

**Environmental and Social Impact  
Assessment for the Seismic  
Survey and Workover Activities  
of Block IOR-4, Myanmar**

**ESIA Summary Report**

# Environmental and Social Impact Assessment for the Seismic Survey and Workover Activities of Block IOR-4, Myanmar

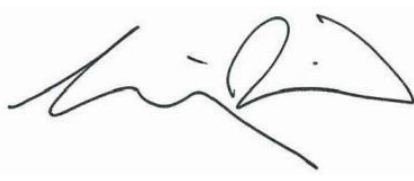


## Environmental and Social Impact Assessment Report

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|---|-------------|--|---------|----------|----------|
| Client:   |             | Project No:  |         |          |          |
| MPRL E&P  |             | 0267078  |         |          |          |
| Summary:  |             | Date:  |         |          |          |
| <p>This document presents the Environmental and Social Impact Assessment Report and the Environmental and Social Management Plan for the proposed seismic survey and workover activities at Block IOR-4.</p>  |             | 15 <sup>th</sup> May 2015  |         |          |          |
|   |             | Approved by:   |         |          |          |
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| 0   | ESIA Report | Var  | JT      | CAR      | 15/05/15 |
| 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> <div style="text-align: right;"> <br/>  </div> |         |          |          |

## 1.0 EXECUTIVE SUMMARY

MPRL E&P Pte Ltd. (MPRL E&P) was awarded the Exploration Block IOR-4 (a.k.a. Pyay) in October 2014 to jointly operate with Myanmar Oil & Gas Enterprise (MOGE) under Improved Petroleum Recovery (IPR) Contract. Following the contract award, MPRL E&P is planning to conduct seismic exploration activities, possibly consisting of 2-Dimensional (2D) and 3- Dimensional (3D) surveys, across Block IOR-4. MPRL E&P is also planning to undertake work-over activities at selected existing wells within the Block ("the Project").

Pursuant to Section 7 of the Environmental Conservation Law and Articles 52 and 53 of the Environmental Conservation Rules of the Republic of the Union of Myanmar, all Projects undertaken in Myanmar which have the potential to cause significant environmental and social impacts are required to undertake an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) and to obtain an Environmental Compliance Certificate (ECC) in accordance with the Environmental Impact Assessment (EIA) Procedures ("the Procedures").

In relation to the above, MPRL E&P has commissioned Environmental Resources Management (ERM), supported by local specialists from Resource and Environment Myanmar (REM), to undertake an Environmental and Social Impact Assessment (ESIA) Study for the Project in accordance with the requirements of the Procedures.

The overall purpose of the Study is to complete a robust ESIA to meet requirements of the EIA Procedures for the ESIA to be approved by the Ministry of Environmental Conservation and Forestry (MOECF).

### 1.1 KEY ENVIRONMENTAL AND SOCIAL FEATURES

An overview of environmental and social baseline features for Block IOR-4 is presented in the ESIA Study. The main parameters described include:

- Physical environment, including climate and meteorology, geology, noise, air, surface water, groundwater and soil quality;
- Biological environment, including terrestrial habitats as well as the associated flora and fauna including avifauna, butterflies, herpetofauna, mammals and aquatic fauna ; and
- Socio-economic environment, including baseline information of the concerned Project Area, the region and the overall country profile.

Information on the above parameters has been collected through desktop review of publicly available information. Primary data collection has also been undertaken in December 2014 to establish the baseline biological, physical and socio-economic environment of the Project Area. The baseline data obtained have been used to characterize the Project Area and informed the assessment of potential environmental and social impacts from the proposed seismic surveys and work-over activities at Block IOR-4.

## 1.2 IMPACT ASSESSMENT AND ENVIRONMENTAL AND SOCIAL MANAGEMENT

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 and social resources or receptors. Interactions which may generate potentially significant environmental and social impacts ranging from those associated with the land accessibility phase (e.g. loss of access to land by the community), through the preparation / mobilization phase (e.g. site preparation and clearance impacts to terrestrial habitat and flora and fauna), subsequent seismic survey phase (e.g. impacts of detonation of explosives) and eventually to the close-out phase (e.g. positive impacts from rehabilitation of habitats) of the seismic surveys as well as the well work-over activities at Block IOR-4.

The potentially significant environmental and social impacts are further assessed in the ESIA 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 social impacts caused by the proposed seismic survey and work-over activities of Block IOR-4 would be of Negligible, Minor or Moderate significance.

## 1.3 CUMULATIVE IMPACTS

Cumulative impacts of the proposed seismic survey and work-over activities at Block IOR-4 with other potential development in the vicinity are also assessed in the ESIA Study. Cumulative impact refers to that generated by other developments or activities in the vicinity of the Project Area, which when added to the impacts of the proposed seismic survey and work-over activities combine to cause a greater impact.

Block IOR-4 is surrounded by other onshore blocks including Block IOR-6, Block EP-3 and Block EP-4. It is understood that seismic surveys may be carried out concurrently at these blocks and the seismic survey areas may overlap slightly with that of Block IOR-4 at the boundary between the blocks. However, it is expected that the environmental and social impacts from seismic surveys and well work-over activities, if properly mitigated, will be localized within the onshore blocks and restricted to environment / communities within them. As such, it is not expected that seismic surveys at adjacent blocks, if undertaken concurrently, will lead to cumulative impacts to the physical, biological or socio-economic environment within Block IOR-4.

## 1.4 PROJECT OVERVIEW

MPRL E&P Pte Ltd (MPRL E&P) was awarded the Exploration Block IOR-4 (a.k.a. Pyay) in October 2014 to jointly operate with Myanmar Oil & Gas Enterprise (MOGE) under Improved Petroleum Recovery (IPR) Contract. Following the contract award, MPRL E&P is planning to undertake work over activities at selected existing wells within the Block ("the Project").

## 1.5 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/>.

## 1.6 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Pursuant to Section 7 of the Environmental Conservation Law and Articles 52 and 53 of the Environmental Conservation Rules of the Republic of the Union of Myanmar, all Projects undertaken in Myanmar which have the potential to cause significant environmental and social impacts are required to undertake an Initial Environmental Examination (IEE) or an Environmental Impact Assessment (EIA) and to obtain an Environmental Compliance Certificate (ECC) in accordance with the Environmental Impact Assessment (EIA) Procedure.

In relation to the above, MPRL E&P has commissioned Environmental Resources Management (ERM), supported by local specialists from Resource and Environment Myanmar (REM), to undertake an Environmental and Social Impact Assessment (ESIA) Study for the Project in accordance with the requirements of the Procedure. This ESIA Report has been prepared for MPRL E&P by ERM and presents the objectives, methodology and outcomes of the IA in accordance with the EIA Procedures.

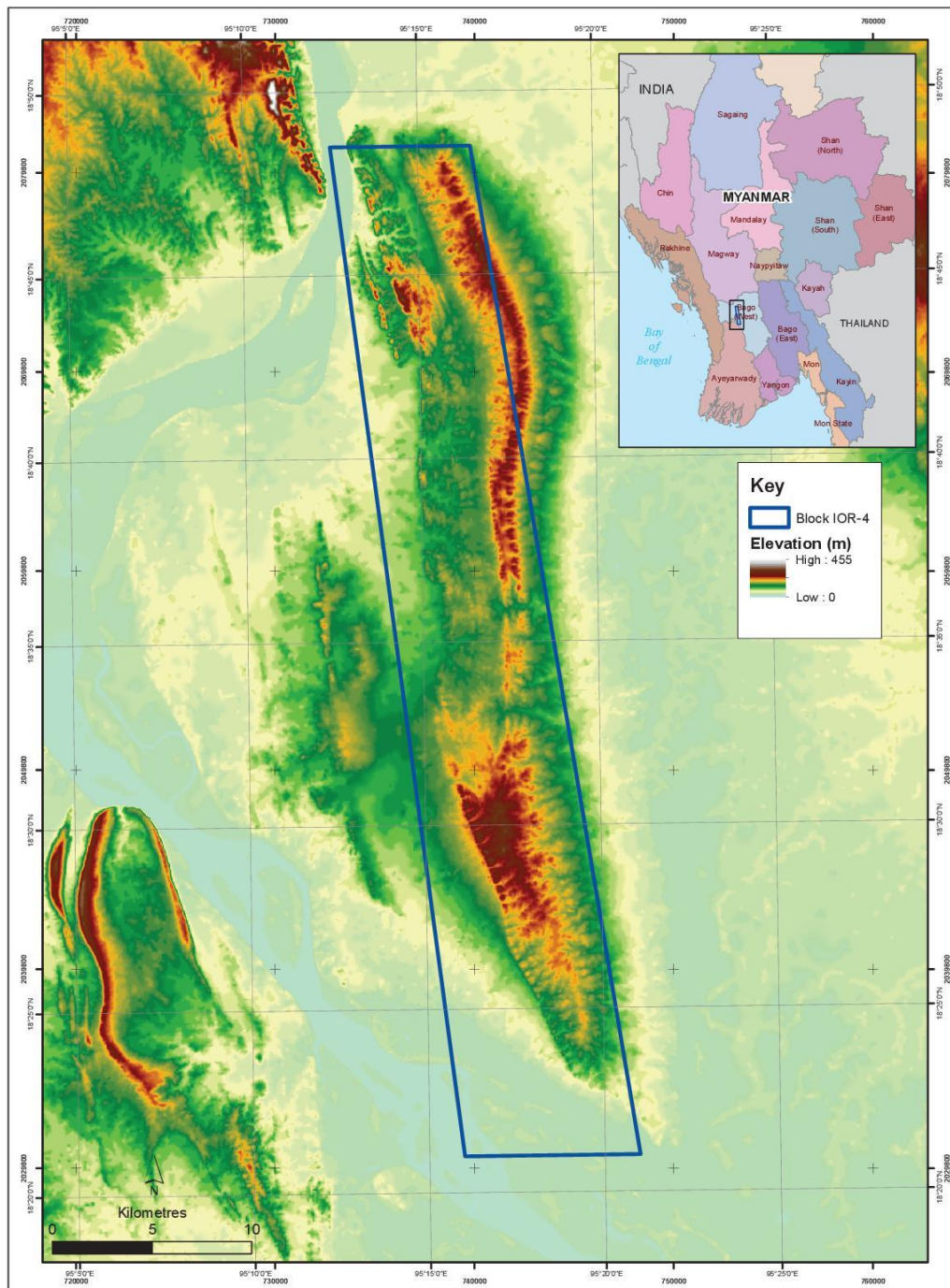
## 1.7 STUDY LIMITATIONS

This IA 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 ESIA do not change and to determine whether any additional mitigation, management or monitoring measures are warranted.

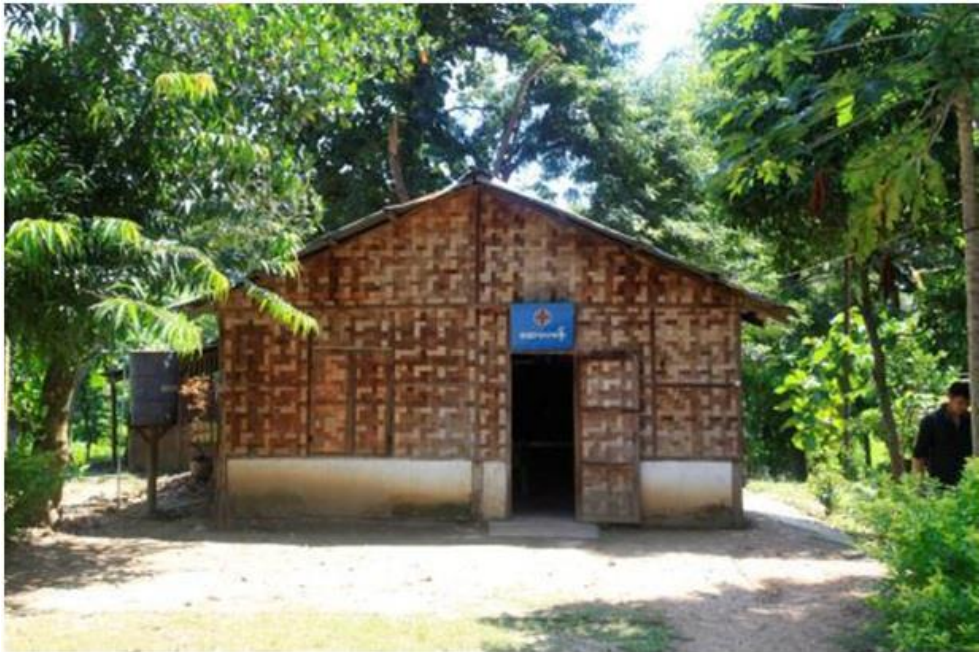


## 2.0 SOCIAL AND PHYSICAL INFRASTRUCTURE

Figure 1. Block IOR 4



**Figure 2. Photos of the Medical Facility in Pyay Taken During the Site Visit as Part of the Scoping Exercise in October 2014**





**Figure 3. Water Supply Facility in Pyay Taken during the Site Visit of the Scoping Exercise in October 2014**



**Figure 4. Cultivated Area Recorded within Block IOR 4 during the Site Visit as part of the Scoping Exercise in October 2014**





**Figure 5. Surrounding Environment of Surface Water Sampling Locations**



**Figure 6. Surrounding Environment of Groundwater Sampling Locations**



**Figure 7. Photos of Representative Plant Species**



*Alstonia scholaris* L.





**Figure 8. Representative Photo of Secondary Forest Habitat Type**



**Figure 9. Representative Photo of Agricultural Land Habitat Type**





**Figure 10. Representative Photo of Cultivated Land / Village Habitat Type**



**Figure 11. Representative Photo of Developed Area**





**Figure 12. Representative Photo of River Habitat Type**



**Figure 13. Photo Records of Identified Bird Species**



**Figure 14. Photo Records of Identified Herpetofauna Species**



**Figure 15. Photo Records of Identified Butterflies Species**





**Figure 16. Photo Records of Identified Aquatic Fauna Species**



*Macrognathus zebrinus*



## 2.1 STAKEHOLDER IDENTIFICATION

A stakeholder is “a person, group, or organization that has a direct or indirect stake in a project/organization because it can affect or be affected by the Project/organization’s actions, objectives, and policies”. As part of this sub section, an attempt has also been made to identify and analyze the stakeholder groups likely to be impacted due to the activities for the Project, which are listed below.

**Table 1. Stakeholder Groups**

| <b>Primary Stakeholders</b>  | <b>Secondary Stakeholders</b>   |
|--|---|
| <ul style="list-style-type: none"><li>• Local community</li><li>• Farmers</li><li>• Vulnerable Groups, including women, elderly, handicapped etc.</li><li>• Fishing groups</li></ul> | <ul style="list-style-type: none"><li>• Government Ministries</li><li>• Local Authorities</li><li>• Village Level Institutions</li><li>• NGOs and Civil Society Organizations</li><li>• Local Media</li><li>• Political Parties</li></ul> |

## 2.2 STAKEHOLDER MAPPING

“Stakeholder mapping” is a process of examining the relative influences that different individuals and groups have over a Project as well as the influence of the Project over them. The purpose of stakeholder mapping is to:

Identify each stakeholder group;

- Study their profile and the nature of the stakes;
- Understand each group’s specific issues, concerns as well as expectations from the Project; and
- Gauge their influence on the Project.

On the basis of such an understanding, the stakeholders are categorized into High Influence/Priority, Medium Influence/ Priority and Low Influence/Priority. The stakeholders who are categorized as high influence are those who have a high influence on the Project or are likely to be heavily impacted by the Project activities, and are thus high up on the Project proponent’s priority list for engagement and consultation. Similarly, the stakeholders categorized as medium influence are those who have a moderate influence on the Project or even though they are to be impacted by the Project, it is unlikely to be substantial and these stakeholders are thus neither high nor low in the Project proponent’s list for engagement. On the other hand, the stakeholders with low influences are those who have a minimal influence on the decision making process or are to be minimally impacted by the Project and are thus low in the Project proponent’s engagement list.



The following table provides a brief profile of the various stakeholders identified with their key concerns in terms of the Project activities and their degree of influence.

**Table 2. Stakeholder Mapping**

| Stakeholders   | Stakeholder Profile   | Level of Influence |
|--|---|--------------------|
| <b>Primary Stakeholders</b>                              |   |                    |
| Local Community  | Comprised of the local community in the project, as identified in the social baseline. This group is comprised of the community in six villages in the area.  | High               |
| Vulnerable Groups, including women, elderly, handicapped | Comprised of those members of the community who due to their socio-economic status are perceived to be more susceptible to the impact from the project and will require special considerations.   | High               |
| Fishing groups   | Comprised of those individuals and households who undertake fishing in Ayerwaddy river and the other surface water bodies in the area.  | High               |
| Farmers  | Comprised of individuals and households who undertake agriculture in the Project Area and its surroundings.   | Medium             |
| <b>Secondary Stakeholders</b>                            |   |                    |
| Government Ministries                                    | This stakeholder group is comprised of the central and region level government departments. These authorities may influence the project in terms of establishing policies, and implementation of the project.   | High               |
| Local Authorities  | This stakeholder group is comprised of the local government bodies, who have the power to regulate or otherwise influence the Project in terms of establishing policy, granting permits and approvals for the Project, monitoring and enforcing compliance with the applicable rules and regulations and making available the necessary infrastructure and resources for the Project. | High               |
| Local Media  |   | High               |
| Members of Parliament                                    | Comprised of the representatives of the Ayerwaddy region in the parliament. It is important to engage with these stakeholders from an early stage of the Project.   | High               |
| NGOs and Civil Society Organizations                     | Includes all other people in society who may have an interest in the project and its social and environmental aspects and non-governmental organizations representing their interests.  | Medium             |
| Village Level Institutions                               | Comprised of institutions including the health and education institutions at the village level.   | Low                |

On the basis of the understanding thus developed, the process of public consultation and disclosure for the Project was undertaken as part of the ESIA Study as is discussed below.

## 2.3 SUMMARY OF CONSULTATIONS AND ACTIVITIES UNDERTAKEN

As part of the ESIA for the Project, meetings were undertaken with the ministry and the local authorities including the MOGE (Figure 4.49). As part of these meetings, an understanding was provided of the proposed Project activities and the impact assessment process for the same. In these meetings the local stakeholders who need to be engaged with, as part of the impact assessment process were identified. The following table provides the schedule of the meetings and consultations undertaken as part of the ESIA Study.

**Table 3. Schedule of Meeting and Consultation As Taken Part Of The ESIA exercise**

| <b>Date</b> | <b>Activity</b>   | <b>Purpose</b>  |
|-------------|---|---|
| 18-12-2014  | Meet with U Kune Myint Than, General Manager, MOGE  | Kick off meeting with MOGE  |
|             | Meet with U Thet Naing Oo, Administrator, General Administrative Department, Shwetaung Township           | Seeking Permission for Stakeholder Meeting and permission of field survey.                |
|             | Meet with MPRL E&P at Golden Guest Hotel, Shwetaung   | Planning for Field Survey.  |
| 19-12-2014  | Meet with U Tin Maung Win, Administrator, District Administrative Department, Pyaw District               | Permission of stakeholder meeting at Pyaw.  |
|             | Meet with U Thu Hein Aoe, Assistance Administrator, General Administrative Department, Shwetaung Township | Collection of Secondary Data.   |
|             | Meet with Head of Htan Kone Village Tract   | Undertaking community and household survey across a sample population of the community.   |
|             | Meet with Head of Kywe Kone Village Tract   | Undertaking community and household surveys across a sample population of the community.  |
| 20-12-2014  | Meet with Head of Ngwe Ma Yan Village Tract   | Undertaking a community and household survey across a sample population of the community. |

|            |   |   |
|------------|---|---|
|            | Meet with Head of Pang Chuk Village Tract   |   |
|            | Meet with Head of Gwe Tank Myaing Village Tract   |   |
| 21-12-2014 | Meet with Head of Kywe Ma Village Tract   | Undertaking a community and household survey across a sample population of the community. |
| 22-12-2014 | Meet with U Thu Hein Soe, Assistant Administrator, General Administrative Department, Shwetaung Township. | Collection of Secondary Data  |
|            | Meeting in Shwetaung Township with stakeholders   | Stakeholder meetings with FGDs with a sample population.                                  |

**Figure 17. Photo records of stakeholder consultation for block IOR 4**

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*Photo 1: Focus Group Survey in Stakeholder Consultation Meeting for Block IOR 4 at Pyay*



*Photo 2: Stakeholder Consultation Meeting for Block IOR 4 at Pyay*



*Photo 3: Focus Group Discussion in Stakeholder Consultation Meeting for Block IOR 4 at Pyay*



*Photo 4: Women Focus Group Survey for Block IOR 4 at Pyay*



*Photo 5: Farmers Focus Group Survey for Block IOR 4 at Pyay*



It is understood that the land required for the Project has already been taken control over by MOGE. In keeping with this, during the engagement with MOGE, an understanding was developed of the land availability for the Project and the manner in which the engagement with the local community is to be undertaken regarding possible compensation, if any.

In consultation with MOGE, prior to the commencement of the consultations for the scoping exercise, Project information was disclosed to the local community through pamphlets containing project information.

Post this disclosure of information consultations were undertaken amongst the local community in five (5) villages from Bago and three (3) from the Shwe Taung Townships. The consultations were undertaken as per the guidance of the MOGE representative, township administrators, and were only carried out in villages where the tract leaders are living. For the purpose of these consultations, an MOGE representative was also present with the field team.

Through these engagement activities an attempt was made to develop an understanding of the socio-economic profile, including the livelihood profile, the agricultural patterns in the area, access to health services, water supply and transportation and the village development plans and presence of local civil society organizations in the area.

As part of these engagement activities, a verbal understanding was also provided to the local community representatives of the proposed Project and its activities and the purpose of the engagement activities.

For the purpose of the primary data collection, household surveys were undertaken in eight (8) villages while community surveys were undertaken in six (6) villages in the Project Area. A total of 38 household surveys and six (6) community surveys were undertaken in the eight (8) villages. Apart from this, two focus group discussions were undertaken for farmers and women's group in the Shwe Taung Township.

### **3. KEY FINDINGS OF CONSULTATIONS**

As has been mentioned above, as part of the ESIA process a public meeting was undertaken in the Myanaung Township. As part of these meetings, REM and MOGE provided an understanding of the Project and its proposed activities, as well as provided clarifications on any queries of the community.

Apart from these meetings, engagement was undertaken with the local stakeholders in the form of focus group discussions during the impact assessment process with the farmers and women group, certain key concerns and expectations of the local community were identified during the impact assessment process:

- **Impact on Land Availability**
  - One of the key concerns of the local community was in terms of the impact of the Project activities on the availability of land in the area and the agriculture undertaken by the community. From the information made available it is understood that agriculture is the primary source of livelihood for a majority of the local community. Thus the Project activities are likely to result in a reduction of the land available for agriculture, which in turn would impact the

income and livelihood sources for the community. This impact is likely to be heightened for those households who are solely dependent upon agriculture, whose majority land holdings are impacted by the Project and those who do not have alternative land available.

- **Payment of Crop Compensation**

- According to the information made available by the local community, it is understood that a number of households have lost their land for the Project (7 of the 38 surveyed households) and all of them have received compensation for the loss. Furthermore, the compensation received has been in the form of crop compensation provided by the previous project developers or the government (MOGE). While the exact information pertaining to the number of households compensated and the amount of compensation paid was unavailable, one of the key expectations of the community from the Project was the provisioning of adequate compensation for the loss of land and crop due to the Project. However, it is understood, that according to the discussions undertaken with the government, no further compensation is to be paid for this Project.

- **Community Development Activities**

- In keeping with this understanding of the impact of the Project activities on the livelihood of the community, the community identified certain areas of expectations from the Project in terms of financial and/or technical assistance for undertaking agriculture and other livelihood activities, especially in terms of providing irrigation facilities.

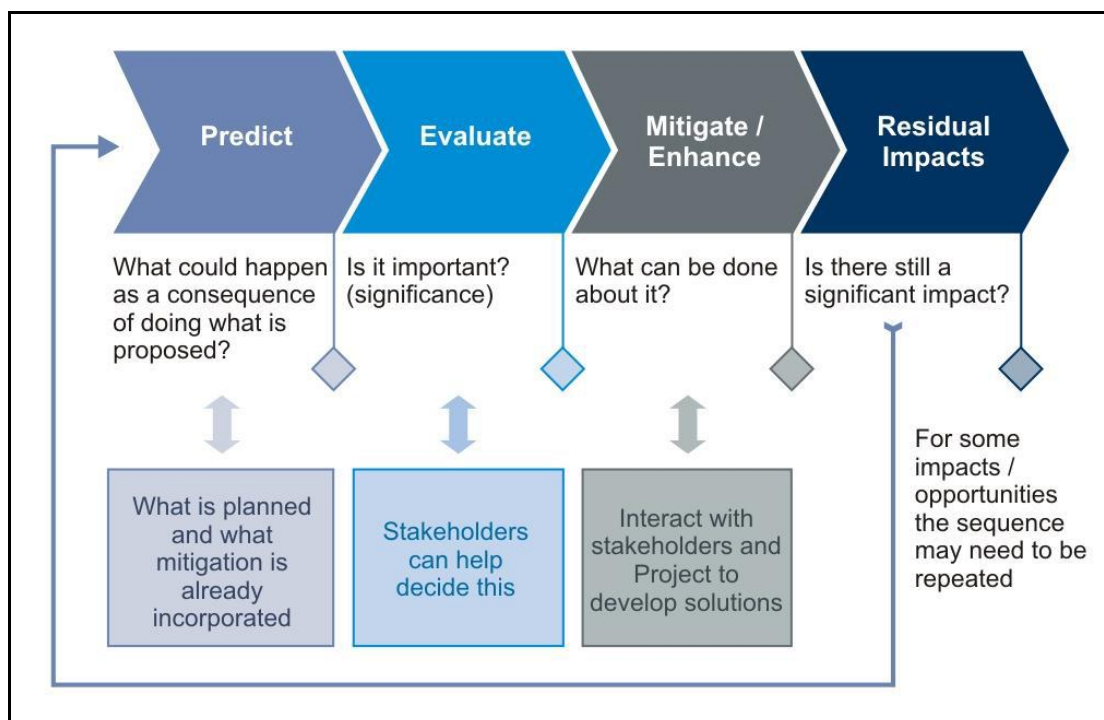
## **4. IMPACT ASSESSMENT**

### **4.1 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 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 18 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).

#### *Impact of Significance*

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.

**Table 4. 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.

#### *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/social/health 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.

## **5. ENVIRONMENTAL AND SOCIAL MANAGEMENT ORGANIZATION**

This document provides the Environmental and Social Management Plan (ESMP) for the planning, construction and operation of the project. This ESMP 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 Pte Ltd. (MPRL E&P) has committed. In addition, this ESMP is used to ensure compliance with statutory requirements and corporate safety and environmental policies.

### **5.1. PROJECT DESCRIPTION**

MPRL E&P was awarded the Exploration Block IOR-4 (a.k.a. Pyay) in October 2013 to jointly operate with Myanma Oil & Gas Enterprise (MOGE) under Improved Petroleum Recovery (IPR) Contract. Following the contract award, MPRL E&P is planning undertake workover activities at selected existing wells within the Block (“the Project”).



## **6. SUMMARY OF IMPACTS/CONTROL MITIGATION**

Through the Project development and the ESIA process, MPRL E&P has made commitments to actions to ensure or improve environmental and social 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 below. Schedule and responsibility of implementation of these mitigation measures are identified as necessary. Additional details on the key elements for the overall environmental and social management of the Project are presented below.

## 6.1 SUMMARY OF KEY IMPACTS AND CONTROL/MITIGATION MEASURES

| Potential Impacts/Issues  | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans  |
|---|---|----------------------------------|-------------------------------|----------------------|--|
| <b>Environmental Impacts</b>  |   |                                  |                               |                      |  |
| <b>Preparation and Mobilization</b>   |   |                                  |                               |                      |  |
| Impacts from construction of workforce camp on terrestrial habitats and associated fauna and flora                | <ul style="list-style-type: none"> <li>Footprints of the proposed camp will be minimized during the design stage</li> </ul>   | Minor                            | Compliance audit              | Design Phase         | N/A  |
|   | <ul style="list-style-type: none"> <li>Construction activities will be restricted to areas that will be clearly demarcated</li> <li>Work site boundaries will be regularly checked to ensure that they are not breached and that damage does not occur to surrounding areas</li> <li>It is assumed felling of large perennial vegetation (i.e. large trees such as roadside trees) will be avoided.</li> <li>Work areas in temporarily affected areas would be reinstated with tree/shrub planting after completion of the works, as far as practicable</li> <li>Construction camp is assumed to be temporary and will be removed in the close-out phase</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | N/A  |
| Impacts from labour (including hunting), equipment and services supply on terrestrial and aquatic flora and fauna | <ul style="list-style-type: none"> <li>A Biodiversity Action Plan will be developed by MPRL E&amp;P or a third party administered under the Environmental and Social Management Plan, whereby management and mitigation measures will be provided covering all aspects of biodiversity that may be affected by the Project.</li> </ul>  | Negligible                       | Compliance Audit              | Design Phase         | Biodiversity Action Plan and Environmental Monitoring Plan |

| Potential Impacts/Issue | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                   | Timing/Frequency     | Related Plans  |
|-------------------------|--|----------------------------------|------------------------------|----------------------|--|
|                         | <ul style="list-style-type: none"> <li>Oil fields are restricted areas and therefore existing access restrictions will be in place and patrolled within the block. Priority areas for patrolling should be identified within the Environmental Monitoring Plan (e.g secondary forest areas where new access routes are considered)</li> <li>Project activities undertaken with sufficient lighting only</li> <li>Minimization of night time driving</li> <li>HSE coordinators will be employed for the duration of the seismic survey. They will be employed by MPRL E&amp;P or a third party and will not be employed by the seismic contractor. Contractors HSE Manager will assist the HSE coordinators in supervising the implementation of mitigation measures.</li> <li>Work areas will be clearly demarcated and any activities outside these areas will be prohibited except under a permit system where necessary. For entry and exit this will occur along designated access routes.</li> <li>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 ban on fishing and hunting.</li> <li>Prohibit workers from uncontrolled interaction and commerce with the local community in terms of buying and selling goods particularly Non-Timber Forest Products (NTFP), bush meat, and wildlife (pets, souvenirs)<br/>Prohibit staff from introducing pets, livestock, and other animals</li> </ul> |                                  | Insurance & Compliance Audit | Implementation Phase | Biodiversity Action Plan and Environmental Monitoring Plan |

| Potential Impacts/Issue  | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring       | Timing/Frequency | Related Plans            |
|--|---|----------------------------------|------------------|------------------|--------------------------|
|  | <ul style="list-style-type: none"> <li>Engagement with local community to convey the message that workers are not allowed to buy Non-Timber Forest Products (NTFP), bush meat and wildlife (pets, souvenirs).</li> <li>Work with local authorities and communities through the stakeholder engagement plan to monitor and control hunting/poaching arising from new access in the Project Area.</li> <li>A monitoring program will be established to ensure mitigation measures are being implemented effectively.</li> </ul>   |                                  |                  |                  |                          |
| Impacts from site preparation/clearance and creation of access routes on terrestrial habitats and associated flora and fauna | <ul style="list-style-type: none"> <li>Minimize footprint of access roads at the design stage (width of any new road should be less than 5m)</li> <li>A Biodiversity Action Plan will be developed by MPRL E&amp;P or a third party to be administered under the Environmental and Social Management Plan, whereby management and mitigation measures will be provided covering all aspects of biodiversity that may be affected by the Project.</li> <li>Teams for deployment of source lines will access areas on foot, as far as practicable and follow/clear a narrow path</li> <li>On the basis that vegetation clearance tracks for tracks to allow access will be by hand, it is assumed felling of large perennial vegetation will be avoided.</li> </ul> | Minor                            | Compliance Audit | Design Phase     | Biodiversity Action Plan |



| Potential Impacts/Issues                                  | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans  |
|---|--|----------------------------------|-------------------------------|----------------------|--|
|   | <ul style="list-style-type: none"> <li>As part of training under the Biodiversity Action Plan, 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"> <li>Outline of vegetation clearance procedures including species not to cut, and the minimum size of tree that should be felled (20cm diameter at breast height (dbh) (i.e. diameter of the tree trunk measured at 1.3m above ground)</li> <li>What to do in the advent of disturbing species (e.g. snakes both from an occupational safety and biodiversity perspective)</li> </ul> </li> <li>A monitoring program will be established to ensure mitigation measures are being implemented effectively.</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | Biodiversity Action Plan and Environmental Monitoring Plan |
| Impacts from mobile power generation on terrestrial fauna | <ul style="list-style-type: none"> <li>Specifications of power generator</li> <li>Project activities undertaken within sufficient lighting only</li> </ul>   | Minor                            | Inspection & Compliance       | Implementation Phase | N/A  |

| Potential Impacts/Issues   | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring              | Timing/Frequency              | Related Plans         |
|--|---|----------------------------------|-------------------------|-------------------------------|-----------------------|
| Impacts from waste disposal 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"> <li>Planning material requirements at the design stage to reduce unnecessary generated waste</li> <li>MPRL E&amp;P HSE Management System requires Waste Management Plan for the project. A Waste Management Plan will be developed by MPRL E&amp;P or a third party separately from but administered under the Environmental and Social Management Plan. The plan will identify and estimate generated volumes of different waste types and set out procedures for responsible management and disposal and will be regularly audited.</li> </ul> | Negligible                       | Compliance Audit        | Design Phase                  | Waste Management Plan |
| Impacts from waste disposal 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"> <li>Induction training for personnel (including contracted local workers) is recommended to include: <ul style="list-style-type: none"> <li>Waste Management System</li> </ul> </li> </ul>   | Negligible                       | Inspection & Compliance | Implementation Phase          | Waste Management Plan |
| Impacts from sewage and 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"> <li>Wastewater treatment facilities will be properly designed and installed</li> <li>Provision of service tank for sewage from toilet facilities</li> <li>Provision of water pit for greywater from kitchen</li> <li>Service tank and water pit are separated from drainage and storm water</li> <li>Properly designed and installed</li> <li>Wastewater treatment facilities will be well maintained to allow effective operations</li> </ul>   | Minor                            | Inspection & Compliance | Design & Implementation Phase | Waste Management Plan |

| Potential Impacts/Issues   | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring                    | Timing/Frequency              | Related Plans         |
|--|---|----------------------------------|-------------------------------|-------------------------------|-----------------------|
| Impacts from waste disposal 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"> <li>Planning material requirements at the design stage to reduce unnecessary generated waste.</li> <li>MPRL E&amp;P HSE Management System requires Waste Management Plan for the project. A Waste Management Plan will be developed by MPRL E&amp;P or a third party separately from but administered under the Environmental and Social Management Plan. The plan will identify and estimate generated volumes of different wastes types and set out procedures for responsible management and disposal and will be regularly audited.</li> </ul> | Negligible                       | Compliance Audit              | Design Phase                  | Waste Management Plan |
|  | <ul style="list-style-type: none"> <li>Induction training for personnel (including contracted local workers) is recommended to include: <ul style="list-style-type: none"> <li>Waste management system</li> <li>Available/provided sanitary facilities</li> </ul> </li> </ul>   | Negligible                       | Inspection & Compliance Audit | Implementation Phase          | Waste Management Plan |
| Impacts from sewage and 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"> <li>Wastewater treatment facilities will be properly designed and installed.</li> <li>Provision of service tank for sewage and toilet facilities</li> <li>Provision of water pit for greywater from kitchen</li> <li>Service tank and water pit for greywater from kitchen</li> <li>Service tank and water pit are separated from drainage and storm water</li> <li>Properly designed and installed</li> <li>Wastewater treatment facilities will be well maintained to allow effective operation</li> </ul>                                       | Minor                            | Inspection & Compliance Audit | Design & Implementation Phase | Waste Management Plan |



| Potential Impacts/Issues   | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans  |
|--|--|----------------------------------|-------------------------------|----------------------|--|
| <b>Close Out Phase</b>   |  |                                  |                               |                      |  |
| Impacts from labor (including hunting), equipment and services supply on terrestrial and aquatic flora and fauna | <ul style="list-style-type: none"> <li>A Biodiversity Action Plan will be developed by MPRL E&amp;P or a third party administered under the Environmental and Social Management Plan, whereby management and mitigation measures will be provided covering all aspects of biodiversity that be affected by the Project.</li> </ul>   | Negligible                       | Compliance Audit              | Design Phase         | Biodiversity Action Plan                                   |
|  | <ul style="list-style-type: none"> <li>Oilfields are restricted areas and therefore entering existing access restrictions will be in place and patrolled within the block. Priority areas for patrolling should be identified within the Environmental Monitoring Plan</li> <li>Project activities in day light hours</li> <li>Minimization of night-time driving</li> <li>Work areas will be clearly demarcated and any activities outside these areas will be prohibited except under a permit system where necessary. For entry and exit this will occur along designated access routes.</li> <li>Induction training for personnel is recommended to include a mandatory segment on biodiversity.</li> <li>Prohibit workers from uncontrolled interaction and commerce with the local community in terms of buying and selling goods i.e. NTFP</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | Biodiversity Action Plan and Environmental Monitoring Plan |

| Potential Impacts/Issues  | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring                    | Timing/Frequency                | Related Plans         |
|---|---|----------------------------------|-------------------------------|---------------------------------|-----------------------|
|   | <ul style="list-style-type: none"> <li>Engagement with local community to convey the message that workers are not allowed to buy NTFP, bush meat and wildlife.</li> <li>Work with local authorities and communities through stakeholder engagement plan to monitor and control hunting and poaching arising from new access in the Project Area</li> <li>A monitoring program will be established to ensure mitigation measures are being implemented effectively.</li> </ul>     |                                  |                               |                                 |                       |
| Impacts from waste disposal 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"> <li>Planning material requirements at the design stage to reduce unnecessary generated waste. MPRL E&amp;P HSE Management System requires a Waste Management Plan for the project. The plan will identify and estimate generated waste volumes of different wastes types and set out procedures for responsible management and disposal.</li> </ul>  | Negligible                       | Compliance Audit              | Design Phase                    | Waste Management Plan |
|   | <ul style="list-style-type: none"> <li>Induction training for personnel (including contracted local workers) is recommended to include: <ul style="list-style-type: none"> <li>Waste management system</li> </ul> </li> </ul>   |                                  | Inspection & Compliance Audit | Implementation Phase            |                       |
| Impacts from sewage and wastewater discharge on surface water quality, soil, terrestrial habitats and aquatic habitats as well as their associated flora and fauna      | <ul style="list-style-type: none"> <li>Wastewater treatment facilities will be properly designed and installed</li> <li>Provision of service tank for sewage from toilet facilities</li> <li>Provision of water pit for grey water from kitchen</li> <li>Service tank and water pit are separated from drainage and storm water</li> <li>Properly designed and installed</li> <li>Wastewater treatment facilities will be well maintained to allow effective operation</li> </ul> | Minor                            | Inspection & Compliance Audit | Design and Implementation Phase | Waste Management Plan |

| Potential Impacts/Issues  | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans               |
|---|---|----------------------------------|-------------------------------|----------------------|-----------------------------|
| Impacts from spills/leaks 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"> <li>Hazardous materials/chemicals will be stored at the MOGE warehouse facility.</li> <li>Fuel and chemical storage areas will have appropriate secondary containment (drip trays for small storage locations/impervious base and bund walls for tanks) and provide procedures for managing the containment systems. All ancillary equipment should be contained securely within the bund when not in use.</li> <li>Oil interceptors will be provided in the drainage systems where necessary and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages.</li> <li>Storage tanks and components will meet international design standards as far as practicable. For example, storage tanks will be equipped with devices that prevent spills and overfill, including overfill alarms, automatic shut-off devices and catch basins around fill pipes.</li> <li>Fuel stores should be kept away from vehicle access routes to prevent collisions.</li> <li>Maintenance of storage tanks, pipes and components (seals, connectors, and valves) will be carried out regularly, including daily inspection of fuelling equipment in satisfactory condition.</li> <li>All construction plants and machinery (e.g. trucks) will be maintained in good working order to avoid leakage or spillage of containments.</li> <li>Routine servicing of plants and equipment will be carried out off-site prior to mobilization or within workshop facilities equipped with bunding areas and oil interceptor.</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | Emergency Preparedness Plan |



| Potential Impacts/Issues  | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans   |
|---|---|----------------------------------|-------------------------------|----------------------|---|
|   | <ul style="list-style-type: none"> <li>Spills kits and shovels will be available onsite at all times 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.</li> <li>If emergency servicing of equipment is required in the field, spill kits and dip trays will be available.</li> <li>Any contaminated soil will be removed from site and disposed of in accordance with the waste management plan.</li> <li>Oils and other service fluids will be removed off-site by the Seismic Team and disposed in accordance with the waste management plan.</li> <li>The location, type, and quantity of any fuel or chemical spill will be reported to the HSE Coordinator immediately.</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | Emergency Preparedness Plan                               |
| Impacts from fires and explosions on air quality, ground water quality, surface water quality, landscape and visual character use of natural resource, terrestrial habitats and aquatic habitats as well as their associated flora and fauna. | <ul style="list-style-type: none"> <li>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 as well as identify where fire control measures should be located.</li> </ul>  | Minor                            | Compliance Audit              | Design Phase         | Emergency Preparedness Plan and Fire Risk Management Plan |
|   | <ul style="list-style-type: none"> <li>Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire.</li> </ul>   |                                  | Inspection & Compliance Audit | Implementation Phase |   |

| Potential Impacts/Issues   | Control/Mitigation Measures   | Significance of Residual Impacts       | Monitoring                    | Timing/Frequency     | Related Plans   |
|--|---|--|-------------------------------|----------------------|---|
|  | <ul style="list-style-type: none"> <li>HSE induction will be undertaken at the site before work commencement, which should include proper use of fire-fighting equipment and communication protocol in case of fire.</li> <li>Restrict smoking to designated areas only.</li> <li>Conduct fire training and response drills.</li> </ul>   | Minor                                  | Inspection & Compliance Audit | Implementation Phase | Emergency Preparedness Plan and Fire Risk Management Plan |
| <b>Work over Activities – Planned Events</b>   |   |  |                               |                      |   |
| Impacts from operation of mechanical equipment required for work over activities on ambient air noise conditions | <ul style="list-style-type: none"> <li>Activities carried out at existing well sites in existing oil field with separation from sensitive receptors.</li> <li>Project activities undertaken with sufficient lighting only.</li> <li>Well-maintained equipment will be used.</li> <li>Noise suppression box will be fabricated over the engine for the PME's being operated nearby the NSRs (e.g. villagers).</li> <li>Appropriate PPE will be used for MPRL E&amp;P personnel</li> <li>Workers not involved with the works will need to at least 100m away from the wellhead if practicable.</li> </ul> | Negligible for Noise and Minor for Air | Inspection & Compliance Audit | Implementation Phase | N/A   |

| Potential Impacts/Issues  | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring       | Timing/Frequency | Related Plans   |
|---|---|----------------------------------|------------------|------------------|---|
|   | <ul style="list-style-type: none"> <li>Well-maintained equipment to be operated on site.</li> <li>Regular maintenance of equipment such as lubricating moving parts, tightening loose parts and replacing worn out components.</li> <li>Shut down or throttled down between work periods for machines and construction plant items (e.g. trucks) that may be intermittent use.</li> <li>Shut down generators, compressors, and other equipment when not in use.</li> <li>Reduce the number of equipment operating simultaneously as far as practicable.</li> <li>Orientate equipment known to emit noise strongly in one direction so that the noise is directed away from receptors as far as practicable.</li> <li>Implement control measures, e.g. noise barriers at site hoarding, movable barriers or barriers that installed on the equipment, wherever applicable. The type of control measure that can be applied will be determined based on site conditions and constraints.</li> </ul> |                                  |                  |                  |   |
| Impacts from disposal of waste from workover activities 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"> <li>A Waste Management Plan will be developed by MPRL E&amp;P or a third party to be administered under the Environmental and Social Management Plan. The plan will identify and estimate generated volumes of different waste types and set out procedures for responsible management and disposal. This should be regularly audited.</li> <li>Careful selection of the fluid system to minimize environmental hazards related to chemical additives.</li> <li></li> </ul>  | Minor                            | Compliance Audit | Design Phase     | Emergency Preparedness Plan and Fire Risk Management Plan |



| Potential Impacts/Issues  | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                      | Timing/Frequency     | Related Plans                                       |
|---|--|----------------------------------|---------------------------------|----------------------|---|
|   | <ul style="list-style-type: none"><li>Careful selection of fluid additives taking into account technical requirements, chemical additive concentration, toxicity, bioavailability, and bioaccumulation potential.</li></ul>  | Minor                            |                                 |                      |   |
|   | <ul style="list-style-type: none"><li>Drill muds used will be WBM and KCL polymer mud will be recycled and treated for future use.</li><li>Monitoring and minimizing the concentration of heavy metal impurities (mainly mercury and cadmium) in barite stock used in the fluid formation, if used.</li></ul>  |                                  | Inspection and Compliance Audit | Implementation Phase | Waste Management Plan                               |
| Workover Activities – Accidental Events   |  |                                  |                                 |                      |   |
| Impacts from spills/leaks 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"><li>Develop an Emergency Preparedness and Spill Response Plan to document communication procedures and actions to take in the event of uncontrolled well fluid release.</li><li>Carefully plan 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.</li><li>Develop water treatment and injection facilities if practicable.</li></ul> | Minor                            | Injection and Compliance Audit  | Design Phase         | Emergency Preparedness Plan and Spill Response Plan |
|   | <ul style="list-style-type: none"><li>Competent and well-trained workover crews</li><li>Well-planned, well-supervised and standard workover/drilling procedures will be used at the wells to maintain well control</li><li>Implementation of maintenance and inspection procedures.</li></ul>  |                                  | Inspection & Compliance Audit   | Implementation Phase |   |

| Potential Impacts/Issues | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans                                       |
|--------------------------|---|----------------------------------|-------------------------------|----------------------|---|
|                          | <ul style="list-style-type: none"> <li>Undertake drilling with international best practice safety procedures.</li> <li>Test safety devices prior to start-up for function and integrity.</li> <li>Continuously monitor pressure in the well and recycle mud during drilling.</li> <li>Train employees on emergency procedures.</li> <li>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 substances enters into groundwater or surface water resources.</li> <li>If emergency servicing of equipment is required in the field, spill lots and drip trays will be available.</li> <li>Any contaminated soil will be removed from site and disposed of in accordance with the waste management plan.</li> <li>The location type and quantity of any fuel or chemical, or mud spill will be reported to the HSE Coordinator immediately.</li> <li>Improve cellars with double cellars for new and reactivated wells.</li> <li>Regularly pump out cellars oil and water separators and treatment water for injection.</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | Emergency Preparedness Plan and Spill Response Plan |

| Potential Impacts/Issues   | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans   |
|--|--|----------------------------------|-------------------------------|----------------------|---|
| Impacts from fires and explosions on air quality, ground water quality, surface water 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"><li>Assign designated smoking areas.</li><li>Smoking is only allowed away from the wellhead of more than 100 feet, up wind, with appropriate ask trays to contain any hot ashes.</li><li>As administered under the Emergency Preparedness Plan, a Fire Risk Management Plan will be developed including communication protocols and measures to control any fires that do arise.</li></ul>   | Minor                            | Compliance Audit              | Design Phase         | Emergency Preparedness Plan and Fire Risk Management Plan |
|  | <ul style="list-style-type: none"><li>Fire control equipment should be located at the well site or appropriate locations.</li><li>Induction training for personnel is recommended to include a mandatory segment on fire safety and actions in the event of a fire.</li><li>It will be of key importance that explosives used for re-perforation activities are kept in a safe manner and no uncontrollable explosions occur. Implement all required safety and management requirements relating to the transportation, storage, and handling of explosives.</li><li>Misfired charges from re-perforation activities will be disabled and destroyed.</li><li>Restrict smoking to designated areas only.</li><li>Conduct fire training and response drills.</li></ul> |                                  | Inspection & Compliance Audit | Implementation Phase |   |
| Social Impacts   |  |                                  |                               |                      |   |
| Land Accessibility Phase   |  |                                  |                               |                      |   |
| Impact regarding loss of access to land  | <ul style="list-style-type: none"><li>A Livelihood Restoration Plan (LRP) for the Project should be developed based on the assessment of various livelihood restoration options available and preferred by the community, reflective of the needs of the community. The LRP should also have clear reporting and monitoring indicators.</li></ul>  | Moderate                         |                               | Design Phase         | Livelihood Restoration plan                               |

| Potential Impacts/Issues                     | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring                             | Timing/Frequency   | Related Plans               |
|--|---|----------------------------------|--|--|-----------------------------|
| Impact regarding loss of access to land      | <ul style="list-style-type: none"> <li>• Compensation for the crop loss should be provided and livelihood restoration facilities should be provided, however, this has to be done keeping cognizance of the local laws and regulations.</li> <li>• In case of any new land requirement, the compensation amount and any livelihood restoration options should be identified in consultation with the local community and local authorities.</li> <li>• In case of landlessness due to Project, preference should be given for employment in various works depending upon the skill levels. Livelihood restoration options or support could be considered for these families.</li> </ul> | Moderate                         | Compliance Audit                       | Design Phase   | Livelihood Restoration Plan |
|  | <ul style="list-style-type: none"> <li>• Preference to land owners for employment and sub-contractor works.</li> </ul>  |                                  | Employment Records                     | Quarterly  | N/A                         |
|  | <ul style="list-style-type: none"> <li>• Preference to land owners in community development and community investment activities.</li> </ul>   |                                  | Community development activity records | Six Monthly  | N/A                         |
| Community and Occupational Health and Safety | <ul style="list-style-type: none"> <li>• A Traffic Management Plan will be developed for the Project and will implement by the HSE team.</li> </ul>   | Minor                            | Compliance Audit                       | Design Phase   | Traffic Management Plan     |
|  | <ul style="list-style-type: none"> <li>• Adopt proper road safety.</li> </ul>   |                                  | Road Safety Policy                     | Prior to the commencement of the planning and mobilization phase | N/A                         |
|  | <ul style="list-style-type: none"> <li>• Synchronize traffic movements with the local community needs.</li> </ul>   |                                  | N/A                                    | Monthly  | Traffic Management Plan     |
|  | <ul style="list-style-type: none"> <li>• Immediate repair of any damage to existing main roads, which are caused by Project activities.</li> </ul>  |                                  | Visual Inspection/records of repair    | Monthly  | N/A                         |



| Potential Impacts/Issues                        | Control/Mitigation Measures   | Significance of Residual Impacts | Monitoring   | Timing/Frequency   | Related Plans           |
|---|---|----------------------------------|--|--|-------------------------|
|   | <ul style="list-style-type: none"> <li>Ensure availability of break services of heavy vehicles</li> </ul>   |                                  | Visual Inspection  | Monthly  | N/A                     |
|   | <ul style="list-style-type: none"> <li>In case of at fault accidents, pay compensation to the affected family or next of kin in keeping with the applicable rules.</li> </ul> |                                  | Records of accidents and compensation paid/grievance records | Monthly  | N/A                     |
|   | <ul style="list-style-type: none"> <li>Undertake a root cause analysis of any accidents which take place</li> </ul>   |                                  | Root cause analysis reports                                  | Monthly  | N/A                     |
|   | <ul style="list-style-type: none"> <li>Develop a policy for safety measures to be undertaken while driving</li> </ul>   |                                  | Road safety policy   | Prior to the commencement of the planning and mobilization phase | N/A                     |
|   | The labor camps should be placed at a distance from the village settlements.  |                                  | Visual Inspection  | Prior to the commencement of the planning and mobilization phase | N/A                     |
|   | <ul style="list-style-type: none"> <li>Undertake pre-employment medical check-ups for all workers.</li> </ul>   |                                  | Medical Records  | Quarterly  | Traffic Management Plan |
|   | <ul style="list-style-type: none"> <li>Undertake regular health check-ups and health survey of the community</li> </ul>   |                                  | Health Survey Reports  | Quarterly  | N/A                     |
| Impact on livelihood profile of the community   | <ul style="list-style-type: none"> <li>Preference to the vulnerable groups according to the skill requirements of the project.</li> </ul>                                     | Positive                         | Employment Records   | Quarterly  |                         |
| Impact on transport and infrastructure services | <ul style="list-style-type: none"> <li>Adopt proper road safety measures</li> </ul>   | Negligible                       | Road Safety Policy   | Prior to the commencement of the planning and mobilization phase |                         |
|   | <ul style="list-style-type: none"> <li>Synchronize traffic movements with the local community needs</li> </ul>  |                                  | N/A  | Monthly  | Traffic Management Plan |

| Potential Impacts/Issues             | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                           | Timing/Frequency     | Related Plans         |
|--------------------------------------|--|----------------------------------|--------------------------------------|----------------------|-----------------------|
|                                      | <ul style="list-style-type: none"> <li>Immediate repair of any damage to existing main roads, which are caused by Project activities.</li> </ul>   |                                  | Visual Inspection/Records of Repairs | Monthly              | N/A                   |
|                                      | <ul style="list-style-type: none"> <li>Ensure availability of break services of heavy vehicles</li> </ul>  |                                  | Visual Inspection                    | Monthly              | N/A                   |
| Impact on source water vulnerability | <ul style="list-style-type: none"> <li>As part of project design, the requirements of acceptable water quality standards and wastewater discharge standards will be maintained.</li> </ul>   | Minor                            | Compliance Audit                     | Design Phase         | Waste Management Plan |
|                                      | <ul style="list-style-type: none"> <li>The local community will be engaged and a water use agreement will be formulated, which would minimize the pressure on the source water and ensure adequate water availability for the community.</li> </ul>  |                                  | Compliance Audit                     | Design Phase         | N/A                   |
| Impacts on cultural heritage         | <ul style="list-style-type: none"> <li>As part of the project design, project facilities/activities will be located away from sensitive cultural heritage resources.</li> <li>A proper protocol or standard operating procedure may be developed and people at the project site located are trained to act suitably in consonance with the regulatory requirement and beliefs and faith of the community, if any.</li> </ul>   | Minor                            | Compliance Audit                     | Design Phase         | Cultural Heritage SOP |
|                                      | <ul style="list-style-type: none"> <li>The project will meet the international best practice for the documentation and protection of the cultural heritage and in case of chance finds.</li> <li>The project will consider retaining professionals to assist in the identification and protection of cultural heritage.</li> <li>In case the removal of nonreplicable cultural heritage is required, the same will be undertaken in consultation with the affected communities and in keeping with the regulatory requirement for the same;</li> </ul> |                                  | Inspection & Compliance Audit        | Implementation Phase | Cultural Heritage SOP |

| Potential Impacts/Issues     | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans         |
|------------------------------|--|----------------------------------|-------------------------------|----------------------|-----------------------|
| Impacts on cultural heritage | <ul style="list-style-type: none"> <li>The project will ensure that the access to cultural heritage by the local community is not disrupted, and if disrupted, and if required, alternative access routes will be provided.</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | Cultural Heritage SOP |

| Potential Impacts/Issues                     | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring   | Timing/Frequency   | Related Plans |
|--|--|----------------------------------|--|--|---------------|
| Community and occupational health and safety | <ul style="list-style-type: none"> <li>Synchronize traffic movements with the local</li> </ul>   | Minor                            | N/A  | Monthly  | N/A           |
|  | <ul style="list-style-type: none"> <li>Immediate repair of any damage to existing main roads, which are caused by project activities.</li> </ul>                             |                                  | Visual Inspection/Records of Repairs                         | Monthly  | N/A           |
|  | <ul style="list-style-type: none"> <li>Ensure availability of break services of heavy vehicles</li> </ul>  |                                  | Visual Inspection  | Monthly  | N/A           |
|  | <ul style="list-style-type: none"> <li>In case of at-fault accidents, pay compensation to the affected family or next of kin in keeping with the applicable rules</li> </ul> |                                  | Records of accidents and compensation paid/grievance records |  | N/A           |
|  | <ul style="list-style-type: none"> <li>Undertake a root cause analysis of any accidents which take place</li> </ul>  |                                  | Root cause analysis report                                   | Monthly  | N/A           |
|  | <ul style="list-style-type: none"> <li>Develop a policy for safety measures to be undertaken while driving</li> </ul>  |                                  | Road safety policy   | Prior to the commencement of the planning and mobilization phase | N/A           |
|  | <ul style="list-style-type: none"> <li>The Labor camps should be placed at a distance from the village settlements.</li> </ul>   |                                  | Visual Inspection  | Prior to the commencement of planning and mobilization phase     | N/A           |
|  | <ul style="list-style-type: none"> <li>Undertake pre-employment medical check-ups for all workers</li> </ul>   |                                  | Medical Records  | Quarterly  | N/A           |
|  | <ul style="list-style-type: none"> <li>Undertake regular health check-ups for all workers</li> </ul>   |                                  | Health Survey Reports  | Quarterly  | N/A           |



| Potential Impacts/Issues                     | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                           | Timing/Frequency   | Related Plans           |
|--|--|----------------------------------|--------------------------------------|--|-------------------------|
| <b>Workover Activities</b>                   |  |                                  |                                      |  |                         |
| Community and occupational health and safety | <ul style="list-style-type: none"> <li>A Traffic Management Plan will be developed for the project and will be implemented by the HSE team.</li> </ul> | Minor                            | Compliance Audit                     | Design Phase   | Traffic Management Plan |
|  | <ul style="list-style-type: none"> <li>Adopt proper road safety measures</li> </ul>  |                                  | Road Safety Policy                   | Prior to the commencement of the planning and mobilization phase | N/A                     |
|  | <ul style="list-style-type: none"> <li>Synchronize traffic movements with the local</li> </ul>   | Minor                            | N/A                                  | Monthly  | N/A                     |
|  | <ul style="list-style-type: none"> <li>Immediate repair of any damage to existing main roads, which are caused by project activities.</li> </ul>       |                                  | Visual Inspection/Records of Repairs | Monthly  | N/A                     |
|  | <ul style="list-style-type: none"> <li>Ensure availability of break services of heavy vehicles</li> </ul>  |                                  | Visual Inspection                    | Monthly  | N/A                     |

| Potential Impacts/Issues              | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring   | Timing/Frequency   | Related Plans         |
|---------------------------------------|--|----------------------------------|--|--|-----------------------|
|                                       | <ul style="list-style-type: none"> <li>In case of at-fault accidents, pay compensation to the affected family or next of kin in keeping with the applicable rules</li> </ul>               |                                  | Records of accidents and compensation paid/grievance records |  | N/A                   |
|                                       | <ul style="list-style-type: none"> <li>Undertake a root cause analysis of any accidents which take place</li> </ul>  |                                  | Root cause analysis report                                   | Monthly  | N/A                   |
|                                       | <ul style="list-style-type: none"> <li>Develop a policy for safety measures to be undertaken while driving</li> </ul>  |                                  | Road safety policy   | Prior to the commencement of the planning and mobilization phase | N/A                   |
|                                       | <ul style="list-style-type: none"> <li>The Labor camps should be placed at a distance from the village settlements.</li> </ul>   |                                  | Visual Inspection  | Prior to the commencement of planning and mobilization phase     | N/A                   |
|                                       | <ul style="list-style-type: none"> <li>Undertake pre-employment medical check-ups for all workers</li> </ul>   |                                  | Medical Records  | Quarterly  | N/A                   |
|                                       | <ul style="list-style-type: none"> <li>Undertake regular health check-ups for all workers</li> </ul>   |                                  | Health Survey Reports  | Quarterly  | N/A                   |
| Impacts on source water vulnerability | <ul style="list-style-type: none"> <li>As part of project design, the requirements of acceptable water quality standards and wastewater discharge standards will be maintained.</li> </ul> | Minor                            | Compliance Audit   | Design Phase   | Waste Management Plan |
|                                       | <ul style="list-style-type: none"> <li>The local community will be engaged and a water use agreement will be formulated, ensure adequate water availability for the community.</li> </ul>  |                                  | Compliance Audit   | Design Phase   | N/A                   |
| Impacts on cultural heritage          | <ul style="list-style-type: none"> <li>As part of the project design, project facilities/activities will be located away from sensitive cultural heritage resources.</li> </ul>            | Minor                            | Compliance Audit   | Design Phase   | Cultural Heritage SOP |

| Potential Impacts/Issues     | Control/Mitigation Measures  | Significance of Residual Impacts | Monitoring                    | Timing/Frequency     | Related Plans         |
|------------------------------|--|----------------------------------|-------------------------------|----------------------|-----------------------|
| Impacts on cultural heritage | <ul style="list-style-type: none"> <li>A proper protocol or standard operating procedure may be developed and people at the project site are trained to act suitably in consonance with the regulatory requirement, beliefs and faith of the community, if any.</li> </ul>   |                                  |                               |                      |                       |
|                              | <ul style="list-style-type: none"> <li>As part of the project design, project facilities/activities will be located away from sensitive cultural heritage resources.</li> <li>A proper protocol or standard operating procedure may be developed and people at the project site located are trained to act suitably in consonance with the regulatory requirement and beliefs and faith of the community, if any.</li> </ul>   | Minor                            | Compliance Audit              | Design Phase         | Cultural Heritage SOP |
|                              | <ul style="list-style-type: none"> <li>The project will meet the international best practice for the documentation and protection of the cultural heritage and in case of chance finds.</li> <li>The project will consider retaining professionals to assist in the identification and protection of cultural heritage.</li> <li>In case the removal of nonreplicable cultural heritage is required, the same will be undertaken in consultation with the affected communities and in keeping with the regulatory requirement for the same;</li> <li>The project will ensure that the access to cultural heritage by the local community is not disrupted, and if disrupted, and if required, alternative access routes will be provided.</li> </ul> |                                  | Inspection & Compliance Audit | Implementation Phase | Cultural Heritage SOP |

## 6.2. MANAGEMENT PLANS

The goal of this ESMP is to ensure full compliance with the Project's policies and with mitigation, monitoring and other commitments made in the ESIA Report. While this ESMP 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 and social elements.

## 6.3. RELATED MANAGEMENT PLANS

A range of management plans will be developed to provide assurances that the outcomes of the ESIA can 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 subcontractors. This will apply to all tiers of contractors, with penalties for noncompliance also set out in the contracts and rigorously enforced by MPRL E&P.

The key management plans are outlined in Table 3 with information on how these relate to the activities and impacts being discussed in the ESIA Report, including reference to who has lead responsibility.



**Figure 19. ESMP Hierarchy of Key Plans**

| Plan Name  | Includes   | Plan Owner  |
|--|--|---|
| <b>ESMP</b>  | Overarching plan linking to other management plans   | MPRL E&P  |
| <b>Biodiversity Action Plan</b>                        | Management and mitigation measures will be described covering all aspects of biodiversity  | MPRL E&P or a third party administered under the Environmental and Social Management Plan |
| <b>Terrestrial Habitat Reinstatement Plan</b>          | The plan will identify provisions for sourcing native species from nursery and procedures for replanting. It will also identify priority areas for rehabilitation including for instance de-facto protected areas such as monastery and cultural heritage locations if trees or vegetation should be cleared. Rehabilitation on seismic lines will also be provided. | MPRL E&P or a third party administered under the Environmental and Social Management Plan |
| <b>Waste Management Plan</b>                           | Project-related waste handling procedures for hazardous and non-hazardous wastes.  | MPRL E&P  |
| <b>Emergency Preparedness Plan (ERP)</b>               | Administration (policy, purpose, distribution, definitions, etc.), organization of emergency areas (command centers, medical stations, etc.), roles and responsibilities, communication systems, emergency response procedures, emergency resources, training and updating, checklists, and business continuity and contingency                                      | MPRL E&P  |
| <b>Spill Response Plan</b>                             | As part of the ERP, spill preventative measures and spill response will be included  | MPRL E&P  |
| <b>Fire Risk Management Plan</b>                       | As part of the ERP, communication protocols and measures to control any fires that do arise as well as identify where fire control measures should be located  |   |
| <b>Traffic Management Plan</b>                         | Controls over prescribed routes, driver training, vehicle maintenance, speed restrictions, appropriate road safety signage, vehicle loading, maintenance measures and vetting procedures   | MPRL E&P  |
| <b>Environmental Monitoring Plan</b>                   | Groundwater monitoring, routine discharge monitoring, air quality monitoring, noise monitoring, terrestrial ecology monitoring etc.  | MPRL E&P or a third party administered under the Environmental and Social Management Plan |
| <b>Cultural Heritage Standard Operating Procedures</b> | Standard Operating Procedures (SOP) to act suitably in consonance with the regulatory requirements, beliefs, and faith of the community, if any, for cultural heritage   | MPRL E&P  |
| <b>Livelihood Restoration Plan</b>                     | Developed based on the assessment of various livelihood restoration options available and preferred by the community and reflects the needs of the community. The LRP should also have clear reporting, monitoring indicators and a supportive implementation mechanism.   | MPRL E&P  |

## 7. PUBLIC CONSULTATION AND DISCLOSURE

### 7.1. METHODOLOGY AND APPROACH

It is understood that Myanmar presently has a set of EIA Procedures being drafted by MOECAP for achieving environmental protection. While Version 8 of the procedures is currently under review, the requirements of the latest version publically available (Version 4) since 2013 were taken into account while undertaking the ESIA for the seismic survey. These procedures require the following steps to be undertaken as part of the EIA process in context to stakeholder engagement and disclosure of information:

- ✚ Scoping exercise:
  - ✚ Disclose information about the proposed Project to the public and civil society through local media, including by means of the prominent posting of legible sign boards and advertising boards at the Project site which are visible to the public; and
  - ✚ Arrange the required complement of consultation meetings as advised by the Ministry, with local communities, potentially PAPs, local authorities, community based organizations, and civil society.
- ✚ EIA process:
  - ✚ Take into consideration the views; concerns and perceptions of the stakeholders that could be affected by the Project or who otherwise have an interest in the Project.
  - ✚ The EIA should include the results of public consultations and negotiations with the affected population on the environmental and social issues.
  - ✚ Timely disclosure of all relevant information about the proposed Project and its likely adverse impacts to the public and civil society through the website of the Project Proponent, at public places such as libraries, community halls and signboards at the Project site visible to the public.
  - ✚ Arrange consultation meetings at the national, state and local level with PAPs, authorities, community based organizations and civil society.
  - ✚ Undertake consultations with concerned government organizations including the Ministry, the concerned sector ministry, regional government authorities, and others alike.
  - ✚ Field visits for the Ministry and concerned government organizations.

In keeping with these requirements, the engagement activities as part of the scoping and impact assessment process for the Project were undertaken, and are described in the following subsections.

### 7.2. FURTHER ONGOING CONSULTATIONS

While the above-mentioned engagement has been undertaken as part of the impact assessment process, stakeholder engagement is understood to be a process undertaken throughout the life of the Project. In keeping with this, a stakeholder engagement plan has been prepared, which identifies the engagement activities to be undertaken throughout the remaining life of the Project. The proposed engagement activities are to include focus group discussions, community meetings, individual discussions, surveys, checklists etc.

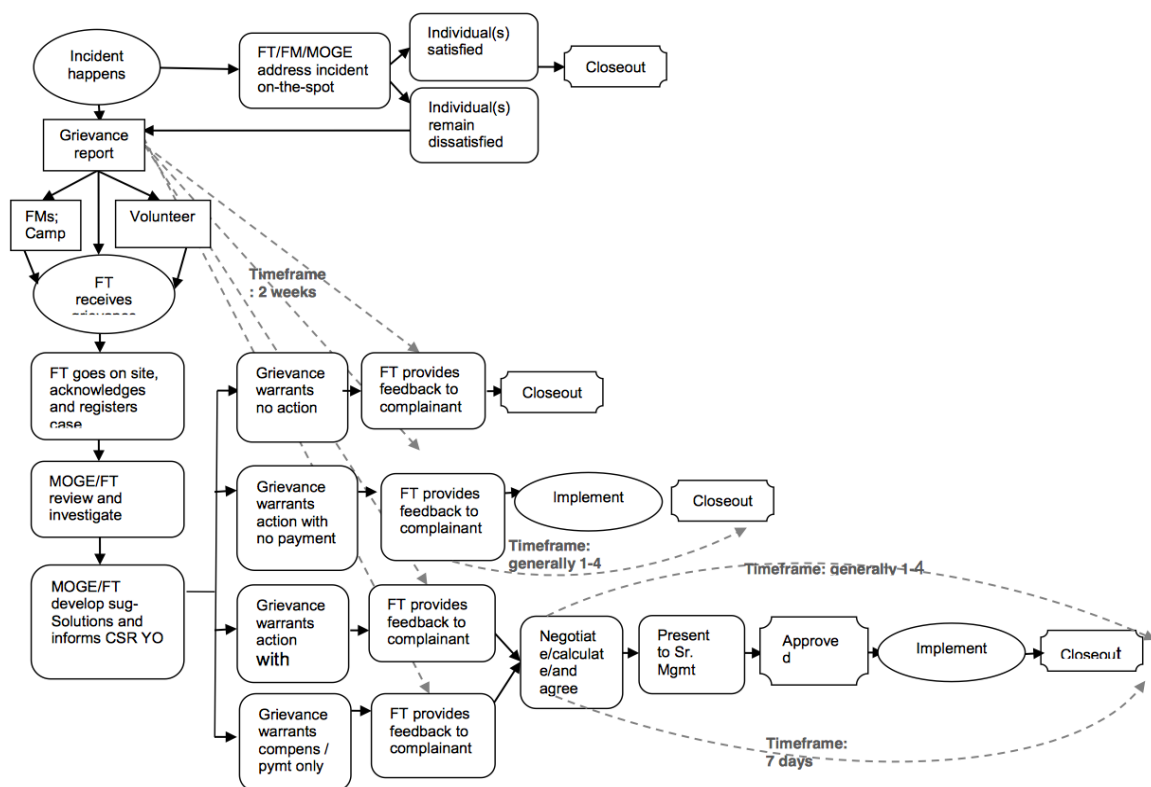
These engagement activities will be undertaken in consultation with MOGE, with the following purpose:

- Allowing the local stakeholders to have an understanding of the Project activities across the various phases.
- To monitor the effectiveness of the mitigation measures for the Project impacts.
- To allow the local stakeholders to provide their feedback on the most desirable manner in which engagement can be undertaken as well as the efficiency of the mitigation measures and the community development activities to be undertaken.

### 7.3. GRIEVANCE REDRESSAL MECHANISM

In addition to these activities identified, a key form of engagement with the community will be the grievance redressal mechanism (GRM) of MPRL E&P, which will be implemented in the Project Area. The key purpose of the GRM will be to allow for an understanding to be developed of the community's perception towards the Project, especially in regards to the engagement and compensation process.

**Figure 20. Grievance redressal process**



#### 7.4. DISCLOSURE

In addition to the proposed engagement activities and GRM for the remaining life of the Project, information disclosure will be undertaken through the life of the Project. This information disclosure will be aimed at allowing for the local stakeholders to develop an understanding of the Project activities across the various phases, the implementation of the mitigation measures identified and the community development activities. The relevant information will be disclosed through the life of the project through pamphlets and reports being made available to the local community, through display of information in community areas, the Project Area signboards and verbally during the engagement activities with the local stakeholders.

Apart from this, the ESIA report for this Project will also be disclosed to the community, in keeping with the EIA procedures of Myanmar. This disclosure will be undertaken through the local media, in which a summary of the report will be provided, the website of the Project Proponent where the ESIA report will be uploaded and verbally in consultation meetings with the local community, if instructed by MOECA. On the basis of the feedback thus received, the ESIA will be reviewed and updated. This updated ESIA will then be finally disclosed to the local stakeholders, if deemed necessary.