPRL E&P HSE Coordinator	Waste Management Plan

Potential Impact/Issue	Control / Mitigation Measures	Significance of Residual Impacts	Monitoring	Timing/Frequency	Responsible Party	Related Plans
OPERATIONAL PHASE						
Impacts from Mobile Power Generation on Terrestrial Fauna	<ul style="list-style-type: none"> Specifications of power generator Project activities limited to day light hours 	Negligible	Inspection & Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	N/A
Impacts from consumptive use of surface water and Groundwater resources on use of nature resources	<ul style="list-style-type: none"> Geological structure and reservoir studied to identify the target sands for EOR. Selection for the shut in wells and identify the communication of the subsurface structures. For the purpose of minimizing the impacts on the surface water and groundwater due to consumptive use by the Project, only two water distribution systems (Kyauk Tan groundwater well and Mann creek pumping station) of MOGE will be used. 	Minor	Compliance Audit by MPRL E&P Compliance Department once a year	Design Phase AND Implementation Phase	MPRL E&P HSE Coordinator and Community Liaison Officer	N/A
Impacts from the use of chemicals for EOR process on groundwater quality	<ul style="list-style-type: none"> The amount of chemical injected in a chemical treat would be as low as practicable and designed to be retained by adsorption, channelling and dilution in the petroleum reservoir. Precautionary measures should be developed and implemented to prevent loss of chemical fluids during the EOR process. As an addition measures, it is recommended that a groundwater monitoring programme should be developed to monitor groundwater quality before, during the after the EOR activities. Should significant groundwater contamination be detected, appropriate remedial measures should be developed to mitigate such impact. 	Minor	Inspection & Compliance Audit by MPRL E&P Compliance Department once a year	Design Phase	MPRL E&P Operations Manager; MPRL E&P HSE Coordinator	N/A
			Inspection & Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Environmental Monitoring Plan
Impacts from improper disposal of solid wastes on surface water quality, groundwater quality, soil quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna)	<ul style="list-style-type: none"> Waste materials will be segregated at source of generation and properly stored in labelled color bins assigned for general waste, recyclable waste, hazardous waste and organic waste. The segregated wastes will be transported to the waste management compound daily for proper temporary storage. The waste management compound will be managed by an experienced environmental team. Recyclable wastes will be collected by an approved third party contractor. Compostable organic wastes will be treated by composting and the products will be used to fertilize and condition soil. Non-compostable wastes will be incinerated in properly designed mobile incinerator. The residual solids from incineration will be used for composting. Hazardous wastes will be collected for proper disposal by approved third party contractor. Hazardous wastes which cannot be collected by the contractor will be buried underground in concrete bunker. Induction training for Project personnel should include the waste management system. 	Negligible	Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Waste Management Plan

Potential Impact/Issue	Control / Mitigation Measures	Significance of Residual Impacts	Monitoring	Timing/Frequency	Responsible Party	Related Plans
Impacts from Improper Disposal of Wastewater and Sludge on Surface Water Quality, Ground Water Quality, Soil, Terrestrial Habitats and Aquatic Habitats as well as their Associated Flora and Fauna	<ul style="list-style-type: none">Sanitary wastewater will be collected in the septic holding tanks to be located at the construction camp and a retained licensed firm will periodically clean and service the septic holding tanks.The discharge of treated sanitary wastewater should meet guideline levels in NEQEGIn order to reduce the concentration of chemicals in produced water, the amount of chemical injected in a chemical treat would be designed to be retained by adsorption, channelling and dilution in the petroleum reservoir. Chemicals dissolved in the produced brines will be recycled through the brine treatment system and reinjected into the reservoir. Chemicals dissolved in the oil will be transported to the refinery to be processed as a part of the crude oil.Adequate well management during well completion activities, this includes for each well to be completed:<ul style="list-style-type: none">Conduct squeeze cementing into all old perforation channelsPlace two cement plugs just above uppermost old perforation channel (2 cement plug x 300 ft)Fill up fluid into casing and place surface cement plug.Recompletion of high water producing wells to minimize water production.Zone Isolation - use of downhole equipment separation techniques, where possible, and water shutoff techniques.Disposing produced water to shut in wells by using gravity method.Disposing produced water to shut in wells by using injection pump.Produced water to be discharged should meet guideline levels in NEQEG for Onshore Oil and Gas Development.	<ul style="list-style-type: none">Negligible to Minor	Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Waste Management Plan
Impacts from Gas Venting on Ambient Air Condition	<ul style="list-style-type: none">Activities carried out at existing well sites in the oil field which are mostly remoted from the ASRs.Good maintenance and operating strategies will be taking into account to keep gas venting volume as low as practicable.Follow NEQEG for Onshore Oil and Gas Development for air emissions.Monitoring with Echo meter for the annulus gas volume on weekly basis, connect the line to LPG plant if the gas volume is acceptable.	Minor	Compliance Audit by MPRL E&P Compliance Department once a year	Design Phase	MPRL E&P HSE Coordinator	
	<ul style="list-style-type: none">Measures related to fire control should be strictly followed.Avoid venting or reduce the number of venting well as far as practicable.When new vents are to be installed, consideration should be given on toxic gas composition, wind direction, design of venting as well as location and distance from the ASRs to reduce the potential of pollutant dispersal to ASRs.Consider flaring instead of venting as far as possible.Implement a programme of regular monitoring of gaseous composition of the vented gas and regular air quality monitoring at selected ASRs to identify and properly respond to any unacceptable air quality impacts caused by the venting.		Inspection & Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Environmental Monitoring Plan
ACCIDENTAL EVENTS						

Potential Impact/Issue	Control / Mitigation Measures	Significance of Residual Impacts	Monitoring	Timing/Frequency	Responsible Party	Related Plans
Impacts from chemical spills, well failure and reservoir leakage on soil quality, surface water quality, groundwater quality as well as terrestrial and aquatic ecological resources (i.e. habitats, flora and fauna).	<ul style="list-style-type: none"> The Project has developed and implemented a detailed Spill Response Plan including community sensitization/notifications when required. The Project will maintain spill clean-up and response capability adequate for addressing spills for all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated and post remediation verification will be carried out. Implementation of spill response procedures including response teams and clean up tools & equipment. Refueling will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. Collection systems will be installed in these areas to manage any spills, fuels will be collected and either reused, treated by incineration or removed by a local contractor. Drip trays must be used when refueling and servicing vehicles or equipment, where it is not on a hard standing. Avoid construction of facilities (e.g. chemical storage compound) in a floodplain, whenever practical, and within a distance of 100 m of the normal high-water mark of a water body or a water well used for drinking or domestic purposes. Evaluating the risk of existing Underground Storage Tank (UST) to determine if upgrades are required for UST that will be continued to be used, including replacement with new systems or permanent closure of abandoned USTs. Ensuring that new USTs are sited away, as far as practicable, from groundwater wells, reservoirs and other source water protection areas and floodplains, and maintained so as to prevent corrosion. Incorporation of siting and safety engineering criteria to prevent failures due to risks posed by flooding. All Project structures should be designed in accordance with engineering and design criteria mandated by site-specific flooding risks. Facilities, buildings, plants, and structures should be situated to minimize potential risks from flooding. Maintaining a list of external equipment, personnel, facilities, funding, expert knowledge, and materials that may be required to respond to emergencies. The list should include personnel with specialized expertise for spill clean-up, flood control and water treatment. The use of competent and well-trained workers for construction and operation. Well-planned, well-supervised and standard procedures will be used at the wells to maintain well control (eg management of mud weight). Implementation of maintenance and inspection procedures. Carefully plan of drilling operation by identifying shallow hazards, using standard materials for well construction/modification, using standard drilling and well control standard operating procedures, and using proper drilling mud formulation with additives if necessary (well kill fluids, loss control and weighting agents). Undertake drilling with international best practice safety procedures. Test safety devices prior to start-up for function and integrity. Continuously monitor pressure in the well and recycled mud during drilling. Train employees on emergency procedures. Spill kits and shovels at well sites or appropriate locations for any accidental leakage of fuel or other hazardous substances during Project activities. It must be ensured that no such substance enters into groundwater or surface water resources. If emergency servicing of equipment is required in the field, spill kits and drip trays will be available. Any contaminated soil will be removed from site and disposed of in accordance with the WMP. The location, type and quantity of any fuel or chemical or mud spill will be reported to HSE coordinator immediately. Improve cellars with double cellars for new and reactivated wells. 	Minor	Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Emergency Preparedness Plan ; Spill Response Plan; Waste Management Plan

Potential Impact/Issue	Control / Mitigation Measures	Significance of Residual Impacts	Monitoring	Timing/Frequency	Responsible Party	Related Plans
Impacts from fires and explosions caused by the accidental events related to the use of explosive materials in re-perforation on air quality, ground water quality, surface water quality, Soil Quality, landscape and visual character, use of natural resources, terrestrial habitats and aquatic habitats as well as their associated flora and fauna.	<ul style="list-style-type: none"> Assign designated smoking areas. Smoking is only allowed away from the well head of more than 100 feet, up wind, with appropriate ash trays to contain any hot ashes. As administered under the Emergency Preparedness Plan, a Fire Risk Management Plan will be developed including communications protocols and measures to control any fires that do arise. Fire control equipment should be located at the well site or appropriate locations. Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire. It will be of key importance that explosives used for re-perforation activities are kept in a safe manner and no uncontrolled explosions occur. Implement all required safety and management requirements relating to the transportation, storage and handling of explosives Misfired charges from re-perforation activities will be disabled and destroyed. Conduct fire training and response drills. 	Minor	Inspection & Compliance Audit by MPRL E&P Compliance Department once a year	Implementation Phase	MPRL E&P HSE Coordinator	Emergency Preparedness Plan; Fire Risk Management Plan
Community health and safety	<ul style="list-style-type: none"> A Contractor EHS Management Plan will be developed to reduce potential impacts of contractors' activities to nearby communities. Road transport safety procedure for the Project is in-place which include no night time driving and speed limitation for vehicles in community areas. Loading /offloading of material and equipment are only allowed in daylight working hours. Enforcement of a speed limit for vehicles related to construction activities of the Project. During the construction phase, a speed limit of 40km/h shall be enforced. 	Minor	Inspection & Compliance Audit	Implementation Phase	MPRL E&P HSE Coordinator	Contractor HSE Management Plan; Traffic Management Plan

8.2.1

Environmental Management Organisation

MPRL E&P is committed to providing resources essential to the implementation and control of the EMP. Resources include the appropriate human resources and specialised skills. The structure for the organisation responsible for environmental management and implementation of the EMP is depicted in *Table 8.2*.

Table 8.2 *Environmental Management Organisation 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.
Operations Manager	Technical aspects of the Project including contractor supervision during operations. Responsible for the execution of Emergency Response Plan including Oil Spill Contingency Plan.
Construction Manager	Technical aspects of the Project including subcontractor supervision during Project implementation.
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.
Community Liaison Officer	Liaise with local communities, farmer and government regulators on the Project's behalf. Implement environmental awareness and education programmes with communities.
Contractor	
Project Manager	Responsible for subcontractor technical performance and compliance.
HSE Manager	Ensure that environment regulatory requirements are met and that EMP requirements are properly implemented.

Supervision of subcontractor activities will be conducted by MPRL E&P General Manager and Operations Manager. This will be accomplished through management controls over strategic project aspects and interaction with subcontractor staff where project activities take place. The MPRL E&P organisation will be staffed at a level to allow for continuous effective supervision of subcontractor activities and work products.

The construction manager and HSE Coordinator will be placed locally at the Project site to supervise contractors during construction while the Operation

Manager and HSE Coordinator will supervise contractors during operational activities. The organisation includes a Community Liaison Officer (CLO) whose role is crucial to the successful implementation of the EMP and the continuation of liaison with the local community.

8.2.2 *Training and Awareness*

MPRL E&P will identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact upon the environment conditions. The Project recognises that it is important that employees at each relevant function and level are aware of the Project's environmental policy; potential impacts of their activities; and roles and responsibilities in achieving conformance with the policy and procedures.

This will be achieved through a formal training process. Employee training will include awareness and competency with respect to:

- Environmental impacts that could potentially arise from their activities;
- Necessity of conforming to the requirements of the EIA and EMP, in order to avoid or reduce those impacts; and
- Roles and responsibilities to achieve that conformity, including with regard to change management and emergency response.

The HSE Coordinator is responsible for coordinating training, maintaining employee-training records, and ensuring that these are monitored and reviewed on a regular basis. The HSE Manager will also periodically verify that staffs are performing competently through discussion and observation.

Employees responsible for performing site inspections will receive training by drawing on external resources as necessary. Training will be coordinated by the HSE Coordinator prior to Project's implementation. Upon completion of training and once deemed competent by management, staff will be ready to train other people.

Similarly the Project will require that each of the contractors institute training programmes for its personnel. Each contractor is responsible for site HSE awareness training for personnel working on the job sites. The contractors are also responsible for identification of any additional training requirements to maintain required competency levels.

The contractor training program will be subject to approval by the Project and it will be audited to ensure that:

- Training programs are adequate;
- All personnel requiring training have been trained; and

- Competency is being verified.

8.2.3 *Inspection*

HSE inspections will be conducted by subcontractors on a daily basis. The results of the inspection and monitoring activities will be reported to MPRL E&P on a weekly basis or more frequently if requested by the HSE coordinator or the Operations Manager.

8.2.4 *Compliance Auditing*

Beyond the routine inspection and monitoring activities conducted, compliance audits will be carried out internally by MPRL E&P to ensure compliance with regulatory requirements as well as their own HSE standards and policies. Audits to be conducted will also cover the subcontractor self-reported monitoring and inspection activities. The audit shall be performed by qualified staff and the results shall be communicated to the General Manager and management board.

The audit will include a review of compliance with the requirements of the EIA and of this EMP and include, at minimum, the following:

- Completeness of EHS documentation, including planning documents and inspection records;
- Conformance with monitoring requirements;
- Efficacy of activities to address any non-conformance with monitoring requirements; and
- Training activities and record keeping.

There will be a cycle of audits into specific areas of the Project such as waste management, and effectiveness of local content plans and discharge controls. The frequency of audits will be risk based and will vary with the stage of the Project (more frequent during construction and in the early stages of the Project operation) and will depend on the results of previous audits.

8.2.5 *Corrective Action*

Impacts will be identified and associated risks addressed before an incident occurs. Investigating a 'near miss' or actual incident after it occurs can be used to obtain valuable lessons and information that can be used to prevent similar or more serious occurrences in the future.

MPRL E&P will implement a formal non-compliance and corrective action tracking procedure for investigating cause and identifying corrective actions in response to accidents or environmental non-compliances. This will ensure coordinated action between MPRL E&P and its subcontractors. The HSE Coordinator will be responsible for keeping records of corrective actions and

for overseeing the modification of environmental protection procedures and/or training programs to avoid repetition of non-conformances and non-compliances.

8.3 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 physical environment should be undertaken:

Physical Environment Monitoring

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

The monitoring methodology should follow that adopted for the EIA Study.

Monitoring should be undertaken during the following periods of the EOR and re-development programme 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.

In addition, a programme of regular monitoring of gaseous composition of the vented gas and regular air quality monitoring at selected ASRs should also be implemented to identify and properly respond to any unacceptable air quality impacts caused by the venting which is an existing operation in the Mann Field.

Details of the environmental monitoring are presented in *Table 8.3*.

The average budget for the HSE during the last two years was about USD 100,000 annually including environmental monitoring programmes. MPRL E&P will implement the environmental monitoring based on MOGE's annual budget approval until end of the Project. It is expected that this budget may be within the range of USD10,000 to USD100,000 per year depending on the necessary activities.

Table 8.3 Environmental and Social Monitoring Programme (Construction and Operation Phase)

Project Stage	Potential Impact	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
At least two weeks before the construction activities for baseline data collection. Construction and Operation	Air Quality	NO _x , SO ₂ , PM _{2.5} , PM ₁₀ , CO. Check compliance with Myanmar National Environmental Quality (Emission) Guidelines (2015).	Z1AQN, Z2AQN, Z3AQN and Z4AQN, locations indicated on Table 5.1 and Figure 5.10	Sampling and analysis of ambient air pollutants to be conducted accordingly to the guidelines of Myanmar NEQEG. Haz-Scanner EPAS Wireless Environmental Perimeter Air Station to be used for measurement.	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	MPRL E&P HSE Coordinator

Project Stage	Potential Impact	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
					aim to prevent any further impacts from occurring	
At least two weeks before the construction activities for baseline data collection. Construction and Operation	Noise	Check compliance with Myanmar National Environmental Quality (Emission) Guidelines (2015)	Z1AQN, Z2AQN, Z3AQN and Z4AQN, locations indicated on <i>Table 5.1</i> and <i>Figure 5.10</i>	24-hour noise monitoring using the portable sound meter (Lutron, SL-0423SD, unit: dB). Noise level (LAeq) measured and recorded at a ten-minute interval and averaged at an hourly and daily (i.e. 24-hour) interval.	As above	MPRL E&P HSE Coordinator
At least two weeks before the construction activities for baseline data collection.	Groundwater Quality	In-situ measurements for transparency, temperature, pH	Z1GW, Z2GW, Z3GW and Z4GW, locations	In-situ measurements for transparency, temperature, pH	As above	MPRL E&P HSE Coordinator

Project Stage	Potential Impact	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
Construction and Operation		DO, turbidity, colour, alkalinity and hardness. Laboratory analysis of BOD ₅ , COD, Total Nitrogen, Total Phosphorus, Oil and grease, TSS, <i>E. coli</i> , Arsenic, Barium, Boron, Total Chromium, Floride, Selenium, Uranium	indicated on <i>Table 5.11</i> and <i>Figure 5.14</i>	DO, turbidity, colour, alkalinity and hardness. Laboratory analysis of BOD ₅ , COD, Total Nitrogen, Total Phosphorus, Oil and grease, TSS, <i>E. coli</i> , Arsenic, Barium, Boron, Total Chromium, Floride, Selenium, Uranium		
At least two weeks before the construction activities for baseline data collection. Construction and Operation	Surface Water Quality	In-situ measurements for transparency, temperature, pH DO, turbidity, colour, alkalinity and hardness. Laboratory analysis of BOD ₅ , COD, Total Nitrogen, Total Phosphorus, Oil and grease, TSS, <i>E. coli</i> , Arsenic, Barium, Boron, Total Chromium, Floride, Selenium, Uranium	Z1SW, Z2SW, Z3SW and Z4SW, locations indicated on <i>Table 5.7</i> and <i>Figure 5.12</i>	In-situ measurements for transparency, temperature, pH DO, turbidity, colour, alkalinity and hardness. Laboratory analysis of BOD ₅ , COD, Total Nitrogen, Total Phosphorus, Oil and grease, TSS, <i>E. coli</i> , Arsenic, Barium, Boron, Total Chromium, Floride, Selenium, Uranium	As above	MPRL E&P HSE Coordinator
At least two weeks before the construction activities for baseline data collection. Construction and Operation	Soil Quality	pH; Arsenic (As); Lead (Pb); Cadmium (Cd); Copper (Cu); Zinc (Zn); Manganese (Mn); and Iron (Fe). Comparison with the Dutch Standard 2000.	Z1S, Z2S, Z3S and Z4S, locations indicated on <i>Table 5.13</i> and <i>Figure 5.16</i>	Follow sampling procedure, sample preservation and sample analysis recommended in Myanmar NEQEG. Laboratory analysis of pH; Arsenic (As);	As above	MPRL E&P HSE Coordinator

Project Stage	Potential Impact	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
				Lead (Pb); Cadmium (Cd); Copper (Cu); Zinc (Zn); Manganese (Mn); and Iron (Fe).		
Construction and Operation	Discharge of treated wastewater and runoff	<p>Check compliance with Myanmar National Environmental Quality (Emissions) Guidelines for site runoff and wastewater discharges (for BOD, COD, TSS, oil and grease, pH, total coliform bacteria, total nitrogen, total phosphorus) during construction.</p> <p>Check compliance with Myanmar National Environmental Quality (Emissions) Guidelines for Onshore Oil and Gas Development during operation.</p>	Treated wastewater discharge points at discharge points such as worker camps, GOCS, shut in wells.	<p>In-situ measurements for pH, temperature, dissolved oxygen (DO), electrical conductivity (EC), and turbidity.</p> <p>Laboratory analysis of BOD5, COD, Total Suspended Solids, Total Nitrogen, Total Phosphorous, Oil and Grease</p>	As above	MPRL E&P HSE Coordinator
Operation	Vented gas	Check compliance with Myanmar National Environmental Quality (Emissions) Guidelines for Onshore Oil and Gas	Three vented gas location (randomly selected)	Real-time measurement	Monthly monitoring for the first three months during operation phase. After the three month	MPRL E&P HSE Coordinator

Project Stage	Potential Impact	Parameters to be Monitored	Location	Measurements	Frequency	Responsibility
		Development during operation (H ₂ S)			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	

8.4 *MANAGEMENT PLANS*

The goal of this EMP is to ensure full compliance with the Project's policies and with mitigation, monitoring and other commitments made in the EIA Report. While this EMP should also be treated as a high-level, framework document, it is linked to a number of detailed management plans as described below which will be developed to lay out the specifications for compliance with specific environmental elements.

8.4.1 *Related Management Plans*

A range of management plans will be developed to provide assurances that the outcomes of the EIA are able to be implemented. These management plans will 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. Where responsibilities will lay with bodies external to MPRL E&P (e.g. Contractors) the invitations to tender and contracts will contain specific clauses that bind contractors and sub-contractors. This will apply to all tiers of contractors, with penalties for non-compliance also set out in the contracts and rigorously enforced by MPRL E&P.

The key management plans are outlined in *Table 8.4* with information on how these relate to the activities and impacts being discussed in the EIA Report, including reference to who has lead responsibility. These management plans are presented in *Annex H* and summarize in *Sections 8.4.2-7* below.

Table 8.4 EMP Hierarchy of Key Plans

Plan Name	Includes	Plan Owner
EMP	Overarching plan linking to other Management Plan	MPRL E&P
Waste Management Plan	Project-related waste handling procedures for hazardous and non-hazardous wastes.	MPRL E&P
Emergency Preparedness Plan	Administration (policy, purpose, distribution, definitions, etc), organization of emergency areas (command centres, medical stations, etc), roles and responsibilities, communication systems, emergency response procedures, emergency resources, training and updating, checklists (role and action list and equipment checklist) and business continuity and contingency.	MPRL E&P
Spill Response Plan	Describes the spill preventative measures and spill response procedures	MPRL E&P
Fire Risk Management Plan	As part of the ERP, including communications protocols and measures to control any fires that do arise and as well as identify where fire control measures should be located.	MPRL E&P
MEDIVAC Procedures	Describe the procedures that must be followed in the event of a medical evacuation (MEDIVAC) of an injured or ill person from the Mann Field.	MPRL E&P
Health and Hygiene Management Plan	Describe risks related to personal health and hygiene as well as the preventative measures which need to be implemented.	MPRL E&P
Transportation Management Procedures	Define controls over traffic routes, speed restrictions, appropriate road safety requirements, vehicle loading and response procedures to traffic related emergency.	MPRL E&P
Environmental Monitoring Plan	Groundwater monitoring, surface water monitoring, soil monitoring, routine effluent and discharge monitoring, air quality monitoring, noise monitoring, etc.	MPRL E&P or a third party administered under the Environmental Management Plan

8.4.2 Waste Management Plan

Objectives and Legal Requirements

The objectives of the Waste Management Plan (WMP) 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 occurs for all wastes generated.

Implementation Schedule

The WMP will be implemented during all Project phases including construction and operation phases.

Management Actions

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 wastes within suitable bins that are clearly labelled;
- Bins/drums are sent to approved 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

Monitoring Plans

MPRL E&P will provide information on waste management to MOGE in the Monthly Mann Field Project Report.

Projected Budget and Responsibilities

The cost for the WMP is included in the overall budget for the EMP.

8.4.3

Emergency Response Plan (include Fire Risk Management Plan)

Objectives and Legal Requirements

MPRL E&P will respond to emergency situations from the Project activities in Myanmar. The Emergency Response Plan (ERP), which also cover fire risk management, includes:

- Hierarchy of protection;
- Preparedness and planning for emergencies;
- Employee responsibilities;
- Emergency response procedures;
- Medical emergencies including medevac procedures;
- Natural disasters (e.g. flood, cyclone, earthquakes) related emergencies;
- Fire and electrical related emergencies; and
- Any other emergency response plan required by the Republic of the Union of Myanmar authorities.

Implementation Schedule

The ERP will be implemented during all Project phases including construction and operation phases.

Management Actions

MPRL E&P will develop 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 include but are not limited 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.

Monitoring Plans

Should emergency situation occur, they will be reported to MOGE.

Projected Budget and Responsibilities

The budget for emergency response is based on the level of response required.

8.4.4

Spill Response Plan

Objectives and Legal Requirements

The objectives of the Spill Response Plan are to describes the spill preventative measures and spill response procedures.

Implementation Schedule

The Spill Response Plan will be implemented during all Project phases including construction and operation phases.

Management Actions

MPRL E&P developed plans and procedures to identify the potential for and response to spill and for preventing and mitigating any potentially adverse environmental and social impacts that may arise. The plans include but are not limited to: spill control hierarchy, control measures to prevent spills such as proper engineering design, handling, storage and transportation guidelines on hazardous materials, spill response training, spill response organization and procedures as well as spill response PPE and drill requirements.

Monitoring Plans

Should spills occur, they will be reported to MOGE.

Projected Budget and Responsibilities

The budget for spill response is based on the level of response required (e.g. types and extent of spill).

8.4.5

Health and Hygiene Management Plan

Objectives and Legal Requirements

The objectives of the Health and Hygiene Management Plan are to describe risks related to personal health and hygiene as well as the preventative measures which need to be implemented.

Implementation Schedule

The Health and Hygiene Management Plan will be implemented during all Project phases including construction and operation phases.

Management Actions

MPRL E&P identified hazards as well as developed preventive and mitigation measures related to health and hygiene of personnel working at Mann Field. The plan include but are not limited to: responsibility of implementation of the Health and Hygiene Management Plan; identification, prevention and

responses to illness such as health related illness and diseases such as those transmitted by insects and parasites; pre-assignment immunisation and health screening requirements; preventive measures to avoid snake bites as well as sickness arising from general hygiene issue and travel to and from the Mann Field.

Monitoring Plans

MPRL E&P will provide information on health and hygiene management to MOGE in the Monthly Mann Field Project Report.

Projected Budget and Responsibilities

The cost for the Health and Hygiene Management Plan is included in the overall budget for the EMP.

8.4.6 MEDIVAC Procedures

Objectives and Legal Requirements

The objective of the MEDIVAC Procedures is to describe the procedures that must be followed in the event of a medical evacuation (MEDIVAC) of an injured or ill person from the Mann Field.

Implementation Schedule

The MEDIVAC Procedures will be implemented during all Project phases including construction and operation phases.

Management Actions

Given the remoteness of the Mann Field and the time taken to medivac a patient to a hospital with appropriate standards, all rotating personnel have to undergo a thorough medical examination before engaged to work at the Mann Field, and this should be repeated at 2 year intervals. MPRL E&P will describe the conditions and remoteness of the Mann Field to the medical examiner. The medical examiner will be required to assess whether the person is suitable for working in the Mann Field. Information will remain confidential between the employee and the medical examiner unless express written permission is given by the employee to make available this information to MPRL E&P.

MPRL E&P undertake to provide medivac facilities to all staff working on the MPRL E&P project in Mann Field. This facility is extended to sub-contracted personnel. This includes a field clinic at the worker base camp. Emergency treatment can be provided by MPRL medical staff at the field clinic, backed up by MEDIVAC support, if necessary.

Monitoring Plans

MPRL E&P will report MEDIVAC situation, if happen, to MOGE.

Projected Budget and Responsibilities

The cost for the MEDIVAC Procedures is included in the overall budget for the EMP.

8.4.7 *Transportation Management Procedures*

Objectives and Legal Requirements

The objectives of the Transportation Management Procedures are to define controls over traffic routes, speed restrictions, appropriate road safety requirements, vehicle loading and maintenance measures and response procedures to traffic related emergency.

Implementation Schedule

The Transportation Management Procedures will be implemented during all Project phases including construction and operation phases.

Management Actions

The following management actions are covered under Transportation Management Procedures:

- Good practices on rest regime, timing, routes and speed of driving;
- Safety rules related to MPRL E&P vehicles usage;
- Procedures of road risk assessment; and
- Procedures to rescue the driver and passenger(s) who fail to get to their check calls or destination by the ETA designated on the Journey Management Plan.

Monitoring Plans

MPRL E&P will report on incident on transportation management, if occurred.

Projected Budget and Responsibilities

The cost for the Transportation Management Procedures is included in the overall budget for the EMP.

The Project will engage contractors to carry out Project activities. The contractors are responsible for performing all work:

- In compliance with relevant national and international HSE legislation and regulations, and with other requirements to which the project subscribes;
- In conformance with the Project's EMP; and
- In accordance with contractual technical and quality specifications.

The Project will also provide specifications for environmental compliance and performance (through this EIA and EMP and the associated plans) and, as a contractual requirement, the contractor will develop and provide to the Project its own specific management plans demonstrating how they intend to comply with the stipulated requirements.

Contractors must also provide documentation detailing their plans for:

- Implementing the measures required in the EIA and this EMP;
- Local content;
- Logistics; and
- Community relations.

The contractor management plans must conform to the requirements of the Project's overarching plans. Contractor plans will be reviewed and approved by MPRL E&P and incorporated into, and form part of, the Project's overall EMP.

Contractors will be required to self-monitor against their plan and the contractor's compliance with the plan will be routinely monitored by MPRL E&P directly or by third-parties. Contractors will be required to submit regular reports of monitoring activities and the Project will review these on a regular basis. An external assurance process will be conducted on an annual basis the results of which will be disclosed at completion of the process.

As a contractual requirement, the subcontractors are required to provide sufficient resources to manage HSE aspects of the work to be performed. This includes providing resources to ensure compliance of next tier subcontractors and a process for emergency stop-work orders in response to monitoring triggers.

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 potentially adverse environmental impacts that may be associated with them.

Emergency preparedness and response will be reviewed by MPRL E&P on at least an annual basis and after the occurrence of any accidents or emergency situations to ensure that lessons learnt inform continuous improvement. Emergency exercises will be undertaken on a regular basis to confirm adequacy of response strategies. Investigations of accidents or incidents will follow formal documented procedures.

The Emergency Response Plan is attached in *Annex H*.

9.1 PURPOSE OF THE CONSULTATION

The specific objectives for stakeholder engagement were to:

- Inform relevant stakeholders about MPRL E&P and its planned Project activities;
- Identify stakeholders and communities potentially affected by Project activities;
- Gather baseline information on the social and biological environment; and,
- Engage with potentially affected groups to understand the scope of fishing activities, potential Project impacts, perceptions and concerns and discuss appropriate mitigation measures.

9.2 METHODOLOGY AND APPROACH

9.2.1 Identification of Relevant Stakeholders and Potential Issues

The process of identifying potentially affected stakeholders started with scoping. The purpose of scoping was to identify relevant issues and the villages potentially impacted. The scoping exercise involved both desk-based and preliminary consultation with a number of stakeholders including government authorities.

The scoping process concluded that those villages active in and around the Project Site as well as the Potentially Affected Communities in Mann Field area.

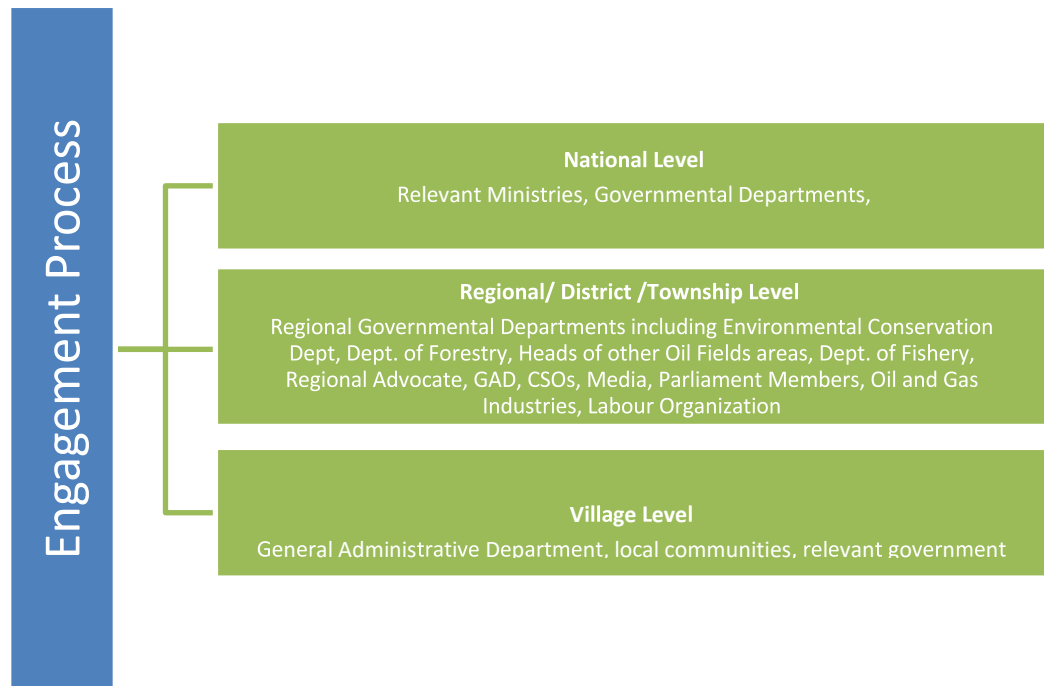
ERM's previous experience of stakeholder engagement in the region was utilised to inform the stakeholder selection. This information is based on discussions with MOGE representatives as well as previous site visit experience.

9.2.2 Overall Approach and Scope of Engagement for the Impact Assessment

Stakeholder engagement was conducted across administrative levels, subject to permissions of responsible authorities. *Figure 9.1* provides an overview of the levels engaged including: National Government, Magwe Region, district and township levels, supported by MOGE representative of Mann Field discussion with the village leaders at the MOGE meeting and community level meetings.

MPRL E&P understands the need for continual engagement and has also undertaken engagement in addition to that required under the Myanmar EIA Procedure. Stakeholder engagement is an ongoing process and as such new stakeholders may emerge as the Project progresses. This will be captured and inform ongoing stakeholder engagement activity that will be undertaken for the Project.

Figure 9.1 *Engagement at Three levels with Key Stakeholders*



Engagement for the EIA was focused on 14 villages of Mann Field area in which the Project is located. A meeting was conducted with Mann Field MOGE as Regional/ District/ Township levels at MOGE office of Mann Field area. The purpose of engagement was to make the regional, district, and township levels aware of the Project, seek an understanding of specific issues and stakeholder concerns, discuss potential impacts and mitigation measures and obtain township level social and environmental data.

Meetings were also conducted at the community area of 14 villages (where the Project is located), two meetings were conducted during scoping and 15 meetings during the EIA investigation phase.

The key stakeholders engaged with included:

- Parliament members
- GAD (District and Township);
- MOGE

- Environmental Conservation Department
- Department of Fisheries;
- Forestry Department
- Labour organization
- Village Tract Leaders
- Local Community in 14 villages;
- Civil Society Organizations;
- NGOs.
- Medias

9.2.3 *Format and Content of Consultation Meetings*

Key Principles

The consultation process was guided by the following key principles:

- **Inclusive:** The consultations were organised to ensure representation of potentially affected and interested stakeholders.
- **Sharing of information:** At the township and village level consultations, special emphasis was given to build community level understanding of the Project and all the information was provided in Myanmar language.
- **Participatory:** Stakeholders were encouraged to actively participate in the consultations and were always given the opportunity to ask questions.

The approach to consultation, informed by these principles, is described below.

The stakeholder consultation meetings were structured as followed:

- **Introductions and information disclosure:** Introduce MOGE and MPRL E&P, the Project's activities, the result of EIA, the proposed stakeholder engagement process, the potential environmental and social impacts and mitigation to help the stakeholders understand the Project and MPRL E&P's intentions for engagement.

- Question and answer session for all stakeholders in the town hall meeting to raise concerns, comments or ask questions to which MPRL E&P, MOGE and ERM did directly respond.
- Data collection: Collection of more in-depth information through socio-economic survey with randomized stakeholders in the community meeting.

Survey Methodology

A survey of 689 households was conducted from 8th to 12th January 2018 in 14 villages focus on:

- Population statics;
- Identification of key local community and stakeholder rights;
- Community history;
- Indigenous communities;
- Culture and key events that have shaped economic and social development;
- Community and institutional structures and resource;
- Local business and industry content;
- Local land use patterns;
- Health and community wellbeing;
- Livelihoods;
- Access to physical and social infrastructure;
- Interests of vulnerable groups (tribal/ethnic minority groups, women headed households, economically vulnerable households, etc.); and
- Gender and equity issues.

There were no focused group discussions, and except where specifically mentioned, no anecdotal evidence was used in the gathering of data or for analysis. The scope of the survey included all the 14 villages that were located in and around the Mann Oil Filed and along the access roads to the site.

The objective was to understand the socio-economic status of the area as a whole, so that an integrated approach to development of the area could be envisioned. It was, therefore, a conscious choice to include villages that would be directly affected by proposed development of oil production activities.

The 25 enumerators were people from the surveyed villages and MPRL E&P staffs. The reason behind choosing them was to ensure authenticity as well as ownership over the information gathered.

Community Engagement Activities

In order to inform the local community of progress being made by MPRL E&P in designing the proposed Project, correspondence of the Project has been issued at various stages. Details of the correspondence issued are provided below.

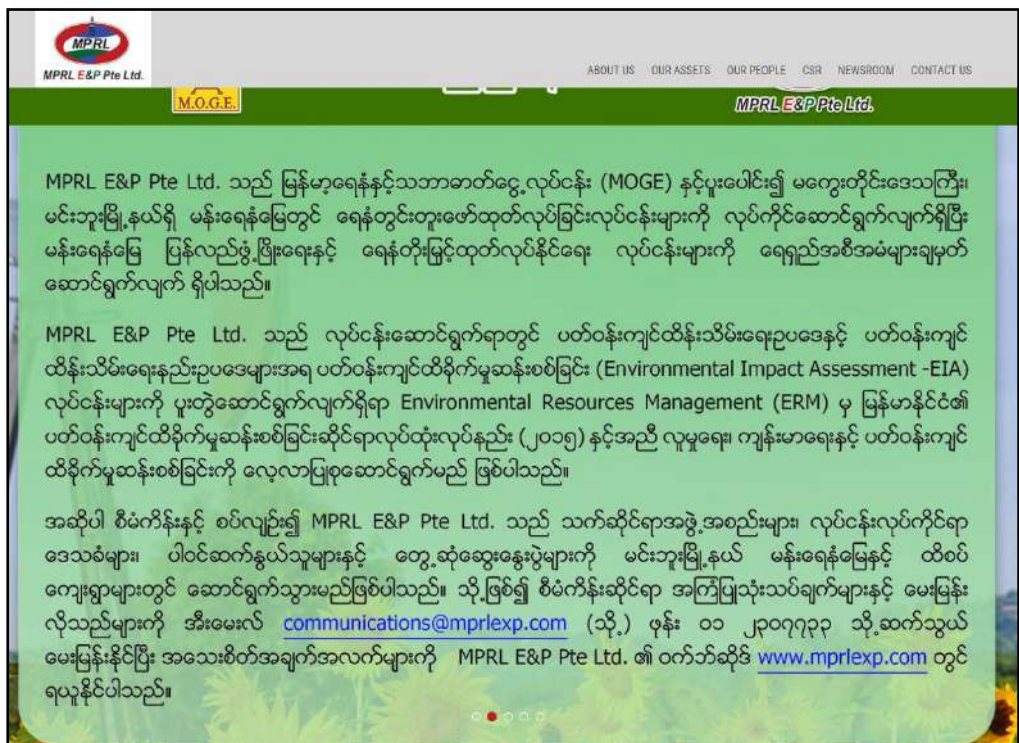
Initial notification to local community – issued 2nd January 2018

A notification was posted at the information board to the local community on 2nd January 2018 to invite local residents of 14 villages to explain the ongoing Project activities, result of EIA studies and interviewing process for the socio-economic status that were being undertaken by ERM and HSE and CSR team of MPRL E&P. Community was also notified MPRL E&P intention to hold a public engagement event. Contact details were provided for representatives of CSR officer of MPRL E&P. The notification is shown in *Figure 9.2*. The notification was also posted in the website of MPRL E&P at www.mprlexp.com (*Figure 9.3*).

Figure 9.2 Notification of the Stakeholder Engagement at the Information Board of Village



Figure 9.3 Notification on the Website of MPRL E&P



SUMMARY OF CONSULTATION ACTIVITIES UNDERTAKEN FOR THE EIA PROCESS

During EIA, one meeting with undertaken at MOGE Office in the Mann Field, and meeting were also undertaken at 14 villages located in the Mann Field. MOGE meeting at Regional, District and Township levels was attended by 79 government employees. In village level, around 1,169 people attended the meetings from 13 villages of 5 village tracts and one village under the Minbu Township's authority. CSOs were also present at the meeting. The date, time, location, stakeholder and purpose of each meeting is provided in *Table 9.1*. A summary of the outcomes of the meetings is presented in *Table 9.2*.

The attendance record of the consultation are provided in *Annex I*. Some photos of the meeting are also provided in *Figure 9.4*.

Table 9.1 Consultation Meetings undertaken in January 2018

Date, time, location	Stakeholder	Purpose of Engagement
8 January, 2018, MOGE Office	General Manager	• Meeting for invitation to the departments and organizations
8 January, 2018, Man Gyo	Villagers	• Public Consultation Meeting
9 January, 2018, Chin Taung	Villagers	• Undertake 92 household surveys.
9 January, 2018, Chin Taung	Villagers	• Public Consultation Meeting
9 January, 2018, Kwe Cha	Villagers	• Undertake 16 household surveys.
9 January, 2018, Lay Eain Tan	Villagers	• Public Consultation Meeting
9 January, 2018, Lat Pan Tapin	Villagers	• Undertake 31 household surveys.
10 January, 2018, Nan Oo	Villagers	• Public Consultation Meeting
10 January, 2018, Auak Kyaung	Villagers	• Undertake 53 household surveys.
10 January, 2018, Lat Pan Taw	Villagers	• Public Consultation Meeting
10 January, 2018, Pauk Kone	Villagers	• Undertake 28 household surveys.
11 January, 2018, Aye Mya	Villagers	• Public Consultation Meeting
11 January, 2018, Mei Bayt Kone	Villagers	• Undertake 30 household surveys.
11 January, 2018, Ywar Thar	Villagers	• Public Consultation Meeting
12 January, 2018, MOGE Office Hall	Parliament member, MOGE, FD, ECD, Labor Association, MPRL E&P, GAD, CSRs, Village Tract Leaders	• Undertake 47 household surveys.
		• Public Consultation Meeting
		• Undertake 74 household surveys.
		• Public Consultation Meeting
		• Undertake 82 household surveys.
		• Stakeholder Consultation

Date, time, location	Stakeholder	Purpose of Engagement
12 January, 2018, Makyee Chaung	Villagers	<ul style="list-style-type: none"> • Public Consultation Meeting • Undertake 45 household surveys.
12 January, 2018, Kyar Kan	Villagers	<ul style="list-style-type: none"> • Public Consultation Meeting • Undertake 72 household surveys.

9.3.1 *Results of Consultation*

A summary of the outcomes of the meetings is presented in *Table 9.2*.

Key concerns raised were related to air quality, noise, water quality as well as soil quality issues from the Project, which are assessed in *Section 6* with mitigation measures proposed. Responses to land compensation issues and CSR programme were responded to directly by MOGE / MPRL E&P during the meetings.

Table 9.2 Summary of Key Questions Raised During EIA Public Consultation

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
1.	8-1-2018	Man Kyoe, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <ol style="list-style-type: none"> 1) Due to the using of dynamite for exploration in 1997, soil erosion happed and top soil was destroyed. However, those events are stopped now. 2) Because of contaminated runoff water in rainy season, some agricultural areas could not be cultivated. <p>(CSOs):</p> <ol style="list-style-type: none"> 1) Although 3 villagers attended the training for the food production of CSR program done by MPRL E&P, there is still lack of knowledge and access to the market. 	<p>(MOGE):</p> <ol style="list-style-type: none"> 1) Mann Field project was started long time before the EIA procedure and MPRL follows MOGE's instruction to conduct an EIA to mitigate impacts to the environment. 2) To repair the soil's fertility, please contact to the agricultural specialists of Agriculture Department. <p>(CSR Dept., MPRL E&P):</p> <ol style="list-style-type: none"> 1) Training on enabling access to market will be given in fiscal year 2018-2019.
2.	9-1-2018	Chin Taung, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <ol style="list-style-type: none"> 1) Some water pipelines are being crossed in the cultivated areas. 30 Acres of northern part of village is being left as a pond by soil digging of project activities. <p>(Villager):</p> <ol style="list-style-type: none"> 1) Water spring of shut in well No.100 in eastern part of Mei Bayt Kone village led to flooding of land of about one acre. 2) Area around Well No. 432 and 437 were left as vacant land which cannot be cultivated. 	<p>(Daw Zin Mar Myint, CSR, MPRL E&P):</p> <ol style="list-style-type: none"> 1) All old wells, which are not in used, will be shut down systematically and unused water line pipes will be put in safe keeping back. There is not wastewater in 30 acres pond and it can be used as natural rainfall reservoir. <p>(MOGE and MPRL E&P):</p> <ol style="list-style-type: none"> 1) MPRL E&P has a good Grievance Mechanism to communicate with community and it can be used to inform event of flooding and oil spill of shut-in well.

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
				<p>3) One shut-in well (M-488) near bridge of Chin Taung village spilled in last 3 days and about 20 gallons of oil spreads out.</p> <p>(Villager):</p> <p>1) One of the wastewater-discharged pipe near the village discharges wastewater to the Man Chung Creek.</p> <p>(Villager):</p> <p>1) We applied Form No. (7) for our Farm land's ownership to Land Management and Statistical Department and GAD. MOGE did not give the recommendation that we own this land.</p>	<p>MOGE and MPRL E&P will investigate the leakage and spill from the shut in well.</p> <p>(Daw Zin Mar Myint, CSR, MPRL E&P):</p> <p>1) We have already investigated this discharged point that the discharged water is not wastewater.</p> <p>(U Soe Min, MOGE):</p> <p>1) The Land Law was issued in 2015 and I will submit this information to the authorized person of MOGE.</p>
3.	9-1-2018	Kywe Cha, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <p>1) Some of shut in wells around the village are open and there are some water pipelines leaks in village.</p> <p>2) Due to lack of the clinic in the village, we have to go to Minbu Township Hospital, which is really far from village.</p> <p>3) Although we could participate the training for the Food production of CSR program done by MPRL E&P, market change opportunities is still lacking.</p>	<p>(U Shwe Ko, MOGE):</p> <p>1) For the emergency case, call ambulance in Kyauk San village supported by MOGE and Clinic in MPRL based camp is also available for medical services.</p> <p>(Daw Wit Hmone Tin Latt, CSR, MPRL E&P):</p> <p>1) We collect the comments from the post boxes every Thursday and solve all the problems at once and some within one week. 77 comments are already received and solved. All cases are recorded properly and anyone can request information from our CSR Field Team. So that I would like to encourage you to report, any concerns through Operational Grievance Mechanism (OGM).</p>

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
					2) We made connection with Minbu market after vocational training of Pigeon peas value-added food production. 3) In coming Fiscal Year, the market access vocational training will be arranged. 4) A workshop was held in Kyaung Taw Yar to analyze the benefit and weakness of our community capacity initiatives we have done with volunteers of villages around the Mann Field.
4.	9-1-2018	Lay Eain Tan, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	(Villager): Noise emission by the pulling unit while passing through the village road at night. (Villager): Dust emission by passing the cars through village road is our main problem. (Villager): Medical health care and a clinic are still required.	(U Nay Myo Aung, MPRL E&P): 1) Inform us with the detail information such as vehicle no., date and time passing through on the road at night. However, we have to use workover unit sometime at night when there is emergency operational requirement. (Daw Myat Mon Swe, ERM): 1) The main priority of your needs can be informed through Operational Grievance Mechanism (OGM) by MPRL E&P and provided to us we conduct interview with you, then organization can consider how to support on that.
5.	9-1-2018	Let Pa Taw, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	(Villager): 1) One shut-in well in northern village spilled in last 3 years and destroyed the soil fertility around this well. 2) A well near Khung Nyi Naung was leaked last year.	(U Soe Min, MOGE): 1) For the soil fertility, please contact to Land Use Division of Dept. of Agriculture.

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
				<p>(Villager):</p> <ol style="list-style-type: none"> 1) Acrid by over heat of rubber bund of pumping unit. 2) Some shut in well around the residential area of the village are still covered by soil and these are really dangerous for our lives. <p>(Villager):</p> <ol style="list-style-type: none"> 1) Is there any land slump by pumping oil from drill well? 	<p>(Daw Zin Mar Myint, CSR, MPRL E&P):</p> <ol style="list-style-type: none"> 1) We noted and will check for that. <p>(U Nay Myo Aung, MPRL E&P):</p> <ol style="list-style-type: none"> 2) Currently, all shut in wells have been identified and recorded and we will secure properly all as priority. 3) The depth of well is about 4500 ft and producing from tight and small reservoir. For some of the pumping wells, after pumping water which is equal to the amount of pumped oil were refilled into the well. However, land slump may happen in long term.
6.	10-1-2018	Nan U, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <ol style="list-style-type: none"> 1) Supply water in Concrete Tank supported by MOGE has more bicarbonate and it cannot be drink. 2) In addition, drinking water is insufficient because of the small water pipeline supported by MOGE. <p>(Villager):</p> <ol style="list-style-type: none"> 1) The water distribution pipes are too small. So that we want to know whether we can upgrade with large pipeline by ourselves or not. 	<p>(U Shwe Ko, MOGE):</p> <ol style="list-style-type: none"> 1) After testing of water quality quarterly a year, we found more bicarbonate than the WHO drinking water standard. Therefore, that MOGE announced not to use this water as drinking water. <p>(Daw Zin Mar Myint, CSR, MPRL E&P):</p> <ol style="list-style-type: none"> 1) We know that drinking water provided by the MOGE's water supply is insufficient. Sometime water supply is stopped and we should have to get water from the joint pipeline of other villages. Drinking water can

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
				2) If MOGE can support 8-9 rejected pipelines to reinstall, it will be sufficient for drinking water.	<p>be obtained at water tap at main gate of MPRL E&P while pipes are repairing.</p> <p>(U Soe Min, MOGE)</p> <p>1) All development plans has to be submitted to the Management Authority to add to the operation budget year by year. MOGE supports CSR programme to the related villages of Mann Field area. For the usage of rejected pipes for water transportation, the approval of Management Committee will have to be required. It is noted and will inform to the Management Committee.</p> <p>(Daw Myat Mon Swe, ERM)</p> <p>1) MPRL E&P can be informed on the main priority of your needs through Operational Grievance Mechanism (OGM) and you can also report this to us during our interview so that appropriate action can be considered.</p>
7.	10-1-2018	Auk Kyaung, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <p>1) By the production of brick for construction, one-acre of my 3 acres land became a burrow and use as waste pit since long ago. So please help to do the ground levelling to cultivate this land.</p> <p>(Villager):</p> <p>2) The building of irrigation project by MOGE at header 75 was occupied my land. It has not been used since</p>	<p>(U Shwe Ko, MOGE)</p> <p>1) Noted and I will submit to the authorized person of Mann Field.</p> <p>(U Shwe Ko, MOGE)</p> <p>2) Please submit a letter to the concerned department with your evidence that you own this land.</p>

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
				30 years. If MOGE does not use this area, I would like to get back this land or consider to give me land compensation.	
8.	10-1-2018	Let Pan Ta Pin, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <p>1) We have lack of electricity since August 2016 after hand over of District Electricity Department from MOGE though there is power transmission line.</p> <p>(Villager):</p> <p>1) We have shortage of drinking water in summer. The water pumped from tube well cannot be used directly for drinking. Though MPRL E&P donate one water-purified plant in school, drinking water is insufficient for all villagers. So that we want to ask MOGE to upgrade the water pipeline supported by MOGE.</p> <p>(Villager):</p> <p>1) An old well near the west of village main road was leaked last two days ago and we noticed that there is oil spill.</p>	<p>(U Shwe Ko, MOGE)</p> <p>1) All noted and we will submit in the report to Management authority.</p> <p>(Daw Myat Mon Swe, ERM)</p> <p>1) Drinking water supply is very important for human life. If the main water source has water shortage, it will be difficult to support the sufficient water. So that the rainfall collection lake has to be built to cover the water shortage in summer.</p> <p>(U Shwe Ko, MOGE)</p> <p>1) Please submit this requirement to have a lake for rainfall collection to MOGE through CSR program for next year 2018 budget.</p> <p>(Daw Zin Mar Myint, CSR, MPRL E&P)</p> <p>1) All shut-in well are being recorded and we will solve this problem as emergency requirement.</p>

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
9.	10-1-2018	Pauk Kone, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <p>1) 4-5 water pipe lines are crossing in my farm land. So that I want to have land compensation for this area crossing pipeline on the land.</p> <p>(Villager):</p> <p>1) Though the land compensation for GOCS(6) was applied since long time after issuing of Land Law in 2012, it is still pending.</p>	<p>(U Soe Min, MOGE)</p> <p>1) MOGE has two pipelines for oil and water transferring. The land and crop compensation was paid for the operation area to land owner. If there is not land acquisition or crop damage, MOGE do not pay any compensation.</p> <p>2) MOGE has already measured in Mann Oil filed and all landowners will have land compensation.</p>
10.	11-1-2018	Aye Mya, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villagers):</p> <p>1) Though we have sufficient drinking water, we face the problem of soil fertility by the wastewater discharge by oil production and crop production rate are very low now. So how to help us for the livelihood restoration?</p> <p>(Villager):</p> <p>1) Though the household are being expended, we have lack of land to cover the increased population. The village area is crowded, and village lanes are becoming narrow. Some pipelines are crossing the residential area and those old pipeline need to be removed.</p>	<p>(U Soe Min, MOGE)</p> <p>1) For the soil fertility, please contact to Land Use Division of Dept. of Agriculture.</p> <p>2) All pipelines are set up since long time before the village is founded and it is so difficult to remove and substitute. If the village is wanted to expend, please apply to the Township General Administration Department and inform parliament members who can solve this problem.</p>

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
11.	11-1-2018	Mae Bayt Kone, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(U Tin Maung Win, villager)</p> <p>1) There is crop damage by wastewater discharge in the eastern village.</p> <p>(U Tin Thaung, Villager)</p> <p>1) Due to the drilling operation, the top soils are damaged.</p> <p>2) Water pipelines at Header 75 are not used since 20 years and those pipelines are needed to take off.</p> <p>3) Refilling soil is needed for the old wastewater ponds.</p> <p>(U Soe Win, Village leader)</p> <p>1) All oil and water pipelines are crossing our lands and makes difficulty to cultivate.</p> <p>2) The old waste disposal pits in south of the village needed soil refilling to cultivate again in that area.</p> <p>3) All the building area which is not using should be given back to the land owner. The pension staffs are using that area for their private business.</p> <p>4) Most of the old wells were outburst with oil and discharged to the creek.</p>	<p>(U Soe Min, MOGE)</p> <p>1) With the EMP, the Mann Field operates systematically to reduce the impacts. We use water, mud and chemicals in drilling process and normally the wastewater is discharged to the surrounding of well. So we dig waste pit to discharge wastewater and covered with plastic sheet not to contaminate the soil. After drilling, the top soil is maintained as original by soil refilling and levelling.</p> <p>2) We recorded all comments and will submit to the head office of MOGE.</p>
12.	11-1-2018	Ywar Thar, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <p>1) There was wrong compensation payment to the wrong owner that was happened when MOGE gave the land compensation. Who will take the responsibilities?</p>	<p>(U Soe Min, MOGE)</p> <p>1) Agricultural Land Management and Statics Department managed the list for the land ownership and MOGE paid for the compensation as per the list.</p>

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
				<p>(Villager):</p> <p>1) We do not get the land compensation for drilling wells No.503 and 363.</p> <p>(Villager):</p> <p>1) There has an underground electric cable passing through in my farm near Well No (665) and worried that will be dangerous in raining. I would like to request to dig back of this cable and change in connection with the pole.</p> <p>(Villager):</p> <p>1) The 2" size of oil pipelines using for transfer of oil to GOCS crossing the farm land and it should be 1 to 1.5 feet underground so that the land can be cultivated.</p>	<p>2) The compensation for the old wells is being managed now and owners will get the land compensation soon.</p> <p>3) We will respond to this electric cable issue in time.</p> <p>4) Noted the comments related to burying the pipeline to the underground and we will submit this request to the authorized person of MOGE in Mann Oil Filed.</p>
13.	12-1-2018	Makyee Chaung, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <p>1) Who will take the responsibilities for the damage of the tree while passing the truck car on the village road?</p> <p>2) There are 2 new waste pits made in 2015 near GOCS. These are not using and the area of land for waste pits should be given back to owner.</p> <p>(Villager):</p>	<p>(U Nay Myo Aung, MPRL E&P):</p> <p>1) Please take note and informed that to MPRL E&P through OGM.</p> <p>(U Soe Min, MOGE)</p> <p>1) In Mann Field area, there are 20 waste pits. We will give back some area of land with soil refilling by the instruction of MOGE head</p>

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
				<p>1) What is CSR? In CSR training, is there has any training for cultivation of alternative crops?</p> <p>(Villager):</p> <p>1) 4 water pipes and 10 “gas pipe are crossing in our 30 acres land near the labor camp (1, 2 3, 4) and we would like to know whether we can get the compensation?</p>	<p>office. Though we discharge the wastewater to the old well, we need to reserve waste pits if there is not enough space in old well and those areas could not be given back.</p> <p>(Daw Wit Hmone Tin Latt, CSR MPRL E&P)</p> <p>1) CSR is business approach to contribute the sustainability development by delivering economic, social and environmental benefits by project owner. We have the plan for agricultural training in next budget year.</p> <p>(U Soe Min, MOGE)</p> <p>1) There is no compensation for the pipelines crossing the land.</p>
14.	12-1-2018	Kyar Kan, Village Chapel	MOGE, MPRL E&P, ERM, GAD, CSRs, Villagers	<p>(Villager):</p> <p>1) MOGE let MPRL E&P construct the labour camp on our farmland in Pauk Kone AD-2. However, after closing the operation, our land has not yet given back. So that we submitted that case to the respective departments of Land Management and Statistical Department, GAD and MOGE, but not yet replied up to now.</p> <p>(Villagers)</p> <p>1) Because of the insufficient water from the existing tube well supported by MOGE, we want to change to a new compressor for more water supply.</p>	<p>(U Soe Min, MOGE)</p> <p>1) MPRL E&P has already given back to MOGE this area. Please submit the letter with evidence of land ownership to the relevant departments and parliament members</p> <p>(Daw Wit Hmone Tin Latt, CSR MPRL E&P)</p> <p>1) If you will need to change a pump motor, please request to our CSR team during community needs assessment and we will serve and consider what is needed in priority</p>

No.	Date	Meeting Venue	Attendees	Suggestion/Comment	Response
					for the village by the meeting with local village leader, GAD, MOGE and departments.

Figure 9.4 Photos from the Consultation Meetings Undertaken for the EIA Process





4) Lay Eain Tan village



5) Lat Pan Taw village



6) Nan Oo village



7) Auak Kyaung village



8) Lat Pan Ta Pin village



9) Pauk Kone village



10) Aye Mya village



11) Mei Bayt Kone village



12) Ywar Thar village



13) Makyee Chaung village



14) Kyar Kan village



15) MOGE, Mann Field GM Office



16) MOGE, Mann Field Meeting Hall

MPRL E&P acknowledges the importance of engagement and buy-in from all its stakeholders. Disclosing information and providing platforms to promote 2-way communication are important factors to building a partnership.

MPRL E&P believes:

- An effective feedback mechanism is a safe, effective, and proactive process that receives complaints and/or concerns associated with the company's operations.
- Stakeholders are provided with a constructive opportunity to develop a partnership with MPRL E&P by working together to minimize risk and address concerns.
- Concerns received can be resolved in a timely manner with all primary stakeholders within a confidential space. The views of each complainant are respected and not discriminated against.

MPRL E&P has developed a multi-stakeholder approach to designing an Operational Grievance Mechanism (OGM), reflecting IFC standards, in the Mann Field (*Figure 9.5*). This is the very first mechanism that has been facilitated and managed by both the host community and MOGE. Best practices from the Mann Field Grievance Mechanism (MFGM) is leveraged and used across assets operated by MPRL E&P.

Figure 9.5 *MPRL E&P Operational Grievance Mechanism*

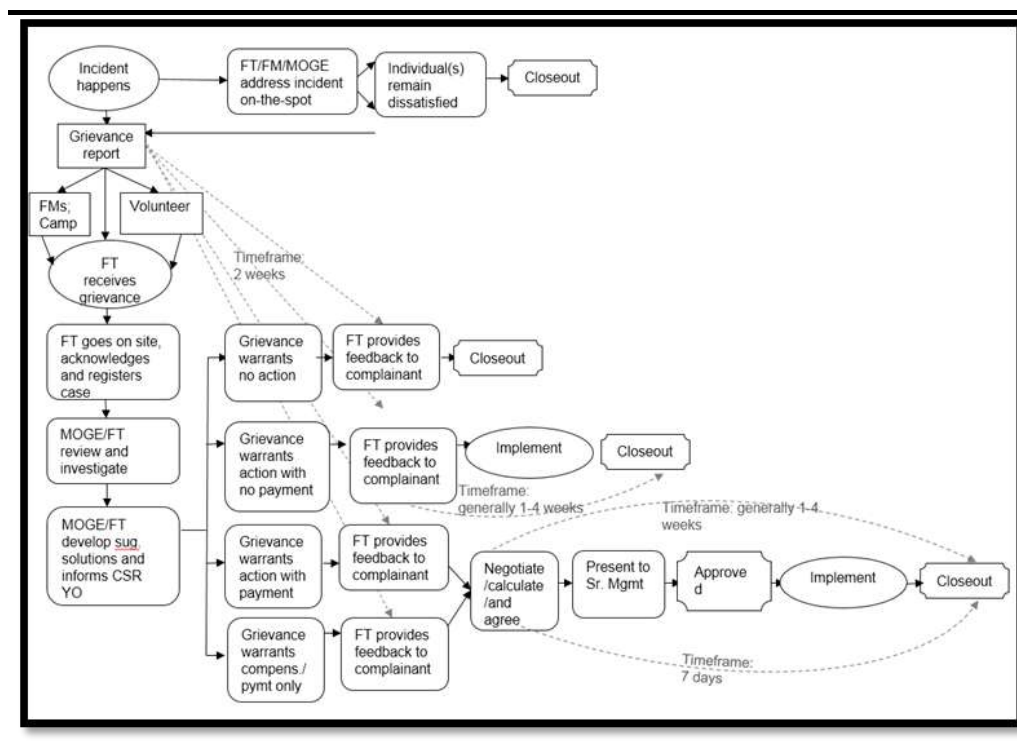


Figure 9.6 MPRL E&P Operational Grievance Mechanism Pamphlets



MPRL E&P works closely with the operator of Mann Field, MOGE, providing advice, support and guidance. The objective of the MFGM is to enable local communities to have a voice and to ensure impact associated with operations affecting the environment and surrounding communities are solicited, monitored, and effectively addressed.

MPRL E&P consider this to be essential in order to maintain a social license to operate in Mann Field. The MFGM enables stakeholders to voice their concerns directly to the company first, instead of turning to third parties, and enables the company to respond to their concerns early before they escalate.

The MFGM began in pilot phase with 3 out of the 14 communities in Mann Field in April 2014, with a full roll out to the remaining communities in August 2014. During this time training was provided to local community volunteers, community meetings were held, information boards erected, and informational cartoon distributed to improve awareness. Grievance collection boxes were placed in strategic locations such as village intersections with high foot traffic. The Mann Field Grievance Progress Update report is published quarterly and concerns and complaints have been recorded and disclosed on the company website.

Designing a mechanism facilitated by community volunteers has proven to be successful as trust is immediately captured. In addition, strengthening the capacity of volunteers has led to improved decision making and empowerment.

During the last quarter of fiscal year 2016-2017, MPRL E&P launched a three-phase campaign to raise awareness about its Operational Grievance Mechanism for selected target community groups in Mann Field with the aim of promoting their interest, awareness and confidence in the process. The campaign was based on the results of knowledge, attitude and practice (KAP) survey that had been conducted in 2015 to establish a baseline level of community knowledge, attitudes and practices.

In Mann Field, MPRL E&P conducts quarterly coordination meeting with MOGE to establish a proper coordination channel and construct a rapport between MOGE and MPRL E&P as well as to identify the gaps and challenges amongst MOGE, MPRL E&P and the communities. CSR Performance Review Workshops with MOGE, District and Township Authorities and the communities have been conducted quarterly in Mann Field and in Nay Pyi Taw. Starting from this fiscal year, review meeting will be held bi-annually in Nay Pyi Taw.

MPRL E&P addresses potential socio-economic impacts flagged during ESIA public consultations in Mann Field in January 2018. It is structured in four main parts, representing the four key focus areas: Community Partnership and Investment; Community Capacity Building; Stakeholder Relations and Communications. An Operational Grievance Mechanism (OGM) is included in the social management plan. Details are presented in *Table 9.3*.

9.5

FUTURE ONGOING CONSULTATIONS AND DISCLOSURE

MPRL E&P intends to disclose all environmental related policies, reporting of EIA and/or SIA assessments and results which are recognized by a consensus of relevant stakeholders including, but not limited to, government representatives, international non-governmental organizations (INGOs) and local non-government organizations (NGOs), civil society organizations (CSOs), and host communities.

In the Mann Field, MPRL E&P conducts monthly coordination meeting with MOGE to establish a proper coordination channel and construct a rapport between MOGE and MPRL E&P as well as to know the gaps and challenges among MOGE, MPRL E&P and Communities. Community Investment Review Workshops with MOGE, Township Authorities and Communities have been conducted quarterly. The Mann Field CSR progress report submitted monthly to MOGE provides an overview of MPRL E&P's CSR approach including a progress update of activities planned for the fiscal year. The intent of the report is to strengthen alignment and communication

between MPRL E&P and MOGE to prevent overlap and maximize impact at the field level.

Stakeholder consultation is a continual process over the life of a Project. MPRL E&P will continue to engage with and disclose information to stakeholders during the development of the Project. Consultation meetings will be conducted in 16 villages which are included in the Mann Oil to:

- Provide progress update to key Project stakeholders,
- Inform Project stakeholders about MPRL E&P,
- Understand the concerns of local community on the Project,
- Communicate to stakeholders about CSR and its programs, and
- Provide regular progress updates on the monitoring, ESIA, CSR programmes, and development of the Project activities.

MPRL E&P will disclose the EIA Report in local newspapers and on their website and copies will be distributed to public meeting places and at the MPRL E&P office in Yangon.

Table 9.3 *MPRL E&P Action Plan to address Community Concern raised during the EIA Consultation.*

Community Partnership and Investment					
Potential Impacts			Affected Population		
Access to drinking water throughout the year - Insufficient supply of drinking water			Nan U Village		
Stakeholders	Action	Responsibility	Timing	Performance Indicator	Review Mechanism
Nan U Communities	Explore opportunities with MOGE GM (Mann) to enhance investment and partnerships as well as community engagement in relation to Nan U village's request	MOGE (Mann)	Ongoing	Meeting held with MOGE GM (Mann)	Department Annual Report Reflection workshop on Community Investment (CI) initiatives
Community Capacity Building					
Potential Impacts			Affected Population		
Training on market access information for vocational trainees			Vocational trainees from surrounding communities of Mann Field		
Insufficient health care facilities in the villages			Chin Taung, Kywe Cha, Lay Eain Tan villages		
Training for cultivation of alternative crops			Farming communities in Mann Field		
Stakeholders	Action	Responsibility	Timing	Performance Indicator	Review Mechanism

Vocational trainees from surrounding communities of Mann Field	A three-day training on "Generate Your Business Idea (GYB) and Start Your Business (SYB)", part of the Start and Improve Your Business (SIYB) training package developed by the ILO, run by Certified SIYB trainer, provided to former vocational trainees in order to help them generate business idea and enable access to markets	MPRL E&P	Completed	Training attendance Number of trainees	Department Annual Report Feature news article in the State-run media News posted on social media
Chin Taung, Kywe Cha, Lay Eain Tan communities	MPRL E&P will implement a Mobile Clinic pilot project in FY 2018-2019 to provide an extra health care assistance	MPRL E&P, in collaboration with Department of Health (MoH), Minbu	To be implemented in September	Mobile Clinic stations (3~4 locations)	Department Annual Report Feature news article in the State-run media News posted on social media

Farming communities in Mann Field	Knowledge on agricultural production using the GAP system, systematic use of soil, chemical fertilizers, natural fertilizers and pesticides, selecting region-suited seeds, and good agricultural practices was shared and discussed between experts and community members. In addition, informational and educational materials on agriculture were distributed to the 191 farmers who attended the training	MPRL E&P, in collaboration with Department of Agriculture (DoA), Minbu	Completed	<p>4 sessions conducted in April and May 2018. 191 farmers attended the sessions.</p> <p>Mann Field's farming communities have gone on a field trip to demonstration farms on the Good Agricultural Practices (GAP) in Minbu (Sagu). Visit township on 25th July as a follow-up activity of the recent agricultural knowledge-sharing sessions in March and April.</p> <p>During the field trip, the farmers studied the use of gypsum, comparison of wet season peanut seeds, and 5-acre wet season sesame plantation. They also gained knowledge</p>	<p>Department Annual Report</p> <p>Feature news article in the State-run media</p> <p>News posted on social media</p>
Stakeholder Relations					
Potential Impacts			Affected Population		
Insufficient water from the existing tube well supported by MOGE – Request to change to a new compressor for more water supply			Kyar Kan village		

Stakeholders	Action	Responsibility	Timing	Performance Indicator	Review Mechanism
Kyar Kan village	Advised community members to make a proper request during community needs assessment where we will serve and consider what is needed in priority for the village by the meeting with local village leader, GAD, MOGE and Heads of Departments	MOGE/ MPRL E&P	Completed	Upon MOGE approval, to be included Next fiscal year budget <i>(feasibility study required)</i>	Community needs assessment process for FY 2019-2020 Reflection workshop on Community Investment (CI) initiatives
Communications					
Potential Impacts			Affected Population		
Informing community needs through Operational Grievance Mechanism (OGM)			Surrounding communities of Mann Field		
Stakeholders	Action	Responsibility	Timing	Performance Indicator	Review Mechanism

Surrounding communities of Mann Field	<p>A safe and secure system provided that effectively receives complaints/ concerns associated with our operations</p> <p>Information sessions on the OGM have been provided by CSR Field Team and Community Volunteers to Mann Field Communities</p> <p>OGM Documentary video produced and aired on MRTV and published on social media</p> <p>Article on OGM featured in the State-run Media</p>	MPRL E&P	<p>Implemented and Promoted</p> <p>Monthly sessions scheduled</p> <p>Completed</p> <p>Completed</p>	<p>% of complainants satisfied with the OGM process</p> <p>% increase in the level of trust</p> <p>% increase in the number of respondents/ complainants utilize the mechanism effectively</p> <p>No. of information sessions</p>	<p>Department Annual Report</p> <p>Quarterly Mann Field OGM Progress Update</p>
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MPRL E&P is spending two percent (2%) of net profit on CSR initiatives. The following section describes MPRL E&P's CSR Programme. Details on MPRL E&P CSR initiative is provided in *Annex J* as well as on the MPRL E&P website here:

<http://mprlexp.com/csr/community/>

Sustainability at MPRL E&P is understood as meeting the needs of the present generation without compromising the ability of the next generation to meet their own needs. Taking responsibility for the way our operations impact societies and the natural environment shapes and influences the type of practices that is initiated within the organization. Frameworks, rules, and business models have been re-shaped to take into account global trends and remain committed to financial obligations that deliver both public and private benefits.

MPRL E&P is a responsible leader that is concerned with reconciling and aligning demands, needs, interests, and values of employees, suppliers, communities, nongovernmental organizations (NGOs), the environment, and society at large.

Our strategic corporate social responsibility (CSR) strategy is used as an instrument to facilitate our journey of addressing social, environmental and economic challenges that impact the business and areas we operate in. The management framework employed is influenced by the following principles:

- Accountability
- Partnering with Stakeholders
- Leadership Capability and Competencies

We recognize the importance of developing a CSR strategy and culture that goes beyond legal compliance and liability of individuals. Our innovative approach to CSR enables MPRL E&P to effectively build relationships with key stakeholders and address sustainability issues together.

The Mann Field Project Report prepared and submitted monthly to MOEE and MOGE provides an overview of MPRL E&P's CSR approach including a progress update of activities planned for the fiscal year. The intent of the report is to strengthen alignment and communication between MPRL E&P and MOGE to prevent overlap and maximize impact at the field level.

The Company will, at a minimum publish the annual Corporate Social Responsibility and Social Management Report and ensure the same information is made available on the Company's website. MPRL E&P also

provides regular updates on CSR Performance Progress at its scheduled meetings with governments, local authorities and the community.

MPRL E&P publishes its social investments and CSR initiatives on social media pages mainly due to the fact that general public in host country uses social media more than website. MPRL E&P's CSR initiatives are posted at the following social media:

<https://www.facebook.com/mprlep>

https://www.youtube.com/channel/UCTVFamsBBC_-dZo4wAMxlNw

Figure 9.7a CSR Work Programme for FY 2018-2019

ဘဏ္ဍာနှစ် (၂၀၁၈-၂၀၁၉) အတွင်း မနန်းရေနံမြေ လူမှုအသိုက်အဝန်းအတွက် ပံ့ပိုးမှုများ

MPRL E&P Pte Ltd.

စဉ်	လုပ်ငန်းလုပ်ဆောင်မှုများ	၁	၂	၃	၄	၅	၆	၇	၈	၉	၁၀	၁၁	၁၂	၁၃	၁၄	၁၅	၁၆	၁၇
		လက်ဝဲတော	ဝေါက်ကုန်း	မကျည်းချောင်း	လေးဆိပ်တန်း	အောက်ကျောင်း	အေးမြ	မယ်သွေကုန်း	လက်ဝဲတောင်	မနန်းကျိုး	ကျွဲချ	ချပ်တောင်	နန်းဦး	ကြာကန်	ရွာသာ	ကျောက်ခဲ	ကြုံဆိပ်တန်း	ဆိပ်ယာကျောင်း
၁	ကျောင်းခြံစည်းရုံး	✓	✓	✓														
၂	KG ကျောင်းဆောင် ပြုပြင်မွမ်းမံခြင်း									✓								
၃	ကျောင်းပရိဘောဂ (စားပွဲ ၃ ဇုံ၊ စာသင်ခုံ ၁၅ ဇုံ)			✓														
၄	မီးသတ်ရေးလှိုင်း				✓													
၅	ရေကျော် (ရွာအရှေ့ပိုင်း)					✓												
၆	မီးသတ်ရေးကန် (၁) ကန် (ရွာအနောက်ပိုင်း)						✓											
၇	ရေကျော်							✓										
၈	ရေသိုလှောင်ကန် (ကျောင်း)								✓									
၉	အသက်မွေးဝမ်းကျောင်းဆိုင်ရာ သင်တန်း (၅) နှစ်	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
၁၀	စိုက်ပျိုးရေးနည်းပညာ သင်တန်း (၃) နှစ်	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
၁၁	ကျေးရွာဖွံ့ဖြိုးရေးကော်မတီနှင့် စေတနာ့သန်တမ်းများ အတွက် စွမ်းဆောင်ရည်မြှင့်သင်တန်း	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
၁၂	အကြံပြုဆွေးနွေးခြင်းကဏ္ဍ မြှင့်တင်ရေး အစီအစဉ်	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
၁၃	လက်ဆေးစင်ဆောက်လုပ်ခြင်း (စာသင်ကျောင်းများတွင် တကိုယ်ရေသန့်ရှင်းမှု မြှင့်တင်ခြင်း)	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓	✓			✓
၁၄	Mobile ဆေးခန်း ကျန်းမာရေးဝန်ဆောင်မှု	Pilot Project အနေဖြင့် ကျေးရွာ ၃-၄ ရွာနှင့် စတင်စောင့်ရှောက်မှုပေးခြင်း																

Figure 9.7b CSR Work Programme for FY 2018-2019

ဘဏ္ဍာနှစ် (၂၀၁၈-၂၀၁၉) အတွက် စွမ်းဆောင်ရည်မြှင့်တင်ခြင်း သင်တန်းစာရင်း			
		 MPRL E&P Pte. Ltd.	
စဉ်	သင်တန်းအမျိုးအစား	Target group	နည်းပြသင်တန်းဆရာ
၁	လူမှုအသိုက်အဝန်း၊ ပုံမှန်မှုနှင့် ဖွံ့ဖြိုးတိုးတက်မှုဆိုင်ရာ အသိပညာပေးသင်တန်း	ကျေးရွာဖွံ့ဖြိုးရေးကော်မတီနှင့် စေတနာ့ဝန်ထမ်းများ	ရုံးတွင်း၊ သင်တန်းဆရာ
၂	ခေါင်းဆောင်မှုနှင့် စီမံအုပ်ချုပ်ခြင်း	ကျေးရွာဖွံ့ဖြိုးရေးကော်မတီနှင့် စေတနာ့ဝန်ထမ်းများ	ရုံးတွင်း၊ သင်တန်းဆရာ
၃	စာရင်းကိုင် အတတ်ပညာ	ကျေးရွာဖွံ့ဖြိုးရေးကော်မတီနှင့် စေတနာ့ဝန်ထမ်းများ	ရုံးတွင်း၊ သင်တန်းဆရာ
၄	လူမှုအသိုက်အဝန်း၊ လိုအပ်ချက်စစ်တမ်းကောက်ယူသည့် Tools နှင့် နည်းလမ်းများ	ကျေးရွာဖွံ့ဖြိုးရေးကော်မတီနှင့် စေတနာ့ဝန်ထမ်းများ	ရုံးတွင်း၊ သင်တန်းဆရာ
၅	လူထုစည်းရုံးလှုံ့ဆော်ခြင်း	ကျေးရွာဖွံ့ဖြိုးရေးကော်မတီနှင့် စေတနာ့ဝန်ထမ်းများ	ရုံးတွင်း၊ သင်တန်းဆရာ
၆	လူထုဆက်ဆံရေးစွမ်းရည်	ကျေးရွာဖွံ့ဖြိုးရေးကော်မတီနှင့် စေတနာ့ဝန်ထမ်းများ	ရုံးတွင်း၊ သင်တန်းဆရာ
၇	ကျေးရွာဖွံ့ဖြိုးမှုကော်မတီ အားကောင်းတိုးတက်လာစေရန် သင်တန်း (ဆရာဖြစ်သင်တန်းပေးခြင်း)	ကွင်းဆင်းဝန်ထမ်းများနှင့် စေတနာ့ဝန်ထမ်းများ	ပြင်ပ သင်တန်းဆရာ
၈	လုပ်ငန်းတစ်ခု စတင်ပြီး တိုးချဲ့လုပ်ဆောင်ခြင်း (SIVB - အဆင့်ဆင့် သင်တန်း ပုံစံ)၊ စီးပွားလုပ်ငန်းတစ်ခုအတွက် စတင်စဉ်းစားခြင်း၊ အရောင်းမြှင့်တင်ခြင်း၊ ဝယ်ယူခြင်း၊ ကုန်စည် သိုလှောင်သိမ်းဆည်းခြင်း၊ စနစ်၊ ကုန်ကျစရိတ်တွက်ခြင်း၊ စာရင်းပြုစုခြင်း၊ လုပ်ငန်းစီးပွား၊ ဝန်ထမ်းများနှင့် ထုတ်ကုန်များအတွက် ကြိုတင် အစီအစဉ်ပြုလုပ်ခြင်း။	သက်မွေးဝမ်းကျောင်းသင်တန်း တက်ရောက်ထားသော သင်တန်းသား/သူများ	ပြင်ပ သင်တန်းဆရာ
၉	သက်မွေးဝမ်းကျောင်းသင်တန်းသားများအား အသိဉာဏ်သစ်လောင်း အစည်းအဝေး/သင်တန်းများ ၃ လ တစ်ကြိမ်ပေးခြင်း	သက်မွေးဝမ်းကျောင်းသင်တန်း တက်ရောက်ထားသော သင်တန်းသား/သူများ	ရုံးတွင်းနှင့် ပြင်ပသင်တန်းဆရာ
၁၀	တောင်သူအသိပညာမြှင့်တင်ခြင်း၊ အလုပ်ရုံဆွေးနွေးပွဲ	အသေခံနယ်မြေ ၁၇ ခုမှ တောင်သူများ	ပြင်ပသင်တန်းဆရာ - မြို့နယ်စိုက်ပျိုးရေးဌာန
၁၁	မင်းဘူးမြို့နယ်အနီးတဝိုက်ရှိ စံပြစိုက်ကွင်းများသို့ တောင်သူများအား အမြင်ခွင့် ကွင်းဆင်းလေ့လာစေခြင်း	အသေခံနယ်မြေ ၁၇ ခုမှ တောင်သူများ	ပြင်ပသင်တန်းဆရာ - မြို့နယ်စိုက်ပျိုးရေးဌာန

9.6.1

Strategy

All MPRL E&P community investment and development projects must be strategic in that they address risk and impact resulting from our operations and have a rational basis for investment. Key methods such as continuous community consultation, stakeholder engagement, and identification of social impact and community needs help guide our business decisions and enable us to proactively address any community concerns. Outcome and impacts of all social investments are measured to indicate significant change.

9.6.2

Management Framework

Human rights, environmental management, communication, as well as community investment and development inform MPRL E&P's social management system. MPRL E&P's Community Investment Policy, CSR Policy, and Human Rights Policy influence how we engage with communities and people. The policies are consistent with internationally recognized International Finance Corporate Performance Standards on Environmental and Social Sustainability and United Nations Global Compact Principles.

The system provides for a focus on 'needs assessments and baseline' to gather the community's opinions, necessities, challenges, and assets in order to determine the real needs of the community.

9.6.3

Strategic Community Investment

MPRL E&P recognizes that strategic community investment projects should provide value for the company and impact the community positively. As a result, MPRL E&P aims to contribute to the sustainable development and improved livelihoods of communities where we operate through active engagement and regular dialogue. This approach reduces risks, provides a social license to operate, and most importantly delivers business value for MPRL E&P. Our business objectives for community investment include building relationships and enabling employee engagement.

To support this approach, MPRL E&P encourages surrounding communities to participate in, and contribute to, the various discussions to address community needs where we operate. 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, capacity development, and vocational training)
- Improving well-being (improve access to water, sanitation, hygiene, health, nutrition, and safety culture)

- Partnerships with local groups

MPRL E&P have spent two percent (2%) of net profit on CSR initiatives. A large proportion of the funds have been spent on strategic community investments. This includes, but is not limited to improving access to safe drinking water, vocational training support, building school fencing for creating a safe learning environment, community capacity building initiatives etc. The onus is on MPRL E&P to do more high-impact activities to bring in social change. This is built into the DNA of the Company. MPRL E&P commits and supports towards the 17 United Nations Sustainable Development Goals by aligning our strategies and initiatives with these goals where applicable.

Figure 9.8 *Example Photos of MPRL E&P CSR Activities - Further can be found at <http://mprlexp.com/csr/community/>*



Annex A

Plant Species Recorded within the Study Area

Annex A **List of Plant Species Recorded within the Study Area**

Species Name	Family Name	Growth Form *	IUCN Red List	Shrubland	Agricultural land	Developed area
<i>Anogeissud avuminata</i> Wall.	Combretaceae	T	LR	Y	Y	Y
<i>Abutilon hirsuta</i> Nees.	Graminae	G	LR		Y	
<i>Abutilon indicum</i> (L.) Sweet.	Malvaceae	H	LR	Y	Y	
<i>Acacia carechu</i> Willd. (1)	Mimosaceae	T	LR	Y	Y	Y
<i>Acacia Chundra</i>	Mimosaceae	ST	LR	Y	Y	Y
<i>Acacia leucophloea</i> (Roxb) Willd	Mimosaceae	T	LR	Y	Y	Y
<i>Albiza lebbek</i> (L.) Benth.	Mimosaceae	T	LR	Y	Y	Y
<i>Andrapogan brevifolius</i> L.	Poaceae	G	LR	Y		
<i>Andropogon fastigiatus</i> Sw.	Poaceae	G	LR		Y	
<i>Azadirachta indica</i> A.Juss	Meliaceae	T	LR	Y	Y	Y
<i>Bombax ceiba</i> L.	Bombacaceae	T	LR	Y	Y	Y
<i>Borassus flabellifer</i> Linn	Palmae	T	LR		Y	Y
<i>Capparis xanthophylla</i> Collett&Hemsl.	Capparaceae	CI	LR	Y		
<i>Capsicum annuum</i> L	Solanaceae	H	LR		Y	
<i>Carcia papaya</i> L.	Caricaceae	T	LR		Y	Y
<i>Cardiospermum corindum</i> L	Sapindaceae	CI	LR	Y	Y	Y
<i>Cassia mimosoides</i> L.	Caesalpiniceae	T	LR	Y	Y	Y
<i>Chromolaena odorata</i> (L.) R.M. King & H.	Asteraceae	H	LR		Y	
<i>Cocculus villosus</i> DC.	Menispermaceae	CI	LR	Y		
<i>Cocos nucifera</i> Linn	Palmae	T	LR		Y	Y
<i>Crossipes</i> Solms	Pontederiaceae	T	LR	Y	Y	Y
<i>Cynodon dactylon</i> (L.)	Graminae	G	LR		Y	
<i>D. longispathus</i> Kurz	Graminae	G	LR	Y	Y	Y

Species Name	Family Name	Growth Form *	IUCN Red List	Shrubland	Agricultural land	Developed area
<i>D.Indica Spreng D.malabarica L. Merr.</i>	Graminae	G	LR		Y	
<i>Decaspermum parviflorum (Lam.) A.J. Scott</i>	Myrtaceae	T	LR	Y	Y	Y
<i>Delonix regia (Bojer ex Hook.)Raf.</i>	Caesalpiniceae	T	LR	Y	Y	Y
<i>Dendrocalamus giganteus Munro.</i>	Graminae	G	LR	Y	Y	Y
<i>Eragrostis bifaria Wt.ex Steud.</i>	Graminae	G	LR		Y	
<i>Eucalyptus camaldulensis Dehnh.</i>	Myrtaceae	T	LR	Y	Y	Y
<i>Ficus religiosa Linn.</i>	Moraceae	T	LR	Y	Y	Y
<i>Hyptis suaveolens (L.) Poit</i>	Lamiaceae	H	LR	Y	Y	
<i>Jatropha gossypifolia L.</i>	Euphorbiaceae	H	LR	Y	Y	Y
<i>Lagenaria siceraria (Molina) Standl.</i>	Cucurbitaceae	CI	LR		Y	
<i>Lebbek Benth</i>	Mimosaceae	T	LR		Y	Y
<i>Leucaena leucocephala (Lam.) De Wit</i>	Mimosaceae	T	LR	Y		
<i>Mangifera indica L.</i>	Anacardiaceae	T	LR		Y	Y
<i>Mimosa pudica L.</i>	Mimosaceae	H	LR		Y	Y
<i>Moringa oleifera Lamk</i>	Moringaceae	T	LR		Y	Y
<i>Musa sapientum L.</i>	Musaceae	H	LR		Y	Y
<i>Oryza sativa L.</i>	Poaceae	G	LR		Y	
<i>Ottlochloa nodosa (Kunth) Dandy</i>	Poaceae	G	LR		Y	
<i>Panicum stagninum Retz.</i>	Graminae	G	LR		Y	
<i>Piper attenuatum Buch.-Ham.</i>	Piperaceae	T	LR	Y	Y	Y
<i>Pithecellobium dulce (Roxb.) Benth.</i>	Mimosaceae	T	LR	Y	Y	Y
<i>Plumeria rubra L.</i>	Apocynaceae	T	LR		Y	Y
<i>Pupalia lappacea Moq.</i>	Amaranthaceae	S	LR	Y	Y	Y
<i>Saccharum spontaneum L.</i>	Poaceae	G	LR		Y	
<i>Samanea saman (Jacq.) Merr.h</i>	Fabaceae	T	LR	Y		
<i>Sesamum indicum (L.) DC.</i>	Pedaliaceae	H	LR		Y	

Species Name	Family Name	Growth Form *	IUCN Red List	Shrubland	Agricultural land	Developed area
<i>Solanum virginanum L.</i>	Solanaceae	H	LR		Y	
<i>Spondias mangifera Willd.</i>	Anacardiaceae	T	LR	Y	Y	Y
<i>Stipa caricosus L.</i>	Graminae	G	LR		Y	
<i>Streblus asper Lour.</i>	Moraceae	T	LR	Y	Y	Y
<i>Tamarindus indica L.</i>	Caesalpiniceae	T	LR	Y	Y	Y
<i>Tectona grandis L.f.</i>	Verbenaceae	T	LR	Y	Y	Y
<i>Terminalia bellerica Roxb.</i>	Combretaceae	T	LR	Y	Y	Y
<i>Terminalia chebula Retz.</i>	Combretaceae	T	LR	Y		
<i>Terminalia pyrifolia Kz</i>	Combretaceae	T	LR	Y	Y	Y
<i>Zea mays L.</i>	Poaceae	H	LR		Y	
<i>Zizyphus jujuba lamk</i>	Rhamnaceae	T	LR	Y	Y	Y

* Note:

Growth form: T = Tree; G = Grass; H = Herb; Cl = Climber; ST = Short Tree

Annex B

Bird Species Recorded within the Study Area

Annex B Full List of Bird Species Recorded within the Study Area in May2015

No.	Scientific Name	Common Name(s)	Family	IUCN status	Shrubland	Developed Area	Agricultural Land
1	<i>Acridotheres burmannicus</i>	Vinous-breasted Myna	PYCNONTIDAE	Least concern		v	
2	<i>Acridotheres fuscus</i>	Jungle Myna	PYCNONTIDAE	Least concern		v	
3	<i>Acridotheres tristis</i>	Common Myna	SAXICOLIDAE	Least concern		v	v
4	<i>Aegithina tiphia</i>	Common Iora	AEGITHININAE	Least concern	v		
5	<i>Amaurionis phoenicurus</i>	White-breasted Waterhen	RALLIDAE	Least concern		v	
6	<i>Anasiomus oscitans</i>	Asian Openbill	CICONIIDAE	Least concern	v		
7	<i>Ardea alba</i>	Little Egret	CICONIIDAE	Least concern	v		v
8	<i>Ardeola bacchus</i>	Chinese pond-heron	CICONIIDAE	Least concern	v		
9	<i>Ardeola grayii</i>	Indian pond-heron	CICONIIDAE	Least concern	v		
10	<i>Buteo buteo</i>	Common Buzzard	ACCIPITRIDAE	Least concern	v		
11	<i>Centropus sinensis</i>	Greater Coucal	CENTROPADIDAE	Least concern		v	
12	<i>Cisticola juncidis</i>	Zitting Cisticola	CISTICOLIDAE	Least concern	v		
13	<i>Columba livia</i>	Rock Pigeon	COLUMBIDAE	Least concern	v		v
14	<i>Copsychus saularis</i>	Oriental Magpie-Robin	SAXICOLIDAE	Least concern		v	v
15	<i>Coracias benghalensis</i>	Indian roller	CORACIIDAE	Least concern	v		
16	<i>Corurnix coturnix</i>	Common Quail	PHASIANIDAE	Least concern	v		
17	<i>Corvus Levallantii</i>	Eastern jungle crow	DICRURINAE	Least concern		v	
18	<i>Corvus splendens</i>	House Crow	CORVINAE	Least concern	v		

No.	Scientific Name	Common Name(s)	Family	IUCN status	Shrubland	Developed Area	Agricultural Land
19	<i>Egretta gazetta</i>	Eastern Cattle Egret	ARDEIDAE	Least concern		v	
20	<i>Fringilla monticola</i>	Chinese francolin	PHASIANIDAE	Least concern	v		
21	<i>Halcyon smyrnensis</i>	White- throated Kingfisher	HALCYONIDAE	Least concern	v		
22	<i>Lanius cristatus</i>	Brown Shrike	LANIIDAE	Least concern	v		
23	<i>Lonchura punctulata</i>	Scaly-breasted Munia	ESTRILDINAE	Least concern	v		v
24	<i>Merops orientalis</i>	Little green bee-eater	MEROPIDAE	Least concern	v		v
25	<i>Merops philippinus</i>	Blue-tailed Bee-eater	MEROPIDAE	Least concern	v	v	
26	<i>Metopidius indicus</i>	Spotted Dove	ARDEIDAE	Least concern	v	v	v
27	<i>Milvus migrans</i>	Black kite	ACCIPITRIDAE	Least concern	v		
28	<i>Mirafra erythrocephala</i>	Burmese bushlark	ALAUDIDAE	LR (Endemic)		v	
29	<i>Motacilla alba</i>	White Wagtail	MOTACILLINAE	Least concern	v		
30	<i>Orthotomus sutorius</i>	Common Tailorbird	SYLVIIDAE	Least concern		v	v
31	<i>Passer domesticus</i>	House Sparrow	PASSERIDAE	Least concern	v		v
32	<i>Passer montanus</i>	Eurasian Tree-sparrow	PASSERIDAE	Least concern	v		v
33	<i>Phalacrocorax niger</i>	Little Cormorant	PHALACROCORACIDAE	Least concern		v	
34	<i>Prinia flaxiventris</i>	Plain prinia	CISTICOLIDAE	Least concern	v		
35	<i>Pyconotus blanfordi</i>	Streak-eared Bul Bul	SAXICOLIDAE	Least concern	v		v
36	<i>Pyconotus cafer</i>	Red-Vented Bul Bul	SAXICOLIDAE	Least concern	v		v
37	<i>Pyconotus jocosus</i>	Red-Whiskered Bul Bul	PYCNONTIDAE	Least concern		v	
38	<i>Saxicola caprata</i>	Pie bushchat	MUSCICAPIDAE	Least concern	v		v

No.	Scientific Name	Common Name(s)	Family	IUCN status	Shrubland	Developed Area	Agricultural Land
39	<i>Saxicola maura</i>	Siberian Stonechat	SAXICOLIDAE	Least concern	v		
40	<i>Streptopelia orientalis</i>	Oriental Turtle Dove	COLUMBIDAE	Least concern	v		
41	<i>Streptopelia tranquebarica</i>	Red-Collared Dove	RALLIDAE	Least concern		v	
42	<i>Sturnus contra</i>	Asian Pied Starling	STURNIDAE	Least concern	v		
43	<i>Threskiornis melanocephalus</i>	Black -headed Ibis	THRESKIORNITHIDAE	Near Threatened	v		
44	<i>Turdoides gularis</i>	White- throated Babbler	SYLVINAE	Endemic	v		
45	<i>Vanellus indicus</i>	Red-wattled Lapwing	CHARADRIINAE	Least concern	v		

Annex C

Herpetofauna Species
Recorded within the Study
Area

Annex C Full List of Herpetofauna Species Recorded within the Study Area in May 2015

No.	Scientific name	Common name	Family name	IUCN Status	Remark	Shrubland	Developed Area	Agricultural Land
Snake								
1	<i>Naja kaouthia</i>	Monocellate cobra	Elapidae	Least Concern	Interview	v	v	v
2	<i>Bungarus fasciatus</i>	Banded krait	Elapidae	Least Concern	Interview	v		v
3	<i>Daboia russelii</i>	Russell's viper	Viperidae	Least Concern	Interview	v	v	v
4	<i>Ptyas korros</i>	Indochinese rat snake	Colubridae	Least Concern	Interview	v	v	v
5	<i>Ptyas mucosa</i>	Indian Rat Snake	Colubridae	Least Concern	Interview	v		v
6	<i>Xenochrophis piscator</i>	Checkered keelback water snake	Colubridae	Least Concern	Interview			v
Skink								
15	<i>Eutropis multifasciata</i>	Common sun skink	Lacertidae	Least Concern	Observed	v	v	v
Lizard								
16	<i>Calotes versicolor</i>	Garden lizard	Agamidae	Least Concern	Observed	v	v	v
17	<i>Gekko gecko</i>	Tokay Gecko	Gekkonidae	Least Concern	Interview		v	

No.	Scientific name	Common name	Family name	IUCN Status	Remark	Shrubland	Developed Area	Agricultural Land
Frog and toad								
20	<i>Bufo melanostictus</i>	Common toad	Bufonidae	Least Concern	Observed	v	v	
21	<i>Kaloula pulchra</i>	Painted bull frog	Microhylidae	Least Concern	Interview		v	
22	<i>Microhyla ornata</i>	Ornate Narrow-mouthed Frog	Microhylidae	Least Concern	Observed			v

Annex D

Mammal Species Recorded
within the Study Area

Annex D Full List of Mammal Species Recorded within the Study Area in May 2015

No.	Scientific name	Common Name	Family	IUCN Status	Remark	Shrubland	Developed Area	Agricultural Land
1	<i>Mus musculus</i>	House mouse	Muridae	Least Concern	Observed		v	
2	<i>Echinosorex gymnurus</i>	Moonrat	Erinaceidae	Least Concern	Observed		v	
3	<i>Niviventer fulvscens</i>	White belleyed rat	Muridae	Least Concern	Observed	v		v
4	<i>Callosciurus pygerithrus</i>	Gray squirrel	Sciuridae	Least Concern	Observed	v		
5	<i>Lepus peguensis</i>	Myanmar hare	Leporidae	Least Concern	Interview			v
6	<i>Ovis aries</i>	Domestic mutton	Bovidae	Least Concern	Observed	v		

Annex E

Butterfly Species Recorded within the Study Area

Annex E Full List of Butterfly Species Recorded within the Study Area in May 2015

No.	Species	Common name	Family	Remark	IUCN Status	Shrubland	Developed Area	Agricultural Land
1	<i>Papilio polytes zomulus</i> Cramer, 1775	Common Mormon	Papilionidae	Very Common	Not Assessed	v		v
2	<i>Papilio demoleus</i> Linnaeus, 1758	Lime butterfly	Papilionidae	Very Common	Not Assessed		v	v
3	<i>Junonia atlites</i> Linnaeus, 1758	Grey Pansy	Nyamphalidae	Common	Not Assessed	v	v	v
4	<i>Danaus chrysippus</i> (Linnaeus, 1758)	Plain Tiger	Danaidae	Very Common	Not Assessed			v
5	<i>Danaus genutia</i> (Cramer, 1779)	Common Tiger or Striped Tiger	Danaidae	Very Common	Not Assessed	v		
6	<i>Neptis hylas kamarupa</i> Linnaeus, 1758	Common sergeant	Nyamphalidae	Common	Not Assessed	v	v	
7	<i>Mycalesis orseis</i> Butler	Common bluefly	Satyridae	Common	Not Assessed	v		v
8	<i>Mycalesis francisca sanatana</i>	Common brown	Satyridae	Common	Least Concern		v	
9	<i>Eurema hecabe</i> (Linnaeus, 1758)	Common Grass Yellow	Pieridae	Very Common	Not Assessed	v	v	v
10	<i>Catopsilia pyranthe pyranthe</i>	White Emigrant	Pieridae	Common	Not Assessed			v
11	<i>Catopsilia pomona</i> Fabricius, 1775	Emigrant	Peridae	Very Common	Not Assessed	v		v

Annex F

Fish Species Recorded
within the Study Area

**Annex F Full List of Aquatic Fauna Species Recorded within the Study Area in
May 2015**

No.	Species	Common name	Local name	Family	IUCN Redlist Status
1	<i>Mystus gulio</i>	Long Whisker Catfish	NgaYway	Bagridae	Least Concern
2	<i>Channa striata</i>	Snakehead Murrel	NgaYant	Channidae	Not Assessed
3	<i>Barbodes binotatus</i>	Spotted barb	-	Cyprinidae	Least Concern
4	<i>Osteobrama alfredianus</i>	Carplet	-	Cyprinidae	Not Assessed
5	<i>Xenentodon cancila</i>	Freshwater Garfish	Nga-PhaunYoe	Belonidae	Least Concern
6	<i>Trichogaster pectoralis</i>	Snakeskin gourami	-	Osphronemidae	Least Concern
7	<i>Mystus vittatus</i>	Striped Dwarf Catfish	NgaZinYainn	Bagridae	Least Concern
8	<i>Clarias batrachus</i>	Walking Catfish	NgaKhu	Clariidae	Least Concern
9	<i>Heteropneustes fossilis</i>	Stinging Catfish	NgaKyee	Heteropneusti-dae	Least Concern
10	<i>Glossogobius giuris</i>	Tank goby	-	Gobiidae	Least Concern
11	<i>Sperata seenghala</i>	Long-whiskered catfish	-	Bagridae	Least Concern
12	<i>Notopterus notopterus</i>	Bronze Featherback	NgaPhe	Notopteridae	Least Concern
13	<i>Anabas testudineus</i>	Climbing Perch	Nga Byay Ma	Anabantidae	Data Deficient
14	<i>Oreochromis niloticus</i>	Nile Tilapia	TeLarr Pee Yarr	Cichlidae	Not Assessed
15	<i>Badis ruber</i>	-	-	Badidae	Least Concern
16	<i>Parambassis ranga</i>	Indian glassy fish	-	Ambassidae	Least Concern
17	<i>Channa orientalis</i>	Walking snakehead	-	Channidae	Not Assessed
18	<i>Monopterus albus</i>	Rice Swampeel	Ngashint Nee	Synbranchidae	Least Concern
19	<i>Mastacembelus unicolor</i>	Colorful eel	-	Mastacembelidae	Not Assessed
20	<i>Channa panaw</i>	Panaw Snakehead	Nga Panaw	Channidae	Least Concern

Annex G

Planktonic & Benthic Species Recorded within the Study Area


Annex G Full List of Planktonic and Benthic Species Recorded within the Study Area in May 2015

No.	Species Name	Phylum	Family	Remark
Zooplankton				
1	<i>Monostyla lunaris</i>	Rotifer	Lecanidae	common
2	<i>Monostyla bulla</i>	Rotifer	Lecanidae	common
3	<i>Lecane unguata</i>	Rotifer	Lecanidae	common
4	<i>Daphnia pulex</i>	Arthropoda	Daphniae	common
5	<i>Cyclops vicinus</i>	Arthropoda	Cyclopoida	common
6	<i>Cyclops sternuns</i>	Arthropoda	Cyclopoida	common
Phytoplankton				
1	<i>Synedra affinis</i>	Fragilariaceae	Chrysophyta	common
2	<i>Synedra acus</i> var. <i>radians</i>	Fragilariaceae	Chrysophyta	common
3	<i>Diatoma elongaum</i>	Fragilariaceae	Chrysophyta	common
4	<i>Spirogyra protecta</i>	Zygnemataceae	Chlorophyta	common
5	<i>Spirogyra microspora</i>	Zygnemataceae	Chlorophyta	common
6	<i>Spirogyra azygospora</i>	Zygnemataceae	Chlorophyta	common
7	<i>Oscillatoria laete-virens</i>	Oscillatoriaceae	Cyanophyta	common
8	<i>Oscillatoria subbrevis</i>	Oscillatoriaceae	Cyanophyta	common
9	<i>Lyngbya martensiana</i>	Oscillatoriaceae	Cyanophyta	common
10	<i>Lyngbya truncicola</i>	Oscillatoriaceae	Cyanophyta	common
11	<i>Phormidium ambiguum</i>	Phormidiaceae	Cyanophyta	common

Benthos				
No.	Species Name	Family	Group	Remark
1	<i>Pila polita</i>	Ampullariidae	Mollusk	uncommon
2	<i>Notoscolex striatus</i>	Megascolecidae	Earthworm	common
3	<i>Trithemis aurora</i>	Libellulidae	Dragonfly nymph	Common

Annex H

Management Plans under the ESMP

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1.0 SCOPE/OBJECTIVES

The purpose of this section is to describe the risks to personal health and the preventative measures, including those of personal hygiene, which need to be implemented. This section applies to those persons living and working at the Mann Field Operations Base. Separate procedures are in place detailing the requirements for:

- Kitchen hygiene and food preparation;
- The living quarters and camp.

2.0 POLICIES/PROCEDURES

2.1 Responsibility


Health and hygiene is largely the responsibility of the individual persons concerned. MPRL provide advice and resources through onsite medical and **HSE personnel**. Each individual should be alert to the symptoms of ill health in themselves and the people they work with. A person who continues to work when feeling unwell or has an infectious disease can be a danger to themselves and to others working around them. Individual employers (Contractors and Sub-contractors) are responsible for providing non-emergency health care and appropriate immunisation programs for their employees. Emergency treatment can be provided by MPRL medical staff at the Field clinic, backed up by medivac support, if necessary.

2.2 Heat Stroke and Heat Exhaustion

Myanmar is in the monsoonal region of South-east Asia and has three seasons:

- “Wet season” between May/June and October, most intense between July and September, with high humidity and daily afternoon/evening rain totalling about 100 cm (40 inches) per annum;
- “Cool season” between November through February with temperatures in the Mann area of between 21 and 28 deg C (70 and 82 deg F) and moderate humidity;
- “Dry season” between March and May with temperatures that may rise to 45 deg C (113 deg F), with an increasingly oppressive humidity immediately prior to the start of the wet season.

Personnel performing heavy work in conditions of high temperatures and humidity are exposed to heat exhaustion and heat-stroke. The body becomes dangerously overheated because of rapid fluid loss and reduced cooling effect by the body due to reduced rate of evaporation of sweat.

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Heat exhaustion is a progressive malady, while heat-stroke often occurs suddenly, however there may be a warning period when the casualty feels uneasy and unwell. There are also other health problems related to heat, such as sunburn and heat rash.

Heat Exhaustion Symptoms

- Headache, dizziness and confusion;
- Loss of appetite and nausea;
- Sweating with pale clammy skin;
- Cramps in the limbs or abdomen;
- Rapid, weakening pulse and breathing.

Heat-stroke Symptoms


- Headache, dizziness and discomfort;
- Restlessness and confusion;
- Hot, flushed and dry skin;
- Rapid deterioration in level of response of eye movement, speech and body movement;
- A full, bounding pulse;
- Bodily temperature above 40 degrees Centigrade.

First Aid treatment of Heat Exhaustion

- Keep casualty lying down in cool surroundings with feet raised 12" (30 cm);
- Immediate treatment with salted water (1 teaspoon per half litre of water given hourly);
- If casualty vomits give no more water;
- Seek medical attention.

First Aid treatment of Heat-stroke

- Remove casualty to cool place, remove all outer clothing and call for medical assistance;
- Apply cold packs to major vessels at neck, under arms and at groin (too rapid cooling can cause shivering – which will further increase body temperature);
- If patient becomes unconscious, check breathing and pulse and be prepared to resuscitate if required;
- Seek medical attention;
- Once body temperature has dropped to 38 deg. Centigrade, replace wet cloth with dry one and monitor;
- If temperature starts to rise repeat the cooling process.

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Prevention of Heat Related Illness

On arrival in Mann from a non-tropical area time must be given for the body to acclimatise to the elevated temperatures and humidity. Acclimatisation is likely to be made more difficult after a long period of travelling, especially from a different time zone. Intake of safe (and non-alcoholic) fluids should be increased and should be at regular intervals throughout the day. The colour and quantity of urine should be monitored to indicate requirements for fluids - generally it should be colourless and be passed at least 5 times per day. The quantities of salt normally consumed with food should be adequate. Direct sunshine should be avoided when possible, particularly during rest periods.

Clothing should be made of cotton and loose fitting to avoid chaffing. The discomfort from prickly heat can be lessened by washing without soap, gentle drying and the application of calamine lotion or zinc oxide powder.


2.3 Insects, Parasites and Disease

Diseases transmitted by insects and parasites are common in Myanmar although in some seasons the problems are more acute, particularly in the wet season from May to October.

2.3.1 General Information and Preventative Measures

The following table is provided for guidance; as there may be a localised outbreak of disease or changes in treatment. Rotators are encouraged to get an update on the medical situation prior to leaving their home country. Additional information can be provided by MPRL E&P doctors in the Mann field and Yangon.

Disease	General Information	Preventative Measures
Malaria	<p>A parasite transmitted through mosquito bite, the type of mosquito concerned (Anopheles) is most active at dusk, and at night. Typically, a malaria attack consists of an initial phase of coldness and shivering, followed by a fever and profuse sweating. There may be symptoms of severe headache, malaise and muscular pain. Some forms of malaria mimic the symptoms of influenza and acute gastro-enteritis.</p> <p>Symptoms may appear up to a</p>	<p><u>Avoidance</u> of mosquitoes through screened rooms, application of insect repellent containing DEET*(see note on page 6), particularly to the wrists, ankles and neck, long trousers and sleeved shirts in the evening.</p> <p>Environmental control measures are discussed in the procedure on living quarters/camp.</p> <p><u>Chemoprophylaxis</u> (anti-malaria drugs). There are a number of different drugs and brands, Myanmar is known to have strains of malaria that are resistant to some drugs.</p>

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	few weeks after infection.	Mefloquim (e.g. Larium) is considered useful, but no drugs are completely effective. Mefloquim side-effects can bring on serious medical conditions in some individuals. Professional medical advice should be sort prior to travel to the field. When used, these drugs should be taken for a period (2 weeks to a month, depending on brand) after leaving Myanmar.
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Disease	General Information	Preventative Measures
Dengue Fever	A viral infection transmitted by the Aedes mosquito. The fever is very sudden in onset and accompanied by severe pains in the joints and back ("break bone fever"), headache and a measles type rash.	The Aedes mosquito is active throughout the day. Prevention involves the minimising of mosquito bites by appropriate clothing, screening and insecticide. No vaccine is available.
Filariasis	Filariasis is caused by a variety of long, thread like worms which live in or under the skin and in lymphatic tissue. The type seen in Myanmar is transmitted by mosquitoes and results in painful swellings of lymph glands and lymph vessels. The effects are slow and chronic.	Personal and environmental protection from mosquito bite. If infection is suspected diagnosis can be confirmed with a routine blood or skin test.
Japanese encephalitis	A viral illness spread by mosquitoes, persons in rural Myanmar particularly at risk during the wet season. There is an incubation period of 4 to 14 days, followed by abrupt onset of fever, headache and convulsions if encephalitis (swelling of the brain) develops. There is about a 90% mortality rate and survivors are usually left with severe brain damage.	Vaccination is strongly recommended for those persons visiting the Mann Field because of the possible high incidence, the very high mortality rate and the very low risk of side-effects from the vaccine. Medical consultation is required to discuss the best regime for the injections (3 doses within 14 to 30 days). Personal and environmental protection from mosquito bite.

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Disease	General Information	Preventative Measures
Hepatitis A	"Infectious Hepatitis" is a viral infection of the liver. The illness can vary from minor flu-like symptoms to liver failure. Transmission is usually via contaminated food, water and eating utensils.	Prevention is dependent on good personal hygiene and strict attention to food and water quality. Only bottled water should be used for drinking and teeth cleaning at the Mann Field. The vaccines for Hepatitis A provide good protection, but there is a schedule of regular injections which need to be followed.
Hepatitis B	An infection of the liver by the B virus and is more serious than Hepatitis A. This is a blood borne disease which is transmitted in much the same way as the AIDS (HIV) virus - through the use of non-sterile needles, syringes, etc during medical and dental procedures, through contaminated blood transfusion and through sexual contact (homosexual or heterosexual).	Medical procedures are in place at the Mann Field clinic and hospitals used in Yangon to ensure all instruments are sterile.
Tetanus	Commonly called "lock-jaw", tetanus is a paralysis caused by bacteria. Infection through a wound or puncture injury is common, especially if there is soil contamination. Symptoms include the feeling of weak and heavy limbs, stiff muscles and fits. Onset may be 2 days to months after infection.	Vaccination is recommended, these normally last ten years but re-vaccination following an injury may be required, depending on time since last vaccination.
Tuberculosis	Tuberculosis of the lungs is a common disease in the Myanmar population. The bacteria are transmitted by inhaling airborne droplets spread by coughing of infected individuals.	The BCG vaccination is recommended.



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Disease	General Information	Preventative Measures
Typhoid	Caused by infection with Salmonella bacteria, transmission can be via the faeces and urine of infected persons contaminating food and water and by the flies carrying the bacteria. The symptoms are usually fever, headache and gastro-intestinal upset, but diagnosis can be difficult because of the similarity of symptoms to malaria.	Prevention consists of safe food handling, reliance on the safe bottled water and good personal and camp hygiene. Vaccination is available and is recommended.
Rabies	Rabies is an almost invariably fatal disease of the central nervous system, following a bite from a rabid animal or a lick to an open wound the lips or eyelid. In most parts of Myanmar dogs are the most common source of infection, although other domestic and wild mammals, including bats can carry and pass on the infection. Eating well-cooked meat will help prevent transmission of the virus.	Avoid contact with all wild or stray animals, particularly dogs. No pets are to be kept at the Mann field base. Existing stray dogs in the camp and township area should not be encouraged through feeding. In the case of a bite from a potentially infected mammal, the wound should be thoroughly washed and disinfected. Post exposure vaccination can be performed at the Mann Field clinic.
Polio	A viral infection, transmission from faeces to mouth. After a seven day incubation period there are flu-like symptoms, headache and vomiting, eventually, in many cases, leading to paralysis of the lower limbs.	Personnel who have received childhood vaccinations will be fully protected if they have a booster dose as an adult (boosters usually last 10 years).
Hookworm	Larvae penetrate the skin of bare feet and legs where they develop causing painful swelling and possible complications.	Closed shoes or boots should be worn at all times outside the living quarters.

*DEET (diethylmethlbenzamide). It is best purchased as a pump spray, as aerosols cannot be carried on board aircraft as passenger baggage. Check the concentration as 30-40% DEET is appropriate for skin application, while high concentrations of 80%+ should only be applied to clothing. When using DEET the following should be considered:

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- follow manufactures instructions;
- apply only to skin that will be exposed, and use sparingly;
- do not inhale, swallow or get in eyes and nose;
- do not apply to the hands because of the risk of mouth and eye contact;
- seek medical advice if an adverse skin reaction occurs.

2.3.2 Summary of Pre-assignment immunisation and health screening

Protocol for Health Screening

The remoteness of the Mann Field and the time taken to medivac a patient to a hospital with appropriate standards requires a special consideration of pre-assignment screening for adverse medical conditions. Consequently all rotating personnel should undergo a thorough medical examination, and this should be repeated at 2 year intervals. Topics to be included in medical examination:

- Recent contact with infectious diseases (for instance rubella, scarlet fever, severe food poisoning);
- Dental abscess or severe gum disease;
- Active peptic ulceration;
- Hernia (unoperated);
- Diseases of liver and pancreas
- Cardio-vascular disease
- Cerebro-vascular disorders
- Anaemia
- Epilepsy or disturbance of consciousness
- Genito-urinary disorders
- Respiratory disease;
- Drug and substance abuse.

The employing company will describe the conditions and remoteness of the Mann Field to the medical examiner. The medical examiner will be required to assess whether the person is suitable for working in the Mann Field. Information will remain confidential between the employee and the medical examiner unless express written permission is given by the employee to make available this information to the employing company.

Pre-assignment immunization - Expatriate personnel

Vaccination/Precaution
<ul style="list-style-type: none"> • Hepatitis A
<ul style="list-style-type: none"> • Hepatitis B

• Tetanus	Adult booster
• Diphtheria	Adult booster
• Polio	Adult booster
• Typhoid	
• Japanese Encephalitis	Strongly recommended. Booster after 3 years.
• BCG	
• Yellow Fever	Certification of vaccination required if travelling from South America or Africa in the previous 6 days.
• Anti-Malaria Drugs	Generally recommended, particularly for those working away from the camp, but seek individual medical advice on side-effects.


National and Locally Recruited Personnel (additional requirements for kitchen staff)

The Mann project involves considerable numbers of locally employed persons on short-term contracts. Because of this “open system” and the contact these employees have outside the project there will have to be a reliance on pre-employment screening and treatment of specific illness at the Field clinic.

Vaccination/Precaution	
• Tetanus	Post-exposure vaccination available at the Field clinic
• Stool and urine tests	Required for Food Handlers, tests can be provided at the Minbu private laboratory (tests cost approx US\$1).
• Tuberculosis detection	Recommended as part of pre-employment screening for all personnel, chest X-rays can be carried out at Minbu and Magwe hospitals.

2.3.3 Recognition of the Symptoms of Malaria

The risk of contracting malaria is reduced by the use of environmental controls around the camp and anti-malaria drugs, however because of the remoteness of the Mann Field it is important that cases are diagnosed quickly and the patient is stabilised at the Field clinic prior to being moved to hospital for treatment. The clinic is able to

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perform tests for Falciparum malaria (the most serious type) but it is also important for non-medical staff to recognise the signs and symptoms of the disease.

Vivax and Ovale Malaria

- After 8 to 30 days of the bite a feeling of general ill health (e.g. feeling cold, aches and pains, weariness, nausea, etc) lasting a few hours or days.
- Attacks of fever, 3 distinct phases are common:
 - * Shivers and rigours for ¼ to 1 hour. Temperature rises, skin is cold and pale. Pulse rises. Vomiting, diarrhoea and urinary frequency may occur.
 - * Temperature very hot (40 deg C +), skin is hot and dry, pulse rises. Headache, delirium, thirst and vomiting are common.
 - * Sweating stage - temperature and pulse normal. Usually followed by sleep and feeling reasonably well on waking.
- Attacks of fever occur on alternate days in uncomplicated cases.

Falciparum Malaria

- After 8 to 14 days of the bite a feeling of general ill health (e.g. feeling cold, headache, backache and pains all over, nausea, vomiting and diarrhoea).
- Attack consisting of:
 - * severe pain in head, bones and muscles
 - * vomiting and diarrhoea
 - * mental confusion and delirium
 - * severe sweating
 - * fast pulse


In all cases of suspected malaria the clinic will use the ICT Pf test kit for falciparum detection. This information will be relayed to the hospital for treatment. Generally, all cases of malaria will require referral to a hospital, all cases of falciparum will initiate medivac procedures.

2.4 Snakes

The common poisonous snakes in the Mann Field area are Russell Vipers, Cobras and Kraits. Vipers cause most of the snake bites in the area. The main risk of coming into contact with snakes is during the hours of darkness.

Precautions:

- Remain on paths and clear areas where possible;
- If walking through grass make a noise and beat a stick;

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- At night use a torch;
- Check before inserting hands into cavities such as pipes;
- Check boots are empty before putting them on.

If a snake is seen:

- Assume it is venomous;
- **Retreat** slowly, do not attempt to drive the snake away alone;
- Warn other personnel of the danger;
- Get assistance to safely kill or drive the snake away.

First aid in the event of snake bite:

- Remain calm, reassure the victim (snake bites rarely kill if managed properly);
- Do not move or cause the casualty to move quickly or unduly;
- DO NOT CUT or apply a tourniquet to the wound;
- Wash the wound with any clean water;¹
- Apply a pressure pad and bandage the entire limb tightly so as to reduce (but not stop) blood flow;
- Elevate the limb and immobilise it with a splint;
- Immediately seek medical assistance, describe type of snake, if known;
- Transfer the victim to the clinic, carry him, do not let him walk;
- Anti-venom must only be administered by qualified medical staff.

Snake identification:

Cobra:


- Relatively slender and long;
- Head generally smoothly contoured (not triangular);
- Neck expands into hood;
- Generally brown or black, some lighter banding (but not very pronounced);
- Marked spectacled or monocled on neck/hood

Russell viper:

- Relatively short and thick;
- Wide triangular head;
- Deep yellow, tan or light brown;
- Three rows of large oval dark-ringed spots.

Kraits:

- Main body is cylindrical, moderately slender, short tail;
- Small flattened head;
- Black to dark brown;
- Series of white or yellow cross-bands, for whole length.

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2.5 General Hygiene

Gastro-enteritis (irritation and inflammation of the digestive tract) usually causes diarrhoea, vomiting and abdominal pain. Such symptoms must not be assumed to relate to the illnesses described in **section 2.3.1** as they can be caused by less serious viral and bacterial infections. Apart from person to person contamination these “stomach upsets” can be caused by changes in the normal gut bacteria due to travelling to a new area or by the use of antibiotics.

The general self-prescription of antibiotics and other drugs must be avoided as this can cause complications and mask other symptoms. The medical staff and Field clinic are provided by MPRL for the prevention and treatment of illness and injury.

The most serious threat from diarrhoea and vomiting is the dehydration caused by loss of fluids. Fluid intake should be increased. In cases of diarrhoea and vomiting lasting more than three days, or associated with fever, medical advice must be sought.

Food and water. The following preventative measures should be taken:

- Only drink and clean your teeth with the safe bottled water supplied at the camp. If bottled water is purchased from elsewhere check the label to see if it is safe - distilled or to an international standard (rather than local “health giving” spring water), and check that the bottle seal is intact;
- Avoid raw fruit and vegetables unless they have been thoroughly washed in safe water or can be peeled;
- All meat should be thoroughly cooked before eating;
- Thoroughly wash your hands before eating;
- Check that eating utensils are clean.

2.6 Travel to/from the Mann Field

Crew change is by bus from Yangon or by air from Yangon to Bagan and then by vehicle. Both methods involve long periods of travel (**currently Yangon to Mann by bus is approximately 12 hours**)

- Ensure you have bottled water for the journey, this is supplied by the bus company and the Mann Camp provides a lunch pack and water for return journeys;

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DOCUMENT DISTRIBUTION			
No.	Name	Hard Copy	Electronic Copy
01	Document Custodian – MFO/MYO office	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
02	Field Operation Manager - MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
03	Field Operation Manager, MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
04	Drilling Manager, MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
05	HSE Manager, MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
06	Assistant HSE Manager, MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
07	HSE Officer, MPRL E&P	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
08	Medics – MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>

REVISION HISTORY					
Rev	Description	Date	Prepared by	Review By	Approved by
A	New Document	1 Sep 2017	HSEM	TXM CXM	GXM

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1.0 SCOPE/OBJECTIVES

The purpose of this section is to define the procedures that must be followed in the event of a medical evacuation (Medivac) of an injured or ill person.

2.0 POLICIES/PROCEDURES

2.1 Responsibilities

MPRL E&P undertake to provide medivac facilities to all staff working on the MPRL E&P project in Mann Field. This facility is extended to sub-contracted personnel. However, once the patient has been transferred to medical care of an appropriate standard, medical treatment and repatriation will be the responsibility of the employing company.

MPRL E&P have a field hospital/clinic at the Mann camp which has a full-time medical staff. In the event of serious injury or illness the role of the medics is to provide emergency care, stabilize the patient prior to evacuation, provide medical information to FOM and accompany the patient on the medivac journey (or part of), as required.

A medivac will only be initiated by the most senior MPRL E&P manager in the Mann Field (usually the Field Operation Manager), following consultation with the medical staff at the camp, and MPRL E&P management in Yangon.

Although next of kin details are held in medical records at the Mann Camp, personnel at the camp must NOT contact next of kin directly. This is the responsibility of MPRL E&P management (Yangon) or the management of the contracting company. Generally, contact with next of kin should be made once specific information can be provided (for instance, nature of medical condition, treatment being given, name and address of hospital), such information is unlikely to be reliable until after the medivac has taken place.

2.2 Medivac procedure

IN THE EVENT OF A MEDICAL EMERGENCY

2.2.1 STEP 1 – Contact MYO

In the event of a medical emergency, the most senior project manager present (usually the Field operation Manager) shall contact MYO in Yangon.

The 24 hour contact numbers are:

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1: Primary Contact:

U Myo Tin (GXM)

Home (95-1) 558 269
 Mobile Phone (95-9) 508 2428
 Office Number (95-1) 230 7702
 Fax Number (95-1) 230 7744

Sithu Moe Myint (CXM)

Home (95-1) 526 705
 Office (95-1) 230 7707
 Mobile Phone (95-9) 515 2999
 Office Fax (95-1) 230 7744

2: MPRL E&P Yangon Office

Office (95-1) 230 7733
 Fax (95-1) 230 7744

The following information must be provided:

- Name of patient
- Nationality of patient
- Location of patient
- Location of patient's passport
- Brief medical description
- Name and location of caller

2.2.2 STEP 2 – Evacuation to Yangon

The final decision on evacuation method will be made by the MPRL E&P FOM in consultation with GXM/CXM in Yangon. There are a number of transport alternatives:

1. Road Mann to Yangon

A vehicle converted to an ambulance is available at the camp. Transportation by road to Yangon is likely to take a minimum of 9 hours and is over poor road surfaces. Road transport for the whole journey will be considered where the patient condition is sufficiently good or stable so that the journey will not compromise their condition more than further treatment at the field clinic while waiting alternative transport methods. The preferred option for road transport

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would be patient and medic to travel towards Yangon in the field ambulance, to be met by ambulance and doctor traveling from Yangon.

2. Road to Bagan, Air to Yangon

Bagan is a minimum of 3 hours road time from Mann field. There are 2 scheduled commercial flights to Yangon every day. Flying time Bagan to Yangon is approximately one hour. Whether a stretcher could be carried depends on the seat availability at the time. Bagan can also be accessed with a charter flight.

2.2.3 STEP 3 - Secondary evacuation

All international flights, including air ambulance from Singapore, have to enter Myanmar by Yangon. Flying time Yangon to Singapore is approximately 3 hours, and Yangon to Bangkok 1 hour. A good standard of medical care is available at Green Cross Hospital at Yangon.

Hospital in Yangon

Green Cross Hospital

No.101, Lan Thit Street

Upper Block

Lanmadaw Township

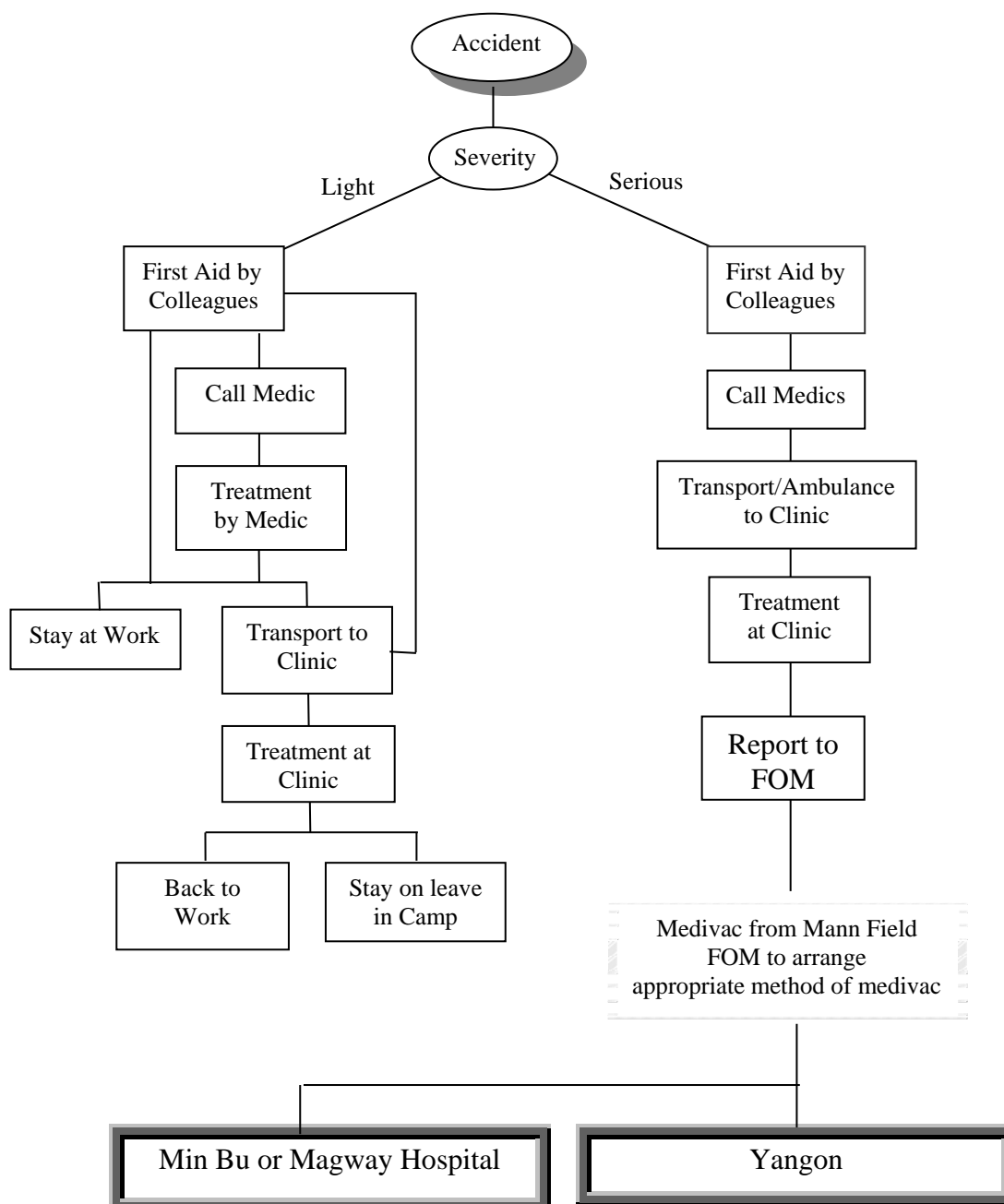
Yangon

Tel: (95-1) 2300551, 2300652, 2300653

Phone 01 523 000



MEDIVAC FLOW CHART




GXM 09 508 2428, 01-230 7733 Ext – 1005
CXM 09 515 2999, 01-230 7733 Ext - 1007
TXM 09 200 5993, 01-230 7733 Ext - 1113
8394
HSEM 09 43182225, 01-230 7733 Ext - 1104

GM Mann Oil Field 065-21009
FOM (U Myo Win) 09 530 0675
FOM (U Moe Zaw Tint) 09 513

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ATTACHMENTS - Patient forms and questionnaires. These forms are also reproduced in the Forms section of the HS&E Manual.

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EMERGENCY CALL TO

HOSPITAL Form 1

1. NAME OF CALLER a) Name: b) Telephone: c) Fax: d) Company:			
1. NAME OF PATIENT a) Name: b) First Name: c) Age: Sex: F / M d) Company			
1. LOCATION OF PATIENT a) Country: Myanmar b) Telephone: (95) 65 21243 (land line). c) Address: Mann Field, Minbu, Myanmar			
1. Has the patient been seen by a doctor? Yes / No			
2. Name of Doctor: Telephone Number:			
3.	Medical Condition:	a) Is the patient conscious b) Is patient agitated/confused c) Breathing problems d) Significant bleeding e) Chest pain f) Burns g) Fractures h) Abdomen pain i) Trauma j) Fever k) Vomiting/diarrhoea l) Pregnancy	Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No Yes / No
4. Comments:			



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MEDICAL INFORMATION – EMERGENCY CALL

Form 2

(Form to be completed by a Doctor)

IN CASE OF AN ACCIDENT			
1. Date and local time of accident			
2. Details on this accident (eg. Fall, traffic accident, etc)			
3. Is there any fracture?		Yes / No	
A – probable		Yes / No	
B – obvious		Yes / No	
C – confirmed by x-ray		Yes / No	
4. Localisation:			
A – skull		()	
B – face		()	
C – cervical column (neck).....level		()	
D – vertebral column		()	
E – ribs.....side.....how many		()	
F – pelvis		()	
G – upper limb ()	left ()	right	
H – lower limb ()	left ()	right	()
I – other places			
5. Wounds. Are there any? Locate them, especially the ones located in the thorax and the abdomen; indicate their size and depth:			
6. Bleeding. Has there been a lot of bleeding?			

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Form 2
(Form to be completed by a Doctor)

<i>IN CASE OF BURN</i>					
6. Date and time of burn?					
7. Cause of burn:					
A – explosion		()			
B – fire (flames)		()			
C – chemical products		()			
D – others (specify)		()			
8. Localisation and degree of the burn:					
A	Face	1 st deg	2 nd deg	3 rd deg	
	B Neck				
	C Thorax				
	D Abdomen				
	E Left arm				
	F Right arm				
	G Left leg				
	H Right leg				
9. Time of the first treatment:					
10. When did patient last pass urine:					



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Form 2
(Form to be completed by a Doctor)

IN CASE OF ILLNESS

6. Date of first symptoms: _____
7. Presumed diagnosis of this illness _____
8. Temperature _____
9. Spontaneous respiration: Yes / . No
 If Yes: normal ()
 laboured ()
10. Respiratory rhythm: regular ()
 Irregular ()
- 17 Artificial respiration effective ()
 ineffective ()
- 18 Number of respiratory movements per minute: _____
- 19 Colour of the nails, lips, ears:
 White () Pink () Black ()
- 20 Does the patient cough? Yes / No
- 21 Does the patient cough up sputum? Yes / No
22. Does the patient cough up blood? Yes / No
23. Has a thorax x-ray been carried out? _____
 If so, results: _____
24. Blood pressure _____
25. Pulse rate _____
26. Has the patient urinated? Yes / No
27. If yes, how much per 24 hour? _____
28. Are the extremities cold? (hands, feet, ears) Yes / No



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Form 2
(Form to be completed by a Doctor)

IN CASE OF ILLNESS (continued)					
29. Is he paralysed?	Localisation:				
	A	right am	()		
	B	left arm	()		
	C	right leg	()		
	D	left leg	()		
	E	respiratory	()		
30. Is the patient agitated?	Yes / No				
31. Is the patient conscious?	Yes / No				
32. Is the patient in a coma? If so, time/date coma began	_____				
33. The pupils are:					
Right	A normal	()	Left	A normal	()
	B dilated	()		B dilated	()
	C contracted	()		C contracted	()
34. Is patient in pain?	Yes / No				
If so, localisation and degree?	_____				
35. Has patient had malaria?	Yes / No				
36. Is patient diabetic?	Yes / No				
37. Does patient vomit?	Yes / No				
38. Does patient have diarrhoea?	Yes / No				
39. Does patient have intestinal bleeding?	Yes / No				
40. Is there any other bleeding?	Yes / No				
If so, where?	_____				
41. Is patient a psychiatric patient?	Yes / No				



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Form 2
(Form to be completed by a Doctor)

<u>ALL CASES</u> <u>TREATMENT ALREADY GIVEN</u>	
42. Has the patient been operated on?	Yes / No
If so, indicate nature and result of the operation:	
43. If fracture, how has it been immobilized?	Yes / No
44. Is the patient on drip?	Yes / No
Nature of infusion	
45. Treatment initiated – present medications	
46. Does the patient need blood?	Yes / No
47. If known, blood type:	
48. Give any other useful, precise details on the nature of the illness and the patient's condition:	
49. Was the patient suffering from an illness known previously?	
50. Were laboratory tests carried out?	
If so, which one and state results:	



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		Initial Release	TJH	1/2013

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1 Introduction

1.1 Purpose/Scope

The purpose of this procedure is to control vehicle movements and avoid unnecessary risks. The aim is to improve Business economics, reduce pollution, and monitor the fleet location efficiently, in order to reduce the number of trips required, which will result in less exposure to potential accidents.

Transportation Management principles will guide the application of controls as follows:

- A journey by road must be necessary and business-related.
- The driver must be fully fit, rested and sober.
- The driver must complete the Pre-Use Vehicle Daily inspection Checklist.
- The driver must complete a written Journey Management Plan form.
- A Man Lost Procedure must be activated if the driver is two hours overdue.

This Procedure applies to all journeys:

- Other than local ones; i.e.,
- Any trip which >100 kilometres from all sites Including off-road routes of travel;
- Undertaken during partial or total darkness.

1.2 Responsibilities

1.2.1 Transportation Manager

The Transportation Manager must ensure that:

- The driver's hours of work are not exceeded;
- The driver informs the destination of his/her departure (ETD) and reports back to base during the trip and upon arrival at destination;
- Journey forms are maintained by the location dispatcher.

Note: Base is the point of origin for the journey; Yangon or CONTRACTOR's Base Camps.

1.2.2 HSE Manager

HSE Manager is responsible for:

- Ensuring that this procedure is implemented at all sites.
- Conducting Road Traffic Assessments for all routine routes.
- Audit and update of this procedure when necessary with the update of risk information.
- Organization of training needs for drivers.

2 Procedure

All COMPANY and CONTRACTOR vehicle movements are subject to the Transportation Management Procedure as follows:

Journeys must be recorded in the Journey Management Plan form (see Appendix 2), stating the following details:

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- Driver's name and mobile telephone number.
- Passengers' names and mobile telephone numbers.
- Vehicle registration number or fleet number.
- Start time (ETD) and arrival time (ETA).
- Check calls (time and location) to be made by the driver (not to exceed 2 hours)
- Planned stops (not to exceed 3 hours).

Note: Deviations from the trip must be called in to the dispatcher immediately

2.1 Safety rules

The following safety rules are to be strictly followed when using company vehicle(s):

- No smoking
- No Betel chewing
- No phone, text messaging and /or using portable communication devices (applied to driver only)
- Seat belt must be worn
- No speeding

2.2 Road Traffic Assessment

Road Traffic Assessment is a Risk Assessment for the traffic route which company vehicle(s) may use.

CHSEO shall by himself or his delegate carry out an actual journey to assess all potential risks on the routes. The following information shall be assessed and recorded.

- Routes (from departure to destination)
- Distance
- Time of assessment
- Road conditions
- Traffic conditions
- High risk area(s)
- Rest location(s)
- Local Emergency contacts

A completed Risk Assessment form shall be distributed to all driver(s)/vehicle(s) which intend to travel on that route(s).

2.3 Driving Off-Road

Always submit a journey management plan and stay on the agreed/planned route.

Use dim headlights at all times; day and night.

After wet weather periods ascertain condition of the road before starting a journey.

If lost, stay with your vehicle. The Man Lost procedure will be activated and you will be located if you have filed your Journey Management Plan.

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2.4 Driving at Night

COMPANY and CONTRACTOR personnel are not permitted to drive during the hours of darkness, with the following exceptions:

- In response to an emergency;
- For urgent operational purposes, with prior approval by M&A Site Management and subject to a journey-specific risk assessment.

2.5 Vehicle Loading

- Vehicle loads must not exceed the weight limitations indicated on the vehicle registration document.
- Vehicle loads must not extend over the sides of the vehicle.
- Any load, which extends beyond the rear of the vehicle, must be marked with a red flag and a red light.
- Vehicle loads must be properly secured. Loose tools or equipment must not be carried inside the passenger compartment. They must be placed behind a protective screen or lashed down.

2.6 Primary Routes of Travel and Rest Locations

Note: Drivers must always carry a map (in an appropriate language) and be aware of their distance and time from departure and destination points.

2.6.1 Passengers

Passengers also have responsibility in vehicle safety. They are not only clients, but also supporters of the driver. Passengers' behaviour encourages the driver to drive well or puts pressure on him/her to break the rules.

Before beginning a journey, passengers must:

- Be on time to avoid rushing the driver.
- Ensure that the vehicle has had a pre-use inspection.
- Confirm that safety equipment is on board.
- Confirm that the driver has a Journey Management plan that includes rest breaks.

During the journey passengers must:

- Always wear seatbelts.
- Always secure cargo.
- Not distract the driver
- Do not drink, eat or smoke inside the vehicle.
- Provide clear directions to the driver, if required.
- Assist the driver when parking and maneuvering in hazardous locations.
- Warn the driver, if he is traveling too fast for existing road/weather conditions or showing poor safety behaviour.

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2.7 Man Lost Procedure

The purpose of this procedure is to rescue the driver and passenger(s) who fail to get to their check calls or destination by the ETA designated on the Journey Management Plan. This is an essential part of a journey and the basic principles are:

- A full-scale search will start if the driver is two hours late for a check call or arrival at the destination. Transportation Manager and Admin in Yangon should be notified immediately.
- Nearest MPRL E&P's Site Response Team will be activated and remain in contact with the Transportation Manager in Yangon.
- No assumptions should be made, debate started, nor blame for over-reaction given.
- The search will use all means of rescue, including air and local emergency services.
- The senior managers at the departure site and the arrival site will both personally investigate the journey plan.
- A man lost incident counts as a serious near miss and an investigation will always be carried out.
- The system should default to over-reaction, not under-reaction.
- Transportation Manager shall report to Senior Management if Lost Vehicle could not be found within 12 hours.
- Incident Management Plan shall be activated as described in Incident Investigation Procedure (MPLR-HSE-PRO-010).



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Appendix 1 – Daily Vehicle Inspection Checklist

Driver:		Vehicle: Number:		Pass ✓ Fail ✗				
		Day of Week						
Item		M	T	W	Th	F	S	Sun
A. Walk Around								
1.General Condition								
Tires								
Windows								
Mirrors								
Lights								
Body Damage								
Wires								
B. Engine Compartment								
Water – Radiator / Wipers								
Oil Levels								
Battery								
Drive Belts								
C. Rear Door / Hatch								
1. Safety Equipment								
Fire Extinguisher								
First Aid Kit								
Tow Rope, Jack, Chains								
Triangle								
Cargo screen								
Survival kit								
2. Tool Box								
Tools								
Tire Pressure Gauges								
Tire Tread Gauge								
Flashlight								
3. Spare Tire								
D. Inside Vehicle								
Adjust Mirrors / Seats / Headrests								
Gauges checked – fuel, oil temp								
Lights (all)								
Seatbelts (all seats)								
Horn								

Be sure this is the latest revision of this document!



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Maps								
Driver Initial Daily								
Comments:								

Appendix 2: Journey Management Form

JOURNEY MANAGEMENT PLAN

Driver name: _____

Driver's Phone number: _____

Passenger(s) Name/Phone number:

_____/_____/_____/_____/_____/_____
_____/_____/_____/_____/_____/_____
_____/_____/_____/_____/_____/_____
_____/_____/_____/_____/_____/_____

Vehicle plate number: _____ Type: _____ Colour: _____

Departure from: _____ Destination: _____

Planned Stop Location(s): _____

Date: _____ ETD: _____ ETA: _____

CHECK CALLS (Driver to report time/location every 2 hours)

1. Location: _____ Overdue: _____ (time)

2. Location: _____ Overdue: _____ (time)

3. Location: _____ Overdue: _____ (time)

4. Location: _____ Overdue: _____ (time)

Driving after dark may ONLY be authorized during Emergencies
Trips from Yangon or between Base Camp(field) MUST BE authorized by Department Head /
Field Manager.

Signature: _____ Date/time _____

Yangon – Transportation Manager Contact: _____



TRANSPORTATION MANAGEMENT PROCEDURE


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Destination Field/Site Manager Contact: _____

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	B	Final DRAFT for review		
	0	Issue for approval		

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1 Introduction

1.1 Purpose

The purpose of this document is to establish guidelines for the management and control of hazardous substances and their discharge into the environment. This document establishes good working practices for prevention, containment and cleanup of any potential discharge to the work and surrounding environment of the project where MPRL E&P operates.

1.2 Scope

This document is applicable to all MPRL E&P operations and Subcontractors work areas that deal with hazardous substance storage, handling, transportation and dispensing, as well as plant equipment maintenance and servicing site within the MPRL E&P business area.

1.3 Definitions

Hazardous substance - Qualities that make a substance 'hazardous' include but not limited to toxic, reactive, corrosive and flammable. This includes such substances as oils (fuels, lubricants, waste oil), chemicals, paints and solvents, hydraulic fluids, medical waste, materials contaminated with hydrocarbons, chemically treated lumber, paint residues, heavy metals and similarly toxic materials, drilling fluid, contaminated products like produced water and other hazardous waste as designate by International Standards.

Spill – The unplanned or accidental loss of primary containment from an operation, irrespective of any secondary containment or recovery.

1.4 Responsibilities

1.4.1 HSE Manager (HSEM)

HSEM is responsible for:

- Carry out the site audits to ensure that the plan is implemented as company's expectations
- Provide technical guidelines regarding the change of the plan

1.4.2 Technical Manager (TXM)

TXM is responsible for:

- Oversee the implementation of this plan at site(s)
- Supervising the technical team regarding the selection of control measures
- Ensure that industrial technical specifications are met.

1.4.3 Field Operations Manager (FOM)

FOM is responsible for:

- Ensure this plan is executed at site
 - Provide Manpower, resources for the execution of this plan
 - Report the execution progress on weekly basis
 - Propose for management of change
-

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1.4.4 Site HSE Officer

Functional Engineer is responsible for:

- Ensure that industrial best practices are applicable
- Ensure the adequate engineering controls are selected
- Establish an adequate maintenance program to meet this plan's requirements.

2 Spill Control Hierarchy

The below hierarchies of spill prevention shall be applied to all process and facilities:

- Operation mode selection
- Engineering
- Construction and Operation
- Storage
- Handling and transportation
- Maintenance
- Emergency Response

2.1 Operation Mode Selection

Selecting a safe operation mode is critical to any project, facilities, process and equipment. The below controls measures should be considered when selecting an operation mode:

- Minimize the possible impact from outside (like third party, nature disaster, etc)
- Minimize the processing or storage volume
- Minimize the risk of transportation
- Minimize the risk to sensitively areas (like drinking water source and / or special protected area)
- Minimize the discharge to the local area

In some of circumstance, a HAZOP should be conducted to ensure that all the safety control measures are met and managed.

2.2 Engineering

Adequate engineering must be applied to all of:

- Design of new process, equipment
- Modification / upgrade of existing process, equipment

Functional Engineer is responsible for the design of the process, selection of equipment/materials and quality controls.

Any change in operation mode, materials, and diagram shall be subjected to a Management of Change and approved by responsible person.

2.3 Construction and Operation

Managing the construction and operation are vital in spill prevention. The designed process must be operated as per approved procedures and industrial best practices. Operation personnel must be trained and competent for the task he/she going to perform.

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Safety integrities must be always maintained and tested/certified on a regular basis.

2.4 Storage

2.4.1 Temporary Storage

Material used for the temporary storage of hydrocarbons, chemicals and hazardous waste must be compatible with the substance. It must have lids and no dents or damage; it must be labeled with company name, content and hazard designation.

2.4.2 Long Term Storage (including Process Vessel & Pipe work)

Long Term containment for hydrocarbon, chemical and hazardous waste must be designed in accordance with the following guidelines:

- To be located away from busy areas especially roads
- Have a concrete or impermeable base
- Bund wall with no holes or taps
- Capacity to contain a minimum of 110% of the volume of the largest container within the bund.
- Perimeter cut off drainage with holding sump.
- Oil/ water separator or interceptor and outlet valves will be required for storage locations without roofs.

Spill containment and clean up materials and equipment will include a standard spill clean up kit containing two (2) booms, and or sacks of saw dust, 100 absorbent pads and a couple of drip pans. An instruction sheet must be duly pasted in close proximity at all times.

Safety:

Suitable firefighting equipment will be provided in close proximity to the storage areas, such as portable compressed air foam (CAF) fire fighting equipment with a capacity of at least 50 gallons or 190 liters and two (2) 30 pounds or 10-kilogram hand held chemical powder fire extinguishers.

2.5 Maintenance

Maintenance program for all process equipment should be established and approved by Technical Manager. The program should include:

- The overhaul maintenance
- The replace of required items
- The examination for the conditions of process equipment
- The technical verification from vendor, manufacture and / or manual instructions

2.6 Handling and Transportation

Selecting and managing the right handling and transportation equipment will also minimize the risk of spill for Mann Field. The selection may include:

- Using pipeline for transferring the crude oil, gas and / or produced water.
 - Using bowser to transporting crude oil and produced water from well sites to GOCS
 - Using mobile tank to transporting crude oil and produced water from well site to GOCS
 - Using vehicle to transporting the chemicals to / between sites
-

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- Using vehicle to transport wastes to / between sites and / or to approach disposal facilities.

Field Manager is responsible to ensure that the vehicles / equipment are fit for use and fit for purposes. Safety inspection should be carried out before departure and / or work commencing.

Emergency response plan should be established and updated to ensure that appropriate controls measures are in place.

2.7 Emergency Response

Emergency response will not prevent an environmental incident, but minimize the severities. While an Environmental Incident happened, effectively response will minimize the scale of effects and the level of impact.

Site Manager should ensure that an updated response procedure is available on site and exercises are carried out in regular basis.

The details can be found in Environmental Incident Management Plan (MPRL-HSE-PL-006)

2.7.1 Emergency response exercise

Environmental incident exercise should be conducted at least one time per year in order to:

- Test the communication channels are correctly set up
- Verify the contact points
- Test the reaction of rescue team and the familiar with the response procedure
- Test the functions of equipments

Environmental engineer and Field Manager are accountable for the facilitation of the Emergency Repose Exercise on his site(s).

3 Spill Management Plan

MPRL E&P has developed a Spill Management Plan which described below:



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3.1 Spill Classifications

MPRL E&P Classifies spill as follow:

Impacted area	Recordable Cases		
	Minor	Medium	Serious
Within a designed operation area.	Less than 200 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation. Less then 20 Liters of harmful chemical and / or substances which used for operation purposes. Less then 10 cubic meters of contaminated fluid and / or washed water from cleaning facilities. Less then 10 cubic meters of drilling mud.	Less than 500 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation. Less then 50 Liters of harmful chemical and / or substances which used for operation purposes. Less then 50 cubic meters of contaminated fluid and / or washed water from cleaning facilities. Less then 50 cubic meters of drilling mud.	More than 500 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation. More then 50 Liters of harmful chemical and / or substances which used for operation purposes. More then 50 cubic meters of contaminated fluid and / or washed water from cleaning facilities. More then 50 cubic meters of drilling mud.
In the farmland	Less than 100 liters of splashes and drips during re-fuelling; broken oil,	Less than 200 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant	More than 200 Liters of splashes and drips during re-fuelling; broken oil, hydraulic



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	<p>hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 5 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 5 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 5 cubic meters of drilling mud.</p>	<p>hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 10 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 20 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 20 cubic meters of drilling mud.</p>	<p>fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>More than 10 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>More than 20 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>More than 20 cubic meters of drilling mud.</p>
River and or water flow	<p>Less than 100 liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 5 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 5 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 5 cubic meters of drilling mud.</p>	<p>Less than 200 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 20 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 10 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 10 cubic meters of drilling mud.</p>	<p>More than 200 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>More than 20 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>More than 10 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>More than 10 cubic meters of drilling mud.</p>
Near shore	<p>Less than 200 liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 10 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 10 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 10 cubic meters of drilling mud.</p>	<p>Less than 500 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 50 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 50 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 50 cubic meters of drilling mud.</p>	<p>More than 500 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>More than 50 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>More than 50 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>More than 50 cubic meters of drilling mud.</p>



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Offshore	<p>Less than 200 liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 20 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 20 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 10 cubic meters of drilling mud.</p>	<p>Less than 500 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>Less than 50 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>Less than 50 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>Less than 50 cubic meters of drilling mud.</p>	<p>More than 500 Liters of splashes and drips during re-fuelling; broken oil, hydraulic fluid, or coolant hoses; and oil and lubricant drips from equipment during normal operation.</p> <p>More than 50 Liters of harmful chemical and / or substances which used for operation purposes.</p> <p>More than 50 cubic meters of contaminated fluid and / or washed water from cleaning facilities.</p> <p>More than 50 cubic meters of drilling mud.</p>
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3.2 Spill Measurement and Reporting

The spill measurement and reporting can be found in the Environmental Monitoring Specifications (MPRL-HSE-SPE-004).



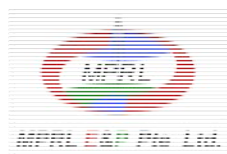
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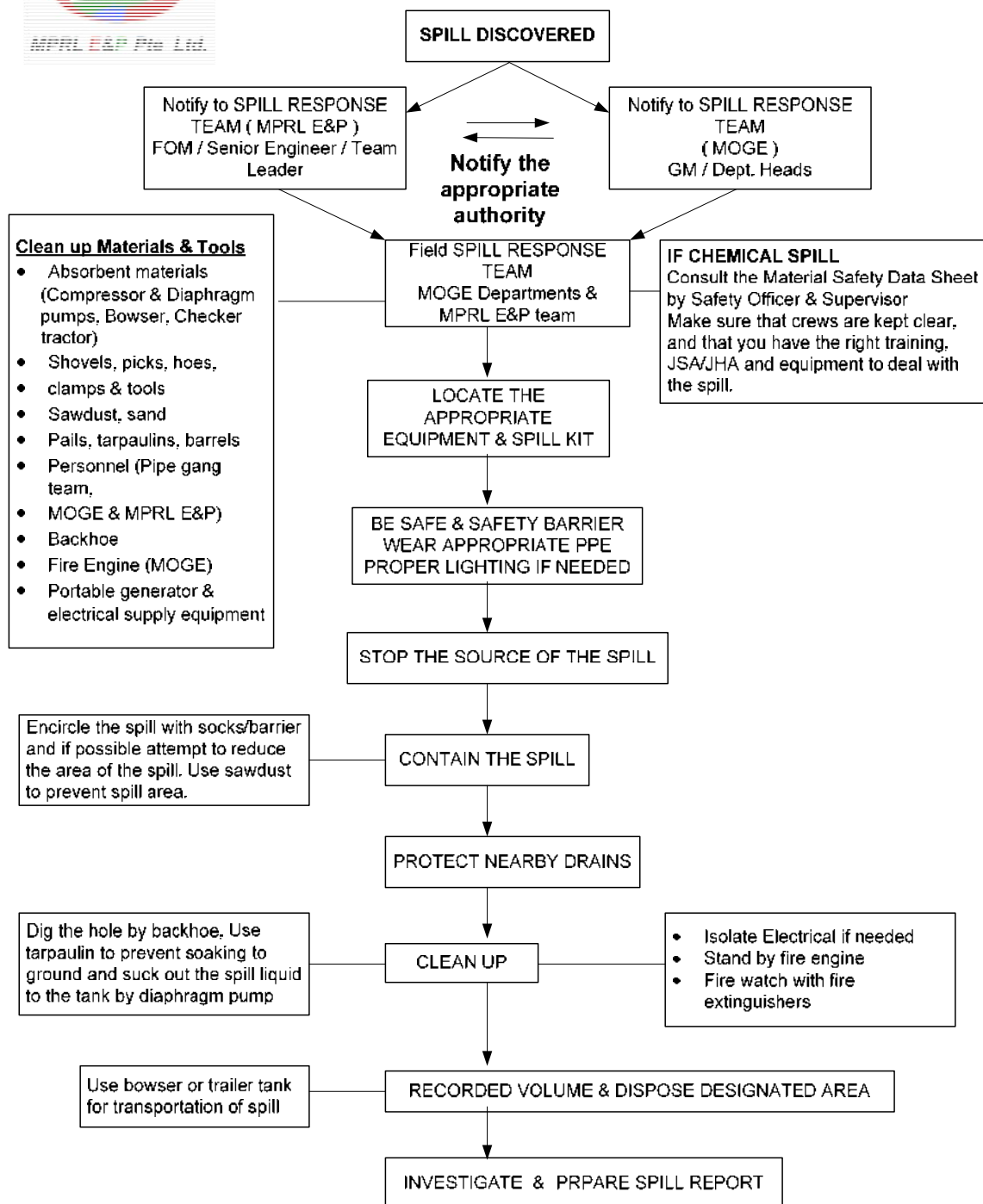
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Spill Response Procedure





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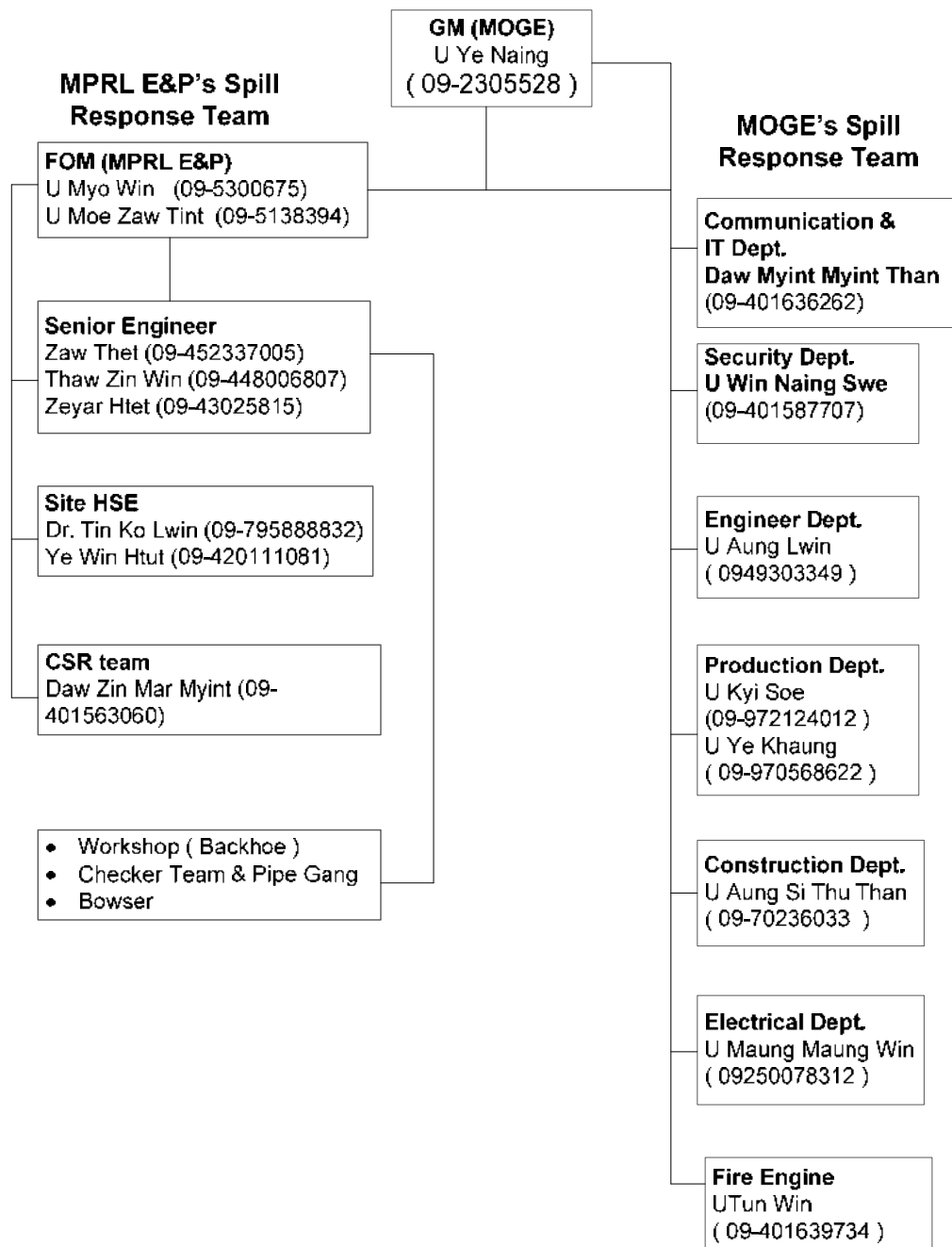
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Spill Response Emergency contact number



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3.3 Spill Clean up procedure

Adequate stocks of clean-up materials should be retained at readily accessible points on the facility. The following materials must be readily available and accessible for use:

- Absorbent granules
- Cloth rags
- Synthetic sorbents
- Oil sorbents
- Industrial maintenance sorbents
- Hazardous spill response kits (specialist kits)
- Drain Covers.

The materials used to control the waste spillage must be disposed of, having regard for the clarification of waste. In addition all appropriate documentation must be raised to identify and clarify the waste, which must also be properly labeled prior to disposal.

At no time should waste be washed to drain unless it has been categorically identified that it would not be an unacceptable loading on the environment and been cleared by the Environmental Engineer or Field Manager.

3.4 PPE

Refers to PPE Procedure (MPRL-HSE-PRO-014)

3.5 Training

3.5.1 Environmental Awareness Training

Environmental Engineer is accountable for developing the training material(s), which is comforted with international best practice, and it is suited to the field requirements.

3.5.2 Emergency Response Training

Field Manager (FM) is accountable for conducting emergency exercises at site by following company approved procedure(s).

CSR department will be coordinated for the exercise that involves with community and / or evacuation scenario.

3.6 Notification and Reporting

In the event of an Environmental Incident, it is required to investigate, take necessary samples and report the incident. The incident should be reported through Incident Investigation procedure (MPRL-HSE-PRO-010).

Where the potential for public interest or liability is high, Field Manager/ Site manager should immediately report to Senior Management for the follow up actions.

Incident Report form (MPRL-HSE-F-008) shall be used for report all the details of the incident.

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4 Appendix

4.1 Mann Field Spill Risk Assessment

4.2 Mann Field Spill Management Action Plan



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Appendix-1: Mann Field Spill Risk Assessment (A workshop will be conducted with the participate of : HSE, CSR, TXM, FM, PPEM, DRL)

No.	Area / Location	Possible Risk	Estimated Volume	Proposed Control Measures
1	Camp	Leakage of fuel oil from vehicles		
2	Warehouse	Leakage of chemical in the warehouse		
		Leakage of fuel oil from fuel station		
		Leakage of lub. oil from warehouse		
3	GOCS	Leakage of hydrocarbon from pipeworks		
		Leakage of crude oil from battery tanks		
		Leakage of crude oil from process tanks		
		Over flow of Produced Water treatment pits		
		Leakage of crude oil from transfer pump(s)		
4	Well Sites	Leakage of hydrocarbon from the process pipeworks		
		Spill case cause by pilfered cases		
		Leakage of hydrocarbon at well head		
		Leakage of crude oil from well site tanks		



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		Over flow from well head cellar		
		Leakage from bowser while transferring crude oil and produced water to the GOCS.		
5	Drillings / well services			
6	Others			

Appendix 2: Mann Field Spill Management Action Plan (To be developed after the Spill Risk Assessment completed)

No.	Tasks	PIC	Target date
1			
2			
3			
4			

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U Myo Tin General Manager				

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05	HSE Manager, MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
06	Assistant HSE Manager, MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>
07	HSE Officer, MPRL E&P	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
08	Medics, MPRL E&P	<input type="checkbox"/>	<input checked="" type="checkbox"/>

REVISION HISTORY					
Rev	Description	Date	Prepared by	Review By	Approved by
A	New Document	20 Mar 2018	HSE Team	TXM CXM	GXM

Be sure this is the latest revision of this document!

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1.0 INTRODUCTION

An emergency is an unforeseen combination of circumstances that disrupt normal operating conditions and pose an actual or a potential threat to human life, health, property, or the environment if not controlled, contained, or eliminated immediately.

Protection Priorities (Strategic Objectives for Emergency Response)

- People: Employees, Contractors, suppliers, customers, and communities
- Environment: Air, water, land, spillages, and area of sensitivity
- Property: MOGE, MPRL E&P, contractors, communities, and third party facilities and offices
- Business: Supply, production, and reputation

At the outset of any emergency it is critical to identify the body/organization which has overall responsibility for the execution of whole or part of the immediate response in the protection of personnel, the environment and property during an emergency.

1.1 Scope / Objectives

The purpose of this section is to familiarize all personnel involved with Mann Field operation with the arrangements for dealing with an emergency. The main emergency situation to plan for is that of fire. This procedure also considers the management of a serious accident (in combination with “Medivac Procedures” MPRL-HSEMS-MAN-007) and of a vehicle incident during crew change operations. The response to an environmental incident is described, but further details are contained in procedure MPRL-HSE-PL-002 “Environmental Management Plan”

1.2 Scope of this document

The design scope of this Emergency Response Plan, Mann Field Production Enhancement Project is;

- Identifies the major risks potentially impacting business operations and local communities.
- Describes the response strategies and the management organization.
- Sets out the roles and responsibilities of the key personnel
- Identifies internal and external notification procedures

2.0 IMPLEMENTATION OF EMERGENCY RESPONSE PLANS

2.1. The Definitions of Emergency Response Plans

Emergency Response Team Commander shall define the coverage of Emergency Response Plans (ERPs) for any particular well operations applicable to Mann Field

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Production Enhancement Operations. The coverage of emergency response plans shall address as a minimum, but not limit to, the following scenarios;

- a. Fire
- b. Well Control
- c. Oil Spill/ Environmental incident
- d. Cyclone
- e. Medical Emergency

2.2. Emergency Categories

Based on initial information, the Emergency Response Team Commander (ERTC) will categorize the incident into one of three levels, as shown in Table 1. The level should be chosen conservatively to allow for potential escalation of the event.

Incident Categories

Injuries	Environment	Assets / Financial	Government / Media Interest
Level One: Local emergency response within location capabilities			
Minor injuries	Small spill with minor (easily and quickly cleaned up) affect to land and/or other environmental resources. Minor gas release quickly dissipated.	< \$10, 000 of actual or potential damage or loss	None
Level Two: Emergency requiring resources in addition to those on site			
Serious injury	Large spill affecting the immediate drilling area and other environmental resources for a short period of time	< \$50, 000 of actual damage or loss	Local news coverage
Level Three: Major emergency or crisis with potentially serious impact on MPRL E&P Pte Ltd.			

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Fatality or multiple serious injury	Large spill affecting an area in excess of the immediate drilling area or other environmental resources for an indefinite period	> \$50, 000 of actual damage or loss	Adverse national/ international news
A Level Three Response normally requires significant additional resources beyond the capabilities of the location and/or region.			

2.3. Existing Emergency Response Plans

In most cases, existing emergency response plans will be in place (e.g. contracted Service Company). These existing emergency response plans have been reviewed, and where appropriate, bridging documentations are in place to ensure the objectives and goals described in Section 1.1 are achieved.

Contractor shall demonstrate the effectiveness of the emergency management system that is currently in place, and such exercises and other activities as required ensuring the crew can effectively respond to identified potential emergencies.

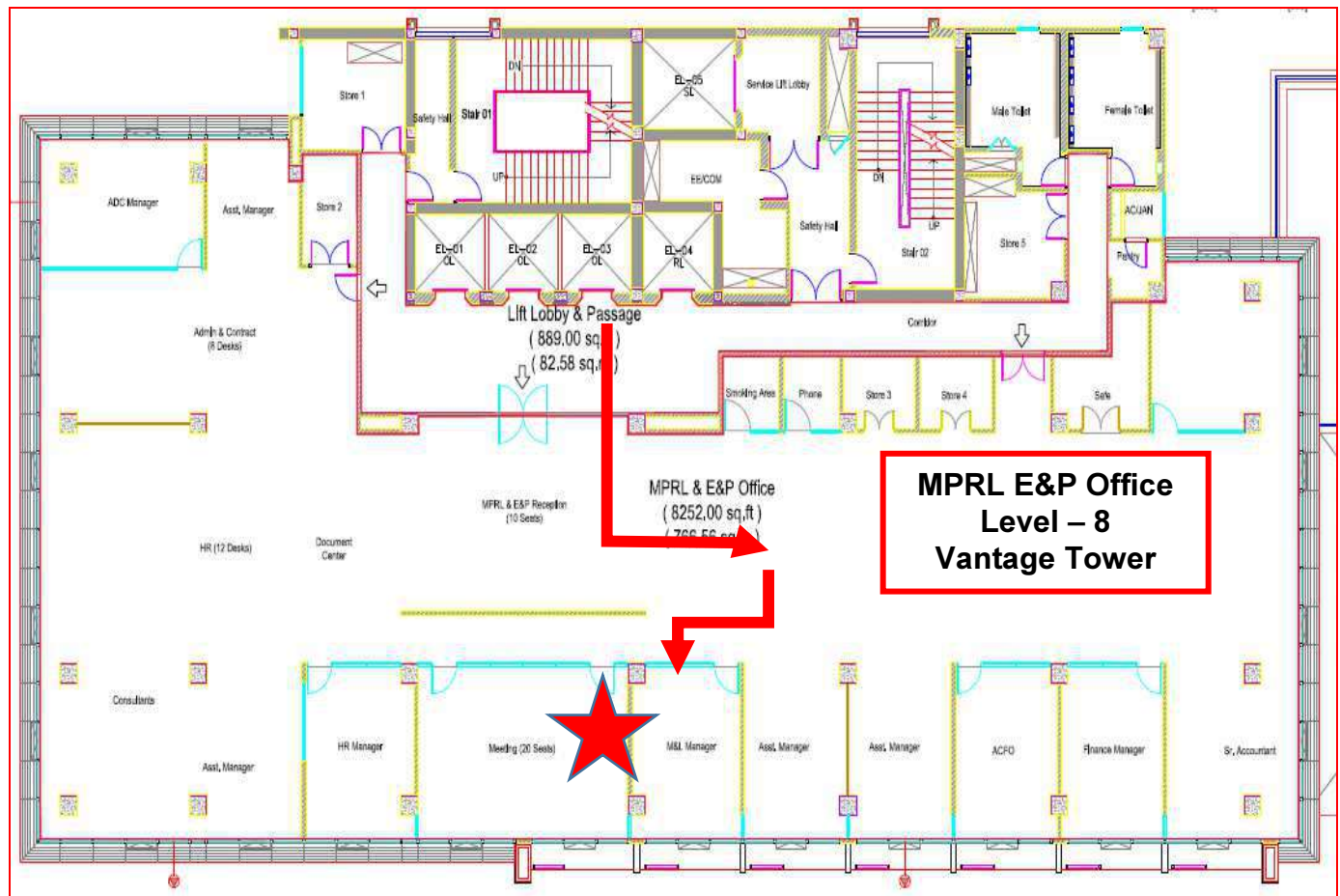
2.4. Emergency Response Planning

Prior to the commencement of any new operations, the Emergency Response Team Commander shall be responsible for completing the following tasks;

- Establishing an Emergency Response Centre which is suitably equipped to support any emergency that may occur. This Emergency Response Centre shall be capable of providing technical support to the affected facility and the Crisis Management Team in MPRL E&P Office if required
- Establishing and maintaining a duty roster and call out procedures as described in the approved Emergency Response Plans
- Ensuring a full set of Emergency Response Plans and any other emergency response documentation is provided to the work site and is available in the Emergency Response Centre in Yangon for daily operations / reference
- Ensuring that Operations Team (staff, contractors, and allied partners) has a work familiarity of the defined operation's Emergency Response Plans. This induction process shall be part of the pre-start up induction process, including Emergency Response Centre in Yangon for appropriate personnel

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Figure 1 Layout of MPRL E&P Emergency Response Centre



2.5. Test Emergency Response Plans

The Emergency Response Team Commander is accountable that there is an effective emergency response process applied to MPRL E&P's operations.

One part of this accountability includes ensuring that the preparedness and competency of Operation Teams is tested by conducting regular training exercises, in conjunction with the Emergency Response Centre in Yangon.

It is the responsibility of the Emergency Response Team Commander to organize and conduct a communications exercise within 7 days of being on location, and thereafter every 60 days'.

It is also the responsibility of the Emergency Response Team Commander and Well Site Representative to review these emergency response exercises to identify learning's to carry forward to the next planned exercise.

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2.6. EMERGENCY RESPONSE PLANS

2.6.1. Fire or Explosion at the Rig Site

Nearby wells, and gas and oil lines running on the ground surface, there is serious risk of escalation of fire. All personnel and vehicles must be cleared up wind of the fire and then evacuated to the camp. Contact the base camp office by radio or in person and direct the Fire Station to be contacted through the land-line telephone exchange on (065)21099 or 09256455613, giving the location (well number) of the fire.

Fire at the Camp, Warehouse or Workshop

In the event of fire:

1. Raise the local alarm and call the fire station via the exchange on 065-21099.
2. Only tackle small fires with hand-held fire extinguishers if it is safe to do so.
3. Go to assembly point.
4. Do not return to the scene of the fire until instructed by the Fire Service that it is safe to do so.

On hearing the alarm at the camp:

1. Wake anyone sleeping – security staff to check all rooms.
2. Go straight to the assembly point.
3. Give your name at the roll-call.
4. Do not return to the scene of the fire until instructed by the Fire Service that it is safe to do so.

The camp alarm is the sound of a steel rod beating on steel pipe or a steel triangle. The assembly point is outside the perimeter fence between the two front gates on the main road. The roll-call will be conducted by the Camp Boss by taking the current personnel list displayed by the office door, in the absence of the Camp Boss the roll-call will be taken by the Field Manager.

On hearing the alarm at the warehouse or workshop:

1. Go immediately to the front gate of the warehouse / workshop.
2. Account for all personnel known to be working in the area.
3. Do not return to the scene of the fire until instructed by the Fire Service that it is safe to do so.



Fire ERP Flowchart

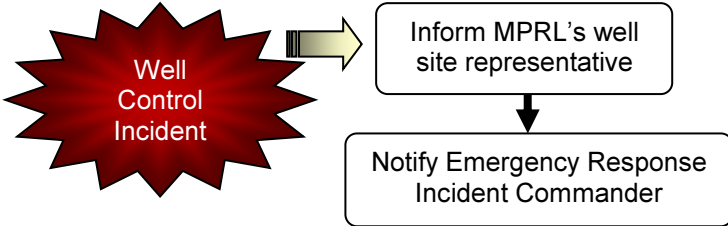
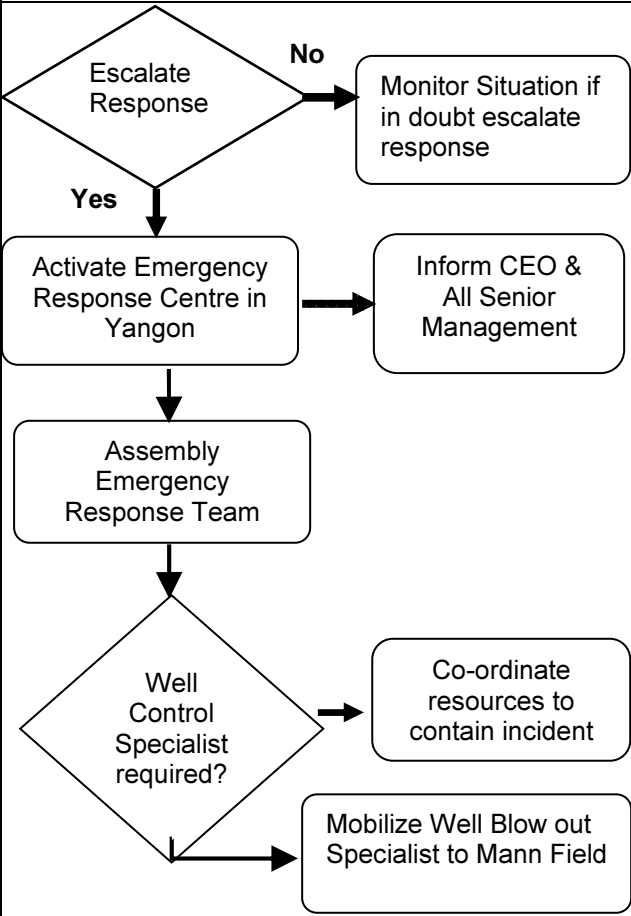
Responsible Contacts	Response Actions
<p>WORK SITE A responsible person recognizes fire control event, i.e. FOM, Camp Boss, Senior Engineer, Supervisor, HSEO, etc.</p>	<pre> graph TD Fire((Fire)) --> InformFOM[Inform FOMs / GM (MOGE)] InformFOM --> NotifyIC[Notify Emergency Response Incident Commander] NotifyIC --> PersonDiscovers[Person discovers Fire] PersonDiscovers --> EasilyExtinguished{Is the fire easily extinguished?} EasilyExtinguished -- Yes --> ExtinguishFire[Extinguish Fire] ExtinguishFire --> ReportFOM[Report Incident to FOM] EasilyExtinguished -- No --> ActivateNearest[Activate nearest] ActivateNearest --> InsideAccommodation{Is fire inside accommodation / office?} InsideAccommodation --> NotifyGM[Notify to GM (Mann)/ FOM] InsideAccommodation --> NotifyCampBoss[Notify to FOM / Camp Boss] NotifyGM --> ArousePersonnel[Arouse all personnel - Go to the Muster point - Conduct a head count. - FOM to designate fire control team] NotifyCampBoss --> ArousePersonnel ArousePersonnel --> CallFireBrigade1[Call the Fire Brigade] CallFireBrigade1 --> FOMNotifySenior[FOM notify to Senior Management] FOMNotifySenior --> CompleteInvestigation[Complete Accident Investigation] CallFireBrigade1 --> CallFireBrigade2[Call the Fire Brigade] CallFireBrigade2 --> FOMNotifySenior CallFireBrigade2 --> RequiredInfo[Following Information Required: • Who - your name • What - is burning • Where - fire location • Which - direction fire is headed • Injuries] RequiredInfo --> FOMNotifySenior </pre>
<p>U Myo Tin (GXM) Vantage Tower 623 Pyay Road, Kamaryut Township, Yangon, Myanmar</p> <p>Tel: (95-1) 230 7733~8 Mob: Fax: (95-1) 230 7744</p>	<p>Following Information Required:</p> <ul style="list-style-type: none"> • Who - your name • What - is burning • Where - fire location • Which – direction fire is headed • Injuries
<p>MPRL's E&P Field Office Mann Oil Field, Minbu Township, Magway Division</p> <p>Tel: 065 21243 Fax: 065 21243</p>	<p><u>Uncontrolled Fire</u> Field ERT Commander (FERTC) reports ASAP to MOGE within 12 hours of event being observed. Follow up confirming details after accident is obtained providing an initial investigation report <u>Myanma Oil & Gas Enterprise (MOGE)</u> U Ye Naing – General Manager U Myo Myint Oo – Managing Director Tel: 067 411055</p>

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2.6.2. Well Control ERP

This well control ERP has been prepared for MPRL E&P well site drilling operation which must be followed in the event of emergency situation as a guide and procedures to maintain safe and effective well control.

Well Control ERP Flowchart

Responsible Contacts	Response Actions
<u>WORK SITE</u> A responsible person recognizes well control event, i.e. CED, DOM, TXM, FOMs, Senior Engineer, Supervisors, etc.	
<u>Emergency Response Incident Commander</u> Vantage Tower 623 Pyay Road Kamaryut Township, Yangon, Myanmar Tel: (95-1) 230 7733~8 Mob: Fax: (95-1) 230 7744	
MPRL E&P's Field Office Mann Oil Field, Minbu Township, Magway Division Tel: 065 21243	<u>Uncontrolled Well Blow out</u> Field ERT Commander (FERTC) reports ASAP to MOGE within 12 hours of event being observed. Follow up confirming details after well control is obtained providing an initial investigation

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Fax: 065 21243	report <u>Myanma Oil & Gas Enterprise (MOGE)</u> U Ye Naing – General Manager U Myo Myint Oo – Managing Director Tel: 067 411055
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2.6.3. Environmental pollution incident

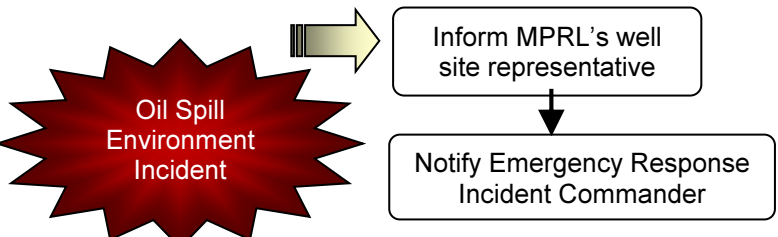
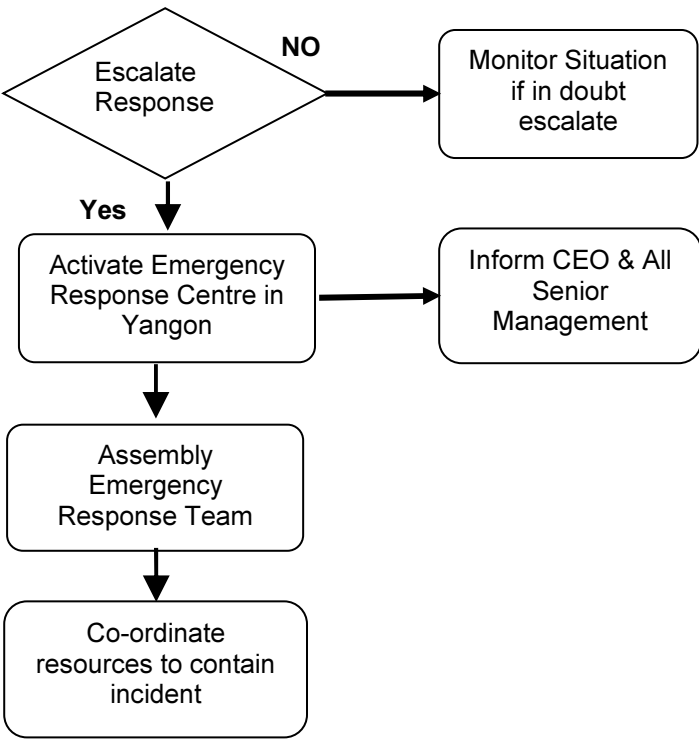
The most likely sources of environmental pollution in the Mann Field Operation are uncontrolled discharges of hydrocarbons from wells and chemical spills from tanks and drums. MPRL- HSEMS- PL-002 “Environmental Management Plan” describes the response to a major oil spill. The response to more minor spills is described below.

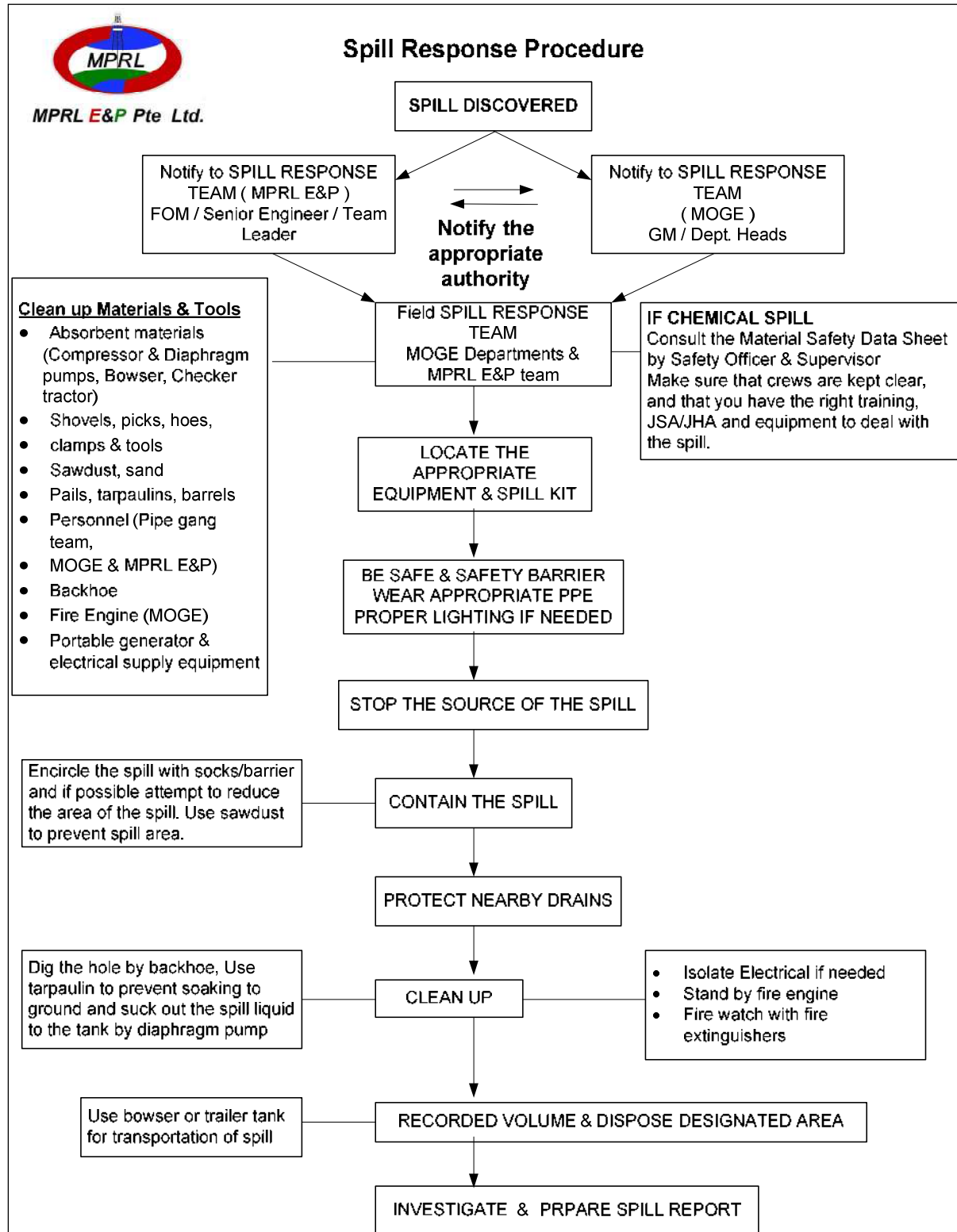
In the event of a discharge / spill:

1. Take the necessary steps to stop the leak / spill (such as close valves, stand up barrels, etc.) and make the area safe (removing sources of ignition, etc.,) only if is safe to do so.
2. If there is a danger of fire, explosion or high levels of toxicity raise the alarm and evacuate the area.
3. Attempt to contain the spill using inert material or barriers.
4. Cordon off the contaminated area, if appropriate.
5. Note the name of the chemicals involved and report the incident to the Medic / Safety Officer.
6. HSE Officer to refer to the Material Safety Data Sheet for guidance on neutralising, clean up and disposal procedures.
7. Ensure the incident is fully reported and investigated (MPRL-HSEMS-PRO - 003 (INCIDENT REPORTING & INVESTIGATION PROCEDURE) and that actions to prevent recurrence are implemented in a timely manner.

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Environment Incident ERP Flowchart

Responsible Contacts	Response Actions
<u>WORK SITE</u> A responsible person recognizes pollution event, i.e. GM (MOGE), FOMs, Senior Engineer, Supervisors, HSEO, etc.	
<u>Emergency Response Incident Commander</u> Vantage Tower 623 Pyay Road, Kamaryut Township, Yangon, Myanmar Tel: (95-1) 230 7733~8 Mob: Fax: (95-1) 230 7744	
GM (MOGE) 092305528 MPRL E&P Field Office Mann Oil Field, Minbu Township, Magway Division Tel: 065 21243 Fax: 065 21243	<u>Spills greater than 500 liters</u> Field ERT Commander (FERTC) reports ASAP to MOGE and within 12 hours of event being observed. Follow up confirming details within 24 hours providing an initial investigation report <u>Myanma Oil & Gas Enterprise (MOGE)</u> U Ye Naing – General Manager U Myo Myint Oo – Managing Director Tel: 067 411055





MPRL E&P Pte Ltd.

**Spill Response
Emergency contact number**

**MPRL E&P's Spill
Response Team**

FOM (MPRL E&P)

U Myo Win (09-5300675)
U Moe Zaw Tint (09-5138394)

Senior Engineer

Zaw Thet (09-452337005)
Thaw Zin Win (09-448006807)
Zeyar Htet (09-43025815)

Site HSE

Dr. Tin Ko Lwin (09-795888832)
Ye Win Htut (09-420111081)

CSR team

Daw Zin Mar Myint (09-401563060)

- Workshop (Backhoe)
- Checker Team & Pipe Gang
- Bowser

GM (MOGE)
U Ye Naing
(09-2305528)

**MOGE's Spill
Response Team**

**Communication &
IT Dept.**

Daw Myint Myint Than
(09-401636262)

Security Dept.

U Win Naing Swe
(09-401587707)

Engineer Dept.

U Aung Lwin
(0949303349)

Production Dept.

U Kyi Soe
(09-972124012)
U Ye Khaung
(09-970568622)

Construction Dept.

U Aung Si Thu Than
(09-70236033)

Electrical Dept.

U Maung Maung Win
(09250078312)

Fire Engine

UTun Win
(09-401639734)

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2.6.5 Major Natural Disaster

Description

- ❖ A Major natural disaster in the area of Mann Oil Field can take the following form: Landslides
 - Earthquake
 - Tropical Storm
 - Cyclone
 - Fire

Possible escalation

- ❖ Mass casualty
- ❖ Beware of the lack of intervention means: as the other Oil & Gas operators will be in alert phase simultaneously, any commitment / assistance in term of logistics cannot be granted by any one. This means that field team will have available, (12) vehicles, one ambulance. However, communication must be established between not only field team members but also with Yangon Head office, be ready to assist accordingly.

Specific safety Instructions to be diffused by site manager in case of natural disaster alert:

Earthquake

- ❖ If an earthquake strikes when you are inside:
 - Stay inside and seek shelter.
 - Watch out for falling objects.
 - Stay away from windows and mirrors.
 - Hide under a table or desk, sit or stand against an inside wall away from windows, or stand in a strong inside doorway.
 - Do not use open flames. Natural gas lines may have been disrupted. Watch for fires that may have started.
 - Do not move seriously injured people unless they are in immediate danger.
 - Do not use plumbing or anything electrical (including elevators) until after the utility and electrical lines have been checked.
- ❖ If an earthquake strikes when you are outside:
 - Avoid walls, power poles, and other objects that may fall. Move to open areas away from hazards.
 - Stop in the nearest open area if possible.
 - If surrounded by buildings, seek shelter in the nearest strong one.
 - If it appears that the buildings may have been damaged, evacuate. Aftershocks can level severely damaged buildings.
- ❖ If an earthquake strikes when employees are in an automobile:
 - Stay in the vehicle.



Flood

- Abandon where you are, climb to higher ground and stay there.
- Avoid wading through floodwaters. If moving swiftly, even water six inches deep can be dangerous.

Field Management Team	Declares the alert, decides and upgrades the alert levels. Ensures that Yangon is notified. Mobilizes the emergency response team (ERT) Collects detailed information regarding the weather and the potential escalation of the event, with Yangon assistance. Decide to evacuate or not evacuate. Prepare with the shutdown team leader a timetable to secure the activities in process. In case of unpredicted earthquake, diffuse the safety information via the radio (Motorolla GP-328 Walkie-Talkie).
Site Medic	In case of mass casualty, identify a safe area for triage with Field Management Team. Request Medevac to Yangon based on Triage priority but expect telecommunication to be disturbed.
Field Admin Officer	Update the log sheet to record the emergency situation in a chronological order.
All Team Members	Join the ERT only if necessary and requested by Field Management Team.
All personnel	Respect the safety instructions and wait for mustering to be safe to assemble.
Field Admin Officer & Site HSEO	If safety allows for mustering, carry out people's counting Consolidate POB Transmit the POB to Field Management
Field Manager	Wait for the area to be safe for intervention. Prepare collective and rescue equipment Proceed to search by directing to last known position Organize the victim rescue team and stretcher team, refer to injury and casualty scenario Collect name/company and number of casualties if applicable
Camp Boss	Assess situation and the need for complementary means Control vehicle traffic Assess the need for extra vehicle for evacuation with the assistance of M&AS (Yangon Office). Define a strategy with Field Management Team for search operations Advises the Field Management Team on evacuation if the situation is required.

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3.0 EMERGENCY RESPONSE TEAM

3.1 Roles and Responsibilities

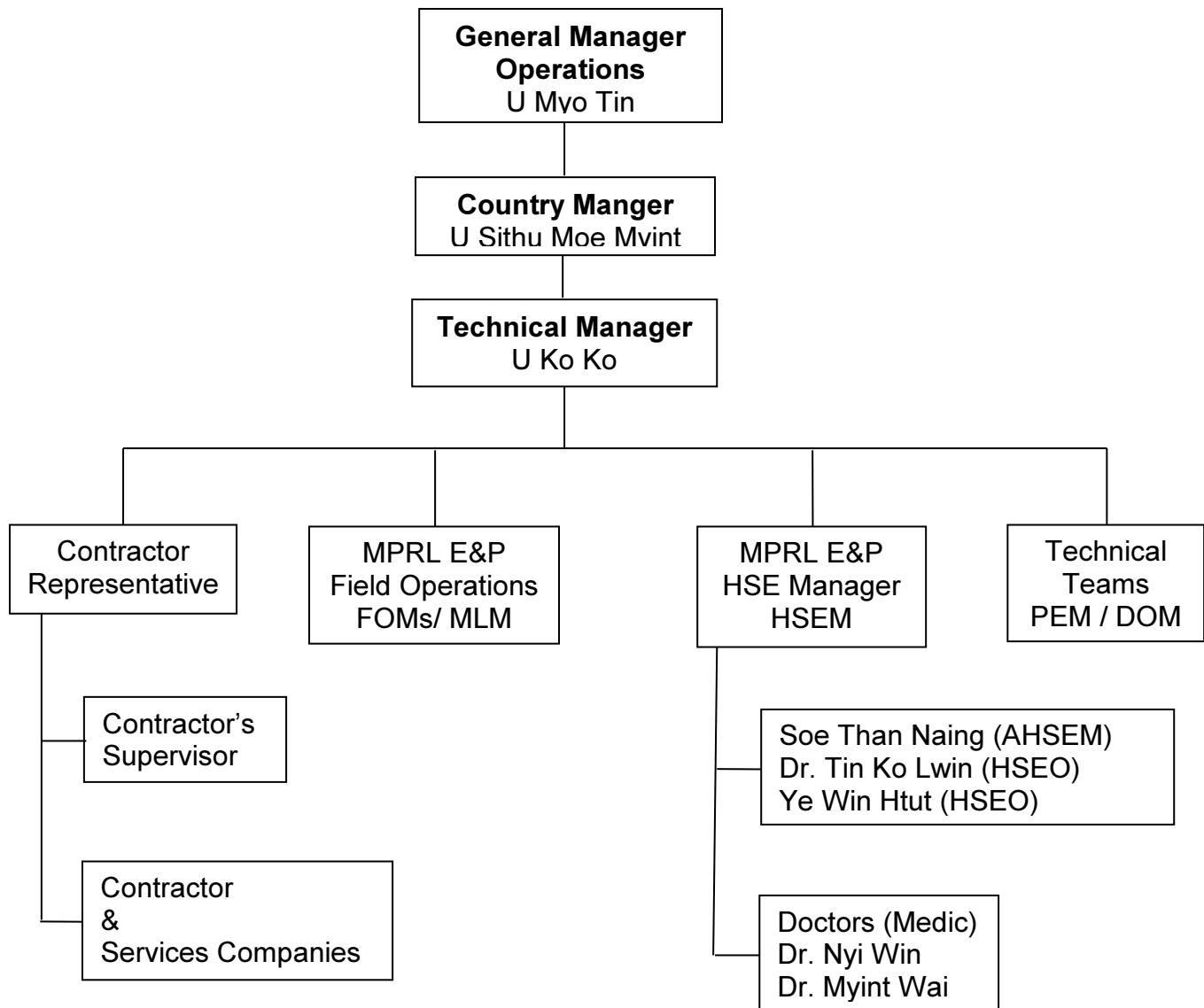
The primary role and responsibility of the Emergency Response Team formed under the guidance of this Emergency Response Plan is to provide for the safe and efficient evacuation of all personnel during an emergency situation. The secondary responsibility will be to manage the mitigation of the emergency whether it is within the capabilities of the Team or outside help is needed. The core team will be comprised of the following members:

The primary role and responsibility of the Emergency Response Team formed under the guidance of this Emergency Response Plan is to provide for the safe and efficient evacuation of all personnel during an emergency situation. The secondary responsibility will be to manage the mitigation of the emergency whether it is within the capabilities of the Team or outside help is needed. The core team will be comprised of the following members:

- | | |
|--|-------|
| • Emergency Response Team Commander | ERTC |
| • Deputy Emergency Response Team Commander | DERTC |
| • Emergency Response Team Scribe | ERTS |
| • Emergency Response Logistic Coordinator | ERLC |
| • HSE Coordinator | HSEC |
| • Field Emergency Response Team Commander | FERTC |
| • Deputy Field Emergency Response Team Commander | DERTC |
| • Field Logistics Coordinator | FLC |
| • Field Operations Coordinator | FOC |
| • Field HSE Coordinator | FHSEC |
| • Field Emergency Response Team Scribe | FERTS |

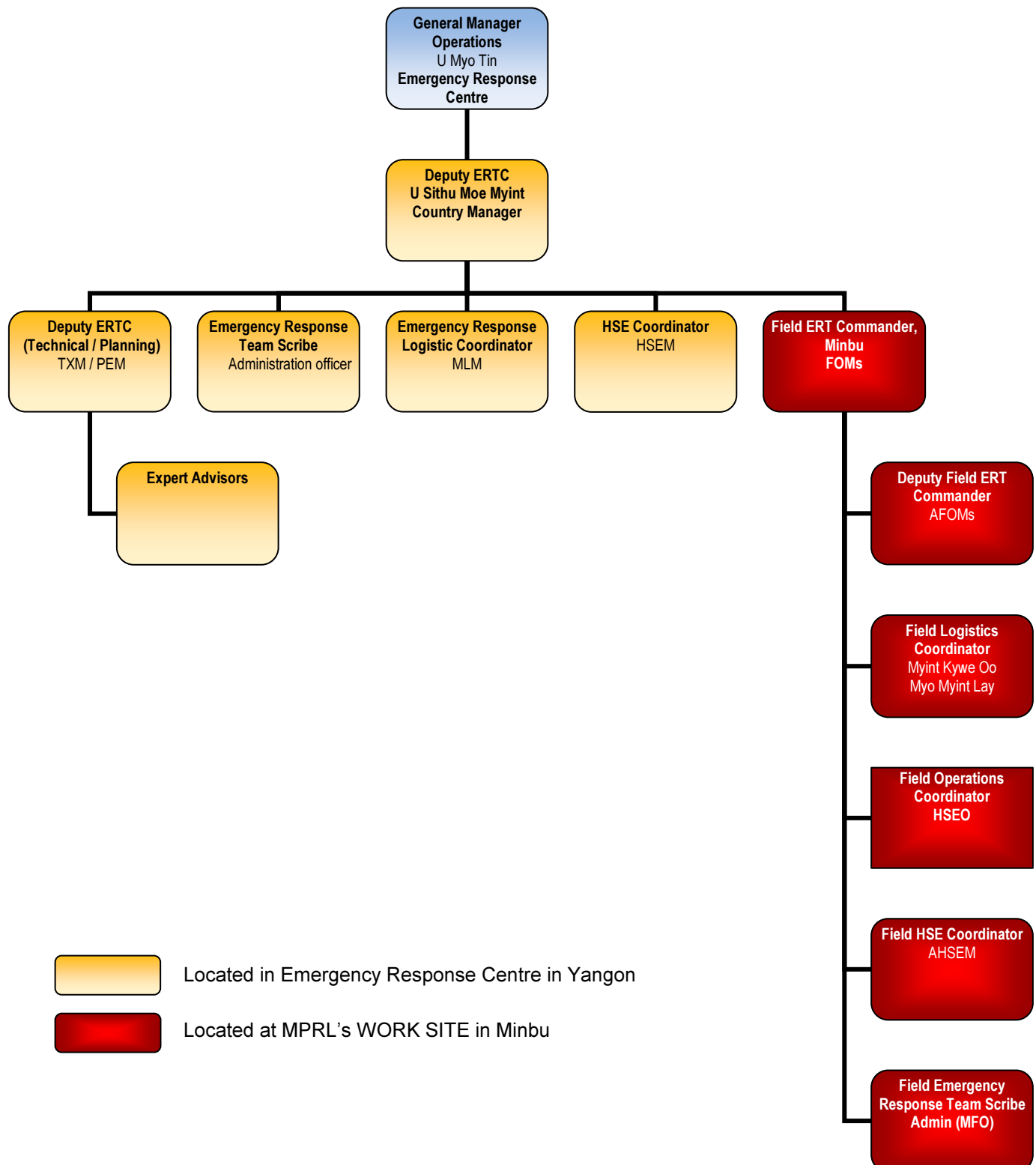
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MPRL E&P Organization Chart during Normal Operations



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Emergency Response Organization Chart



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3.2 MPRL E&P Representations

3.2.1. General Managers

Under MPRL E&P Management System, General Manager is accountable for establishing a crisis management system. The general manager also has certain corporate roles to manage communication links with governments, media and external parties on matters of material significance on a national basis and to manage the inter-Company communication of such activities.

General Manager's roles and responsibilities during an emergency are;

- Direct the establishment of a Crisis Management System in MPRL E&P Yangon Office
- Keep Chief Executive Officer (CEO) advised of the incident status and the MPRL E&P position in the country.
- Consult with Emergency Response Team Commander (ERTC) on media, government and public relations activities and strategies, and agree on the MPRL E&P spokesperson's role.
- Consult with Legal and elsewhere as necessary on the corporate statutory obligations in terms of the incident.
- As necessary, facilitate cross-business/company resource utilization in terms of response to the incident.
- Provision of all the necessary facts in order to produce suitable press releases.
- Establish a media strategy.
- Secure additional financial authority if required beyond the normal delegated level.

3.3 Emergency Response Centre, Yangon

3.3.1. Emergency Response Team Commander (ERTC) – GXM

The Emergency Response Team Commander (ERTC) shall be located in Yangon and upon activation of the Emergency Response System will assume overall command of the emergency. His duties include but are not limited to:

- Oversee the preparation of the Site Emergency Plan.
- Assist in the selection of other ERT members.
- Runs the Emergency Response Centre.
- Obtains initial information regarding a crisis situation in close coordination with other ERT members.

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- Determines the need for emergency response.
- Determines what outside agencies should be notified.
- Determines if evacuations are in order, and for what area(s).
- Instructs Team Leaders as to the movement and actions of their personnel during the emergency.
- Identity's and appoints "replacement members" of the ERT whenever original Team Members are unavailable, and appoints additional replacement members if necessary.

3.3.2. Deputy Emergency Response Team Commander (DERTC) – CXM

Under the direction of the Emergency Response Team Commander (ERTC), the Deputy Emergency Response Team Commander (DERTC) shall:

- Assume Team Leader for planning and overseeing the planning activities of the MPRL E&P resources and outside resources.
- Assist the ERT Commander as directed.
- Assume interim command and responsibility for ERT Commander Duties when the ERT Commander is not available.
- Verify execution of the ERT Commander's directives.
- Appoint department personnel as Agency Representatives to be located at the command centre of outside agencies.
- Request participating agencies to provide liaison personnel to the Field ERT Command Centre (FERTCC).
- Review situation reports, journals, and other reports for completeness.
- Ensure that the officers in charge of the FERTCC sections submit unit logs to the ERT Commander at the end of each shift, detailing the activities of their section.

3.3.3. Deputy Emergency Response Team Commander (DERTC)- TXM/PEM/DOM

Under the direction of the Emergency Response Team Commander (ERTC), the Deputy Emergency Response Team Commander (DERTC) shall:

- Assume Team Leader for technical and overseeing the planning activities of the MPRL E&P resources and outside resources.

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- Assist the ERT Commander as directed.
- Assume interim command and responsibility for ERT Commander Duties when the ERT Commander is not available.
- Verify execution of the ERT Commander's directives.
- Appoint department personnel as Agency Representatives to be located at the command centre of outside agencies.
- Request participating agencies to provide liaison personnel to the Field ERT Command Centre (FERTCC).
- Review situation reports, journals, and other reports for completeness.

Ensure that the officers in charge of the FERTCC sections submit unit logs to the ERT Commander at the end of each shift, detailing the activities of their section.

3.3.4. Emergency Response Team Scribe (ERTS) – Administration Officer

Scribes shall try to answer who, what, when, where, how, and why on the command side. They write down any specific instructions that were given by or to the ERT Commander.

Scribes shall document anyone whom the ERT commander talked to over the phone outside the chain of command. This helps eliminate having to ask dispatch for the same information or asking them to have someone call you back.

At the direction of the ERT Commander, the Scribe shall record information from all incident message forms with reference to time, message and action taken. Responsibilities include:

- Maintaining and periodically distributing a situation report.
- Gathering incident related information from other ERT Sections for entry in the ERT Command Log.
- Referring newsworthy information to the Public affairs / communication team as authorized by the ERT Commander.
- Ensuring that all messages are appropriately routed.
- Ensuring that the incident communications and messages are established.
- Setting up telephone and public address systems as required.
- Establishing appropriate communications to and from all relevant locations.

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- Ensuring that these communications systems are operating properly and efficiently.
- Ensuring that radio equipment is distributed (as required), per radio plan, giving special attention to battery resupply and/or recharging.
- Will maintain contact with the Crisis Management Team at MPRL E&P Yangon Office

3.3.5. Emergency Response Team Logistics Manager (ERLC) – MLM

The ERT Logistical Resource Coordinator is responsible for coordinating providing facilities, services, and materials for the incident response and provides all incident support needs such as:

- Facilities
- Transportation
- Communications
- Supplies
- Equipment Maintenance
- Provides logistical input to the ERT Commander in preparing the Incident Action Plan.
- Identify anticipated and known logistical service and support requirements impacting incident.
- Request additional logistical resources as needed.

3.3.6. Emergency Response Team HSE Coordinator (HSEC) – HSEM

The HSE Coordinator (HSEC) role is to develop and recommend measures to the ERT and / or FERT for assuring personnel health and safety and to assess and/or anticipate hazardous and unsafe situations. The HSE Coordinator (HSEC) also develops the Site Safety Plan, reviews the Incident Action Plan for safety implications, and provides timely, complete, specific, and accurate assessment of hazards and required controls. His duties include but are not limited to:

- Participate in planning and strategy and meetings providing HSE input as necessary.
- Periodic assessment and identification of hazardous situations associated with the incident and prevent accidents.

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- Assign assistants qualified to evaluate special hazards.
- Review the Incident Action Plan for safety implications and prepare specific safety message or plan based on hazards, problems, or EIA requirements.
- Exercise emergency authority to stop and prevent unsafe actions.
- Initiate preliminary investigation of accidents that have occurred within the incident area.
- Ensure safety messages and briefings are made as needed.
- Conduct risk assessments on activities associated with response to incident.

3.3.7. Emergency Response Centre Supplies

The Emergency Response Centre will serve as the nucleus for response to an emergency situation. As such it is important that it contain the necessary resources, equipment, supplies, personnel, etc. The following is a list of basics that should be used as a minimum guideline:

- Telephones with international access
- Mobile phones
- Teleconference phone with speaker phone
- Laptops with Internet Access
- Mass Notification System
- Contact lists
- Maps
- Printer(s), Copier, Scanner
- Fax
- Overhead projector
- Pin board and white board
- Flip charts and markers
- Office supplies-staplers, tape, pens, paper
- Access to water, food, coffee, tea

These supplies will be located in a designated area in the MPRL E&P office in Yangon

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3.4 MPRL E&P Work Site, Minbu

3.4.1 Field Emergency Response Team Commander (FERTC) – FOMs

The Field Emergency Response Team Commander (FERTC) is responsible for all aspects of the response, including developing incident objectives and managing all incident operations.

The FERT Commander is faced with many responsibilities when he/she arrives on scene. Unless specifically assigned to another member of the ERT, these responsibilities remain with the FERT Commander. Some of the more complex responsibilities include:

- Establish immediate priorities especially the safety of responders, other emergency workers, bystanders, and people involved in the emergency.
- Stabilize the incident by ensuring safety of life and managing all resources efficiently and cost effectively.
- Determine incident objectives and coordinate strategy with ERT Commander to achieve the objectives.
- Establish and monitor incident organization in accordance with this emergency response plan to achieve objectives.
- Approve the implementation of the written or oral Incident Action Plan.
- Ensure adequate health and safety measures are in place.
- Establish and maintain coordination with ERT Command Centre in Yangon through protocols established on an “incident specific” basis.

3.4.2 Deputy Field Emergency Response Team Commander (DFERT) – AFOM

In addition to being prepared to assume the duties of the FERT Commander, the following is a list of responsibilities that the Deputy Field ERT (FERT) Commander should perform or assign to appropriate members of the Command as directed by the FERT Commander:

- Provide response direction.
- Coordinate effective communication.
- Coordinate resources.
- Establish incident priorities.

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- Develop mutually agreed-upon incident objectives and approve response strategies.
- Assign objectives to the response structure.
- Review and approve incident action plans.
- Ensure integration of response organizations into the emergency as required.
- Establish protocols.
- Ensure worker and public health and safety.

3.4.3 Field Logistics Coordinator (FLC) – (M&A Camp boss)

The Field ERT Logistical Resource Coordinator is responsible for providing facilities, services, and materials for the incident response and provides all incident support needs such as:

- Facilities
- Transportation
- Communications
- Supplies
- Equipment Maintenance
- Food Services (responders)
- Medical Services (responders)
- Provides logistical input to the FERT Commander in preparing the Incident Action Plan.
- Identify anticipated and known logistical service and support requirements impacting incident.
- Request additional logistical resources as needed.
- Develop traffic plans and vehicle movement strategy.

3.4.4 Field Operations Coordinator (FOC) – Contractor Representative

The Operations Coordinator is responsible for all operations directly applicable to the primary mission of the response. The Field Operations Coordinator (FOC) is also responsible for the management of all operations which are directly applicable to the primary mission. The Field Operations Coordinator (FOC)

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activates and supervises the organizational elements in accordance with the incident action plan and directs its execution. The Field Operations Coordinator (FOC) also coordinates tactics, requests and/or releases resources, makes expedient changes to the incident action plan as necessary, and reports such actions to the Incident Commander. Responsibilities include:

- Obtaining a briefing from the Incident Commander.
- Coordinating field operations section activities with other sections.
- Supervising and directing Field Operations Section personnel.
- Appointing staff as needed.
- Advising the FERT Commander regarding the organization and deployment of field forces for control of the emergency.
- Recommending areas for staging of personnel / equipment, and coordinating this function with the Field Logistics Coordinator.
- Recommending perimeters, interior control plans, and evacuation plans as needed.
- Establishing plans for ingress and egress.
- Assembling and disassembling various units as dictated by the circumstances.
- Reporting information about special activities, events and occurrences to the FERT Commander.
- Determining the needs and requesting resources as required.
- Monitoring the chain-of-command and span-of-control for efficiency.
- Assuring effective communications.
- Maintain a unit log.
- Responsible for managing all tactical operations during an incident.
- Assist in the development of the public health operations (strategy) portion of the Incident Action Plan.
- Maintain close contact with FERT subordinate positions and direct as required.
- Ensure safe tactical operations for responders.
- Request additional resources to support tactical operations as necessary.
- Expedite changes to the public health operations portion of the Incident
- Action Plan as required.

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- Maintain close communications with the FERT Commander and/or ERT Commander.

3.4.5 Field HSE Coordinator (FHSEC) – AHSEM / HSEO

The Field HSE Coordinator (FHSEC) role is to develop and recommend measures to the ERT and / or FERT for assuring personnel health and safety and to assess and/or anticipate hazardous and unsafe situations. The Field HSE Coordinator (FHSEC) also develops the Site Safety Plan, reviews the Incident Action Plan for safety implications, and provides timely, complete, specific, and accurate assessment of hazards and required controls. His duties include but are not limited to:

- Participate in planning and strategy and meetings providing HSE input as necessary.
- Periodic assessment and identification of hazardous situations associated with the incident and prevent accidents.
- Assign assistants qualified to evaluate special hazards.
- Review the Incident Action Plan for safety implications and prepare specific safety message or plan based on hazards, problems, or EIA requirements.
- Exercise emergency authority to stop and prevent unsafe actions.
- Initiate preliminary investigation of accidents that have occurred within the incident area.
- Ensure safety messages and briefings are made as needed.
- Conduct risk assessments on activities associated with response to incident.
- Conduct safety meetings and toolbox talks using relevant topics to activities associated with the incident.

3.4.6 Field Emergency Response Team Scribe (FERTS) – (MPRL E&P Field Admin.)

Scribes should try to answer who, what, when, where, how, and why on the command side. They write down any specific instructions that were given by or to the FERT Commander.

Scribes should document anyone whom the FERT Commander talked to over the phone outside the chain of command. This helps eliminate having to ask dispatch for the same information or asking them to have someone call you back.

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At the direction of the FERT Commander, the Scribe shall record information from all incident message forms with reference to time, message and action taken.

Responsibilities include:

- Maintaining and periodically distributing a situation report.
- Gathering incident related information from other FERT Sections for entry in the FERT Command Log.
- Referring newsworthy information to the Public Information Officer as authorized by the FERT Commander.
- Ensuring that all messages are appropriately routed.
- Ensuring that the incident communications and messages are established.
- Setting up telephone and public address systems as required.
- Establishing appropriate communications to and from all relevant locations.
- Ensuring that these communications systems are operating properly and efficiently.
- Ensuring that radio equipment is distributed (as required), per radio plan, giving special attention to battery resupply and/or recharging.

3.5 Crisis Management Team, MPRL E&P Yangon Office

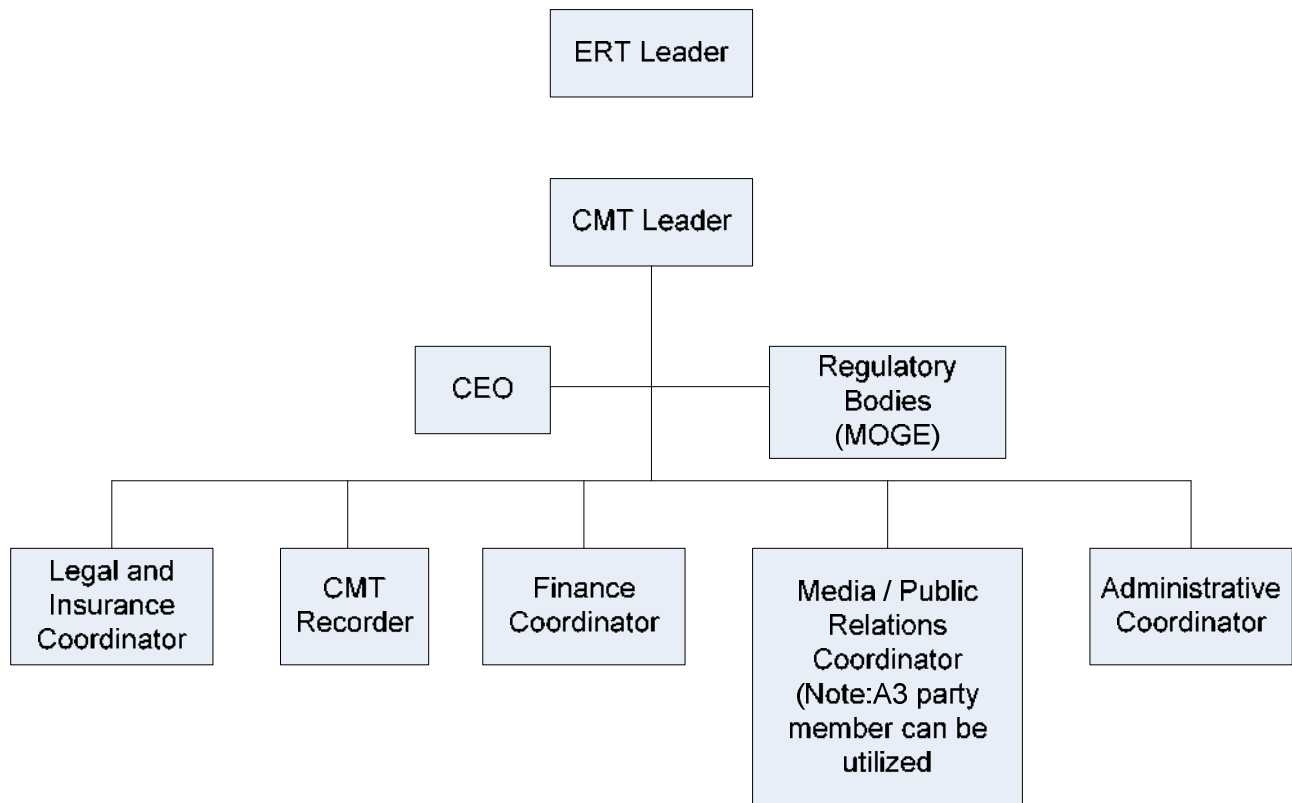
Should an incident occur that has the potential to significantly affect MPRL's commercial position, reputation, or stretch the ability of the ERT to manage the incident, the ERTC shall contact the CMT Leader who will decide if the Crisis Management Team should be mobilised.

The primary responsibility of the Crisis Management Team is to:

- Consider the strategies required to minimise the incident's effect on the organisation
- Media liaison,
- Relative liaison,
- Manage insurance notifications and claims, and Shareholder and other stakeholder communications.



CMT Organization Chart



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3.5.1. Roles & Responsibilities of Crisis Management Team Members

Role	Responsibility	Done <input checked="" type="checkbox"/> or Not Applicable NA
CMT Leader	<ul style="list-style-type: none"> • Be the point of contact for all communications between the ERTC and MPRL E&P's management at the headquarters in Yangon • Liaise with the regulatory bodies to MOGE • Determine the appropriate response to the incident to protect MPRL E&P's interests • Assist the ERTC in preparing and reviewing the strategic and tactical objectives and ensure that these are acceptable to MPRL E&P • Ensure sufficient data and information is collated for the member of the CMT team to conduct their duties, and ensure company spokespeople are thoroughly briefed on events • Call time-out by taking phone off hook and updating team • Issue status update to CEO and Senior Management • Prepare with ERTC media and external release statements • Initiate Communications with family of MPRL E&P employees and MPRL E&P direct contractors affected by incident • Ensure that enquiries from the media are handled according to procedural guidelines; • Initiate contact with MOGE 	
CMT Recorder	<ul style="list-style-type: none"> • Maintain a log of all events as they happen and provide assistance with the preparation of media statements, written programmes and strategies • Provide support to the CMT leader as required (This is a key position that requires a sound knowledge of the company's workings and how they can assist with strategic planning.) 	
CMT Legal and Insurance Coordinator	<ul style="list-style-type: none"> • Protect the interest of MPRL E&P and the personnel involved in the emergency response while ensuring that legal requirements are met and that insurance claims are maximised 	
CMT Finance Coordinator	<ul style="list-style-type: none"> • Keeping track of all payments, receipts, contacts, etc. as response operations progress • All accounting / audit requirement • Ensuring that MPRL E&P takes full advantage of all 	

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	insurance policies, that expenditures made during response operations are properly audited and establishing a programme for the receipt and processing of all third party claims	
--	--	--

Role	Responsibility	Done ✓ or Not Applicable NA
CMT Media / Public Relations Coordinator	<ul style="list-style-type: none"> Assist with the interface between the emergency response operations, MPRL E&P, and the media / public through the use of professional media management practices. <i>(All contact with the media should be controlled to ensure they receive factual and consistent information in the proper context)</i> Assist with the initial holding statements, Ensure that the switchboard operators are briefed, Assist with briefing to media representative as appropriate. 	
CMT Receptionist	<ul style="list-style-type: none"> Remain calm and professional Release only approved information Take detailed messages on carbonated telephone pads located in cupboard at Reception, and pass onto the appropriate CMT person immediately 	

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Crisis Management Team Contact Details

U Myo Tin Office : (95-1) 230 7733 Ext (1005) Mob : (95-9) 508 2428	GXM Secretary (Ohnmar) Office: (95-1) 230 7733 Ext 1039 Mob: (95-9) 43201013
U Sithu Moe Myint Office: (95-1) 230 7733 Ext 1007 Mob : (95-9) 515 2999	Ma Yu Mon Office: (95-1) 230 7733 Ext 1039 Mob: (95-9) 507 1268
U Tint Swe (XOD) Office: (95-1) 230 7737 Mob: (95-9) 519 6770	
U Ko Ko Office: (95-1) 230 7733 Ext 1113 Mob: (95-9) 2005993	
U Thu Nyo Office: (95-1) 230 7733 Ext 1087 Mob: (95-9) 2005990	
U Nay Myo Aung Office: (95-1) 230 7733 Ext 1104 Mob: (95-9) 43182225	

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4.0 INTERNAL & EXTERNAL NOTIFICATION PROCEDURES

4.1 Communication Procedures

The following personnel from the Emergency Response Team shall assume the following roles and responsibilities regarding internal and external notification procedures during an emergency

- MPRL E&P Drilling Coordinator shall be required at Emergency Response Centre in Yangon to assume the role of Emergency Response Team Scribe and to serve a single point of contact between Emergency Response Centre in Yangon and Crisis Management Team.
- In addition to MPRL's Spokesmen's roles & responsibilities in liaising with the media, XOD shall assume a similar role of an official spokesperson at work site in Minbu to distribute an official media response to local authorities and media as required. The official media response shall be delivered from Crisis Management Team at MPRL Yangon Office via Emergency Response Team Scribe (ERTS) to MPRL E&P HSE Coordinator for media distribution at work site respectively.
- Field Emergency Response Team Commander shall provide assistance to Emergency Response Team Commander in liaise with local police, security, acquisition of additional land, materials, and resources from other petroleum concessionaires to resolve an emergency situation.

4.2 Reports

MPRL E&P's Emergency Response Team shall utilize the following forms for internal and external notification procedures between MPRL E&P's WORK SITE, The Emergency Response Centre in Yangon as well as the Crisis Management Team:

- ATTACHMENT 1 EMERGENCY NOTIFICATION FORM
- ATTACHMENT 2 INITIAL INCIDENT REPORT
-
-
- ATTACHMENT 3 MAJOR INCIDENT ANNOUNCEMENT
- ATTACHMENT 4 EVENTS LOG
- ATTACHMENT 5 EMERGENCY RESPONSE TEAM CONTACT DETAILS
- ATTACHMENT 6 CRISIS MANAGEMENT TEAM CONTACT DETAILS
- ATTACHMENT 7 EMERGENCY SERVICE CONTACT DETAILS

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• ATTACHMENT 8 EMERGENCY RESPONSE WORK SHEET

ATTACHMENT 1 EMERGENCY NOTIFICATION FORM

FORM 0: EMERGENCY NOTIFICATION FORM	
Who are you? Name of person reporting the emergency	
What are your contact details? Telephone, mobile phone	
Where are you? Name of location, road, building, or landmark	
What is the nature of the emergency? Brief description of the emergency	
Are there any fatalities or injuries?	
Do you need immediate assistance?	
Notes: 	
Mark with <input checked="" type="checkbox"/> which Emergency Response Plan must be activated:	
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 10px;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div> 1. Well Control 2. Oil Spill/Environmental Incident 3. Medical Emergency 4. Other Emergency, i.e. Fire, Explosion, Assault, Robbery, Kidnap, Bomb Threat, Evacuation, Security threat, Civil unrest, etc. </div> </div>	
Date and Time of Call: 	

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ATTACHMENT 2 INITIAL INCIDENT REPORT

FORM 1 INITIAL INCIDENT REPORT																													
Date of Incident		Time of Incident																											
Incident Location:																													
Is there MPRL representative at the scene <input type="checkbox"/> Yes <input type="checkbox"/> No																													
Representative's details	Name																												
	Role																												
	Phone																												
Type of Incident 1. Well Control <input type="checkbox"/> 2. Oil Spill/Environmental Incident <input type="checkbox"/> 3. Medical Emergency <input type="checkbox"/> 4. Other Emergency, <input type="checkbox"/> (I.e. Fire, Explosion, Assault, Robbery, Kidnap, Bomb Threat, Evacuation, Security threat, Civil unrest, etc.)																													
Scale of the Incident: Involvement at scene Organisations at the scene (tick) <input type="checkbox"/> Police <input type="checkbox"/> Fire <input type="checkbox"/> Ambulance <input type="checkbox"/> Military <input type="checkbox"/> Media																													
Does the caller require help? <input type="checkbox"/> Yes <input type="checkbox"/> No																													
Incident details/ what help are needed?																													
Scale of Incident: Personnel/Casualty Status <table border="1"> <thead> <tr> <th></th> <th>Fatalities</th> <th>Injuries</th> <th>Survivors</th> <th>Missing</th> <th>Unknown</th> </tr> </thead> <tbody> <tr> <td>MPRL Employees</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Non MPRL Employees</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Member of Public</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> Total number of people involved <input type="text"/>						Fatalities	Injuries	Survivors	Missing	Unknown	MPRL Employees						Non MPRL Employees						Member of Public						
	Fatalities	Injuries	Survivors	Missing	Unknown																								
MPRL Employees																													
Non MPRL Employees																													
Member of Public																													
Scale of the Incident: Environment <table border="1"> <thead> <tr> <th>Details</th> <th>Type</th> <th>Quantity Released</th> <th>Quantity Remaining</th> <th>Rate of Loss</th> </tr> </thead> <tbody> <tr> <td>Oil</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Chemical</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gas</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>					Details	Type	Quantity Released	Quantity Remaining	Rate of Loss	Oil					Chemical					Gas					Other				
Details	Type	Quantity Released	Quantity Remaining	Rate of Loss																									
Oil																													
Chemical																													
Gas																													
Other																													
Recorder's Details																													
Date of alert:		Time of alert																											
Recorder's name:		Contact number:																											

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ATTACHMENT 3 MAJOR INCIDENT ANNOUNCEMENT

FORM 2 MAJOR INCIDENT ANNOUNCEMENT

Initial notification to be performed by Telephone, following up by completing this form and send by E-mail to MPRL. Add other addresses as necessary to meet Regional requirements, i.e. local management team, MOGE

Concession		Issued by:	
Country		Location of Incident	
Date of incident		Time of incident	

Brief account of incident (Report as fact only what you are clear is fact. Specify the status of anything else which you report, i.e. a belief or an estimate):

People:	No. of Injuries	No. of fatalities	Description / Details
Employee			
Contractor			
Third Party			

Business impact/damage/loss:

External agencies involved:

New media coverage seen:

What assistance has been requested:

Person in charge of response/investigation

Office Telephone

Mobile Telephone

Home Telephone

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ATTACHMENT 4 EVENTS LOG

FORM 3 – EVENTS LOG SHEET	
TITLE OF THE INCIDENT:	
Log Header:	
Date:	Time:
Your Name:	Other name
Your Position:	Other position
Log Type:	Other phone
Log Entry:	
Follow-up actions	

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ATTACHMENT 5 EMERGENCY RESPONSE TEAM CONTACT DETAILS

Emergency Response Roles	Name	Phone Number
Vantage Tower, 623 Pyay Road, Kamaryut Township, Yangon, Myanmar		Tel: (95-1) 230 7733 Fax: (95-1) 230 7744
Emergency Response Team Commander (ERTC)	U Myo Tin	Tel: (95-9) 508 2428
Deputy Emergency Response Team Commander (DERTC)	U Sithu Moe Myint	Tel: (95-9) 515 2999
Technical Manager	U Ko Ko	Tel: (95-9) 2005993
Emergency Response Team Scribe		
Emergency Response Logistic Coordinator	Ko Ko Naing	Tel: (95-9) 516 3272 / 862 4502
Field Emergency Response Centre Mann Oil Field, Minbu Township	MPRL Field Office	Tel: 065 21243 Fax: 065 21243
Field Emergency Response Team Commander (FERTC)	U Moe Zaw Tint U Myo Win	Mob: (95-9) 501 2970 Tel: (95-9) 200 5991
Deputy Field Emergency Response Team Commander (DFEPTC)	AFOMs	Tel: 065 21243
Field Logistics Coordinator (FLC)	Camp Boss	Tel: 065 21243 Tel: (95-9) 862 4503
Field Operations Coordinator (FOC)	Contractor (Third party)	
Field HSE Coordinator	AHSEM HSEO	Mob: Tel: 065 21243
Field Emergency Response Team Scribe (FERTS)	Min Zaw Tun Zaw Lin Aung	Tel: 065 21243

Correct as of (Time)..... (Date)

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ATTACHMENT 6 CRISIS MANAGEMENT TEAM CONTACT DETAILS

CMT Leader	U Myo Tin Office : (95-1) 230 7733 Ext (1005) Mob : (95-9) 508 2428	
DY CMT Leader	U Sithu Moe Myint Office: (95-1) 230 7733 Ext 1007 Mob : (95-9) 515 2999	Ma Yu Mon Office: (95-1) 230 7733 Ext 1039 Mob: (95-9) 507 1268
CMT Technical	U Ko Ko Office: (95-1) 230 7733 Ext 1113 Mob: (95-9) 2005993	U Thu Nyo Office: (95-1) 230 7733 Ext 1087 Mob: (95-9) 2005990
CMT HSE Coordinator	U Nay Myo Aung Office: (95-1) 230 7733 Ext 1104 Mob: (95-9) 43182225	
CMT Recorder, Accounts	Daw Mya Wit Ye Office: (95-1) 230 7733 Ext 1219 Mob: (95-9) 254385878	
CMT Receptionist	GXM Secretary (Ohnmar) / The receptionist at MPRL Office: (95-1) 230 7733 Ext 1039	

Correct as of (Time)..... (Date)

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ATTACHMENT 7 EMERGENCY SERVICE CONTACT DETAILS

Reginal Administrator		Magway Office Tel: 063 23015
Deputy Director (Regional) Environmental Conservation Department, Magway		Tel : 063-2028700
District Administrator Minbu District		Min Bu Office Tel: 065 21059 / 21011
Township Administrator Minbu District		Minbu Office Tel: 065 21007
Township Officer Labour Department, Minbu		Min Bu Office Tel ; 0979-1853539
MOGE VIP Guest House		Tel: 065 21242
Bagan (Nyaung Oo)		Tel: 062 70206
POLICE		
Minbu Police Station.		Tel: 065 21504
Magwe Police Station.		Tel: 063 25504
Mann Oil Field Police Station		Tel: 065 21099 (Thru Exchange)
FIRE STATION		
Minbu Fire Station		Tel: 065 21502
Magwe Fire Station		Tel: 063 21502
Mann Oil Field Fire Station		Tel: 065 21099 (Thru Exchange)
HOSPITAL		
Minbu Hospital		Tel: 065 21511
Magwe Hospital		Tel: 063 21511
Green Cross Hospital (Yangon)		Tel: 01 523 000

Minbu Hospital	Magwe Hospital	Minbu Fire Station	Magwe Fire Station
2 km	11 km	1.5 km	10.5 km
6 minutes	28 minutes	3 minutes	23 minutes

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ATTACHMENT 8 EMERGENCY RESPONSE WORK SHEET

FORM 4 - EMERGENCY RESPONSE WORK SHEET	
Date/Time:	
Completed By:	
Please define the potential area subject to potential impacts	
SOURCE OF DISCHARGE	
Source of discharge?	<input type="checkbox"/> Known <input type="checkbox"/> Unknown
Source control status?	<input type="checkbox"/> Controlled <input type="checkbox"/> UNCONTROLLED
If the source is controlled, what is the potential for loss of control?	<input type="checkbox"/> Low <input type="checkbox"/> MEDIUM <input type="checkbox"/> HIGH
Nature of uncontrolled source?	<input type="checkbox"/> Stabilised <input type="checkbox"/> GROWING
Is special expertise needed to bring the source under control	<input type="checkbox"/> YES <input type="checkbox"/> No
MAGNITUDE AND DURATION OF INCIDENT RESPONSE OPERATIONS	
Can the incident be managed solely by local resources?	<input type="checkbox"/> Yes <input type="checkbox"/> NO
Will emergency response operations continue around the clock?	<input type="checkbox"/> YES <input type="checkbox"/> No
Will emergency response operations go on for an extended period of time?	<input type="checkbox"/> YES <input type="checkbox"/> No HOW LONG?
MATERIAL SPILLED/EMITTED	
Nature/hazards of material known?	Nature known: <input type="checkbox"/> Yes <input type="checkbox"/> NO Hazards known: <input type="checkbox"/> Yes <input type="checkbox"/> NO
Nature of release?	<input type="checkbox"/> Batch <input type="checkbox"/> CONTINUOUS
Material contained or uncontained?	<input type="checkbox"/> Contained <input type="checkbox"/> UNCONTAINED
If the material is contained, what is the potential for loss of containment	<input type="checkbox"/> None <input type="checkbox"/> Low <input type="checkbox"/> MEDIUM <input type="checkbox"/> HIGH
What is the maximum probably quantity of the discharge of materials?	<i>bbls</i>
What is the worst case discharge of materials?	<i>bbls</i>
Material in a moving water way?	<input type="checkbox"/> YES <input type="checkbox"/> No
Is special expertise needed to contain and recover the material	<input type="checkbox"/> YES <input type="checkbox"/> No
HEALTH AND SAFETY	
Does the release are appear to pose an immediate danger to the life or health of any person?	<input type="checkbox"/> YES <input type="checkbox"/> No
Are there significant, on-going short-term or long-term threats to personnel or public safety?	Personnel <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, term: <input type="checkbox"/> Short <input type="checkbox"/> Long Public <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, term: <input type="checkbox"/> Short <input type="checkbox"/> Long
Has the facility been abandoned?	<input type="checkbox"/> YES <input type="checkbox"/> No <input type="checkbox"/> Partial <input type="checkbox"/> Full
Are there people missing? How many? Affiliation? Likelihood of rescue/survival?	<input type="checkbox"/> YES <input type="checkbox"/> No <input type="checkbox"/> EMPLOYEE <input type="checkbox"/> CONTRACTOR <input type="checkbox"/> OTHER <input type="checkbox"/> HIGH <input type="checkbox"/> LOW <input type="checkbox"/> UNKNOWN
Are any people injured? How many? Have the victims been identified?	<input type="checkbox"/> YES <input type="checkbox"/> No <input type="checkbox"/> YES <input type="checkbox"/> No



EMERGENCY PREPAREDNESS RESPONSE PROCEDURE

Affiliation?	<input type="checkbox"/> EMPLOYEE	
	<input type="checkbox"/> CONTRACTOR	
	<input type="checkbox"/> OTHER	
Nature and severity of injuries?	<input type="checkbox"/> NOT LIFE THREATENING	
	<input type="checkbox"/> LIFE THREATENING	
Have next of kin notifications been made?	<input type="checkbox"/> Yes	<input type="checkbox"/> NO
Are there any fatalities?	<input type="checkbox"/> YES	<input type="checkbox"/> No
How many?		
Have the victims been identified?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Affiliation?	<input type="checkbox"/> EMPLOYEE	
	<input type="checkbox"/> CONTRACTOR	
	<input type="checkbox"/> OTHER	
Have the bodies been removed from incident scene?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
Have next of kin been notified?	<input type="checkbox"/> YES	<input type="checkbox"/> NO
SECURITY		
Is there a security threat?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Can Company's Security personnel handle situation?	<input type="checkbox"/> YES	<input type="checkbox"/> No
What is the source of threat?		
Public outrage?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Civil unrest?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Rebels?	<input type="checkbox"/> YES	<input type="checkbox"/> No
What is the source of the threat? (<i>continued</i>)		
Terrorists?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Military?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Disgruntled Employee?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Other?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Who or what is threatened?		
National Employees?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Ex-pat Employees?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Families?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Contractors?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Business Partners?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Facilities?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Operations?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Others?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Is there a potential need for:		
Sheltering-in-place?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Mustering?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Evacuation?	<input type="checkbox"/> YES	<input type="checkbox"/> No
HUMAN RESOURCES CONCERNS		
Do the responders need psychological support?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Do employees need psychological support?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Are there issues relating to compensation with response personnel?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Is there a need for family assistance for response personnel	<input type="checkbox"/> YES	<input type="checkbox"/> No
COMMUNITY IMPACTS		
Are communities impacted or threatened?	<input type="checkbox"/> YES	<input type="checkbox"/> No
What is the nature of the impact:		
Health and safety?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Social?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Cultural?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Economic?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Environmental?	<input type="checkbox"/> YES	<input type="checkbox"/> No



EMERGENCY PREPAREDNESS RESPONSE PROCEDURE

	<input type="checkbox"/> YES <input type="checkbox"/> No
What is the potential exposure to requests for compensation?	<input type="checkbox"/> None <input type="checkbox"/> Minor (localised) <input type="checkbox"/> MAJOR (regional or beyond)
What is the tenor of contacts with/from impacted/threatened communities?	<input type="checkbox"/> Cooperative <input type="checkbox"/> STRAINED <input type="checkbox"/> ANTAGONISTIC
IMPACT ON NORMAL OPERATIONS	
Has the incident caused a shutdown or curtailment of normal operations?	<input type="checkbox"/> YES <input type="checkbox"/> No: <i>if yes:</i> <input type="checkbox"/> SHUT DOWN <input type="checkbox"/> CURTAILMENT
How long is the shutdown/curtailment likely to last?	
What impact will the shutdown/curtailment have on other operations?	<input type="checkbox"/> None <input type="checkbox"/> Minor (a few day) <input type="checkbox"/> MODERATE (approx. 1 week) <input type="checkbox"/> SEVERE
FACILITY STATUS	
Is the affected facility shut down?	<input type="checkbox"/> YES <input type="checkbox"/> No
Are critical systems in the affected facility shutdown	<input type="checkbox"/> YES <input type="checkbox"/> No
Is the facility on fire?	<input type="checkbox"/> YES <input type="checkbox"/> No
Is there a structural problem on the facility	<input type="checkbox"/> YES <input type="checkbox"/> No
ENVIRONMENT IMPACTS	
What is the potential magnitude of environmental impacts?	<input type="checkbox"/> Localised <input type="checkbox"/> WIDESPREAD
Is the incident likely to impact wildlife?	<input type="checkbox"/> YES <input type="checkbox"/> No <i>If yes:</i> <input type="checkbox"/> Minor <input type="checkbox"/> MAJOR
Are listed species/pre-identified sensitive areas impacted/threatened by the incident?	<input type="checkbox"/> YES <input type="checkbox"/> No
Is the incident likely to impact cultural or historical resources?	<input type="checkbox"/> YES <input type="checkbox"/> No
Are specialised resources needed to provide assistance in any of the following areas:	
Land access?	<input type="checkbox"/> YES <input type="checkbox"/> No
Use of alternative technologies?	<input type="checkbox"/> YES <input type="checkbox"/> No
Wildlife capture/rehabilitation?	<input type="checkbox"/> YES <input type="checkbox"/> No
Waste management?	<input type="checkbox"/> YES <input type="checkbox"/> No
Clean-up assessment?	<input type="checkbox"/> YES <input type="checkbox"/> No
Natural resource damage assessment?	<input type="checkbox"/> YES <input type="checkbox"/> No
Air quality monitoring?	<input type="checkbox"/> YES <input type="checkbox"/> No
Water quality monitoring?	<input type="checkbox"/> YES <input type="checkbox"/> No
EXTERNAL AFFAIRS	
Are there any required notifications yet to be made?	<input type="checkbox"/> YES <input type="checkbox"/> No
Are government agencies willing to participate in Coordinated Command?	<input type="checkbox"/> YES <input type="checkbox"/> No
What is the tenor of interactions with/from government agencies?	<input type="checkbox"/> Cooperative <input type="checkbox"/> STRAINED <input type="checkbox"/> ANTAGONISTIC
What level of media interest is the incident likely to generate	<input type="checkbox"/> Low <input type="checkbox"/> HIGH
Are representatives of the media present?	<input type="checkbox"/> YES <input type="checkbox"/> No
What is the volume of media inquiries?	<input type="checkbox"/> Low <input type="checkbox"/> HIGH
What is the tenor of media inquiries?	<input type="checkbox"/> Cooperative <input type="checkbox"/> STRAINED <input type="checkbox"/> ANTAGONISTIC
Can media inquiries be handled with local resources?	<input type="checkbox"/> YES <input type="checkbox"/> No
LEGAL CONCERNS	
Are there legal issues/concerns that require the activation of the Law Officer?	<input type="checkbox"/> YES <input type="checkbox"/> No
Is legal assistance needed in any of the following areas:	
Incident investigation?	<input type="checkbox"/> YES <input type="checkbox"/> No
Accident investigation?	<input type="checkbox"/> YES <input type="checkbox"/> No



MPRL E&P Pte Ltd.

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MPRL-HSEMS- 001

HSE-MAN- 4.1

Issue: 01

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Documentation?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Contracts?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Claims?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Damage assessment?	<input type="checkbox"/> YES	<input type="checkbox"/> No
FINANCIAL CONCERNS		
Is financial assistance needed in any of the following areas:		
Accounting?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Cost Tracking?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Contracts?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Audit?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Claims?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Insurance?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Will there be a need to maintain cash accounts to support emergency response operations?	<input type="checkbox"/> YES	<input type="checkbox"/> No
Are spending authorities adequate?	<input type="checkbox"/> YES	<input type="checkbox"/> No
SUMMARY OF FINDING		
Magnitude and Duration of Incident Response Operations:		
Source:		
Material Spilled/Emitted		
Health and Safety		
Security		
Human Resources Concerns:		
Community Impacts:		
Impact on Normal Operations:		
Facility Status:		
Environmental Impacts:		
External Affairs:		
Legal Concerns:		
Financial Concerns:		

The responses indicated on this worksheet reflect the preliminary views of the person filling out the worksheet based on the information available and known to that person as of the date and time shown and, as such, are subject to modification as additional information is obtained


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DCN	REV	AMENDMENT DETAIL	APPRVL	DATE
	A	Initial Release		2/06/2014
	1	Approved for implementation		20.06.2014

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Be sure this is the latest revision of this document!



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1 Introduction

1.1 Purpose / Scope

The purpose of this document is to describe the procedure for managing waste at Mann Field.

This plan applies to any material (solid, liquid, or mixture) that is surplus to requirements of the Construction and Production and Work over phases.

1.2 Definitions

1.2.1 General Waste

Any discarded, rejected, abandoned, unwanted or surplus matter, whether or not intended for sale or for recycling, reprocessing, recovery or purification by a separate operation from that which produced the matter. General waste can be:

- Paper
- Used Cloth
- Cardboard
- Wooden boxes

1.2.2 Recycle Waste

The Waste which can be re-used, manufactured into other products. Recycle Waste can be:

- Plastic,
- Cans,
- Drums,
- Glass,
- Rubber,
- Metal,
- Used machines / equipment

1.2.3 Hazardous Waste

Waste which contains a hazardous substance in such a quantity liable to cause death, injury or impairment to living beings, pollution of waters or an unacceptable impact on the environment if improperly handled, treated or disposed of, e.g., chemicals, some oils, some fuels, i.e., naphtha.

1.2.4 Organic Waste

Organic waste is organic material and / or organic surplus which can be:

- Food
- Leaves
- Grass
- Dead animals
- etc

1.2.5 Composting

Composting is the controlled process whereby compostable organic waste is pasteurized and microbiologically transformed under aerobic and thermophilic conditions for a period not less than six weeks, including the pasteurization phase.



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1.2.6 Disposal

The Final stage in the management of waste, which includes:

- Treatment of waste prior to disposal
- Incineration of waste, with or without energy recovery
- Deposit of waste to land or water
- Discharge of liquid waste to sewer
- Permanent, indefinite or long term storage of waste

1.2.7 Third Party

An approved organization that has a valid license for treatment of waste.

1.2.8 Waste Management Compound

The facilities where all the waste is collected, stored, re-cycled, composted and disposed,

2 Responsibilities

2.1 HSE Manager (HSEM)

HSE Manager is responsible for:

- Ensure this procedure is implemented at all site/field
- Carry out audits and revise this procedure in appropriate time
- Provide appropriate training for staff

2.2 Environment Engineer

Environment engineer is responsible for:

- Conduct necessarily training for involved personnel
- Provide technical support for Site/Field Manager
- Approve disposal method statement
- Record and Report quantity of disposed waste
- Carry out Waste Audit and report to CHSEO

2.3 Environmental Officer (Waste Operator)

Environmental officer is responsible for:

- Ensure the right type of waste bins are located at the appropriate locations
 - Ensure the waste bins are emptied in time to prevent over flow
 - Ensure the disposed waste is recorded in “Waste Register” form and submitted to the site HS officer
 - Transfer the waste to Waste Management Compound for further treatment
 - Manage the waste in Waste Management Compound as per instructions in this procedure
 - Coordinate with third party and / or contractor in order to dispose the waste as per FM’s instructions
 - Keep the Waste Management Compound clean and tidy at all times
-



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2.4 Site/Field Manager

Site/Field Manager is responsible for:

- Provision of necessary manpower, facilities and equipment
- Approve Waste Disposal form(s)

3 Procedure

3.1 General

The overall process of waste management is summarized in the flow chart in Figure 1.

This process incorporates the principle of pollution prevention. If elimination of a waste is not possible, minimizing the amount of waste generated will be investigated. The following hierarchy of waste management practices will be used:

A) Source Reduction-the generation of less waste through more efficient practices, such as:

- Material elimination
- Inventory control and management
- Material substitution
- Process modification and
- Improved housekeeping

B) Reuse-the use of materials or products that are reusable in their original form such as

- Non-hazardous waste containers
- Wooden pallets
- Plastic bags

C) Recycling/Recovery - the conversion of waste into usable materials and/or extraction of energy or materials from waste such as:

- Recycling scrap metal and
- Recovering oil from tank bottoms and produced water
- Drilling mud
- Plastic
- Glass
- Cardboard
- Wood

D) Treatment - the destruction, detoxification, and/or neutralization of residues through processes such as Biological methods:

- Composting, tank based degradation
- Thermal methods - incineration, thermal desorption

E) Responsible Disposal – depositing waste on land or in water using methods appropriate for a given situation. Disposal methods include:

- Land filling
 - Land spreading or land farming
 - Incineration
-

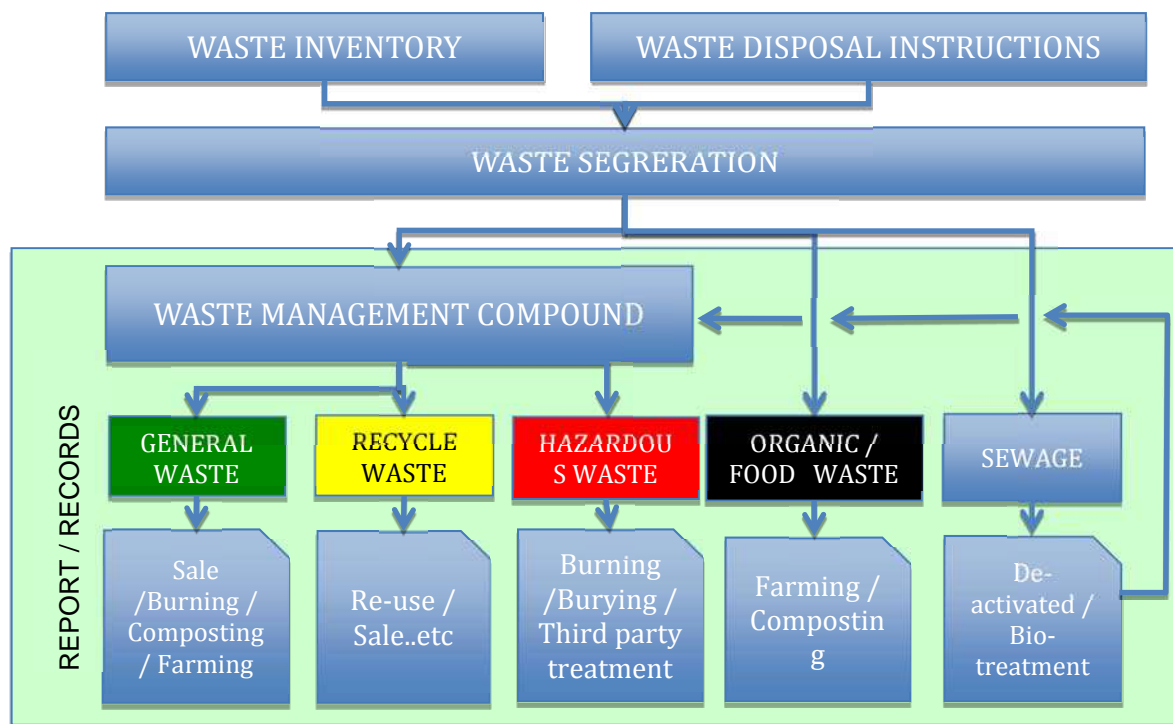


Figure 1: Waste Management Process

3.2 Waste rules

“Any waste which has made contact with hazardous waste shall be identified as hazardous waste”

Example: Gloves contaminated by hazardous chemicals shall be treated as hazardous waste

3.3 Waste Segregation

Given the complex nature of the waste expected, waste segregation will be implemented involving sorting and separating waste on the basis of its characteristics. Waste materials will be segregated at source by providing colored and marked (with universal symbols and writing in English and Burmese) bins for storing the waste as follows:

- Green – General Waste
- Yellow – Recycle Waste
- Red – Hazardous Waste
- Black – Organic Wastes

Bins will be placed in GOCS, offices, ware house, workshop, construction site, mess centers, and clinics. No waste collection bin will be allowed to overflow before it is emptied, and waste storage receptacles will be replaced promptly, in the event of damage. A sufficient number of bins will be placed for each type of waste at waste collection points, depending on the variety and quantity of the waste expected from the location.



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3.3.1 Waste Bin

Waste Bins (Green, Yellow, Red, Black) shall be provide at each waste collection points. Each 100L plastic bin can be able to store the waste produces in one day.



Figure 2: Proposed waste bin for Mann Field

3.3.2 Hazardous Waste Container

Five (05) steel containers shall be fabricated to store the hazardous at Waste Management Compound. This container should be designed for lifting by crane and / or forklift.



Figure 3: Hazardous Waste container

3.4 Collection and Cleanliness

All solid waste will be managed and properly packaged and disposed of. The camp and work site will be kept in a neat, clean and safe condition and remove and properly dispose of all debris and rubbish will be removed and properly disposed.



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All waste bins shall be collected and transferred to Waste Management Compound for emptying on daily basis. An Environmental Team will be employed to operate and manage the Waste Management Compound.

Waste bin pick-up points accessible to Environmental Team attendants and garbage trucks will be responsible for the following:

- Provide a Waste truck(s) specifically designed and manufactured for the purpose of picking up Waste bins and transporting the bins in a safe and sanitary manner from waste collection point to the Waste Management Compound.
- Collect food waste from all food establishments daily
- Use of a sufficient number of fly-proof bins or containers for all food establishments, camp areas, and work sites to maintain cleanliness. Bins will be cleaned immediately after being emptied.
- Collect waste from the clinic in clearly marked yellow clinical waste bags. Clinical waste includes dressings, swabs, human tissues, used syringes, needles, cartridges, broken glass, expired medicine and other chemical waste from the pharmacy.

3.5 Waste Management Compound

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

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

3.5.1 Design philosophy

The Mann Field Waste Management Compound should consist of:

- Hazardous Waste storage area (100m²)
- Recycle Waste storage area (200m²)
- Burning (incineration) area (100m²)
- Burying area (5000m²)
- Composting area (500m²)

3.5.1.1 Health, Safety and Environment (HSE) Requirements

The Waste Management Compound should meet the following requirements:

- Away from any living compound and / or communities
- Away from water sources (surface)
- Equipped with fire protection/prevention and / or fire extinguishers

3.5.1.2 Hazardous Waste storage area

The Hazardous storage area shall be built to meet the following criteria:

- Weather protection
 - Leakage Prevention with drain, bunk and spill collection pits
 - Fire prevention system (fire extinguisher)
 - Separate from other type of waste
-



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3.5.1.3 Recycle Waste Storage area

The Recycle storage area shall be built to meet the following criteria:

- Weather protection
- Leakage Prevention with drain, bunk and spill collection pits
- Fire prevention system (fire extinguisher)
- Separate from other type of waste

3.5.1.4 Incineration Area

The Incineration Area shall be built to meet the following criteria:

- Safe for a naked flame
- Have adequate fire extinguishers

3.5.1.5 Burying Area

A burying area is designed for burying solid waste which cannot be treated and / or transferred to a third party for treatment.

Burying Area should meet the following criteria:

- Sufficient area for the estimated quantities of waste
- Have a minimum of 1m topsoil covered after back fill

3.5.1.6 Composting Area

The composting area should not effect the surrounding environment through odour, dust etc. All the possible impacts on flora and fauna including terrestrial and aquatic habitats need to be considered

3.5.2 Recycle Waste

Recycle waste from producer shall be collected and transferred to Waste Management Compound via a Waste Recycle bin (Yellow Color).

The Waste then shall be re-selected, packed and store at the Waste Recycle storage area.

Recycle waste shall be disposed of by an approved third party.

Recycle waste shall be registered using the “Waste Register” form including specific detail as to the type quantity of waste.

Recycle Waste which is going to be sent to a selected third party for adequate disposal shall be monitored using the “Waste Disposal Contractor Approval” form. This form shall be approved by the Field Manager and / or site HS Officer.

3.5.3 Hazardous Waste

Hazardous Waste from operations shall be transferred to the Waste Management Compound via a hazardous waste bin (Red Color).

Hazardous waste shall be stored properly with a spill prevention method to ensure there is no impact to the environment.



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When the hazardous waste is not transferable to a third party for disposal. A specific method of disposal shall be applied. Field Manager shall consult with Environmental Engineer for an adequate method of disposal.

Hazardous waste shall be registered using a “Waste Register” form which details type of waste and the quantities.

Hazardous waste sent to a selected third party for adequate disposal methods shall be monitored using “Waste Disposal Contractor Approval” form. This form shall be approved by Field Manager and / or site HS Officer.

3.5.4 Burning (Incineration)

A mobile incinerator shall be made to burn some types of general waste. The incinerator should meet the following requirement:

- Safe for use
- Burning temperature is up to 400 Degree Celsius (400°C)
- Acceptable dust/smoke exhausted.

When the waste is transferred to the Waste Management Compound, the Waste Operator shall identify what type of waste can be (or should be) burned. A “Waste Disposal Site Approval” form shall be raised and approved by Field Manager and / or Site HS Officer before burning.

The following waste can be burned in Mann Field:

- Paper
- leaves
- Cardboard
- Wooden boxes
- Used cloth
- Rag
- Used gloves (cotton only)
- Contaminated saw dust



Figure 4: A proposed waste burner which was fabricated by MPRL E&P

3.5.5 Burying

Hazardous Waste which cannot be deformed and / or treated on site or removed by a third party can be buried. A specified method for each type of waste shall be used and approved by the Environmental Engineer.

The burying of waste must meet the below requirements:

- No spill or leakage to the environment
- Is not affected by adverse weather
- No vent and / or smell exposed to living areas / communities.

The following waste can be buried in Mann Field:



- Drilling Mud and Cuttings (After dewatered)
- Slug and Contaminated soils
- Ashes from burner (if cannot use for composting)



Figure 5: Example of a waste burying case

3.5.6 Composting

Composting is a technique used to accelerate the natural decay process. The technique converts organic waste to mulch which is used to fertilize and condition soil. Leaf waste decomposes naturally in about two years. Composting can take as long as a year or as little as 14 days, depending upon the amount of human control.

Organic waste can be composted in Mann Field with the following requirements:

- Solid waste ONLY (like leaves, grass)
- Minimal amount of odour / smell
- Is not affected by adverse weather

Materials should NOT be composted if they promote disease, cause odors, attract pests, or create other nuisances. These include meat, fish, poultry, dairy products, food containing animal fats, human/pet faeces, weeds with developed seed heads, and plants infected with or highly susceptible to disease, such as roses and peonies.

Materials that should be composted only in limited amounts include wood ashes (a source of lime), sawdust (requires extra nitrogen), plants treated with herbicides or pesticides (the chemicals need time for thorough decomposition), and black and white newsprint (composts slowly, so it should comprise no more than 10% by weight of the total pile)

3.5.7 Third party disposal

It is requested that the hazardous waste must be treated properly using approved facilities. The Environmental Engineer shall coordinate with the Field Manager to identify and approve any licensed organization.

Waste disposal by a third party shall be recorded, monitored and confirmed after disposal.

The third party shall be fully responsible for the waste received from any MPRL E&P site. After treatment, the third party is required to send a report to MPRL E&P after the received waste has been treated.



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3.6 Transportation of Waste

Note: Radio active material and / or explosive material shall not be included in this procedure.

When waste disposal by a third party is required, Field Manager shall notify the third party the possible transfer time, type of waste and estimated volume.

The third party shall be responsible to send adequate vehicles to Mann Field to collect the waste. The vehicle should meet the following requirements:

- Adequate bunk to prevent any spill or leakage
- Have adequate safety signs which describe the waste
- Have adequate fire extinguishers and spill kits

“Waste Disposal Third Party Approval” form shall be used to record all required safety information.

3.7 Waste Inspection and Control

Waste Storage Area Inspection

As part of the ongoing health, safety and environmental standard, procedures and audit systems a formal inspection of all waste storage areas will be completed as a minimum once a year or more frequently if large quantities of waste materials are to be stored.

4 Training

MPRL E&P will give adequate training to its personnel to aware how to deal with unforeseen environmental incident or accident.

The MPRL E&P Environmental Engineer will ensure that all MPRL E&P personnel are aware and trained in their responsibilities and use of this procedure. Additionally, the MPRL E&P Environmental Engineer will work with Field Manager to ensure that site personnel and contractor(s) are trained in the use of this procedure and into the appropriate courses of action to be taken in the event of an environmental incident.

The Field Environmental personnel with support of the MPRL E&P Environmental Engineer will ensure that the employed contractors working on behalf of MPRL E&P are trained in the appropriate courses of action in the event of a non-compliance. Contractors should also be trained in MPRL E&P requirements to report environmental non-compliance.

5 Audits

HSE Manager is responsible for the audits of this procedure. The audits are not limited to:

- The implementation of this procedure
- The facilities of Waste Management
- The compliance of disposal contractors
- The training programs

All the findings from each audit shall be reported to Management on a monthly basis.



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6 Appendix

Appendix 1: Waste Management Process



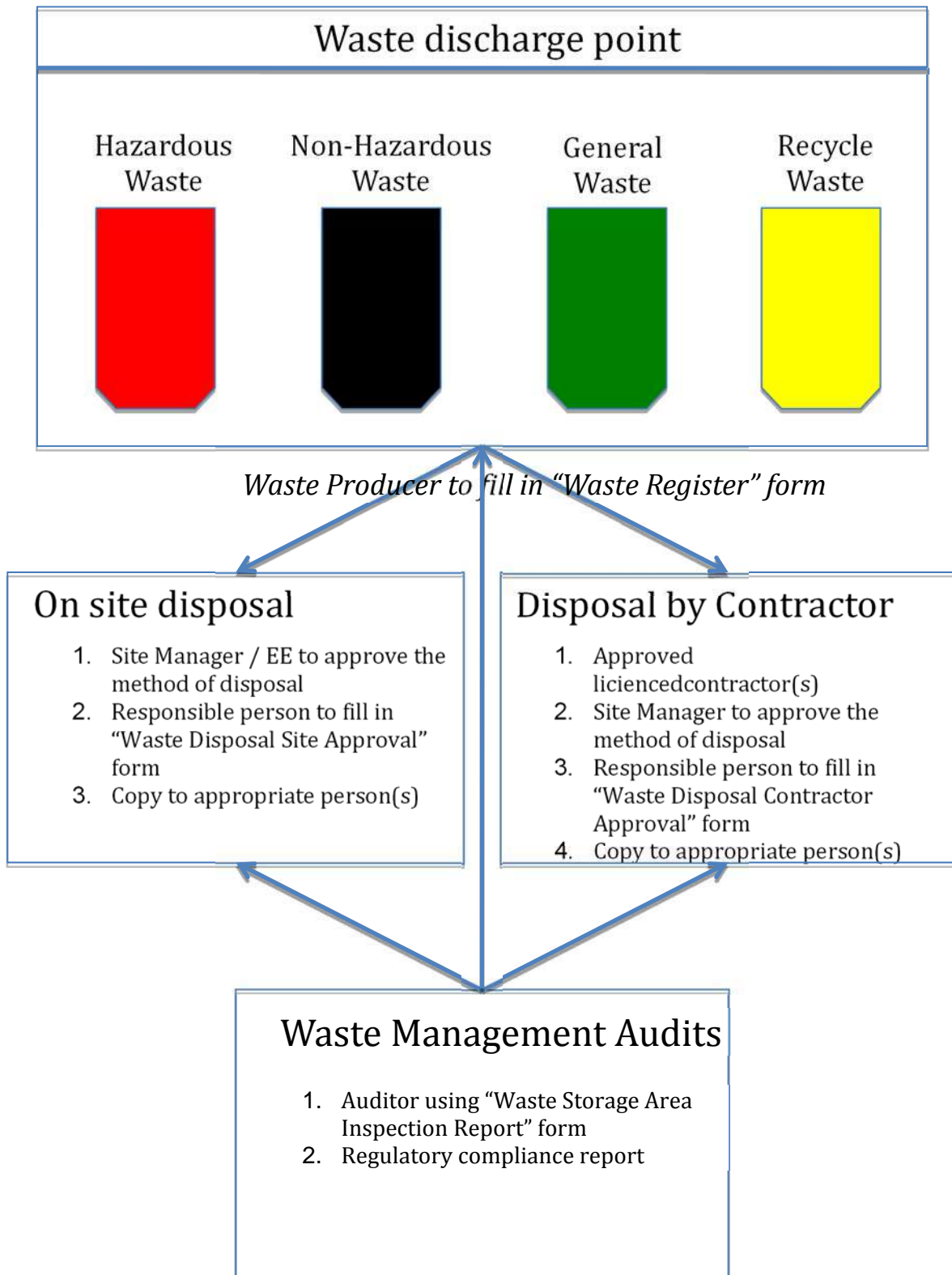
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Appendix 2: Waste Storage Area Inspection Report.

WASTE STORAGE AREA INSPECTION REPORT		Serial No.:
		Date:
Section 1		
Person/s completing inspection	Name _____	Designation _____
	Name _____	Designation _____
	Name _____	Designation _____
Location of storage area _____		
Section 2		
2.1 Is the waste storage area separate from other materials/substance storage?	Yes [] No []	
2.2 Is the waste area storage secure?	Yes [] No []	
2.3 Is the waste storage area under cover and protected from the elements?	Yes [] No []	
2.4 Is the storage area clearly identified?	Yes [] No []	
2.5 Is different waste stored separately?	Yes [] No []	
2.6 Are the storage containers "fit for purpose"?	Yes [] No []	
2.7 Are bunded areas necessary, if so are they fitted and adequate?	Yes [] No []	
2.8 Are all containers clearly and correctly identified and dated?	Yes [] No []	
2.9 Is there adequate access and egress for emergencies?	Yes [] No []	
2.10 Is the general area clean and tidy?	Yes [] No []	
2.11 Are fire extinguisher(s) provided?	Yes [] No []	
Section 3 – General Comments		
Section 4 – Signature		
Name: _____	Signature _____	Date: _____

(Note: This form can be used for Waste Management Compound and Waste Producer location)



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Appendix 3: Waste Register

Waste Register		IN [] OUT []	No:MPRL / / _____ Date: _____ Site name: _____
From: _____ To: _____			
No.	Description of Waste	Type of Waste	Quantity
1		Hazardous [] Non-hazardous [] Recycle [] Used Chemical []	
2		Hazardous [] Non-hazardous [] Recycle [] Used Chemical []	
3		Hazardous [] Non-hazardous [] Recycle [] Used Chemical []	
4		Hazardous [] Non-hazardous [] Recycle [] Used Chemical []	
Register made by: Name: _____ Title: _____ Signature _____			
1 st Copy – Originator; 2 nd Copy - Environment Officer; 3 rd Copy - Contractor; 4 th Copy – HSE Controller			



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Appendix 4: Waste Disposal Site Approval

Waste Disposal Site Approval		No:MPRL / / _____ Date: _____ Site name: _____
1. Description of Waste	Type of Waste	Quantity
	Hazardous [] Non-hazardous [] Recycle [] Used Chemical []	
2. Proposed method of disposal		
2.1 At site: Burn [] Bury [] Recycle [] Bio-treatment [] Other [] _____		
2.2 Disposal method statement No.: _____		
3. Precautions to be taken		
3.1 Has a proper disposal method been approved? 3.2 Have personnel involved who disposal received appropriate training? 3.3 Is suitable PPE provided? 3.4 Have safety precautions being taken at disposal location?		
4. Approval		
Approved by Name: _____ Title: _____ Date: _____	Person in charge Name: _____ Title: _____ Date: _____	
1 st Copy – Originator; 2 nd Copy - Environment Officer; 3 rd Copy - Contractor; 4 th Copy – HSE Controller		



MANN FIELD – WASTE MANAGEMENT PROCEDURE

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REV. 1

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Appendix 5: Waste Disposal Contractor Approval

Waste Disposal Contractor Approval		No:MPRL / / _____ Date: _____ Site name: _____
1. The Company		
Name : _____ Address: _____		Waste Treatment license no: _____
Transportation Equipment Plate number: _____ Type: _____ 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.: _____		Total volume: _____
4. Delivery Confirmation		
MPRL E&P Representative Name: _____ Title: _____ Signature: _____ Date/time: _____		Contractor representative Name: _____ Title: _____ Signature: _____ Date/time: _____
1 st Copy – Originator; 2 nd Copy - Environment Officer; 3 rd Copy - Contractor; 4 th Copy – HSE Controller		



MANN FIELD – WASTE MANAGEMENT PROCEDURE

NO.MPRL-HSE-PRO-046

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Appendix 6: Mann Field Waste Inventory

No.	Waste type	Discharge from	Quantity (Kg) Estimated
1	Food Waste	Kitchen	20 L / day
2	Paper Waste (dry waste)	Kitchen, Camp	120 Kg / week
3	General waste (leave , grass)	Workshop& GOCSs	150 Kg / week
4	Used lubricating oil	From Vehicle	1 bbl / month
6	Rags (dirty cloth)	From petroleum equipment cleaning	1 bbl / for one processing.
7	Oil and Grease contaminated waste	From GOCS compound	1 bbl / month
8	Waste water	Steaming, cleaning of petroleum equipment	3 bbl / one processing.
9	Drilling Mud (3.5 % KCl)	Well deepening	300 bbl / every well deepening
10	Drill cutting	New well drilling	18bbl / every well deepening
11	Drilling Mud(2 % KCl)	New well drilling	600bbl / new well deepening.
12	Slug (formation sand/clay)	From all GOCSs	10 m ³ / month



MANN FIELD – WASTE MANAGEMENT PROCEDURE

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Appendix 7: Budget plan

Item	Descriptions	Quantity	Estimated Cost (USD)	Note
1	Waste Management Compound	01 unit	45,000.00	Not including land compensation
2	Waste Bins (100L; plastic)	60 units	6,000.00	
3	Hazardous containers (1mx2mx1m; steel)	5 units	5,000.00	
4	Hand tools		1,000.00	
5	Waste Burners	3 units	900.00	
6	Dewatering Machine + 1 year spare parts	01 unit	25,000.00	
7	Plastic liners	5000m ²	5,000.00	Yearly Budgets
8	Manpower	4 per	15,000.00	Yearly Budgets
9	Waste record forms		100.00	Yearly Budgets
Grand Total			83,000.00	

Annex I

Attendance Record of
Stakeholder
Consultation

EIA for Mann Fieldနှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
၁	မဖြူတုတ်		ကောက်ကောက်		ဖြူ
၂	မရွှေဝင်း		"		ဝင်း
၃	မဖြူနီ		"		ဖြူ
၄	မအောင်ခိုင်		"		ခိုင်
၅	မဝင်းခိုင်		"		ဝင်း
၆	မအိအိခိုင်		"		ခိုင်
၇	ဒေါ်နီနီ		"		နီ
၈	ဒေါ်တင်တင်		"		တင်
၉	ဒေါ်အိအိ		"		အိ
၁၀	ဒေါ်အေး		"		အေး

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

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၁၂	ဒေါ်အေးအေး		။		အေး
၁၃	ဒေါ်ပိုင်		။		ပိုင်
၁၄	ဒေါ်ပွင့်		။		ပွင့်
၁၅	ဒေါ်အိန်		။		အိန်
၁၆	ဒေါ်အေးဝင်း		။		ဝင်း
၁၇	ဒေါ်ကြည်ဝေ		။		ဝေ
၁၈	ဒေါ်ဝင်း		။		ဝင်း
၁၉	မောင်အေးယု		။		ယု
၂၀	မအု		။		အု

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STAKEHOLDER CONSULTATION FOR



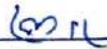



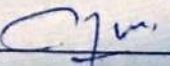
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၂၃		ဓလှ		"		ဗု
၂၄		ဦးတင်မောင်		"		အေဒ်
၂၅		ဦးမြတ်စိုး		"		အေဒ်
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၂၉		ဦးတင်မောင်		"		အေဒ်
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STAKEHOLDER CONSULTATION FOR

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၃၁		ဦးခေါင်း		ကောက်ကုက်		
၃၂		ဦးစိန်ကောင်		"		
၃၃		ဒေါ်ဖြူ		"		
၃၄		ဒေါ်စိန်		"		ဒေါ်စိန်
၃၅		ဒေါ်တင်ညွန့်		"		
၃၆		ဒေါ်ရင်စိန်		"		ညွန့်
၃၇		ဒေါ်ဌေး		"		စစ်ဌေး
၃၈		ဦးစော့ချို		"		
၃၉		ဦးဖြိုးချို		"		
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၄၅	မိုး		u		မိုး
၄၆	ဒေါ်ခင်စန်းစော		u		စန်းစော
၄၇	ဒေါ်ဖြူစိန်		u		စိန်
၄၈	ဒေါ်ဂင်စာဝင်း		u		ဝင်း
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၅၀	ဒေါ်အေးအေးအေး		u		အေး




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STAKEHOLDER CONSULTATION FOR ...

Date/ နေ့ရက်/...../.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign ...
၅၁	ဦးဆိုးကော်		ဒေသနာကျောင်း		✍
၅၂	ဒေါ်ဆိုးဆိုးမိုး				မိုး
၅၃	ဒေါ်မိုးကြည်စိုး				မိုး
၅၄	ဒေါ်အောင်				အောင်
၅၅	ဒေါ်စိုးစိုး				စိုး
၅၆	ဒေါ်မိုးကြည်				မိုး
၅၇	ဒေါ်အေးအေး				အေး
၅၈	ဒေါ်အေး				အေး
၅၉	ဒေါ်အေး				အေး
၆၀	ဒေါ်အေးအေးအေး				အေး

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 STAKEHOLDER CONSULTATION FOR
 Date/ နေ့ရက်၂၀၁၈.၁၁.၂၀.၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
၆၀	ဦး ရာထွန်း		အောက်ကျောင်း		
၆၁	မတာ		"		တာ
၆၂	ဦး အောင်		"		အောင်
၆၃	ဦး သန်းစွေ		"		သန်း
၆၄	ဦး သန်းဇွေ		"		သန်း
၆၅	ဦး မိမိမိ		"		
၆၆	အောင်		"		
၆၇	၊ ဝင်းဇော်		"		ဝင်း
၆၈	၊ ဇော်စိန်		"		ဇော်
၆၉	ဦး မြသောင်း		"		မြ

.....နှင့် ပတ်သက်၍ ပီပံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR ...ဒေအာက်ကျောင်း.....

Date/ နေ့ရက်၂၀၁၁.၁၂.၂၀.၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign ..
၇၀	မသူ		ဒေအာက်ကျောင်း		Y Zar
၇၁	မေအိမ်သင်း		"		သင်း
၇၂	မတင်ပူ		"		တင်
၇၃	မာမိန်လှိုင်		"		မိန်
၇၄	" ဗမာ		"		ဗမာ
၇၅	" သန်းကြွယ်		"		သန်း
၇၆	" ခိုင်ခိုင်ခိုင်		"		ခိုင်
၇၇	ဦး ခိုင်		"		ခိုင်
၇၈	" ဦးဦးဦး		"		ဦး
၇၉	မခင်စန်းဖြူ		"		စင်

- ၈၀ ဒေါက်ကုံးဖြတ်
- ၈၁ မချီ
- ၈၂ စစ်:
- ၈၃ မမိုးထိုကောင်
- ၈၄ ဒေါက်ကုံးဖြတ်
- ၈၅ မမိုး
- ၈၆ မကြည်ဖြတ်
- ၈၇ ဒေါ်ပူ
- ၈၈ ဒေါ်ကြည်ပူ
- ၈၉ ဒေါ်ကြည်ရွှေ
- ၉၀ ဒေါ်စိုးစော်
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- ၉၃ ဒေါ်ကြည်ကြည်ဝင်း
- ၉၄ ဒေါ်ဖြူစိုး
- ၉၅ ဒေါ်ဌေးဌေးသတ်
- ၉၆ မချီလတ်
- ၉၇ ဒေါ်ဇွဲချို
- ၉၈ ဒေါ်တင်

လက်မှတ်
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 ၇၃
 ၇၄
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 ၉၃
 ၉၄
 ၉၅
 ၉၆
 ၉၇
 ၉၈
 ၉၉
 ၁၀၀

၉၈ ဒါညွှန်းစို	လက်ဖျတ်
၉၉ ဒေါ်ယဉ်ယဉ်စို	ထွေး
၁၀၀ ဒေါ်ကေးဒွယ်	ဒွယ်
၁၀၁ ဒေါ်စို	စို
၁၀၂ မမုလဲ	မလဲ
၁၀၃ ဦးကျော်စို	စို
၁၀၄ ဒေါ်ဝတ်မာဝတ်	ဝတ်
၁၀၅ ဒေါ်ဝတ်ဒွယ်	ဒွယ်
၁၀၆ ဦးတင်ကေး	ကေး
၁၀၇ မမုလဲညွှန်း	ညွှန်း
၁၀၈ ဒေါ်စိုယဉ်	ယဉ်
၁၀၉ ဒေါ်ဝတ်ကွယ်	ကွယ်
၁၁၀ ဒေါ်ဝတ်ကွယ်	ကွယ်
၁၁၁ ဦးပုခင်	ပုခင်
၁၁၂ ဒေါ်	
၁၁၃ ဦးသိန်းစို	သိန်းစို
၁၁၄ ဦးသိန်းစို	စို

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORမြို့.....

Date/ နေ့ရက်၂၀၁၁.၁၁.၁၀.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဒေါ်ရှမ်း		အေးမြ		၅၁၆
	ဒေါ်သန်းသန်းနွဲ့				၁၂၁၂၆
	ဒေါ်နီနီ အောင်				၉
	ဦးမိုးမိုး				၉၆၆
	ဒေါ်လှလှ				၃
	အောင်လှိုင်				၁၃
	ဒေါ်ခင်ခင်				၁၃
	မာမာအောင်				၁၃
	ဦးမင်းဟန်ချစ်				၁၃
	ဒေါ်စိုးစိုး				၁၃

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် ...11.1.2018

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign ..
	ဒေါ်နွဲ့ယုဝင်း				၁၁/၈
	ဒေါ်သန်းဌေး				၁၁/၈
	ဒေါ်ခင်စန်း				၁၁/၈
	ဒေါ်အေးမြင့်				၁၁/၈
	ဦးရွှေနိုင်စိုး				၁၁/၈
	ဦးအေးမြင့်				၁၁/၈
	ဦးအောင်ဦး				၁၁/၈
	ဦးအောင်မောင်				၁၁/၈
	ဦးမင်းမောင်				၁၁/၈
	ဒေါ်စန္ဒာဝင်း				၁၁/၈

နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် 11. 1. 2018

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦးသန်းဝင်း				မနုဇာ
	ဒေါ်ခိုင်ခိုင်ခို				ခိုင်
	ဒေါ်အေးသက်				သက်
	ဒေါ်အာမာဇာလ်				မာဇာ
	ဒေါ်သီတာဦး				သီတာ
	ဦးညွှန်းအောင်				ညွှန်းအောင်
	ဦးကျော်မွန်				ကျော်မွန်
	ဦးဗဟိုဦး				ဗဟိုဦး
	ဦးကျော်စိုး				ကျော်စိုး
	ဦးမျိုးသုတိန်				မျိုးသုတိန်

နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR






Date/ နေ့ရက် 11.1.2018

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign ..
	ဒေါ်ခင်စုစု				ခင်
	ဦးစိုးဝင်း				
	ဒေါ်နီ				နီ
	ဒေါ်သန်းသန်း				သန်း
	ဒေါ်စွယ်စွယ်				စွယ်
	ဒေါ်စွယ်နီဝင်း				စွယ်စွယ်
	ဒေါ်ကျင်စွယ်				စွယ်
	ဦးသိန်းလှိုင်				သိန်း
	ဦးဘောဇော				ဘော
	ဒေါ်မိုးမိုး				မိုး

နှင့် မက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် ...11.1.2018

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	ဒေါ်အေးဖွင့်လှ				၆၂
	ဦးစိုးတင့်				
	ဦးအောင်စိုး				စိုး
	ဦးအောင်ဇော်				
	ဒေါ်ဌေးစိုး				ဌေး
	ဒေါ်မမဝင်း				
	ဒေါ်အေးထိုက်				
	ဒေါ်အေးသန်း				အေး
	ဦးကျော်မောင်				
	ဒေါ်စုယ်စိုအောင်				စိုမ

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်1.1.2018

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ဒေါ်မျိုးစုံဖြူ				၆၆
	ဒေါ်သန်းဌေး(ပ)				၂၁
	ဒေါ်စို				၃
	ဦးမေဦး				
	ဦးစန်းမြိုင်				
	ဦးအောင်အောင်				
	ဒေါ်သန်းစိန်				၁၆
	ဒေါ်စိုးစစ်ဌေး				၆၁
	ဒေါ်ယုန်းလွင်				၁၅

နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
၁။	ညွှန်ကြားချုပ်		ချင်းတောင်	၀၉-၂၅၅၅၇၂၆၀	Chen
၂။	အထွေထွေ		။	။ ၉၇၈၇၄၇၁၆၆	Phun
၃။	အထွေထွေ		။		Phun
၄။	သန့်ရှင်းရေး		။		Phun
၅။	သန့်ရှင်းရေး		။		Phun
၆။	သန့်ရှင်းရေး		။		Phun
၇။	ဆုံးဖြတ်ချက်		။		Phun
၈။	ဆုံးဖြတ်ချက်		။		Phun
၉။	ဆုံးဖြတ်ချက်		။		Phun
၁၀။	ဆုံးဖြတ်ချက်		။		Phun

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
၁၁	စောအောင်ကြည်				စောအောင်
၁၂	မိုးဝင်း				မိုးဝင်း
၁၃	ကျော်ဇော်				ကျော်ဇော်
၁၄	ဦးတင်အောင်				ဦးတင်အောင်
၁၅	ဆန်းစု				ဆန်းစု
၁၆	စိန်ဝင်း				စိန်ဝင်း
၁၇	ခင်မောင်				ခင်မောင်
၁၈	စန်းစု				စန်းစု
၁၉	ခင်မိုး				ခင်မိုး
၂၀	တင်စော				တင်စော

နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	၂၀ လှလှဝင်း				လှ
	၂၁ သန်းထွန်းဦး				သန်း
	၂၃ ကျော်ရင်ဦး				ကျော်
	၂၄ ဒေါ်ကလေး				ကလေး
	၂၅ မအူမြင့်ကြည်				မအူမြင့်
	၂၆ ဦးစိုးစိုး				စိုးစိုး
	၂၇ ဒေါ်အေးကျွန်း				မအေးကျွန်း
	၂၈ ဦးထွန်းစော				ထွန်းစော
	၂၉ ဦးမြတ်				မြတ်
	၃၀ ဦး ကိုစိုး				ကိုစိုး

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORကြာ.စာန.....

Date/ နေ့ရက် ၂၀၁၈.၁.၁၂.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	စောမြို့		ကြာစာန		၆၂
	စောစိုးလှ		၂		၆၃
	စောဦးစိုး		၂		၆၄
	စောဦးစိုး		၂		၆၅
	စောဦးစိုး		၂		၆၆
	စောဦးစိုး		၂		၆၇
	စောဦးစိုး		၂		၆၈
	စောဦးစိုး		၂		၆၉
	စောဦးစိုး		၂		၇၀
	စောဦးစိုး		၂		၇၁
	စောဦးစိုး		၂		၇၂

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FORကြာကုန်း.....

Date/ နေ့ရက် ..12..11..20..13.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မစန်းဦး		ကြာကုန်း		ဦး
	မအာအာဝင်း		"		အာ
	မဝင်းမာ		"		မာ
	မအိမ်စွန်		"		စွန်
	ဒေါ်ကြည်ဝင်း		"		ဝင်း
	ဒေါ်ကြည်စော		"		စော
	ဒေါ်မု		"		မု
	ဒေါ်ဖြူဝင်း				ဖြူ
	ဒေါ်ကြည်စိန်				စိန်
"	မစန်းဝင်း				စန်း

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FORမြောက်.....






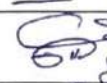
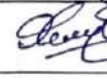



Date/ နေ့ရက် ...12...1...18.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဒေါ်ဌေးဝင်း		မြောက်		ဝင်း
	မောင်		၂		၂
	မောင်မိုး		၂		မိုး
	မောင်လွင်		၂		လွင်
	မောင်အောင်		၂		အောင်
	မောင်		၂		မောင်
	မောင်မိုးဝင်း		၂		မိုးဝင်း
	ဒေါ်မိုးလှ		၂		လှ
	ဒေါ်မိုးလှိုင်		၂		လှိုင်
	မောင်လွင်		၂		လွင်

နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FORရွာကျ.....

Date/ နေ့ရက် 12.1.2018

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ကိုဝင်း မျက်		ရွာကျ		
	ဦး ဉာဏ်မောင်		"		
	ဦး ချစ်ယုန်		"		
	ဦး မောင်ဖြူ		"		
	ဦး ထိုးလွင်		"		
	ဦး တင်ကျော်		"		
	ဦး မောင်ဦး		"		
	ကို အောင်ဆိုး		"		
	ဦး ဒေါ်နန်းအောင်		"		
	ဦး ဖြူညွန့်				

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORအောက်.....

Date/ နေ့ရက် .12.1.2018.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဒေါ်အိမ်နီ		ကြာကုန်		ဒီ
	ဒေါ်သန်းစော		၂		စော
	ဒေါ်ခင် (၂)		၂		ခင်
	ဒေါ်ဖြူဝင်း		၂		ဝင်း
	ဒေါ်မောင်နှမ		၂		စော
	ဒေါ်စန်းစို (၂)		၂		စို
	ဦးကျော်စွာ		၂		ကျော်
	ဒေါ်မန်းကြည်		၂		မန်း

ERM

နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FORကျွန်းကျ.....

Date/ နေ့ရက်၉.၁.၂၀၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မောင်တင်ညို		ကျွန်းကျ		ညို
	မောင်မာရီ		"		မောင်
	မောင်ဇော်		"		ဇော်
	ဦးစိုးတင်		"		တင်
	" မြတ်ကြီး		"		ကြီး
	" တင်ဝင်း		"		ဝင်း
	" မောင်မောင်		"		မောင်
	" ကျော်သန်း		"		သန်း
	" တင်ညို		"		ညို
	မသန်းဌေး		"		သန်း

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORကျွန်းလွှာ.....

Date/ နေ့ရက်၇.၁.၂၀၁၉.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မဖြူ ခင်ဝင်း		ကျွန်းလွှာ		၇၈
	မစွယ်စွယ်အောင်		"		Nwe
	မနာဇ်စိုင်း		"		၇၉
	မဝင်းမာ		"		၈၀
	မခွဲ		"		မခွဲ
	မအေးသိန်း		"		၆၈
	မစိုင်းတင်		"		စိုင်း
	မဖြူဝင်း		"		ဝင်း
	မအေးဖူး		"		၇၉
	မဝ		"		၀

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORရွှေကျ.....

Date/ နေ့ရက်၃.၁.၂၀၁၉.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မောင်ငွေ		ကျွဲကျ		တင်
	မခန့်		"		ခန့်
	မသောင်းဇလည်		"		သောင်း
	မဒေးစွဲ		"		ဒေး
	မဇွန်ခိန်		"		ဇွန်
	မဇွန်ခို		"		ဇွန်
	မသန်-သန်-ဒေး		"		သန်
	မယဉ်အေး		"		ယဉ်
	မစန်းစန်း-စို		"		စန်း
	မခင်သန့်		"		ခင်

Date/နေ့ရက် ...၇.၁.၂၀၁၈.....

[illegible]

EIA for Mann Field နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

Part-60

STAKEHOLDER CONSULTATION FORသစ်တောမြို့နယ်.....

Date/ နေ့ရက် ၂၀.၁.၂၀၂၃

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ဦးထွန်းရှိ		မကွေးတိုင်း		ထွန်းရှိ
	ဦးထွန်းကျော်		"		ထွန်းကျော်
	ဦးဝေ		"	၂၆၂၄၂၁၁၆၆	ဝေ
	ဦးကျော်ကျော်		"		ကျော်ကျော်
	ဦးအုန်းမောင်		"	၃၃၄၆၆၆၇	အုန်းမောင်
	ဦးမိုးတာ		"		မိုးတာ
	ဦးကျော်စိုး		"		ကျော်စိုး
	ဦးသိင်္ခ		"		သိင်္ခ
	ဦးကျော်စိုး		"		ကျော်စိုး
	ဦးကျော်စိုး		"		ကျော်စိုး

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလက်ကွက်မပါ.....

Date/ နေ့ရက်၂၀၁၉.၁၁.၂၀/၁၉.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	စွမ်းနိုင်ဝင်း		မောင်မောင်တန်း		၀၉:
	မောင် သိန်း		၂		၁၃
	၀င်း မြင့်		၂		Hleg
	ဖြေ ဦးမိုး တ်		၂		၁၃
	၀င်း ဦး		၂		၁၃
	ဒေါ်စန်းရှင်		၂		၁၃
	၂ ဒေါ် ဦး		၂		၁၃
	၂ ဒေါ်ခင်မြ		၂		၁၃
	၂ ဒေါ် ဝင်း		၂		၁၃
	၂ ဒေါ် မိုးမိုး		၂		၁၃

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလှေကား.....

Date/ နေ့ရက် ၂၀၂၁.၁၁.၂၃.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့၊ Public ပြည်သူလူထု၊ Media မီဒီယာ၊ NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ဒေါ်စန်း		လှိုင်သာယာ		စန်း
	နွဲ့ကြည်		"		စန်း
	ဒေါ်အောင်ဆန်း		"		စန်း
	လှိုင်စန်း		"		စန်း
	ဒေါ်အောင်ကြည်		"		စန်း
	ဒေါ်စိုး		"	၄၄၈၇၈၄၂၃၀	စန်း
	ဦးကျော်		"	၄၄၈၇၇၇၂၃၀	စန်း
	ဦးအောင်		"		စန်း
	ဦးကျော်		"		စန်း
	ဒေါ်အောင်		"		စန်း

.....နှင့် ဟက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလုံခြုံရေး.....

Date/ နေ့ရက် ၁၀.၁.၂၀၂၁

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ဒေါ်လှဆန်း		မာတိပုံအလယ်		ဆန်း
	မေဂျီဇော်မေ		၇		မ
	မအိအိအိအိ		၇		ဝင်း
	ဒေါ်လှစော		၇		စော
	ဒေါ်မြ		၇		မြ
	ဒေါ်အိအိအိအိ		၇		အိအိ
	ဒေါ်ဝင်းအေး		၇		အေး
	ဒေါ်ဝင်း		၇		ဝင်း
	ဒေါ်အိအိအိ		၇		အိအိ
	မဒေါ်မေမြတ်		၇		မြတ်

နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလက်ပံတယ်.....

Date/ နေ့ရက် ...၁၈.၁.၂၀၂၃.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	ဦးမြင့်ဝေ		လက်ပံတယ်		၆၁
	ဒေါ်ခွင်ခွင်		"		၆၂
	ဒေါ် ဖုန်း		"		၆၃
	မဖြူမ		"		၆၄
	မဖြူဖြူဖြူ		"		၆၅
	ဒေါ်ဝင်းဝင်း		"		၆၆
	ဒေါ်ခွင်ခွင်		"		၆၇
	ဒေါ်ခွင်ခွင်		"		၆၈
	မဖြူမ		"		၆၉
	မဖြူမ		"		၇၀

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလက်ယံတန်း.....

Date/ နေ့ရက် ၂၀၁၁.၁၂.၂၁ နံနက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့၊ Public ပြည်သူလူထု၊ Media မီဒီယာ၊ NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address လက်ယံတန်း	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	ဒေါ်နီ.လှဝေ		၂		၆၆
	ဒေါ်တင်ရှေး		၂		၀၁၆
	ဒေါ်စုစုခင်		၂		၇၂
	ဒေါ်အိန်အိန်ဝေ		၂		၀၃၁
	မ.မ.ဝေ	မ.မ.ဝေ	၂		၆၀
	မ.ဂျီ.ခါ		၂		
	ဒေါ်အောင်အောင်		၂		၀၁၆
	ဒေါ်အေးမ		၂		၀၃
	ဒေါ်မာမာခိုင်		၂		၀၃
	မ.နီ.နီ.မောင်		၂		၀၃

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORသစ်ပင်တော.....

Date/ နေ့ရက်၄.၁.၂၀၁၆.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	ဥက္ကဋ္ဌစာရိ:				စာရိ:
	စာရေး				စာ
	စာရေးအဖွဲ့				အဖွဲ့
	မြို့နေအဖွဲ့အစည်း				အဖွဲ့
	သက်တော				သက်
	အဖွဲ့အစည်း				အဖွဲ့
	ရိုဂျ်				ရိုဂျ်
	ရိုဂျ်				ရိုဂျ်
	အောင်မြင်				အောင်
	အောင်မြင်				အောင်

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORမက်ပုံကော.....

Date/ နေ့ရက်၄.၁.၂၀၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ကျွန်းမြို့				၇
	စင်္ကြံ				၁၈
	ဒေါ်သိန်းသိန်း				၁၃၄
	ဦးကျော်				၈၂
	အကျွန်ုပ်တို့				၁၁၃
	ဦးမောင်				၇၆
	စန်စန်မောင်				၈၃
	ဝင်းနိုင်				၇၉
	စန်မောင်				၈၅
	တင်ဦး				၈၈
	အိုမောင်				၈၅

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORအင်္ဂါမံကွေး.....

Date/ နေ့ရက်၁.၁.၂၀၁၉.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မိုးသီရိ				၀၉
	မောင်မောင်				မောင်
	မိုးခိုင်				မိုး
	မောင်အိမ်				အိ
	မောင်				မောင်
	မိုးခိုင်				မိုးခိုင်
	မောင်				မောင်
	မောင်မောင်				မောင်မောင်
	မောင်မောင်				မောင်မောင်
	မောင်မောင်				မောင်မောင်

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်


အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ကိုသောင်း ဦး				Thir
	မခင်စိန်ဌ				ခင်
	ကိုဇော်စိုး				ဇော်
	ကိုကျော်စစ်				ကျော်
	ကိုခင်ဝင်း				ခင်
	ဦးခင်				ခင်
	ဦးချစ်စိန်				ချစ်
	ဦးဝင်းဝင်း				ဝင်း
	မစန်းစု				စု
	မဝင်းစု				စု

[illegible]

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလေးဒဂုံမြို့နယ်.....

Date/ နေ့ရက်၁၀.၁၂.၁၈.....

Page ၇၆၉

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	မောင်မိုးညွှင်				
	မမော်				မမော်
	မချိုလှေ				ချို
	မအုန်မြင့်				မြင့်
	မဝင်း				ဝင်း
	မဖြူ				ဖြူ
	မအေးမာ				မာ
	မသန်းစိုး				စိုး
	ဒေါ်အုန်းစိန်				စိန်
	မအေး				အေး

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလေးဒဂုံမြို့နယ်.....


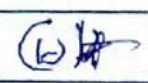
Date/ နေ့ရက်၁.၁.၂၀၁၆.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign "
	မမာကျွ				၈၁
	ဒေါ်သိန်းစန်း				၁၃၆
	မဝင်း				၁၆
	ဒေါ်ခိုင်				၉၆
	မမာဌေး				
	မယုဝေ				၁၃
	ဒေါ်ဖွားအေး				၁၆
	မမိုးမိုး				၁၆
	မငွေစုံစိုး				၁၆
	မလှလှ				၁၆

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FORလေးဒဂုံမြို့နယ်.....

Date/ နေ့ရက် ၁၁.၁၂.၂၀၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign "
	ဒေါ်အေးနု				
	မသင်းမြတ်ဗွယ်				
	ဒေါ်ဝင်း				
	ဒေါ်ဌေးသောင်း				ဌေးသောင်း
	မခင်မြတ်ဗွယ်				
	ဒေါ်စုမြ				
	စာအုပ်				အုပ်
	မဂဒုဒေသနာ				မြင့်
	ဝတ်				ဝတ်
"	စာအုပ်အဖွဲ့				စာအုပ်




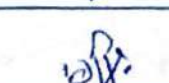
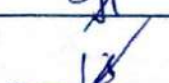


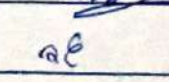
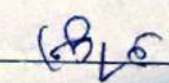
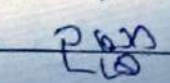
နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလေးဒဂုံမြို့နယ်.....

Date/ နေ့ရက် ၇.၁.၂၀၁၆

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မ.၁၃၇၂၆၀				၁၃
	မ.၁၆.၁၆				၁၆
	ဒေါ်ဘောဇရင်				ဘောဇ
	ဒေါ်တင်မာ				
	ဦးခင်မောင်				
	မ.မျိုးမင်းသိန်း				
	မ.အိမ်မောင်				အိမ်မောင်
	မ.ရင်းမောင်				ရင်းမောင်
	မ.လှမောင်				
	မ.မြင့်မြင့်				မြင့်

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလေ့လာမှုစီမံကိန်း.....

Date/ နေ့ရက်၁၂.၁.၂၀၁၆.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့၊ Public ပြည်သူလူထု၊ Media မီဒီယာ၊ NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ဒေါ်အောင်ဆန်းစုကြည်				
	မောင်ခိုင်				
	မောင်မျိုးသုဇင်				
	မလှမျိုးဝေ				
	မောင်စိန်				
	မ.စိုးမြင့်ဝင်း				
	မ.ကျော်ကျော်စိုး				
	ဇော်လွင်				
	ဒေါ် ဂျွန်နီ				
	ဦးစော				

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORလေးဒဂုံမြို့နယ်.....

Date/ နေ့ရက်၇.၁.၂၀၁၆.....








အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign "
	သိဝကဝဏ်း				၁၆
	ညိုညိုဝင်း				၁၇
	မခင်မြဝင်းကြည်				၁၈
	မခင်စိုး				၁၉
	မိုးမိုးဝင်း				၂၀
	မမေဦး				၂၁
	မစိုးဝင်း				၂၂
	မအေးမိုး				၂၃
	မအိမ်နတ်				၂၄
"	မမေ				၂၅

STAKEHOLDER CONSULTATION FORකළා: වර්ගීකරණය.....

Date/ දිනය 9.1.2018.

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	စန်၊ စန်၊ အေ၊				အေ၊
	ဂင်ဘန်၊				ဂင်
	အေ၊				အေ၊
	ဘန်၊ ဘန်၊ မို၊				ဘန်
	မို၊ မို၊ သင်၊				မို၊
	သွယ်စို၊				စို၊
	ချို၊ နွယ်ဝင်း၊				Cho
	မချို				ချို
	ဦးတေအောင်				တေ
	“ နိုးလွင်				လွင်

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FOR
 Date/ နေ့ရက်၂၀၁၈

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦးမင်းနိုင်				
	မောင်မောင်	စာပေဗျာဓိအဖွဲ့			
	မ. အောင်ကျော်				
	မောင်မောင်				
	ဦးဌေး				
					

နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Lai







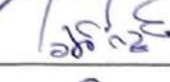

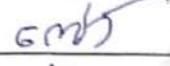

Date/ နေ့ရက် 12.1.2018

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
1	ဦးကျော်ဗင်း		အမှတ် ၁၊ ဗဟိုချေးကမ်း ၀၇၄၀၁၅၁၈၅၃		
2	အသိ			၀၇/၄၀/၅၅၅၇၀၄	
3	ဦးကျော်ဗို		"	၀၇/၇၆၂၅၇၄၃၇	
4	ဦးမြစန်း		"	၀၇/၇၅၇ ၁၅၂၅၆၃	
5	ဦးညွန့်ကွင်		"	၀၇၇၇၄၃၆၈၈၇၁	
6	ဦးဇော်အောင်		"		
7	ဦးငွေဝင်း		"	၀၇၄၀၁၆၃၇၆၈၇	
8	ဦးစိုးဝင်း		"		
9	ဦးစိုးဝင်း				
10	ဦးစိုးအောင်				

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR


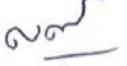

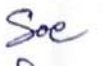



Date/ ဇန်နဝါရီ

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign "
11	ဦး ဇော် ဇော်		မလှိုင်၊ ချောင်း		
12	ဦး လှ ဇော်		"		
13	ဦး လှ ဇော်		"		
14	ဦး ဦး		"		
15	ဦး စစ် ဇော်		"		
16	ဦး သိန်း ဇော်		"		
17	ဦး သိန်း လွင်		"		
18	ဦး သိန်း ဦး		"		
19	ဦး ကျော် လက်		"		
20	ဦး စော ဦး		"		

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း







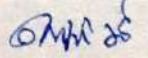

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် ..12.1.2018.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
21.	မစိုး		မကျိုးကျွန်း		
22.	ဦးလတ်		~		
23.	မေမိစိုးယုဝေ		~		
24.	မစိုးစိုး ကောင်		~		
25.	ဦးဌေးဝင်း		~		
26.	ဦးကျွန်း		~		
27.	မတိုးတိုး		~		

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORမုဒုံမြို့နယ်.....

Date/ နေ့ရက် ၀၁.၁၂.၀၁၅

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦးစိုးမောင်		မဟာဘေလွန်		
	မိုးစိုး		"		
	ဦးစောကမ္ဘာဦး		"		သွေး
	ဦးသန်းမြင့်		"		
	ဦးအောင်ကျော်စိုး		"		
	ကိုကိုထူး		"		
	ဦးမြင့်မြင့်		"		
	ဦးကျော်မင်း		"		
	ဦးလှသိန်း		"		၇၃၄
	ဦးအောင်မောင်မောင်		"		

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORမယ်ကျေးရွာ.....

Date/ နေ့ရက် ၁၁ - ၁ - ၂၀၁၈

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့၊ Public ပြည်သူလူထု၊ Media မီဒီယာ၊ NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦးသန်းမြင့်		မယ်ကျေးရွာ		✓
	ဦးကျော်စား		"		ဦးကျော်စား
	ဦးစောစော		"		ဦးစောစော
	ဦးသိန်းစော		"		ဦးသိန်းစော
	ဒေါ်ခင်မြင့်		"		ဒေါ်ခင်မြင့်
	ဒေါ်ခင်စော		"		ဒေါ်ခင်စော
	ဒေါ်ခင်စု		"		ဒေါ်ခင်စု
	ဒေါ်ခင်စု		"		ဒေါ်ခင်စု
	ဒေါ်ခင်စု		"		ဒေါ်ခင်စု

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORမဟော်မြစ်တူးဖော်ရေး.....

Date/ နေ့ရက်၁၁.၁၁.၂၀၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဒေါ်အေး ဂျိန်		မဟော်မြစ်တူးဖော်ရေး		ဒေါ်အေး ဂျိန်
	ဒေါ်အိန္ဒာဝယ်လ်		“		ဒေါ်အိန္ဒာဝယ်လ်
	ဒေါ်မင်း		“		ဒေါ်မင်း
	ဒေါ်အေး		“		ဒေါ်အေး
	ဒေါ်အိန္ဒာဝယ်လ်		“		ဒေါ်အိန္ဒာဝယ်လ်
	ဒေါ်မင်း		“		ဒေါ်မင်း
	ဒေါ်အေး		“		ဒေါ်အေး
	ဒေါ်အိန္ဒာဝယ်လ်		“		ဒေါ်အိန္ဒာဝယ်လ်
	ဒေါ်မင်း		“		ဒေါ်မင်း
	ဒေါ်အေး		“		ဒေါ်အေး

Date/ နေ့ရက် ၁၁.၁.၂၀၁၇

[illegible]

.....နှင့် ပက်သက်၍မိမိတို့နှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် ၂၀၁၈

Place / နေရာ Mawm Kyae village

အမျိုးအစား/Type • Government အစိုးရအဖွဲ့ • Public ပြည်သူ • Media မီဒီယာ • NGO အစိုးရမဟုတ်သောအဖွဲ့အစည်း	အမည် Name	ရာထူး Position	ဌာန/အဖွဲ့အစည်းအမည် Department/ Organization	နေရပ်လိပ်စာ Address	ဆက်သွယ်ရန်စနစ် Phone	လက်မှတ် Sign
၁	စောသန်းလှ			မင်းမိကျိ		
၂	- စန်ဝင်း					စန်ဝင်း
၃	- ခင်မာရီ				၀၉၇၇၂၂၃၃၃ ၀၃	ခင်မာရီ
၄	ခင်မာမောင်					ခင်မာ
၅	သန်းမော်				၀၉၇၅၈၀၇၇ ၆၆၆	သန်းမော်
၆	အိမ်					အိမ်
၇	မောင်မြင့်					မောင်

.....နှင့် ပက်သက်၍စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

Place / နေရာ

အမျိုးအစား/Type • Government အစိုးရအဖွဲ့ • Public ပြည်သူ • Media မီဒီယာ • NGO အစိုးရမဟုတ်သောအဖွဲ့အစည်း	အမည် Name	ရာထူး Position	ဌာန/အဖွဲ့အစည်းအမည် Department/ Organization	နေရပ်လိပ်စာ Address	ဆက်သွယ်ရန်နံပါတ် Phone	လက်မှတ် Sign
၁	ဒေါ်စုအောင်					စုအောင်
၂	မကြာ					မကြာ
၃	မအုတ်စုအောင်					မအုတ်
၄	ဦးဦး၊ ဦးစို					ဦးစို
၅	မအုတ်စုအောင်					မအုတ်
၆	မအုတ်စုအောင်					မအုတ်
၇	မအုတ်စုအောင်					မအုတ်

နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
၁၅	မအောမမြေ				စော:
၁၆	မိုးဝင်းမြေ				အောင်မြေ
၁၇	မိုးစန်းစာ				စန်း
၁၈	မမြေ				မြေ
၁၉	မမြတ်ဌေး				ဌေး
၂၀	မဌေးဌေးဝင်း				
၂၁	မဇာနည်စိန်				စိန်
၂၂	မိုးတင်မြ				မြ
၂၃	မိုးမခလေး				လေး
၂၄	" ခင်စို				စို

နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
၂၅	မစန်းမြိုင်				စန်
၂၆	ဒေါ်မယ်ကြီး				မယ်မယ်ကြီး
၂၇	သောဌာန				သောဌာန
၂၈	မစိုး				စိုး
၂၉	မခင်ဝင်း				ခင်
၃၀	မမျိုးစိန်				မျိုး
၃၁	မစိန်ဝင်း				စိန်
၃၂	မချို				ချို
၃၃	မလွေး				လွေး
၃၄	မချို				ချို

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

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၃၅	မ.ရီ.ရီ.လွင်				လွင်
၃၆	မ.ခင်စောမူ				ခင်
၃၇	မ.စိန်မြစု				စိန်
၃၈	မ.လှမ				လှမ
၃၉	မ.လင်း				လင်း
၄၀	မ.လှမြစု(ကျွန်း)				ကျွန်း
၄၁	မ.ရီ				ရီ
၄၂	မ.စံ				စံ
၄၃	မ.စိန်စိန်စိန်				စိန်
၄၄	မ.စောသိ			၀၉၇၈၅၀၅ ၄၇၁၆	စောသိ

နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

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၄၅	မသက်စာ			၀၉၇၆၇၇၇၇၇၅	သက်စာ
၄၆	မပေါက်				မပေါက်
၄၇	မသန်၊ ဇွဲ				သန်၊
၄၈	မခွေဇွဲ၊ အိုဇွဲ				ခွေဇွဲ
၄၉	မဝင်ဇွဲ				ဝင်ဇွဲ
၅၀	မစောဇွဲ				စောဇွဲ
၅၁	မတင်ပန်းသင်				တင်
၅၂	မစောဇွဲ၊ ခံ				စောဇွဲ
၅၃	မဝင် ဇွဲ				ဝင် ဇွဲ
၅၄	မဝင်ပန်း ဇွဲ				ဝင်ပန်း

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

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၅၅	မမ္ဘိရီစော			၂၅၆၀၃၇၁၇၆	မျိုး
၅၆	မမော်				မော်
၅၇	မဖြူ				ဖြူ
၅၈	မသီရိစန္ဒာ				သီရိ
၅၉	မိုးစန်းသန်း				မိုး
၆၀	မချစ်ချစ်စော				ချစ်
၆၁	မဆန်ဆန်				ဆန်
၆၂	မစိုးစိုး				စိုး
၆၃	မငယ်				ငယ်
၆၄	မမင်းသိန်း				

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

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၆၅	မ(ရ)				၆၈
၆၆	မဝါချီ				၆၉
၆၇	မဝင်း				၇၀
၆၈	မေါ်မြ				၇၁
၆၉	မခင်ချီ				၇၂
၇၀	မညိုမ				၇၃
၇၁	မခင်မာမာ				၇၄
၇၂	မဝေချို				၇၅
၇၃	မခင်ပိုင်				၇၆
၇၄	မဟေးသင်း				၇၇

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

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၇၅	ဗဟိုဦးစီး				ဗဟို
၇၆	မန္တလေး မြို့				မြို့
၇၇	အဖွဲ့အစည်း				စီ
၇၈	ဒေါ်ခင်စု				အချိုးအစား
၇၉	မန္တလေးတိုင်း				စီ
၈၀	ဒေါ်ခင်စု				အချိုးအစား
၈၁	ဒေါ်ခင်စု				စီ

Marm Oilfield

နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/နေ့ရက် ၁၈-၁-၂၀၁၈

အမျိုးအစား/ Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/ Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
Public	ဦးစစ်ဘေးရေး		မင်းတူးမြို့	၀၉-၇၅၁၂၃	၀၂၄၈၆၄
	ဦး စန္ဒာ နိုင်		"		
	ဦး မောင်ရွှေ		"		
	ဦး ဒေါ်ခင်		"		
	ဦး ရဲဝင်း		"		
	ဦး စိုချမ်း		"		
	ဦး ကျော်		"		
	ဦး မောင်		"		
	ဦး စောမောင်		"		
	ဦး သန်းကျော်		"		

နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် ၁၂.၁.၂၀၁၈

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	ဦး များ		မိုးကြိုး	မိုးကြိုး	
	၁. ဂျေမီဗိုင်း				
	၂. ခင်မြိုင်				
	၃. မေမိမောင်				
	၄. သန်းစိုး				
	၅. ဖေဖေ				
	၆. ဝင်းစိုး				
	၇. ဖြေတုတ်				
	၈. စစ်စစ်				
	၉. အောင်စိန်				

.....နှင့် ပက်သက်၍စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် ၂၀၁၈. ၁၂. ၁၈

Place / နေရာ

အမျိုးအစား/Type • Government အစိုးရအဖွဲ့ • Public ပြည်သူ • Media မီဒီယာ • NGO အစိုးရမဟုတ်သောအဖွဲ့အစည်း	အမည် Name	ရာထူး Position	ဌာန/အဖွဲ့အစည်းအမည် Department/ Organization	နေရပ်လိပ်စာ Address	ဆက်သွယ်ရန်နံပါတ် Phone	လက်မှတ် Sign
	ဦးတင်မောင်		မိုးမြင့်	မိုးမြင့်	မိုးမြင့်	
	။ ဝင်း နိုင်					
	။ သန်းမြင့်					
	။ ဦးတင်					
	။ မြင့်မောင်					
	။ တင်မိုး					
	။ မောင်မြတ်					

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက် ၂၀၁၈. ၁၁. ၁၈

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦး နှစ်ကို		မင်းကျီး	မင်းကျီး	
	၁။ သိန်းဝင်း				
	၂။ ဦးစိုင်း				
	၃။ ဦးစိုင်း				
	၄။ ဦးစိုင်း				
	၅။ ဦးစိုင်း				
	၆။ ဦးစိုင်း				
	၇။ သက်တော				
	၈။ သိန်းဝင်း				
	၉။ ဦးစိုင်း				

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်၂၀..... ၁ ၂၀.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦး နိုင်လင်း		မိုးကျို	မိုးကျို	
	။ ဆက်ထွန်း				
	။ ကုမ္ပဏီ				
	။ ငွေ့အောင်				
	။ ဆင်းစိန်				
	။ မိုးခိုင်				

လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန၊ မြန်မာ့ရေနံနှင့်သဘာဝဓာတ်ငွေ့လုပ်ငန်း (MOGE) နှင့်
ရေနံတူးဖော်ထုတ်လုပ်ရေးလုပ်ငန်းများကို အကျိုးတူပူးပေါင်းဆောင်ရွက်လျက်ရှိသည့်
MPRL E&P Pte.Ltd .မှ Environmental Resources Management (ERM)
ကုမ္ပဏီနှင့် ပူးပေါင်း၍ မနန်းရေနံမြေ ပတ်ဝန်းကျင်တွင် လူမှုရေး၊ ကျန်းမာရေးနှင့်
ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ ဆွေးနွေးပွဲ
တက်ရောက်သူများစာရင်း

၁၂-၁-၂၀၁၈

စဉ်	အမည်	ရာထူး	ဖုန်းနံပါတ်	လက်မှတ်
၁	ဦးဖြူမျိုးစု	GM	၀၉၂၅၀၀၇၇၇၄၈၀	
၂	ဒေါ်ခင်မောင်သင်း	ဧည့်သည်အဖြစ် တက်ရောက်သူ	၀၉၅၆၅၃၇၇၇၇	
၃	ဦးစိုးဦး	U	၀၉-၇၇၆၇၀၇၃၇၇	
၄	ဦးဝင်းမောင်	ယ/ဝ ပြည် ငြိမ်းရေးဌာန	၀၉-၇၇၇၇၇၇၆၇၀၇	
၅	ဦးလမ်းသန်း	မြို့စားဧကရာဇ်	၀၉-၄၄၄၄၀၀၀၇၀	
၆	ဦးအောင်ကျော်	ဒုတိယဧကရာဇ်	၀၉-၂၆၇၀၂၄၂၄၅	
၇	ဦးဝင်းဝင်း	GN	၀၉-၇၇၀၇၆၇၆၈၇	
၈	ဦးဝင်းဝင်း	မြို့သူအဖွဲ့ဝင်	၀၉၄၀၇၆၃၆၆၈၇	
၉	ဦးမောင်မောင်	မြို့သူအဖွဲ့ဝင်	၀၉၅၇၇၇၇၇၇၇	
၁၀	ဦးကျော်	ERD	၀၉-၂၆၅၅၇၇၇၇၇	
၁၁	ဦးမောင်	A. MGR (Adm.)	၀၉-၇၇၆၄၃၅၄၄၇	
၁၂	ဦးမောင်မောင်	MGR (Adm.)	၀၉-၄၀၇၆၇၇၇၇၇	
၁၃	ဦးမောင်မောင်	HA	၀၉-၄၄၄၀၇၇၇၇၇	
၁၄	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၅၀၇၇၇၇၇၇	
၁၅	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၁၆	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၁၇	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၁၈	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၁၉	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၀	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၁	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၂	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၃	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၄	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၅	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၆	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၇	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၈	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၂၉	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	
၃၀	ဦးမောင်မောင်	ဦးမောင်မောင်	၀၉-၇၇၇၇၇၇၇၇	

လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန၊ မြန်မာ့ရေနံနှင့်သဘာဝဓာတ်ငွေ့လုပ်ငန်း (MOGE) နှင့်
 ရေနံတူးဖော်ထုတ်လုပ်ရေးလုပ်ငန်းများကို အကျိုးတူပူးပေါင်းဆောင်ရွက်လျက်ရှိသည့်
 MPRL E&P Pte.Ltd .မှ Environmental Resources Management (ERM)
 ကုမ္ပဏီနှင့် ပူးပေါင်း၍ မနန်းရေနံမြေ ပတ်ဝန်းကျင်တွင် လူမှုရေး၊ ကျန်းမာရေးနှင့်
 ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ ဆွေးနွေးပွဲ
 တက်ရောက်သူများစာရင်း

၁၂-၁-၂၀၁၈

စဉ်	အမည်	ရာထူး	ဖုန်းနံပါတ်	လက်မှတ်
၁။	ဦးမင်းလှိုင်	ဦးစီးဦးစီး	၀၉-၉၅၆၂၄၅၆၃၈	
၂။	ဦးဝင်းမင်းထွန်း	ဦးစီးဥပဒေ	၀၉-၆၇၁၇၆၆၆၆	
၃။	ဦးဝင်းထွန်း	အုပ်ချုပ်ရေးမှူး	ကြီးမင်းကန် ၀၉-၄၀၁၅၇၄၂၀	
၄။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၅။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၄၄၀၅၀၅၀၅၀၅	
၆။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၇။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၈။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၉။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၀။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၁။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၂။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၃။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၄။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၅။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၆။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၇။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၈။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၁၉။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၀။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၁။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၂။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၃။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၄။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၅။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၆။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၇။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၈။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၂၉။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	
၃၀။	ဦးဝင်းမင်း	အုပ်ချုပ်ရေးမှူး	၀၉-၇၆၆၇၆၆၆၆၆၆	

လျှပ်စစ်နှင့်စွမ်းအင်ဝန်ကြီးဌာန၊ မြန်မာ့ရေနံနှင့်သဘာဝဓာတ်ငွေ့လုပ်ငန်း (MOGE) နှင့်
ရေနံတူးဖော်ထုတ်လုပ်ရေးလုပ်ငန်းများကို အကျိုးတူပူးပေါင်းဆောင်ရွက်လျက်ရှိသည့်
MPRL E&P Pte.Ltd . မှ Environmental Resources Management (ERM)
ကုမ္ပဏီနှင့် ပူးပေါင်း၍ မန်းရေနံမြေ ပတ်ဝန်းကျင်တွင် လူမှုရေး၊ ကျန်းမာရေးနှင့်
ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ ဆွေးနွေးပွဲ
တက်ရောက်သူများစာရင်း

[illegible]

EIA Main Field

နှင့် ပတ်သက်၍ စိမ့်ကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
STAKEHOLDER CONSULTATION FOR
နေ့ရက် ၁၀.၁၁.၂၀၁၈

၄၄
page

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မောင်သိ		၉၆ ဦးကျော်	၀၉. ၄၄၀၇၂၆၆၆	Nhe
	မိန်းမား သွယ်		"	၀၉. ၇၆၆၆၆၆၆၆	မား
	မောင်စင်		"	၀၉. ၇၇၇၇၇၇၇၇	စင်
	မောင်သန်းသိ		"	၀၉. ၇၇၇၇၇၇၇၇	သိ
	မောင်စိန်		"	၀၉. ၇၇၇၇၇၇၇၇	စိန်
	မောင်စိုး		"	၀၉. ၇၇၇၇၇၇၇၇	စိုး
	မောင်စိုးစိုး		"	၀၉. ၇၇၇၇၇၇၇၇	စိုးစိုး
	မောင်စိုးစိုး		"	၀၉. ၇၇၇၇၇၇၇၇	စိုးစိုး
	မောင်စိုးစိုး		"	၀၉. ၇၇၇၇၇၇၇၇	စိုးစိုး
	မောင်စိုးစိုး		"	၀၉. ၇၇၇၇၇၇၇၇	စိုးစိုး

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FOR
 Date/ နေ့ရက် ၂၀၁၈ ခုနှစ်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့၊ Public ပြည်သူလူထု၊ Media မီဒီယာ၊ NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	မသိသိဟန်		ဦးဦးလမ်း ၇	၀၉-၇၇၈၇၇၅၀၇၄	ဦး
	မစိုးလွင်မိုး		၂	၀၉-၄၀၁၆၅၈၇၈၁	မိုး
	မောင်စိုး			၀၉-၇၇၆၇၇၇၇၄	မောင်
	မစန္ဒာဝင်း			၀၉-၇၈၇၆၇၈၇၅	စန္ဒာ
	မစိုး			၀၉-၄၄၈၇၇၀၁၆	မစိုး
	မစားအိမ်			၀၉-၄၇၇၈၆၈၇၇၇	မစား
	မယုယုဝေ			၀၉-၇၇၇၇၇၇၇၇	မယု
	မစားသလ			၀၉-၇၇၇၇၇၇၇၇	မစား
	မစိုးစိုးစိုး				
	မစိုးစိုး			၀၉-၇၇၇၇၇၇၇၇	မစိုး

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORအိုးဒါမြို့နယ်.....(မယ်ပင်အောက်ကုန်းဒေသ)

Date/ နေ့ရက်၂၀၁၉.၀၂.၂၇.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	မစန္ဒာဝင်း		ဦးဦးကျေးရွာ	၀၉-၇၅၈၈၃၄၁၈၁	ဝင်း
	မစုဇော်မိုး		"	၀၉-၃၃၁၈၇၅၁၀	မြ
	မမာမာဝင်း		"	၀၉-၇၈၈၃၆၆၃၇၄	မာ
	မယုယုဝေ		"	၀၉-	ယု
	မအောင်ခင်		"	၀၉-၄၄၁၁၆၆၆၀၄	ခင်
	မအိအိအိ		"		အိ
	မအိအိအိ		"		အိ
	မအိအိအိ		"	၀၉-၇၇၇၇၇၇၇၇	အိ
	မအိအိအိ		"		အိ
	မအိအိအိ		"	၀၉-၃၃၁၈၇၇၆၇	အိ

.....နှင့် ဟက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FORနယ်နိမိတ် (မေပင်တောလွှာအုပ်စု)

Date/ နေ့ရက် ...10.1.18.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်စုန်း/ Phone	လက်မှတ်/ Sign
	မောင် ဖြူငြိမ်း	-	၁၉-ဦးကျေးရွာ	၀၇၄၀၁၅၅၄၇၁၇	မောင်
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	ဦးစောမောင်		"		ဦးစောမောင်
	ဦးလှစာအုပ်		"		ဦးလှစာအုပ်
	ဦးကျယ်သိန်း		"		ဦးကျယ်သိန်း
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 STAKEHOLDER CONSULTATION FORနယ်မြေ.....မြို့နယ်.....ကျေးရွာများအတွက်


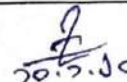








Date/ နေ့ရက်၂၀၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့၊ Public ပြည်သူလူထု၊ Media မီဒီယာ၊ NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	မစ္စတာ		နီပေါ ဗျာ၊ ၅၁		၅၄
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	မစ္စတာ				၁၀၃
	မစ္စတာ မြင့်				၁၁၄ မြင့်

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

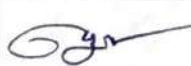
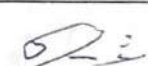
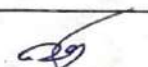
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အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်နံပါတ်/ Phone	လက်မှတ်/ Sign
	ဦးအုန်းမြ		ပေါက်ကျွန်း		
	မ.ဖြူခိုင်		မ		
	မ.မောင်ခိုင်		မ		
	မ.ကျွန်းဆင်ဖြူ		မ		
	မ.သိန်းထွန်းဦး		မ		
	မ.တာ		မ		
	မ.ဖြူ		မ		
	မ.ဘုန်းမင်း		မ		
	ဒေါ်ဝေဝေစွယ်		မ		
	မ.မင်းမာ		မ		

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

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	ဒေါ်ဖြူဝေ		မေတ္တာတောင်		၆၀
	ဦးလွင်		"		
	အောင်မြင်		"		
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	မောင်အောင်		"		မောင်အောင်
	မောင်အောင်		"		မောင်
	သက်ဝင်း		"		သက်
	မောင်အောင်		"		မောင်
	အောင်မြင်		"		အောင်
	အောင်မြင်		"		အောင်

Date/နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဒေါ်နောင် ခင်		ဓါးကောက်:	၀၉-၅၆၇၈၉	ခင်
	ဦးစိုးစိုး				စိုး
	ဦးစိုးဝင်း				ဝင်း
	၏အောင်				အောင်
	၏အောင်				အောင်
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.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FOR

Date/ နေ့ရက်

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address ပေါက်တူရွာ	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign ..
	မ.မ.ဝေါက်		မ		လမ
	မ.သက်ခိုင်		မ		ခိုင်
	မ.မ.ခိုင်		မ		ခိုင်
	မ.မ.မာ		မ		မာ
	မ.သက်ခိုင်		မ		ခိုင်
	မ.သက်ခိုင်		မ		ခိုင်
	မ.မ.ခိုင်		မ		ခိုင်
	မ.မ.ခိုင်		မ		ခိုင်
	မ.မ.ခိုင်		မ		ခိုင်
	မ.မ.ခိုင်		မ		ခိုင်

.....နှင့် ပတ်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း

STAKEHOLDER CONSULTATION FORရွာအသစ်.....

Date/ နေ့ရက် 11.1.2018.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့, Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦးကျော်ဌေး		ရွာအသစ်		
	ဦးမောင်ဆွေး		၂		
	မမေ		၂		
	တင်မောင်ဆွန်		၂		
	ဦးစိုးမြင့်		၂		
	ဦးဆွန်းဦး		၂		
	ဦးကျော်ဝင်း		၂		
	ဒေါ်စိုး		၂		
	ဒေါ်စန်းမေ		၂		
"	ဒေါ်ဆန်း		၂		

.....နှင့် ပက်သက်၍ စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် တွေ့ဆုံဆွေးနွေးခြင်း
 STAKEHOLDER CONSULTATION FOR၅၇၁၁၇.....

Date/ နေ့ရက်၁၁-၁-၂၀၁၈.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign "
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	မဝင်းမာ		"		
	မဟုဝေ		"		
	ဒေါ်တင်အုန်း		"		
	ကိုမောင်ဌေး		"		
	ဦး ငြိမ်းမောင်		"		
	မလဲ, လဲ, ဖြူ		"		
	မောင်စိုး		"		
"					

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STAKEHOLDER CONSULTATION FORရွာသာ.....

Date/ နေ့ရက်12.1.2018.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
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	မိုး		၂		
	ဒေါ်ပု		၂		
	မောင်စွေ		၂		
	ဒေါ်ဖြူ		၂		
	ဒေါ်စန်းဖြူ		၂		
	ဦးဂျော့		၂		
	ဦးမောင်တင်		၂		
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STAKEHOLDER CONSULTATION FORဂွာဘာ.....

Date/ နေ့ရက်11.1.2018.....

အမျိုးအစား/Type (Government အစိုးရအဖွဲ့., Public ပြည်သူလူထု, Media မီဒီယာ, NGO ပြည်ပအဖွဲ့အစည်း)	အမည်/ Name	အဖွဲ့အစည်း/Organization	နေရပ်လိပ်စာ/ Address	ဆက်သွယ်ရန်ဖုန်း/ Phone	လက်မှတ်/ Sign
	ဦးသိန်းဌေး		ဂွာဘာ	၀၇၇၇၅၈၄၇၈၆၇	
	ဦးဌေးဝင်း		h		
	ဦးဌေးအောင်		h		
	ဦးစောမောင်		h		
	ဦးသုန္ဒရီ		h		
	ဦးရွှေလေး		h		
	မာဝီတာဦး		h		
	ဒေါ်ဗွာ		h		
	မသန်းစွယ်		h		
	ဒေါ်ဦး		h		

Annex J

MPRL E&P CSR Programme

Corporate Social Responsibility (CSR)

OUR APPROACH

Sustainability at MPRL E&P is understood as meeting the needs of the present generation without compromising the ability of the next generation to meet their own needs. Taking responsibility for the way our operations impact societies and the natural environment shapes and influences the type of practices that is initiated within the organization. Frameworks, rules, and business models have been re-shaped to take into account global trends and remain committed to financial obligations that deliver both public and private benefits.

MPRL E&P is a responsible leader that is concerned with reconciling and aligning demands, needs, interests, and values of employees, suppliers, communities, nongovernmental organizations (NGOs), the environment, and society at large.

Our strategic corporate social responsibility (CSR) strategy is used as an instrument to facilitate our journey of addressing social, environmental and economic challenges that impact the business and areas we operate in. The management framework employed is influenced by the following principles:

- Accountability
- Partnering with Stakeholders
- Leadership Capability and Competencies

We recognize the importance of developing a CSR strategy and culture that goes beyond legal compliance and liability of individuals. Our innovative approach to CSR enables MPRL E&P to effectively build relationships with key stakeholders and address sustainability issues together.

Our Strategy

All MPRL E&P community investment and development projects must be strategic in that they address risk and impact resulting from our operations and have a rational basis for investment. Key methods such as continuous community consultation, stakeholder engagement, and identification of social impact and community needs help guide our business decisions and enable us to proactively address any community concerns. Outcome and impacts of all social investments are measured to indicate significant change.

Our Management Framework

Human rights, environmental management, communication, as well as community investment and development inform MPRL E&P's social management system. MPRL E&P's Community Investment Policy, CSR Policy, and Human Rights Policy influence how we engage with communities and people. The policies are consistent with internationally recognized International Finance Corporate Performance Standards on Environmental and Social Sustainability and United Nations Global Compact Principles.

The system provides for a focus on 'needs assessments and baseline' to gather the community's opinions, necessities, challenges, and assets in order to determine the real needs of the community.

STRATEGIC COMMUNITY INVESTMENTS

MPRL E&P recognizes that strategic community investment projects should provide value for the company and impact the community positively. As a result, MPRL E&P aims to contribute to the sustainable development and improved livelihoods of communities where we operate through active engagement and regular dialogue. This approach reduces risks, provides a social license to operate, and most importantly delivers business value for MPRL E&P. Our business objectives for community investment include building relationships and enabling employee engagement.

To support this approach, MPRL E&P encourages surrounding communities to participate in, and contribute to, the various discussions to address community needs where we operate. 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, capacity development, and vocational training)
- Improving well-being (improve access to water, sanitation, hygiene, health, nutrition, and safety culture)
- Partnerships with local groups

MPRL E&P have spent two percent (2%) of net profit on CSR initiatives. A large proportion of the funds have been spent on strategic community investments. This includes, but is not limited to improving access to safe drinking water, vocational training support, building school fencing for creating a safe learning environment, community capacity building initiatives etc. The onus is on MPRL E&P to do more high-impact activities to



bring in social change. This is built into the DNA of the Company. MPRL E&P commits and supports

towards the 17 United Nations Sustainable Development Goals by aligning our strategies and initiatives with these goals where applicable.



CSR Knowledge Sharing Sessions for MOGE General Managers from Onshore Operating Fields



CSR Knowledge Sharing Sessions for MOGE General Managers from Onshore Operating Fields



CSR Knowledge Sharing Sessions for MOGE General Managers from Onshore Operating Fields





Showing Community Investment Projects in Auk Kyaung & Aye Mya Villages

STAKEHOLDER ENGAGEMENT

Engaging with stakeholders from different backgrounds can be a challenging process. Various communication tools and a strategy is required to ensure all stakeholders are frequently consulted and their concerns and needs are included in the decision making process of project activities. MPRL E&P acknowledges the importance of engagement and buy-in from all of its stakeholders. A series of assessments and coordination meetings are periodically held to identify and prioritize concerns of stakeholders. To further facilitate this process, a grievance mechanism process has been successfully implemented in Mann field. The multi-stakeholder approach to managing community concerns has resulted in a 98% satisfactory rate with regard to how grievances are addressed and resolved.



Quarterly CSR Progress Update – MOGE (Mann) & Township Administration

Who are our stakeholders?

There are a number of stakeholders that influence and have an interest in our operations. Our stakeholders include local communities, non-governmental organizations, business partners, employees, governments, regulators, investors, and the media. As a result, stakeholders are prioritized determining the level of engagement required.



Table 1: Overview of stakeholders influencing or having an interest in MPRL E&P's operations

Stakeholder	Engagement Methods
Employees	
Yangon Based	Internal communication and publications
Mann Field Based	Surveys and other feedback mechanisms
	Monthly coordination meetings

Government	
Ministry of Electricity and Energy MOGE Ministry of Natural Resources and Environmental Conservation Regional Government District/Local Authority	Direct meetings Quarterly workshops and roundtable discussions Key national events Participation in government initiatives Surveys and other feedback mechanisms Monthly coordination meetings Monthly training and information sessions
Host Communities	
Mann field Block IOR-6 / IOR-4 Block A-6	Community investment initiatives Community based volunteers Assessments and surveys Monthly grievance updates and information sessions Monthly training and information sessions Focus group discussions Feedback and grievance process Events Publications
NGOs, Civil Society, and Development Institutes	
MCRB MATA Yangon Technological University MEITI	Publications Events Workshops and roundtable discussions MEITI Multi-Stakeholder Group (MSG) United Nations Global Compact (UNGC) Pwint Thit Sa Initiative

1. Government

We do not participate in party politics, or make payments to political parties or individual politicians. We engage with government representatives to provide progress updates on our operations as well as share our experience to help governments develop policy and legislation. For example, we have worked extensively with MOGE and District Authorities to share our experience of grievance mechanisms. In addition, proactively participate in discussions with MONREC to help shape and influence the EIA Guidelines.

2. Business Partners

We currently have a joint venture arrangement with Woodside Myanmar and Total Myanmar for block A-6. Engaging effectively with these stakeholders ensures our interests are aligned.

3. Host Communities

These communities live in close proximity to our field and can be directly affected by our operations. As a result, engagement is necessary to obtain a social license to operate. We strive to building relationships with communities where we operate to make sure we manage our operations in a way that is consistent with community expectations. For example we work with community volunteers to engage with farmers and fisherman within Mann field.

COMMUNITY BASED VOLUNTEERS AND VILLAGE DEVELOPMENT COMMITTEES



MPRL E&P's approach towards sustainable development and social management involves empowering local communities to be actively involved. We have developed and use a community volunteer framework in Mann field whereby a volunteer from each community is recruited to act as the main liaison between the company and their respective community. The term of a community volunteer is one year whereby such community volunteers are given fit for purpose training with regard to communication and social/project management

skills. They are also provided with cash and other incentives for volunteering their time and efforts towards the betterment of their respective communities'.

Fourteen community volunteers are appointed on an annual basis from the communities surrounding Mann field. They all work closely through the guidance and facilitation of MPRL E&P which has resulted in the formation of a partnership and the strengthening of a robust relationship between the local communities and company. Community volunteers are actively involved in executing community-based projects and are also responsible to encourage further community participation, decision making and ownership.



Volunteer Reflection Workshop at Kyaung Taw Yar



GRIEVANCE MECHANISMS

MPRL E&P acknowledges the importance of engagement and buy-in from all its stakeholders. Disclosing information and providing platforms to promote 2-way communication are important factors to building a partnership.

MPRL E&P believes:

- An effective feedback mechanism is a safe, effective, and proactive process that receives complaints and/or concerns associated with the company's operations.
- Stakeholders are provided with a constructive opportunity to develop a partnership with MPRL E&P by working together to minimize risk and address concerns.
- Concerns received can be resolved in a timely manner with all primary stakeholders within a confidential space.
- The views of each complainant are respected and not discriminated against.



MPRL E&P has developed a multi-stakeholder approach to designing an Operational Grievance Mechanism (OGM) in Mann field. This is the very first mechanism that has been facilitated and managed by both the host community and Myanmar Oil and Gas Enterprise (MOGE). Best practices from the Mann Field Grievance Mechanism (MFGM) is leveraged and used across assets operated by MPRL E&P.

The Community Grievance Mechanism at Mann Field

MPRL E&P works closely with the operator of Mann field, Myanmar Oil and Gas Enterprise (MOGE), providing advice, support and guidance. The objective of the MFGM is to enable local communities to have a voice and to ensure impact associated with operations affecting the environment and surrounding communities are solicited, monitored, and effectively addressed.

We consider this to be essential in order to maintain a social license to operate in Mann field. The MFGM enables stakeholders to voice their concerns directly to the company first, instead of turning to third parties, and enables the company to respond to their concerns early before they escalate.

The MFGM began in pilot phase with 3 out of the 14 communities in Mann field in April 2014, with a full roll out to the remaining communities in August 2014. During this time training was provided to local community volunteers, community meetings were held, information boards erected, and informational cartoon distributed to improve awareness. Grievance collection boxes were placed in strategic locations such as village intersections with high foot traffic.

Designing a mechanism facilitated by community volunteers has proven to be successful as trust is immediately captured. In addition, strengthening the capacity of volunteers has led to improved decision making and empowerment.



OGM Pamphlet

အကြံပြု ဆွေးနွေးရာ တစ်ခုတည်းတည်းက ကျွန်တော်တို့ဆီ ဖျက်ဖျက်ဆက်သွယ်လိုက်ပါ။

အကြံပြု ဆွေးနွေးခြင်းမှာ
ဘယ်လိုအဆင့်တွေ ပါဝင်ပါသလဲ

အကြံပြုဆွေးနွေးချက်ကို လက်ခံစာရင်းသွင်းခြင်း

MOGE နှင့် MPRL E&P က အကြံပြုဆွေးနွေးချက်ကို ကြည့်ရှုသုံးသပ်ခြင်း

MOGE နှင့် MPRL E&P က လိုအပ်သည့်အချက်အလက်/အထောက်အထားများ စုဆောင်းရန်အတွက် ကွင်းဆင်းစာလှည့်ခြင်း

MOGE နှင့် MPRL E&P က အကြံပြုဆွေးနွေးချက်အတွက် ဆုံးဖြတ်ချက်ချမှတ်ခြင်း

MPRL E&P CSR အဖွဲ့က ဆုံးဖြတ်ချက်ကို အကြံပြုဆွေးနွေးသူထံ အကြောင်းပြန်ကြားခြင်း

ဆုံးဖြတ်ချက်ကို အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်း

အစီရင်ခံစာအကြမ်းဖျင်းများ အကြံပြုဆွေးနွေးသူအနေဖြင့် တုံ့ပြန်မှုရရှိကြောင်း လက်မှတ်ရေးထိုးစေခြင်း

စောင့်ကြည့်သုံးသပ်ခြင်း

သင့်ရဲ့အကြံပြုတောင်းဆိုဆွေးနွေးတာကို တုံ့ပြန်ဆောင်ရွက်တာ အကြမ်းဖျင်းအားဖြင့် ရက်သတ္တပတ် နှစ်ပတ်လောက် ကြာမြင့်နိုင်ပါသည်။

အကြံပြုဆွေးနွေးခြင်းဆိုတာ

ကျွန်တို့ရဲ့လုပ်ငန်းဆောင်ရွက်မှုနဲ့ ဆက်စပ်ပတ်သက်နေတဲ့ လူတွေအတွင်းက တစ်စုံတစ်ယောက် (သို့မဟုတ်) အုပ်စုတစ်စုက သူတို့အကြံပြုချင်တာ၊ တောင်းဆိုဆွေးနွေးချင်တာတွေကို ဆက်သွယ်ပြောကြားခြင်းကို ခေါ်ပါတယ်။

Myanmar Oil & Gas Enterprise

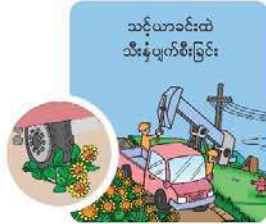
MPRL E&P Pte Ltd.

OGM Pamphlet

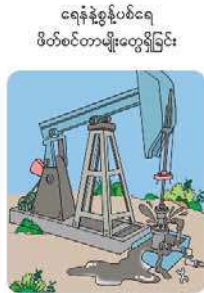
ဘယ်လိုအခြေအနေအကြောင်းအရာတွေကို
အကြံပြုဆွေးနွေးလိုရပါသလဲ။
ကျွန်တော်တို့ရဲ့ ဆုပေးဆောင်ရွက်မှုကြောင့်



မြေဆီလွှာ
ပျက်စီးခြင်း



သင့်ယာခင်းထဲ
သီးနှံပျက်စီးခြင်း



ရေနံခွံစွန့်ပစ်ရေ
ဖိတ်စင်တာမျိုးတွေရှိခြင်း



လျှပ်စစ်ဝါယာကြိုးတွေ စနစ်တကျမရှိတာ
ကြီးတွေဟောင်းနွမ်း ပျက်စီးတာတွေကြောင့်
လျှပ်စစ်အန္တရာယ်ရှိခြင်း



ကျွန်တော်တို့ဆောင်ရွက်မှုကြောင့်
သင့်မှာ ကျန်းမာရေးပြဿနာ
တစ်ခုတစ်ရာရှိခြင်း



ကျွန်တော်တို့မဆောင်ရွက်မနေဘဲ
လူမှုအကျိုးပြုလုပ်ငန်းတွေမှာ ဆုံးဖြတ်ချက်
တွေက မသူတည်းလို့ယူဆရင် (ဒါမှမဟုတ်)
ပန်ထမ်းတွေရဲ့ လူမှုဆက်ဆံရေး မပြေလည်ရင်



သင့်ရပ်ရွာမှာရှိတဲ့
ကျွန်တော်တို့ကုမ္ပဏီရဲ့
လုပ်ကားပေးဝန်ထမ်းထဲကနေ
အကြံပြုဆွေးနွေးလွှာရယူပြီး
ကျွန်တော်တို့ထံကို
စာရေးသားပေးပို့နိုင်သလို



တစ်ပြုစာဆို
ကျွန်တော်တို့ကုမ္ပဏီရဲ့
တာဝန်ရှိသူတွေထံ
တိုက်ရိုက်ဆက်သွယ်
ဆွေးနွေးနိုင်ပါသည်။

MPRL E&P ကုမ္ပဏီ
(ရန်ကုန်)

အမှတ် (၆၂၃)၊ ပြည်လမ်း
ကမာရွတ်မြို့နယ် (၀၀၀၄၀)
ရန်ကုန်
ဖုန်း - ၀၁ ၂၃၀ ၇၇၇၇

MPRL E&P ကုမ္ပဏီ
(မန်းလေးမြို့)

ဦးဖိုးစိန်ထွန်း
(ခရိုင်မြေပုံရေးရာ)
ဖုန်း - ၀၉ ၅၀၃၀ ၃၉၄

ဦးမျိုးဝင်း
(ခရိုင်မြေပုံရေးရာ)
ဖုန်း - ၀၉ ၅၃၀၀ ၆၇၅

အောင်မာမြင့်
(အေးချမ်းသာယာရေးအဖွဲ့အစည်း)
ဖုန်း - ၀၉ ၄၀၁၅ ၆၃၀၆၀

Operational Grievance Mechanism Awareness Raising Campaign



OUR COMMITMENT TO THE UNITED NATIONS GLOBAL COMPACT

As a signatory to the United Nations Global Compact, we confirm our commitment to support the UN Global Compact universally accepted principles in the areas of human rights, labor, environment and anti-corruption.

We acknowledge the importance of corporate responsibility (CR) as it influences operating principles and guides our commitment to conducting business ethically, engage our employees, and protect the environment.

Our CR strategy is about creating value for people, communities, and increasing the impact of our activities. We are committed to building and promoting ethical values and behavior throughout our business and in addition, exert influence and share knowledge with contractors and partners to implement adequate policies and procedures that promote best practice to prevent bribery and promote ethical standards throughout our supply chain.

MPRL E&P, in working towards achieving our mission to be the leading oil and gas company in the country, acknowledges the importance of working responsibly and therefore embed the UNGC principles in our practices.



MPRL E&P Pte Ltd.

H.E. Ban Ki-moon
Secretary-General
United Nations
New York, NY 10017
USA

Date : 02 February 2016
Ref. : MPRL E&P / LET - 030 / 16

Dear Sir,

I am pleased to confirm that MPRL E&P supports the ten principles of the Global Compact on human rights, labour, environment and anti-corruption. With this communication, we express our intent to implement those principles. We are committed to making the Global Compact and its principles part of the strategy, culture and day-to-day operations of our company, and to engaging in collaborative projects which advance the broader development goals of the United Nations, particularly the Sustainable Development Goals. MPRL E&P will make a clear statement of this commitment to our stakeholders and the general public.

We recognize that a key requirement for participation in the Global Compact is the annual submission of a Communication on Progress (COP) that describes our company's efforts to implement the ten principles. We support public accountability and transparency, and therefore commit to report on progress within one year of joining the Global Compact, and annually thereafter according to the Global Compact COP policy. This includes:

- A statement signed by the chief executive expressing continued support for the Global Compact and renewing our ongoing commitment to the initiative and its principles. This is separate from our initial letter of commitment to join the Global Compact.
- A description of practical actions (i.e., disclosure of any relevant policies, procedures, activities) that the company has taken (or plans to undertake) to implement the Global Compact principles in each of the four issue areas (human rights, labour, environment, anti-corruption).
- A measurement of outcomes (i.e., the degree to which targets/performance indicators were met, or other qualitative or quantitative measurements of results).

Yours sincerely,


U Myo Tin
General Manager

84-85 Hlaing Myint Moh Lane #1, 10th Quarter, Hlaing Township, Yangon, Myanmar
Tel : (95-1) 521 471, 521 472, 521 473, 521 461, 521 462 / Fax : (95-1) 521 156
email : mprlstaff@mprlexp.com

PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Promoting transparency leads to improved governance. Our values encourage us to conduct our business with honesty, integrity and fairness in all aspects of our business. We work hard to keep this commitment and promote transparency throughout our business.

MPRL E&P intends to disclose all environmental related policies, reporting of EIA and/or SIA assessments and results which are recognized by a consensus of relevant stakeholders including, but not limited to, government representatives, international non-governmental organizations (INGOs) and local non-government organizations (NGOs), civil society organizations (CSOs), and host communities.

In compliance with the Myanmar Environmental Conservation Law and Environmental Impact Assessment Guidelines, MPRL E&P has recently undertaken an environmental and/or social impact assessment (EIA or ESIA) in three of its onshore assets. An ESIA conducted in these assets focused primarily on public consultation and collecting baseline data to identify and measure risks impacting the business and project-affected communities. Existing internal policies has influenced the level of communication taken to disclose the report to primary and secondary stakeholders. Concerns and complaints have been recorded and disclosed on the company website.

MPRL E&P commissioned Environmental Resources Management (ERM), a contractor specializing in environmental and social studies for a number of projects in accordance with the requirements of the Myanmar Environmental Impact Assessment Guidelines, to undertake environmental and social impact assessment studies for blocks IOR-4 & IOR-6, and an environmental impact assessment for Mann Field.

Environmental Management Plans (EMPs) and Environmental Action Plans (EAPs) have been developed to monitor and minimize environmental impacts associated with our projects. The plans provide mitigation measures required to minimize impact associated with project activities.

- Zero discharge targets
- Fuel and energy consumption reduction
- Well-site abandonment
- Environmental Analysis and Monitoring Framework
- Environmental Incident Response Plan
- Waste Management Plan
- Spills Management Plan

In Mann Field, MPRL E&P conducts monthly coordination meeting with MOGE to establish a proper coordination channel and construct a rapport between MOGE and MPRL E&P as well as to know the gaps and challenges among MOGE, MPRL E&P and Communities. Community Investment Review Workshops with MOGE, Township Authorities and Communities have been conducted quarterly. The Mann Field CSR progress report submitted monthly to MOGE provides an overview of MPRL E&P's CSR approach including a progress update of activities planned for the fiscal year. The intent of the report is to strengthen alignment and communication between MPRL E&P and MOGE to prevent overlap and maximize impact at the field level.

ANTI-BRIBERY AND CORRUPTION

MPRL E&P's policy is to be a responsible investor in the long-term development of Myanmar by conducting business ethically and with integrity and transparency.

We are committed to conducting business in accordance with all applicable laws, rules and regulations, and to the highest ethical standards.

We recognize that directors, employees and other personnel including, but not limited to, agents, contractors, consultants, and secondees who work on behalf of MPRL E&P can be subjected to corrupt behaviors that involve offers of, or requests for bribes, facilitation payments or grease payments. Our policies strive to provide guidance and means to appropriately mitigate and avoid such acts.

Our Strategy

Our commitment to anti-corruption is set out in Anti-Bribery and Corruption Policy and influenced by the UNGC principles on Anti-Corruption. Our employees are required to accept personal responsibility and commit to doing the right thing. MPRL E&P will provide learning opportunities for employees to better understand types of ethical conduct risks and how to manage those risks.

Our Management Framework

- We provide training to MPRL E&P employees and contractors to better understand ethical practices against corruption and bribery.
- Our Compliance Department is tasked with conducting due diligence to evaluate potential compliance risks to ensure that MPRL E&P only enters into business relationships with reputable and qualified individuals and firms.

Internal audits of sites, operating units, and contractors are conducted and results communicated to develop action plans.



MPRL E&P Pte Ltd.

Executive Management Statement to Anti-Bribery and Corruption

As a signatory to the United Nations Global Compact, MPRL E&P ensures to engage actively with stakeholders in the fight against corruption and abide by all existing laws and regulations.

MPRL E&P is firmly committed to building and promoting ethical values and behavior throughout our value chain, whether it is with new investments, partners, agents, consultants, contractors or suppliers, and employees associated with our business operations.

We will not influence any business activity by the illegal offer or receipt of bribes, kickbacks, or other illegal inducements. We shall not offer or receive anything of value or any other advantage to or from any person for the purpose of illegally influencing any act, omission or decision in violation of the recipient's duty in order to obtain, retain or direct a business advantage.

Executive management endorses the Anti-Bribery and Corruption Policy and its procedures and will be responsible for ensuring that adequate resources are available and deployed to implement, maintain, and assure compliance with the policy and procedures.

U Myo Tin
General Manager

Trash Hero Minbu



663
Heroes

1,660
Kilos of
Trash

16
Communi-
ties



Annex K

Response to ECD
Comments on the Draft
ESIA Report

Comments on the submission of First Revised EIA report related to Enhanced Oil Recovery (EOR) Programme at Mann Oil Field in Magway Region implemented by MPRL E&P Pte., Ltd.

No.	Subject and Suggestions	Explanation from MRPL E&P Pte., Ltd.	Subject on Revised EIA Report	Suggest/Comments on Revised EIA Report	Response to Comments
1.	Executive summary				
(a)	To describe the Executive Summary in Myanmar Language	Described in Section 1	Described executive summary in Myanmar.	No comment	Noted.
(b)	To describe summary of each section (introduction, policy, legal and institutional framework, project description and alternative selection, description of surrounding environment, impact assessment, mitigation measures, cumulative impact assessment, environmental management plan, stakeholder consultation and disclosure)	Described in Section 1	Described in Section 1	No comment	Noted.
(c)	To describe the information complete for the environmental and social impact assessment, and will follow as the commitment letter in the report.	Described	Described	No comment	Noted.
(d)	To describe the list including the commitment for the each section	Described with the letter of MPRL E&P	Not describe.	No comment	Noted.

No.	Subject and Suggestions	Explanation from MRPL E&P Pte., Ltd.	Subject on Revised EIA Report	Suggest/Comments on Revised EIA Report	Response to Comments
2.	Introduction				
(a)	Page (1), Section 1.2, there is need to describe background and address of project proponent although describe that MPRL E&P Pte., Ltd. is project proponent and company's website http://mprlexp.com/ to view the information of company.	Described the company's http://mprlexp.com/ to view the information of company and address of project proponent in Section 2.3	Contact person was included in Section 2.3	No comment	Noted.
(b)	To describe the address and experiences of the third party although describe that Environmental Resources Management (ERM) and Resource and Environment Myanmar (REM) are third parties to take impact assessment in Page (1) Section (1.3), and the name of Environmental Specialists and their professional fields in Page (2) Section (1.6)		List of experts, job description and license status was described	No comment	Noted.
3.	Policy, law and the institutional framework				
(a)	To describe Myanmar rule and regulation regarding with the project although describe that policies of environmental conservation of company organization in the institutional framework in Section (2).	Described the policies of company in Section 3.2	HSE requirements are under the jurisdiction of the ministries and state-owned enterprises in the oil and gas operations include the following: <ul style="list-style-type: none"> Ministry of Natural Resources and Environmental Conservation (MONREC); Ministry of Fisheries, Livestock and Rural Development 	To revise as "Ministry of Agriculture, Livestock and Irrigation" and describe full department name.	Revised accordingly in Section 3.2.

No.	Subject and Suggestions	Explanation from MRPL E&P Pte., Ltd.	Subject on Revised EIA Report	Suggest/Comments on Revised EIA Report	Response to Comments
			<ul style="list-style-type: none"> Ministry of Labour, Immigration and Population; Ministry of Electricity and Energy (MOEE); MOGE; and Myanmar Investment Commission (MIC). 		
(b)	To describe additional laws related to the project and legal commitment from the project proponent that they will apply all the referring laws and acts	Described in Table 3.1	<ul style="list-style-type: none"> Table 3.1 of page 23 (3-6) described that a list of laws relevant to HSE of the Proposed Project. Described Article 68 of Environmental Conservation rules, 2014 Described that EQ(E)G should be considered as per procedure of EIA and EMP. Described the right of ethnic minorities 2015 (BURMA 2015 HUMAN RIGHTS REPORT). 	<p>To describe that the laws and rules related to the project mentioned below are understood and will be complied with:</p> <ul style="list-style-type: none"> To describe Environmental Conservation Law article 69 (a) and (b) To describe NEQEG (project related emission and discharges) and committed to follow To correct as The Ethnic Rights Protection Law (2015) and describe Article 5 of the law 	Revised accordingly in Table 3.1.
(c)	Section (2.3), we found that IEE, Scoping Study, Impact assessment, Reporting when implement EIA and also need to clearly describe the act of Environmental Conservation Law, act of Environmental Conservation Rules, the article that show in EIA procedure.	Clarification about the EIA Procedure in Section 3.2.1	Clarification about the EIA Procedure in Section 3.2.1	No comment	Noted.

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(d)	Section (2.4) Page (14), we found that international standards and guidance regarding with the project, the guidelines has been unacted the National Environmental Quality (Emission) (2015) so that need to describe in it.	EQ(E)G was added in Section 3.2.2	Specifications of related project activities referred to EQ(E)G are mentioned in Section 3.2.2	No comment	Noted.
(e)	Page 99), Table (2-1) In the culture section, only 1998 The Protection and Preservation of Cultural Heritage Region Law was only mentioned, <ul style="list-style-type: none"> - To include 2015 Protection and Prevention of Ancient Monument Law and act. - To include 2015 Protection and Prevention of Antique Object and commit to follow it. 	Included in Section 3.1	Included in Section 3.1	No comment	Noted.
4.	Project Description and alternative selection				
(a)	Need to describe the Map that summarize project activities	Described at Figure 1.1	Location of the existing wells, the wells that will operate in Enhanced Oil Recovery (EOR) Programme were not mentioned.	To mention the locations of the existing wells and the wells that will be considered for the Enhanced Oil Recovery (EOR) Programme	Locations of the existing wells are shown in Figure 1.1. and the potential well locations for EOR programme are shown in Figure 1.2.
(b)	Need to describe Maps including staff quarter, office location, chemical stores, workshop, existing roads, planning roads etc.	Described at Figure 1.1	Locations of villages in the project area was mentioned but the location of the project related buildings and storage tank are not mentioned in the map.	To clearly describe the project related buildings and storage tank in the map with narration.	Project related facilities are shown in Figure 1.1.
(c)	Section (3.2.1) Page (16), there are three technologies; Gas injection, Thermal injection, Chemical injection to implement EOR. We noticed that this project will be used by Chemical injection.	Included in Section 4.2.1	It is mentioned that there are three technologies: Gas injection, Thermal injection and Chemical injection but gas injection and thermal injection cannot be applied due to the gas limitation.	No comment	Noted.

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(d)	Page (18), Table (3.2), it is found that Paraffin Inhibitor, Paraffin Dispersant, PPD, Green Zyme was described among the chemical use in EOR, - To describe other Chemical which can be used - The reason for choosing those chemicals compared to other chemicals - To describe the source where Chemical will be taken	Included in Table 4.3 and 4.6	Although the chemicals which will be used in EOR was mentioned in Table 4.3, the explosive materials which will be used in Re-perforations activities were not mentioned. It is described that the chemicals will be imported from China and America in Section 4.6	To describe the explosive materials used in re-perforations activities.	Explosive materials that may be used are described in Section 4.3.
(e)	Page 18, Table (3.2), Need to explain about DATA DEFICIT and describe toxicological information and biodegradable of Paraffin Inhibitor and Pour Point Depressant.	Included in Table 4.2	In Table 4.2, there has the descriptions of the Toxicological and Biodegradable of the chemicals are included.	No comment	Noted.
(f)	Need to describe the number of staff in the stage of construction and operation stage	Included in Section 4.2.2 and 4.3	In Section 4.2.2, 50 labours from 500 labours will be assigned for the construction phase.	No comment	Noted.
(g)	Need to include the quantities of machine (equipment) to be used for the project	Included in Table 4.3	In Table 4.3, the machines in operation that will be used in EOR are mentioned.	No comment	Noted.
5.	Description of the surrounding environment				
(a)	Page (27), Figure 4.3, We found that the description of average temperature and rainfall data of Pyay from 1982 to 2012, also need to describe that how to relate Pyay and Project location because of the project located in Magway Region	Describe in Figure 5.3	Average temperature and rainfall of Magwe are mentioned in Figure 5.3	To include the average temperature and rainfall of the townships in the project areas such as Minbu, Saku and Pwint Phyu.	Section 5.3.1 is revised and Figure 5.4 is added to describe condition at Minbu.
(b)	Need to describe the main livelihood of local community	Describe in Section 5.6.3	Baseline data including the information of population, agriculture, livelihood, land use, transportation, access to electricity, education	The graduate rate of Technological College and University in Chin Taung, Kywe Cha, Auk Kyaung	Table 5.20 is checked and revised.

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			and health of 14 villages in Mann Oil Filed was collected and explained in section 5.6.1 to 5.6.8	villages are mentioned as 0% in Table 5.20. To check the University graduate rate of Aut Kyaung Ywar as it is a big village.	
(c)	Need to study concerning with heritage area and cultural building around the project, - Need to mention and assess the impact on heritage area sand cultural building around the project - Since the project area is located in the Minbu, whether preserved pagoda and stone inscription near the Kan Ni monastery and Wet Kyi Inn cave pagoda located in the western part of North Shin Pin Nyinaung pagoda that need to describe the project area is included or not included in the project area	Describe in Section 5.7	<ul style="list-style-type: none"> In Section 5.7, it is mentioned that Kyaung Taw Yar pagoda located in Auk Kyaung village with the map however it is found that the pagoda in Auk Kyaung village is not Kyaung Taw Yar pagoda. There has no description that the location of Kan Ni monastery and Wet Kyi Inn cave pagoda located in the western part of North Shin Pin Nyinaung pagoda are in the territory of the project area or not. 	<ul style="list-style-type: none"> To describe the distance between Auk Kyaung pagoda and EOR area and potential impact To describe whether the project area is related to, Kan Ni monastery and stone inscription that is conserved by the Department of Conservation of Archaeology and National Museum and Wet Kyi Inn cave pagoda located at the western part of North Shin Pin Nyinaung pagoda or not. To describe if there is ancient pagoda and stone inscription conserved by the Department of Conservation of Archaeology and National Museum in the project area and if so, to mention what 	Revised in Section 5.7.

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				<p>will be the impact related to the project.</p> <ul style="list-style-type: none"> To include the pagodas and monasteries which local villagers used and explained the potential impact. 	
			It is described Mann Oil Field is located at the Eastern part of Ayeyarwaddy River in the para of Surface Water Quality para in page 5-8.	To access that Mann Oil Field is located in the Eastern part of Ayeyarwaddy River.	Revised in Section 5.3.1.
			It is found that the results of surface water, ground water and soil sampler not described.	To describe the results of surface water, ground water and soil sample.	Results are described in Sections 5.4.3-5. Name of the laboratory undertaking the analysis is also provided.
			It is found that in Section 5.4.5, Figure 5.17 mentioned as Soil Sampling but it is the figure of Ground Water Sampling Location.	To describe appropriately for the figure and content.	Figure 5.17 is revised.
			Table 6.4, we found that Construction Phase and Operation Phase are not equal in placed of Ambient Air Quality and Ambient Noise due to the Mobile Power Generation	Table 6.4; to review the Construction Phase and Operation Phase impacts on Ambient Air Quality and Ambient Noise due to the Mobile Power Generation which is currently not in the same category.	Table 6.4 is revised with impacts from mobile power generation to ambient air quality and ambient noise described as not potentially significant.
(d)	Page (40), we noticed that description of noise with IFC standards during the project operation, need to describe in accordance with NEQG (2015) because it was released in December 2015, Myanmar.	Describe as EQ(E)G in Section 5.4.2	In Section 5.4.2, although the measurement of Ambient air quality, Ambient noise, Ground water, Surface water and Soil quality are described with the standards of EQ(E)G, there is a description that air pollutant sample are screening by the guidelines of United States Environmental Protection Agency.	EQ(E)G is released in December 2015 in Myanmar. Please refer to the EQ(E)G standards for the results in Table 5.4	Table 5.4 and Section 5.4.1 are revised.

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(e)	Table (4.6), to explain about that the noise level from Station (2) is over the standards	Describe in Section 5.4.2	In Section 5.4.2, it is mentioned that the noise exceeded than standard comes from the traffic and not from the Mann Oil Field.	No comment	Noted.
(f)	In Table 4.11, need to describe the reason why TSS amount from Station (Z4SW-2) exceeded the standards	Describe in Section 5.4.2	It is mentioned that TSS amount from station (Z4SW-1) and (Z4SW-2) exceeded the standards due to naturally deposits.	No comment	Noted.
(g)	Section (4), to describe with rescreening for the serial number of Tables and Figures from the description of surrounding environment	Described	Described	No comment	Noted.
(h)			The collection of Air Quality, Noise, Surface Water, Ground Water and Soil Quality were mentioned but there is no description for the reason why those survey points are chosen.	To describe the reason why those survey points chosen and the relation with the location of EOR activity.	These survey points were chosen to represent baseline environmental quality within the wider Mann Field area where the Project will be implemented. Sections 5.4.1-5 are revised.
(i)	In EIA report, there is no include the health data of local communities, <ul style="list-style-type: none"> - To perform Health Impact Assessment for the local communities of surrounding environment. - To get Baseline data of health status as related with health for local communities - To perform Public Health Management Plan (PHMP) as related with HIA 	Describe in Section 5.6.7	Described in section 5.6.7	No comment	Noted.
6.	Environmental Management Plan				

No.	Subject and Suggestions	Explanation from MRPL E&P Pte., Ltd.	Subject on Revised EIA Report	Suggest/Comments on Revised EIA Report	Response to Comments
(a)			In Section 6.5.3, it is mentioned that IFC guideline has been referred for noise impact as there is no guideline in Myanmar.	IFC guideline can be referred however EQ(E)G has been released in December 2015 in Myanmar so that the project has to refer to EQ(E)G.	Revised in Section 6.5.3.
(b)			In Section 6, Page 6-1 to 6-43, the environmental impacts was described but there is no description for the type and volume of wastes (solid, liquid and gas) from the project during Operation at Construction Phases EOR Programme.	To describe the types and volume of the wastes (solid, liquid and gas) from the project during Operation and Construction Phases of EOR Programme.	Waste types are mentioned in Section 6.9.1 and Section 6.14.1.
(c)			Cumulative Impact Assessment mentioned that there is a high potential impact from the activities near the project area, pre-planned EOR and other development activities.	Section 1.3 mentioned that Mann Oil Field was discovered in 1970 with 672 wells and 305 wells are currently in operation, therefore please provide the assessment of the cumulative impacts from the currently operated wells and planned EOR activities.	Cumulative impacts are assessed in Section 7.
(d)	Section (7.2) Page (127-132), need to describe the proposed fund in spite of description of the summary of impacts and mitigation measures	Described in Section 8.2, Page 8-18.	Section 8.2, Page 8-6, mentioned that 1,300,000 USD was spent for the environmental impacts and mitigation measure and additional 200,000 USD will be spent.	No comment	Noted.
(e)	Page (138) Table (7.4) we noticed that action plan of key impact mitigation measure describe generally, need to describe in detail proposed budget, Waste Management Plan, Emergency Preparedness Plan, Spill Response Plan, Fire Risk Management Plan etc. when implement	Described in Annex H	Health & Hygiene Emergency Response Preparedness Plan (Spill Response Plan, Fire Risk Management Plan) and Waste Management Plan were mentioned in Annex H but the Action Plan of environmental impacts and mitigation measures during Construction and Operation Phases of EOR activity was not included.	To describe the Action Plan of environmental impacts and mitigation measures during Construction and Operation Phases of EOR activity.	The Action Plans are added to Section 8.4.2 to Section 8.4.7. Detailed management plans are described in Annex H.

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	environmental impact mitigation measures				
(f)	Page (7.2) Page (127-132) Table (7.2), need to describe MPRL E&P Project Team and MPRL E&P HSE Team will be implemented for EMP.	Describe in Table 8.1	Section 8.2.1, Table 8.2 described the responsibilities of MPRL E&P and Contractor for the EMP.	No comment	Noted.
(g)	To describe detailed EMP and Emergency Response Plan that related to fire, flood, natural disaster, safety and potential impact of each different operation steps	In Annex H, describe the Emergency Response Plan Preparedness Plan (Fire, Flood, Natural Disaster)	Health & Hygiene Emergency Response Preparedness Plan (Spill Response Plan, Fire Risk Management Plan) and Waste Management Plan were mentioned in Annex H but there is no plan related to Flood, Cyclone and Earthquake.	To include the Flood, Cyclone and Earthquake plan in Emergency Preparedness Response Plan.	The plan is added to Annex H as Section 2.6.5 of the Emergency Preparedness Response Plan.
(h)			In Table 8.1 described that adequate well management during well completion activities to minimize water production and disposing produced water to shut in wells by using gravity method but the well completion plan or unproductive well completion plan of EOR programme are not described.	To include detailed well completion plan	Added in Table 8.1 for “Impacts from Improper Disposal of Wastewater and Sludge on Surface Water Quality, Ground Water Quality, Soil, Terrestrial Habitats and Aquatic Habitats as well as their Associated Flora and Fauna” during operation phase.
(i)			Table 8.1 described that there will be “auditing and compliance auditing” in mitigation measures but auditing and compliance auditing plan was not described.	To include auditing and compliance auditing plan	Added in Table 8.1.
7.	Monitoring Program				
(a)	Section (7.2.4) Page (135), need to describe the monitoring times, scope, method, organization, fund in spite of description of the monitoring plan for Ambient air Quality, Acoustic environment,	Describe in Table 8.3	Section 8.3 described that 10,000 to 100,000 USD will be spent for Environmental Monitoring Programme. Monitoring Programme in Table 8.1 explained to perform United States Environmental Protection Agency (U.S. EPA) guideline.	EQ(E)G is released in December 2015 in Myanmar so that to describe the project will be implemented as per the standards of EQ(E)G.	Revised in Table 8.3.

No.	Subject and Suggestions	Explanation from MRPL E&P Pte., Ltd.	Subject on Revised EIA Report	Suggest/Comments on Revised EIA Report	Response to Comments
	Ground water quality, surface water quality, Soil quality				
8.	Public Consultation and information disclosure				
(a)	We noticed that not describe the information regarding with public consultation and information disclosure, need to undertake and include the following with regards to public consultation and information disclosure (1) Methodology and Approach (2) Summary of consultations and activities (3) Results of Consultation (4) Further ongoing consultations (5) Information disclosure	Describe in Section 9	Section 9 explained public consultation meeting schedule, discussion, stakeholder engagement plans and further activities.	To describe the following up action of the issues which stakeholders discussed in the consultation.	The last two paragraph of Section 9.4 and Table 9.3 are added to address the comment.
(b)	We noticed that not describe CSR, - To describe CSR for local development in detail (if it is already practice, to include in the report), To spend 2% for CSR	Describe in Section 9.7	Section 9.7 described that the company spent two percent (2%) of net profit on CSR initiatives and it includes vocational training support, fencing for schools and capacity building of community and the CSR activities of MPRL E&P can be learnt at http://mprlexp.com/csr/community .	To include the implemented CSR activities and further activities mentioned in company on website in the report.	Supplementary information provided in Section 9.6 and Figure 9.7.
9.	HSE and Health Care Program				
(a)	Workers health care system and situation is not mentioned although Employee dormitory are arranged in the working premises, - Hygiene system of workers dormitory in working premises - To describe health care system and to include curative plan, infectious disease control plan, Emergency Preparedness Plan	Describe in Section 5.6.8	Section 5.6.8 described that medivac facilitates to all staffs working on the Mann Field are provided and there is a field clinic at the worker base camp but the status of occupational health and safety (eg. Accident, other health issues) were not mentioned.	To describe the status of occupational health and safety (eg. Accident, other health issues) and workers accommodation, clean water and adequate hygiene were not mentioned.	Added in Section 5.6.8.