DAWEI POWER GENERATING COMPANY LIMITED

FINAL REPORT

Environmental Management Plan (EMP)

for

ESIA for Dawei SEZ Initial Phase Development of Boil-Off Gas Power Plant Project

In Dawei District, The Republic of the Union of Myanmar

Prepared by

TEAM Consulting Engineering and Management Public Company Limited

TOTAL Business Solution Co., Ltd.

April 2018

Our Ref: ENV/P03153/611007

27th April 2018

Mr. Poawpadet Vorabutr, Director:

Dawei Power Generating Company Limited ("DPG")

6th Floor, Salomon Business Center, 224/A U Wisara Road, Bahan Township, Yangon, the Republic of the Union of Myanmar

Subject: Submission of Final Report of ESIA for Boil-Off Power Plant, Dawei District, the Republic of the Union of Myanmar

With reference to the Confirmation Letter, dated – 15th February, 2018, from The Ministry of National Resource and Environmental Conservation, Union Minister Office on "Environmental and Social Impact Assessment (ESIA) of Boil-Off Gas Power Plant by Dawei Power Generating Company Limited at the initial stage of Dawei Special Economic Zone".

We are pleased to submit the Final Report of ESIA for Boil-Off Power Plant, Dawei District, The Republic of the Union of Myanmar (include ESIA and EMP) for your consideration.

Sincerely yours,

S. Boonyuen

Dr. Sirinimit Boonyuen

Senior Executive Vice President - International

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FINAL REPORT

ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR BOIL-OFF POWER PLANT

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INTRODUCTION

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INTRODUCTION

1.1 NEED FOR ENVIRONMENTAL MANAGEMENT PLANS (EMPs)

Results of an ESIA study for a proposed development project (Boil-off Gas Power Plant Project) will not lead to any practical outcomes if the proposed mitigation measures and monitoring program are not implemented in the construction and operational phases of the proposed project. Therefore, an ESIA study will need to extend beyond impact assessment to planning for implementation of the proposed mitigation measures and monitoring program. In this regard, the results of the ESIA study will need to cover preparation of two Environmental Management Plans (EMPs): (i) one EMP for implementation by the contractor in the construction phase; and (ii) one EMP for implementation by the project proponent in the operational phase. Recognizing this fact, the ESIA Procedure requires the ESIA study to include preparation of a Construction Phase EMP (CEMP) and an Operational phase EMP (OEMP).

The two EMPs are defined in the ESIA Procedure (2015) as follows:

Construction Phase EMP *means a detailed and comprehensive EMP for the pre-construction and construction phase of a Project. Such plan shall present all relevant commitments, Emission Limit Values, Environmental Quality Standards and other environmental requirements and include a description of the construction works, present an overview of Adverse Impacts, present mitigation measures and monitoring programs together with time schedules, overview maps, images, aerial photos, satellite images, site layout plans, cross-sections, transects, environmental management and monitoring sub-plans for each construction site, thematic sub-plans, and management procedures as appropriate.*

Operational Phase EMP *means a detailed and comprehensive EMP for the operational phase of a Project. Such plan shall present all relevant commitments, Emission Limit Values, Environmental Quality Standards and other environmental requirements. The plan shall include a description of the Project operations, installations, and infrastructure, and shall present an overview of Adverse Impacts, present mitigation measures together with time schedules, overview maps, images, aerial photos, satellite images, site layout plans, cross-sections, transects, environmental management and monitoring sub-plans for each Project site, thematic sub-plans, and management procedures as appropriate.*

In case of decommissioning phase, the EMPs are similar to those recommended for the construction phase. The EMP during commissioning phase depends on decision of the Concerned Authorities confirm to remove of all components at the end of concession.

The above two definitions clearly indicate that the two EMPs required by Ministry of Natural Resources and Environmental Conservation (MONREC) will be comprehensive and have more details than conventional EMPs presented in ESIA reports of the past. This requirement of MONREC is in line with current good ESIA practices.

1.2 GENERIC SCOPE OF AN EMP

Environmental management is based on the basic principle of management known as the Deming cycle (PDCA Cycle): Plan (P), Do (D), Check (C) and Act (A) (see ***Figure 1.2-1***). Environmental management thus consists of four (4) related tasks:

(i) Plan (P) - what need to be done;

(ii) Do (D) - implement the plan;

(iii) Check (C) - monitor and evaluate the results of implementation and;

(iv) Act (A) - taking corrective actions to improve the results, if found inadequate

FIGURE 1.2-1 : PDCA CYCLE FOR ENVIRONMENTAL MANAGEMENT

Therefore, an EMP will need to cover the following subjects: (i) mitigation measures to be implemented; (ii) arrangements for the implementation of mitigation measures; (iii) monitoring, evaluating and reporting of the implementation of mitigation measures to provide feedback information on whether the environmental performance deviates from the prescribed benchmarks; (iv) corrective actions process if the environmental performance below the benchmarks, environmental incident response, and emergency plan; (v) arrangements for operating the Social Management System (EMS), including organizational structure, responsibilities, documentation, training, communication, and management review; and (vi) involvement of stakeholders or affected people in environmental management, including public grievance redress mechanism.

It should be noted that the context of the six (6) elements of environmental management during project construction will be different from those during project operation. Therefore, it is preferable to present a CEMP separate from an OEMP to facilitate their use and reference.

1.3 ORGANIZATION OF THIS EMP DOCUMENT

This EMP document is structured to follow the two outlines as appropriate within the environmental management context of this Project. The essence of each chapter following this introductory chapter is as follows:

Chapter 2 - Project Proponent's environmental and social policy and commitments

Chapter 3 - Institutional Arrangements

Chapter 4 - Legal Requirements

Chapter 5 - Summary of Impacts and Mitigation Measures

Chapter 6 - Construction Phase EMP

Chapter 7 - Operation Phase EMP

Chapter 8 - Emergency Plan

Chapter 9 - Implementation Budget and Schedule

1.4 NEED FOR UPDATING THE EMPs

The CEMP and OEMP presented in this Document are based on preliminary project designs and initial construction plans and schedules. Therefore, the two EMPs should be considered as framework plans. They are intended to provide framework and prescribe requirements for the preparation of detailed CEMP and OEMP by the Engineering Procurement Construction (EPC Contractor). In this regard, the Project Proponent will require the EPC Contractor to prepare a detailed CEMP in due course before commencing the construction, and a detailed OEMP in due course before commercial operation of the project.

The Contractor will use the CEMP presented in this Document as the basis to prepare a detailed CEMP based on the Contractor's final designs, construction plan and methods, and construction schedule. The scope and content of the Contractor's CEMP will not be less than the scope and content of the CEMP in this Document. The Contractor's CEMP shall be contractually binding. During the construction, the Contractor will implement the Contractor CEMP under the supervision of the Project Manager to be appointed by the Project proponent (Owner).

As the Contractor will be responsible for the design, supply, installation, testing, and commissioning of the Boil-off Gas Power Plant Project and its associated facilities, the Contractor will use the OEMP presented in this Document as the basis for preparing a detailed OEMP based on the actual construction, results of plant commissioning, and final operational procedures. The Boil-off Gas Power Plant Management Team of the Project Proponent or Owner will review and revise the Contractor's OEMP as appropriate to prepare the Owner's OEMP for implementation in the operational phase.

For clarity, the application of the ESIA's EMPs as above described is shown as a diagram in ***Figure 1.4-1***.

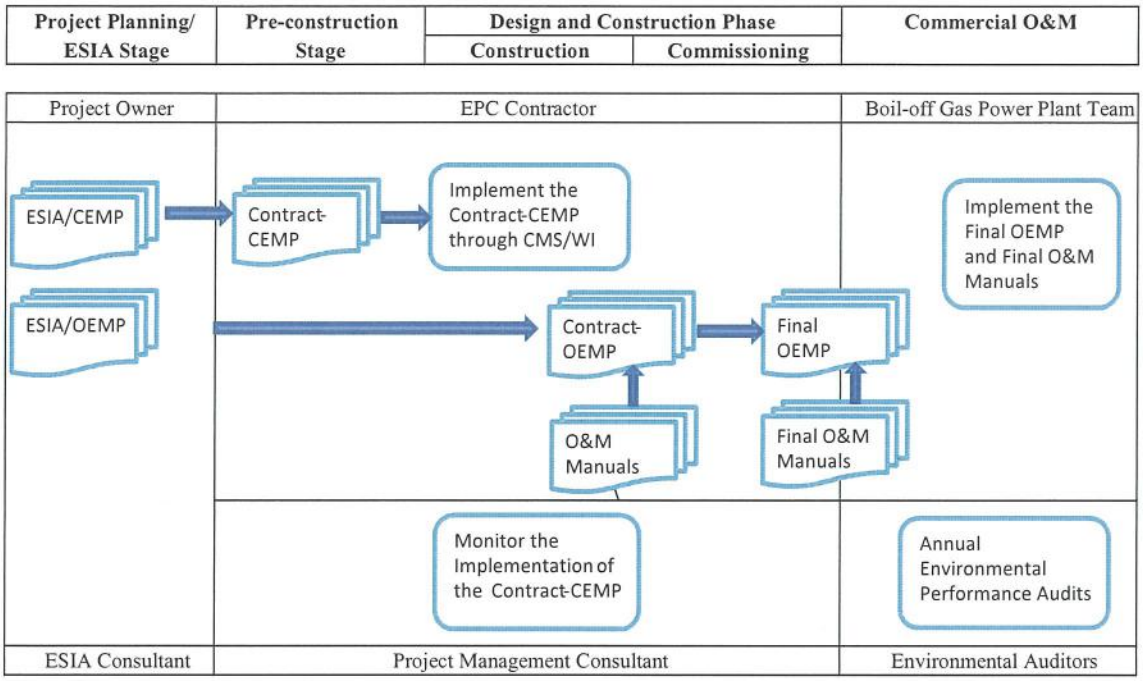

FIGURE 1.4-1 : APPLICATION OF THE ESIA'S EMPs

CHAPTER 2

PROJECT PROPONENT'S ENVIRONMENTAL AND SOCIAL POLICY AND COMMITMENTS

CHAPTER 2

PROJECT PROPONENT'S ENVIRONMENTAL AND SOCIAL POLICY AND COMMITMENTS

2.1 CORPORATE ENVIRONMENTAL AND SOCIAL POLICIES

The Project Proponent-Dawei Power Generating Company Limited ("DPG") is committed to the sustainable development principle. In this regard, DPG will manage environmental aspects of the Project (Boil-off Gas Power Plant Project) in accordance with the Project Proponent Safeguard Policy. Consequently, the Project Proponent will establish an environmental management system (EMS) for the project and will operate the EMS to meet the requirements of Safeguard Policy.

As the first step towards meeting the requirements of Safeguard Policy, DPG will formulate an environmental and social management policy to guide its environmental and social management during the construction phase and the operation phase of the Project. Such a policy will support the following activities:

- Develop a comprehensive Environmental, Health, and Safety (EHS) Management System for implementing the Environmental Management Plan (EMP) to be prepared as part of the ESIA of the Project;
- Implement the EMP and as part of project and operational management with due diligence audit to be conducted at appropriate interval during the construction and operational phases of the Project;
- In implementing the EMP during the project construction, the nominated EPC contractors will be required to prepare and implement contract specific EHS measures for the construction of the Boil-off Gas Project;
- During the operational phase, EHS management will be an integral part of the operational management of the Boil-off Gas Power Plant Project;
- Establish adequate environmental and social safeguards capabilities;
- Encourage public participation in the EHS management as related to the surrounding communities; and
- Maintain information generated in the EHS management and prepare EHS performance reports as required by the corporate management and the concerned authorities of the Government.

In line with this policy, the Project will commit to the followings:

During Construction: The Project will endeavour to minimize environmental impacts and meet all EHS requirements during the construction. This will be achieved through adopting designs, construction methods, construction management practices, and impact mitigation measures. The Project EHS performance will be measured and evaluated against applicable national or international standards and guidelines prescribed by MONREC or proposed in the CEMP. In addition, the Project will establish an EMS for the Project construction.

During Operation: The Project will endeavor to minimize environmental impacts and meet all EHS requirements of the project operation and maintenance (O&M). This will be achieved through adopting: (i) best available technologies in the Boil-off Gas Power Plant design and operation; and (ii) effective impact mitigation measures proposed in the ESIA. The Project EHS performance will be measured and evaluated against applicable national or international standards and guidelines prescribed by MONREC or proposed in the OEMP. The Project will also establish an EMS specific for the project operation, which will follow principles and good practices in environmental management of Boil-off Gas Power Plant.

2.2 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM (ESMS)

The Project Proponent will establish an Environmental and Social Management System (ESMS) to support the implementation of the CEMP and the OEMP. The ESMS for the construction phase is described in the CEMP while that for the operational phase is described in the OEMP.

In addition, the Project Proponent will require the Engineering Procurement Construction (EPC) Contractor to establish its own ESMS to support its implementation of the detailed CEMP.

2.3 ENVIRONMENTAL AND SOCIAL PROCEDURES AND GUIDELINES

Health, safety, environmental management general guidelines, and health, safety and environmental risk assessment for Site Activities will be established in accordance with the policy stated in ***Section 2.1***.

2.4 ENVIRONMENTAL AND SOCIAL COMMITMENTS

DPG's environmental and social commitments are clearly indicated in its policy statement in ***Section 2.1***. In this Project, DPG will make at most efforts to minimize environmental and social impacts that the Project may cause in its construction and operation, DPG recognizes the need for the Project to exist in harmony with all stakeholders, particularly the communities surrounding the Project site.

CHAPTER 3

INSTITUTIONAL ARRANGEMENTS

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INSTITUTIONAL ARRANGEMENTS

3.1 RESPONSIBILITIES OF THE PROJECT PROPONENT

The Project proponent (Dawei Power Generating Company Limited: DPG) is legally responsible for environmental performance of the Project as prescribed in the Environmental Compliance Certificate (ECC) and other permits. The Project proponent will report to Ministry of Natural Resources and Environment Conservation (MONREC) on the Project's environmental and social performance, also to other authorities responsible for specific environmental and social issues relevant to the Project.

Specifically, the Project Proponent will have the following responsibilities:

Pre-Construction and Construction Phases

1) Ensure that the Contractor will update the CEMP presented in this document to prepare a detailed CEMP based on the results of detailed design, construction plan, and construction schedule.

2) Establish and operate an Environmental and Social Management System (ESMS) containing elements outlined in this EMP.

3) Supervise the Contractor closely in implementing the Contractor CEMP as an integral part of its project implementation management and construction supervision.

4) Submit periodic monitoring and audit reports to MOECAF as required in the ESIA Procedure and concerned authorities.

5) Notwithstanding the periodic monitoring reports to be submitted to MONREC, keep MONREC and other concerned authorities informed of any serious environmental events and responses to the events.

6) Conducting periodic audit of environmental and social performances of the Contractor.

Operational Phase

1) Ensure that the Contractor will update the OEMP presented in this document to prepare a detailed OEMP based on the results of detailed design, results of commissioning, and operational manuals.

2) Establish and operate an ESMS containing elements outlined in this EMP. The ESMS will be part of the management system of the power plant.

3) Establish an environmental, health and safety (EHS) unit within the organization for operation and maintenance of the Boil-off Power Plant Facilities (both onshore and offshore areas). The EHS unit will be adequately staffed with qualified personnel.

4) Ensure that the Boil-off Gas Power Plant Manager will operate the ESH unit to comply with all ESH requirements prescribed in the ECC.

5) Submit periodic monitoring and audit reports to MONREC as required in the ESIA Procedure and concern authorities.

6) Notwithstanding the periodic monitoring reports to be submitted to MONREC, keep MONREC and other concerned authorities informed of any serious environmental events and responses to the events.

7) Conducting annual audit of environmental and social performances of the Boil-off Gas Power Plant.

3.2 RESPONSIBILITY OF THE CONTRACTOR

The Contractor, including its approved sub-contractors, is contractually responsible to the Project proponent for environmental performance of the project construction as prescribed in the Contract.

Specifically, the Contractor will have the following responsibilities:

1) Prepare a detailed Contractor CEMP for review and approval by the Project Proponent. The Contractor CEMP should follow the outline prescribed by the Project Proponent as proposed in ***Appendix 6A***.

2) Implement the mitigation measures during the construction through construction method statements and work instructions in strict conformance with environmental conducts prescribed in the Contract.

3) Ensure that all process and environmental control equipment meet all technical specifications related to their environmental performance.

4) Conduct periodic monitoring and reporting of its compliance with the environmental and social performance prescribed in the Contract.

5) Ensure that its sub-contractors shall comply with the Contractor CEMP.

6) Consistently update the Contractor CEMP and submit the updated version to the Project Proponent for approval.

3.3 RESPONSIBILITY OF MONREC

MONREC is the key agency to monitor and evaluate environmental performance of the construction and operation.

Other agencies or authorities will cooperate with MONREC in the monitoring and evaluation of project implementation and environmental performance of the project during pre-construction, construction, and operation phase.

3.4 RESPONSIBILITY OF STATE/REGION AND DISTRICT AUTHORITIES

Local government authorities are the regulator to monitor and evaluate environmental performance of the pre-construction, construction, and operation.

3.5 RESPONSIBILITY OF THE ENVIRONMENTAL, HEALTH AND SAFETY (EHS) UNITS

In the construction phase, the Project proponent will establish an EHS unit within its project management organization. In the operational phase, the Project proponent will establish an EHS unit within the organization for Operation and Maintenance of the Boil-off Gas Power Plant and its associated facilities. Functions and responsibilities of the two EMS units are described in the CEMP and OEMP.

Arrangements for Operating the EMS

There are three (3) key groups with responsibility for environmental management of the Project:

- Project proponent or Project Owner who manages the Project through a Project Manager;
- Contractor as the party undertaking the pre-construction and construction; and
- MONREC through Environmental Conservation Department (ECD), and other government agencies at the regional, township and community levels.

CHAPTER 4

LEGAL REQUIREMENTS

CHAPTER 4

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4.1 SUMMARY OF KEY LEGAL REQUIREMENTS

Environmental management of the Project will comply with legal requirements pertinent to the EMP prescribed in the draft Environmental Conservation Rule 2013, and the Final ESIA Procedure 2015.

A. Environmental Conservation Rules 2014

Chapter IX of Environmental Conservation Rules 2014, Articles 41 to 46 prescribes the tasks regarding waste management under the control of MONREC and the Environmental Conservation Department. Waste management covers hazardous wastes, solid wastes, wastewater and emissions.

B. ESIA Procedure (2015)

Articles in the ESIA Procedure relevant to the preparation and implementation of the EMPs are summarized below in ***Table 4.1-1***. Preparation and implementation of the two EMPs will need to comply with relevant articles in the table.

TABLE 4.1-1

CONTENT OF THE ESIA PROCEDURE RELEVANT TO THE EMPS

Subject	Relevant Articles
Content of the EMPs	63
Project Approval Requirements	
- Issuance of an ECC	70
- Conditions of the ECC	87,88,89,90,91,92,93,94,95,96,97,98,99,100,101
- Submission of an CEMP and OEMP	91,92,94,100
Revision and updating the EMPs	94,95,96,97,98,99,101
Implementing the EMPs	102,103,104,105
Monitoring and Reporting	
- Responsibility for Monitoring	106,107
- Content of Monitoring Report	109
- Submission of Monitoring Report	108
- Disclosure of Monitoring Report	110
- Inspection by MONREC	111,112,113,114,115,116,117,118,119,120,121,122

4.2 PROJECT STANDARDS

Environmental management of the Project during construction and operation will comply with the national or international environmental guidelines and standards as appropriate. The international guidelines and standards will be adopted only when the national guidelines and standards do not exist. In addition, the Project will control stack emissions following the standards which are specifically agreed in the drafted concession agreement of the Project.

Table 4.2-1 presents international ambient environmental quality standards to be adopted as the national ambient environmental quality standards have not yet been issued. ***Table 4.2-2 to Table 4.2-3*** presents national environmental quality standard (ambient air and noise). ***Table 4.2-4*** presents national emission standard to be adopted for stack gas emission. ***Table 4.2-5*** presents national quality standards for effluents to be discharged into the coastal water through the internal storm water system.

TABLE 4.2-1
RELEVANT INTERNATIONAL ENVIRONMENTAL GUIDELINES AND STANDARDS

Subjects	Parameters	Values	References
Ambient Air Quality (24 hour average)	TSP average 24 hour PM10 average 24 hour NO_x as NO_2 average 1 hour NO_x as NO_2 average 24 hour SO_2 average 24 hour	230 µg/m^3 150 µg/m^3 200 µg/m^3 150 µg/m^3 125 µg/m^3	- Thermal Power: Guidelines for New Plant, Pollution Prevention and Abatement Handbook WORLD BANK GROUP, 1998 - WHO Ambient Air Quality Guidelines stated on Environmental, Health, and Safety Guidelines: Environment Air Emissions and Ambient Air Quality of International Finance Corporation, 2007
Ambient Noise Levels - industrial and commercial area - residential areas	Leq (24 hrs) Leq (1 hr) Lmax	70 dB(A) 55 dB(A) daytime 45 dB(A) nighttime 115 dB(A)	Environmental, Health, and Safety (EHS) Guidelines: General EHS Guide GUIDELINES:ENVIRONMENTAL NOISE MANAGEMENT, IFC, 2007
Vibration - for industrial buildings and residential building	Peak Particle Velocity (PPV) Human Response (PPV)	5 mm/s 0.035 in/sec (Bare Perceptible)	DIN4150 Wiss, 1974
Coastal Water Quality	DO pH Nitrate Nitrogen Phosphates as P Lead Cadmium Mercury Temperature (incremental increase) SS	not less than 4 mg/L 5.0-9.0 ≤ 60 µg/L ≤ 15 µg/L for coastal ≤ 45 µg/L for estuarine water ≤ 8.5 µg/L ≤ 10 µg/L ≤ 0.16 µg/L < 2° C above the maximum Ambient water temperature < 50 µg /L	Marine water quality criteria for the ASEAN Region for aquatic life protection, 2008 ASEAN proposed Marine Water Quality Criteria (Only Malaysia)

TABLE 4.2-1

RELEVANT INTERNATIONAL ENVIRONMENTAL GUIDELINES AND STANDARDS (CONT'D)

Subjects	Parameters	Values	References
Sediment Quality		Maximum limits	International Association for Impact Assessment (IAIA) NOAA Screen Quick Reference Table, 2004
	Total Chromium	81 µg/kg	
	Total Arsenic	8.2 µg/kg	
	Total Lead	46.7 µg/kg	
	Total Nickel	20.9 µg/kg	
	Total Zinc	150 µg/kg	
	Total Copper	34 µg/kg	
	Total Mercury	0.15 µg/kg	
Groundwater Quality	pH at 25° C	6.5-8.5	WHO's Guidelines for Drinking Water Quality, 2011
	Nitrate-Nitrogen	≤ 11 µg/L	
	Nitrite-Nitrogen	≤ 0.9 µg/L	
	Cadmium	≤ 0.003 µg/L	
	Lead	≤ 0.01 µg/L	
	Arsenic	≤ 0.01 µg/L	
	Copper	≤ 2 µg/L	
	Mercury	≤ 0.006 µg/L	
Thermal Heat Flux	Safe level of exposure at the property line of storage facility	5 kW/m^2 (1,600 Btu/hr ft^2)	NFPA 59A (standards for the production facility)

TABLE 4.2-2

NATIONAL AMBIENT AIR QUALITY STANDARD

Parameter	Average Period	Guideline Value (µg/m^3)
Nitrogen Dioxide	1-year	40
	1-hour	200
PM-10	1-year	20
	24-hour	50
Sulfur Dioxide	24-hour	20
	10 minute	500

Source: National Environmental Quality (emission) Guidelines 2015, Myanmar

TABLE 4.2-3

NATIONAL NOISE LEVEL STANDARD

Receptor	One Hour LAeq (dBA)	
	Day Time (07:00-22:00)	Nighttime (22:00-7:00)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Source: National Environmental Quality (emission) Guidelines 2015, Myanmar

TABLE 4.2-4
NATIONAL EMISSION STANDARDS

Parameter	Standard	Note
Particulate matter, PM_{10}	-	Not specified for natural gas power plant
SO_2	-	Not specified for natural gas power plant
NO_X	50 µg /Nm^3	For natural gas power plant 15-50 MW

Sources : National Environmental Quality (emission) Guidelines 2015, Myanmar

TABLE 4.2-5
NATIONAL EFFLUENT STANDARDS

Parameter	Standard
5-day Biochemical oxygen demand	50 mg/l
Ammonia	10 mg/l
Arsenic	0.1 mg/l
Cadmium	0.1 mg/l
Chemical oxygen demand	250 mg/l
Chlorine (total residual)	0.2 mg/l
Chromium (hexavalent)	0.1 mg/l
Chromium (total)	0.5 mg/l
Copper	0.5 mg/l
Cyanide (free)	0.1 mg/l
Cyanide (total)	1 mg/l
Fluoride	20 mg/l
Heavy Metals (total)	10 mg/l
Iron	3.5 mg/l
Lead	0.1 mg/l
Mercury	0.01 mg/l
Nickel	0.5 mg/l
Oil and Grease	10 mg/l
pH	6-9 S.U.[a]
Phenols	0.5 mg/l

TABLE 4.2-5

NATIONAL EFFLUENT STANDARDS (CONT'D)

Parameter	Standard
Selenium	0.1 mg/l
Silver	0.5 mg/l
Sulphide	1 mg/l
Temperature increase	<3 °C [b]
Total coliform bacteria	400 / 100 ml
Total suspended solids	2 mg/l
Total phosphorus	50 mg/l
Zinc	2 mg/l

Note : [a] Standard unit

[b] At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity; when the zone is not defined, use 100 meters from point of discharge

Sources : National Environmental Quality (emission) Guidelines 2015, Myanmar

However, the gaseous emission standards as specified in the draft concession agreement of the Project are more stringent than the national standards, except NOx, as shown in ***Table 4.2-6***. The Project will adopt the national standard for NOx.

TABLE 4.2-6

EMISSION STANDARDS FOR THE PROJECT

Parameter	Standard
Particulate matter, PM_{10}	60 mg/Nm^3
SO_2	20 ppm (20 mg/Nm^3)
NO_X	120 ppm (120 mg/Nm^3)

Sources: As specified by the draft concession agreement of the Project

CHAPTER 5

SUMMARY OF IMPACTS AND MITIGATION MEASURES

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5.1 PROJECT DESCRIPTION

A. Sector and Subsectors

The Project falls under the Power Generation Sector, natural gas subsector. Power generation using reciprocating gas engine is considered as one category of thermal power plants.

Boil-off Gas Power Plant Project involves initial phase development in the electricity generation subsector.

The Project will install a boil-off gas power plant in DSEZ to additionally supply electricity for LNG terminal consumption. Technically, this power plant will be utilized to generate electricity supply through boil-off gas, which is the supplementary benefit from LNG terminal.

Wartsila Model: W16V34SG is a selected technology innovation, with a footprint of only 113 m^2, made it a perfect fit. The two units have one Wartsila 16V34SG Engine each. Beneficially, they run on locally supplied natural gas and have a total output of 15.488 MW. In addition, it illustrates a high electrical efficiency through minimization of the plant's own consumption, as well as easily maintenance, referring to the Wartsila's data.

B. Project Size and Location

The proposed Boil-Off Gas Power Plant will be constructed on a 34 acre and plot, adjacent to the LNG Terminal, in the designated industrial estate area in DSEZ as indicated in ***Figures 5.1-1 and 5.1-2***. The coordinates of the project site are 1572050.46 N and 398256.35 E. This land plot has some patches of degraded mangrove forest and beach forest. The site is relatively flat with an average elevation at about 1 m above mean sea level (+1.0 m MSL). Three villages are located within 5 kilometer radius from the project site. One village is the fishing village of Nga Pitat. The remaining two villages, Nyaung Bin Siek and Mudu, are located further inland and on the opposite side of the tidal creek.

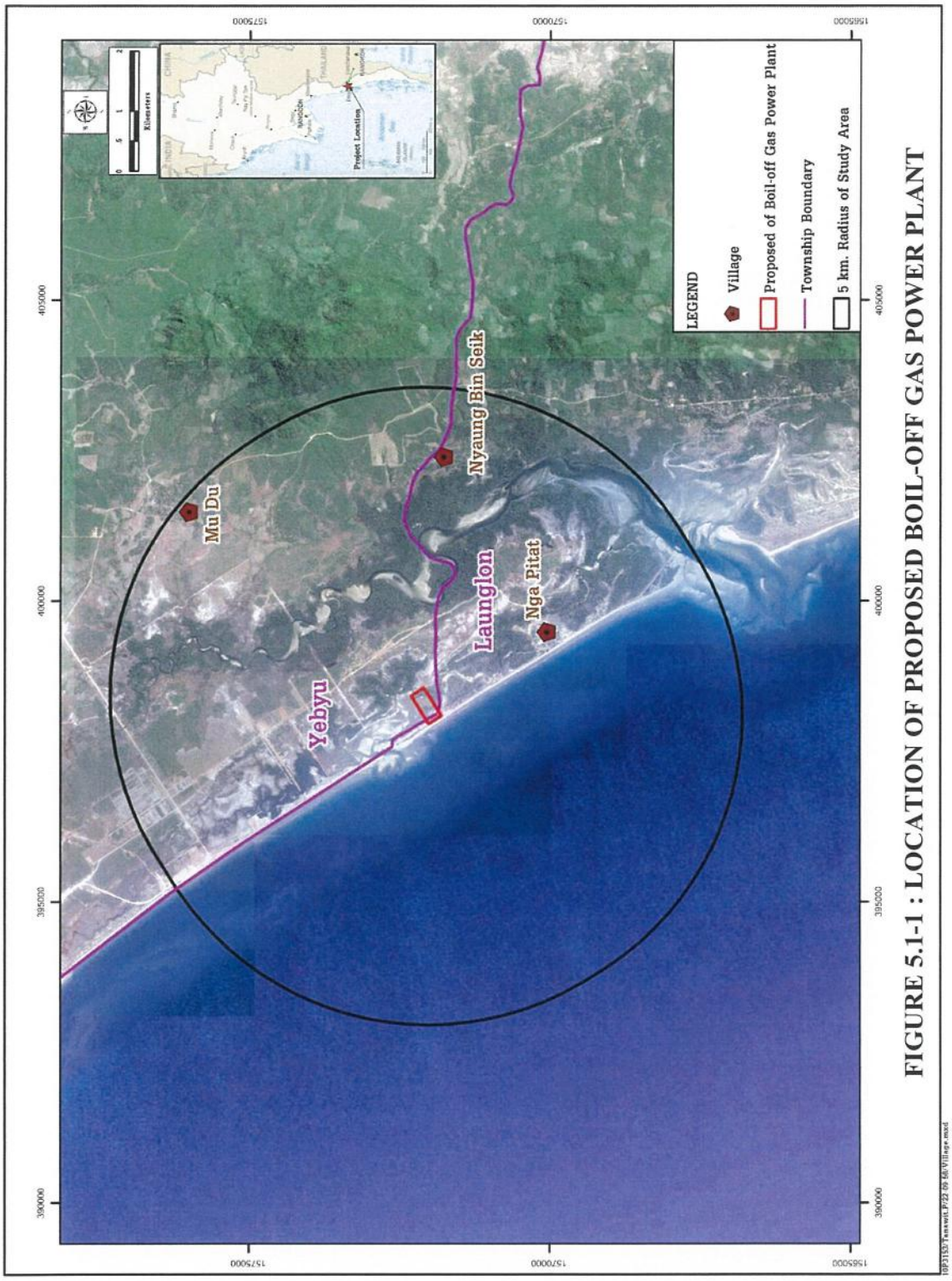


FIGURE 5.1-1 : LOCATION OF PROPOSED BOIL-OFF GAS POWER PLANT

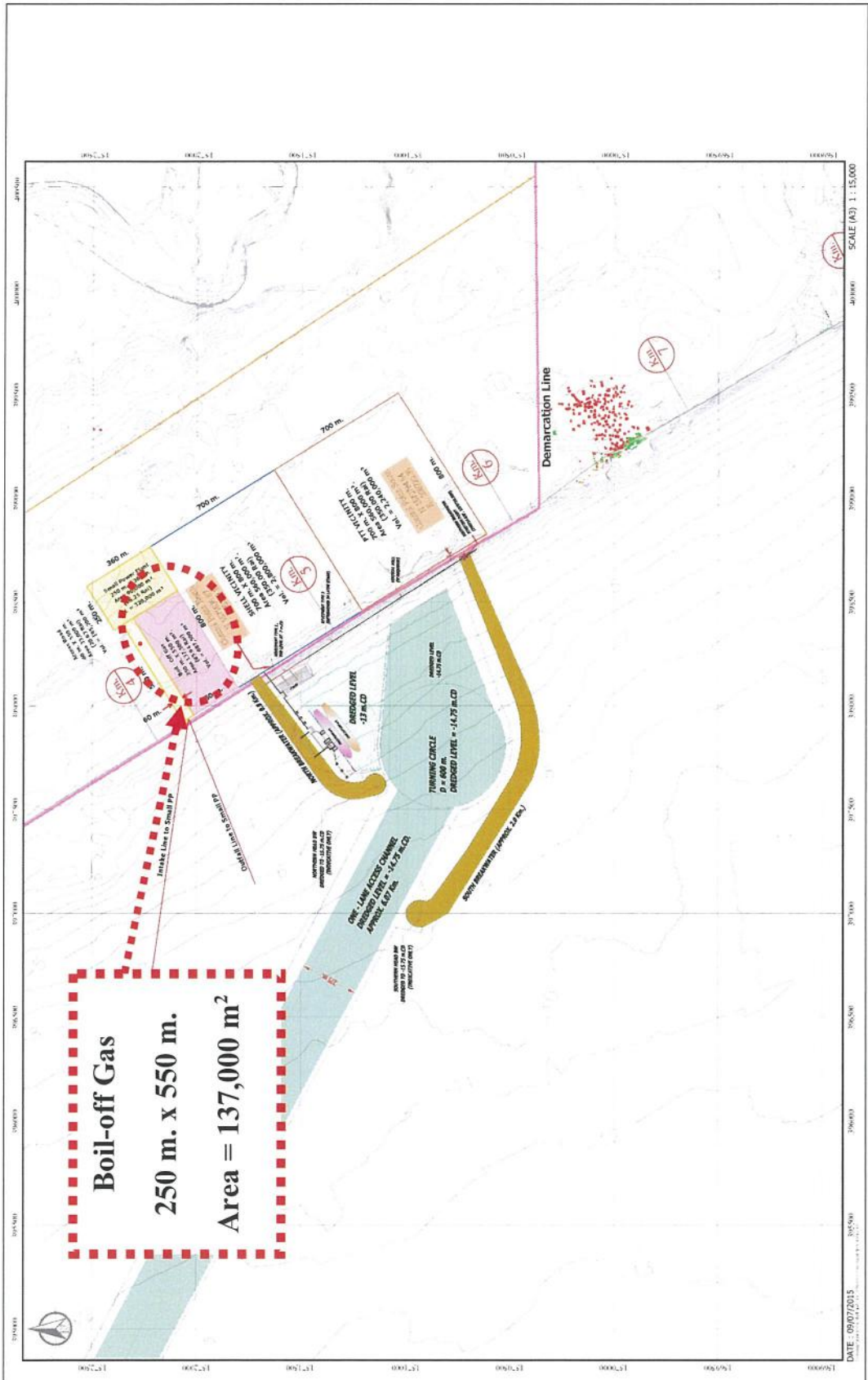


FIGURE 5.1-2: LOCATION OF PROPOSED BOIL OFF GAS POWER PLANT AND RELATED COMPONENTS (LNG TERMINAL AND SMALL POWER PLANT PROJECT)

C. Project Components

The Boil-Off Gas Power Plant will cover an area of about 6,000 m^2 (1.5 Acres). Major and other related components include:

1) Engine hall
2) Electrical equipment Building
3) Tank yard and switch yard, and;
4) Support facilities including compact workshop and warehouse, administration and social facility building, guardhouse, etc. These support facilities will be shared by the LNG terminal project.

The proposed boil-off gas power plant, after completion, will look similar to a similar power plant shown in ***Figure 5.1-3***.

FIGURE 5.1-3 : BOIL-OFF GAS POWER PLANT (W16V34SG)

Source : WARTSILA, 2015.

Detailed components of the boil-off gas power plant is shown in ***Figure 5.1-4***.

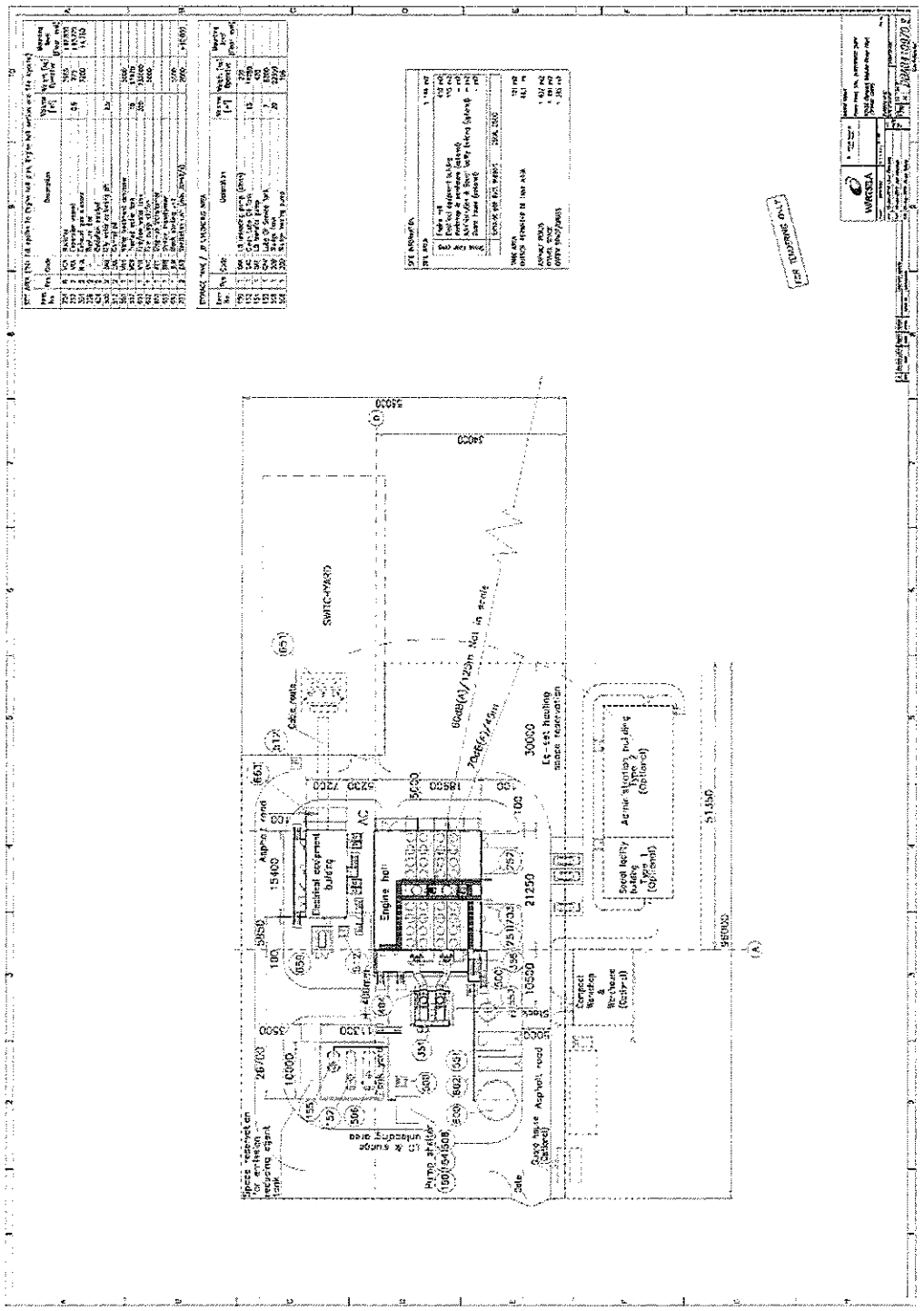


FIGURE 5.1-4 : COMPONENTS OF PROPOSED BOIL-OFF GAS POWER PLANT

D. Technical Features of the Boil-off Power Plant:

Technical details of gas engine:

Number of gas engines:	two units
Manufacturer:	Wärtsilä
Model:	W16V34SG Gas Cubes
Fuel:	BOG from the LNG terminal
Net Heat Rate (80%)	8,386 kJ/kWh (approx., incl. auxiliary load)
Nominal output:	7,200 kW
Nominal speed:	750 rpm
Stack height:	27.5 m.
Fuel consumption:	Approx. 8,000 btu/kWh

Technical details of generator:

Number of generator:	two units
Manufacturer:	AVK
Model:	DIG167 E/8
Power:	8,712 kVA
Rated power factor:	0.8
Current:	457 A
Nominal voltage:	11,000 V
Frequency:	50 Hz
Total Plant Gross Output:	15.488 MW
Net Plant Output:	15.488 MW
Net Heat Rate (80%):	8,386 kJ/kWh (approx., incl. auxiliary load)

E. Characteristics of Natural Gas

Characteristics of the BOG would be similar to those of the LNG to be imported by the LNG terminal project. ***Table 5.1-1*** presents characteristics of the average gas sample provided by the LNG supplier.

F. BOG Handling and Storage

The BOG will be transported from the LNG terminal through a gas pipeline to the gas metering and regulating station of the power plant. The gas supply pipeline will be laid underground.

TABLE 5.1-1

CHARACTERISTICS OF THE LNG TO BE IMPORTED

Component	Unit	Concentration
CO_2	% mol	0
N_2	% mol	0.25
C_1	% mol	92.20
C_2	% mol	5.95
C_3	% mol	1.40
IC_4	% mol	0.10
NC_4	% mol	0.10
IC_5	% mol	0
NC_5	% mol	0
C_6	% mol	0
C_7	% mol	0
C_{8+}	% mol	0
C_6	% mol	0
C_8	% mol	0
N_2	% mol	0
HHv ^{real}, sat.gas	Btu/scf.	1,083
HHv ^{real}, dry.gas	Btu/scf.	1,083

5.2 SUMMARY OF IMPACT

The identified environmental disturbances and mitigation measures during pre-construction phase are presented in ***Table 5.2-1***, the identified environmental disturbances and mitigation measures during construction phase are presented in ***Table 5.2-2***, the identified environmental disturbances and mitigation measures during operation phase are presented in ***Table 5.2-3 and*** the identified environmental disturbances and mitigation measures during decommissioning phase are presented in ***Table 5.2-4***.

TABLE 5.2-1

IMPACTS DURING PRE-CONSTRUCTION PHASE AND MITIGATION MEASURES

Environmental and Social Issue	Impacts	Mitigation Measures
Ecosystem	The site clearance and filling of boil-off power plant will permanently eliminate the existing swamp, mangrove, beach forest, fish, other aquatic animals and wildlife.	• Survey and record flora and fauna species in the Project site before land clearing. If endangered flora and fauna species are found, they should be moved to protected swamps and mangrove areas. • In consultation with concerned authorities such as MONREC, Forest Department, and Local Villagers, design and implement a mangrove reforestation program in areas outside DSEZ. The purpose is to compensate for the loss of mangrove area by the Project. • Green buffer zones should be created around the boundaries of the Project site. • Tree cutting will be avoided and cannot be done without prior permission from the Project Proponent's Project Manager.
Livelihood	Permanent Impact on Villagers in Nga Pitat Village near the Project site, harvest fish and other resources due to loss of the Britney Creek and mangrove in the Project site.	• The Project Proponent intends to develop Chi Oo Klong area inside Pan Din In River to provide the new ground for fishing and resource harvesting and the new area for fishing boats berthing. • The Project Proponent should design and implement a long term of livelihood restoration program (LRP) for the affected people in consultation with them and the concerned authorities
Fugitive Dust, Noise and Gaseous Emissions	NgaPitat Village will impact from dust diffusion and increase noise level due to site preparation works and heavy equipment e.g. bulldozers, excavators and graders	**Mitigation for Fugitive Dust** Water spraying could reduce as much as 75% of the dust. **Mitigation for Noise** Provide ear muff to workers working in the excessive noise environment.

TABLE 5.2-2

IMPACTS DURING CONSTRUCTION PHASE AND MITIGATION MEASURES

Environmental and Social Issue	Impacts	Mitigation Measures
Impacts from Gaseous Emission	Increases emissions from operation of trucks and heavy construction equipment.	**Mitigation Measures for to minimize gaseous emissions at sources** • Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the construction sites; • Maintain all construction equipment in proper working conditions according to the manufacturer's specifications. • Provide adequate training to the equipment operators in the proper use of equipment. • Use the proper size of equipment for the job. • Use the equipment fitted engines with latest low emission technologies (repowered engines, electric drive trains). • Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines). • Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes. • Ensure all construction vehicles and stationary plant and equipment powered by diesel motors are fitted with emission control measures, and are regularly maintained to manufacturers' specifications.

TABLE 5.2-2

IMPACTS DURING CONSTRUCTION PHASE AND MITIGATION MEASURES (CONT'D)

Environmental and Social Issue	Impacts	Mitigation Measures
Noise	Increase ambient noise level at the construction activities that generate excessive noise include soil compaction by heavy graders and truck	• Major construction activities which generate loud noise should be limited to only during the day time. • Speeds of vehicles in the construction site will not be more than 40 km/hr. • Noise performance requirements of construction equipment will need to be clearly stated in contract specifications. • Temporary sound barriers or shielding should be installed for non-mobile equipment. • The EPC contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period.
Wastewaters	Wastewaters from construction activities include: • Domestic sewage generated by daily living activities of about 70 construction personnel at peak of the construction • Wash waters in the construction site, mainly from truck wheel washing and concrete wash waters • Surface runoff	**Domestic Wastewater** • Kitchen and canteen waste water will be discharged into oil and grease trap tank before draining into a retention pond. • Toilet wastes will be discharged into a septic tank (or more than one septic tank) with a hydraulic retention time of about 5 days. • Grey water will be discharged into the retention pond which designed as an oxidation pond with a hydraulic retention time of about 7 days. **Wash waters** • The concrete wash water and the wheel wash water will be discharged into a concrete settling basin. The effluent will be treated to adjust the pH, if necessary, and reused. The remaining effluent will be discharged into the retention pond.

TABLE 5.2-2

IMPACTS DURING CONSTRUCTION PHASE AND MITIGATION MEASURES (CONT'D)

Environmental and Social Issue	Impacts	Mitigation Measures
Wastewaters (Cont'd)		**Surface runoff** • The site preparation activities, including land clearing and site filling and compaction, should be carried out during the dry season. • The power plant construction site should be surrounded by temporary fences to limit the amount of sediment that could be washed from the construction area during the raining time into the sea. • Construct a temporary drainage system to collect the surfaced runoff from the construction area to avoid the discharge of surface runoff into the open sea. • The collected storm water will be drained into a retention pond for removal of suspended solids before discharging into the sea or a nearby drainage channel, if exist.
Construction Wastes	During the construction of Project facilities, the following waste materials will be generated: • Vegetation from site clearance • Spoils and excavated materials from earth works (rocks, soil) • Construction material debris (concrete, wood, scrap metal) • Hazardous waste (empty fuel drums, used oil filters, batteries, spent solvents, oils) • Domestic wastes from site workers (food waste, waste paper, packaging)	**Waste Segregation** • The Contractor will design and implement a waste segregation system and procedure and communicate it to all construction personnel to strictly adhere to the segregation procedure. • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. **Waste Collection and Storage** • Daily collection and transport will be organized and carried out for each sub-category of segregated wastes; • The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil.

TABLE 5.2-2

IMPACTS DURING CONSTRUCTION PHASE AND MITIGATION MEASURES (CONT'D)

Environmental and Social Issue	Impacts	Mitigation Measures
Construction Wastes (Cont'd)		**Waste Reuse and Recycling** • Reuse of excavated material as fill at approved fill sites; • Topsoil free of weeds to be stockpiled and stored for re-use, if possible; • Collection and return of packaging materials (e.g. pallets) to suppliers wherever practicable; • Use of recycled materials to the limits of design in concrete, road base, asphalt and other construction materials; • Collection and recycling of used oils by a licensed contractor; **The remaining wastes that cannot be reused or recycled** • An efficient construction waste management system should be established and implemented. • Haphazard disposal of construction waste in or off the construction site will be prohibited. • Non-construction wastes will be disposed off with the construction wastes. • Provide adequate number of refuse bins or containers with tight covers, daily collection of disposal. • Hazardous wastes will be handled by a licensed hazardous waste contractor. • A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated.

TABLE 5.2-2

IMPACTS DURING CONSTRUCTION PHASE AND MITIGATION MEASURES (CONT'D)

Environmental and Social Issue	Impacts	Mitigation Measures
Road Traffic	Increase number of vehicle at ITD coastal road and Nga Pitat road due to transport construction wastes, construction materials, and plant equipment.	• In consultation with the concerned authorities at the national, regional, and township levels, develop and implement a Construction Traffic Management Plan • Measures to manage the operation of the construction truck fleet for incorporation into a Construction Vehicle management sub-plan • Heavy trailer trucks transporting heavy and large plant equipment will have to be directed by a traffic police car. • Notify the local community about proposed changes to local traffic access arising from construction activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement; • Prepare and implement an employee parking policy for the construction work sites. • Provide traffic controls designed for the safe movement of pedestrians and cyclists near the worksites.
Local Communities	**Local Economy** - Cash injection into the local economy due to workers requirement on local services, particularly foods and sundries - Opportunities of local people to work during project construction	**Local Economy** • Priority should be given to local employment, especially the villages close to the construction site; e.g. Nga Pitat, Nyaung Bin Seik and Mudu. • The recruitment process should be fair and transparent and wage rates are commensurate with experiences and qualifications. • The employment conditions will need to comply with the requirements in the national labor law, the social security law and standard wage rate, and other applicable laws and regulations.

TABLE 5.2-2

IMPACTS DURING CONSTRUCTION PHASE AND MITIGATION MEASURES (CONT'D)

Environmental and Social Issue	Impacts	Mitigation Measures
Local Communities (Cont'd)	**Livelihood** The major livelihood effect is adjust fishing ground activities in the new alternative fishing ground and boatyard area. In the early stage, the local people will obstruct to adjust fishing ground activities in the new area.	**Local Economy (Cont'd)** • The Project Proponent should establish good relationship with the locals and provide the locals with timely information about the project, likely impacts and mitigation measures, and procedures to address local concerns and grievances. • Disclose relevant information before the construction of major components and during the construction. **Livelihood** • Continue restore livelihoods through provision of knowledge for strengthening occupation career as proposed during pre-construction phase • Conduct attitude survey to collect information on local concerns, issues, and problems of the communities in the new alternative fishing ground and boatyard area (should be all household in Nga Pitat Village).
Community Health, Safety and Security	- Without proper management, the influx of construction workers could pose health risks to the communities in case of communicable diseases such as sexually transmitted diseases - The influx of workers could also pose security risks to the communities in terms of crimes and drug abuses.	**Health Risks** • All recruited workers should receive health examinations for screening of major communicable diseases before employment. Subsequently, annual check-ups should be provided. • Provide health awareness training to workers on hygiene and sanitation, communicable and infectious diseases. **Security Risk** • All workers should be cleared with the local security authorities regarding criminal records before employment. • The EPC contractor will be required to establish and implement a site security system and appropriate measures, including prevention of drug abuse.

TABLE 5.2-3

IMPACTS DURING OPERATION PHASE AND MITIGATION MEASURES

Environmental and Social Issue	Impacts	Mitigation Measures
Air Quality	• Affect to village due to gas emission from stack especially NO_2	• The reduction of NO_2 at source using the Low NO_2 burner will be adopted to meet the emission standard. There will be no need for further reduction of NO_2 in stack gas using such technology as SCR.
Wastewaters	Waste Waters of the boil-off gas power plant will come from the following sources: • Domestic sewage • Plant wash water • Strom water	• The wash water contaminated with oil will be segregated for oil removal in an oil separator. The oil-free wash water will then be combined with other wastewater streams for further treatment. • Domestic sewage will be treated in a small treatment plant. The treated effluent will be combined with the effluents from wash water and domestic sewage. • A drainage system will be provided to collect surface runoff and storm water discharged into the sewers or directly into the coastal water. Surface runoff from open areas contaminated by oil will be separately drained into an oil separator before discharging into the main drainage system.
Waste	During the operation phase, the following waste will be generated and need to be controlled: • Lubricating oil from maintenance of the engines • Waste lube oil and spent coolant from maintenance of the power plant	• Liquid waste will need to be classified and sorted out at source for stored and shipped to Thailand for regeneration. • Haphazard disposal of liquid waste in or off the power plant area will be prohibited. • Provide adequate number of bins or containers with tight covers, collection of liquid waste.

TABLE 5.2-4

IMPACTS DURING DECOMMISSIONING PHASE AND MITIGATION MEASURES

Environmental and Social Issue	Impacts	Mitigation Measures
Air Quality	Dust diffusion during demolition of onshore facilities and land reclamation	Frequent water spraying is normally used to suppress dust and it could reduce as much as 75% of the dust.
Noise	Increase noise level from heavy equipments and vehicles.	• A practical measure is to provide ear muff to workers working in the excessive noise environment. • Temporary sound barrier should be setting during demolition and land reclamation of small port to reduce noise impact to Nga Pitat Village.
Waste Management	• Residue from demolition activities • Hazardous waste • Domestic wastes from site workers	• The Contractor will design and implement a waste segregation system and procedure and communicate it to all worker to strictly adhere to the segregation procedure; • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories.
Land Reclamation	Land Reclamation	• Developer should design with discuss with concerned authority and local villagers to management on the open land after demolition complete. • Typical utilization on the open land such as mangrove reforestation, develop agriculture land, transfer port and area to local authorities to confirm use.

5.3 RISK ASSESSMENT

(1) Environmental Risk Management - Pre-construction Phase

A. Risk Identification

During pre-construction phase, two uncertain events or two environmental risks would be of concern to the Project Proponent:

- The Project may not be able to comply with environmental requirements prescribed by MONREC or other concerned authorities.
- The Project may be opposed to by stakeholders, especially the affected people in nearby communities.

B. Risk Analysis

Risk 1-Failure to comply with the environmental requirements

Potential causes:

- the EPC contractor and subcontractor have inadequate understanding of the environmental performance requirements of the Project
- the EPC contractor and subcontractor unintentionally omit the environmental requirements due to ambiguity of the environmental requirements in the contract
- inadequate supervision and monitoring of environmental mitigation activities of the EPC contractor and subcontractors
- changes in designs or construction methods without revising the originally proposed mitigation measures
- changes in the environmental requirements during the construction without the revision of the originally proposed mitigation measures

Risk 2-Public opposition to the Project

Potential causes:

- misunderstanding or misinformed of the nature, severity and extent of impacts of the Project
- rough relationship between the Project and the surrounding communities

C. Risk Classification

Risk 1 is considered major risk as it would have a high level of likelihood of occurrence and a high level of impacts.

Risk 2 is considered minor risk as it would have a low level of likelihood of occurrence and a high level of impacts.

D. Risk Mitigation Measures

Risk mitigation measures need to address the identified causes of the risk. Mitigation measures for the two identified risks correspond to the identified causes are presented in ***Table 6.2.2-1 (Chapter 6) of main report.***

(2) Environmental Risk Management - Construction Phase

A. Risk Identification

During the construction phase, three uncertain events or three environmental risks would be of concern to the Project Proponent:

- The Project may not be able to comply with environmental requirements prescribed by MONREC or other concerned authorities.
- The Project may be opposed to by stakeholders, especially the nearby communities.
- Fires and explosions may occur during the testing and commissioning period. However, this risk is similar to the operational risk, and it will therefore be included in the operational risks.

B. Risk Analysis

Risk 1-Cyclone Situation

Based on the historical storms, the following observations can be made:

- No cyclone in the period 1969 - 2011 made landfall in Dawei;
- Most of the cyclones are generated west of Dawei and move away from the site;
- The smallest distance between Dawei and a cyclone was 200 km.
- The probability of cyclone occurrence at Dawei is considered to be < 1 in 100 years for storms with a lower intensity that travel over land from the South China Sea.
- This would not motivate capital investments in the structures of the Boil-off Power Plant.

Risk 2-Tsunami

According to the result from "Report on Post Tsunami Survey along the Myanmar Coast for the December 2004 Sumatra-Andaman Earthquake, 2005", The study covered on Muangmagan beach. The study can summarize as follow:

- The tsunami height during 2004 at Muangmagan beach approximate 1.8 m,
- No adverse affected on the house and shop near Muangmagan beach. The effected only on increase water level on the beach along Muangmagan.

C. Risk Classification

Both Risk 1 and Risk 2 is considered minor risk as it would have a low level of likelihood of occurrence and a high level of impacts.

D. Risk Mitigation Measures

Even through very low effect from cyclone and tsunami to the boil-off power plan and facilities, risk mitigation measures need to address the identified causes of the risk. Mitigation measures for the two identified risks correspond to the identified causes are presented as follow:

- Prepare the detail design of boil-off power plant structure to withstand the cyclone and tsunami.
- Establish and regularly monitor the warning system for tsunami and cyclone.
- Set the safety zone for evacuation of staff and people in case of tsunami and cyclone.
- Set up the evacuation plan for tsunami and cyclone and train all staff in boil-off power plan.

(3) Environmental Risk Management - Operation Phase

A. Risk Identification

1) Operational Risks

During the commissioning and operational phases, the major concerns are on possible hazardous events which, if occur, would seriously damage the power plant and could cause injuries and fatalities to operational personnel and people in the nearest communities. The hazards in the power plants are generally well understood resulting in numerous standards and codes of practice to cover the design, construction, installation, testing, commissioning, operation and maintenance of the power plant facilities.

Recognized major hazards in gas-fired power plants include gas leakage, internal explosions, and failure of rotating machinery. Although these hazardous incidents are very rare for natural gas-fired power plants but they did occur.

2) Pollution Control Risks

Other risks would include the concerns on non-compliance with environmental requirements related to: (i) gaseous emission control, including emission standard, ambient air quality standard, and monitoring requirements; and (ii) wastewater management, including treated effluent standard. These concerns are minor for the Project as these two environmental issues are minor and would not have adverse consequences on the power plant or the surrounding communities.

B. Risk Analysis

1) Operational Risks

Consequences

If a serious accident occurs, the damages would be contained within the power plant site as the nearest community is about 2.22 km away.

Underlying Causes

Several studies of failures of chemical and power plants traced the incidents to the following root causes or underlying causes: (i) faulty designs; (ii) defective equipment and improper equipment installation and construction; (iii) inadequate and/or improper operation and maintenance procedures; and (iv) human error in the operations and maintenance.

Likelihood of Occurrence

The likelihood of occurrence of the operational risks would be low if: (i) technical specifications and performance requirements are clearly prescribed in the contract; (ii) equipment suppliers have good track records in safety; (iii) close supervision and quality control of the installation and construction; (iv) rigorous training of operators; (v) clear and adequate operational procedures for all operations and maintenance; and (vi) efficient plant safety management.

2) Gaseous Emission Control Risks

Consequences

The Project's power plant will generate only very small amounts of NOx and SO_2. Therefore, non-compliance with the emission standards and monitoring requirements, if occurs, will not create a significant impact on local air quality. Nevertheless, the non-compliance, when detected, will need to be rectified as soon as possible.

Underlying Causes

Non-compliance with the gaseous emission control requirements may be caused by the following:

- the actual efficiency of the installed low NOx burner is lower than the 30% level used in the calculation of emission standard;

Likelihood of Occurrence

Considering the above possible causes, the likelihood of occurrence of the non-compliance with the gaseous emission control requirements would be low.

3) Wastewater Control Risk

Consequences

The wastewater generated in the power plant operation, even without treatment, will contribute only insignificant amounts of non-toxic pollutants into the sea. Therefore, non-compliance with the treated effluent standards and monitoring requirements, if occurs, will not result in a serious degradation of the seawater quality. Nevertheless, the non-compliance, when detected, will need to be rectified as soon as possible.

Underlying Causes

Non-compliance with the wastewater control requirements may be caused by the following:

- Inadequate operational management of the wastewater collection and treatment facilities resulting in a part of wastewater bypassing the treatment facilities, poor performance of the treatment facilities, and negligence of monitoring tasks;
- Inadequate maintenance of the collection and treatment facilities;

Likelihood of Occurrence

Considering the possible causes, the likelihood of occurrence of the non-compliance with wastewater control requirements would be medium.

C. Risk Classification

1) Operational Risks

Although the operational risks could have serious consequences on the power plant, their likelihood of occurrence is low. Therefore, they are classified as moderate risks.

2) Pollution Control Risks

Gaseous Emission Control

The risk related to the compliance with the gaseous emission control requirements is rated as minor or insignificant risk.

Wastewater Control

The risk events related to the wastewater control requirements could also be rated as minor or insignificant risk.

D. Risk Mitigation Measures

1) Operational Risks

Measures for managing the operational risks will be divided into two groups. The first group will aim at minimizing the possibility of faulty design and defects in the equipment, equipment installation, and construction. The second group will aim at minimizing inadequacies in the operation and maintenance procedures, and human error in the operations and maintenance. The first group of measures will be mainly related to the EPC contractor and his design consultant and subcontractors. The second group of measures will be related to both the EPC contractor and the boil-off gas power plant operational team.

2) Pollution Control Risks

No special risk mitigation measures will be required. Careful selection of the low NOx burner will be adequate to minimize the risk. Other possible causes of the risks will be minimized by efficient environmental management.

(4) Environmental Risk Management - Decommissioning Phase

A. Risk Identification

If the power plant is decommissioned, i.e. taken out of operation, it would need to be demolished and dismantled. During the decommissioning phase, major activities will be removal of equipment, pipes, and cables, cleaning the equipment, tanks, and pipes, and demolition of control building and removal of instrument. The main environmental issues are fugitive dust and gas emission caused by heavy machines and equipment, noise, disposal of waste and hazardous waste. The potentially affected environmental components to be considered are coastal water, soil, groundwater and occupational health and safety of personnel.

B. Risk Analysis

It is study in case of opportunity of proposed project site to get impact form air, noise, water and occupational health.

The identified risk events could be caused by the following:

Potential causes:

- the EPC contractor and subcontractor have inadequate understanding of the environmental performance requirements of the Project
- the EPC contractor and subcontractor unintentionally omit the environmental requirements due to ambiguity of the environmental requirements in the contract
- inadequate supervision and monitoring of environmental mitigation activities of the EPC contractor and subcontractors
- changes in designs or decommission methods without revising the originally proposed mitigation measures

- changes in the environmental requirements during the decommission without the revision of the originally proposed mitigation measures

C. Risk Classification

Risk during decommission phase is considered major risk as it would have a medium level of likelihood of occurrence and a medium level of impacts.

D. Risk Mitigation Measures

1) Mitigation Measures to Reduce Fugitive Dust

At all the decommissioning sites, measures should be implemented to reduce fugitive dust emission. The most common measures are:

- Spray water at and around the decommissioning areas and access roads during site demolishing and dismantling.
- Enforce a speed limit for vehicles and trucks in the decommissioning sites not to exceed 40 km/hr. Decommissioning activities shall be kept as planned so that the disturbed areas will be minimized at any time.
- Prohibit the open burning of waste in the decommissioning area.
- Dust masks should be provided (where applicable) to all construction workers.

2) Mitigation Measures to Reduce Noise

2.1) Physical Measures

- The noise reduction at the perimeter could be achieved using an acoustic wall or a sound barrier at least 3 m high with adequate length to block the noise emanating to the receptor. However, this would not be necessary as the nearest community is 600 m from the decommissioning site.
- Provide ear plugs or ear muffs to workers operating in the excessive noise areas.

2.2) Management Measures

The following management measures should be implemented to complement the physical measures.

- Major construction activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures.
- Speeds of vehicles in the decommissioning site will not be more than 40 km/hr.
- Temporary sound barriers or shielding should be installed for non-mobile equipment.

3) Mitigation Measures for Waste Management

- The contractor will design and implement a waste segregation system and procedure and communicate it to all worker to strictly adhere to the segregation procedure.

- An appropriate number of containers with adequate volume and appropriate materials will be to support the segregation. Each waste category will be segregated into recycles, reuse and disposal sub-categories.

CHAPTER 6

CONSTRUCTION PHASE EMP

CHAPTER 6

CONSTRUCTION PHASE EMP

6.1 OBJECTIVES OF THE CEMP

For the Project proponent, the objective of environmental management of Project construction is to ensure that the construction will not create significant impacts and will meet all applicable standards and guidelines and requirements prescribed as conditions for issuing an Environmental Compliance Certificate (ECC). The standards, guidelines and requirements will be prescribed in the Contract.

The key objective of the Owner-CEMP (OCEMP) is to establish a clear operational framework and requirements for environmental management during the construction phase of the Project. Based on the OCEMP, the Contractor will prepare a Contractor-CEMP (CCEMP) which will have operational details based on the detailed designs, construction methods, and construction schedule. The CCEMP will therefore be part of the Contract.

6.2 MAPS

Project construction will take place at one site. ***Figure 6.2-1*** is a base map of the main construction site and villages within 5 km radius.

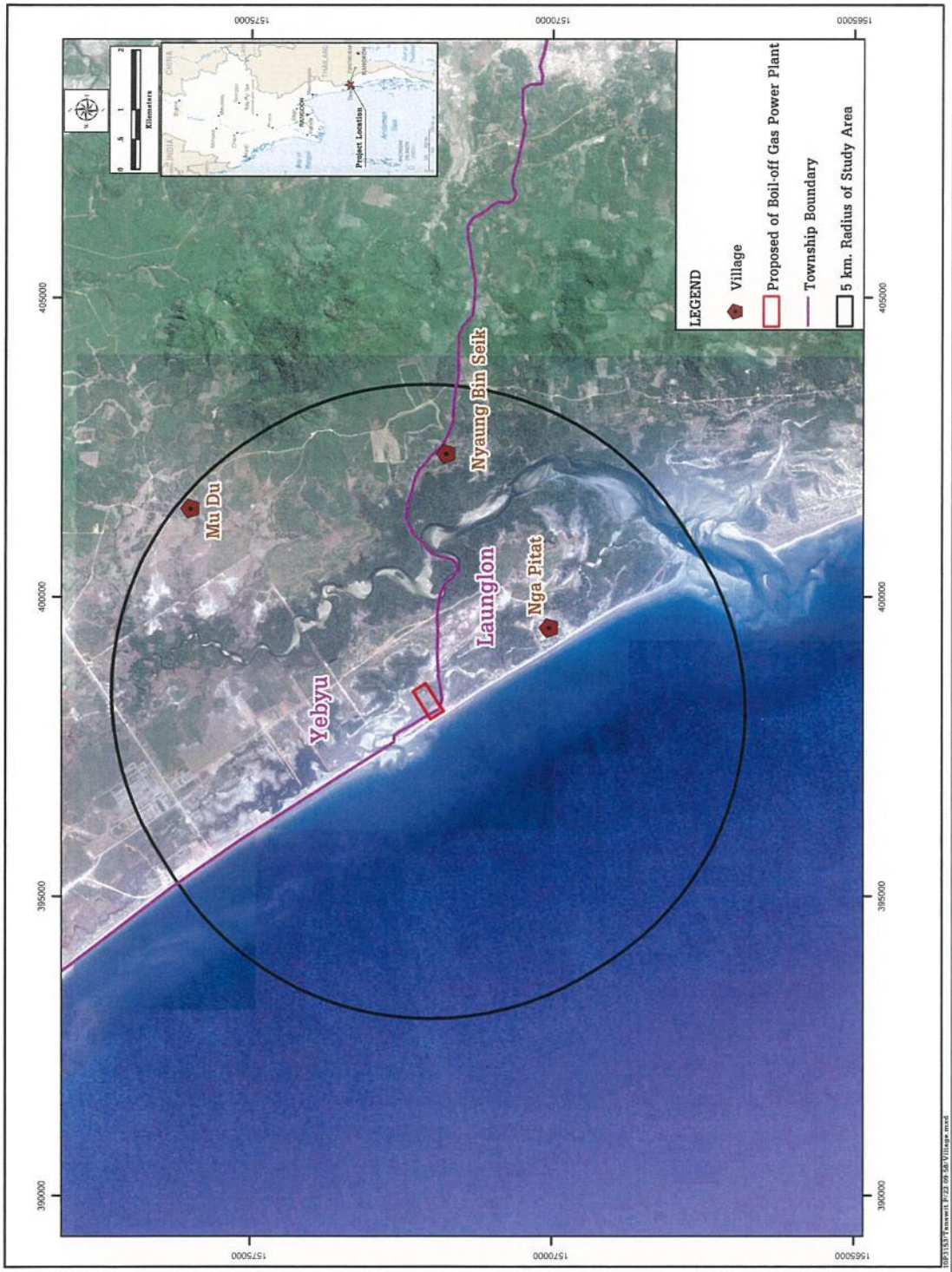


FIGURE 6.2-1 : THE PROJECT CONSTRUCTION SITE AND SURROUNDING VILLAGES

6.3 IMPACT AND MANAGEMENT PLAN

Environmental issues expected at various stages of construction were identified based on a tentative construction schedule prepared by the Consultant for the EIA study purpose (see ***Table 6.3-1***).

TABLE 6.3-1

ANTICIPATED IMPACTS AT VARIOUS MONTHS OF THE CONSTRUCTION

Construction Activities	Duration (Months)	Impacts
Phase 1: Earth and Foundation work and Building Structures	6.5	Dust, Noise, Wastewater, Solid Waste, Road Traffic, Mangrove, Social and Livelihood
Phase 2: Installation of Gas Engines and Associate Equipments	2	Air, Noise, Road traffic
Phase 3: Load Test and Commission Test	2	Air, Noise
Phase 4: Completion Stage	4	Air, Noise

The following issues will be managed during the pre-construction/construction phase: (1) general construction, (2) mangrove management (3) air quality management, (4) noise, (5) wastewater management, (6) waste management, (7) hazardous waste management, (8) traffic management, (9) OHS management, (10) natural used monitoring plan, (11) social environmental management, and (12) emergency management plan (flood, tsunami, and cyclone). A sub-management plan for each of the identified issues is prepared and the 12 sub-plans are presented in Appendix 6A. The Contractor will update the sub-plans and include in the Contractor-CEMP. Each sub-plan will be a working document and as such it will be reviewed and amended or updated as deemed necessary to reflect changes in construction schedule and management review changes.

6.4 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

The Project proponent and the Contractor will both be involved in environmental management of the Project construction. The Contractor will select construction methods or practices that have least environmental impacts, thus meeting environmental performance targets prescribed in the Contract. During the construction, the Contractor will implement, under supervision of the Project proponent, impact mitigation measures prescribed in the Contract.

The Project proponent and the Contractor will have to establish and operate their own environmental management systems (EMS) for the Project construction. The two EMSs will be related and based on the same information base. The Project proponent's EMS will be focused on monitoring and reviewing environmental compliance at the Project level as part of the Project management. The Contractor's EMS will be focused on environmental management at the task level as part of the construction management. The two EMSs will therefore be complementary and will enable the Contractor and the Project proponent to complete the Project construction with no significant environmental impacts.

The EMS of the Project Proponent will adopt the following procedures:

6.4.1 Monitoring, Evaluation and Reporting

6.4.1.1 Scheduled Environmental Monitoring and Evaluation

Before commencing the construction, the Contractor will review and update existing data on relevant baseline environmental condition, particularly at locations expected to be affected by the construction.

Scheduled monitoring of environmental performance is required throughout the construction phase of the Project to evaluate compliance with legal requirements, the environmental management objectives, and relevant policies, standards and guidelines. The monitoring and evaluation will enable the overall effectiveness of the environmental controls to be determined and allow areas of non-compliance to be identified so corrective actions can be taken. The environmental monitoring plan for each issue to be managed is also presented in each sub-plan.

Environmental monitoring will be undertaken according to the following:

- The Contractor's Environmental, Health and Safety (EHS) Manager is responsible for implementing the monitoring plans, and arranging training and specialist consultants for the monitoring as required.
- The monitoring will be conducted by the Contractor using the approved methods stated in the Contract.
- Environmental results not meeting the required standards will be managed as per the corrective action process and issued with a non-compliance report.

- The EHS Manager will advise the Contractor Project Manager of any non-compliance from monitoring and will report these to the Owner's EHS Manager as required.

6.4.1.2 Site Inspections

In addition to scheduled environmental monitoring, the Contractor's EHS Manager will conduct daily, weekly, and monthly general inspections at the construction site. The objectives are to early identify or detect factors which, if unattended to, could result in major environmental events and/or non-compliance. A general scope of inspections is outlined below in ***Table 6.4-1*** and it will need to be updated when the detailed construction plan is made.

The daily inspections will be informal visual inspections to observe conditions of the construction sites. The focus will be on the Boil-off Gas Power Plant construction site where construction activities are concentrated.

The weekly inspections will be formal visual inspections in more details than the daily inspections.

The Contractor's EHS Manager will be responsible for the daily and weekly site inspections. The Owner's EHS Manager will participate in the weekly site inspections, and occasionally in the daily site inspections.

The monthly inspections will be conducted in more detail than the weekly inspections. The monthly inspections will also include risk triggers identified in the environmental risk management plan. The monthly inspections will be conducted jointly by personnel from both sides, including the Project Managers, the Construction Manager and the EHS Managers.

TABLE 6.4-1

OUTLINE OF SITE INSPECTION PLAN FOR CONSTRUCTION

Inspection Focus	Daily Inspection	Weekly Inspection	Monthly Inspection
1. Onshore			
1.1 Project Clearance	√	√	√
1.2 Land Leveling	√	√	√
1.3 Sanitation Condition of Worker Camp, Canteen, Office, Construction Site		√	√
1.4 Storage of Construction Material and Hazardous Material		√	√
1.5 Fugitive Dust	√	√	√
1.6 Ambient Noise Level	√	√	√
1.7 Safety in Work Place	√	√	√
1.8 Drainage	√	√	√
1.9 Traffic Accident	√	√	√
1.10 Wastewater Disposal	√	√	√
1.11 Risk Trigger			√
2. Offshore			
2.1 Coastal Water Quality and Marine Ecology	√	√	√
2.2 Navigation Accident	√	√	√
2.3 Safety in Work Place	√	√	√
2.4 Risk Trigger			√

6.4.2 Environmental Incidents

6.4.2.1 Definition of an Environmental Incident

In addition to scheduled environmental monitoring, the monitoring will also cover environmental incidents. An environmental incident during Project construction is an occurrence which has (or potentially could have had) a negative or adverse effect on the environment. An adverse effect is something that causes (or could have caused) environmental harm. An environmental incident can also be a deviation from a requirement or practice prescribed in this CEMP and the Contractor CEMP. This means there has been a failure to follow the established process or procedures that help the Project achieve best practice (e.g. failure to report a spill). Some environmental incident could create an emergency, i.e. its impact is so serious that it has to be promptly dealt with. Potential environmental incidents and emergencies are identified in the environmental risk assessment for the construction phase in ***Chapter 5***.

6.4.2.2 Environmental Incident Form

An environmental incident, once noted, has to be recorded in an Environmental Incident Form (EIF). A standard Environmental Incident Form (EIF) template will be used for all site specific activities throughout the construction of the Project.

6.4.2.3 Environmental Incident Register

The Contractor's EHS Manager will input all data from completed EIFs as soon as possible to generate an Environmental Incident Register (EIR). A standard Environmental Incident Register (EIR) will be controlled by the Contractor's EHS Manager. It will contain all environmental incidents occurring on the construction sites of the Boil-off Gas Power Plant and other components. The EIR will be discussed regularly at the project environmental performance review meetings. These meetings will discuss the corrective actions taken, and the preventative measures that have been put in place.

6.4.3 Monitoring Reports

Two types of monitoring reports will be generated in the environmental monitoring and site inspections. The first type is reports generated for internal use to provide feedback to the EMS. The second type is reports generated for submission to Ministry of Natural Resources and Environment Conservation (MONREC), which will be disclosed to public as prescribed in ***Chapter IX*** of the ESIA Procedure.

6.4.3.1 Internal Monitoring Reports

Site Inspection Reports

The Contractor's EHS Manager will record results of the daily inspections in daily site inspection notes. The Contractor's EHS Manager and Construction Manager will review the daily site inspection notes on a weekly basis to confirm that the checks and subsequent required works are being carried out, and additional inspections are included as per construction progress.

For weekly inspections, the Contractor's EHS Manager will present results of the inspections in weekly site inspection reports for discussion in the weekly project review meetings. Both the daily inspection notes and weekly inspection reports will highlight factors or events that could lead to non-compliance and will need attention of the Contractor's Project Manager.

The Contractor's EHS Manager will prepare monthly site inspection reports as part of the monthly environmental monitoring reports.

Environmental Monitoring Reports

The Contractor's EHS Manager will prepare monthly environmental performance reports for submission to the Owner's Project Manager. The monthly environmental monitoring report will concisely present (i) results of scheduled environmental monitoring and site inspections carried out during the month; (ii) identified non-compliance, if any, and causes of the non-compliance; (iii) complaints received; (iv) environmental incidents; (v) associated investigations and corrective actions taken; (vi) proposed changes to the monitoring plan, if any; and (vii) work program for the following month.

The monthly environmental performance reports will be discussed in the monthly project status review meetings or in separate monthly environmental performance meetings as appropriate.

6.4.3.2 Monitoring Reports for Submission to MONREC

Based on the monthly internal monitoring reports and results of the monthly review meetings, the Owner's EHS Manager will prepare a project environmental monitoring report every six months for submission to MONREC. This report as prescribed in the ESIA Procedure (***Article 108, 109***, and ***110***) will contain the followings:

- 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 monitoring reports should also present the construction progress over the report period.

6.4.4 Corrective Actions

The Contractor will be instructed by the Owner's Project Manager to take corrective actions for any identified non-compliance with prescribed environmental indicators. Taking corrective actions in the context of CEMP will have to be a part of project management and will use the same procedure for taking corrective actions in project management. The procedure proposed in the CEMP will therefore have to be reviewed and revised as necessary to make it similar to the procedure for project management.A single procedure for taking corrective actions should be used in project management.

The Contractor is required to establish own procedure for corrective actions related to EHS non-compliances.

A. Categories of Non-Compliances

Non-compliances cover non-compliance with legal requirements, non-conformance with internal requirements of the Project, inadequate environmental performance, environmental incident, and complaints or grievances received from the public. Non-compliances could be identified from the following:

- External EHS audits;
- Internal EHS audits;
- Site inspection notes and reports;
- Schedule environmental monitoring;
- Complaints, grievance or inquiries registers;
- Environmental incident registers;
- Specific environmental studies and reports;
- Directives from MONREC/ECD or other government authorities;
- Review meetings;
- Recommendations from any project staff member, Contractor or visitors, which are considered by the EHS Manager and the Project Manager to warrant investigation.

B. Categories of Non-Compliances

EHS non-compliances can be identified, ranked and recorded at three levels. Once the level of anon-compliance has been established the appropriate tool shall automatically be selected for closing out the non-compliance. The actions required for each are detailed below; also a temporary work suspension for cause may be enforced in case of Level A or B non- compliances.

Level A: A critical non-compliance situation, typically including material damage to or a reasonable expectation of impending material damage to an ecologically or socially sensitive resource or has the potential for an extreme health and safety incident. Intentional disregard of project standards which may lead to a serious EHS incident is also classified as Level A.

Level B: A non-compliance situation that has not yet resulted in clearly identified damage or irreversible impact to sensitive important resource, or has the potential for a serious health and safety incident. It requires expeditious corrective action and site specific attention to prevent such effects. Repeated Level B non-compliance may become Level A non-compliance if left unattended or are continuously recurring.

Level C: A non-compliance situation not consistent with the original requirements but not believed to present an immediate threat to an identified important resource, community or employee health and safety. Repeated Level C non-compliance may become Level B non-compliance if left unattended.

The non-compliance may also be of a procedural nature where the Contractor has failed to implement specified requirements and actions. In this case, the Contractor may need to take actions to ensure the procedural requirements are effectively implemented.

C. Responsibilities and Process

The Owner's EHS Manager will be responsible for identifying and ranking EHS non-compliances. However, all Project management personnel are encouraged to help identify EHS non-conformance.

The Owner's EHS Manager will take actions according to the category of non-compliances.

For Level A Non-Compliances: The Owner's EHS Manager will report the identified non-conformances to the Project Manager with recommendations on corrective actions and instructions for the Contractor.

For Level B Non-Compliances: The Owner's EHS Manager will issue instructions to the Contractor in consultation with the Project Manager and the Resident Engineer as necessary.

For Level C Non-Compliances: The Owner's EHS Manager will instruct the Contractor to take appropriate corrective actions.

The Project Manager will be responsible for:

- Issuing instructions to the Contractor to take corrective actions within a given timeframe;
- Follow up on corrective actions taken by the Contractor;
- Evaluate the results of taking corrective actions;
- Prepare a non-compliance report to close the case.

The Contractor will be required to conduct an investigation of the non-compliance to determine its root causes and formulate effective actions to correct the root causes.

For Level B and C non-compliances, the Contractor will submit a brief note on corrective actions to be taken to the EHS Manager and the Resident Engineer, if the corrective actions are related to change in construction practices.

For Level A non-compliances, the Contractor will submit a brief report on the results of investigation and proposed corrective actions to the Project Manager through the EHS Manager and the Resident Engineer, if the corrective actions are related to change in construction method.

D. Corrective Action Request

Instructions to the Contractor will be in the form of Corrective Action Request (CAR). The CAR will contain: (i) information sources of non-compliance; (ii) description of non-compliance; (iii) category of non-compliance; (iv) originator; and (v) time frame for corrective actions.

The corrective action requirements will be included in the requirement tracking system of the project management information system.

E. Non-Compliance Report

The EHS Manager will prepare a brief non-compliance report based on the CAR and reports from the Contractor. The non-compliance report will contain: (i) information in the CAR; (ii) corrective actions taken by the Contractor; (iii) implementation period; (iv) results; and (v) recommendation for further actions, if any. The non-compliance report should be in one or two pages in a Form to be designed.

Each and every non-compliance report will be closed out on a progressive basis, until construction is completed.

Non Compliance Report Forms will be verified and closed out by the originator or his designee. Correspondence referring to a proposed course of action shall be referenced and attached to the Non Compliance Report Form as appropriate and stored within the Project Documentation System.

6.5 EMERGENCY RESPONSE PLAN

The Contractor will be required to prepare an emergency response plan to efficiently and effectively cope with accidents and emergencies which may occur during the construction period. Considering the nature and magnitude of the construction and the construction site, the emergency response plan would deal with work accidents and accidental fires. Natural emergency events such as earthquakes and floods would be very unlikely. Consequently, the emergency response plan during the construction would focus on procedures and facilities to deal with work accidents and accidental fires to minimize injuries and loss of lives, damage to properties, and construction delay.The emergency response plan will be a part of the OSH system. Facilities to be provided on site will contain at minimum the following: fully equipped first aid station, fire-fighting equipment, arranged access to emergency services of the local hospital, and direct communication link with local fire brigades and other relevant government authorities and the local police station.

6.6 ARRANGEMENTS FOR OPERATING THE EMS

6.6.1 Responsibilities

There are three key groups with responsibility for environmental management of the Project:

- Project Proponent or Project Owner who manages the Project through a Project Manager;
- Contractor as the party undertaking the construction; and
- MONREC through Environmental Conservation Department (ECD), and other government agencies at the regional, township and community levels.

Responsibilities of each party in environmental management are as follows:

Project Proponent

The Project Proponent is legally responsible to MONREC and other line organizations responsible for specific environmental issues for environmental performance of the Project as prescribed as conditions in the ECC and other permits.

Specifically, the Project Proponent will have the following responsibilities:

- Supervise closely the Contractor in implementing the Contractor CEMP as an integral part of its project implementation management and construction supervision.
- Submit periodic monitoring reports to MONREC as required in the ESIA Procedure.
- Notwithstanding the periodic monitoring reports to be submitted to MONREC, keep MONREC, and other concerned authorities informed of any serious environmental events and responses to the events.
- Conducting periodic audit of environmental and social performances of the Contractor.

Contractor

The Contractor, including its approved sub-contractors, is contractually responsible to the Project Proponent for environmental performance of the construction as prescribed in the construction Contract.

Specifically, the Contractor will have the following responsibilities:

- Prepare a detailed Contractor CEMP for review and approval by the Project Proponent. The Contractor CEMP should follow the outline prescribed by the Project Proponent as proposed in ***Appendix 6A***.
- Implement the mitigation measures during the construction through construction method statements and work instructions in strict conformance with environmental conducts prescribed in the Contract.
- Ensure that all process and environmental control equipment meet all technical specifications related to their environmental performance.
- Conduct periodic monitoring and reporting of its compliance with the environmental and social performance prescribed in the Contract.
- Ensure that its sub-contractors shall comply with the Contractor CEMP.
- Consistently update the Contractor CEMP and submit the updated version to the Project Proponent for approval.

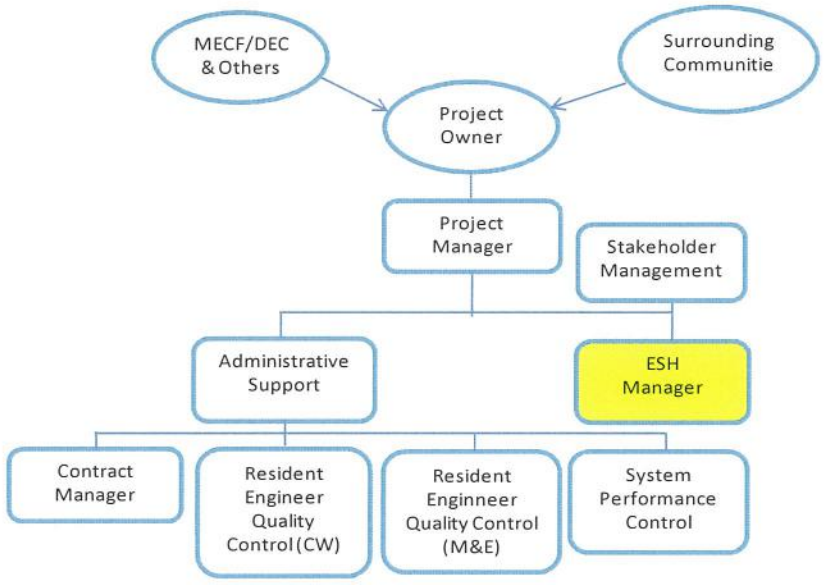
MONREC

MONREC is the key agency to monitor and evaluate environmental performance of the Project construction.Other agencies concerned will support MONREC in the monitoring and evaluation of environmental performance of the Project construction.

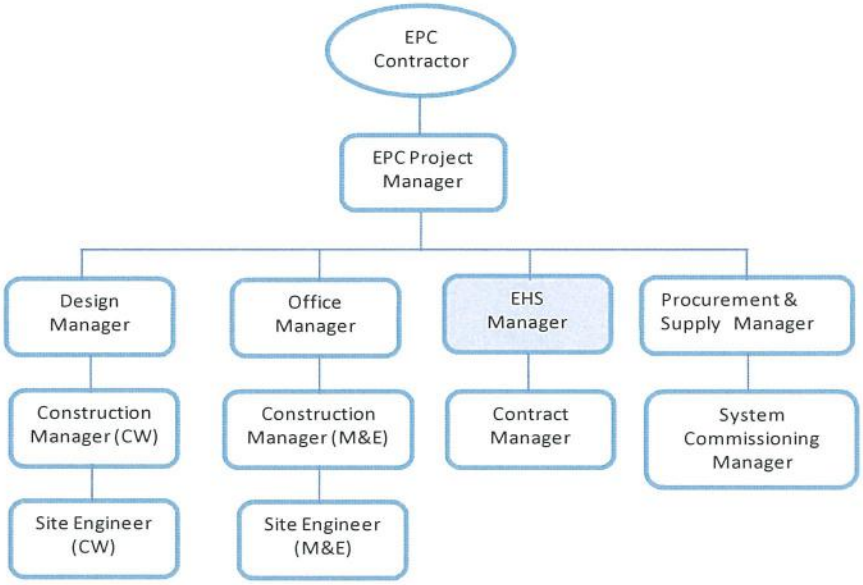
Other agencies concerned will cooperate with MONREC in the monitoring and evaluation of project implementation and environmental performance of the project during pre-construction and construction phases

Organizational Structure

As environmental management will be carried out as part of the Project management, it will be a functional unit in the project management organization. ***Figure 6.6-1*** shows a tentative organizational structure for Project construction consisting of an organizational structure of the Project Proponent and an organizational structure of the Contractor. The two organizational structures will need to be revised as appropriate as the Project moves from the planning stage to the design stage.



PROJECT MANAGEMENT STRUCTURE



EPC CONTRACTOR'S PROJECT MANAGEMENT STRUCTURE

FIGURE 6.6-1 : ORGANIZATION FOR PROJECT CONSTRUCTION

(1) Organizational Structure of the Project Proponent

The Project Proponent will establish a Project Management Office (PMO), headed by a Project Manager. The Project Manager will be responsible for the overall Project management to ensure that the Project construction will be completed on time and fully meet the requirements on scope, quality, budget and environmental performance of the Project construction. The PMO will have seven functional units: (i) Contract management and administration; (ii) construction quality control (civil works); (iii) quality control (mechanical and electrical works); (iv) system performance control; (v) environmental, health and safety management; (vi) stakeholder management; and (vii) administrative support.

The EHS management and the stakeholder management functions are directly related to the implementation of the Project CEMP. The two functions cover the following tasks or activities:

EHS Management Function:

- Review the Contractor CEMP and environmentally-related construction method statements and work instructions prepared by the Contractor;
- Ensure that environmental monitoring activities of the Contractor are properly carried out and will generate reliable data;
- Inspect sites where environmental mitigation measures are implemented;
- Review periodic EHS reports submitted by the Contractor;
- Evaluate the Contractor's environmental performance;
- Prepare Project EHS performance reports;
- In consultation with the relevant quality control functional unit, prepare recommendations to the Project Manager on corrective actions related to environmental performance;
- Coordinating with MONREC/ECD, and other government agencies concerned regarding monitoring environmental compliance of the Project; and
- Make arrangements to facilitate site inspection by MONREC/ECD, and other agencies concerned.

Stakeholder Management Function:

- Design and implement an appropriate Corporate social responsibility (CSR) program for the Project;
- Process public complaints in accordance with the public grievance redress process;
- Carry out community and public relation activities to ensure acceptance of the Project by all key stakeholders of the Project; and
- Coordinate with the EHS Manager in making arrangements for site visit or inspection by the Project stakeholders.

(2) Organizational Structure of the Contractor

The Contractor will establish a Contractor Project Management Office (CPMO), headed by a Contractor Project Manager. The Contractor Project Manager will be responsible for the overall management of Project construction, testing and commissioning of the Boil-off Gas Power Plant and associated facilities to ensure that the Project construction will be completed on time and fully meet the requirements on scope, quality, budget and environmental performance. The Contractor may have a certain organizational structure but the EHS function is required.

The construction management and the EHS management functions are directly related to the implementation of the Contract-specific or Contractor CEMP. The two functions cover the following tasks or activities:

(a) Construction Management Function

- Translate environmental mitigation measures into construction method statements and work instructions for engineers and foremen to carry out;
- Closely supervise construction activities with environmental impacts and implementation of mitigation measures to ensure residual environmental impacts will be within permissible limits;
- Ensure full compliance with all environmental management covenants in the Contract; and
- Coordinate and facilitate environmental monitoring activities of the EHS personnel.

(b) EHS Management Function:

- Review the Project CEMP and prepare a Contract specific CEMP;
- Update the Contractor-specific CEMP as needed to reflect the latest changes in construction plan or schedules;
- Prepare environmentally-related construction method statements and work instructions in consultation with the construction management functional unit;
- Carry out environmental monitoring of construction activities as prescribed in the monitoring schedules in the Contract-specific CEMP;
- Closely supervise the implementation of environmental mitigation measures in collaboration with the construction management functional unit;
- Prepare periodic EHS performance reports for submitting to the Project Proponent;
- Coordinate with the EHS management functional unit of the Project Proponent to facilitate site inspection or visits of officials from MONREC/ECD, other government agencies, and representatives of communities in the vicinities;
- Cooperate with the Project Proponent in investigations related to public complaints;

- In consultation with the construction management functional unit, prepare recommendations to the Contractor Project Manager on corrective actions related to environmental performance; and
- Carry out environmental monitoring during the commissioning of Boil-off Gas Power Plant system and prepare an environmental performance report of the Boil-off Gas Power Plant.

It should be noted that environmental management during the system commissioning will be included in the OEMP.The Boil-off Gas Power Plant operation and maintenance team will participate in the commissioning and will take over the Boil-off Gas Power Plant and associated facilities once the technical and environmental performance of the Boil-off Gas Power Plant is accepted.

The Project Management team will support the Boil-off Gas Power Plant O&M team during the transition phase between construction and operational phases. In particular, the Project Management team is responsible for the sign off construction and post construction resource consent and designation conditions, handover of environmental monitoring data and reports and compliance and audit reports before the Project is handed to the O&M team.

6.6.2 Documentation

All documents generated in environmental management and references used will be systematically filed and maintained as part of the Project documentation system. The Contractor is required to design and establish an appropriate documentation system for environmental management as an element of its project documentation system which is an integral element of its project management information system. The documentation system will include an appropriate document control procedure.

The Contractor will ensure that the Project Proponent will have a convenient access to its documentation system for environmental management.The documentation system will provide information for environmental audit of the Contractor. Details on the access to the documentation system and documentation control related to the Project Proponent will be worked out by the Contractor and presented in its CEMP.

6.6.3 Communication Plan

Environmental management of the Project construction will involve communication, both internally and externally. Clear, concise and timely communications are important to the achievement of the objectives of environmental management.

Internal communication will involve: (i) communications within PMO; and (ii) communications within CPMO; and (iii) communications between PMO and CPMO. External communication will involve communications between PMO and stakeholders and the public. Communications between CPMO and stakeholders will need to receive prior concurrence of PMO.

Communications relevant to environmental management of the Project construction will clearly be a part of the project communication.

(1) Objectives of Communication

Internal Communication

The objective of internal communication within PMO and CPMO is to ensure efficiency of environmental management of the Project construction.

The objective of internal communication between PMO and CPMO is to ensure efficiency in monitoring and control environmental management performance of the Contractor, which leads to efficient environmental management of the Project construction.

External Communication

The objective of external communication between PMO and MONREC Port Authorities, and other concerned government authorities is to comply with the reporting requirements prescribed in the ESIA Procedure.

The objectives of external communication between PMO and communities around the Project site as well as mass media and Non-Governmental Organizations (NGOs), if any, are to: (i) ensure adequate and correct understanding of environmental impacts of the Project; and (ii) keep the stakeholders closely informed of the Project's efforts in environmental management and environmental performance of the Project construction. The bottom line is to create trust among the stakeholders in the Project's determination and commitment to environmental management to enable the Project to exist in harmony with the environment and communities.

(2) Topics of Communication

Major topics of communication include:

- Scope of construction;
- Construction schedule;
- Environmental impacts and mitigation measures;
- Environmental policy, objectives, and targets;
- Environmental management roles and responsibilities;
- Legal requirements and environmental quality standards;
- OCEMP;
- CCEMP;
- Results of environmental monitoring and performance evaluation;
- Hazards and emergency situation; and
- Mechanisms for grievance redress, queries, comments, or complaints from stakeholders

As communication involves providing information, information requirements related to the above communication topics for various communicating parties will need to be identified. Internal and external communications will have different information requirements as they have different objectives. ***Table 6.6-1*** presents a tentative information requirements for the internal and external communications.

TABLE 6.6-1

INFORMATION REQUIREMENTS FOR INTERNAL AND EXTERNAL COMMUNICATIONS IN ENVIRONMENTAL MANAGEMENT DURING CONSTRUCTION

Information	Communications	
	Internal	External
Basic Information		
Corporate's environmental policy on project construction	√	√
ESIA Report	√	√
Owner-CEMP	√	√
MONREC's EHS requirements or conditions attached to the issuance of ECC	√	√
Contractor-CEMP	√	√
EHS's specification and clauses in the EPC contract	√	
Construction schedule	√	√
Project EMS	√	
Project management organization-Owner	√	√
Construction management organization-Contractor	√	√
Information Generated in EHS Management		
Daily, weekly and monthly site inspection reports	√	
Environmental monitoring results	√	
Minutes of project review meetings-EHS	√	
Monthly monitoring reports	√	
Minutes of Tripartite Committee's meetings	√	√
Complaints register and response	√	√
Reports on visits by media and stakeholders for environmental purposes	√	
Environmental incident reports	√	√
Corrective action reports	√	√
Biannual monitoring reports submitted to MONREC	√	

(3) Methods of Communication

The internal communication will use informal communication, formal communication through meetings, and formal correspondence in writing through e-mail or letters, notice boards, and formal notifications or instructions.The methods of communication will follow the methods of project communication.

The external communication will use a variety of methods depending on the purpose of communication and the stakeholders. The methods of communication will follow the methods of project communication.

(4) Responsibilities

Project Proponent

The EMS Manager of the Project Proponent is responsible for:

- Communicating the Project's environmental policy, commitments and procedures to all project management staff;
- Communicating roles and responsibilities for environmental management and the results of monitoring activities carried out by the Contractor;
- External communications with stakeholders under the supervision of the Project Manager;
- Preparing a list of information to be provided in external communication and persons with authority to release the information;
- Recording the external communication on an External Communication Log and tracking any pending matters; and
- Supporting the Project's public relation activities through providing environmentally related information.

The Contractor

The EMS Manager of the Contractor has the following responsibilities:

- Communicating the Project's environmental policy, commitments and procedures to all project management and construction personnel;
- Communicating roles and responsibilities for environmental management and the results of monitoring activities to all personnel;
- Providing information support to the Project Proponent's EMS Manager for use in external communication with stakeholders as well as in internal communication.

(5) Management Review

This CEMP will be consistently reviewed and updated by the EMS Manager or the Project Manager to ensure that it adequately responds to the construction progress and changes in the construction schedule and methods, if any.

6.7 PUBLIC CONSULTATION AND DISCLOSURE

6.7.1 Organization for Public Consultation

The CEMP proposes a tripartite committee as the main mechanism for public consultation and disclosure. The components and responsibilities of the tripartite committee are defined. A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the construction will be effectively addressed as soon as possible.

The tripartite committee established during the construction phase should be maintained. However, its role would be more on providing advice in the implementation of the community support plan. The components and responsibilities of the tripartite committee are defined. A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the Boil-off Gas Power Plant operation will be effectively addressed as quick as possible.

6.7.2 Information Disclosure

Information to be disclosed during the Project construction phase will be monitoring reports as required in Article 110 of the ESIA Procedure shown below.

Within ten (10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the Project Proponent shall make such report (except as may relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Project offices. Any organization or person may request a digital copy of a monitoring report and the Project shall, within ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.

The Owner PMO will make arrangements for the disclosure of monitoring reports in compliance with the above legal requirements. In addition, information on environmental management will be disclosed to the proposed tripartite committee.

6.7.3 Grievance Redress

A grievance redress process will be established and implemented as part of project management by the PMO. The process is shown in a diagram in ***Figure 6.7-1.*** Each step of the process is clearly explained in the diagram. The process will enable efficient management of grievance redress or response to complaints related to EHS of the Project construction.

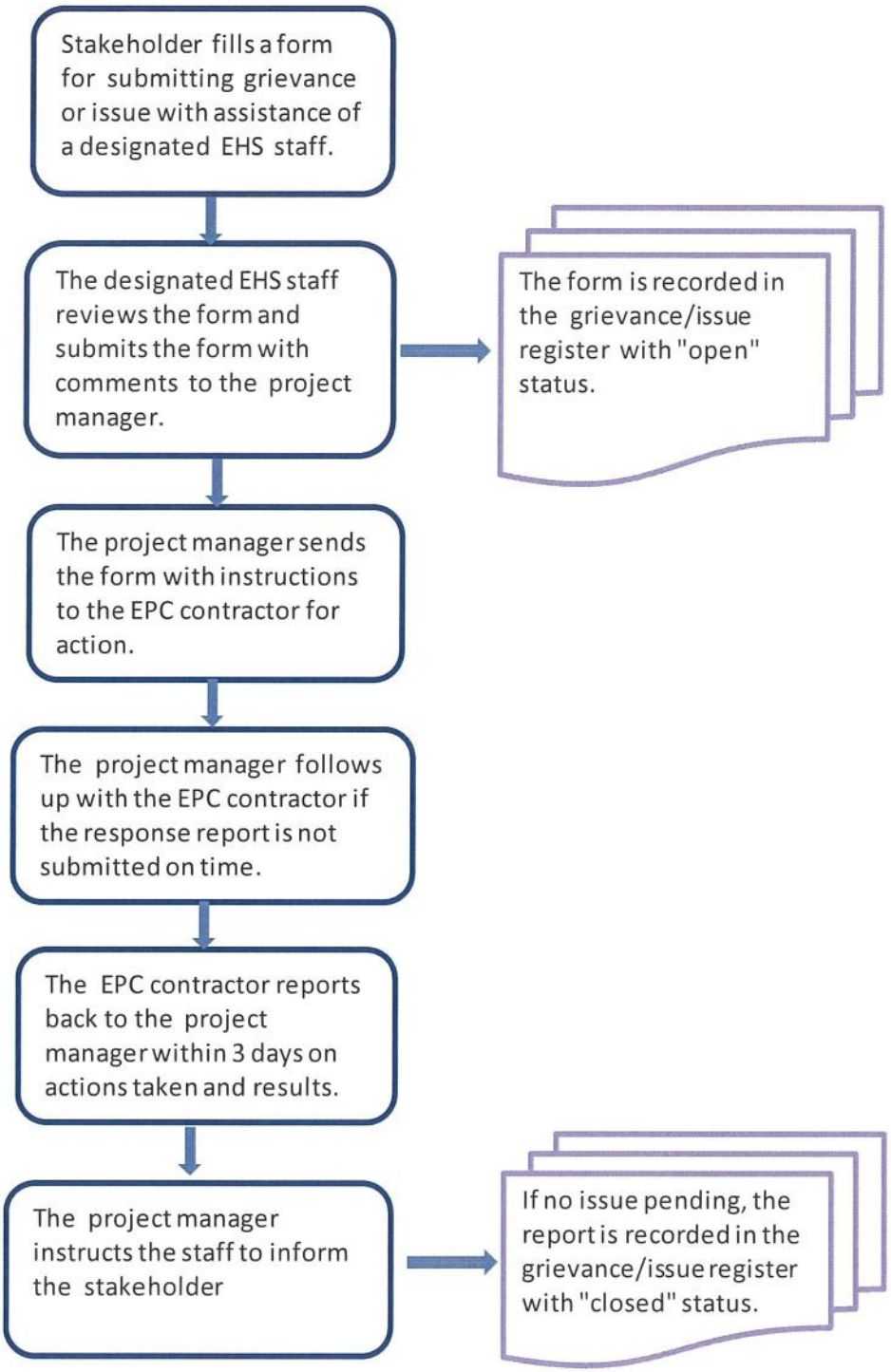


FIGURE 6.7-1 : GRIEVANCE MANAGEMENT PROCESS

6.8 ENVIRONMENTAL RISK MANAGEMENT

Environmental risk management is to be carried out as part of the Project risk management.***Section 6.6*** on environmental risk assessment identifies and assesses environmental risks during the construction phase. Each major environmental risk will be documented in an Environmental Risk Register (ERR). The ERR is to be maintained and regularly updated and reassessed to allow all significant aspects to be identified. The Risk Register will allow the Project team to monitor risk factors, update the risk assessment, and make changes to the risk mitigation measures and controls accordingly to ensure efficient risk management. It should be noted that an emergency plan is essentially a risk mitigation measure.

6.9 AUDIT

An audit is proposed at the end of the first year of operation and thereafter, if necessary.

CHAPTER 7

OPERATIONAL PHASE EMP

CHAPTER 7

OPERATIONAL PHASE EMP

7.1 OBJECTIVES OF THE OEMP

Environmental management in the operational phase will be carried out by an Operation and Maintenance (O&M) organization to be established by the Project Developer. The objective of environmental management of Project operation is to ensure that O&M of the Boil-off Gas Power Plant and its associated facilities will not create significant impacts and will meet all applicable standards and guidelines and requirements prescribed as conditions for issuing an Environmental Compliance Certificate (ECC) and the operation permit.

The key objective of the Operation EMP (OEMP) presented in this section is to establish a clear operational framework for environmental management during the operational phase of the Project. The Engineering Procurement Construction (EPC) Contractor will then use this OEMP to prepare a more detailed OEMP which will be based on the detailed designs of the Boil-off Gas Power Plant, results of the commissioning, and O&M details. The detailed OEMP will be reviewed and revised as appropriate by the power plant O&M team to reflect actual conditions during commercial operation.

7.2 MITIGATION MEASURES AND PLANS

The ESIA study (***Volume 1 - ESIA Report*** in ***Chapter 6***) confirms that O&M of the Boil-off Gas Power Plant and its associated facilities will not create any significant environmental impacts. Environmental management is presented in ***Appendix7A***.

The sub-plans will be working documents and as such they will be reviewed and amended or updated as deemed necessary.

7.3 ENVIRONMENTAL RISK MANAGEMENT

Environmental risk management is to be carried out as part of the Boil-off Gas Power Plant risk management. ***Section 5.3*** indicate environmental risk assessment identifies and assesses environmental risks during the operational phase. Each major environmental risk will be documented in an Environmental Risk Register (ERR). The ERR is to be maintained and regularly updated and reassessed to allow all significant aspects to be identified. The Risk Register will allow the Environmental, Health and Safety (EHS) Manager to monitor risk factors, update the risk assessment, and make changes to the risk mitigation measures and controls accordingly to ensure efficient environmental risk management. It should be noted that an emergency plan is essentially a risk mitigation measure.

7.4 ENVIRONMENTAL INCIDENTS

1. Definition of an Environmental Incident

In addition to scheduled environmental monitoring, the monitoring will also cover environmental incidents. An environmental incident during Project operation is an occurrence which has (or potentially could have had) a negative or adverse effect on the environment. An adverse effect is something that causes (or could have caused) environmental harm. An environmental incident can also be a deviation from a requirement or practice prescribed in this OEMP. This means there has been a failure to follow the established process or procedures that help the Project achieve best practice (e.g. failure to report a spill). Some environmental incident could create an emergency, i.e. its impact is so serious that it has to be promptly dealt with. Potential environmental incidents and emergencies are identified in the environmental risk assessment for the operation phase in ***Chapter 5***.

2. Environmental Incident Form

An environmental incident, once noted, has to be recorded in an Environmental Incident Form (EIF). A standard Environmental Incident Form (EIF) template will be used for all site specific activities throughout the construction of the Project.

3. Environmental Incident Register

The Project Manager will input all data from completed EIFs as soon as possible to generate an Environmental Incident Register (EIR). A standard Environmental Incident Register (EIR) will be controlled by the Contractor's EHS Manager. It will contain all environmental incidents occurring on the construction sites of the power plant, transmission line, gas pipeline, and access road. The EIR will be discussed regularly at the project environmental performance review meetings. These meetings will discuss the corrective actions taken, and the preventative measures that have been put in place.

7.5 MONITORING, EVALUATING AND REPORTING

The MER will include scheduled monitoring of noise, air quality, coastal water and marine ecology, continue monitor on mangrove management, shoreline erosion, navigation and other related components needed to be monitored.

Air Quality monitoring will conduct least twice a year during 1^{st}-5^{th} year of operation phase and 1 time per year throughout operation phase at project site and Villages (closest sensitive receptor).

Monitor on mangrove management will be conducted twice a year during 1^{st}-10^{th} year of operation phases to check types and quantity of flora and fauna in mangrove rehabilitation area.

Project developer should be continue attitude survey at Villages about new fishing ground and boat yard area to ensure the villagers can use natural resource in the new alternative area. The monitoring will be conducted 2 time per year during 1^{st}-5^{th} year and once a year during 6^{th}-10^{th} year of operation phases

The sampling and analysis requirements will be similar to those of the surveys conducted before the commissioning. Annual environmental reports will be prepared for submission to MONREC and other concerned authorities.

7.6 CORRECTIVE ACTIONS

Corrective actions are described as part of the management of the implementation of the community support. The process is discussed in the sub-plans (***Appendix 7A***).

7.7 ORGANIZATION

As environmental management will be carried out as part of the Boil-off Gas Power Plant management, it is a functional unit in the Boil-off Gas Power Plant management organization.***Figure 7.7-1*** shows a tentative organizational structure for Boil-off Gas Power Plant management, including the EHS unit.The organizational structure will be revised as appropriate in due course by the Project developer before the commissioning.

7.8 PUBLIC CONSULTATION AND DISCLOSURE

The tripartite committee established during the construction phase should be maintained. However, its role would be more on providing advice in the implementation of the community support plan. The components and responsibilities of the tripartite committee are defined. A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the Boil-off Gas Power Plant operation will be effectively addressed as quick as possible.

7.9 GRIEVANCE REDRESS PROCESS

A grievance redress process is proposed as mechanism for ensuring that public complaints and concerns related to the Boil-off Power Plant operation will be effectively addressed as quick as possible. The process is shown in a diagram in ***Figure 7.9-1***.

7.10 AUDIT

An audit is proposed at the end of the first year of operation and every year thereafter, if necessary.

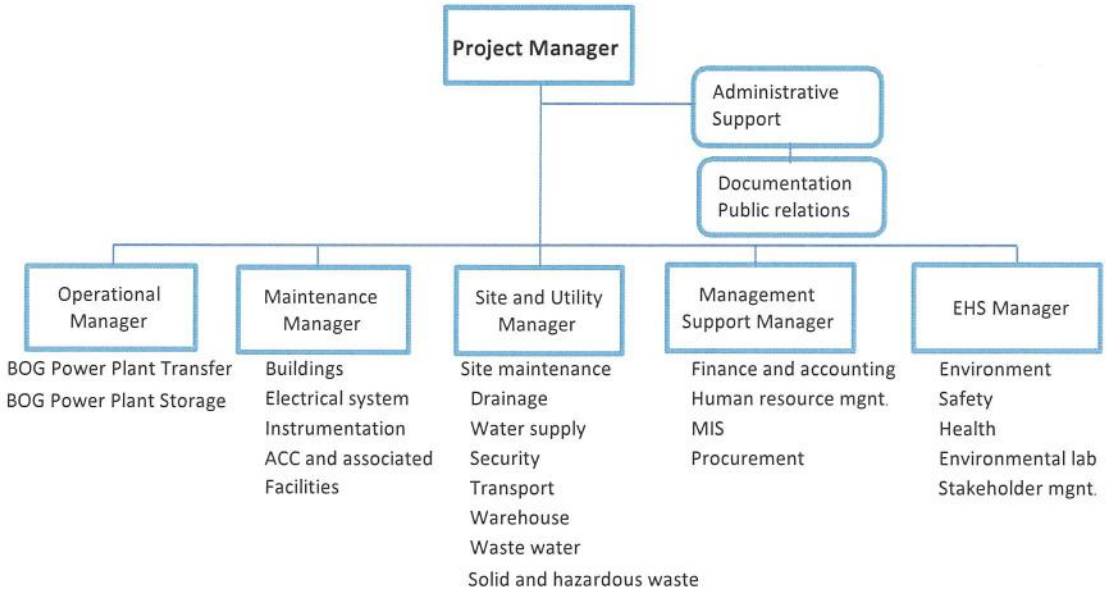


FIGURE 7.7-1 : TENTATIVE ORGANIZATION FOR BOIL-OFF GAS POWER PLANT O&M AND ENVIRONMENTAL MANAGEMENT

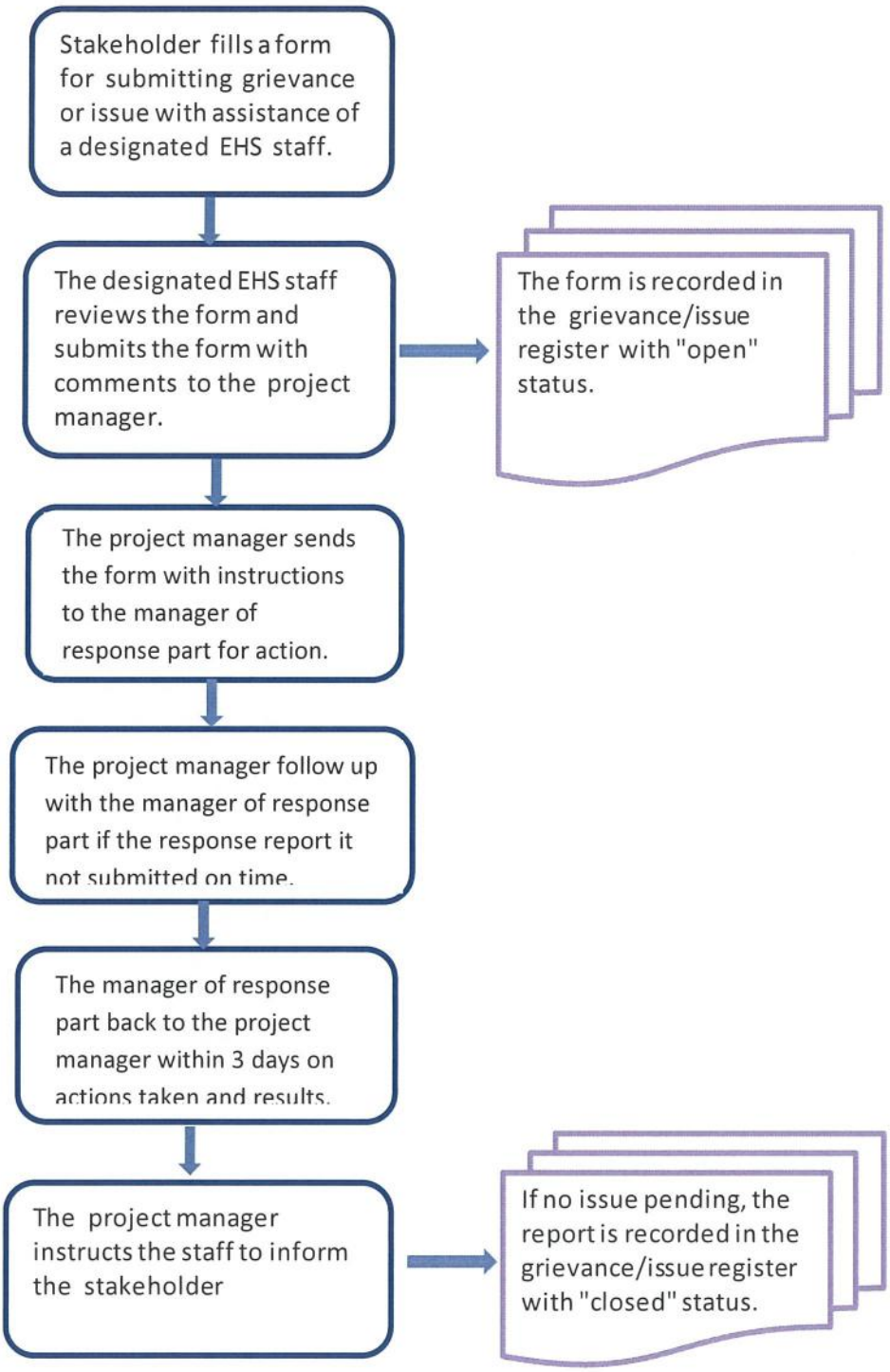


FIGURE 7.9-1 : GRIEVANCE MANAGEMENT PROCESS DURING OPERATION PHASES

CHAPTER 8

EMERGENCY PLAN

CHAPTER 8
EMERGENCY PLAN

According to impact and risk assessment in ***Chapter 6*** of ESIA Report, the emergency plan for flood, cyclone, tsunami and contingency plan must be prepared to protect and minimize impact in case of ship collision and any kind of risk will appear. The detail of each plan are described as follow:

8.1 EMERGENCY PLAN FOR TSUNAMI AND CYCLONE

Even through the tsunami and cyclone situation have not ever found in the project area, Seismic Hazard Map from Meteorological and Hydrological Department, Myanmar, indicate that the Boil-off Gas Power Plant area is classified as a moderate seismic zone, so impacts from this issue may be low or moderate (Probable range of ground acceleration = 0.1-0.15 g).

With the location near Indian Ocean, the tsunami may occur again similar to the situation in 2004 caused by earthquake in Indian Ocean.

The recommendation about emergency and contingency plan for the Boil-off Gas Power Plant in case of cyclone and tsunami protection include:

- Prepare the detail design of Boil-off Gas Power Plant to withstand the cyclone and tsunami.
- Establish and regularly monitor the warning system for tsunami.
- Set the safety zone for evacuation of staff and people in case of tsunami and cyclone.
- Set up the evacuation plan for tsunami and cyclone and train all staff in Boil-off Gas Power Plant.

Refer to the Tsunami Emergency Planning in Australia, 2010, Tsunami emergency plans should cover strategies to be used in preparedness, response and the initiation of recovery for tsunami.

Table 8.1-1 described the concept details of content considerations which may be included in tsunami and cyclone emergency plans. This concept will be required for Project Proponent and Contractor to prepare an emergency response plan to efficiently and effectively cope with accidents and emergencies which may occur in case of Tsunami Situation.

For flood situation, flash flood or normal flood will be minimized through detailed design on drainage system of project site, to handle with all kinds of flood.

TABLE 8.1-1
CONCEPT DETAILS FOR TSUNAMI AND CYCLONE EMERGENCY PLANS

Phase	Content
Preparedness	• Review of Plans • Establishment and review of tsunami risk assessment / intelligence • Conduct of community education • Establishment and/or maintenance of warning systems
Response	• Control and coordination arrangements • Outline of operational divisions / sectors • Location of operations centres • Warning at-risk communities • Evacuation of at-risk affected communities; including the identification of suitables evacuation routes and shelters • Provision of welfare relief • Pre-deployment of resources to staging areas outside the impact area • Protection of emergency land and marine resources by removing them from likely impact areas • Restriction of access and security of evacuated areas • Reconnaissance / monitoring of potentially affected areas and the undertaking of rapid impact assessments • Rescue of trapped and injured people • Care for sick and injured persons • Disaster victim registration • Disaster victim identification • Establishment of a public enquiry system • Issue of 'all clear'
Recovery	• Initiation of recovery • Recovery coordination • Conduct of after action reviews / debriefs
General	• Description of the risk within the scope of the Plan

Source: Tsunami Emergency Planning in Australia, 2010

8.2 IMPLEMENTATION ARRANGEMENTS

Environmental management on emergency plan needs to be an integral element of environmental management and risk management of the operational phase. Therefore, the organization for environmental management proposed in the CEMP will also be responsible for environmental risk management.

However, the proposed measures for managing the operational risks will need to be implemented by project management team during the design and construction phase and by the power plant management team starting from the testing and commissioning through the operational phase.

The Boil-off Gas Power Plant management organization should have an emergency plan committee to be chaired by the manager and participated by the operational manager and the EHS manager. Other members of the safety management committee would be head of various units of sections of the Boil-off Gas Power Plant. These unit heads will be responsible for the operation and maintenance of the units in strict adherence to the applicable work procedures. The risk committee will be involved in operational and environmental risks, including safety aspect. The risk committee will consistently review and evaluate the operational risks of the power plant, and recommend necessary improvements of the work procedures to ensure the risks are minimized or avoided. ***Figure 8.2-1*** shows the tentative organization chart of emergency responsible team for Boil-off Gas Power Plant Project.

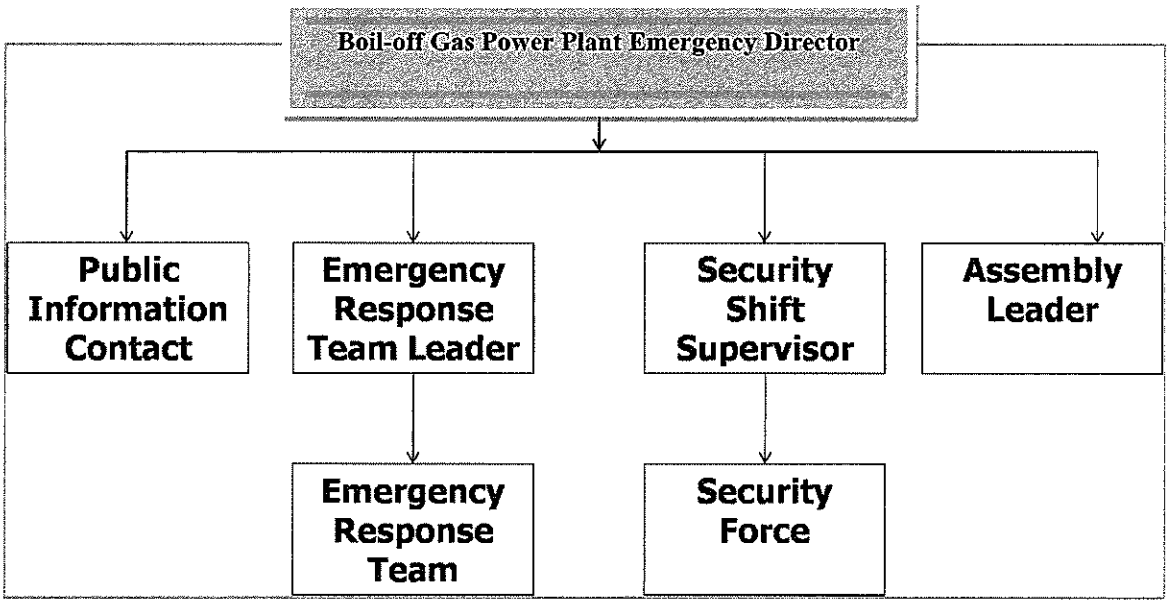


FIGURE 8.2-1: THE TENTATIVE ORGANIZATION CHART OF EMERGENCY RESPONSIBLE TEAM FOR BOIL-OFF GAS POWER PLANT PROJECT

CHAPTER 9

IMPLEMENTATION BUDGET AND SCHEDULE

CHAPTER 9

IMPLEMENTATION BUDGET AND SCHEDULE

9.1 BUDGET

9.1.1 Mitigation Measures

Pre-Construction and Construction Phases

All mitigation measures to be implemented in the construction will be included in the contract cost. As most mitigation measures are operational control measures, it is not possible to estimate their costs.

Operational Phase

All mitigation measures to be implemented in the operation will be included in the contract cost. As most mitigation measures are operational control measures, it is not possible to estimate their costs.

9.1.2 Monitoring

During the pre-construction and construction phases, a budget of about 147,500 USD will be allocated for monitoring and evaluation of the Project's environmental and social performance over the construction period of 15 months.

During operation phase, budget for monitoring and evaluation will be allocated for period separation (75 years, 50 years operation plus 25 years extensions). The first period will be for the five first year after commissioning and another one for the 6th year throughout the project life (total operation period approx. 75 years). Therefore an annual budget of 128,700 USD (include 10% contingency) will be allocated for the five first year, and an annual budget of 528,550 USD (include 10% contingency) will be allocated from the 6th year throughout the project life. Therefore, total cost during operation phase approx. 657,250 USD (include 10% contingency). The cost detail and schedule are described in ***Appendix 9A***. In addition, the monitoring cost will be adjusted depended on situation and suitability of the project.

9.2 SCHEDULE

The schedule for implementing the Construction EMP (CEMP) and Operation EMP (OEMP) will be linked to the project schedule. After the Contractor completes the detailed designs and detailed construction plan and schedule, the Contractor should prepare a detailed CEMP within one month.

The Contractor should prepare a detailed OEMP within two weeks after commissioning of the Boil-off Gas Power Plant and its associated facilities.

APPENDIX 6A

SUB-PLANS FOR CEMP

APPENDIX 6A-1

GENERAL-CONSTRUCTION

APPENDIX 6A-1

GENERAL-CONSTRUCTION

Element	Content
Objective	• Manage construction in accordance with the Construction Environmental Management Plan (CEMP) and CEMP sub-plans to avoid or minimize adverse impacts on the environment and the community.
Performance Criteria	• Worksites prepared in accordance with designs providing for the management and mitigation of construction impacts. • Construction works (civil engineering and mechanical works) are managed to avoid, or mitigate and manage impacts on the amenity and environmental conditions prevailing in the vicinity of the worksites. • Non-compliance with guidelines and standards established in this CEMP are avoided or minimized. • Maintain safe and efficient access near worksites for emergency vehicles. • Take reasonable measures to minimize potential construction risks to construction workers, to the general public in adjacent areas and to the environment.
Mitigation Measures	**Hours of work:** • Works (civil engineering and mechanical works) which may generate excessive levels of noise, vibration, dust or traffic movements should only be undertaken between 6.30 am and 6.30 pm Monday to Saturday and at no time on Sundays or Public Holidays except for special circumstances where the works should be conducted outside these days and hours. • In case of urgent situation, exceeding the hours of work, information dissemination should be conducted prior to commence construction activities. • Special circumstances include works on transport of heavy and large process equipment to the construction sites, transport of materials for site filling, and transport of large construction equipment to the construction sites (on land and by shipment logistics). • Collection, loading and haulage of spoil from construction worksites by truck/ship would be undertaken between 6.30 am Mondays and 6.30 pm Saturdays. If this is taken place out of the hours of work and it is really or emergent to be done at that time, a request/information should be done prior to the action of collection, loading and haulage. • Notify local communities of duration and timing of works to be conducted outside of usual working hours.

Element	Content
	Construction worksites: • To be designed and constructed for the minimization, management and mitigation of construction impacts; • The main construction site will include foundation work, other infrastructures and routinely utilities/facilities. • Civil engineering and mechanical materials, for Boil-off, should be transported by shipment or lorry trucks appropriately in accordance with national regulations and acts. • To conduct spoil handling, storage and loading at all times within enclosures designed and constructed to achieve environmental objectives and performance criteria for noise and air quality as set out in the CEMP; • To have night lighting, including security lighting and avoid light spill onto adjoining premises, in excess of 8 lux measured at the common boundary; • To include fencing to worksite boundaries to ensure site security and public safety (onshore or offshore restricted area).
Monitoring	• Site inspections will be conducted as outlined in this CEMP.
Reporting	• Results of site inspections will be included in the environmental monitoring reports.
Area	• Within the project site.
Responsible Agency	• Project developer and construction contractor.
Estimate Cost	• Include on pre-construction and construction cost

APPENDIX 6A-2

MANGROVE REHABILITATION MANAGEMENT PLAN

APPENDIX 6A-2

MANGROVE REHABILITATION MANAGEMENT PLAN

Element	Content
Objectives	• To reduce impacts on loss mangrove forest area from the Project. • To rehabilitate mangrove forest resources
Performance Indicator	• Types and number of flora species in disturbed mangrove forest area that clearance for proposed project site • Types and number of flora species in reforestation area
Mitigation Measures	• Survey and record flora species in the proposed project site before construction (biological survey). • Select appropriate mangrove species for rehabilitation area. • Prepared and design mangrove rehabilitation program and monitoring with concerned authorities such as MONREC and Forest Department. • The mangrove rehabilitation program should also include mangrove reforestation to expand mangrove area which serves as natural sanctuaries for marine ecological resources. • Mangrove rehabilitation program should be involve local villagers participates in site selection. • Developer should be create a green buffer zone around the Project port boundaries. • In case of conservation plant species will be found, the plant will be transferred to growth in green buffer zone, mangrove reforestation or other areas. • Cutting and clearance must done only on specific area designated in the term of reference. • Prohibit workers to cut tree outside project boundary. Also, prohibit and control workers not to hunt wildlife in all area (restricted area). • Give a brief orientation for collectors/visitors (for educational and recreational purposes) about mangrove forest and other relevant topics for rehabilitation plan.
Monitoring	• Monitor flora and fauna species before project clearance - Frequency : 1 time before site clearance. • Monitor project site clearance to ensure that it is strictly carried out in accordance with proper equipment as specified in contract and ensure strictly conducted only within the project site - Frequency : 1 time/month during pre-construction/construction phase • Consider and monitor on mangrove rehabilitation area due to clearance activities for proposed project site - Frequency : 2 times/month during pre-construction/construction phase

Element	Content
Reporting	• Results of site inspections will be included in the environmental monitoring reports and submitted to MONREC and related Authorities Department.
Area	• Mangrove rehabilitation area (investigating for the appropriate area).
Responsible Agency	• Project developer
Estimate Cost	• 3,000 USD Lumpsump for Flora and Fauna species investigate before land clearance

APPENDIX 6A-3

AIR QUALITY MANAGEMENT PLAN

APPENDIX 6A-3

AIR QUALITY MANAGEMENT PLAN

<table>
<tr><th>Element</th><th>Content</th></tr>
<tr><td>Objectives</td><td>• Ambient air quality in the construction sites and at the identified sensitive receptors meets the prescribed standards throughout the construction period.
• Community concerns and complaints about air quality are addressed quickly and effectively.</td></tr>
<tr><td>Performance Indicators</td><td>• Number of complaints filed through the complaint response channel.
• Number of times that the local ambient air quality is below the prescribed standards related to dust and exhaust emissions.</td></tr>
<tr><td>Sources</td><td>The construction could adversely affect local air quality in and near the construction sites. The issues will be:
• Fugitive dust generated in soil compaction (site development work-removal of vegetation, top soil and engineered filling and compaction of raise the level of project area), and vehicle movements in the construction sites and along the transport routes;
• Exhaust emissions from ships, trucks and heavy construction equipment and materials powered by diesel engines and other kinds of fuel.</td></tr>
<tr><td>Applicable Standards</td><td>Applicable ambient air quality standards related to fugitive dust and exhaust emissions are as follows:
Table 1 – Construction Air Quality Goals
<table>
<tr><th>Pollutant</th><th>Not to be Exceeded</th></tr>
<tr><td>Particulate as PM_{10}</td><td>150 $\mu g/m^3$ (24 hr average)</td></tr>
<tr><td></td><td>50 $\mu g/m^3$ (annual average)</td></tr>
<tr><td>Total Solid Particulates (TSP)</td><td>230 $\mu g/m^3$ (24 hr average)</td></tr>
</table></td></tr>
<tr><td>Mitigation Measures</td><td>The Contractor will conduct air quality surveys at the construction sites (non-mobile pollutant source) and trucks (mobile pollutant source) to identify sensitive receptors and update the baseline data established in the Final ESIA Report.

Fugitive Dust Control
• Enforce speed limit for trucks not to exceed 40 km/hr when passing the communities.
• Cover construction materials by canvas during transportation, materials should be dampened, if necessary, before transportation.
• Establish a vehicle washing facilities to minimize the quantity of material deposition on public roads.</td></tr>
</table>

Element	Content
	• Establish a checkpoint at project gate to ensure the vehicles leaving the project site are following the measures prescribed to reduce dust emissions. **Gaseous Emissions** • Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than 5 minutes) if required to queue to enter the construction sites; • Maintain all construction equipment in proper working conditions according to the manufacturer's specifications. The engines of the construction equipment fleet must be routinely maintained by qualified mechanics to ensure their proper conditions during construction phase. • Provide adequate training to the equipment operators in the proper use of equipment. • Use the proper size of equipment for the job. • Use the equipment fitted engines with latest low emission technologies (repowered engines, electric drive trains). For example, the diesel generator set to be used must be equipped with modern pollution control equipment. • Perform on-site material hauling with trucks equipped with on-road engines (if determined to be less emissive than the off-road engines). • Encourage and provide carpools, shuttle vans, transit passes and/or secure bicycle parking for construction worker commutes. • Take measures to manage the movement of construction vehicles entering and leaving the construction sites to avoid, or mitigate and manage the potential for vehicle emissions impacting on adjacent properties, except where such residential or sensitive activities front an arterial road to be used for access to or from the construction site. Measures for construction fleet management are to be provided in the construction vehicle management plan and the construction traffic management plan. Such measures may include avoiding or minimizing queuing on streets approaching the worksites or adjacent to other sensitive activities; • For stationary plant and equipment powered by diesel motors, take measures to avoid or mitigate and manage the potential impacts of exhaust emissions on adjacent residential or other sensitive activities. For example, ensure all construction vehicles and stationary plant and equipment powered by diesel motors are fitted with emission control measures, and are regularly maintained to manufacturers' specifications.

Element	Content
Monitoring	**Ambient Air Quality** • Undertake local, 1 time per three months monitoring of ambient air quality in the vicinity of construction sites and Villages situated near the project site for the duration of construction works (Nga Pitat Village), and in response to complaints, based on the following parameters: - Total suspended particulates (TSP) - Particulates (PM 10) • Monitor and manage the incidence of dust deposition and manage construction vehicle emissions in relation to ambient air quality. **Dust** • Monitor 1 time per three months or more frequently if weather conditions required, construction sites, stockpiles, vehicles and roads leaving the construction sites for evidence of dust generation or loose, unstable material with potential for dust. • Monitor regularly (weekly minimum) by inspection or other effective sampling: • The performance of dust filtration systems on construction shed ventilation systems; • Spillage or deposition of loose material on roads leaving a construction site. • Monitor performance of mitigation measures in relation to the construction air quality goals in the above table.
Reporting	• Twice a year. If more than one complaint is received in the preceding more frequently. • Twice a year reports for submission to MONREC and related Authorities Department.
Area	• Project sites. • Closest villages (Nga Pitat Village).
Responsible Agency	• Project developer. • Air quality monitoring agency • Construction contractor.
Estimate Cost	• 800 USD/station/time

APPENDIX 6A-4

NOISE MANAGEMENT PLAN

APPENDIX 6A-4

NOISE MANAGEMENT PLAN

<table>
<tr><th>Element</th><th>Content</th></tr>
<tr><td>Objectives</td><td>• To minimize noise level of construction activities.
• To ensure that the noise level at the identified sensitive receptors will not exceed the maximum limits prescribed by MONREC as a condition of the ECC and will be acceptable to the sensitive receptors.</td></tr>
<tr><td>Performance Indicators</td><td>• The incremental increases in noise level during the construction works compared to the targets.
• Net ambient noise level compared to the applicable ambient noise standards.</td></tr>
<tr><td>Sources</td><td>Noise (vehicles, trucks, cars, civil engineering and mechanical works and etc.) will be managed at the project site. The Boil-off Gas construction site will be where construction activities causing noise will be most intensive and concentrated.
Construction activities creating noise at the project site are shown in the table below:
<table>
<tr><th>Construction Activities</th><th>Boil-off Gas</th></tr>
<tr><td>Site Development</td><td>Removal of vegetation, top soil, and foundation work.</td></tr>
<tr><td>Erection and installation of equipment (only noise) – civil and mechanical works</td><td>Materials and equipment and various kinds of vehicle will be generating disturbance noises in wide range within the project area (onshore or offshore activities)</td></tr>
</table></td></tr>
<tr><td>Applicable Standards</td><td>Noise performance will be evaluated against the following standards:
National Ambient Noise Level Standards:
- Ambient noise level standard, Myanmar National Environment Quality (Emission) Guidelines, Final Draft (December 2015).
Noise Standards: World Health Organization (WHO), 1999
- Guidelines for Community Noise, World Health Organization (WHO), 1999
Standard
Noise impacts should not exceed the levels presented in Table below, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.
<table>
<tr><th></th><th colspan="2">One Hour L_{Aeq} (dBA)</th></tr>
<tr><th>Receptor Daytime</th><th>Daytime
07:00 - 22:00</th><th>Nighttime
22:00 - 07:00</th></tr>
<tr><td>Residential; institutional; educational</td><td>55</td><td>45</td></tr>
<tr><td>Industrial; commercial</td><td>70</td><td>70</td></tr>
</table></td></tr>
</table>

Element	Content
	U.S. EPA Standard: Noise level not higher than 70 dB(A) $L_{eq\text{-}24\ hour}$
Mitigation Measures	**Design** • The Contract will require the Contractor and his sub-contractors to use construction equipment that generate low levels of noise and vibrations. The Contractor will present alternative construction equipment to demonstrate that the selected equipment adopts best available technologies to minimize noise level. • Before commencing the construction, the Contractor will conduct a noise and vibration survey covering the identified sensitive receptors to update the existing baseline data in the Final EIA Report. The noise survey will be manually conducted using a sound level meter following Noise Standard stated on Environmental, Health, and Safety Guidelines : Noise Management (April 30, 2007). • Demonstrate through predictive modelling of the proposed construction techniques and monitoring ambient noise and vibration readings prior to construction to establish pre-disturbance levels, the likely levels of noise due to construction works throughout the construction phase. **Construction Noise** • Major construction activities which generate loud noise should be limited to only during the day time. Activities that are necessary to be carried out at night time will need approval of the site engineers, and will need to have adequate noise control equipment or measures. • Speeds of vehicles in the construction site will not be more than 40 km/hr. • Noise performance requirements of construction equipment will need to be clearly stated in contract specifications. • Temporary sound barriers or shielding should be installed for non-mobile equipment. • The contractor will be required to regularly monitor ambient noise levels at the receptors, particularly during the noise generation period. • The construction environmental management plan needs to include an efficient complaints redress procedure and an efficient corrective action procedure to address the none compliance of noise performance.

Element	Content
Monitoring	• Undertake local, 1 time per three months monitoring of noise level in the vicinity of construction sites and Nga Pitat Villages for the duration of construction works, and in response to complaints, based on the following parameters: - L_{max}, - $L_{eq\ 1\ hr}$, - $L_{eq\ 24\ hr}$, - L_{dn} and, - L_{90} • Monitor and manage the incidence of noise level and manage construction vehicle noise level. • The Contractor is to implement measures to receive and respond to complaints about construction noise and vibration made at any time during the construction phase of the Project. Such measures may include a complaints management and correction action system developed and incorporated in this CEMP. Key requirements for the system include: - On receipt of a complaint, implement a complaint response procedure for tracking and responding to the issue(s) and the complaint; - Identify the relevant construction activity at which the complaint is directed; - As soon as practicable, investigate and measure the level of noise from that activity; - Respond to the complainant as soon as practicable upon completion of the investigation and describe the corrective action taken; and - Report to the Proponent on the complaint, the activity, the corrective action and the response.
Reporting	• Twice a year reporting on noise performance and complaints. • Twice a year reports for submission to MONREC and related Authorities Department.
Area	• Project sites. • Closest villages (Nga Pitat Village).
Responsible Agency	• Project developer • Contractor • Sub-contractors
Estimate Cost	• 700 USD / station/time

APPENDIX 6A-5

WASTE MANAGEMENT PLAN

APPENDIX 6A-5

WASTE MANAGEMENT PLAN

Element	Content
Objective	To minimize all types of wastes generated at the construction sites, particularly the construction site that will have to be disposed. To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to waste disposal.
Sources	Wastes will be divided into three categories: • Construction, demolition, and land-clearing (CDL) waste: Includes all non-hazardous solid wastes resulting from site clearing, excavation, concrete works, steel works, piping works, installation of equipment, and construction of buildings. CDL wastes for this Project will consist of vegetation removed from the site before site preparation works, excavated materials particularly top soil, construction debris, remnants of steel bars and beams, packaging materials, broken roofing materials and tiles, and remnants of pipes, glasses, and other inert building materials. • Non-construction waste: Includes wastes generated in worker camps, canteens and offices such as paper, food and beverage containers, food wastes, and other domestic items.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	**Design and Planning before Commencing the Construction** • The Contractor will consult with the EHS Manager of the Project developer, ECD, SWB and the township governments the possibility of using existing waste disposal facilities managed by the regional or local governments. If this not possible, the Contractor will need to develop its own disposal facility preferably within the construction site, if possible. • The Contractor will ensure that the design and the proposed construction methods will generate the least amount of wastes. • Based on the construction plan, methods, and schedule, The Contractor will prepare estimates of the quantity of each waste category to be generated in each quarter of the construction period. The estimates will be monthly updated. • The Contractor will propose methods for waste reuse and recycling and prepare estimates of the remaining quantity of each waste category that will be disposed off.

Element	Content
	• The Contractor will propose methods of waste transport and disposal. • The Contractor will then prepare an action plan for waste management for the first quarter of the construction period containing all the above estimates and proposals. The action plan will be submitted to the EHS Manager of the Project developer not later than three weeks before commencing the construction. • The subsequent quarterly action plans will be prepared by updating or revising the preceding plans as appropriate to reflect cumulative results of the previous quarters. The next quarterly action plan will be submitted to the EHS Manager not later than two weeks before the end of the current quarter. • Consider using materials and products that have a recycled content wherever cost/performance competitive, and where environmentally preferable to the non-recycled alternative; • Arrangements with suppliers to return any unused construction materials; • Where possible, goods to be ordered in bulk to minimize packaging waste and packaging material returned to the supplier wherever practicable; and **During Construction** **Waste Segregation** • The Contractor will design and implement a waste segregation system and procedure and communicate it to all construction personnel to strictly adhere to the segregation procedure. • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories. **Waste Collection and Storage** • Daily collection and transport will be organized and carried out for each sub-category of segregated wastes. • A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling. • The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil.

Element	Content
	Waste Reuse and Recycling • Chipping and mulching of vegetation cleared during construction and reuse of mulched material for landscaping purposes; • Reuse of excavated material as fill at approved fill sites; • Topsoil free of weeds to be stockpiled and stored for re-use, if possible; • Collection and return of packaging materials (e.g. pallets) to suppliers wherever practicable; • Use of recycled materials to the limits of design in concrete, road base, asphalt and other construction materials; • Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site. • Collection and recycling of used oils by a licensed contractor; • Collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities; **Waste Disposal** • Disposal of the remaining wastes that are unable to be reused or recycled in the approved land fill site(s). • Preferably, inert wastes such as broken tiles, bricks, plastics should be used for filling the site in areas planned to be vacant space. • No burning of wastes will be allowed. • Non-construction wastes will be contracted to the existing municipal services, if possible. If not, they will need to be disposed of in a small sanitary land fill to be located within the power plant site in designated green areas. • Decomposable wastes such as food wastes and vegetation may be disposed of by composting. **On-site Record Keeping** The Contractor will design and maintain record keeping procedures with provisions for: • Tracking collections of waste materials at the sites and deliveries to recycling, reuse, salvage, and landfill facilities. • Maintaining on-site logs that include for each load of materials removed from the site: type of material, load weight, recycling/hauling service, and date accepted by recycling service or landfill.

Element	Content
	• Accessibility to the EHS Manager of the Project developer for verification of construction waste recycling. Legible copies of on-site logs, manifests, weight tickets, and receipts. Manifests shall be from recycling and disposal site operators that can legally accept the materials for the purpose of recycling, reuse, salvage, or disposal.
Monitoring	Monitoring of the waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. Daily site inspections will include observation of the collection and storage of waste materials in the construction sites and waste disposal areas, and reviewing the daily records. This will be focused on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the Construction Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment. • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC and related Authorities Department.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Sub-contractors (waste management company)
Estimate Cost	• include on cost for pre-construction and construction

APPENDIX 6A-6

WASTEWATER MANAGEMENT PLAN

APPENDIX 6A-6
WASTEWATER MANAGEMENT PLAN

Element	Content
Objective	To ensure that all wastewaters generated during the construction will be adequately treated before discharging into the sea
Performance Indicators	Qualities of the treated effluent compared with the applicable effluent quality standards.
Sources	• Domestic wastewater generated by living activities of about 70 persons at peak of construction, estimated volume about 11 m^3/d. • Construction wastewater, estimated volume about 42 m^3/d. • Storm water with a return period of 5 years at boil-off power plant approx. 28,635 m^3.
Applicable Standards	**Effluent quality standards:** • General Guideline of Site Runoff and Wastewater Discharges (construction phase), National Environmental Quality (Emission) Guidelines (Final), 2015 • Environmental, Health, and Safety-General Guidelines Environmental Wastewater and Ambient Water Quality, April 30, 2007 (World Bank Group/IFC); Standard (both from Myanmar and World Bank Group/IFC Guidelines) - Oil and Grease = 10 mg/L - pH = 6-9 - Total Suspended Solid = 50 mg/L - BOD = 30 mg/L - Total Nitrogen = 10 mg/L

Element	Content
Mitigation Measures	**Design Concept** The Contractor will prepare detailed design of a wastewater management system for the Boil-off Gas construction site. The wastewater management system will consist of a collection system and a simple treatment system. The proposed design concept is based on the principle of wastewater segregation, treatment and reuse as briefly described below: • **Domestic Wastewater** - Toilet wastes will be separated from grey water or salvage. - Kitchen and canteen waste water will be discharged into oil and grease trap tank before draining into a retention pond. - Toilet wastes will be discharged into a septic tank (or more than one septic tank) with a hydraulic retention time of about 5 days. - Grey water will be discharged into the retention pond. - The retention pond will be designed as an oxidation pond with a hydraulic retention time of about 7 days.
Monitoring	• Once a month collection of one water samples at Effluent from release point of temporary drainage system. The treatment performance of the drainage system will be assessed from the monitoring data.
Reporting	• The results of monitoring will be presented in the monitoring reports. • Twice a year reporting on wastewater performance, and submit to MONREC and related Authorities Department.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Sub-contractors (wastewater management company)
Estimate Cost	• 600 USD/station/time

APPENDIX 6A-7

HAZARDOUS WASTE MANAGEMENT PLAN

APPENDIX 6A-7

HAZARDOUS WASTE MANAGEMENT PLAN

Element	Content
Objectives	• To minimize all types of hazardous wastes generated at the construction sites, particularly the Boil-off Gas construction site that will have to be disposed. • To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to hazardous waste disposal.
Sources	Hazardous waste: Includes such wastes as spent lubricating oil, paints, and chemicals used in the construction. Most of the hazardous wastes are in liquid form.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of hazardous wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	• Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the Contractor will need to find appropriate arrangements for incineration, safe permanent storage, or other appropriate methods of disposal. • A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government, if any.
Monitoring	Monitoring of the hazardous waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. Daily site inspections will include observation of the collection and storage of hazardous waste materials in the construction sites and hazardous waste disposal areas, and reviewing the daily records. This will be focused on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the Construction Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.

Element	Content
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment. • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Contractor/Sub-contractors (waste management company)
Estimate Cost	• include on cost for pre-construction and construction

APPENDIX 6A-8

TRAFFIC MANAGEMENT PLAN

APPENDIX 6A-8

TRAFFIC MANAGEMENT PLAN

Element	Content
Objective	• Manage construction traffic and transport issues to minimize potential impacts on the communities and the operation of the road network
Performance indicators	• Number of traffic accidents in the identified impact areas • Number of traffic on Road during the construction period.
Sources	• Traffic disturbances could be caused by haulage of spoil, fill materials, construction materials and plant equipment. • Potential impact areas: - Local roads
Management guidelines	• Take reasonable and practicable measures to avoid, or mitigate and manage the potential construction traffic impacts on communities near the worksites. • Minimize as far as reasonably practicable, potential traffic disruptions to the operation of the road network and the public transport network due to the transport of materials to and from the construction sites. • Maintain safe access near all project work areas for road users, including pedestrians and cyclists. In particular, develop local access strategies in consultation with stakeholder groups to maintain safe, convenient and efficient access to community facilities such as schools and monastery, if any. • Implement traffic management measures near worksites and other project works to avoid conflicts between construction traffic, and pedestrians and cyclists. • Take reasonable and practicable measures to inform the local and broader communities about the timing and scale of changes to traffic conditions on roads in the vicinity of worksites and construction works. • Monitor traffic flows near construction works and take corrective action in response to traffic impacts as a consequence of construction works.
Mitigation Measures	**Truck routes and construction site access** • In consultation with the concerned authorities at the regional, and township levels, develop and implement a Construction Traffic Management Plan to address the following issues:

Element	Content
	- Avoid haulage tasks during peak traffic periods as far as practicable. Where haulage in peak periods is unavoidable, such activities are to be managed in accordance with specific traffic management sub-plans provided to the relevant agencies in advance. - Control heavy vehicle movements on project related road to avoid interference with major events, if any; - Investigate the capacity of intersections on haulage routes to minimize impact on intersection operations by heavy vehicles servicing the construction worksites; - Prepare and implement a comprehensive construction traffic management plan to control truck movements to avoid, or mitigate and manage the impacts of heavy vehicle traffic on the road network. • Measures to manage the operation of the construction truck fleet for incorporation into a Construction Vehicle management sub-plan to include: - Monitoring of truck position, speed, route and performance in relation of traffic conditions and schedule requirements; - Management of truck speed and position to avoid queuing on the approaches to the spoil handling and loading facilities; - Management of traffic signals on nominated spoil haulage along the routes; - Maintain all vehicles transporting material to and from the construction sites to a high standard (ADR28/01) with regards noise emissions, exhaust emissions, traffic safety and operational safety; - Ensure all vehicles leaving a construction site pass over or through devices designed and maintained to remove soil and other materials. **Construction Traffic Hazards** • Heavy trailer trucks transporting heavy and large plant equipment will have to be directed by a traffic police car. **Local Traffic** • Implement management measures to avoid, or minimize increase in traffic caused by the project works in local streets as practicable; • Notify the local community about proposed changes to local traffic access arising from construction activities, and provide clear signage of changed traffic conditions and take other measures to ensure safe traffic movement;

Element	Content
	• Prepare and implement an employee parking policy for the construction worksites; • Employ local people a Nga Pitat village to give a sign when local villagers walk across the road during construction **Traffic Management at the Intersection of Local Roads** • Provide a traffic police or relevant officers to control traffic at the intersection during the transport period. **Pedestrians and Cyclists** • Maintain safe pedestrian and cycle access near construction works (particularly for elderly and children), including to community facilities, such as schools, monastery, open space and particularly: • Notify the local community, and in particular, local schools, about changes to pedestrian and cycle access during construction near construction works; • Provide traffic controls designed for the safe movement of cyclists near the worksites.
Monitoring	• Monitor number of vehicles two times per year at 2 sampling stations include 1) boil-off gas area and 2) at Village. • Monitor traffic accident situation related to the project every day at project access road.
Reporting	• Monthly report on local traffic conditions, including any accidents involving construction traffic. • Twice a year reporting on traffic performance, and submission to MONREC and related Authorities Department.
Area	• Local roads and Boil-off Gas Site.
Responsible Agency	• Project developer • Relevant authorities (police)
Estimate Cost	• 500 USD/station/time for monitoring number of vehicles throughout pre-construction and construction phase • Cost for monitoring vehicles accident situation related to the project include on cost for pre-construction and construction

APPENDIX 6A-9

OHS MANAGEMENT PLAN

APPENDIX 6A-9

OHS MANAGEMENT PLAN

Element	Content
Objective	To establish best practicable OHS conditions to ensure work related health and safety of construction personnel.
Performance Indicators	• Total Recordable Injury Frequency Rate (TRIFR) • Lost Time Injury Frequency Rate (LTIFR) • Medical Treatment Injury Frequency Rate (MTIFR) • Duration rate • Incident rate
Sources	Public safety related to construction traffic will be managed in the traffic management plan. The issues of concern in this OSH plan are worker safety in construction site.
Applicable Standards	OHS guidelines and standards enforced by the Ministry of Health and proposed for this Project as follows: "To safeguard public health and to take necessary measure and respect of environmental health"
Mitigation Measures	**Design and Planning before Commencing the Construction** • The Contractor will prepare an OHS management plan and implementation procedures specific to this Project and in line with its corporate OHS policy and procedures. The OHS management plan and implementation procedures will be submitted not later than one month before commencing the construction for approval of the Project Manager of the Project developer and relevant authorities, if so required. • The Contractor will conduct necessary orientation and training to all construction personnel to ensure that the construction personnel clearly understand the OSH plan and implementation procedures. • The OHS management plan and implementation procedures will cover but not limited to the following subjects: - Organization and responsibilities of OHS management - Training plan - Communication plan - Contractor responsibilities

Element	Content
	- Job-specific work requirements - Compliance monitoring and evaluation plan - Audit plan - Reporting system - Documentation system • Develop and implement safety measures for the construction works including treatment strategies that address fire and chemical hazard, communications, access for emergency services, response coordination and management. • Develop emergency response procedures, and implement in the event of accidents and emergencies. • Provide fire and life safety measures, including ventilation, smoke extraction and firefighting systems for the duration of the construction phase. • The project proponent must be set buffer zone between gas engine of Boil-off power plant project and gas tank of LNG Terminal project (at least 1.5 km) to prevent hazard during gas leakage. If none of adequate distance, fire protection wall or plant perennial tree will recommended to set for protecting the impact during gas leakage situation. **During Construction** • The implementation of the OHS plan will be integrated with construction supervision. • The Contractor will implement the OHS plan and procedures as part of its construction supervision. The Contractor's site engineers and foremen will supervise the implementation of OHS procedures to comply with relevant requirements. • The Contractor's EHS Manager will monitor the OHS performance.
Monitoring	• Monitoring of OHS performance of the Contractor will be made through: - Daily informal inspections (walk through of the construction sites) - Weekly formal inspections of the work place. - Audits - Corrective Action Reports

Element	Content
	• The daily inspections will observe: (i) adherence of the construction workers to the OHS procedures such as wearing of protective equipment in high risk working areas; (ii) working conditions; (iii) readiness of fire and life safety systems as relevant; and (iv) potential new hazards. The daily inspections will be carried out by the Contractor's EHS Manager and Construction Manager, Site Managers, and relevant foremen. The Project EHS Manager will occasionally join the daily inspections. The Contractor's EHS Manager will prepare daily OHS inspection notes as part of the site inspection notes. • The weekly formal inspections will be carried out at weekly intervals and shall be documented using appropriate "Weekly OHS Inspection Checklists". The Contractor's Construction Manager, EHS Manager, and Site Engineers will carry out the weekly inspections. The Owner's EHS Manager will jointly undertake the weekly inspections. Subcontractors will also be required to participate in the weekly inspections. The weekly inspections will include plant, substances, equipment and temporary structures used by subcontractors. • Internal audits will be carried out annually or more frequent if the OHS performance is significantly below established targets. The internal auditor or team will be engaged by the Contractor with concurrence of the Project developer. • Monitoring results will be discussed in Project OHS monthly review meetings.
Reporting	• Monthly as part of the monthly monitoring reports except in case of an incident when reporting should occur immediately on completion of any investigation required to resolve the incident. • Twice a year reporting on OHS performance, and submission to MONREC and related Authorities.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers • Sub-contractors
Estimate Cost	• include on cost for pre-construction and construction

APPENDIX 6A-10

NATURAL RESOURCE USED MONITORING PLAN

APPENDIX 6A-10

NATURAL RESOURCE USED MONITORING PLAN

Element	Content
Objective	To ensure that Nga Pitat villagers can still utilize marine and coastal resources sufficient to their livelihoods.
Performance Indicators	Number of complaints related to resource management.
Sources	Loss of fishing ground and boatyard areas in Britney Creek cause of livelihood affect to Nga Pitat Villagers
Applicable Standards	All complaints about construction about 15 months period
Mitigation Measures	**Pre-Construction** • Alternative fishing ground and boatyard areas will need to be identified and discuss with local villagers and fishermen and concern authorities include MONREC, Fisheries Department at Taninthayi Region, and Concerned Authorities Department. If justified, supports will need to be provided to the affected local villagers and fishermen to enable them to adjust to the alternative fishing grounds and boatyard areas • The Project Proponent should design and implement a long term of livelihood restoration program (LRP) for the affected people in consultation with them and the concerned authorities. The LRP will provide training and initial supports to assist the affected people to enhance their income through increasing efficiency of their current economic activities or creating secondary sources of income through new economic activities. The scope of training may cover the following subjects: - Community forest and mangroves management - Coastal aquaculture within extensive system - Fish processing - Crop cultivation techniques - Product development and marketing - Food preparation and preservation

Element	Content
	During Construction • Continue restore livelihoods through provision of knowledge for strengthening occupation career as proposed during pre-construction phase • Conduct attitude survey to collect information on local concerns, issues, and problems of the communities in the new alternative fishing ground and boatyard area (should be all household in Nga Pitat Village).
Monitoring	• Report community consultation's activities and on consultation. • Training and promotion household account record. • Consultation with Nga Pitat Village to collect information on local concerns, issues, and problems of the communities in the new alternative fishing ground and boatyard area (should be all household in Nga Pitat Village) at least 1 times per three month.
Reporting	• Results of the resource management will be included in the monthly monitoring reports and the twice a year reports for submission to MONREC and related Authorities. • Report immediately to the relevant authorities in case of complaint from villagers.
Area	• Project sites/fishing ground/villages/natural resources within the area nearby project site.
Responsible Agency	• Project developer
Estimate Cost	• 100,000 USD lump sump throughout pre-construction / construction phase

APPENDIX 6A-11

SOCIAL ENVIRONMENTAL MANAGEMENT PLAN

APPENDIX 6A-11
SOCIAL ENVIRONMENTAL MANAGEMENT PLAN

Element	Content
Objective	To avoid or mitigate and manage construction impacts on the social environment. *Note: The social environment includes residential and neighborhood amenity, connectivity, community health, community diversity, social infrastructure provision, livelihood and safety.*
Performance Indicators	• Number of grievances or complaints filed with the Project Management Office of the Project developer. • Number of complaints successfully responded.
Sources	Daily living of people in the surrounding communities may be disturbed or inconvenienced by environmental disturbances caused by the construction such as dust, traffic inconveniences (both land traffic and navigation), noise, coastal water, and workers' misconduct. The management of social environment will cover villages potentially to be affected by construction activities.
Applicable Standards	The target for the entire construction period of about 15 months in total for all phases is all complaints are responded by the EPC and filed with the Project Management Office.
Mitigation Measures	Mitigation measures for minimizing physical impacts on the social environment are prescribed in relevant sub-plans, such as air quality, noise, traffic, navigation and marine ecology. Mitigation measures in this sub-plan are community measures designed to support the implementation of the physical measures. The basic requirement is that the communities have access to the communication and complaints process to address and respond to their complaints related to the construction impacts on their daily living and properties. **Amenity and Community Life** • Liaise with key stakeholders and the community through a public consultation process to ensure insignificant impacts of the construction on community facilities, schools and monastery. • As soon as it is practicable after the completion of construction, the Contractor shall reinstate community facilities affected by the works, if any.

Element	Content
	Social Infrastructure • Consult with managers of community facilities in neighborhoods adjacent to work sites to develop effective mitigation strategies and maintain regular communication with these facility managers. **Complaints and Corrective Actions** • Develop an effective and responsive system for receiving, handling and responding to, complaints received during the construction of project works. • Ensure complaints are received and responded to on a 24-hour per day basis for the duration of the construction phase. • Provide reporting on complaints received, responses provided, timeliness of responses, and corrective actions taken on a monthly basis. • Raise community awareness of the complaints systems and procedures through public notifications and website facilities. **Early Consultation** • Initiate consultation with owners and occupants of directly affected properties and nearest neighbors to construction activities as soon as practicable before commencing the construction. • Conduct consultation and community information strategies in conjunction with the public or community consultation process. • Establish a tripartite committee to provide mechanism and channel for the committees to participate in the project environmental management. **Community Consultation Program** • Undertake and maintain a comprehensive community information program to inform residents, businesses, community groups and motorists of Project activities and potential impacts. Effective and accessible consultation measures are required including maintenance of a 24-hour contact line operated by a person with authority to stop works if goals and agreements with the community are not met. • Ensure medical facilities, community centers, monastery and schools in the area have access to construction updates and community education during the construction.

Element	Content
	Regional Communication • Monitor traffic volumes and traffic congestion affecting the district and township population during construction and if necessary adopt travel demand and signal stage management strategies.
Monitoring	• Consultation with three village include Nga Pitat, Mudu, and Nya Binsiek to collect information include local concerns, issues, and problems during pre-construction and construction phase at least 1 time per three months • Evaluate effectiveness of consultation, liaison and mitigation outcomes. • Cases of conflicts between the construction workers and local people. • Survey and report on actual impacts of the construction on community amenities and infrastructure. • Report community consultation's activities and on consultation, liaison and environmental compliance and public transport access in work site neighborhoods.
Reporting	• Results of the social management will be included in the monthly monitoring reports and the twice a year reports for submission to MONREC. • Report immediately in case of a safety incident or complaint from a neighbor.
Area	• Villages
Responsible Agency	• Project developer
Estimate Cost	• Cost include in the budget for Natural Resources Used Monitoring Plan

APPENDIX 6A-12

EMERGENCY MANAGEMENT PLAN (FLOOD, TSUNAMI AND CYCLONE)

APPENDIX 6A-12

EMERGENCY MANAGEMENT PLAN (FLOOD, TSUNAMI AND CYCLONE)

Element	Content
Objectives	• To minimize impacts in case of emergency during construction phase. • To acknowledge and raise awareness of construction workers to evacuate, shelter or lockdown can save lives.
Performance Indicator	• Number of employees/workers/staff understand about emergent situation and know how to minimize/survive from the hostile situation (flood, tsunami and cyclone). • Conduct a test (pre-test and post-test) to evaluate their understanding.
Mitigation Measures	• Provide training program about emergency plan before commencing construction activities. • Construct buffer zone (for both off-shore and on-shore area) to minimize impacts.
Monitor	• Results of pre-test and post-test of construction workers.
Reporting	• Results of pre-test and post-test directly reporting to project developer.
Area	• Project sites.
Responsible Agency	• Project developer • Construction workers
Estimate Cost	• Include cost for pre-construction and construction.

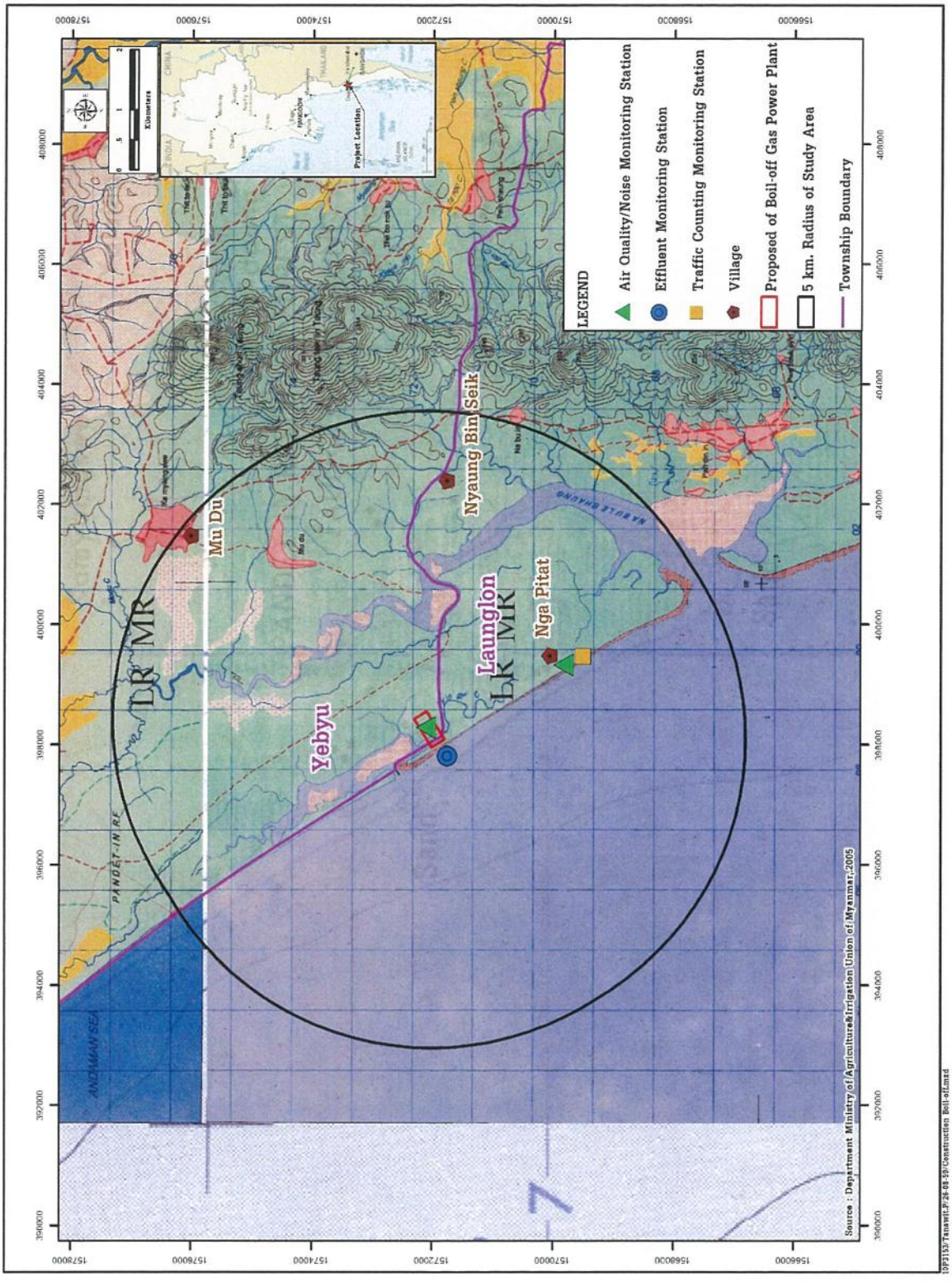


FIGURE 1 : MONITORING STATION DURING PRE-CONSTURTCION / CONSTRUCTION PHASE

APPENDIX 7A

SUB-PLANS FOR OEMP

APPENDIX 7A-1

MANGROVE REHABILITATION MANAGEMENT PLAN

APPENDIX 7A-1

MANGROVE REHABILITATION MANAGEMENT PLAN

Element	Content
Objective	• To monitor the activities of rehabilitate mangrove forest resources • To conserve in existing mangrove forest around project area.
Performance Indicator	• Types and number of flora species in mangrove rehabilitation area
Mitigation Measures	• Planting, checking and evaluating fertilities in mangrove rehabilitation area and around project site. • Plant additional mangroves. • Mangrove rehabilitation program should be involve local villagers participates in prepare seeding, and maintain the areas. Developer should provide appropriate budget for this activity. • Give a brief orientation for collectors/visitors (for educational and recreational purposes) about mangrove forest and other relevant topics for rehabilitation plan. • Maintenance program for the rehabilitation area.
Monitoring	• Monitor on mangrove rehabilitation area and forest area around project site. - Frequency : 2 times/year during 1^{st}-10^{th} years of operation phases
Reporting	• Results of site inspections will be included in the environmental monitoring reports and submitted to MONREC and Port Authorities Department.
Area	• Mangrove rehabilitation area (investigating for the appropriate area).
Responsible Agency	• Project developer (CSR Team)
Estimate Cost	• 95,000 USD lump sump for planting and maintenance in reforestation area during 1^{st}-10^{th} of operation phases. • 1,000 USD / year for support local villagers (from Nga Pitat and Nyua Binseik Villages) in rehabilitation activities (during 1^{st}-10^{th} years during operation phase, total cost 10,000 USD)

APPENDIX 7A-2

AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

APPENDIX 7A-2

AIR QUALITY AND GREENHOUSE GAS MANAGEMENT PLAN

<table>
<tr><th>Element</th><th>Content</th></tr>
<tr><td>Objectives</td><td>• To minimize the emissions from the power plant, particularly NO_x.
• To ensure the emissions are within the limits prescribed as a condition of the ECC prescribed by MONREC.</td></tr>
<tr><td>Performance Indicators</td><td>• Concentrations of NO_x in the stack gas as percentage of the permissible maximum concentrations.
• No complaint on ambient air quality in sensitive receptor areas.</td></tr>
<tr><td>Sources</td><td>Stack gas</td></tr>
<tr><td>Applicable Standards</td><td>1) Emission Standard for the project
Table 1 : Emission Standards for the Project
<table>
<tr><th>Parameter</th><th>Standard</th></tr>
<tr><td>Particulate matter, PM_{10}</td><td>60 mg/Nm^3</td></tr>
<tr><td>SO_2</td><td>20 ppm (20 mg/Nm^3)</td></tr>
<tr><td>NO_X</td><td>120 ppm (120 mg/Nm^3)</td></tr>
</table>
Sources: As specified by the draft concession agreement of the Project

2)Ambient Air Quality
Applicable ambient air quality standards related to exhaust emissions are as follows:
Table 2 –Air Quality Goals
<table>
<tr><th>Pollutant</th><th>Not to be Exceeded</th></tr>
<tr><td rowspan="2">PM-10</td><td>150 µg/m^3 (24 hr average)</td></tr>
<tr><td>50 µg/m^3 (annual average)</td></tr>
<tr><td>SO_2</td><td>125 µg/m^3 (24 hr average)</td></tr>
<tr><td>NO_2</td><td>150 µg/m^3 (24 hr average)</td></tr>
</table></td></tr>
<tr><td>Mitigation Measures</td><td>Design and Commissioning
• The gas turbine facility has been modelled and designed so as to ensure stack emissions will meet prescribed technical specifications;
• Low NOx burners will be used to minimize thermal NOx emissions.
• The Contractor and his supplier will complete the testing and tuning program on the turbines before operational handover to ensure efficient operation of plant.</td></tr>
</table>

Element	Content
	Management Controls • Ensure that the power plant personnel will be suitably qualified for their assigned tasks; • The Contractor with support of the equipment suppliers shall provide appropriate training to plant operation personnel to enhance their competency in operation and control of turbines using low NOx burners. The Contractor will propose a training program for plant operators not later than three months before the commissioning, and conduct the training as part of the overall training in parallel with the commissioning; • Regular periodic review of air quality monitoring data (monthly) with comparison of monitoring data with that assumed and predicted in the documents listed under Condition of the Project Approval.
Monitoring	**Stack Emission** • Each of the exhaust stacks will be fitted with in-stack monitoring equipment linked to the continuous emissions monitoring system (CEMS). This monitoring system will be designed to meet the regulatory requirements. As specified by the draft concession agreement of the Project, in particular monitoring of NOx. **Ambient Air Quality** • Undertake local, 2 times per year monitoring of ambient air quality in Villages (closest sensitive receptors include Nga Pitat and Mudu) for the duration of 1^{st}-5^{th} year of operation works and 1 time per year throughout operation phase, and in response to complaints, based on the following parameters: - Particulates (PM 10) - Sulfur Dioxide (SO_2) - Nitrogen Dioxide (NO_2)
Reporting	• Twice a year reports for submission to MONREC and Concerned Authorities Department.
Area	• Stack • Closest sensitive receptors (Nga Pitat and Mudu).
Responsible Agency	• Project developer (Monitoring Team)
Estimate Cost	**Stack Emission** • Including in operation cost **Ambient Air Quality** • 800 USD/station/time

APPENDIX 7A-3

WASTE MANAGEMENT PLAN

APPENDIX 7A-3

WASTE MANAGEMENT PLAN

Element	Content
Objective	To minimize all types of wastes generated at the operation sites, that will have to be disposed. To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to waste disposal/Environmental issue in relation to waste management.
Sources	• Operation waste: • Non-operation waste: Includes wastes generated in worker project site, canteens and offices such as paper, food and beverage containers, food wastes, and other domestic items.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	**Design and Planning before Commencing the Operation** • The Contractor will consult with the EHS Manager of the Project developer, ECD, SWB and the township governments the possibility of using existing waste disposal facilities managed by the regional or local governments. If this not possible, the Contractor will need to develop its own disposal facility preferably within the operation site, if possible. • The Contractor will ensure that the design and the proposed operation methods will generate the least amount of wastes. • Based on the operation plan, methods, and schedule, the project developer will prepare estimates of the quantity of each waste category to be generated in each quarter of the operation phase. The estimates will be monthly updated. • The project developer/contractor will propose methods for waste reuse and recycling and prepare estimates of the remaining quantity of each waste category that will be disposed off. • The project developer/contractor will propose methods of waste transport and disposal. • The project developer/contractor will then prepare an action plan for waste management for the first quarter of the operation phase containing all the above estimates and proposals. The action plan will be submitted to the EHS Manager of the Project developer not later than three weeks before commencing the operation.

Element	Content
	• The subsequent quarterly action plans will be prepared by updating or revising the preceding plans as appropriate to reflect cumulative results of the previous quarters. The next quarterly action plan will be submitted to the EHS Manager not later than two weeks before the end of the current quarter. • Consider using materials and products that have a recycled content wherever cost/performance competitive, and where environmentally preferable to the non-recycled alternative; • Arrangements with suppliers to return any unused operation materials; • Where possible, goods to be ordered in bulk to minimize packaging waste and packaging material returned to the supplier wherever practicable; and **During Operation** **Waste Segregation** • The project developer/contractor will design and implement a waste segregation system and procedure and communicate it to all operation personnel to strictly adhere to the segregation procedure. • An appropriate number of containers with adequate volume and appropriate materials will be provided at strategic locations to support the segregation. Each waste category will be segregated into recycling, reuse and disposal sub-categories. **Waste Collection and Storage** • Daily collection and transport will be organized and carried out for each sub-category of segregated wastes. • A roofed storage area with adequate space will be provided for storing the segregated wastes waiting for the on-site or off-site reuse or recycling. • The storage area for hazardous waste will need to be specially designed to prevent spills or leaks onto the soil. **Waste Reuse and Recycling** • Chipping and mulching of vegetation cleared during operation and reuse of mulched material for landscaping purposes; • Reuse of excavated material as fill at approved fill sites; • Topsoil free of weeds to be stockpiled and stored for re-use, if possible;

Element	Content
	• Collection and return of packaging materials (e.g. pallets) to suppliers wherever practicable; • Use of recycled materials to the limits of design in concrete, road base, asphalt and other operation materials; • Remove any contamination inadvertently deposited in recyclable waste material containers. Provide cleanup of excessive contamination at recycling vendor locations when such contamination is not controlled at the project site. • Collection and recycling of used oils by a licensed contractor; • Collection by a licensed contractor of empty oil and fuel drums and other containers for return to recycling facilities; **Waste Disposal** • Disposal of the remaining wastes that are unable to be reused or recycled in the approved land fill site(s). • Preferably, inert wastes such as broken tiles, bricks, plastics should be used for filling the site in areas planned to be vacant space. • No burning of wastes will be allowed. • Non-operation wastes will be contracted to the existing municipal services, if possible. If not, they will need to be disposed of in a small sanitary land fill to be located within the power plant site in designated green areas. • Decomposable wastes such as food wastes and vegetation may be disposed of by composting. **On-site Record Keeping** The project developer/contractor will design and maintain record keeping procedures with provisions for: • Tracking collections of waste materials at the sites and deliveries to recycling, reuse, salvage, and landfill facilities. • Maintaining on-site logs that include for each load of materials removed from the site: type of material, load weight, recycling/hauling service, and date accepted by recycling service or landfill. • Accessibility to the EHS Manager of the project developer for verification of operation waste recycling. Legible copies of on-site logs, manifests, weight tickets, and receipts. Manifests shall be from recycling and disposal site operators that can legally accept the materials for the purpose of recycling, reuse, salvage, or disposal.

Element	Content
Monitoring	Monitoring of the waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. Daily site inspections will include observation of the collection and storage of waste materials in the operation sites and waste disposal areas, and reviewing the daily records. The focus will be on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the operation Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment. • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC and related Authority Department.
Area	• Project site
Responsible Agency	• Sub-contractor (Waste management company)
Estimate Cost	• Include of operation cost.

APPENDIX 7A-4

WASTEWATER MANAGEMENT PLAN

APPENDIX 7A-4

WASTEWATER MANAGEMENT PLAN

Element	Content
Objective	To ensure that all wastewaters generated during the operation will be adequately treated before discharging into the sea
Performance Indicators	Qualities of the treated effluent compared with the applicable effluent quality standards.
Sources	• Domestic wastewater generated by living activities of about 20 persons at peak of operation, estimated volume about 0.96 m^3/d. • Storm water with a return period of 5 years at boil-off gas approx. 28,635 m^3.
Applicable Standards	**Effluent quality standards:** • General Guideline of Site Runoff and Wastewater Discharges (operation phase), National Environmental Quality (Emission) Guidelines (Final), 2015 • Environmental, Health, and Safety-General Guidelines Environmental Wastewater and Ambient Water Quality, April 30, 2007 (World Bank Group/IFC); Standard (both from Myanmar and World Bank Group/IFC Guidelines) - Oil and Grease = 10 mg/L - pH = 6-9 - Total Suspended Solid =50 mg/L - BOD_5 = 50 mg/L - Total coliform bacteria = 400 / 100 ml - Temperature increase = <3°C (100 m. from discharge point)
Mitigation Measures	**Design Concept** The Contractor will prepare detailed design of a wastewater management system for the Boil-off gas operation site. The wastewater management system will consist of a collection system and a simple treatment system. The proposed design concept is based on the principle of wastewater segregation, treatment and reuse as briefly described below:

Element	Content
	• **Domestic Wastewater** - Toilet wastes will be separated from grey water or salvage. - Kitchen and canteen waste water will be discharged into oil and grease trap tank before draining into a retention pond. - Toilet wastes will be discharged into a septic tank (or more than one septic tank) with a hydraulic retention time of about 5 days. - Grey water will be discharged into the retention pond. - The retention pond will be designed as an oxidation pond with a hydraulic retention time of about 7 days. • **Operation Wastewater** - There is no wastewater discharged (closed system).
Monitoring	• Twice a year collection (cover dry and wet seasons) of one water samples at Effluent from release point of temporary drainage system. The treatment performance of the drainage system will be assessed from the monitoring data.
Reporting	• The results of monitoring will be presented in the monitoring reports. • Twice a year reporting on wastewater performance, and submit to MONREC and related Authorities Department.
Area	• Project site
Responsible Agency	• Sub-contractor (Waste management company)
Estimate Cost	• 600 USD/station/time

APPENDIX 7A-5

HAZARDOUS WASTE MANAGEMENT PLAN

APPENDIX 7A-5

HAZARDOUS WASTE MANAGEMENT PLAN

Element	Content
Objectives	• To minimize all types of hazardous wastes generated at the operation sites, particularly the boil-off gas operation site that will have to be disposed. • To minimize environmental impacts of waste disposal.
Performance Indicators	Number of complaints related to hazardous waste disposal.
Sources	Hazardous waste: Includes such wastes as spent lubricating oil, paints, and chemicals used in the operation. Most of the hazardous wastes are in liquid form.
Applicable Standards	Applicable guidelines and standards regarding the management and disposal of the three categories of hazardous wastes as prescribed by MONREC or enforced by the local government, whichever are more stringent.
Mitigation Measures	• Hazardous wastes will be handled by a licensed hazardous waste contractor. If this service is not available, the Contractor will need to find appropriate arrangements for incineration, safe permanent storage, or other appropriate methods of disposal. • A Hazardous Waste Management System covering waste classification, separation, collection, storage, transfer and disposal should be set up and operated. The waste management system will comply with applicable regulation of the government, if any.
Monitoring	Monitoring of the hazardous waste management performance will be carried out through quick daily site inspections and detailed weekly site inspections. Daily site inspections will include observation of the collection and storage of hazardous waste materials in the operation sites and hazardous waste disposal areas, and reviewing the daily records. This will be focused on efficiency of the collection, storage, and disposal; and on the quality of the records. The EHS Managers of the Project developer and the Contractor will jointly inspect the sites. In weekly site inspections, the EHS Manager will be participated by the Resident Engineer of the Project developer and the operation Manager of the Contractor. The inspection will cover verification of the records, disposal activities, discussion on the performance of the past week, and identification of problems, if any, that affect the waste management performance.

Element	Content
Reporting	• Report immediately to the relevant authorities any incident where harmful waste material is accidentally released to the environment. • In the event of an environmental incident, take such corrective or remedial action as is required to render the area safe and avoid or minimize environmental harm. • Monthly reports on the waste management results as part of the monthly monitoring reports. • Twice a year reports for submission to MONREC and related Authorities Department.
Area	• Project site
Responsible Agency	• Sub-contractor (Waste management company)
Estimate Cost	• include on operation cost

APPENDIX 7A-6

TRAFFIC MANAGEMENT PLAN

APPENDIX 7A-6

TRAFFIC MANAGEMENT PLAN

Element	Content
Objective	• Manage operation traffic and transport issues to minimize potential impacts on the communities and the operation of the road network and navigation/shipping
Performance indicators	• Number of traffic accidents in the identified impact areas • Number of traffic on local roads during the Operation phase.
Sources	• Traffic disturbances could be caused by haulage of spoil, fill materials, operation materials and plant equipment. • Potential impact areas: local roads
Management guidelines	• Take reasonable and practicable measures to avoid, or mitigate and manage the potential traffic impacts on communities near the worksites. • Minimize as far as reasonably practicable, potential traffic disruptions to the operation of the road network and the public transport network due to the transport of materials to and from the boil-off gas sites. • Monitor traffic flows near project site and take corrective action in response to traffic impacts as a consequence of operation works.
Mitigation Measures	• Strictly enforce the traffic regulations (on drivers and pedestrians) to reduce road traffic accidents • Construction the bridge for local villagers and children walk across the project coastal road. • Prepare and implement an improvement program for improving safety of the local road network/navigation/shipping to cope with expected increase in traffic volume during operations.
Monitoring	• Monitor number of vehicles two times per year at 2 sampling stations include 1) project area and 2) at Village. • Monitor traffic accident situation related to the project every day at project access road/ or even navigation.
Reporting	• Monthly report on local traffic conditions, including any accidents involving operation traffic. • Twice a year reporting on traffic performance, and submission to MONREC and related Authorities Department.
Area	• Project site (Onshore) and Project Access Road (at Nga Pitat Village)
Responsible Agency	• Project developer
Estimate Cost	• 500 USD/station/time throughout operation phase • Cost for monitoring vehicle accident situation related to the project include on cost for operation.

APPENDIX 7A-7

OHS MANAGEMENT PLAN

APPENDIX 7A-7

OHS MANAGEMENT PLAN

Element	Content
Objective	To establish best practicable OHS conditions to ensure work related health and safety of operational personnel.
Performance Indicators	• Total Recordable Injury Frequency Rate (TRIFR) • Lost Time Injury Frequency Rate (LTIFR) • Medical Treatment Injury Frequency Rate (MTIFR) • Duration rate • Incident rate
Sources	Issues of concern: excessive noise and temperature inside the power plant, fire and explosion risks.
Applicable Standards	OSH guidelines and standards enforced by the Ministry of Health and proposed for this Project as follows:
Mitigation Measures	**Design and Equipment Selection** (1) Incorporate in the EPC contract, all OHS requirements that the EPC contractor will in the design of the project and associated facilities, including equipment selection; give due consideration to, but not limited to, the following OHS requirements: (i) integrity of workplace structures; (ii) standard operating procedures for process shutdown, including emergency plan; (iii) work space and exit; (iv)fire precautions; (v) toilets and showers; (vi) potable water supply; (vii) clean eating area; (viii) lighting; (ix) safe access; (x) first aid; (xi) air supply and ventilation; (xii) work environment temperature; (xiii) noise and vibration; (xiv) electrical safety; (xv) fire and explosions; and (xvi) confined working space. (2) The EPC contractor will be required to prepare for consideration of the Project developer an OHS management plan and implementation procedures specific to the power plant of this Project and in line with the Owner's OHS policy and procedures. The OHS management plan and implementation procedures will be submitted not later than one month before commissioning of Boil-off gas and associated facilities. (3) The OHS management plan and implementation procedures will cover but not limited to the following subjects:

Element	Content
	• Organization and responsibilities of OHS management • Training plan • Communication plan • Contractor responsibilities • Safety measures for the Boil-off gas's O&M, including-safety in project operations, fire, explosion, and chemical hazards. • Emergency response procedures. • Task-specific work requirements Compliance monitoring and evaluation plan • Audit plan • Reporting system • Documentation system **During Project Commissioning** During project commissioning, the EPC contractor will be required to conduct necessary orientation and training to the Owner's Boil-off gas operational team to ensure that the operational team clearly understands the OHS plan and implementation procedures. **During Operations** The Plant Manager will implement the OHS plan and procedures as part of his operational control and management. The EHS Manager will monitor the implementation of OSH procedures to comply with relevant requirements.
Monitoring	Monitoring of OSH performance of the Contractor will be made through: • Daily informal inspections (walk through of the construction sites) • Weekly formal inspections of the work place. • Monthly formal inspections of the work place. • Audits • Corrective Action Reports The daily inspections will observe: (i) adherence of the operational personnel to the OHS procedures such as wearing of protective equipment in high risk working areas; (ii) working conditions; (iii) readiness of fire and life safety systems as relevant; and (iv) potential new hazards.

Element	Content
	The daily inspections will be carried out by the EHS Manager, the Operational Manager, and relevant unit heads. The Manager will occasionally join the daily inspections. The EHS Manager will prepare daily OHS inspection notes as part of the site inspection notes. The weekly formal inspections will be carried out at weekly interval sand shall be documented using appropriate "Weekly OHS Inspection Checklists". The EHS Manager and the Operational Manager will carry out the weekly inspections. The weekly inspections will include the same issues as the daily inspections but will be in more details and quantitative. The monthly formal inspections will review the OHS performance of the month based on results of the weekly inspections. Progress in addressing issues or problems identified in the precedent weekly inspections will be evaluated. Internal audits will be carried out annually or more frequent if the OHS performance is significantly below established targets. The internal auditor or team will be engaged by the power plant company's Board of Directors. Monitoring results will be discussed in monthly review meetings on power plant performance.
Reporting	• Monthly as part of the monthly monitoring reports except in case of an incident when reporting should occur immediately on completion of any investigation required to resolve the incident. • Results of OHS monitoring will be reported: - Twice a year reports will be submitted to MONREC and Port Authorities in the first five year after commissioning. - Annually report will be submitted to MONREC and Port Authorities throughout the Project life.
Area	• Project site
Responsible Agency	• Project developer (OHS Team)
Estimate Cost	• include operation cost

APPENDIX 7A-8

SOCIAL ENVIRONMENTAL MANAGEMENT PLAN AND CSR PROGRAM

APPENDIX 7A-8

SOCIAL ENVIRONMENTAL MANAGEMENT PLAN AND CSR PROGRAM

Element	Content
Objective	Avoid or mitigate and manage operation impacts on the social environment. *Note: The social environment includes residential and neighborhood amenity, connectivity, community health, community diversity, social infrastructure provision, livelihood and safety.*
Performance Indicators	• Number of grievances or complaints filed with the Project Management Office of the Project developer. • Number of complaints successfully responded.
Sources	Daily living of people in the surrounding communities may be disturbed or inconvenienced by environmental disturbances caused by the operation such as air quality, traffic, and waste management not satisfaction with marine resources utilization. The management of social environment will cover villages (sensitive receptors).
Applicable Standards	The target for the entire operation period of about 50 years is all complaints are responded by the EPC and filed with the Project Management Office.
Mitigation Measures	Mitigation measures for minimizing physical impacts on the social environment are prescribed in relevant sub-plans, such as noise, air quality and wastewater management. Mitigation measures in this sub-plan are community measures designed to support the implementation of the physical measures. The basic requirement is that the communities have access to the communication and complaints process to address and respond to their complaints related to the construction impacts on their daily living and properties. Establish the CSR Program to implement and support public relations and mitigation measures. **Amenity and Community Life** • Liaise with key stakeholders and the community through a public consultation process to ensure insignificant impacts of the construction on community facilities, schools and monastery. • As soon as it is practicable after the completion of construction, the Contractor shall reinstate community facilities affected by the works, if any.

Element	Content
	• Continue restore livelihoods through provision of knowledge for strengthening occupation career as proposed during construction phase • Conduct attitude survey to collect information on local concerns, issues, and problems of the communities in the new alternative fishing ground and boatyard area (should be all households in Villages). **Complaints and Corrective Actions** • Develop an effective and responsive system for receiving, handling and responding to complaints received during the construction of project works. • Ensure complaints are received and responded to on a 24-hour per day basis for the duration of the construction phase. • Provide reporting on complaints received, responses provided, timeliness of responses, and corrective actions taken on a monthly basis. • Raise community awareness of the complaints systems and procedures through public notifications and website facilities. **Community Consultation Program** • Undertake and maintain a comprehensive community information program to inform residents, businesses, community groups and motorists of Project activities and potential impacts. Effective and accessible consultation measures are required including maintenance of a 24-hour contact line operated by a person with authority to stop works if goals and agreements with the community are not met. • Ensure medical facilities, community centers, monastery and schools in the area have access to construction updates and community education during the construction. • Training and promotion household account record. • Support on development program such as electricity supply, improve on local road, and fishery program in new alternative fishing ground and boatyard area in CSR Program.

Element	Content
Monitoring	• Evaluate effectiveness of consultation, liaison and mitigation outcomes. • Survey and report on actual impacts of the operation on community amenities. • Report community consultation's activities and on consultation, liaison and environmental compliance and public transport access in work site neighborhoods.
Reporting	• Report immediately in case of complaint from a neighbor. • CSR Program will be reported: - Twice a year reports will be submitted to MONREC and Concerned Authorities in the first five year after commissioning. - Annually report will be submitted to MONREC and Port Authorities throughout the Project life.
Area	• Villagers (PAPs)
Responsible Agency	• Project developer
Estimate Cost	• 150,000 USD lump sump for group interview or village forum at 3 affected villages throughout operation phase • 2,000 USD / year for development fund during 1^{st}-5^{th} years of operation phase • 1000 USD / year for development fund during 6^{th}- throughout operation phase.

APPENDIX 7A-9

OPERATION STAFF MANAGEMENT PLAN

APPENDIX 7A-9

OPERATION STAFF MANAGEMENT PLAN

Element	Content
Objective	• To manage staff resources throughout the life of project. • To ensure that sufficient staff processing the correct skill sets and experience to ensure a successful project completion.
Performance Indicator	• Operation staff meet the target/goal of proposed plan (percentage). • Results/products meet the standard requirement used for the Boil-off gas Project.
Mitigation Measures	• Provide a training program for operational staff. • Incentive idea for achieving goals.
Monitoring	Set Key Performance Indicators (KPIs) for operation staff (individual staff or department).
Reporting	• Results will be included in the environmental monitoring reports and submitted to MONREC and related Authorities Department.
Area	• Project site/or outside.
Responsible Agency	• Project developer (HR Team)
Estimate Cost	• include on operation cost

APPENDIX 7A-10

EMERGENCY MANAGEMENT PLAN (FLOOD, TSUNAMI AND CYCLONE)

APPENDIX 7A-10

EMERGENCY MANAGEMENT PLAN (FLOOD, TSUNAMI AND CYCLONE)

Element	Content
Objectives	• To minimize impacts in case of emergency during operation phase. • To acknowledge and raise awareness of operation staff to evacuate, shelter or lockdown can save lives.
Performance Indicator	• Number of staff understand about emergent situation and know how to minimize/survive from the hostile situation (flood, tsunami and cyclone). • Conduct a test (pre-test and post-test) to evaluate their understanding.
Mitigation Measures	• Provide training program about emergency plan in orientation program. • Practice emergency plan every year taught by experts.
Monitor	• Results of pre-test and post-test of construction workers (understanding and application of knowledge).
Reporting	• Results of pre-test and post-test/yearly emergency practice, directly reporting to project developer.
Area	• Project sites (onshore and off shore).
Responsible Agency	• Project developer • Operation staff
Estimate Cost	• include on operation cost

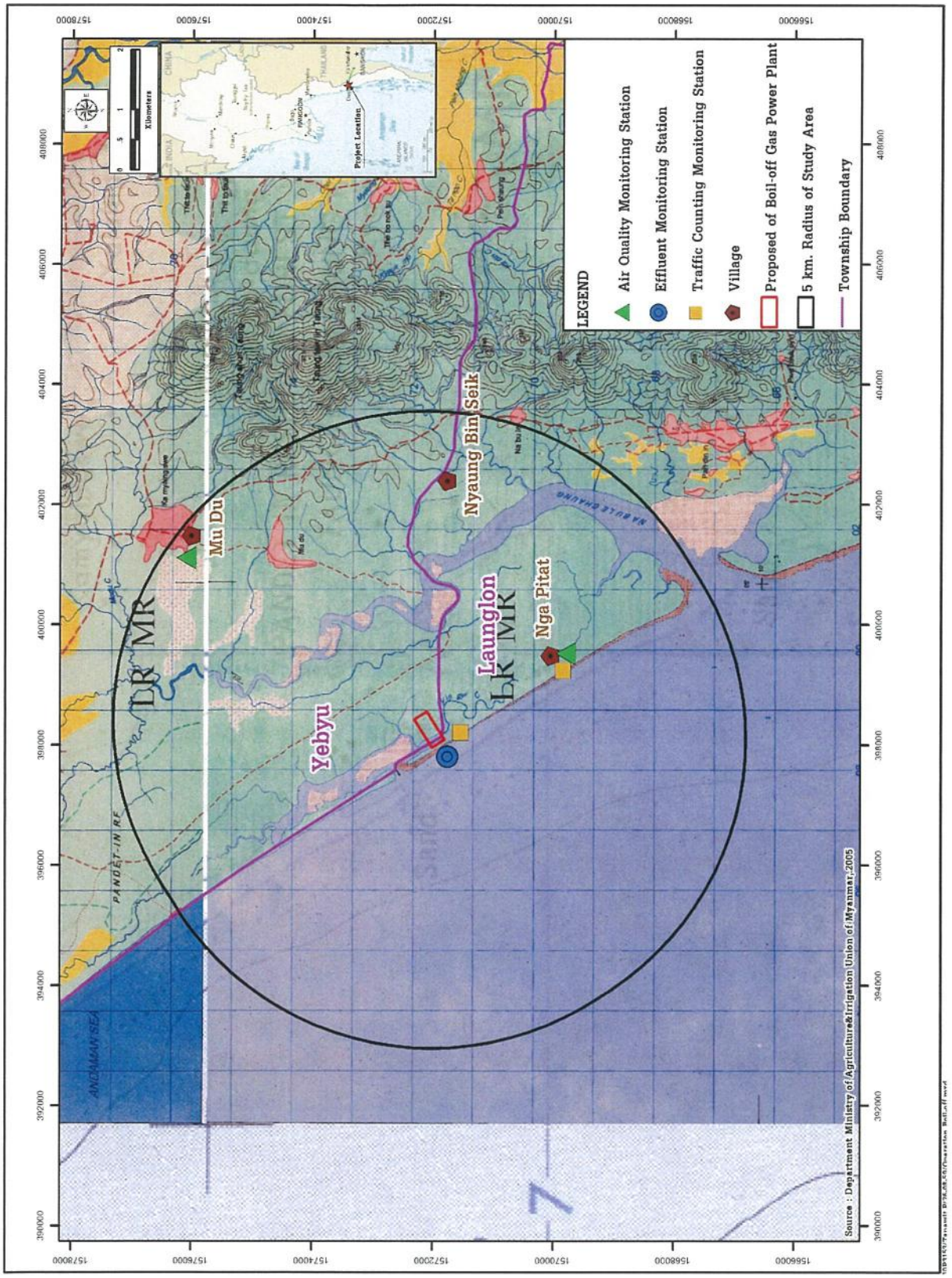


FIGURE 1 : MONITORING STATION DURING OPERATION PHASE

APPENDIX 9A

PRELIMINARY ENVIRONMENTAL AND SOCIAL COST ESTIMATION

APPENDIX 9A

PRELIMINARY ENVIRONMENTAL AND SOCIAL COST ESTIMATION

A. Annual Budget during 15 months of Pre-construction and Construction Phase

No.	COST ITEMS	Unit Cost		Frequency	Sampling Station	Total Cost (US$)
		US$	Units			
1	Environmental monitoring during the pre- construciton/ construction period					
	air quality (2 stations)	800	Station	1 time/three months (5 time during pre-construction/construction Phase)	2 stations at project site and Nga Pitat Village	8,000
	noise measurement (2 stations)	700	Station	1 time/three months (5 time during pre-construction/construction Phase)	2 stations at project site and Nga Pitat Village	7,000
	wastewater measurement (1 station)	600	Station	1 time/ months (15 time during pre-construction/construction Phase)	1 stations at discharge point	9,000
	traffic flows measurement (1 stations)	500	Station	2 times per year during pre-construction/operation phase	1 station at Nga Pitat Village	1,000
	flora and fauna field survey	3,000	Lumpsum	1 time before site clearance	34 acre of proposed project site	3,000
2	OHS Management Plan	-	Include Construction Cost	Every day	Cosntruction Site and Surrounding Area	a
3	For natural resource used management, Village Forum, and support local villagers in rehabilitati	100,000	Lumpsum	Every day	At 3 affected villages	100,000
	TOTAL					**128,000**
	CONTINGENCY (APPROX. 10%)					**19,500**
	GRAND TOTAL					**147,500**

Remark : a = include on construction cost prepared by sub-contractor

APPENDIX 9A
PRELIMINARY ENVIRONMENTAL AND SOCIAL COST ESTIMATION (CONT'D)

B. Annual Budget during Operation Phase (75 years, 50 years operation plus 25 years extensions)

No.	COST ITEMS	Unit Cost		Frequency	Sampling Station	Annual Budget During Operation Phase (US$)	
		US$	Units			From year 1 to year 5 of operaiton (total 5 years)	From year 6 and throughout operation (total 70 years)
1	Environmental monitoring during the operation period						
	Stack Emission	-	Include Operation Cost	veryday throughtout operation phas	Stack of Boil-off Power Plant	b	b
	ambient air quality (2 stations)	800	Station	twice a year during 1st-5th year of operation phase and 1 time per year throughtout operation phase	at Nga Pitat and Mudu Village	16,000	112,000
	wastewater measurement (1 stations)	600	Station	twice a year during 1st-5th year of operation phase and 1 time per year throughtout operation phase	1 stations at discharge point	6,000	42,000
	traffic measurement (2 stations)	500	Station	twice a year throughtout operation phase	2 station at project access road near Nga Pitat Village and Small Port	5,000	70,000
	Mangrove reforetation, rehabilitation, and maintenance (10 years)	95,000	Lumpsump	during 1st-10th year of operation phas	at reforestation area	47,500	47,500
	support local villagers in rehabilitation activities (10 years)	1,000	time	during 1st-10th year of operation phas	at reforestation area	5,000	5,000
2	OSH Management Plan	-	Include Operation Cost	Everyday	Project Site	b	b
3	Social development and livelihood support for PAPs						
3.1	Development Fund during 1st-5th year	1,500	time	During 1st-5th of opration phase	at three affected village	7,500	-
3.2	Development Fund during 6th to throughout opeartion phase	1,200	time	During 6th-throughout opration phase	at three affected village	-	84,000
3.3	Village forum	150,000	Lumpsum	2 times per year during 1st-5th of opration phase and once a year throughout operation	at three affected village	30,000	120,000
	TOTAL					117,000	480,500
	CONTINGENCY (APPROX. 10%)					11,700	48,050
	GRAND TOTAL					128,700	528,550
							657,250

Remark : b = include operation cost prepared by project proponent