



PTTEP International Limited (Yangon Branch)

Monitoring Report

3D Seismic Survey in Block M9, Offshore Myanmar



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Monitoring Report 3D Seismic Survey in Block M9, Offshore Myanmar

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Chapter 1

Introduction

1.0 INTRODUCTION

1.1 BACKGROUND

PTTEP International Limited (Yangon Branch) or PTTEPI conducted a 3D Seismic Survey Project (the Project) in Myanmar's offshore concession block M9, which is 178 km from the nearest shoreline in southern Myanmar (Figure 1-1).

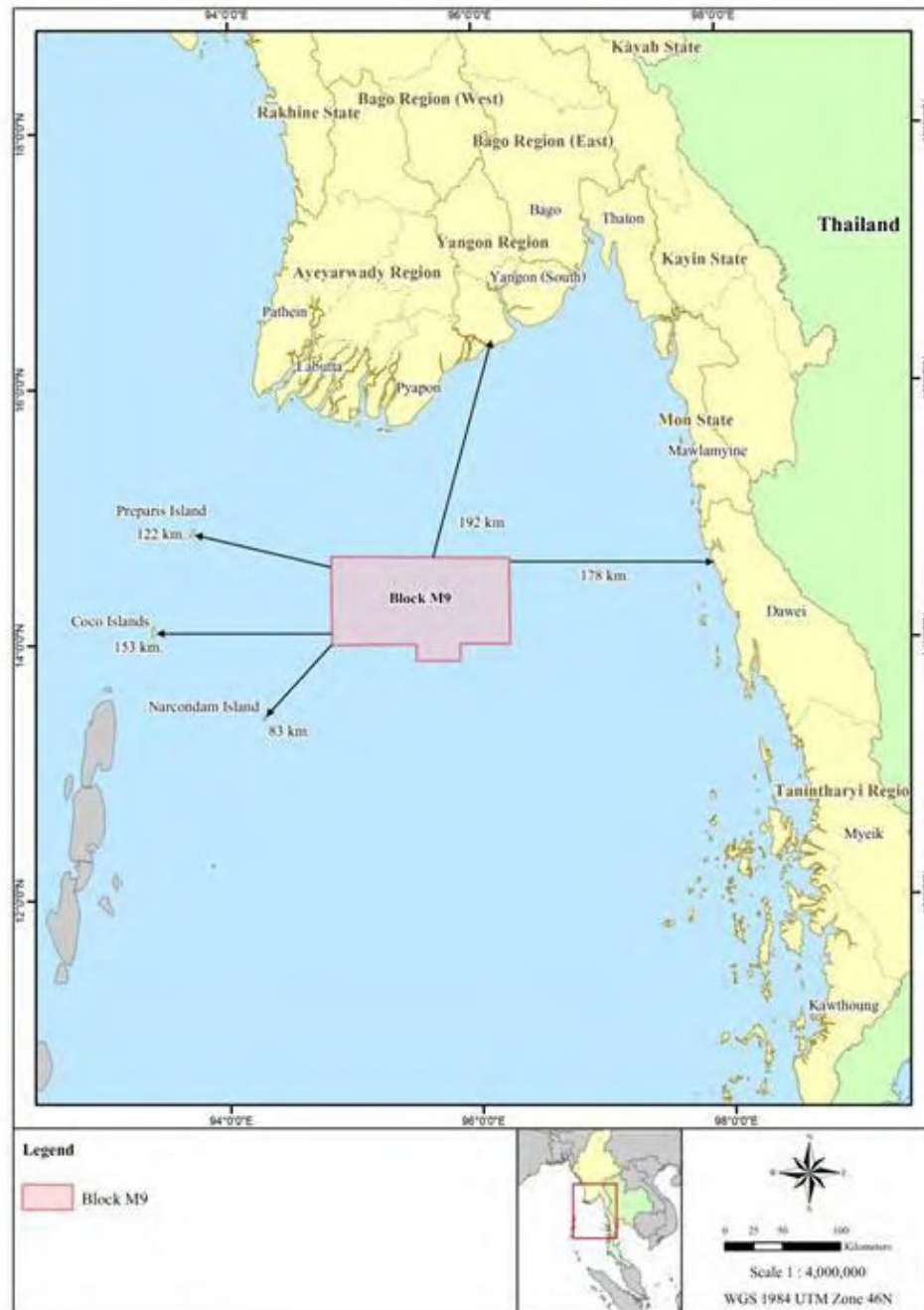


Figure 1-1 Location of Offshore Concession Block M9

According to the requirement as stipulated in the Notification No. 50/2014 of the Ministry of Environmental Conservation and Forestry (MOECF) titled *Environmental Conservation Rules* and MOECF's Notification No. 616/2015 titled *Environmental Impact Assessment Procedure*, an Initial Environmental Examination (IEE) is required for the Project's activities.

PTTEPI submitted an IEE to Environmental Conservation Department (ECD) and Myanmar Oil and Gas Enterprise (MOGE) for approval in December 2016 and received a notification to start the seismic survey work in Block M9 from MOGE in February 2017 (Appendix 1-1). MOGE informed PTTEPI that the Environmental Conservation Department (ECD) concurred with the IEE and issued the Environmental Compliance Certificate (ECC) in a letter number MD 100 3/6 (1211) 2017 dated May 30, 2017 (Appendix 1-1).

To verify whether the seismic survey operation was complying with Environmental Management Plan (EMP) requirements, PTTEPI contracted Tetra Tech Inc. (Tetra Tech) to conduct an independent site audit and prepare an EMP Compliance Report, which is to be submitted to MOECF within 6 months after the completion of the project.

1.2 PURPOSE OF THE EMP COMPLIANCE REPORT

The EMP Compliance Report is prepared to meet the following requirements as set in Article 109 in Chapter IX of *Environmental Impact Assessment Procedure*, which states that a monitoring report shall include:

- documentation of compliance with all conditions;
- progress made to date on implementation of the EMP against the submitted implementation schedule;
- difficulties encountered in implementing the EMP and recommendations for remedying those difficulties and steps proposed to prevent or avoid similar future difficulties;
- number and type of non-compliance with the EMP and proposed remedial measures and timelines for completion of remediation;
- accidents or incidents relating to the occupational and community health and safety, and the environment; and
- monitoring data of environmental parameters and conditions as committed in the EMP or otherwise required.

The EMP Compliance Report describes compliance and non-compliance conditions, issues/difficulties and corrective actions, and relevant supporting documents for each of the mitigation measures and monitoring programs in the EMP. The supporting documents are included as appendices to the compliance report. The compliance report also includes the information on occupational health and safety and monitoring data in the explanation of the relevant mitigation measures or monitoring programs.

1.3 SUMMARY OF PROJECT ACTIVITIES

The Project covered the Phase 1 area of 3,080 km² in Block M9. Water depth in the seismic survey area varied from 77-550 meters. The seismic survey operation started on April 5, 2017, and the last day of seismic survey activities was May 26, 2017. Demobilization of the survey vessel from the Block was completed on May 28, 2017.

The seismic survey contractor for the Project was Petroleum Geo-Services (PGS). The seismic survey vessel was *M/V Ramform Sovereign*. There were four support and escort vessels, which

are *M/V Thor Freyja*, *M/V Ultra Jaya*, *M/V Nur Amanah*, and *M/V Winjaya*. Details of each vessel are shown in Figure 1-2.

The survey was three-dimensional (3D) seismic survey. The seismic data acquisition was done by 14 streamers and dual seismic sources. Each streamer was 8,100 m long and approximately 100 m apart. The total width of the tow was approximately 1,300 m at the beginning of the streamers and over 1,800 m at the end of the streamers (Figure 1-3). Sail lines were in north-south direction spreading throughout the area.

The support and escort vessels worked closely with the seismic survey vessel. Their duties included transportation of crews, equipment, and materials to/from shore; survey and removal of fishing gears; and communicating with and intercepting other vessels coming close to the seismic survey vessel and towed equipment.



| | |
|---------------|---|
| Vessel | Ramform Sovereign |
| Call sign | 9VBN9 |
| Built | 2008 |
| Length | 102.2 m |
| Breadth | 40 m |
| Draft | 7.4 m |
| GRT | 13688 t |
| Fuel capacity | 6184 m ³ HFO 454 m ³ MGO |
| Accommodation | 70 |



| | |
|---------------|---|
| Vessel | Thor Freyja |
| Call sign | C6B16 |
| Built | 2015 |
| Length | 64.40 m |
| Breadth | 14.50 m |
| Draft | 5.70 m |
| GRT | 2089 t |
| Bollard pull | 50 t |
| Fuel capacity | 1104 m ³ HFO 437 m ³ MGO |
| Accommodation | 60 (48 - 52 ext. pax) |



| | |
|---------------|------------------------|
| Vessel | Nur Amanah |
| Call sign | 9MQO3 |
| Built | 2013 |
| Length | 32.0 m |
| Breadth | 9.2 m |
| Draft | 3.3 m |
| GRT | 299 t |
| Bollard pull | 30.4 t |
| Fuel capacity | 270 m ³ MGO |
| Accommodation | 20 |

Source: PGS. 2017. *Project Plan - Myanmar Block M9 West*.

Figure 1-2 Brief Technical Details of Vessels in the Project



| | |
|---------------|------------------------|
| Vessel | Ultra Jaya |
| Call sign | 9WRQ8 |
| Built | 2015 |
| Length | 40.0 m |
| Breadth | 10.0 m |
| Draft | 3.0 m |
| GRT | 499 t |
| Bollard pull | 30.0 t |
| Fuel capacity | 150 m ³ MGO |
| Accommodation | 34 |



| | |
|---------------|------------------------|
| Vessel | Winjaya |
| Call sign | 9WOJ3 |
| Built | 2012 |
| Length | 30.22 m |
| Breadth | 9.0 m |
| Draft | 3.6 m |
| GRT | 295 t |
| Bollard pull | 30.8 t |
| Fuel capacity | 270 m ³ MGO |
| Accommodation | 12 |

Source: PGS. 2017. *Project Plan - Myanmar Block M9 West.*

Figure 1-2 Brief Technical Details of Vessels in the Project (Cont.)

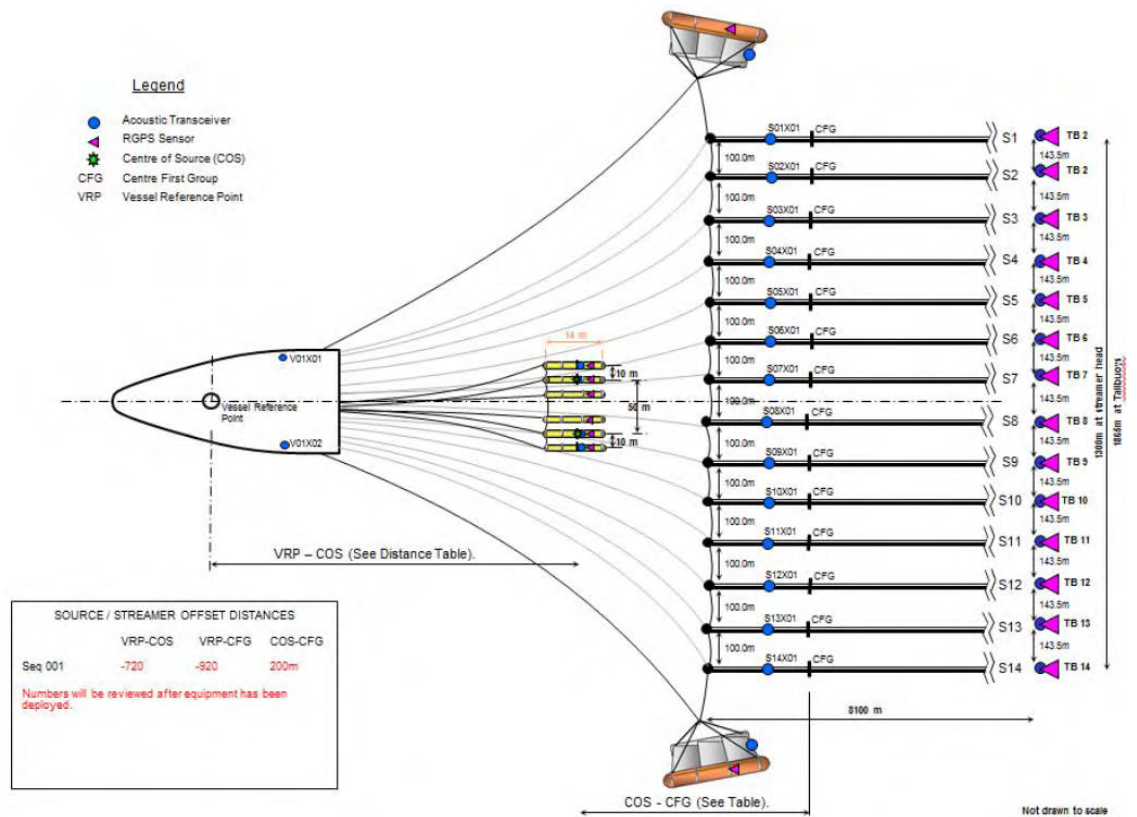


Figure 1-3 Towing Configuration

1.4 AUDIT SCOPE AND METHODOLOGY

Scope of the audit was limited to the implementation of EMP requirements by PTTEPI and the seismic survey contractor.

The audit consisted of two main components:

- Site visit
- Review of relevant documents

Site visit was conducted by two auditors (Appendix 1-2) from Tetra Tech on May 2-4, 2017 on *M/V Ramform Sovereign*. Key members of the Project including PTTEPI Representative, Party Chief, Master, Chief Officer, Chief Engineer, Marine Mammal Observer, and Medic were interviewed during the site visit. Site inspection was conducted at facilities relevant to the EMP requirements including waste management facilities, the engine room, chemical storage areas, deck areas, and medical and emergency response facilities.

During the site visit, the auditors explained the EMP requirements to the persons being interviewed to assess their understanding of the EMP and level of on-site implementation. Supporting documents including procedures, instructions, manuals, permits, certificates, and records were requested and reviewed during the site visit to verify the auditors' understanding of on-site operation and compliance conditions with the EMP requirements. The relevant documents were used as supporting evidence in the compliance audit report.

The auditors recorded their observations and findings through detailed notes and photographs. Findings were explained to the key Project members at a closing meeting on the last day of the site visit. Corrective actions were discussed and agreed with the key members and were recorded in the closing meeting material and in the compliance audit report.

1.5 REPORT STRUCTURE

The EMP Compliance Report is separated into three chapters:

- **Chapter 1 – Introduction.** This chapter summarizes the project description, the current status of project development, and scope and methodology of EMP compliance audit.
- **Chapter 2 – Compliance with Mitigation Measures.** This chapter summarizes the project's compliance with the mitigation measures (Table 7.1 of the EMP). Findings from the site audit corresponding to the mitigation measures will mainly be discussed in this chapter.
- **Chapter 3 – Compliance with Monitoring Programs.** Results of EMP's monitoring requirements including sewage analytical result are to be included in this chapter and compliance with the monitoring program (Table 7.2 of the EMP).

Chapter 2

Compliance with Mitigation Measures

2.0 COMPLIANCE WITH MITIGATION MEASURES

The approved Initial Environmental Examination (IEE) Report (Appendix 1-1) requires that PTTEPI complies with the Environmental Management Plan (EMP). To determine level of compliance, the status is classified as follows:

- ✓ **Compliance:** PTTEPI fully complies with the approved mitigation measures.
- ✓ **Compliance with Conditions:** PTTEPI partially complies with the approved mitigation measures. In the case of non-compliance, PTTEPI has implemented other alternatives or technologies as seems appropriate.
- ✗ **Non-compliance:** PTTEPI does not comply with the mitigation measures or make an effort to apply other approaches to solve the issues.
- N/A **Not Applicable:** A current status of the project is not within the phases specified in the approved measures.

The Project fully complies with 62 of a total of 68 mitigation measures or 91% of the total number of measures.

There are three measures (measures 2.1.5, 2.1.8, and 2.2.3) categorized as “compliance with conditions”, or 4% of the total number of measures. All of which are originated from the management of used oil and oily sludge by shipboard incinerator in lieu of onshore disposal as stipulated in the EMP. It should be noted that incineration of used oil and sludge from normal operation is allowed under MARPOL 73/78 Annexes V and VI, and the shipboard incinerator is certified under relevant conditions of MARPOL 73/78. No hazardous waste was disposed to the sea.

Three N/A measures, or 4% of the total number of measures, are identified:

- Employ fishing vessels as chase vessels (measure 6.1.1) because it is not possible to find a local fishing vessels that meet international standards for marine operation and safety requirements.
- Actions in case of oil spill (measure 8.1.6) because there is no oil spill case.
- Actions in case of vessel collision (measure 9.1.2) because there is no vessel collision case.

There is no non-compliance measure.

Details of compliance with the mitigation measures as stipulated in the EMP are discussed in Table 2-1.

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|------------------------------|---|---|---------------------|--------------------|---|------------------------------------|--|
| Environmental Impacts | | | | | | | |
| 1. Air Quality | 1.1 Impact on air quality due to the emission of air pollutants and greenhouse gases from engine combustion of the seismic vessel and support vessels | 1.1.1 Conduct routine inspection and preventive maintenance as per maintenance schedule or recommended by manufacturers to maintain combustion efficiency and to reduce air pollutant emission. | All project vessels | ✓ | The survey vessel implements IFS system for their resources management system. The maintenance schedule recommended by the manufacturers are input to the system and the system generates inspection and preventive maintenance program for all equipment and machines onboard including the six main generators used to provide power for the entire ship and electrical propulsion system. There has been no exceedance in inspection and preventive maintenance program for the six main generators. | - | Figure 2-1 – Screen Capture from PMS for a Main Generator from IFS System |
| | | 1.1.2 Vessels will be in compliance with MARPOL 73/78 Regulations for the prevention of air pollution from ships (Annex VI). | All project vessels | ✓ | The survey vessel and the chase and support vessels more than 400 gross tons have valid MARPOL 73/78 Annex VI certificates. | - | Appendix 2-1 – Relevant Certificates of Project Vessels |

Note: * Compliance Status: ✓ : Compliance ✓ : Compliance with Conditions ✗ : Non-compliance N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---------------------|--|--|----------------------|--------------------|---|------------------------------------|--|
| 2. Seawater Quality | 2.1 Impact on seawater quality due to improper management of non-hazardous and hazardous waste | 2.1.1 Operate the seismic vessels in compliance with the requirements under MARPOL 73/78 and PTTEPI's Waste Management Plan | All project vessels. | ✓ | PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with MARPOL 73/78 Annex V and PTTEPI's obligations, policies, and plans including the Waste Management Plan. | - | Appendix 2-2 – PTTEPI Relevant Plans and Procedures Appendix 2-3 – Project Plan – Myanmar Block M9 West |
| | | 2.1.2 Separate and store each type of waste (non-hazardous waste and hazardous waste) into appropriate containers having clear labels. | All project vessels. | ✓ | Waste is separated into non-hazardous (plastic, paper, metal, glass, wood, food waste, and non-recyclable) and hazardous waste (oil-contaminated waste, batteries, and infirmity waste) complying with project's waste management plan. Separated reception and storage containers with clear labels are provided for each type of waste in designated places. | - | Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign |

Note: * Compliance Status: ✓ : Compliance ✓ : Compliance with Conditions ✗ : Non-compliance N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|--|----------------------|--------------------|--|------------------------------------|---|
| 2. Seawater Quality (cont.) | 2.1 Impact on seawater quality due to improper management of non-hazardous and hazardous waste (cont.) | 2.1.3 Store hazardous waste in sealed container and keep such container away from sparkling area until disposal/treatment. The container shall be durable, safe and proper for transporting, transferring, treatment and disposal. | All project vessels. | ✓ | Separated reception and storage containers with clear labels are provided hazardous waste in designated places. Disposal of hazardous waste at sea is prohibited according to project's waste management plan and MARPOL 73/78 Annex V. Hazardous waste is stored in durable sags in enclosed garbage rooms and under helideck protected from weather. | - | Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign |
| | | 2.1.4 Prohibit any discharge of hazardous waste into the sea. | All project vessels. | ✓ | Disposal of hazardous waste at sea is prohibited according to project's waste management plan and MARPOL 73/78 Annex V. | | Appendix 2-2 – PTTEPI Relevant Plans and Procedures Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|--|----------------------|--------------------|---|--|--|
| 2. Seawater Quality (cont.) | 2.1 Impact on seawater quality due to improper management of non-hazardous and hazardous waste (cont.) | 2.1.5 Used oil and oil-contaminated waste shall be stored separately with labels for disposal onshore. | All project vessels. | ✓ | <p>Separated reception and storage containers with clear labels are provided for oil contaminated waste in designated places.</p> <p>Used oil and oily sludge from Oil/Water Separator on the survey vessel is incinerated with shipboard incinerator in lieu of onshore disposal. Incineration of used oil and sludge from normal operation is allowed under MARPOL 73/78 Annexes V and VI. The shipboard incinerator of the survey vessel is also certified with MARPOL 73/78 Annex VI Regulation 16. Quantity of incinerated used oil and oily sludge is recorded in Oil Record Book according to the requirement of MARPOL 73/78 Annex I.</p> | Incineration of liquid used oil and oily sludge from normal operation within the allowable scope of MARPOL 73/78 minimizes risk of spills and waste handling. Only solid oil-contaminated waste is stored onboard in labeled containers for future disposal onshore. | <p>Appendix 2-1 – Relevant Certificates of Project Vessels</p> <p>Appendix 2-4 – Bilge System, Alarm Certificate, and Example from Oil Record Book of M/V Ramform Sovereign</p> <p>Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign</p> |
| | | 2.1.6 The vessel deck shall be cleaned to minimise the impact from oil and chemical contamination into the sea during periods of rain. | All project vessels. | ✓ | Vessel deck and work areas are kept clean. Housekeeping conditions of the deck areas of the survey vessel are routinely inspected by the Chief Officer. | - | <p>Appendix 2-5 – Routine Housekeeping Inspection Checklist</p> <p>Figure 2-3 – Deck Area of M/V Ramform Sovereign</p> |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|---|----------------------|--------------------|--|--|--|
| 2. Seawater Quality (cont.) | 2.1 Impact on seawater quality due to improper management of non-hazardous and hazardous waste (cont.) | 2.1.7 Oil absorbents are required in the case of a small spill and the used absorbent shall be stored in containers onboard and disposed of onshore. | All project vessels. | ✓ | Absorbents are provided according to Shipboard Oil Pollution Emergency Plan (SOPEP). The Chief Officer maintains inventory and conduct monthly inspection of SOPEP equipment. SOPEP equipment are provided at SOPEP station and areas where there are risk of oil and chemical spills. Used absorbents are collected in oil-contaminated waste container for onshore disposal. | - | Appendix 2-6 – SOPEP Equipment Inventory Figure 2-4 – SOPEP Equipment on M/V Ramform Sovereign |
| | | 2.1.8 Dispose hazardous waste at onshore treatment & disposal facilities in accordance with MARPOL requirements, international standard practices of the vessel, and/or PTTEP's Waste Management Plan | All project vessels. | ✓ | Hazardous waste is stored onboard and will be disposed when the survey vessel arrive at a port in Singapore after completing the survey work in Block M9. Used oil and oily sludge from Oil/Water Separator on the survey vessel is incinerated with shipboard incinerator in lieu of onshore disposal. Incineration of used oil and sludge from normal operation is allowed under MARPOL 73/78 Annexes V and VI. | Incineration of liquid used oil and oily sludge from normal operation is within the allowable scope of MARPOL 73/78 minimizes risk of spills and waste handling. Only solid oil-contaminated | Appendix 2-1 – Relevant Certificates of Project Vessels Appendix 2-4 – Bilge System, Alarm Certificate, and Example from Oil Record Book of M/V Ramform Sovereign |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|--|----------------------|--------------------|--|--|---|
| 2. Seawater Quality (cont.) | 2.1 Impact on seawater quality due to improper management of non-hazardous and hazardous waste (cont.) | 2.1.8 (cont.) | | | The shipboard incinerator of the survey vessel is also certified with MARPOL 73/78 Annex VI Regulation 16. Quantity of incinerated used oil and oily sludge is recorded in Oil Record Book according to the requirement of MARPOL 73/78 Annex I. | waste is stored onboard in labeled containers for future disposal onshore. | Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign |
| | | 2.1.9 Ensure manifest of hazardous waste is kept. | All project vessels. | ✓ | Chief Officer maintains logs of waste onboard in Garbage Record Book consistent with MARPOL Annex V requirements and in garbage record according to the PGS waste management system. | - | Appendix 2-7 – Garbage Record Book and Garbage Log |
| | | 2.1.10 Segregate non-hazardous waste including food waste, paper, aluminium can, glass, rag and other wastes in separate containers or proper areas. | All project vessels. | ✓ | Non-hazardous waste is segregated into plastic, paper, metal, glass, wood, food waste, and non-recyclable complying with project's waste management plan. Separated containers are provided for each type of waste. | - | Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|--|----------------------|--------------------|---|------------------------------------|--|
| 2. Seawater Quality (cont.) | 2.1 Impact on seawater quality due to improper management of non-hazardous and hazardous waste (cont.) | 2.1.11 Grind food waste to a size less than 25 mm before discharge into the sea at a distance of 12 nautical miles from shore, in a location that is not located in coral reef area, according to the requirements under MARPOL 73/78. | All project vessels. | ✓ | Food waste are managed according to MARPOL 73/78 Annex V requirement. Discharge of food waste is recorded in Garbage Record Book consistent with MARPOL Annex V requirements and in garbage record according to the PGS waste management system. | - | Appendix 2-7 – Garbage Record Book and Garbage Log |
| | | 2.1.12 The survey contractor is responsible for the proper onshore disposal of non-hazardous waste according to MARPOL requirements, international standard practices of the vessel, and/or PTTEPI's Waste Management Plan | All project vessels. | ✓ | PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with MARPOL 73/78 Annex V and PTTEPI's obligations, policies, and plans including the Waste Management Plan. The survey contractor (PGS) manages waste according to MARPOL Annex V requirements. | - | Appendix 2-2 – PTTEPI Relevant Plans and Procedures Appendix 2-7 – Garbage Record Book and Garbage Log Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|---|---|----------------------|--------------------|--|------------------------------------|--|
| 2. Seawater Quality (cont.) | 2.2 Impact on seawater quality due to improper management of wastewater | 2.2.1 Operate the seismic vessels in compliance with the requirements under MARPOL 73/78 and PTTEPI's Waste Management Plan, including all measures below. | All project vessels. | ✓ | PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with MARPOL 73/78 Annexes I, IV, and V and PTTEPI's obligations, policies, and plans including the Waste Management Plan. | - | Appendix 2-1 – Relevant Certificates of Project Vessels Appendix 2-2 – PTTEPI Relevant Plans and Procedures Appendix 2-3 – Project Plan – Myanmar Block M9 West |
| | | 2.2.2 Large operating vessels (over 400 gross tons) shall comply with the MARPOL 73/78 requirements and Regulation of Vessel Inspection (No. 34) B.E. 2551 (A.D. 2008). Oil contaminated bilge water shall be de-oiled prior to discharge into the sea. Discharge water shall contain less than 15 ppm oil content. | All project vessels. | ✓ | The survey, chase, and support vessels more than 400 gross tons have valid MARPOL Annex I certificates. Bilge water is deoiled through Oil/Water Separator (OWS) prior to discharge to the sea. The 15 ppm alarm has been calibrated. Discharge from OWS is recorded in Oil Record Book as per MARPOL Annex I requirement. | - | Appendix 2-1 – Relevant Certificates of Project Vessels Appendix 2-4 – Bilge System, Alarm Certificate, and Example from Oil Record Book of M/V Ramform Sovereign Figure 2-5 – Oil/Water Separator on M/V Ramform Sovereign |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|---|---|----------------------|--------------------|---|---|---|
| 2. Seawater Quality (cont.) | 2.2 Impact on seawater quality due to improper management of wastewater (cont.) | 2.2.3 Oil-contaminated waste separated by the Oil Filtering Equipment on vessels over 400 gross tons shall be stored in appropriate drums for disposal onshore. | All project vessels. | ✓ | Oily sludge from Oil/Water Separator on the survey vessel is incinerated with shipboard incinerator in lieu of onshore disposal. Incineration of used oil and sludge from normal operation is allowed under MARPOL 73/78 Annexes V and VI. The shipboard incinerator of the survey vessel is also certified with MARPOL 73/78 Annex VI Regulation 16. Quantity of incinerated used oil and oily sludge is recorded in Oil Record Book according to the requirement of MARPOL 73/78 Annex I. | Incineration of liquid used oil and oily sludge from normal operation is within the allowable scope of MARPOL 73/78 minimizes risk of spills and waste handling. Only solid oil-contaminated waste is stored onboard in labeled containers for future disposal onshore. | Appendix 2-1 – Relevant Certificates of Project Vessels Appendix 2-4 – Bilge System, Alarm Certificate, and Example from Oil Record Book of M/V Ramform Sovereign Figure 2-2 – Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign |
| | | 2.2.4 An oily slop storage tank shall be provided. | All project vessels. | ✓ | Oily water is stored in bilge tanks. Two bilge tanks are provided on the survey vessel. | - | Appendix 2-4 – Bilge System, Alarm Certificate, and Example from Oil Record Book of M/V Ramform Sovereign |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|---|---|----------------------|--------------------|---|------------------------------------|--|
| 2. Seawater Quality (cont.) | 2.2 Impact on seawater quality due to improper management of wastewater (cont.) | 2.2.5 Oily effluents from bilges, machinery spaces etc. should not be discharged in shallow coastal waters or near coral reefs. | All project vessels. | ✓ | The vessels more than 400 gross tons are certified with MARPOL 73/78 Annex I. Direct discharge of bilge is unallowable under MARPOL 73/78 Annex I requirements. Project area is more than 100 km offshore with water depth ranging from 77 to 550 m and the nearest island (Narcodam island) is more than 80 km away. Oil Record Book contains information of the vessel location at the time of discharge as per requirement of MARPOL 73/78 Annex I. | - | Appendix 2-1 – Relevant Certificates of Project Vessels Appendix 2-4 – Bilge System, Alarm Certificate, and Example from Oil Record Book of M/V Ramform Sovereign |
| | | 2.2.6 Sewage will either be treated by sewage treatment system before discharged into the sea, or will be retained in a storage tank and will be pumped for disposal at the port/support base after the operation is completed. | All project vessels. | ✓ | Vessels more than 400 gross tons used in the Project are certified with MARPOL 73/78 Annex IV. | - | Appendix 2-1 – Relevant Certificates of Project Vessels |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------------|---|---|--|--------------------|--|------------------------------------|---|
| 2. Seawater Quality (cont.) | 2.2 Impact on seawater quality due to improper management of wastewater (cont.) | 2.2.7 For sewage that is treated and discharged into the sea, it shall be discharged more than 12 nautical miles from the nearest land. | All project vessels. | ✓ | Project area is more than 100 km offshore with water depth ranging from 77 to 550 m and the nearest island (Narcoodam island) is more than 80 km away. | - | - |
| 3. Marine Life and Marine Ecology | 3.1 Impact on marine life forms, especially marine mammals due to noise generated by airgun | 3.1.1 Ensure that survey contractor follows codes of good practices for seismic survey, especially measures to minimise impact on marine mammals. | All project vessels. Entire survey area. | ✓ | <p>PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with requirements in the EMP regarding the mitigation measures for marine mammals.</p> <p>Daily Operations Reports contain a section regarding marine mammals, which describe record sighting and actions taken if a marine mammal is sighted. Actions taken include suspension of seismic operation when an unidentifiable whale was sighted 1,000 m from survey vessel on April 13, 2017.</p> | - | <p>Appendix 2-3 – Project Plan – Myanmar Block M9 West</p> <p>Appendix 2-8 – Example of Daily Operations Report</p> |

Note: * Compliance Status: ✓ : Compliance ✓ : Compliance with Conditions ✗ : Non-compliance N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---|---|---|--|--------------------|---|------------------------------------|--|
| 3. Marine Life and Marine Ecology (cont.) | 3.1 Impact on marine life forms, especially marine mammals due to noise generated by airgun (cont.) | 3.1.2 Implement the 'Pre Start-up Visual Observation Procedures' – make a visual check from a suitable high observation platform to see if there are any marine mammals within a 3 km radius at least 90 minutes prior the commencement of seismic acquisition. | All project vessels. Entire survey area. | ✓ | Marine mammal observer is assigned to observe marine mammals during daytime throughout the project operation period. Pre start-up visual observation is conducted at least 90 minutes prior to commencement of soft-start of airgun array. Note that visual observation cannot be conducted if start of airgun array occurs during nighttime. | - | Appendix 3-2 – Marine Mammal Observation Report |
| | | 3.1.3 If mammals are observed, delay the start of the seismic sources until the marine mammals have moved out of the 3 km radius or 20 minutes after the last sighting within 3 km. | All project vessels. Entire survey area. | ✓ | Marine mammals are observed once during vessel turning, before start of airgun array. Soft-start of airgun array occurs more than 20 minutes after the marine mammals disappear from the observation radius. | - | Appendix 3-2 – Marine Mammal Observation Report |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---|---|---|--|--------------------|--|------------------------------------|--|
| 3. Marine Life and Marine Ecology (cont.) | 3.1 Impact on marine life forms, especially marine mammals due to noise generated by airgun (cont.) | 3.1.4 Implementation of Soft Start Procedures at least 20 minutes to warn the marine life in the survey area. | All project vessels. Entire survey area. | ✓ | Soft start procedure is implemented. The 21-minute soft start process is used every time at the start of airgun array before the survey vessel approach the start of a survey line. | - | Appendix 2-9 – Soft Start Work Instruction |
| | | 3.1.5 Maintain visual observation continuously during soft starts and operations to determine the presence of marine mammals. | All project vessels. Entire survey area. | ✓ | A marine mammal observer is assigned to observe marine mammals during daytime throughout the project operation period. | - | Appendix 3-2 – Marine Mammal Observation Report |
| | | 3.1.6 If marine mammals are sighted within the 3 km observation zone, power down the seismic source to stand-by mode. The seismic acquisition (with soft-start procedures) must not recommence until either the marine mammals have moved outside the 3 km observation zone or have not been seen for 30 minutes. | All project vessels. Entire survey area. | ✓ | Marine mammal observer is assigned to observe marine mammals during daytime throughout the project operation period. Daily Operations Reports contain a section regarding marine mammals, which describe record sighting and actions taken if a marine mammal is sighted. Actions taken include suspension of seismic operation when an unidentifiable whale was sighted ~1,000 m from survey vessel on April 13, 2017. | - | Appendix 2-8 – Example of Daily Operations Report Appendix 3-2 – Marine Mammal Observation Report |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---|---|---|--|--------------------|--|------------------------------------|--|
| 3. Marine Life and Marine Ecology (cont.) | 3.1 Impact on marine life forms, especially marine mammals due to noise generated by airgun (cont.) | 3.1.7 After detecting marine mammals, a record shall be made that includes observation detail and marine mammal description, such as the seismic vessel coordinates and distance between the vessel and the marine mammal, and if possible, species & number of the marine mammal, frequency and duration of marine mammal in the observation area. Recorded information shall be collected in Observation Report for future reference. | All project vessels. Entire survey area. | ✓ | <p>The following data were recorded in datasheet in case of a marine mammal sighting: time, location, direction of vessel, bearing, distance of marine mammal from the vessel, estimated number, species, behavior, age class, wind direction, beaufort sea state, percent cloud cover, and water depth.</p> <p>Details of marine mammals observed during the operation period are reported in Marine Mammal Observation Report.</p> | - | Appendix 3-2 – Marine Mammal Observation Report |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---|---|--|---|--------------------|--|------------------------------------|---|
| 3. Marine Life and Marine Ecology (cont.) | 3.1 Impact on marine life forms, especially marine mammals due to noise generated by airgun (cont.) | 3.1.8 Utilize chase vessels to monitor the survey area at least 24 hours prior to commencement of airgun array operations. | All project vessels. Entire survey area. | ✓ | The Project assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation. | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West Appendix 2-10 – Guidance for Support Vessels |
| Social Impacts | | | | | | | |
| 4. Fishing Communities and Fisheries | 4.1 Fishermen may temporarily be unable to carry out fishing activities in some areas during survey | 4.1.1 At least 30 days prior to survey, coordinate with MOGE, who will then issue "Notice to Mariner" regarding project activities to appropriate parties (i.e. Department of Fisheries, Ministry of Livestock and Fisheries, and Navy). | All project vessels. Entire survey area. Relevant authorities | ✓ | PTTEPI submit Letter No. PTTEPI.L.BM(PMP) 182/30-01/17 to MOGE requesting MOGE to issue Notice to Mariners for 3D Seismic Survey Vessel on January 31, 2017, more than 30 days prior to commencement of survey in March. | - | Appendix 2-12 – Notice to Mariners and MOGE Representatives |

Note: * Compliance Status: ✓ : Compliance ✓ : Compliance with Conditions ✗ : Non-compliance N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--|---|--|---|--------------------|--|------------------------------------|---|
| 4. Fishing Communities and Fisheries (cont.) | 4.1 Fishermen may temporarily be unable to carry out fishing activities in some areas during survey (cont.) | 4.1.2 Patrol the seismic survey area for at least one (1) week before commencing seismic survey activity, and remove all obstructions in the survey area. Record location and details of removed fishing gear. | All project vessels. Entire survey area. Relevant authorities | ✓ | A support vessel (M/V Ultra Jaya) is deployed to conduct scouting of the survey area on March 20, 2017. The activity is planned and conducted as part of the project mobilization activities. | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West |
| | | 4.1.3 Fishing vessels operating over the proposed survey lines for a marine seismic survey, or those in danger of passing over the deployed streamer will be warned off by the chase boats. | All project vessels. Entire survey area. Relevant authorities | ✓ | The Project assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation. | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West Appendix 2-10 – Guidance for Support Vessels |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--|---|--|---|--------------------|---|------------------------------------|---|
| 4. Fishing Communities and Fisheries (cont.) | 4.1 Fishermen may temporarily be unable to carry out fishing activities in some areas during survey (cont.) | 4.1.4 Chase vessels will be available to warn vessels to keep clear of the seismic survey vessel and associated trailing equipment, and to escort any unauthorised vessels out of the Project Area. In addition, stationary fishing equipment (eg fishing gears) identified by the chase vessels on the survey route will be removed in advance of operations. | All project vessels. Entire survey area. Relevant authorities | ✓ | <p>The Project assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation.</p> <p>The Project maintains log of fishing gears found in the seismic survey line and removed before and during project operation.</p> | - | <p>Appendix 2-3 – Project Plan – Myanmar Block M9 West</p> <p>Appendix 2-10 – Guidance for Support Vessels</p> <p>Appendix 3-3 – Fishing Gear Record</p> |
| | | 4.1.5 Chase vessel with MOGE Representative will be employed to ensure navigational safety and appropriate management of fishing interactions. | All project vessels. Entire survey area. Relevant authorities | ✓ | MOGE assigns representative to be stationed on the chase vessels to facilitate interaction with fishing activities. | - | Appendix 2-12 – Notice to Mariners and MOGE Representatives |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--|---|--|---|--------------------|--|------------------------------------|--|
| 4. Fishing Communities and Fisheries (cont.) | 4.1 Fishermen may temporarily be unable to carry out fishing activities in some areas during survey (cont.) | 4.1.6 Mobile exclusion zone, limiting the duration and extent of disruption to the fishing activity in any area. | All project vessels. Entire survey area. Relevant authorities | ✓ | The chase and support vessels maintain their stations around the survey vessel to keep a minimum distance of any other ships outside 3 nautical miles from the survey vessel and seismic survey equipment. | - | Appendix 2-10 – Guidance for Support Vessels |
| | | 4.1.7 Upon completion of the survey, all equipment will be immediately removed from the Project Area, i.e. demobilization. | All project vessels. Entire survey area. Relevant authorities | ✓ | Demobilization of the survey vessel occurs on May 28, 2017. All streamers are recovered and all chase vessels are released and the survey vessel traveled from the Project Area on the same day. | - | Appendix 2-8 – Example of Daily Operations Report |
| | | 4.1.8 Organize a complaint, problem, and suggestion receiving point for the entire project duration. Findings from complaints and suggestions shall be reported to MOGE. | All project vessels. Entire survey area. Relevant authorities | ✓ | PTTEPI implements Grievance Handling Guidelines for receiving and resolving complaints, problems, or suggestions from the public which may arise from its activities. PTTEPI sets up a complaint receiving point at Yangon Office. No complaints related to project activities are received. | - | Appendix 2-2 – PTTEPI Relevant Plans and Procedures |

Note: * Compliance Status: ✓ : Compliance ✓ : Compliance with Conditions ✗ : Non-compliance N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--------------------------|---|--|---|--------------------|---|------------------------------------|--|
| 5. Shipping / Navigation | 5.1 Survey equipment, including airgun arrays and steamers, could be a temporary obstruction to navigation in the area. Increased marine traffic could increase the risk of accident or collisions in the survey area | 5.1.1 At least 30 days prior to survey, coordinate with MOGE, who will then issue "Notice to Mariner" regarding project activities to appropriate parties (i.e. Department of Fisheries, Ministry of Livestock and Fisheries, and Navy). | All project vessels. Entire survey area. Relevant authorities | ✓ | PTTEPI submit Letter No. PTTEPI.L.BM(PMP) 182/30-01/17 to MOGE requesting MOGE to issue Notice to Mariners for 3D Seismic Survey Vessel on January 31, 2017, more than 30 days prior to commencement of survey in March. | - | Appendix 2-12 – Notice to Mariners and MOGE Representatives |
| | | 5.1.2 Use support vessels to warn off traffic. | All project vessels. Entire survey area. Relevant authorities | ✓ | <p>The Project assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation.</p> <p>The chase and support vessels maintain their stations around the survey vessel to keep a minimum distance of any other ships outside 3 nautical miles from the survey vessel and seismic survey equipment.</p> | - | Appendix 2-10 – Guidance for Support Vessels |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|----------------------------------|---|--|---|--------------------|---|------------------------------------|--|
| 5. Shipping / Navigation (cont.) | 5.1 Survey equipment, including airgun arrays and steamers, could be a temporary obstruction to navigation in the area. Increased marine traffic could increase the risk of accident or collisions in the survey area (cont.) | 5.1.3 Provide adequate lighting and signal blinker on the seismic vessel, and chase vessel to prevent the collision hazard with fishing or cargo vessels. | All project vessels. Entire survey area. Relevant authorities | ✓ | The survey, chase, and supporting vessels have valid Cargo Ship Safety Equipment Certificates according to the requirements in the International Convention for the Safety of Life at Sea (SOLAS), which include requirements on navigation systems and equipment such as radar, communication system, and signals. | - | Appendix 2-1 – Relevant Certificates of Project Vessels |
| | | 5.1.4 Vessels will be equipped with radar, navigation equipment, and communication equipment to identify obstructions and to provide sufficient warning of approaching surface vessels that may pose a danger to the operations. | All project vessels. Entire survey area. Relevant authorities | ✓ | <p>The survey, chase, and supporting vessels have valid Cargo Ship Safety Equipment Certificates according to the requirements in the International Convention for the Safety of Life at Sea (SOLAS), which include requirements on navigation systems and equipment such as radar, communication system, and signals. The communication system can be used to contact vessel approaching the seismic survey area.</p> <p>The Project also assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation.</p> | - | <p>Appendix 2-1 – Relevant Certificates of Project Vessels</p> <p>Appendix 2-3 – Project Plan – Myanmar Block M9 West</p> <p>Appendix 2-10 – Guidance for Support Vessels</p> |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|----------------------------------|---|---|---|--------------------|---|------------------------------------|--|
| 5. Shipping / Navigation (cont.) | 5.1 Survey equipment, including airgun arrays and steamers, could be a temporary obstruction to navigation in the area. Increased marine traffic could increase the risk of accident or collisions in the survey area (cont.) | 5.1.5 Stop the survey in case of poor visibility or extreme weather conditions (such as cyclone), and record the event. | All project vessels. Entire survey area. Relevant authorities | ✓ | <p>The seismic survey contractor (PGS) conducted Operational Risk Evaluation for the whole operation prior to commencement of work. The risk evaluation includes risks identification, assessment, and mitigation measures for several project risks including oilfield operation, weather conditions, fishing activities, and maritime traffic.</p> <p>The weather risk was reassessed when weather forecast indicated that a tropical storm may pass <300 nautical miles from the survey area. The operation was suspended for 1 day during the storm event.</p> | - | Appendix 2-11 – Operational Risk Evaluation and Storm Risk Assessment |
| | | 5.1.6 Warning device (i.e. Bell or Light) will be provided on the streamer tail buoy for night-time operations. | All project vessels. Entire survey area. Relevant authorities | ✓ | Streamer tail buoy is equipped with signal light powered by solar cell and turbine. | - | Figure 2-6 End Buoy Used at the end of Each Streamer Equipped with Signal Light |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|----------------------------------|---|--|---|--------------------|--|--|--|
| 5. Shipping / Navigation (cont.) | 5.1 Survey equipment, including airgun arrays and steamers, could be a temporary obstruction to navigation in the area. Increased marine traffic could increase the risk of accident or collisions in the survey area (cont.) | 5.1.7 Upon completion of the survey, all equipment will be immediately removed from the Project Area, i.e. demobilization. | All project vessels. Entire survey area. Relevant authorities | ✓ | Demobilization of the survey vessel occurs on May 28, 2017. All streamers are recovered and all chase vessels are released and the survey vessel traveled from the Project Area on the same day. | - | Appendix 2-8 – Example of Daily Operations Report |
| 6. Socio-Economy | 6.1 Positive impact includes temporarily increasing income and employment. | 6.1.1 Where possible, employ local fishing vessels as chase vessel during the survey period. | Relevant regions | N/A | It is not possible to find a local fishing vessels that meet international standards for marine operation and safety requirements. | It is not possible to find a local fishing vessels that meet international standards and safety requirements for marine operation. | - |

Note: * Compliance Status: ✓ : Compliance ✓ : Compliance with Conditions ✖ : Non-compliance N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---|--|--|----------------------|--------------------|---|------------------------------------|---|
| Health Impacts | | | | | | | |
| 7. Occupational Health and Safety of the Project Employees | 7.1 Potential impacts on health and safety of employees on the seismic vessel from potential exposure of workers to unsafe noise levels during survey operation, accidents during operation and improper sanitary system | 7.1.1 Implement PTTEPI's SSHE Management System, including the following: <ul style="list-style-type: none">• Ensure that all employees wear appropriate PPE, and implement PTTEPI's Personal Protective Equipment Standard.• In case of emergency or accident affecting occupational health and safety, implement PTTEPI's Emergency and Crisis Management Plan and conduct rehearsal /training for staff to handle emergency situations. | All project vessels. | ✓ | PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with PTTEPI's SSHE Management System including use of PPEs, Emergency and Crisis Management Plan, and Tropical Revolving Storm Procedure. The seismic survey contractor (PGS) conducted Operational Risk Evaluation for the whole operation prior to commencement of work. The risk evaluation includes risks identification, assessment, and mitigation measures for several project risks including oilfield operation, weather conditions, fishing activities, and maritime traffic. Emergency drills according to International Convention for the Safety of Life at Sea (SOLAS) and emergency response plan requirements are conducted on regular basis. Each emergency drill is documented and evaluated. | - | Appendix 2-2 – PTTEPI Relevant Plans and Procedures Appendix 2-11 – Operational Risk Evaluation and Storm Risk Assessment Appendix 2-13 – Emergency Drill Matrix and Examples of Drill Records |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--|--|---|----------------------|--------------------|---|------------------------------------|--|
| | | <ul style="list-style-type: none"> Implement PTTEPI's Tropical Revolving Storm Procedure. | | | | | |
| 7. Occupational Health and Safety of the Project Employees (cont.) | 7.1 Potential impacts on health and safety of employees on the seismic vessel from potential exposure of workers to unsafe noise levels during survey operation, accidents during operation and improper sanitary system (cont.) | 7.1.2 Ensure that survey contractor implements standard operational procedures regarding occupational health, safety, and environment and the emergency response plan, and make it available on the seismic vessel. Training programs or drills shall be provided as appropriate. | All project vessels. | ✓ | <p>PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with PTTEPI's SSHE Management System including use of PPEs, Emergency and Crisis Management Plan, and Tropical Revolving Storm Procedure.</p> <p>The seismic survey contractor (PGS) conducted Operational Risk Evaluation for the whole operation prior to commencement of work. The risk evaluation includes risks identification, assessment, and mitigation measures for several project risks including oilfield operation, weather conditions, fishing activities, and maritime traffic.</p> <p>Emergency drills are conducted on regular basis. Each emergency drill is documented and evaluated.</p> | - | <p>Appendix 2-2 – PTTEPI Relevant Plans and Procedures</p> <p>Appendix 2-11 – Operational Risk Evaluation and Storm Risk Assessment</p> <p>Appendix 2-13 – Emergency Drill Matrix and Examples of Drill Records</p> |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--|--|---|----------------------|--------------------|---|------------------------------------|---|
| 7. Occupational Health and Safety of the Project Employees (cont.) | 7.1 Potential impacts on health and safety of employees on the seismic vessel from potential exposure of workers to unsafe noise levels during survey operation, accidents during operation and improper sanitary system (cont.) | 7.1.3 Provide proper sanitary system including drinking water, potable water, toilet, and waste management. | All project vessels. | ✓ | <p>The seismic survey vessel is equipped with separated potable water, grey wastewater, and black wastewater (sewage) systems. Toilets are provided in each accommodation cabin, change room, and other public areas as appropriate.</p> <p>Quality of potable water is tested weekly by the onboard medic and annually by a third party laboratory. Hygiene conditions of food preparation, toilets, cabins, and other public areas are audited every week by medic and chief steward. The weekly audit also includes implementation of waste management system according to the waste management requirement of the vessel.</p> | - | <p>Appendix 2-14 – Grey and Black Water System and Sewage Treatment System</p> <p>Appendix 2-15 – Hygiene Inspection Checklist and Potable Water Test Results</p> |
| | | 7.1.4 Cooperate with the nearest health center/hospital in order to immediately support response to emergency events. | All project vessels. | ✓ | PTTEPI and the seismic survey contractor (PGS) prepare Medical Emergency Response Plan (MERP) for the Project. The MERP includes details on organization, responsible parties, communication, evacuation details and list of primary and secondary hospitals should a medical evacuation is required. | - | Appendix 2-16 – Medical Emergency Response Plan (MERP) |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---|--|--|----------------------|--------------------|---|------------------------------------|--|
| 7. Occupational Health and Safety of the Project Employees (cont.) | 7.1 Potential impacts on health and safety of employees on the seismic vessel from potential exposure of workers to unsafe noise levels during survey operation, accidents during operation and improper sanitary system (cont.) | 7.1.5 Implement steps of operation for occupational, health, and safety; and the protection and controlling of accidents: <ul style="list-style-type: none"> • Safety method for working with machines/equipment • Procedure for safety operation • Procedure for work permission • Provide SDS for all chemicals • Regulations for fuel storage and waste management • Compliance monitoring system and manifest system for hazardous wastes | All project vessels. | ✓ | <p>PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with PTTEPI's SSHE Management System including use of PPEs, Emergency and Crisis Management Plan, and Tropical Revolving Storm Procedure.</p> <p>PGS implements Occupational Health Manual and Risk Management Procedure which outlines safety methods and operations. Risk assessment is conducted prior to commencement of the Project. Work Permit and Job Safety Assessment (JSA) is implemented.</p> <p>Chemical inventory is maintained by Safety Officer. PPEs and SDSs are available and provided at the paint and chemical storage areas.</p> <p>Chief Officer maintains logs of waste onboard in Garbage Record Book consistent with MARPOL Annex V requirements and in garbage record according to the PGS waste management system.</p> | - | <p>Appendix 2-2 – PTTEPI Relevant Plans and Procedures</p> <p>Appendix 2-7 – Garbage Record Book and Garbage Log</p> <p>Appendix 2-17 – Occupational Health Management</p> <p>Appendix 2-18 – Chemical Management and Training Materials</p> <p>Figure 2-7 Chemical and Paint Storage Areas and Associated PPEs and SDS Files</p> |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---|--|--|----------------------|--------------------|---|------------------------------------|--|
| 7. Occupational Health and Safety of the Project Employees (cont.) | 7.1 Potential impacts on health and safety of employees on the seismic vessel from potential exposure of workers to unsafe noise levels during survey operation, accidents during operation and improper sanitary system (cont.) | 7.1.6 Provide fire protection equipment and manual for emergency management at project site, and provide the appropriate practice complying with mitigation measures. | All project vessels. | ✓ | Fire protection equipment is provided according to the Fire Control Plan in classification certificate. Fire protection system is inspected annually. Emergency drills are conducted on regular basis. Each emergency drill is documented and evaluated. | - | Appendix 2-13 – Emergency Drill Matrix and Examples of Drill Records Appendix 2-19 – Fire Protection System Inspection |
| Unplanned Events | | | | | | | |
| 8. Oil and Chemical Spills | 8.1 Impact on water quality and marine organisms from spillage of fuel oil, or lubricant into the sea due to accidental collision between vessels, accidental spills, etc. | 8.1.1 Implement PTTEPI's SSHE Management System, including the following: • In case of oil or chemical spills, follow PTTEPI's Emergency and Crisis Management Plan. • Follow PTTEPI's Spill Contingency Plan. | All project vessels. | ✓ | PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with PTTEPI's SSHE Management System including use of PPEs, Emergency and Crisis Management Plan, and Tropical Revolving Storm Procedure. | - | Appendix 2-2 – PTTEPI Relevant Plans and Procedures |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|------------------------------------|--|---|----------------------|--------------------|--|------------------------------------|--|
| 8. Oil and Chemical Spills (cont.) | 8.1 Impact on water quality and marine organisms from spillage of fuel oil, or lubricant into the sea due to accidental collision between vessels, accidental spills, etc. (cont.) | 8.1.2 Conduct the survey activity according to the operational procedure of the vessel which includes: <ul style="list-style-type: none"> Safety Management: main components include policy, organization & responsibility, planning & operation, monitoring on operation performance, and inspection & review for improvement. Survey Planning for the survey activity. Activity Recording: record on role and responsibility of the key personnel. | All project vessels. | ✓ | <p>The seismic survey contractor (PGS) prepared a Project Plan which include the following content which aligns with the EMP requirements:</p> <ul style="list-style-type: none"> Communication Interface Flowchart HSE Management System HSE Policies Key personnel, positions, and contact details Emergency response organization, interface, and responsibilities Survey plan and timeline <p>Daily Operations Reports summarize activities that occur during the operation including records associated with health, safety, and environment.</p> | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West Appendix 2-8 – Example of Daily Operations Report |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|------------------------------------|--|---|----------------------|--------------------|--|------------------------------------|--|
| 8. Oil and Chemical Spills (cont.) | 8.1 Impact on water quality and marine organisms from spillage of fuel oil, or lubricant into the sea due to accidental collision between vessels, accidental spills, etc. (cont.) | 8.1.3 Ensure that the survey contractor has an oil spill response plan in place in accordance with MARPOL 73/78 regulations (Shipboard Marine Pollution Emergency Plans), and/or follows PTTEPI's Spill Contingency Plan in the event of emergency. | All project vessels. | ✓ | <p>PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with PTTEPI's SSHE Management System including use of PPEs, Spill Contingency Plan, Emergency and Crisis Management Plan, and Tropical Revolving Storm Procedure.</p> <p>Absorbents are provided according to Shipboard Oil Pollution Emergency Plan (SOPEP). The Chief Officer maintains inventory and conduct monthly inspection of SOPEP equipment. SOPEP equipment are provided at SOPEP station and areas where there are risk of oil and chemical spills.</p> | - | <p>Appendix 2-2 – PTTEPI Relevant Plans and Procedures</p> <p>Appendix 2-6 – SOPEP Equipment Inventory</p> <p>Figure 2-4 – SOPEP Equipment on M/V Ramform Sovereign</p> |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|------------------------------------|--|--|----------------------|--------------------|---|------------------------------------|---|
| 8. Oil and Chemical Spills (cont.) | 8.1 Impact on water quality and marine organisms from spillage of fuel oil, or lubricant into the sea due to accidental collision between vessels, accidental spills, etc. (cont.) | 8.1.4 Implement proper training in the use and handling of the relevant chemicals and standard safety procedures implemented by all contractors. | All project vessels. | ✓ | <p>The seismic survey contractor implements Management of Chemicals Procedure and Working with Chemicals Work Instruction for works that involve use of chemicals.</p> <p>Emergency drills according to International Convention for the Safety of Life at Sea (SOLAS) and emergency response plan requirements are conducted on regular basis. Each emergency drill is documented and evaluated.</p> <p>Content of training on safe storage, handling and disposal of hazardous material contains information regarding labeling, SDS, safe storage and handling, PPEs, and disposal of chemicals.</p> | - | <p>Appendix 2-13 – Emergency Drill Matrix and Examples of Drill Records</p> <p>Appendix 2-18 – Chemical Management and Training Materials</p> |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|------------------------------------|--|--|----------------------|--------------------|---|------------------------------------|---|
| 8. Oil and Chemical Spills (cont.) | 8.1 Impact on water quality and marine organisms from spillage of fuel oil, or lubricant into the sea due to accidental collision between vessels, accidental spills, etc. (cont.) | 8.1.5 Staff will wear Personal Protective Equipment (PPE) appropriate to the nature and volume of spilled material. | All project vessels. | ✓ | <p>The seismic survey contractor implements Management of Chemicals Procedure and Working with Chemicals Work Instruction for works that involve use of chemicals.</p> <p>Emergency drills according to International Convention for the Safety of Life at Sea (SOLAS) and emergency response plan requirements are conducted on regular basis. Each emergency drill is documented and evaluated.</p> <p>Content of training on safe storage, handling and disposal of hazardous material contains information regarding labeling, SDS, safe storage and handling, PPEs, and disposal of chemicals.</p> | - | <p>Appendix 2-13 – Emergency Drill Matrix and Examples of Drill Records</p> <p>Appendix 2-18 – Chemical Management and Training Materials</p> |
| | | 8.1.6 In case of spill, appropriate medical care will be provided, clean-up will be carried out, and incident or accident reports will be filed. | All project vessels. | N/A | No accidental spill case. | - | - |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|------------------------------------|--|---|----------------------|--------------------|---|------------------------------------|---|
| 8. Oil and Chemical Spills (cont.) | 8.1 Impact on water quality and marine organisms from spillage of fuel oil, or lubricant into the sea due to accidental collision between vessels, accidental spills, etc. (cont.) | 8.1.7 Provide spill clean up kits and training for designated rapid response team to clean up any spills. | All project vessels. | ✓ | Emergency drills according to International Convention for the Safety of Life at Sea (SOLAS) and emergency response plan requirements are conducted on regular basis. Each emergency drill is documented and evaluated. Content of training on safe storage, handling and disposal of hazardous material contains information regarding labeling, SDS, safe storage and handling, PPEs, and disposal of chemicals. | - | Appendix 2-13 – Emergency Drill Matrix and Examples of Drill Records Appendix 2-18 – Chemical Management and Training Materials |
| | | 8.1.8 Store all chemicals in secured storage area with impervious (cement or plastic sheet) floor and bund wall. Handle all chemicals according to their SDS. | All project vessels. | ✓ | Chemicals are stored in designated storage areas with impervious floor and no discharge point to environment. | - | Appendix 2-18 – Chemical Management and Training Materials Figure 2-7 Chemical and Paint Storage Areas and Associated PPEs and SDS Files |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|------------------------------------|--|---|----------------------|--------------------|---|------------------------------------|---|
| 8. Oil and Chemical Spills (cont.) | 8.1 Impact on water quality and marine organisms from spillage of fuel oil, or lubricant into the sea due to accidental collision between vessels, accidental spills, etc. (cont.) | 8.1.9 Assign chase vessel to report abnormal situation to the seismic vessel. | All project vessels. | ✓ | The Project assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation. | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West Appendix 2-10 – Guidance for Support Vessels |
| 9. Vessel Collision | 9.1 Collisions could potentially occur during the survey, potentially causing injury or death to personnel, damage to vessels, and possibly leading to accidental spills. | 9.1.1 Implement PTTEPI's SSHE Management System. | All project vessels. | ✓ | PTTEPI and the seismic survey contractor (PGS) prepared a Project Plan and Bridging Document that align the project operation procedures to ensure that the Project's operations comply with PTTEPI's SSHE Management System including use of PPEs, Emergency and Crisis Management Plan, and Tropical Revolving Storm Procedure. | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|--|----------------------|--------------------|--|------------------------------------|--|
| 9. Vessel Collision (cont.) | 9.1 Collisions could potentially occur during the survey, potentially causing injury or death to personnel, damage to vessels, and possibly leading to accidental spills (cont.) | 9.1.2 In case of vessel collision, follow PTTEPI's Emergency and Crisis Management Plan, including procedures in the event of an accidental vessel collision. | All project vessels. | N/A | No vessel collision case. | - | - |
| | | 9.1.3 At least 30 days prior to survey, coordinate with MOGE, who will then issue "Notice to Mariner" regarding project activities to appropriate parties (i.e. Department of Fisheries, Ministry of Livestock and Fisheries, and Navy). | All project vessels. | ✓ | PTTEPI submit Letter No. PTTEPI.L.BM(PMP) 182/30-01/17 to MOGE requesting MOGE to issue Notice to Mariners for 3D Seismic Survey Vessel on January 31, 2017, more than 30 days prior to commencement of survey in March. | - | Appendix 2-12 – Notice to Mariners and MOGE Representatives |

Note:

* Compliance Status:

✓ : Compliance

✓ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|--|----------------------|--------------------|---|------------------------------------|---|
| 9. Vessel Collision (cont.) | 9.1 Collisions could potentially occur during the survey, potentially causing injury or death to personnel, damage to vessels, and possibly leading to accidental spills (cont.) | 9.1.4 Use support vessels to warn off traffic. | All project vessels. | ✓ | The Project assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation. | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West Appendix 2-10 – Guidance for Support Vessels |
| | | 9.1.5 Provide appropriate lights and warning signals on all vessels to prevent accidental collision. | All project vessels. | ✓ | The survey, chase, and supporting vessels have valid Cargo Ship Safety Equipment Certificates according to the requirements in the International Convention for the Safety of Life at Sea (SOLAS), which include requirements on navigation systems and equipment such as radar, communication system, and signals. | - | Appendix 2-1 – Relevant Certificates of Project Vessels |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Table 2-1 Compliance with Approved Mitigation Measures for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Potential Impacts | Mitigation Measure | Implementation Area | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------------------------|--|--|----------------------|--------------------|---|------------------------------------|---|
| 9. Vessel Collision (cont.) | 9.1 Collisions could potentially occur during the survey, potentially causing injury or death to personnel, damage to vessels, and possibly leading to accidental spills (cont.) | 9.1.6 Chase vessel with MOGE Representative will be employed to ensure navigational safety and appropriate management of fishing interactions. | All project vessels. | ✓ | The Project assigns four vessels: M/V Thor Freyja, M/V Nur Amanah, M/V Ultra Jaya, and M/V Winjaya as chase and support vessels. There will be at least three chase and support vessels operating around the survey vessel at all time during the project operation. MOGE assigns representative to be stationed on the chase vessels to facilitate interaction with fishing activities. | - | Appendix 2-3 – Project Plan – Myanmar Block M9 West Appendix 2-10 – Guidance for Support Vessels Appendix 2-12 – Notice to Mariners and MOGE Representatives |
| | | 9.1.7 Mobile exclusion zone, limiting the duration and extent of disruption to the fishing activity and other marine users in any area. | All project vessels. | ✓ | The chase and support vessels maintain their stations around the survey vessel to keep a minimum distance of any other ships outside 3 nautical miles from the survey vessel and seismic survey equipment. | - | Appendix 2-10 – Guidance for Support Vessels |
| | | 9.1.8 Disclosure and implementation of the Grievance Mechanism for the Project and timely investigation of any grievances. | All project vessels. | ✓ | PTTEPI implements Grievance Handling Guidelines for receiving and resolving complaints, problems, or suggestions from the public which may arise from its activities. PTTEPI sets up a complaint receiving point at Yangon Office. No complaints related to project activities are received. | - | Appendix 2-2 – PTTEPI Relevant Plans and Procedures |

Note:

* Compliance Status:

✓ : Compliance

⚡ : Compliance with Conditions

✗ : Non-compliance

N/A : Not Applicable

Figure 2-1 Screen Capture from PMS for a Main Generator from IFS System

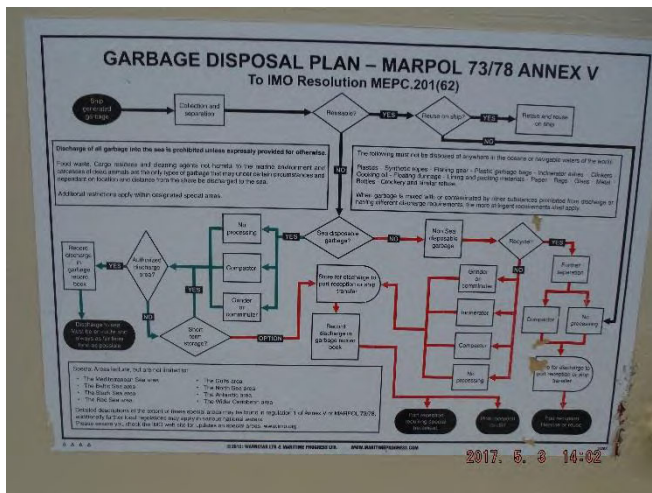


Figure 2-2 Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign



Figure 2-2 Waste Management Plan and Waste Reception and Storage Facilities on M/V Ramform Sovereign (cont.)



Figure 2-3 Deck Area of M/V Ramform Sovereign



Figure 2-4 SOPEP Equipment on M/V Ramform Sovereign



Figure 2-5 Oil/Water Separator on M/V Ramform Sovereign

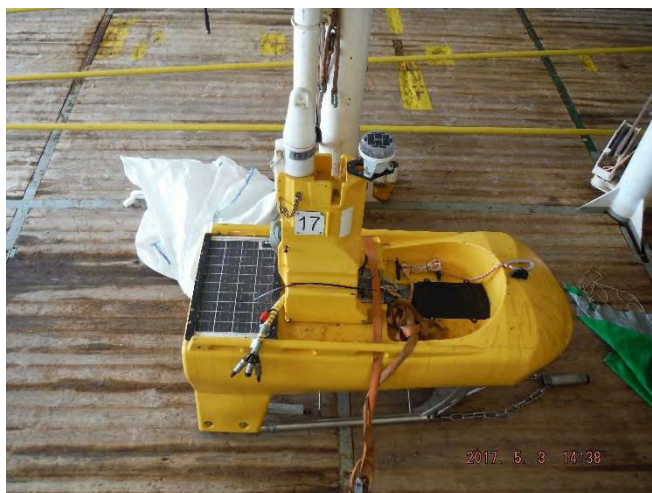


Figure 2-6 End Buoy Used at the end of Each Streamer Equipped with Signal Light

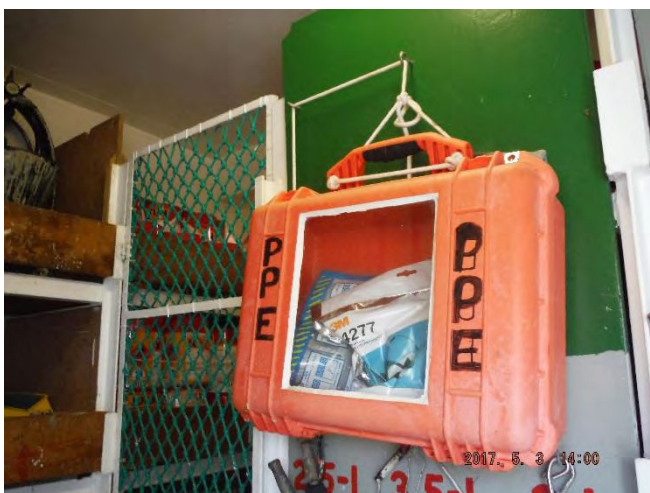


Figure 2-7 Chemical and Paint Storage Areas and Associated PPEs and SDS Files

Chapter 3

Compliance with Monitoring Program

3.0 COMPLIANCE WITH MONITORING PROGRAM

The approved Initial Environmental Examination (IEE) Report (Appendix 1-1) requires that PTTEPI complies with the Environmental Management Plan (EMP). To determine level of compliance, the status is classified as follows:

- ✓ **Compliance:** PTTEPI fully complies with the approved mitigation measures.
- ✓ **Compliance with Conditions:** PTTEPI partially complies with the approved mitigation measures. In the case of non-compliance, PTTEPI has implemented other alternatives or technologies as seems appropriate.
- ✗ **Non-compliance:** PTTEPI does not comply with the mitigation measures or make an effort to apply other approaches to solve the issues.
- N/A **Not Applicable:** A current status of the project is not within the phases specified in the approved measures.

The Project fully complies with all six monitoring programs, or 100% compliance, stipulated in the EMP. Details of compliance with the monitoring program as stipulated in the EMP are discussed in Table 3-1.

Table 3-1 Compliance with Approved Monitoring Programs for 3D Seismic Survey of Block M9

| Aspects | Parameters | Method | Duration / Frequency of Monitoring | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-----------|--|--|--|--------------------|--|--|--|
| 1. Sewage | <p>Parameters to be analyzed for sewage as follows:</p> <p><u>Required by NEQG (as per MARPOL 73/78):</u></p> <ul style="list-style-type: none"> Thermotolerant Coliforms Biochemical Oxygen Demand (BOD) Chemical Oxygen Demand (COD) pH | <p><u>Methods used for sampling/analysis should be as specified in MARPOL 73/78 and associated standards, as follows:</u></p> <ul style="list-style-type: none"> Thermotolerant Coliform Standard- determined by membrane filter, multiple tube fermentation or an equivalent analytical procedure. TSS - Method of testing should be by: <ul style="list-style-type: none"> 1. filtration of representative sample through a 0.45 µm filter membrane, drying at 105°C and weighing; or 2. centrifuging of a representative sample (for at least five minutes with mean acceleration of 2,800-3,200 g), drying at least 105°C and weighing; or 3. other internationally accepted equivalent test standard. | <ul style="list-style-type: none"> Once during survey | ✓ | <p>One sewage sample was taken by Tetra Tech Inc. during the site audit on 4th May 2017. The sampling point is at the effluent point of the sewage treatment system onboard the seismic survey vessel. The sample was preserved, stored in ice for temperature control, and delivered to an environmental laboratory, REM-UAE, in Yangon within the same day.</p> <p>Parameters analyzed include pH, BOD₅, COD, TSS, Total Coliform Bacteria, and Fecal Coliform Bacteria (equivalent to thermotolerant coliform). The analytical methods are in accordance with <i>APHA/AWWA/WEF Standard Method for the Examination of Water and Wastewater</i>, 22nd Edition, 2012, which is an internationally accepted analytical procedure.</p> <p>Although, the EMP refers to Resolution of the Marine Environment Protection Committee MEPC.159(55), the shipboard sewage treatment plant is certified with MEPC.2(VI),</p> | <p>The quality of effluent does not meet MEPC.159(55), which is the reference that EMP refers to for analytical method. The survey vessel should improve the performance of sewage treatment system prior to the recertification or at the earliest opportunity.</p> | <p>Appendix 2-1 – Relevant Certificates of Project Vessels</p> <p>Appendix 3-1 – Analysis Report of Effluent from Sewage Treatment Plant</p> |

Table 3-1 Compliance with Approved Monitoring Programs for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Parameters | Method | Duration / Frequency of Monitoring | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|-------------------|--|---|---|--------------------|---|------------------------------------|---|
| 1. (Cont.) | | <ul style="list-style-type: none"> BOD and COD - The test method standard should be ISO 15705:2002 for COD and ISO 5815-1:2003 for BOD₅, or other internationally accepted equivalent test standards. | | | <p>an older version of MEPC, which is allowable for a sewage treatment system installed prior to 2010.</p> <p>The analytical results do not meet the standard as set in MEPC.159(55). Although, the MEPC states that the treatment plant should satisfy the effluent standard when tested for its certificate of type approval.</p> | | |
| 2. Marine Mammals | <ul style="list-style-type: none"> Species and number of marine mammals | <ul style="list-style-type: none"> Record species and number of marine mammals observed before commencing survey and during survey within a distance of three (3) kilometers, including the seismic vessel coordinates, distance between the vessel and the marine mammal, and if possible, species & number of marine mammals, frequency and duration of marine mammal in the observation area. | <ul style="list-style-type: none"> As required throughout survey | ✓ | <p>Marine mammal observer is assigned to observe marine mammals during daytime throughout the project operation period.</p> <p>There are a total of 10 sightings recorded in the Marine Mammal Observation Report. The report includes the following information for each sightings: time, location (latitude and longitude) direction of vessel, estimated number, species, behavior, age class, other marine environmental conditions, and activities for the seismic survey.</p> | - | Appendix 3-2 – Marine Mammal Observation Report |

Table 3-1 Compliance with Approved Monitoring Programs for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Parameters | Method | Duration / Frequency of Monitoring | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|---------------------------|---|--|---|--------------------|---|------------------------------------|---|
| 3. Fishery and Navigation | <ul style="list-style-type: none"> Records of removed fishing gears Records of complaints and responses Records of fishing vessels Accident reports | <ul style="list-style-type: none"> Record containing details of removed fishing gears Record containing details of complaints and responding results Record containing details on number, type, and duration for fishing vessels and other vessels entering the survey area during survey Report on accidents/incidents with a fishing vessel or other vessels during the survey | <ul style="list-style-type: none"> As required throughout survey | ✓ | <p>The chase vessels maintain fishing gear record containing the following details of each finding of fishing gear and fishing vessel:</p> <ul style="list-style-type: none"> Date and time Position (latitude – longitude) Type and number of fishing gears or fishing vessels Communication with fishing vessel Photos Comments and action taken <p>The record covers the entire survey period.</p> <p>Complaint logs are reviewed. No complaints relevant to the project activities are received during the survey period.</p> | - | Appendix 3-3 – Fishing Gear Record |

Table 3-1 Compliance with Approved Monitoring Programs for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Parameters | Method | Duration / Frequency of Monitoring | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--------------------------------------|---|--|---|--------------------|---|------------------------------------|--|
| 4. Hazardous and Non-hazardous Waste | <ul style="list-style-type: none"> Type/volume of waste generated. | <ul style="list-style-type: none"> Prepare a record on type and volume of generated waste | <ul style="list-style-type: none"> As required throughout survey | ✓ | <p>Chief Officer maintains logs of waste onboard in Garbage Record Book consistent with MARPOL Annex V requirements and in garbage record according to the PGS waste management system.</p> <p>Types of waste generated during the survey period can be categorized into hazardous and non-hazardous waste as follow:</p> <ul style="list-style-type: none"> Hazardous Waste: Oil filters, waste oil, oily rags, aerosol, batteries, fluorescent tubes, electrical waste, used toner, infirmary waste, and cooking oil. Non-hazardous Waste: Plastic, streamer skin, streamer gel, incinerator ash, paper, metals, glass, wood, food, and marine debris <p>The quantity of waste generated during the survey period as recorded by PGS, categorized into hazardous and non-hazardous waste according to PTTEPI Waste Management Procedure is as follow:</p> | - | Appendix 2-7 – Garbage Record Book and Garbage Log |

Table 3-1 Compliance with Approved Monitoring Programs for 3D Seismic Survey of Block M9 (Cont.)

| Aspects | Parameters | Method | Duration / Frequency of Monitoring | Compliance Status* | Compliance Summary | Issue/ Approach/ Corrective Action | Reference |
|--|--|---|---|--------------------|--|------------------------------------|--|
| 4. (Cont.) | | | | | <ul style="list-style-type: none"> Hazardous Waste: 4 m³ Non-hazardous Waste: 27.4 m³ <p>Most of the hazardous waste generated is oily rags (1.5 m³) and electrical waste (1.5 m³). Plastic (9.5 m³) and paper (8.1 m³) are the majority of non-hazardous waste.</p> | | |
| 5. Employee Occupational Health and Safety | <ul style="list-style-type: none"> Accident statistics Evacuation report | <ul style="list-style-type: none"> Record statistics on accident/emergency situation (incident/accident record) on board or during survey Report on evacuation from the area due to cyclone | <ul style="list-style-type: none"> As required throughout survey | ✓ | <p>PTTEPI and PGS have system to record and report incident/accident in their operation.</p> <p>During the survey period, four events are recorded. They are categorized into:</p> <ul style="list-style-type: none"> One near miss event Two first aid case incidents One property damage incident <p>The operation was suspended for 1 day during a storm event but there is no evacuation from the area.</p> | - | Appendix 2-11 – Operational Risk Evaluation and Storm Risk Assessment |



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