ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

FOR

EIA Report of Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for Fully Integrated Cement Production Facility

November 2018



MAWLAMYINE CEMENT LIMITED

Khayongu, Chaunghnakwa Main Road, Kwanngan Village Tract, Kyaikmaraw Twonship, Mon State



Date: Reference No.:

Attention: Director General, Environmental Conservation Department, Nay Pyi Taw, Myanmar

Dear Sir,

We hereby submit our Environmental Impact Assessment (EIA) Report for in English in 3 sets (1 original and 2 copies) with Summary of EIA Report in Myanmar and in 2 CDs for getting approval of the EIA Report, "*EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for Fully-Integrated Cement Production Facility*".

We confirm that we prepared the EIA Report in a format prescribed by the Ministry according to Section 62 of EIA procedure which were addressed at:

a) the accuracy and completeness of the EIA;

b) that the EIA has been prepared in strict compliance with applicable laws including this Procedure and with the TOR for the EIA; and

c) that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EIA Report.

Expected date of public disclosure:

Yours sincerely

Name Title Company Name Company Address

Mr.Hatsachai Prahanphap Managing Director Mawlamyine Cement Limited Khayongu,Chaunghnakwa Main Road,Kwanngan Village Track Kyaikmaraw Township, 097-96093056



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DECLARATIONS

DECLARATION - EIA Experts

Resource & Environment Myanmar Co., Ltd. (REM); a local environmental consultant firm, conducted environmental impact assessment and prepared ESIA report for Mawlamyine Cement Limited in compliance with EIA Procedure and other relevant laws/rules and formally submitted to the Environmental Conservation Department (ECD) for final approval.

We do state, to the best of our knowledge at the time of report preparation, that

- To our knowledge, all information contained in this report is accurate and a truthful representation of all findings as relating to the project, and;
- The ESIA Report has been prepared in strict compliance with all applicable laws, rules regulations and procedure in force.

We also consulted to Mawlamyine Cement Limited to undertake that;

Mawlamyine Cement Limited in respect of the "EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for Fully-Integrated Cement Production Facility" will at all times comply fully with (1) any and all commitments and obligations as set forth in the ESIA Report which has been reviewed by Review Team, and (2) any and all plans and the various components thereof, including without limitation, impact avoidance, mitigation, and remediation measures, and with respect to such commitments, obligations, plans and measures related to the development, construction, commissioning, operation and maintenance of the project, and any circumstance in which work done or to be done, or services performed or to be performed, in connection with the project's development.

Signed: (Zaw Naing Oo)

Date: 16 -10-2018



For: Resource & Environment Myanmar Co., Ltd. (REM)



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EXECUTIVE SUMMARY

1 INTRODUCTION

The Environmental and Social Impact Assessment (ESIA) report illustrates an assessment of the potential environmental and social impacts connected to construction and operation of captive power plant (9MW Waste Heat and 40MW (20MW x 2) coal based thermal power plant for production of 5,000 ton per day Cement Plant Project, located in Kyaikmaraw Township of Mon State, Myanmar (in the following, the Project).

This report has been prepared for MCL by Resource & Environment Myanmar, selected as the Environmental and Social Consultant to perform the ESIA, a local environmental consulting firm based in Yangon, Myanmar.

This Report presents the objectives, the methodology applied and the outcomes of the ESIA study conducted and it was prepared in order to meet compliance with national and international requirements, such as International Finance Corporation (IFC) Performance Standards (PSs). The Project has been classified by IFC as Category B project.

1.1 Project Background and Overview

The ESIA report was submitted to Myanmar Investment Commission in 2013 and MCL received permission letter from MIC on 7 May 2013. At present, the cement plant and captive power plant (9MW Waste Heat and 40MW (20MW x 2)) coal based thermal power plant have been constructed.

According to the meeting between the developer and the officers from Environmental Conservation Department, Ministry of Natural Resources and Environmental Conservation, the ESHIA report shall be updated based on EIA procedures (2015).

The 40MW coal power plant project herein referred to as "the Project" includes the following main components:

- ➢ construction and of 40MW (2 X 20MW) coal power plant
- > operation of 40MW (2 X 20MW) coal power plant

According to the EIA procedure, ECD decided that individual EIA report for this project shall be submitted.

The location of the MCL the project site is shown in Figure 1.



Figure 1: Location of the Project Site

2 LEGISLATIVE FRAMEWORK

2.1 Overview of Myanmar Legislation

Myanmar issued a new EIA (Environmental Impact Assessment) procedure on 29 December 2015, which defines the requirements for the EIA and states that: "An EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual-components of the environment, together with all pertinent legal matters relating to the environment (including land use, resources use, and ownership of and rights to land and other resources) that may be affected by the Project during all project phases including pre-construction, construction, operation, decommissioning, closure, and post-closure; and shall identify and assess all Adverse impacts and risks that potentially could arise from the project."

2.2 EIA Process

Three different steps are foreseen for the EIA process, these are described in the following sections:

- Screening Phase;
- Scoping Phase; and
- EIA Investigation and Report Preparation.

2.2.1 Screening Phase

Screening is the first step of a complete EIA process. The MOECAF (now MONREC) is empowered and has the exclusive authority to define the screening criteria for a project. Guidance is provided as to which projects or activities should carry out an Initial Environmental Examination (IEE) or EIA. If, as a result of that determination, an IEE or an EIA is required, then the proponent of the project or activity has to prepare, obtain approval for, and implement an appropriate Environmental Management Plan (EMP) in respect of the proposed project or activity.

Therefore, this project is deeply concerned with air pollution issues, use of raw material, and likely to effect on the surrounding environment by especially during the operation phase such as machinery noise and air emissions from the project activities. Therefore, EIA investigation work for this project has strongly proposed to be done.

2.2.2 Scoping Phase

All EIA type projects are required to undergo the Scoping Phase. The project proponent shall be responsible to ensure that the Scoping and the preparation of the Terms of Reference (ToR) for the EIA report are undertaken in a professional manner and in accordance with any applicable guidelines issued or adopted by the MONREC.

As part of the scoping, the project proponent shall ensure that the following public consultation and participation process is carried out with the followings.

 \succ disclose information about the proposed project to the public and civil society through local media, including by means of the prominent posting of legible sign boards and advertising boards at the Project Site which are visible to the public; and

> arrange the required complement of consultation meetings as advised by the MOECAF, with local communities, potentially PAPs, local authorities, community-based organizations, and civil society.

The project proponent shall prepare a scoping report and ToR for the EIA investigations and submit the completed Scoping Report and ToR to the MONREC for review and approval.

2.2.3 EIA Investigation and Report Preparation

The Project Proponent has to ensure that the EIA investigation properly addresses all adverse impacts and is undertaken in accordance with the approved TOR. The EIA investigation shall consider all biological, physical, social, economic, health, cultural and visual components of the environment, together with all pertinent legal matters relating to the environment (including land use, resources use, and ownership of and rights to land and other resources) that may be affected by the Project during all project phases, including pre-construction, construction, operation, decommissioning, closure, and post-closure; and shall identify and assess all adverse impacts and risks for environment, social and, if relevant, health that potentially could arise from the Project.

The EIA Procedure does not address the social impacts of involuntary resettlement or which relate to indigenous people. Separate procedures shall be issued by responsible ministries, and in the absence of such procedures all such Projects shall adhere to international practice on involuntary resettlement and indigenous people.

The Project Proponent is obliged to use, comply with and refer to applicable national standards, international standards adopted by the Government and/or the MONREC, or, in the absence of relevant national or adopted international standards, such standards as may be agreed with the MONREC.

The EIA Report shall consider the views, concerns, and perceptions of stakeholders, communities and individuals that could be affected by the Project or who otherwise have an interest in the Project. The EIA should include the results of public consultations and negotiations with the affected populations on the environmental and social issues. Public concerns should also be taken into account in assessing impacts, designing mitigation measures, and selecting monitoring parameters.

The MONREC shall within 10 days after submission disclose the EIA Report to civil society, PAPs, concerned government organizations, and other interested stakeholders. The MONREC shall submit the EIA Report to the EIA Report Review Body for comment and recommendations and also arrange for public consultation meetings at national and State/ Regional/ local levels where the Project Proponent shall present the EIA Report. All received comments and recommendations, including those of the EIA Report Review Board, will be collected and reviewed by the MONREC prior to making a final decision on approval of the EIA Report.

The MONREC shall deliver its final decision within 90 days from the receipt of the EIA Report. All costs incurred in completing to the EIA Report disclosure and review, including the public participation process, shall be borne by the Project Proponent. Upon completion of its review of the EIA Report, the MONREC will issue an ECC or inform the Project Proponent of its decision to reject the EIA Report and publically disclose its decision.

2.3 International Standards and Applicable Guidelines

In addition to the applicable host Country Laws, this ESIA Report presents the Project impacts and mitigation measures with explicit reference to the following international standards and guidelines:

- ➢ IFC performance standards PS (2012);
- WB Group's EHS guidelines, as applicable to the project, including EHS General Guidelines

2.4 National Laws and Regulations

The project proponent, MCL shall comply the all National Laws that related to the project activities. The followings are the list of laws and regulations that applied and commits to follow related to the present project.

- 1. National Environmental Policy (1994)
- 2. The Environmental Conservation Law (2012)
- 3. Environmental Conservation Rule(2014)

- 4. Environmental Impact Assessment Procedure (2015)
- 5. National Environmental Quality (Emission) Guidelines(2015)
- 6. Underground Water Act(1930)
- 7. Fresh Water Fisheries Law (1991)
- 8. The Law Relating to Aquaculture (1989)
- 9. Conservation of Water Resources and Rivers Law (2006)
- 10. Mon State Municipal Law (2017)
- 11. Forest Law (1992)
- 12. The Protection of Wildlife and Wild Plants and Conservation of Natural Areas Law (1994)
- 13. The Protection and Preservation of Cultural Heritage Regions Law (1998)
- 14. The Protection and Conservation of Antique Objects Law (2015)
- 15. The Land Acquisition Act (1894)
- 16. The Farmland Law (2012)
- 17. The Vacant, Fallow and Virgin Lands Management Law (2012)
- 18. National Land Use Policy (2016)
- 19. Factories Act (1951)
- 20. Private Industrial Enterprise Law (1990)
- 21. The Export and Import Law (2012)
- 22. The Boiler Law (2015)
- 23. Explosive Substance Act (1908)
- 24. Myanmar Investment Law (2016)
- 25. Prevention of Hazard from Chemical and Related Substances Law (2016)
- 26. Electricity Law (2014)
- 27. The Law Amending the Workmen' Compensation
- 28. Leave and Holiday Act (1951)
- 29. Labour Organization Law (2011)
- 30. Settlement of Labour Dispute Law (2012)
- 31. Social Security Law (2012)
- 32. Labor Dispute Settlement Law (2012)
- 33. Minimum Wage Law (2013)
- 34. Employment and Skill Development Law (2013)
- 35. The Payment of Wages Law (2016)
- 36. The Union of Myanmar Public Health Law (1972)
- 37. The Prevention and Control of Communicable Diseases Law (1995)
- 38. Myanmar Investment Law (2016)
- 39. The Ethnic Rights Protection Law (2015)
- 40. The Fire Service Law (2015)

2.5 MCL's Pollution Control Framework for Proposed Cement Project

In addition to compliance with the existing legal policies, regulation and guidelines and this coal power plant is part of the MCL cement plant, MCL had its own Sustainability Development Policy and environmental management plan. Indeed, MCL had been established by collaborative work of SCG cement (Thailand) and Pacific Link Cement Industry (PLCI). SCG already got certification of ISO 14001 series for Sustainable Development Policy and MCL also handled to develop the proposed project by operating the manufacturing processes in sustainable policy and guidelines (see in MCL announcement described as follow).



Announcement MCL 009/2016

SUSTAINABLE DEVELOPMENT POLICY (Safety, Environment, CSR)

Mawlamyine Cement Limited establish safety to our employees and contractors, preserve the environment and collaborate with local government and surrounding communities in order to be environmental friendly factory and be a good citizen in Mon state under corporate governance.

Mawlamyine Cement Limited has therefore implemented the Sustainable Development policy as the followings:

- 1. Align SCG Safety Principle to develop Safety Management Program
- 2. Promote safety caring culture with uncompromising on safety standard
- 3. Safety is everybody's accountability
- Control air emission and noise to conform to the relevant standards by implementing Pollution Prevention and Clean Technology.
 Reduce natural resource consumptions; increase the efficiency of energy by improving the
- Reduce hadra resource consumptions, increase the enciency of energy by improving the operation to reduce the environmental impacts.
 Improve waste management by applying 3R's (Reduce, Reuse, Recycle) management and
- comply with legal requirements.7. Prevent pollution by improving operation effectiveness and efficiency and increase more green
- areas.8. Coordinate with government, external organizations and communities to conserve environment and natural resources for sustainable development.
- Increase more satisfaction from surrounding communities by implementing CSR program and stakeholder engagement program.

The Sustainable Development policy is communicated within Mawlamyine Cement Limited to make all employees understood and well implemented.

The policy, objective and target of the environmental management system are maintained, reviewed and revised at least once a year via regular Management Review meeting.

8

Managing Director Mawlamyine Cement Limited

March 4, 2016

Mawlamyine Cement Limited No.136/137, Pyay Road, Saw Bwar Gyi Gone, Insein Township, Yangon, Myanmar.

2.5.1 Environmental Caring Policy of Proposed MCL Project

It had been stated as: "Any employee who is careless and makes the standard value of pollution $(SO_x, NO_x, Dust and Noise)$ exceed standardization shall be punished by the company. The highest penalty would be termination."

Other Safety plans and employee management plan will be described in Chapter 2 which was stated as Legal Framework and the attached Annexes.

2.5.2 MCL Commitments and EIA Implementation Team

In support and approval of EIA, the Resource & Environment Myanmar Ltd. had collected and analyzed physical, biological and social data such as people's perceptions, concern, opinion, and expectation on the project for the approval of clean environment and guiltless society during and after the development of the project.

Any type of development activity has both beneficial and adverse impacts on the environment in which it operates. The impacts are identified and evaluated by the project proponents to reduce their negative impacts and maximize the positive effects on the surrounding environment. The proposed project is being expected to supply stable electricity so that cement plant meets the cement requirement for the construction and industries in the surrounding areas and also in different parts of Myanmar. The proposed project will generate an optimum employment generation for the local

population. Full pledged Environmental Management Plan for the proposed project shall be constituted with qualified Engineers and Technicians.

According to the technical study and the environmental, social and health impacts assessment, this project is type of off-grid electricity production and only provides its electricity for MCL cement production and the recommended Environmental Monitoring, Health, Safety & Environmental Management Plan (EMP) are fully integrated by the project proponents.

2.5.3 MCL's Organization Structure

Electricity production by this project is mainly responsible by Mawlamyaine Cement Limited and the maintenance, monitoring and EIA implementation works are implemented by the instruction of sectors to sectors. Sustainable and organization development department will mainly control the proper implementation of EMP and HSE plans and they will also play a role in stakeholder consultation and public relation. MCL organization chart is presented as follow.





3 PROJECT DESCRIPTION

3.1 **Project Location**

The coal power plant project site is situated near the Kawdun and Kawpanaw villages in Kyaikmaraw Township, Mon State. It lies between latitude 16° 20' N to 16° 23' N and longitude 97° 47' E to 97° 49' E, in one-inch topographic map No.94 H/15 of Myanmar Survey Department. It is also located at Mon State, about 19 km southeast of Mawlamyine City, State City of Mon.

3.2 Coal Fired Power Plant

Cement production is a continuous process and therefore the unreliability and the insufficiency of power supply from grid system can lead to production loss. Consequently, establishing MCL Cement's own Power Plant is considered to be the important issue.

There are many sources of power production such as coal, natural gas, oil, hydroelectricity or renewable energy resources etc. Practically, Coal is the most suitable source for power production in cement plant, because it is also the main fuel for clinker production and coal for both purposes can be transported together.

Coal fired power plants have been developed continuously from Pulverized Coal Boiler (PC Boiler) to Circulating Fluidized Bed boiler (CFB Boiler) which is the newest generation of coal fired boiler. After taking both technologies into consideration, CFB boiler is the most suitable type for a 5000-tonper-day cement of which power usage is around 40 Megawatts.

3.2.1 Sources of Coal

Two types of coal (Indo and local coal) are used in the combustion process. Local coal is obtained from the Pin Lone township, southern Shan state. Coals are mixed in the range 20-100% depending on the supply and quality of coal in each lot. Current coal consumption rate ranges 500-600 ton a day. Chemical analysis results of Indo and local coals are presented in the table 1.

Description		Local					Imported						
		Kalawa			Pinlon		Indo (Low Sulfur)		Indo (Normal Sulfur)				
		As Receive d	Air Drie d	Dry	As Receive d	Air Drie d	Dry	As Receive d	Air Drie d	Dry	As Receive d	Air Drie d	Dry
Moisture													
Total	%	13.49			35.38			10.45			12.61		
Inherent	%		7.59			13.69			3.04			9.73	
Ash	%	15.94	17.02	18.35	11.11	14.84	17.17	21.40	23.17	23.90	4.38	4.53	5.02
Volatile Matter	%	35.96	38.45	41.66	29.91	39.98	46.35	37.85	40.98	42.26	42.81	44.21	48.97
Fixed Carbon	%	34.62	36.94	39.99	23.61	31.50	36.49	30.30	32.81	33.84	40.20	41.53	46.01
Calorific Value													
Gross	Cal/ g	5094	5436	5884	3454	4608	5339	5257	5692	5870	5913	6107	6765
Sulfur													
Bomb Sulfur	%	1.33	1.42	1.53	0.66	0.89	1.02	0.35	0.37	0.39	1.90	1.96	2.17
Size	mm	0-50											

 Table 1: Comparison of coal analysis between Indo and Local coal

Source: MCL Laboratory analysis

3.3 MCL Layout

The overall layout plan of MCL that includes power plant, cement plant, limestone mine and jetty is is shown in Figure 3.



Figure 3: Preliminary Layout of Plan of MCL Project

3.3.1 Coal Based Thermal Power Plant



Figure 4: Power Plant Layout

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Figure 5: Locations of Coal Storage and Captive Power Plant in MCL

3.3.2 Description of Main Component of Coal Fired Circulating Fluidization Bed (CFB) Boiler



Figure 6: Circulating Fluidization Bed (CFB) Boiler

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Figure 7: CFB Boiler Operation System

3.4 Waste Heat Power Generation

The Waste Heat Power Generation Plant is a facility to generate power by recovering heat from waste gas discharged from a cement plant. This is an energy saving system to cover approximately 20 % of the total electric consumption of a cement plant. The Waste Heat Power Generation Plant generates electric power by a steam turbine utilizing steam produced from the heat of two sources– suspension pre-heater waste gas (SP waste gas) and air quenching cooler waste gas (AQC waste gas).



Figure 8: Schematic Diagram of Waste Heat Power Generation

Waste Heat Recovery System (Maximum: 9.00MW, Normal Operation: 6-9 MW) Boiler Specification: Natural Circulation Type Suspension Preheater Boiler:

	Rated Steam Generation: Rated Working Pressure: Rated Steam Temperature: Inlet Flue Gas Volume: Inlet Flue Gas Temperature: Efficiency of Heat Recovery:	26.4 tph 1.6 MPa 313 °C 350,000 Nm3/h 330°C 24.8%
Air Qu	enching Cooler Boiler:	J4.070
-	Rated HP Steam Generation: Rated HP Steam Temperature: Rated HP Steam Temperature: Rated LP Steam Generation: Rated LP Steam Temperature: Rated LP Steam Temperature: Inlet Flue Gas Volume: Inlet Flue Gas Temperature: Efficiency of Heat Recovery:	21.4 tph 1.6 MPa 365 °C 3.7 tph 0.5 MPa 200 °C 225,000 Nm3/h 380°C 74.5%
	Turbo-generator Specification:	Condensing Turbine Type
	Rated Power Output: Rated Speed: Rated Voltage: Inlet Steam Condition: Rotational Direction:	9,000 kW 3,000 rpm 10.5 kV 44.5 tph, 1.6 MPa, 320°C Clockwise

3.5 Analysis of Project Alternatives

The alternative selection for main coal fire machines was proceeded by examining technologies and alternative criteria with respect to system features such as general description, operation, installation, ease of operation, operation cost, ease of maintenance, maintenance cost, less energy use, versatility and upgrading and the benefits of installing those machines in cement manufacturing plant operations.

The selective alternative systems of the machines used in MCL coal power plant were as follows.

3.5.1 Comparative System Features of Coal Fired Boiler

Circulating Fluidized Bed Combustion, which is the high efficiency boiler but has the low combusting temperature 840-950°C. With this range of temperature, NOx producing from this boiler is lower than other type of boiler that has higher combusting temperature. Moreover, limestone can be used as bed material and refill in boiler to capture the Sulfur in coal which reduce amount of SO_x emission from the boiler. This boiler type also equipped with Bag filter which remove the dust from the waste gas. After boiler, MCL also equipped the Flue gas de-sulfurization system which can remove SO_x from waste gas down to very low level.

3.6 Conclusion for Technology Selection

Practically, Coal fired power plant is the most suitable source for power production in cement plant, because it is also the main fuel for clinker production and coal for both purposes can be transported together.

Since coal fired power plants have been developed continuously from time to time starting from Pulverized Coal Boiler (PC Boiler) to Circulating Fluidized Bed boiler (CFB Boiler) which is the newest generation of coal fired boiler.

Circulating Fluidized Bed boiler (CFB Boiler) use a technology of Fluidized Bed Combustion which is more environmentally friendly and recognize by many power plants in many countries.

Circulating Fluidized Bed combustion gives the flexibility to burn a wide range of fuels with optimum efficiency and 99% with completely combustion, resulting in lower of Thermal NOx emission compared to other technologies and during combustion process, limestone can be add to the chamber to react with SO_2 in order to reduce SO_2 emission.

For a post-combustion technology, MCL considered to installed Flue Gas Desulfurization (FGD) combine with Bag Filter (BF) to reduce SO_2 and dust after combustion process which efficiency of FGD is higher than 95%

After taking considerations for all technology and advantages, Circulating Fluidized Bed boiler (CFB Boiler) with Flue Gas Desulfurization (FGD) is the most suitable type of Power Plant to support 5000-ton-per-day cement production of which power usage is about 40 Megawatts.

4 MAIN POLLUTION SOURCES AND ITS CHARACTERISTICS

The major air emissions during the operation period of the power plant include Total Suspended Particulate (TSP), Sulfur dioxide (SO₂) and Nitrogen Oxides (NO_x), can be controlled by bag filters, oxygen and temperature control at boiler and Flue Gas Desulfurization system.

4.1 Major Air Emissions and Impacts Mitigation & Management

Air emissions from power plant operation are mainly released by the coal crusher, coal combustion process at CFB boilers, limestone preparation process and FGD stack.

4.1.1 Dust emission Control

Bag filter is used for flue gas dust removal, belt transfer point, crusher area, whose dust removal efficiency is 99.99%.

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NO.	Name	Specification	unit	location	
1	Boiler				
1.1	Bag filter	230000m ³ /h, 1500Pa	2	Used for boiler	
2	Coal transportation				
2.1	Bag filter	4500m ³ /h, 1500Pa	1	Raw coal silo	
2.2	Bag filter	1200m ³ /h, 1500Pa	2	Rear of #1 belt conveyor	
2.3	Bag filter	1200m ³ /h, 1500Pa	2	Head of #1 belt conveyor	
2.4	Bag filter	7800m ³ /h, 1550Pa	2	Rear of #2 belt conveyor	
2.5	Bag filter	1200m ³ /h, 1500Pa	2	Head of #2 belt conveyor	
2.6	Bag filter	4500m ³ /h, 1500Pa	1	#1 coal bunker of boiler	
2.7	Bag filter	4500m ³ /h, 1500Pa	1	#2 coal bunker of boiler	
3	Ash and slag treatment				
3.1	Bag filter	4500m ³ /h, <mark>1</mark> 500Pa	1	Top of the ash silo	
3.2	Bag filter	1140m ³ /h, 1100Pa	1	Top of the slag silo	
4	Desulfuration system and	d limestone crush system	n		
4.1	Bag filter	1140m ³ /h, 1100Pa	1	Top of #1 limestone silo	
4.2	Bag filter	1140m ³ /h, 1100Pa	1	Top of #2 limestone silo	
4.3	Bag filter	~20010m3/h	1	Limestone grinding system	





Figure 9: MCL Control Units Installation for Dust Emissions

4.2 Noise Control

Low noise equipment is on priority in design, and sound insulation cover, or sound insulation level shall be set up in rotating machinery and equipment, silencer shall be installed at the FD fan inlet and boiler ignition and steam exhaust mouth to reduce noise pollution to the environment.



i) Air Fan with Silencer

Steam Blow Pipe with Silencer

Figure 10: MCL's Mitigation Measure Units for Noise

ii)

4.3 Ash & Slag Removal System

Ash and slag by the power plant boilers are utilized completely and comprehensively in cement plant. Positive-pressure dense phase bunker pump conveying system is used for ash removal system. Fine ash captured by bag filter is sent to ash silo of power plant through conveying pipes by compressed air. And then send to cement plant by tank car for comprehensive utilization. The ash silo adopts the reinforced concrete structure, with a volume of 400m³, and can store 7-days ash generated by 2 sets of 90t/h boilers.

Boiler slag is discharged to cooling slag remover and cooled dry slag is transferred to #2 scraper conveyer by #1 scraper conveyor. Then it is sent to slag bunker and transported to cement plant by

vehicles for comprehensive utilization. The slag silo adopts the steel structure, with a volume of $200m^3$, and can store 3-days slag generated by 2 sets of 90 t/h boilers.



Figure 11: MCL's Mitigation Measure Units for Ash and Slag Emissions

4.4 Water Consumption

The water demand for the operation phase will be entirely provided by the Ataran River and rain water collected by the small reservoirs (Pond 1, 250,000 m³ and Pond 2, 150,000 m³ water ponds) that can collect rain water to use for power plant. Based on the hydrogeological features of the site, the Project area is settled in alluvial plain rich in water and groundwater sources even in the dry season.

Estimate daily water usage: 8,800 m³

Daily water return: 2000 m³ (from industrial)

Actual Daily usage: 8,640 m³

Monthly usage: $8,640 \text{ m}^3 \text{ x } 30 = 259,200 \text{ m}^3$

Reserve raw water pond $#1 = 250,000 \text{ m}^3$. Can use for almost 1 month.

Table 2: Water usage by months

Month	Amount of Water Utilization			
Jan				
Feb				
March	Actual need to fill water for 5 months (Jan, Feb, Mar, April, May)			
April				
May				
June				
July	During Paining Sasson (June July August San) (No need to fill up water)			
Aug	During Raining Season (June, July, August, Sep) (No need to fin up water)			
Sep				
Oct	Enough reserve water from Pond #1 for Oct and Nov			
Nov				
Dec	Reserve water from Pond #2 (capacity): 150,000 m3. Can use for for about 17 days in December.			

Total amount of water filled from Ataran River: $259,200 \text{ m}^3 \text{ x} 5 \text{ months} = 1,296,000 \text{ m}^3 \text{ per year}$.

4.5 Wastewater Discharges and Control

The power plant uses proper circulation system for water and all of the discharge water from plant will be circulated for cooling purpose and there will be no discharge of process water into the surface water and ground water.



Figure 12: MCL's Water Circulation System

4.5.1 Demineralized Water Treatment System

Makeup water of boiler is handled by two stage RO+EDI desalination system according to main equipment type, parameter and makeup water quality requirements with system capacity 2*20t/h.



Figure 13: Demineralized Water Treatment Unit

4.5.2 Circulating Cooling Water System

Open circulating system of mechanical ventilation cooling tower made of FRP (Glass Fiber Reinforced Plastics) is used for circulating cooling water system. 4 set of mechanical ventilation cooling towers of $3000m^3/h$ are selected, totaling 12,000 m₃/h in cooling water, and temperature

difference $\Delta T=10^{\circ}$ C, 5 set circulating pumps with the parameter is as follows: 3170 m³/h, 0.22MPa , 250kW, 10kV, 4 working 1 standby.



Figure 14:MCL's Water Control Systems

5 MCL'S MITIGATION AND MONITORING PROGRAM

In this case, there was no need for any Ecological Offset Plan for the coal power plant operation activity because of lack of the endangered species in plant or animals in MCL project area according to the survey results. And supposed MCL's coal power plant area is far enough from Archaeological and religious area in historical evidences. Besides, there wasn't found any new cultural heritage area around the project area.

MCL has committed to fully protection of the environment in the proposed project area with developing and implementation of environmental management plan which will act as an adequate tool to mitigate the potential adverse impact and enhance the beneficial impacts associated with coal power plant project during the construction and operation phase.

Environmental protection is the major requirement for the MCL's project area. In consistent with company's environment protection policy and recommended international best practices, this plan focus on the systematic formulation of control measures and implementing of those in various stages of the project.

As principal objective of EMP is to develop an effective management tool that will ensure diverse ranges of environmental and social components observed through earlier environmental impact assessment process are systematically mitigated through effective managing and monitoring mechanism. This will assist MCL to achieve its environmental and social goals with the principle of avoiding potential damage, costly remedial action and adverse public concerns. In addition, this toll will help project for enhancing benefits, compliance with company policy host country legislations and internationally accepted best industrial practices.

This environmental management plan outlines the appropriate and effective management and mitigation measures so as to alleviate the environmental and social concerns which have identified in the impact assessment section of this report. In addition, this report has integrated environmental protection strategy into the project.

The elements of biological, physical and human system receptors which are concerned of being disturbance of proposed project for construction and operation period are mentioned as follows.

- Terrestrial Biodiversity
- Air Quality
- Water Quality
- Noise and Vibration
- Waste Management
- Landscape and visual intrusion
- Health and Safety
- Social Dimensions

This document shall be treated as a dynamic and live document. Reviewing, revising and updating are subject to do as deemed necessary in line with the variation of proposed activities described in this document ensuring it remains appropriate to ongoing aspects of project.

5.1 Role and Responsibilities

Being owner of this document, MCL will hold ultimate responsibility and shall fully exercise in developing, reviewing, updating and effective implementing of this document. If the measures set up in it does not meet or follow accordingly, company will redefine as necessary until full satisfaction is achieved.

Responsibilities for the implementation of environmental social considerations lie with SCG management. Management shall be accountable for delivering commitments made in this document.

Finding from the continuous monitoring of environmental management plan is subject to be reviewed periodically and as deemed necessary by management. Based on the result, management shall be able to take necessary remedial actions and to enforce to adopt adequate performance strategy toward the continual improvement of the environmental management system.

5.2 Terrestrial Biodiversity

During the construction period, loss of vegetation and habitat are highly expected in plant construction area due to the site clearance and removal activities. In order to minimize the disturbance to local flora and fauna species, following mitigation and recommendation are provided to take necessary actions.

5.3 **Preconstruction**

- Receive the necessary permit prior to the commencement of construction
- Minimize vegetation clearance and habitat disturbance by demarcating the clearing boundaries
- Unnecessary cleaning the trees is to avoid
- Environmental awareness training to be given to all workers for the preservation of local biodiversity species and induct the nature of the sensitivity of project area
- Site Specific instruction / protocol for identifying and relocation of plant and wildlife species if necessary, shall be provided to all workers with education materials including photographs.

5.4 Construction

- Ensure all native fauna is not intentionally harmed as a result of construction works
- Night work activity shall be avoided as possible as it can be in working day time
- Project site boundaries shall be regularly checked ensuring unnecessary habitat and vegetation do not happen in the project area
- Relocate the native fauna specie to the area where same habitat system is provided for those.
- Designate a fauna catcher on site prior to commence of area clearing with the anticipation of removing fauna to a nearest location where same habitat exists
- Regular monitoring and auditing the performance of environmental monitoring activities by competent environmentalist
- Instruction given to all drivers and workers to take care from causing incidents of fauna fatalities by the movement of construction vehicles and machine
- Hunting and catching the local wildlife is strictly prohibited.
- To construct sediment control system, such as using fencing during raining period to avoid disturbance to surrounding habitats of unaffected area

- Where technically feasible and practicable, new plants are to be grown as early as possible during the construction phase of project. New vegetation in the project area should use native species and the use of exotic species should be not be allowed.
- Works areas in temporarily affected areas shall be reinstated with tree/shrub/ grass upon completion of the works

5.5 Operation

- Maintain and implement the ongoing environmental monitoring mechanism
- Continue the development of green belt development
- All machinery shall be turned off if they are not in use.
- Regular maintenance to be scheduled for the equipment which emitting unwanted noise
- Use of low-noise engines and installing noise muffler and silencers
- Noise emission shall be maintained as per guideline (general emission < 85 dB(A), Impulse < 115 db(A) from 1.5 m distance, 85 dB(A) from building, 70 db(A) from plant boundaries at all time of operation)
- Workers must be equipped with earplugs or earmuffs as appropriate and wearing must be enforced whenever working in the noisy environment.
- Appropriate training shall be given to the employees on the noise abatement methodology
- Transportation of raw materials and products to and from the site should be well covered to prevent air pollution.

5.6 Green Belt Development Plan

In order to attenuate the air pollution, one of the mitigation measures, known as green belt program which also act as a noise barrier, will be developed in the project area.

The recommended locations where this plantation should occur are around the plant boundary, road side, open land and other areas where there is no facilities is intended to build.

In selection of the plant species, it is highly recommended to use ever green local plant species as possible.

Not only in buffer zone, but in other available areas where possible, plant species of aesthetic value, fruit bearing, and birds attracting tree will be planted.

Establishing a tree plantation program, it would benefit the abatement of noise and dust emission. Other than that, it would be converted the project area into a possible park for the nearby villages and project staff for recreation.

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Figure 15: Green Belt Area (Buffer Zone)

5.7 Water and Wastewater

Issues	Mitigation Measure	Monitoring Program
Water • Stormwater runoff • Surface water • Groundwater	 Flood management : Drainage system Water reservoir (Internal use) Re-circulate cooling water 	 Surface water monitoring Groundwater monitoring Baseline data gathering
Wastewater (W/W) W/W from coal stockpile W/W from Power plant (Backwash water) 	 Pavement coal storage area Ensure zero discharge of water from any facility into the surrounding areas Install w/w treatment i.e. grease & oil trap, sedimentation pond 	 Effluent water sampling (All point source discharges) Groundwater boreholes

5.8 Internal Waste

Issues	Mitigation Measure	Monitoring Program
Solid wastes • Fly ash • Bottom ash • Gypsum	 Alternative Raw Material in cement process i.e. fly ash, gypsum Ash & Gypsum storage facility → Indoor storage to prevent leachate from rain 	 Fly ash & Gypsum Sampling Quality Control
Liquid wastes • Used oil • Chemicals	 Alternative Fuel in cement process i.e. used oil, some chemicals 	 Quality control

5.9 Waste Management

- Adopted 3Rs Program (Reduce, Reuse, Recycle) in order to maximize resource use
- Aligned with SCG's policy especially ZERO waste to landfill
- a waste management plan shall be developed including requirements for separation, handling and disposal of all waste generated;
- all hazardous materials shall be stored in clearly labeled containers;

- storage and handling of hazardous materials should be in accordance with national and local regulations appropriate to their hazard characteristics;
- waste shall be separated on site and waste storage areas shall be roofed and bounded to prevent potential cross-contamination;
- spent oils (including transformer oil) shall be recycled;
- fire prevention systems and secondary containment shall be provided for storage facilities, where necessary, to prevent fires or releases of hazardous materials;
- all waste shall be disposed of in line with local requirements at a suitable and licensed waste disposal facility; and
- suitable disposal sites shall be identified with capacities for disposal for general and hazardous
 waste prior to the operation phase.

6 CORPORATE SOCIAL RESPONSIBILITY PROGRAM

6.1 MCL CSR Program and Monitoring Plan

Expecting part of the profit of the project to share the social benefit of the community, the project company "MCL" would manage to fulfill the following CSR program for the local residents, 2 percent of annual net profits will be formulated.

MCL encouraged to push the company CSR strategy for every benefited project in accordance with the followings;



MCL CSR monitoring implementations will be managed by SOD team with the following monitoring plan.



Annual CSR reporting will be prepared as the followings;

- Prepare and file annual CSR reports according to regulatory guidelines
- Tax inputs for accurate representation
- CARE tool services.

6.2 MCL CSR Activities

- 1. Public health & medical programs
- 2. Clinic and mobile medical care service especially near MCL areas.
- 3. Public benefit activities
- 4. Support and contribute appropriately to society and communities, especially near cement plant operating areas i.e. recondition public road, school, temple & pagoda, government office etc.
- 5. Education/ religion

- 6. Encourage and promote activities/programs related to helping young people realize their potential and capability in education, science, technology, sport and art, and instill ethics and moral sense, thus creating smart and ethical people i.e. scholarships, playground, sport area, science camp, English language camp etc.
- 7. Occupational development
- 8. Occupational development program according to sufficient economy i.e. Integrated Farming System, biogas, Bio-fertilizer, Non-toxic vegetables etc.
- 9. Community activities
- 10. Provide opportunities to communities and relevant parties to collaborate in activities and many different programs i.e. open-house program, One Cell One Project (OCOP) etc.
- 11. Join traditional activities i.e. Thingyan festival

The amount of budget spent on past CSR activities are provided in the following figure and the photos of CSR program conducted by MCL are attached in Annex-9-1.



Figure 16: Budget spent on CSR program from 2014 to 2018

7 MCL'S SOCIAL IMPACT ASSESSMENT AND MONITORING PROGRAM

Regarded on the baseline survey, about 300 sample respondents selected from 7 Villages such as Pauktaw, Kaw Don, Kaw Pa Naw, Hni Don, Kwan Nyan, Ka Don Sit and Me Ko Ro villages within the project area were interviewed. All these are project affected people (PAPs), but they are not necessary to be relocated under any project activity. To understand their existing situations, attitudes and impacts from the project development, the interviews were undertaken with the help of the structured questionnaires which cover the contents of basic information of interviewees, their socio-economic conditions, education and current environmental problems, facilities and social problems, perceptions of the project, attitudes towards the project, and attitudes towards draft mitigation measures regarding the impact caused by the project development.

The survey focused on community study within 3 km circle surrounding the project site. The survey covered 7 Village Tracts as shown in the following figure and table.

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



Figure 17: Village Community Area Around Proposed MCL Project

Table 3:	Location of Villages in	Location of Villages in the Project Area				
No.	Name of Village	Latitude (North)	Longitude (East)			
1	Pauktaw	16° 21' 43"	97° 49' 09''			
2	Kaw Dun	16° 22' 60"	97° 48' 24"			
3	Kaw Pa Naw	16° 23' 12"	97° 48' 40''			
4	Hni Don	16° 20' 42"	97° 46' 44''			
5	Kwan Nyan	16° 20' 1"	97° 47' 34"			
6	Ka Don Sit	16° 20' 43"	97° 50' 44"			
7	Me Ko Ro	16° 23' 9"	97° 46' 42"			

Source: REM Field survey, February 2013

7.1 Socioeconomic Impacts

The evaluation and assessment involve the assessment of both qualitative and quantities data with professional judgment and stakeholder consultation.

In assessing the characteristics of the individual impact, following factors are taken into consideration.

- Nature of impact (beneficial or adverse)
- Duration of impact (temporary and permanent)
- Likelihood
- Severity
- Significance of impact

7.2 Social Management Plan Framework

In the Environmental and Social Management Plan (ESMP) framework a summary of the mitigation measures to be implemented both during construction and operation phase is reported.

Mitigation measures during construction phase of the Project (estimated in 24 months) are associated to good practices, and mitigation measures to be adopted during operation phase (such as those for air emissions and noise generation) are part of the design and will be inserted into the Project design specifications.

7.3 Stakeholder Engagement and Public Consultation Activities

Disclosure of project information and stakeholder consultation have been developed during the development of the EIA. The social impact assessment team consulted project area for first time on 23rd February to 26th February 2013 and second time on 7th February to 10th February 2016. A series of meetings were conducted as shown in Table 5.

No.	Date	Name of Town/Village	Participation	Arranged by		
Year 2013						
1.	23.2.2013	Kaw Pa Naw Village	Respondents and	Head of Village Tract		
			REM Co. Ltd.			
		Pauktaw Village				
2.	24.2.2013	Me Ko Ro Village	Respondents and	Head of Village		
		Kwan Nyan Village	REM Co. Ltd.			
		Hni Don Village				
3.	25.2.2013	Ka Don Sit Village	Respondents and	Head of Village		
		Kaw Don Village	REM Co. Ltd.			
4.	25.2.2013	Kyaikmaraw Town	Head of Village Tracts in Kyaikmaraw Township, REM Co. Ltd., Mawlamyine Cement Limited	Administrator, General Administrative Department, Kyaikmaraw Township		
5	26.2.2013	Kyaikmaraw Town	REM Co. Ltd.	GAD Office, Kyaikmaraw Township		
Year 2016						
1.	7.2.2016	Kaw Pa Naw	-Villagers	Kaw Pa Naw Monastery		
2.	7.2.2016	Kaw Dun	-REM Co. Ltd.			
3.	7.2.2016	We Nge				
4.	7.2.2016	Kwan Nyan	-Villagers	Kwan Nyan Monastery		
			-REM Co. Ltd.			
5.	8.2.2016	KaDonSit	-Villagers	KaDonSit Monastery		
6.	8.2.2016	Shwe War Gyaung	-REM Co. Ltd.	Shwe War Gyaung Monastery		
7.	8.2.2016	MeKuRo	1	MeKuRo Monastery		
8.	10.2.2016	MCL	-REM Co. Ltd.	MCL Meeting Room		
			-MCL (Kyaikmayaw)			

 Table 4:
 List of Public Disclosures and Consultations

During stakeholder consultations most of the respondents suggested the followings: -

- 1. to give a good salary to workers in the project for reducing to go and work in Thailand where the salary is higher,
- 2. to give information on how to apply for the job,
- 3. to consider about the fishing boats if Ataran River is used for water transportation,
- 4. to maintain water from Ataran River during the dry season,
- 5. to conserve the mountain,
- 6. to acquire the public opinion,
- 7. to promote roads and electricity,
- 8. to give compensate money in current price,
- 9. to supply schools and teachers,
- 10. to provide wells for drinking water,
- 11. to reduce dust from project,
- 12. to encourage regional development, and
- 13. to construct clinics and medical centers.

The villagers considered that the project is acceptable for the rural and regional development and the respondents hoped that the project will support the economy of the country.

There are some basic requirements of rural and regional development, suggested by the community as follows;

- 1. To prepare the roads
- 2. To be free of charge in the health services
- 3. To create job opportunities
- 4. To construct new school buildings.

8 MCL ENVIRONMENTAL MONITORING TEAM FOR EIA IMPLEMENTATION



Figure 18:

MCL Organization Structure for Top Management Role



Figure 19: MCL Organization Structure for Sustainable Development Department
Role	Responsibility
Top management (Safety and Health Committees	set the policy, rules and regulations for safety and environment programs
SOD manager	Management of CSR, Environmental Team, Safety Team
CSR team	Communities relation, Government Relation, Communities Development programs, Education, Religions and other correspondent activities
Environment Team	inbound and outbound monitoring process, plantation, waste management
Safety team	employees' and workplace safety such as fire safety, workplace safety, vehicles and road safety
Liaison Officer	-To liaise with the different stakeholders from government offices, communities and other associated organization like consultants, NGOs, etc.
	-To receive the grievances/complaints related with the project activities via suggestion box, on call, email or by person and address and close the complaints according with the adequate communication and management actions

Table 5:	Organizational	Tasks and Resp	onsibility of M	CL's Implem	entation Team
		1			

Indicator (Survey item)	Location of Data Collection	Method and Frequency	Institution	Annual Cost (USD)
Construction Phase				
Monitoring EMP implementation	Project area	Daily monitoring and documenting, and	SOD Department	14,400
□ Mitigation measures		quarterly reporting		
□ Enhancement measures				
Air quality (NO ₂ , SO ₂ , CO, TSP, PM ₁₀)	3 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	19,500
Noise	4 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	10,755
Surface Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are same as baseline data collection	Quarterly (March, July, November)	Third Party	8,715
Ground Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are (same as baseline data collection)	Quarterly (March, July, November)	Third Party	10,455
Soil Quality	Locations and number of samples are (same as baseline data collection)	Yearly (March)	Third Party	8,475
Operation Phase				
Air quality (NO ₂ , SO ₂ , CO, PM _{2.5} , PM ₁₀)	3 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	19,500
(Temperature, Velocity, SO ₂ , SPM, NOx, HC, CO)	Stack/Chimney Monitoring	Quarterly (March, July, November)	SOD Department	6,450
Noise	4 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	10,755
Surface Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are same as baseline data collection	Quarterly (March, July, November)	Third Party	8,715
Ground Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are(same as baseline data collection)	Quarterly (March, July, November)	Third Party	10,455

Table 6:Estimated Environmental Management Plan and Monitoring Cost (Operation
Phase)

Implementation of Air quality management plan, Noise Management plan, Waste management plan	Within factory area (Stack)	Daily monitoring and quarterly reporting	SOD Department	14,440
Surface water pollution monitoring (DO, BOD, COD, Heavy metal, pH, salinity, Total hardness, Nitrate, TDS, TSS, Temperature, etc.)	1. Effluent discharge point	Quarterly (March, July, November)	Third Party	4,250
Implementation of Ecosystem Management plan	Within project area	Regular monitoring and quarterly reporting	SOD Department or Third Party	10,350
Occupational Health and Safety	Cement Plant and Compound (Work site and offices)	Twice per year Record of accidents and infectious diseases	SOD Department	1,250
Community Health and Safety	5 villages nearby the project sites	Twice per year Record of accidents and infectious diseases related to the community	SODDepartment	14,250
The implementation status for CSR activities such as community support program	5 villages nearby the project sites	Once per year	SOD Department	2 percent of annual net profits
Usage of chemicals	Cement Plant and Compound (Work site and offices)	Biannually Record of the type and quantity of chemicals and implementation status of control measures through self- inspection	SOD Department	4,600

Table 7: Target Schedule for Monitoring Report

Task		Yearly EMP Reporting Schedule																													
	1	2	3	4	5	6	7	8	9	1 0	1 1	1 2	1 3	1 4	1 5	1 6	1 7	1 8	1 9	2 0	2 1	2 2	2 3	2 4	2 5	2 6	2 7	2 8	2 9	3 0	3 1
Jan																															
Feb																															
Mar																															
Apr																															
May																															
Jun																															
Jul																															
Aug																															

Sep																
Oct																
Nov																
Dec																

Public Holiday

Target Reporting Period

9 POTENTIAL IMPACT TO POPULATION AND DEMOGRAPHIC CHANGE

Potential impact of migration to the project affected area by the development of Mawlamyine Cement Project area likely to result mainly from the migration of personnel with the hope of getting job and receiving potential health, education and other social services that may result from the project.

However, it is expected that number of personnel moving into the project affected area is very low in comparison with the existing local population. It is also the reason that there are an enormous number of local people working in Thailand have the chance to return their natives so movement of labors from other region would be minor. As a result, there may be no alter in the number of residential populations around the project areas or affect their demographic structure.

10 POTENTIAL IMPACT TO TRAFFIC ISSUES ON ROAD AND WATERWAY

There may be traffic volume increase during the construction phase. The traffic will use Mawlamyine – Kyaikmaraw Road and Mawlamyine – Hpa-An Road to assess to the proposed project site.

Construction related traffic will not utilize largely on Local Streets which are adjuring local communities. The traffic is expected not to interact with venerable local communities.

The project is located in the shrub and forest area and people not commonly visit into the project site. Besides, there is no project activities which defer the community assess and movement. No communities would be severed by the project in term of access and movement. Construction will not affect the existing road network as the transportation vehicles will apply vessels along the Ataran River.

The impact to the public access and movement resulted from the project activities during construction and operation is forecasted minor.

11 POTENTIAL IMPACT TO EMPLOYMENT, SKILL AND BUSINESS

Project will source it operative work forces mainly from the local area due to the reason of project's commitment of prioritizing the selection to local people and availability in adjacent areas for the basic level semi-skill and non-skilled works.

Owing to the information collected during the course of the survey in study area, the people are expecting with though that the cement project will bring improvements to the living standard and local economic status of local people by creating job opportunities.

Since construction phase is the period of high demand of job openings with temporary employment, the numbers of employees will be dramatically high.

The prospect of an increased income and greater autonomy is likely to cause an increase in the aspirations of local communities both those involved with the project and, to a lesser extent, those from other working individually. This is a direct positive effect with a moderate extent and long-term duration. As consequence, it is considered as a major beneficial impact resulted from the project.

Company is intending to conduct both awareness and critical training necessary to its employees, it is perceived that capacity building which is expected by both company and local community is the one of the beneficial effects as well. As this will be long term income stability to the hired employees assuring the economy security to its family members.

The project is located in Kyaikmaraw Township which is not far from the Thai border; there will be potential of having return of immigrant labors from Thailand. Most of the families in the project area have members who have been working as labors in Thailand. New job opportunities with reliable salary will encourage the households to re-organize in their native.

Proposed project area is closed to the local residential areas.

Both during the construction and operational phase, it has the high opportunity to employ local people in all level of full- skilled, semi-skilled, unskilled and technicians. In this regard, company shall develop local hiring plan. Here local people refer to the people living in the affected areas or entire project area of influence.

This project is anticipated to source the operative force on local basis and has the potential to increase the educational and technical qualification of local work forces through onsite technical transferring and in-house training programs.

The project will definitely have significant beneficial impacts on the local communities.

One of the effective implementations of the Social Impact Management Plan of the project is the development of a capacity and local awareness building.

12 RECOMMENDED MITIGATION AND ENHANCEMENT MEASURES

In order to enhance the local capacity building, and avoid unnecessary social conflict and dispute related to the employment within local communities, following measures are suggested.

- Identify the range of skill required for the labor force and conduct a gap analysis against skills availability
- Notify local people of job openings through local advertising, information center, project notice boards to place in office or road junctions of each village
- Develop and implement a local employment policy for the people of affected communities
- Careful management to be practiced about the expectation of local people in regard to the employment to avoid any disputes
- Undertake regular review of labor requirement and skill demands ensuring that training strategies meet the needs of project
- Initiate training and job skill development programs
- Considering to establishing a contractual agreement with contractors to ensure that all contractors understand the company's expectation of favor local content in hiring employees.

12.1 Potential Impact to Land Use and Property

The Project activities will entail temporary occupation of land to set up the construction site and the temporary worker camp. During construction phase, land occupation will be limited to areas categorized as agricultural land that will be acquired for the needed of the Project. In particular, the occupied area is private land that already purchased, therefore, impacts connected with land occupation in terms of restrictions on the land use are considered negligible during the construction phase.

12.2 Impact on Community Value and LifeStyle and Social Cohesion

As mentioned previously, the project area is located closed to the residential area (villages), the temporary construction camps for workers is expected to be built in the project area which is about half kilometer to the nearest residential area.

Though a proportion of construction workforces are to be recruited from the local areas and live locally, some numbers of workforces are to be sourced outside of the community area.

It is anticipated the relationship between workforce and local community will be increased from time to time. As a result, potential crime and antisocial behavior within the local community from the Mawlamyine Cement Limited (MCL) project are foreseeable to some extent. Those anticipated potential crimes include alcohol /drug use and other social misconducts.

The potential for increases in crime and anti-social behavior is likely and may challenge local authorities and create resentment amongst the local community. It may also result in some changes to the lifestyles or cohesion of communities in the surrounding suburbs.

During the phase of survey by social team, there is no significant dispute or unrest caused in terms of the political belief, religious thoughts and social concepts within the community. There is no major development in study areas and it is unlikely that social cohesion issues will arise.

Anyway, with project exist, both within and outside the current project area, this finding might alter and there could be potentially impact the project by creating a preconceived perception of the project and its associated activities from local communities and other organization.

The impact on the lifestyle and social cohesion is predicted as moderate and additional control measures are required.

12.3 Local Economy

There is some probability that the workforce will patronize local retail services, such as food outlets during lunch or coffee time, which would be beneficial to the economy at the local scale.

On the project site, it is certain that some materials required for the project use could be locally available and due to the easy accessibility, there might be greater consumption for local market and increase business opportunity for local business.

In addition, the arrival of newcomers to project area could result in increased economic activity, greater exposure to markets and opportunities, larger customer bases for local businesses and positive diversity with the community.

Following measures to enhance this beneficial effect are recommended

- Investigate the possible procurement needs of the project that can be sourced locally
- Investigate the possible employment needs of the project that can be sourced locally

12.4 Occupational Health and Safety

All hazards can be successfully controlled by the adoption of safe plant methods, training programs and OHS management systems. The introduction of health and safety measures by the Client into the plant management will be reflected in a strong enhancement of the OHS conditions of the Project workers compared to the current level.

There is various occupational health and safety risks are likely to happen during the construction and operation period.

In order to avoid the harms caused by project activities to employees and local people, occupation health and safety management system shall be developed for the proposed power plant plant.

12.5 Impacts on Community Health

The main impact which may affect local communities residing close to the Project areas during the Project construction phase is related to the increase in the heavy vehicle traffic. As mentioned before, the risk of increased prevalence of diseases deriving from the foreign workforce is considered minor. During this phase the risk of incidents and process characteristics which might affect community health and safety remains unchanged with respect to the normal operation (pre - and post expansion) of the facilities.

A significant traffic volume increase, especially on the road, is expected to occur during the construction activities within the cement plant as well as during the construction of the conveyor belt, all along the path till the quarry, and for the realization of the worker camp. In any case, heavy traffic movement will negatively impact the road condition; will cause disturbances to road bordering residents due to noise, and dust, which might damage crops and structures close to dirt roads, as well as disturbances and temporary disruptions to local traffic. Furthermore, a significant increase in traffic levels combined with a number of factors including poor current road conditions, uneven surfaces and the limited understanding of road safety among local drivers and pedestrians is likely to increase the number of accidents. These might particularly involve the numerous motorbikes and pedestrians using local roads, especially vulnerable groups (i.e.: children walking to school).

12.6 Health Mitigation Measures

The aim of the Health Impact Assessment (HIA) aspect of the study is to determine the potential effect that construction and operation of the Project will have on the local communities' health and the capacity of local health services to cope with any increased demand for services in terms of equipment, trained personnel, medicines and the balance between the community and workforce needs.

The following measures in line with GIIP and PS2 will be adopted to avoid, minimize and mitigate the negative health and safety impacts of the Project construction and operation:

- adopting and training all personnel (including contractor workers) in the use of Personal Protective Equipment (PPE) and chemical handling;
- clear marking of work site hazards (especially close to high temperatures and open tanks) and training in recognition of hazard symbols;
- adoption of work site hazards signage both in Myanmar and other relevant languages;
- training of all personnel in health and safety risk prevention and protection;
- regular noise surveys to ensure the on-site maximum levels are not exceeded;
- development of inspection, testing and maintenance programs for machinery and equipment;
- accident recording and investigation and prevention initiatives;
- development of and training in site emergency response plans both for the construction and operation phase; and
- compliance to all international, national or local HS standards that may exist.

12.7 Visual/Landscape Impact

This project is first and major project which will include various infrastructures for proposed region where there does not facilitate any project before. The project will introduce the vertical structures which can be overseen from various parts of the region.

In consideration of impacts due to the change of landscape of the region, the degree of significance of visual impact could be moderate to high. Anyway, there are control measures those can be adopted during the detailed design of the project.

Lighter color can be utilized to complement the surrounding areas. Where technically feasible, to decrease the visibility of facilities, plantation around the building should be planned.

12.8 Cultural Heritage

The planned construction **for the power plant** will be realized within the boundaries of the private land and agricultural land, thus **no impact on any cultural heritage site is expected**.

The construction work will only foresee surface interventions and vegetation removal with very limited ground excavations. The area which will be used for this purpose does not have historical and archeological importance and thus **the risk of encountering historical finds is negligible**.

12.9 Considerations of Climate Change Impacts

Climate change should be recognized when the project activities are related with the Greenhouse gases emissions (GHGs) such as carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆), etc.

Electricity production activities are mainly relevant with the CO_2 emissions and the generation of CO_2 from the proposed project in Myanmar is relatively very small when compared with the international CO_2 emission rate from power generation, seen in the following figure.

 CO_2 emission from the combustion of coal at power plant is estimated by using the following method.

$$Em_i = A_i \times EF_i$$

where,

 $Em_i = emission of pollutant i (ton/yr)$ $A_i = activity rate of pollutant i (ton/yr)$ $EF_i = emission factor of pollutant i (lb/ton).$ $ER_i = Overall control efficiency of pollutant i (%)$

Calculation;

Coal consumption rate -219,000 ton/year

Emission factor of $CO_2 - 0.15 \ lb/ton^1$

$Em_i = 219,000 \times 0.15 = 32,850 \text{ ton/yr}$

According to calculation, multiplying mass of fuel consumption (219,000 ton/year) by emission factor¹ (0.15lb/ton), the total CO₂ emission from the coal-fired power plant is 32,850 **ton/year**. In addition due to the lack of CO₂ emission data base especially for the coal used power plant in Myanmar, the emission are referred to CDIAC-Carbon Dioxide Information Analysis Center (2013) which are presented in the following figure to estimate the CO₂ emission contribution from this project. In 2013, CDIAC estimated that the annual CO₂ emission from the solid fuel combustion was approximately 15 billion tones while this 40MW-plant generates 32,850 ton of CO₂ annually which contributes about 0.0002 % to global CO₂ emission by solid fuel. This amount is very low when compared with global CO₂ emission by solid fuel. Thus, impacts on global warming and climate change by this project alone can be considered as low.

¹ Emission Factor is referred to AP42, Table 1.7-1, Emission Factors For SOx, NOx, CO, And CO₂ from Uncontrolled Lignite Combustion SCC 1-01-003-17/1. <u>https://www3.epa.gov/ttnchie1/old/ap42/ch01/s07/final/c01s07_oct1996.pdf</u>



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Source: CDIAC, 2014
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Figure 21: Global CO₂ emission by sources

CO₂ Emission Control

 CO_2 emission during the combustion of coal is controlled at CFB boiler. The boiler is designed to increase the combustion efficiency by circulating unburned particles to make the combustion tempearture more stable. The higier efficiency in conbusiton, the lower consumption in fuel that lead to the lower by-product ash and CO_2 emission.

13 ANALYSIS OF CUMULATIVE IMPACTS

Cumulative impacts must be taken into account for incremental direct and indirect impacts of the proposed project which resulted on Valued Ecosystem Components (VECs) such as fundamental elements of the physical, biological or socio-economic environment, including the air, water, soil, terrain, vegetation, wildlife, fish, birds and land use, as well as the added contributed effects to same VECs from other past, present and future projects or actions located in the same area.

The key VEC physical components include:

Atmosphere: climate conditions and trends, and extreme weather events and air-quality conditions.

Physiography and Geology: physiography such as landforms, elevations, relief and unique features; surficial geology including types and depths; and bedrock geology including types, location and depths.

Soils: soil types and characteristics, soil capabilities and limitations, and permafrost

conditions.

Surface Water: watersheds and waterbodies characteristics, shoreline environment, and sources of potable water.

Groundwater: primarily local groundwater characteristics.

The selected criteria will be considered on the followings;

- Overall importance/value to people
- Regulatory requirements

- Potential for substantial Project effects
- Key for ecosystem function
- Umbrella indicator

There were no other project activities in proposed project area, however, this coal power plant project will be operated together with the cement plant, limestone quarry, jetty & canal, as its associated facilities.

The potential affected VEC components by power plant and its associated facilities are to be land use, vegetation, air and socioeconomic environments. However, the advantage of minimizing impacts can be expected and all of these projects can be considered as the fully-integrated project because MCL is the same project proponent for all of these project activities and same EIA implementation team, Sustainable Organization and Development Department (SOD) will take accountability of controlling and monitoring for all potential impacts in order to minimize and mitigate in consideration of the overall project actions.

14 LIST OF COMMITMENTS

A consolidated summary list of environmental and social impacts and mitigation measures commitments that Mawlamyine Cement Limited (MCL) will be expected to adopt in order to manage and mitigate potential impacts associated with the project development is provided below in Table.

Commitment Source	Commitment
Chapter II	Mawlamyine Cement Limited (MCL) commits to follow National and international Laws, By Laws, Regulations and Guidelines Relevant to Coal-fired Power Plant operation process. Also, the project will meet the national emission and effluent standards
Chapter II	Mawlamyine Cement Limited (MCL) commits to specifically commit itself to the prevention of pollution through the implementation of processes, practices, and techniques to avoid, reduce and control the creation, emission and discharge of any type of pollutant and waste.
Chapter II, Use of Natural Resources	Mawlamyine Cement Limited (MCL) commits to specifically commit itself to minimize the use of consumptive resources and promote the reduction and recycling of waste products where possible.
Chapter II, Air quality standard	Mawlamyine Cement Limited (MCL) commits to follow National Environmental Quality (Emission) Guideline, Industry Specific Guideline, <i>Thermal Power Plant</i> , <i>Table 2.3</i> and IFC General EHS Guidelines for the ambient air quality especially for coal power plant in operation phase.
Chapter II, Wastewater Effluent	Mawlamyine Cement Limited (MCL) commits to follow National Environmental Quality (Emission) Guideline expressed in Table 2.2 and Table 2.7: IFC Effluent Guideline for Thermal Power Plant.
Chapter II, Ambient Noise Standard	Mawlamyine Cement Limited (MCL) commits to follow NEQG,: NEQG Ambient Noise Level, Table 2.4 for the ambient and industrial noise standard during construction and operation phase and IFC General EHS Guideline for Noise Level Table 2.8.
International Standard Industrial Air Emission	Mawlamyine Cement Limited (MCL) commits to follow International Finance Corporation's EHS Standard for air emissions as in Table 2.6.
Chapter II Commitments	Mawlamyine Cement Limited (MCL) commits to prepare an EIA report with fully compliment with EIA procedure 2015 in timely and precisely manner as in Table 2.1, subsection 4.
	Mawlamyine Cement Limited (MCL) commits to follow all the policy, rules,

Table 8:Project Key Commitments

	regulations, procedures and guidelines illustrated in Table 2.1
Chapter III Designs and Equipment	Mawlamyine Cement Limited (MCL) commits to utilize and maintain the facilities' designs and modernized equipment and machinery as described in Project description for power plant construction and operation.
Chapter IV Existing Environmental Conditions	Mawlamyine Cement Limited (MCL) commits not to disturb the Existing Environmental Conditions described in Chapter IV.
Chapter V Environmental Socioeconomic Baselines	Mawlamyine Cement Limited (MCL) commits to consider the baseline condition of environmental and socioeconomic of the area during the operation phase.
Chapter VI Stakeholder Engagement Plan	Mawlamyine Cement Limited (MCL) commits to follow the Stakeholder Engagement Plan described in section 6.2
Chapter VII Impact Assessments and Mitigation Measures	Mawlamyine Cement Limited (MCL) commits to precisely follow the discussed mitigation measures for avoiding or reducing such environmental and socio- economic impacts potentially generated by the Project during both the construction and operation phases.
Chapter VII Ambient Air Emission	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures for ambient air emission in sections 7.3 and 7.4 (during construction and operation period) with the regular monitoring plan.
Chapter VII Noise Emission	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures for operation phase as mentioned in sections 7.3.2 and 7.4.2 (during construction and operation period).
Chapter VII Wastewater Effluents	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in Sections 7.3.3.3 and 7.4.3 for both construction and operation period.
Chapter VII Solid Wastes	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures for solid waste as mentioned in Section 7.3.5.3 and 7.4.5.2. (during construction and operation period).
Chapter VII Soil	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in section 7.4.4.3 to avoid soil pollution and keep maintaining regional soil fertility.
Chapter VII Biodiversity	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in sections 7.5.5.1 and 5.5.8 to rebuild biodiversity disrupts due to the project.
Chapter VII Visual/Landscape	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in section 7.8 to reduce the impact for visual change.
Chapter VII Cultural Heritage	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as shown in section 7.9 to keep avoiding not to harm cultural heritage value.
Chapter VII Decommissioning Phase	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as described in section 7.10 while decommissioning the project.
Chapter VII Cumulative Impacts	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as shown in section 7.11 considering on the cumulative impacts.
Chapter VII Traffic Issue	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures expressed in section 7.6.4.1 for facilitation of transportation.

Social cohesion	as in 7.12 to avoid social cohesion in the region.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures
Socioeconomic	as in 7.6 for reduce impacts on socioeconomic.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures
Community Health	as in 7.7.1 for community health.
Chapter VII	The labor recruitment policy must be formulated in such a way that local laborers
Possibility of employment	can easily get chance of employment in the project.
opportunities	
Chapter VII	Arrangement of personal protective equipment such as gloves, helmet, mask,
Occupational health hazard	glasses and other tools, safety boots and uniforms for each worker so that the workers can keep themselves safe from any kinds of accident and the occupational health training will also be provided.
Chapter VIII, Responsibilities of Implementation Team for Environmental and Social Management Plan	Mawlamyine Cement Limited (MCL) commits to follow up Main Tasks for Environmental and Social Consideration of implementation team at MCL expressed in Table 8.2-1.
Chapter VIII, Environmental and Social Management Plan	Mawlamyine Cement Limited (MCL) commits to follow the discussed mitigation measures for each component illustrated in Table 8.2-2.
Chapter VIII,	Mawlamyine Cement Limited (MCL) commits to follow MCL's pollution control
MCL's Pollution Control	policy presented in section 8.3.
Chapter VIII,	Mawlamyine Cement Limited (MCL) commits to follow Occupational Health and
Occupational Health and Safety Management Plan	Safety Management Fran presented in section 8.8.
Chapter VIII,	Mawlamyine Cement Limited (MCL) commits to follow Emergency Response
Emergency Response and Rescue Plan	and Rescue Fian presented in section 8.10 and table 8.10-2.
Chapter IX, Environmental Monitoring Plan	The compliance monitoring report along with the checklist will be indexed and annexed with the monthly and annual monitoring report. It may be required to submit the annual monitoring report to Department of Environmental Conservation for renewing of the Environmental Clearance Certificate each year.
Chapter IX,	Mawlamyine Cement Limited (MCL) will develop and implement a monitoring
Monitoring and Reporting	and reporting plan as presented in Section 9.1 and table 9.1-1.
Chapter IX,	Mawlamyine Cement Limited (MCL) plan and reserve for cooperate social
CSR Program	profit of the project and CSR will be implemented as shown in Section 9.4.1
Chapter IX,	Mawlamyine Cement Limited (MCL) plan and reserve for cooperate social responsibility (CSR) (during operation period) two percent (2%) of yearly net
CSR Program	profit of the project.

15 CONCLUSION

The ESIA Study for coal power plant for MCL project was conducted to comply with the requirements of the Ministry of Natural Resources and Conservation (MONREC) EIA Procedures. In support and approval of this EIA report, the Resource & Environment Myanmar Ltd. had collected and analyzed physical, biological and social data such as people's perceptions, concern, opinion, and

expectation on the project for the approval of clean environment and guiltless society during and after the development of the project.

Any type of development activity has both beneficial and adverse impacts on the environment in which it operates. The impacts are identified and evaluated by the project proponents to reduce their negative impacts and maximize the positive effects on the surrounding environment. The present coal fired power plant project is only support for energy support for cement production, distribution that is being expected to meet the cement requirement for the construction and industries in the surrounding areas and also in different parts of Myanmar. Full pledged Environmental Management Plan for the present coal fired power plant for cement plant project shall be constituted with qualified Engineers and Technicians.

According to the technical study and the environmental, social and health impacts assessment, the MCL project will have positive impact on the Environment if, the recommended Environmental Monitoring, Health, Safety & Environmental Management Plan (EMP) are fully implemented in high spirit by the project proponents.

စီမံကိန်း အကျဉ်းချပ်

ာ။ နိဒါန်း

မြန်မာနိုင်ငံ မွန်ပြည်နယ်၊ ကိျက်မရောမြို့နယ်တွင် တည်ရှိသည့် အောက်ဖော်ပြပါ စီမံကိန်း ဖြစ်သော တစ်ရက်လျှင် တန် ၅၀၀၀ ကျ ထုတ်လုပ်မည့်ဘိလပ်မြေစက်ရုံနှင့် ဆက်စပ်၍ ဖြစ်နိုင်ခြေရှိ သည့် ပတ်ဝန်း ကျင်နှင့် လူမှုဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှုဆန်းစစ်ချက်တစ်ရပ်ကို ပတ်ဝန်းကျင် နှင့် လူမှုဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် ရှင်းလင်းဖော်ပြပေးသွားပါမည်။

ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုဆန်းစစ်ခြင်း ဆောင်ရွက်ရန် ရွေးချယ်ထားသည့် ပတ်ဝန်း ကျင်နှင့် လူမှုဝန်းကျင်ဆိုင်ရာ အကြံပေးကုမ္ပဏီ ဖြစ်သော Resource & Environment Myanmar မှ MCL အတွက် အစီရင်ခံစာကို ပြင်ဆင်ပေးထားပါသည်။ ၄င်းသည် မြန်မာနိုင်ငံရန်ကုန် မြို့အခြေစိုက် ဒေသတွင်း ပတ်ဝန်းကျင်အကြံပေး အဖွဲ့အစည်းတစ်ခုဖြစ်သည်။

အစီရင်ခံစာတွင် ရည်ရွယ်ချက်များ၊ အသုံးပြုထားသည့် နည်းလမ်းများနှင့်အတူ ပတ်ဝန်းကျင်နှင့် လူမှုဝန်း ကျင်ဆိုင်ရာ ထိခိုက်မှုဆန်းစစ် လေ့လာခြင်းမှ ရလဒ်များကို တင်ပြထားပါသည်။ ထို့အပြင် နိုင်ငံတကာ ငွေ ကြေးကော်ပိုရေးရှင်း (IFC) မှ စံချိန်စံညွှန်းများ Performance Standards (PSs) ကဲ့သို့ အမျိုး သားရေးရာ၊ နိုင်ငံတကာရေးရာ လိုအပ်ချက်များနှင့်အညီ ဆောင်ရွက်ရန်အလို ့ငှာ ပြင်ဆင်ထားပါသည်။

၁.၁။ စီမံကိန်းနောက်ခံအကြောင်းအရာနှင့် ရြှံငုံလေ့လာခြင်း

ပတ်ဝန်းကျင်၊ လူမှုဝန်းကျင်နှင့် ကျန်းမာရေးဆိုင်ရာ ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို မြန်မာနိုင်ငံ ရင်း နှီးမြှပ်နှံမှုကော်မရှင် (MIC) သို့ ၂၀၁၃ ခုနှစ်တွင် တင်သွင်းခဲ့ပြီး ၂၀၁၃ခုနှစ် မေလ ၇ ရက်နေ့တွင် MIC မှ ခွင့်ပြုစာ ရရှိခဲ့ပါသည်။ လက်ရှိတွင် ဘိလပ်မြေစက်ရုံနှင့် ယင်းအတွက် လျှပ်စစ် ဓာတ်အားပေးစက်ရုံ (စွန့် ပစ်အပူသုံး ၉ မဂ္ဂါဝပ်နှင့် ကျောက်မီးသွေးအပူသုံး လျှပ်စစ်ဓာတ်အားပေး စက်ရုံ ၄၀ မဂ္ဂါဝပ် (၂၀ မဂ္ဂါဝပ် နှစ်ခု) ကို တည်ဆောက်ထားပါသည်။

သယံဇာတနှင့် သဘာဝဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာနရှိ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနမှ ဦးစီးများနှင့် စီမံကိန်း အကောင်အထည်ဖော်ဆောင်သူတို့မှ ပြုလုပ်သော အစည်းအဝေးအရ ပတ်ဝန်းကျင်၊ လူမှုဝန်းကျင်နှင့် ကျန်းမာရေးဆိုင်ရာ ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာကို ပတ်ဝန်း ကျင် ထိခိုက်မှုဆန်းစစ် ခြင်း လုပ်ထုံးလုပ်နည်း (၂၀၁၅) အရ အသစ်ထပ်မံ ဖြည့်စွက်သွားရမည် ဖြစ်သည်။

အပြည့်အစုံ ပေါင်းစပ်ဖွဲ့စည်းထားသော ဘိလပ်မြေစက်ရုံစီမံကိန်းကို ဤနေရာတွင် အောက်ပါအဓိက ဆောင်ရွက် ချက်များ ပါဝင်သော စီမံကိန်းဟု ကိုယ်စားပြုပါသည်။

> မဂ္ဂါပပ် ၄၀ (၂၀ မဂ္ဂါပပ် ၂လုံး) ကျောက်မီးသွေးသုံး ဓါတ်အားပေးစက်ရုံတည်ဆောက်ခြင်း

မဂ္ဂါပပ် ၄၀ (၂၀ မဂ္ဂါပပ် ၂လုံး) ကျောက်မီးသွေးသုံး ဓါတ်အားပေးစက်ရုံ လည်ပတ်ခြင်း

ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်းအရ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာနမှ စက်ရုံ သုံးလျှပ်စစ်ဓာတ်အားပေးစက်ရုံ တစ်ခုချင်းစီ အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ သီးခြားစီ တင်သွင်းသွားရမည်ဟု ဆုံးဖြတ်ချက်ချထားပါသည်။

MCL စီမံကိန်း တည်နေရာကို ပုံ (၁) တွင် ဖော်ပြထားပါသည်။



၂။ ပြဌါန်းထားသည့် ဥပဒေမူဘောင်

၂.၁။ မြန်မာ့ ဥပဒေများကို ရြံငုံသုံးသပ်ခြင်း

မြန်မာနိုင်ငံသည် ၂၀၁၅ ခုနှစ် ဒီဇင်ဘာလ ၂၉ ရက်နေ့တွင် ပတ်ပန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ် နည်းများ (EIA) ကို ပြဌ်န်းခဲ့ပြီး ထိုအတွက် လိုအပ်ချက်များကို သတ်မှတ်ဖော်ပြရာတွင် "ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် စုံစမ်းစစ်ဆေးရာတွင် လေ့လာမှု ဧရိယာ၏ သက်ရှိ ဇိဝဆိုင်ရာ၊ ရုပ်ဝတ္ထု ဆိုင်ရာ၊ လူမှုရေး၊ စီးပွားရေး၊ ကျန်းမာရေး၊ ယဉ်ကျေးမှုနှင့် ပတ်ဝန်းကျင် ရှုခင်းရှုကွက် အစိတ်အပိုင်းများနှင့် အတူ အကြို တည်ဆောက်ရေး လုပ်ငန်းဆောင်ရွက်ခြင်း၊ တည်ဆောက်ခြင်း၊ လုပ်ငန်းလည်ပတ်ခြင်း၊ လုပ်ငန်းရပ်စဲခြင်း၊ ပိတ်သိမ်းခြင်းနှင့် လုပ်ငန်းပိတ်သိမ်းပြီး နောက်ပိုင်း စသည့် စီမံကိန်းလုပ်ငန်း အဆင့်အားလုံး ဆောင်ရွက်စဉ် အတွင်း စီမံကိန်းကြောင့် ထိခိုက်ရသော မြေအသုံးချမှု၊ အရင်းအမြစ် အသုံးပြုမှု၊ မြေပိုင်ဆိုင်မှုနှင့် မြေနှင့် အခြား အရင်းအမြစ်ဆိုင်ရာ အခွင့်အရေးတို့ အပါအဝင် ပတ်ဝန်းကျင်၊ အများပြည်သူနှင့် လူမှု အဖွဲအစည်းနှင့် သက်ဆိုင်သော ဥပဒေရေးရာ ကိစ္စများကိုလည်း ထည့်သွင်း စဉ်းစားရမည်။ ထို့အပြင် စီမံကိန်းမှ ပေါ်ပေါက်လာနိုင်သော ဆိုးကျိုးသက်ရောက်မှုများနှင့် ဘေးအန္တာရာယ် ရှိမှု တို့ကို ဆန်းစစ်သုံးသပ်ပေးရမည်။"

၂.၂။ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်အတွက် ကွဲပြားသည့် အဆင့် ၃ ဆင့် ကို အောက်ပါ ကဏ္ဍများတွင် ဖော်ပြထားပါသည်။

- > හිහර්බුරි: නකරද්
- > နယ်ပယ်တိုင်းတာ သတ်မှတ်ခြင်းအဆင့်
- > ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အတွက် စုံစမ်းစစ်ဆေးခြင်းနှင့် အစီရင်ခံစာပြင်ဆင်ခြင်း

၂,၂,၁။ စိစစ်ခြင်း အဆင့်

ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်မှာ စိစစ်ခြင်း လုပ်ငန်းစဉ်ဖြင့် စတင်ပါသည်။ သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာ ဝန်ကြီးဌာန (ယခု သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာန) သည် စီမံကိန်းကို ပဏာမ စိစစ်ခြင်းဆိုင်ရာ စံများ သတ်မှတ်ခြင်း လုပ်ပိုင်ခွင့် ကို ဆောင်ရွက်နိုင်ပါသည်။ မည်သည့်စီမံကိန်း သို့မဟုတ် လုပ်ငန်းများသည် ကနဦးပတ်ဝန်းကျင် ဆန်းစစ် ခြင်း သို့မဟုတ် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းကို ဆောင်ရွက်သင့်သည် စသဖြင့် လမ်း ညွှန်ချက်တွင် စီစဉ်ဖော်ပြထားပါသည်။ ယင်းဆုံးဖြတ်ချက်အရ ကနဦးပတ်ဝန်းကျင် ဆန်းစစ်ခြင်း သို့မဟုတ် ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းကို ဆောင်ရွက်ရန် လိုအပ်ပါက စီမံကိန်းအဆိုပြုသူသည် ယင်းအတွက် ခွင့်ပြုချက်ရ ယူခြင်းနှင့် အဆိုပြု စီမံကိန်းနှင့် သင့်လျော်သည့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ကို အကောင်အထည် ဖော်ဆောင်ခြင်းကို ကြိုတင်ပြင်ဆင်ရမည် ဖြစ်ပါသည်။

ထို့ကြောင့် ဤစီမံကိန်းတွင် ကျောက်မီးသွေးကို မီးရှို့ခြင်းမှ ဖြစ်ပေါ် လာသော လေထုညစ်ညမ်းမှု၊ စက်ယွန္တ ရားများမှ ထွက်ရှိလာသောဆူညံသံ နှင့် ကုန်ဂြာမ်း (ကျောက်မီးသွေးလောင်စာ) အသုံးပြုမှုတို့သည် ၄င်း နှင့် အနီးတွင်ရှိသော ပတ်ပန်းကျင်အပေါ် သက်ရောက်မှုရှိနိုင်ပါသည်။ ထို့ကြောင့် လျှပ်စစ်ဓာတ်အားထုတ်လုပ်မှု လုပ်ငန်း စဉ်အတွက် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် စုံစမ်းစစ် ဆေးဖို့ရန်လိုအပ်ကြောင်း ခိုင်မာစွာ အဆိုပြုအပ်ပါ သည်။

၂.၂.၂။ နယ်ပယ်တိုင်းတာ သတ်မှတ်ခြင်း အဆင့်

ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း ပြုလုပ်ရန် လိုအပ်သည့် စီမံကိန်း အမျိုးအစားအားလုံးသည် ပတ်ဝန်း ကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ နယ်ပယ် တိုင်းတာသတ်မှတ်ခြင်းကို ဆောင်ရွက်ရန် လိုအပ်ပါသည်။ စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် နယ်ပယ်တိုင်းတာ သတ်မှတ်ခြင်း နှင့် ဆန်းစစ်ခြင်း ဆောင်ရွက်ရမည့် လုပ်ငန်း တာဝန်များ သတ်မှတ်ခြင်းကို ကျွမ်းကျင်မှုဆိုင်ရာ နည်းလမ်း ဖြင့် ဆောင်ရွက်ရန်နှင့် ဤလုပ်ထုံးလုပ်နည်းနှင့် သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာနက ထုတ်ပြန်ထားသော သို့မဟုတ် သတ်မှတ်ထားသော သက်ဆိုင်ရာ လမ်းညွှန်ချက်များနှင့် အ ညီ ဆောင်ရွက်ရမည်။

စီမံကိန်း အဆိုပြုသူသည် နယ်ပယ်တိုင်းတာ သတ်မှတ်ခြင်း၏ အစိတ်အပိုင်း တစ်ရပ်အဖြစ် အများပြည် သူ နှင့် တိုင်ပင် ဆွေးနွေးခြင်းနှင့် အများပြည်သူ ပူးပေါင်းပါဝင်ခြင်းဆိုင်ရာ အောက်ပါ တိုင်ပင် ဆွေးနွေးမှု လုပ်ငန်းစဉ်ကို ဆောင်ရွက်ရမည်။

- အဆိုပြုထားသည့် စီမံကိန်းဆိုင်ရာ သတင်း အချက်အလက်များကို အများပြည်သူနှင့် လူမှုအဖွဲ့ အ စည်းများက သိရှိနိုင်ရန် စီမံကိန်း နေရာများတွင် အများပြည်သူ မြင်တွေ့နိုင်သည့် ဆိုင်းဘုတ် များနှင့် ကြော်ငြာသင်ပုန်းများ ထင်ရှားစွာ စိုက်ထူခြင်း အပါအဝင် ပြည်တွင်း မီဒီယာများမှ ထုတ်ဖော်ခြင်း၊
- ဒေသခံလူ အဖွဲ့ အစည်းများ၊ စီမံကိန်းကြောင့် အဓိက ထိနိုက်ခံစားရမည့်သူများ၊ ဒေသဆိုင်ရာ အုပ်ချုပ်ရေး အဖွဲ့ အစည်းများ၊ ရပ်ရွာ အခြေပြု အဖွဲ့ အစည်းများ၊ လူမှု အဖွဲ့အစည်းများနှင့် လိုအပ် သည့် တိုင်ပင် ဆွေးနွေးပွဲများကို ဝန်ကြီးဌာနက အကြံပြုသည့် အတိုင်း စီစဉ်ပြုလုပ်ခြင်း။

စီမံကိန်း အဆိုပြုသူသည် နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း အစီရင်ခံစာနှင့် ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ စုံစမ်းစစ်ဆေးခြင်း အတွက် ဆောင်ရွက်မည့်လုပ်ငန်း တာဝန်များကို ပြုစုရမည်။ ပြုစုပြီး နယ်ပယ်တိုင်းတာ သတ်မှတ်ခြင်း အစီရင်ခံစာနှင့် ဆောင်ရွက်မည့် လုပ်ငန်းတာဝန်များကို သုံးသပ် အတည်ပြု ပေးနိုင်ရန် သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာနသို့ တင်ပြ ရမည်။

၂.၂.၃။ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် စုံစမ်းစစ်ဆေးခြင်းနှင့် အစီရင်ခံစာ ပြင်ဆင်ခြင်း

စီမံကိန်း အဆိုပြုံသူသည် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းအတွက် ဆိုးကျိုးသက်ရောက်မှု အား လုံးကို သင့်တင့်စွာ စုံစမ်း စစ်ဆေးမှုပြုရန် လုပ်ငန်း တာဝန်များနှင့်အညီ ဆောက်ရွက်ရပါမည်။ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း အတွက် စုံစမ်းစစ်ဆေးရာတွင် လေ့လာမှုဧရိယာ၏ သက်ရှိ ဇီဝဆိုင်ရာ၊ ရုပ် ဝတ္ထု ဆိုင်ရာ၊ လူမှုရေး၊ စီးပွားရေး၊ ကျန်းမာရေး၊ ယဉ်ကျေးမှုနှင့် ပတ်ဝန်းကျင် ရှုခင်းရှုကွက် အစိတ်အပိုင်း များနှင့် အတူ အကြို ဆောက်လုပ်ရေးလုပ်ငန်း ဆောင်ရွက်ခြင်း၊ တည်ဆောက်ခြင်း၊ လုပ်ငန်း လည်ပတ်ခြင်း၊ လုပ်ငန်းရပ်စဲခြင်း၊ ပိတ်သိမ်းခြင်းနှင့် လုပ်ငန်းပိတ်သိမ်းပြီး နောက်ပိုင်း စသည့် စီမံကိန်း လုပ်ငန်းအ ဆင့်အား လုံး ဆောင်ရွက်စဉ်အတွင်း စီမံကိန်းကြောင့် ထိခိုက်ရသော မြေအသုံးချမှု၊ အရင်းအမြစ် အသုံးပြုမှု၊ မြေပိုင် ဆိုင်မှုနှင့် မြေနှင့် အခြားအရင်းအမြစ်ဆိုင်ရာ အခွင့်အရေးတို့ အပါအဝင် ပတ်ဝန်းကျင်၊ အများပြည်သူနှင့် လူမှုအဖွဲ့ အစည်းနှင့် သက်ဆိုင်သော ဥပဒေရေးရာ ကိစ္စများကိုလည်း ထည့်သွင်း စဉ်းစား ရမည်။ ထို့အပြင် စီမံကိန်း ပေါ်ပေါက်လာ နိုင်သော ဆိုးကျိုးသက်ရောက်မှုများအတွက် ပတ်ဝန်းကျင် ထိခိုက်မှု၊ လူမှုရေး ထိခိုက်မှုနှင့် လိုအပ်ပါက ကျန်းမာရေး ထိခိုက်မှုတို့ကို ဆန်းစစ်သုံး သပ်ရမည်။

အိမ်ယာပြောင်းရွေ့ရမှု သို့မဟုတ် တိုင်းရင်သား မျိုးနွယ်စုများ အပေါ် သက်ရောက်မှု ရှိနိုင်သော စီမံ ကိန်းများဆိုင်ရာ သီးသန့် ကိစ္စများနှင့် စပ်လျဉ်း၍ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံး လုပ် နည်းတွင် ထုတ်ပြန်ထားခြင်း မရှိပါ။ အဆိုပါ စီမံကိန်းများသည် သက်ဆိုင်ရာ ဝန်ကြီးဌာနများက သီးခြား ထုတ်ပြန်ထားသည့် လုပ်ထုံးလုပ်နည်းများကို လိုက်နာဆောင်ရွက်ရမည်။ ယင်းသို့ သီးခြား လုပ်ထုံး လုပ်နည်း များမရှိလျှင် ဆန္ဒမပါသော နေရာပြောင်းရွေ့ရမှုနှင့် တိုင်းရင်းသား မျိုးနွယ်စုဆိုင်ရာ အပြည်ပြည် ဆိုင်ရာ အလေ့အကျင့်ကောင်းများကို လိုက်နာ ဆောင်ရွက်ရမည်။

စီမံကိန်း အဆိုပြုသူသည် ပြည်ထောင်စု အစိုးရအဖွဲ့ကဖြစ်စေ သယံဇာတနှင့် သဘာဝ ပတ်ဝန်း ကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာနကဖြစ်စေ အတည်ပြုထားသော သက်ဆိုင်ရာ အမျိုးသား စံရိန်စံညွှန်း သို့မ ဟုတ် အပြည်ပြည်ဆိုင်ရာ စံရိန် စံညွှန်းကို လည်းကောင်း၊ ယင်းအမျိုးသား စံရိန်စံညွှန်း သို့မဟုတ် ချမှတ် ထားသော အပြည်ပြည်ဆိုင်ရာ စံရိန်စံညွှန်းမရှိပါက ဝန်ကြီးဌာနက သဘောတူထားသော စံရိန်စံညွှန်း များကို လည်း ကောင်း အသုံးပြုခြင်း သို့မဟုတ် လိုက်နာခြင်းနှင့် ကိုးကားခြင်းပြုရမည်။

ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းတွင် စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသူများ၊ လူမှုအဖွဲ့ အစည်းများနှင့် ပုဂ္ဂိုလ် တစ်ဦးချင်းစီ သို့မဟုတ် စီမံကိန်းတွင် အကျိုးသက်ဆိုင်သူများ၏ အမြင်၊ အလေးထားမှုနှင့် သဘော ထားများကို ထည့်သွင်းစဉ်းစားရမည်။ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းဆစ်ခြင်းတွင် အများပြည်သူနှင့် တိုင်ပင် ဆွေးနွေးခြင်း၏ ရလာဒ်များ၊ ထိခိုက်ခံစားရသည့် အများပြည်သူနှင့် အခြားသက်ဆိုင်သူများ၏ ပတ်ဝန်း ကျင်နှင့် လူမှုရေးဆိုင်ရာ ပြဿနာများ ပါဝင်ရမည်။ ပတ်ဝန်းကျင် အပေါ် သက်ရောက်မှုများကို ဆန်းစစ် ခြင်း၊ ဆိုးကျိုး သက်သာလျော့နည်းစေသည့် အရေးယူ ဆောင်ရွက်ချက်များကို ဒီဇိုင်းရေးဆွဲခြင်း နှင့် စောင့် ကြပ်ကြည့်ရှုမည့် သတ်မှတ်ချက်များ ရွေးချယ်ခြင်းတို့တွင် တိုင်ပင်ဆွေးနွေးမှုများမှ ထွက်ပေါ် လာသည့် စိုး ရိမ်ကြောင့်ကြမှုများကို ထည့်သွင်းစဉ်းစားရမည်။

သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာနသည် အစီရင်ခံစာ တင်သွင်းပြီး ၁၀ ရက် အတွင်း ပတ်ဝန်းကျင် ထိရိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာကို လူမှု အဖွဲ့အစည်း၊ စီမံကိန်း ကြောင့် ထိရိုက်ခံ စားရသူများ၊ သက်ဆိုင်ရာ အစိုးရ အဖွဲ့အစည်းများနှင့် အခြား အကျိုး သက်ဆိုင်သူများ သိရှိနိုင်ရန် ထုတ်ဖော်ကြေညာရမည်။ သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်းကြီးဌာန သည် ပတ်ဝန်းကျင် ထိရိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာကို သဘောထား မှတ်ချက်နှင့် ထောက်ခံချက် အတွက် စိစစ်သုံးသပ်နိုင်ရန် ပတ်ဝန်းကျင် ထိရိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ စိစစ် သုံးသပ်ရေး အဖွဲ့သို့ ပေးပို့ရ မည်။ အမျိုးသား အဆင့်နှင့် တိုင်းဒေသကြီး/ ပြည်နယ်/ နယ်မြေ အဆင့်တွင် စီမံကိန်း အဆိုပြုသူက အများပြည်သူနှင့် တိုင်ပင် ဆွေးနွေးပွဲများ ကျင်းပရန်နှင့် ယင်းဆွေးနွေးပွဲများတွင် ပတ်ဝန်းကျင် ထိရိုက်မှု အစီရင်ခံ စာကို တင်ပြရန် စီမံ ကိန်း အဆိုပြုသူအား ညွှန်ကြားရမည်။ ပတ်ဝန်းကျင် ထိရိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ စိစစ် သုံးသပ်ရေး အဖွဲ့၏ သဘောထား မှတ်ချက်နှင့် ထောက်ခံချက်များ အပါအဝင် လက်ခံရ ရှိသော သဘောထား မှတ်ချက်နှင့် အကြံပြုချက်အားလုံးကို သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်း သိမ်းရေး ဝန်းကြီးဌာနမှ စုစည်းသုံးသပ်ရွှေ တွင်ခန်းကျင် ထိရိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ စွင့်ပြုချက်ကို အပြီးသတ် ဆုံးဖြတ်ချက်ချမှတ်မည် ဖြစ်ပါ သည်။

သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်းကြီးဌာနသည် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်း စစ်ခြင်း အစီရင်ခံစာကို လက်ခံရရှိပြီး ရက်ပေါင်း ၉ဂ အတွင်း ယင်း၏ အပြီးသတ် ဆုံးဖြတ်ချက်ကို ချရမည်။ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း လုပ်ငန်းစဉ် အပါအဝင် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ် ခြင်း အစီရင်ခံစာ ထုတ်ဖော်ကြေညာခြင်းနှင့် သုံးသပ်ခြင်းလုပ်ငန်းစဉ်ပြီးမြောက်ရေး အတွက် ကုန်ကျခဲ့ သည့် ကုန်ကျစ ရိတ်အားလုံးကို စီမံကိန်း အဆိုပြုသူက ကျခံရမည်။ ပတ်ဝန်းကျင် ထိခိုက်မှု အစီရင်ခံစာကို စိစစ်သုံးသပ်ပြီးပါ က သယံဇာတနှင့် သဘာဝ ပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်းကြီးဌာနသည် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဆိုင်ရာ လိုက်နာဆောင်ရွက်မှု သက်သေခံလက်မှတ် ထုတ်ပေးရမည် သို့မဟုတ် ပတ်ဝန်း ကျင်ထိခိုက်မှု အစီရင်ခံစာအား ငြင်းပယ်ကြောင်း ဆုံးဖြတ်ချက်ကို စီမံကိန်း အဆိုပြုသူထံ အကြောင်းကြား ရမည်။ ယင်း၏ ဆုံးဖြတ်ချက်ကို အများပြည်သူသိရှိရန် ထုတ်ပြန်ကြေညာရမည်။

၂.၃။ နိုင်ငံတကာ စံရိုန်စံညွှန်းများနှင့် လက်တွေ့ကျသော လမ်းညွှန်မှုများ

ိပ်တ်ဝန်းကျင်ဆိုင်ရာနှင့် လူမှုဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာတွင် လက်တွေ့ အသုံး ကျသော အိမ်ရှင်နိုင်ငံဥပဒေများအပြင် အောက်ဖော်ပြပါနိုင်ငံတကာ စံချိန်စံညွှန်းများနှင့် လမ်းညွှန်မှု များကို အတိအလင်းကိုးကား၍ စီမံကိန်းကြောင့်ထိခိုက်မှုများနှင့် လျော့နည်းသက်သာစေမည့် နည်းလမ်းများ ကို တင်ပြထားပါသည်။

- နိုင်ငံတကာဘဏ္ဍာရေး ကော်ပိုရေးရှင်း၏ စံချိန်စံညွှန်းများ Performance Standards (2012);
- စီမံကိန်းတွင် အသုံးချမည့် ပတ်ပန်းကျင်၊ ကျန်းမာရေး နှင့်ဘေးကင်းမှု အထွေထွေ လမ်းညွှန်ချက် များအပါအဝင် ကမ္ဘာဘက် အုပ်စု၏ ပတ်ပန်းကျင်၊ ကျန်းမာရေး နှင့် ဘေးကင်းမှု လမ်းညွှန်ချက်များ
- (World Business Council for Sustainable Development (WBCSD) မှ ပြုလုပ်ထားသော Cement Sustainability Initiatives (CSI) ဘိလပ်မြေစက်ရုံအတွက် ပတ်ပန်းကျင် နှင့် လူမှုဝန်း ကျင်ဆိုင်ရာ ထိခိုက်မှုဆန်းစစ်ခြင်းအတွက် လမ်းညွှန်ချက်များ

နိုင်ငံတွင်း ပြဌာန်းထားသော ဥပဒေနှင့် လိုက်နာရမည့် လမ်းညွှန်ချက်များ ၂.၄။

စီမံကိန်း ပိုင်ရှင်ဖြစ်သူ MCL သည် စီမံကိန်းနှင့်သက်ဆိုင်သော ဖော်ပြပါ နိုင်ငံ့ဥပဒေများအားလုံးကို လေး စားလိုက်နာပါမည်။ လက်ရှိစီမံကိန်းနှင့်သက်ဆိုင်သည့် လိုက်နာဆောင်ရွက်ရမည့် ဥပဒေနှင့် လမ်းညွှန် ချက်များကို အောက်ပါအတိုင်း စာရင်းပြုစုထားရှိပါသည်။

၁။ အမျိုးသားပတ်ဝန်းကျင် မူဝါဒ (၁၉၉၄)

- ၂။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ(၂ဂ၁၂)
- ၃။ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ (၂၀၁၄)
- ၄။ ပတ်ဝန်းကျင်ထိခိုက်မူဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း(၂၀၁၅)
- ၅။ အမျိုးသား သဘာဝပတ်ဝန်းကျင်ဆိုင် အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅)

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ (၂၀၁၄)

- ၆။ မြေအောက်ရေဥပဒေ (၁၉၃၀)
- ၇။ ရေချိုငါးဖမ်းလုပ်ငန်း ဥပဒေ (၁၉၉၁)
- ၈။ ငါးသားဖောက်ခြင်းဆိုင်ရာ ဥပဒေ

၉။ ရေအရင်းအမြစ် နှင့် မြစ်ချောင်းများ ထိန်းသိမ်းရေး ဥပဒေ (၂၀၀၆)

၁၀။ မွန်ပြည်နယ် စည်ပင်သာယာရေး ဥပဒေ (၂၀၁၇)

၁၁။ သစ်တော ဥပဒေ (၁၉၉၂)

၁၂။ သဘာဝဒေသများ ထိန်းသိမ်းရေးနှင့် တောရိုင်းတိရှိစွာန်များ၊ အပင်များကာကွယ်ရေး ဥပဒေ (၁၉၉၄)

၁၃။ ယဉ်ကျေးမှု အမွေအနစ်ဆိုင်ရာ ဒေသများ ကာကွယ် ထိန်းသိမ်းရေး ဥပဒေ (၁၉၉၈)

၂၅။ ဓါတုနှင့်ဆက်စပ်ပစ္စည်းများ ဘေးအွန္တရာယ်ကြိုတင်ကာကွယ်ရေးဥပဒေ (၂၀၁၆)

၃၄။ တိုင်းရင်းသား လူမျိုးများ၏ အခွင့်အရေး ကာကွယ် စောင့်ရှောက်သည့် ဥပဒေ (၂ပ၁၅) ၃၅။ တိုင်းရင်းသား လူမျိုးများ၏ အခွင့်အရေး ကာကွယ် စောင့်ရှောက်သည့် ဥပဒေ (၂ပ၁၅)

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၂၇။ အလုပ်အမားများ လျော်ကြေးဆိုင်ရာ အက်ဥပဒေ (ပြင်ဆင် ၂၀၀၅)

၃ဂ။ အလုပ်သမားရေးရာ အငြင်းပွားမှုဖြေရှင်းရေး ဥပဒေ (၂၀၁၂)

၃၃။ အလုပ်အကိုင် နှင့် ကျွမ်းကျင်မှု ဖွံဖြိုးတိုးတက်ရေး ဥပဒေ(၂၊၁၃)

၁၄။ ရှေးဟောင်းဝတ္ထုပစ္စည်းများ ကာကွယ်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၅)

၁၅။ မြေသိမ်းယူမူအက်ဥပဒေ

၁၆။ လယ်ယာမြေဥပဒေ

၂၂။ ဘွိုင်လာ ဥပဒေ (၂၀၁၅)

၂၆။ လျပ်စစ်ဥပဒေ (၂၀၁၄)

၃၁။ လူမှုဖူလုံရေး ဥပဒေ (၂၀၁၂) ၃၂။ အနိမ့်ဆုံး လုပ်ခ ဥပဒေ (၂၀၁၃)

၁၉။ စက်ရုံများ အက်ဥပဒေ (၁၉၅၁)

၂၀။ ပုဂ္ဂလိက စက်မူလုပ်ငန်းဥပဒေ (၁၉၉၀) ၂၁။ ပို့ကုန်နင့် သွင်းကုန်ဥပဒေ (၂၀၁၂)

၂၄။ မြန်မာနိုင်ငံရင်နီးမြှုပ်နံမှုဉပဒေ (၂၀၁၆)

၁၈။ အမျိုးသားမြေအသုံးချမှုမူဂါဒ (၂ဂ၁၆)

၂၃။ ပေါက်ကွဲစေတတ်သော ပစ္စည်းများ ဥပဒေ (၁၉၀၈)

၂၈။ ခွင့်ရက်နင့် အလုပ်ပိတ်ရက် အက်ဥပဒေ (၁၉၅၁)

၂၉။ အလုပ်သမား အဖွဲ့အစည်းဥပဒေ (၂၀၁၁)

၃၆။ အခကြေးငွေပေးချေရေး ဥပဒေ (၂၀၁၆) ၃၇။ ပြည်သူ့ကျန်းမာရေး ဥပဒေ (၁၉၇၂)

၁၇။ မြေလွတ်၊ မြေလပ် နှင့် မြေရိုင်းများ စီမံခန့်ခွဲရေး ဥပဒေ (၂၀၁၂)

၃၈။ ကူးစက်ရောဂါများ တားဆီးကာကွယ်ရေး ဥပဒေ (၁၉၉၅) ၃၉။ မီးသတ်ဂန်ဆေင်မူဥပဒေ (၂၀၁၅) ၄ဂ။ စီမံကိန်းနှင့်ဆက်စပ်သော နိုင်ငံတကာ ဥပဒေများ

အဆိုပြုထားသော ဘိလပ်မြေစီမံကိန်း အတွက် MCL ၏ ပတ်ဂန်းကျင်ညစ်ညမ်းမှု မဖြစ်စေရန် ထိန်းသိမ်း ၂**.၅**။ ဆောင်ရွက်ရေး ဇွဲ့စည်းပုံ မူဘောင်များ

လက်ရှိတရားပင်ကျင့်သုံးနေသော ဥပဒေ မူဝါဒ နှင့် လမ်းညွှန်ချက်များကို လိုက်နာမည် ဖြစ်သည့် အပြင် MCL ကိုယ်တိုင်ကပင် ရေရှည်ဖွံ့ဖြိုးတိုးတက်ရေး မူဝါဒနှင့် ပတ်ဂန်းကျင်ထိန်းသိမ်းရေး လိုက်နာဆောင်ရွက်ရမည့် အစီအစဉ်များ ထားရှိဆောင်ရွက်ထားပါသည်။ အမှန်တကယ်တွင် MCL သည် SCG cement (Thailand) နှင့် Pacific Link Cement Industry (PLCI) တို့ ပူးပေါင်း ဆောင်ရွက်ထားသည့် စီမံကိန်းတစ်ခုဖြစ်ပါသည်။ SCG အနေဖြင့် စဉ်ဆက်မပြတ် ဖွံ့ဖြိုးတိုးတက်စေရေး မူဝါဒ (ISO 14001 series standards) အတိုင်း လိုက်နာဆောင်ရွက်ခဲ့ သည့်အတွက် ထောက်ခံချက် လက်မှတ် ရရှိထားပြီး ဖြစ်ပြီး MCL စီမံကိန်းကို ရေရှည်ဖွံ့ဖြိုးတိုးတက်စေရေး မူဝါဒ နှင့်လမ်းညွှန်ချက်များ အတိုင်း လိုက်နာကာ ထုတ် လုပ် လည်ပတ်စေမည် ဖြစ်ပါသည်။

MCL ၏ကြေငြာချက်ကိုလည်း အောက်ပါအတိုင်း ထုတ်ပြန်ထားပါသည်။



Announcement MCL 009/2016

SUSTAINABLE DEVELOPMENT POLICY (Safety, Environment, CSR)

Mawlamyine Cement Limited establish safety to our employees and contractors, preserve the environment and collaborate with local government and surrounding communities in order to be environmental friendly factory and be a good citizen in Mon state under corporate governance.

Mawlamyine Cement Limited has therefore implemented the Sustainable Development policy as the followings:

- Align SCG Safety Principle to develop Safety Management Program 1.
- 2. Promote safety caring culture with uncompromising on safety standard
- Safety is everybody's accountability 3.
- Control air emission and noise to conform to the relevant standards by implementing Pollution 4. Prevention and Clean Technology.
- Reduce natural resource consumptions; increase the efficiency of energy by improving the 5. operation to reduce the environmental impacts
- Improve waste management by applying 3R's (Reduce, Reuse, Recycle) management and 6. comply with legal requirements.
- Prevent pollution by improving operation effectiveness and efficiency and increase more green areas.
- Coordinate with government, external organizations and communities to conserve 8. environment and natural resources for sustainable development.
- Increase more satisfaction from surrounding communities by implementing CSR program and stakeholder engagement program.

The Sustainable Development policy is communicated within Mawlamyine Cement Limited to make all employees understood and well implemented.

The policy, objective and target of the environmental management system are maintained, reviewed and revised at least once a year via regular Management Review meeting.

lanaging Director Mawlamvine Cement Limited March 4, 2016

A JEan

Mawlamyine Cement Limited

No.136/137, Pyay Road, Saw Bwar Gyi Gone, Insein Township, Yangon, Myanmar.

၂.၅.၁။ MCL စီမံကိန်း၏ ပတ်ဂန်းကျင်ထိန်းသိမ်းစောင့်ရှောက်ရေး မူဝါဒ

မူဝါဒတွင် ဖော်ပြထားသည်မှာ ``အလုပ်သမားထဲမှ မည်သူမဆို (SOx, NOx, Dust and Noise) အစရှိသည့် လေထုနှင့် အသံညစ်ညမ်းစေသောအရာများ၏ သတ်မှတ်ထားသောစံနှုန်းကို အလေးဂရုမပြုပဲ သတ်မှတ်စံနှုန်းထက် မြင့်တက်သွားအောင် ကျော်လွန်သွားအောင် ပြုလုပ်ပါက ကုမ္ပကီမှ အပြစ်ပေးခြင်းကို ခံယူရပါမည်။ အမြင့်ဆုံး ပြစ်ဒက်မှ အလုပ်မှ ထုတ်ပယ်ခြင်း ဖြစ်ပါမည်″ ဟူ၍ ဖြစ်ပါသည်။

အခြား အန္တရာယ်ကင်းရှင်းရေး အစီအမံများနှင့် အလုပ်သမားများ စီမံခန့်ခွဲမှု အစီအစဉ်များကို အခန်း (၂)၊ မူဝါဒဆိုင်ရာအခန်းတွင် ဖော်ပြထားပြီး နောက်ဆက်တွဲတွင်လည်း ထည့်သွင်းထားပါသည်။

၂.၅.၂။ MCL ကတိခံပန်ချက်နှင့် EIA လုပ်ငန်းများကို အကောင်အထည်ဖော်ဆောင်ရွက်မည့်အဖွဲ့ အစည်း

ပတ်ပန်းကျင်နှင့် လူမှုရေးရာ ဆန်းစစ်ခြင်းအစီရင်ခံစာသဘောတူအတည်ပြုချက် ရရှိရေးအတွက် Resource & Environment Myanmar Co. Ltd. သည် စီမံကိန်းနှင့် သက်ဆိုင်သောရုပ်ပိုင်းဆိုင်ရာနှင့် သက်ရှိ ပတ်ပန်းကျင်များကို လေ့လာခြင်းနှင့် လူထုနားလည်လက်ခံမှု၊ စိုးရိမ်ပူပန်မှု၊ စီမံကိန်းအပေါ် ယူဆချက် နှင့် မျှော်လင့်ချက်များ အစရှိသော လူမှုရေးဆိုင်ရာ အချက်အလက်များကို စစ်တမ်းကောက်ယူပြုစုကာ စီမံကိန်း အနေဖြင့် ပတ်ပန်းကျင်နှင့်လူမှုရေးရာများအပေါ်တွင် ထိခိုက်နစ်နာမှုမရှိစေရေးနှင့် အမှားနည်း နိုင်သမျှနည်းပါးအောင် သတိထား၍ အကောင်အထည်ဖော်ဆောင်ရွက်စေရေးအတွက် ဖြစ်ပါသည်။

ဇွံ့မြိုးတိုးတက်ရေးလုပ်ငန်းများကို တည်ဆောက်လည်ပတ်ရာတွင် မည်သည့်လုပ်ငန်းပင်ဖြစ်စေ ပတ်ဂန်း ကျင်အပေါ် သို့ ကောင်းကျိုးရော ဆိုးကျိုးပါ ဖြစ်ပေါ် စေနိုင်ပါသည်။ စီမံကိန်းပိုင်ရှင်အနေဖြင့် နီးစပ်ရာ ပတ်ဂန်း ကျင်အပေါ် ထိခိုက်သက်ရောက်မှုများကို ခွဲခြားဆန်းစစ်ပြီး ဆိုးကျိုးများကို လျော့နည်းအောင် နှင့် ကောင်းကျိုးများကို များသထက်များစေရန် ဆောင်ရွက်ရပါမည်။ အဆိုပြုထားသော ကျောက်မီးသွေးသုံး ဓါတ်အား ပေးစက်ရုံမှ ရရှိသော လျပ်စစ်သည် ဘိလပ်မြေ ထုတ်လုပ်ခြင်းအတွက်သာအသုံးပြုမည်ဖြစ်ပြီး ထိုဘိလပ်မြေစက်ရုံမှ နီးစပ်ရာ ဂန်းကျင်သာ မက မြန်မာနိုင်ငံတဂန်းလုံးရှိ ဆောက်လုပ်ရေးလုပ်ငန်း နှင့် စက်ရုံများအတွက် ဘိလပ်မြေလိုအပ်ချက်ကို ဖြည့်ဆည်း ပေးရန် မျှော်လင့်ပါသည်။ ဤစီမံကိန်းနှင့် ဆက်စပ်လုပ်ငန်းများအတွက် ပတ်ဂန်းကျင်ထိန်းသိမ်းရေး စီမံကွပ်ကဲမှု များကို အရည်အသွေးပြည့်ဂသော အင်ဂျင်နီယာများနှင့် နည်းပညာရှင်များဖြင့် အဖွဲ့များ ဖွဲ့စည်းကာ ပြည့်ပြည့် ဂဂ ဆောင်ရွက်ပါမည်။

ပတ်ပန်းကျင်၊ လူမှုရေးရာ နှင့် ကျန်းမာရေးဆိုင်ရာ ထိခိုက်သက်ရောက်မှုများကို နည်းစနစ်တကျ လေ့လာ ထားမှုများအရ မော်လမြိုင်ဘိလပ်မြေစက်ရုံစီမံကိန်းသည် အကောင်အထည်ဖော်ဆောင်ရွက်ရန် ကတိက ပတ်ပြုထား သော ပတ်ပန်းကျင်ထိန်းသိမ်းရေး စီမံကွပ်ကဲမှုများ၊ လူမှုရေးရာ၊ ကျန်းမာရေးဆိုင်ရာ နှင့် ဘေးအန္တရာယ်ကင်းရှင်း ရေးဆိုင်ရာလိုက်နာဆောင်ရွက်ဖွယ်ရှိသည်များကို အတိအကျလိုက်နာ အကောင်အထည် ဖော်ဆောင်ရွက်ပါက လူမှုပတ်ပန်းကျင်အပေါ် တွင်ကောင်းကျိုးများသက်ရောက် စေမည် ဖြစ်ပါသည်။

၂.၅.၃။ MCL ပန်ထမ်းများ ဖွဲ့စည်းပုံ

ကျောက်မီးသွေးသုံဓါတ်အားပေးစက်ရုံကို မော်လမြိုင်ဘိလပ်မြေစက်ရုံမှ အစစ တာဂန်ယူမည် ဖြစ်ပြီး ထိန်းသိမ်း ပြင်ဆင်ခြင်း၊ ကြီးကြပ်ကွပ်ကဲခြင်း နှင့် EIA လုပ်ငန်းများကို အကောင်အထည်ဖော် ဆောင်ရွက် ခြင်းများကို အခန်းကဏ္ဍတစ်ခုချင်းစီအလိုက် စီမံဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။ စဉ်ဆက်မပြတ် ရေရှည် ဖွံ့ဖြိုးတိုးတက်စေရေး အဖွဲ့အစည်းဌာန (Sustainable and Organization Development Department) မှ EMP and HSE အစီအစဉ်များကို သင့်လျော်သော ထိန်းချုပ်ဆောင်ရွက်မှုများဖြင့် စီမံအုပ်ချုပ် လုပ်ကိုင် သွားမည်ဖြစ်ပြီး စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် ညိနှိုင်းဆွေးနွေးခြင်းနှင့် လူထု ဆက်ဆံရေးလုပ်ငန်းများကိုပါ အဓိကထား ဆောင်ရွက်သွား ပါမည်။ MCL ဖွဲ့စည်းပုံကို အောက်တွင် ဖော်ပြထားပါသည်။



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၃။ စီမံကိန်းလုပ်ငန်းဖော်ပြချက်

၃.၁။ စီမံကိန်းတည်နေရာ

MCL ကျောက်မီးသွေးသုံး ဓါတ်အားပေးစက်ရုံ စီမံကိန်းနေရာသည် မွန်ပြည်နယ်၊ ကျိုက်မရောမြို့နယ်ရှိ ကော့ဒွန်း နှင့် ကော့ပနော်ကျေးရွာများအနီးတွင် တည်ရှိပါသည်။ မြန်မာမြေတိုင်းဦးစီးဌာန၏ မြေမျက်နှာသွင် ပြင် ပြမြေပုံအမှတ် ၉၄ H/၁၅ အရ မြောက်လတ္တီကျူ့ ၁၆ ဒီဂရီ ၂ဂ မိနစ်နှင့် ၁၆ ဒီဂရီ ၂၃ မိနစ်ကြား အရှေ့လောင်ဂျီကျူ့ ၉၇ ဒီဂရီ ၄၇ မိနစ်နှင့် ၉၇ ဒီဂရီ ၄၉ မိနစ်ကြားတွင် တည်ရှိပါသည်။ ၎င်းသည် မွန်ပြည်နယ်တွင် တည်ရှိပြီး မွန်ပြည်နယ်၏ မြို့တော်ဖြစ်သော မော်လမြိုင်မြို့၏ အရှေ့တောင်ဘက် ၁၉ ကီလိုမီတာအကွာတွင် တည်ရှိပါသည်။

၃.၂။ ကျောက်မီးသွေးသုံး လှုပ်စစ်စက်ရုံ

ဘိလပ်မြေထုတ်လုပ်ခြင်းသည် စဉ်ဆက်မပြတ်လည်ပတ်နေရသော ဖြစ်စဉ်ဖြစ်သောကြောင့် အမျိုးသား ဓာတ်အားပေးလိုင်းစနစ်မှ လျှပ်စစ်ဓာတ်အားရရှိမှုအပေါ်တွင် ကိုးစားမှီခို၍မရသကဲ့သို့ လုံလောက်သော လျှပ်စစ်ဓာ တ်အားမရရှိခြင်းကလည်း ထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ်တွင် ဆုံးရှုံးမှုများဖြစ်စေပါသည်။ အကျိုး ဆက်အားဖြင့် MCL အနေဖြင့် ကိုယ်ပိုင်လျှပ်စစ်စက်ရုံကို တည်ဆောက်ဖို့ရန်မှာ အရေးတကြီးစဉ်းစား ရန်လိုအပ်လာပါသည်။

လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ရရှိနိုင်သော အရင်းအမြစ်များမှာ ကျောက်မီးသွေး၊ သဘာပဓာတ်ငွေ့၊ ဆီ၊ ရေ အားလျှပ်စစ် သို့မဟုတ် ပြန်လည်ပြည့်ဖြိုးမြဲ စွမ်းအင် အစရှိသဖြင့် များစွာ ရှိပါသည်။ လက်တွေ့အားဖြင့် ဘိလပ် မြေထုတ်လုပ်ခြင်းတွင် လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ရန်အတွက်မူ ကျောက်မီးသွေးမှာ အသင့်တော် ဆုံးဖြစ်ပါသည်။ အဘယ်ကြောင့်ဆိုသော် ကျောက်မီးသွေးသည် clinker ထုတ်လုပ်မှုဖြစ်စဉ်အတွက်လည်း အဓိကကျသော လောင်စာဖြစ်သောကြောင့် လိုအပ်သော ကျောက်မီးသွေးများကို အတူတကွ သယ်ယူပို့ ဆောင်နိုင်ပါသည်။

ကျောက်မီးသွေးသုံးလှုုပ်စစ်စက်ရုံများသည် အမှုန့်ရေသော ကျောက်မီးသွေး ဘွိုင်လာအမျိုးအစားများ (Pulverized coal Boilers) တစ်နည်းအားဖြင့် (PC Boilers) များမှ နောက်ဆုံးပေါ် ကျောက်မီးသွေးသုံး ဘွိုင်လာ များ ဖြစ်ကြသော Circulating Fluidized Bed boiler (CFB Boiler) အဖြစ် တိုးတက်လာခဲ့ကြပါသည်။ နည်းပညာပိုင်းဆိုင်ရာများကိုလည်း ထည့်သွင်းစဉ်းစားကာ (CFB Boiler) များသည် လျှပ်စစ် ထုတ်လုပ်သည့် ပမာက အားဖြင့် ၄ဂ မီဂါဂဒ်ပတ်လည်သုံးရမည် ဖြစ်သော တစ်နေ့လျှင် တန် ၅၀၀၀ ကျထုတ်လုပ်မည့် ဘိလပ်မြေ စက်ရုံအတွက် အသင့်တော်ဆုံး အမျိုးအစားများအဖြစ် တွေ့ရှိရပါသည်။

၃.၂.၁ အသုံးပြုသည့်ကျောက်မီးသွေးအရင်းအမြစ်

လက်ရှိအရိုန်တွင်အင်ဒိုနီးရှားမှတင်ပို့သော ကျောက်မီးသွေး နှင့် ပြည်တွင်းမှ ကျောက်မီးသွေးနှစ်မျိုး အားရောနော၍ အသုံးပြုပါသည်။ ပြည်တွင်း ကျောက်မီးသွေးအမျိုးအစားကို ပင်လုံမြို့နယ်၊ ရှမ်းပြည်တောင်ပိုင်းမှ ရရှိပါသည်။ ကျောက်မီးသွေးလက်ခံရရှိမှု နှင့် ၄င်းတွင်ပါပင်သော အရည်အသွေးပေါ် မူတည်ပြီး (ပြည်တွင်း နှင့် ပြည်ပ) ကျောက်မီးသွေးကို ၂၀ မှ ၁၀၀ % အထိ ရောနှောအသုံးပြုပါသည်။ လက်ရှိတစ်ရက် ကျောက်မီးသွေးအသုံးပြုမှုမှာ တစ်ရက်လျင် တန် ၅၀၀ မှ ၆၀၀ ရှိပါသည်။ အဆိုပါ ကျောက်မီးသွေး နှစ်မျိုး၏ ဓါတုဆိုင်ရာ ဓါတ်ခွဲရျက် ရလဒ်များအား ဇယား ၃.၁ တွင် ဖော်ပြထားပါသည်။

ဖကား ၁။

အင်ဒိုနီးရှား နှင့် ပြည်တွင်းကျောက်မီးသွေးများ၏ ဓာတုပစ္စည်းပါဂင်မှုဆန်းစစ်ခြင်းရလာဒ်

			Lo	cal					Impo	orted		
Description	Kalawa			Pinlon			Indo (Lov	v Sulfur)		Indo (Nor	mal Sulf	fur)
	As	Air	Dry	As	Air	Dry	As	Air	Dry	As	Air	Dry
	Receive	Drie		Receive	Drie		Receive	Drie		Receive	Drie	

									· .				
		d	d		d	d		d	d		d	d	
Moisture													
Total	%	13.49			35.38			10.45			12.61		
Inheren	%		7.59			13.6			3.04			9.73	
t						9							
Ash	%	15.94	17.0	18.3	11.11	14.8	17.1	21.40	23.1	23.9	4.38	4.53	5.02
			2	5		4	7		7	0			
Volatile	%	35.96	38.4	41.6	29.91	39.9	46.3	37.85	40.9	42.2	42.81	44.2	48.9
Matter			5	6		8	5		8	6		1	7
Fixed	%	34.62	36.9	39.9	23.61	31.5	36.4	30.30	32.8	33.8	40.20	41.5	46.0
Carbon			4	9		0	9		1	4		3	1
Calorific V	/alue												
Gross	Cal	5094	5436	5884	3454	4608	5339	5257	5692	5870	5913	6107	6765
	/g												
Sulfur													
Bomb	%	1.33	1.42	1.53	0.66	0.89	1.02	0.35	0.37	0.39	1.90	1.96	2.17
Sulfur													
Size	mm	0-50											

၃.၃။ MCL စီမံကိန်း၏ နေရာအခင်းအကျဉ်းအစီအစဉ်

ဘိလပ်မြေစက်ရုံနှင့်အတူ ယှဉ်တွဲတည်ဆောက်မည့် လျှပ်စစ်ဓာတ်အားစက်ရုံ နှင့် ရေသင်္ဘောံဆိပ် တို့ကို ပုံ (၃) တွင် ဖော်ပြထားပါသည်။



ပုံ (၃)။ MCL စီမံကိန်း၏ နေရာအခင်းအကျဉ်းအစီအစဉ်

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



ပုံ (၄)။ လျှပ်စစ်ဓာတ်အားပေးစက်ရုံ တည်ဆောက်မည့်အစီအစဉ် နှင့်ကျောက်မီးသွေးသုံး လျှပ်စစ်ဓာတ်အား စက်ရုံ



ပုံ (၅): MCL ရှိ ကျောက်မီးသွေးသိုလှောင်ရုံနှင့် စက်ရုံတွင်းသုံး လျှပ်စစ်ဓာတ်အား စက်ရုံ

၃.၃.၂။ ကျောက်မီးသွေးသုံး Circulating Fluidization Bed (CFB) Boiler များ၏ အဓိက ပါပင်သော လက္ခကာ ရပ်များ



ပံ့ (၆)။ Circulating Fluidization Bed (CFB) Boiler



ပုံ (၇)။ CFB Boiler လည်ပတ်မှုစနစ်

၃.၄။ စွန့်ပစ်အပူမှ လျှပ်စစ်ဓာတ်အားထုတ်လုပ်ခြင်း

စွန့်ပစ်အပူသုံး လျှပ်စစ်စက်ရုံသည် ဘိလပ်မြေစက်ရုံမှ စွန့်ပစ်လိုက်သော ဓာတ်ငွေ့များမှ အပူကို ပြန်လည်ရ ယူကာ လျှပ်စစ်ဓာတ်အားထုတ်ယူခြင်းဖြစ်ပါသည်။ ဘိလပ်မြေစက်ရုံတစ်ခုလုံး၏ စုစုပေါင်း လျှပ်စစ်ဓာတ်အား သုံးစွဲမှု၏ ၂၀ ရာခိုင်နှုန်းထိ ထောက်ပံ့ပေးထားနိုင်ပြီး စွမ်းအင်သုံးစွဲမှု သက်သာစေသော စနစ်တစ်ခုဖြစ်ပါ သည်။ စွန့်ပစ်အပူသုံး လျှပ်စစ်စက်ရုံသည် steam turbine တစ်ခုကို သုံးထားပြီး pre-heater waste gas (SP waste gas) နှင့် air quenching cooler waste gas (AQC waste gas) အစရှိသော အပူရင်း မြစ်နှစ်ခုမှ ထွက်သော အပူမှ လျှပ်စစ်စွမ်းအင်ထုတ်လုပ်ခြင်း ဖြစ်ပါသည်။



Waste Heat Recovery System (Maximum: 9.00MW, Normal Operation: 6-9 MW)

Boiler Specification: Natural Circulation Type

Suspension Preheater Boiler:

	Rated Steam Generation:	26.4 tph
	Rated Working Pressure:	1.6 MPa
	Rated Steam Temperature:	313 °C
	Inlet Flue Gas Volume:	350,000 Nm3/h
	Inlet Flue Gas Temperature:	330°C
	Efficiency of Heat Recovery:	34.8%
Air Qu	enching Cooler Boiler:	
	Rated HP Steam Generation:	21.4 tph
	Rated HP Steam Temperature:	1.6 MPa
	Rated HP Steam Temperature:	365 °C
	Rated LP Steam Generation:	3.7 tph
	Rated LP Steam Temperature:	0.5 MPa
	Rated LP Steam Temperature:	200 °C
	Inlet Flue Gas Volume:	225,000 Nm3/h
	Inlet Flue Gas Temperature:	380°C
	Efficiency of Heat Recovery:	74.5%
	Turbo-generator Specification:	Condensing Turbine Type

Rated Power Output:	9,000 kW
Rated Speed:	3,000 rpm
Rated Voltage:	10.5 kV
Inlet Steam Condition:	44.5 tph, 1.6 MPa, 320°C
Rotational Direction:	Clockwise

၃.၅ စီမံကိန်းလုပ်ငန်း၏ နိုင်းယှဉ်ရွေးချယ်ချက်များ

ကျောက်မီးသွေးသုံးလျှပ်စ်စိစက်ရုံ၏ စက်ပစ္စည်းများကို နည်းပညာအပေါ်တွင် အခြေခံကာ စဉ်းစား ခဲ့ပြီး ထည့်သွင်းစဉ်းစားချက်များတွင် ယေဘူယသဘောဖော်ပြချက်၊ လည်ပတ်နှုန်း၊ တပ်ဆင်ခြင်း၊ လုပ်ငန်း လည်ပတ် ရန်လွယ်ကူသက်သာမှု၊ လည်ပတ်ရန်ကုန်ကျစရိတ်၊ ပြင်ဆင်ထိန်းသိမ်းရန်လွယ်ကူမှု နှင့် ကုန်ကျ စရိတ်၊ စွမ်းအင်သုံးရာတွင် သက်သာမှု၊ အသုံးကျယ်ပြန့်မှု၊ အဆင့်မြင့်တင်သုံးစွဲနိုင်မှု စသည့် ဘိလပ်မြေ ထုတ်လုပ်သည့် စက်ရုံလည် ပတ်ရာတွင် ၎င်းင်းတို့ကို တပ်ဆင်အသုံးပြုရခြင်း၏ အားသာချက်များ ပါပင်ပါ သည်။

်ကြCL ကျောက်မီးသွေးသုံးလျှပ်စစ်စက်ရုံ၏ နှိုင်းယှဉ်ရွေးချယ်ခဲ့သော အဓိကစက်ပစ္စည်းများမှာ အောက်ပါ အတိုင်းဖြစ်ပါသည်။

၃.၅.၁။ ကျောက်မီးသွေးသုံးဘွိုင်လာအတွက် နှိုင်းယှဉ်စဉ်းစားခဲ့သော စနစ်လက္ခကာများ

ကျောက်မီးသွေးသုံး **Circulating Fluidization Bed (CFB) Boiler** များသည် မြင့်မားသော စွမ်းဆောင်ရ ည်ရှိသည့် ဘွိုင်လာများဖြစ်ပြီး လောင်ကျမ်းသော အပူချိန်မှာ ၈၄ဂ-၉၅၀ ဒီဂရီစင်တီဂရိတ်သာ ရှိပါသည်။ ဤအပူ ချိန်အတွင်းတွင် နိုက်ထရိုဂျင်အောက်ဆိုဒ် (NOx) ထုတ်လုပ်မှုမှာ အခြားသော ပိုမို၍အပူချိန် မြင့်သော ဘွိုင်လာအမျိုးအစားများထက်လျော့နည်းပါသည်။ ထို့အပြင် ထုံးကျောက်ကို ကြမ်းခင်းပစ္စည်း အဖြစ်အသုံးပြုပြီး ကျောက်မီးသွေးတွင်ပါဂင်သော ဆာလဖာ (Sulfur) ကိုစုပ်ယူကာ ဘွိုင်လာမှ ဆာလ ဖာအောက်ဆိုဒ် (SOx) ထုတ်လွှတ်မှုကို လျော့နည်းစေပါသည်။ ဘွိုင်လာတွင် **Bag Filter** ကိုလည်း တပ်ဆင်ထားပြီး စွန့်ပစ်အငွေ့ထဲမှ ဖုန်မှုန့်ကိုလည်း ဖယ်ရှားပေးနိုင်ပါသည်။ MCL သည် ဘွိုင်လာနောက်တွင် Flue gas de-sulfuri- zation system ကို တပ်ဆင်ထားပြီး ၎င်းသည် စွန့်ပစ်အငွေ့မှ ဆာလဖာအောက်ဆိုဒ် (SOx) ကို လျော့နည်းသွားသည်အထိ ဖယ်ရှားနိုင်ပါသည်။

၃.၆။ နည်းပညာပိုင်းဆိုင်ရာရွေးချယ်ခြင်း

ကျောက်မီးသွေးလောင်စာသည် ဘိလပ်မြေစက်ရုံ၏လျှပ်စစ်ဓါတ်အားထုတ်လုပ်ခြင်းအတွက် သင့်တော် သောလောင့်စာဖြစ်ပါသည်။ အဘယ်ကြောင့်ဆိုသော် ဘိလပ်မြေထုတ်လုပ်ရာတွင်လည်း ကျောက်မီးသွေးကို အဓိကလောင်စာအဖြစ်အသုံးပြုခြင်းကြောင့် ကျောက်မီးသွေးကိုလျှပ်စစ်ထုတ်လုပ်ခြင်း အတွက် သာမက ဘိလပ်မြေ စက်ရုံအတွက်ပါ သယ်ယူပို့ဆောင်နိုင်ပါသည်။

ကျောက်မီးသွေးသုံး ဘွိုင်လာများ၏ (ယခင် Pulverized Coal Boiler မှ ယခု Circulating Fluidized Bed boiler) နည်းပညာများသည်လည်း အချိန်နှင့်အမျှ တိုးတက်ပြောင်းလဲပါသည်။ ယခု စက်ရုံတွင် အသုံးပြုမည့် ဘွိုင်လာသည် အပူလောင်ကျွမ်းအားကောင်း၍ လောင်စာအမျိုးအစားစုံ လောင်ကျွမ်းနိုင်ရင် ဒီဇိုင်းပြုလုပ်ထား သည့်အတွက် NOx နှင့် SO2 ထွက်ရှိနိုင်ခြေ ပြီး သဘာပပတ်ပန်းကျင် နှင့်လည်း သဟဇာတ ဖြစ်ပါသည်။ ထို့အပြင် SO2 ထွက်ရှိနိုင်မှုအား ထပ်မံလျော့ချနိုင်ရန် စွမ်းဆောင်ရည် ၉၅% ရှိသော Flue Gas Desulfurization (FGD) ကိုတပ်ဆင်ထားပါသည်။ လေထုညစ်ညမ်းမှုလျော့ ချနိုင်ရန်အလို့ငှာ CFB Boiler နှင့် FGD စနစ်များကို တပ်ဆင်ထားပါသည်။

၄။ အဓိက ညစ်ညမ်းပစ္စည်းထွက်ရှိရာရင်းမြစ်နေရာနှင့် ၎င်းတို့၏ လက္ခဏာရပ်များ

ကျောက်မီသွေးဓါတ်အားပေးစက်ရံ လည်ပတ်နေစဉ်ကာအတွင်း TSP, ဆာလဖာဒိုင်အောက်ဆိုဒ် နှင့် နိက်ထရိုက်ဂျင်အောက်ဆိုဒ် စသည့်ဓါတ်ငွေ့များ ထွက်ရှိနိုင်ပါသည်။ ၄င်းတို့ကို Bag Filters, oxygen and temperature control at boiler and Flue Gas Desulfurization system စသည့် စနစ်များအသုံးပြုကာ ထုတ်လွှတ်မှု လျော့နည်းစေရန် စီမံဆောင်ရွက်ပါသည်။

၄.၁။ အဓိက လေထုထဲသို့ စွန့်ထုတ်သော ပစ္စည်းများနှင့် ထိခိုက်သက်ရောက်မှုများကို ဆန်းစစ်ခြင်း နှင့် ထိန်းချုပ်စီမံခြင်း

ဓါတ်အားပေးစက်ရုံလည်ပတ်ခြင်းတွင် ကြားခံပစ္စည်းများ (coal crusher, CFB boilers နှင့် ထုံး ကျောက်အရည်ဖျော်ခြင်း လုပ်ငန်း) နှင့် နောက်ဆုံးထွက်ကုန် ပစ္စည်းများကို ကိုင်တွယ်ခြင်းနှင့် သိုလှောင်ထား ရှိခြင်းတို့မှ လေထုထဲသို့ ညစ်ညမ်းစေသော ပစ္စည်းများ ထုတ်လွှတ်စေနိုင်ပါသည်။

၄.၁.၁။ ဖုန်မှုန့် များထုတ်လွှတ်မှုကို ထိန်းချပ်ခြင်း

မီးခိုးခေါင်းတိုင်ဓာတ်ငွေ့များမှ ဖုန်မှုန့်များဖယ်ထုတ်ခြင်း၊ ရွေ့လျားစက်ခါးပတ် သုံးစွဲသည့်နေရာများ (belt transfer) နှင့် ကိုတ်ခွဲစက်ရှိသော နေရာများမှ ဖုန်မှုန့်များကို Bag filter အသုံးပြုခြင်းဖြင့် ၉၉.၉၉ % အထိ ဖယ်ရှား ရှင်းလင်းနိုင်ပါသည်။

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

NO.	Name	Specification	unit	location
1	Boiler			
1.1	Bag filter	230000m ³ /h, 1500Pa	2	Used for boiler
2	Coal transportation			
2.1	Bag filter	4500m ³ /h, 1500Pa	1	Raw coal silo
2.2	Bag filter	1200m ³ /h, 1500Pa	2	Rear of #1 belt conveyor
2.3	Bag filter	1200m ³ /h, 1500Pa	2	Head of #1 belt conveyor
2.4	Bag filter	7800m ³ /h, 1550Pa	2	Rear of #2 belt conveyor
2.5	Bag filter	1200m ³ /h, 1500Pa	2	Head of #2 belt conveyor
2.6	Bag filter	4500m ³ /h, 1500Pa	1	#1 coal bunker of boiler
2.7	Bag filter	4500m ³ /h, 1500Pa	1	#2 coal bunker of boiler
3	Ash and slag treatment			
3.1	Bag filter	4500m ³ /h, 1500Pa	1	Top of the ash silo
3.2	Bag filter	1140m ³ /h, 1100Pa	1	Top of the slag silo
4	Desulfuration system ar	d limestone crush system	ı	
4.1	Bag filter	1140m ³ /h, 1100Pa	1	Top of #1 limestone silo
4.2	Bag filter	1140m ³ /h, 1100Pa	1	Top of #2 limestone silo
4.3	Bag filter	~20010m3/h	1	Limestone grinding system

ပုံ (၉) : MCL စက်ရုံတွင် ဖုန်မှုန့် ထုတ်လွှတ်ခြင်းကို ထိန်းချုပ်ရန် တပ်ဆင်ထားမှုများ

၄.၂။ အသံဆူညံခြင်း ထိန်းချုပ်မှု

အသံဆူညံနှုန်းနည်းသော စက်ပစ္စည်းများကို ဦးစားပေးတပ်ဆင်ထားပြီး ပတ်ရာလည်နေသော စက်များနှင့် ကိရိယာများတွင် အသံလုံသော အဖုံးအကာ များတပ်ဆင်ခြင်း သို့မဟုတ် အသံကာပစ္စည်းများကို တပ်ဆင်သုံးစွဲ သင့်ပြီး FD ပန်ကာရေလက်ကြားများ၊ ဘွိုင်လာစက်နှိုးခြင်း နှင့် ရေနွေးငွေ့စက်များတွင် ပန်းကျင်ဆူညံမှုကို ထိန်းချုပ် ရန် အသံတိတ်ပစ္စည်းများကို တပ်ဆင်အသုံးပြုထားပါသည်။



က) အသံတိတ်စနစ်တပ်ဆင်ထားသောလေပန်ကာ ခ) အသံတိတ်စနစ်တပ်ဆင်ထားသော ရေနွေးငွေ့စက် ပုံ (၁၀) : MCL စက်ရုံတွင် အသံဆူညံထုတ်လွှတ်ခြင်းကို ထိန်းချုပ်ရန် တပ်ဆင်ထားမှုများ

၄.၃။ ပြာနှင့်သတ္တုချေး (Ash & Slag) များကို ဖယ်ရှားသော စနစ်

ဘွိုင်လာမှထွက်သော ပြာနှင့်သတ္တုချေးများကို ဘိလပ်မြေထုတ်လုပ်သည့်အထဲတွင် အလုံး စုံထည့်၍ အသုံးပြုနိုင်ပါသည်။ ဖိအားသုံးရွေ့လျားပန့်စနစ်ကို အသုံးပြုကာ ပြာကိုဖယ်ရှားပါ သည်။ ပြာမှုန်များကို bag filter ဖြင့်ဖမ်းယူပြီး သိုလှောင်ရုံ (silo) ထဲသို့ လေဖိအားသုံးရွေ့လျားပန့်များဖြင့် စုပ်ထုတ်ပေးပို့ပါသည်။ ထို့နောက် ဘိလပ်မြေစက်ရုံသို့ ကားများဖြင့်ပို့ကာ အကုန်လုံးကို သုံးစွဲပါသည်။ Ash silo ကို ကွန်ကရိ ဖြင့်တည်ဆောက်ထားပြီး ၄ပဂ ကုဗမီတာအထိ ပင်ဆန့်ပြီး တစ်နာရီ တန် ၉၀ ကျသော ဘွိုင်လာ ၂ လုံးမှ (၇) ရက်တိုင်တိုင် ထွက်ရှိသောပြာများကို သိုလှောင်ထားနိုင်ပါသည်။

ဘွိုင်လာသတ္ထုချေးကို အအေးခံသတ္ထုချေးဖယ်ရှားစက်များဖြင့်ဖယ်ရှားပြီး အအေးခံအခြောက်ခံပြီး ချေမွ စက် နံပတ် (၁) နှင့် (၂) ထဲသို့ ပို့ပေးရပါသည်။ ထို့နောက် သတ္ထုချေးသိုလှောင်ရာအခန်းသို့ ပို့ပြီး ဘိလပ်မြေ စက်ရုံတွင် ထည့်သုံးရန် ယာဉ်များဖြင့်ပို့ဆောင်ရပါသည်။ **slag silo** ကို စတီးလ်ဖြင့် ပြုလုပ် ထားပြီး ၂၀၀ ကုဗမီတာ အထိဂင်ဆန့်ပြီး တစ်နာရီ တန် ၉၀ ကျသော ဘွိုင်လာ ၂ လုံးမှ (၃) ရက်တိုင်တိုင် ထွက်ရှိသော သတ္တုချေးများကို သိုလှောင်ထားနိုင်ပါသည်။



ပုံ (၁၁) : MCL စက်ရုံတွင် ပြာနှင့် သတ္တုချေးထုတ်လွှတ်ခြင်းကို ထိန်းချုပ်ရန် တပ်ဆင်ထားမှုများ

၄.၄။ ရေအသုံးပြုမှု

လအလိုက်ရေအသုံးပြုမှု အမာက ကို ဇယား ၄ တွင်ဖော်ပြထားပါသည်။ **ဇယား ၂: လအလိုက် ရေအသုံးပြုမှု**

Month	Amount of Water Utilization			
Jan				
Feb	Actual need to fill water for 5 months (Jan, Feb, Mar, April, May)			
March				
April				
May				
June				
July	During Raining Season (June, July, August, Sep) (No need to fill up water)			
Aug				
Sep				
Oct	Enough reserve water from Pond #1 for Oct and Nov			
Nov				
Dec	Reserve water from Pond #2 (capacity): 150,000 m3. Can use for for about 17 days in December.			
ကစ်နှစ်ကာ	စာပေါင်းအသုံးပြုသော ရ လအတွက် အတွင် မြစ်မှု မြစ်ရေစက်လအသုံးပြုမှုမှာ ၃ မြေပေလ တဗမီတာ			

တစ်နှစ်တာ စုစုပေါင်းအသုံးပြုသော ၅ လအတွက် အထ္ထရံ မြစ်မှ မြစ်ရေစုတ်ယူအသုံးပြုမှုမှာ ၁၂၉၆၀၀၀ ကုဗမီတာ ဖြစ်ပါသည်။

၄.၅။ ရေဆိုးထုတ်လွှတ်မှု နှင့်ထိန်းချုပ်ခြင်း

ရေဆိုးထုတ်လွှတ်မှုမှာ လည်ပတ်စဉ်ကာလ စက်ပစ္စည်းများကို အအေးခံရန်အတွက်အသုံးပြုခြင်း လုပ်ငန်း စဉ်များမှသာ (e.g. bearings, kiln rings) ထွက်ရှိခြင်းမှာ MCL စီမံကိန်းသည် ဘိလပ်မြေ အခြောက် ထုတ်လုပ်ခြင်း နည်းလမ်း ကိုအသုံးပြုသောကြောင့် ဖြစ်ပါသည်။ လည်ပတ်စဉ်အချို့သော အအေးခံ အ ဆင့်များ မှထွက်ရှိသော ရေဆိုးများတွင် pH နှင့် suspended solids များ မြင့်မားနေပါသည်။ သို့သော်ငြားလည်း ရေကို ထပ်ခါတလဲလဲ ပြန်လည်လည်ပတ်အသုံးပြုခြင်း စနစ်ကို အသုံးပြုထား သောကြောင့် ဘိလပ်မြေစက်ရုံမှ စွန့်ထုတ်လိုက်သော ရေဆိုးများအားလုံးမှာ အအေးခံခြင်း လုပ်ငန်းစဉ်အ တွက် သင့်လျော်စွာ ပြန်လည် အသုံးပြုထားသော ကြောင့် မြေပေါ် ရေနှင့်မြေအောက်ရေအရင်းအမြစ်များ ထဲသို့ ရေဆိုးစွန့်ထုတ်မှု လုံးပမရှိတော့ပါ။ ရေကိုထပ်ခါ တလဲလဲ ပြန်လည်အသုံးပြုခြင်း စနစ်ကို အောက်တွင် ဖော်ပြထားပါသည်။



ပုံ (၁၂)။ MCL စက်ရုံ၏ ရေကိုထပ်ခါတလဲလဲအသုံးပြုခြင်းစနစ်

၄.၅.၁။ ရေထဲမှ ဓာတ်သတ္ထုဖယ်ရှားသန့် စင်သော စနစ်

ဘွိုင်လာတွင် အသုံးပြုမည့်ရေကို RO+EDI နည်းလမ်း ၂ ဆင့်ဖြင့် သတ္တုဆားများ ဖယ်ရှားခြင်း စနစ်ကို အသုံးပြုကာ စက်ကိရိယာတန်ဆာပလာများကို ထိန်းသိမ်းရန် နှင့် စနစ်တကျ လုပ်ဆောင်နိုင်စွမ်းအား တစ်နာ ရီ တန် ၄၀ (2*20t/h) ကျရန်အတွက် ရေအရည်အသွေး လက္ခကာရပ်များလိုအပ်ချက် ပြည့်မီစေရန် စနစ်တကျ ကိုင်တွယ်တွက်ချက်ကာ လုပ်ဆောင်ပါသည်။



ပုံ (၁၃) : **Demineralized Water Treatment Unit**

၄.၅.၂။ ရေကိုထပ်ခါတလဲလဲအအေးခံအသုံးပြုခြင်းစနစ်

စက်ပစ္စည်းများ လေပင်လေထွက်ကောင်းမွန်စေရန် (သံချေးမတက်စေရန်) ရေကို အဖုံးဖွင့် ထပ်ခါတ လဲလဲလည်ပတ်စေသောစနစ်သည် ရေကို ထပ်ခါတလဲလဲအအေးခံခြင်းစနစ်အတွက် FRP (Glass Fiber Reinforced Plastics) စနစ်ကို အသုံးပြုထားပါသည်။ လေပင်လေထွက်ကောင်းမွန်စေရန် အအေးခံ စနစ် မျှော် စင်များသည် တစ်နာရီ ဥပပပ ကုဗမီတာရှိ မျှော်စင် ၄ စင်တပ်ဆင်ထားပြီး ရေကို စုစုပေါင်း တစ်နာရီ ၁၂ပပပ ကုဗမီတာထိ အအေးခံထားနိုင်ပြီး အပူချိန်ခြားနားမှုမှာ ၁၀ ဒီဂရီစင်တီဂရိတ် ရှိပြီး ရေစုပ်စက် ၅ လုံးမှာ တစ်နာ ရီ ၃၁၇၀ ကုဗမီတာ၊ ပ.၂၂ MPa၊ ၂၅၀ ကီလိုပပ်၊ ၁၀ ကီလိုဗို့ရှိပြီး ၄ လုံး မှာတစ်ပြိုင်နက်တည်း လည်ပတ်နေပြီး တစ်လုံးမှာ ပျက်လျင်အစားထိုးရန် အရန်သင့် ဆောင်ထားပါ သည်။



Pretreatment

Cooling Tower

ပုံ (၁၄) : MCL စက်ရုံရှိ ရေသန့် စင်သည့်စနစ်များ MCL ၏ ပတ်ဂန်းကျင်ညစ်ညမ်းမှု သက်သာလျော့ပါးစေရေးနှင့် ကြီးကြပ်ကွပ်ကဲမှု အစီအစဉ် வ

စီမံကိန်းဧရိယာအတွင်းတွင် လေ့လာတွေ့ရှိချက်များအရ ဘိလပ်မြေစက်ရုံလုပ်ငန်းများနှင့် ဆက်စပ် လုပ် ငန်းများအတွက် တည်ရှိသောအပင်နှင့် သတ္တဝါများတွင် ရှားပါးအန္တရာယ်ကျရောက်မည့် မျိုးစိတ်များ မရှိ သဖြင့် မည်သည့်ဂေဟစနစ်ဆိုင်ရာသက်ရှိပစ္စည်းကိုမျှ ထိန်းသိမ်းဆောင်ရွက်ရမည့် အစီအစဉ် မလိုအပ်ပါ။ ထို့ပြင် MCL စီမံကိန်းဧရိယာသည် ရှေးဟောင်းသမိုင်းပင်ဘာသာရေးနယ် မြေများနှင့် ပေးကွာပြီး အနီးပန်း ကျင်၌လည်း မည်သည့်ရှေးဟောင်းယဉ်ကျေးမှု အမွေအနစ်ပစ္စည်းကိုမှု ရှာဖွေတွေ့ ရှိမူလည်း မရှိပါ။

MCL တွင် အဆိုပြုထားသော စီမံကိန်းဓရိယာအတွင်း ပတ်ပန်းကျင်ကာကွယ်ရေးလုပ်ငန်းများကို ပတ်ပန်း ကျင်စီမံခန့်ခွဲခြင်း အစီအမံများအတိုင်းအပြည့်အပအကောင်အထည်ဖော်ဆောင်ရွက်ကာ ဖွံ့ဖြိုးတိုး တက်စေရန် ခံပန်ကတိပြုထားပြီး လုပ်ငန်းဆောင်ရွက်စဉ်နှင့် လည်ပတ်စဉ်ကာလတွင် ပတ်ပန်းကျင် အပေါ် ထိခိုက်သက်ရောက်မှုများကို လျော့နည်းစေ၍ ကောင်းကျိုးများကို ပိုမိုတိုးတက်များပြားစေရန် သင့်တော် သည့် နည်းလမ်းများကို အသုံးပြုကာ ဆောင်ရွက်သွားမည် ဖြစ်ပါသည်။

ပတ်ပန်းကျင်ကာကွယ်စောင့်ရှောက်ရေးမှာ MCL ဘိလပ်မြေစက်ရုံစီမံကိန်းဧရိယာအတွက် အဓိက လိုအပ်ချက်တစ်ခုဖြစ်ပါသည်။ ကုမ္ပကီမှ ချမှတ်ထားသော ပတ်ပန်းကျင်ကာကွယ်စောင့်ရှောက်ရေးမူဝါဒ နှင့် အကြံပြုတင်ပြထားသော နိုင်ငံတကာစံနှုန်းများနှင့်အညီ လုပ်ကိုင်ဆောင်ရွက်ချက်များနှင့် ကိုက်ညီမှု ရှိစေရန်အတွက် စီမံကိန်းအကောင်အထည်ဖော်ဆောင်ရွက်ရသည့် အဆင့်တိုင်း အဆင့်တိုင်း၌ အစီအ စဉ်ကို စနစ် တကျ ချမှတ်ကာ လျော့ပါးသက်သာစေရေးအတွက် ထိန်းချုပ်စီမံသွားရမည် ဖြစ်ပါသည်။

၏အဓိကရည်မှန်းချက်မှာ ကနဦးပတ်ဂန်းကျင်အပေါ် ထိခိုက်သက်ရောက်မှုများကို EMP ဆန်းစစ်ခြင်း လုပ်ငန်းဆောင်ရွက်စဉ်ကတည်းက အကျိုးရှိထိရောက်သော ထိန်းသိမ်းစီမံကွပ်ကဲမှုနှင့် ကြီး ကြပ်ကွပ်ကဲမှု လုပ်ငန်းစဉ်များချမှတ်ကာ နည်းစနစ်တကျဖြင့် သက်သာလျော့ပါးစေရေးလုပ်ငန်းများကို ဆောင်ရွက်ထား စေရန်နှင့် ပတ်ပန်းကျင်နှင့်လူမှုရေးထိခိုက်သက်ရောက်မှု ထိုသို့လုပ်ဆောင်မှသာ ဆိုးကျိုးများကို အကိူး ရှိစွာ လျော့ချထိန်းသိမ်းပေးနိုင်စေရေးအတွက် ချမှတ်ထားသော အထောက်အကူပြုအစီအစဉ် တစ်ခု ဖြစ်လာ ပါမည်။ ထို EMP အစီအစဉ်သည် ဖြစ်လာနိုင်သော ပျက်စီးဆုံးရှုံးမှုများကို ရှောင်ရှားနိုင်ခြင်း၊ ဖြစ်သင့် ဖြစ်ထိုက်သည်ကို ကျခံသုံးစွဲခြင်း နှင့် ပြည်သူလူထု၏ အတွေးအမြင်နှင့် မဆန့်ကျင်ပဲ လိုက်လျော ညီထွေဖြစ်အောင် ဆောင်ရွက် စေခြင်းဖြင့် MCL အား ၎င်းင်းတို့ရည်မှန်းထားသော ပတ်ဂန်းကျင် နှင့် လူမှုဆက်ဆံရေးတွင် အောင်မြင်မှု ပန်းတိုင်ကို ရောက်ရှိစေရန် အထောက်အကူဖြစ်စေမည် ဖြစ်ပါသည်။ ထို့အပြင် ဤအစီအ စဉ်အားဖြင့် စီမံကိန်း ၏ ကောင်းကိူးများ ပိုမိုတိုးတက်လာစေခြင်း၊ အမိနိုင်ငံမှ ချမှတ်ထားသော မူဘောင်အတွင်း အံပင်ခွင်ကျရှိခြင်း နှင့် စက်ရုံလုပ်ငန်းများနှင့်သက်ဆိုင်သော နိုင်ငံတကာမှ အကောင်းဆုံးနည်းလမ်းများကို စံပြုအတုယူကာ လိုက်နာ ဆောင်ရွက်စေခြင်း စသည်တို့ဖြစ်ပေါ် လာနိုင်စေရန်အထောက်အကူ ပြုပါလိမ့်မည်။

်ဤပတိပန်းကျင်ထိန်းသိမ်းရေးစီမံကွပ်ကဲမှုအစီအစဉ်တွင် သင့်လျော်ပြီး အကျိုးဖြစ်ထွန်းစေမည့် စီမံ ဆောင်ရွက်ချက်များနှင့် လျော့ပါးသက်သာစေရေး နည်းလမ်းများပါပင်ခြင်းကြောင့် ထိခိုက်သက် ရောက်မှု များဆန်းစစ်ခြင်းဆိုင်ရာ အခန်းကဏ္ဍတွင် သတ်မှတ်ဖော်ပြထားသော ပတ်ပန်းကျင်နှင့် လူမှုရေးရာ ထိခိုက်သက် ရောက်မှုများကို လျော့ပါးသက်သာစေပါသည်။ ထို့အပြင် ဤအစီရင်ခံစာတွင် ပတ်ပန်းကျင်ကာကွယ်ထိန်းသိမ်း ရေး နည်းစနစ်လုပ်ငန်းစဉ်များကိုပါ စီမံကိန်းထဲသို့ တစ်ပါတည်းထည့် သွင်းထားပါ သည်။

်ဆောက်လုပ်ရေးနှင့် လည်ပတ်စဉ်ကာလတွင် အဆိုပြု စီမံကိန်းမှ သက်ရှိပန်းကျင်၊ ပြင်ပရုပ်ပတ္ထု ပန်းကျင်နှင့် လူသားပန်းကျင်များသို့ ထိပါးလာနိုင်ဖွယ်ရှိသောအရိပ်လက္ခဏာများကို အောက်ပါအတိုင်း ဖော်ပြအပ်ပါ သည်။

- ရေနေကုန်းနေ ဇီပမျိုးကွဲစုံများ
- လေအရည်အသွေး
- ရေအရည်အသွေး
- အသံဆူညံမှု နှင့်တုန်ခါမှု
- အမှိုက်များကို စီမံဆောင်ရွက်မှု
- ရှုခင်းနှင့် မြင်ကွင်းအလှအပေါ် တွင် ထိခိုက်မှု
- ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းမှု
- လူမှုရေးရာ ရောယှက်ရှုပ်ထွေးလာမှု

ဤအစီရင်ခံစာကို အမြဲပြင်ဆင်ဖြည့်စွက်ဆောင်ရွက်ပေးပါမည်။ စီမံကိန်း လက်တွေ့ဆောင်ရွက်နေစဉ် အတွင်း ဤအစီရင်ခံစာတွင် ဖော်ပြထားသောလုပ်ငန်းစဉ်များ၌ အပြောင်းအလဲတစ်စုံတစ်ရာရှိခဲ့ပါက ထို ပြောင်းလဲမှုနှင့် လိုက်လျောညီထွေဖြစ်စေရန် လိုအပ်ပါက သင့်လျော်သော ပြန်လည်စိစစ်သုံးသပ်ခြင်း၊ ဖြည့်စွက်ပြင်ဆင်ခြင်း နှင့် ပြုပြင်မွမ်းမံခြင်း အစရှိသည်တို့ကို စဉ်ဆက်မပြတ်ဆောင်ရွက်သွားပါမည်။

၅.၁။ အခန်းကဣာအလိုက်တာဂန်ယူမှုများ

ဤအစီရင်ခံစာ၏ပိုင်ရှင်ဖြစ်သည်အားလျော်စွာ MCL သည် ဤအစီရင်ခံစာအတိုင်း ဇွံ့ဖြိုးတိုးတက် စေရန် ပြန်လည်စိစစ်သုံးသပ်ခြင်း၊ ပြင်ဆင်ဖြည့်စွက်ခြင်း၊ ပြုပြင်မွှမ်းမံခြင်းနှင့် အကျိုးရှိစေသော အကောင်အထည်ဖော် ဆောင်ချက်များအပပကို လုံးပဉဿုံ တာပန်ယူပါမည်။ အကယ်၍ လျော့ပါးသက်သာစေရေး နည်း လမ်းများသည် ချမှတ်ထားသော မူဝါဒ လမ်းစဉ်များနှင့် မကိုက်ညီပါက ပြည့်ပစွာကျေနပ်မှု ရရှိစေ သည်အထိ လိုအပ်သလို ပြန်လည် ပြင်ဆင်ဆောင်ရွက်ပေးပါမည်။

ပတ်ဂန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ အကောင်အထည်ဖော်ဆောင်ရွက်ရန်အတွက် တာဂန်ဂတ္တရား များကို SCG ၏ စီမံဆောင်ရွက်မှုနှင့်အတူ ဖြစ်စေရပါမည်။ ထိုစီမံဆောင်ရွက်မှုများမှာလည်း ဤအစီရင်ခံစာတွင် ဖော်ပြထား သော ကတိကဂတ်များအတိုင်း တာဂန်ယူဆောင်ရွက်စေပါမည်။

ပတ်ပန်းကျင်ထိန်းသိမ်းရေး စီမံဆောင်ရွက်မှု အစီအစဉ်များကို စဉ်ဆက်မပြတ်ကြီးကြပ်ကွပ်ကဲခြင်း မှ စီမံကွပ်ကဲမှု လိုအပ်သည်ဟု ယူဆနိုင်ကြောင့် ရှာဖွေတွေ့ရှိချက်များအား အချိန်နှင့် တစ်ပြေးညီ စိစစ်သုံးသပ်ပါ မည်။ လေ့လာချက်ရလာဒ်အပေါ် အခြေခံ၍ မှားယွင်းလွဲချော်မှုများကို အမှန်အကန်ဖြစ်စေရန်နှင့် ပတ်ပန်းကျင် ထိန်းသိမ်းရေးစနစ်ကို စဉ်ဆက်မပြတ်တိုးတက်နေစေရန် မှန်ကန်သင့်မြတ်သော လုပ်ဆောင်ချက်နည်းစနစ်များကို သတ်သတ်မှတ်မှတ်လုပ်ဆောင်စေရေးအတွက် အတည်တကျဖြစ်နေစေ ရန် စီမံကွပ်ကဲ သွားပါမည်။

၅.၂။ ကုန်းနေသတ္တဝါများ

ဆောက်လုပ်ရေးလုပ်ငန်းကာလတွင် ဆောက်လုပ်ရေး ဧရိယာအတွင်းရှိသော သဘာပပေါက်ပင် များနှင့် အလေ့ကျအပင်များအား နေရာရှင်းလင်းရေးအတွက် ဖယ်ရှားရှင်းထုတ်ပစ်ရမည် ဖြစ်ပါသည်။ ဒေသရင်းအပင် နှင့် သတ္တဝါမျိုးစိပ်များကို မထိခိုက်စေရန် အောက်ပါလျော့ပါးသက်သာစေရေးနည်းလမ်းများကို လိုအပ်သလို လိုက်နာ ဆောင်ရွက်သင့်ပါသည်။

၅.၃။ အကြိုဆောက်လုပ်ရေးကာလ

- ဆောက်လုပ်ရေးလုပ်ငန်းကတိပန်ခံချက်များကို ခွင့်ပြုမိန့် မကျခင်တည်းက ရယူထားခြင်း
- သဘာပပေါက်ပင်နှင့် အလေ့ကျအပင်များကို ဆုံးရှုံးမှုလျော့နည်းစေရန် ရှင်းလင်းမည့်နေရာအား နယ်နိမိတ်သတ်မှတ်ကာ ဘောင်စတ်ထားခြင်း
- မလိုအပ်ပဲ သစ်ပင်များခုတ်လှဲမှုကို ရှောင်ကြဉ်ရမည်။
- ဒေသရင်းဇီပမျိုးစုံမျိုးကွဲများအား ထိန်းသိမ်းရန် ပတ်ပန်းကျင် ဆိုင်ရာအသိပညာပေးသင်တန်းများ ကို အလုပ်သမားအားလုံးအား ပေးထားရမည်ဖြစ်ပြီး စီမံကိန်းဧရိယာ၏ အထိမခံပျက်စီးလွယ်သော သဘောသ ဘာဂများကို သိရှိစေရန် လုပ်ငန်းခွင်ဂင်သင်တန်းပေးခြင်း
- အပင်နှင့်တောရိုင်းတိရစ္ဆာန်များကို ခွဲခြားသတ်မှတ်ရန်နှင့် နေရာရွှေ့ပေး ရေးအတွက် လိုအပ်ပါက လုပ်ငန်းခွင်အတွက်သတ်မှတ်ထားသော ညွှန်ကြားချက်များ၊ကျင့်ပတ်စည်းကမ်းများအား ရုပ်ပုံကား ချပ်များပါပင်သော အသိပညာပေး သင်ထောက်ကူပစ္စည်းများကို အသုံးပြုကာ အလုပ်သမားအားလုံးကို သင်ကြားပေးရပါမည်။

၅,၄။ ဆောက်လုပ်ရေးကာလ

- ဒေသရင်းတော်ရိုင်းတိရစ္ဆာန်များအား ဆောက်လုပ်ရေးလုပ်ငန်းများကြောင့် ရည်ရွယ်ချက်ရှိရှိ ထိ ခိုက်စေခြင်းမျိုးမရှိရပါ။
- နေ့ ဘက်တွင် လုပ်ကိုင်နိုင်သော လုပ်ငန်းတာပန်များအား ညဘက်တွင် လုပ်ကိုင်ခြင်းကို ရှောင်ရှား သင့်ပါသည်။
- သတ်မှတ်ထားသည့် စီမံကိန်းနေရာနယ်နိမိတ်အား မလိုလားအပ်သော အလေ့ကျအပင် နှင့်သဘာ () ပေါက်ပင်ရှင်းလင်းခုတ်ထွင်မှုများမရှိရအောင် ပုံမှန်စစ်ဆေးသင့်ပါ သည်။

- ဒေသရင်းတောရိုင်းတိရစ္ဆာန်များအား ၎င်းတို့နေထိုင်ရာ သဘာပနှင့်ကိုက်ညီတူညီမှုရှိသော နေရာ များသို့ ပြောင်းရွှေ့ပေးရမည်။
- တောရိုင်းတိရစ္ဆာန်များ၏ ဝိသေသလက္ခဏာရပ်များကို နေရာရှင်းလင်းရေးမပြုလုပ်ခင်ကတည်းက လေ့လာစိစစ်ထားပြီး ၎င်းတို့နေထိုင်ရာ သဘာပနှင့်ကိုက်ညီတူညီမှုရှိသော အနီးဆုံးနေရာသို့ ပြောင်းရွှေ့ပေးနိုင်ရန် သတ်မှတ်ဆောင်ရွက်ရမည်။
- အရည်အချင်းပြည့်မီသော ပတ်ပန်းကျင်ပညာရှင်မှ ပတ်ပန်းကျင်စောင့်ကြည့်စစ်ဆေးရေး လုပ်ငန်း ဆောင်ရွက်ချက်များကို ပုံမှန်ကြီးကြပ်ကာ စစ်ဆေးနေရမည်။
- ဆောက်လုပ်ရေးယာဉ်များလှုပ်ရှားဆောင်ရွက်မှုကြောင့် တောရိုင်းတိရစ္ဆာန်များ သေကြေပျက် စီးမှု မရှိစေရန် ယာဉ်မောင်းသူများနှင့် အလုပ်သမားများအားလုံးကို သတိထား လုပ် ဆောင်ကြရန် ညွှန်ကြား ချက်ပေးရမည်။
- ဒေသရင်း တောတိရစ္ဆာန်များအား အမဲလိုက်ခြင်း၊ ဖမ်းယူခြင်းများကို တားမြစ်ရမည်။
- အနည်အနှစ်ထိန်းချုပ်ရေးစံနစ်ကို တည်ဆောက်ရန် မိုးတွင်းအခါသမယတွင် ခြံစည်းရိုး ပင်စိုက် ခြင်း၊ ခြံစတ်ခြင်း အစရှိသည်တို့ကို စီမံကိန်းမှ အသုံးမပြုသော ဂန်းကျင်နေရာဒေသများသို့ အနည်များပျံ့ နံ့ခြင်းမရှိစေရန် ရှောင်ကြည်ခြင်း
- နည်းပညာအရ လက်တွေ့ဖြစ်မြောက်နိုင်စွမ်းရှိသာနေရာများတွင် စီမံကိန်း၏ ဆောက်လုပ်ရေးကာ လအတွင်း အပင်သစ်များကို ကြိုတင်စိုက်ပျိုးထားရပါမည်။ စီမံကိန်းနယ်နိမိတ်တွင် အပင်မျိုးများ ပြန် လည်ပြုစုပျိုးထောင်ရာတွင် ဒေသရင်းမျိုးစိတ်များကိုသာ အသုံးပြုရမည်ဖြစ်ပြီး နိုင်ငံခြား တိုင်းတပါးမှ လာသော မျိုးစိတ်များကို လုံးဂစိုက်ပျိုးခွင့်မပြုရပါ။
- ယာယီသတ်မှတ်ထားသော လုပ်ငန်းခွင်နေရာတွင် လုပ်ကိုင်ဆောင်ရွက်ပြီးစီးပါက သစ်ပင်များ၊ ချုံပုပ် များ၊ မြက်ပင်များ အစရှိသည်တို့ကို ပြန်လည် နေရာချထားပေးခဲ့ရပါမည်။

၅.၅။ လည်ပတ်စဉ်ကာလ

- ပတ်ပန်းကျင်ထိန်းသိမ်းရေးစနစ် ကြီးကြပ်ဆောင်ရွက်မှုများကို အကောင်အထည်ဖော်လုပ် ကိုင်ခြင်း ကို ဆက်လက်လုပ်ဆောင်ရန်နှင့် ထိန်းသိမ်းထားရန်
- သတ်မှတ်ထားသော စိမ်းစိုဓရိယာကို ဆက်လက်ဖွံ့ဖြိုးတိုးတက်အောင် ဆောင်ရွက်ခြင်း
- စက်ကိရိယာများကို အသုံးမပြုသည့်အချိန်တွင် ပိတ်ထားရမည်။
- မလိုလားအပ်သော အသံဆူညံထုတ်လွှတ်နေသော စက်ပစ္စည်း ကိရိယာများကို သတ်မှတ်အချိန်အ တိုင်း ပုံမှန်စစ်ဆေးမှုများ ပြုလုပ်ပေးရမည်။
- အသံဆူညံမှုနည်းသော စက်အင်ဂျင်များနှင့် အသံကာပစ္စည်းများ၊ အသံတိတ်ပစ္စည်းများကို အသုံးပြု ရမည်။
- အသံထုတ်လွှတ်မှုကို လမ်းညွှန်သတ်မှတ်ချက်များ (ယေဘူယျ ထုတ်လွှတ်မှု လမ်းညွှန်ချက်များ <
 အဆောက်အဦးများမှထုတ်လွှတ်မှုကို 85 dB(A), Impulse < 115 db(A) from 1.5 m distance, 85
 dB(A) နှင့် စက်ရုံလည်ပတ်စဉ်ကာလ စက်ရုံနယ်နိ မိတ်များမှ 70 db(A)) အတိုင်း
 ထိန်းသိမ်းဆောင်ရွက်ရမည်။
- အလုပ်သမားများအား သင့်လျော်သော နားကြပ်များ၊ နားကာပစ္စည်းများထောက်ပံ့ပေးထားပြီး
 အသံဆူညံသော နေရာများတွင် အလုပ်လုပ်ရပါက မဖြစ်မနေ တပ်ဆင်ထားရန် ညွှန်ကြားထားရ မည်။
- အသံဆူညံမှု လျော့ပါးရေး နည်းလမ်းများကို သိရှိနားလည်ရန် အလုပ်သမားများအား သင့်လျော် သော သင်တန်းများပေးရမည်။
- ကုန်ကြမ်းပစ္စည်းများနှင့် ကုန်ချောပစ္စည်းများကို တစ်နေရာမှ တစ်နေရာသို့ သယ်ယူပို့ ဆောင်ရာ တွင် လေထုညစ်ညမ်းမှုမရှိစေရန် သေချာစွာ ဖုံးအုပ်ထားရမည်။
၅.၆။ စိမ်းစိုနယ်မြေ ဇွံ့ဖြိုးတိုးတက်ရေး အစီအစဉ်

သက်သာလျော့ပါးစေရေး နည်းလမ်းများတွင် လေထုညစ်ညမ်းမှုလျော့ပါးစေရေးတွင် အသံကာအရံအ တားအဖြစ်လည်း လုပ်ဆောင်နိုင်သော စိမ်းစိုနယ်မြေ ဖွံ့ဖြိုးတိုးတက်ရေး အစီအစဉ်ကို စီမံကိန်း ဧရိယာ အတွင်းတွင် တည်ဆောက်ထားရမည်။

ဤအပင်များစိုက်ပျိုးရန် သတ်မှတ်ထားသောနေရာများမှာ စီမံကိန်းနယ်နိမိတ်တစ်လျှောက်၊ လမ်း ဘေးဝဲယာများ၊ မြေလွတ်များ နှင့် အခြားအဆောက်အဉီများဆောက်လုပ်ရန် လျာထားချက် မရှိသော နေရာများတွင် ဖြစ်ရမည်။

အပင်မျိုးစိတ်များကိုရွေးချယ်ရာတွင် ဖြစ်နိုင်ပါက အမြဲစိမ်းလန်းနေသော ဒေသရင်းအပင်မျိုးစိတ် များကိုသာ စိုက်ပျိုးရမည်။

ကြားခံနယ်မြေသာလျှင်မကပဲ အခြားဖြစ်နိုင်သော အမြဲတစေလွတ်နေသော နေရာများတွင် မြင်ကွင်း လှပစေသော၊ အသီးသီးသော၊ ကျေးငှက်သာရကာများ နားခိုနိုင်သော အပင်မျိုးစိတ်များကို စိုက်ပျိုးရပါမည်။ သစ်ပင် စိုက်ပျိုးမှု အစီအစဉ်ကို အကောင်အထည်ဖော်ဆောင်ရွက်ခြင်းဖြင့် အသံဆူညံမှုနှင့် ဖုန်မှုန့်ထုတ်လွှတ်မှုကို လျော့နည်းစေပါသည်။ ထို့အပြင် စီမံကိန်းဧရိယာကို အနီးအနားရှိရွာများ နှင့် အလုပ်သမားများအတွက် အပန်း ဖြေနေရာ ပန်းခြံအဖြစ်ပင် ပြောင်းလဲသက်ရောက်စေပါသည်။



Issues	Mitigation Measure	Monitoring Program					
Water Stormwater runoff Surface water Groundwater	 Flood management : Drainage system Water reservoir (Internal use) Re-circulate cooling water 	 Surface water monitoring Groundwater monitoring Baseline data gathering 					
Wastewater (W/W) • W/W from coal stockpile • W/W from Power plant (Backwash water)	 Pavement coal storage area Ensure zero discharge of water from any facility into the surrounding areas Install w/w treatment i.e. grease & oil trap, sedimentation pond 	 Effluent water sampling (All point source discharges) Groundwater boreholes 					

၅.၈။ စက်ရုံတွင်းရှိစွန် ပစ်ပစ္စည်းများ

Issues	Mitigation Measure	Monitoring Program						
Solid wastes • Fly ash • Bottom ash • Gypsum	 Alternative Raw Material in cement process i.e. fly ash, gypsum Ash & Gypsum storage facility → Indoor storage to prevent leachate from rain 	 Fly ash & Gypsum Sampling Quality Control 						
Liquid wastes • Used oil • Chemicals	 Alternative Fuel in cement process i.e. used oil, some chemicals 	 Quality control 						

၅.၉။ စွန့်ပစ်ပစ္စည်းများ စီမံကွပ်ကဲခြင်း

- ရင်းမြစ်ပစ္စည်းများ သုံးစွဲမှုကို လျှော့ချရန် (Reduce, Reuse, Recycle) စသော 3Rs အစီအစဉ်အတိုင်း အတည်ပြုသုံးစွဲရမည်။
- SCG ၏ ZERO waste to landfill မူဝါဒကို လိုက်နာကျင့်သုံးရမည်။
- အမှိုက်စွန့် ပစ်ရေး စီမံကွပ်ကဲမှုတွင် အမှိုက်ကို ခွဲခြားစွန့် ပစ်ခြင်း၊ ထွက်ရှိသမျှ အမှိုက်အားလုံးကို စီမံကာ စွန့်ပစ်ရမည်။
- ဘေးအန္တရာယ်ဖြစ်စေသောပစ္စည်းများကို အမှတ်အသားပြုထားသော အမှိုက်ပုံးများတွင်သာ စွန့်ရမည်။
- ဘေးအန္တရာယ်ဖြစ်စေသောပစ္စည်းများကို သိုလှောင်စွန့်ပစ်ရာတွင် ၎င်းတို့၏ဘေးအန္တရာယ်ဖြစ်စေ သော ဝိသေ သလက္ခဏာရပ်များအပေါ် မူတည်ကာ ဒေသတွင်းနှင့်နိုင်ငံတွင်း သတ်မှတ်ထားသော ညွှန်ကြား ချက်များ၊ စည်းမျဉ်းစည်းကမ်းများအတိုင်း လိုက်နာဆောင်ရွက်ရမည်။
- စွန့်ပစ်ပစ္စည်းများကိုသတ်မှတ်ထားသောနေရာတွင် ခွဲခြားထားပြီး သိုလှောင် သောနေရာမှ အခြားတစ် နေရာ သို့ ဘက်တီးရီးယားပိုးမွှားများ ပျံ့နှံ့မှုမရှိစေရန် အမိုးအကာများဖြင့် ထားရမည်။
- ထရန်စဖော်မာတွင်အသုံးပြုသော ဆီအပါအဂင် အသုံးပြုပြီးသော ဆီများကို ပြန်လည် သုံးစွဲရမည်။
- မီးဘေးကာကွယ်ရေးစနစ်နှင့် တဆင့်ခံထိန်းချုပ်ပစ္စည်းများကို မီးဘေးအန္တရာယ်ကာကွယ်ရန်နှင့် အန္တ ရာယ်ရှိပစ္စည်းများ ယိုစိမ့်ကျမှု မရှိစေရန် အသုံးပြုထားရမည်။
- စွန့်ပစ်ပစ္စည်းအားလုံးကို ဒေသတွင်းသတ်မှတ်ထားသော လိုအပ်ချက်များနှင့်ကိုက်ညီမှု ရှိစေရန်နှင်
 သင့်လျော်သော လိုင်စင်ရှိထားပြီးသောစွန့်ပစ်ပစ္စည်း စွန့်ထုတ်ရန် အင်္ဂါရပ်များနှင့်အညီ စွန့်ပစ်ရပါ မည်။
- စွန့်ပစ်ပစ္စည်းစွန့် ရာနေရာကို သတ်မှတ်ထားပြီး လုပ်ငန်းမလည်ပတ်စဉ်အချိန်ကတည်းက ရိုးရိုးစွန့် ပစ် ပစ္စည်းနှင့် အန္တရာယ်ရှိသောစွန့်ပစ်ပစ္စည်းများအတွက် နေရာကို သတ်သတ် ခွဲထုတ်ကာ သတ်မှတ်ထားရပါမည်။

၆။ လူမှုဆိုင်ရာတာပန်သိလုပ်ငန်းများအစီအစဉ်

6.၁) MCL ၏ လူမှုဆိုင်ရာတာပန်သိလုပ်ငန်းများအစီအစဉ် နှင့် စောင့်ကြပ်ကြည့်ရှုရေးအစီအစဉ်များ

MCL မှ ဆောင်ရွက်လျက်ရှိသော စီမံကိန်း၏ အကျိုးအမြတ်ထဲများထဲမှ ၂ ရာခိုင်နှုန်းသော ပမာ က ကို ဒေသခံပြည်သူအစုအဖွဲ့များ အကျိုးဖြစ်ထွန်းစေရန်အလို့ငှာ အောက်ပါ လုပ်ငန်းဆိုင်ရာများနှင့် လုပ်ဆောင်ရန် စီစဉ်ထားပါသည်။

MCL ၏ တာဂန်သိလူမှုဆိုင်ရာ လုပ်ဆောင်ချက် များ အား SOD အဖွဲ့ မှ အောက်ဖော်ပြပါ အစီအ စဉ်များဖြင့် အကောင်ထည်ဖော်ဆောင်ရွက်မည်ဖြစ်ပါသည်။



၆.၂) MCL မှ လုပ်ဆောင်ရန်ရှိသော CSR အစီအစဉ်များ

၁။ အများပြည်သူ ကျန်းမာရေးနှင့် ဆေးဂါးထောက်ပံ့မှု အစီအစဉ်များ

၂။ MCL စီမံကိန်းအနီးတစ်ဂိုက်ကျေးရွာများတွင် ဆေးပေးခန်း နှင့် ရွေ့လျားကျန်းမာရေးဆိုင်ရာ စောင့် ရှောက်မှု အစီအစဉ်များ

၃။ လူထုအကျိုးပြု လုပ်ငန်းဆောင်တာများဥပမာ၊ စီမံကိန်းအနီးတစ်ပိုက် နေရာများတွင် လမ်း၊ စာသင်ကျောင်း ၊ ဘုရားကျောင်း၊ စေတီ၊ ဘာသာရေးဆိုင်ရာ အဆောက်အဦ၊ အစိုးရရုံး စသည်တို့ကို အထောက်ပံ့များ ပြုလုပ်ရန်၊

၄။ လူငယ်များအား ပညာရေး၊ ကျန်းမာရေး၊ အနုပညာ၊ ကျင့်ပတ်ဆိုင်ရာ၊ သိပ္ပံ နှင့် နည်းပညာ ဆိုင်ရာ စသော အခြေအနေများ တိုးတက်လာစေရန် ကူညီဆောင်ရွက်ပေးရေးအစီအစဉ်များ (ဥပမာ- ပညာသင်ထောက်ပံ့ကြေး ၊ အားကစားကွင်း၊ ပညာရပ်ဆိုင်ရာ လူငယ်တွေ့ဆုံပွဲများ၊ အင်္ဂလိပ်စာ သင်တန်းကျောင်းများ)

၅။ လုပ်ငန်းခွင် ဆိုင်ရာ ဖွံ့ဖြိုးတိုးတက်မှု အစီအစဉ်များ (ဥပမာ- စိုက်ပျိုးမှုဆိုင်ရာ နည်းပညာများပို့ချခြင်း ၊ စီဂမြေဩဇာ ပြုလုပ်ခြင်း၊ အသုံးချခြင်းနှင့်ဆိုင်သော သင်တန်းများ)

မြေကြလ ဂြိုင်ပိုင်မြင်။ အထိုးမျိုမ်းမှာ အငိုးမျိုင်းမှာ သင်ငံနားများ) ၆။ ဒေသခံအစုအဖွဲ့ဆိုင်ရာလုပ်ဆောင်ချက်များ နှင့်ပတ်သက်၍ သက်ဆိုင်ရာအဖွဲ့အစည်းများအား ပူးပေါင်း ပါဂင် လုပ်ကိုင်၍ရသော၊ မည်သူမဆို ပူးပေါင်းပါဂင် ဆောင်ရွက်နိုင်သော အခြေအနေများ ဖန်တီးပေး ရေး

ျပမာ- open-house) ၈။ သင်္ကြန်ကဲ့သို့သော လူအများနှင့်သက်ဆိုင်သော ပွဲများတွင် ပါပင်ကူညီ ထောက်ပံ့ခြင်း။

စ။ သကြနကဲ့သုံ့သော လူအများနှင့်သက်ဆိုင်သော ပွဲများတွင် ဝါဂင်ကူည ထောက်စုံမြင်း။ ယခင်ပြုလုပ်ခဲ့ပြီးဖြစ်သော CSR အစီအစဉ်များကို နောက်ဆက်တွဲ ၉-၁ တွင် ထည့်သွင်းဖော် ပြထားပါသည်။





ပုံ (၁၆)။ ၂၀၁၄ မှ ၂၀၁၈ အတွင်း CSR အတွက်အသုံးပြခဲ့သော ငွေပမာက

၇။ MCL ၏ လူမှုရေးရာ ထိခိုက်ဆန်းစစ်မှု နှင့် ကြီးကြပ်ကွပ်ကဲရေး အစီအစဉ်

အနီးဂန်းကျင်ရှိ ရရှိရင်းစွဲအရာဂတ္ထုများကို ဆန်းစစ်လေ့လာရာတွင် စီမံကိန်းဧရိယာအတွင်းရှိ ပေါက် တော၊ ကော့ဒွန်း၊ ကော့ပနော်၊ နှီးဒုံ၊ ကွမ်ငန်း၊ ကဒုံစိ နှင့် မဲကရိုရွာ စသော ရွာပေါင်း ၇ ရွာမှ ဖြေကြား သူ စုစုပေါင်း ၃၀၀ ကို ထိုသူများအားလုံးမှာ စီမံကိန်းထိခိုက် သက်ရောက်ခံ လူတွေ့မေးမြန်းခဲ့ပါသည်။ ဖရိ ယာအတွင်းမှ ပုဂ္ဂိုလ်များဖြစ်သော်လည်း စီမံကိန်းကြောင့် ရွှေ့ပြောင်းမှု ပြုလုပ်ရန် မလိုအပ်ပါ။ ၎င်းင်းတို့၏ လက်ရှိတည်ရှိနေသော အခြေအနေ အနေအထားများ၊ စီမံကိန်းတည်ဆောက် ခြင်းအပေါ် သဘောထား အမြင်များ နှင့် ထိခိုက်သက် ရောက်နိုင်မှုများကို နားလည်သဘောပေါက်ရန် လူတွေ့မေးမြန်းသူများသည် နည်းစနစ်တကျ ပြင်ဆင်ထားသော စစ်တမ်းကို ပြုစုကာ သတင်းအချက်အလက်များ ကောက်ယူခဲ့ပါသည်။ ထိုစစ်တမ်းတွင် လူတွေ့ဖြေကြားမည့် သူများ၏ အခြေခံအချက်အလက်များ၊ လူမူစီးပွားအခြေအနေများ၊ ပညာရေးနင့် လက်ရှိပတ်ပန်းကျင်ဆိုင်ရာ ပြဿနာများ၊ အဆောက်အဦးနှင့် လူမှုရေးပြဿနာများ၊ စီမံကိန်း အပေါ်ထားရှိသည့် ခံယူချက်များ၊ သဘောထားများ နှင့် စီမံကိန်းဆောင်ရွက်ရာမှ ဖြစ်ပေါ် လာသော ထိခိုက်သက်ရောက်မှုများနှင့်ပတ်သက်၍ လျော့ပါးသက်သာ စေရေးများ ဆောင်ရွက်ထားရှိသည့်အပေါ် သဘောထားအမြင်များစသော အချက်အလက်များစွာကို ထည့်သွင်း မေးမြန်းခဲ့ပါသည်။

စစ်တမ်းကို စီမံကိန်းဧရိယာမှ ၃ ကီလိုမီတာအကွာအပေးအတွင်းရှိ သက်ဆိုင်ရာ ပြည်သူလူထု အ ပေါ်တွင် အဓိကထား၍ ဆောင်ရွက်ခဲ့ပါသည်။ စစ်တမ်းကောက်ယူမည့် ဧရိယာတွင် ရွာပေါင်း ၇ ရွာ ရှိပြီး အောက်ဖော်ပြပါ ပုံနှင့်ဇယားတို့တွင် ဖော်ပြထားပါသည်။



ပုံ (၁၇) : အဆိုပြုထားသော MCL စီမံကိန်းအနီးဝန်းကျင်ရှိ လူနေထိုင်ရာ ကျေးရွာများပြမြေပုံ

No.	Name of Village	Latitude (North)	Longitude (East)
1	Pauktaw	16° 21' 43"	97° 49' 09"
2	Kaw Dun	16° 22' 60"	97° 48' 24"
3	Kaw Pa Naw	16° 23' 12"	97° 48' 40"
4	Hni Don	16° 20' 42"	97° 46' 44''
5	Kwan Nyan	16° 20' 1"	97° 47' 34"
6	Ka Don Sit	16° 20' 43"	97° 50' 44"
7	Me Ko Ro	16° 23' 9"	97° 46' 42''

«ယား (၃) : စီမံကိန်းဧရိယာအတွင်းရှိ ကျေးရွာများ၏ တည်နေရာ

Source: REM Field survey, February 2013

၇.၁။ လူမှုစီးပွားဆိုင်ရာ ထိခိုက်သက်ရောက်မှုများ

ကောက်ယူရဲရှိလာသော သတင်းအချက်အလက်များကို အရေအတွက်အားဖြင့်သော်လည်းကောင်း အရည် အသွေးပေါ် တွင်လည်းကောင်း အခြေခံကာ ဆန်းစစ်အကဲဖြတ်ရာတွင် နည်းပညာရှင်များ၏ နည်းစ နစ်ကျကျ ဆုံးဖြတ် ချက်များနှင့် စီမံကိန်းနှင့် သက်ဆိုင်သူများ၏ ဆွေးနွေးအကြံပြု ပေဖန်ချက်များကို ထည့် သွင်း စဉ်းစားခဲ့ပါ သည်။ သက်ရောက်မှု တစ်ခုချင်းစီ၏ လက္ခဏာရပ်များကို ဆန်းစစ်အကဲဖြတ်ရာတွင် အောက်ပါအချက်အ လက်များကို

ထည့်သွင်းစဉ်းစားခဲ့ပါသည်။

- ထိခိုက်သက်ရောက်မှု၏ သဘောသဘာပ (အကောင်း သို့မဟုတ် အဆိုး)
- ထိခိုက်သက်ရောက်မှု၏ ကြာချိန် ကာလ အပိုင်းအခြား (ယာယ် သို့မဟုတ် တစ်သက်တာ)
- အရေးပါမှု
- ပြင်းထန်မှု
- ထင်ထင်ရှားရှားသက်ရောက်ထိခိုက်မှု

၇.၂။ ပတ်ဝန်းကျင်ဆိုင်ရာနှင့် လူမှုဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှု အစီအစဉ် တည်ဆောက်ပုံ

ပတ်ဝန်းကျင်ဆိုင်ရာနှင့် လူမှုဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီအစဉ် တည်ဆောက်ပုံ စီမံကိန်း ၏ ဆောက်လု ပ်ရေး ကာလနှင့် လည်ပတ်စဉ်ကာလအတွင်း လျော့ပါးသက်သာစေရေး ဆောင်ရွက်ချက်များ အကျဉ်းချုပ် ကို အစီရင်ခံတင်ပြပါမည်။

ဆောက်လုပ်ရေး ကာလ ခန့်မှန်းခြေ၂၄ လအတွင်း ထိခိုက်မှု လျှော့ချရေး နည်းလမ်းများကို နည်းနာ ကောင်းများနှင့် ဆက်စပ် လုပ်ဆောင်သွားမည် ဖြစ်ပြီး လုပ်ငန်းလည်ပတ်ခြင်း ကာလအတွင်း (လေထု ထုတ်လွှတ်မှု နှင့် ဆူညံသံ ထွက်ရှိမှု) ထိခိုက်မှု လျှော့ချရေးနည်းလမ်းများကိုလည်း စီမံကိန်းဒီ ဇိုင်း ရေးဆွဲ သတ်မှတ်ရာတွင် တစ်ပါတည်း ထည့်သွင်း ရေးဆွဲပါမည်။

၇.၃။ စီမံကိန်းနှင့် အဓိကသက်ဆိုင်သူများနှင့် တွေ့ဆုံညိနှိုင်းခြင်းနှင့် အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးမှု လုပ်ငန်းစဉ်များ

စီမံကိန်း အကြောင်းအရာ သတင်းအချက်အလက်များအား ထုတ်ဖော်ချပြခြင်း နှင့် သက်ဆိုင်သူ များနှင့်တွေ့ဆုံညိနှိုင်းခြင်းများကို ပတ်ဂန်းကျင်ဆိုင်ရာထိခိုက်သက်ရောက်မှုများဆန်းစစ်ခြင်းကို လုပ်ဆောင်နေစဉ်အ တွင်းတွင် တစ်ပါတည်း ဆောင်ရွက်ပါမည်။ လူမှုရေးဆိုင်ရာ ထိခိုက်သက်ရောက်မှုများကို ဆန်းစစ် သူအဖွဲ့သည် ပထမအကြိမ်အဖြစ် ၂၀၁၃ ခုနှစ် ဖေဖော်ဝါရီလ ၂၃ ရက်နေ့မှ ၂၆ ရက်နေ့အတွင်း တစ်ကြိမ်၊ ဒုတိယအကြိမ်အဖြစ် ၂၀၁၆ ခုနှစ် ဖေဖော်ဝါရီလ ၇ ရက်မှ ၁၀ ရက်အထိ တစ်ကြိမ်၊ စီမံ ကိန်းဧရိယာသို့ သွားရောက်လေ့ လာ ခဲ့ပါသည်။ ပြုလုပ်ခဲ့သောအစည်းအဝေးအစီအစဉ်များကို အောက်ပါ ဇယားအတိုင်း ပြုစုတင်ပြအပ်ပါသည်။

No.	Date	Name of	Participation	Arranged by					
		Town/Village	•	. ,					
Year	2013								
1.	23.2.2013	Kaw Pa Naw Village	Respondents and	Head of Village Tract					
			REM Co. Ltd.						
		Pauktaw Village							
2.	24.2.2013	Me Ko Ro Village	Respondents and	Head of Village					
		Kwan Nyan Village	REM Co. Ltd.						
		Hni Don Village							
3.	25.2.2013	Ka Don Sit Village	Respondents and	Head of Village					
		Kaw Don Village	REM Co. Ltd.						
4.	25.2.2013	Kyaikmaraw Town	Head of Village Tracts	Administrator, General					
			in Kyaikmaraw	Administrative					
			Township, REM Co.	Department,					
			Ltd., Mawlamyine	Kyaikmaraw Township					
			Cement Limited						
5	26.2.2013	Kyaikmaraw Town	REM Co. Ltd.	GAD Office, Kyaikmaraw					
				Township					
Year	2016								
1.	7.2.2016	Kaw Pa Naw	-Villagers	Kaw Pa Naw Monastery					
2.	7.2.2016	Kaw Dun	-REM Co. Ltd.						
3.	7.2.2016	We Nge							
4.	7.2.2016	Kwan Nyan	-Villagers	Kwan Nyan Monastery					
			-REM Co. Ltd.						

«ယား (၄) : အများပြည်သူနှင့် တွေ့ဆုံပွဲများနှင့် တိုင်ပင်ဆွေးနွေးမှုများ စာရင်း

No.	Date	Name of	Participation	Arranged by						
		Town/Village								
5.	8.2.2016	KaDonSit	-Villagers	KaDonSit Monastery						
6.	8.2.2016	Shwe War Gyaung	-REM Co. Ltd.	Shwe War Gyaung						
				Monastery						
7.	8.2.2016	MeKuRo		MeKuRo Monastery						
8.	10.2.2016	MCL	-REM Co. Ltd.	MCL Meeting Room						
			-MCL (Kyaikmayaw)							

စီမံကိန်းနှင့် သက်ဆိုင်သူများနှင့် ညိနိူင်းဆွေးနွေးစဉ်တွင် ပါဂင်ဆွေးနွေးသူများမှ အောက်ပါအတိုင်း အ ကြံပြ ဆွေးနွေးတင်ပြထားပါသည်။

- ວ. စီမံကိန်းတွင်ပင်ရောက်အလုပ်လုပ်နေသော အလုပ်သမားများအားလစာမြင့်သော ထိုင်းနိုင်ငံ သို့ သွားရောက်အလုပ်လုပ်ကိုင်ခြင်းမှ လျှော့ချနိုင်ရန် လစာကောင်းကောင်းပေးထားရန်။
- ၂. အလုပ်ကို မည်သို့လျှောက်ရမည် ဟူသော သတင်းအချက်အလက်များကို ပေးရန်။
- ၃. အတ္ထရံမြစ်ကို ရေလမ်းသယ်ယူပို့ဆောင်ရေးအတွက် အသုံးပြုမည်ဆိုပါက ငါးဖမ်းလှေများအား ထည့်သွင်းစဉ်းစားပေးရန်။
- ၄. ခြောက်သွေ့ ရာသီတွင် အတ္ထရံမြစ်ရေသုံးစွဲမှုကို ထိန်းသိမ်းရန်။
- ၅. တောင်များကို ထိန်းသိမ်းရန်။
- ၆. ပြည်သူလူထု၏ ယူဆချက် အတွေးအမြင်ကို ရယူရန်။
- ၇. လမ်းပြင်ခြင်းနှင့် လျှပ်စစ်ဓာတ်အားရရှိမှုကို တိုးမြင့်ဆောင်ရွက်ပေးရန်။
- ၈. လျော်ကြေးငွေများပေးရာတွင် လက်ရှိပေါက်စျေးအတိုင်း ငွေပေးချေရန်။
- ၉. စာသင်ကျောင်းများနှင့် ဆရာအင်အားကို ဖြည့်တင်းပေးရန်။
- ၁၀. သောက်ရေအတွက် ရေတွင်းများ တူးဖော်ပေးရန်။
- ၁၁. စီမံကိန်းမှ ဖုန်မှုန့်ထွက်ရှိမှုကို လျှော့ချပေးရန်။
- ၁၂. ဒေသတွင်း ဖွံ့ဖြိုးတိုးတက်ရေးကို အရှိန်အဟုန် မြင့်တင်ရန်။
- ၁၃. ဆေးခန်းများနှင့် ဆေးပေးခန်းများကို တည်ဆောက်ပေးရန်။

ကျေးရွာရှိလူများသည် စီမံကိန်းသည် ကျေးလက်ဒေသနှင့် ဒေသတွင်း ဖွံ့ဖြိုးတိုးတက်မှုအတွက် လက်ခံ သင့်သည်ဟု ယူဆကြပြီး ဖြေဆိုသူများကလည်း စီမံကိန်းသည် တိုင်းပြည် စီးပွားရေးအတွက် အထောက်အကူ ဖြစ် စေလိမ့်မည် ဟု မျှော်လင့်ထားကြပါသည်။

ကျေးလက်ဒေသနှင့် ဒေသတွင်း ဖွံ့ဖြိုးတိုးတက်မှုအတွက် လူထုမှတောင်းဆိုသော အခြေခံလိုအပ် ချက်များမှာ အောက်ပါအတိုင်း ဖြစ်ပါသည်။

- ၁. လမ်းပြင်ပေးရန်
- ၂. ကျန်းမာရေးစောင့်ရှောက်မှုအား အခကြေးငွေ မယူပဲ ပန်ဆောင်မှု ပေးရန်
- ၃. အလုပ်အကိုင်အခွင့်အလမ်းများဖန်တီးပေးရန်
- ၄. စာသင်ကျောင်းဆောင်သစ်များ ဆောက်လုပ်ပေးရန်



၈။ EIA လုပ်ငန်းများကို အကောင်အထည်ဖော် ဆောင်ရွက်မည့် အဖွဲ့ အစည်း

ပုံ (၁၉) :MCL ရေရှည်ဖွံ့ဖြိုးတိုးတက်ရေး စီမံခန့် ခွဲမှုကဏ္ဍ ဖွဲ့စည်းမှု

Role	Responsibility
Top management (Safety and Health Committees	set the policy, rules and regulations for safety
	and environment programs
SOD manager	Management of CSR, Environmental Team,
	Safety Team
CSR team	Communities relation, Government Relation,
	Communities Development programs, Education,
	Religions and other correspondent activities
Environment Team	inbound and outbound monitoring process,
	plantation, waste management
Safety team	employees' and workplace safety such as fire
	safety, workplace safety, vehicles and road safety
Liaison Officer	-To liaise with the different stakeholders from
	government offices, communities and other
	associated organization like consultants, NGOs,
	etc.
	-To receive the grievances/complaints related
	with the project activities via suggestion box, on
	call, email or by person and address and close
	the complaints according with the adequate
	communication and management actions

ဖယား (၅) : MCL အကောင်အထည်ဖော်ဆောင်ရေးအဖွဲ့ ၏ လုပ်ငန်းတာဂန်များနှင့် တာဂန်ယူမှုများ

ဖယား	(၆):	ပတ်ပန်းကျင်ထိန်းသိမ်းရေးအစီအစဉ်နှင့်
	ကုန်ကျစ	ရိတ်များ (လည်ပတ်စဉ်ကာလ)

ကြီးကြပ်ကွပ်ကဲရေးလုပ်ငန်းများအတွက် ခန့်မှန်း

Indicator (Survey item)	Location of Data	Method and	Institution	Annual
	Collection	Frequency		Cost
				(USD)
Construction Phase				
Monitoring EMP	Project area	Daily monitoring and	SOD	14,400
implementation		documenting, and	Department	
□ Mitigation measures		quarterly reporting		
Enhancement				
measures				
□ Contingency				
□ Compensation				
Air quality (NO ₂ , SO ₂ ,	3 locations (same as	Quarterly (March,	Third Party	19,500
CO, TSP, PM ₁₀)	baseline data	July, November)		
	collection locations)			

Noise	4 locations (same as	Quarterly (March,	Third Party	10,755
	baseline data	July, November)		
	collection locations)			
Surface Water Quality	Locations and	Quarterly (March,	Third Party	8,715
Analysis (Parameter	number of samples	July, November)		
are same as IFC	are same as			
standard)	baseline data			
	collection			
Ground Water Quality	Locations and	Quarterly (March,	Third Party	10,455
Analysis (Parameter	number of samples	July, November)		
are same as IFC	are (same as			
standard)	baseline data			
	collection)			
Soil Quality	Locations and	Yearly (March)	Third Party	8,475
	number of samples			
	are (same as			
	baseline data			
	collection)			
Operation Phase	I		1	
Air quality (NO ₂ , SO ₂ ,	3 locations (same as	Quarterly (March,	Third Party	19,500
CO, PM _{2.5} , PM ₁₀)	baseline data	July, November)		
	collection locations)			
(Temperature,	Stack/Chimney	Quarterly (March,	SOD	6,450
Velocity, SO ₂ , SPM,	Monitoring	July, November)	Department	
NOx, HC, CO)				
Noise	4 locations (same as	Quarterly (March,	Third Party	10,755
	baseline data	July, November)		
	collection locations)			
Surface Water Quality	Locations and	Quarterly (March,	Third Party	8,715
Analysis (Parameter	number of samples	July, November)		
are same as IFC	are same as			
standard)	baseline data			
	collection			
Ground Water Quality	Locations and	Quarterly (March,	Third Party	10,455
Analysis (Parameter	number of samples	July, November)		
are same as IFC	are(same as			
standard)	baseline data			
	collection)			
Implementation of Air	Within factory area	Daily monitoring and	SOD	14,440
quality management	(Stack)	quarterly reporting	Department	
plan, Noise				
Management plan,				

Waste management				
Surface water pollution	1 Effluent discharge	Quarterly (March	Third Party	4 250
monitoring (DO_BOD	noint	July November)	Third Farty	1,230
COD Heavy metal	point	Suly, November)		
nH salinity Total				
bardness Nitrate TDS				
TSS Temperature				
etc.)				
Implementation of	Within project area	Regular monitoring	SOD	10,350
Ecosystem		and quarterly	Department or	
Management plan		reporting	Third Party	
Occupational Health	Cement Plant and	Twice per year	SOD	1,250
and Safety	Compound (Work	Record of accidents	Department	
	site and offices)	and infectious		
		diseases		
Community Health and	5 villages nearby	Twice per year	SODDepartment	14,250
Safety	the project sites	Record of accidents		
		and infectious		
		diseases related to		
		the community		
The implementation	5 villages nearby	Once per year	SOD	2
status for CSR activities	the project sites		Department	percent
such as community				of annual
support program				net
				profits
Usage of chemicals	Cement Plant and	Biannually	SOD	4,600
	Compound (Work	Record of the type	Department	
	site and offices)	and quantity of		
		chemicals and		
		implementation		
		status of control		
		measures through		
		self-inspection		

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Tas	Yearly EMP Reporting Schedule																														
k	1	2	3	4	5	6	7	8	9	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	3	3
										0	1	2	3	4	5	6	7	8	Q	0	1	2	З	4	5	6	7	8	9	0	1
Jan																															
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Jul																															
Aug																															
Sep																															
Oct																															
Nov																															
Dec																															

ဇယား (၇) : ကြီးကြပ်ကွပ်ကဲမှု အစီရင်ခံစာတင်ရန် ရည်ရွယ်ထားရှိမှု အချိန်ဇယား

Public Holiday

Target Reporting Period

၉။ လူဦးရေနှင့် လူဦးရေစာရင်း အခြေအနေ ပြောင်းလဲမှု ဖြစ်နိုင်ခြေရှိသည့် သက်ရောက်မှု

မော်လမြိုင် ဘိလ်ပ်မြေစီမံကိန်း တည်ဆောက်ခြင်းအားဖြင့် သက်ရောက်ခံရသည့် ဧရိယာသို့ ပြောင်းရွေ့အခြေချမှုကြောင့် ဖြစ်နိုင်ခြေရှိသည့် အကျိုးသက်ရောက်မှုများမှာ အဓိကအားဖြင့် အလုပ်ရရှိလို သည့် ရည်ရွယ်ချက်ဖြင့် ပြောင်းရွေလာသည့် ဝန်ထမ်းများနှင့် စီမံကိန်းမှ ရရှိနိုင်သည့် ကျန်းမာရေး၊ ပညာရေး နှင့် အခြား လူမှုရေး ဝန်ဆာင်မှုများကြောင့် ဖြစ်နိုင်ပါသည်။

သို့သော်လည်း စီမံကိန်း ဧရိယာသို့ ပြောင်းရွေ့လာသည့် ဝန်ထမ်းဦးရေမှာ ယခင်တည်းကရှိခဲ့သော ဒေသခံ လူဦးရေ အရေအတွက် နှင့်နှိုင်းယှဉ်လျှင် အလွန်းနည်းပါးသည်ဟု ယူဆလျှင် ရပါသည်။ ၄င်း အချက်မှာ ထိုင်းနိုင်ငံတွင် အလုပ်လုပ်ကိုင်နေသည့် များစွာသော ဒေသခံများနေရပ်ပြန်နိုင်သည့် အခွင့် အရေး ရှိမည်ဖြစ်ပြီး တစ်ခြား ဒေသမှ အလုပ်သမားများ ပြောင်းရွေ့မှုမှာ အသေးအဖွဲ မပြောပလောက်ပါ။ ရလာဒ်အရ စီမံကိန်း ပတ်ဝန်းကျင်အနီး နေထိုင်သည့် လူဦးရေ ပြောင်းလဲမှု ရှိနိုင်မည် မဟုတ်ပါ သို့မဟုတ် လူဦးရေ ဖွဲ့စည်းပုံ အခြေ အနေကို သက်ရောက်မှု မရှိနိုင်ပါ။

၁၀။ လမ်းနှင့် သွားလာလှုပ်ရှားမှု အပေါ် ထိခိုက်သက်ရောက်မှု

ဆောက်လုပ်ရေး ကာလအတွင်း ယာဉ်သွားလာမှု ပမာဏ များပြားနိုင်ပါသည်။ အဆိုပြု စီမံကိန်းသို့ သွားရန် ယာဉ်သွားလာမှုမှာ မော်လမြိုင် - ကိူက်မရောလမ်းနှင့် မော်လမြိုင် - ဘားအံလမ်းကို အသုံးပြုမည် ဖြစ်ပါသည်။

ဆောက်လုပ်ရေးနှင့် ဆက်စပ်သည့် ယာဉ်သွားလာမှုမှာ ဒေသခံ လူထု ညွှန်ကြားချက်အရ ဒေသ တွင်းလမ်းများကို များစွာ အသုံးပြုမည် မဟုတ်ပါ။ ယာဉ်သွားလာမှုမှာ ထိခိုက်လွယ်သည့် ဒေသခံလူထုနှင့် တုံ့ပြန်မှု မရှိနိုင်ဟု မှန်းဆရပါသည်။

စီမံကိန်းမှာ ချုံနှင့် သစ်တော ဧရိယာတွင် တည်ရှိပြီး စီမံကိန်း နေရာသို့ အများအားဖြင့် လူများ မလာရောက်နိုင်ပါ။ ထို့အပြင် လူထု သွားလာမှုလမ်းကို ရွေ့ဆိုင်းမည့် စီမံကိန်း လုပ်ငန်းများလည်း မရှိပါ။ စီမံကိန်း သွားလာလှုပ်ရှားမှုကြောင့် ကန့်ကွက်မည့် လူထုလည်း မရှိပါ။ ဆောက်လုပ်ရေး ကာလတွင် အတ္တရံ မြစ်တစ်လျှောက် ရေယာဉ်များကို သယ်ယူပို့ဆောင်ရေးယာဉ်များအဖြစ် အသုံးပြုမည် ဖြစ်သော ကြောင့် လက်ရှိ လမ်းပန်း ဆက်သွယ်မှုကို သက်ရောက်နိုင်မည် မဟုတ်ပါ။

ဆောက်လုပ်ရေးကာလနှင့် လုပ်ငန်းလည်ပတ်သည့် ကာလအတွင်းစီမံကိန်း လုပ်ငန်းများမှ အများ ပြည်သူ အသုံးပြုလမ်းနှင့် သွားလာမှု အပေါ် သက်ရောက်မှုမှာ သေးငယ်သည်ဟု ခန့်မှန်းရပါသည်။

၁၁။ အလုပ်အကိုင်အခွင့်အလမ်း၊ ကျွမ်းကျင်မှု နှင့် စီးပွားရေးပေါ် ဖြစ်ပေါ် လာနိုင်သော သက်ရောက်မှု

စီမံကိန်း သဘောတူညီချက်အရ စီမံကိန်းတွင် ဒေသခံများအားဦးစားပေးခန့်ထားမည်ဖြစ်ပြီး အခြေခံ လုပ်သားအဆင့်နှင့် ကျွမ်းကျင်မှု မလိုအပ်သော လုပ်ငန်းနေရာများအတွက် ခန့်ထားမည်ဖြစ်သည်။

စီမံကိန်း ဧရိယာသို့ ကွင်းဆင်းလေ့လာ၍ ရရှိသော သတင်းအချက်အလက်များအပေါ် မူတည်ပြီး ထုံးကျောက်မိုင်း စီမံကိန်းသည် ဒေသခံလူထုအား အလုပ်အကိုင်ဖန်တီးပေးခြင်းဖြင့် လူနေမှု အဆင့်အတန်း နှင့် ဒေသစီးပွားရေးအား တိုးတက်စေနိုင်ကြောင်း မျှော်လင့်ရသည်။

ဆောက်လုပ်ရေးကာလသည် ယာယီအလုပ်အကိုင်များအား မြင့်မားစွာ ဖန်တီးပေးနိုင်သည့်အတွက် လုပ်သားအရေအတွက်မှာ မြင့်တက်လာမည်ဖြစ်သည်။

ဝင်ငွေမြင့်မားလာခြင်းနှင့် အလုပ်အကိုင် အခွင့်အလမ်းရရှိလာခြင်းကြောင့် ဒေသခံပြည်သူလူထု၏ စီမံကိန်းတွင် ပါပင်လုပ်ကိုင်လိုခြင်းနှင့် တစ်ဦးချင်း ကိုယ်ပိုင်လုပ်ငန်းထူထောင်လုပ်ကိုင်လိုခြင်း စသော စိတ် ဆန္ဒများ ရေတိုကာလအတွင်း ပြင်းပြလာစေပါသည်။ တိုက်ရိုက်အကျိုးဆက်အားဖြင့် ထိုရေတိုစိတ် ဆန္ဒ ပြင်းပြမှုသည် ရေရှည်ကာလတွင် ဖွံ့ဖြိုးတိုးတက်မှုအတွက် တိုက်ရိုက်အကျိုး သက်ရောက်စေပါ သည်။ ၎င်းင်းမှာ စီမံ ကိန်းမှ ရရှိသော အဓိက ကောင်းကျိုးတစ်ခုဟု မှတ်ယူနိုင်ပါသည်။

ကုမ္ပကီသည် ဝန်ထမ်းများအား လိုအပ်သည့် အသိပညာ ဗဟုသုတ မြှင့်တင်ပေးခြင်းနှင့် အတွေးအ ခေါ် တိုးတက်မြင့်မားလာစေရေးအတွက် လိုအပ်သော သင်တန်းများအား စီစဉ်ပေးရန်ရှိပြီး ထိုကဲ့သို့ လုပ် ဆောင်ခြင်းအားဖြင့် အခြေခံ စွမ်းရည်နှင့် အသိစိတ်ဓာတ် တိုးတက်ကောင်းမွန်လာပြီး ကုမ္ပကီနှင့်ဒေသခံ ပြည်သူ နှစ်ဦးနှစ်ဘက်အတွက် ကောင်းကျိုးများ ရရှိခံစားရမည် ဖြစ်ပါသည်။ ထို့အတူ အလုပ်သမားအတွက် လည်း တည်ငြိမ်သော ပင်ငွေ အမြဲရရှိနေသောကြောင့် သက်ဆိုင်ရာ မိသားစုကို စီးပွားငွေကြေးပိုင်း ဆိုင်ရာ ဖူလုံမှု ပေးစွမ်းနိုင်မည် ဖြစ်ပါသည်။

စီမံကိန်းမှာ ကိျက်မရောမြို့နယ်တွင် တည်ရှိသောကြောင့် ထိုင်းနယ်စပ်နှင့် နီးကပ်လျက်ရှိသည့် အတွက် ထိုင်းနိုင်ငံမှ လုပ်သားများ ကိုယ့်နေရပ်သို့ ပြန်လာလုပ်ကိုင်ရန်အတွက် အခွင့်အလမ်းများ ဖြစ် ပေါ်စေနိုင်ပါသည်။ စီမံကိန်း ဧရိယာမှ မိသားစုအများစုသည် ထိုင်းနိုင်ငံတွင် အလုပ်လုပ်နေကြသော မိသား စုဝင်များ ရှိကြသည်။ သင့်တော်သော လုပ်စလစာနှင့် အလုပ်အကိုင်သစ်များသည် ထိုသူများအတွက် နေရပ်သို့ပြန်ကာ မိသားစုနှင့် ပြန်လည်ပေါင်းစည်းနေထိုင်ရေးအတွက် တွန်းအားတစ်ခု ဖြစ်လာနိုင်ပါသည်။

စီမံကိန်း ဒရိယာမှာ ဒေသခံ လူနေထိုင်ရာ ဒရိယာများနှင့် နီးကပ်စွာ တည်ရှိသည်။

ဆောက်လုပ်ရေးကာလနှင့် လုပ်ငန်းခွင်ကာလတွင် ကျွမ်းကျင်လုပ်သား၊ အခြေခံ ကျွမ်းကျင်လုပ် သား၊ အလုပ်ကြမ်းသမား နှင့် နည်းပညာရှင်နေရာများ စသောလုပ်သားလိုအပ်ချက်များသည် ဒေသခံပြည် သူလူထု အတွက် အလုပ်အကိုင်အခွင့်အလမ်းများ တိုးတက်မြင့်မားစေလျှက်ရှိပါသည်။ ကုမ္ပကီ မှလည်း ဒေသခံပြည်သူများအား ငှားရမ်းခန့် အပ်ရန် ဆန္ဒရှိပါသည်။ ဤနေရာတွင် ဒေသခံပြည် သူလူထု ဆိုသည်မှာ စီမံကိန်းမှ ထိခိုက် သက်ရောက်မှုကို ခံရသော ဧရိယာအတွင်း နေထိုင်သူများ သို့မဟုတ် စီမံကိန်း၏ လွှမ်းမိုးသက်ရောက်မှုခံရသော နယ်မြေဧရိယာများဟု မှတ်ယူရပါမည်။

စိမံကိန်းသည် ဒေသခံအပေါ် အခြေခံပြီး လည်ပတ်ရန် ရှိကာ နည်းပညာလွှဲပြောင်းမှု နှင့်နေအိမ် လုပ် ငန်းခွင်အတွင်း သင်တန်းများပေးခြင်းဖြင့် ဒေသတွင်း ပညာရေးနှင့် နည်းပညာအရည်အသွေးများ ဖွံ့ဖြိုး တိုး တက်လာရန် အလားအလာရှိပါသည်။

စီမံကိန်းသည်ဒေသခံလူထုပေါ် သို့ သိသာထင်ရှားသော ကောင်းကျိုးများ ရရှိစေပါသည်။ ဒေသ နေ ပြည်သူတို့၏ အသိပညာ ဗဟုသုတ မြင့်မားရေးနှင့် စွမ်းရည်ဖွံ့ဖြိုးတိုးတက်စေရေးတို့သည် စီမံကိန်း ၏ လူမှုရေး သက်ရောက်မှု စီမံခန့်ခွဲခြင်း အစီအစဉ်လုပ်ဆောင်ခြင်းမှ ရရှိလာသော ကောင်းကျိုးတစ်ရပ် ဖြစ် သည်။

၁၂။ သက်သာလျော့ပါးစေရေး နှင့် ဖွံ့ဖြိုးတိုးတက်စေရေး အတွက် ဆောင်ရွက်ရမည့် အစီအမံများ

ဒေသနေလူထု၏ စွမ်းရည်ဖွံ့ဖြိုးတိုးတက်လာစေရန်နှင့် မလိုလားအပ်သော လူမှုရေး ပဋိပက္ခများ မဖြစ်ပွားစေရန်နှင့် ဒေသခံလူထု အလုပ်အကိုင်နှင့် ဆက်စပ်၍ အငြင်းပွားမှုများ မဖြစ်စေရန် အောက်ပါ နည်း လမ်းများကို လိုက်နာကျင့်သုံးရပါမည်။

- လုပ်သားထုအတွက် လိုအပ်သောကျွမ်းကျင်မှု နှင့် ကျွမ်းကျင်မှုမရှိရခြင်း၏ အကြောင်းရင်း လိုအပ် ချက်ကို စိစစ်သုံးသပ်၍ စီမံဆောင်ရွက်ရေး
- ဒေသတွင်း ကြော်ငြာစာစောင်များ၊ သတင်းဌာနများ၊ စီမံကိန်းသတင်းကြော်ငြာဘုတ်များ (ရုံးနေရာ နှင့် တစ်ရွာချင်းစီ၏လမ်းဆုံလမ်းခွများ) များမှတဆင့် ဒေသခံများအား အလုပ်ခေါ် ယူနေကြောင်း အချက်ပြ သတင်းပေးခြင်း
- ထိခိုက်သက်ရောက်ခံ ပြည်သူလူထုအတွက်ဒေသတွင်း အလုပ်အကိုင်ပေးရေးမူဝါဒကို ချမှတ်၍ ဆောင် ရွက်ရေး
- ဒေသခံပြည်သူများ၏ မျှော်လင့်ချက်များပြည့်စေရန် ဆောင်ရွက်ရာတွင်အလုပ်ခန့် အပ်ခြင်း နှင့် စပ်လျဉ်း၍ အငြင်းပွားမှုများကို မဖြစ်စေရန် သေချာစွာ စီမံ၍ အကောင်အထည်ဖော်ဆောင်ရေး
- စီမံကိန်းလိုအပ်ချက်နှင့်အညီ လုပ်သားလိုအပ်မှု နှင့် သင်တန်းနည်းဗျူဟာများ စနစ်တကျရှိစေရေး အတွက် ကျွမ်းကျင်မှု လိုအပ်ချက်များကို ပုံမှန်သုံးသပ်လေ့လာရန် တာပန်ယူဆောင်ရွက်ရေး
- သင်တန်းပေးရေးနှင့် လုပ်ငန်းကျွမ်းကျင်မှု ဖွံ့ဖြိုးတိုးတက်စေရေး အစီအစဉ်များကို စတင်ရန်
- ကန်ထရိုက်တာများနှင့် သဘောတူစာချုပ်ချုပ်ဆိုရာတွင် ကန်ထရိုက်တာများအား လုပ်သားငှားရမ်း ခြင်းကိစ္စရပ်များတွင်ဒေသခံများကိုသာ ဦးစားပေးခေါ် ယူရေးသည် ကုမ္ပကီ၏ မျှော်လင့်ချက် ဖြစ် ကြောင်း သိရှိနားလည်ပြီး ထည့်သွင်းစဉ်းစားစေရေး။

၁၂.၁။ မြေအသုံးချမှုနှင့် မြေယာပိုင်ဆိုင်မှု

ဤစီမံကိန်းဆောက်လုပ်နေစဉ် ကာလတွင် ယာယီမြေယာအသုံးပြုမှုများနှင့် အလုပ်သမားများနေစရာ ယာယီနေရာများကို တည်ဆောင်မည်ဖြစ်သောကြောင့် အနီးရှိစိုက်မျိုးမြေများကို စေတ္တသာအသုံးပြုမည် ဖြစ်ပါသည်။ ထို့အပြင် စီမံကိန်းတည်နေရာတည် ပုဂ္ဂလိကပိုင်ဆိုင်မြေဖြစ်ပြီး စီမံကိန်းမစတင်ခင်အချိန်များ က ပယ်ယူထားသော ကြောင့် မြေယာနှင့်ဆိုင်သော ထိခိုက်နှစ်နာမှုများ ဖြစ်ပေါ်နိုင်ခြေမရှိပါ။

၁၂.၂။ ပြည်သူလူထု၏ အလေးထားမှုများ၊ လူနေမှုစရိုက် နှင့် လူမှုရေး ဆက်နွှယ်မှုအပေါ် သက်ရောက်မှု

အထက်တွင် ဖော်ပြခဲ့သည့်အတိုင်း စီမံကိန်းဖရိယာမှာ လူနေထိုင်သည့်ဒေသခံဧရိယာနှင့် နီးကပ်စွာ တည်ရှိနေသည့်အတွက် လူနေထိုင်သည့် ဒေသနှင့် အနီးဆုံး ကီလိုမီတာဝက်ခန့်အကွာတွင် လုပ်သားများ အတွက် ယာယီဆောက်လုပ်ရေးလုပ်ငန်းခွင်သုံး လူနေအိမ် တည်ဆောက်ရန် ရည်ရွယ်ထား သည်။

ဆောက်လုပ်ရေး လုပ်ငန်းခွင်တွင် ဒေသခံ ဧရိယာမှ လုပ်သားများ ခန့်ထားရန်နှင့် အချို့လုပ်ငန်း ခွင်တွင် ပြင်ပမှ လုပ်သားများ ခန့်ထားမည်ဖြစ်သည်။

လုပ်ငန်းခွင်နှင့် ဒေသလူထုကြား ဆက်စပ်မှုသည် အချိန်ကြာလာသည်နှင့်အမှု ရင်းနှီးမှုတိုးတက် လာမည်ဟု မျှော်မှန်းရသည်။ အကျိုးဆက်အဖြစ် ဘိလပ်မြေစီမံကိန်းအနေဖြင့် ဒေသခံပြည်သူလူထု အတွင်း ဖြစ်လာနိုင်ဖွယ် အလားအလာရှိသော ရာဇပတ်မှု နှင့် လူမှုရေး မှားယွင်းဖောက်ဖျက်မှု အစရှိသော ကိစ္စရပ်များ အခြေအနေများကို ဖြစ်လာနိုင်သည်ဟု ခန့်မှန်းမိပါသည်။ ထိုဖြစ်ပေါ် လာနိုင်သော ရာဇပတ် မှုများတွင် အရက်သေစာ သောက်စားခြင်း၊ မူးယစ်ဆေးဝါးသုံးစွဲခြင်း နှင့် အခြားလူမှုရေးကိစ္စများတွင် မှားယွင်း စွာ ဆုံးဖြတ် လုပ်ကိုင်မှု အစရှိသည်တို ပါဂင်နိုင်ပါသည်။

ထိုရာဇဂတ်မှုများနှင့် လူမှုရေးမှားယွင်းဖောက်ဖျက်မှုများမှာ ဖြစ်လာနိုင်ဖွယ်ရာရှိပြီး ဒေသခံ အာကာ ပိုင်များအတွက် စိန်ခေါ်မှု တစ်ရပ်ကဲ့သို့ ဖြစ်လာနိုင်ကာ လူထုအတွင်း၌လည်း အချင်းချင်း ခါးသီး မှုနှင့် အမုန်း တရားများ ဖြစ်ပွားစေနိုင်ပါသည်။ ထိုအကြောင်းတရားများကြောင့် ထိုအနီးတဝိုက် ဆင်ခြေဖုံး တွင် နေထိုင် ကြသော ပြည်သူလူထုအတွင်း ချစ်ခင်စည်းလုံးမှု ပျက်ပြားခြင်းနှင့် လူနေမှုစရိုက်များ ပြောင်းလဲ သွားခြင်း အစ ရှိသည်တို့ ဖြစ်ပေါ် လာနိုင်ပါသည်။

လူမှုစစ်တမ်း ကောက်ယူခြင်း အဖွဲ့၏ စစ်တမ်းအရ သိသာထင်ရှားသော နိုင်ငံရေး၊ ဘာသာရေးနှင့် လူမှုရေးရေးဆိုင်ရာ ဆူပူမှုများ၊ အငြင်းပွားမှုများ မရှိကြောင်းတွေ့ရှိရသည်။ ထိုဧရိယာအတွင်းတွင် သိသာ ထင်ရှားသော တိုးတက်မှုကို မတွေ့ရှိခဲ့ရသလို ချစ်ခင်စည်းလုံးညီညွတ်မှုပျက်ပြားခြင်းများလည်း ဖြစ်လာ မည့် လက္ခဏာ မတွေ့ရှိခဲ့ဟု ယူဆရပါသည်။

မည်သို့ပင်ဆိုစေကာမူ စီမံကိန်းတည်ရှိနေသည့်အတွက် စီမံကိန်း၏ နယ်မြေအတွင်း နှင့် အပြင် နှစ်ခု လုံးကို ထည့်သွင်းစဉ်းစားပါက ဤထင်မြင်ယူဆချက်မှာ ပြောင်းလဲကောင်း ပြောင်းလဲသွားနိုင်ပါသည်။ ထို ကြောင့် စီမံကိန်းကြောင့် ဖြစ်ပွားလာနိုင်ဖွယ်ရှိသော အလားအလာရှိသော ထိခိုက်သက်ရောက်မှုအဖြစ် စီမံကိန်းနှင့် စီမံကိန်းနှင့်သက်ဆိုင်သူ ဒေသခံပြည်သူလူထု၊ အခြားအဖွဲ့အစည်းများအနေဖြင့် ကြိုတင် တွက်ဆ ကာထားရပါမည်။

ထို့ကြောင့် လူနေမှုစရိုက်နှင့် ပြည်သူအချင်းချင်း ချစ်ခင်စည်းလုံးမှု ပျက်ပြားနိုင်စေရန် ထိခိုက်သက် ရောက်မှုကို အလယ်အလတ်တန်းစားအဆင့် ထိခိုက်မှုဟု သတ်မှတ်ကာ သင့်တော် သော ဖြေလျှော့မှုများ ကိုဆောင်ရွက်ရန် လိုအပ်လာပါသည်။

၁၂.၃။ ဒေသတွင်း စီးပွားရေး

လုပ်ငန်းခွင်တွင်းနေ့လည်စာနှင့် ကော်ဖီသောက်နားရန် စားသောက်ဆိုင်များကို ဖွင့်လှစ်စေခြင်းဖြင့် ဒေသ တွင်းစီးပွားရေးလုပ်ငန်းများ ဖွံ့ဖြိုးတိုးတက်လာစေရန် ကောင်းမွန်သော အထောက်အပံ့ ကောင်းတစ်ခုဖြစ်ပါသည်။

စီမံကိန်းတွင် လိုအပ်သောပစ္စည်းများအား ဒေသတွင်း လွယ်ကူစွာရယူအသုံးပြုနိုင်ပါက စီမံကိန်းမှ ရယူအသုံးပြုခြင်းကြောင့် ဒေသဈေးကွက်၌ သုံးစွဲမှုမြင့်တက်စေပြီး ဒေသတွင်း စီးပွားရေး အခွင့်အလမ်း ကောင်းများ တိုးပွားစေသည်။

ထို့အပြင် စီမံကိန်းဖရိယာသို့ အသစ်ပင်ရောက်လာသူများကြောင့် စီးပွားရေးဆိုင်ရာ၊ ဈေးကွက်နှင့် အခွင့်အလမ်းများအား ပိုမိုထိတွေ့နားလည်လာခြင်း၊ ဒေသတွင်းစီးပွားရေးလုပ်ငန်းများတွင် ပယ်ယူသုံးစွဲသူ စားသုံးသူအရေအတွက် တိုးတက်လာပြီး ပြည်သူလူထုအတွင်း လူမျိုးပေါင်းစုံလင်စွာဖြင့် စီးပွားရေးလုပ်ငန်း များ တွင်ကျယ်လာမည် ဖြစ်ပါသည်။

ကောင်းကျိုးများပိုမိုတိုးတက်လာစေရေးအတွက် အောက်ပါအတိုင်း ဆောင်ရွက်ရမည် ဖြစ်ပါသည်။

- စီမံကိန်းတွင် လိုအပ်သည့် လိုအပ်ချက်များအား ဖြစ်နိုင်ပါက ဒေသတွင်းမှာသာ ရင်းနှီးမြုပ်နံ ရန်။
- စီမံကိန်းတွင် လိုအပ်သည့် အလုပ်အကိုင်အခွင့်လမ်းများအား ဒေသတွင်းမှ ဖြည့်ဆည်းရန်။

၁၂.၄။ လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးကင်း လုံခြုံမှု

ဘိလပ်မြေထုတ်လုပ်ရေး စီမံကိန်း လုပ်ငန်းများတွင်ဓာတုပစ္စည်းများအသုံးပြုမှုများကြောင့်အန္တရာ ယ်ကျ ရောက်လာနိုင်ပါသည်။ ထိုအန္တရာယ်များကိုဘေးကင်းစေရေး အစီအစဉ်များချမှတ်အကောင်အ ထည်ဖော် ဆောင်ရွက်ခြင်း၊ သင်တန်းများ ပေးခြင်း နှင့်ဘေးကင်းလုံခြုံစေရေး နည်း လမ်းများ (OHS) စ နှစ်များကို အသုံးပြုခြင်း စသဖြင့် စီမံထားရှိရပါမည်။ကျန်းမာရေး နှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေအစီအ မံများကို လုပ်ငန်း ပိုင်ရှင်မှ စီမံထားရှိပြီး လုပ်သားများ၏ ဘေးကင်းလုံခြုံစေရေးကို တိုးမြှင့် ဆောင်ရွ က် ထားရှိရပါမည်။

ဆောက်လုပ်ရေးနှင့် လုပ်ငန်းခွင်ကာလတွင် လုပ်ငန်းခွင်ကျန်းမာရေးနှင့် လုံခြုံမှုအတွက် အမျိုးမျိုး အထွေထွေသော အန္တရာယ်များ ဖြစ်ပွားနိုင်ပေသည်။

လုပ်သားများနှင့် ဒေသခံပြည်သူအား စီမံကိန်း လုပ်ငန်းစဉ်များမှ ထိခိုက်ခြင်းများ ကင်းဝေးစေရန် လုပ်ငန်း ခွင်ကျန်းမာရေးနှင့် လုံခြုံမှုစီမံခန့်ခွဲခြင်း အစီအစဉ်အား အဆိုပြုထုံးကျောက်မိုင်းတွင်းအတွက် လုပ်ဆောင် ရန် လိုအပ်သည်။

၁၂.၅။ လူထု ကျန်းမာရေးအပေါ် သက်ရောက်မှုများ

ဆောက်လုပ်ရေးကာလတွင်း စီမံကိန်းနှင့်နီးသော ဒေသခံ ပြည်သူလူထုထံ အဓိကသက်ရောက်မှုမှာ ယာဉ် ကြောပိတ်ဆို့မှုပင်ဖြစ်သည်။

အထက်တွင် ဖော်ပြခဲ့သည့်အတိုင်း ပြင်ပမှဂင်ရောက်လုပ်ကိုင်သော အလုပ်သမားများမှ ရောဂါ များ ပျံ့နှံ့မှု မှာလည်း မပြောပလောက်သော သက်ရောက်မှုတစ်ခုပင်ဖြစ်သည်။ ထိုကာလအတွင်း ဂင်ရောက်မှု များနှင့် ဖြစ်ရပ် လက္ခဏာများကြောင့် ပြည်သူလူထုအတွက် ကျန်းမာရေးနှင့်လုံခြုံမှုသည် ပုံမှန်အခြေအနေ တစ်ခု တွင် ပြောင်းလဲမှု မရှိနိုင်ပါ။

သိသာထင်ရှားသော ယာဉ်ကြောပိတ်ဆို့မှုကိုဘိလပ်မြေစက်ရုံ ဆောက်လုပ်နေစဉ်အတွင်း နှင့်ထုံးကျောက် သယ်ယူပို့ဆောင်ရာလမ်းတစ်လျှောက်သယ်ယူပို့ဆောင်ရေး လမ်းကြောင်း စနစ်တစ်ခု တည်ဆောက်နေစဉ်အတွင်း နှင့် ဆောက်လုပ်ရေးအလုပ်သမားများ ပြောင်းရွှေ့လမှုများကြောင့် တွေ့ရနိုင်သည်။

မည်သည့်ကိစ္စရပ်တွင် ဖြစ်စေ လေးလံသော ယာဉ်များ မောင်းနှင်မှုသည်လမ်းအခြေအနေကို ဆိုးရွားစွာ ထိ ခိုက်စေပြီးလမ်းဘေးလူနေအိမ်ခြေများအား အသံဆူညံမှု၊ ဖုန်မှုန့် လွင့်ပျံ့စေမှုတို့ ဖြစ်စေကာ နီးစပ်ရာရှိ ကောက်ပဲ သီးနှံများကို ပျက်ဆီးစေခြင်းနှင့် နီးစပ်ရာ ပစ္စည်းများလမ်းများကိုညစ်ပတ်စေခြင်း အပြင် ဒေသတွင်း ယာဉ်ကြော ပိတ်ဆို မှု ကိုလည်း ယာယီအားဖြင့် ထိခိုက်သက်ရောက်စေနိုင်ပါသည်။

ထို့အပြင် ယာဉ်သွားလာမှုများ သိသာစွာတိုးလာခြင်းသည် လက်ရှိလမ်းအခြေအနေအား ဆိုးရွားစေြာင်း၊ ချိုင့် ရာများ ဖြစ်ပေါ် စေခြင်းနှင့် ဒေသတွင်းရှိ ယာဉ်မောင်းသူများနှင့် ခြေကျင် သွားလာသူများ ၏ လမ်းအန္တ ရာယ်ကင်း ရှင်းမှုအား အဟန့် အတားဖြစ်စေကာ ယာဉ်မတော်တဆမူများ များပြားလာနိုင်ပါသည်။

ထိုဒေသတွင်း လမ်းကိုအသုံးပြု၍သွားလာသူများတွင် မော်တော်ဆိုင်ကယ်များ ခြကျင်လမ်းလျှောက် သူများအပါအပင်အဓိကခုခံနိုင်စွမ်းအားနည်းသူများဖြစ်သော ကျောင်းသို့လမ်းလျှောက်သွား သော ကျောင်းသူ ကျောင်းသား ကလေးသူငယ်များ ပါပင်မည်ဖြစ်ပါသည်။

၁၂.၆။ ကျန်းမားရေး အန္တရာယ် လျော့ပါး သက်သာစေရေး အစီအမံများ

ကျန်းမာရေးကို ထိခိုက်သက်ရောက်နိုင်မှုများကို ဆန်းစစ်ရာတွင် စီမံကိန်း၏ဆောက်လုပ်စဉ် ကာလ နှင့် လည်ပတ်စဉ်ကာလများ၌ ဒေသတွင်း ပြည်သူလူထုအတွက် ကျန်းမာရေး စောင့်ရှောက်မှု နှင့် ကျန်းမာ ရေးအတွက် လိုအပ်သောအဆောက်အဦး၊ ကိရိယာတန်ဆာပလာ၊ ကျန်းမာရေးသင်တန်း ပြီးမြောက် အောင်မြင်ထားသူ များ၊ ဆေးဝါးများနှင့် ပြည်သူလူထုနှင့် ဆေးလုပ်သား အရေအတွက်အင်အားမျှတမှု အစရှိ သည်တို့ကို ဆန်းစစ်လေ့လာပြီးမှ ဆောင်ရွက်ရန် ဖြစ်ပါသည်။

ထိုအစီအစဉ်များသည် GIIP and IFC PS-2 တို့နှင့် ကိုက်ညီမှု ရှိအောင် ထားရှိရမည် ဖြစ်ပြီး အလုပ်သမားများအား ဆိုးရွားစွာထိခိုက်စေခြင်းမှ လျော့နည်းသွားစေပါမည်။

- ကန်ထရိုက် အလုပ်သမားများအပါအပင် အလုပ်သမားများကို Personal Protective Equipment (PPE)
 နှင့် ဓာတုပစ္စည်းများကိုင်တွယ်ရာတွင် သင်တန်းပေးပြီးမှ ဆောင်ရွက်လုပ်ကိုင်စေရန်။
- လုပ်ငန်းခွင် အန္တရာယ်ရှိသောနေရာများ (အပူချိန်မြင့်သောနရာများ နှင် အဖုံး ဖွင့်ထားသော ရေ တိုင်ကီ များ) တွင်သေချာစွာ မြင်သာအောင် အမှတ်အသား ပြုလုပ်ထား ပေးရန် နှင့် အန္တရာယ် ပြ အမှတ် အသား များကို မှတ်မိအောင် သင်တန်းပေးထားရန်။
- လုပ်ငန်းခွင် အန္တရာယ်ပြ အမှတ်အသားများကို တရုပ် နှင့် မြန်မာ ဘာသာစကားများဖြင့် ဖော်ပြရန်။
- ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေးအတွက် ကာကွယ်ရေး နှင့် တားဆီးရေး သင်တန်း များကို ပေးထားရန်။
- အသံဆူညံမှုကို လုပ်ငန်းခွင်အတွင်း သတ်မှတ်ထားသောအမြင့်ဆုံး နှုန်းထက် မကျော်စေရန် ပုံ မှန် စစ်ဆေး ပေးရန်။
- စက်ပစ္စည်း ကိရိယာတန်ဆာပလာများကိုစမ်းသပ်စစ်ဆေးခြင်း၊ ထိန်းသိမ်းပြုပြင်ရေး အစီအစဉ်များ ထားရှိ ထားပြီး ဖွံ့ဖြိုးတိုးတက်စေရန်။
- မတော်တဆမှု မှတ်တမ်းထားရှိခြင်း၊ စုံစမ်းစစ်ဆေးခြင်း နှင့် ကာကွယ်တားဆီးရေး အစီအစဉ်များ ထားရှိ ရန်။
- လုပ်ငန်းတည်ဆောက်စဉ်နှင့် လည်ပတ်စဉ်ကာလအတွင်း လုပ်ငန်းခွင် အရေးပေါ် တုန့်ပြန်မှုအစီအစဉ်များ
 ကို သင်တန်းပေးထားရန် နှင့် ဖွံ့ဖြိုးအောင် ဆောင်ရွက်ရန်။
- နိုင်ငံတကာ နှင့် ပြည်တွင်း သို့မဟုတ် ဒေသတွင် ပြဌါန်းထားသော ကျန်းမာရေး နှင့် ဘေးအန္တရာ ယိ ကင်းရှင်းရေး စံချိန်စံညွှန်းများအတိုင်း ကိုက်ညီအောင် ဆောင်ရွက်ရန်။

၁၂.၇။ မြေယာရှုခင်းအပေါ် ထိခိုက်သက်ရောက်မှု

ဤစီမံကိန်းသည် ဒေသအတွင်း မည်သည့်စီမံကိန်းမှ ယခင်ကမလုပ်ခဲ့ဖူးသော အခြေခံအဆော က်အဦးများ အားလုံးထည့်တွက် ဆောင်ရွက်ထားသော ပထမဦးဆုံး စီမံကိန်း ဖြစ်ပါသည်။ စီမံကိန်းသည် အခြားနေရာ ဒေသများမှ လှမ်းကြည့်လျှင် မြင်နိုင်သော ဒေါင်လိုက် အဆောက်အဦး အားလုံး ကို ဖော်ပြထားပါသည်။

ဒေသတွင်း မြင်ကွင်းဆိုင်ရာ ပြောင်းလဲမှုကြောင့် ထိနိုက်သက်ရောက်မှုကိုစဉ်းစားရာတွင် ထိနိုက် သက် ရောက်မှု၏ပမာဏမှာအလယ်အလတ်မှ အမြင့်အဆင့်တွင်ရှိနိုင်ပါသည်။ မည်သို့ပင်ဖြစ်စေ စီမံကိန်း၏ အသေး စိတ်ဒီဇိုင်းရေးဆွဲချိန်ကတည်းက အပင်များပြန်လည်စိုက်ပျိုးမည့်အစီအစဉ်များကဲ့သို့သော ထိနိုက်မှု လျှော့ချ သက်သာစေရေး နည်းလမ်းများကို အတည်ပြုထည့်သွင်းထားနိုင်ပါသည်။

ပတ်ဂန်းကျင်ဇရိယာတစ်ဝိုက်တွင် အမြင်အာရုံအားမထိခိုက်စေသော အရောင်ဖျော့နှင့် သင့်တော်သော အရောင်များကို သုံးစွဲရပါမည်။ နည်းပညာအရ ဖြစ်နိုင်မည်ဆိုပါက အဆောက်အဦးများ၏ထင်သာမြင်သာဖြစ်မှု ကို လျှော့ချရန် အဆောက်အဦးတစ်ဝိုက်တွင် အပင်များ စိုက်ပျိုးထားသင့်ပါသည်။

၁၂.၈။ ယဉ်ကျေးမှုဆိုင်ရာ အမွေအနှစ်များ

ဤစီမံကိန်းသည် ပယ်ယူထားပြီးဖြစ်သော ပုဂ္ဂလိက မြေဖြစ်သောကြောင့် ယဉ်ကျေးမှု အမွေအနှစ်များ ပေါ်တွင် သက်ရောက် ထိခိုက်မှု ရှိနိုင်လိမ့်မည်ဟု မယူဆပါ။

ဤမူဘောင်များအတွင်းဆောင်ရွက်ရာတွင် စီမံကိန်းလုပ်ငန်းမှ SOD Manager မှ လုပ်ငန်းခွင် အတွင်း တွင် ထိုကဲ့သို့ရှာဇွေတွေ့ရှိမှုများ ရှိမရှိစစ်ဆေးရန်အတွက် လုပ်ငန်းခွင်အတွင်း နေ့စဉ်စစ်ဆေး မေးမြန်းရပါမည်။ ၎င်း သည် ထိုကဲ့သို့အဆန်းတကြယ်ပစ္စည်းများတွေ့ရှိနိုင်ခြေရှိသော လုပ်ငန်းခွင်များအား ကြီးကြပ်ကွပ်ကဲပြီး မှန်ကန် သော ထိခိုက်မှု လျော့ပါးစေရေး အစီအမံများ နှင့် ဆက်သွယ်ဆောင်ရွက်မှုများကို လုပ်ဆောင်ရပါမည်။ ထိုသို့ ရှာ ဇွေတွေ့ရှိမှုများကို သတင်းပေးဖြန့်ဖြူးရန် စီမံကိန်း အလုပ်သမားများ နှင့်ကန်ထရိုက်တာများအား သင်တန်းများ ပေးထားရပါမည်။

၁၂.၉။ ရာသီဥတုပြောင်းလဲမှုဆိုင်ရာ ထိနိုက်သက်ရောက်မှုများအပေါ် ထည့်သွင်းစဉ်းစားချက်

စီမံကိန်းလုပ်ငန်းများသည် carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆) စသော ဖန်လုံအိမ်ဓာတ်ငွေ့ထွက်ရှိမှုများနှင့် ဆက်နွယ်ခဲ့မည်ဆိုပါက ရာသီဥတုပြောင်းလဲခြင်းဆိုင်ရာ ထိခိုက်မှုများ ကို ထည့်သွင်းစဉ်းစားသင့်ပါသည်။

ကျောက်မီးသွေးဓါတ်အားပေးစက်ရုံသည် အဓိကအားဖြင့် CO₂ ထုတ်လွှတ်မှုနှင့် ဆက်စပ်နေပြီး နိုင်ငံတကာ တွင် ဘိလပ်မြေထုတ်လုပ်မှုမှ ထွက်ရှိသော CO₂ ပမာဏနှင့် နှိုင်းယှဉ်ပါက မြန်မာနိုင်ငံ၏ ဘိလပ်မြေထုတ်လုပ်မှုမှ ထွက်ရှိသော CO₂ ပမာဏသည် အဆမတန်နည်းပါးသည်ကို အောက်ပါပုံများ တွင်တွေ့ ရှိနိုင်ပါသည်။



Source: CDIAC, 2014

ပုံ၂၁ ။ ကမ္ဘာလုံးဆိုင်ရာ အရင်းအမြစ်များမှ ကာဗွန်ဒိုင်အောက်ဆိုဒ်ထွက်ရှိမှု

ဓါတ်အားပေးစက်ရုံ၏ ကိန်းဂဏန်း အချက်အလက်များအပေါ် မူတည်၍ CO₂ ထွက်ရှိမှုအား ခန့်မှန်း တွက်ချက်လိုက်သောအခါ တစ်နှစ်လျင် CO2 တန်ချိန် ၃၂၈၅၀ ရှိပါသည်။ အဆိုပါ ကိန်းဂဏန်းကို CDIAC 2014 ၏ World CO2 emission from solid fuel တန်ဘိုးနှင့် နှိုင်းယှဉ်လိုက်သောအခါ ယခု စီမံကိန်းအနေဖြင့် ၀.၀၀၂ ရာခိုင်နှုန်းသာ ရှိပါသည်။ ထို့ကြောင့် ဤစီမံကိန်း အနေဖြင့် ကမ္ဘာ့အပူချိန်မြင့်တက်ခြင်း နှင့် ရာသီဉတုပြောင်း လဲခြင်း အပေါ် သက်ရောက်နိုင်မှု နည်းသည်ဟု သတ်မှတ်နိုင်ပါသည်။

၁၃။ စပ်ဆက်ထိခိုက်သက်ရောက်မှုများကို လေ့လာဆန်းစစ်ခြင်း

စပ်ဆက်ထိခိုက်သက်ရောက်မှုများကို လေ့လာဆန်းစစ်ရာတွင် အခြေခံလိုအပ်ချက်များဖြစ်သော လေ ၊ ရေ ၊ မြေ၊ အနေအထား၊ သဘာပပေါက်ပင်၊ တောရိုင်းတိရစ္ဆာန်များ၊ ငါးများ၊ ငှက်များနှင့် မြေအသုံး ပြုမှုများအစ ရှိ သော ရုပ်ပိုင်းဆိုင်ရာ၊သက်ရှိများဆိုင်ရာ နှင့် လူမှုစီးပွားဆိုင်ရာ ပန်းကျင်လက္ခဏာများ စသော တန်ဖိုးထားဖွယ် ဂေ ဟဗေဒဆိုင်ရာအစိတ်အပိုင်းများအပေါ် စီမံကိန်းလုပ်ငန်းများ ဆောင်ရွက်မှုမှ တိုက်ရိုက် နှင့်သွယ်ဝိုက်ထိ ခိုက်သက် ရောက်မှုများနှင့်အတူ စီမံကိန်းရေယာအတွင်း၌ လွန်ခဲ့သောအတိတ်ကာလ၊လက်ရှိကာလနှင့် အနာဂတ်ကာလ စီမံ ကိန်းလုပ်ငန်းများနှင့် ဆောင်ရွက်ချက်များမှ ထိုတန်ဖိုးထားဖွယ်ဂေဟ ဗေဒ ဆိုင်ရာအစိတ်အပိုင်းများ အပေါ် သို့ ထိ ခိုက်သက်ရောက်နိုင်ခြေရှိ မှု တိုးတက်လာနိုင်ခြင်း များကိုပါ ထည့်သွင်း စဉ်းစားရပါမည်။

တန်ဖိုးထားဖွယ်ဂေဟဗေဒဆိုင်ရာ အစိတ်အပိုင်းများတွင် -

လေထု : ရာသီဥတုအခြေအနေနှင့်ဦးတည်ချက်များ နှင့် ရာသီဥတုအခြေအနေလွန်ကဲမှုများ နှင့် လေအ ရည် အသွေးအခြေအနေများ

မြေမျက်နှာသွင်ပြင်နှင့် ဘူမိဗေဒ :မြေအနေအထား၊ ရေမျက်နှာပြင်အထက်အမြင့်ပိုင်း၊ အနိမ့်ပိုင်းနှင့် ထူးခြား သောလက္ခဏာရပ်များ။ မြေမျက်နှာသွင်ပြင်အမျိုးအစားနှင့် နက်ရှိုင်းမှုများ၊ အောက်ခြေရှိကျောက်များ ၏ ဘူမိဗေဒအမျိုးအစားများ၊ တည်နေရာများနှင့် နက်ရှိုင်းမှုများ။

မြေ :မြေအမျိုးအစားနှင့်လက္ခဏာရပ်များ၊ မြေအရည်အသွေးနှင့်ကန့်သတ်ချက်များ နှင့် ပင်ရိုးစွန်းဒေသများ ရှိ အစဉ်အေးနေသော မြေဆီလွှာ အခြေအနေများ။

မျက်နှာပြင်ရေ :ရေအလင်းပြန်မှုနှင့်ရေထုလက္ခဏာရပ်များ၊ ကမ်းခြေပန်းကျင်နှင်ရေပင်ရောက်နိုင် သော နေရာများ **မြေအောက်ရေ** : မူလရှိနှင့်ပြီးသော ဒေသရင်း မြေအောက်ရေလက္ခဏာများ

ရွေးချယ်စရာ လက္ခဏာရပ်များကို အောက်ပါအတိုင်းထည့်သွင်းစဉ်းစားခဲ့ပါသည် -

- လူသားများအတွက် လုံးပဉဿုံ အရေးကြီးမှု သို့မဟုတ် တန်ဖိုးထားမှု
- ထိန်းသိမ်းစောင့်ရှောက်ရန် လိုအပ်မှုများ
- စီမံကိန်းမှထိခိုက်သက်ရောက်မှုများစွာကို ခံရနိုင်ဖွယ်ရှိမှု
- ဂေဟစနစ်တွင် အရေးပါထိရောက်မှု
- ဂေဟစနစ်ကို ထိန်းသိမ်းနိုင်သောမျိုးစိပ်များ တည်ရှိမှု

လက်ရှိ ဘိလပ်မြေစီမံကိန်းဇရိယာတွင် အခြားသော စီမံကိန်းလုပ်ငန်းများမရှိသော်လည်း ဘိလပ်မြေ ထုတ်လုပ်ခြင်းစီမံကိန်းသည် ထုံးကျောက်မိုင်း၊ ကျောက်မီးသွေးလျှပ်စစ်စက်ရုံ၊ ဆိပ်ကမ်းနှင့် တူးမြောင်း အစ ရှိသော ဆက်စပ်ရာ လုပ်ငန်းများနှင့် ဆက်နွယ်နေပါသည်။

ဘိလပ်မြေစက်ရုံနှင့် ဆက်စပ်လုပ်ငန်းများကြောင့် ထိခိုက်သက်ရောက်နိုင်ဖွယ်ရှိသော တန်ဖိုးထား ဖွယ်ဂေဟဗေဒ ဆိုင်ရာအစိတ်အပိုင်းများမှာမြေအသုံးချမှု၊ သဘာပပေါက်ပင်များ၊ လေထုနှင့် လူမှုစီးပွား ဆိုင် ရာပန်းကျင်တို့ဖြစ်ပါသည်။ သို့သော်ငြားလည်း ထိုထိခိုက်သက်ရောက်မှုများမှာ လျှော့ချနိုင်ဖွယ်ရာ ရှိသည် ဟုယူဆရပြီး ဤစီမံကိန်းများအားလုံးကိုလည်း ပြည့်စုံစွာပေါင်းစပ်ဖွဲ့စည်းထားသည့် ဘိလပ်မြေ စီမံကိန်း တစ်ခုဟုသာ ယူဆနိုင်ပါသည်။ အဘယ်ကြောင့်ဆိုသော် ဤစီမံကိန်းများအားလုံး ၏ ပိုင်ရှင်မှာ MCL တစ်ဦး တည်းဖြစ်ကာ EIA လုပ်ငန်းများကို အကောင်အထည်ဖော်ဆောင်ရွက်ရာတွင်လည်း တစ်ခုတည်းသော SOD အသင်းမှသာ စဉ်ဆက်မပြတ်ဖွံ့ဖြိုးတိုးတက်စေရေးအတွက် စီမံကိန်း ဆောင်ရွက်ချက်များအားလုံးကို ခြုံငုံသုံးသပ်ကာ ဖြစ်ပေါ် လာနိုင်ဖွယ်ရှိသော ထိခိုက်သက်ရောက်မှုများ အားလုံးကိုစဉ်းစား၍ လျှော့ချသက်သာစေရေးနည်းလမ်းများ ဆောင်ရွ က်ရေးကို ထိန်းချုပ်ကြီးကြပ်ကွပ်ကဲ ကာ တာပန်ယူဆောင်ရွက်မည် ဖြစ် သောကြောင့် ဖြစ်ပါသည်။

၁၄။ ကတိကပတ်များ

မော်လမြိုင်ဘိလပ်မြေစက်ရုံ မှ လိုက်နာမည့် သက်ဆိုင်ရာ ကတိကပတ်များကို အောက်ပါ ဇယား ၁၀-၁ တွင် အခန်းခွဲ တစ်ခုချင်းဆီအလိုက် အနှစ်ချုပ်ဖော်ပြထားပါသည်။

Commitment Source	Commitment
Chapter II	Mawlamyine Cement Limited (MCL) commits to follow National and international Laws, By Laws, Regulations and Guidelines Relevant to Coal- fired Power Plant operation process. Also, the project will meet the national emission and effluent standards
Chapter II	Mawlamyine Cement Limited (MCL) commits to specifically commit itself to the prevention of pollution through the implementation of processes, practices, and techniques to avoid, reduce and control the creation, emission and discharge of any type of pollutant and waste.
Chapter II, Use of Natural Resources	Mawlamyine Cement Limited (MCL) commits to specifically commit itself to minimize the use of consumptive resources and promote the reduction and recycling of waste products where possible.
Chapter II, Air quality standard	Mawlamyine Cement Limited (MCL) commits to follow National Environmental Quality (Emission) Guideline, Industry Specific Guideline, <i>Thermal Power Plant, Table 2.3</i> and IFC General EHS Guidelines for the ambient air quality especially for coal power plant in operation phase.
Chapter II, Wastewater	Mawlamyine Cement Limited (MCL) commits to follow National

«ယား (စ): စီမံကိန်းဆိုင်ရာ ကတိကပတ်များ

Effluent	Environmental Quality (Emission) Guideline expressed in Table 2.2 and Table 2.7: IFC Effluent Guideline for Thermal Power Plant.
Chapter II, Ambient Noise Standard	Mawlamyine Cement Limited (MCL) commits to follow NEQG,: NEQG Ambient Noise Level, Table 2.4 for the ambient and industrial noise standard during construction and operation phase and IFC General EHS Guideline for Noise Level Table 2.8.
International Standard Industrial Air Emission	Mawlamyine Cement Limited (MCL) commits to follow International Finance Corporation's EHS Standard for air emissions as in Table 2.6.
Chapter II Commitments	Mawlamyine Cement Limited (MCL) commits to prepare an EIA report with fully compliment with EIA procedure 2015 in timely and precisely manner as in Table 2.1, subsection 4. Mawlamyine Cement Limited (MCL) commits to follow all the policy, rules, regulations, procedures and guidelines illustrated in Table 2.1
Chapter III Designs and Equipment	Mawlamyine Cement Limited (MCL) commits to utilize and maintain the facilities' designs and modernized equipment and machinery as described in Project description for power plant construction and operation.
Chapter IV Existing Environmental Conditions	Mawlamyine Cement Limited (MCL) commits not to disturb the Existing Environmental Conditions described in Chapter IV.
Chapter V Environmental Socioeconomic Baselines	Mawlamyine Cement Limited (MCL) commits to consider the baseline condition of environmental and socioeconomic of the area during the operation phase.
Chapter VI Stakeholder Engagement Plan	Mawlamyine Cement Limited (MCL) commits to follow the Stakeholder Engagement Plan described in section 6.2
Chapter VII Impact Assessments and Mitigation Measures	Mawlamyine Cement Limited (MCL) commits to precisely follow the discussed mitigation measures for avoiding or reducing such environmental and socio-economic impacts potentially generated by the Project during both the construction and operation phases.
Chapter VII Ambient Air Emission	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures for ambient air emission in sections 7.3 and 7.4 (during construction and operation period) with the regular monitoring plan.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures for operation phase as mentioned in sections 7.3.2 and 7.4.2

Noise Emission	(during construction and operation period).		
Chapter VII Wastewater Effluents	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in Sections 7.3.3.3 and 7.4.3 for both construction and operation period.		
Chapter VII Solid Wastes	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures for solid waste as mentioned in Section 7.3.5.3 and 7.4.5.2. (during construction and operation period).		
Chapter VII Soil	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in section 7.4.4.3 to avoid soil pollution and keep maintaining regional soil fertility.		
Chapter VII Biodiversity	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in sections 7.5.5.1 and 5.5.8 to rebuild biodiversity disrupts due to the project.		
Chapter VII Visual/Landscape	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures in section 7.8 to reduce the impact for visual change.		
Chapter VII Cultural Heritage	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as shown in section 7.9 to keep avoiding not to harm cultural heritage value.		
Chapter VII Decommissioning Phase	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as described in section 7.10 while decommissioning the project.		
Chapter VII Cumulative Impacts	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as shown in section 7.11 considering on the cumulative impacts.		
Chapter VII Traffic Issue	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures expressed in section 7.6.4.1 for facilitation of transportation.		
Chapter VII Social cohesion	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as in 7.12 to avoid social cohesion in the region.		
Chapter VII Socioeconomic	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as in 7.6 for reduce impacts on socioeconomic.		
Chapter VII Community Health	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as in 7.7.1 for community health.		
Chapter VII Possibility of employment	The labor recruitment policy must be formulated in such a way that local laborers can easily get chance of employment in the project.		

opportunities	
Chapter VII Occupational health hazard	Arrangement of personal protective equipment such as gloves, helmet, mask, glasses and other tools, safety boots and uniforms for each worker so that the workers can keep themselves safe from any kinds of accident and the occupational health training will also be provided.
Chapter VIII, Responsibilities of Implementation Team for Environmental and Social Management Plan	Mawlamyine Cement Limited (MCL) commits to follow up Main Tasks for Environmental and Social Consideration of implementation team at MCL expressed in Table 8.2-1.
Chapter VIII, Environmental and Social Management Plan	Mawlamyine Cement Limited (MCL) commits to follow the discussed mitigation measures for each component illustrated in Table 8.2-2.
Chapter VIII, MCL's Pollution Control	Mawlamyine Cement Limited (MCL) commits to follow MCL's pollution control policy presented in section 8.3.
Chapter VIII, Occupational Health and Safety Management Plan	Mawlamyine Cement Limited (MCL) commits to follow Occupational Health and Safety Management Plan presented in section 8.8.
Chapter VIII, Emergency Response and Rescue Plan	Mawlamyine Cement Limited (MCL) commits to follow Emergency Response and Rescue Plan presented in section 8.10 and table 8.10-2.
Chapter IX, Environmental Monitoring Plan	The compliance monitoring report along with the checklist will be indexed and annexed with the monthly and annual monitoring report. It may be required to submit the annual monitoring report to Department of Environmental Conservation for renewing of the Environmental Clearance Certificate each year.
Chapter IX, Monitoring and Reporting	Mawlamyine Cement Limited (MCL) will develop and implement a monitoring and reporting plan as presented in Section 9.1 and table 9.1-1.
Chapter IX, CSR Program	Mawlamyine Cement Limited (MCL) plan and reserve for cooperate social responsibility (CSR) (during operation period), two percent (2%) of yearly net profit of the project and CSR will be implemented as shown in Section 9.4.1
Chapter IX, CSR Program	Mawlamyine Cement Limited (MCL) plan and reserve for cooperate social responsibility (CSR) (during operation period), two percent (2%) of yearly net profit of the project.

၁၅။ နိဂုံး

MC စီမံကိန်း (ကျောက်မီးေသွးသုံးဓါတ်အားပေး စက်ရုံအတွက်ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်ထိ ခိုက်မှုဆန်းစစ်ခြင်းအား သယံဇာတနှင့် ပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန၏ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်း၏ လိုအပ်ချက်များနှင့်အညီ ဆောင်ရွက်ခဲ့ပါသည်။ ကနဦးပတ်ဝန်းကျင်ဆန်းစစ်ခြင်းအစီရင်ခံစာ အတည်ပြုရန် နှင့် ကူညီဆောင်ရွက်ရန် Resource & Environment Myanmar Ltd သည် စီမံကိန်း အကောင်အထည်ဖော်မဆောင်ရွက်မှီနှင့် ဖော်ဆောင်နေစဉ်အတွင်း ရူပ၊ ဇီဝနှင့် လူမှုရေးအချက်အလက်များဖြစ်သည့် လူအများ၏ စီမံကိန်းအပေါ် ထားရှိသည့် ရှူထောင့်၊ စိုးရိမ်မှု၊ သဘောထား၊ မျှော်လင့်ချက် အစရှိသည်တို့ကို သန့်ရှင်း သော ပတ်ဝန်းကျင်နှင့် အပြစ်ကင်းသော လူ့အဖွဲ့အစည်း ဖြစ်ကြောင်း အတည်ပြု ချက်အတွက် စုဆောင်း၍ ခွဲခြမ်း စိတ်ဖြာခဲ့ပါသည်။

အကောင်အထည်ဖော်ဆောင်သည့် မည်သည့်လုပ်ငန်းအမျိုးအစားမဆို ၄င်းလည်ပတ်ဆောင်ရမည့် ပတ်ဝန်းကျင်အား ကောင်းကျိုးဆိုးကျိုး ဒွန်တွဲဖြစ်ပေါ် စေသည်။ ထိုသက်ရောက်မှုများကို စီမံကိန်း ဖော် ဆောင်သူမှ ဆိုးကျိုးသက်ရောက်မှုများကို လျော့ချ၍ ကောင်းကျိုးသက်ရောက်မှုများကို များပြားလာစေ ရန်အတွက် အမျိုးအစား ခွဲခြား၍ အကဲဖြတ်ပါသည်။ ယခုလက်ရှိ ဆိပ်ကမ်းနှင့် တူးမြောင်းစီမံကိန်းသည် ဘိလပ်မြေဖြန့်ဖြူးရန်နှင့် ဘိလပ်မြေ စက်ရုံတွက် ကုန်ကြမ်းများထောက်ပံ့ရန်စသည့် ပို့ဆောင်ထောက်ပံ့ရေး ရည်ရွယ်ချက်အတွက် တည်ဆောက်ထားခြင်း ဖြစ်ပါသည်။ ဘိလပ်မြေစက်ရုံသည့် မြန်မာနိုင်ငံ အစိတ်အပိုင်း အတော်များများ နှင့်အနီး အနားပတ်ဝန်းကျင်ရှိ ဖရိယာ များတွင် ဆောက်လုပ်ရေးနှင့် စက်မှုလုပ်ငန်း များအတွက် ဘိလပ်မြေလိုအပ်ချက်ကို ဖြည့်ဆည်းပေးရန် ရည်မှန်းထား ပါသည်။

ထို့အပြင် တူးမြောင်းသည် အနီးအနားဝန်းကျင်ဒေသများတွင် ရုတ်ချည်းရေလျှံခြင်းကို လျော့နည်းစေခြင်း အတွက် အထောက်အပံပေးပါသည်။ လက်ရှိဘိလပ်မြေစက်ရုံ စီမံကိန်းအတွက် အပြည့်အဝကတိခံထား သည့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အား အရည်အချင်းပြည့်မှီသည့် အင်ဂျင်နီယာများနှင့် အတတ်ပညာရှင်များဖြင့် ဖွဲ့စည်းထားမည်ဖြစ်ပါသည်။

နည်းပညာပိုင်းဆိုင်ရာလေ့လာမှုများနှင့် ပတ်ဝန်းကျင်၊လူမှုဝန်းကျင်နှင့် ကျန်းမာရေးထိခိုက်မှု ဆန်းစစ်ခြင်း အရ ထောက်ခံထားသော ပတ်ဝန်းကျင် စောင့်ကြပ်ကြည့်ရှုရေးနှင့် ကျန်းမာရေး၊ ဘေးကင်းလုံခြုံရေးနှင့် ပတ်ဝန်း ကျင်စီမံခန့်ခွဲမှု အစီအစဉ်အား စီမံကိန်းဖော်ဆောင်သူမှ စိတ်အားထက်သန်စွာဖြင့် အပြည့်အဝ အကောင်အ ထည်ဖော်ဆောင်ပါက MCLဘိလပ်မြေစက်ရုံသည် ပတ်ဝန်းကျင်အပေါ် ကောင်းသော သက်ရောက်မှုများ ရှိမည်ဖြစ်ပါ သည်။

CHAPTER I INTRODUCTION

The Resource & Environment Myanmar Ltd. or "the Consultant" has been invited by "the Client", SCG Cement (SCG) and Pacific Link Cement Industry (PLCI) to propose for Environmental, Social and Health Impact Assessment for the proposed Captive Power Plant for Mon State of the southeastern part of Myanmar. Later SCG and PLCI has established the joint venture company as Mawlamyine Cement Limited (MCL). In support and approval of EIA, the Consultant will collect and analyze physical, biological and social data like people's perceptions, concern, opinion, and expectation on the project for the approval of clean environment and guiltless society during and after the development of the project.

The EIA report for fully integrated cement plant project was submitted to Myanmar Investment Commission in 2013 and MCL received permission letter from MIC on 7 May 2013. At present, the cement plant and captive power plant (9MW Waste Heat and 40MW (20MW x 2) coal based thermal power plant have been constructed together with the operation of limestone quarry for the provision of raw materials for cement manufacturing and jetty and jetty for transportation of products.

According to the meeting between the developer and the officers from Environmental Conservation Department, Ministry of Natural Resources and Environmental Conservation, the EIA report shall be updated based on EIA procedures (2015).

The fully integrated cement plant Project herein referred to as "the Project" includes the following main components:

- Construction and operation of 5000 ton per day cement plant
- Operation of the quarry site within the existing concession area
- Construction and operation of captive power plant (9MW Waste Heat and 40MW (20MW x 2) coal based thermal power plant, and
- Construction and operation of jetty

Besides, according to the EIA procedure, ECD decided that individual EIA report for cement plant, quarry and captive power plant shall be submitted.

Thus, this Report represents the Environmental, Social and Health Impact Assessment (EIA) for construction and operation of captive power plant (9MW Waste Heat Generator and 40MW (20MW x 2) coal based thermal power plant and was prepared in order to meet compliance with national and international requirements, such as International Finance Corporation (IFC) Performance Standards (PSs).

It is underlined that the Project has been classified by IFC as Category B project.

1.1 Purpose and Scope

The main purpose of this proposed project is to fulfill the local demand of cements for any construction related activities and to create a local cement market for national economic development.

The main objectives are:

- 1. To produce high quality cement in local
- 2. To reduce the importation of cement and related material of Myanmar.
- 3. To fulfill the cement required for the local consumer and developer in Myanmar

- 4. To create job opportunities for people in Myanmar especially who lives near the factory location.
- 5. To provide directly and/or indirectly for the improvement of national economic development
- 6. To raise the industrial production development sectors
- 7. To increase technology advancement in the country and interact both national and international levels.

Resource & Environment Myanmar Co., Ltd. (REM) was appointed by MCL as an Environmental and Social Consultant to establish the updated EIA report for the present Captive Power Plant Project under the scope to assess the environmental and social effects of the Project and other existing and planned activities in the area related to the Project, including any associated facilities and prepared in compliance with national and international requirements, namely the IFC PS and World Bank (WB) Group's Environmental Health and Safety (EHS) Guidelines with the general objectives as the following:

- Identify the social and environmental components likely to be affected by the proposed Project activities;
- Describe the baseline environmental and social conditions of the Project site and its surroundings within the Area of Influence (AoI) potentially affected by the Project through direct and indirect affected impacts;
- Determine the significance of impacts;
- Provide an analysis of the environmental, social, and health and safety aspects of the Project according to the international applicable standards; and
- Highlight the positive impacts of the Project and address the negative ones, developing mitigation measures as to minimize pollution, environmental disturbance, and nuisance during construction and operation.

1.2 Report Organization

This document is outlined as follows:

Chapter 1: provides a general introduction to the Project, the Scope of Work (SoW), and a brief description of the adopted methodology;

Chapter 2: provides the most relevant regulatory information. The pertinent and applicable regulations and standards on environmental & social aspects are described in agreement with local guidelines and regulations and the international IFC PSs and WB EHS Guidelines;

Chapter 3: presents a description of the Project, including the characteristics of the proposed works and related activities. The consideration of the alternatives which are taken into account during the design phase of the Project are also presented;

Chapter 4: discusses the physical, biological, and socio-economic baseline conditions at the project site and surrounding areas, prior to the Project execution. Assembling and analysing the baseline data/information allowed to identify the critical environmental variables, which may be affected by Project-related actions and to avoid considerable impacts unrelated to the areas and sites of interest;

Chapter 5: presents the plans for Stakeholder Engagement and Public Consultation Activities as part of the EIA for the present project

Chapter 6: identifies, evaluates and quantifies any potential environmental and social impact relevant to both construction and operation phases of the present Project and indicates the mitigation measures to be adopted in order to avoid or, when avoidance is not feasible, reduce the identified impacts.

Chapter 7: presents the framework Environmental Social Management Plan (ESMP) prepared for the Project and based on the main findings of the EIA process;

Chapter 8: describes the Environmental Monitoring Plan and

Chapter 9: describes the conclusion.

1.3 EIA Methodology

The present Report was developed following the EIA guidelines and included:

- a clear description of the proposed Project including its objectives, design concepts and proposed natural resources uses;
- description of the Project alternatives and selection criteria;
- description of the baseline conditions in the Project area to cover the physical location, environmental settings, social and economic issues;
- a description of the legal, policy and institutional framework within which the proposed project will be implemented;
- details of the anticipated impacts to the environment, social and economic aspects of the area covered by the project;
- appropriate mitigation and/or corrective measure plan; and
- development of a framework ESMP presenting the Project activities, potential impacts, and mitigation actions to be taken to bring the Project in line with the IFC standards.

The main objective of this methodology was to identify impacts resulting from the proposed Project based on the baseline conditions established during the field works and information obtained from the documents reviewed.

1.4 Documentary Review

A certain number of Project-related documents were reviewed for a clear understanding of the terms of reference, environmental status of the Project area, demographic trends, land use practices in the affected areas, development strategies and plans as well as the applicable policy and legal framework. Some of the reviewed documents include:

- design Reports and associated documents provided by MCL
- relevant Legal, Policy and Regulatory documents;
- EIA Cement Industry Guidelines developed by World Business Council Sustainable Development (WBCSD) within Cement Sustainability Initiative (CSI); and
- IFC PSs and WB EHS Guidelines.

1.5 Field Survey

Field surveys were conducted by the project teams to assess the physical and biological environment of the Project area as well as the Project Affected Parties (PAPs). The fieldwork was aimed at determining the anticipated positive and negative impacts in terms of physical and biological environment (hydrology, climatic patterns and water resources related aspects), social and economic trends, (population trends, settlement trends, economic patterns, cultural setting and linkages, land ownership issues, etc.).

Specific objectives of the field survey included:

- obtaining any available information and data from the local public offices on the AoI environment, water, lands and agriculture;
- evaluating the environmental setting in the AoI. General observations were focused on the topography, land use trends, surface water sources, public amenities, land cover, climate, settlements, forests, soils, etc.;
- evaluating social, economic and cultural settings in the Project areas; and

• Undertaking consultative public participation exercises to reach a large section of the PAPs as well as other stakeholders, with the purpose to inform them about the Project and collect their feedback and concerns.

1.5.1 Detailed EIA Study Activities

A clear picture of the environmental and social baseline status was achieved also through interviews and physical inspection of the entire Project area. The baseline conditions provided the starting point for the impacts predictions and benchmark for the mitigation measures. Details and outputs of the activities are outlined in the sections below and include:

- review of the proposed project details for understanding the project magnitude;
- establishment of the current baseline conditions to provide a documented foundation for the impact assessment and a benchmark for the development of mitigation measures;
- update of the legislative and regulatory requirements as a basis for drawing a compliance monitoring protocol for the construction and commissioning phases;
- environmental and social impacts assessments for the identification of significant impacts to the environment and the nearby communities; and
- environmental management plan on mitigation measures, responsibilities, timeframes, environmental costs and a comprehensive environmental management plan.

1.5.2 Stakeholder and Public Consultations

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organisations and groups with special interests, the academic community, or other businesses.¹

As part of the EIA preparation process, a certain number of public consultations and meetings have been organized to present to the stakeholders of the Project, as the preliminary outcomes of the EIA and collect feedback. These stakeholder meetings have been organized also as part of the public consultation requirements foreseen in the national EIA approval process. A presentation of the public consultations carried out is given in Chapter 5 with engagement plan as well.

The objectives of stakeholder engagement is to explore options to avoid, minimize and/or mitigate Project impacts with Project stakeholders in particular affected communities, which are categorized stakeholders by their thematic relevance, priority, when/where/how they will be impacted by the Project and how they would influence the Project, their inter-relationships and dynamics, and the size or level of operation.

1.5.3 Reporting

The reports (draft and final) were done within pre-agreed time frames to meet with the requirements of ECD. The report schedule included a draft final EIA study report and final EIA study report.

The present document is the Draft Environmental & Social Impact Assessment study submitted to ECD for comments.

¹ International Finance Corporation Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets

1.6 Organizations for Establishment and Implementation of EIA Report

In developing the project, the processes and methods which were specified by REM consultant team to be compliance with national and international standards and implemented by the project owner, MCL project E&S implementation team.

1.6.1 MCL Organization for EIA Implementation

The project proponent (MCL) consists of 5 departments/divisions which are Production dept., Maintenance dept., Quarry dept., Human Resources dept. and Operation Administrative Dept. Sustainable and Organization Development Section is responsible for environmental, health and safety management as well as Community relation. This department, which is directly under supervision of managing director, is responsible for grievance adjustment, support of the community, CSR activities etc.

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Address:	Khayongu-Chaungnakwa Road, Kwanngan village Tra	
	Kyaikmayaw	
	Township, Mon state, Myanmar	
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SOD Officer:	Ms. Myat Aye Tun	
E-mail:	myatayet@scg.com	
SOD Officer:	Ms. Aye Mya Thidar	
E-mail:	ayemyath@scg.com	

1.6.2 Consultant Organization of Environmental Impact Assessment

Resource & Environment Myanmar Ltd (REM) is in Yangon, Myanmar, and it is a leading resources and environment consulting firm in the country. The company members are composed of environment, society and earth resources management and other related subjects. Its predecessor was a research team founded in 1998 in University of Yangon, the team members were ecologists, social economists, geologists, doctors, economists, and data management staff. In 2003, an environmental impact assessment team was established; the team members are retired and current professors and scientists who have strong interest in environmental and resource management.

After five years of cooperation in several projects with the scientists from various subjects of University of Yangon (such as environmental data collection, oilfield development evaluation, construction of offshore oil & gas production base, beach resorts and onshore gas pipelines, etc.), the Resource & Environment Myanmar is registered under the current laws and regulations in Myanmar, the company can provide systematic services for a variety of major infrastructure projects under the request.

The company can provide environmental impact assessment, social and health impact evaluation for private or government authorities` projects. In addition, the Company can also deliver geotechnical engineering, geological and hydrogeological survey, and soil investigation, geological hazard assessment (potential landslide risk figure, seismic hazard assessment, and flood risk map). The company currently has nine research groups, including ecology, plants, soil and water, social investigation, cultural heritage, public health, risk, information management and atmospheric research, a total of 33 experts and has passed ISO9001:2008 No. 686750 certified laboratory's

assistance. In recent years, the company has delivered environmental impact assessment services for such projects as Shweli River two-stage hydropower station project, Yangon municipal development planning and Thilawa class A of special economic zones and three 500MW gas turbine projects.

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Designation	:	General Manager	
	Address Telephone Facsimile Email Contact Person Designation	Address:Telephone:Facsimile:Email:Contact Person:Designation:	

1.7 EIA Team Members

The EIA study team comprises members who have been involved in numerous environmental related studies. The personnel are well trained and qualified in their respective field. Please refer to Table 1-for detail information about the members in the study team. Curriculum Vitae of each member were attached in Annex 1-1.

Sr.No.	Name	Field of Study	Responsibility
1.	Dr. Win Maung	Principal Consultant	Ecology (Fauna)
2.	Dr. Saw Pyone Naing	Principal Consultant	Traffic, Land use, Social Impact
3.	Daw Khin Ohnmar Htwe	Principal Consultant	Socio-Economic
4.	U Zaw Naing Oo	Principal Consultant	Environmental Management Plan
5.	U Kyaw Zin Win	Principal Consultant	GIS and Physical Environment
6.	Dr. Myint Aung	Principal Consultant	Ecology (Flora)
7.	Dr. Thiha Soe	Principal Consultant	Mining Geology
8.	U Soe Yu Htun	Senior Consultant	Physical Baseline Data Collection
9.	U Kyaw Naing Oo	Senior Consultant (Ecology)	Wildlife
10.	U Ngwe Moe	Principal Consultant	Environment, health and safety
11.	Dr. Tin Tin Khaing	Principal Consultant	Ecology
12.	Dr. Sandar Win	Principal Consultant	Ecology
13.	U Chit Myo Lwin	Senior Consultant	Physical Environment
14.	U Nyan Lin Maung	Senior Consultant	Ecology
15.	U Thura Aung	Principal Consultant	Environmental Geology
16.	Dr. Nyomie Razak	Principal Consultant	Cultural Heritage
17.	Daw Lai Lai Win	Principal Consultant	Impact Assessment and Reporting

Table 1-1 EIA Team Members

CHAPTER 2

LEGAL FRAMEWORK

Legislation of Myanmar and international standards for the issues of interest are presented in the following sections in order to figure out a set of regulatory or reference limits and to address the best management practices for each considered environmental and social aspects relevant for the Project.

Legislation will be required or chosen for the implementation of a policy if:

- existing rights and obligations are to be modified
- the policy is to have long term operation
- the policy is of a very high level of importance.

2.1 Myanmar Law and Regulation (Background)

Myanmar already had some legislations and regulations which are, the more or the less, relating to natural environmental aspects since before its independence. The Forest Act and the Burma Wildlife Protection Act, for example, have been enacted respectively in 1902 and 1936 for the sustainability of the forest products. Amended versions of such earlier act and newly promulgated one are briefly outlined to give a perspective on the existing legal and administrative framework concerning the environmental affairs in Myanmar.

National Commission on Environmental Affairs (NCEA) was formed in 1990 with the purposes of setting environmental standards and creating environmental policies for utilizing natural resources and controlling environmental pollutions.

NCEA has adopted a National Environmental Policy in 1994 to ensure the incorporation of environmental concerns in planning for economic development. The NEP emphasizes "the responsibility of the State and every citizen to preserve its natural resources in the interest of present and future generations". In accordance with Notification No. 26/94 made in 1994, National Environmental Policy was stated as follows.

"To establish sound environment policies, utilization of water, land, forests, mineral, marine resources and other natural resources in order to conserve the environment and prevent its degradation, the Government of the Union of Myanmar hereby adopts the following policy: The wealth of the nation is its people, its cultural heritage, its environment and its natural resources. The objective of Myanmar's environmental policy is aimed at achieving harmony and balance between these through the integration of environmental considerations into the development process to enhance the quality of the life of all its citizens. Every nation has the sovereign right to utilize its natural resources in accordance with its environmental policies; but great care must be taken not to exceed its jurisdiction or infringe upon the interests of other nations.

It is the responsibility of the State and every citizen to preserve its natural resources in the interests of present and future generations. Environmental protection should always be the primary objective in seeking development".

The commission also formulated a blueprint, the Myanmar Agenda 21, in 1997 in response to the call of the Earth Summit to develop national strategies to implement the Global Agenda 21. This document may serve as a framework for integrating environmental considerations in future national development plans as well as sectorial and regional development plans in Myanmar with the purpose of securing the aims of sustainable development.

The *Myanmar Agenda 21* is divided into 4 Parts and 19 Chapters and encompasses a broad range of sectors and issues. Building on the National Environment Policy, the agenda takes into consideration the programme guidelines found in the *Global Agenda 21* and is aimed at strengthening and promoting systematic environmental management in the country.

Most importantly, the *Myanmar Agenda 21* makes recommendations for the drafting and promulgation of a framework law which can further promote the integration of environmental and developmental concerns in the decision-making processes of the country.

Environmental management in Myanmar is founded on the National Environmental Policy (1994), the Constitution of the Union of Myanmar (2008), and the Environmental Conservation Law (2012).

No	Name of Convention/Protocol/Agreement	Date of Rectification
1	Plant Protection Agreement for the South-East Asia and the Pacific Region,	4-11-1959 (Adherence)
	Rome, 1956	
8	United Nations Framework Convention on Climate Change, New York,	25-11-1994 (Ratification)
	1992 (UNFCCC)	
	The Kyoto Protocol (international agreement linked to the UNFCCC),	13-08-2003 (Ratification)
	Kyoto, 1997	
9	Convention on Biological Diversity, Rio de Janeiro, 1992	25-11-1994 (Ratification)
	The Paris Agreement, Paris, 2015	19-09-2017 (Ratification)
12	International Tropical Timber Agreement (ITTA), Geneva, 1994	31-1-1996 (Rectification)
13	Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985	24-11-1993 (Rectification)
14	Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal,	24-11-1993 (Rectification)
15	1987 Lander Arrendment to the Mentreel Protocol on Substances that Devicts the	24 11 1002 (Destification)
15	London Amendment to the Montreal Protocol on Substances that Deplete the	24-11-1995 (Reculication)
16	The Convention for the Protection of the World Culture and Netural	20.4.1004 (Acceptones)
10	Heritage Paris 1972	29-4-1994 (Acceptance)
20	Agreement on the Networks of Aquaculture Centres in Asia and the Pacific.	22-5-1990 (Accession)
20	Bangkok, 1988	
21	South East Asia Nuclear Weapon Free Zone Treaty, Bangkok, 1995	16-7-1996 (Rectification)
- 22		
22	United Nations Convention to Combat Desertification in Those Countries	02-01-1997 (Accession)
	Experiencing Serious Drought and / or Desertification, Particularly in Africa,	
- 22	Paris, 1994 (UNCCD)	12 (1007 (1
23	Convention on International Trade in Endangered Species of wild Fauna and Eleme Weshington, $D = 1072$, and this accounting as arounded in Dem	13-6-1997 (Accession)
	Cormony 1070 (CITES)	
20	ASEAN Agreement on Trans boundary Here Dellution	12 2 2002 (Pastification)
20	Kuete Drotocol to the Convention on Climate Change Kuete 1007	13-3-2003 (Recuircation)
21	Stockholm Convention on Dereistant Organic Delleterts (DODs), 2001	15-6-2005 (Accession)
51	Stocknoim Convention on Persistent Organic Pollutants (POPs), 2001	18-4-2004 (Accession)

Table 2.1-1: Associated International Convention, Protocol and Agreements

2.2 National Applicable Laws by Mawlamyine Cement Limited

MCL will strictly follow the following national applicable laws along with the attached articles, rules and regulations in details.

Legislation	Laws/Rules/	MCL Commitments	Project Relevant
Section	Guidelines		Sections
Administrativ	ve		
1	The Constitution of Union of Myanmar (2012)	The project will act to be a good citizen in compliance with the duties.	Sect. 24, 37 (a, b,c), 42 (a, b), 390 (a, b, c, d)
2	The Territorial Sea and Maritime Zones Law, 1977	No ballast, rubbish or other wastes will be discharged at Myanmar ports.	Sect. 3-5
3	The Explosive Substances Act, 1908	The project shall not unlawfully and maliciously cause by any explosive substance an explosion of a nature likely to endanger life or to cause serious injury to property.	Sec. 3, 4 (a, b, d, e), 5
4	The Explosives Act, 1887	The project shall obtainrelevantgovernmentpermissions.	Sect. 1, 2, 3, 4, 5, 6, 30 (a, b)
5	Myanmar Investment Law (2016)	The project owner will obtain permit or endorsement accordance with the law.	Sec. 50 (a, d), 51 (a, b, c, d), 65 (g, I, j, k, l, m, n, o, p, q), 78
Agriculture I	Land		
1	The Farmland Law, 2012	The project shall obtain relevant government permissions and registration for paddy land for other use.	Sect. 7, 30. (a, b)
2	The Land Acquisition (Mines) Act. 1885	The project shall obtain relevant government permissions.	Taking Possession, section 16, 17, Acquisition of Land for Companies, sect. 38A and 44B, Determination of Compensation Rate, Sect. 23-25
3	The Vacant, Fallow, and Virgin Lands Management Law, 2012	The project shall obtain relevant government permissions for land use and purpose.	Right to Cultivate or Utilize Vacant, Fallow and Virgin Lands, Sect. 4 (d), 5 (a-e),6 (a-d) 7, 8, 9, 10 (d), 12, 16 (a)-(g), 23, (a-c), 24, 25 (a)-(c), 26, 27, 28, 29
4	National Land Use Policy (2016)	The project shall obtainrelevantgovernmentpermissions.	Objectives
Cultural			
	The Protection and	The project shall shide by the	Sect 13 (a) (b) (c) 16
I		The project shall ablue by the	5000, 15(a), (0), (0), 10,

 Table 2.2-1: Existing National Applicable Laws/Regulations

	Preservation of Cultural Heritage Regions Law (1998)	provisions of other existing laws and also apply to the Department in accordance with stipulations to obtain prior permission within ancient monumental zone. The antique object is valuable	18, 22
2	The Protection and Conservation of Antique Objects Law, 2015	for national heritage. So, anybody has to inform if he or she has found any antique object.	Purpose, Sect. 3 (a)-©, Sect. 12, 16, 19, 20, 25
3	The Protection and Preservation of Ancient Monuments Law (2015)	The proponent will inform to the nearest village and township administration department if found out an ancient building of 100 years or more of age without owner on the ground, underground, above the water or under water, if the building is recognized as or believed to be an ancient monument.	Sec. 12, 15 (b), 17,18, 19, 20 (b), 21, 23, 24, 25, 26, 30
City Develop	ment		
1	Mon State Municipal Law (2017)	Mon State Parliament enacted this law in June 2017. The sections 48 (d)-(f), 49 (a), 50 (a)-(c) and 52 (g) are related to this project. The section 48 and 49 illustrate the duties and responsibilities of the committee to encourage the factories to proper effluent discharge and solid waste disposal. The section 50 provides the laws transport vehicles while 52 sub-section (g) mentions construction of road.	Sect. 48 (d)-(f), 49 (a), 50 (a)-(c), 52 (g)
Finance & Re	evenue		
1	The Myanmar Citizen Investment Law (2016)	The project shall obtain relevant government permissions.	50 (d), 51, 69 (c)-(n), 73
2	Rules (2017)		202, 203, 206
Forestry			
1	The Forest Law, 2018	The project proponent will obtain the approval of Ministry if the project area is included in the forest land or the land administrated by the	Sect. 12 (a) (b)

		government which covers the	
Health		101051.	
1	The Public Health Law (1972)	The project proponent make ensure the public health include not only employees but also resident people and cooperation with the authorized person or organization of health department.	Purpose, Sect. 3 (1), 4, 5
2	Prevention and Control of Communicable Disease Law (1995)	The proponent make ensure the healthy work environment and prevention the communicable diseases by the cooperation with the relevant health department.	Objectives Prevention, Sect. 3 (a-c), 4, 9, Measures taken in respect of an outbreak of Principal Epidemic Disease, Sect. 11
3	The Control of Smoking and Consumption of Tobacco Product Law (2006)	The project owner will arrange the specific place for smoking in the operation area and keep the caption and mark in accordance with the stipulations.	Sec: 7, 9 (Sub sect: a, b,c,d)
Industry Sect	or		
1	The Private Industrial Enterprise Law, 1990	The project shall understand to obey the prohibitions, offences and penalty for industrial operation process.	Basic Principles, Sect. 3 (a), (b), (d)-(g), 4, 13 (b, e, f, g), 15 (a, b) Prohibitions Sect. 26 Offence and Penalty Sect. 28 (a), (h), (c), 29 (a), (h), (c)
2	The Factories Act (2016)	The project proponent will strictly follow the guidelines to keep clean and free from effluvia arising from any drain, privy or other nuisance and provide the canteen for foods and sheds for rest time and the particular room while the workers are sick.	Sec. 13 (a-e), 15 (1), 16 (1), 18 (1), -19 (1), 20, 21, 23 (1), 36, 40 (4,5), 48, 49, 50
3	Petroleum Act (1934)	The project shall import, transport, store or distribute any petroleum save in accordance with the rules.	Sec. 3 (Sec: 1, 2) Sec. 4
4	Petroleum and Petroleum Products Law (2017)	The project shall have the licenses for exportation, importation, transportation, transit, storage, refinery, distribution, testing of petroleum and any petroleum products must be obtained from	9 (a)-(d), 10 (a), (b), (d), (e)

		the relevant ministries.	
5	The Petroleum Rules (1937)	The project proponent shall take all due precautions at all time to prevent accident by leakage, or fire or explosion or discharge when using and stored the petroleum and its related materials including all the empty tanks or other receptacles which contained petroleum for vehicle uses and other purposes during the project construction and operation in accordance with the rules.	Prohibition: 7 and 8
6	The Export and Import Law (2012)	No the project shall export or import restricted, prohibited and banned goods.	Sec. 5,6,7
7	Industrial Use Explosive Substances (2018)	The project proponent shall get the relevant Departmental permissions for import, usage, storage and transportation of mining explosive substances for industrial production purpose.	Chapter I: Definitions Chapter II: Objectives Chapter III: Requesting and getting the permissions for the land for store area, import, usage and storage of explosive substances for industrial purpose. Section: (4-9) Chapter IV: Registration of license after inspector's checklists complement and renew the license once a year before 30 day to expired. Section: (10-14) Chapter V: The responsibilities of license holders Section: (15-16) Chapter VI: The responsibilities of Inspector Section: 17 Chapter VII: Prohibitions Section: (18-21) -Not to refuse the inspector's investigation -Not to import, store and transport any explosive substances that are not consistence with this law -Not to destroy any

			explosive substances without the permission from ministry of defense -Not fail to implement the rules, regulations and guidelines by this law -Not to store the explosive substances in area without holding license. -Not to store the additional amount more than the permitted one -To inform the nearby police station if any explosion occurred -Not to store without renewing license when expired. Chapter VIII: Offenses and Penalties Chap. IX: Miscellaneous Objectives, (a), (c), (e), (f) Boiler Registration						
8	The Boiler Law (2015)	The project proponent shall get the relevant Departmental permissions for extraction, usage, storage and transportation of mining explosive substances for industrial production purpose.	Boiler Registration Sect. 5, 6, 8, 10, 11 Duties and Rights of the Owner, Sect. 12-24, Duties and Rights of Boiler Attendant Sect. 29, Void of Certificate and Provisional Order Sect. 53, 59, 60-63, Offence and Penalty, Sect. 64-68, 70-73						
Labour			,						
1	Labour Organization Law (2011)	The project owner will give the right to the labour organization to carry out freely in drawing up their constitution and rules, in electing their representatives, in organizing their administration and activities or in formulating their programmes.	Rights and Responsibilities of the Labour Organization, Sec. 17, 18, 19, 20, 21, 22, 23						
2	Settlement of Labour Dispute Law, 2012	The project owner shall not fail to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause and no alter the conditions of service relating to workers concerned in such	Sec. 38, 39, 40, 51						
EIA Report for Captive Power Plant (9MW	Waste	Heat a	and 4	40 MW	(20MW	x 2)	Coal	Based	Thermal
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Power Plant for Mawlamyine Cement Limited									

		dispute at the consecutive		
	Employment and	The project proponent will provide the suitable trainings		
3	Skill Development Law (2013)	and activities to improve the skill of employees in relevant practical field.	Sec. 5 (a)-(h), 14, 30 (a, b)	
4	The Minimum Wages Law (2013)	The project proponent shall not pay wage to the worker less than the minimum wage stipulated under the law.	Sec. 12 (a-e), 13 (a-g)	
5	The Leaves and Holiday Act (1951)	The project proponent will follow the prescriptions for the rights of the workers in a private enterprise which are granted the following leaves and holidays' 6 days casual leave, 30 days medical leave, 10 days earned leave, and 21 public holidays in a year with wages. In addition, women workers in private enterprises covered by the Social Security Act 1954 are granted maternity leave with paid wages.		
6	The Law Amending the Workmen' Compensation Act, 1923 (Amended in 2005)	This act is to provide for the payment by certain classes of employers to their workmen of compensation for injury by accident.		
7	The Payment of Wages Law (2016)	The project proponent shall pay wages to the workers employing as stipulations of Central Bank of Myarmar with the necessary to pay particular benefit, profits and opportunities for workers working in commerce, production and service businesses and overtime wages.	Sec. 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 18	
8	Labour Welfare Law, 2012	The project will manage according to the said law for labour welfare issue.	11 (a), 15, 18, 48 (b), 49, 75	
9	Myanmar Insurance Law	The project will compensate for all the general damages to the environment and injuries to public to ensure the needed insurances such as making insurance for the project owned vehicles and injured person.	Sec: 15 and 16	
10	Workmen Compensation Law (1923)	This act is to provide for the payment by certain classes of employers to their workmen of compensation for injury by accident.		
Livestock and	l Fisheries Sector			
1	The Freshwater Fisheries Law, 1992	The project will not violate any prohibitions related to aqua species.	22 (c), 34 (a), 35, 36, 39, 40, 41, 43, 45, 46, 47, 48	

2	The Myanma Marine Fisheries Law, 1990 (The Law Amending the Myanma Marine Fisheries Law, 1993)	The project will follow any requirement and take actions to conserve and protect the marine organisms.	Prohibitions, Sec. 34, 36, 40, 41 Penalties, Sec. 43,45-47
3	The Law Relating to Aquaculture, 1989	No the Project shall do the following: -obstructing navigation and -flowing of water or polluting the water within the fisheries water or -abetting such acts;"	Sect. 29, 31
4	The Conservation of Water Resources and Rivers Law 2017	The project shall not carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks and cause the wastage of water resources willfully without disposing any harms to water resources.	Sec. 8, 9, 11, 12, 13, 14, 19, 21, 22, 23, 24, 26, 27, 28, 29, 30
Environment			
1	National Environmental Policy (1994)	The project proponent will follo law to achieve harmony and economic, natural resources and integration of environmental development process enhancing to its citizens.	bw any stipulations of the balance between socio- environment through the considerations into the the quality of the life of all
2	The Environmental Conservation Law (2012)	The project will comply the duties and powers relating to the environmental conservation of relevant Ministry and follow any stipulation to conserve the environments.	Sec.7 (d), (o), Environmental Conservation Sec. 10, 12, 14,15, Prior Permission, Sec. 24, Prohibitions, Sec. 29
3	Environmental Conservation Rules (2014)	carry out any activity which can damage the ecosystem and the natural environment	69 (a, b)
4	The EIA Procedure (2015)	The project proponent will prepare an IEE report with the relevant sections and fully commitments, correctly and timely action to build a suitable EMP framework for the project impacts and monitoring and management plan that will meet to approve from relevant department.	32, 33, 24, 35, 77, 78, 79, 82, 83, 84, 86, 87, 88, 91, 92, 93, 94, 95, 96, 100, 102-110, 113, 115, 117, 123, 128
5	Environmental and Social Impact Assessment Guidelines (2014)	The project proponent will submit a standalone document with the required identification and management of impacts from the project on affected	Chap. 1 and 2

		communities and stakeholders		
		and the preparation of an		
		international standard ESIA.		
		The project proponent will	For air emission and	
		follow and comply the	condition (Ambient)	
		following target level of each	Cement and	
	National	component Each quantitative	manufacturing section	
	Environmental	target value to be applied is	MARPOL 83/87 I, II, IV	
6	Quality (Emission)	described below.	and VI for waterway	
	Guidelines (2015)	1. Air Quality	transportation will be	
		2. Water Quality	complied. Noise and	
		3. Noise	vibration will be	
		4. Vibration	complied with industrial	
			production section.	
		The project shall not cause		
	The Protection of	unacceptable impacts to		
	Wildlife, Wild Plants	Protected Area protected	35, 36, 39 (a) (d) (e), 40	
7	and Conservation of	habitats and species. The	(a)-(c), 41 (a, b)	
	Natural Area Law	project shall ensure the		
	(2018)	protection of natural areas and		
		wildlife and wild plants which		
		The project proponent will		
		strictly follow when chemicals		
	The Prevention of	and related substances is to be		
8	Chemical and	transferred, stored, used, or	15 (a, b), 16, 17, 22, 23	
0	Related Substances	disposed, operating approval	(a), 27	
	Law (2013)	certificate in accordance with		
		international treaties		
Transportatio	on Sector	international treates.		
-		The proponent shall comply an		
	The Highways Law	interactive general guides and		
1	2015	regulations that citizens shall	Article 8, 9, 17	
		follow when using the Highway		
	The Motor Vehicle	The project proponent promises	to abide by the nearly all	
2	Law (2015) and	provisions of said law and rules.	especially, the provisions	
	Rules (1987)	related to air pollution, noise poll	ution and life safety.	
Socioeconomi	ic Sector	<u>^</u>		
	.	The project proponent will	Formation of the	
	Protection the Rights	make ensure to disclose to the	Ministry and	
1	Nationalities I aw	about the project fully	Appointment of the	
	(2015)	moreover, to ensure cooperate	Union Minister,	
		with them.	Sect. 5, 14, 22, 23, 24	
		The Project owner will create	Sect. 11 (a), 15 (a), 18	
2	Social Security Law	the social security for the	(b), 48 (a, b, c),	
		employees and ensure the	49 (a, b), 75 (a,b,c)	

		social security for employees of the project and register to the social security offices and to pay the prescribed funds.	
3	The Fire Force Law (2015)	The project proponent will follow the rules and precautions to prevent fire hazard.	Fire Precaution and Prevention Works, Sect. 18 (c), (d), (f), Prohibitions, Sect. 25, Penalties, Sect. 35
4	The Fire Service Law (2015)	The project proponent will get the granting permission from the relevant department.	Sec. 18 (c, d, f), 25, 35
5	The Consumer Protection Law (2014)	The project will cause fulfillment of goods or services that enable to ensure the high quality for safety, health, satisfaction of the consumer and not carry out the production, trade of illegal and prohibited goods.	Sec. 8 (a,b,c,d,e,f,g,h,i,j) Sec. 9 (a,b,c,d,e,f,g,h) Sec. 11, 12, 15
Myanmar En	gineering Council Law		
1	Myanmar Engineering Council Law (2013)	The project will hire the registered engineers and technician for the industrial processing related with engineering work.	The Duties and Rights of Registered Engineers, Graduate Technologists and Technicians 31, 34, 37 Prohibitions and Penalties 37

2.3 National Environmental Quality (Emission) Guidelines (2015)

MONREC formulated the National Environmental Quality (Emission) Guidelines (NEQG) in coordination with ADB in December 2015. The NEQG determines the guideline values for general emission such as air emissions, wastewater, noise levels, odor, and those for sector-specific emission such as emission from forestry, agribusiness/food production, chemicals, oil and gas, infrastructure, general manufacturing, mining and power generation.

Emission guideline and target values of ambient air quality, air emission, wastewater, and noise levels were set in NEQG, while other standards have not been set yet by MONREC.

MCL will follow and comply the following target level of each component. Each quantitative target value to be applied is described below.

- 1. Air Quality
- 2. Water Quality
- 3. Noise

2.3.1 General Application for Ambient Air Quality

(1) Target Value of Ambient Air Quality

On the basis of the above standards, the target value for air quality in the Project, as shown in **Table 2-1** has been set with the following considerations:

Target parameters of ambient air quality in Myanmar's standards are applied if it has set (SO₂, NO₂, $PM_{2.5}$, and PM_{10}).

The averaging period adopted is 24 hours, which could be measured using the available equipment in Myanmar whereas currently it is impossible to implement continuous measurement for one month or one year at the project site due to battery/electrical capacities.

The power transmission and distribution sector does not typically give rise to significant effluents or air emissions. The major emission during construction period is only dust and exhaust gas from vehicles. Therefore, MCL will comply with General Guidelines for air quality.

Parameter	Averaging Period	Guideline Value μg/m ³
Nitrogen Dioxide	1-year	40
	1-hour	200
Ozone	8-hour daily maximum	100
Particulate Matter PM10 ^a	1-year	20
	24-hour	50
Particulate Matter PM2.5 ^b	1-year	10
	24-hour	25
Sulfur Dioxide	24-hour	20
	10-minute	500

 Table 2.3-1: Air Emission Level Set in NEQG

^a Particulate matter 10 micrometers or less in diameter

^b Particulate matter 2.5 micrometers or less in diameter

2.3.2 General Application for Effluent

Table 2.3-2: Wastewater, Storm Water Runoff, Effluent and Sanitary Discharges (general application)

Parameter	Unit	Guideline Value
5-day Biochemical oxygen demand	mg/l	50
Ammonia	mg/l	10
Arsenic	mg/l	0.1
Cadmium	mg/l	0.1
Chemical oxygen demand	mg/l	250
Chlorine (Total residual)	mg/l	0.2
Chromium (hexavalent)	mg/ls	0.1
Chromium (total)	mg/l	0.5
Copper	mg/l	0.5
Cyanide (free)	mg/l	0.1
Cyanide (total)	mg/l	1
Fluoride	mg/l	20
Heavy metal (total)	mg/l	10
Iron	mg/l	3.5
Lead	mg/l	0.1
Mercury	mg/l	0.01
Nickel	mg/l	0.5

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Oil and grease	mg/l	10
pH	S.U. ^a	6-9
Phenols	mg/l	0.5
Selenium	mg/l	0.1
Silver	mg/l	0.5
Sulphide	mg/l	1
Temperature increase	°C	<3b
Total coliform bacteria	100 ml	400
Total phosphorus	mg/l	2
Total suspended solids	mg/l	50
Zinc	mg/l	2

³ Pollution prevention and abatement handbook. 1998. Toward cleaner production. World Bank Group in collaboration with United Nations Environment Programme and the United Nations Industrial Development Organization.

^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 the point of discharge.

2.3.3 Industrial Specific Guidelines for Wastewater Discharges

Industry-specific guidelines apply during the operations phase of projects and cover direct or indirect discharge of wastewater to the environment. They are also applicable to industrial discharges to sanitary (domestic) sewers that discharge to the environment without any treatment. Wastewater generated from project operations includes process wastewater, wastewater from utility operations, runoff from process and storage areas, and miscellaneous activities including wastewater from laboratories, and equipment maintenance shops. Projects with the potential to generate process wastewater, sanitary sewage, or storm water should incorporate the necessary precautions to avoid, minimize, and control adverse impacts to human health, safety or the environment. Industry-specific guidelines summarized hereinafter shall be applied by all projects, where applicable, to ensure that effluent emissions conform to good industry practice.

For project types where industry-specific guidelines are not set out in these Guidelines, the following general guideline values, or as stipulated on a case-by-case basis, apply during project operations.

Table 2.3-3: Air Emission Levels (Applicable to Non-Degraded Air Sheds)

Combustion	Parameter/ Guideline Values			
Technology/Fuel	Particulate matter PM10 ^a	Sulfur dioxide	Nitrogen oxides	
Combustion turbine				
Fuels other than natural gas (unit > 50 MW ^c)	50 mg/Nm ^{3 b}	Use of \leq 1% Sulfur fuel	310 mg/Nm ³	
Boiler				
Liquid fuels (plant > 600 MW)	50 mg/Nm ³	200 mg/Nm ³	400 mg/Nm ³	
Liquid fuels (plant 50- 600 MW)	50 mg/Nm ³	900 mg/Nm ³	400 mg/Nm ³	
Natural gas	-	-	240 mg/Nm ³	

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Other gaseous fuels	50 mg/Nm^3	400 mg/Nm^3	240 mg/Nm^3	
Solid fuels (plant > 600	50 mg/Nm^3	200 mg/Nm^3	510 mg/Nm^3	
MW)				
Solid fuels (plant 50-600	50 mg/Nm^3	900 mg/Nm^3	510 mg/Nm^3	
MW)	50 mg/10m	Joo ing/14in	510 mg/14m	
Reciprocating engine				
Biofuels / gaseous fuels			30% higher	
other than	50 mg/Nm^3	-	then for other fuels	
natural gas			ulan for other fuers	
Liquid fuels (plant > 300	50 mg/Nm^3	585 mg/Nm^3	740 mg/Nm^3	
MW)	JU IIIg/IVIII	Job Ing/Ivin	740 mg/10m	
Liquid fuels (plant 50-	50 mg/Nm^3	1.170 mg/Nm^3	1460 mg/Nm^3	
300 MW)	JU IIIg/INIII	1,170 mg/mm	1400 mg/mm	
Natural gas	-	-	200 mg/Nm ³	

^a Particulate matter 10 micrometers or less in diameter

^b Milligrams per normal cubic meter at specified temperature and pressure

^c Megawatt

Table 2.3-4: Effluent Levels (Industry Specific Guidelines, Energy Sector Development, thermal Power)

Parameter	Unit	Guideline
Arsenic	mg/l	0.5
Cadmium	mg/l	0.1
Chromium (total)	mg/l	0.5
Copper	mg/l	0.5
Iron	mg/l	1
Lead	mg/l	0.5
Mercury	mg/l	0.005
Oil and grease	mg/l	10
pH	S.U. ^a	6-9
Temperature increase	°C	<3 ^b
Total residual chlorine	mg/l	0.2
Total suspended solids	mg/l	50
Zinc	mg/l	1

^a Standard unit

^b Temperature increase due to discharge of once-through cooling water

2.3.4 Noise Level Set in NEQG

In NEQG, the noise level is set as shown in Table 2-3-5 and noise prevention and mitigation measures should be taken by all projects where the predicted or measured noise impacts from a project facility or operation exceed the applicable noise level guideline at the most sensitive point of reception. Noise impact should not exceed the levels shown below or result in a maximum increase in background levels of three decibels at the nearest offsite receptor location.

	One Hour LAeq (dBA)			
Receptor	Daytime (7:00-22:00)	Nighttime (22:00-7:00)		
	(10:00-22:00 for public holidays)	(22:00-10:00 for public holidays)		
Residential, institutional,	55	45		
educational	55	CT CT		
Industrial, commercial	70	70		

Table 2.3-5: Target Noise Level Set in NEQG

Source: NEQG (December 2015)

2.4 International Standards

In addition to the applicable host Country Laws, this ESIA Report presents the Project impacts and mitigation measures with explicit reference to the following international standards and guidelines:

- 1. IFC Performance Standards PS (2012);
- 2. WB Group's EHS Guidelines, as applicable to the Project, including EHS General Guidelines;

2.4.1 IFC Performance Standards on Environmental and Social Sustainability (2012)

The IFC's Performance Standards define a proponent' responsibilities for managing their environmental and social risks. The IFC has eight Performance Standards that are relevant to environmental and social safeguards including:

a. Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts. This Performance Standard highlights the importance of identifying environmental and social risks and impacts and managing environmental and social performance throughout the life of a project;

b. Performance Standard 2: Labour and Working Conditions. This Performance Standard recognizes that the pursuit of economic growth through employment creation and income generation should be balanced with protection of basic rights for workers;

c. Performance Standard 3: Resource Efficiency and Pollution Prevention. This Performance Standard recognizes that increased industrial activity and urbanization often generate higher levels of air, water and land pollution and that there are efficiency opportunities;

d. Performance Standard 4: Community Health, Safety and Security. This Performance Standard recognizes that projects can bring benefits to communities, but can also increase potential exposure to risks and impacts from incidents, structural failures and hazardous materials;

e. Performance Standard 5: Land Acquisition and Involuntary Resettlement. This Performance Standard applies to physical or economic displacement resulting from land transactions such as expropriation or negotiated settlements;

f. Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. This Performance Standard promotes the protection of biodiversity and the sustainable management and use of natural resources;

g. Performance Standard 7: Indigenous Peoples. This Performance Standard aims to ensure that the development process fosters full respect for Indigenous Peoples; and

h. Performance Standard 8: Cultural Heritage. This Performance Standard aims to protect cultural heritage from adverse impacts of project activities and support its preservation.

Further, with respect to the use of international good practice and for example, the IFC Performance Standards, reference is required to section 7 of the Environmental Impact Assessment Procedure 2015 specifically states that:

Projects that involve Involuntary Resettlement or which may potentially have an Adverse Impact on Indigenous People shall comply with specific procedures separately issued by the responsible ministries. Prior to the issuance of any such specific procedures, all such Projects shall adhere to international good practice (as accepted by international financial institutions including the World Bank Group and Asian Development Bank) on Involuntary Resettlement and Indigenous Peoples.

2.4.2 International Finance Corporation Environmental, Health, and Safety Guidelines

The IFC EHS Guidelines are technical reference documents with general and industry-specific examples of good international industry practice.

The General EHS Guidelines are designed to be used together with the relevant industry sector EHS guidelines that provide guidance to users on EHS issues in specific industry sectors. The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent.

The EHS Guidelines for cement and lime manufacturing include information relevant to cement and lime manufacturing projects. Extraction of raw materials, which is a common activity associated with cement manufacturing projects, is covered in the EHS Guidelines for Construction Materials Extraction. The contents of both sector EHS Guidelines will be described in the following sections, after a brief presentation of the general EHS Guidelines.

The General EHS Guidelines are organized as reported in the following Table.

r	1				
Objective	Workplace Hazards	Hazards Suggested PPE			
Eye and face protection	Flying particles, molten metal,	Safety glasses with side- shields,			
	liquid chemicals, gases or	protective shades, etc.			
	vapors, light radiation.				
Head protection	Falling objects, inadequate	Plastic helmets with top and side			
	height clearance, and overhead	impact protection.			
	power cords.				
Hearing protection	Noise, ultra-sound.	Hearing protectors (ear plugs or			
		ear muffs).			
Foot protection	Falling or rolling objects,	Safety shoes or boots for			
	pointed objects. Corrosive or hot	protection against moving &			
	liquids.	falling objects, liquids and			
		chemicals.			
Hand protection	Hazardous materials, cuts or	Gloves made of rubber or			
	lacerations, vibrations, extreme	synthetic materials (Neoprene),			

Cable 2.4-1: Summary of Recommended Personal Protective Equipment According t	to
Hazards	

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	temperatures.	leather, steel, insulating
		materials, etc.
Respiratory protection	Dust, fogs, fumes, mists, gases,	Facemasks with appropriate
	smokes, vapors.	filters for dust removal and air
		purification (chemicals, mists,
		vapors and gases). Single or
		multi-gas personal monitors, if
		available.
	Oxygen deficiency	Portable or supplied air (fixed
		lines). On-site rescue equipment.
Body/leg protection	Extreme temperatures,	Insulating clothing, body suits,
	hazardous materials, biological	aprons etc. of appropriate
	agents, cutting and laceration.	materials.

2.4.2.1 Occupational Health and Safety

The most significant occupational health and safety impacts occur during the operational phase of cement and lime manufacturing projects and primarily include the following:

- Dust
- Heat
- Noise and vibrations
- Physical hazards
- Radiation
- Chemical hazards and other industrial hygiene issues

Effluents from thermal power plants include thermal discharges, wastewater effluents, and sanitary wastewater.

2.4.2.2 Solid Wastes

Sources of solid waste in cement and lime manufacturing include clinker production waste, mainly composed of spoil rocks, which are removed from the raw materials during the raw meal preparation. Another potential waste stream involves the kiln dust removed from the bypass flow and the stack, if it is not recycled in the process.

Limited waste is generated from plant maintenance (e.g. used oil and scrap metal). Other waste materials may include alkali or chloride / fluoride containing dust buildup from the kiln.19 In lime production, dust, off-specification quicklime, and hydrated lime are reused / recycled in selected commercial products (e.g. lime for construction uses, lime for soil stabilization, hydrated lime, and palletized products).

Guidance on the management of hazardous and non-hazardous wastes is provided in the General EHS Guidelines.

2.4.2.3 Noise

Noise pollution is related to several cement and lime manufacturing phases, including raw material extraction (discussed in the EHS Guidelines for Construction Materials Extraction); grinding and storage; raw material, intermediate and final product handling and transportation; and operation of exhaust fans. The General EHS Guidelines provides levels for recommended noise abatement measures and ambient noise levels.

Noise Limits for Various Working Environments		
Location / Activity	Equivalent Level LA _{eq} ,8h	Maximum LA _{max} ,fast
Heavy Industry (no demand for oral communication)	85 dB(A)	110 dB(A)
Light industry (decreasing demand for oral communication)	50-65 dB(A)	110 dB(A)
Open offices, control rooms, service counters or similar	45-50 dB(A)	-
Individual officers (no disturbing noise)	40-45 dB(A)	-
Classrooms lecture halls	35-40 dB(A)	-
Hospitals	35-40 dB(A)	B(A)

Table 2.4-2: Noise Limits for Different Working Environments – IFC EHS General

Guidelines

2.5 MCL's Sustainable Policy

In addition to compliance with the existing legal policies, regulation and guidelines, MCL had its own Sustainability Development Policy and environmental management plan. Indeed, MCL had been established by collaborative work of SCG cement (Thailand) and Pacific Link Cement Industry (PLCI). SCG already got certification of ISO 14001 series for Sustainable Development Policy and MCL also handled to develop the proposed project by operating the manufacturing processes in sustainable policy and guidelines (see in MCL announcement described as follow).



Announcement MCL 009/2016

SUSTAINABLE DEVELOPMENT POLICY (Safety, Environment, CSR)

Mawlamyine Cement Limited establish safety to our employees and contractors, preserve the environment and collaborate with local government and surrounding communities in order to be environmental friendly factory and be a good citizen in Mon state under corporate governance.

Mawlamyine Cement Limited has therefore implemented the Sustainable Development policy as the followings:

- 1. Align SCG Safety Principle to develop Safety Management Program
- 2. Promote safety caring culture with uncompromising on safety standard
- 3. Safety is everybody's accountability
- Control air emission and noise to conform to the relevant standards by implementing Pollution Prevention and Clean Technology.
- Reduce natural resource consumptions; Increase the efficiency of energy by improving the operation to reduce the environmental impacts.
- Improve waste management by applying 3R's (Reduce, Reuse, Recycle) management and comply with legal requirements.
- Prevent pollution by improving operation effectiveness and efficiency and increase more green areas.
- Coordinate with government, external organizations and communities to conserve environment and natural resources for sustainable development.
- Increase more satisfaction from surrounding communities by implementing CSR program and stakeholder engagement program.

The Sustainable Development policy is communicated within Mawlamyine Cement Limited to make all employees understood and well implemented.

The policy, objective and target of the environmental management system are maintained, reviewed and revised at least once a year via regular Management Review meeting.

Managing Director Mawlamyine Cement Limited March 4, 2016

Mawlamyine Cement Limited No.136/137, Pyay Road, Saw Bwar Gyi Gone, Insein Township, Yangon, Myanmar.

2.5.1 MCL Environmental Policy

Mawlamyine Cement Limited (MCL) is committed to responsible environmental management in all its operations during construction, operation, decommissioning, closure and post-closure monitoring of the Project because the SCG was satisfied **ISO 14001 Sustainable Development Policy** for sustainable cement production. To this effect the company adopted the Safety Design Guideline, and Occupational Health and Safety Manual. The Safety Design Guidelines and Occupational Health and Safety Manual. The Safety Design Guidelines and Occupational Health and Safety Manual are shown in **Annex- 2-1 and 2-2** and MCL announcement in **Sustainable Development Policy**. MCL also have the logistic models for transportation.

2.5.2 Environmental Caring Policy of Proposed MCL Project

In 2nd February 2018, MCL released announcement letter for monitoring the emission standards control and environmental caring policy for every working area as the following:

"Any employee who is careless and makes the standard value of pollution (SO_x, NO_x and Dust) exceed standardization shall be punished by the company. The highest penalty would be termination".



2.5.3 MCL Commitments

In support and approval of EIA, the Resource & Environment Myanmar Ltd. had collected and analyzed physical, biological and social data such as people's perceptions, concern, opinion, and expectation on the project for the approval of clean environment and guiltless society during and after the development of the project.

Any type of development activity has both beneficial and adverse impacts on the environment in which it operates. The impacts were identified and evaluated by the project proponents to reduce their negative impacts and maximize the positive effects on the surrounding environment. The proposed project is being expected to meet the cement requirement for the construction and industries in the surrounding area and also in different parts of Myanmar. The proposed project will generate an optimum employment generation for the local population. Full pledged Environmental Management Plan for the proposed cement project shall be constituted with qualified Engineers and Technicians.

According to the technical study and the environmental, social and health impacts assessment, the MCL Cement project will have positive impact on the Environment if the recommended Environmental Monitoring, Health, Safety & Environmental Management Plan (EMP) are fully integrated by the project proponents.

CHAPTER 3

PROJECT DESCRIPTION

3.1 Geographical Location of the Power Plant Site

The power plant site is located in the Pya Taung area, approximately 0.86 km north of the Kwan Ngan village, east bank of the Ataran River, in the Kyaikmaraw Township, Mawlamyine District, Mon state of the Union of Myanmar. The power plant is located between 16°21'44" and 16°22'05" N latitude and between 97°49'25" and 97°50'17" E longitude.

Mawlamyine is the third largest city of Myanmar, and also the capital of Mon State, the main trading center and seaport in south-eastern Myanmar.

Mawlamyine is situated about 300 km south east of Yangon and 70 km south of Thaton at the mouth of Thanlwin (Salween) river. There are several ways to get to Mawlamyine, by air, by railway or by road. By car, it takes around 4.5 hours from Yangon to Mawlamyine.

From Mawlamyine, the plant site can be accessed via 2 routes;

- <u>Route</u> 1, West of Pya Taung, traveling to the town of Kyaikmaraw by car and then going to Kwan Ngan village by boat, and after that going to plant site by car or walk. Boat can be directly accessed to plant site only rainy season. Total time is around 2 hour.
- 2) <u>Routes 2</u>, East of Pya Taung, the plant site can be access by car directly through the Ataran Bridge and then go along the road through the villages of Pha Yon Gu, Tharana and Kaw Pa Naw to the plant site. This way can be used any season to plant site but road condition is not good. Total time is around 2-2.5 hour.

3.2 Topography of the Power Plant Site

The climate of Myanmar is controlled by the monsoon circulating system of South Asia. Mountain ranges run generally N to S or NW-SE presenting a barrier for the SW monsoon in the summer and the NE monsoon in the winter.

The Pya Taung area is classed as a tropical monsoon area. In the rainy season between June to October rainfall exceeds 250 cm. In the so-called summer from March to May maximum daytime temperature exceeds 32° C. During the cold season from November to February the maximum day time temperature averages 24° C

The main vegetation is typical evergreen tropical forest often containing tropical hardwoods such as Kanyin, Thingan, Taungthayet, Da Nyin, Thitkya and Malwa. Some deciduous forest can be seen in some places. Bamboos, ferns and grasses are growing in the area that can be found. Agriculture is largely limited to rubbers, palm trees and vegetables. The paddy fields can see in the surrounding areas of Pya Taung and local village.

Summary of the Power Plant Topography

Heights above mean sea level (+MSL)	10	m
Temperature		
Yearly average	28	⁰ C
Average of the hottest month: Max	36	⁰ C
Average of the coldest month: Min	18	oC
Relative humidity Yearly average	76.71	%
Average of the hottest month	65.50) %

63.70 %				
481 mm (16.6.2004)				
236 mm (1.5.2008)				
4727.20 mm				
866.56 %				
65.73 %				
100 km/hr				

Earthquake factor at site: There is no earthquake in this area according to the seismic fault in Myanmar map. (i.e. It is beyond the limit of seismic faults)



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Figure 3.2-1: Location Map of MCL Cement Project (Source: Google Earth Satellite Images _2017)

3.3 Captive Power Plant

The off-gird captive power plant (2 X 20 MW) is designed to provide stable electricity to MCL cement plant as cement production is a continuous process and therefore the unreliability and the insufficiency of power supply from grid system can lead to production loss. Consequently, establishing MCL Cement's own Power Plant is considered to be the important issue.

There are many sources of power production such as coal, natural gas, oil, hydroelectricity or renewable energy resources etc.

3.4 Project Schedule

The construction period is about 2 years and the progress of construction activities are presented in table 3.4-1. Currently, the captive power plant is in operation with the installed capacity of 40 MW.

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D	During 2015		During 2016												2017 - Present										Dural		
Process	Construction	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	- Remark	
Phase I		Li Ci Ri	mes rush un	tone er T	e est																					100 %	
Phase II					Start Power Generation from Boiler							100 %															
Phase III					Coal Mill First Load Run							100 %															
Phase IV									Ra	aw N	Aill F	irst L	Load F	Run												100 %	
Phase V										Ki	iln Fi	ring														100 %	
Phase VI																						Co Ri	omme un	ercial		100 %	

Table 3.4-1: MCL Project Schedule

3.5 MCL Power Plant Concept

Coal fired power plant including 2 units 20 MW gross capacity each. All generated power from power plant will be used for cement production only, and by-product from power plant can be used in cement process. Furthermore, to minimize emission, power plant is designed with Green Coal Technology as following;

- Circulating Fluidized Bed (CFB) boiler
- Inline lime injection for primary control of SO₂ emission
- Flue Gas Desulfurization (FGD) system
- Control combustion temperature to control NOx emission
- Equipped with dust control system

The main criteria of power plant design are:

- low emission to meet environmental regulations.
- safety and environmental concern.
- high reliability (without grid system)

3.6 MCL Power Plant Project Layout

Location of Coal-fired Power plant is located in MCL cement plant compound as shown in figure 3.6-1 Power Plant Layout and the detailed layout plan is provided in Annex 3-1.



Figure 3.6-1: Power Plant Layout

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Figure 3.6-2: Locations of Coal Storage and Captive Power Plant in MCL

The main component of MCL coal fire power plant can be divided into main 3 parts which are

- 1. Power plant production and controlling
 - Circulating Fluidized Bed boiler (CFB Boiler) 20MW x 2
 - Turbine and Generator
 - Flue Gas Desulfurization (FGD) system
 - Main bag filter
 - Stack
- 2. Fuel storage and preparations
 - Coal Storage, the indoor coal stores (2 units which has dimension of 355m X 4m each)
 - HFO

3.

- Water treatment plant, cooling water system and supporting facility
 - Chemical Water Treatment
 - Cooling Tower
 - Air Compressor room
 - Main substation



MCL CFB Coal-fired Power Plant (2 x 20 MW)

Figure 3.6-3: Coal Fire Power Plant Concept

3.7 Power Plant Production Process and Controlling Units

This unit is the unit for produce power to supply to cement plant, there are main machine in this unit as following.



Figure 3.7-1: General View of Coal Fire Power Plant

3.7.1 Circulating Fluidized Bed Boiler (CFB Boiler) 20 MW x 2

The combustion of crushed coal and air in CFB boiler occurs at 800-900 °C. CFB Boiler has given power-plant operators a greater flexibility in burning a wide range of coal and other fuels. At the bottom of the boiler furnace, there is a bed of inert materials where coal or fuels are spread. Pressurized air is supplied through the bed to lift bed materials and coal particles. Then, combustion takes place in suspended condition. Fine particles of partly burned coal, ash and bed material are carried along with the flue gases to the upper areas of the furnace and then into a cyclone.

Flue gases with unburned particle flown through cyclone separator located at top part of boiler. At this point, heavier particles will have separated and returned to boiler's bed for recirculation. Hence named Circulating Fluidized Bed (CFB) Boiler.

The hot gases from the separator pass to the heat transfer surfaces and go out of the boiler. The flue gases from the boiler are at high temperature while the water needs to be preheated at low temperature. Thus, feed water from low temperature superheated is passed through economizer to transfer heat from flue gases and increase the feed of water temperature.

In addition, the air preheater is installed at the downstream of the economizer to recover the waste heat from the outgoing flue gas and make the stable combustion in furnace. Then the flue gases enter to the bag filers (2 units) to remove the particulate matters. The flue gases are absorbed by induced draft fans to Flue Gas Desulfurization (FGD) system for desulfurization process and discharged the cleaned gases through the stack.

Moreover, the CFB Boiler has a higher thermal efficiency and the other benefits of CFB boiler can be summarized as follows;

- Low emission of NO_x in the flue gas because of low combustion temperature (800-900°C),
- Capable to removing SO₂ by limestone injection in the furnace
- Low emission of CO₂ due to high combustion efficiency that may result in low fuel consumption
- Flexibility of fuel utilization [lignite / coal / anthracite / petroleum coke / agricultural waste with low heating value (>1500 kcal/kg)]
- Less auxiliary equipment when compared with the other type of boiler







Figure 3.7-3: Circulating Fluidization Bed (CFB) Boiler

Since Steam Turbine uses steam as the energy source for rotating itself. Boiler will be put into operation to produce steam. Boiler will use coal as the fuel for combustion and will use diesel oil as fuel for startup period. Semi high-temperature and Semi high-pressure circulating fluidization bed boiler of 2x90t/h is set for this project.

Fuel Coal is sent from raw coal bunker to furnace for combustion by coal supply air and sowing air by 2 stokehold coal feeders. Combustion air is divided into primary air and secondary air for segmented air supply. Primary air is sent to furnace through distribution air plate in air chamber after preheating and it accounts for about 50%, and after secondary heating, it will be sent into furnace through front and rear furnace wall, which also accounts for 50%.

Flue gas enters into cyclone separation in furnace outlet and that separated by cyclone separator enters into horizontal flue duct on the top of furnace and tail shaft flue duct.

It is sent to chimney by induced draught fan after dust collection by bag filter for atmospheric emission. Most of materials will be separated by cyclone separator during boiler operation. They will be sent to combustion room by return air.

No. of Unit	2 Unit
Manufacturer	-
Boiler Type	Membrane type water-cooled wall of natural
	circulation
Boiler Model	NG-90-5,4/490
Rated Output	90t/h
Main steam temperature	490°C
Main steam pressure	5.4MPa
Thermal efficiency of Boiler	90%
Design and Manufacture Standard for Boiler	ASME

Table 3.7-1: Specifications of Boiler

3.7.2 Turbine and Generator

Circulating fluidization bed boiler is together with 2x20MW condensing turbine generator unit and reserved with extension space. Turbine is made in Japan and the model is Kawasaki RC-200 Type. (Rated power is 20MW). Generator is supplied in matching model, Rated power is 20MW. Outgoing feeder voltage is 10.5kV of AC brushless excitation.

Table 3.7-2: Specification of Turbine

No. of Unit	2 Unit
Manufacturer	Kawasaki
Model	Kawasaki RC-200
Rated Power	20MW at Gen. terminal
Rotation speed	5,600 rpm
Main steam condition at MSV inlet	-
Pressure	$5.2 \text{ MP}_{a}(A)$
Temperature	480°C
Noise	<950dB(A) without acoustic encloser

Table 3.7-1: Specifications of Generator

No. of Unit	2 Unit
Manufacturer	Kawasaki
Rated Power	20 MW
Rated frequency	50 Hz
Rated Voltage	10.0 kV
Power factor	>0.8 lagging
Efficiency	>97%

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Figure 3.7-4: Turbine and Generator

3.8 Emission and Controlling Systems

3.8.1 Air Emission Control

Several control technologies are utilized to reduce the pollutant emission from the coal used power plant across the world. At MCL, the emission is controlled using different technologies for individual pollutants such as CFB boiler for DeNOx, limestone injection at boiler and FGD system for DeSOx and bag filters for Particulate Matter (PM) removal from flue gas.

MCL sets the target emission limit that the final discharge of flue gas from the stack must not exceed and emission is also monitored continuously and recorded. The technologies used to emission control, target emission, emission from continuous monitoring and referenced removal efficiency are presented in the following table. The stack monitoring results by third party is also provided in Annex 3-2.

Table 3.8-1: Emission Control Technologies, Target Emission, emission from Continuous

Pollutants	Control Technology	MCL's Target Emission	Myanmar NEQG	Emission values from continuous monitoring	Referenced Removal Efficiency (%)
SO ₂ (ppm)	Primary and secondary limestone injection	71	71	≈21	90 ¹
NOx (ppm)	CFB Boiler (Oxygen & Temperature control)	200	252	≈77	30-70 ¹
PM (mg/Nm ³)	Bag filters	30	50	≈9	99.97 ²

Monitoring and Removal Efficiency

Note: The emission limits of Myanmar NEQG are referred to the Sub-section 2.1.1 Thermal Power, Air Emission Levels (applicable to non-degraded air sheds), Boiler, Solid fuels (plant > 600 MW).

¹ Shrestha, R.M., Kim Oanh, N.T., Shrestha, R. P., Rupakheti, M., Rajbhandari, S., Permadi, D.A., Kanabkaew, T., and Iyngararasan, M. (2013), Atmospheric Brown Clouds (ABC) Emission Inventory Manual, United Nations Environment Programme, Nairobi, Kenya.

² Removal efficiency is calculated by finding difference between PM concentrations from flue gas inlet and outlet.

Technology	SO _g Reduction [*] (%)	NO _r Reduction [*] (%)	PM _{L3} Reduction ⁶ (%)	BC Reduction [®] (%)	OC Reduction (%)
Lime/Limestone Wet Scrubber (WS)	90	-	-	•	
Spray Dryer Absorption (SDA)	90	-	-	-	-
Dry Sorbent Injection (DSI)	70	-	-	-	-
Wellman Lord (WL)	97	-	-	-	
Walther Process (WAP)	88	-	-	-	-
Low NOx Burner	-	10-30°	-	-	•
Staged Air Supply (SAS)		20 ^d		-	-
Overfire Air (OFA)	-	10-40*	-	-	
Flue Gas Recirculation (FGR)	-	15-20 ^f	-	-	
Selective Non-Catalytic Reduction (SNCR)	•	80	-	•	•
Selective Catalytic Reduction (SCR)	•	90	•	•	•
Activated Carbon Process	95	70	-	-	•
DESONOX Process	95	95	-	-	•
Electrostatic Precipitators (ESP)	-	-	<mark>99.2</mark>	98	96 ^h
Multiple Cyclones	-	-	11 ^k	11 ^k	11 ⁿ
Scrubber	-	-	94	76	90
Baghouse	-	-	99.8	95	•
ESP + Others	•	-	99.8	>98	99.5
Fabric filters			99.9 ^h	99.9 ^k	99.9 ^k

 Table 3.8-2: Efficiency of Representative Emission Reduction Efficiency

3.8.2 Flue Gas Desulfurization (FGD) System

Limestone reagent is used to neutralize the sulfur compounds from the flue gas since sulfur is an acidic. The lime slurry is injected into the FGD system in terms of wet scrubbing process. The FGD system with wet scrubber is installed at the base of the stack. The flue gas after passing through the bag filters is absorbed to the FGD system where the gas flows upward through the absorbers countercurrent to the spray limestone slurry flowing downward through the absorber.

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The sprayed slurry contact with SO_2 from the flue gas and produce calcium sulfite (CaSO₃) simultaneously carbon dioxide (CO₂) is also formed due to the reaction of SO₂ and limestone. This reaction can be expressed as follow;

$CaCO_3 + SO_2 + \frac{1}{2}H_2O \rightarrow CaSO_3. \frac{1}{2}H_2O + CO_2$

Oxidizing air is added through the bottom of the FGD system to produce gypsum-CaSO₄. 2H₂O with the following chemical reaction;

$CaSO_3. \frac{1}{2}H_2O + \frac{1}{2}O_2 + \frac{1}{2}H_2O \rightarrow CaSO_4. 2H_2O$

The gypsum dehydrate ($CaSO_4$. $2H_2O$) from the FGD systems enter the gypsum slurry pool which is then absorbed by pumps for dehydration process.

The dehydration is conducted at the vacuum belt filter and dehydrated gypsum is used as raw material in cement manufacturing. Since the FGD is a close loop system, no wastewater is discharged because the residual water from the gypsum dehydration is sent to limestone slurry preparation pool where the slurry is absorbed by pumps to spray at FGD tower. The cleaned gas is emitted through the stack after the flue gas desulfurization process. The stpe-by-step operation processes and specification of FGD system and are presented in figure 3.8-1.



Figure 3.8-1: The Concept of FGD Wet System

SO ₂ concentration of boiler back pass (before primary desulfurization)	2004 mg/ Nm ³
S0 ₂ emission (after FGD system)	<203 mg/Nm ³
Flue gas flow rate	250,000 Nm ³ /h
Flue gas discharge temperature	65°C
Equipment noise	<85 dB(A)
Stack height	60m
Noise	<85dB(A) 1m away from equipment
SO ₂ removal efficiency	90%

Table 3.8-3: Specification of FGD System

3.8.3 Main Bag Filter for Control of Dust and PM

Two main bag filters with the dust removal efficiency of 99.99% are installed at the downstream of each CFB boiler to capture PMs in flue gas. The specifications of main bag filters are illustrated in table 0-4.

Table3.8-4: Specification of Main Bag Filter

No. of Unit	2 Unit
Manufacturer	HeNan Sinoma Co., Ltd.
Туре	Pulse Jet Bag Filter
Flue Gas Flow	230,000 m ³ /h
Outlet flue gas dust emission	10 mg/Nm^3
Dust collection efficiency	99.99%



Figure 3.8-2: Bag Filter Installation

Dust and PM emission at other auxiliary operations are also reduced by multiple bag filters installing at major emission sources such as belt transfer point, crusher area. There are total of 19 bag filters and the locations of installed bag filters are presented in table 3.8-5.

No.	Name	Specification	Unit	Location
1	Boiler			
1.1	Boiler	230000 m ³ /h, 1500 Pa	2	Used for boiler
2	Coal Transportation			
2.1	Bag filter	4500 m ³ /h, 1500 Pa	1	Raw coal silo
2.2	Bag filter	1200 m ³ /h, 1500 Pa	2	Rear of #1 belt conveyor
2.3	Bag filter	1200 m ³ /h, 1500 Pa	2	Head of #1 belt conveyor
2.4	Bag filter	7800 m ³ /h, 1550 Pa	2	Rear of #2 belt conveyor
2.5	Bag filter	1200 m ³ /h, 1500 Pa	2	Head of #2 belt conveyor
2.6	Bag filter	4500 m ³ /h, 1500 Pa	1	#1 coal bunker of boiler
2.7	Bag filter	4500 m ³ /h, 1500 Pa	1	#2 coal bunker of boiler
3	Ash and slag treatment	•		•
3.1	Bag filter	4500 m ³ /h, 1500 Pa	1	Top of the ash silo
3.2	Bag filter	1140 m ³ /h, 1100 Pa	1	Top of the slag silo
4	Desulfurization system and lim	nestone crush system		
4.1	Bag filter	1140 m ³ /h, 1100 Pa	1	Top of the #1 limestone silo
4.2	Bag filter	1140 m ³ /h, 1100 Pa	1	Top of the #2 limestone silo
4.3	Bag filter	~20010 m ³ /h	1	Limestone grinding system
	Total		19	

Table 3.8-5: List of Bag Filters Installation in Coal Power Plant

3.8.4 Stack

There will be 2 main stacks to install into MCL coal fired power plant, 2 different stacks will be used with the following purposes

a. When heat up the boiler with Diesel, the start-up stack will be use.

b. When boilers start using coal, it will be switched to FGD system.

Both 2 all stacks height are considered to height enough for control SO_2 emission, based on the calculation both 2 stack are 60 meter height.

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from equipment

Figure 3.8-3: Stack Installation

3.8.4.1 Calculation for Stack Height

The stack height calculation of MCL coal fired power plant is based on the SO₂ emission value.

 $H=(10^{3}Q/PU)^{1/2}$

Where,

- H Stack height (m)
- Q Maximum SO₂ emission amount (kg/h)
- $Q = SO_2$ emission figure (mg/Nm³) x Gas flow rate (Nm³/h)
- P Emission control factor
- U Stack outlet average wind speed (m/s)

The SO₂ emission figure less than (\leq) 203mg/Nm³ after desulfurization of this project, consider 2 sets of boiler together operation maximum gas emission flow is 250,000Nm³/h, therefore,

Q = $203 \text{ (mg/Nm}^3) \times 250,000 \text{ (Nm}^3/\text{h)}$

= 50.75 kg/h.

Emission control factor:

Type of Area	Emission Control Factor
Important city built up area and it's planning area	$P \le 5.1$
Generic city built up area and it's planning area	$P \le 9.7$

	Out of built up area and planning area as above n	P ≤ 15.4	
Cons	ider of this project location out of built up area,	P =15.4	
Estin	nated Stack outlet average wind speed is 1.5m/s,	U = 1.5	

H= $(1000 \times 50.75/15.4 \times 1.5)^{1/2}$ = 46.8 m Stack Height at least 46.8 m

Based on the above calculated result, MCL selected standard 60 m height steel structure stack.

3.8.5 Continuous Emission Monitoring System

As for continuous monitor air emission parameter-PM, SO_2 , NO_2 , and O_2 -MCL is install Continuous Emission Monitoring System (CEMs) in order to monitor emission from the process from time to time Data from CEMs will record every 1 hour by operator, and also data will present on the electronic sign board in front of MCL plant. Information for CEMs specification, calibration, weekly and monthly emission reports are attached in Annex 3-3, Annex 3-4 and Annex 3-5.



3.8.6 Fuel Storage and Preparation

3.8.6.1 Coal

i. Coal consumption for MCL Power Plant

Previously, two types of coal-low sulfur and normal sulfur-are imported from the Indonesia to use in power plant operation. These coals were equally mixed with total consumption rate of about 500 ton a day to feed the boiler as the combination of low and medium sulfur coal can reduce SO_2 emission from the flue gas.

Currently, local and imported coal are mixed (ranging 20-100%) and used in the combustion process. Local coal is obtained from the Pin Lone township, southern Shan state.

MCL Power Plant Actual consumption of boiler is approximate 2947 kcal/kWh power generation by the result of Machine Guarantee test and Daily operation data. However, in term of tonnage, the consumption of coal is depended on the heating value of coal.

Result of supplier guarantee test is as follow;

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

-hourly power supply	33.78 MWh
-(LHV) heat consumption for power generation	2947 kcal/kWh
-coal consumption for power generation	517 g/kWh
-(LHV) heat consumption for power supply	3490 kcal/kWh
-coal consumption for power supply	612 g/kWh

In case of only the imported coal used, (approx.) 6000 kcal/kg.AR (AR = As Received) will be considered, the consumption is 491 kg /MWh power generation or equivalent to 470 ton of coal/day will be used at full operation (9800 kg/hr /1 boiler).

In case of the mixing imported coal 6000 kcal/kg.AR with Local Coal 3500 kcal/kg.AR, the consumption of coal is change according to the ratio for example if mixing 50% of imported coal and local coal, the consumption is 620 kg/MWh power generation or equivalent to 595 ton of coal/day will be used at full operation (12,396 kg/hr/ 1boiler).

Current coal consumption rate ranges from 500 to 600 ton per day depending on heating value of Coal in each batch. Due to the technological advancement in CFB boiler especially in higher thermal efficiency and lower emission, the coal rank of sub-bituminous and Lignite especially found in Myanmar are also flexible to use in combustion process.

The MCL is now using local coal by mixing with indo low sulfur coal and collected information on local coal analysis results are presented in Table. 3.8-6.

		Local					Imported						
Description		Kalawa			Pinlon			Indo (Low Sulfur)			Indo (Normal Sulfur)		
		As Receive d	Air Drie d	Dry	As Receive d	Air Drie d	Dry	As Receive d	Air Drie d	Dry	As Receive d	Air Drie d	Dry
Moisture													
Total	%	13.49			35.38			10.45			12.61		
Inherent	%		7.59			13.69			3.04			9.73	
Ash	%	15.94	17.02	18.35	11.11	14.84	17.17	21.40	23.17	23.90	4.38	4.53	5.02
Volatile Matter	%	35.96	38.45	41.66	29.91	39.98	46.35	37.85	40.98	42.26	42.81	44.21	48.97
Fixed Carbon	%	34.62	36.94	39.99	23.61	31.50	36.49	30.30	32.81	33.84	40.20	41.53	46.01
Calorific Value													
Gross	Cal/ g	5094	5436	5884	3454	4608	5339	5257	5692	5870	5913	6107	6765
Sulfur													
Bomb Sulfur	%	1.33	1.42	1.53	0.66	0.89	1.02	0.35	0.37	0.39	1.90	1.96	2.17
Size	mm	0-50											

Table 3.8-6: Comparison of Coal Analysis Results between Imported and Local Coals

Source: MCL

Revise this table for decimal up to two decimal value										
Type of Sa	ample:				Fu	iel, Fly A	sh			
Lab Sample	Sample	As	Cd	Cr	Cu	Mn	Ni	Pb	Se	Zn
No	name	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
61AT211001	Local low heat	23	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
61AT211002	Local high heat	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
61AT211003	Indonesia Low sulfur	21	< 1	< 1	< 1	25	< 1	< 1	< 1	< 1
61AT211004	Indonesia normal sulfur	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
61AT211005	Fly ash	< 1	< 1	22	2	108	21	32	< 1	41

Table 3.8-7: Results of Heavy Metal Concentration in Coal and Coal Ash

According to the heavy metal test report, it was found that mercury is not present in coal. In addition, heavy metals emission is also estimated by the following method since the laboratory were not able to provide the heavy metals test results in two decimal value and staffs from MCL are still seeking the laboratory that can provide the results as per requirements.

3.8.7 Heavy Metals Emission Estimation

The amount of heavy metals emission by the stack may vary depending on the efficiency of control devices (bag filters) because toxic elements especially heavy metals are presented in the fly ash and emitted as fine particles. Currently, the two units of bag filters have 99.97% removal efficiency and only 0.03% of fly ash which might contain heavy metals can be emitted to the atmosphere. Despite heavy metals concentration in the flue gas would be in very low and the emission is calculated with the following methods.

$$Em_i = A_i \times EF_i (100 - ER_i/100)$$

where,

 $Em_i = emission of pollutant i (g/yr)$ $A_i = activity rate of pollutant i (mass of fuel consumption in GJ)$ $EF_i = emission factor of pollutant i (g/GJ).$ $ER_i = Overall control efficiency of pollutant i (%)$ Coal consumption rate - 6,418,364 GJ, based on 219000 ton/year Flue gas flow rate^a - 69.44 m³/s

Emission factors (g/t) used for calculation of Pb and Cd emission, according to different methodologies, Estimation of heavy metal emissions from coal-fired power plants and Emission factors for coal combustion, power plants and district heating plants, wet bottom boilers, Improved Inventory for Heavy Metal Emission from Stationary Combustion Plants (1990-2009).

Table 3.8-8: Estimated Emission of Heavy Metals (3,4)

³ S. Gromov & V. Ginzburg: Estimation of heavy metal emissions from coal fired power plants in Russia, Wfzfwfg q/GVoW C/zmare aW&Wogy, 20-5 G/g6ovj&aya &., Moscow, 107258, Russia.

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Parameter	Emission Factor (mg/GJ)	g/s	mg/Nm ³	Guideline limit* ⁵ , mg/Nm ³
Arsenic (As)	8.0	4.88E-07	8.78E-06	-
Cadmium (Cd)	1.1	6.72E-08	1.21E-06	0.0153
Copper (Cu)	4.8	2.93E-07	5.27E-06	-
Mercury (Hg)	1.7	1.04E-07	1.87E-06	0.061
Nickel (Ni)	5.7	3.48E-07	6.26E-06	-
Lead (Pb)	8.6	5.25E-07	9.45E-06	0.153

*U.S. EPA Promulgated 12/95 for New Large Units

3.8.8 Coal Quality for MCL Power Plant

In order to assure quality of coal, MCL has their own lab to analyze coal which used in MCL power plant. The chemicals used in coal quality analysis were described in Table 3.8-9 and the quality analysis procedures were described as the followings.

Table 3.8-9: List of Chemicals Used for Coal Qualitative Analysis

No			Chemical Consumpti		Objecti	Use/Fe	Stora ge	Stock Preparation		
•	Туре	Name	Formula	g/month	ve of Usage	ed in System	Metho d	Durati on	Min. Stoc k: (kg)	Max. Stoc k: (kg)
1	Liqui d	Phenolphthal ein Indicator 100G	C2H6O2	once/ 5month	Sulfur	Coal testing	Cabin et	2g/ Year	5 g	100 g
2	Solid	Sodium carbonate 1kg	Na2-C-O3	15g/ 2month	Sulfur	Coal testing	Cabin et	15g/ 2Month	500 g	1 Kg
3	Solid	Methyl orange, 100G	C14H14N3Na O3S	once/ 5month	Sulfur	Coal testing	Cabin et	1g/ Year	5 g	100 g
4	Liqui d	Barium Hydroxide	Ba(OH)2	35g/ 1month	Sulfur	Coal testing	Cabin et	35g/ 1month	300 g	1 Kg

Coal Analysis (QA)

Proximate Analysis (Air-Dried Basis)	
Total Moisture (as received):	36 % max
Inherent Moisture:	15-20 %
Ash Content:	4-10 %
Lump Size:	$0-50 \ mm$
Gross Heating Value:	5,000-5,500 kcal/kg

Required Equipment for Analysis

⁵ U.S. EPA Promulgated 12/95 for New Large Units

⁴ Malene Nielsen, Ole-Kenneth Nielsen and Leif Hoff Mann: Improved Inventory for Heavy Metal Emissions from stationary combustion plants (1990-2009), Scientific Report from DCE – Danish Centre for Environment and Energy, Aarhus University, NO. 68:2013. <u>https://dce2.au.dk/pub/SR68.pdf</u>.

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



Figure 3.8-4: Equipment and Procedure for Coal Analysis in MCL



Figure 3.8-5: Demonstration of Analysis Process of Air-Dry Basis in MCL


Figure 3.8-6: Demonstration of Analysis Process of Dry Basis in MCL

3.8.9 Homogenization of Coal

MCL using coal mixing technique by using machines called Stacker and Reclaimer. Those machines are using for homogenizing the quality of coal by the method coal "Chevron Homogenizing".

Pre-homogenization

A pre-homogenizing store is often necessary when the chemical composition of raw material varies greatly (e.g. Limestone, clay or coal).

The most common stacking methods are chevron, windrow and cone shell. These methods consist of stacking a large number of layers on top of each other in the direction of the pile.



Figure: 3.8-7: Ccommon Stacking Methods Used in Homogenization

Longitudinal Homogenizing Stacker-reclaimer System

The longitudinal stacker-reclaimer system operates with two piles. One pile is stacked while the other is being reclaimed.

The input material comes on a rubber-belt conveyor and is discharged through the stacker traveling on rails alongside the store at a constant speed. Its height above the top of the pile is kept at a minimum distance to reduce dust emission.

The reclaimer bridge moves alongside the pile onto two rails located on each side of the pile.

Reclaiming takes place from the face of the pile to be reclaimed by harrow traveling on the bridge reclaimer. The sweeping movements of the horrow cause the material to slide on the pile base.

A scraper conveyor equipped with chains and blades drags the material to a belt conveyor located along the pile, and the material goes to the next process step.

Electrical feed for power and controls is accomplished by use of multi-composition cable and motor cable reel.

The machine may be operated locally using controls located on operating console inside the cabin or from a remote location.



Figure 3.8-8: Parts of Homogenizing Stacker-Reclaimer Systems⁶



Figure 3.8-9: Coal Mixing Process in MCL

⁶ Source: <u>https://www.ameco.eu.com/PDF/AMECO_reelwork.pdf</u>

3.8.10 Coal Storage System

Coal is stored in indoor and outdoor storage area which made of concrete floor and has the drainage system to prevent coal leaching.



Figure 3.8-10: Inside Coal Storage Building

Coal Transportation from Port to Plant will be unload from vessel by Screw unloader and transport to storage by belt conveyor.



Figure 3.8-11: Transportation Route of Coal from Port to Cement Plant

3.8.11 Coal Conveying System

Fuel coal is supplied by the Indoor coal storage, and then put into transfer coal silo of 400m³ by using Re-claimer and covered belt conveyors.

After that, through electromagnetic vibration, coal feeder to coal belt conveyor. It shall be sent to main building raw coal bunker by coal belt conveyor after secondary crushing.

Dual-loop belt conveyor of belt width of 650mm shall be used according to planned capacity, with systematic output of a single belt conveyor being 100t/h.



Figure 3.8-12: Coal Conveying System Used in MCL

3.8.12 HFO/Diesel Oil

Heavy Fuel Oil (HFO)/ Diesel oil: is used to startup the boiler and as alternative fuel in case power shutdown occurs. The Heavy Fuel Oil (HFO)/diesel oil is used for diesel generators, 2units 3MW for

each. The generators are used to startup the boiler and as temporary power sources in case power shutdown occurs. The average consumption rate is around 1,500 tons per year.

3.9 Water Source, Water Treatment Plant, Cooling Water System and Supporting Facility

3.9.1 Water Source

Basically, power plant needs water for steam cycle and cooling process. Raw water comes from raw water pond which located inside MCL. Two main water ponds are considered to support both cement and power plant



Figure 3.9-1: Layout plan of Raw Water Pond, Sediment Pond and Coal Sediment Pond



Figure 3.9-2: Water System Flow Chart

3.9.2 Water Treatment System for MCL Coal Fire Power Plant

Basically water supply to Coal fire power plant for 2 main system

- 1. Demineralized water treatment system to produce steam
- 2. Cooling water system

1. **Demineralized Water Treatment System**

Makeup water of boiler is handled by two stage RO+EDI desalination system according to main equipment type, parameter and makeup water quality requirements with system capacity 2*20t/h.



Figure 3.9-3: Demineralized Water Treatment Unit

2. Circulating Cooling Water System

Open circulating system of mechanical ventilation cooling tower made of FRP (Glass Fiber Reinforced Plastics) is used for circulating cooling water system. Four set of mechanical ventilation cooling towers of $3000m^3/h$ are selected, totaling $12,000 m^3/h$ in cooling water, and temperature difference $\Delta T=10^{\circ}$ C, 5 set circulating pumps with the parameter is as follows: $3170 m^3/h$, 0.22MPa, 250kW, 10kV, 4 working 1 standby.



Water Pretreatment

Cooling Tower



Figure 3.9-4: Water Pretreatment Unit and Cooling Tower

Figure 3.9-5: Water Balance Diagram of MCL's Coal-fired Power Plant

3.9.3 Water Emission Control

Basically, power plant uses water in steam cycle and cooling processes. Raw water is pretreated and sent to downstream auxiliary process. Raw water comes from raw water pond which is inside MLC campus. Also, water loss occurs from water quality adjustment (blow down) and water evaporation. Blow down water is sent to sedimentation pond.

3.9.4 Noise Emission Control

Low noise equipment is on priority in design, and sound insulation cover or sound insulation level shall be set up in rotating machinery and equipment, silencer shall be installed at the FD fan inlet and boiler ignition and steam exhaust mouth to reduce noise pollution to the environment.



Air Fan with silencer

Steam blow pipe with silencer

Figure 3.9-6: Silencer Installations

Blow down stream

- Control Noise level at distance 1.5 m from machine < 85 dB(A) by installing Silencer
- Control Noise level at factory boundary < 70 dB(A)

3.9.5 Byproduct of Power Plant



Figure 3.9-7: Power Plant Mass Balance

The byproducts from power plant as the following.

- Bottom ash (0.6 t/h or 4,800 t/y): Mixed with raw material in clinker production process (avg. 330t/h) → 0.2% of raw material
- Fly ash (2.2 t/h or 17,500 t/y): Mixed with raw material in cement mill process (avg. 219 t/h) → 1% of cement product
- Ash and Slag Removal System

Ash and slag of boiler are utilized completely and comprehensively for cement. Positive-pressure dense phase bunker pump conveying system is used for ash removal system. Fine ash captured by bag filter is sent to ash silo of power plant through conveying pipes by compressed air. And then send to cement plant by tank car for comprehensive utilization. The ash silo adopts the reinforced concrete structure, with a volume of 400m³, and can store 7-days ash generated by 2 sets of 90t/h boilers.



Ash Transporters



Ash Silo

Figure 3.9-8: Ash Transporters and Silo Installations

Boiler slag is discharged to cooling slag remover and cooled dry slag is transferred to #2 scraper conveyor by #1 scraper conveyor. Then it is sent to slag bunker and transported to cement plant by vehicles for comprehensive utilization. The slag silo adopts the steel structure, with a volume of 200m3, and can store 3-days slag generated by 2 sets of 90 t/h boilers.



Slag Silo

Slag Coolers

Figure 3.9-9: Slag Silo and Coolers Installation

3.10 WHG (Waste Heat Generation)

Waste Heat Recovery System (Maximum: 9.00MW, Normal Operation: 6-9MW)

Boiler Specification: Natural Circulation Type

Suspension Preheater Boiler:

Rated Steam Generation:	26.4 tph
Rated Working Pressure:	1.6 MPa
Rated Steam Temperature:	313 °C
Inlet Flue Gas Volume:	350,000 Nm3/h
Inlet Flue Gas Temperature:	330°C
Efficiency of Heat Recovery:	34.8%
Air Quenching Cooler Boiler:	
Rated HP Steam Generation:	21.4 tph
Rated HP Steam Temperature:	1.6 MPa
Rated HP Steam Temperature:	365 °C
Rated LP Steam Generation:	3.7 tph
Rated LP Steam Temperature:	0.5 MPa
Rated LP Steam Temperature:	200 °C

Inlet Flue Gas Volume:	225,000 Nm3/h
Inlet Flue Gas Temperature:	380°C
Efficiency of Heat Recovery:	74.5%
Turbo-generator Specification:	Condensing Turbine Type
Rated Power Output:	9,000 kW
Rated Speed:	3,000 rpm
Rated Voltage:	10.5 kV
Inlet Steam Condition:	44.5 tph, 1.6 MPa, 320°C
Rotational Direction:	Clockwise



Figure 3.10-1: Schematic Diagram of Waste Heat Power Generation

The Cement Plant Waste Heat Power Generation Plant is a facility to generate power by recovering heat from waste gas discharged from a cement plant. This is an energy saving system to cover approximately 20 % of the total electric consumption of a cement plant. The Cement Plant Waste Heat Power Generation Plant generates electric power by a steam turbine utilizing steam produced from the heat of two sources– suspension pre-heater waste gas (SP waste gas) and air quenching cooler waste gas (AQC waste gas).



Figure 3.10-2: Turbine and Generator

1	No. of Unit	1 Unit
2	Manufacturer	Luoyang Generating equipment
3	Model	Kawasaki RC-200
4	Rated power	9 MW at Gen. terminal
5	Rotation speed	3000 rpm

Table 3.10-1: Specifications of Turbine

6	Main steam condition at MSV inlet	
7	Pressure	MPa.(A)
8	Temperature	480°C
9	Noise	<95dB(A) without acoustic encloser

Table 3.10-2: Specifications of Generator

1	No. of unit	1 unit
2	Manufacturer	Luoyang Generating equipment
	Model	QF-K9-2
3	Rated power	9 MW
4	Rated frequency	50 Hz
5	Rated voltage	10.5 kV
6	Power Factor	0.85
7	Efficiency	>97.3

Table 3.10-3: Specifications of Air Quenching Cooler Boiler (AQC Boiler)

1	No. of unit	1 unit	
2	Manufacturer	HangZhou Boiler group Co., Ltd	
3	Boiler model	QC225/380-21,4(3.67)- 1.6(0.45)/365(200)	
4	Rated output	21.4 t/hr	
5	Main steam temperature	365°C	
6	Main steam pressure	1.6 MPa	

Table 3.10-4: Suspension Preheater Boiler (SP Boiler)

1	No. of unit	1 unit	
2	Manufacturer	HangZhou Boiler group Co., Ltd.	
3	Boiler model	QC350/330-26,4-1.6/313	

4	Rated output	26.4 t/hr	
5	Main steam temperature	313°C	
6	Main steam pressure	1.6 MPa	

3.11 Analysis of Project Alternatives

The alternative selection for main core fire machines was proceeded by examining technologies and alternative criteria with respect to system features such as general description, operation, installation, ease of operation, operation cost, ease of maintenance, maintenance cost, less energy use, versatility and upgrading and the benefits of environmental friendly technology. The selective of Power Plant alternative systems used in MCL cement plant base on criteria as in Table 3.11-1.

System	**Fluidized Bed Combustion (FBC)	Spreader stokers	Chain-grate or traveling-grate stoker	Pulverized Fuel Boiler
Feature				
Coal Fired Boiler System	Place hearing Place hearing Water wall Secondary ar Arrainogroup Convection hearing surface Economizer Arrainogroup Convection hearing surface Convection he	FUEL CONVEYER FUEL CONVEYER FUEL CONVEYER FUEL CONT FUEL	Chair Construction Construct	Notice Baser Conference Participation Conference Confe
General Description	Boiler Particles (e.g. sand) are suspended in high velocity air stream: bubbling fluidized bed Combustion at 840° – 950° C	Coal is first burnt in suspension then in coal bed to meet load fluctuations. Favored in many industrial applications.	Coal is burnt on moving steel grate Coal gate controls coal feeding rate Uniform coal size for complete combustion.	Pulverized coal powder blown with combustion air into boiler through burner nozzles. The basic idea of a firing system using pulverized fuel is to use the whole volume of the furnace for the combustion of solid fuels. Coal is ground to the size of a fine grain, mixed with air and burned in the flue gas flow. Biomass and other materials can also be added to the mixture. Coal contains mineral matter which is converted to ash during combustion. The ash is removed as bottom ash and fly ash. The bottom ash is removed at the furnace bottom
Fuel	Coal, washery rejects, rice husk,	coal, variety of biomass	coal, variety of biomass	Pulverized coal powder. So, need

Figure 3.11-1: Comparative System Features of Coal Fired Boiler

System	**Fluidized Bed Combustion (FBC)	Spreader stokers	Chain-grate or traveling-grate stoker	Pulverized Fuel Boiler
Feature				
	bagasse and agricultural wastes			grinding process.
Operation	When an evenly distributed air or gas is passed upward through a finely divided bed of solid particles such as sand supported on a fine mesh, the particles are undisturbed at low velocity. As air velocity is gradually increased, a stage is reached when the individual particles are suspended in the air stream – the bed is called "fluidized". With further increase in air velocity, there is bubble formation, vigorous turbulence, rapid mixing and formation of dense defined bed surface. The bed of solid particles exhibits the properties of a boiling liquid and assumes the appearance of a fluid – "bubbling fluidized bed". The fuels burnt in these boilers can include coal, washery rejects; rice husk and bagasse (sugar cane wastes) & other agricultural wastes. The	Spreader stokers utilize a combination of suspension burning and grate burning. The coal is continually fed into the furnace above a burning bed of coal. The coal fines are burned in suspension; the larger particles fall to the grate, where they are burned in a thin, fast- burning coal bed.	Coal is fed onto one end of a moving steel grate. As the grate moves along the length of the furnace, the coal burns before dropping off at the end as ash. The coal-feed hopper runs along the entire coal-feed end of the furnace. A coal gate is used to control the rate at which coal is fed into the furnace by controlling the thickness of the fuel bed. Coal must be uniform in size as large lumps will not burn out completely by the time they reach the end of the grate.	Pulverized Fuel Boiler is One of the most popular systems for firing pulverized coal is the tangential firing using four burners corner to corner to create a fireball at the center of the furnace. This is shown in the figure. The coal is pulverized to a fine powder until less than 2% of the coal is +300 micro meter and 70-75% is below 75 microns for bituminous coal. The pulverized coal is then blown with part of the combustion air into the boiler plant through a series of burner nozzles. The combustion takes place at temperatures ranging between degrees Celsius depending mainly on the coal grade. The particle residence time in the boiler is typically 2 to 5
	fluidized bed boilers have a wide capacity range- 0.5 T/hr to over 100			seconds and the particles have to be small enough to be completely
	T/hr. The fluidized bed combustion			combusted during this time
	(FBC) takes place at about 840°C to			period.
	950°C. Fluidized bed combustion			
	(FBC) has emerged as a viable			
	alternative and has significant			

System	**Fluidized Bed Combustion (FBC)	Spreader stokers	Chain-grate or traveling-grate stoker	Pulverized Fuel Boiler
Feature				
	advantages over a conventional firing system and offers multiple.			
Benefit	FBC plants are capable of burning a variety of low-grade solid fuels, including most types of coal and woody biomass, at high efficiency and without the necessity for expensive fuel preparation (e.g., pulverizing). In addition, for any given thermal duty, FBCs are smaller than the equivalent conventional furnace, so may offer significant advantages over the latter in terms of cost and flexibility. Compactness, fuel flexibility, higher combustion efficiency, reduced SOx & NOx.	This method of firing provides good flexibility to meet load fluctuations, since ignition is almost instantaneous when the firing rate is increased. Due to this, the spreader stoker is favored over other types of stokers in many industrial applications.	This method of firing provides good flexibility to meet load fluctuations, since ignition is almost instantaneous when the firing rate is increased.	Varying coal quality coal, quick response to load changes and high pre-heat air temperatures.

**- Technology Selection in MCL

3.11.1 Conclusion for Technology Selection

Practically, Coal is the most suitable source for power production in cement plant, because it is also the main fuel for clinker production and coal for both purposes can be transported together.

Since coal fired power plants have been developed continuously from time to time starting from Pulverized Coal Boiler (PC Boiler) to Circulating Fluidized Bed boiler (CFB Boiler) which is the newest generation of coal fired boiler.

Circulating Fluidized Bed boiler (CFB Boiler) use a technology of Fluidized Bed Combustion which is more environmental friendly and recognize by many power plant in many countries.

Circulating Fluidized Bed combustion gives the flexibility to burn a wide range of fuels with optimum efficiency and 99% with completely combustion, resulting in lower of Thermal NOx emission compared to other technologies and during combustion process, limestone can be add to the chamber to react with SO_2 in order to reduce SO_2 emission.

For a post-combustion technology, MCL considered to installed Flue Gas Desulfurization (FGD) combine with Bag Filter (BF) to reduce SO2 and dust after combustion process which efficiency of FGD is higher than 95%

After taking considerations for all technology and advantages, Circulating Fluidized Bed boiler (CFB Boiler) with Flue Gas Desulfurization (FGD) is the most suitable type of Power Plant to support 5000-ton-per-day cement production of which power usage is about 40 Megawatts.

CHAPTER 4

EXISTING ENVIRONMENTAL AND SOCIAL CONDITIONS

4.1. Overview

An overview of the existing environmental and social settings shall be provided in order to place the proposal in its local and regional context. It will also incorporate the appropriate control measures required to be adopted or implemented in order to minimize the adverse effects thereof.

In order to carry out baseline study, it is first necessary to delineate and define the existing environmental factors in and around the proposed project on the existing environmental scenario which will include various environs according to the list below.

- Land characteristics and use,
- Landscape Character and Existing View,
- Habitats, Flora and Fauna,
- Water including Hydrogeology, groundwater and water quality,
- Noise levels,
- Antiquities and other sites of historic and cultural significance,
- The social and economic context,
- Traffic flows and transport infrastructure,
- Utility service

This section incorporates the description of the existing environmental settings within the area of proposed project site and its surrounding.

This description will specifically include;

- Past, existing and planned urban and or other developments on or near the proposed site;
- Past environmental performance, including the impacts of existing developments on the environment and the effectiveness of any impact mitigation measures applied on the site; and
- The relationship of the proposed development to any existing developments in nearby neighborhoods or areas.

4.2. Existing Environmental Condition

The environmental existing data such as water, air and noise quality, soil, and sediment survey and ecological survey were conducted selected sample sites within the project site and its surrounding. The ecological survey was conducted to assess the type of flora and fauna prevailing within the site. Geological mapping was done with clients before conducted the EIA Survey.

Topography, climate and meteorological information were collected through literature review and available data from Universities and some relevant NGO reports.

4.2.1. Geographical Location of the MCL Cement Project

The cement plant site is located in the Pya Taung area, approximately 0.86 km north of the Kwan Ngan village, east bank of the Attaran River, in the Kyaikmaraw Township, Mawlamyine District, Mon state of the Union of Myanmar. The cement plant is located between 16°21'44" and 16°22'05" N latitude and between 97°49'25" and 97°50'17" E longitude.

The Pya Taung Limestone deposit is situated near the Kawdun and Kawpanaw villages in Kyaikmaraw Township, Mon State. It lies between latitude $16^{\circ} 20'$ N to $16^{\circ} 23'$ N and longitude $97^{\circ} 47'$ E to $97^{\circ} 49'$ E, in one-inch topographic map No.94 H/15 of Myanmar Survey Department. It is also located at Mon State, about 19 km southeast of Mawlamyine City, State City of Mon Fig.1. It also lies between UTM Grid no 1806000N and 1809000N and 371000E and 374000E, WGS 84, UTM zone 47 Q.





Pya Taung Mountain (from East View)

Pya Taung Moutain (from West View)



Cement Plant Site Area

Cement Plant and Raw Storage Area



Access Road to Project Area

Proposed Canal Area



Attaran River



Figure 4.2-1: Existing Environmental Conditions near the Project Site (Source: REM Survey, Feb 2013)

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Figure 4.2-2: Location Map of MCL Cement Project

4.3. Existing Surface Characteristics

The existing surface characteristics such as topography, soil characteristics, terrain stability and susceptibility to erosion or landslip, the existing land uses occupying the site, the existing surface characteristics of the surrounding area, the existing land uses occupying the surrounding area and particularly those land uses which would be sensitive to industrial development.

4.3.1. Land Cover

According to the General Administrative Department of Kyaikmaraw Township, forest cover is about 22.04 % of total area of Kyaikmaraw Township.

According to the Kyaikmaraw General Administrative Department (GAD), the land use pattern is shown in Table 4.3-1.

No.	Land types	Area (Acres)
1	Total area of net agriculture land	144589
	(1) Farm Land area	52853
	(2) Garden Land	91736
2	Total area of exposed land	51708
	(1) Farm Land area	51708
3	Pastureland	8005
4	Industrialization land	1492
5	Urban land	2912
6	Rural land	9079
7	Other land	3071
8	Reserved Forest	72602
9	Virgin land	6569
10	Fallow land	11544
11	Non-arable land	40482
	Total	327494

Table 4.3-1: Land Types of Kyaikmaraw Township

Source: General Administrative Department (2017)



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Figure 4.3-1: Land Use/ Land Cover of Kyaikmaraw Township (Landsat 8 Satellite Image _2015 Dec)

4.3.2. Topography

The area is isolated hill that exposed in the flat region. The Pya Taung area is mainly occupied by the lowland in the lower course of the Gyaing and low hills with plains on the right bank of Attaran River. These lowlands are built up of fertile alluvial soils carried by the tributaries of Gyaing and Attaran Rivers. These plains are useful for agriculture and are about 15 m above mean sea level. At

the junction of the Gyaing and Attaran rivers, the plain is below 15 m. The lowland can be regarded as the economic backbone of the Kyaikmaraw Township.

The highest points of the Pya Taung mountain area are about 190 meter and 290 meter above sea level. The surrounding area of the Pya Taung is mainly covered by cultivated low land area with general elevation about 5 to 6 meters above sea level.

It forms rugged mountains characterized by karstic phenomena and rises as steep crags from the alluvial plains. West of the mountain is occupied by the Attaran River, which flows south to north and enters into the Thanlwin River near north of Mawlamyine City.



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Figure 4.3-2: Topographic Map of Project Area (Digital Elevation Model_30m Resolution)

4.3.3. Regional Geologic Setting

The area is part of the Shan Plateau or Sino-Burman Ranges, extends from the gulf of Mottama into the south to the Mogok Ranges into the North. There are several limestone outcrops trending NNW-SSE along the western foothill of The Tanintharyi range especially between Pa-An to south of Mawlamyine through Dawei into the South. The Pya Taung hill is completely made up of limestone,

minor dolomitic limestone and dolomite of the Moulmein Limestone Group (Permian). Martaban beds and Mesozoic granitoid rocks are exposed at the northwestern part of the area.

The lower boundary of Moulmein Limestone cannot be seen in the area, but previous workers considered Taungnyo Series is overlain by Permian Moulmein Limestone with an unconformity (Bender, 1983). Generally, Pya Taung is trending in NW-SE position and standing on alluvial land. The general strike trend of the rock unit is NW-SE trending and dipping west with average dip amount is between 20° to 40°. In the western and southern parts of the area, the Taungnyo range also occupies with nearly N-S trending position. Martaban beds and Mesozoic granitoid rocks exposed at the northwestern part of the area. These limestones can be correlated with plateau limestone on the basis of stratigraphic position, lithologic similarities and faunla assemblages (I.G.C.P, 1977).

4.3.4. Climate

Of all the physical factors, climate is one of the most important factors which determine general land utilization and natural vegetation of the area. Kyaikmaraw Township lies in the monsoon region to southern Asia and, therefore, the predominant wind systems are northeast monsoon and Southeast monsoon winds. "Monsoon" refers to the directional shifting of winds from one season to the next usually. The monsoon shifting is from a humid wind blowing from the ocean towards the land in the summer to a day, cooler wind blowing seaward off the land in the winter. A large amount of annual rainfall high temperature and humidity and a small amount of annual range temperature are the main climatic features of this area on the basic of rainfall. The climate can be differentiated into the rainy season and the dry season.

4.3.5. Temperature

Its location within the tropic makes the area suffer high temperature throughout the year. But because of the nearness to the sea, the heat is modified to some extent. The mean temperature for the month of January which is the coldest month of the year is 25.05° C (77.45 °F) and the mean monthly temperature for the hottest month in April is 30.49° C (90.41°F). The heat is intense during the dry period from March to May with above 28° C (82.4°F). The annual mean is 27.39° C (81.30°F). The diurnal range of temperature recorded for the month of December is 14.61° C (58.29°F), and on the other hand, the highest maximum temperature recorded for the month of April is 38.32° C (100.97°F). Monthly maximum, minimum, and mean temperatures of Kyaikmaraw Township (2002-2011) are shown in Table 4.3-2 and Figure 4.3-4). Moreover, temperature in both maximum and minimum temperatures of Mawlamyine Station are provided as below tables.

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	31.4	32.5	35.8	37.1	38	30.5	26.3	28.8	30.2	30.5	33.8	30.5
2	30.1	31	35.7	36.7	36.2	30.8	26.3	27.5	30	33	34.5	31.5
3	29.7	30.5	35.7	37.1	36	30.1	26.6	29	30	32	33	32
4	30.8	32.2	37.5	38	31.1	30.8	26.3	28.5	29.5	28	32.5	33
5	31.8	31.7	35.8	38.2	25.5	28.5	26.1	27	28.8	27.1	31.7	33.3
6	29.8	33	34.5	36.8	26.9	31	27.2	28.5	30.8	26.6	32.7	33.2
7	33.5	33.2	34	37.5	29.5	28.3	27.5	27.3	29.5	29.4	33.1	34.5
8	32.8	34.1	33.5	37.2	32.6	31.2	28.3	27.2	31	31	32.8	34.7
9	34.2	34	34.3	37	30.5	32.2	27	27	30.4	29.6	32.4	33
10	34	34.8	35.5	36.3	31.5	32.5	29.5	28	29.2	30	33.5	32.8
11	33.2	36	37	37.1	33	31.5	30.5	26.7	26.8	29.9	33.8	34
12	34.3	33.2	36.2	36.4	34	31.2	30	29	27.5	32.2	33.7	33.3
13	34.8	35.5	36.2	34.5	33.7	32.1	29.6	30.2	30	31	35	34.2
14	35.7	35	35	30.1	32.4	30.5	26.9	30.7	31	29.2	35	33.8
15	34.5	34.1	36.3	32.2	30.7	31	27.8	30.3	32	30.8	35	36
16	35	34	34.8	35.1	31	31.2	29	29	31.8	32.3	34.3	34.5
17	35	33.7	34	35.5	31.5	31.5	28	28.2	31.8	33.5	34.5	34.6
18	34.6	35	35	36.4	29.5	31.5	28.5	28.2	30.5	33.5	35	36
19	33.6	35	34.2	37	27.5	33.2	27.8	28.2	27	34.5	33.7	35.5
20	34.3	35.7	34.5	37.6	30.1	33.8	27.2	28.5	28.5	34	35	36.3
21	34.5	36.5	36.2	38.3	28.1	33.5	27	30	26.3	33	34.5	34.8
22	35	36.5	35.1	37.5	28.2	33	28.7	27.8	30	32.8	32.7	33.3
23	35	36.6	36.5	37.6	30.8	34	31.7	30.1	31.2	33.4	32	31.6
24	34.4	35.6	37	37.5	32	31.7	28.2	30	31.2	33.2	31.4	31
25	35.3	35.3	34.3	37.8	32.3	30.5	31.8	27.3	31.5	33	32	31
26	35	35.5	34.3	39.8	31.5	31.4	32.3	30.5	32.6	32.5	32	31.1
27	35	35	36	36	31.8	31.5	33	30.8	29.5	33.5	31.8	32.4
28	33.6	35	35.6	36	32.5	26	33.2	32.2	30.5	34.5	32.5	31
29	31.7		36	36	29.4	30.2	32.6	30.7	29.8	34.5	30.6	31.2
30	32.7		36.5	38.3	30.5	28.2	32.2	30	30	34.2	30.6	33.3
31	32.6		36.7		29.5		29.4	29.8		30.5		34

 Table 4.3-2: Daily Maximum Temperature (°C) of Mawlamyine Station (2007)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	31.5	28.2	36.2	3.18	29.3	30	26.7	29	31.4	28	27.5	30
2	30	30.7	35.7	34.4	30	29	28	28	30.5	31.8	28	31.2
3	31.2	32.8	36.3	34.8	26.8	30	30	28.8	32.3	31.7	33.3	32.5
4	31.5	33.1	36.2	36.3	27.5	27.6	29.8	28.8	31.8	31.8	33.2	32.5
5	32.8	34	35.3	36.8	32	29	27.5	26.8	30.3	31	33.5	31.5
6	33.8	34.5	35	37.3	32	27.6	28	25.8	29.3	32.6	31	32
7	33.7	35	36.3	33	32.1	29.8	27	27.2	28.8	29.6	31	32.7
8	31.7	35.8	37	35.2	32	28.8	28.5	26.3	31.8	32	33.6	31.8
9	33.8	34.8	36.2	35.5	30.7	32.2	29.8	27.8	29.5	33.5	32.5	31.5
10	33.5	34.7	35.8	36	30.4	32.4	29.5	26.5	33	35.3	31.8	31
11	33	34.1	35.3	35.5	30.2	32.2	29.5	26.2	31.2	33.5	30.5	31
12	32.8	34.3	36.5	36	31	31.3	29.3	25.5	27.5	32.3	30	31.2
13	33	34	36.8	35.8	28.8	32	28.2	27.5	26.8	34	30	31.8
14	33.7	33	36.3	37	26.5	27	29.5	27.8	29	33.5	29.8	32
15	34	33.2	35.8	36.8	30.3	26.7	28.5	29	28.3	34	31	31.5
16	35	32.5	35.6	36.8	30.7	28.5	30	27.8	29.4	30	33.7	31.5
17	34	32.5	36	36.3	29.8	28	30	28	27.7	33.8	34.5	31
18	35	34	36	36	27.3	30	30.4	27.7	30.6	33.5	34	30.7
19	35	35	35.8	36	26	28	30.5	27.8	28.5	34	32	30.2
20	34.2	34.7	35.3	36.8	29.3	29.2	30	30	27.3	35	33	30.2
21	34	33.3	35.4	37	31.2	30	31.2	29	25.8	32.5	33	31.2
22	34.2	34.3	36.4	36.8	29.1	30.3	26.8	29	26.7	34	34.5	32.2
23	36	35	36	37	31	29.3	26.2	30.5	29	33.8	33.8	32.2
24	35	35.5	35.5	36.8	30.5	31.3	27.3	31.8	30	32.4	34.8	32.8
25	34.7	36	36	34.5	30	30.8	26.6	32	26.8	30.7	35	32.7
26	35.3	36.2	35.7	35	31	28.3	27.5	31	26.8	31.3	33.2	29.8
27	35	37	35.2	32.4	30.7	31	27.1	31.8	28.5	29.8	32.2	31.8
28	28.1	35	36	30.5	30	27.8	26.5	32	30	32.3	31	32
29	32.7	35	36	28	30.5	30.2	28.5	31.5	29.9	32	29.8	32.5
30	32.1		36.3	26	28.9	28	27.5	32.1	31.3	31.3	30	32.8
31	32.5		30.8		29.9		25.7	32.3		29.5		34.1

 Table 4.3-3: Daily Maximum Temperature (°C) of Mawlamyine Station (2008)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	33	33	37	38.7	34.5	28	27	27	32.2	29.5	34.5	32.3
2	31.8	33	36.5	37.8	35	28.8	27.7	28	31	29.5	33	33.2
3	32	33	35.6	37.5	35	27.8	29.5	29.9	33.5	30.2	31.8	33
4	32.2	33.5	34.6	38.5	33.5	30	29.5	28.9	29.8	31.5	28	33
5	32.5	33	34.5	38	32.8	27.3	27.3	29.9	30	31.8	32.3	32.5
6	32.8	33.5	35	38.5	34	28.7	26.2	27.5	28.7	32	33.4	32.2
7	32.8	34	35	37.8	34.5	29.3	28.8	27.7	31	32.1	35	32.2
8	312.7	34	34.7	37.5	34.5	28.5	27.8	27.7	30.6	32.2	35.3	31.8
9	31.8	35	37.5	28.2	34.7	25.5	29.2	29.8	32	31.8	35	33.5
10	28.8	35.4	37	35	35.1	27	30.2	31	31	32	35	33.3
11	29.3	35.2	37	32	33.5	29.5	31.3	27.6	32.2	31.8	35	33
12	30	33.5	36	31.3	33.5	29.5	30	31.5	32.5	32	36.8	33
13	29.3	32.7	35	35	33.5	30.5	27.5	31.5	31	33	36.2	34
14	29.2	33.5	36.5	31.5	32	31	27.5	35.5	28.5	32	35.2	32.5
15	27.5	32.5	35.8	35.7	31.3	31.5	28.5	35	31.5	31.8	34	33.3
16	29.2	32.8	35.4	36	35	30.3	28.6	36.5	29.5	31.8	35	33.5
17	30.1	34.5	35	31	36.3	31.5	27.5	35.8	30.5	32.3	35.8	33.8
18	31	34.5	32	32.5	35	30.3	26.5	35.3	30.6	30.3	32.7	35
19	31.8	35	36	33.8	32	31	29.2	35.2	31.8	30.2	32.5	35
20	31.5	36.2	36	34	30	28.6	27.8	36	32.5	31.8	32.7	33.8
21	31.2	35.7	36.5	34.3	33	26.5	29.7	36.7	32.5	33.8	31.8	33.5
22	31.3	35.5	35.2	34.3	30	29	29.3	33	31.8	32.2	30.7	33
23	32.7	35.5	36.3	33.8	31.8	28.8	27.8	35	31.2	30.2	30.8	33.5
24	33.2	36.5	35.6	33.3	31.5	31.1	27.9	32.5	31	31.8	34	33.2
25	34.5	37.3	35.7	34.4	30.8	32.2	26.8	33.5	32	33.2	33	38.2
26	33.5	36.5	35.3	32.6	31.5	31.2	27.9	33	29.3	32.5	31.9	33
27	33.3	37.5	35.7	31.8	31.5	28.3	30	33.4	30.8	35.2	33.8	32.2
28	33.2	36	36	31	30	28.3	29.2	34.2	29.5	35	34	32.5
29	33.8		36	31.5	30	29.8	26.8	34	30.2	34.5	34	31.8
30	34		38.6	32.6	30.2	30.5	26.6	33.8	31.5	35.1	33.5	32.8
31	33		38		30.5		26.6	33.8		34.5		33.2

 Table 4.3-4: Daily Maximum Temperature (°C) of Mawlamyine Station (2009)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	33.5	35.7	35.2	36.8	37	32.8	33.5	31.3	29.9	34.2	30.7	34
2	33.3	35	34.8	37.2	37.8	32.8	31	30.8	32	34.6	31.5	33.8
3	34	35.7	35	38.3	37.3	32.6	32.1	28.8	31	34.2	31.3	33
4	33.8	36	34.5	37.7	37.9	33	31	27.8	30.5	33.6	31.6	33.5
5	34.3	34.8	32.5	38	37.8	33	33	27.3	28.7	33.7	31.6	34.7
6	32.2	35.2	34	37.5	37	33	33.2	28.2	29.3	33.7	31.6	36
7	31	35.7	33.8	38.2	38.5	32.2	32	27.5	30.8	32	32.1	35.2
8	34.5	36.2	35.8	38.3	37.8	31.7	32	27.5	31.8	32.8	32.6	34.5
9	34.4	35.7	36.6	36.6	37.7	29	29.2	30.7	32.5	32.8	33.5	34.2
10	35	36	35.2	36	37.4	33.5	29.8	28.6	32	30.3	34.8	35
11	35	36.5	32.7	36.3	38	31.8	31	30.5	28	31	33.8	26.3
12	35	36.5	35.2	35.2	37.8	30.9	29.7	29.3	29.5	31.2	32.5	27
13	34.4	36.5	34.5	35.2	38.4	32.8	32.1	29.1	30.3	31.3	33.5	31.3
14	35.1	36	34.5	37	38	33	33.5	28.7	29.7	29.3	34.2	29.8
15	33	36.2	36	37.8	38.8	31.1	31.3	31.5	30	30.2	34	27
16	34.1	37.5	32.8	36.8	38.2	31.1	32.3	31.8	28	29.8	34.8	32.3
17	33	35.8	37.8	36.5	39	31.9	30	30.3	30.8	31.7	35.2	26.4
18	32.7	36.5	37.2	36.5	36.8	31.2	30	31.8	32.5	32	35	30.6
19	32.3	36	36.8	35.2	36.3	32.1	30	33	29.5	31.5	35.9	31.8
20	35.2	34.5	35.3	36.5	36.7	33.3	31.2	33.8	30.7	32	35	33.4
21	32.5	34.8	35.8	36.4	33	32.7	31.8	31	30.5	29.3	34.5	33.2
22	35	35.3	36	37.5	34.5	32.8	31.8	28.7	30.1	30.5	34.2	33.3
23	35.2	35	36	37.7	28	30.7	30.2	31.6	31.2	30.7	34.1	33
24	35	34	37.2	37.7	32.8	29	26.3	30.5	31.4	32.5	34.2	32.7
25	35	35	38	37.6	30.3	30.7	30.7	29.6	30.3	32.5	35	32.3
26	34.3	35.6	39	38	30.2	29.8	31.1	29.7	33.2	33.2	34.3	32
27	34.8	35.2	36.2	38.2	32.6	31.5	29.9	30.5	33.7	33.3	34.3	31.5
28	35.3	35.3	36	34.9	33.3	31.8	31.5	28.5	32	34.3	34.2	30.7
29	35		35	35.5	33.8	28.5	29.6	28.5	33	34.7	33.5	30.6
30	36.3		36.3	37.5	31.5	32	31	29.5	34.4	33.8	34.6	31.5
31	35.3		36		32.5		30.5	29.9		30.3		31.7

 Table 4.3-5: Daily Maximum Temperature (°C) of Mawlamyine Station (2010)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1	32.3	37.8	36.2	34.1	31.5	32.8	26.6	26.8
2	32.6	33.5	36	35.2	33	33.1	25.2	30.9
3	33.6	33.3	35.5	35.1	34.9	32.5	27.8	30
4	32.7	33.5	35.8	36	35.2	33.9	31.2	28.5
5	33.7	34.2	37.1	35	33.7	34.2	32	30.3
6	34.9	33.3	36.5	35.8	33.8	31.7	32.6	30
7	32.9	33.5	37	34.9	33.4	31.8	31.6	28
8	31	31.9	35.5	35.2	35.6	31.6	33	28
9	33.3	31.8	35.9	37	27.9	30.8	31	27.5
10	33	33.3	36	34.8	29.1	29.3	27.8	27.8
11	31.1	33.8	37.1	35.7	31	28.9	30.4	26.5
12	31	33.9	36.4	34.4	33.4	30.1	32.1	27.8
13	30.5	32.7	37.1	34.4	32.8	29.6	31.5	30.7
14	30.5	33.7	32.8	34.5	32.1	32.3	29.5	31.3
15	31.7	34.2	30.8	34.4	31	29.9	29	29.9
16	30.8	34	21.4	35.8	32.8	28.1	29.6	30
17	31.3	34.7	20.8	35.2	33.4	30.6	28.3	28.3
18	31.6	34.2	29.5	34.4	31.9	27.2	28.5	27.8
19	31.2	35.5	33.4	34.3	29.2	27.5	28.4	25.2
20	31.5	35.3	34.1	35.4	29.2	27.8	26.8	30
21	31	36.5	33.3	35.6	30.6	27.2	26.5	26.8
22	32.9	36	35	37	30.7	31.2	27	30.5
23	32.8	35.4	31.6	35.8	32.9	30.2	28.5	30.4
24	32.6	35.8	35.4	36.8	30.7	29.1	30.5	31.1
25	32.6	35.8	32.5	27.5	31.8	27.3	31.4	30
26	33.8	36.2	32.8	33.1	32.5	33.1	29.2	31.3
27	33.8	35.5	30.1	33.4	31.2	27.6	30.8	30.1
28	34.2	35.1	26.1	34.9	29.6	27	31	31.8
29	34.7		27	37.2	32	30.8	31.1	29.6
30	33.3		30.9	38	32.5	29.7	30.2	27.3
31	33.3		33.2		32.8		25.8	30.2

 Table 4.3-6: Daily Maximum Temperature (°C) of Mawlamyine Station (2011)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	16.5	15.5	21.6	25.7	25.2	23.5	23.4	23.8	23.9	24	23	14
2	16.5	16.7	21.2	26	26	23.8	23	21.7	24.3	24.8	23.5	16
3	15.2	15.5	19.8	23.8	25.4	25.1	23.4	23	23	24.8	24.5	16.5
4	15.1	15	20.2	23.6	25.7	24.5	23.5	22.9	23.8	25	23	19.5
5	16.2	15.5	20.3	24	24.2	24.7	23.5	23.5	23.5	23.3	23.8	18.5
6	20.8	16.5	21.8	24.2	24	23.8	23.5	24	23.7	23.5	23.5	19
7	21.5	16.4	19.5	25.7	22.5	24.3	22.5	23.8	22.9	23	22.8	20
8	20	16.2	20.7	26.1	24.8	24.2	23	23.7	24	23.3	20.5	19.6
9	19.8	19	17.5	24	24	25	24.8	24	25.2	23.7	20.5	19.5
10	19	19	16.7	24	26	25.5	23.8	24	24.5	24.3	20.2	20.3
11	18	21.8	16.6	25.8	25.7	26.5	24.6	23.2	23.8	23.6	21	20
12	17	22.2	21	25.5	25.5	24.5	24.2	23.8	23.7	23.8	21	20.5
13	18	22.2	20.8	25.4	25.5	26	24.2	24.5	23.5	23	22.8	20
14	18.5	22	21.7	25.3	26.4	25.1	23.5	24.5	23.7	23.2	23.5	19.8
15	17.5	21.8	21.6	24.8	24.5	25.4	24.2	25	24.1	23.6	23.5	20.5
16	17.2	20.4	24.5	23.9	23.5	25.2	24.5	23	24.9	24.5	23	21.5
17	16.8	20.4	24.5	25.3	23.3	23	24.5	23	25	23.8	22.2	22.5
18	16.6	19.5	24.2	25.4	24.2	23.5	24	23	24.5	24.8	21.5	23
19	16.7	19.5	20.5	25.6	23	25.9	24.5	23.5	24.2	25	21.7	22.7
20	16.5	18.5	23	26.5	23.4	24	23.8	24.5	23.5	23.8	24.2	23
21	14.8	18.2	20	26	23.6	25.3	23.5	24.5	22.5	22.2	21.5	22
22	14.5	20.5	23	27	23.3	24.8	23	23.8	22.5	22.5	23.4	21
23	15.1	20.5	23	27	23.2	24.3	24.6	23.9	22.8	22.8	22.6	20
24	17.5	23.5	21	27	24.1	24	23.5	24	22.9	23.6	23.6	14
25	20.2	23.2	21	27	24	25.1	24.1	25	24	23.5	19.5	16
26	22.7	23.2	23	26.8	25.5	25.3	24	23.8	24.8	21.8	19	17.3
27	22.3	21.9	22.9	27.5	25.1	24.8	25.3	23.8	27.2	22.5	19.6	17.5
28	22.2	21.8	23	24.5	23.4	22	24.9	23.9	24.6	23.4	16.5	17.5
29	21		24	24.7	24.2	24.6	26	25.1	23.5	23.8	16.5	18.5
30	17.5		24	26.6	25	23.8	24.7	24.2	23.5	24.5	15	18.5
31	16		24.5		24.8		23.2	24.1		23.5		19.1

 Table 4.3-7: Daily Minimum Temperature (°C) of Mawlamyine Station (2007)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	18	22.7	22	21	23	24.5	23	22	24	22	22.3	17.5
2	18.8	22	21	23	23.5	23.2	22	22.5	23.8	22.5	20.5	16.7
3	18.9	21	21.3	23.5	20	23.5	22.7	22.7	23.5	22.5	21.6	16.5
4	16.5	19.6	20.7	24.3	21.7	23	22.5	22.5	23.2	23	21.8	16.6
5	16.5	20	20.5	23	21.5	22.7	22.5	21	22.8	21	22.8	17.3
6	17	17.8	21.5	25	24	23.2	22	22	22.1	22	22	17.5
7	17.3	18	20.5	25	22.8	22.8	21.5	21.3	23.4	22.5	21.8	17.5
8	19	18.3	18.5	24.8	22.7	24	22	22.2	21.8	21.7	22	19
9	19	19.5	21	24.8	23	23	23	21.3	22	21.8	22	17.2
10	17	21.8	22.8	26.5	23.5	25	22	22.2	22.5	22.8	19.5	17
11	17	20.5	21.5	24.7	22.5	25	23	21.7	22.5	23	19	16.5
12	15	20.7	19.4	25	24	24.5	23.8	21.4	22.6	21.2	18.1	15.9
13	16	21	21.5	25	24.8	23.8	22.9	21	21.8	22.6	18	17
14	16	21.7	21.8	25.2	22.7	24.5	22.7	21.6	20.7	22.5	19	16.8
15	16	21.5	23	24.5	23.8	25	23.7	22	22.7	22.5	18	16.5
16	18	19.5	22.2	26	24	23.4	22	22.5	21.8	23	19.5	16.8
17	19.8	18.5	23	26	23.2	23	22.5	22	21	23.5	20	16.8
18	19	16	23.8	26.5	23.2	23.9	22.8	21.9	21.8	23	21.4	15.3
19	20	18	23.8	26.8	21	23.5	23.2	21.9	21.5	23	23	15.3
20	20.1	21	22.6	26	21	22.8	23.5	22.2	22.1	23.5	22.5	14.5
21	19.5	20.5	22.6	26.7	23.7	22.7	24	22.9	21.5	21	21	14
22	17.3	17.5	23	26.8	23.1	22.3	23	22.3	20.5	22	22	16.7
23	17.4	17	22.8	25	23.2	23.3	22	23	20.5	22.4	20.8	17
24	19	19.2	23.4	22.6	24.7	24	21.8	23	21.6	22.5	21.5	17
25	18.8	19.1	22.8	22.2	24.5	25	22	23.6	22	22.8	22.2	18
26	21	18.8	22.8	24.4	24.8	22.5	21.8	23.8	21.6	23	21.5	21
27	22	19	23.4	23.5	23.2	22.7	21.5	23.8	21	22.2	19.8	19.5
28	21.8	22.8	23	24	24.5	22.8	21.5	22.5	22.2	22.8	18.5	18.5
29	22	22.8	23	23.5	24.7	24	21.7	22.7	22.2	22.5	18	18
30	21.3		24	21	24.5	23.7	22.1	22.7	22.3	22	17	16.4
31	21.5		23		23.3		22.2	23		22.2		16.7

 Table 4.3-8: Daily Minimum Temperature (°C) of Mawlamyine Station (2008)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	19.3	17.2	22.9	23.6	25.2	24	22.3	23	23	24	23.5	18.8
2	20	18.2	23	23.3	25.4	22.5	22.5	23.5	22.8	24	21.5	18.5
3	18.6	19	24	24.5	23.5	23	23.7	23.8	22.5	23.9	22.5	18
4	18	19	23.5	24	23.8	23.8	23.3	24	23	24	22	18.5
5	18	18.8	22.5	24	24.5	23.3	23.8	24	23.5	24.5	21	17.5
6	17	18	22.3	24	24	23.5	22.3	24	23.5	24.5	21.2	17.5
7	17.5	20.5	23	24.4	25.5	22.8	22	24.5	24.5	24.6	22.8	17.3
8	16.8	21	20	24.8	26.5	24.5	23	23	24.3	25.2	23.3	17
9	15.8	20.5	20.8	25	27	23.5	23.2	22.8	24.5	24.7	23.8	16.5
10	16.2	20.5	20.5	24	26.8	22.5	22.3	23.7	24.6	24	23.7	17.5
11	13.6	19.5	20.8	24.8	24.5	23	24.2	23.7	24.6	24	24.3	20
12	13	19.5	21.7	25	24.3	23.8	23	23.7	25	24.3	24.2	19.5
13	13	21	22	25	22.7	23.5	22.5	23.7	25.7	25	24.2	20
14	16.5	18.5	22	24.5	23.8	24.2	22.5	24.5	24.5	25	24.5	19.6
15	16.5	18.5	23	24.5	24.5	23.2	22.7	25.3	24.3	24.8	24.6	19.5
16	16.5	20.5	23.4	25	25.3	23.8	23	25.5	24.5	25	23.5	19.8
17	11.5	21	24	24.2	25	23.5	22.8	25.9	24.3	24	24.5	19.8
18	11.4	21.5	22.5	23.8	24.6	24.2	22.9	25.3	24.3	23.5	23.5	21
19	13	22.8	22	24	25.5	24.6	22.3	25.2	24.6	24.3	22.8	22.3
20	13	23	22.9	25.5	24.3	24.3	23.5	24.3	24.2	24.5	20.5	21.5
21	14.5	22	23.5	25.8	24	23.2	23	24.7	24	24.5	20.5	21.3
22	17	22	23.5	23.5	25	23	23.8	25.5	24.8	24.5	20.5	19
23	15.5	21.7	23.6	24	22.3	24	22	24.8	23.5	25	19	19
24	16	20.5	23.6	25.2	25	22.2	22.2	25	24.5	24.5	18	19.3
25	18.5	20.7	24.4	26.8	24.3	23.5	20	24.8	24.3	24.5	18.6	18.5
26	18.3	20.8	24.5	26.8	23.8	24.2	22.8	23.7	22.8	25	19.6	19
27	18.1	22.7	22.8	23.8	22.8	23.2	22.8	24	22.8	25	18	19
28	17	22.7	22.8	24	23	23.5	24.4	24.5	23.5	24.5	19	19.5
29	16.8		23	24.5	23.5	23.5	23.5	24.9	23.8	23.7	19.5	19.5
30	18.3		24	24.5	23.4	24	24	24.8	24.2	23.5	20.5	18.3
31	18.2		24		24		23.5	24.2		23.5		18

 Table 4.3-9: Daily Minimum Temperature (°C) of Mawlamyine Station (2009)
EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	18	19.5	20.2	24	26.5	24.3	24.5	23.7	24	24	20.6	21.5
2	17.5	19.5	20	25	25.7	23.7	25.5	25	24.8	25.2	19.7	20.6
3	18.5	19	19.7	25.5	26.5	24.3	25.9	23.8	24.5	25.2	19.2	22.5
4	18.5	21.3	20.5	25.5	26.6	26.3	25.5	23	24.5	25.5	19	22.6
5	20	21.3	22.5	25.7	27.5	24	25	23.3	24.5	25.9	21.5	22.6
6	20	18	22.5	26.7	27	27	25.5	23.8	24.8	25.7	21.8	22
7	22.6	18.7	22.5	25.7	28.2	25.2	24.8	23.5	23.9	24.1	21.4	22.5
8	23	18.5	21.5	25	26.6	25.2	25	24	23.9	24.3	21	23
9	22.2	19	25.1	25	28.1	25.7	24.5	25.1	25	24.9	21.5	21.8
10	20.5	20.2	24.5	26.5	27.5	25	24.5	24.7	23.8	23.5	20.5	21.8
11	20.5	20.3	24.5	24.8	27.5	25.5	24	25.2	23.4	23.5	21.5	22.5
12	21	19.7	24.2	26	28.5	24.5	24.5	25	23.5	23.8	23	23
13	21	19.1	22.8	25.8	26.5	24	24.3	24.1	24	24.5	23	21
14	21	18.7	22.7	25.4	27.5	25	24.3	24	23.3	24.2	24	19.6
15	21	18.6	23.8	24.8	27.5	24.8	25	23.3	23	22.5	22.8	19.5
16	20.8	18	24	22.5	28	24.6	25.5	23.3	23	23	22.8	19.8
17	20	21.5	25	25	25.5	23.8	25.3	25	23.5	23.5	22.2	23.2
18	18.3	22.2	23.2	25	25.8	25.3	24.8	24.5	24	25	22.5	20.8
19	18	22.3	25.5	25	26	24.9	24.9	24.5	24.3	24	22.7	20
20	17	23.5	22.5	25.8	23.8	25.3	25	25	24.7	23.7	23.5	21.5
21	17	19.5	24	26.8	27.5	24.8	24.5	24.2	24.5	23.2	22.5	20.5
22	22.5	19	23.5	27	24.5	25	24.5	23.8	24.9	23.3	22.8	19.8
23	21.3	17.6	22.5	27	24.5	25	24.3	24.1	24	23.8	22	19.2
24	23.3	17.7	23	27.2	24.3	25	23.8	23.6	24.8	22.8	22.3	20.8
25	22.5	19.6	22.7	25.2	24.2	24.5	23.5	22	23.9	23.3	21.5	18.2
26	22.2	20.7	22	27.5	22.2	24.5	23	23.7	24.3	24.5	21.5	17
27	22.8	20.5	22.2	27	24	25	23.3	24	24.8	23.5	21.5	17
28	21.5	19.7	24.5	23.2	25.8	26	24.7	23.4	24.5	22.7	21	16.8
29	20.8		22.5	25.3	24.8	24.8	24.8	23	24.3	22.3	23.5	17.3
30	20.8		22.5	25	24.5	24.5	24.7	22.8	23.7	22.3	21.5	16.7
31	21		23		25		23.7	24.5		20		17.8

 Table 4.3-10: Daily Minimum Temperature (°C) of Mawlamyine Station (2010)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1	18	22.3	23	20.5	23.6	25.5	25.2	24.8
2	17.2	19.3	24.5	22	24.3	23	23.5	24.5
3	17.2	19.5	24.5	21.9	24.7	26.1	22.8	24.3
4	19	19.2	24	22	24.6	25.8	23.3	23.5
5	19.8	18.1	22.8	22.2	25.3	25.1	24.2	24
6	19.3	17.5	24	24.5	24.5	26.3	24.4	24
7	19.3	17	22.5	25	24.4	26	25	23.3
8	20.5	17.3	23	24.4	24.5	23.9	24.5	23.5
9	21.5	15.8	23.3	24.2	24.3	23.8	23.8	23.5
10	22.3	16.5	22.5	22.1	24.2	24.5	23.2	22
11	21.8	17.4	21.7	22.8	22.7	24	23.7	23.2
12	20	17.5	22	25	23.2	23.6	24.8	24.3
13	17.7	18.5	24.5	23.7	24.7	23	24.5	23
14	16.8	17.2	23.5	23.3	23.6	24	23.8	23.8
15	17.5	19	23.7	25	24.3	24	23.2	24.3
16	17.6	19.5	19.8	24.8	24.3	23	24	24.2
17	19.5	19.5	16.2	24.9	25	24.5	23.9	23.5
18	18.9	21	16	24.5	25.2	23	24	23.5
19	18.2	21.3	20.7	25.2	22.7	24.2	24	23
20	16.5	21.3	20	25	22.1	23.8	23.8	23.2
21	15.8	21.7	20.8	25.2	24	23.8	23.2	23.5
22	17	23.2	19.9	25	24	23.3	23	23
23	17	22.1	21.8	26.2	23.8	23.5	22.5	23.5
24	18.5	21.5	21.6	24.3	24.4	25.3	23.5	23.8
25	19.2	21	23	24.3	24.9	23.5	24.3	23.9
26	19.8	24	23.8	24.5	24.2	24.3	24.5	24.7
27	19.5	23	23.9	23.5	24.3	24	23	23.5
28	21.7	23	22.5	25	24.3	23.8	24.5	23.3
29	22.5		19.1	24.5	23.7	24.5	24.2	24.2
30	23.9		20	24.6	24	25.8	25.2	24
31	23.3		21.2		24.2		24.5	23.5

 Table 4.3-11: Daily Minimum Temperature (°C) of Mawlamyine Station (2011)

4.3.5.1 Regional Climate Classification of the Project Site

According to these informative data of temperature range throughout the year, the climate is tropical in Mawlamyine region. There is significant rainfall in most months of the year. The short dry season has little effect on the overall climate. This climate is considered to be **Am** according to the Köppen-Geiger climate classification. The average temperature in Mawlamyine is 26.8 °C.

Am means Tropical monsoon climate; driest month (which nearly always occurs at or soon after the "winter" solstice for that side of the equator) with precipitation less than 60 mm (2.4 in), but more than 4% the total annual precipitation.¹

With an average of 29.8 °C, April is the warmest month. January has the driest and lowest average temperature of the year. It is 24.3 °C. During the year, the average temperatures vary by 5.5 °C.²

4.3.6 Rainfall

Rainfall is not evenly distributed throughout the year but therefore is distinct in dry season for about four months where monthly rainfall amounts are less than 1" (25.4mm). The rain comes in with the beginning of southwest monsoon wind when the southwest monsoon wind carries moisture while crossing the Andaman Sea. There is only a maximum in the month of July during the year. The annual rainfall received is over 500mm. January, February and March are the driest months and July has the highest monthly rainfall with 1245.53 mm. A large amount of rain occurs from May to October, Table (4.3-12) and Figure (4.3-4). There were 139 rainy days in 2011. Good rainfall in the late of monsoon season, especially December and January usually destroy the staple good crops for people. However, it happens rarely with coming of northeast monsoon wind in November. Dryness begins and lasts till May of next year. Stronger northeast winds indicate the drier nature of the weather. Total annual rainfall of Kyaikmaraw Township (2002-2011) is shown in Table 4.3-22. So, it enjoys Tropical Monsoon (Am) climate.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	0	0	0	22	24	83	6	20	5	Trace	0
2	0	0	0	0	Trace	0	59	84	6	Trace	0	0
3	0	0	0	0	Trace	0	134	44	22	1	0	0
4	0	0	0	0	1	5	111	22	47	4	8	0
5	0	0	0	0	52	22	195	67	65	107	Trace	0
6	0	0	0	0	251	44	82	30	30	177	0	0
7	0	0	0	0	38	81	42	22	35	45	0	0
8	0	0	0	0	5	Trace	12	84	0	8	0	0
9	0	0	0	0	0	8	3	81	22	0	0	0
10	0	0	0	0	0	0	50	76	4	Trace	0	0
11	0	0	0	0	3	3	8	163	44	3	0	0
12	0	0	0	0	11	9	11	48	61	2	0	0
13	0	0	0	Trace	Trace	14	10	11	7	87	0	0

 Table 4.3-12: Daily Rainfall (mm) of Mawlamyine Station (2007)

¹ Chen, Hans; Chen, Deliang. "Köppen climate classification". hanschen.org. Retrieved 2017-08-04.

² https://en.climate-data.org/location/1003326/

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14	0	0	0	1	16	22	161	2	0	0	0	0
14	0	0	0	1	10	23	101	2	0	0	0	0
15	0	0	0	5	25	7	68	2	3	5	0	0
16	0	0	0	0	5	0	40	19	0	0	0	0
17	0	0	0	0	20	34	24	65	3	Trace	0	0
18	0	0	0	0	23	12	18	34	10	Trace	0	0
19	0	0	0	0	19	Trace	22	13	5	0	0	0
20	0	0	0	0	63	30	17	0	87	0	0	0
21	0	0	0	0	37	13	42	2	45	0	0	0
22	0	0	0	Trace	51	4	4	75	13	0	0	0
23	0	0	0	0	34	25	Trace	2	Trace	0	0	0
23 24	0	0	0	0	34 21	25 11	Trace 2	2 19	Trace Trace	0 0	0 Trace	0
23 24 25	0 0 0	0 0 0	0 0 0	0 0 0	34 21 1	25 11 5	Trace 2 3	2 19 7	Trace Trace 6	0 0 0	0 Trace 0	0 0 0
23 24 25 26	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	34 21 1 8	25 11 5 1	Trace230	2 19 7 23	Trace Trace 6 0	0 0 0 0	0 Trace 0 0	0 0 0 0
23 24 25 26 27	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	34 21 1 8 4	25 11 5 1 68	Trace 2 3 0 2	2 19 7 23 1	Trace Trace 6 0 2	0 0 0 0 0	0 Trace 0 0 0	0 0 0 0 0
23 24 25 26 27 28	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 Trace	34 21 1 8 4 7	25 11 5 1 68 170	Trace 2 3 0 2 0 0	2 19 7 23 1 2	Trace Trace 6 0 2 0	0 0 0 0 0 0	0 Trace 0 0 0 0	0 0 0 0 0 0
23 24 25 26 27 28 29	0 0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 Trace Trace	34 21 1 8 4 7 11	25 11 5 1 68 170 13	Trace 2 3 0 2 0 0 0 0 0	2 19 7 23 1 2 3	Trace Trace 6 0 2 0 8	0 0 0 0 0 0 0	0 Trace 0 0 0 0 0	0 0 0 0 0 0 0
23 24 25 26 27 28 29 30	0 0 0 0 0 0 0 0 0	0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 Trace Trace 0	34 21 1 8 4 7 11 5	25 11 5 1 68 170 13 20	Trace 2 3 0 2 0 0 1	2 19 7 23 1 2 3 14	Trace Trace 6 0 2 0 8 1	0 0 0 0 0 0 0 0 0	0 Trace 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0

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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	Trace	0	10	236	8	38	15	0	50	12	0
2	0	7	0	1	Trace	25	49	27	Trace	0	8	0
3	0	0	0	Trace	227	22	3	6	36	0	0	0
4	0	0	0	0	38	18	22	16	2	2	0	0
5	0	0	0	0	2	17	43	43	20	27	0	0
6	0	0	0	0	0	64	77	135	14	0	23	0
7	0	0	0	0	15	50	38	123	8	5	5	0
8	0	0	0	0	4	7	90	59	54	3	0	0
9	0	0	0	Trace	18	14	20	67	2	0	0	0
10	0	0	0	0	27	1	44	44	35	Trace	0	0
11	0	0	0	0	14	0	19	82	3	0	0	0
12	0	0	0	0	6	2	7	54	19	26	0	0
13	0	0	0	0	4	8	62	138	87	0	0	0
14	0	0	0	0	28	124	56	5	58	0	0	0
15	0	0	0	0	10	37	5	24	22	0	0	0
16	0	0	0	0	21	26	29	17	33	0	0	0
17	0	0	0	0	26	76	27	24	8	Trace	0	0
18	0	0	0	0	60	21	3	63	0	0	0	0
19	0	0	0	0	238	23	48	6	31	0	0	0
20	0	0	0	0	8	54	15	3	10	0	0	0
21	0	0	0	0	Trace	14	2	16	65	52	0	0
22	0	0	0	0	9	28	63	40	31	0	0	0
23	0	0	0	5	1	16	58	3	13	6	0	0
24	0	0	0	45	4	7	102	0	22	Trace	0	0
25	0	0	0	22	9	3	72	0	89	0	0	0
26	0	0	0	0	Trace	36	67	1	63	10	0	Trace
27	0	0	0	0	25	40	124	4	46	18	0	Trace
28	19	0	0	12	18	60	55	4	21	3	0	0
29	10	Trace	0	13	10	7	206	0	0	39	0	0
30	0		0	152	10	39	53	9	Trace	41	0	0
31	0		Trace		55		85	0		15		0

 Table 4.3.13: Daily Rainfall (mm) of Mawlamyine Station (2008)

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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	0	0	0	0	77	110	81	46	42	0	0
2	0	0	0	0	0	25	32	9	54	6	0	0
3	0	0	0	0	0	78	11	7	39	62	0	0
4	0	0	0	0	3	20	42	11	42	3	Trace	0
5	0	0	0	0	1	27	30	136	18	2	0	0
6	0	0	0	0	0	80	86	14	84	38	0	0
7	0	0	0	0	0	71	12	135	34	0	0	0
8	0	0	0	0	0	34	1	59	19	4	0	0
9	0	0	0	0	Trace	83	17	112	11	2	0	0
10	0	0	0	6	0	187	39	51	2	27	0	0
11	0	0	0	0	Trace	28	30	14	6	0	0	0
12	0	0	0	3	Trace	23	84	11	0	40	0	0
13	0	0	0	1	34	27	169	9	5	0	0	0
14	0	0	0	4	0	4	206	3	46	Trace	0	0
15	0	0	0	14	0	13	43	7	9	Trace	0	0
16	0	0	0	0	Trace	21	16	0	9	0	0	0
17	0	0	0	21	0	15	71	0	6	13	0	0
18	0	0	2	23	1	9	70	2	5	7	12	0
19	0	0	1	5	0	19	95	0	0	Trace	Trace	0
20	0	0	0	2	36	64	50	3	6	0	0	0
21	0	0	0	0	0	63	34	0	1	5	0	0
22	0	0	0	2	7	18	5	5	0	0	0	0
23	0	0	0	8	47	30	7	25	22	Trace	0	0
24	0	0	0	6	2	60	96	Trace	6	0	0	0
25	0	0	0	0	15	0	25	49	17	0	0	0
26	0	0	0	0	22	1	56	0	41	0	0	0
27	0	0	0	0	48	57	12	0	42	0	0	0
28	0	0	0	3	70	41	10	0	31	0	0	0
29	0		0	4	5	21	72	Trace	Trace	0	0	0
30	0		0	Trace	8	2	83	24	2	0	0	0
31	0		0		38		96	15		0		0

 Table 4.3-14: Daily Rainfall (mm) of Mawlamyine Station (2009)

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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	0	0	0	0	15	0	5	9	2	0	
2	0	0	0	0	0	81	14	0	6	0	0	0
3	0	0	0	0	0	15	1	61	5	0	0	0
4	0	0	0	0	0	8	11	108	19	Trace	0	0
5	0	0	0	0	0	23	3	39	48	0	0	0
6	0	0	0	0	0	5	0	8	13	Trace	0	0
7	Trace	0	0	0	0	4	Trace	98	2	18	0	0
8	Trace	0	0	0	4	11	24	174	Trace	0	0	0
9	0	0	0	0	0	7	22	32	11	18	0	0
10	0	0	0	0	0	Trace	63	30	30	1	0	0
11	0	0	0	0	0	4	41	10	3	7	0	104
12	0	0	0	0	0	26	12	1	21	3	0	48
13	0	0	0	0	0	26	57	60	5	1	0	2
14	0	0	0	0	0	10	Trace	8	21	11	0	0
15	0	0	0	0	0	1	4	27	6	1	0	0
16	0	0	0	0	0	19	10	12	3	0	0	0
17	0	0	0	0	Trace	48	4	19	0	8	0	3
18	0	0	0	0	Trace	9	30	13	11	Trace	0	0
19	0	0	0	0	0	1	11	7	2	24	0	0
20	0	0	Trace	0	Trace	0	8		Trace	0	0	0
21	0	0	0	0	Trace	11	5	35	19	5	0	0
22	0	0	0	0	18	3	56	41	6	5	0	0
23	0	0	0	0	37	4	26	3	22	8	0	0
24	0	0	0	0	11	32	98	21	3	9	0	0
25	0	0	0	0	30	11	43	40	0	Trace	0	0
26	Trace	0	0	0	73	46	20	31	0	0	0	0
27	0	0	0	0	7	8	Trace	20	0	0	0	0
28	0	0	Trace	20	Trace	Trace	2	43	0	0	0	0
29	0		3	0	3	7	20	118	0	0	0	0
30	0		Trace	Trace	34	26	64	50	13	Trace	0	0
31	0		0		10		21	26		Trace		0

 Table 4.3-15: Daily Rainfall (mm) of Mawlamyine Station (2010)

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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1	0	Trace	0	0	10	1	13	123
2	0	0	0	0	6	1	79	56
3	0	0	0	0	3	0	66	40
4	0	0	0	0	0	Trace	7	67
5	0	0	0	0	1	1	5	49
6	0	0	0	0	1	2	1	13
7	0	0	0	0	2	Trace	22	61
8	0	0	0	0	Trace	16	0	69
9	0	0	0	0	32	20	63	95
10	0	0	0	17	40	29	85	38
11	0	0	0	0	97	86	45	33
12	0	0	0	0	1	78	0	61
13	0	0	0	0	1	28	1	19
14	0	0	0	0	1	11	13	Trace
15	0	0	Trace	0	1	40	45	Trace
16	0	0	0	0	14	64	25	23
17	0	0	0	0	1	31	35	26
18	0	0	0	0	8	148	107	46
19	0	0	0	0	96	88	59	130
20	0	0	0	0	77	35	145	77
21	0	0	0	0	28	7	146	74
22	0	0	0	0	91	43	39	7
23	0	0	0	0	10	59	58	7
24	0	0	0	0	7	26	33	3
25	0	0	Trace	Trace	21	67	4	78
26	0	0	0	10	29	46	0	15
27	0	0	0	0	4	35	Trace	114
28	0	0	Trace	0	20	16	3	0
29	0		Trace	0	23	24	Trace	6
30	Trace		0	0	0	Trace	Trace	36
31	Trace		0		0		55	44

 Table 4.3-16: Daily Rainfall (mm) of Mawlamyine Station (2010)

The rainfall in Mawlamyine region is 4 mm of precipitation in the driest month, January. With an average of 1253 mm, the most precipitation falls in August. The precipitation varies 1249 mm between the driest month and the wettest month.³

4.3.7 Relative Humidity

The relative humiliation of Mawlamyine Station are provided in following tables.

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	73	40	65	61	61	84	100	92	84	84	59	67
2	74	32	77	61	54	84	100	91	84	71	65	58
3	65	35	63	59	65	79	100	92	92	84	70	59
4	66	39	100	61	84	84	100	83	84	92	83	54
5	82	65	64	65	100	100	100	100	92	100	77	60
6	59	58	65	53	92	85	100	92	84	100	57	67
7	54	65	63	66	100	100	92	92	92	92	59	61
8	50	65	63	54	92	85	100	100	79	84	63	68
9	42	54	62	61	79	85	92	100	92	84	63	62
10	48	54	47	55	71	79	92	93	84	79	54	69
11	66	48	50	59	71	93	84	100	100	84	59	69
12	60	84	63	49	79	93	92	93	100	84	59	68
13	67	70	57	65	84	85	92	93	84	92	70	67
14	67	92	56	84	65	100	100	85	92	84	59	61
15	54	77	65	65	92	92	100	93	93	84	65	62
16	59	77	65	71	79	79	100	93	84	77	59	57
17	59	63	70	65	85	92	93	100	84	71	63	70
18	60	70	65	72	84	92	92	92	92	70	70	64
19	60	69	76	54	84	78	100	92	92	79	59	70
20	54	77	77	66	92	85	93	92	92	70	59	70
21	52	62	51	61	92	78	100	100	100	64	64	70
22	52	76	64	54	100	71	92	92	83	70	63	77
23	58	70	46	54	93	79	84	84	84	70	50	91
24	67	77	65	61	84	85	92	92	84	77	48	82
25	69	77	65	66	93	92	84	92	92	64	56	66
26	76	65	70	79	93	79	79	92	84	70	61	74
27	70	70	65	52	85	100	71	84	92	70	61	68
28	50	65	70	76	84	100	79	84	79	70	60	83
29	45		71	72	100	85	71	84	92	71	47	66
30	34		65	55	84	92	79	92	84	79	53	74
31	29		61		92		92	84		77		68

Table 4.3-17: Relative Humidity (%) at (09:00) hrs:M.S.T of Mawlamyine Station (2007)

³ https://en.climate-data.org/location/1003326/

Table 4.5-10. Relative Humany (70) at (07.00) ms.Mi.5.1 of Mawianiyine Station (2000)												
DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	42	76	70	83	92	84	100	100	85	100	100	47
2	59	83	64	77	65	100	92	100	79	84	92	47
3	40	83	70	77	100	92	84	92	71	93	84	60
4	40	76	53	59	100	100	92	100	85	85	70	66
5	66	76	45	65	84	92	100	100	92	84	79	70
6	47	61	63	64	70	100	100	100	100	93	92	61
7	61	61	62	77	79	84	100	100	84	84	92	54
8	68	54	56	65	84	92	100	100	79	85	85	68
9	68	64	59	65	79	79	100	92	84	71	84	61
10	66	77	59	71	84	71	100	92	85	79	50	76
11	74	70	59	61	77	79	92	100	79	71	54	60
12	74	70	62	71	84	84	84	100	100	92	54	60
13	82	63	63	65	77	85	92	100	100	71	54	66
14	82	65	59	66	92	100	92	100	92	79	54	67
15	61	70	79	66	84	92	92	84	100	71	54	61
16	67	70	65	65	84	100	93	92	100	85	63	60
17	54	83	59	66	92	100	92	92	92	71	70	60
18	68	74	65	66	100	92	84	100	92	65	71	73
19	68	54	65	66	100	100	93	92	100	65	59	59
20	61	63	84	61	92	92	92	84	92	71	53	58
21	54	69	70	66	77	92	84	92	100	84	59	65
22	66	50	71	66	100	100	100	100	92	71	64	59
23	61	54	71	84	79	100	100	84	92	84	64	54
24	54	60	79	71	71	84	92	79	92	84	65	54
25	67	48	65	77	92	85	100	84	100	79	59	67
26	56	54	65	70	79	100	100	85	100	84	46	76
27	69	56	71	71	92	92	100	92	93	92	46	67
28	100	57	65	70	92	100	100	84	85	79	54	68
29	83	77	71	92	93	92	100	79	84	79	76	76
30	83		59	100	92	100	100	79	77	92	76	66
31	77		64		100		100	71		92		67

Table 4.3-18: Relative Humidity (%) at (09:00) hrs:M.S.T of Mawlamyine Station (2008)

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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	54	83	92	49	71	100	100	100	84	100	71	68
2	62	60	55	54	71	100	92	92	84	93	46	54
3	54	83	79	54	61	93	92	93	84	92	46	54
4	54	83	71	56	79	92	92	93	84	79	61	54
5	74	67	77	50	71	92	100	93	93	78	57	50
6	61	54	65	51	66	92	100	100	100	79	59	60
7	61	68	71	55	71	93	92	100	100	84	65	74
8	54	68	70	61	72	100	92	100	92	100	71	83
9	54	76	83	55	79	100	85	100	92	85	71	67
10	45	63	92	92	71	100	92	92	84	85	71	74
11	50	76	65	61	84	92	93	100	70	85	71	76
12	50	77	70	71	79	84	100	93	79	84	85	68
13	36	69	70	79	84	92	100	100	84	79	72	67
14	36	76	79	92	84	84	100	92	100	79	100	69
15	42	77	46	71	71	84	92	85	85	79	72	76
16	42	77	70	71	71	92	92	85	100	79	71	68
17	44	77	84	100	85	79	100	80	84	79	92	76
18	65	84	92	100	79	85	100	73	84	84	100	69
19	51	84	64	85	71	84	100	73	85	79	64	64
20	65	84	71	71	92	100	100	79	71	79	56	57
21	60	71	70	71	71	100	92	72	71	71	57	56
22	54	65	65	79	92	84	92	92	79	79	54	62
23	66	71	71	71	83	100	92	85	92	84	60	61
24	60	83	70	79	84	84	92	85	84	79	62	76
25	67	92	71	79	92	71	92	92	93	79	68	76
26	63	83	71	79	92	92	92	79	92	85	76	70
27	68	84	61	71	100	100	92	71	92	79	68	68
28	67	70	61	100	100	92	92	79	100	71	68	76
29	91		61	92	92	92	100	85	84	71	56	69
30	76		71	84	84	79	100	93	79	71	62	76
31	67		61		92		100	85		71		67

 Table 4.3-19: Relative Humidity (%) at (09:00) hrs: M.S.T of Mawlamyine Station (2009)

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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	61	56	59	54	62	84	78	84	85	85	54	63
2	60	63	53	66	56	100	93	84	92	85	50	56
3	54	56	64	66	62	79	79	100	85	79	44	51
4	54	64	53	62	61	93	78	100	85	61	50	50
5	68	77	77	62	56	84	79	92	100	64	50	63
6	70	76	59	62	61	100	72	84	79	79	56	56
7	83	76	71	61	61	85	79	92	79	84	63	64
8	84	68	65	62	72	100	85	100	79	79	70	53
9	70	69	65	56	56	93	92	85	100	100	59	56
10	64	57	79	62	56	71	85	92	100	85	51	64
11	70	56	61	55	52	84	79	84	84	92	57	100
12	65	56	72	61	56	85	85	79	93	85	56	92
13	70	59	71	61	62	85	84	84	92	84	59	76
14	69	45	65	61	62	71	79	84	83	100	65	67
15	70	59	65	61	62	71	100	77	92	70	59	83
16	69	68	84	66	62	92	85	84	77	83	70	83
17	56	69	79	66	56	84	84	84	84	79	65	92
18	54	71	54	56	61	79	79	84	100	79	59	61
19	69	71	72	55	56	84	93	79	84	92	65	68
20	66	71	61	61	85	79	85	71	85	71	59	70
21	61	69	66	61	71	100	79	84	100	79	70	76
22	70	83	71	55	85	78	100	100	79	100	84	68
23	77	83	61	56	100	93	84	71	84	92	92	68
24	65	70	59	56	79	93	92	100	79	85	70	92
25	70	76	54	61	100	84	84	84	84	79	70	76
26	83	70	54	44	92	100	79	92	71	85	70	74
27	70	65	49	67	65	78	85	84	77	71	64	60
28	92	92	83	65	72	78	79	92	71	71	57	59
29	62		82	67	71	84	100	84	71	59	63	65
30	54		61	62	100	79	92	92	79	50	63	65
31	56		61		92		92	92		56		59

 Table 4.3-20: Relative Humidity (%) at (09:00) hrs: M.S.T of Mawlamyine Station (2010)

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DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1	66	53	71	70	92	71	92	100
2	74	67	71	70	85	79	100	93
3	66	76	71	79	72	72	84	100
4	76	60	71	71	78	78	84	92
5	67	66	71	79	93	79	79	93
6	67	67	84	92	79	93	79	93
7	56	66	70	71	72	79	92	100
8	63	60	71	71	71	85	85	92
9	56	82	71	71	100	93	85	100
10	62	74	83	84	100	84	92	100
11	83	76	70	71	100	100	85	100
12	83	76	70	83	79	92	79	100
13	91	70	65	71	79	84	92	84
14	100	68	77	71	79	85	84	79
15	91	76	83	79	79	84	100	92
16	59	56	100	71	66	100	84	84
17	52	84	100	79	79	92	93	84
18	61	70	69	72	79	92	92	92
19	82	69	67	72	100	100	92	100
20	82	77	77	71	92	100	100	92
21	73	83	70	79	84	92	100	100
22	74	70	77	66	92	92	100	92
23	67	77	77	72	85	93	92	92
24	74	70	79	71	85	93	84	84
25	67	77	84	92	85	100	85	100
26	67	84	64	79	84	100	84	92
27	74	71	77	71	79	100	79	93
28	57	70	82	79	84	100	84	85
29	64		73	71	84	84	93	92
30	67		59	61	78	93	96	100
31	54		56		72		100	92

 Table 4.3-21: Relative Humidity (%) at (09:00) hrs: M.S.T of Mawlamyine Station (2011)

4.3.8 Regional Hydrology

The Attaran River is the main river of the township. The Attaran River is formed by the Zami and Winyaw streams near Chaunghnakhwa Village. It flows from south to north and enters the Thanlwin River.

Its numerous tributaries are Damathat, Ulay, Khanaung, Phanon, Kyaikparan, MagyiChaung, Mekaro, Kadonsi, Pharthein and Daungdin creeks. Most of the tributaries join the Attaran River. They flow the Taungnyo Range watershed in the west and Dawna Range watershed in the east.

The drainage patterns provide the natural irrigation for winter crops. Small creeks are used to supplement the natural rainfall in post monsoon. The land around the creeks can be used for double cropping.

The General Information of Attaran River (Source: DWIR)

The Depth: Average 12-14 m

The Width: Average 100 m

Water flow -0.3 to 0.4 m/s

The relevant informations of Attaran river to the project are:

Distance from the mounth of Attaran river = 3404.517 m (11170 ft)

The depth of Attaran river in dry season at jetty = 5.7 m (18.7 ft)

The depth of Atraran river in wet season at jetty = 7.01 m (23 ft)

The depth of Attaran river (near canal) in dry season = 14.7 m (48 ft)

River bed condition = U shape Average high tide is 7 ft from datum in dry season.

Average low tide is below 3 ft from datum in dry season.

Average high tide is 17.5 ft from datum in wet season. Average low tide is 5 ft from datum in wet season.

Marsth	Rainfall	Rain days		Temperature		
Month	(mm)		Maximum °C	Minimum °C	Mean [°] C	
January	5.02	1	34.7	15.4	25.05	
February	0.74	1	36.58	17.39	26.98	
March	10.92	1	37.29	18.82	28.05	
April	56.24	4	38.32	22.66	30.49	
May	659.84	19	35.77	22.46	29.11	
June	1014.4	26	32.34	22.57	27.45	
July	1245.53	26	31.49	22.28	26.88	
August	1207.74	27	32.11	22.34	27.22	
September	657.04	23	32.9	22.44	27.67	
October	199.93	9	34.71	22.93	28.82	
November	6.96	1	34.07	18.57	26.32	
December	15.77	1	34.9	14.61	24.75	
Total Average	5080.13	139	33.8	20.21	27.39	

 Table 4.3-22: The Monthly Climate Data in Mawlamyine Township (2002-2011)

Source: Meteorology and Hydrology Department



Figure 4.3-3: Climograph of Mawlamyine Township (2002-2011)

4.4 Overview of Existing Biological Environment

With the total land extent of 676,552 square kilometers (261,218 sq miles), Myanmar is located between Latitude 9°28" and 28°29" North and Longitude 92° 10" and 101° 10" East, and a largest country in mainland South East Asia sharing its international boundary with People Republic of China in the North and North East, Lao in the East, Thailand in the South East, Bangladesh and India in the West. Approximately, the estimated length from North to South is 2100 km while it is widened 925 km from East to West. Physical geography of Myanmar is structurally complex and diverse having the topography of steeper mountain ranges, upland plateau and hill valleys in the eastern, northern and north western regions while undulated central dry zone is surrounded by western coastal range and lowland deltaic region at the lower part of the country and narrower coastal strip is formed at further south adjoining with the peninsular Thailand.

Industrial projects in any given planning region must learn to respect the ecological integrity and biodiversity values of that region as these are going to be the determinants of environmental quality 'as well as the sustainability of development interventions. While some tradeoffs with these values may be inevitable, it is now widely recognized that the measure of resulting environmental degradation will be an inverse indicator of sustainability. Sustainable development is one that meets the needs of present, without compromising the ability of the future generations to meet their needs (Brundtland 1992). In practice, industrial development is often accompanied by significant adverse impacts on all or different components of the environment. For all potentially impacting development projects like multipurpose hydroelectric projects, thermal power plants, fertilizer plants, nuclear plants, transport and telecommunication projects, prior assessment and appraisal of impacts on the different components of environment (abiotic and biotic, including forests, wildlife and people) is imperative for several reasons. It is needed to ensure sustainability that can result from conservation of ecological processes and thereby of life support systems and gene pool resources (or biodiversity). World Conservation Strategy (IUCN 1980) has laid down three criteria for identifying impacts on the environment. The first concerns the length of time and geographic area over which the effects will be felt. The second is urgency or the quickness with which a natural system might deteriorate. Finally, it is important to assess the degree of irreversible damage to communities of plants and animals. It also needs to ensure developmental pace and economic prosperity without actually altering the state of the environment.

4.4.1 Protected and Environmentally Sensitive Areas

There is no protected area in Kyaikmaraw Township.

4.4.2 Habitat

Wildlife habitat is important for the survival of the wildlife animals in terrestrial ecosystem. The wild animals are now threatened by habitat degradation and habitat loss caused by misconduct of human being. A habitat is a part of an ecosystem and diverse ecosystems support for high species diversity. A change in an ecosystem necessarily affects the plant and animal species in the system, and changes in species affect ecosystem processes. The distribution of species on earth is becoming more homogenous.

In the proposed project area, three major habitat types were observed namely (1) Forest, (2) Mixed plantation and cultivated land and (3) aquatic habitat (Attaran River). There is one threatened plant species in the proposed project area and the overall habitat value is assumed to be moderate (Table 4.4.1).

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 Table 4.4-1: Key Terrestrial Habitat Features of the Proposed Project Site

Sr. No.	Criterion	Features	Remark
1	Fauna and Flora	Threatened species	Plant species Hopea odorata
2	Threatened Communities	Mixed vegetation and River water body	Potential human disturbance
3	Migratory Birds	No record	Nil
4	Wildlife Corridor	Moderate	Limestone cast forest
5	Representativeness	Moderate	Mixed vegetation and River Water body
6	Natural Diversity	Moderate	Some parts disturbed
7	Rarity and Distinctiveness	Moderate	Inhabitants of Limestone cast forest
8	Naturalness	Moderate	Limestone cast forest
9	Pest Species	Insect pests and field rat	Seasonal
10	Long -term viability	Moderate	Potential human pressure
11	Adjacent habitat values	Moderate	Plantation area and Limestone cast
12	Degree of existing modification	Low	Human activities
13	Sensitivity to disturbance	Moderate	Limestone cast forest and River
14	Overall habitat value	Moderate	Naturalness of the Limestone cast forest and Attaran River



Figure 4.4-1: Protected Area and Reserve Forest Area near and outside of Kyaikmaraw Township

4.4.3 Birds

Birds are included in the wildlife animals with considerable number of the species listed under the categories of threatened and near threatened species. Some natural habitats of the birds including wetlands and forests were destructed or degraded. Lowland and highland forests inhabited by various bird species were cleared with different purposes such as timber extraction, cultivation, human settlement and development projects etc. Hunting is still a major threat to wildlife even in national parks and wildlife sanctuaries, as local people living around protected area margins are poor and supplemented their income by collecting and selling various forest products collected within.

A total of 21 bird species, which belong to 16 families, were recorded at the proposed project area (Table 4.8-6). The bird Red-vented Bulbul *Pycnonotus cafer* (Plate 3.4), Common myna *Acridotheres tristis tristis* and Spotted dove *Spilopelia chinensis* were dominant species in the proposed project area.

During the study period some bird species were seen in all kinds of habitat showing their capability of wide distribution. Such commonly distributed species comprise insect eaters, some omnivores that have alternative food choice on insects, flowers, seeds and fruits. The common species of the study area include *Acridotheres tristis tristis* and *Streptopelia chinensis*.

Some bird species are adapted to different habitats and they can be found in shrubland, human habitation area and forest; e.g. Common myna *Acridotheres tristis tristis*. Some bird species like Common myna *Acridotheres tristis tristis* and Spotted dove *Spilopelia chinensis* recorded in the present study were normally common in the human habitation area.

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Pycnonotus cafer

Table 4.4-2: Bird Species Recorded in the Proposed Project Area

Sr. No.	Order/Family	Common name	Species	IUCN status
1	Accipitridae	Shikra	Accipiter badius	NT
2	Columbidae	Spotted Dove	Streptopelia chinensis	NT
3	Strigidae	Collared Owlet	Glaucidium brodiei	NT
4	Strigidae	Asian Barred Owlet	Glaucidium cuculoides	NT
5	Hirundinidae	Barn Swallow	Hirundo rustica	NT
6	Hirundinidae	Asian palm-swift	Cypsiurus batasiensis	NT
7	Campephagidae	Scarlet Minivet	Pericrocotus flammeus	NT
8	Pycnonotidae	Black-crested Bulbul	Pycnonotus melanicterus	NT
9	Pycnonotidae	Red-whiskered Bulbul	Pycnonotus jocosus	NT
10	Pycnonotidae	Red-vented Bulbul	Pycnonotus cafer	NT
11	Dicruridae	Black Drongo	Dicrurus macrocercus	NT
12	Corvidae	Large-billed Crow	Corvus macrorhynchos	NT
13	Corvidae	Large-billed Crow	Corvus macrorhynchos	NT
14	Psittacidae	Red-breasted parakeet	Psittacula alexandri	NT
15	Megalaimidae	Lineated barbet	Megalaima asiatica	NT
16	Sylviidae	Common tailorbird	Orthotomus sutorius	NT
17	Meropidae	Green Bee-eater	Merops orientalis	NT
18	Irenidae	Common Iora	Aegithina tiphia	NT
19	Saxiculidae	Oriental Magpie Robin	Copsychus saularis	NT
20	Passeridae	Eurasian Tree Sparrow	Passer montanus	NT
21	Emberizidae	Greater Coucal	Centropus sinensis	NT

NT - Near Threatened

4.4.4 Mammals

A total of four mammal species were recorded during the survey periods (Table 4.4-3). Long-tailed Macaque *Macaca fascicularis* was commonly found in limestone cast forest. Some species like White bellied rat *Niviventer fulvscens*, and Greater bandicoot rat *Bandicota indica* were found mainly in the mixed plantation and cultivated area whereas grey squirrel *Callosciurus pygerythrus* was found in both scattered trees and plantation areas.



Niviventer fulvscens

Table 4.4-3: Recorded Mammal Specie	es of the Proposed Project Area
-------------------------------------	---------------------------------

Sr. No.	Scientific name	Common name	Family	IUCN Status	Remark
1	Callosciurus pygerythrus	Grey squirrel	Sciuridae	Lc	Observed
2	Macaca fascicularis	Long-tailed Macaque	Cercopithecidae	Lc	Track
3	Niviventer fulvscens	White belleyed rat	Muridae	Lc	Observed
4	Bandicota indica	Greater bandicoot rat	Muridae	Lc	KII

KII: Key Informant Interview

4.4.5 Reptilian and Amphibian Species

Nine reptilian species and seven amphibian species (Table 4.4-4) were recorded at the proposed project site during the survey period. The reptile species *Calotes versicolor* as shown as follow was observed in the mixed vegetation with scattered trees area. Among the recorded species, the paddy frog *Fejervarya limnocharis* was found as a very common species. The frog species, *Holobatrachus tigerinus*, was also common in the area distributing in many parts of the area in wet season.

Sr. No.	Scientific name	Common name	Family	IUCN Red List Status	Type of evidence
1	Naja kaouthia	Monocellate cobra	Elapidae	Lc	KII
2	Bungarus fasciatus	Banded krait	Elapidae	Lc	KII
3	Daboia russellii siamensis	Russell's Viper	Viperidae	Lc	KII
4	Ptyas korros	Indo-chinese rat snake	Colubridae	Lc	KII
5	Ahaetulla nasuta	Indian vine snake	Colubridae	Lc	Observed
6	Rhabdophissubminiatus	Red-necked keelback	Colubridae	Lc	Observed
7	Xenochrophis piscator	Chequered keelback	Colubridae	Lc	Observed
8	Holobatrachus tigerinus	Indian bull frog	Dicroglossidae	Lc	KII
9	Fejervarya limnocharis	Paddy frog	Dicroglossidae	Lc	KII
10	Fejervarya limnocharis limnocharis	Paddy frog	Dicroglossidae	Lc	Observed
11	Polypedates leucomystax	Common Tree frog	Rhacophoridae	Lc	KII
12	Duttaphrynus melanostictus	Common toad	Bufonidae	Lc	KII
13	Microhyla ornata	Ornate sand frog	Microhylidae	Lc	Observed
14	Kaloula pulchra	Painted bull frog	Microhylidae	Lc	KII
15	Eutropis carinatus	Common sun skink	Scincidae	Lc	KII
16	Calotes versicolor	Garden fence lizard	Agamidae	Lc	KII

Table 4.4-4: Recorded Reptile and Amphibian Species of the Proposed Project Area

*Lc means "Least Concern".

KII: Key Informant Interview

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Calotes versicolor



Holobatrachus tigerinus

4.5 Aquatic Ecology

Inland fishery in Myanmar is mostly associated with riverine and estuarine systems. Inland water bodies, such as natural lakes, reservoirs, river systems and ponds, cover about 8.1 million hectares, of which 1.3 million hectares are permanent; the remainder being seasonally inundated floodplains. Ayeyarwaddy, Chindwin, Sittatung and Thanlwin are the main rivers, and extend from the eastern part of the Bay of Bengal to the Gulf of Moattama and along the eastern edge of the Andaman Sea. A total of 449 freshwater fish species were recorded in Myanmar.

"The Fisheries Law" 1905 was the only legislation regulating fishery management and the fishing industry of Myanmar until amended in 1954 and was finally repealed by "Law relating to the fishing rights of foreign fishing vessels" in 1989. After that, the government promulgated three other fisheries laws, namely "Aquaculture fisheries law" in 1989, "Myanmar marine fisheries law" in 1990, and "Freshwater fisheries law in 1991. This law protects the spawners, breeders and fingerlings of freshwater fishes, specifying those species that it is forbidden to catch, export, kill or keep in captivity in the months of May, June, July and August without permission of the Director General of Department of Fishery (DoF). These prohibit trade in spawners, breeders and fingerlings of the freshwater prawns *Macrobrachium rosenbergii*, and *M. malcolnsonii*, which cannot be caught, exported, sold, killed or kept in captivity in the months of May, June and July, unless permitted by the Director General of DoF. The regulation lists all the species of fish and mammals that are protected,

including the dugong, whale, whale shark, dolphin, giant clam and turtle, and included in the list of endangered species in the Convention on International Trade of Endangered Species (CITES).

4.5.1 Aquatic fauna

The Attaran River was studied for aquatic fauna. The fishes were collected with the help of the fishermen during the survey period. Traps were also used to get various types of fish like surface dwellers and bottom dwellers. The fishes were photographed soon after the collection and measurements were also taken for key characteristics. The fishes were then preserved in 10% formalin solution for further identification in the laboratory. The fishes were then identified according to Jayaram (1981) and Talwar and Jhingram (1991).

4.5.2 Fish

A total of 26 fish species were recorded during the survey period (Table 4.5-1). The fishes are important for the ecosystem of the Attaran river ecosystem. The fish species *Mystus cavasius* and *puntius chola* were found as very common species in the proposed project area. The fish species *Mystus bleekeri* and *Labeo calbasu* were also abundant in the aquatic habitat. Some brackish water fish species were also recorded along the river.

Sr. No.	Scientific Name	Common Name	Family	Remark
1	Notopterus notopterus	Grey featherback	Notopteridae	Observed
2	Puntius chola	Barb	Cyprinidae	Observed
3	Amblypharyngodon mola	Mola carplet	Cyprinidae	Observed
4	Labeo calbasu	Carp	Cyprinidae	Observed
5	Cirrhinus mrigala	Carp	Cyprinidae	Observed
6	Clarias batrachus	Walking catfish	Claridae	Observed
7	Heteropneustes fossilis	Stinging catfish	Heteropneustidae	Observed
8	Anabas testudineus	Climbing perch	Anabantidae	Observed
9	Late calcarifer	Giant sea perch	Centropomidae	Observed
10	Mystus bleekeri	Catfish	Bagridae	Observed
11	Mystus leucophasis	Catfish	Bagridae	Observed
12	Neotropius acutriostris	Dwarf cat-fish	Schilbeidae	Observed
13	Channa striatus	Striped snake head	Channidae	Observed
14	Channa orientalis	Brown snakehead	Channidae	Observed
15	Channa panaw	Green snakehead	Channidae	Observed
16	Macrognathus aral	Lesser spiny eel	Mastacembelidae	Observed
17	Macrognathus zebrinus	Burmese spiny eel	Mastacembelidae	Observed
18	Monopterus albus	Asian swamp eel	Synbranchidae	Observed
19	Monopterus cuchia	Cuchia	Synbranchidae	Observed
20	Oreochromic spp	Mozambic cichlid	Cichlidae	Observed
21	Boleophthalmus boddarti	Boddart's goddle eye goby	Gobiidae	Observed
22	Tenualosa ilisha	River shad	Clupeidae	Observed
23	Glossogobius giuris	Gobifish	Gobiidae	Observed
24	Polynemus paradiseus	Mangoes fish	Polynemidae	Observed
25	Sillago sihama	Silver whiting	Sillaginidae	Observed
26	Cynoglossus lingua	Long tonguesole	Cynoglossidae	Observed

Table 4.5-1: Fish Species Recorded in the Attaran River



Puntius chola

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Labeo calbasu

4.5.3 Benthos species

Three immature dragonfly nymphs were found as benthic species in the surface layer of the sediment of the irrigation canal. The recorded nymph species were *Brachydiplax sobrina*, *Brachythemis contaminate*, and *Neurothemis tullia tullia*. The tadpoles of the paddy frog species *Fejervarya limnocharis* was also found as benthic species living in the sediment.

4.5.4 Plankton species

A total of 11 plankton species were found in the Attaran River (Table 4.5-2). Among the recorded species, five species were zooplankton species and six species were found as phytoplankton species. The species *Cyclops scutifer* as zooplankton and and *Staurastrum bibrachiatum* as phytoplankton species were commonly found in the aquatic area. The plankton species are primary products of the natural water body supporting the aquatic ecological web. The planktons are essential prey of the small vertebrates and fishes in aquatic habitat.

Sr. No.	Scientific Name	Family	Phylum/Division	IUCN
1	Notholca acuminate	Brachiondae	Rotifer	NE
2	Lecane sp	Lecanidae	Rotifer	NE
3	Cyclops scutifer	Cyclopoida	Arthropoda	NE
4	Diaptomus sp.	Diaptomidae	Arthropoda	NE
5	Bosminopsis sp.	Bosminidae	Arthropoda	NE
6	Synedra affinis	Fragilariaceae	Chrysophyta	NE
7	Oscillatoria limnetica	Oscillatoriaceae	Cyanophyta	NE
8	Gyrosigma attenuatum	Naviculaceae	Chrysophyta	NE
9	Staurastrum bibrachiatum	Desmidiaceae	Chlorophyta	NE
10	Staurastrum ophiura	Desmidiaceae	Chlorophyta	NE
11	Staurastrum tohopekaligense	Desmidiaceae	Chlorophyta	NE

 Table 4.5-2: Plankton Species Recorded in the Attaran River

4.6 Overview of Existing Regional Socioeconomic and Cultural Settings

An overview of the existing social and cultural conditions will be provided in order to place the proposal in its local and regional context.

Kyaikmaraw Township is situated in Mon State within North latitudes 16° 7' and 16° 34', and within 97° 9' and 97° 50'. Total area of township is about 511.70 square miles which extends about 40 miles from north to south and about 18 miles from west to east. The Kyaikmaraw Township is bounded on east by Kyainseikgyi and Kawkareik Townships, on south by Kyainseikgyi Township, on west by Mudon Township and on north by Mawlamyine and Hpa-An Townships respectively as shown in Figure 4.6-2.

4.6.1 Demography of Kyaikmaraw Township

As human beings are solely responsible for the socio economy of all regions, the characteristics of human population become the basis for understanding the socio-economic conditions of a particular region. Population number, population growth, population distribution and density, ethnic composition and believes are the major factors for the socioeconomic development of all regions.

The total population of Kyaikmaraw Township has about 222,091 persons which are 12,855 persons in urban area and 209,236 persons in rural area. The largest population are occurred in Kyaikmaraw Urban area and Tarana, Yae Twin Kone, Pein Hne Kone and Ka Dar Village Tracts according to the GAD data (2017).

Population density of Kyaikmaraw Township is about 434 persons per square mile including reserve forest area in 2017 (GAD). However, the population density varies with the population number and areas of village tracts in Kyaikmaraw Township. The highest population density is found in Kyaikmaraw Township with 12855 persons.

Year	Total Population
2004	200,248
2005	201,458
2006	202,578
2007	211,767
2008	211,953
2009	212,277
2010	209,524
2011	213,446
2012	212,706
2013	213,215
2017	222,091

Table 4.6-1: Total Population of Kyaikmaraw Township (2000-2013 & 2017)

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Figure 4.6-1: Total Population of Kyaikmaraw Township Table 4.6-2: Population, Houses and Households of Kyaikmaraw Township

No.	Ward/Village Tract	Village	Houses	Household	Total		
					Male	Female	Total
1	Shinsawpu Ward		1005	1020	2,584	2,849	5433
2	Yanmyoaung Ward		1,097	1,100	3,691	3,731	7422
	Total		2102	2120	6,275	6,580	12855
1	Antkaye Village Tract	Antkaye	89	91	344	331	675
		Katkataung	16	16	52	96	121
		Daungkone	41	45	163	180	343
	Total		146	152	559	607	1139
2	Attaran Village Tract	Attaran	80	85	260	247	507
		Pawlawkone	55	60	219	230	449
		Metwekone	91	99	303	272	575
		Pawlawkyne	282	296	1035	990	2025
		Kawtar	22	18	29	40	69
		Kyaukkwe	102	111	247	266	513
	Total		632	669	2093	2045	4138
3	Barbukone Village Tract	Barbukone	859	892	2638	2859	5497
4	Banebawe Village Tract	Banebawe	53	53	211	196	407
		BanebawesatKone	87	87	360	350	710
		Banebaweywathit	42	42	130	136	266
		Natsan	95	109	339	323	662

r	1	1					
		Phayarkone	71	76	267	264	531
		Mayanchan	31	31	148	164	312
		Sannitkya	87	92	308	330	638
		AyeyeikThar	117	121	499	508	1007
		Attaran	196	196	553	566	1119
	Total		779	807	2815	2837	5652
5	Dammata Village Tract	Dammata	820	829	2495	2577	5072
6	Hlakazine Village Tract	Hlakazine	245	245	615	664	1279
		Taungkalay	834	834	1812	1933	3745
		Mekaro	265	265	674	769	1443
		Fattaykone	86	86	196	197	393
		Htawpalaw	125	125	248	289	537
	Total		1555	1555	3545	3852	7397
7	Kadar Village Tract	Kadar	73	73	191	171	362
		Thayetkone	217	218	556	742	1298
		Kyantaw	431	431	1106	1125	2231
		Hlaingkamine	170	175	488	577	1065
		Kanainglo	320	331	765	1229	1994
		Kawkalaintaung	89	89	327	358	685
		Lonpimyuak	165	172	435	581	1016
		Kadarshanyar	111	121	319	492	811
		Pawtawmu	115	115	306	463	769
		Nyutle	154	159	399	489	888
		Yemon	69	69	143	240	383
	Total		1914	1953	5035	6467	11502
8	Kalinekanaine Village Tract	Kalinekanaine	379	387	1335	1197	2532
		Apawyar	203	214	461	437	898
		Thone ein su	28	30	68	67	135
		Autywar	65	70	208	185	393
		Kazunekone	158	160	549	472	1021
	Total		833	861	2621	2358	4979
9	Kanaung Village Tract	Kanaung	180	186	462	490	952
10	Kawbee Village Tract	Kawbee	449	492	1613	1676	3289
		Kawwan	477	509	1697	1694	3391

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		Alatkone	266	281	798	806	1604
		Ankazine	72	80	231	247	478
	Total		1264	1362	4339	4423	8762
11	Kawkalain Village Tract	Kawkalain	271	302	1013	993	2006
		Kawkyik	52	73	240	274	514
		Kyarinnchaung	265	295	810	841	1651
	Total		588	670	2063	2108	4171
12	Kawpaline Village Tract	Kawpaline	248	248	783	735	1518
13	Kawpalaw Village Tract	Kawpalaw	302	305	868	869	1737
		Kadonkaye	20	21	54	49	103
		Pankone	120	122	296	156	552
		Thinkanchaung	72	73	192	222	414
		Mekathan	28	29	93	87	180
		Utochaung	156	157	463	517	980
		Kawdun	78	60	169	149	318
		Shanyargyi	76	78	132	152	284
		Mwehouse	119	120	317	311	628
	Total		971	965	2584	2512	5196
14	Kawpanaw Village Tract	Kawpanaw	547	575	1558	1668	3226
		Kawdun	396	429	1264	1277	2541
		Walngee	73	80	202	195	397
	Total		1016	1084	3024	3140	6164
15	Kawthat Village Tract	Kawthat	758	769	2244	2382	4626
16	Kayon Village Tract	Kayon	500	503	1777	1905	3682
17	Kwan Nyan Village Tract	Kwan Nyan	434	440	880	904	1784
		Pauktaw	37	40	98	106	204
	Total		471	480	978	1010	1988
18	Kyukepayan Village Tract	Kyukepayan	566	630	1872	2039	3911
		Kawpyat	146	169	459	502	961
	Total		712	799	2331	2541	4872
19	Kyieeoat Village Tract	Kyieeoat	175	183	697	603	1298
		Kayinhlaing	173	118	681	515	1196
		Shankyun	58	68	214	193	407
	Total		406	369	1592	1311	2901

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			1				
20	Kyonekyal Village Tract	Kyonekyal	192	226	586	626	1212
		Tadaoo	60	67	195	247	442
		Ohantapin	80	95	268	273	541
		Kawpyangmalar	90	104	282	300	582
		Payarngatto	108	110	345	362	707
		Myaingtaryar	48	54	163	176	339
		Tharyarkone	42	54	153	171	324
		Minkalarkone	16	17	52	56	108
		Yarnaing	44	63	171	174	345
		Kawkyaike	42	47	135	146	281
		Taungnar	117	140	418	440	858
		Nuteout	162	180	660	680	1340
		Ngaphalchaung	149	176	465	534	999
		Htiwakali	21	21	48	54	102
	Total		1171	1354	3941	4239	8180
21	Kyonsein Village Tract	Kyonsein	259	286	861	850	1711
		Kawlin	35	35	112	118	230
		Kawmin	45	48	171	167	338
	Total		339	369	1144	1135	2279
22	Kyonwan Village Tract	Kyonwan	485	508	1529	1621	3150
		Kyonmanin	270	290	917	838	1755
	Total		755	798	2446	2459	4905
23	Kyunyar Village Tract	Kyunywar	1114	1114	3100	3172	6272
24	Lamuko Village Tract	Lamuko	56	67	171	140	311
		Mayinkone	278	288	760	712	1472
		Nyaungkone	65	77	221	199	420
		Warpyankone	205	226	624	561	1185
		Aungbalakone	36	48	131	106	237
		Kyukehtaw	95	108	344	288	632
		Oukawkone	21	25	61	69	130
	Total		756	839	2312	2075	4387
25	Latpan Village Tract	Latpan	347	350	948	1031	1979
		Yarthit	127	130	456	514	970
		Alankyun	18	18	102	90	192

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	Total		492	498	1506	1635	3141
26	Me Ko Ro Village Tract	Me Ko Ro	492	498	1506	1635	3141
27	Mikathit Village Tract	Mikathit	292	292	860	895	1755
		Mikhar	119	119	410	384	794
		Layeinsu	134	134	427	430	857
		Nayattaung	125	125	287	307	594
		Minut	127	127	409	448	857
	Total		797	797	2393	2464	4857
28	Musoekyun Village Tract	Musoekyun	380	396	1159	1263	2422
		Tagukalote	98	109	304	300	604
		Kawkanee	12	12	49	42	91
	Total		490	517	1512	1605	3117
29	Ngapuinn Village Tract	Ngapuinn	71	70	326	260	586
		NaungNaungkone	35	35	120	114	234
		Yarthit	99	102	408	394	802
		Phayephahtaw	46	48	203	217	420
		Hlawsinkone	42	45	165	154	319
	Total		293	300	1222	1139	2361
30	Ngapinma Village Tract	Ngapyinma	210	235	665	660	1325
		Kyatkhakone	270	290	799	896	1695
31	Hnidon Village Tract	Hnidon	417	433	1330	1360	2690
		Myakone	102	104	325	334	659
		Shanyarkalay	139	154	429	461	890
		Chankone	153	163	516	519	1035
	Total		811	854	2600	2674	5274
32	Naungpinseik Village Tract	Naungpinseik	No data				
		Phayarkone	No data				
		Kyarinnkone	No data				
	Total						
33	Pharpyauk Village Tract	Pharpyauk	281	292	723	778	1501
		Myanmarhlaing	140	153	349	358	707
	Total		421	445	1072	1136	2208
34	Painnalkone Village Tract	Painnalkone	460	470	1500	1596	3096
		Kyattonkone	206	210	785	922	1707

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		Rawbarneekone	97	100	322	333	655
		Thukhamyaing	140	145	478	478	970
		Kinsu	114	116	418	418	888
		Theinphukone	486	490	1602	1602	3145
		Hledan	230	232	596	596	1193
	Total		1733	1763	5701	5945	11654
35	Phanote Village Tract	Phanote	377	382	1351	1336	2687
		Kywechankone	90	92	327	314	641
		Kawkwne	40	41	137	150	287
		Kawkalauk	87	89	182	270	452
		Kawwat	36	37	129	137	266
		Kawpankyaw	84	86	270	287	558
	Total		714	727	2396	2494	4891
36	Pharthein Village Tract	Phathein	625	625	1253	1417	2670
		Taungkalay	165	165	401	521	922
		Taungthukone	100	100	355	309	664
		Kannarsu	90	90	194	227	421
		Yarthitkone	61	61	208	197	405
	Total		1041	1041	2411	2671	5082
37	Tarana Village Tract	Tarana	1733	2383	4972	4951	9923
		Kyunkone	303	329	742	737	1479
		Kawnut	226	243	629	656	1285
		Kawsawe	607	607	1633	1641	3274
	Total		2869	3562	7976	7985	15961
38	Thankalaung Village Tract	Thankalaung	387	496	868	997	1865
39	Ulay Village Tract	Ulay	390	394	1186	1221	2407
40	Yaytwinkone Village Tract	Yaytwinkone	279	303	1195	1189	2384
		Naunglon	472	494	1936	1883	3819
		Maharmyaing	354	369	1397	1496	2893
		Thukhamyaing	41	42	122	151	273
		Shankone	31	31	88	78	166
		Minkalarkone	380	395	1663	1663	3172
		Malaykone	170	174	696	686	1350
	Total		1727	1808	7097	7146	14057

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41	Lwasinkone Village Tract	Lwasinkone	81	70	229	240	469
		Monsu	37	37	125	105	230
		Ywartanshae	43	41	164	165	329
	Total		161	148	518	510	1028
42	Chaungnakwa Village Tract	Chaungnakwa	392	504	981	1218	2199
		Mayankone	250	269	668	818	1486
		Payarkone	137	154	383	460	843
	Total		779	927	2032	2496	4528
43	KaDonsit Village Tract	KaDonsit	404	439	1131	1124	2255
		Shwewarchang	155	192	664	699	1363
	Total		559	631	1795	1823	3618
44	Yaepukawsut Village Tract	Kawsut	230	252	740	831	1571
		Tayatkone	105	128	372	363	735
	Total		335	380	1112	1194	2306
Total	of Villages		33515	35717	102395	106841	209236
Total	of Township		35617	37837	108670	113421	222091

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Source: General Administrative Department (2017)



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Figure 4.6-2: Population Density Map of Kyaikmaraw Township (Source: General Administrative Department 2017)

4.6.2 Socioeconomic Condition of Kyaikmaraw Township

Kyaikmaraw Township is situated at middle of Mawlamyine District with slower economic development. The main economy is agriculture and plantation. The main local product is rubber and mostly exported to Mawlamyine and Mudon Towns.

4.6.2.1 Land Use

General land use of Kyaikmaraw Township includes cultivated land, virgin land and non-cultivated land.

No	Land Types	Area (Acrea)
1	Total area of net agriculture land	144589
	(1) Farm Land area	52853
	(2) Garden Land	91736
2	Total area of exposed land	51708
	(1) Farm Land area	51708
3	Pastureland	8005
4	Industrialization land	1492
5	Urban land	2912
6	Rural land	9079
7	Other land	3071
8	Reserved Forest	72602
9	Virgin land	6569
10	Fallow land	11544
11	Non arable land	40482
	Total	327494

Table 4.6-3: Land Use of Kyaikmaraw Township

Source: General Administrative Department (2017)

4.6.2.2 Fishermen

There are fishing boats in every Village Tracts of Kyaikmaraw for fishery in Attaran River. Highest numbers of fishing boats are found in TaYaNar (20 boats), KyonSein (31 boats) and NyaungPinSeik (39 boats) village tracts. However, there are only 1 boat each in Kayil Pa Lan and Far Pyauk villages. The villagers worried about to lose their fishery business after the implementation of the project. Table 4.6-4 showed the list of fishing boats owned by each village.
Sr.	Village Tract	Number of Boats
1	Me Ka Ro	13
2	Kaw Pa Naw	8
3	U Lay	10
4	Ka Don Sit	3
5	Kwan Nyan	5
6	NgaPyay Ma	14
7	Kaw Vee	12
8	Hni Don	3
9	Ta Ya Nar	20
10	Kayik Pa Lan	1
11	Far Pyauk	1
12	Far Thein	6
13	ChaungNitKwa	12
14	Khayon	10
15	KyonSein	31
16	Nyaung Pin Seik	39

 Table 4.6-4: List of Fishing Boats in Attaran River (2012)

Source: General Administrative Department, Kyaikmaraw Township

4.6.3 Modes of Transportation in Kyaikmaraw Township

There are 18 buses running along the 5 routes of land transportation in the project area. Among them, Attaran Myay Bus line operates daily trip between Kawwan and Mawlamyine.

Two boats alternately run at HniDon- KwaDon Jetty. About 11 boats are running daily at Sabegu Jetty. There is a daily boat from KwaDon to Sabegu. There are 29 boats running along the 3 trips in the ferry services of the project area. HniDon- KwanNyan ferry service is operating in all season. However, some boats run from Kyaikmaraw Jetty during the rainy season only. (Table 4.6-5 and Table 4.6-6).

Sr.	Trip (up and down)	Number of Bus
1	KawWan to Mawlamyine	4
2	FarPyauk- Mawlamyine	4
3	KawPaNaw- Mawlamyine	5
4	KaDonSit- Mawlamyine	2
5	Ngapyayma- Kyakatkone- Mawlamyine	3
	Total	18

Table 4.6-5: Road Transportation in the Project Area

Source: General Administrative Department, Kyaikmaraw Township

Sr.	Ferry (up and down)	Number of Boats
1	Hni Don- Kwan Nyan	9
2	MeKoRo-Sabai-Gu- Kaw Don	11
3	KawDon- Sabai-Gu	9
	Total	29

Table 4.4-6: Waterways in the Project Area





Figure 4.6-3: Transportation Network in the Study Area, Kyaikmaraw Township

4.7 Education Status in Kyaikmaraw Township

The development of a region can be evaluated, by the standard of education. There are schools in all village-tracts with convenient communication and transportation Graduates are also found in Kyaikmaraw Township.

According to 2208 data, Kyaikmaraw Township had (3) basic Education High Schools, (5) Basic Education Middle Schools (Affiliated), (4) Basic Education Middle Schools, (9) Basic Education Middle Schools (Affiliated), and (110) Basic Education Primary Schools in Kyaikmaraw Township. The teachers and the students' ratios were 1:22 for High School level, 1:32 for Middle School level,

and 1:42 for Primary School. Therefore, the ratios of teachers and students are sufficient, especially for High School level. The number of education buildings and staffs can be seen in Table 4.7-1.

No.	Categories	High School	High School (affiliated)	Middle School	Middle School (affiliated)	Primary School
1	Number of Schools	3	5	4	9	110
2	Number of Teachers	30	27	298	165	577
3	Number of Students	482	801	4197	5246	24175

Table 4.7-1: Number of Schools, Teachers and Students in Kyaikmaraw Township

Source: General Administrative Department, Kyaikmaraw Township

4.8 Community Health Status In Kyaikmaraw Township

Kyaikmaraw Township has one township-hospital, one station-hospital and four rural health-care centres. The 25-bedded hospital is in Kyaikmaraw Township. There are 4 doctors, 9 nurses and 25 midwives in this township hospital. One station-hospital was opened in Chaungngekhwa Village Tract which was operated by one doctor and 3 nurses as shown in Table 4.8-1.

Rural health-care centers are opened in Pein Hne Kone, Taranar, Thapyauk, and Pharthein Village Tracts. Each rural health-care center consists of four branches of health-care centers under their central management.

The maternal and child care department was opened in Kyaikmaraw Township. This department takes care of pregnant mothers' health, disease prevention for child and providing nutritious food for the children. Moreover, they made monthly field trips to villages to provide educational talks for feeding habit to get high nutritional value.

The most common diseases found in Kyaikmaraw Township are Malaria, Jaundice and Cholera. Most of the residents in the township suffer from these diseases owning to water contamination after flash flood in the rainy season.

No.	Categories	Building	Doctor	Nurse	Midwives	Total Staffs
1	Township Hospital	1	5	9	27	41
2	Station-township Hospital	1	1	5	10	16
3	Rural Health-care Centre	4	0	4	4	8
4	Maternal and Childcare Department	1	0	1	2	3

Table 4.8-1: Health Facilities Status in Kyaikmaraw Township

Source: General Administrative Department, Kyaikmaraw Township

4.9 Cultural Status of the Kyaikmayaw Township

The vocabulary of *Kyaikmaraw* is a derivative of Mon word (*Kyaik*). The meaning of (Kyaik) stands for pagoda. The historic Kyaikmaraw pagoda existed 1300 years ago built by Queen Banyar Htaw (Shin Saw Bu), a well-known Queen who devoted and donated gold to the Shwedagon Pagoda, in Myanmar Era, 817 (A.D 1455) according to the inscription which was found in pagoda compound. The extraordinary point of the image is sitting in the position of the legs hanging down as if sitting on a chair. It is widely believed that the wishes surely will come true while praying to Kyaikmayaw Pagoda and making a wish. Thus, this pagoda is well-known in the region.

Sr. No.	Township	Location	Name	Kinds	Building Dates
1	Kyaikmayaw	Shin Saw Bu word	Su Taung Pyae pagoda	Image	817(1455)
2	Kyaikmayaw	Letpan Ywa	Kharon Gu	Gu (cave)	-
3	Kyaikmayaw	Dhammasa Ywa	Dhammasa Hair Relic	Ceti (pagoda)	117(755)
4	Kyaikmayaw	Niton Ywa	Sanpae Gu	Gu (cave)	-
5	Kyaikmayaw	Lumokho Ywa	Paaung Gu Pagoda	Gu (cave)	1200(1838)

Тя	ble	4.9-	1:	Famous	Historical	Mour	ntains in	Kv	aikmaraw
I U		T •/		1 amous	mountai	TTTOUL	icanno m	. .y	ansmar a m

4.9.1 Findings in Project Affected Village Area of Kyaikmaraw Township

Although there are 46 villages in *Kyaikmaraw* Townships, only *Maekaro, Kadonsit, Pauktaw* and *Kwan Ngan* villages are located within 3 km radius from the cement project (see in Figure 4.9-1).



Figure 4.9-1: Village Community Area Around Proposed MCL Cement Plant

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	Table 4.9-2. Elocations of Vinages within 5 km effect of 1 roject Area						
No.	Name of Village	Latitude (North)	Longitude (East)				
1	Pauktaw	16° 21' 43"	97° 49' 09"				
2	Kwan Nyan	16° 20' 1"	97° 47' 34"				
3	Ka Don Sit	16° 20' 43"	97° 50' 44"				
4	Me Ka Ro	16° 23' 9"	97° 46' 42"				

Table 4.9-2: Locations of Villages within 3 km Circle of Project Area

Source: REM Field Survey, February 2013

Pauktaw Village

Pauktaw villages are situated east of the *Pya Taung*. It is included in the project area. There is a monastery a *ceti* (*pagoda*) and a school is found in the village. It is found that 3-year aged monastery and the *ceti* (*pagoda*) about ten years. A larger *ceti*, *so called*, *Kawkit ceti* (*pagoda*) was situated 1.4 km from *Pauktaw* (Figure 4.3-15). Furthermore, there was a religious area with bare ground as flooring. It is known that the original pagoda was enveloped within a new pagoda. The pagoda was built 500 years ago so that it was an ancient pagoda. People says that *Kawkit* pagoda was renovated in 1990 by Mon People's Party and a monk.

There is a dilapidated laterite statute situated on the east of *Kawkit* pagoda. The locals called it Thai statute and it is similar to Thai image. This village has also a laterite well. It is presumed that *Pauktaw* village is included in the project area so that it must be taken great care not to damage the ancient *ceties* (*pagodas*).

<u>Kwan Nyan village</u>

Kwan nyan village is also included within the project area, about two miles away from the cannel that was set to be dug for factory project. There is a large monastery in this village. An image that is similar to Emerald Buddha of Thailand was also found in the monastery. Moreover, *Bhumiphassa mudra* (translated as the earth touching gesture)⁴ bronze images and stone images are also found. Therefore, this village is rich of places where *religious* buildings and facilities therein. Due to the very near to the factory project area, if a cannel is dug, it should be taken with great care.

Kadonsit village

Kadonsit village is situated 4.84 km in the east of *Pya Taung*, which is set to build a cement factory. The two villages, *Kadonsit* and *Pauktaw*, are within 3km radius away from the project area so that they must be considered as the environs of the project area. There was an ancient pagoda in the middle of *Kadonsait* village. Some Buddha images are also found. Moreover, a stone inscription inscribed in Mon language was also found. However, it was inscribed in later years and cannot be considered as ancient.

Mae Karo Village

It cannot be known exactly when the establishment of the village but the scars of the olds still existed. A dilapidated pagoda and a rest house have been found in the ancient city. An ancient brick has also been found in the place in which a *ceti (pagoda)* used to be existed. Moreover, a few musical instruments made of copper are there too.

⁴ https://www.burmese-art.com/about-buddha-statues/hand-positions/bhumisparsha-mudra

There is an ancient monastery in the middle of the village. A *ceti* (*pagoda*) still exists in the monastery compound. The date of *ceti* (*pagoda*) is 1223 ME (Myanmar *era*) (A.D 1861). It has been renovated in present condition. Moreover, an ancient laterite well is also found. A tomb of monk has been found. There are gandagudi, a special chamber used by Buddha and *Sima* in the monastery. The renovation date of the *Sima* is thus_

The establishment date of the Sima	1272 (1910)
The second renovation date	1307 (1943)
The third renovation date	1367 (2005)

Although religious buildings and ancient artifacts are found, they are far away from the project area.

Stalactite and Stalagmite Caves

Krone village, *Dhammathat, Kawbane, Makaro* and other areas situated in *Kyaikmaraw* have famous stalactite and stalagmite caves. *Krone* is a kind of cave. It is situated within the Krone village and it is a limestone cave. It is on the east of the *Attaran* Rriver, a branch of *Thanlwin R*iver. And it is about 10 m above sea level. Notable culture characteristic of *Krone* cave is votive tablets sticked to the cave ceiling and walls. The length of the votive tablet is 3 inches and its width is 6 inches. The thickness of the tablet is 0.6 inch. All *are bhumiphassa mudras*. According to the stylistic analysis of the votive tablets, it was made in *Nyaung Yan* era (AD 17 century). There are 65 Buddha images in the cave donated by later donors. Among them, 5 are reclining Buddha. *Karone* cave has been protected since 1975 by Department of national Museum and Library, Archaeological Research, Ministry of Culture. *Krone* cave is few miles away from cement project area.





Figure 4.9-2: Kawkit Pagoda Near the MCL Project Site

<u>Pya Taung</u>

Pagodas can also be found at the northwest of *Pya Taung*. A cave situated in the south of *Pya Taung* has a lot of ancient ceti-es (pagodas) as shown in Figure 4.8-3. The authorities informed the Archaeological Department where the places have to be investigated. The cave is included in the project area so that a special care is a must not to damage them and to maintain the cultural heritages.

<u>Sabai cave</u>

There are many pagodas in *Sabai* cave situated on *the Sabai Taung*. A lot of small Buddha images, besides the statues in sitting position, is found. Furthermore, there was also a shrine for Myanmar Nats (Spirit)⁵.



Figure 4.9-3: Photos of Sabai Cave

4.9.2 Reviewing the Project from Cultural Point of View

Kyaikmayaw regions in which the cement Project is set to be built, is flourishing with ancient Mon cultural, religious buildings such as abundant of Pagodas (Ceti), Cave (gu), Sima (Pali word meaning ordination halls in temples and monasteries in Myanmar which are called "Thein" in Myanmar),

⁵ https://en.wikipedia.org/wiki/Nat_(spirit)

monasteries, ancient bricks, lateritic artifacts, Coins and votive tablets. Due to the facts that Mon respects their religions and they are proud of their culture heritages, deep care should be taken in implementing the cement manufacturing plants.

On the other hand, Mon people are willing to develop their region, therefore, there were many educated persons in the region and most of them migrated to Thailand for their greener pastures. They believed that building a cement plant will open floodgate of job opportunities and the cement factory will foreside better transportation in their region. They thought that they don't need to go to Thailand for work if this happened. Thus, it is presumed that building of the cement factory is pleasant for regional Mon people. These are good points of view for the implementation of MCL cement project, so called "positive impacts".

There are also community's worries about the impacts in relation with mines processing which will be used for the cement project. Due to mine explorations, vibrations might affect the religious (*Buddhist*) buildings. Worrying is a must that *Kawkit ceti* (*pagoda*) of *Pauktaw* village situated within the project area might be potentially damaged due to vibration of mine activities. A canal will be dug to transport the products from the cement factory to the stock area. That canal set to dig is very close to *Pauktaw* Village so that taking great care is also necessary to avoid not to disturb the fishermen livelihoods and the accidental cases. Similarly, not to damaging the ancient *pagodas* (*ceti-es*), the cave (*gu*) situated on the south of *Pya Taung* included in the project area is essential to prevent.

If artifacts are found during the excavation for the cement plant, it's an important suggest that all must be sent to the Archaeology Department.

Meanwhile, the evidence of '0' impact from project mining activity to Archaeological Zone which had been defined by Achaeology Department was provided in Annex 4-1: Archaeological Evidence: which was released from Archaeological Department to Ministry of Mine on February 2011 and the 'No Objection' letter for mining activity in the MCL proposed mining area has also been reported to Minister from Nay Pyi Taw main office on March 2011.





Figure 4.9-4: The Cave Pagodas, Images and Pagodas Located in Southern Part of Pya Taung

4.10 Recent Natural Disaster Hazards

According to the AGD survey (2017) in Mon State, there was no disasters such as Cyclone, Tsunamis, Earthquakes, Flooding in Kyaikmaraw Township till the record of September 2017. However, the seasonal flooding was occurred almost every year which was caused by heavy rain. The maximum water level of Atran River during flooding was used to raise at 510 cm.

Fire case was occurred about 7 times in Kyaikmaraw Township with 4 houses lost and 2 injuries and the estimated loss was about 6.167 million Kyats.



Figure 4.10-1: Flooding Caused by Heavy Rain (Aug 2013) at Kyan Ngan Village

Flood in 2018

In 2018 June, Mon state experienced the worst flood in over 40 years after hours of heavy rain and rise of the tide in Thanlwin river. Myanmar Times stated that 'Hundreds of people were forced to flee their homes after floods swept Mawlamyine and other townships in Mon state after hours of heavy rain, government officials and rescuers said." The wall in front of Kyaikkalan pagoda was suddenly broken due to heavy rain and most of the roads and landslide were destroyed by this flood. The rain fall rates were 13.7 inches in Mawlamyine and 11.69, 6.22 and 11.89 for Mudon, Thanphyusayat and Chaung Zone townships, respectively. At least 16 people have been killed or are missing in the strong monsoon and affected over 35,00 households in Mon state.



Figure 4.10-2: Flood (June 2018) at Kwan Ngan Village

CHAPTER 5 ENVIRONMENTAL AND SOCIOECONOMIC BASELINES

5.1 Introduction

Desk studies as well as site specific baseline investigations were carried out to provide a full picture of the status of the existing natural and human environment and to understand potential impacts and any sensitive risk receptors for the Project, in terms of the purpose of environmental management plans and social management plans by minimizing the negative impacts and maximizing the positive impacts of the project activities.



Figure 5.1-1: Area Potentially Affected by the Project (Source of Map: Google

Earth, 2012)

The baseline surveys were focused on circle of 3 km radius respectively centered at the Cement Plant, representing the area potentially affected by the Project as shown in Figure 5.1-1.

The baseline study was conducted during Pre Monsoon season during February 2013. The resulting environmental and socioeconomic baseline studies and conducted site surveys are presented in the following.

The environmental baseline data such as water, air and noise quality, river sediment bed, soil & water and ecological survey were conducted at the selected sampling sites within the project site. The ecological survey was conducted to assess the type of flora and fauna prevailing within the site. In addition, the socio-economic baseline surveys have also been done at the surrounding area.

5.2 Physical Baseline Studies

5.2.1 Outline

Resource and Environment Myanmar Co. Ltd. (REM) conducted the actual environmental survey for environmental impact assessment at the 5000 T/D Cement Plant and its facilities near Town, Mawlamyine District in Mon State. Three sampling sites for air quality and noise monitoring, eight sampling sites of water quality survey, four for surface water and four for underground water, three sampling sites for river bed and sixteen sampling points for soil were conducted in project site baseline investigation.

The summary of physical environmental survey is shown in Table 5.2-1 and sampling points for environmental survey are shown in Figure 5.2-1.

Air Quality	Parameter	 Nitrogen dioxide, 2) CO, 3) particulate Matter PM₁₀, 4) Total Suspended Particulate, 5) Sulphur Dioxide, 6) VOC, 7) Relative Humidity, Temperature, 9) Wind Speed, and 10) Wind Direction 			
& Meteorology	Period	3 points for one time within 24 hours			
	Location	Residential area			
	Parameter	LAeq (A-weighted loudness equivalent)			
Noise Level	Period	One time at 4 locations within 24 hours			
	Location	Residential and rural areas			
	Parameter	In-situ Test : 1) pH, 2) EC, 3)TDS, 4) Temperature, 5) Turbidity, & 6) ORP			
Surface Water	Period	One time at 4 locations			
Quanty	Location	River			
	Parameter	In-situ Test: 1) pH, 2) EC, 3)TDS, 4) Temperature, 5) Turbidity, & 6) ORP			
Under ground	Period	One time at 4 locations			
water Quanty	Location	Wells and tube well			
	Parameter	Field Observation Survey and Sampling			
River Bed Sediment	Period	One time at 3 locations			
	Location	River bed sediment along the river			
	Parameter	Field Observation Survey and Sampling			
Soil Quality	Period	One time at 16 locations			
2 on Quanty	Location	Residential and rural areas			

Table 5.2-1. Summary of Dasenne Survey for Filysical Environment	Table	5.2-1	: Summary	of Baseline	Survey for	· Physical	Environmer
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Source – REM Field Survey (Feb 2012)

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



Figure 5.2-1: Location Map of Baseline Sampling Points for Physical Environment Studies (Source of Map: Google Earth 2012)

5.2.2 Air Quality

Survey Item

Myanmar National Environmental Quality (Emission) Guidelines were released on 29th December, 2015 and guideline values for air pollution level are shown in Table 5.2-2.

Table 5.2-2: Myanmar National Environmental Quality Guideline Values for Air Quality

No	Parameter	Averaging Period	Guideline Value	Units
1.	Nitrogen dioxide	1-hour	20	$\mu g/m^3$
2.	Carbon monoxide	-	-	-
3.	Particulate matter PM10 ^a	24-hours	50	$\mu g/m^3$
4.	Particulate matter PM2.5 b	24-hours	25	$\mu g/m^3$
5.	Sulphur dioxide	24-hour	20	µg/m ³
6.	Temperature	-	-	°C
7.	Relative Humidity	-	-	%
Remark: PM10 ^a		Particulate matter 10 mic diamete	crometers or less in r	

Survey Parameters

Survey Location

PM2.5^b

The locations of air quality monitoring survey in detail are shown in Figure 5.2-2. The detailed sampling points are described as Table 5.2-3.

=Particulate matter 2.5 micrometers or less in

diameter

 Table 5.2-3: Sampling Locations of Air Quality Survey

No.	Monitoring Point	Coordination	Level above the ground (m)	Description	
1.	Point 1	16° 23' 10.5'' N 97°48' 59.9'' E	1.5	At the monastery compound of Kawpanaw village and north of project site	
2.	Point 2	16° 21' 35.7'' N 97° 49' 10.5'' E	1.5	At the monastery compound of Pauktaw village and west of project site	
3.	Point 3	16° 20' 0.6'' N 97° 47' 27.8''E)	1.5	At the monastery compound of Kwan Ngan Village	



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Figure 5.2-2: Location Map of Air Quality Monitoring Survey (Source of Map: Google Earth (2012)

Point 1

The sampling site was conducted in the compound of Kawpanaw Village, Township, Mon State. It was fared about 2.7 km at northwest of project site. The location is surrounded by residential houses and rubber plantation. The possible emissions might become from human activities, such as cooking gases from normal biomass burning and dust from transportation on low level road infrastructures and the flocks through the roads for the purpose of agricultural business. The location of Point 1 is shown in Figure 5.2-3.



Figure 5.2-3: Air Quality Monitoring Survey at Point 1

Point 2

Point 2 was surveyed in the monastery compound of Pauk taw Village, Kyan Nyan Village Track, Township, Mon State and it was fared about 1.2 km at southwest of project site. The location of point 2 is generally flat terrain and covered with some houses and paddy fields as shown in Figure 5.2-4. The possible emissions might source from the human activities of residents as in above point 1.



Figure 5.2-4: Air Quality Monitoring Survey at Point 2

Point 3

The point 3 sampling site was set at the monastery compound of Kyan nyan village and fared about 5.6 km at southwest of project site. The location was at the bank of Ataran River and generally flat terrain and covered with many residential houses. The possible emission sources might become as above. The location of Point 3 is shown in Figure 5.2-5.



Figure 5.2-5: Air Quality Monitoring Survey at Point 3

Survey Methodology

Sampling and analysis of ambient air pollutants were conducted by referring to the recommendation of United States Environmental Protection Agency (U.S. EPA) as shown in Table 5.2-4. The Haz-Scanner EPAS Wireless Environmental Perimeter Air Station was used to collect Ambient Air Monitoring data.

No.	Parameter	Analysis Method
1	Nitrogen dioxide (NO ₂)	In Situ
2	Carbon monoxide (CO)	In Situ
3	Particulate matter 10 (PM ₁₀)	In Situ
4	Particulate matter 2.5 (PM _{2.5})	In Situ
5	Sulphur dioxide (SO ₂)	In Situ
6	VOC	In Situ
7	Temperature	In Situ
8	Relative Humidity	In Situ
9	Wind Speed	In Situ
10	Wind Direction	In Situ

Table 5.2-4: Sampling and Analysis Method for Air Quality

Survey Results

Point 1

The survey results for Point 1 between 2013 and 2016 are compared in table 5.2-5. It was observed that the concentrations of CO, NO₂ and SO₂ from 2013 measurement are lower than 2016 while the TSP and PM_{10} concentration values in 2013 are doubled of 2016 values. So, it indicate that the area had particulate sources and it was certainly to say the measured data were baseline level in the area. However, all the measured pollutants are within the Myanmar National Emission Guideline limit.

Location	Items	Unit	25-25 Feb, 2013	17-18 Day Result, in March 2016	18-19 Day Result, in March 2016	19-20 Day Result, in March 2016	Target Value to be applied	Country's Standard	Method
			Measured Value (Mean)	Measured Value (Mean)	Measured Value (Mean)	Measured Value (Mean)			
	СО	mg/m ³	0.001	0.14	0.19	0.14	No Guideline	MNEQG	EPAS
	NO ₂	mg/m ³	0	0.06	0.06	0.06	0.2 (1 hour)	MNEQG	EPAS
	NO	mg/m ³	-	0.04	< 0.01	0.02	No Guideline	MNEQG	EPAS
AQN-1 (at Kawpanaw Village)	SO ₂	mg/m ³	0	<0.01	<0.01	<0.01	0.5 (10 mins), 0.02 (24 hours)	MNEQG	EPAS
	TSP	mg/m ³	0.26	0.07	0.05	0.05	No Guideline	MNEQG	EPAS
	PM ₁₀	mg/m ³	0.13	0.06	0.05	0.04	0.02 (1 year), 0.05 (24 hours)	MNEQG	EPAS

Table 5.2-5: Comparison of Ambient Air Quality	Results between 2013 and 2016 for Point 1
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Point 2

The survey results for Point 2 between 2013 and 2016 are compared in table 5.2-6. Similar to the measurement results in Point 1, the concentration of gases CO, NO₂ and SO₂ in 2013 are lower than 2016 whereas the TSP and PM₁₀ higher. Besides, the PM₁₀ concentrations (25-26 Feb, 2016 and 19-20 Mar, 2016) exceed the guideline limit while the remaining parameters are below the limit. Thus, it indicates the area had few PM emission sources during baseline studies.

Location	Items	Unit	25-25 Feb, 2013	17-18 Day Result, in March 2016	18-19 Day Result, in March 2016	19-20 Day Result, in March 2016	Target Value to be applied	Country's Standard	Method
			Measured Value (Mean)	Measured Value (Mean)	Measured Value (Mean)	Measured Value (Mean)			
	СО	mg/m ³	0.001	0.11	0.16	0.17	No Guideline	MNEQG	EPAS
	NO ₂	mg/m ³	0.05	0.07	0.07	0.07	0.2 (1 hour)	MNEQG	EPAS
	NO	mg/m ³	-	0.04	0.04	0.03	No Guideline	MNEQG	EPAS
AQN-2 (at Pauk Taw Village)	SO ₂	mg/m ³	0.002	<0.01	<0.01	<0.01	0.5 (10 mins), 0.02 (24 hours)	MNEQG	EPAS
	TSP	mg/m ³	0.15	0.06	0.06	0.06	No Guideline	MNEQG	EPAS
	PM ₁₀	mg/m ³	0.11	0.05	0.05	0.06	0.02 (1 year), 0.05 (24 hours)	MNEQG	EPAS

Table 5.2-6: Comparison of Ambient Air Quality Results between 2013 and 2016 for Point 2

Point 3

The survey results for Point 3 between 2013 and 2016 are compared in table 5.2-7. It was observed that all the concentration of pollutants from the measurement conducted in 2013 and 2016 are within the acceptable limit of NEQG values except the PM10 concentration from the 2013 measurement exceed the guideline value of 0.05 mg/m³. Thus, it can be considered that this area had the background PM10 emission.

Location	_	Unit	25-25 Feb, 2013	17-18 Day Result, in March 2016	18-19 Day Result, in March 2016	19-20 Day Result, in March 2016		Country's	Method
	Items		Measured Value	Measured Value	Measured Value	Measured Value	Target Value to be applied	Standard	
			(Mean)	(Mean)	(Mean)	(Mean)			
	СО	mg/m ³	0	0.12	0.16	0.12	No Guideline	MNEQG	EPAS
	NO ₂	mg/m ³	0.05	0.09	0.08	0.08	0.2 (1 hour)	MNEQG	EPAS
	NO	mg/m ³	-	0.17	0.13	0.16	No Guideline	MNEQG	EPAS
(at Kwangan Village)	SO ₂	mg/m ³	0.004	0.02	0.02	0.02	0.5 (10 mins), 0.02 (24 hours)	MNEQG	EPAS
	TSP	mg/m ³	0.24	0.08	0.06	0.06	No Guideline	MNEQG	EPAS
	PM ₁₀	mg/m ³	0.13	0.06	0.04	0.05	0.02 (1 year), 0.05 (24 hours)	MNEQG	EPAS

Table 5.2-7: Comparison of Ambient Air Quality Results between 2013 and 2016 for Point 3

5.2.3 Noise Level

Survey Item

Myanmar National Environmental Quality (Emission) Guidelines were announced on 29th December, 2015 and guideline value for noise level is as shown in Table 5.2-8.

Survey Location

The locations of Noise quality monitoring survey in detail are shown in Figure 5.2-6. The detailed of sampling points are described as Table 5.2-9.

Sampling Points	Coordinates	Description of Monitoring Point		
N1 16°23'8.51"N 97°48'57.87"E		Same as Point 1 of Air Quality Survey		
N2	16°21'35.83" 97°49'9.63"E	Same as the Point 2 of Air Quality Survey		
N3	16°20'38.34"N 97°50'17.91"E	Near the proposed Quarry site		
N4	16°21'41.83"N 97°50'17.91"E	Near Proposed Cement Plant Site		

Table 5.2-8: Locations of Noise Quality Monitoring Station



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Figure 5.2-6: Location Map of Noise Quality Survey



N2



N3

N4

Figure 5.2-7: Noise Monitoring Survey Activities

Survey Period

Noise level survey was conducted on 24 hours consecutively. The measurement duration is shown in Table 5.2-10.

Point	Period
N1	Feb 25 th – 26 th , 2013 (24 hours)
N2	Feb 26 th – 27 th , 2013 (24 hours)
N3	Feb 27 th – 28 th , 2013 (24 hours)
N4	Feb 27 ^{8h} – Mar 1st, 2013 (24 hours)

Table 5.2-9: Sampling Duration for Noise Level Survey

Survey Method

Measurement of environmental sound level was conducted by referring to the recommendation of International Organization for Standardization (ISO), i.e. ISO 1996-1:2003 and ISO 1996-2:2007. The instrumentation used for noise quality survey is shown in the following Table 5.2-11.

Noise meter was set up to record the log as ten minutes intervals during an hour for one consecutive day.

Instrumentation	Description
Sound level meter	Sound level meter with SD Card, Model SL-4023SD

Table 5.2-10: Instrumentation for Noise Survey

Source: Resource and Environment Myanmar Co., Ltd.





Figure 5.2-8: Lutron Sound Level Meter

Survey Results

The noise level within the 24 hours at most of all survey locations found lower than the noise quality of Myanmar National Environmental Quality (Emission) guideline except the day time of N1 which is slightly higher than the guideline values as shown in Table 5.2-12.

One day L_{Aeq} was calculated by using the following array formula in the excel sheet. This formula is firstly used for hourly L_{Aeq} and then for the 24 hours;

L_{Aeq}. 10*LOG10 (AVERGAE (10^((RANGE)/10)))

As the monitoring is conducted for the industrial areas, the results are compared with "Residential, educational, institutional" environment.

By means of the calculated results, daytime and night time L_{eq} at most of all monitoring points are lower than the national emission guideline standards for each categorized environment, however, N1 point at day time is slightly higher than the guideline standard because of unusual noise (strong wind, school activities at day time and heavy rain) during the survey period.

Table 5.2-11: A-weighted	Loudness Equivalen	nt (LAeq) Level Resul	t (24 hours)
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Day/Point	N1	N2	N3	N4

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	Feb $25^{\text{th}} - 26^{\text{th}} 2013$		Feb $26^{\text{th}} - 27^{\text{th}} 2013$		Feb 27 th -28 th 2013		Mar 28 th –Mar1 st 2013	
	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time	Day Time	Night Time
Result (dBA)	56.37	40.44	53.03	36.65	45.36	44.68	46.74	41.61
EQEG* (dBA)	55	45	55	45	55	45	55	45

EQEG* - Myanmar National Environmental Quality (Emission) Guidelines for Residential, educational, and institutional.

Remark: N1, Shaded area is higher than the standard.

5.2.4 Surface Water Quality Standard

There is no standard for ambient surface water quality in Myanmar. However, in 2015 December 29th, Myanmar National Environmental Quality (Emission) Guidelines was released for effluent quality of Wastewater, Storm water runoff, Effluent and sanitary discharges for operation period of industries as showed in Table 5.2-12.

No.	Parameter	Unit	Myanmar Environmental Guideline Value (General Application)
1	pH	-	6 – 9
2	Electrical Conductivity (EC)	μS/cm	-
3	Total Dissolved Solid (TDS)	ppm	-
4	Temperature	°C	-
5	Turbidity	FNU	-
6	ORP	-	
7	Total Suspended Solids (TSS)	mg/l	50
8	Total Hardness	mg/l	-
9	BOD (5 days)	mg/l	50
10	Salinity	ppt	50
11	Iron (Fe)	mg/l	-
12	SO_4	mg/l	-
13	Manganese	mg/l	-
14	Total Coliforms	cfu/100ml	-
15	Fecal Coliforms	cfu/100ml	-
16	E.Coli	cfu/100ml	-
17	Oil & Grease	mg/l	10
18	Dissolved Oxygen (mg/l)	mg/l	-
19	Total Alkalinity (mg/l)	mg/l	-
20	Fluoride (mg/l)	mg/l	-
21	Calcium (mg/l)	mg/l	0.1

 Table 5.2-12: Survey Parameters for Water Quality Survey

Source: General Application; Wastewater, Storm water runoff, Effluent and sanitary discharges

(MNEG, General Application)

5.2.4.1 Surface Water Quality Survey Parameters

Parameters for water quality survey are determined so as to cover the parameters of existing environmental standards. The following parameters are to be measured and analyzed in situ as well as laboratory.

- 1) Colour
- 2) pH
- 3) Alkalinity
- 4) Temperature
- 5) Turbidity
- 6) Dissolved Oxygen
- 7) Hardness
- 8) Electrical Conductivity
- 9) BOD5
- 10) COD
- 11) Total Suspended Solids

- 12) Total Nitrogen
- 13) Total Phosphorous
- 14) Total Coliform Bacteria
- 15) Oil and Grease

Survey Locations

The locations of water sampling sites are described in Table 5.2-13 and Figure 5.2-9.

Category	Sampling Point	Coordinates	Description of Sampling Point
Surface Water	W-1	16°21'53.65" N 97°47'24.78" E	Upstream of Ataran River, Kyaikmaraw Township
Surface Water	W-2	16°20'9.63" N 97°46'55.74" E	Middle Stream of Ataran River, Kyaikmaraw Township
Surface Water	W-3	16°19'51.51" N 97°48'58.71" E	Downstream of Ataran River, Kyaikmaraw Township
Surface Water	W-4	16°19'51.16" N 97°47'59.14" E	In the Creek, near Entrance of Kwangan Village, Kyaikmaraw Township

Table 5.2-13: Sampling and Survey Points of Surface Water Quality Survey



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Figure 5.2-9: Location Map of Surface Water Quality Survey Area

5.2.4.2 Surface Water Sampling and Surveying

Four surface water quality survey and sampling were carried out along the Ataran River, which is generally flowing to Than Lwin River from southeast to northwest, Kyaukmaraw Township, Mawlamyine District, Mon State. SW1 sampling point was collected in the Ataran River at west of Pya Taung (Limestone Quarry) and also downstream sampling point of project area. SW2 surface water quality points was surveyed in Ataran River at south of Pya Taung and also closer to the Kyan Nyan Village to cover the downstream condition of canal in future. SW-4 point was collected in small canal which is flowing to Ataran River at just east of Kyan Nyan Village. The last water sampling, SW-3, was surveyed in upstream of canal entrance. The activites of surface water sampling and survey are shown in Figure 5.2-10.



Figure 5.2-10: Collection of Surface Water Samples

The sampling and measuring of the surface water were conducted on 26^{th} - 27^{th} May, 2013.

5.2.4.3 Survey Method

Water samples were taken by Alpha horizontal water sampler and collected in plastic and sterilized glass sample containers. All sampling was in strict accordance with recognized standard

procedures. The parameters as pH, temperature, dissolved oxygen (DO), electrical conductivity (EC), and total dissolved solid including the odor and color in visual analyzing were measured at each site concurrently with sample collection and. All samples were kept in iced boxes and were transported to the laboratory within 24 hours and kept at 4°C in the refrigerator.

Moreover, the river survey; the flow rate, width and depth of river, was also measured using Vale port Flow Meter equipment and depth sounder.

No.	Equipment	Manufacturer	Originate Country	Model
1	Multiparameter (water quality)	HANNA	USA	HI7609829 (with 3 sensors)
2	SmarTROLL multi- parameter	In-situ Inc.	USA	
3	pH meter	HANNA	USA	HI 98129
4	Alpha Bottle (Water Sampler)	Wildlife Supply Company®	Indonesia	_
5	DO meter	HANNA	USA	

Table 5.2-14: Field Equipment for Surface Water Quality Survey

No.	Parameter	Container	Volume (ml)	Preservation	Holding Time
1	BOD	PE	1,000	Cool 4±2 °C	48 Hours
2	COD	PE	500	Add H2SO4 to pH <2	28 Days
3	TSS	PE	1,000	Cool 4±2 °C	7 Days
4	TDS	PE	1,000	Cool 4±2 °C	7 Days
5	TCB	Glass	250	Cool 4±2 °C	24 Hours
6	Heavy Metals (Pb, As, Fe)	PE	1,000	Add HNO3 to pH <2	6 Months
7	Cyanide	PE	134	Add NaOH to pH >12	24 Hours
8	Oil and Grease	glass bottle	1,000	Sulfuric acid, Refrigerate	-
9	Bacteria	plastic bottle	2,800	Refrigerate	-

 Table 5.2-15: Container and Preservation Method for Water Samples

Survey Results

Results of In-situ measurement and laboratory for surface water quality are provided in below Table 5.2-16 and Table 5.2-17. The original results documents from the laboratories are attached in Annex 5-1.

Site ID	рН	EC (µS/cm)	TDS (ppm)	Temp (°C)	Turbidity (FNU)	ORP
W-1	7.88	252.92	126.58	29.94	136.38	113.73
W-2	7.73	287.25	143.58	30.45	70.73	105.10
W-3	7.59	268.75	132.17	30.13	144.08	80.02
W-4	7.89	278.75	139.42	30.39	157.25	54.10

Table 5.2-16: Result of in-situ Test of Surface Water Quality

Sample Code	W 1 T	W 1 B	W 2 T	W 2 B	W 3 T	W 3 B	W 4
Suspended Solid (mg/l)	185	177	171	170	166	165	171
Total Hardness (mg/l)	180	216	120	144	120	140	160
BOD (mg/l)	1	1.5	0.5	0.5	1.75	3	2.5
Salinity (ppt)	nil	nil	nil	nil	nil	nil	nil
Iron (mg/l)	nil	nil	nil	nil	0.01	3.1	1.02
Nitrate - N (mg/l)	nil	nil	nil	0.009	nil	nil	nil
SO4 (mg/l)	0.4	4.16	4.48	0.68	0.36	0.28	4.24
Manganese (mg/l)	129.5	182.35	88.05	102	85.56	106.4	106.23
Total Coliforms (cfu/100ml)	1.4x10 ³	4x10 ²	1x10 ²	2x10 ²	2x10 ²	2x10 ²	7.4x10 ⁴
Fecal Coliforms (cfu/100ml)	$1.4 \text{x} 10^3$	4x10 ²	1x10 ²	2x10 ²	2x10 ²	2x10 ²	7.4x10 ⁴
E.Coli (cfu/100ml)	0	0	0	0	0	0	0
Oil & Grease (mg/l)	<1	<1	<1	<1	<1	<1	<1
Dissolved Oxygen (mg/l)	5.5	5.0	5.0	4.5	5.0	5.0	5.5
Total Alkalinity (mg/l)	100	102	108	108	84	96	108
Fluoride (mg/l)	nil	nil	0.01	nil	0.01	nil	nil
Calcium (mg/l)	50.41	33.64	31.95	42	34.44	33.6	53.77

 Table 5.2-17: Laboratory Result of Surface Water Quality

(a) Underground Water Quality

Survey Item

There is no standard for ambient underground water quality in Myanmar. However, in 2015 December 29th, Myanmar National Environmental Quality (Emission) Guidelines was released for effluent quality of Wastewater, Storm water runoff, Effluent and sanitary discharges for operation period of industries as showed in Table 5.2-13. Measured and analyzed parameters are as same as surface water quality.

Survey Location

The locations of water samples and surveys are shown in Table 5.2-19 and Figure 5.2-11. The detail of each sampling points are described as below.

Category	Sampling Point	Coordinates	Description of Sampling Point
Ground Water	W-5	16°19'59.74" N 97°50'46.01" E	Handed well at west of Kadonsit village, Kyaikmaraw Township
Ground Water	W-6	16°20'1.94" N 97°47'27.98" E	Tube Well at the west of Kwangan village, in the compound of primary school, Kyaikmaraw Township
Ground Water	W-7	16°21'41.75" N 97°50'17.27" E	Handed well at rubber plantation near proposed project site, Kyaikmaraw Township.
Ground Water	W-8	16°23'5.42" N 97°48'24.78" E	Well at Kaw dun village, Kyaikmaraw Township.
Ground Water	W-4	16°21'40.85" N 97°49'9.84" E	Handed Well at the middle part of Pauktaw village, Kyaikmaraw Township.

Table 5.2-18: Sampling and Survey Points of Ground Water Quality Survey



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Figure 5.2-11: Location Map of Underground Water Survey

Underground Water Sampling and Survey

Underground water quality sampling and survey were conducted at or near project area of cement plant, canal, and limestone quarry from tube well, handed well, and well for physical in-situ and laboratory tests. Some of field activities are shown in below Figure 5.2-12.



Figure 5.2-12: Underground Water Quality Survey

Survey Period

The sampling and measuring of the surface water were conducted on 26th -27th May, 2013.

Survey Method

Survey method of surface water and ground water quality survey are the same.

Survey Results

Results of In-situ measurement and laboratory for surface water quality are provided in below Table 5.2-19.
Sample Code	W-5	W-6	W-7	W-8	W-9	Guideline Value (WHO, 2008)
Suspended Solid (mg/l)	102	160	35	80	43	-
Total Hardness (mg/l)	88	120	80	36	56	-
BOD (mg/l)	2.25	3.25	4.5	4.0	3.0	-
Salinity (ppt)	Nil	Nil	Nil	Nil	Nil	-
Iron (mg/l)	5.0	1.12	1.5	1.1	0.015	-
Nitrate - N (mg/l)	Nil	Nil	Nil	0.01	0.007	-
SO4 (mg/l)	0.28	0.48	0.36	0.52	0.36	300
Manganese (mg/l)	59.44	86.4	76.64	27.6	47.6	0.4
Total Coliforms (cfu/100ml)	6x10 ³	4 x10 ²	4 x10 ²	$1.2 \text{ x} 10^3$	1.1 x10 ³	-
Fecal Coliforms (cfu/100ml)	6 x10 ²	4 x10 ²	4 x10 ²	$1.2 \text{ x} 10^3$	1.1 x10 ³	-
E.Coli (cfu/100ml)	0	0	0	0	0	-
Dissolved Oxygen (mg/l)	5.5	6.0	6.5	6.0	6.0	-
Total Alkalinity (mg/l)	64	96	32	20	20	-
Fluoride (mg/l)	Nil	Nil	Nil	Nil	0.01	1.5
Calcium (mg/l)	28.56	33.6	3.36	8.4	8.4	75

 Table 5.2-19: Laboratory Result of Underground Water

5.2.5 Soil

Survey Item

Parameters for soil quality survey are determined so as to cover the parameters of existing available environmental standards as below.

No.	Parameter	Unit
1	Moisture	%
2	SO4	mg/kg
3	Na	mg/kg
4	Κ	mg/kg
5	Ca	mg/kg
6	NO3-N	%
7	Total Nitrogen	%
8	O.M	%
9	Р	mg/kg
2 3 4 5 6 7 8 9	SO4 Na K Ca NO3-N Total Nitrogen O.M P	mg/kg mg/kg mg/kg % % % % mg/kg

Survey Locations

Total of 16 soil samples were collected in and around the cement plant site and quarry and also canal alignment as shown in Table 5.2-21 and Figure 5.2.13.



Figure 5.2-13: Location Map of Soil Sampling Points

Category	Sampling Point	Coordinates	Description of Sampling Point
Soil	S 01	N16° 22' 04.2'' E97° 49' 25.6''	At the rubber plantation area and just near to the proposed cement plant at west
Soil	S 02	N16° 22' 02.2'' E97° 50' 14.6''	At the rubber plantation area at east of proposed cement plant
Soil	S 03	N16° 21' 44.1'' E97° 50' 12.8''	At rubber plantation area of proposed cement plant
Soil	S 04	N16° 21' 45.2'' E97° 49' 48.8''	At paddy field near to prosed cement plant
Soil	S 05	N16° 21' 58.6'' E97° 49' 48.3''	At rubber plantation area near to proposed cement plant
Soil	S 06	N16° 21' 44.5'' E97° 49' 50.4''	At paddy field near to proposed cement plant
Soil	S 07	N16° 21' 36.9'' E97° 50' 07.2''	At paddy field near to prosed jetty
Soil	S 08	N16° 21' 08.5'' E97° 49' 58.8''	At rubber plantation at northeast of Kadonsit Village
Soil	S 09	N16° 20' 41.8'' E97° 49' 49.6''	At Paddy field along the prosed canal alignment
Soil	S-010	N16° 20' 26.0'' E97° 49' 35.4''	At Paddy field along the prosed canal alignment
Soil	S-011	N16° 19' 51.5'' E97° 49' 24.1''	At Paddy field along the prosed canal alignment
Soil	S-012	N16° 21' 34.1'' E97° 48' 38.6''	At Paddy field along the prosed canal alignment near to Ataran River
Soil	S-013	N16°21' 04.4'' E97° 48' 46.1''	At Paddy field at east of Pya Taung
Soil	S-014	N16° 21' 05.8'' E97° 48' 24.5''	At the land near to limestone quarry area of Pya Taung
Soil	S-015	N16° 20' 48.4'' E97° 48' 15.7''	At the land near to limestone quarry area of Pya Taung
Soil	S-016	N16° 20' 26.3'' E97° 48' 10.0''	At paddy filed at south of Pya Taung

Table 5.2-20:	Sampling and Survey Points of Soil Quality Survey
1 abic 5.2-20.	Sampling and Survey I onlis of Son Quanty Survey





Figure 5.2-14: Field Survey on Soil Quality Test

Survey Period

The sampling and measuring of the surface water were conducted on $20^{\text{th}} - 22^{\text{th}}$ Feb 2013.

Samp le code	S1	S2	S 3	S 4	S 5	S 6	S7	S 8	S 9	S10	S11	S12	S13	S14	S15	S16
Moist ure (%)	1.5 95	1.3 07	5.9 22	1.1 23	0.9 69	0.9 34	3.8 07	3.9 12	5.5 25	3.9 44	5.8 96	9.8 05	9.8 05	7.2 33	6.4 17	6.0 73
SO ₄ (mg/k g)	112 .8	118 .8	106 .7	120 0	112 .8	106 .7	106 .7	118 .8	106 .7	112 .8	118 .8	112 .8	234 .7	115 .3	115 .6	112 .8
Na (mg/k g)	9.8 9	7.3 6	10. 81	6.4 4	5.2 9	3.9 1	8.2 8	5.2 9	15. 87	12. 88	14. 59	20. 47	42. 78	22. 08	34. 5	37. 49
K (mg/k g)	35. 58	25. 02	53. 17	14. 17	19. 94	9.7 75	30. 88	10. 16	36. 75	30. 88	37. 14	38. 70	4.4 18	37. 53	58. 65	63. 73
Ca (mg/k g)	226 .5	533 .0	533 .0	533 .0	799 .5	533 .0	799 .5	533 .0	106 8	132 2	213 6	186 9	213 6	347 2	240 4	347 2
NO ₃₋ N (%)	0.0 71	0.0 57	0.1 05	0.0 45	0.0 92	0.0 91	0.0 29	0.1 15	0.0 11	0.1 35	0.0 11	0.0 81	0.2 02	0.1 23	0.1 01	ND
Mg (mg/k g)	ND	ND	80. 25	323 .4	161 .7	161 .7	161 .7	ND	161 .7	ND	161 .7	161 .7	323 .4	161 .7	323 .4	323 .4
Total N (%)	0.1 78	0.2 48	0.1 86	0.1 42	0.1 77	0.1 24	0.2 36	0.1 46	0.1 29	0.1 64	0.1 67	0.1 94	0.2 52	0.2 08	0.1 68	0.1 49
O.M (%)	1.0 31	0.3 95	0.4 15	0.4 73	0.8 66	0.6 69	0.8 11	0.4 46	0.2 89	0.9 33	0.9 11	0.7 35	1.7 29	1.3 04	0.8 33	0.5 4
P (mg/k g)	5.9 1	22. 65	31. 27	23. 87	8.2 8	20. 6	10. 83	9.5 8	8.5 1	7.2 9	2.1 2	3.5 5	1.7 7	1.3	3.2 2	1.0 7

 Table 5.2-21:
 Soil Quality Analytical Data (REM Ecology Survey)

Survey Method

The soil contamination caused by the project activities during both construction and operation could be a potential significant issue. Potential contamination of soil from the project activities may affect the agriculture. So, total of 16 soil samples were collected in and around the cement plant site and quarry and also canal alignment to establish baseline conditions. Detailed of the sampling locations and its geographical coordinates are provided in Table 5.2-21 and Figure 5.2-13.

Soil Survey Group will examine the soil profile of the proposed plant site and jetty site. An auger drill will be applied to collect subsoil information to an appropriate depth (2 meters or till the top of ground water table) from total 16 auger holes in the project area and general soil interpretation, especially susceptibility to the erosion and dust propagation will be reported. To determine the baseline condition before starting the project, a contamination study will perform by testing two samples from each drill.

The common soil types found in the project area are red brown forest soil, laterite soil and meadow soil. These are used for orchard garden and rubber plantations. The Meadow Soil (Gleysol), they are also known as paddy soils. They are occurred at the flat areas and very gently sloping areas, along the Gyaing and Ataran Rivers. The soil texture is mostly made up of clay alluvium and does not have definite stratification down to 1.5 m from the surface. Generally, the colour of the surface soils is yellow brown. This soil can be utilized for rice cultivation.

The total of soil samples collected during the file survey period from project site and within the study area sent to accredited laboratories in Myanmar for physical and chemical analyzing and the results of all soil samples are shown in below Table 5.2-21.

5.2.6 Riverbed Sediment

Survey Item

Parameters for river bed sediment quality survey are determined so as to cover the parameters of existing available environmental standards as below Table 5.2-22.

Physical Parameters						
Particle Size	Unit					
Gravel	%					
Sand	%					
Silt & Clay	%					
Chemical Characters						
Mercury	ppm					
Arsenic as As	ppm					
Cadmium as Cd	ppm					
Copper as Cu	ppm					
Lead as Pb	ppm					
Zinc as Zn	ppm					
Chromium as C	ppm					
Nickel as Ni	ppm					

fable 5.2-22: Physical and	Chemical Data for	r Riverbed Sediment	Parameters Units
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Survey Locations

Three sediment samplings were carried out during this survey as below Table 5.2-23.

Category	Sampling Point	Coordinates	Description of Sampling Point
Sediment	SB-1	16°21'53.65" N 97°47'24.78" E	Same as W1 of surface water sampling
Sediment	SB-2	16°20'9.63" N 97°46'55.74" E	Same as W2 of surface water sampling
Sediment	SB-3	16°19'51.51" N 97°48'58.71" E	Same as W3 of surface water sampling





Figure 5.2-15: Location Map of Riverbed Sediment Sampling Points



Figure 5.2-16: Riverbed Sediment Sampling

Survey Period

The sampling and measuring of the surface water were conducted on 26th May, 2013.

Survey Method

River sea bed sediments were collected by dive-based sampling method. Three stations were collected in this survey. At each station, sediment was collected in an amber glass bottle. Sample were labeled and refrigerated (<4° C) before being dispatched for laboratory analyses. Two (2) replicates of benthic samples were collected in a plastic basin. Each benthic sample was then slowly washed through a sieve with a mesh size of 500. The specimens and coarse sediment that were retained in the sieve were collected in a plastic container and preserved in 10% formalin solution.

Survey Result

The below Table 5.2-24 is the survey result of sediment bed.

	Unit	SB1	SB2 SB3		
Physical Parameters					
Particle Size					
Gravel	%	0	0	0	
Sand	%	5	10	5	
Silt & Clay	%	95	90	95	
Parameters	Units	SB1	SB2	SB3	
Chemical Characters					
Mercury	ppm	ND	ND	ND	
Arsenic as As	ppm	ND	ND	ND	
Cadmium as Cd	ppm	0.007	0.004	0.004	
Copper as Cu	ppm	120	130	125	
Lead as Pb	ppm	75	85	80	
Zinc as Zn	ppm	115	120	105	
Chromium as Cr	ppm	15	20	10	
Nickel as Ni	ppm	7	12	8	

Table: 5.2-24: Physical and Chemical Data for River Bed Sediment Parameters Units

5.3 Biological Baseline Studies

5.3.1 Introduction

With the total land extent of 676,552 square kilometers (261,218 sq miles), Myanmar is located between Latitude 9°28" and 28°29" North and Longitude 92° 10" and 101° 10" East, and a largest country in mainland South East Asia sharing its international boundary with People Republic of China in the North and North East, Lao in the East, Thailand in the South East, Bangladesh and India in the West. Approximately, the estimated length from North to South is 2100 km while it is widened 925 km from East to West. Physical geography of Myanmar is structurally complex and diverse having the topography of steeper mountain ranges, upland plateau and hill valleys in the eastern, northern and north western regions while undulated central dry zone is surrounded by western coastal range and lowland deltaic region at the lower part of the country and narrower coastal strip is formed at further south adjoining with the peninsular Thailand.

Industrial projects in any given planning region must learn to respect the ecological integrity and biodiversity values of that region as these are going to be the determinants of environmental quality 'as well as the sustainability of development interventions. While some tradeoffs with these values may be inevitable, it is now widely recognized that the measure of resulting environmental degradation will be an inverse indicator of sustainability. Sustainable development is one that meets the needs of present, without compromising the ability of the future generations to meet their needs (Brundtland 1992). In practice, industrial development is often accompanied by significant adverse impacts on all or different components of the environment. For all potentially impacting development projects like multipurpose hydroelectric projects, thermal power plants, fertilizer plants, nuclear plants, transport and telecommunication projects, prior assessment and appraisal of impacts on the different components of environment (abiotic and biotic, including forests, wildlife and people) is imperative for several reasons. It is needed to ensure sustainability that can result from conservation of ecological processes and thereby of life support systems and gene pool resources (or biodiversity). World Conservation Strategy (IUCN 1980) has laid down three criteria for identifying impacts on the environment. The first concerns the length of time and geographic area over which the effects will be felt. The second is urgency or the quickness with which a natural system might deteriorate. Finally, it is important to assess the degree of irreversible damage to communities of plants and animals. It also needs to ensure developmental pace and economic prosperity without actually altering the state of the environment.

5.3.2 Objective of the Survey

The following is the objectives of why conducting ecology baseline study:

- 1. Provision of comprehensive and accurate information on the ecological baseline;
- 2. Identification and prediction of potential ecological impacts;
- 3. Evaluation of the significance of the impacts identified;
- 4. Recommendations of effective and practicable alternatives and mitigation measures; and
- 5. Recommendations of the need for and the scope of an appropriate monitoring and audit programme.

5.3.3 Methodology

5.3.3.1 Desktop Survey

Publicly available sources of information were analyzed to build an outline of known and likely ecological values for the Study Area. Aerial imagery was used to build a more complete spatial understanding of the pattern of vegetation communities and human uses on the site, and to map access routes and internal tracks. In addition, ecologists with experience of the Study Area were consulted where possible to obtain information about species known to be present or previously recorded from the site, and other ecological values considered by them to be relevant.

5.3.3.2 Field Observation

(1) Flora

In order to obtain essential ecological data for predicting flora of trees, shrubs and herbs, 10 sample plots in the proposed cement factory, canal and Pya-Taung construction areas (each sample plot was 20m x 20m) were subjectively laid down and observed. All shrubs and herbs were listed and counted in each plot. In each sample plot every living tree of girth at breast height (GBH) \leq 10cm was measured, listed and counted. Care has been taken to cover different elevation, slope, aspects, drainage and density gradients to study overall spectrum of species diversity. In addition, all trees, shrubs, herbs and cultivated crops around the project area were recorded and listed. Identification of plants and animal species was conducted with assistances of skilled local people. The identified species and families were translated to scientific name with assistance of a checklist of trees, shrubs, herbs and climbers of Myanmar.

(2) Fauna

Birds were observed with binoculars and identified aided with field guide. The birds were watched from 6:00 am to 10:00 am in the morning and from 4:00 pm to 6:00 pm in the evening. Nocturnal birds were observed when it becomes dusk. Point count and opportunistic methods were used to census the species richness and point counting and transect count were used to get the relative measure of bird abundance. Birds were identified according to Smythies (1953, 2001), King et.al (1975) Lekagul and Round (1991), Harrison and Greensmith (1993), Eve and Guigue (1996) and Webster (1997). Protection status of the bird species was recorded citing the works of Collar (2000) and Hilton-Taylor (2000).

Distribution and presence of mammals were examined by conducting track and sign surveys. Sighting of prey species, tracks, scats, droppings were undertaken as data gathering in the field. Voucher specimens of tracks were taken in the forms of plaster casts, photographs or tracings. Questionnaire survey was carried out. The results of questioning each individual informant were treated as a distinct sample.

The tracks and signs of small mammals were observed along the proposed project area. Small mammal traps were set up in systematic randomization design and left to cover night and day hours and checked the trapped animals. The small mammal species were identified following after Tun Yin (1966), Lekagul and McNeely (1988) and Francis (2001). Stratified random sampling method was applied for field survey.

In the present study, methodology of the study on reptilian and amphibian species was based on active search and trapping methods. Stratification of the habitat was relatively similar to that of mammal study. Reptilian and amphibian species were actively searched during the survey period. The collected specimens were preserved in 10% formalin for further identification in the laboratory.

Turtles and tortoises were identified according to Win Maung and Win Ko Ko (2002).

Butterfly species were collected using insect net and kept in paper boxes in dry condition and brought to the laboratory for further identification. Population of each species within a catch period was recorded to analyze their diversity and distribution pattern. Identification of the butterflies was made according to Bingham (1907) and Talbot (1939).

(3) Aquatic Fauna

Interviewed with local fisherman from the study area were conducted during the collection of the specimen. Fishermen were interviewed with regard to fishery process including kinds of gear used, number of fishing time per day, target species. The fishing gears are trap, hook and line and gill nets. The water body of the irrigation canal was studied for aquatic fauna. The fishes were collected with the help of the fishermen during the survey period. Traps were also used to get various types of fish like surface dwellers and bottom dwellers. The fishes were photographed soon after the collection and measurements were also taken for key characteristics. Indirect observation at a market and interview with fishermen about kind and quality of fishery product.

5.3.3.3 Interview Survey

In addition to the field observation, secondary data was also surveyed by interviewing from local residents and literature reviewing. In the interview survey, the surveyor visited the residents in and around the survey area and interviewed the name of plants and animals existing in and around the area. Also, the past situation of flora and fauna, and the change on biodiversity and ecosystem in the area was interviewed for examination.

5.3.4 Survey Area

The field survey was carried out at the proposed cement factory, canal and Pya-Taung areas. The survey area is shown in Figure 5.3-1 and the sceneries of the survey area is shown in the following 5.3-1.

97°470°E 97'48'0'E 97"490"E 97"510"E 97-500°E 97-52% 1-2401 112 i don Tann N-11-22-9 CEMENT PLANT Legend N-051-91 Flora Plot 3 km Buffer 97°470°E 97°51'0"E 0714E0"E 07189'0"E 97*520°E

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Figure 5.3-1: Survey Area of Biological Environnemt



Figure 5.3-2: Sceneries of the Survey Area





Figure 5.3-3: Field Survey Activities of Ecology Team

5.3.5 Survey Result

5.3.5.1 Flora

A total of 116 plant species representing 103 genera and 50 families were listed in the proposed cement factory site. It indicates that the study area is floristically heterogeneous. The value of

diversity and evenness for plant species was moderate in study area. A total of 14 plant species representing 14 genera and 13 families were listed as cultivated plant species. A total of 17 plant species representing 17 genera and 11 families were recorded along the proposed canal area and in the proposed quarry area.

Among the recorded plant species, a threatened plant species, *Hopea odorata Roxb*. was noted in the area, which was listed as vulnerable species under IUCN Red List.

No.	Botanical Name	Family Name	Myanmar Name	Habit	IUCN Status
1	<i>Acacia auriculiformis</i> A. Cunn.	Mimosaceae	Malaysia padauk	ST	NE
2	<i>Acacia mangium</i> A. Cunn.	Mimosaceae	Malaysia padauk	ST	NE
3	<i>Acacia pennata</i> (L.) Willd.	Mimosaceae	Suyit	S/Cl	NE
4	Acmella calva (DC.) R.K. Jansen	Asteraceae	Shadon-po, Sein-nagat	Н	NE
5	Albizia chinensis (Osbeck) Merr.	Mimosaceae	Bonmeza	Т	NE
6	<i>Albizia odoratissima</i> (L. f.) Benth.	Mimosaceae	Thit-magyi	Т	NE
7	<i>Alysicarpus vaginalis</i> (L.) DC.	Fabaceae	Than-ma-naing- kyauk-ma-naing	S	NE
8	Ascocentrum curvifolium (Lindl.) Schltr.	Orchidaceae	Thanda-lay	Epiphyte	NE
9	Ageratum conyzoides L.	Asteraceae	Khwe-thay-pan	Н	NE
10	Amaranthus spinosus L.	Amaranthaceae	Hin-nu-nwe-subauk	Н	NE
11	Antidesma acidum Retz.	Euphorbiaceae	-	ST	NE
12	<i>Aporusa villosa</i> (Lindl.) Baill.	Euphorbiaceae	Ye-main	Т	NE
13	Aporusa villosula Kurz	Euphorbiaceae	Thit-khauk	ST	NE
14	Argyreia roxburghii Arn. ex Choisy	Convolvulaceae	Taung kazun new	Cl/Cr	NE
15	Aristolochia roxburghiana Klotzsch	Aristolochiaceae	-	Cl/Cr	NE
16	Axonopus sp.	Poaceae	-	G	-
17	Barleria strigosa Willd.	Acanthaceae	Na-ga	S	NE
18	<i>Barringtonia acutangula</i> (L.) Gaertn.	Lecythidaceae	Ye-kyi	Т	NE
19	Bauhinia sp.	Caesalpiniaceae	-	ST	-
20	Blumea sp.	Asteraceae	Kadu	S	-
21	Breynia angustifolia Hook. f.	Euphorbiaceae	Ngetmana khinsa	S	NE
22	Bridelia sp.	Euphorbiaceae	-	ST	-
23	Butea parviflora Roxb.	Fabaceae	Pauk-nwe	Cl	LC
24	Caesalpinia sp.	Caesalpiniaceae	-	S	-
25	Calamus viminalis Willd.	Arecaceae	Kyein-kha	S	NE
26	<i>Carallia brachiata</i> (Lour.) Merr.	Rhizophoraceae	Mani-awga	Т	NE
27	Careya arborea Roxb.	Lecythidaceae	Ban-bwe	Т	NE

Table 5.3-1: Plant Species Recorded in the Proposed Cement Factory Area

28	Cassampelos pareira L.	Menispermaceae	Tilin kathar	Cl	NE
29	Cephalandra indica Naud.	Cucurbitaceae	Kinmon	Cl/Cr	NE
30	<i>Chromolaena odorata</i> (L.) R. M. King & H. Robinson	Asteraceae	Bizat	S	NE
31	Clitoria macrophylla Wall.	Fabaceae	Taw-pe	Cl/Cr	NE
32	Combretum latifolium Blume	Combretaceae	Maung-ma-khaw-nwe	Cl	NE
33	Congea tomentosa Roxb.	Verbenaceae	Thamaga-hmwezoke	Cl	NE
34	<i>Crassocephalum crepidioides</i> (Benth.) S. Moore	Asteraceae	-	Н	NE
35	Cratoxylum sp.	Hypericaceae	-	Т	-
36	Crotalaria retusa L.	Fabaceae	Taw-peiksan	Н	NE
37	Crotalaria sp.	Fabaceae	-	S	-
38	Croton joufra Roxb	Euphorbiaceae	Thetyin-kado	ST	NE
39	<i>Crypteronia paniculata</i> Blume	Crypteroniaceae	Anan-bo	Т	NE
40	Cyperus sp.	Cyperaceae	-	G	-
41	Dalbergia stipulacea Roxb.	Fabaceae	-	S/Cl	NE
42	Desmodium triflorum (L.) DC.	Fabaceae	Pe yaing	Н	LC
43	Dipterocarpus tuberculatus Roxb.	Dipterocarpaceae	In	Т	NT
44	Eleusine indica L.	Poaceae	Sin ngo myet	G	LC
45	Emblica officinalis Gaertn.	Euphorbiaceae	Zee-phyu	Т	NE
46	Euphorbia hirta L.	Euphorbiaceae	Kywekyaung hmin say	Н	NE
47	Euphorbia hypericifolia L.	Euphorbiaceae	-	Н	NE
48	Ficus hispida L. f.	Moraceae	Kha-aung	ST	NE
49	Ficus rumphii Blume	Moraceae	Nyaung	Т	NE
50	Flacourtia sp.	Flacourtiaceae	Naywe	Т	-
51	Flueggea leucopyrus Willd.	Euphorbiaceae	Chinya-pyu, Kon- chinya	S	NE
52	Gardenia coronaria Buch Ham.	Rubiaceae	Yin-gat-kyi	Т	NE
53	Getonia floribunda Roxb.	Combretaceae	Kywet nwe	Cl	NE
54	Glochidion fagifolium Miq.	Euphorbiaceae	Htamasok	ST	NE
55	Glycine sp.	Fabaceae	-	Cl	-
56	Helicteres sp.	Sterculiaceae	-	S	-
57	Holarrhena pubescens Wall. ex. G. Don	Apocynaceae	Let htoke gyi	ST	LC
58	Hyptis suaveolens (L.) Poit.	Lamiaceae	Kala pin sein	Н	NE
59	Indigofera sp.	Fabaceae	Me-yaing	S	-
60	Ipomoea sagittata Poir	Convolvulaceae	Kone kazun	Cl	NE
61	<i>Ipomoea</i> sp.	Convolvulaceae	-	Cl	-
62	Jasminum sp.	Oleaceae	Taw-sabe	S	
63	Leea indica Merr.	Leeaceae	Naga-mauk	S	NE

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64	Lepidagathis hyalina Nees	Acanthaceae	-	Н	NE
65	<i>Leptadenia reticulata</i> Wight & Arn.	Asclepiadaceae	Gon-kha	Cl/Cr	NE
66	<i>Litsea glutinosa</i> (Lour.) C.B. Rob.	Lauraceae	Ondon, Tagu	Т	NE
67	Lygodium sp.	Schizaeaceae	Kauk kwe	F	-
68	<i>Markhamia stipulata</i> (Wall.) Seem. ex K. Schum.	Bignoniaceae	Ma-hlwa, Mayu-de	Т	NE
69	Mecopus nidulans Benn.	Fabaceae	-	Н	LC
70	Melastoma malabathricum L.	Melastomataceae	Se-oboke	S	NE
71	Melochia corchorifolia L.	Sterculiaceae	Pilaw-akyi	S	NE
72	Memecylon sp.	Melastomataceae	-	S	-
73	Microcos paniculata L.	Tiliaceae	Муа-уа	Т	NE
74	Millettia extensa Benth.	Fabaceae	Dama-nge	S/Cl	NE
75	Mimosa pudica L.	Mimosaceae	Hti-ka-yone	Н	LC
76	<i>Mitragyna parvifolia</i> (Roxb.) Korth.	Rubiaceae	Hetin	Т	NE
77	Moghania macrophylla (Willd.) Kuntze	Fabaceae	Kyemi gyi	S	NE
78	Moghania strobilifera (L.) Aiton f.	Fabaceae	Gaung-ohnsa	S	NE
79	Morinda angustifolia Roxb.	Rubiaceae	-	ST	NE
80	Ochna fruticulosa Kurz.	Ochnaceae	Indaing se ni	S, ST	NE
81	Oroxylum indicum (L.) Kurz	Bignoniaceae	Kyaung-sha	Т	NE
82	Osbeckia chinensis L.	Melastomataceae	Oboke lay	Н	NE
83	Passiflora foetida L.	Passifloraceae	Taw suka	Cl	NE
84	Pavetta sp.	Rubiaceae	-	S	-
85	Pennisetum pedicellatum Trin.	Poaceae	Bottle-brush	G	NE
86	Phyllanthus sp.	Euphorbiaceae	-	S	-
87	Phyllanthus urinaria L.	Euphorbiaceae	Mye-zi-phyu	Н	NE
88	Physalis minima L.	Solanaceae	Bauk pin	Н	LC
89	Piper sp.	Piperaceae	-	Cl/Cr	-
90	Pterospermum semisagittatum Buch-Hum	Sterculiaceae	Na-gye	Т	NE
91	Quercus sp.	Fagaceae	Sagat	Т	-
92	Randia uliginosa DC.	Rubiaceae	Hman phyu	ST	NE
93	<i>Randia</i> sp.	Rubiaceae	Ma-gyi-bauk	S	-
94	Rauwolfia serpentina Benth.	Apocynaceae	Bonmayaza	S	NE
95	Rungia pectinata (L.) Nees	Acanthaceae	-	Н	NE
96	Schleichera oleosa (Lour.) Oken	Sapindaceae	Gyo	Т	NE
97	Scoparia dulcis L.	Scorphulariaceae	Darna-thu-kha	Н	NE
98	Sida acuta Burm. f.	Malvaceae	Wet-chay-pane	S	NE
99	Sida rhombifolia L., s.1.	Malvaceae	Katsi-ne	Н	NE

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100	Smilax macrophylla Roxb.	Smilacaceae	Sein nabaw	Cl	NE
101	Solanum indicum L.	Solanaceae	Khayan-kazaw	S	NE
102	Spermacoce latifolia Rubl.	Rubiaceae	-	Н	NE
103	Spermacoce sp.	Rubiaceae	-	Н	-
104	Streptocaulon tomentosum Wight & Arn.	Asclepiadaceae	Myinsa-gonni	Cl/Cr	NE
105	<i>Strychnos nux-blanda</i> A. W. Hill	Loganiaceae	Kha baung	Т	NE
106	Symplocos racemosa Roxb.	Symplocaceae	Dauk-yut	ST	NE
107	<i>Syzygium kurzii</i> (Duthie) N.P.Balakr.	Myrtaceae	Thabye-nyo	ST	NE
108	<i>Tadehagi triquetrum</i> (L.) H. Ohashi	Fabaceae	Lauk-thay	S	LC
109	Terminalia bellerica Roxb.	Combretaceae	Thit seint	Т	NE
110	<i>Thespesia lampas</i> (Cav.) Dalzell E.A Gibson.	Malvaceae	Taw-wah	S	NE
111	Tridax procumbens L.	Asteraceae	Hmwezok-negya	Н	NE
112	Urena lobata L.	Malvaceae	Katsene	S	NE
113	Vernonia cinerea Less.	Asteraceae	Kadu-pyan	Н	NE
114	Walsura sp.	Meliaceae	-	Т	-
115	<i>Xylia xylocarpa</i> (Roxb.) Taub.	Mimosaceae	Pyinka do	Т	NE
116	Ziziphus jujuba Lam.	Rhamnaceae	Zee pin	ST	LC

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NE = Not Evaluated

LC = Least Concerned

NT = Near Threatened

T- Tree

Cl- Climber

ST- Small tree

Cr- Creeper

S- Shrub

G - Grass

H- Herb

No.	Botanical Name	Family Name	Myanmar Name	Habit	IUCN Status
1	Anacardium occidentale L.	Anacardiaceae	Thiho	Т	NE
2	Hevea brasiliensis (Willd. ex A. Juss.) Muell.	Euphorbiaceae	Rubber	Т	NE
3	Nephelium lappaceum L.	Sapindaceae	Kyetmauk	Т	LC
4	Artocarpus heterophyllus Lam.	Moraceae	Pein -hne	Т	NE
5	Capsicum annuum L.	Solanaceae	Ngayoke	S	LC
6	Citrus sp.	Rutaceae	Shauk	ST	-
7	<i>Cymbopogon citratus</i> (DC.) Stapf	Poaceae	Sabalin	G	NE
8	Eryngium foetidum L.	Apiaceae	Shan-nan-nan	Н	NE
9	Ismelia spp.	Asteraceae	Gandama	Н	-
10	Lagenaria siceraria (Molina) Standl.	Cucurbitaceae	Bu	Cr	NE
11	Mangifera indica L.	Anacardiaceae	Tha-yet	Т	DD
12	<i>Musa</i> sp.	Musaceae	Nget-pyaw	Т	-
13	Piper nigrum L.	Piperaceae	Ngayoke-kaung	Cl/Cr	NE
14	Psidium guajava L.	Myrtaceae	Malaka	ST	NE

Table 5.3-2: Cultivated Plant Species in the Proposed Project Area

NE = Not Evaluated

LC = Least Concerned

DD = Data Deficit

T- Tree Cl- Climber

ST- Small tree Cr- Creeper

S- Shrub G - Grass

H- Herb

5.3.5.2 Fauna

Wildlife habitat is important for the survival of the wildlife animals in terrestrial ecosystem. The wild animals are now threatened by habitat degradation and habitat loss caused by misconduct of human being. A habitat is a part of an ecosystem and diverse ecosystems support for high species diversity. A change in an ecosystem necessarily affects the plant and animal species in the system, and changes in species affect ecosystem processes. The distribution of species on earth is becoming more homogenous.

In the proposed project area, three major habitat types were observed namely (1) Forest, (2) Mixed plantation and cultivated land and (3) aquatic habitat (Ataran River). There is one threatened plant species in the proposed project area and the overall habitat value is assumed to be moderate.

Survey Result

During the survey period, 4 species of Mammals, 9 species of Reptiles and 7 species of Amphibian, 21 species of Birds, total of 41 species of Butterflies and 26 species of Fish were recorded in and around the Project are. During the field survey period, one threatended species of bird namely Redbreasted parakeet (*Psittacula alexandri*) was recorded from the survey area according to the IUCN Red List of Threatened Species (2017). According to the field survey, no endemic species of Bird found. Butterflies species was found abundantly within the survey area. Other fauna species were recorded by interviewing local villager who live within the project area. There was no globally threatened species of mammals according to the IUCN Red list threatened species (2017). Fish Species were recorded by direct observation during the field survey period.

(i) Birds

Birds are included in the wildlife animals with considerable number of the species listed under the categories of threatened and near threatened species. Some natural habitats of the birds including wetlands and forests were destructed or degraded. Lowland and highland forests inhabited by various bird species were cleared with different purposes such as timber extraction, cultivation, human settlement and development projects etc. Hunting is still a major threat to wildlife even in national parks and wildlife sanctuaries, as local people living around protected area margins are poor and supplemented their income by collecting and selling various forest products collected within.

A total of 21 bird species, which belong to 16 families, were recorded at the proposed project area. The bird Red-vented Bulbul *Pycnonotus cafer*, Common myna *Acridotheres tristis tristis* and spotted dove *Spilopelia chinensis* were dominant species in the proposed project area.

During the study period some bird species were seen in all kinds of habitat showing their capability of wide distribution. Such commonly distributed species comprise insect eaters, some omnivores that have alternative food choice on insects, flowers, seeds and fruits. The common species of the study area include *Acridotheres tristis tristis* and *Streptopelia chinensis*.

Some bird species are adapted to different habitats and they can be found in shrubland, human habitation area and forest; e.g. Common myna *Acridotheres tristis tristis*. Some bird species like Common myna *Acridotheres tristis tristis* and spotted dove *Spilopelia chinensis* recorded in the present study were normally common in the human habitation area.

Sr. No.	Order/Family	Common name	Species	IUCN Status
1	Accipitridae	Shikra	Accipiter badius	LC
2	Columbidae	Spotted Dove	Streptopelia chinensis	NE
3	Strigidae	Collared Owlet	Glaucidium brodiei	LC
4	Strigidae	Asian Barred Owlet	Glaucidium cuculoides	LC
5	Hirundinidae	Barn Swallow	Hirundo rustica	LC
6	Hirundinidae	Asian palm-swift	Cypsiurus batasiensis	NE
7	Campephagidae	Scarlet Minivet	Pericrocotus flammeus	LC
8	Pycnonotidae	Black-crested Bulbul	Pycnonotus melanicterus	LC
9	Pycnonotidae	Red-whiskered Bulbul	Pycnonotus jocosus	LC
10	Pycnonotidae	Red-vented Bulbul	Pycnonotus cafer	LC
11	Dicruridae	Black Drongo	Dicrurus macrocercus	LC
12	Corvidae	Large-billed Crow	Corvus macrorhynchos	LC
13	Corvidae	Large-billed Crow	Corvus macrorhynchos	LC
14	Psittacidae	Red-breasted parakeet	Psittacula alexandri	NT
15	Megalaimidae	Lineated barbet	Megalaima asiatica	NE
16	Sylviidae	Common tailorbird	Orthotomus sutorius	LC
17	Meropidae	Green Bee-eater	Merops orientalis	LC
18	Irenidae	Common Iora	Aegithina tiphia	LC
19	Saxiculidae	Oriental Magpie Robin	Copsychus saularis	LC
20	Passeridae	Eurasian Tree Sparrow	Passer montanus	LC
21	Emberizidae	Greater Coucal	Centropus sinensis	LC

LC = Least Concerned

NT = Near Threatened

NE = Not Evaluated





Figure 5.3-4: Bird Speices Recorded in the Survey Area

(ii) Mammals

A total of four mammal species were recorded during the survey periods. Long-tailed Macaque (*Macaca fascicularis*) was commonly found in limestone cast forest. Some species like White bellied rat (*Niviventer fulvscens*), and Greater bandicoot rat (*Bandicota indica*) were found mainly in the mixed plantation and cultivated area whereas grey squirrel (*Callosciurus pygerythrus*) was found in both scattered trees and plantation areas.

Sr. No.	Scientific name	Common Name	Family	IUCN Status	Observation Status
1	Callosciurus pygerythrus	Irrawaddy Squirrel	Sciuridae	LC	Observed
2	Macaca fascicularis	Long-tailed Macaque	Cercopithecidae	LC	Track
3	Niviventer fulvscens	Indomalayan Niviventer	Muridae	NE	Observed
4	Bandicota indica	Greater bandicoot rat	Muridae	LC	Interviewed

Table 5.3-4: List of Mammal Species Recorded in the Survey Area

NE = Not Evaluated

LC = Least Concerned



Figure 5.3-5: Mammal Species Recorded in the Survey Area

(iii) Reptile and Amphibian

Nine reptilian species and seven amphibian species were recorded at the proposed project site during the survey period. The reptile species *Calotes versicolor* was observed in the mixed vegetation with scattered trees area. Among the recorded species, the paddy frog (*Fejervarya limnocharis*) was found as a very common species. The frog species (*Holobatrachus tigerinus*) was also common in the area distributing in many parts of the area in wet season.

Sr.	Scientific Name Common Name Family		Fomily	IUCN	Type of
No.	Scientific Name		ганшу	Status	evidence
1	Naja kaouthia	Monocled cobra	Elapidae	LC	Interviewed
2	Bungarus fasciatus	Banded krait	Elapidae	LC	Interviewed
3	Daboia russelii	Russell's Viper	Viperidae	NE	Interviewed
4	Ptyas korros	Indo-chinese rat snake	Colubridae	NE	Interviewed
5	Ahaetulla nasuta	Indian vine snake	Colubridae	NE	Observed
6	Rhabdophis subminiatus	Red-necked keelback	Colubridae	LC	Observed
7	Xenochrophis piscator	Chequered keelback Water Snake	Colubridae	NE	Observed
8	Holobatrachus tigerinus	Indian bull frog	Dicroglossidae	NE	Interviewed
9	Fejervarya limnocharis	Asian Grass Frog	Dicroglossidae	LC	Interviewed
10	Polypedates leucomystax	White-lipped Tree Frog	Rhacophoridae	LC	Interviewed
11	Bufo bufo	Common toad	Bufonidae	LC	Interviewed
12	Microhyla ornata	Ornate sand frog	Microhylidae	LC	Observed
13	Kaloula pulchra	Painted bull frog	Microhylidae	LC	Interviewed
14	Eutropis multifasciata	Common sun skink	Scincidae	NE	Interviewed
15	Calotes versicolor	Garden fence lizard	Agamidae	NE	Interviewed

Fable	e 5.3-5:	List of	f Reptile ar	nd Amphibiar	n Species	Recorded in	n the Survey	' Area
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NE = Not Evaluated

LC = Least Concerned



Figure 5.3-6: Reptile and Amphibian Species Recorded in the Survey Area

(iv)Butterfly

A total of 10, 15 and 16 butterfly species were recorded in the proposed Pya-Taung ore extraction site, cement factory site and along the canal area respectively. All the recorded butterfly species were common species. Estimated butterfly density of the proposed project area is moderate, and the distribution of the butterflies is random.

Sr.	Species	Common nomo	Family	Abundance	IUCN
No.	Species	Common name	гапшу	Status	/Status
1	Danaus. chrysippus	Plain Tiger	Danaidae	Very Common	NE
2	Danaus genutia	Common Tiger or Striped Tiger	Danaidae	Common	NE
3	Euploea core godartii	Crow	Danaidae	Common	NE
4	Papilio polytes zomulus	Common Mormon	Papilionidae	Common	NE
5	Junonia atlites Linnaeus	Grey Pansy	Nymphalidae	Common	NE
6	Symbrenthia javanus Moore	Jester	Nymphalidae	Very Common	NE
7	Paduca fasciata fasciata	The Little Banded Yemon	Nymphalidae	Very Common	NE
8	Euploea modesta modesta	Plain Blue Crow	Nymphalidae	Very Common	NE
9	Euploea midamus	Blue Spotted Crow	Nymphalidae	Common	NE
10	Neptis hylas	Common sailer	Nymphalidae	Common	NE
11	Euploea crameri crameri	Spotted Black Crow	Nymphalidae	Common	NE
12	Eurema hecabe	Common Grass Yellow	Pieridae	Very Common	NE
13	Catopsilia Pomona	Lemon Emigrant	Pieridae	Very Common	NE
14	Catopsilia pyranthe Linnaeus	The Mottled Emigrant	Pieridae	Very Common	NE

Table 5.3-6: Butterfly Species Recorded in the Proposed Cement Factory Area

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Power Plant for Mawlamyine Cement Limited						

Sr. No	Species	Common name	Family	Abundance Status	IUCN /Statu s
1	Danaus. chrysippus	Plain Tiger	Danaidae	Very Common	NE
2	Danaus genutia	Common Tiger or Striped Tiger	Danaidae	Common	NE
3	Euploea core godartii	Crow	Danaidae	Common	NE
4	Papilio polytes zomulus	Common Mormon	Papilionidae	Common	NE
5	Junonia atlites Linnaeus	Grey Pansy	Nymphalidae	Common	NE
6	Symbrenthia javanus Moore	Jester	Nymphalidae	Very Common	NE
7	Paduca fasciata fasciata	The Little Banded Yemon	Nymphalidae	Very Common	NE
8	Euploea modesta modesta	Plain Blue Crow	Nymphalidae	Very Common	NE
9	Euploea midamus	Blue Spotted Crow	Nymphalidae	Common	NE
10	Neptis hylas	Common sailer	Nymphalidae	Common	NE
11	Euploea crameri crameri	Spotted Black Crow	Nymphalidae	Common	NE
12	Eurema hecabe	Common Grass Yellow	Pieridae	Very Common	NE
13	Catopsilia Pomona	Lemon Emigrant	Pieridae	Very Common	NE
14	Catopsilia pyranthe Linnaeus	The Mottled Emigrant	Pieridae	Very Common	NE

NE = Not Evaluated



Catopsilia pomona

Figure 5.3-7: Butterfly Species Recorded in the Survey Area

5.3.5.3 Aquatic Fauna

The Ataran River was studied for aquatic fauna. The fishes were collected with the help of the fishermen during the survey period. Traps were also used to get various types of fish like surface dwellers and bottom dwellers. The fishes were photographed soon after the collection and measurements were also taken for key characteristics. The fishes were then preserved in 10%

formalin solution for further identification in the laboratory. The fishes were then identified according to Jayaram (1981) and Talwar and Jhingram (1991).

(i) Fish

A total of 26 fish species were recorded during the survey period. The fishes are important for the ecosystem of the Ataran river ecosystem. The fish species *Mystus cavasius* and *puntius chola* were found as very common species in the proposed project area. The fish species *Mystus bleekeri* and *Labeo calbasu* were also abundant in the aquatic habitat. Some brackish water fish species were also recorded along the river.

Sr. No.	Scientific Name	Common Name	Family	Remark	IUCN/Statu s
1	Notopterus notopterus	Grey featherback	Notopteridae	Observed	LC
2	Puntius chola	Chola Barb	Cyprinidae	Observed	LC
3	Amblypharyngodon mola	Mola carplet	Cyprinidae	Observed	LC
4	Labeo calbasu	Karnataka labeo	Cyprinidae	Observed	LC
5	Cirrhinus mrigala	Mrigal Carp	Cyprinidae	Observed	LC
6	Clarias batrachus	Walking catfish	Claridae	Observed	LC
7	Heteropneustes fossilis	Stinging catfish	Heteropneustidae	Observed	LC
8	Anabas testudineus	Climbing perch	Anabantidae	Observed	LC
9	Late calcarifer	Giant sea perch	Centropomidae	Observed	NE
10	Mystus bleekeri	Catfish	Bagridae	Observed	LC
11	Mystus leucophasis	Catfish	Bagridae	Observed	LC
12	Neotropius acutriostris	Dwarf cat-fish	Schilbeidae	Observed	NE
13	Channa striatus	Striped snake head	Channidae	Observed	NE
14	Channa orientalis	Brown snakehead	Channidae	Observed	NE
15	Channa panaw	Green snakehead	Channidae	Observed	LC
16	Macrognathus aral	Lesser spiny eel	Mastacembelidae	Observed	LC
17	Macrognathus zebrinus	Burmese spiny eel	Mastacembelidae	Observed	LC
18	Monopterus albus	Asian swamp eel	Synbranchidae	Observed	LC
19	Monopterus cuchia	Cuchia	Synbranchidae	Observed	LC
20	Oreochromic spp	Mozambic cichlid	Cichlidae	Observed	NE
21	Boleophthalmus boddarti	Boddart's goddle eye goby	Gobiidae	Observed	LC
22	Tenualosa ilisha	River shad	Clupeidae	Observed	LC
23	Glossogobius giuris	Gobifish	Gobiidae	Observed	LC
24	Polynemus paradiseus	Mangoes fish	Polynemidae	Observed	NE
25	Sillago sihama	Silver whiting	Sillaginidae	Observed	LC
26	Cynoglossus lingua	Long tonguesole	Cynoglossidae	Observed	NE

NE = Not Evaluated

LC = Least Concern



Puntius chola

Labeo calbasu

Figure 5.3-8: Fish Species Recorded around the Survey Area

(ii) Benthos species

Three immature dragonfly nymphs were found as benthic species in the surface layer of the sediment of the irrigation canal. The recorded nymph species were *Brachydiplax sobrina*, *Brachythemis contaminate*, and *Neurothemis tullia tullia*. The tadpoles of the paddy frog species Fejervarya *limnocharis* was also found as benthic species living in the sediment.

(iii) Plankton species

A total of 11 plankton species were found in the Ataran River. Among the recorded species, five species were zooplankton species and six species were found as phytoplankton species. The species *Cyclops scutifer* as zooplankton and and *Staurastrum bibrachiatum* as phytoplankton species were commonly found in the aquatic area. The plankton species are primary products of the natural water body supporting the aquatic ecological web. The planktons are essential prey of the small vertebrates and fishes in aquatic habitat.

Sr. No.	Scientific Name	Family	Phylum/Division	IUCN Status
1	Notholca acuminate	Brachiondae	Rotifer	NE
2	Lecane sp	Lecanidae	Rotifer	-
3	Cyclops scutifer	Cyclopoida	Arthropoda	NE
4	Diaptomus sp.	Diaptomidae	Arthropoda	-
5	Bosminopsis sp.	Bosminidae	Arthropoda	-
6	Synedra affinis	Fragilariaceae	Chrysophyta	NE
7	Oscillatoria limnetica	Oscillatoriaceae	Cyanophyta	NE
8	Gyrosigma attenuatum	Naviculaceae	Chrysophyta	NE
9	Staurastrum bibrachiatum	Desmidiaceae	Chlorophyta	NE
10	Staurastrum ophiura	Desmidiaceae	Chlorophyta	NE
11	Staurastrum tohopekaligense	Desmidiaceae	Chlorophyta	NE

Table 5.3-8: Plankton Sp	becies Recorded	in the Ataran	River
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NE = Not Evaluated

5.4 Socio-Economic Baseline Studies

5.4.1 Findings in Project Affected Village Area of Kyaikmaraw Township

Although there are 46 villages in Kyaikmaraw Townships, only **Pauktaw, Ka Don Sit, Kaw Dun and Kaw Pa Naw** villages are located within 3 km radius from the project site (see in Figure 5.4-1). However, the baseline study considered the other villages- **Me Ka Ro, Hni Don, Kwan Nyan** where these villages are included within 3 km radius of limestone mine. Major ethnic group in all study villages is Mon. Most of the people were Buddhist.



Figure 5.4-1: Village Community Area around Proposed Coal Power Plant

5.4.2 Demography

Among the seven villages, Kaw Pa Naw Village is the biggest village with 556 houses and 580 households followed by Kaw Dun Village with 395 houses and 425 households. Hni Don is the third biggest village with 387 houses and 402 households. However, Pauktaw Village is very near to the project site. In fact, potential social impact of this project to Kaw Pa Naw and Kaw Dun villages is relatively higher due to their wide social network.

There are 3,327 persons in Kaw Pa Naw Village, 2,451 persons in Hni don Village, 2,235 persons in Kaw Dun Village, 2,022 persons in Ka Don Sit Village, 1,704 persons in Kwan Ngan Village,1,579 persons in Me Ko Ro Village and 248 persons in Pauktaw Village. Among them, 300 respondents are selected as sample population for the study. (Table 5.4-2 and Figure 5.4-3).

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Sr.	Villages	Houses	Household	Male	Female	Total	No. of Sample
1	Pauktaw	35	48	123	125	248	20
2	Kaw Dun	395	425	1107	1128	2235	50
3	Kaw Pa Naw	556	580	1629	1698	3327	50
4	Hni Don	387	402	1209	1242	2451	50
5	Kwan Ngan	351	350	859	845	1704	50
6	Ka Don Sit	333	341	968	1054	2022	50
7	Me Ko Ro	280	296	770	809	1579	30
		2337	2442	6665	6901	13566	300

Table 5.4-1: Total Population of the Study Villages (2012)

Source: Field survey, February 2013



Figure 5.4-2: Houses and Households of the Study Villages



Figure 5.4-3: Total Population by Gender in the Study Wards

5.4.2.1 Occupational Structure

According to the field survey data, type of occupation includes dependent, flora/fauna gathering in the forest, farmer/Gardener, Casual Labour, government staff and student. All villages are farmers/ gardener. Larger percentages of farmers/ gardeners were found in Kaw Pa Naw. Kaw Don, and Me Ko Ro villages with more than 60 percent. In Kaw Don, Kaw Pa Naw and Ka Don Sit villages, some respondents are flora and fauna gatherers. Government staffs are mainly found in Hni Don and Kwan Ngan villages. Certain amounts of respondents are dependent persons in the study area (Table 5.4-2 and Figure 5.4-4).

Village	Dependent	flora/fauna gathering in the forest	Farmer/ Gardener	Casual Labour	Government staff	student
Pauktaw	30	0	45	25	0	0
Kaw Dun	40	2	44	14	2	8
Kaw Pa Naw	26	2	62	8	0	2
Hni Don	28	0	46	8	14	4
Kwan Ngan	18	0	46	26	8	2
Ka Don Sit	6	12	64	14	4	0
Me Ko Ro	34	0	60	0	3	3

Table 5.4-2: Profile of Occupational Structure in the Study Wards (%)

Source: Field Survey, February 2013





Figure 5.4-4: Profile of Occupational Structure in the Study Villages (%)

5.4.2.2 Income Level

Income level of people in four wards was measured by using primary data received from field survey in February 2013. (Table 5.4-3 and Figure 5.4-5).

Most of the respondents in all study villages are in high income level of more than 6 lakh kyats. Low income group with less than 2 lakh kyats is observed in no villages. High income group is mainly found in Pauktaw, Kaw Don, Ka Don Sit and Me Ko Ro villages. Among them, respondents from Pauktaw Village and Kaw Don Village have regular income level more than 4 lakh kyats per year.

	< 2lakh	2.1 lakh - 4 lakh	4.1 lakh - 6 lakh	> 6 lakh
Pauktaw	0	0	15	85
Kaw Dun	0	0	18	82
Kaw Pa Naw	0	12	30	58
Hni Don	0	6	20	74
Kwan Ngan	0	2	20	78
Ka Don Sit	0	20	0	80
Me Ko Ro	0	7	3	90

Table 5.4-3: Income Level of the Study wards (%	the Study Wards (%	e Studv	the	∠evel of	Income L	5.4-3:	Fable	Τ
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Source: Field Survey, February 2013

note: 1 lakh Kyats = 120 USD average in 2013 March



Source: Field survey, February 2013

Figure 5.4-5: Income Level of the Study Villages (%)

Note: 1 lakh Kyats = 120 USD average in 2013 March.

5.4.2.3 Public Health and Health Status

To collect the baseline information on health conditions of the houses around the project area, present survey was conducted based on the questionnaires distribution to 70 representative households. Public health and health status are determined based on the source of food, source of drinking water, management of wastewater, solid waste management, medical history and current status of public health services. Main sources of daily food for respondents are market, forest and river and home gardens. The main source is the market and some respondents also rely their daily food on home gardens where vegetables and edible plants are grown. Forest and river are major source of food for a few respondents from PaukTaw Village and Hni Don Village. For them the loss of forest and river is a major problem for daily food supply. Most of the respondents utilize water from well and some villages use from the Ataran River (Table 5.4-4 and Figure 5.4-6).

Village	Owned- orchards	Natural resources (forest, river)	From market
Pauktaw	5	10	85
Kaw Dun	6	0	94
Kaw Pa Naw	14	0	86
Hni Don	8	6	86
Kwan Ngan	14	0	86
Ka Don Sit	2	0	98
Me Ko Ro	13	0	87

Source: Field Survey, February 2013



Figure 5.4.-6: Food Source Analysis of Respondents

5.4.3 Results of Interview and Questionnaire Survey

In the survey, about 300 sample respondents selected from 7 Villages such as Pauktaw, Kaw Don, Kaw Pa Naw, Hni Don, Kwan Ngan, Ka Don Sit and Me Ko Ro villages within the project area were interviewed. All these are project affected people (PAPs), but they are not necessary to be relocated under the project. To understand their existing situations, attitudes and impacts from the project development, the interviews were undertaken with the help of the structured questionnaires which cover the contents of basic information of interviewees, their socio-economic conditions, education and current environmental problems, facilities and social problems, perceptions of the project, attitudes towards the project, and attitudes towards draft mitigation measures regarding the impact caused by the project development.

5.4.3.1 Basic Information

Field surveys and semi- structured interviews were done in four sample groups within the project area. Most of the respondents are males (54 percent of total respondents) and remaining are females (46 percent of the respondents). Most of the respondents belong to Mon ethnic group and they are Buddhists (Figure 5.4-7).



Figure 5.4-7 Gender of Respondents

Respondents on semi- structured interviews mainly represented age group between 20 years old and over 60 years old. Respondents generally covered the working group of population in the project area although some respondents from Hni Don and Me Ko Ro are under 20 years of age. Opinions and suggestions represented adult group of population within the project are because most of the respondents are in the age group between 20 years old and 60 years old. Most of the respondents are found in the age group of 41 to 60 years who have significant knowledge about their region. (Table 5.4-5 and Figure 5.4-8).

Age Group	Pyinmapin	Resettlement	Tawtait	Pyitawthar
under 20	2	1	0	0
20 to 34	11	15	25	25
35 to 49	37	44	35	60
50 to 64	35	37	25	15
above 60	15	3	25	0

 Table 5.4-5: Age Composition of Respondents (%)



Source: Field Survey, February 2013

Figure 5.4-8: Age Composition of Respondents (%)

5.4.3.2 Family Size

Family size of respondents can be grouped into three classes as;

- 1. Family with 1 to 3 persons,
- 2. Family with 4 to 6 persons,
- 3. more than 6 persons.

Among the respondents, family size with more than 6 persons is observed in all study villages. Most of the families have members of 4 persons and above. Only a few families have 1 to 3 persons of family members. Therefore, the results of this survey represented families with high members. Size of family determined the relocation of houses from one place to another (Table 5.4-6 and Figure 5.4-9).

Table 5.4-6: Family Size of Respondents (%)
EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

Family Size	Pauktaw	KawDon	KawPaNaw	HniDon	KwanNyan	KaDonSit	MeKoRo
1 to 3 persons	15	12	16	16	36	18	13
4 to 6 persons	45	48	58	44	44	50	60
More than 6 persons	40	40	26	40	20	32	27

Source: Field Survey, February 2013



Figure 5.4-9: Family Sizes of Respondents (%)

5.4.3.3 Education Level

Many respondents are in primary education level and some have no education level. A very few persons entered high school levels. However, some graduates are also found in respondents of study villages. Generally, respondents in the survey represented an education of primary school level although non-educated persons are found in all villages of the study area (Table 5.4-7 and Figure 5.4-10).

Education	Pauktaw	KawDon	KawPaNaw	HniDon	Kwan Ngan	KaDonSit	MeKoRo
None	55	24	18	42	24	14	14
Primary	45	42	48	38	40	76	46
Middle	0	16	24	18	18	8	30
High	0	6	8	2	10	2	7
Graduate	0	10	2	2	8	0	3
Post Graduate	0	2	0	0	0	0	0

Table 5.4-7:	Education	Level	in the	Study	Villages	(%)
1 abic 3.4 / .	Luucation		in the	Diuuy	1 mages	(70)

Source: Field Survey, February 2013

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



Figure 5.4-10: Education Level in the Study Villages (%)

5.4.3.4 Current Environmental Problems, Facilities and Social Problems

Current environmental problems being considered by respondents include solid waste disposal, wastewater disposal and dust, noise and odor from construction.

Most of the respondents considered that current waste disposal is not a problem for their environment. Very few respondents are interested is some impacts of solid waste disposal. For wastewater disposal, most of the respondents did not reveal the impacts of wastewater on their environment. However, some respondents considered the low impacts of wastewater and solid waste disposal to their surrounding areas.

5.4.3.5 Source of Project Information

It is also important to survey whether the people in the project area know about the project or not. If they know about the project they can prepare for the impacts of the project. The survey results showed that most of the respondents have already known about the project. But some families did not know about the project (Table 5.4-8 and Figure 5.4-11).

Village	Number	%	Yes	%
Pauktaw	6	30	14	70
Kaw Dun	9	18	41	82
Kaw Pa Naw	7	14	43	86
Hni Don	12	24	38	76
Kwan Ngan	14	28	36	72
Ka Don Sit	11	22	39	78
Me Ko Ro	7	23	23	77

 Table 5.4-8: Receiving Information about the Project (%)

Source: Field Survey, February 2013



Figure 5.4-11: Receiving Information about the Project (%)

During the survey, 14 percent to 30 percent of respondents from 7 villages did not receive information about the project and 70 percent to 86 percent of the respondents got information on the project.

High percentages of respondents from PaukTaw (30%) and KwanNyan (2.8%) did not know about the project in prior to construction phase. The project developer should inform about their project to the local villagers to avoid misunderstanding.

The survey also stressed on the sources of information about the project from which the respondents received. There are 3 main sources of information about the project received by the respondents. These are;

- 1. Information from authority,
- 2. Information from neighbours, and
- 3. Information from public media.

The result of the survey showed that information about the project is rarely came from authority and public media.

Transparency between project developer and local people is one of the important factors for planning and implementation of the project. If the local people received the information from their neighbors, it will be very subjective. Therefore, it is necessary to give information about the project to the people who are living around the project area for full cooperation.

5.4.3.6 Attitude towards the Project

According to the survey results, most of the respondents believed that the project will not generate environmental, Social, Health and Agricultural impacts on their villages and surrounding region. However, some respondents, especially from KawPaNaw and KawDon villages considered that the project will also create all impacts on their village (Table 5.4-13 and Figure 5.4-19).

Dust from construction and traffic is main impact of the project on air quality deterioration. Most of the respondents from 7 villages generally agreed that dust from the construction has no impact on air quality of their environment. But, some respondents from Kaw Dun Village and Kaw Pa Naw Village mentioned that the project created negative impact on air quality by producing dust from construction site and roads.

Most of the respondents from all surveyed villagers considered that gas emission from the project will not impact on air quality of surrounding environment. However, some villagers, especially from Kaw Dun Village and Kaw Pa Naw Village, mentioned that gas emission from project area will not create air pollution in some extent (Table 5.4-14 and Figure 5.4-20).

5.4.3.7 Community's Opinions about the Project

All respondents agreed to operate the project within their region expect some villagers from Hni Don Village. About 10 per cent of the respondents from Hni Don Village did not agree the project to be implemented. However, their reasons for not allowing the project in their village are much generalized and weak and also notable to have on the basis of their experience on a poorly managed project few years ago.

Village	No	Yes	No. comment
Pauktaw	0	90	10
Kaw Dun	0	50	50
Kaw Pa Naw	0	52	48
Hni Don	10	60	30
Kwan Ngan	0	90	10
Ka Don Sit	0	100	0
Me Ko Ro	0	67	33

Table 5.4-9: Community Agreement on the Project (%)

Source: Field Survey, February 2013



Figure 5.4-12: Community Agreement on the Project (%)

Most of the respondents suggested: -

- 1. to provide a good salary for workers in the project for reducing to go and work in Thailand where the salary is higher,
- 2. to support full of information on how to apply for the job in the plant,
- 3. to consider about the fishing boats if Ataran River is used for water transportation,
- 4. to maintain Ataran River water during dry season,
- 5. to conserve the mountain,
- 6. to acquire the public opinion,
- 7. to promote availability of access roads and electricity,
- 8. to compensate with the current price,
- 9. to support school facilities and requirement of teachers,
- 10. to provide wells for drinking water,
- 11. to reduce dusts generated from factory,
- 12. to encourage regional development, and
- 13. to construct clinic and medical centers.

The villagers considered that the project is acceptable for the rural and regional development and the respondents hoped that the project will support the economy of the country.

There are some basic requirements of rural and regional development, suggested by the community as follows;

- 1. To repair the access roads
- 2. To support the free of charge health services
- 3. To create employment opportunities
- 4. To construct new school buildings

CHAPTER 6

STAKEHOLDER ENGAGEMENT AND PUBLIC CONSULTATION

This Section summarizes the stakeholder consultation process initiated as part of the ESIA for the proposed MCL project. It is presented in the context of the ongoing process that is being taken forward by Mawlamyine Cement Ltd. (MCL) to engage with stakeholders, both those who are directly affected by the Project (primary stakeholders), and those who, although not directly affected, have an interest in or influence on the Project (secondary stakeholders).

"Stakeholder engagement" is emerging as a means of describing a broader, more inclusive, and continuous process between a company and those potentially impacted that encompasses a range of activities and approaches and spans the entire life of a project.¹

Stakeholder engagement refers to a process of sharing information and knowledge, seeking to understand the concerns of others and building relationships based on collaboration and partnership. It is a long-term process that requires the building of trust through open dialogue and the delivery of commitments.

Disclosure of information and stakeholder consultation during the development of the ESIA is a substantial component of overall stakeholder engagement, which is outlined in the Stakeholder Engagement Plan. It is fundamental to the development of the ESIA itself in the following ways:

- information is shared in a meaningful and timely manner to enable the public to provide considered feedback in the proactive approach at a much earlier stage of a project than in the past;
- it enables the Project to develop effective mitigation measures and management plans that are sensitive to the local context; and
- Opportunities can be identified for affected communities to participate in mitigation, monitoring and enhancement measures.

The stakeholder engagement outlines and timeframe were described in detail information in the following sections.

6.1 **Project Stakeholders**

Project stakeholders are identified according to IFC stakeholder engagement guideline in order to understand the individuals or organizations that will be affected by or may influence the Project or related activities either positively or negatively. Broadly categorized into affected parties and influential/interested groups, the preliminary key stakeholders are identified below in Table 6.1-1. The updated list of stakeholders will be maintained in the SEP.

¹ International Finance Corporation Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets

Sub-Categories	Description	Potential Impact/ Involvement			
	AFFECTED PARTIES				
Land Owners and Land Users	Land owners and land users of the parcels affected by the construction of cement plant and associated facilities, including owners and users with formal or informal right and claim on the land they occupy	Economic displacement due to land acquisition and compensation for the loss of assets.			
Project Affected Communities	Inhabitants of the villages close to the cement plant, the quarry, along the access road to the affected facilities, in the surrounding areas.	Receptors of direct/ indir- ect and positive/ negative social and environmental impacts; in particular, aff- ected by project traffic, dust and noise during the construction phase			
Vulnerable Groups	Any person/group who can be disproportionally affected by the Project construction (i.e., children, illiterate people, low income people, female-headed households, wo- men, minority groups, elderly people, etc.).	Limited access to infor- mation on Project activi- ties, impacts and mitig- ation measures, especi- ally if affected by the land acquisition process or by Project traffic, noise and dust during the constr- uction phase.			
Local Government and Authorities of the Counties affected by the Project	Local authorities of Kyaikmaraw township and District affected/ involved by project activities (i.e., local health centers and service providers for education, trainings, emergency services).	Use of resources, servi- ces and infrastructures and providing some local permits and instructions.			
Local Formal and Informal Leaders, Community Representatives and Opinion Makers	Influential persons within the community as opinion makers (e.g., local politicians, local religious leaders and wealthy persons from the community, NGOs); local delegations of political parties.	Influence on the commu- nity regarding the Project perceptions; informal coll- ectors/ bearer of comm- unity opinions and complaints.			
Local Interest Groups	Formal and informal associations and groups composed by and representing the affected parties (e.g. women's and farmers groups); Federation of Trade Unions – Myanmar	Influence on the community regarding the Project perceptions; informal collectors/ bearer of community opinions and complaints.			
INFLUENTIAL/INTERESTED GROUPS					
National and Regional Government Bodies, Regulatory Agencies and Certification Authorities	Institutions, agencies, authorities involved in the permitting procedures and Project approvals, including MONREC, Ministry of Industry, Ministry of Labor	Responsible for the delivery of operation and construction permits, authorizations, certifications and involved in the land acquisition process.			
Main National and Local NGOs and Associations	NGOs and associations mainly operating in Kyaikmaraw region, especially in the fields of human rights and social development.	Watch the Company and can provide early warning signals about emerging issues and community concerns.			

Table 6.1-1: Overview of Key Project Stakeholders

Local and National Media	Television, Radio, Press (also via internet), social media	Disseminate information on ongoing and planned activities, shape public image of the Project and affect reputation positively or negatively
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6.1.1 Stakeholder Identification and Stakeholders' Capacity Analysis

An integral component of assessing a project's potential impacts is to identify and prioritize the project's stakeholders.

Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organizations and groups with special interests, the academic community, or other businesses.²

For some projects, the most vocal opposition may come from stakeholders outside the affected area - in other parts of the country or the world. It is therefore important to also include those groups or organizations that are not adversely affected, but whose interests determine them as stakeholders in the stakeholder analysis.

Following the initial identification of stakeholders, a more in-depth look at stakeholder group interests has been undertaken to consider how they will be affected and to what degree, and what influence they could have on the project.

A preliminary stakeholder identification survey has been undertaken. The survey involved the following steps:

- a. Interviews with project stakeholders of General Administrative Officer and Head of 34 villages from Kyaikmaraw Township, staffs from Pacific Link Company Limited and staffs from SCG Cement Company Ltd.
- b. Following the identification of project stakeholders, each stakeholder group was assessed on the basis of their likely interest in, and influence over the project.
- c. Focus Group Meetings are conducted after consultation in villages. The stakeholder map provides a visual representation of project stakeholders.

During the present study, high interest and low influenced group, especially of local people are analyzed as principal component for the management of the developer.

According to IFC stakeholder engagement guidelines, the developer will take the strategic keys to make stakeholder consultation which involves mainly to be transparency, strategy and prioritization, referring to the past stakeholder consultation and information, development of socio-economic fact sheets with a focus on vulnerable groups. Verification of stakeholder representatives is also very important and need to engage in their own communities and be ensure that the government is the key stakeholder.

6.2 Stakeholder Engagement Plan (Sep)

6.2.1 Purpose of SEP

This Stakeholder Engagement Plan (SEP) has been prepared as part of the ESIA undertaken for the proposed Project by Resource & Environment Myanmar Co., Ltd.

This SEP, whose beneficiary will be MCL, presents the Project commitments and plans for stakeholder engagement.

² International Finance Corporation Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets

The objectives of this stakeholder engagement plan are to:

- Identify and map all different stakeholders (groups and individuals) either directly or indirectly impacted by the MCL Project or in any other way have a stake in the Project.
- Categorize stakeholders by their thematic relevance, priority, when/where/how they will be impacted by the Project and how they would influence the Project, their inter-relationships and dynamics, and the size or level of operation.
- Conduct stakeholder consultation meetings with all identified stakeholders to discuss the MCL Project plans and intentions and to receive the stakeholder opinions on the proposed Project. Criteria for the meetings are as follows:
 - (i) Stakeholders and households for focus group discussions and household surveys are statistically representative/significant;
 - (ii) Inclusive of all stakeholder sub-groups e.g. women, elderly, youth, vulnerable persons;
 - (iii) One-on-one household interviews and focus groups are arranged directly and not through village chiefs or influential community persons, and are conducted in a locally/culturally sensitive manner and without external interference or pressure so that interviewees can speak freely;
 - (iv) Notices of meetings and surveys should be sufficiently notified in advance at prominent locations;
 - (v) The comments and suggestions received from the participants shall be collected and incorporated into the ESIA and ESMP. When the ESIA and ESMP are completed these reports need to be disclosed in an appropriate way to the different stakeholders.
- Explore options to avoid, minimize and/or mitigate Project impacts with Project stakeholders in particular affected communities. Incorporate these findings into the ESIA, ESMP.

The purpose of this MCL SEP plan is to establish and maintain a constructive relationship with affected people and other interested parties over the life of the Project in order to obtain and maintain the "social license to operate" and broad public support. The objectives of stakeholder engagement are:

- to ensure the timely provision of relevant and understandable information;
- to create a process that provides opportunities for stakeholders to express their views, concerns and complaints, and allow MCL to consider and respond to them;
- to maintain awareness of safety and environmental issues among communities in the vicinity of Project facilities;
- to monitor community attitude to the Project;
- to manage and monitor the effectiveness of any corrective actions implemented as a result of stakeholder concerns or complaints during Project activities;
- to manage and report on the closing out of stakeholder concerns or complaints; and
- to comply with IFC Performance Standards.

Stakeholder engagement will include an on-going communication process based on:

- public disclosure of appropriate information so as to enable meaningful, accessible and continued communication to consultation with stakeholders;
- meaningful consultation with potentially affected and interested parties; and
- a procedure by which people can make comments or complaints.

Reference No:					
Full Name					
	By Post: Please provide mailing address:				
Contact Information					
Please mark how you wish to be contacted (mail,	By Telephone:				
telephone, e-mail).	Py E moil				
	Бу Е-шап				
Droformed Language for	Burmese				
communication	English				
	Other				
	What become do Where did it because 0. To exhere did it				
Description of Incident or Gri	evance: what happened? where did it happen? To whom did it happen? What is the result of the problem?				
Date of Incident/Grievance					
	One time incident/grievance (date)				
	Happened more than once (how many times?)				
	On-going (currently experiencing problem)				
What would you like to see ha	appen to resolve the problem?				
Signature:					
Date:					
Please return this form to):				
Name of Contact Person. P	Position and Title:				
Address:					
Tel.:					

Table 6.2-1: Public Grievance Sample Form

Name of Contact Person, Position and Title:	
Address:	
Tel.:	
E-mail:	

Reference No:				
(to be determined by th project)	e			
Site name				
Contact details of appointe staff	d Name			
	Telephone:			
	E-mail			
Language of th Communication Activity	e Burmese English Other			
Description of Consultation A	Activity:	Meet	ing, Location, office address,	, etc.
Type and number of stakehol	ders met (specify gender)	:		
Materials Provided:				
Date of Consultation Activity		Loc	cation where information is a	vailable
		We	bsite	
		Har	d copy	
		Oth	er	
Issues raised	Response provided		Actions to be taken	Deadline

Table 6.2-2: Consultation Information Template



Flowchart for Processing Grievances

Figure 6.2-1: The Flow Chart of Processing Grievances

6.2.2 Stakeholder Consultation Meetings

The social impact assessment team visited project area for one time on 23th February to 26th February 2013. A series of meetings were conducted as shown in Table 6.2-3. The detailed meeting minutes during the consultation meetings are provided in Annex 6-1.

No.	Date	Name of Town/ Village	Participation	Arranged by
			Year 2013	
1.	23.2.2013	- Kaw Pa Naw village - Pauktaw Village	- Villagers - REM Co. Ltd.	Head of Village Tract
2.	24.2.2013	- Me Ko Ro Village - Kwan Nyan Village - Hni Don Village	- Villagers - REM Co. Ltd.	Head of Village
3.	25.2.2013	Ka Don Sit Village Kaw Don Village	- Villagers - REM Co. Ltd.	Head of Village
4.	25.2.2013	Kyaikmaraw Town	 Head of Village Tracts in Kyaikmaraw Township, -REM Co. Ltd., Mawlamyine Cement Limited 	Administrator, General Administrative Department, Kyaikmaraw Township
5	26.2.2013	Kyaikmaraw Town	- REM Co. Ltd. -Township GAD Officers	GAD Office, Kyaikmaraw Township

Table 6.2-3: Stakeholde	r Consultation and	Disclose of Project	Relevant Information
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The 2nd stakeholder consultation for the construction of project access road was held in 7 Villages in Kyaiukmaraw Township from 28th October to 31st October, 2013. The aim of the public consultation is to introduce the project information to the stakeholders. The information distributed and expected to receive from the stakeholders include: objectives, explanation on road plan and time schedule, road station and section, project billboard, measure taking, equipment and traffic and safety sign board, for and key benefit for community and discussion. The name and number of attendees, key discussions, comments, questions and anasers are provided in Annex 6-1.

No.	Date	Name of Town/Village/Ward Participation		Arranged by
		Year 2013 (2 nd Stakeholder Me	eting on Road Access)	
1	28.10.2013	Village's Head Office,	-REM Consultants	MCI
1	10:00-11:00	Kadonsit Village	-MCL Authorities	MeL
	29.10.2013	Villaga's Hand Office	-REM Consultants	
2	11:00 AM –	Kawdon Village	-MCL Authorities	MCL
	12:00 PM		-Villagers	
	29.10.2013		-REM Consultants	
3	1:00 PM -	Wenge Village	-MCL Authorities	MCL
	2:00 PM		-Villagers	
	30.10.2013	Village's Head Office, KawWon Village	-REM Consultants	
4	9:30 AM -		-MCL Authorities	MCL
	10:30 AM		-Villagers	
	30.10.2013		-REM Consultants	
5	11:00 AM -	Angazine Village	-MCL Authorities	MCL
	12:00 PM		-Villagers	
	30.10.2013		-REM Consultants	
6	1:00 PM –	Village's Head Office, Taranar Village	-MCL Authorities	MCL
	2:00 PM		-Villagers	
	30.10.2013	Village's Head Office	-REM Consultants	
7	2:30 PM –	Kaw Thet	-MCL Authorities	MCL
	3:30 PM		-Villagers	

Table 6.2-4: The 2nd Stakeholder Consultation Meetings on Access Road Construction

The series of 3rd stakeholder consulation meetings were organized by MCL in 8 locations and detailed meeting minutes are attached in Annex 6-1.

No.	Date	Name of Town/ Village/Ward	Participation	Arranged by
		Year 2016 (3 rd S	takeholder Consultation)	
1.	7.2.2016	KawPaNaw Monastery	-Villagers	
2.	7.2.2016	Kaw Dun Monastery	-REM Consultants	
3.	7.2.2016	We Nge Monastery	-MCL Authorities -Kaw Pa Naw -Kaw Dun -We Nge	MCL
4.	7.2.2016	Kwan Nyan Monastery	-Villagers -REM Consultants -MCL Authorities	
5.	8.2.2016	KaDonSit Monastery	-Villagers	
6.	8.2.2016	Shwe War Gyaung Monastery	-REM Consultants -MCL Authorities	MCL
7.	8.2.2016	MeKaRo Monastery	-Shwewarchaung -Mekaro	
8.	10.2.2016	MCL Meeting Room	-REM Consultants -MCL Authorities	MCL

Table 6.2-5: The 3rd Stakeholder Consultation Meetings

6.2.3 Public Consultation Meetings

Social Impact Assessment Team from REM conducted a survey and held second public consultation meeting in Kyaikmaraw on 25th May 2013. The meeting minutes are provided in Annex **6.2-6**.

No.	Date	Name of Town/Village/Ward	Participation	Arranged by				
	Year 2013 (1 st Public Consultation and Disclose Project Relevant Information)							
1	25.5.2013	Meeting Hall, Kyaikmaraw Administrative Office	-Government Stakeholders -MCL Authorities -Villagers -REM Consultants	MCL				

The 2^{nd} public consultation was conducted from 3 to 8 August 2013 regarding with the scorping report. The meeting minutes are illustrated in Annex 6-2.

No.	Date	Name of Town/Village/Ward	Participation	Arranged by
		Year 2013 (2 nd Public Consul	Itation and Disclose on Scopin	g Report)
1	3.9.2013	Kyaikmaraw office	-Government Officers from Kyaikmaraw office -MCL Authorities -REM Consultants -Heads of Village tracts	MCL
2	4.9.2013	Kawpanaw	-MCL Authorities -REM Consultants -Wegne -Kawpanaw -Kaw Dun	MCL
3	4.9.2013	Ka don sit	-MCL Authorities -REM Consultants -Ka Don Sit -Shwe war gyaung	MCL
4	5.9.2013	Kyan Nyan	-MCL Authorities -REM Consultants -Kyan Nyan -Pauk Taw	MCL
5	5.9.2013	Hni Don	-MCL Authorities -REM Consultants -Hni Don	MCL
6	6.9.2013	Mekaro	-MCL Authorities -REM Co. Ltd. -Mekaro	MCL
7	6.9.2013	Shin Zaw Pu Ward	-MCL Authorities -REM Consultants -Shin Zaw Pu Ward (Kyaikmara)	MCL
8	7.9.2013	Tarana	-MCL Authorities -REM Consultants -Tarana -Kyun Gon	MCL
9	7.9.2013	Kaw That	-MCL Authorities -REM Consultants -Kaw That Villagers	MCL
10	8.9.2013	Kaw Wan	-MCL Authorities -REM Consultants -Ang Ka Zaing & Kaw Wan	MCL
11	8.9.2013	Nyaung Bin Seik	-MCL Authorities -REM Consultants -Nyaung Bin Seik (village Tract)	MCL
12	8.9.2013	Kyonewan Village Monastery	-MCL Authorities -REM Consultants -Villagers	MCL

Table 6.2-7: The 2nd Public	c Consultation ar	nd Disclose on	Scoping Report
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The 3rd public consultation meeting was held on 17 Aug 2017 at Rheymonya Hotel, Mawlamyine regarding the disclosure of EIA report submission. The chief minister, government officals, NGOs and interested persons, villagers, media, REM consultant and MCL authorities are attended the meeting. Besides, 5 more public consultation meeting are organized in selected villages so as to get

get more insights and concerns about the MCL project from the local people. The meeting minutes of series of public consultation are described in Annex 6.2-7.

	Year 2017 (Public Disclosure on EIA Report Submission)					
1	17.8.2017 9:00 AM - 12:40 PM	Rheymonya Hotel, Mawlamyine	-Chief Minister of Mon State -State Governmental Officers -Kyaikmaraw Township GAD officer -Local people project surrounding villagers -Media -NGOs and interested persons -REM Consultants -MCL Authorities	MCL		
2	18.8.2017, 9:00 AM – 12:00 PM	Kaw Pa Nor new Monastery	-Kaw Pa Naw Villagers -REM Consultants -MCL Authorities	MCL		
3	18.8.2017, 2:00 PM – 5:00 PM	Kaw Dun New Monastery	-Kaw Dun Villagers -Mekaro Villagers -REM Consultants -MCL Authorities	MCL		
4	19.8.2017 9:00 AM - 12:00 PM	Kaw-Krid Monastery	-Kwan Ngan Villagers -Pauk Taw Villagers -REM Consultants -MCL Authorities	MCL		
5	19.8.2017 2:00 PM – 5:00 PM	Shwe War Chaung Monastary	-Kadonsit Villagers -Shwe War Chaung Villagers -REM Consultants	MCL		
6	20.8.2017 9:00 AM– 12:00 PM	Hnidon Village Administrative office	-Hnidon Villagers -REM Consultants -MCL Authorities	MCL		

Table 6.2-8:	The 3rd Public	Consultation	and Disclose	Meeting on	EIA Submission
	The of a Lubhe	Compartation		meeting on	

6.2.4 Stakeholder Consultation and Public Disclosure

The SEP will utilize a multi-stakeholder approach, using workshops at national and local levels, focus group discussions (thematic) at the local level and interviews with key informants/stakeholders (socio-economic baseline survey).

The mixed approach outlined above will allow this Stakeholder Engagement Plan to reach affected people, vulnerable groups, interested persons, government agencies and NGOs, among others.

Interview and Questionnaire survey methods were used in the survey for about 300 sample respondents selected from 7 Villages such as Pauktaw, Kaw Don, Kaw Pa Naw, Hni Don, Kwan Ngan, Ka Don Sit and Me Ko Ro within the project area. The developed questionnaire is provided in Annex 6-3.

Regarding on the socioeconomic survey and stakeholder consultation results, it has found out that all these villages are said to be project affected people (PAPs) within the project area, but they are not necessary to relocate by any project activities. The main purpose of these consultation meetings is to understand their existing situations, attitudes and concerns on the affected impacts from the project development and the interviews were undertaken with the help of the structured questionnaires which cover the contents of basic information of interviewees, their socio-economic conditions, education status and current environmental problems, existing provided facilities and social problems, perceptions of the project, attitudes towards the project, and attitudes towards the possible mitigation measures regarding the impacts on them caused by the project development and the impacts analysis by each gender and focus group.

The SEP describes the Project strategy and procedures for interactions with stakeholders at local, regional and national level, with particular focus on Project Affected Persons (PAPs). The SEP also outlines a grievance mechanism to allow stakeholders to bring concerns to the Project attention.

The SEP is designed to promote the Project objectives in the field of stakeholder engagement: by providing good public information, communicating well with all stakeholders, and developing positive relationships with local and regional communities, markets and clients, the Project enhances its reputation, brand, and ultimately, value but it also reduces the risks deriving from social instability improperly managed and impacting Project activities. By adopting this document, MCL shows its will to engage in fostering good stakeholder relations and communication with local and national groups.

The SEP is also a 'living document' which, once endorsed, will be updated periodically by MCL to summarize results achieved i.e. to record consultations undertaken, issues raised, actions taken; to describe lessons learned and any changes to the consultation process; and to update the stakeholder group list and outline the schedule for on-going and future interactions.

This document applies to all the phases and components of the Fully-Integrated Cement Production Facility Project (cement plant, coal fired power plant, quarry site and Jetty).

This survey work will be focused on community study within 3 km circle surrounding the project site. The survey will cover 7 Villages Tracts which were located within 3 km circle around the project site as shown in Table 6.1-3.

No.	Name of Villages	Latitude (North)	Longitude (East)
1	Pauktaw	16° 21' 43"	97° 49' 09"
2	Kaw Dun	16° 22' 60"	97° 48' 24"
3	Kaw Pa Naw	16° 23' 12"	97° 48' 40"
4	Hni Don	16° 20' 42"	97° 46' 44"
5	Kwan Ngan	16° 20' 1"	97° 47' 34"
6	Ka Don Sit	16° 20' 43"	97° 50' 44"
7	Me Ko Ro	16° 23' 9"	97° 46' 42"

Table 6.2-9: Location of Villages in the Project Area

Source: REM Field survey, February 2013

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



Table 6.2-10: Public Consultation Images at the Affected Township and Villages



EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*



Pauktaw Village

Kyaikmaraw (Feb 2013)

MCL will create a website with the main Projects' information and events of interest for the various stakeholders for public disclosure. The documents and information that will be disclosed in the website include, but are not limited to, the following:

- SEP will be disclosed in English and Burmese language;
- ESIA executive summary;

- information on the construction schedule and services disruption;
- stakeholder's consultations timeframe, venues and MoM;
- grievance procedure;
- community development activities; and
- SEP Manager contact

Considering the low percentages of internet users in the affected area, the Project disclosure through MCL website will be mainly targeted, but not limited to, specific stakeholders (NGOs, national or regional stakeholders, authorities, Lenders, etc.).

In addition, given the particular setting of Project operational areas, possible methods to reach the target audience include, but are not limited, to:

- open meetings with residents of the affected communities (e.g., at schools, public/ religious or associations premises);
- separate meetings with land owners/land users, vulnerable groups, farmers associations and local NGOs, as needed and appropriate;
- brochures, posters, informative leaflets at key communities' centres, and radio announcements, in particular to inform about the construction schedule, grievance mechanism and forthcoming community meetings. Written information material should take in duly consideration the fact that there is a relevant number of illiterate people in the area; and
- social media: this method can be useful to keep on going communication with NGOs and other interested stakeholders.

MCL will provide and publicise well in advance a schedule of the dates and locations of any planned consultation activities, including follow up and disclosure activities. A stakeholder engagement and disclosure plan detailing methods and content of engagement and disclosure for each type of stakeholder is presented in Table 6.2-3.

All meetings will be carefully documented and logged, minutes taken, and follow up activities recorded. A Public Grievance Sample Form and the Consultation Information Template are presented respectively in Table 6.2-2 and 6.2-3. The flow chart of processing grievances is shown in Figure 6.2-1.

6.2.5 Stakeholder and Public Disclosure Plan

MCL will keep on going consultations with all identified stakeholders. Consultation activities will not be limited to a single meeting with the interested parties but will entail a series of meetings, discussions, and opportunities for affected parties to learn about the Project details, be informed of the potential impacts, and of planned mitigation measures. They will be followed up with written records and agreements. These activities are valuable for MCL to understand stakeholder concerns, gain feedback, identify potential risks and act pre-emptively to ensure positive outcomes. At the same time, the MCL awareness of the local context will allow to better define and tailor community development activities.

MCL will prepare information to be disclosed in advance and in a format adapted and suitable to the different public and groups. It will identify multiple and preferred communication channels to convey information on the Project activities and mitigation of identified impacts, or occurrence of new impacts, effectively so as to be fully transparent and informative. In addition, the venue and timing of meetings will be adapted to stakeholders' preference and needs.

The disclosure plan, as preliminarily presented in Table 6-5, is mainly addressed to the construction and operation phases and only in very generic terms to the decommissioning phase, which at the moment appears unlikely to occur: in case any decommissioning will take place, this SEP will be updated accordingly, and decommissioning will be treated in more detailed terms.

During the Project construction and operation phases MCL will disclose information regarding ongoing Project activities or relevant changes in the Project through the following main methods:

- detailed publications in local newspapers or other media and radio spots, which allow to easily reach also illiterate people: this method is aimed at informing all Project stakeholders on the ongoing activities and future development plans, including the impacts and mitigation measures foreseen;
- notice boards in the main public spaces of the affected areas: this method addresses in particular all Project affected communities (residents) and land owners and users on the ongoing activities, including the impacts and mitigation measures foreseen, methods to present complains and comments;
- meetings and events (with open or restricted participation), which allow to reach local and national authorities, residents of affected communities, NGOs and civil society associations to present Project activities, including the impacts and mitigation measures foreseen, grievance mechanism, and discussion on relevant topics such as labour issues, environmental impacts, communities health and safety, etc.;
- MCL webpage and SEP Manager contact (see Section Error! Reference source not found.), which will allow the distribution of information on Project impacts and mitigation measures, schedule of activities and plans, as well as the collection of grievances. Furthermore, it will represent a good channel to collect stakeholders' suggestions and concerns.

An internal and external grievance mechanism will be in place during all the Project phases.

Table 6.2-11 presents a tentative plan for stakeholder engagement according to the information available at the time on its preparation. Future updates will be done every time relevant modification to the Project context are foreseen.

Table 6.2-11: Preliminary Stakeholder Disclosure Plan during Construction and Operation Phases

Project Information Dissemination Methods	Stakeholders Addressed	Information Disclosed	Timeline	Resources - Responsibilities

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Therm	nal
Power Plant for Mawlamyine Cement Limited	

Face-to-face meetings with PAPs	Residents and representatives of the Project affected communities, vulnerable groups, local businesses	Information on planned activities, assessed positive and negative impacts and mitigation measures, presentation of the external grievance mechanism	Along the EIA approval process, before and the beginning of and during construction activity	Project staff with SEP Manager
Meetings with local level authorities and administrations, National Government Bodies involved in the authorization phases	Regulators (national, governorate, and local)	Project development, identified ES impacts, schedule of activities, definition of the emergency response plan	According to the procedural and administrati ve needs	MCL Factory Managers with SEP Manager
Induction and staff trainings	Temporary and permanent workers	Working conditions, OHS induction, and code of conduct/ awareness raising on local customs, internal grievance mechanism	Immediately after hiring and later only when contractual changes occur	MCL Human Resources
Publications/announ cements in national and local media, social media, MCL website	All identified stakeholders	Information on planned activities in each specific area, assessed positive and negative ES impacts and mitigation measures, presentation of grievance mechanism and MCL points of contacts	Before the beginning of the construction phase; at the end of the of the construction phase	Project staff with SEP Manager
Notice boards in the main public spaces of the affected areas	People in the Project affected area (mainly residents), land owners and users	Information on the schedule of the forthcoming construction activities in each specific area, Impacts and mitigation measures, grievance mechanism, SEP Manager contacts	Before the beginning of the construction phase	SEP Manager

6.2.6 Grievance Mechanism

The purpose of the grievance mechanism is to ensure that all requests and complaints from individuals, groups and local communities throughout the Project life, from planning and design through construction, operations and decommissioning, are dealt with systematically in a timely manner with appropriate corrective actions being implemented and the complainant being informed of the outcomes.

As aforementioned, MCL will establish several channels for grievance and information to enable the public to register any concern about the Project. Grievance mechanism will be in place throughout all Project stages and presented and discussed with the public during consultations. Channels to raise grievances will include:

- postal, electronic mail, and local telephone line reaching the administrative office of MCL in Project Compound (to be specifically created);
- written or orally to the conveyor belt construction site manager; and
- written or orally during public events and meetings.

The grievance mechanism is responsibility of the staff appointed for the SEP implementation. All complaints will be logged and processed and addressed within a fixed time, communicated to the complainant, as shown in Annex - B by the processing grievances flowchart. The procedure is summarized below:

- grievances will be logged in a Grievance Register and an acknowledgement of receipt of complaint will be issued to the complainant within five working days;
- in case an immediate corrective action is not possible or sufficient, MCL will inform complainant of the proposed long-term corrective action, specifying a deadline, or explain the reason why the action is not feasible within 10 working days;
- MCL will identify responsibilities and internal deadline for corrective action(s);
- MCL will follow up the implementation of the corrective measures;
- MCL will inform the complainant in writing and in person of the corrective action and record the closure of the grievance; and
- if the corrective action implemented is not accepted, it may be reviewed to identify alternative corrective actions. A revised resolution may be proposed. in case the resolution is then accepted by the stakeholder, the relevant grievance will be closed. On the contrary, if it will be not accepted, and no further improvements can be made, then external remedies may be pursued.

Complaints will be resolved within a period that will not exceed 30 days from their receipt and registration date.

As part of the grievance process, MCL when receiving the complaint will log each grievance and document the action taken. It will regularly review the database of received grievances to identify and analyze any recurrent issues and trends.

6.2.7 Monitoring and Evaluation

The SEP will be endorsed by the MCL, who will have the responsibility for its implementation.

The Company SEP will be regularly updated, presenting changes in Project activities, stakeholders, as well as advice and inputs received, lessons learned and any change to the consultation process. As a minimum, the SEP will be updated before the start of the operation phase.

The Company will develop a programme to monitor the Project stakeholder engagement activities and public perception of the Project. The monitoring programme will detail key elements of the monitoring, such as monitoring parameters, modality and frequency. The Company will also describe how and when the results will be reported.

Stakeholder, consultation and grievance registers, recording relevant information in a tabular form, shall be updated on an on-going basis. Progress reports will be prepared on a quarterly basis during the construction period and on a biannual basis during the operation phase to include updates on the grievance process, with the number of grievances received and addressed/closed, most frequent types of grievances, and any recommendation or action taken to decrease the number of grievances.

As long as there will be open grievances, the SEP Manager will make a selection of a random sample of grievances biannually and follow up with the complainants to ensure that appropriate corrective actions have been taken and that the outcomes are satisfactory.

The reporting mechanism and responsibilities for stakeholder engagement are outlined in Table 6.2-12.

SEP Reporting Mechanism	Timing	Responsibility
Consultation Form	For each consultation or stakeholder contacted	SEP Manager
Stakeholder Identification and Consultation Register	Continued	SEP Manager
Grievance Register	Continued	SEP Manager
Grievance Monitoring	Quarterly during construction Biannual during the operation	
SEP Progress Reports	Quarterly during construction Biannual during the operation	SEP Manager
SEP Annual Report	Annually	

 Table 6.2-12: SEP Reporting Mechanisms and Responsibilities

6.2.8 Resources and Responsibilities

The implementation of this SEP is responsibility of MCL during all over Project phases. MCL will appoint one SEP Manager in charge of all SEP activities (from the available staff or an external figure, for example from a local NGO or university, in both cases with appropriate professional background on stakeholder engagement in the local context).

MCL staff involved in the Project will be briefed in order to be aware of the commitments taken by the Project and the Project approach in dealing with stakeholders. The SEP Manager will coordinate the implementation of the SEP activities and keeping ongoing contacts with the construction manager.

The SEP Manager will be based in Project Office and will take part to all the stakeholder engagement activities in the area. He/she has a general control function of the grievance mechanism process and collects, records and deals with grievances.

6.2.9 Budget

The budget for the SEP implementation will consider the following items throughout the Project construction and operation phase:

- cost of human resources: the remuneration of the SEP Manager, if not identified within the internal MCL staff, and of a short-term expert to carry out specific tasks, if necessary;
- training of the SEP Manager;
- specific consultation activities as outlined in the SEP;

- consultation materials and tools; and
- monitoring of the effectiveness of the SEP

CHAPTER 7

IMPACT ASSESSMENTAND MITIGATION MEASURES

The purpose of impact assessment and mitigation is to identify and evaluate the significance of potential impacts on identified receptors and resources according to defined assessment criteria and to develop and describe measures that will be taken to avoid or minimize any potential adverse effects and to enhance potential benefits.

Taking into account the Project description and the biophysical and socio-economic baseline results reported respectively Chapter 3 and 4; this section presents the environmental and socio-economic impacts potentially generated by the Project during both the construction and operation phases and indicates the mitigation measures to be adopted for avoiding or reducing such impacts.

The assessment of impacts proceeds considering three key elements:

- a) *Prediction of the significance of impacts* that are the consequence of the Project on the natural and social environment.
- b) Development of mitigation measures to avoid, reduce or manage the impacts.
- c) Assessment of residual significant impacts after the application of mitigation measures.

7.1 Impact Assessment Methodology

The first stage of environmental impact assessment is the identification of environmental activities and environmental aspects based on the project description and industrial experience. The second stage of impact assessment is the identification of environmental receptors and environmental resources, which allow for an understanding of the environmental impact pathway and an assessment of the sensitivity to change. The severity, spatial scope and duration of the environmental impact together comprise the consequence of the environmental impact and when summed can obtain a maximum value of 15, as shown in Table 7.1-1 below. The frequency of the activity and the frequency of the environmental impact together comprise the likelihood of the environmental impact occurring and can obtain a maximum value of 10, as shown in Tables.

Severity of Environmental Impacts	Rating	
Insignificant / Non-harmful	1	
Small / Potentially Harmful	2	
Significant/ Slightly Harmful	3	
Great / Harmful	4	
Disastrous/Extremely Harmful	5	
Spatial scope of Environmental Impact	Rating	
Activity Site	1	CE
Plant Boundary	2	DUEN
Local area (within 5 km of the plant boundary)	3	NSEC
Regional	4	CO
National	5	
Duration of Environmental Impact	Rating	
Construction (up to 2 years)	1	
Construction (2- 5 years)	2	
Construction (6- 10 years)	3	
Life of Plant Operation	4	
Permanent (exists after closure)	5	
Frequency of activity/Duration of Aspect	Rating	
Annually or less (but > 6 months) / Low	1	
Biannual / Temporary	2	
Monthly / Infrequent	3	
Weekly / Life of Plant / Regularly / Likely	4	<u>e</u>
Daily / Permanent / High	5	ООН
Frequency of Environmental Impact	Rating	KELI
Almost never / Almost Impossible	1	L LI
Very seldom / Highly Unlikely	2	
Infrequent / Unlikely	3	
Often / Regularly / Likely	4	
Daily / Permanent / Highly Likely	5	

Table 7.1-1: Consequence and Likelihoods of Environmental Impacts

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

The significance of the environmental impact arithmetic product of the ratings for likelihood and consequence of the environmental impact shown in Table 7.1-2 and Table 7.1-3 which are used to determine the significance of the environmental impact.

Measures such as demolishing infrastructure, and re-instatement and rehabilitation of land, are considered post-mitigation. The model outcome of the environmental impacts is then assessed in terms of impact certainty and consideration of available information.

	CONSEQUENCE														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
Q	4	8	12	16	20	24	28	32	36	40	44	48	42	56	60
ЮН	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
KELJ	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
ΓI	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 7.1-2: Consequence and Likelihood Ratings

 Table 7.1-3: Consequence and Likelihood Ratings

Significance Rating	Value
Very High	126 - 150
High	101 - 125
Medium – High	76 - 100
Low – Medium	51 - 75
Low	26-50
Very Low	1-25

7.1.1 Mitigation Measures and Residual Impacts

For the identified significant impacts, the project team, with the input of the client, has identified suitable and practical mitigation measures that are implementable. Mitigation that can be incorporated into the project design, in order to avoid or reduce the negative impacts or enhance the positive impacts, have been defined and require final agreement with the client.

After first assigning significance in the absence of mitigation, each impact is re-evaluated assuming the appropriate mitigation measure(s) is/are effectively applied, and this results in a significance rating for the residual impact.

Based on the above, the following Table presents a preliminary identification of the potential impacts and the related affected components, associated to the planned Project activities, during both the construction and operation phases.

7.2 Preliminary Identification of Potential Impacts for Captive Power Plant Table 7.2-1 Significance of Potential Impacts during Construction Phase

Component	Consequence	of Impact		Likelihood of	Significance	
Component/EHS Aspects	Severity	Spatial Scope	Duration	Frequency of Activity	Frequency of Impact	of Impact
	Small	Local Area	Construction	Infrequent	Often	Negative
Emission of Air Pollutants	3	3	1	3	5	Low- Medium
	7			8		56
	Small	Local Area	Construction	Infrequent	Often	Negative
Noise Impacts	3	3	1	3	5	Low- Medium
	7			8		56
	Small	Local Area	Construction	Infrequent	Often	Negative
Water Resources Impacts	3	3	1	3	4	Low
	7			7	49	
	Small	Plant Boundary	Construction	Infrequent	Permanent	Negative
Land	2	2	1	3	5	Low
	5			8	40	
	Small	Plant Boundary	Construction	Infrequent	Infrequent	Negative
Solid Waste	3	2	1	3	4	Low
	6			7		42
Biodiversity	Significant	Local area	Construction	Infrequent	Highly Likely	Negative
	4	2	5	3	5	Medium- High
	11			8		88

Component/EHS Consequence of Impact			Likelihood of Impact		Significance of Impact		
Aspects	Severity	Spatial Scope	Duration	ı	Frequency of Activity	Frequency of Impact	
Emission of Air	Great	Regional	Life Plant	of	Daily	Highly Likely	Negative
Pollutants	4	4	4		5	5	High
	12		1		10		120
	Significant	Local Area	Life Plant	of	Daily	Highly Likely	Negative
Noise Impacts	3	3	4		5	5	Medium-High
	10				10		100
Water Resources	Significant	Local Area	Life Plant	of	Daily	Highly Likely	Negative
Impacts	3	3	4		5	5	Medium-High
	10	1	1		10		100
	Significant	Plant Boundary	Life Plant	of	Daily	Highly Likely	Negative
Soil	3	2	4		5	5	Medium-High
	9				10	90	
	Significant	Plant Boundary	Life Plant	of	Daily	Highly Likely	Negative
Waste	3	2	4		5	5	Medium-High
	9				10		90
	Potentially Harmful	Plant Boundary	Life Plant	of	Temporary	Infrequent	Negative
Emergency Case	2	2	4		2	3	Low
	8				5		40
	Insignificant	Plant Boundary	Life Plant	of	Annual or less	Very Seldom	Negative
Biodiversity	1	2	4		2	2	Low
	7	·	·		4		28

Table 7.2-2: Significance of Potential Impacts during Operation Phase

In the following sections, the potential environmental and socio-economic impacts associated to the Project activities are assessed and the relevant mitigation measures are described.

7.3 Impact Assessment during Construction Phase

Potential impacts are evaluated for the power plant because the projects are located within the same boundary and construction and the operation phase are same period. Mitigation measures to be adopted in order to avoid or minimize potential impacts are provided as well.

7.3.1 Air Quality Impacts and Mitigation Measures

During the construction phase, emissions of air pollutants at the power plant site are mainly associated to transportation (i.e. vehicle movement), earth works, foundation works, dismantling, construction and site clearance activities. These activities are expected to occur over a period of about 24 months.

Construction phase activities will generate the following main types of air emissions:

- combustion and exhaust emissions generated from the construction equipment, generators and vehicles; and
- fugitive dust generated by earthworks including excavation, backfilling, grading, equipment movement, material piling, loading and unloading, and demolition of decommissioned buildings.

The construction activities at the power plant include the following main steps:

- preparation works and excavation;
- concrete works;
- structure installation and assembling; and
- commissioning

The pollutant emissions from yard equipment (land vehicles, machinery, etc.) generated during the construction steps identified above were quantified using specific emission factors taken from literature.

Similarly, the production of dust due to earth moving during excavation works was conservatively estimated on the basis of standard emission factors present in literature.

7.3.1.1 Air Emissions from Construction Equipment and Machineries

Air pollutants emissions during construction phase are essentially due to exhausts gases. The emissions into air caused by construction-site equipment/machineries were assessed starting out from standard emission factors reported in literature. These factors recommend the specific emissions of the single pollutants (NO_x , SO_x , and Particulate Matter) for each item of equipment on the basis of its typology. The estimate of the emissions produced by the whole equipment was calculated by multiplying the emission factor by the number of items of that type of equipment and by repeating this calculation for each type of equipment used on site during the construction phase.

The vehicles expected to be used during the construction phase and the emission factors, derived from the Air Quality Dispersion Modelling (AQDM) study for diesel engines, are showed in the following Tables, for preparation works and excavation, concrete works, structure installation and assembling and commissioning respectively. For each type of vehicle, a typical output power in kW was indicated, to which reference was made for assessing the emission factor.

Table 7.3-1: Construction Equipment, Emission Factors AQDM Preparation Works and Excavation

Typology	Power (kW)	No. of equipment	NOx [kg/h]	SOx [kg/h]	Particulate Matter [kg/h]
Backhoe excavator	95.5	3	1.0068	0.0017	0.0514
mini-excavator	40.9	1	0.1022	0.0001	0.0076
Wheeled loader	154	4	1.6394	0.0035	0.0532
Dump truck	220	9	5.7749	0.0109	0.2059

Table 7.3-2: Construction Equipment	, Emission Factors AQMD Concrete Works

Typology	Power	No. of	NO _x	SO _x	Particulate Matter
	(KW)	equipment	[kg/h]	[kg/h]	[kg/h]
Forklift	37	1	0.0600	0.0001	0.0042
Forklift (5t)	83	1	0.1054	0.0002	0.0079
Forklift	110	1	0.1559	0.0003	0.0085
Forklift	83	1	0.1054	0.0002	0.0079
Truck crane (25t)	206	2	0.7505	0.0011	0.0259
Truck crane (50t)	247	1	0.5351	0.0008	0.0193
Truck crane	230	1	0.5351	0.0008	0.0193
Crane	230	1	0.5351	0.0008	0.0193
Crane	206	2	1.0702	0.0016	0.0386
Crawler crane	242	1	0.5351	0.0008	0.0193
Crane	206	1	0.5351	0.0008	0.0193
Concrete mixer truck	202	6	3.8499	0.0073	0.1372
Wheeled loader	154	4	1.6394	0.0035	0.0532
Dump truck	220	9	5.7749	0.0109	0.2059
Concrete pump truck	300	2	1.2833	0.0024	0.0457
Earthmover	160	2	0.8095	0.0016	0.0269
Rotary drilling machine	300	2	0.6969	0.0028	0.0213

Typology	Power (kW)	No. of equipment	NOx [kg/h]	SOx [kg/h]	Particulate Matter [kg/h]
Forklift	37	1	0.0600	0.0001	0.0042
Forklift (5t)	83	1	0.1054	0.0002	0.0079
Forklift	110	1	0.1559	0.0003	0.0085
Forklift	83	1	0.1054	0.0002	0.0079
Truck crane (25t)	206	2	0.7505	0.0011	0.0259
Truck crane (50t)	247	1	0.5351	0.0008	0.0193
Truck crane	230	1	0.5351	0.0008	0.0193
Crane	230	1	0.5351	0.0008	0.0193
Crane	206	2	1.0702	0.0016	0.0386
Crawler crane	242	1	0.5351	0.0008	0.0193
Crane	206	1	0.5351	0.0008	0,0193
60t crane	132	1	0.3028	0.0004	0.0171
Flat truck	300	1	0.6417	0.0012	0.0229
Flat truck	120	1	0.3894	0.0006	0.0216

Table 7.3-3: Construction Equipment, Emission Factors AQMD Structure Installation and Assembling

Table 7.3-4: Power Plant Construction Equipment, Emission Factors AQMD Commissioning

Typology	Power (kW)	No. of equipment	NO _x [kg/h]	SO _x [kg/h]	Particulate Matter [kg/h]
Forklift (5t)	83	1	0.1054	0.0002	0.0079
Forklift	83	1	0.1054	0.0002	0.0079
Truck crane (50t)	247	1	0.5351	0.0008	0.0193
Wheeled loader	154	4	1.6394	0.0035	0.0532

The maximum level of air pollutants emission during the construction phase is expected during a medium advancement stage of the works when the aboveground concrete works at the areas will overlap to the earthworks. This period of construction, which will entail different concurrent activities on site and involve a higher number of different heavy equipment for construction and earth moving, was therefore considered to estimate the maximum expected emission of air pollutants rate from the construction site and related air concentrations at increasing distances from the site.

7.3.1.2 Estimated Impacts

In the following Table, a summary of the total emission for NO_x , SO_x , Particulate Matter during each of the identified construction phases is summarized.
Construction Phase	Total Number of Equipment	NO _x (kg/h)	SO _x (kg/h)	Particulate Matter (kg/h)
Excavation	16	8.5232	0.0163	0.3181
Concrete Works	32	18.9766	0.0359	0.6800
Structure Installation & Assembling	7	6.2566	0.0097	0.2512
Commissioning	6	2.3852	0.0046	0.0883

Table 7.3-5: Pollutants Discharged into the Air by the Equipment Used during the Construction Activities

As shown, the most critical phases occur while earth moving, and concrete works are carried out and while preparing the areas and during construction of foundations.

In any case, it should be noted that these emissions are concentrated in a limited period and occur inside the boundaries of the project boundary. The repercussions are entirely acceptable and will only affect the plant area. The associated impacts are therefore expected to be low and, in any case, reversible.

Overall, during construction phase there will be impacts on air quality due to construction site equipment. However, the adoption of the proposed mitigation measures will allow reducing the impacts to an acceptable level, especially as they are limited to the construction phase.

7.3.1.3 Dust Emissions from Earth working and Vehicles Traffic

Dust lifting can be generated because of soil disturbance during earthworks excavation, filling and grading of the site area. Total dust emissions due to earth moving result from several distinct source activities:

- loading of aggregate onto storage piles (batch or continuous drop operations);
- wind erosion of pile surfaces and ground areas around piles; and
- load-out of aggregate for shipment or for return to the process stream (batch or continuous drop operations).

Estimation of the quantity of dust generated is closely related to the type of equipment used, and the duration and nature of the civil works. USEPA reports the typical emissions factors for various construction activities which are presented in the following table. These are illustrated for indicative purposes.

Sources	TSP Emission Factors	Unit
Topsoil removal by scraper	0.029	kg/Mg
Truck loading by power shovel	0.018	kg/Mg
Bottom dump truck unloading	0.001	kg/Mg
Scrapper unloading	0.02	kg/Mg
Wind erosion of exposed areas	0.38	ton/acre/year

Table 7.3-6: Uncontrolled Particulate Emission Factors for Open Dust Sources (USEPA, AP-42)

During the construction activities, atmospheric dust levels are anticipated by the movement of trucks and vehicles transporting construction material and equipment. The amount of dust generated by the activity is difficult to estimate at this stage because no information on the overall amount of materials to be excavated has been provided; however, the occurrence and significance of the dust generation depend upon meteorological and ground conditions at the time and location of the civil works activities. In any case, under normal meteorological conditions, dust impacts should be limited to within several hundred meters around the existing cement plant boundary.

The main environmental concern associated with dust generation is then likely to be limited to occupational health risk and irritation to humans (i.e. construction workers and nearby local community). Therefore, it must be noted that the dust production during construction is concentrated within a limited period of time. The repercussions, which may be assumed to be minor and affecting only the existing plant boundary and low density of local community area, will not affect sensitive areas or receptors. The associated impact, of a temporary nature, is therefore considered to be low and, in any case, reversible.

As concern traffic, in general, an overall increase in traffic and heavy machinery movement is foreseen during the construction phase with an increase in dust emission levels. Such emissions together with exhaust emissions coming from the equipment used during the construction phase are likely to result in marginal increases in levels of SO_x and NO_x . However, the overall impact on air quality due to these emissions can be considered as low, due to the limited duration of the construction period (around 24 months). Furthermore, some emissions sources and activities, such as earth moving, land clearing and demolition works, are estimated to be short term duration, therefore the related impacts are expected to be low and, in any case, reversible.

7.3.1.4 Mitigation and Monitoring Measures for Emission of Pollutants and Dust

With the purpose to reduce the emissions of dust and gaseous pollutants during the construction phase from the equipment used for the power plant and, the following mitigation measures and good practice have to be taken into account:

- vehicle engines and other machinery will be operated only if necessary, avoiding any unnecessary emission;
- machines and equipment will be periodically checked and maintained to ensure their good working condition;
- all equipment and machines must be maintained and tested for compliance with standards and technical regulations for the protection of the environment and have appropriate certifications;
- activities will be conducted trying to use the minimum required number of means at the same time;
- electric small-scale mechanization and technical tools will be used when available and feasible; and
- repair and maintenance of construction equipment and vehicles will be performed outside of the construction site by at specialized enterprises.

Concerning dust control methods and measures, the following actions are recommended to reduce the generation of dust:

- watering or increase of the moisture level of the open materials storage piles to reduce dust levels (especially during dry season);
- enclosure or covering of inactive piles to reduce wind erosion;
- loads in all trucks transporting dust-generating materials will be sprayed with water to suppress
 dust, as well as wheels of means moving inside and outside of the construction site;
- speed reduction for the means travelling inside the construction site; and
- stabilization and re-vegetation of cleared areas that are no longer needed as soon as practicable during construction.

Environmental monitoring activities will have to be performed in order to monitor the air pollution during construction activities in the surroundings of the site and at the residential buildings located close to the site boundaries. The monitoring program to be conducted at the project site will be developed according to the following considerations:

- dust concentration (PM_{2.5} and PM₁₀) would be monitored considering that it represents the main pollutant discharged into the air during construction phase and its relatively high concentrations in rural areas as resulting from the baseline assessment (air emission in the area are mostly generated by mobile sources – vehicles traffic on unpaved road);
- monitoring points would be located in the residential areas surrounding the project site; and
- air monitoring activities would be conducted on a quarterly basis. In particular, with reference to the conveyor belt, environmental monitoring activities would have to be performed in order to monitor the air pollution during construction activities at the residential areas located close to the corridor of conveyor belt.

Overall, the construction activities of the project have been completed and no serious environmental problem especially on the ambient air quality around the power plant was found. Thus the significance of residual impacts can be considered to be very low.

	Significance of Impacts								
	Potential Impacts	Residual Impacts							
Component	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact				
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact		
Emission of Air Pollutants	Low	Insignific ant	Activity Site	Construct ion	Tempora ry	Very seldom	Negativ e		
	56	1	1	1	2	2	Very Low		
			3 4			12			

Table 7.3-7: Significance of Residual Impacts for Air Emission

7.3.2 Noise Impacts and Mitigation Measures

Potential impacts on noise environment generated by the construction phase of the power plant are discussed in the following.

The construction schedule of the power plant can be divided into four construction stages. Each stage is characterized by different noise emissions:

- Earthwork: the main noise sources are related to the use of equipment and earthwork machinery such as: bulldozers, excavators, loaders, various transport vehicles.
- Groundwork: the main noise sources are pile hammers, and excavators. It has been noted that the pile hammers noise is characterized by an impulse noise
- structure installation: the main noise sources during the structure installation stage are concrete mixer, vibrating machine, electric saw, etc., and collision noise impact during the load and unload of materials.and;
- Equipment installation: the main noise source during the equipment stage is crane elevator.

The planned construction program of the power plant will only take place during daytime period (i.e. 6:00 am till 6:00 pm). Noise levels from different activities can vary between 50 - 100 dB(A) based on the typical noise levels of machinery specified in the British Standards for Noise and Vibration Control on Construction and Operation sites (BS5228:1997).

Noise impact was evaluated considering the equipment that could operate simultaneously during the construction site. In the following table the equipment and the related sound power levels Lw (dBA) are reported.

Machinery	L _w (dBA)
Backhoe Excavator	106
Truck crane	91
Truck	91
Wheeled Loader	91
Forklift	91
Steel Plant Shearer	106
Plate Rolling machine	101
Concrete mixing truck	97
Short Blasting Machine	111
Concrete Truck Pump	91
Concrete dragging pump	106
Rotary Drilling Machine	101
Earthmover	91

 Table 7.3-8: Power Plant Construction – Noise Emission Sources

7.3.2.1 Mitigation and Monitoring Measures for Noise Pollution

The protection, mitigation and monitoring measures foreseen in order to minimize and reduce the impacts related to the noise emissions during the construction phase of the power plant are:

- to select adequate equipment (fit with noise mufflers);
- to minimize machinery and equipment unused conditions with engines in action;
- to maintain machinery and equipment in good conditions;
- to maintain an active community consultation and positive relations with local residents that will assist in alleviating concerns that might arise and resolve any potential noise complaints;
- to post warning signs within the vicinity of the impact and all personnel shall be provided with personal protective equipment. For example, workers operating equipment that generates noise should be equipped with the appropriate noise protection gear; and
- to restrict the construction activities that will generate disturbing sounds to normal working hours.

The above-mentioned mitigation measures should be considered typical for site activities as the ones under examination. It should also be noted that in EU countries temporary activities are normally regulated under derogation normative, setting noise limits on a case-by-case (normally around 70 dBA for day-time and 60 dBA for night-time and excluding the application of a maximum increase in background levels). It is pointed out that the monitoring campaign noise contribution of the site can be considered as peak condition which can occur in limited period of time within the site construction period.

In conclusion, for the reasons the noise impact generated by the construction activities to the surrounding environment at the identified receptors can be considered very low, reversible and on a local scale.

In any case, the construction phase is characterized by intermittent noise emissions and they generally not expected to be continuously operational during the entire construction period. Overall, the nature of construction noise impacts is characterized by temporary short- term reversible impacts as they cease to exist once the construction activities will be completed.

		Significance of Impacts						
	Potential Impacts	Residual Impacts						
Component	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact			
	Negative	Severity Spatial Scope		Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact	
	Low	Insignific ant	Plant Boundar y	Construct ion	Tempora ry	Infreq uent	Negativ e	
Noise Impacts	56	1	2	1	2	3	Very Low	
			4		5		20	

Table 7.3-9: Significance of Residual Impacts for Noise Level

7.3.3 Water Resources Impacts and Mitigation Measures

The potential impacts on water resources derived from the construction phase for the power plant are mainly related to water consumption; and water quality modifications.

Water necessary for the construction activities and for feeding the worker camp will be taken from the Ataran River. Consequently, the assessment of impacts on the water environment is limited to the evaluation of:

- impacts on river water availability and accessibility with respect to the water needs requested by the Project, during the construction phase, and
- impacts on groundwater quality as a result of construction activities such as deep foundation and piling works, and discharges.

7.3.3.1 Impacts Related to Water Consumption

During the construction phase, the water consumption is mainly related to:

- domestic use due to the presence of the staff and construction workers. It is planned that in average a total of 300 workers will be employed for the construction phase. The total consumption will be around 30 m³/day;
- water for concrete batching;
- soil watering for dust mitigation and management during excavation works and construction vehicles transits and washing down and cleaning equipment at localized work sites. The total consumption foreseen are evaluated in average in 300 m³/day and will vary from 230 m³/day to 430 m³/day; and
- fire-fighting system.

Overall, during the construction phase at the power plant, the average water demand can vary from $230 \text{ m}^3/\text{day}$ and $430 \text{ m}^3/\text{day}$ per normal practice. It is estimated that the main water consumption will be used for construction purposes (75%) and associated operations; whereas the remaining 25 % would serve for domestic purposes for office use, worker camp and canteen.

Taking into account that the water will be withdrawn by Ataran River (that has an average discharge amount 575 m^3/s) the impacts related to water consumption can be considered negligible because the quantities of water involved are relatively small towards the overall discharge of the river, and they will be required over a relatively short period of time.

Additionally, impacts from water consumption can be further reduced to as low as reasonably practicable by adopting water control and saving measures (discussed in the mitigation and monitoring subsection).

7.3.3.2 Impact on Water Quality

Potential sources of contamination of surficial and groundwater quality are likely to include:

- construction and site clearance activities;
- wastewater discharge;
- piling operations for foundation; and

accidental chemical or oil spill from the project operations (e.g.: refueling operations).

i) Wastewater Discharge

Potential water pollution would occur within construction phase on Ataran River and it could cause by the discharged wastewater during the construction work at the power plant.

During construction, wastewater would be discharged from the construction area as the result of rainfall on the construction unpaved areas. In any case, and in accordance to the protection, mitigation and monitoring measures to be taken into account during the construction phase (as discussed in the following sub-section), the potential surficial and groundwater contamination caused by the construction phase would be well controlled and managed and would not cause any significant impact on surrounding and downstream area.

In conclusion wastewater discharge will have negligible impact on the quality of surficial and groundwater in consideration of both the effluents characteristics, and the disposal systems; furthermore, the wastewater discharge is characterized by limited amounts (related to the river flow rate) and a temporary short – term condition.

ii) Site Preparation Works

Site preparation works will comprise the levelling of the site, earthworks and the excavations for foundations, trenching and installation of underground services.

Both surface water and groundwater resources may be subjected to potential impacts related to accidental spillage or leakage as described in the following.

iii) Accidental Events

Pollution of surface and/or groundwater may arise from accidental spills during construction (fuel, oils, grease, etc.). Both surficial water and groundwater resources will be at risk during these construction activities from potential pollution caused by accidental spillage of fuels, lubricants, cement and wet concrete.

About oil spill/leaks potentially impacting groundwater, the impact is considered as negligible taking into account the same consideration discussed at Section 6.4. Land Impacts.

7.3.3.3 Protection, Mitigation and Monitoring Measures

As discussed above, during the construction phase, the potential impacts on water resources are expected to be limited, because wastewater discharges from the construction site will be considered as a temporary event.

The potential contamination and/or erosion risks during construction phase related activities shall be mitigated by adopting good construction management practices.

Therefore, the following mitigation options shall be put in place to reduce the potential negative impacts on the water environment:

- direct runoff away from disturbed areas by means of temporary drainage ways, utilizing for example cut-off drains;
- provide containment measures for hazardous material and storage areas to prevent spills or leakage of fluid materials which may soak into the ground and reach the groundwater table;
- design of store hazardous material providing suitable reception facility with impervious flooring, roofing and suitable drainage control;

- regular maintenance and checking of all plant and machinery in order to minimize the risk of fuel or lubricant leakages;
- no discharge of untreated wastewater to soil and groundwater and onto surficial water bodies;
- as construction activities typically generate disturbed soil, concrete fines, oils and other waste, on-site collection and settling of storm water, prohibition of equipment wash down, and prevention of soil loss and toxic releases from the construction site are necessary to minimize water pollution; and
- training and equipping relevant staff in protected storage and handling practices, and rapid spill response and clean up techniques.

After conducting mitigation measures, the significance of residual impacts on water resources during construction phase can be considered very low.

	Significance of Impacts								
	Potential Impacts	Residual Impacts							
Component	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact				
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact		
Water Resource Impacts	Low	Insignific ant	Plant Boundar y	Construct ion	Tempora ry	Infreq uent	Negativ e		
	49	1	2	1	2	3	Very Low		
			4		5		20		

 Table 7.3-10: Significance of Residual Impacts for Water Resources

7.3.4 Land Impacts and Mitigation Measures

In the present section, the potential impacts on land component during construction and operation phases are assessed, together with the related protection and mitigation measures to be adopted in order to avoid or minimize the related potential impacts.

7.3.4.1 Land Use

The Project activities will entail temporary occupation of land to set up the construction site and the temporary worker camp. During construction phase, land occupation will be limited to areas categorized as agricultural land that will be acquired for the needed of the Project.

In particular, the occupied area is private land that already purchased, therefore, impacts connected with land occupation in terms of restrictions on the land use are considered negligible during the construction phase.

7.3.4.2 Landscape Impacts - Construction Phase

The activities related to the construction of the Project would be phased, temporary and restricted to the construction period, and therefore the resulting landscape and visual impacts will also be temporary. The possible impacts on landscape resulting from the construction phase include those resulting from:

• impacts arising from the installation of all site compound, including temporary living and production areas;

- temporary works and installations, and temporary storage;
- the installation and movement of heavy and light construction machinery (including tall cranes);
- construction lighting, including high mast lighting for activities; and
- special load movement and storage.

Construction phases will be carried out in about 24 months as scheduled. Completion will be accompanied with waste collection. Therefore, construction phases only affect landscape in a limited period of time.

As described in the baseline, the general landscape within the development area is characterized by a flatting, alluvial area and a hilly area in the West (in correspondence of the presence of the limestone quarry).

Constructions activities may change the visual landscape of the Project area. Site clearance activities, gathering of equipment and construction materials may reduce the scenic beauty. Nevertheless, the impact is for a short duration, and reversible as the project plan includes landscape planning, green belt development etc.

In conclusion, taking into consideration the low sensitivity of the receiving landscape, the absence of any landscape designations and the temporariness of the activities duration, it is considered that the construction impacts are most likely to be of low negative significance with regard to both landscape and visual impacts.

7.3.4.3 Protection, Mitigation and Monitoring Measures

As consturction related activities can arise visual impacts that can be highly visible from the surrounding area, the following mitigation measures are recommended to be taken into account;

- minimize the clearance of existing trees and ground vegetations. If feasible, No-cutting zone should be established with the project area,
- Proper fencing that match with the existing environment shoud be established,
- Excavated topsoil shoud be covered or watered so as to avoid wind erosion. If feasible, sulpus topsoil should be re-used in for the new planting area and/or properly disposed according to the local municiple acts.

The consturction is already completed along with recommended mitigation measures. Therefore, the significance of residual impacts can be considered to be very low.

		Significance of Impacts						
	Potential Impacts	Residual Impacts						
Component	Consequence & Likelihood	Requence & kelihoodConsequence of ImpactJegativeSeveritySpatial ScopeDur		Consequence of Impact		Likelihood of Impact		
	Negative			Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact	
	Low	Insignific ant	Plant Boundar y	Construct ion	Tempora ry	Very seldom	Negativ e	
Land Impacts	40	1	2	1	2	2	Very Low	
			4		4		16	

 Table 7.3-11: Significance of Residual Impacts for Land

7.3.4.4 Soil Impacts and Mitigation Measures

Potential impacts on soil associated to construction phase are identified and assessed in the following:

- Soil erosion: The increasing of soil erosion could be caused by the removal of vegetation and excavation activities for the construction of the power plant, all the construction activities will be performed within the present project boundary. In any case, if necessary, effective construction site drainage measures, utilizing cut-off drains (to divert surface runoff from exposed soils or construction activities, top-soil and sub-soil will be removed especially at the foundations area. The excavated soil will be temporary stored using the best available procedure and techniques to avoid loss and/or degradation. After the construction works will be completed, soil cover shall be placed back on for reinstatement activities;
- Modification of the geomorphologic condition: The construction activities at the site of interest will not cause detrimental changes in geomorphologic landforms and site setting, considering that the site is quite flat. An "open excavation" method will be adopted, and it will determine only temporary changes in the micro-topography of the area. The original conditions will be then restored at the end of excavation works and construction phase;
- Changes in geological and lithological conditions: After excavation activities and following backfilling, compaction of soil as well as mixing of construction material with natural soil, should lead to changes in the physical, mechanical and other soil properties. These modifications are in any case evaluated as negligible because of small entity. Furthermore, the changes will not affect soil with particular archaeological or natural landscape values, therefore the possible related impacts could be considered negligible also on historical and archaeological point of view; and
- Pollution of soil: Pollution could affect soil in case of accidental spillage of oil from vehicles used for transportation of construction material and accidental spillage from the building material used for construction purposes. These accidental events could be considered remote if specific maintenance activities and safety procedures will be correctly implemented. More details are provided in the following section presenting the main applicable protection and mitigation measures.

7.3.4.5 Protection, Mitigation and Monitoring Measures

With reference to the construction phase, the following environmental protection and mitigation measures will be implemented in order to reduce or prevent potential impacts on soil:

- to prevent soil contamination by oil or grease spills, leakages or releases, all manipulations of oil derivate in the process of construction and provision of fuel to the machines should be performed with maximum attention;
- leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated properly before disposal;
- construction waste and debris shall be collected on a regular basis, covered by roof and disposed of at designated landfills;
- it must be prohibited to operate with equipment and vehicles outside the designated work areas and roads; and
- training and equipment will be in place to minimize the potential environmental impact in the case of accidents (for example through the use of spill kits).

With particular reference to landscape impacts, the following mitigation measures shall be taken into account during the construction activities:

• machinery and materials will be stored tidily during the works. Tall machinery including cranes will not be left in place for longer than required for construction purposes, in order to minimize its

visual intrusion;

- temporary roads providing access to site compounds and work areas will be maintained free of dust; and
- security and work lighting shall be shielded and directed downwards, and the use of tall mast lights shall be carefully assessed.

In conclusion, taking into account the mitigation measures implemented, the medium term and the reversibility of the activities, the soil impacts during construction phase can be considered as very low.

		Significance of Impacts							
	Potential Impacts	Residual Impacts							
Component Consequence & Likelihood		Conse	Consequence of Impact			Likelihood of Impact			
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact		
	Low	Insignific ant	Activity Site	Construct ion	Tempora ry	Very seldom	Negativ e		
Soil Impacts	30	1	1	1	2	2	Very Low		
			3		4		12		

Figure 7.3-12: Significance of Residual Impacts for Soil Impacts

7.3.5 Solid Waste Impacts and Mitigation Measures

Solid waste related issues are discussed under PS3, IFC EHS General Guidelines (Section 1.6) and IFC EHS Guidelines for Thermal Power Plant (Section 1.1). In general, the Project is requested to avoid the generation of hazardous and non-hazardous waste materials. In case waste generation cannot be avoided, the project through the protection and mitigation measures to be taken into account would reduce the generation of waste and recover or reuse the waste in a safe way for human health and the environment; instead, in case waste cannot be recovered or reused, it is foreseen to treat, destroy, or dispose of it in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the waste material.

The different types of waste that will arise during construction and operation phases were identified through an understanding of the processes associated with the different parts of the proposed development. Considering that there is no specific information available regarding the quantities of waste that are likely to be produced during Project phases, the impact assessment was performed qualitatively.

7.3.5.1 Waste Impact Assessment

The present Section illustrates the potential environmental and social impacts of waste associated with the power plant construction phase throughout the following stages of the waste management process:

- temporary storage on the site area; and
- management and disposal of waste.

7.3.5.2 Waste Identification

The construction phase will be carried out through different activities as civil, mechanical, electrical installation operations and liquid effluents which in turn will generate volumes of waste with typology

characteristic of the nature of each activity.

In general, waste streams, generated during construction phase of the project, shall be related to:

- excavation spoil;
- construction waste;
- domestic waste; and
- sewage and wastewater.

The generation and handling of these waste streams are discussed in the following sections.

Waste generated during excavation activities will be mainly related with the excavation works for foundations of the major items of plant and equipment, underground piping and ponds development and ground levelling.

Wherever possible, the spoil which is excavated will be re-profiled around the site or re-used for landscaping. The surplus amount (if any) is planned to be disposed of offsite in authorized plants.

Solid construction waste typically includes:

- a variety of non-hazardous materials including surplus of concrete, asphalt, plastic, glass, metals, vehicle tyres and packaging materials (plastic, card, cardboard, etc); and
- a small amount of hazardous waste (produced also during maintenance activities) such as paints, vehicle and machineries batteries, used oils (lubricating and hydraulic oils from machinery and vehicles), fluorescent light bulbs and contaminated containers (such as old paint tins, etc).

The solid waste generated during construction phase of the Project will either be recycled or sent to a transfer facility for subsequent disposal.

Domestic waste will be generated by the workers at the construction camp. It may comprise nonhazardous materials including for example paper, food residues, used containers (bottles, can, etc.), broken furniture and packaging, and sanitary effluent.

The potential adverse impacts resulting from the generation of waste during the construction phase may be summarized as follows:

- increasing of traffic while disposing waste at licensed landfills;
- possible contamination of groundwater or soil caused by an improper waste management; and
- potential negative impact on community health.

7.3.5.3 Mitigation Measures for Waste

A Waste Management Plan (WMP) will be prepared for managing the waste during the construction phase, in order to minimize the potential negative impact on the environment and community health. The following main environmental standards for waste management will be adopted:

- all types of waste generated during the construction phase should be inventoried and scheduled;
- local waste management facilities will be identified and evaluated;
- waste will be sorted into a number of waste streams (groups of waste requiring common handling methods, i.e. re-use, decontamination/processing, authorized disposal, etc.);
- waste storage facilities must be fenced on the perimeter, properly lighted and with access constraints for unauthorized people;
- no uncontrolled disposal of waste will be carried out during the construction phase, as all waste streams will be directed to proper treatment;

- disposal of waste and hazardous materials will be performed by authorized in-country contractors according with local legislation;
- maximization of reuse and recycle, for example by returning the materials to the original vendor for commercial regeneration. When no market or capability exists for a given waste, the waste will be temporarily stored on site and sent to an appropriate off-site treatment/disposal facility;
- specific disposal procedures for all waste streams will be identified (transporting, auditing, recording, monitoring, etc);
- transporting vehicles will be properly marked and drivers will carry the appropriate documents describing nature of the transported waste and its hazardous degree. A register of the quantities and characteristics of the waste sent to landfill, indicating origin, type, quantities and landfill locations will be maintained;
- all vehicles and containers will be designed to prevent leakage of transported liquid and solid waste; drivers will have specialized training license related to handling and disposal of cargo;
- incineration of combustible waste and construction debris is prohibited; and
- construction site will be periodically cleaned.

In any case, taking into account the proposed measures to ensure proper handling and disposal of generated solid waste (see the following section), and if all the potentially hazardous waste is disposed of correctly and the additional waste deposited at the local dumpsites can be reduced to the absolute minimum, the residual impact associated with waste generated during the construction phase should be of very low significance and of a short-term duration.

		Significance of Impacts							
	Potential Impacts	Residual Impacts							
Component	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact				
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact		
	Low	Insignific ant	Activity Site	Construct ion	Tempora ry	Very seldom	Negativ e		
Solid Waste Impacts	42 1	1	1	1	2	2	Very Low		
			3 4			12			

Table 7.3-13: Significance of Residual Impacts for Solid Waste

7.4 Impact Assessment of Emissions to Air during Operation Phase

7.4.1 Air Quality Impacts and Mitigation Measures

During plant operation, the air emissions are mainly characterized by particulate matter, SO_2 and NO_x . Depending upon the removal efficiency of emission control systems adopted at the power plant, fine particles-PM, SO_2 and NO_x will be emitted from the stack.

7.4.1.1 PM Emission

Particulate matters emission will be generated from the coal conveyor belt, temporary coal yard (open type), bottom ash handling. The main sources of fine particle ($PM_{2.5}$ and PM_{10} emissions are coal power plant stack.

(i) PM Emisison Esitmation

Since the PM concentration in the flue gas, the flue gas flow rate and the removal efficiency of associated control technology are available; the following method is used to estimate the PM emission from the stack.

$$Em_{i,t} = V_t \times C_{i,t}$$

Where,

t = Period of operation (h) $Em_{i,t}$ = Emission of pollutant *i* in the period of operation *t* (mg/h) V_t = Flue gas volume flow rate in period *t* (m³/h) $C_{i,t}$ = Flue gas concentration of pollutant *i* in period *t* (mg/Nm³)

Calculation;

 V_t , Flue gas volume flow rate in period t (m³/h) = 230,000 m³/h $C_{i,t}$, Flue gas concentration of pollutant i in period $t = 10 \text{ mg/Nm}^3$

$$Em_{i,t} = 230,000 \times 10$$

= 2,300,000 mg/h (0.64 g/s)

The unit, from emission, (g/s) to concentration (mg/Nm³) is converted by the following equation;

concentration
$$\left(\frac{g}{m^3}\right) = \frac{\text{emission rate}\left(\frac{g}{s}\right)}{\text{gas flow}\left(\frac{m^3}{s}\right)} = 0.01 \text{ g/m}^3 (10 \text{ mg/Nm}^3)$$

Table 7.4-1:	Estimated	PM	Emission	from	the Stack

Pollutant	Estimated emission based on designed emission values	Actual Emission from CEMS	Guideline Value ¹
PM (g/s)	0.64 (2,300,000mg/h)	0.5 (1,800,000mg/h)	-
PM ² (mg/Nm ³)	10	9	50

7.4.1.2 PM Emission Control System

Two units of Bag filters with the removal efficiency of ≥ 99 % are installed at the downstream of each CFB boiler so PM from the flue gas to be removed. The specification of bag filter is presented in table 7.4-2.

¹ Thermal Power (Solid Fuel, 50-600 MW), Energy Sector Development, Industry Specific Guideline, NEQG.

² Emission values are converted to mg/Nm³ to be comparable to NEQG value.

Bag filter (for Unit 1 and Unit 2)	Unit	Values
Gas Volume	m ³ /h	230,000
Normal gas temperature	-	≤ 145
Highest gas temperature	-	≤ 155
PM inlet concentration	g/Nm ³	<i>≤</i> 30.4
PM outlet concentration	mg/Nm ³	<i>≤</i> 10
Resistance lost	Ра	≤1500
Filtration speed	m/min	0.77
Air leak	%	≤3
Ash clean pressure	MPa	0.3 – 0.4
Compressor air consumption	Nm ³ /min	4
Configuration parameter	-	
Bag filter size	-	130*7500
Bag of filter material	-	PPS + PTFE (550g/m3)
Total Bag of filter	-	1548
Total filtration area	m ²	4740
Chamber quantity	-	2*3
Each of filtration area	m ²	790
Pulse valve size	Inch	3
Pulse valve quantity	-	72
Casing pressure	Ра	± 6000

Based on the stack emission estimation and CEMS results, the concentrations of particulate PM are within the applicable limits, and related air impact can be considered as low.

7.4.1.3 Sulphur Dioxide (SO₂) Emission from Coal Combustion

The main source of SO_2 emissions during the operation of power plant is the combustion of Sulphur present in coal fed to the power generation plant.

DESCRIPTIONS			As Received	Air Dried	Dry
Moisture					
	Total	%	10.45		
	Inherent	%		3.04	
Ash		%	21.40	23.17	23.90
Volatile Matter		%	37.85	40.98	42.26
Fixed Carbon		%	30.30	32.81	33.84
Calorific Value					
	Gross	cal/g	5257	5692	5870
	net	cal/g			
Sulfur					
	Bomb Sulfur	%	0.35	0.37	0.39
Size					
	15-50 mm				

Table 7.4-3: Indo (Low Sulfur)

Parameters			As Received	Air Dried	Dry
Moisture					
	Total	%	18.34		
	Inherent	%		10.48	
Ash		%	5.06	5.54	6.19
Volatile Matter		%	40.55	44.44	49.65
Fixed Carbon		%	36.06	39.53	44.16
Calorific Value					
	Gross	cal/g	5550	6083	6796
	net	cal/g	5560		6588
Sulfur					
	Bomb Sulfur	%	1.59	1.74	1.94
Size					
	15-50 mm				

Table 7.4-4: Indo (Normal Sulfur)

Estimating Sulfur Dioxide Emissions

The emission of SO_2 from the stack is estimated by using similar equation used in PM emission calculation. Since desulfurization is conducted in two stages-limestone powder injection in furnace (primary deSOx) and limestone slurry spraying at FGD system (secondary deSOx), step-by-step SO₂ emissions are calculated using representative emission control efficiencies.

Data	Value
Designed SO ₂ emission of boiler back pass-	701 ppm
	$(2004 \text{ mg/Nm}^3),$
Referenced SO ₂ removal efficiency by injecting dry sorbent	70% ³ ,
(limestone) at boiler	
The calculated concentration of SO ₂ after dry sorbent injection	210 ppm
(primary deSOx)	$(601 \text{ mg/Nm}^3),$
Referenced SO ₂ removal efficiency of FGD system (secondary	90% ³ ,
deSOx)	
The calculated concentration of SO ₂ after FGD system (secondary	21 ppm
deSOx)	(60 mg/Nm3)
Flue gas flow rate	230,000 m ³ /h (63.89m ³ /s)

Emission rate $(g/s) = \text{concentration} (g/m^3) \times \text{gas flow} (m^3/s)$

Table 7.4-5: Estimated SO2 Emission from the Stack

Pollutant	Estimated emission based on designed emission values	Actual Emission from CEMS	Guideline Value ⁴
$SO_2(g/s)$	3.83 (13,788,000 mg/h)	3.34 (12,000,000mg/h)	-
SO ₂ ⁵ (mg/Nm ³)	60	50	900

³ Table 0-Error! Main Document Only.: Efficiency of Representative Emission Reduction Efficiency

 ⁴ Thermal Power (Solid Fuel, 50-600MW), Energy Sector Development, Industry Specific Guideline, NEQG
 ⁵ emission values are converted to mg/Nm³ to be comparable to NEQG

SO₂ Emission Control

Desulfurization is conducted limestone powder injection at furnace (primary deSOx) and limestone slurry spraying at FGD system (secondary deSOx). The primary deSOx process is considered to be 70% removal efficiency whereas the secondary deSOx process, 90 % according to the ABC EIM, 2013.

Based on the estimated emission and CEMS results, the sulphur dioxide (SO_2) from the stack are within the guideline value of industry specific sector. Thus, the impact on this component can be considered low.

7.4.1.4 Nitrogen Dioxides (NO₂) Emission

The impacts generated by nitrogen oxides (NO_x) on surrounding environment are mainly formed by the reaction of nitrogen (N_2) in air with oxygen (O_2) at the high temperatures reached during the power generation process.

Estimating Nitrogen Oxides (NO_X) Emission

Since the designed concentration of NOx at the Boiler outlet is 200 ppm (410 mg/Nm³), and flue gas flow rate are available, the same equation used for PM and SO_2 calculation is used for NOx estimation.

Pollutant	Estimated emission based on designed emission values	Actual Emission from CEMS	Guideline Value ³
$NO_X(g/s)$	26.19 (94,284,000 mg/h)	8.78 (31,600,000 mg/h)	-
NO _x ⁴ (mg/Nm ³)	410	158	510

NO_x Emission Control

Emission of NOx is mainly controlled by adjusting combustion temperature and air supply at Circulating fluidized bed (CFB) boiler which can significantly inhibit the generation of NOx, whose content is $\leq 410 \text{mg/Nm}^3$ at 7%O₂. The operational functions of CFB boiler are stated in section 3.7.1.

According to the estimated emission and CEMS results, NO_X concentrations from the stack during operation period are well below the guideline limit at 510 mg/Nm³. Therefore, NOx impacts from the power plant can be considered as low.

7.4.1.5 CO₂ Emissions

 CO_2 emission from the combustion of coal at power plant is estimated by using the following method.

$$Em_i = A_i \times EF_i$$

where,

 $Em_i = emission of pollutant i (ton/yr)$

 A_i = activity rate of pollutant i (ton/yr)

 EF_i = emission factor of pollutant i (lb/ton).

 $ER_i = Overall \ control \ efficiency \ of \ pollutant \ i \ (\%)$

Calculation;

Coal consumption rate -219,000 ton/year

Emission factor of $CO_2 - 0.15 \ lb/ton^6$

 $Em_i = 219,000 \times 0.15 = 32,850 \text{ ton/yr}$

According to calculation, multiplying mass of fuel consumption (600 ton/year) by emission factor^a (0.15lb/ton), the total CO₂ emission from the coal-fired power plant is 32,850 ton/year. In addition due to the lack of CO₂ emission data base especially for the coal used power plant in Myanmar, the emission are referred to CDIAC-Carbon Dioxide Information Analysis Center (2013) which are presented in the following figure to estimate the CO₂ emission contribution from this project. In 2013, CDIAC estimated that the annual CO₂ emission from the solid fuel combustion was approximately 15 billion tones while this 40MW-plant generates 32,850 ton of CO₂ annually which contributes about 0.0002 % to global CO₂ emission by solid fuel. This amount is very low when compared with global CO₂ emission by solid fuel. Thus, global warming impact from this project alone can be considered as low.



Figure: 7.4-1: Global CO2 emission by sources

CO₂ Emission Control

 CO_2 emission during the combustion of coal is controlled at CFB boiler. The boiler is designed to increase the combustion efficiency by circulating unburned particles to make the combustion tempearture more stable. The higier efficiency in conbusiton, the lower consumption in fuel that lead to the lower by-product ash and CO_2 emission.

⁶ Emission Factor is referred to AP42, Table 1.7-1, Emission Factors For SOx, NOx, CO, And CO₂ from Uncontrolled Lignite Combustion SCC 1-01-003-17/1. https://www3.epa.gov/ttnchie1/old/ap42/ch01/s07/final/c01s07_oct1996.pdf

7.4.1.6 Heavy Metals

The amount of heavy metals emission from the stack may vary depending on the efficiency of control devices-bag filters- because toxic elements especially heavy metals are presented in the fly ash and emitted as fine particles. Currently, the two units of bag filters have 99.97% removal efficiency and only 0.03% of fly ash which might contain heavy metals can be emitted to the atmosphere. Despite heavy metals concentration in the flue gas would be in very low, the heavy metals emission is considered using the following methods.

$$Em_i = A_i \times EF_i (100 - ER_i/100)$$

where,

 $Em_i = emission of pollutant i (g/yr)$ $A_i = activity rate of pollutant i (mass of fuel consumption in GJ)$ $EF_i = emission factor of pollutant i (g/GJ).$ $ER_i = Overall control efficiency of pollutant i (%)$

Coal consumption rate - 6,418,364 GJ, (converted from coal consumption rate at 219,000 ton/year), Note: 1 tonne of coal equivalent to gigajoule = 29.3076 gigajoule.

Flue gas flow rate⁷ – 63.89 m³/s (converted from 230,000 m³/h of flue gas flow rate)

Emission factors⁸ are provided in the following table.

Parameter	Emission Factor (mg/GJ)	Concentration in g/s	Concentration in mg/Nm ³	Guideline limit*, mg/Nm ³
Arsenic (As)	8.0	1.63E-02	2.55E-04	-
Cadmium (Cd)	1.1	2.24E-03	3.51E-05	0.0153
Copper (Cu)	4.8	9.77E-03	1.53E-04	-
Mercury (Hg)	1.7	3.46E-03	5.42E-05	0.061
Nickel (Ni)	5.7	1.16E-02	1.82E-04	-
Lead (Pb)	8.6	1.75E-02	2.74E-04	0.153

 Table 7.4-8: Estimated Concentration of Heavy Metals

*U.S. EPA Promulgated 12/95 for New Large Units

Heavy Metal Emission Control

As discussed in above section, the heavy metals emission depends on the removal efficiency of control technologies. The selection of coal used is of also importance to reduce heavy metals emission. The power plant is now using the coal with lower ash and heavy metal content. Besides installation of higher removal efficiency of bag filters reduces the amount of ash which includes heavy metals. Thus, the impacts can be considered as low accordingly.

7.4.1.7. Continuous Emission Monitoring System

CEMs system of power plane record SO₂, NOx, PM, O₂ with real time function and can track back the

⁷ Flue gas flow rate is referred to Table 3.8-4.

⁸ Emission Factors, are referred to Table 4.2, Emission factors (g/t) used for calculation of Pb and Cd emission, according to different methodologies, Estimation of heavy metal emissions from coal-fired power plants. Table 6.1, Emission factors for coal combustion, power plants and district heating plants, wet bottom boilers, Improved Inventory for Heavy Metal Emission from Stationary Combustion Plants (1990-2009)

record maximum 1 week. Daily Monitoring Display of Emission result with Myanmar Language. So Public can see easily about monitoring result of emission daily.



Figure 7.4-1: Demonstration of Continuous Monitoring System in MCL

	Significance of Impacts								
Component	Potential Impacts	al Impacts Residual Impacts							
	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact				
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact		
Emission of Air Pollutants	High	Insignific ant	Local area	Life of Plant Operatio n	Regularl y	Very seldom	Negativ e		
	120	1	3	4	4	2	Low		
			8		6		48		

Table 7.4-9: Significance of Residual Impacts

7.4.2 Noise Impacts and Mitigation Measures

Impacts on noise environment potentially generated by the activities of the power plant are provided in the following along with recommended mitigation measures.

The noise intensity when the equipment operate is usually among $85 \sim 110$ dB(A). The noise intensity, preventive measures and noise reduction effect of the project main equipment are shown in Table 7.4-10.

No.	Noise Source	Noise Intensity	Preventive Measure	Noise Reduction
1	Coal mill	90~100	Foundation vibration reduction	10~15
2	Water pump	85~90	Flexible joints and Workshop closed	15~20
3	Condensing steam turbine	~105	Foundation vibration reduction, install silencer and Workshop closed	5~15

Table 7.4-10: Main	Equipment N	oise Intensity,	Prevention	Measures	and Effects	Unit: dB	6 (A)
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During the test run period, the monitoring of noise level produced from the operation of the MCL power plant at 4 receptors were done.

Exposure levels measured at the four receptor points are all well within the IFC EHS guideline and National Environmental Quality (Emission) Guideline. Based on the monitoring camping conducted and the consideration reported above, the noise impact related to the operation phase of the power plant can be considered as low.

	Significance of Impacts								
	Potential Impacts	Residual Impacts							
Component	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact		npact		
	Negative	Severity Spatial Scope Duration		Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact			
Noise Impacts	Medium-High	Insignific ant	Activity Site	Life of Plant Operatio n	Regularl y	Very seldom	Negativ e		
	100	1	1	4	4	2	Low		
	100		6			6			

Table 7.4-11: Significance of Residual Impacts

	Leasting			17-18-day Results, in March 2016	18-19-day Results, in March 2016	19-20-day Results, in March 2016	Target Value to	
No.	Location	Items	Unit	Measured Value	Measured Value	Measured Value	be applied	Country's Standard
				(Mean) LAeq	(Mean) LAeq	(Mean) LAeq		
		Noise		48	49	46	55	Myanmar
1	N-1	Noise	uD(A)	(Day Time)	(Day Time)	(Day Time)	55	Standard
1.	(Pauk Taw village)			41	42	39	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	45	Standard
		Noise		51	50	52	55	Myanmar
2	N-2 (Kawpanaw Village)	Noise	UD(A)	(Day Time)	(Day Time)	(Day Time)	33	Standard
2.				41	48	49	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	43	Standard
		Noisa	$d\mathbf{P}(\mathbf{A})$	58	57	51	55	Myanmar
3	N-3	Noise	uD(A)	(Day Time)	(Day Time)	(Day Time)	55	Standard
5.	(Kwangan Village)			55	45	43	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	43	Standard
		Noise		53	55	58	55	Myanmar
	N-4	Noise	uD(A)	(Day Time)	(Day Time)	(Day Time)	55	Standard
4.	(Kadonsit Village)			52	49	51	15	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	43	Standard

 Table 7.4-12: Summarized/Comparison Data Sheet for Noise Monitoring Annual Results, March 2016

Note: Target Noise Level 70 dB(A) is "Industrial & Commercial" zone standard which announced on 29, DEC 2015 Myanmar National Environmental Quality (emission) Guideline.

	.	_		26-27-day Result, in July 2016	27-28-day Result, in July 2016	28-29-day Result, in July 2016	Target Value to	
No.	Location	Items	Unit	Measured Value	Measured Value	Measured Value	be applied	Country's Standard
				(Mean) LAeq	(Mean) LAeq	(Mean) LAeq		
		Noise	$d\mathbf{P}(\mathbf{A})$	50	55	49	55	Myanmar
1	N-1	Noise	dB(A)	(Day Time)	(Day Time)	(Day Time)	33	Standard
1.	(Pauk Taw village)			66	52	49	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	45	Standard
		Naina	dB(A)	48	60	60	55	Myanmar
2	N-2 (Kawpanaw Village)	Noise		(Day Time)	(Day Time)	(Day Time)	55	Standard
2.				41	55	53	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	45	Standard
		Noisa	Naina JD(A)	57	62	66	55	Myanmar
3	N-3	Noise	uD(A)	(Day Time)	(Day Time)	(Day Time)	55	Standard
5.	(Kwangan Village)			61	54	54	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	45	Standard
		Noise	$d\mathbf{P}(\mathbf{A})$	67	63	60	55	Myanmar
	N-4	Noise	ub(A)	(Day Time)	(Day Time)	(Day Time)	55	Standard
4.	(Kadonsit Village)			75	60	51	15	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	43	Standard

Table 7.4-13: Summarized/Comparison Data Sheet for Noise Monitoring Annual Results, July 2016

Note: Target Noise Level 70 dB(A) is "Industrial & Commercial" zone standard which announced on 29, DEC 2015 Myanmar National Environmental Quality (emission) Guideline.

N	Leastin	L	TT '.	14-15-day Results, in Nov 2016	15-16-day Result, in Nov 2016	16-17-day Results, in Nov 2016	Target Value	
No.	Location	Items	Unit	Measured Value	Measured Value	Measured Value	to be applied	Country's Standard
				(Mean) LAeq	(Mean) LAeq	(Mean) LAeq		
		Noisa	$d\mathbf{P}(\mathbf{A})$	48	47	50	55	Myanmar
1	N-1	NOISE	uD(A)	(Day Time)	(Day Time)	(Day Time)	55	Standard
1.	(Pauk Taw village)			54	51	50	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	43	Standard
		Naina		56	56	48	55	Myanmar
	N-2 (Kawpanaw Village)	Noise	dD(A)	(Day Time)	(Day Time)	(Day Time)	33	Standard
2.				54	49	49	15	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	43	Standard
		Noiso	$d\mathbf{P}(\mathbf{A})$	62	65	69	55	Myanmar
3	N-3	NOISC		(Day Time)	(Day Time)	(Day Time)	55	Standard
5.	(Kwangan Village)			50	52	49	45	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	43	Standard
		Noice	$d\mathbf{D}(\mathbf{A})$	63	60	59	55	Myanmar
	N-4	Noise	dD(A)	(Day Time)	(Day Time)	(Day Time)	33	Standard
4.	(Kadonsit Village)			52	53	54	15	Myanmar
				(Nighttime)	(Nighttime)	(Nighttime)	4J	Standard

Table 7.4-14: Summarized/Comparison Data Sheet for Noise Monitoring Annual Results, November 2016

Note: Target Noise Level 70 dB(A) is "Industrial & Commercial" zone standard which announced on 29, DEC 2015 Myanmar National Environmental Quality (emission) Guideline.

7.4.3 Water Resources Impacts and Mitigation Measures

The potential impacts on water resources derived from the operation phase of the power plant and its facilities are mainly related to:

- water consumption; and
- water quality modifications.

The operation phase is characterized by an overall amount of approximately 209,000 m^3/d of water will be used, subdivided as reported in the following Table 7.4-15.

Consumptions	Amount (m ³ /day)
Cement Production	9,600
Power Cooling Water	199,200
Water for Domestic purposes (sanitary water)	330
Fire-fighting water	540
TOTAL	209,670

Table 7.4-15: Water Consumptions

7.4.3.1 Impacts Related to Water Consumption

The water demand for the operation phase will be entirely provided by the Ataran River and rainwater collected by the small reservoirs (Pond 1, 250,000 m³ and Pond 2, 150,000 m³ water ponds) that can collect rain water to use for power plant. Based on the hydrogeological features of the site, the Project area is settled in alluvial plain rich in water and groundwater sources even in the dry season.

Estimate daily water usage: 8,800 m³

Daily water return: 2,000 m³ (from industrial)

Actual Daily usage: 8,640 m³

Monthly usage: $8,640 \text{ m}^3 \text{ x } 30 = 259,200 \text{ m}^3$

Reserve raw water pond $#1 = 250,000 \text{ m}^3$. Can use for almost 1 month.

 Table 7.4-16: Water Utilization by Months

36 1	
Month	Amount of Water Utilization
Jan	
Feb	
March	Actual need to fill water for 5 months (Jan, Feb, Mar, April, May)
April	
May	
June	
July	During Paining Sasson (Juna, July, August, San) (No need to fill up water)
Aug	During Ranning Season (June, Jury, August, Sep) (No need to Thrup water)
Sep	
Oct	Enough reserve water from Pond #1 for Oct and Nev
Nov	Lifetigh reserve water from Fond #1 for Oct and Nov
Dec	Reserve water from Pond #2 (capacity): 150,000 m3. Can use for for about 17 days in December.

Total amount of water filled from Ataran River: $259,200 \text{ m}^3 \text{ x} 5 \text{ months} = 1,296,000 \text{ m}^3 \text{ per year.}$

Since the distance from the project site to the mounth of Ataran river is approximately 3404.52m, the average river depth in dry season is 5.70 m and the width is about 100 m, the volume of water is calculated below;

Total Water Volume of Attran River in Dry Season = $L \times W \times H$

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Thus, Total Water Volume of Attran River in Dry Season is about 1940576. 40 m³

The daily water consumption during 5 months (Jan-May) is approximately 8640 m³

Accordingly, the project consumes 0.45 % of Attran river water during the fill up period (Jan-May). Therefore, the impact of water consumption by the project during the dry season can be considered as low.

The Depth	Average 12-14 m
The Width	Average 100 m
Water flow	0.30 to 0.40 m/s
Distance from the mounth of Ataran river	3404.52 m (11170 ft)
The depth of Ataran river in dry season at jetty	5.70 m (18.7 ft)
The depth of Atraran river in wet season at jetty	7.01 m (23 ft)
The depth of Ataran river (near canal) in dry	14.70 m (48 ft)
season	
River bed condition	U shape
Average high tide (dry season)	7 ft
Average low tide (dry season)	3 ft
Average high tide (wet season)	17.50 ft
Average low tide (wet season)	5 ft

Table 7.4-17: The general information of Ataran River





Source: MCL

Figure 7.4-2: Water Balance Diagram of Power Plant

Based on the above, it can be concluded that the overall impact on the water availability for the existing purposes (surrounding villages, agriculture purposes, etc.) can be considered of low significance.

7.4.3.2 Impact on Water Quality

Wastewater effluents from the thermal power plant are generated by cooling operations in different phases of the process (e.g. cooling tower blow down). Domestic wastewater will be generated from

the manpower camps and office facilities.

Wastewater from process and utilities will not directly discharge into the environment. Waste water management system of the plant is a closed system. Effluent is recycling without discharging from the plant.



Figure 7.4-3: Recirculation System of MCL Wastewater Management

In any case, the use of a proper water treatment system, and appropriate protection measures, together with the potential volume of involved materials, can be considered as a low impact.

7.4.3.3 Mitigation Measures for Water Resource Impacts

The protection, mitigation and monitoring measures to be taken into account during operation are the following:

 water used for cooling system is reused or circulated in cooling water system. Therefore, the production does not cause water pollution;



Figure 7.4-4: Cooling Tower Water Process and Treatment System

For pH adjustment, feed sulphuric acid by using auto mode pH sensor at Cooling Tower. If any of control parameter is not in target range, drain the water to sediment pond as necessary.



Figure 7.4-5: Boiler Feed Water Process and Treatment System

- Provision of separated water drainage and treatment system for outdoor coal storage. Compact the storage ground with clay to prevent seepage into the ground.
- As per MCL Historical data Maximum flooding level in plant area in Y2013 is recorded at +8.50MSL (Mean Sea Level)
- Overflow of water pond is designed at +9.00 MSL. Overflow water will flood in MCL area and Clay Mine
- After 2013 the flooding level is approx. +7.0-7.5 MSL in MCL area. There is no overflow water from Water Pond release outside MCL

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Figure 7.4-6: Water Drainage and Treatment System for Outdoor Coal

Cooling Tower discharge (drain) water, Pre-treatment, RO system drain location: Sediment Pond.

Parameter	At Sediment Pond	At Coal Sediment Pond	NEQG
рН	8.2	7.8	-
Conductivity	1828µs/cm	1445µs/cm	-
Iron	70ppm	140ppm	-
Chlorine	0ppm	0.02ppm	0.2 mg/l
Phosphate	0ppm	6.7ppm	-
Total Hardness	310ppm	290ppm	-
Turbidity	16.8NTU	9.8NTU	-

Table 7.4-18: Results of Wastewater Discharges from Cooling Tower

Water sample was taken from Pond no-1 on 26 Jan 2017 and laboratory analysis results are presented below.

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Parameter	Unit	Results	NEQG
BOD (5-day)	mg/l	< 1.0	50
Alkalinity (as CaCO3)	mg/l	69	-
Total Hardness (as CaCO3)	mg/l	308.0	-
Dissolved Oxygen	mg/l	7.4	-
рН	mg/l	8.1	6-9
Sulfate	mg/l	218.52	-
Total Suspended Solids	mg/l	<5	50
Calcium	mg/l	79.6	-
Iron	mg/l	0.13	3.5
Manganese	mg/l	0.01	-
Fluoride (as F)	mg/l	Not Detected	20
Nitrate (as N)	mg/l	Not Detected	-

Table 7.4-19: Results of Water Quality at Raw Water Pond-1

Table 7.4-20: Waste Water Tank: Septic Tank

Location	Type of tank	No. of Tank
Main office	Concrete	1
Residence 1	Concrete	3
Residence 2	Concrete	3
Residence 3	Polyethylene	4
Clinic	Concrete	1
Canteen	Concrete	1
Club house	Concrete	1
CCR	Concrete	1
Work shop	Concrete	2
Raw mill Toilet	Polyethylene	1
Kiln Toilet	Polyethylene	1
Cement mill Toilet	Polyethylene	1
Packer	Polyethylene	1
EU	Polyethylene	1
EU Toilet	Polyethylene	1
Total		24

In any case, the use of a proper water treatment system, and appropriate protection measures, can be considered as a low impact.

	Type		Consump tion				Stock Preparation		
N O.	of Chemi cal	Name	g/month	Objective of Usage	Use/Feed in System	Storage Method	Duration	Min. Stock: (kg)	Max. Stock: (kg)
1	liquid	VRB ACH (Coagulants)	10000 kg	To Coagulant Suspended Solid	Purify Plant	Chemical Storage	2 Months	15000	20000
2	powde r	VRB Anionic Polymer (Flocculant)	125 kg	To flocculated suspended solid	Purify Plant	Chemical Storage	2 Months	300	400
3	liquid	SDI Reducer	125 kg	To reduce Silt Density Index	RO	Chemical Storage	2 Months	300	400
4	liquid	Antiscalant 410	125 kg	To prevent Scaling	RO	Chemical Storage	2 Months	300	400
5	liquid	Dechlorine 30	125 kg	To reduce FRC (Chlorine)	RO	Chemical Storage	2 Months	300	400
6	liquid	pH Booster (OH)	120 kg	To increase pH	RO	Chemical Storage	2 Months	300	400
7	liquid	CoolPerse (Antiscale)	15000 kg	To reduce scaling	Cooling Tower	Chemical Storage	2 Months	30000	35000
8	liquid	Sodium Hypochlorite -NaOCL (Oxidizing)	20000 kg	Anti-bacteria	Cooling Tower	Chemical Storage	2 Months	40000	45000
9	liquid	BacTrol (Biocide)	1000 kg	Anti-bacteria	Cooling Tower	Chemical Storage	2 Months	2000	3000
10	liquid	CorrGuard (Anti-Corrosion))	20000 kg	To prevent Corrosion	Cooling Tower	Chemical Storage	2 Months	40000	45000
11	liquid	KLEEN H (L637000026)	10000 kg	To adjust pH	Cooling Tower	Chemical Storage	2 Months	20000	25000
12	liquid	VRB Amine	120 kg	To increase pH in steam	Boiler Water	Chemical Storage	2 Months	200	300
13	liquid	VRB TriPhos (Phosphate)	1000 kg	To increse pH in Boiler Drum	Boiler Water	Chemical Storage	2 Months	2000	25000
14	liquid	VRB DHA (Oxygen Scavenger)	300 kg	To adjust oxygen in Boiler Feed Water	Boiler Water	Chemical Storage	2 Months	600	700
15	liquid	RO Cleaner 511	125 kg	To clean RO membrane	For CIP RO Membrane	Chemical Storage	2 Months	200	300

 Table 7.4-21: List of Chemicals in Wastewater Treatment

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16	liquid	RO Cleaner 822	100kg	To clean RO membrane	For CIP RO Membrane	Chemical Storage	2 Months	200	300
17	liquid	pH Reducer (H)	50 kg	To clean RO membrane	For CIP RO Membrane	Chemical Storage	2 Months	150	250
18	powde r	Softener Regenerant Agent (Salt)	30000 kg	To regenerate Softener Resin	Purify Plant for cement water treatent	Chemical Storage	2 Months	60000	65000

	Significance of Impacts										
	Potential Impacts		Residual Impacts								
Component	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact						
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact				
Water Resource	Medium-High	Insignific ant	Activity Site	Life of Plant Operatio n	Tempora ry	Infreq uent	Negativ e				
impacts	100	1	1	4	2	3	Low				
	100		6				30				

Table 7.4-22: Significance of Residual Impacts for Water Resources

7.4.4 Soil Impacts and Mitigation Measures

Potential impacts on soil associated to operation phase are identified and assessed in the following.

7.4.4.1 Soil Pollution

During the operation phase, the contamination of soil and subsoil is expected as a result of leaks or spills as:

- equipment containing lubricating oil and/or chemical additives used in the plant process will be placed in enclosed premises; and
- fuel oil (heavy and light fuel oil) used as main power source for the cement plant will be stored in dedicated storage tanks, in such a manner that any possible small leakages of polluting oil can be contained.

Considering the adopted design and the mitigation measures described in this Section, the risk of soil and subsoil contamination related to spills of oil and/or pollutants can be considered low.

7.4.4.2 Landscape Impacts

In consideration of impacts due to the change of landscape of the region, the degree of significance of visual impact could be moderate to high. Anyway, there are control measures those can be adopted during the detailed design of the project such as design and arrangement.

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Figure 7.4-7: Existing Environments around the Project Boundary

Color for the power plant facilities should be carefully selected. Lighter color can be utilized to complement the surrounding areas. Where technically feasible, to decrease the visibility of facilities, plantation around the building should be planned.

This project is first and major project which will include various infrastructures for proposed region where there does not facilitate any project before. The project will introduce the vertical structures which can be overseen from various parts of the region.

7.4.4.3 Mitigation Measures for Soil Impacts

The following mitigation measures will be taken into account in order to limit the impacts on land:

- the use of lighter colour and grey hues for coloring the power plant structures as to blend into the environment; and
- consultation with villages/ward to address their particular impacts.

The implementation of the above-mentioned mitigation measures likely to reduce the negative visual impact and the residual impacts can be very low. Where technically feasible, to decrease the visibility of facilities, plantation around the building should be planned.

	Significance of Impacts									
Component	Potential Impacts	Residual Impacts								
	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact					
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact			
Soil Impacts	Medium-High	Insignific ant	Plant Boundar y	Life of Plant Operatio n	Tempor ary	Very seldom	Negativ e			
	90	1	2	4	2	2	Very Low			
			7			4				

Table 7.4-23: Significance of Residual Impacts for Soil

7.4.5 Waste Impact Assessment

During the operation phase, there will be a number of wastes generated from the Project processes (process waste) that will need to be managed in accordance with the international standards, as discussed in the following.

7.4.5.1 Waste Identification

The main process waste streams generated during the Project operation will comprise:

- used lubricating oils from plant machinery and vehicles;
- used hydraulic oils;
- sludge from the wastewater treatment system;
- separated oil sludge from oil/water separators; and
- used oil or water treatment chemical containers.

In addition to the above process waste, there will be a number of waste associated to the operation and maintenance of the plant, such as:

- used oil and air filters from machinery and vehicles;
- used batteries from vehicles and trucks; and
- other maintenance waste (i.e. oily rags, paint residues, etc); and
- very small quantities of expired chemicals.

Staff working on site will also generate general domestic waste (i.e. food and packaging) and office waste (paper, etc).

If not controlled properly, there could be impacts from the waste generated during the operation phase of the Project. In more detail, a not proper disposal of this waste, in particular of hazardous waste such as used oils filters, could result in potential contamination for surface water, groundwater resources and soils, which could have negative impacts on ecosystem functioning and also on human health for those living close to the dump sites.

Concerning the management of general waste (like food, plastic, etc), the disposal at existing dumpsites will increase associated environmental issues such as windblown litter, vermin and other

disease vectors. There are also health impacts related to the direct contact of waste scavengers with the disposed waste.

7.4.5.2 Mitigation Measures for Waste

The overall impacts during operation should be considered as negligible as the following mitigation measures are taken into account during the operation phase:

- MCL adopts 3Rs system and developed a waste management program which includes separation, handling and disposal of all waste generated
- Different types of bins such as municipal, recyclable and hazardous are provided at the plant area. These wastes are temporarily stored at storage area.
- The municipal wastes are managed either in terms of landfill or burning while the recyclable wastes are used in cement production line (i.e gypsum from FGD system).
- Process waste such as steel structures, metals, wooden packaging, pallet, rubber belt, wire, cable are managed for sell while the other wastes such as gloves, packaging materials, big filters, air slide inlet filter are managed for burning.
- The hazardous wastes such as electronic equipment, insulation material are returned to supplier.

	Significance of Impacts									
	Potential Impacts	Residual Impacts								
Component	Consequence & Likelihood	Consequence of Impact			Likelihood of Impact					
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact			
Solid Waste Impacts	Medium-High	Insignific ant	Activity Site	Life of Plant	Low	Very seldom	Negativ e			
	90	1	1	4	1	2	Very Low			
			6	3			18			

 Table 7.4-24: Significance of Residual Impacts for Solid Waste

7.5 Emergency Case during Operation

Emergency case caused by failure and stop of some part of plant are happened due to unexpected condition during operation phase.

Action in emergency case of boiler, turbine and generator operations are described details in working procedure (Annex 7-1 and 7-2, WI-P-EU-003 Steam Production & WI-P-EU-004 Turbine and Generator Operation.)

After working procedures have been implemented, the significance rating of this impact is predicated to be Low.

7.5.1 Maintenance System



Figure 7.5-1: Demonstration of Maintenance System

7.5.2 Time base Maintenance

Daily Inspection of Machine

Route List Checking of machine (Weekly)

7.5.2.1 Annual Maintenance

	Annual Maintenance Plan for Turbine and Boiler {EU & WHG}								
	2016	2017	2018	2019	2020	2021	2022	2023	2024
Boiler	-	Yi	Mi				6Yr		
Steam Turbine	-	Yi	Mi	Yi	Mo	Yi	Mi	Yi	Mo
Generator	-	Yi	Yi	Mi	Yi	Yi	Mo	Yi	Yi

Main Machine	Description	Yearly Inspection (YI) Every 1 years	Minor Inspection (MI) Every 2 years	Major Overhaul (MO) Every 4 years	
Generator	Reassemble rotor & stator	·	·	MO	
	Reassemble exciter			MO	
Turbine	Reallign rotor			МО	
	Reassemble casing & diaphragm blade			MO	
	Discoupling, realign, and reasemble			МО	
	•				
-------------	---	----	----	----	--
Steam Valve	Extraction emergency stop valv	e	MI	МО	
	Strainer cleaning & replacement		MI	MO	
Auxiliary	Boiler feed pump inspection		MI	MO	
Steam Valve	Extraction control valve inspection	YI	MI	MO	
	Governor inspection	YI	MI	MO	
	Simulate signal for characteristic plot	YI	MI	MO	
Generator	Front&rear bearing inspection	YI	MI	MO	
Turbine	Main oil pump inspection	YI	MI	MO	
	Front&rear bearing inspection	YI	MI	MO	
	Vibration Check	YI	MI	MO	
Lube Oil	Filter check & replacement	YI	MI	MO	
	DC pump inspection	YI	MI	MO	
	AC pump inspection	YI	MI	MO	
	Auxiliary pump inspection	YI	MI	MO	
Auxiliary	Cooling tower cleaning & inspection	YI	MI	MO	
	Vacuum pump inspection	YI	MI	MO	
	Condenser cleaning & inspection	YI	MI	MO	
	Deaerator system inspection	YI	MI	MO	
	Boiler Inspection	YI	MI	MO	

Figure 7.5-2: Significance of Residual Impacts for Emergency Case

	Significance of Impacts									
	Potential Impacts			Residual I	mpacts					
Component	Consequence & Likelihood	Conse	quence of I	npact	Likelihood of Impact					
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact			
Impacts for	Low	Insignific ant	Plant Boundar y	Life of Plant	Tempor ary	Very seldom	Negativ e			
Case	40	1	2	4	2	2	Low			
	υ	7			4 28					

7.5.3 Biodiversity Impacts during Construction Phase

With reference to the field observations that describe the general conditions of the terrestrial investigated area, the main ecosystems expected in the area are:

It is necessary to know the configuration of vegetation, plantation, animals, birds, aquatic life, wild life features, bird sanctuaries, national parks, reserved forests etc., in the study area in order to assess the probable effect likely to be reflected on the existence of these features after the commissioning of the proposed project.

In the study area, most of the land is agricultural and residential oriented. As a result, there is no major suitable habitat for either natural flora or fauna other than domestic animals, birds and reptiles. Wildlife habitat is important for the survival of the wildlife animals in terrestrial ecosystem. The wild animals are now threatened by habitat degradation and habitat loss caused by misconduct of human being. A habitat is a part of an ecosystem and diverse ecosystems support for high species diversity.

A change in an ecosystem necessarily affects the plant and animal species in the system, and changes in species affect ecosystem processes. The distribution of species on earth is becoming more homogenous.

In the proposed project area, three major habitat types were observed namely (1) Forest, (2) Mixed plantation and cultivated land and (3) aquatic habitat (Attran River). There is one threatened plant species in the proposed project area and the overall habitat value is assumed to be moderate. The following table shows the key terrestrial habitat features of the project area.

Sr. No.	Criterion	Features	Remark	
1	Fauna and Flora	Threatened species	Plant species Hopea odorata	
2	Threatened Communities	Mixed vegetation and River water body	Potential human disturbance	
3	Migratory Birds	No record	Nil	
4	Wildlife Corridor	Moderate	Limestone cast forest	
5	Representativeness	Moderate	Mixed vegetation and River Water body	
6	Natural Diversity	Moderate	Some parts disturbed	
7	Rarity and Distinctiveness	Moderate	Inhabitants of Limestone cast forest	
8	Naturalness	Moderate	Limestone cast forest	
9	Pest Species	Insect pests and field rat	Seasonal	
10	Long –term viability	Moderate	Potential human pressure	
11	Adjacent habitat values	Moderate	Plantation area and Limestone cast	
12	Degree of existing modification	Low	Human activities	
13	Sensitivity to disturbance	Moderate	Limestone cast forest and River	
14	Overall habitat value	Moderate	Naturalness of the Limestone cast forest and Ataran River	

 Table 7.5-1: Key Terrestrial Habitat Features of MCL Project

7.5.4 Fauna – Construction Phase

In the power plant and areas typically, the elevated background noise levels emitted by the civil works and vehicular movement may compel the native fauna to vacate in the immediate vicinity. Additional sources of noise include the high number of generators which will be used to supply the facility with its power demand during the entire construction period. It is noted that the faunal species in the surrounding area is generally mobile hence no particular territorial needs will be affected by the works.

However, noise may disturb animal breeding, feeding and migration patterns. The light (night-time guard watch) and noise impacts is expected to be of long-term duration given the expected 24 months construction phase followed by the on-going operation procedures required for cement manufacturing and power generation (i.e. transportation of manpower and raw material in and out of the facilities). The **impact of dust caused by site equipment and vehicles is considered as a low impact**, given

the duration of the work (limited to working hours), the restricted perimeter of the construction as well as the dust suppression and control and monitoring measures to be implemented by the Project throughout de-dusting operations (electro-static precipitators/bag filters), vehicle wash-downs and damping of roads.

According to the findings of the baseline conducted, in the power plant area, a total of 15 butterfly species, 4 mammal species, 9 reptile and 7 amphibian species and 21 bird species were observed.

Endangered (EN) species, vulnerable (VU) species by IUCN Red List 2015 ver.3.1 and prohibited species, which need to conserve and no hunting, trading and no disturb to them by Myanmar Law, were not identified in the power plant area.

The power plant is located in active agriculture and plantation area where high ecological values of species are unexpected. On the other hands, some species of mammals, reptiles/amphibians would be affected by the construction work, although important species would not be included these affected species. However, it is confirmed by literature and local experts that most of these species live widely in the surrounding area.

Based on the above, the construction activities at the power plant will not cause any significant impact on species and its habitats. The relevant impact can be considered as low.

7.5.5 Flora – Construction Phase

As already reported in the baseline section, the habitats found out in the survey area are made up of degraded mixed forest, grassland, agricultural land, and developed area and orchard villages.

The direct ecological impact in terms of flora, resulting from the construction phase, is the loss of vegetation and habitat associated with site clearance in particular for the power plant and associated facilities. According to the baseline data survey result, total of 116 plant species in the power plant area were recorded.

The power plant construction activities are the major source of potential impacts on the study area for floral biodiversity and vegetation cover. Site clearance activities, grading and transport of heavy machinery and vehicles would most likely result in physical damage of the land cover. There are some potential disturbances to the flora resulting in invasion of some alien species when the construction work is terminated. The flora may also be impacted by solid waste littering by the construction crew members, and accidental leaks or spills. It is anticipated that the vegetative cover along the proposed footprint, access routes (as well as newly upgraded roads) and the workers camp will be completely damaged and lost following the civil works during the construction phase of the project.

7.5.5.1 Mitigation Measures – Flora and Fauna (Construction Phase)

Mitigation measures to minimize further potential impacts on the Project area fauna and flora include:

- preservation of excavated top-soil for future site restoration procedures particularly in highly disturbed areas;
- washing down of vehicles in place and prior to commencing work;
- limiting vehicular transport to defined roads as to prevent unnecessary injury, habitat destruction and complying with safe driving procedures;
- unnecessary cleaning the trees is to avoid;
- works areas in temporarily affected areas shall be reinstated with tree/shrub/ grass upon completion of the works.

Overall, due to the limited period of time of the construction works, the relevant impact on flora can be considered as low for the power plant area, also taking into account the mitigation measures provided in this section.

	Significance of Impacts									
Component	Potential Impacts			Residual I	mpacts	npacts				
	Consequence & Likelihood	Conse	equence of I	mpact	Likelihood of Impact					
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact			
Impacts on Flora and Fauna	Medium-High	Insignific ant	Plant Boundar y	Life of Plant	Tempora ry	Very seldom	Negativ e			
	00	2	2	1	5	3	Low			
		5			8	40				

Table 7.5-2: Significance of Residual Impacts on Flora and Fauna

7.5.6 Impact on Fauna during Operation Phase

Impacts on fauna during the Power Plant operation phase are mainly linked air and noise emissions and effluent discharges.

Taking into account the outcomes of the previous sections (absence of critical endangered, endangered and vulnerable species and habitats) and the overall low entity of the impacts on air quality, noise and water resources described above, the impacts related to the power plant operation phase can be considered as negligible.

Quarrying/blasting operations and vehicular movement may compel the native fauna to vacate the immediate vicinity. Among the listed species, there are no endangered species in the power plant area. It is noted that the faunal species of the surrounding area is generally mobile, hence no particular territorial needs will be affected by the works. In any case, noise may disturb animal breeding, feeding and migration patterns.

Taking into account the outcomes of the previous sections (absence of critical endangered, endangered and vulnerable species and habitats) and the overall low entity of the impacts on air quality, noise and water resources described above, the impacts related to the operation phase can be considered as negligible.

Finally, there are no anticipated impacts on fauna caused by the operation of power plant.

7.5.7 Impacts on Flora during Operation Phase

With reference to the cement plant area, air pollution causes some damages to vegetation cover at power plant through movement of vehicles and maintenance activities in operation phase. Air pollution causes damages on the on-site vegetation, through the decrease of the absorption of light intensity for the plant growth and pollination. Most of the effects of dust particles on plants include the potential to block and damage the stomata such that photosynthesis and respiration are affected. Pollutants such as dust, gaseous emissions and air- borne particulates will be produced and get deposited on the plants. This will no doubt affect the physiological activities of the plants most especially those around the cement plant area such as in photosynthesis and respiration. The implication of these is that some of the plants may have retarded growth while others may be eliminated.

The floral species identified in the study area as well as the floral community listed in the existing literature are regarded as common species suggesting a low environmental value.

7.5.8 Mitigation Measures – Flora and Fauna (Operation Phase)

Mitigation measures to minimize further potential impacts on the Project area fauna and flora include:

- limiting vehicular transport to defined roads as to prevent unnecessary injury, habitat destruction and complying with safe driving procedures;
- reporting of any violation relating to hunting and trading activities;
- implementing good housekeeping practices on the field and implementing good Solid Waste Management Plan in order to eliminate any source of hazard to the native fauna;
- environmental awareness training to be given to all workers for the preservation of local biodiversity species and induct the nature of the sensitivity of project area; and
- site specific instruction/protocol for identifying and relocation of plant and wildlife species if necessary, shall be provided to all workers with education materials including photographs.

	Significance of Impacts									
	Potential Impacts			Residual I	mpacts					
Component	Consequence & Likelihood	Conse	quence of I	npact	Likelihood of Impact					
	Negative	Severity	Spatial Scope	Duration	Frequenc y of Activity	Freque ncy of Impact	Signific ance of Impact			
Impacts on	Low	Insignific ant	Plant Boundar y	Life of Plant	Tempor ary	Very seldom	Negativ e			
Flora and Fauna	28	1	2	4	1	2	Low			
	20	7			3		21			

Table 7.5-3: Significance of Residual Impacts on Flora and Fauna

7.5.9 Sensitive Habitats and Protected Areas

The following figure shows the protected areas and sensitive habitat of Myanmar and there is no sensitive habitat in and around the Project site. Consequently, no impact on sensitive habitats and protected areas is expected to be generated by the Project during both construction and operation phase.

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Figure 7.5-3: Sensitive Habitats and Protected Areas around the Mawlamyine Cement Plant

7.6 Socio-Economic Impacts and Mitigation Measures

7.6.1 Impact Assessment Criteria

Social impact assessment (SIA) is a proactive tool used to understand the potential impact, adverse or beneficial, that proposed project could have on the affected communities and to recommend effective mitigation measures so as to reduce those identified impacts to a lesser degree of significance.

According to IAIA (International Association for Impact Assessment), SIA is generally defined as a process of analyzing, analyzing and monitoring the consequence of the project.

More precisely, Social Impact Assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative of planned interventions (policies, programs, plans, projects) and any social change invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment.

The evaluation and assessment involves the assessment of both qualitative and quantities data with professional judgment and stakeholder consultation.

7.6.2 Potential Impact to Population and Demographic Change

Potential impact of migration to the project affected area by the development of Mawlamyine Cement Project area likely to result mainly from the migration of personnel with the hope of getting job and receiving potential health, education and other social services that may result from the project.

However, it is expected that number of personnel moving into the project affected area is very low in comparison with the existing local population. It is also the reason that there are an enormous number of local people working in Thailand have the chance to return their natives so movement of labors from other region would be minor. As a result, there may be no alter in the number of residential population around the project areas or affect their demographic structure.

As a result, **an alteration in the number of residential population around the project area or impacts to the local demographic structure is not expected**. Thus, it is considered the potential impact related to population demographic structure of local communities is negligible to minor.

7.6.3 Potential Impact to Assess and Movement

There may be traffic volume increase during the construction phase. The traffic will use Mawlamyine – Kyaikmaraw Road and Mawlamyine – Hpa-an Road to assess to the proposed project site.

Construction related traffic will not utilize largely on Local Streets which are adjuring local communities. The traffic is expected not to interact with venerable local communities.

The project is located in the shrub and forest area and people not commonly visit into the project site. Besides, there is no project activities which defer the community assess and movement. No communities would be severed by the project in term of access and movement. Construction will not affect the existing road network as the transportation vehicles will apply vessels along the Ataran River.

The impact to the public access and movement resulted from the project activities during construction and operation is forecasted minor.



Figure 7.6-1: Project Area and its Environments

Note: The red dotted lines represent for existing local road assessment.

7.6.3.1 Mitigation Measures

MCL provided some improvement of the existing roads in the region as shown in the following figure.

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Figure 7.6-2: Improvement of Existing Road Access by MCL

7.6.4 Traffic Issue (Transportation)

During the construction and operation phase, there will not have potential traffic increase on the road where local people are using for their transportation. The volume of vehicles carrying raw materials will be very low during the operation period as coal transportation will be relied on water way. Besides, proper traffic management plan is to be adopted and local road improvement scheme is to be developed without interfering the existing transportation system of local people.

Ataran River is the most important for the communication and transportation for Kyaikmaraw Township. Local residents use this water for transportation of goods and navigational purpose by private boats. There are total of 29 boats running as ferry services along the Ataran River around the project site.

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Figure 7.6-3: Overall Logistic Model of the Project

Ataran River will be used for the main water way for transportation of raw materials for the power plant. The volume of barges will be used for transportation of coal and other materials (including bag cement and bulk cement) will be 3 to 4 barge per day. It is anticipated that traffic issues generated by the transportation in operation phase will not have a significant impact. The width of barges is 15 to 15.5 meter and the width of the river is 100 meter so the traffic congestion should not be considered as high.



Figure 7.6-4: Waterway Transportation of the Project in Ataran River

The sizes of vessels are:

Lighter		Motor barge	
Length:	62 m	Length: 75m	
Beam:	15m	Beam:	15m
Depth:	5.5m	Depth:	5.5m
Draft:	4.0m	Draft:	4.0m
Cement loadi	ing: 5,000ton	Cement loading	: 2,500ton

The other minor impact is wave from cruising upstream affects accomondations and fish boat/ passenger boat along the river.

During the first period of operation of the coal power plant, an increase of vehicular traffic is expected to be very low as transportation of coal will mainly be rely on water way. Thus, the dust and noise impacts resulting from traffic transit transportation will be low.

7.6.4.1 Mitigation Measures

In conclusion, the adoption of the following measures will allow mitigating the negative impacts resulting from the Project traffic during the operation phase:

- to install appropriate road signage on the roads used by Project traffic in particular at bends, junctions, schools and populated areas;
- to define speed limits and make sure that they are respected by Project drivers (including contractors);
- to maintain the Project roads in order to reduce the possibility of accidents, including clearing of vegetation on to improve sight distance and visibility; and
- to adopt a Traffic Management Plan to ensure traffic safety, which should foresee safe drive trainings and regular alcohol and drug tests for drivers.

7.6.5 Potential Impact to Employment, Skill and Business

Project will source it operative work forces mainly from the local area due to the reason of project's commitment of prioritizing the selection to local people and availability in adjacent areas for the basic level semi-skill and non-skilled works.

Owing to the information collected during the course of the survey in study area, the people are expecting with though that the project will bring improvements to the living standard and local economic status of local people by creating job opportunities.

Since construction phase is the period of high demand of job openings with temporary employment, the numbers of employees will be dramatically high.

The prospect of an increased income and greater autonomy is likely to cause an increase in the aspirations of local communities both those involved with the project and, to a lesser extent, those from other working individually. This is a direct positive effect with a moderate extent and long-term duration. As consequence, it is considered as a major beneficial impact resulted from the project.

Company is intending to conduct both awareness and critical training necessary to its employees, it is perceived that capacity building which is expected by both company and local community is the one of the beneficial effects as well.

As this will be long term income stability to the hired employees assuring the economy security to its family members.

The project is located in Kyaikmaraw Township which is not far from the Thai border; there will be

potential of having return of immigrant labors from Thailand. Most of the families in the project area have members who have been working as labors in Thailand. New job opportunities with reliable salary will encourage the households to re-organize in their native.

Proposed project area is closed to the local residential areas.

Both during the construction and operational phase, it has the high opportunity to employ local people in all level of full- skilled, semi-skilled, unskilled and technicians. In this regard, company shall develop local hiring plan. Here local people refer to the people living in the affected areas or entire project area of influence.

This project is anticipated to source the operative force on local basis and has the potential to increase the educational and technical qualification of local work forces through onsite technical transferring and in-house training programs.

The project will have significant beneficial impacts on the local communities.

One of the effective implementations of the Social Impact Management Plan of the project is the development of a capacity and local awareness building.

In order to enhance the local capacity building, and avoid unnecessary social conflict and dispute related to the employment within local communities, following measures are suggested.

Recommended Mitigation and Enhancement Measures

- Identify the range of skill required for the labor force and conduct a gap analysis against skills availability
- Notify local people of job openings through local advertising, information center, project notice boards to place in office or road junctions of each village
- Develop and implement a local employment policy for the people of affected communities
- Careful management to be practiced about the expectation of local people in regard to the employment to avoid any disputes
- Undertake regular review of labor requirement and skill demands ensuring that training strategies meet the needs of project
- Initiate training and job skill development programs
- Considering establishing a contractual agreement with contractors to ensure that all contractors understand the company's expectation of favor local content in hiring employees

7.6.6 Potential impact to Land Use and Property

Project is considered to be constructed and operated in the plantation area which is purchased by the company with current price.

It is informed that there will be no resident, business or industry properties acquired for the proposed cement project. Consequently, no population would be directly related to the project.

Based on the information provided above there will be no impact on the land use related issues. And no additional mitigation measures are provided in this regards as there is no impact on the land use and effect on the private property.

7.6.7 Impact on Community Value and Life Style and Social Cohesion

As mentioned previously, the project area is located closed to the residential area, the temporary construction camps for workers is expected to be built in the project area which is about half kilometer to the nearest residential area.

Though a proportion of construction workforces are to be recruited from the local areas and live locally, some numbers of workforces are to be sourced outside of the community area.

It is anticipated the relationship between workforce and local community will be increased from time to time. As a result, potential crime and antisocial behavior within the local community from the Mawlamyine cement project are foreseeable to some extent. Those anticipated potential crimes include alcohol /drug use and other social misconducts.

The potential for increases in crime and anti-social behavior is likely and may challenge local authorities and create resentment amongst the local community. It may also result in some changes to the lifestyles or cohesion of communities in the surrounding suburbs.

During the phase of survey by social team, there is no significant dispute or unrest caused in terms of the political belief, religious thoughts and social concepts within the community. There is no major development in study areas and it is unlikely that social cohesion issues will arise.

Anyway, with project exist, both within and outside the current project area, this finding might alter and there could be potentially impact the project by creating a preconceived perception of the project and its associated activities from local communities and other organization.

The impact on the lifestyle and social cohesion is predicted as moderate and additional control measures are required.

7.6.8 Local Economy

There is some probability that the workforce will patronize local retail services, such as food outlets during lunch or coffee time, which would be beneficial to the economy at the local scale.

On the project side, it is certain that some materials required for the project use could be locally available and due to the easy accessibility, there might be greater consumption for local market and increase business opportunity for local business.

In addition, the arrival of newcomers to project area could result in increased economic activity, greater exposure to markets and opportunities, larger customer bases for local businesses and positive diversity with the community.

Following measures to enhance this beneficial effect are recommended

- Investigate the possible procurement needs of the project that can be sourced locally
- Investigate the possible employment needs of the project that can be sourced locally

7.7 Health Impact Assessment

The aim of the Health Impact Assessment (HIA) aspect of the study is to determine the potential effect that construction and operation of the Mawlamyine Cement Project will have on the local communities' health and the capacity of local health services to cope with any increased demand for services in terms of equipment, trained personnel, medicines and the balance between the community and workforce needs.

The objectives of the HIA are:

- To identify and evaluate all short, medium- and long-term impacts of the project on the health of all stakeholders in all project phases within an agreed geographical boundary so that any potential negative impacts can be reduced or avoided, and positive impacts enhanced.
- To recommend and justify specific, practical measures for mitigating negative and enhancing positive health impacts.

The main focus of the health impacts will be the communities near the cement plant site, power plant site, jetty site and quarry site; affected communities were determined by the social studies and the same groups will be considered for health impacts. However, health impacts in surrounding villages also were addressed, reflecting the potential for communicable, including sexually transmitted, infections to impact this town.

Due to the need to consider capacity of hospitals, clinics etc., to deal with the potential extra demands that the existence of the Project may place upon them (especially during construction), the health of residents in these villages also need to be considered, as be the status of the clinics in these locations.

7.7.1 Impacts on Community Health

The main impact which may affect local communities residing close to the Project areas during the Project construction phase is related to the increase in the heavy vehicle traffic. As mentioned before, the risk of increased prevalence of diseases deriving from the foreign workforce is considered minor. During this phase the risk of incidents and process characteristics which might affect community health and safety remains unchanged with respect to the normal operation (pre - and post expansion) of the facilities.

A significant traffic volume increase, especially on the road, is expected to occur during the construction activities within the power plant, and for the realization of the worker camp. In any case, heavy traffic movement will negatively impact the road condition; will cause disturbances to road bordering residents due to noise, and dust, which might damage crops and structures close to dirt roads, as well as disturbances and temporary disruptions to local traffic. Furthermore, a significant increase in traffic levels combined with a number of factors including poor current road conditions, uneven surfaces and the limited understanding of road safety among local drivers and pedestrians is likely to increase the number of accidents. These might particularly involve the numerous motorbikes and pedestrians using local roads, especially vulnerable groups (i.e.: children walking to school).

No information is currently available regarding the possible Project need to enlarge the existing roads to facilitate trucks traffic or the possibility to create new access roads.

Overall, the potential impacts on existing community health and safety can be considered as low due to the temporary features of the construction phase and also taking into account the mitigation measures:

- to establish of a grievance mechanism with the aim of receiving and facilitating resolution of affected communities' concerns and grievances, including thus related to Project traffic;
- to develop an annual medical surveillance program for project employees to monitor the trend and pattern of communicable disease and foresee health awareness raising campaigns as part of them heal and safety induction.
- a series of traffic measures should be also taken into account: dust suppression measures, as vehicle speed restrictions, wheel washing area installed at all site access points, containment for dusty materials, and frequent watering or covering of exposed areas of ground, and prompt site restoration;
- installation of appropriate temporary road signs points on the roads used by Project traffic in particular at bends, junctions, schools and populated areas;
- definition of speed limits and make sure that they are respected by Project drivers (including contractors);
- guarantee proper vehicle maintenance to reduce noise and accidents;
- maintain the Project roads to reduce the possibility of accidents, including clearing of vegetation on to improve sight distance and visibility;
- adopt a Traffic Management Plan to ensure traffic safety, which should foresee safe drive trainings, regular alcohol and drug tests for drivers and driving restrictions during rush hours (especially close to schools);
- if road enlargements are required close to settlements, foresee a pedestrian path and/or provide pedestrian alternative walkways to reach the main points of interest (i.e., schools, markets,

etc.); and

• engage with local communities through traffic safety awareness campaigns.

During the first period of operation of the power plant, an slight increase of vehicular traffic is expected, as a result of the higher number of trucks necessary to transport the raw materials and others. This should be a transition solution until the planned increase in the number of boats for the transportation via river. During this temporary phase, trucks will travel only on paved roads therefore, the dust and noise impacts resulting from traffic transit transportation will be medium.

In any case, till the transportation of the finished product will be mainly transported via Attaran river, a potential impact on local population due to noise and risk of vehicular accidents is not expected. Taking into consideration the provisional nature of such situation, the related potential impact can be considered as low.

In conclusion, the adoption of the following measures will allow mitigating the negative impacts resulting from the Project traffic during the operation phase:

- to install appropriate road signage on the roads used by Project traffic in particular at bends, junctions, schools and populated areas;
- to define speed limits and make sure that they are respected by Project drivers (including contractors);
- to maintain the Project roads in order to reduce the possibility of accidents, including clearing of vegetation on to improve sight distance and visibility; and
- to adopt a Traffic Management Plan to ensure traffic safety, which should foresee safe drive trainings and regular alcohol and drug tests for drivers.

7.7.2 Occupational Health and Safety

There is various occupational health and safety risks are likely to happen during the construction and operation period.

Additional hazards can also arise from the use of chemicals in the process and explosive materials used in quarrying activities. All such hazards can be successfully controlled by the adoption of safe plant methods, training programs and OHS management systems. The introduction of health and safety measures by the Client into the plant management will be reflected in a strong enhancement of the OHS conditions of the Project workers compared to the current level.

The following measures in line with GIIP and PS2 will be adopted to avoid, minimize and mitigate the negative health and safety impacts of the Project construction and operation:

- adopting and training all personnel (including contractor workers) in the use of Personal Protective Equipment (PPE) and chemical handling;
- clear marking of work site hazards (especially close to high temperatures and open tanks) and training in recognition of hazard symbols;
- adoption of work site hazards signage both in English and Myanmar language;
- training of all personnel in health and safety risk prevention and protection;
- regular noise surveys to ensure the on-site maximum levels are not exceeded;
- development of inspection, testing and maintenance programs for machinery and equipment;
- accident recording and investigation and prevention initiatives;
- development of and training in site emergency response plans both for the construction and operation phase; and

• compliance to all international, national or local HS standards that may exist.

An OHS Management Plan will cover all the Project components and phases to provide a clearly written statement of intent and plan of action for the prevention of accidents and occupational illness and injury. Based on the risks and hazard assessment (e.g. HAZOP), it will include:

- strategies to control, respond rapidly to and prevent accidents, illness and injury resulting from each of the identified hazards and risks (e.g. introduction of a Permit to Enter system, effective housekeeping, safety walkthrough, wearing of PPE, etc);
- prevention and response strategies and clear and documented rules and safety procedures for health and safety in the workplace (both in Myanmar and English language);
- staff safety education and training (including toolbox talks and inductions);
- measures to promote workers' safety culture via periodic HSE training, induction, toolbox talks to focus workers' attention on particular and specific safety issues;
- emergency response plan; and
- documentation, monitoring and reporting requirements, including daily monitoring and monthly review of near-misses, incidents, occupational diseases, dangerous occurrences, accidents at project activity areas.

In conclusion, taking into account the mitigation measures listed above, **the impacts related to OHS both during the construction and operation phase are considered having a medium significance.**

7.7.3 Labour and Working Conditions

The current workforce of the plant totals 394 employees approx. (Myanmar, 95 % of which are from mainly from Mon State and nearby area such as Kayin State, Bago division, Yangon etc. and Thai, 5 % of which are from Thailand), which will work during the operation phase. In terms of employment opportunities for local communities, it is therefore expected that only few new workplaces will be created both during the construction (mainly unskilled workers) and operation phases.

To meet IFC requirements, the Client will develop appropriate HR policies, procedures and employment contracts compliant with the Myanmar labor legislation and IFC PS2 to be applied to temporary and permanent workers, construction workers, operation workers, third- party and supply chain workers. The procedures should include:

- a human resources policy;
- working conditions and terms of employment, to be clearly communicated to workers on the commencement of their employment and to be applied also to migrant workers (including anticipated duration of the contract for temporary workers);
- measures to guarantee fair treatment both for local and migrant workers, non-discrimination & equal opportunity and avoidance of child and forced labor, especially within the supply chain;
- a grievance mechanism to be disseminated among and accessible by all workers (including third party workers); and
- measure to protect the workforce from health and safety risks.

Overall, taking into account the mitigation measures implemented, the impacts related to Labour and Working Conditions both during the construction and operation phase are considered having a medium significance.

7.8 Visual/Landscape Impact

This project is first and major project which will include various infrastructures for proposed region where there does not facilitate any project before. The project will introduce the vertical structures which can be overseen from various parts of the region.

Color for the power plant facilities should be carefully selected. Lighter color can be utilized to complement the surrounding areas. Where technically feasible, to decrease the visibility of facilities, plantation around the building should be planned.

7.9 Cultural Heritage

The planned construction **for the power plant** will be realized within the boundaries of the private land and agricultural land, thus **no impact on any cultural heritage site is expected**.

The construction work will only foresee surface interventions and vegetation removal with very limited ground excavations. The area which will be used for this purpose does not have historical and archeological importance and thus **the risk of encountering historical finds is negligible**.

In conclusion, taking into account the surveys performed and the literature documentation examined, there are no potential ancient above ground resources in the Project area which may be impacted during the construction works. In any case, a Chance Find Procedure shall be developed for the Project to be applied in case unknown cultural heritage sites/remains will be found during construction activities. The objective is to protect previously unrecorded cultural heritage sites, objects, or features from Project-related damage and unexpectedly discovered during excavation works. The procedure, in accordance with national and international requirements in this field, has to outline roles, responsibilities and the response times for project staff in case unknown heritage resources are encountered, clear instructions to deal with the findings (including the possible involvement of an expert) and potential work stoppages that could be required.

Standard provisions in construction contracts in Myanmar foresee the following steps in case of chance finds:

- to interrupt the construction activities in the area of the chance find;
- to delineate the discovered site or area;
- to secure the site to prevent any damage or loss of removable objects;
- to notify the supervisory Engineer who in turn will notify the responsible local authorities;
- responsible local authorities and the relevant Ministry would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures;
- decisions on how to handle the finding shall be taken by the responsible authorities and the relevant Ministry (this could include changes in the layout, conservation, restoration and salvage);
- implementation for the authority decision concerning the management of the finding shall be communicated in writing by the relevant Ministry;
- Construction work could resume only after permission is given from the responsible local authorities and the relevant Ministry concerning safeguard of the heritage.

In this framework, the Client HSE Manager shall conduct routine inspections of site activities to assess the potential for chance finds at work sites. He/she will also supervise sites where chance finds were unearthed to ensure that the correct control procedures and engagement activities were performed. Induction training will be organized to Project staff and contractors to disseminate the Chance Find Procedure.

No.	Place	Coordinates	Distance from the Project (km)
1	Kyaikmaraw Pagoda	16°22'40" N 97°44'8" E	10.47
2	Sabei Cave	16°22′23" N 97°46′22" E	6.42
3	Pauk Taw Village	16°21′42" N 97°49′9" E	1.34
4	Kawtkit Pagoda	16°21'7" N 97°49'41" E	1.02
5	Kyauk KaLauk Cave	16°20'46" N 97°49'7" E	2.06
6	Kayone Cave	16°32′0" N 97°42′54" E	23.07

Table 7.9-1:	Cultural	Resources	around	the	Project Site
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Figure 7.9-1: Cultural Resources Maps around the Project Site

7.10 Impacts during Decommissioning Phase

No detailed assessment of environmental impacts associated with decommissioning can be made at present. The plan has an expected lifespan of over 30 years and so only general principles can be established at the present time.

In broad terms, the process of decommissioning is likely to give rise to impacts similar to those experienced in the construction phase. The methods and techniques selected are expected to be in accordance with national and international standards prevailing at the time of decommissioning.

- Decommissioning will require the following activities:
- Removal of all surface equipment and units:
- Potential removal of hard standing and surface cover;

Abandonment of sub-surface utilities or filling and abandonment as appropriate; the rehabilitation of the quarries during operation, the works shall be conducted on a on-going basis in accordance with the accepted timetable set out in the planning proposals to the National authorities.

For the cement plant, Mawlamyine Cement Limited (MCL) will develop a site closure plan during the later stages of project design and maintain the plan throughout the life of the development. The plan should include arrangements for decommissioning the plant in a manner which avoids any pollution and return the site to an acceptable state. In addition, any decommissioning plan should take into account the social and economic impacts and include mitigation measures where necessary.

The opportunities the site provides for long term biodiversity conservation purposes should be investigated as part of the site closure plan. There are no identified sites of ecological significance outside the main development areas that should be affected by decommissioning activities, though consideration will need to be given as to the long-term use of the access roads and "re-instate" the ground and vegetation but maintaining vehicle access or foot access only are also possibilities.

The site closure plan and preceding rehabilitation plans will need to be reviewed and updated in the light of experience with implementing the ecological mitigation and compensation measure-especially the "Habitat Restoration" proposals. These restoration activities will need to be monitored, during the course of the project, so that lessons can be learned and applied prior to and at the time of final site closure.

Overall, decommissioning activities are transitory, and are likely to be similar in magnitude to construction impacts.

7.11 Analysis of Cumulative Impacts

Cumulative impacts must be taken into account for incremental direct and indirect impacts of the proposed project which resulted on Valued Ecosystem Components (VECs) such as fundamental elements of the physical, biological or socio-economic environment, including the air, water, soil, terrain, vegetation, wildlife, fish, birds and land use, as well as the added contributed effects to same VECs from other past, present and future projects or actions located in the same area.

The key VEC physical components include:

Atmosphere: climate conditions and trends, and extreme weather events and air-quality conditions.

Physiography and Geology: physiography such as landforms, elevations, relief and unique features; surficial geology including types and depths; and bedrock geology including types, location and depths.

Soils: soil types and characteristics, soil capabilities and limitations, and permafrost conditions.

Surface Water: watersheds and waterbodies characteristics, shoreline environment, and sources of potable water.

Groundwater: primarily local groundwater characteristics.

The selected criteria will be considered on the followings;

- Overall importance/value to people
- Regulatory requirements

- Potential for substantial Project effects
- Key for ecosystem function
- Umbrella indicator

The selected criteria will be considered on the followings;

- Overall importance/value to people
- Regulatory requirements
- Potential for substantial Project effects
- Key for ecosystem function
- Umbrella indicator

The following table illustrated other project activities in proposed cement project area, however, related industrial activities with the cement production, limestone quarry, power plant and jetty & canal processes.

No.	Activity	Location	Distance from Project Area	Project Operator	Photographs
1	Myaing Ka Lay Cement Plant	Next to the Thaton- Mawlamyine Highway Road	~ 61.94 km, N	The factory is producing approximately 4,000 tons of cement per day. The factory is operated by Myanmar Economic Corporation.	
2	Mawlamyine Gas-fired Power Plant (230MW)	Eastern part of Mawlamyine Train Station	~ 19.89 km, NW	Developed by Myanmar Lighting under the government's independent power producer (IPP) system. The plant has a generation capacity of 230MW from four gas-fired turbines and two steam turbines.	

Table 7.11-1: Development of Related Industrial Project Activities in the Region

3	June Cement Industry Ltd	Pya Taung Area, Kyaikmaraw Township	~ 0.85 km, NW	June Cement Company Limited is planned to produce 5000 tons cement per day. It is also expected to produce limestone quarry process in the project. The project is currently in the ESIA processing stage.	Er CogeLanity
4	Location 1	A mountain near Pya Taung	~ 2.19 km, S	Illegal small-scale local mine (currently cease the operation by the Local Authorities)	

5	Location 2	A mountain near Pya Taung	~ 2.22 km, S	Illegal small-scale local mine (currently cease the operation by the Local Authorities)	
6	Mawlamyine Cement Limited (5000 ton per day)	Located in Pya Taung Area	~ 3 km	Mawlamyine Cement Limited, cooperation with the Pacific Link Cement Limited, operated the jointly cement production process with the associated facilities such as limestone quarry, coal power plant and canal and jetty.	

7.17.1 Prediction and Leverage Assessment of Cumulative Impacts

The potential affected VEC components by cement plant and its associated facilities are to be land use, biodiversity, air, noise and socioeconomic environments.

For the calculation of cumulative impacts, Mawlamyine Cement Plant is associated with some of the fully operation facilities within the factory boundary such as limestone mining, coal power plant and canal and jetty projects though without considering other project activities within the region. However, those projects will be implemented through the same monitoring team from MCL to reduce the negative impacts and promote the positive impacts along with the project's implementation period.

While considering the cumulative impacts of the fully integrated cement plant can be estimated as the following table.

		Cum	ulative	Impact Evalua	Descriptions /Mitigation Measures	
	Level of Significance		Temporal Frame Spatial (2014~2016 Frame			
Impact Parameter (VECs)	1	2	3	(2 years for constructio n and operation period before decommiss ioning)	(Some rural area in Kyaikmara w township in Mon State)	
Air Emission	\checkmark					Stakeholder consultation and strictly follow to EMP
Water Quality				2 years for		Stakeholder consultation and take mitigation actions
Noise and Vibration				constructio n (2014- 2016) and during	Nearby villages in Kyaikmara	Stakeholder consultation and avoid repeat action with other noise generation activities and working at nighttime.
Biodiversity (Forest, Flora, Fauna)				operation period	w Township	Stakeholder consultation and establish a tree-compensation plan
Geology and Soil	Soil		Need to be reflected in detail design if the periods of the two projects overlap. through coordination with MPA. Monitoring action as ESMP plans			
Socio-economic Component		\checkmark		Constructio n and	Nearby Villages in	Combined with a series of listed projects that would occur simultaneously or in

 Table 7.11-2:
 Significance Levels of Cumulative Impact Assessment

EIA Report for Captive Power Plant (9MW Waste Heat and 40 MW (20MW x 2) Coal Based Thermal Power Plant for *Mawlamyine Cement Limited*

		1	Operation	Kyaikmara	near future with the proposed project
			period	w Township	would accelerate urbanization and population growth as well as the infrastructure and socio-economic development in the region.
					Livelihood of the community in the four affected Township and the broader community of the Mon state shall be affected positively.
					[Mitigation measures]
					► MCL to coordinate the overall management of the cumulative socio- economic impacts of the multiple projects that are to be implemented in the region in coordination with the relevant stakeholders and the related local government agencies.
Hydrology			Constructio n and Operation period	Beyond the affected township (to the entire Region)	Need to further review whether flood protection is suitable for seasonal flood Monitoring action as EMP plans
Wildlife			Constructio n and Operation period	Area at Pya Taung area	Strictly forbid to haunt the animals and took a stringent action when would be happened.
Cultural Resource			Impact not triggered	Impact not triggered	Regular stakeholder consultation and Chance find procedure to be implemented
Visual Resource			Constructio n and Operation period	Area along nearby villages	Consultation Monitoring actions

7.11.2 Impact Mitigation Measures

i. Land

MCL had been already got the license approvement for governmental land area for the overall fully operated cement plant (about 1400 Acres) and limestone quarry (320 Acres) and had also been compensated for privater ownership land area. The leese area for land use will be attached in Annex-5-2.

ii. Air Pollution and Noise

□ All MCL employees shall be provided with hardhats, safety boots, overalls, ear and eye protection, dust masks and gloves as appropriate as shown in Table 8.7-1.

- □ The company shall ensure that The Mining Explosives Regulations governing the safe storage, handling and transport of explosives to, in and around the mine is strictly enforced.
- □ Only qualified and certified personnel shall be allowed to carry out blasting operations.
- □ Hazard and warning signs shall be erected or posted around the plant site to warn employees and contractors of potential dangers.
- □ Monitoring sites will be checked up periodically and the new sites will be added wherever needed or when received from communities complains.

iii. Vegetation

MCL will strictly follow the replantation according to mine closure plan and the greenbelt area will also be developed to maintain the landscape and for other mitigation purposes according to the descriptions in EMP plan.

iv. Socioeconomic

MCL will also take control actions for socioeconomic issues such as providing the educational and healthcare facilities to the community, opening the job opportunities to the local communities, especially the affected communities as mentioned in the above sections.

However, the advantage of minimizing impacts can be expected and all of these projects can be considered as the fully-integrated cement project because MCL is the same project proponent for all of these project activities and same EIA implementation team, Sustainable Organization and Development Department (SOD) will take accountability of controlling and monitoring for all potential impacts in order to minimize and mitigate in consideration of the overall project actions.

7.12 Grievance Mechanism for Mitigation Measures of Social Entitlements

MCL will create a website with the main Projects' information and events of interest for the various stakeholders for public disclosure. The documents and information that will be disclosed in the website include, but are not limited to, the following:

- SEP will be disclosed in English and Burmese language;
- ESIA executive summary;
- information on the construction schedule and services disruption;
- stakeholder's consultations timeframe, venues and MoM;
- grievance procedure;
- community development activities; and
- SEP Manager contact

Considering the low percentages of internet users in the affected area, the Project disclosure through MCL website will be mainly targeted, but not limited to, specific stakeholders (NGOs, national or regional stakeholders, authorities, Lenders, etc.).

In addition, given the particular setting of Project operational areas, possible methods to reach the target audience include, but are not limited, to:

- open meetings with residents of the affected communities (e.g., at schools, public/ religious or associations premises);
- separate meetings with land owners/land users, vulnerable groups, farmers associations and local NGOs, as needed and appropriate;

- brochures, posters, informative leaflets at key communities' centres, and radio announcements, in particular to inform about the construction schedule, grievance mechanism and forthcoming community meetings. Written information material should take in duly consideration the fact that there is a relevant number of illiterate people in the area; and
- social media: this method can be useful to keep ongoing communication with NGOs and other interested stakeholders.

MCL will provide and publicise well in advance a schedule of the dates and locations of any planned consultation activities, including follow up and disclosure activities. A series of stakeholder engagement and disclosure plan detailing methods and content of engagement and disclosure for each type of stakeholder as presented in Chapter 6. All meetings will be carefully documented and logged, minutes taken, and follow up activities recorded. By using a Public Grievance Sample Form and the Consultation Information Template are presented respectively in Chapter 8.

CHAPTER 8

ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Introduction

The ESMP framework is a site-specific plan developed to ensure that the Project is implemented in an environmentally sustainable manner where all contractors and subcontractors, including consultants, understand the potential environmental and social risks arising from the proposed Project and take appropriate actions to properly manage that risk.

The ESMP also ensures the Project implementation is carried out in accordance with the design by taking appropriate mitigation actions to reduce adverse environmental and social impacts during its life cycle. The plan outlines existing and potential problems that may adversely impact the environment and recommends corrective measures where required.

The components of the ESMP, potential impacts arising out of the Project and remediation measures are summarized in the following Table.

This document shall be treated as a dynamic and live document. Reviewing, revising and updating are subject to do as deemed necessary in line with the variation of proposed activities described in this document ensuring its remains appropriate to ongoing aspects of project.

8.2 Institutional Framework of MCL

8.2.1 Project Proponent

The project proponent (MCL) consists of 5 departments/divisions which are Production dept., Maintenance dept., Quarry dept., Human Resources dept. and Operation Administrative Dept. As shown in Figure 8.2-1. Sustainable and Organization Development Section is responsible for environmental, health and safety management as well as Community relation. This department, which is directly under supervision of managing director, is responsible for grievance adjustment, support of the community, CSR activities etc.



Figure 8.2-1: MCL Organization Structure for Top Management Role



Figure 8.2-2: MCL Organization Structure for Sustainable Development Department

Role	Responsibility		
Top management (Safety and Health Committees	set the policy, rules and regulations for safety and		
	environment programs		
SOD manager	Management of CSR, Environmental Team, Safety		
	Team		
CSR team	Communities relation, Government Relation,		
	Communities Development programs, Education,		
Religions and other correspondent activ			
Environment Team	inbound and outbound monitoring process, plantation,		
	waste management		
Safety team	employees' and workplace safety such as fire safety,		
	workplace safety, vehicles and road safety		
Liaison Officer	-To liaise with the different stakeholders from		
	government offices, communities and other associated		
	organization like consultants, NGOs, etc.		
	-To receive the grievances/complaints related with the		
	project activities via suggestion box, on call, email or		
	by person and address and close the complaints		
	according with the adequate management actions		

	Table 8.2-1: Main	Tasks for E	Environmental and	d Social Consider	ation in MCL
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Source: MCL

The present project has finished the construction period and MIC issued permission letter to MCL. So, the institutional arrangement for operation period will be proposed as follows.

8.2.2 Role and Responsibilities

Being owner of this project, MCL will hold ultimate responsibility and shall fully exercise in developing, reviewing, updating and effective implementing of this document. If the measures set up in it does not meet or follow accordingly, company will redefine as necessary until full satisfaction is achieved.

Responsibilities for the implementation of environmental social considerations lie with MCL management. Management shall be accountable for delivering commitments made in this report.

Finding from the continuous monitoring of environmental management plan is subject to be reviewed periodically and as deemed necessary by management. Based on the result, management shall be able to take necessary remedial actions and to enforce to adopt adequate performance strategy toward the continual improvement of the environmental management system.

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated Cost
		Activities			Categories
1	Air	Impacts on ambient air quality may occur due to construction activities such as earthworks, dust and exhaust emission from vehicle movement, loading and unloading of construction materials	 Reduce the idle condition of vehicles and other machinery to reduce unnecessary emission. all equipment and machinery must be maintained and tested regulary to reduce unnecessary emission. spraying water must be done prior to begin earthwork activities and traveling on project site's unpaved road. enclosure or covering of inactive piles to reduce wind erosion limit the speed of vehicle movement within the project site re-vegetation of cleared areas that are no longer needed as soon as practicable during construction. Minimize the clearance of trees and vegetation within hte project area to serve as physical barrier in emission emission reduction. Transportation of raw materials and products to 	Project proponent	 Water spraying cost Seedling and labor cost for revegetation
			and from the site should be well covered to prevent dust and falling of materials.		
2	Noise and Vibration	Noise vibration levels may be increased due to construction activities (eg. cutting steal structure, drilling, piling, etc,.)	 minimize to use heavy machineries that may cause serious noise and vibration avoid construction operation at night time posting of warning signs within the vicinity of the project area if intensive operation are conducted (eg. piling,driling etc,.) 	Project proponent	 Cost for installation of warning sign- board, vinyl PPE cost for construction workers

 Table 8.2-2: Environmental Components – Construction Phase

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated Cost
		Activities			Categories
	Weter		• all personnel shall be provided with personal protective equipment. For example, workers operating equipment that generates noise should be equipped with the appropriate noise protection gear;		
3	water Resources (Surface and Groundwater)	contamination of water resources from construction and operation activities due to: 1. wastewater discharge 2. site preparation works 3. accidental events	 avoid direct runoff from project area by means of temporary setelling ponds, drainage ways, utilizing for example cut-off drains; provide containment measures for hazardous material and storage areas to prevent spills or leakage of fluid materials which may soak into the ground and reach the groundwater table; make proper design to store hazardous material by providing suitable reception facility with impervious flooring, roofing and suitable drainage control; regular maintenance and checking of all plant and machinery in order to minimize the risk of fuel or lubricant leakages; training and equipping relevant staff in protected storage and handling practices, and rapid spill response and cleanup techniques 	Project proponent	 extra labor and machinery cost for digging temporary setlling ponds and drainages
4	Land Environment	 <i>Land Use</i>: temporary occupation of land to set up the construction site and the temporary worker camp <i>Landscape</i>: impacts arising from the installation of all site compounds; temporary works, installations, and storage; 	 prevention of soil contamination by oil or grease spills, leakages or releases, all manipulations of oil derivate in the process of construction and provision of fuel to the machines should be performed with maximum attention; leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be 	Project proponent	 cost for digging temporary setlling ponds and drainages

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated C	ost
		Activities			Categories	
		 3. the installation and movement of heavy and light construction machinery (including tall cranes); 4. construction lighting, including high mast lighting for activities; and 5. special load movement and storage <i>Soil/Subsoil Modifications and</i> <i>Contamination</i> 1. soil erosion; 2. modification of the geomorphologic condition; 3. changes in geological and lithological conditions; 4. pollution of soil 	 drained through drains and treated properly before disposal; construction waste and debris shall be collected on a regular basis, and disposed of at designated landfills; it must be prohibited to operate with equipment and vehicles outside the designated work areas and roads; training and equipment will be in place to minimize the potential environmental impact in the case of accidents (for example through the use of spill kits); machinery and materials will be stored tidily during the works. temporary roads providing access to site compounds and work areas will be maintained free of dust; security and work lighting shall be shielded and directed downwards and the use of tall mast 			
5	Solid and Hazardous Waste	Solid and hazardous may be generated due to construction waste including excavation spoil, construction waste, domestic waste and sewage / wastewater	 inventory and schedule of all types of waste identification and evaluation of local waste management facilities waste sorted into a number of waste streams waste storage facilities fenced on the perimeter, properly lighted and with access constraints for unauthorized people no uncontrolled disposal of during the construction phase and all waste streams directed to proper treatment 	Project proponent	 extra labor cost for waste separation cost for onstruction of temporary storage area for solid and hazardous waste 	

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated C	ost
		Activities			Categories	
			 disposal of waste and hazardous materials by authorized contractors according with local legislation maximization of reuse and recycle (when possible) identification of specific disposal procedures for all waste streams (transporting, auditing, recording, monitoring, etc); transporting vehicles properly marked and provided with documents describing nature of the transported waste and its hazardous degree compilation of a register of the quantities and characteristics of the waste sent to landfill, (origin, type, quantities and landfill locations) construction site periodically cleaned 			
6	Biological Environment	Depletionofnaturalhabitat/protectedspeciesCaptiveCoalPowerPlant, andConveyorBelt:-project area can be considered to have a low biodiversity and low significance area for 	 refer to applicable mitigation measures related to air, waste, water, etc; washing down of vehicles in place and prior to commencing work; preservation of excavated top-soil for future site restoration procedures particularly in highly disturbed areas; limiting vehicular transport to defined roads as to prevent unnecessary injury, habitat destruction and complying with safe driving procedures; implementing good housekeeping practices on the field and implementing good Solid 	Project proponent	Miscellaneous co	ost

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated	Cost
		Activities			Categories	
		expected	Waste Management Plan in order to			
		 endemic habitats can be 	eliminate any source of hazard to the native			
		affected by the proposed	fauna;			
		project	• minimize vegetation clearance and habitat			
		 no rare species fauna / flora 	disturbance by demarcating the clearing			
		and no endangered species of	boundaries in the quarry site;			
		fauna / flora are encountered	 unnecessary cleaning the trees is to avoid; 			
		in surveyed area	• environmental awareness training to be given			
			to all workers for the preservation of local			
			biodiversity species and induct the nature of			
			the sensitivity of project area;			
			• site specific instruction/protocol for			
			identifying and relocation of plant and			
			wildlife species if necessary, shall be			
			provided to all workers with education			
			materials including photographs; and			

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost Categories
7	Socio Economic environment	 Impacts on Demography and Social Structure can cause due to interactions between foreign migrant workers (Chinese) and the local community could result in social conflicts and cultural misunderstanding socio-economic context may be positive impacts (new, even if moderate, job opportunities and general benefits to the local welfare). 	 organization of awareness raising campaign to inform foreign workers on the local social customs and traditions Appropriate enhancement measures should be implemented to boost the beneficial effects on the local socio-economic context 	Project proponent	Cost for extension/education
8	Community Health and Safety	 Increase in the heavy vehicle traffic impacts on community health due to the arrival of foreign workers 	 Traffic management plan should be implemented (including alcohol test, vehicle check and maintenance plan, limit the maximum speed). Installation of appropriate temporary road sign points in the vinicnity of project area especially at bends, junctions, schools and populated areas. development of an medical surveillance program for project employees to monitor the trend and pattern of communicable disease and foresee health awareness raising campaigns as part of their heal and safety induction 	Project proponent	Cost for extension/education
9	Stakeholder Engagement	• Community engagement for the management of risks, impacts and mitigation measures on local	 Regular implementation and update of the SEP ESIA and all related materials to be made available to stakeholders 	Project proponent	Logistics and other miscellaneous cost

 Table 8.2-3: Social and OHS Components – Construction Phase

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost Categories
		communities.	 Public consultations to be carried out and duly recorded Company to implement an adequate grievance mechanism addressed to communities and affected land owners development and adoption of an appropriate OHS 		• Cost for
10	Occupational Health and Safety (OHS)	Captive Coal Power plant during operations include potential for respiratory diseases, burns, allergies and industrial accidents as well as from the use of chemicals in the process and explosive materials used in quarrying activities.	 development and adoption of an appropriate Oris' Plan covering all Project components and phases; adoption and training all personnel (including contractor workers) in the use of PPE and chemical handling; clear marking of work site hazards (especially close to high temperatures and open tanks) and training in recognition of hazard symbols; adoption of work site hazards signage both in Burmese language and others; training of all personnel in health and safety risk prevention and protection; regular noise surveys to ensure the on-site maximum levels are not exceeded; development of inspection, testing and maintenance programs for machinery and equipment; accident recording and investigation and prevention initiatives; development of and training in site emergency 	Project proponent	extension/educati on and OHS trainings
Item	Component	omponent Potential Impacts from Project Mitigation Measures Activities		Responsible Person	Anticipated Cost Categories
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			response plans both for the construction and operation phase		
11	Labor and Working Condition	 labor conditions during the construction and operation phase have to comply with IFC requirements and Myanmar labor legislation; they have to apply to temporary and permanent workers, construction workers, operation workers, third- party and supply chain workers 	 development of appropriate HR policies, procedures and employment contracts to include: a human resources policy; working conditions and terms of employment, to be clearly communicated to workers on the commencement of their employment and to be applied also to migrant workers (including anticipated duration of the contract for temporary workers); measures to guarantee fair treatment both for local and migrant workers, non-discrimination & equal opportunity and avoidance of child and forced labor, especially within the supply chain; a grievance mechanism to be disseminated among and accessible by all workers (including third party workers); and measures to protect the workforce from health and safety risks 	Project proponent	Miscellaneous cost
12	Cultural Heritage	• Potential uncovering of cultural artifacts during excavation works	• A Chance Find Procedure should be developed for the Project to be applied in case unknown cultural heritage sites/ remains will be found during construction activities	Project proponent	Miscellaneous cost

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated Cost
Item 1	Component Air	Potential Impacts from Project Activities • Air Pollutant Emissions	 Mitigation Measures stacks are designed and constructed to have sufficient heights to effectively vent dust, smoke and odors to the atmosphere; all bag filters are designed, and installed to reduce particulate matter emissions; Flue Gas Desulfurization system are adopted to reduce sulfur content in flue gas. Oxygen and temperature control are adjusted at CFB boiler to redce NOx emission regular inspection and maintenance of emission control devices are carried out to maintain a good operational condition; tree plantations are provided along the boundary of the Captive Coal Power plant. This green belt can minimize dust dispersion generated from on-site transportation; the concentration of dust in areas where plant 	Responsible Person Project proponent	 Anticipated Cost Installation of Bag filters, CFB boilers, FGD system Spraying water on unpaved road
			• the concentration of dust in areas where plant personnel are working such as the areas along the conveying system, at which material is transferred including the areas around receiving hoppers, is limited to be less than 15 mg/m ³ ; (Dust in working		
			area)		

 Table 8.2-4: Environmental Components – Operation Phase

Item	Component	Potential Impacts from Project	Responsible Person	Anticipated Cost	
2	Noise and Vibration	Increase of noise and vibration levels	 the silencers are installed for high noise level machine and equipment. ear muffs and other PPE are provided to the workers; ensuring good maintenance and repair of the heavy equipment; period equipment maintenance schedule is to be practiced; ambient noise level monitoring will be conducted a suitable location at periodic intervals during the operation phase in order to meet the relevant standards. 	Project proponent	Installation of silancers
3	Water Resources (Surface and Groundwater)	 contamination of water resources from operation activities due to wastewater discharge and accidental events 	 Captive Coal Power plant is operated in dry condition and water used for cooling system is reused or circulated in cooling water system. Therefore, the production does not cause water pollution; wastewater generated from production process is sent to oil separator and sedimentation pond, respectively. The water from sedimentation pond is reused in some equipment and other activities in Captive Coal Power plant, such as conditioning tower, raw mill, and boiler, turbine and generator and open storage of coal; wastewater generated from offices, canteens, and staff accommodation is treated by a treatment system or septic tank ; provision of grease and oil trap for workshop and maintenance area; and provision of separated water drainage and treatment 	Project proponent	Treatment cost

	_	Activities			
			system for outdoor coal storage. Compact the storage ground with clay to prevent seepage into the ground		
4	Land Environment	 Land Use: permanent occupation of land Soil/Subsoil Modifications and Contamination 	• consultation with villages/ward to address their particular impacts	Miscellaneous	
5	Solid and Hazardous Waste	 generation process waste (filters, used lubricating oils, sludge, used oil, etc) and waste associated to the maintenance of the facilities 	 a waste management plan shall be developed including requirements for separation, handling and disposal of all waste generated; all hazardous materials shall be stored in clearly labeled containers; storage and handling of hazardous materials should be in accordance with national and local regulations appropriate to their hazard characteristics; Hazardous waste shall be separated on site and waste storage areas shall be roofed and bounded to prevent potential cross-contamination; spent oils (including transformer oil) shall be recycled; fire prevention systems and secondary containment shall be provided for storage facilities, where necessary, to prevent fires or releases of hazardous materials; all waste shall be disposed of in line with local requirements at a suitable and licensed waste disposal facility; and suitable disposal sites shall be identified with capacities for disposal for general and hazardous waste prior to the operation phase 	Project proponent	Installation of waste yard, different waste bins

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	sible Person Anticipated Cost	
		Activities				
6	Biological Environment	 project area can be considered to have a limited extension the construction phase will be characterized by temporary activities no endangered habitats are expected endemic habitats can be affected by the proposed project no rare species fauna / flora and no endangered species of fauna / flora are encountered in surveyed area 	 refer to applicable mitigation measures related to air, waste, water, etc; washing down of vehicles in place and prior to commencing work; preservation of excavated top-soil for future site restoration procedures particularly in highly disturbed areas; limiting vehicular transport to defined roads as to prevent unnecessary injury, habitat destruction and complying with safe driving procedures; implementing good housekeeping practices on the field and implementing good Solid Waste Management Plan in order to eliminate any source of hazard to the native fauna; minimize vegetation clearance and habitat disturbance by demarcating the clearing boundaries in the quarry site; unnecessary cleaning the trees is to avoid; environmental awareness training to be given to all workers for the preservation of local biodiversity species and induct the nature of the sensitivity of project area; site specific instruction/protocol for identifying and relocation of plant and wildlife species if necessary, shall be provided to all workers with education materials including photographs; 	Project proponent	• Miscellaneous	

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost
7	Socio Economic environment	• Positive impacts on the local socio-economic context (new business opportunities for upstream and downstream satellite activities in the region).	 further investigations on the possibility to increase the local supply of goods and services (i.e. food supply, material supply, restoration services); further increase of the efforts to employ local sources both for skilled and unskilled workforce and provide them with appropriate training for the development of their capacity 	Project proponent	Miscellaneous cost
8	Logistics Activities	 Oil leakage from barge operation Dust leaking and material dropping in ocean and river from coal and gypsum stevedoring process and cement jetty Moorage affects water traffic Effect of anchorage operations on important aquatic animals and fish 	 Label indicating details of each lubricant tank The movement of tank is operated under work instruction Provide oil spill dispersant in case of leakage Cover the transport goods/materials to avoid leakage Schedule port cleaning time (entrance and road cleaning) Regular dust measurement Moorage area is provided in canal near the cement jetty Avoid anchorage point that near fishery and endangered aquatic animals 	Project proponent	Miscellaneous cost

Table 8.2-5: Social and OHS Components – Operation Phase

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost
9	Community Health and Safety	Increase of Project Traffic	 adopt a Traffic Management Plan to ensure traffic safety, which should foresee safe drive trainings and regular alcohol and drug tests for drivers; install appropriate road signage on the roads used by Project traffic in particular at bends, junctions, schools and populated areas; define speed limits and make sure that they are respected by Project drivers (including contractors); maintain the Project roads in order to reduce the possibility of accidents, including control clearing of vegetation on to improve sight distance and visibility 	Project proponent	Cost for installation of traffic signal signboard and other miscellaneous cost
10	Stakeholder Engagement	• Community engagement for the management of risks, impacts and mitigation measures on local communities	 Regular implementation and update of the SEP (Stakeholder Engagement Plan) ESIA and all related materials to be made available to stakeholders Public consultations to be carried out and duly recorded Company to implement an adequate grievance mechanism addressed to communities and affected land owners 	Project proponent	• Extension/Education cost

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost
11	Occupational Health and Safety (OHS)	• The health and safety risks in a Captive Coal Power plant during operations include potential for respiratory diseases, burns, allergies and industrial accidents as well as from the use of chemicals in the process and explosive materials used in quarrying activities. However, the introduction of health and safety measures by Client into the plant management will be reflected in a strong enhancement of the OHS conditions of the Project workers compared to the current level.	 development and adoption of an appropriate OHS Plan covering all Project components and phases; adoption and training all personnel (including contractor workers) in the use of PPE and chemical handling; clear marking of work site hazards (especially close to high temperatures and open tanks) and training in recognition of hazard symbols; adoption of work site hazards signage both in Burmese language and others; training of all personnel in health and safety risk prevention and protection; regular noise surveys to ensure the on-site maximum levels are not exceeded; development of inspection, testing and maintenance programs for machinery and equipment; accident recording and investigation and prevention initiatives; development of and training in site emergency response plans both for the construction and operation phase; and compliance to, national or local HS 	Project proponent	cost for OHS training and PPE

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Item	Component	Potential Impacts from Project Activities	Responsible Person	Anticipated Cost	
			standards that may exist		
12	Labor and Working Condition	• labor conditions during the construction and operation phase have to comply with IFC requirements and Myanmar labor legislation; they have to apply to temporary and permanent workers, construction workers, operation workers, third- party and supply chain workers	 development of appropriate HR policies, procedures and employment contracts to include: a human resources policy; working conditions and terms of employment, to be clearly communicated to workers on the commencement of their employment and to be applied also to migrant workers (including anticipated duration of the contract for temporary workers); measures to guarantee fair treatment both for local and migrant workers, non-discrimination & equal opportunity and avoidance of child and forced labor, especially within the supply chain; a grievance mechanism to be disseminated among and accessible by all workers 	Project proponent	• Miscellaneous

Item	Component	Potential Impacts from Project	Responsible Person	Anticipated Cost	
			 (including third party workers); and measures to protect the workforce from health and safety risks 		
13	Emergency (chemicals hazards)	Risk of chemicals hazards and industrial hygiene	 Formulation of chemical management plan as necessary Training of safety usage and preparation of the emergency response plans Implementation of the proper storage and record of usage. Applying for the acquisition of the license with management plan in accordance with the relevant law, and compliance with the law. Provision of protective equipment and clothes to workers as necessary. 	Project proponent	Training cost for Chemical handling, sotrage and emergency response plan
14	Emergency (Risk of Fire)	• Impact on the community around the project site by increasing of risk of fire	 Installation of the fire hydrants in and aroud the coal power plant and offices in sufficiently. Implementation of emergency drill Preparartion of Emergency Response Plan (See in Appendix-2) Coorpate with Myanmar Fire Services Department in case of accidential fire 	Project proponent	Training cost for fire emergency response plan

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Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost
15	Emergency (Risk of Flood)	• Impact on the power plant and nearby community due to increase of water level	 Prepare emergency response/rescue plan for flood Frequently watch local weather news and disaster notices by the relevent media 	Project proponent	Training cost for flood emergency response plan
16	Emergency (Risk of Earthquake)	• Impact on the power plant and nearby community due to damage of building and others materials	 Building design/structure should be compliance with municiple building standards Prepare emergency response/rescue plan for earthquate 	Project proponent	Training cost for disaster emergency response/recuse plan

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated Cost
		Activities			Categories
1	Air	Impacts on ambient air quality may occur due to such as decommission activities such as demolition of buildings and materials, dismantling of machinery and other equipment, clearance of residual concrete structures, vehicular movements	 Reduce the idle condition of vehicles and other machinery to reduce unnecessary emission. all equipment and machinery must be maintained and tested regulary to reduce unnecessary emission. spraying water must be done prior to begin earthwork activities and traveling on project site's unpaved road. enclosure or covering of residual concrete piles to reduce wind erosion limit the speed of vehicle movement within the project site re-vegetation of cleared areas that are no longer needed as soon as practicable during construction. Minimize the clearance of trees and vegetation within hte project area to serve as physical barrier in emission emission reduction. Transportation of raw materials and products to and from the site should be well covered to prevent dust and falling of materials. 	Project proponent	 Water spraying cost Seedling and labor cost for re- vegetation
2	Noise and Vibration	Noise and vibration levels may be increased due to decommission activities (eg. demolition of buildings and materials)	 avoid construction operation at night time posting of warning signs within the vicinity of the project area if intensive operation are conducted (eg. piling,driling etc,.) all personnel shall be provided with personal 	Project proponent	 Cost for installation of warning sign- board PPE cost for construction workers

 Table 8.2-6: Environmental Components – Decommission Phase

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated Cost
		Activities			Categories
			protective equipment. For example, workers operating equipment that generates noise should be equipped with the appropriate noise protection gear;		
3	Water Resources (Surface and Groundwater)	contamination of water resources from decommission activities due to: 1. wastewater discharge 2. runoff water from decommission site 3. accidental events	 avoid direct runoff from project area by means of temporary setelling ponds, drainage ways, utilizing for example cut-off drains; provide containment measures for hazardous material and storage areas to prevent spills or leakage of fluid materials which may soak into the ground and reach the groundwater table; make proper design to store hazardous material by providing suitable reception facility with impervious flooring, roofing and suitable drainage control; regular maintenance and checking of all plant and machinery in order to minimize the risk of fuel or lubricant leakages; training and equipping relevant staff in protected storage and handling practices, and rapid spill response and cleanup techniques 	Project proponent	• extra labor and machinery cost for digging temporary setlling ponds and drainages
4	Land Environment	 <i>Landscape:</i> impacts arising from the installation of all site compounds; temporary works, installations, and storage; movement of heavy and light demolition machinery (including tall cranes); special load movement and storage 	 prevention of soil contamination by oil or grease spills, leakages or releases, all manipulations of oil derivate in the process of construction and provision of fuel to the machines should be performed with maximum attention; leak proof containers should be used for storage and transportation of oil/grease and wash off from the oil/grease handling area shall be drained through drains and treated properly before disposal; 	Project proponent	 cost for digging temporary setlling ponds and drainages

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated Cost
	F	Activities	g		Categories
		 Soil/Subsoil Modifications and Contamination 1. soil erosion; 2. changes in geomorphological 4. pollution of soil 	 demolition waste and debris shall be collected and disposed of at designated landfills; it must be prohibited to operate with equipment and vehicles outside the designated work areas and roads; training and equipment will be in place to minimize the potential environmental impact in the case of accidents (for example through the use of spill kits) 		
5	Solid and Hazardous Waste	Solid and hazardous may be generated due to demolition waste, domestic waste and sewage / wastewater	 waste sorted into a number of waste streams no uncontrolled disposal of during the decommission phase and all waste streams directed to proper disposal disposal of hazardous materials by authorized contractors according with local legislation identification of specific disposal procedures for all waste streams (transporting, auditing, recording, monitoring, etc); transporting vehicles properly marked and 	Project proponent	 extra labor cost for waste separation cost for construction of temporary storage area for solid and hazardous waste

			recording, monitoring, etc);		
			 transporting vehicles properly marked and 		
			provided with documents describing nature of		
			the transported waste and its hazardous degree		
			• compilation of a register of the quantities and		
			characteristics of the waste sent to landfill,		
			(origin, type, quantities and landfill locations)		
			 decommission site properly cleaned 		
6	Biological	Depletion of natural	• refer to applicable mitigation measures related	Project proponent	Miscellaneous cost
	Environment	habitat/protected species	to air, waste, water, etc;		
		• project area can be considered	 limiting vehicular transport to defined roads as 		
		to have a low biodiversity and	to prevent unnecessary injury, habitat		
		low significance area for	destruction and complying with safe driving		

Item	Component	Potential Impacts from Project	Mitigation Measures	Responsible Person	Anticipated	Cost
		Activities			Categories	
		 ecosystem the demolition phase will be characterized by temporary activities no endangered habitats are expected endemic habitats can be affected by the proposed project no rare species fauna / flora and no endangered species of fauna / flora are encountered in surveyed area 	 procedures; environmental awareness training to be given to all workers for the preservation of local biodiversity species and induct the nature of the sensitivity of project area; site specific instruction/protocol for identifying and relocation of plant and wildlife species if necessary, shall be provided to all workers with education materials including photographs; and enhance re-vegetation program that selected tree species are compitable with existing environment 			

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost Categories
7	Socio Economic environment	• Socio-economic context may be negative impacts due to loss of job opportunities if employer does not announced about the project closure plan	 Employer should announce the project closure plan in advance Appropriate enhancement measures should be implemented to boost the beneficial effects on the local socio-economic context 	Project proponent	Cost for miscellaneous
8	Community Health and Safety	 Increase in the heavy vehicle traffic impacts on community health due to the arrival of foreign workers 	 Traffic management plan should be implemented (including alcohol test, vehicle check and maintenance plan, limit the maximum speed). Installation of appropriate temporary road sign points in the vinicnity of project area especially at bends, junctions, schools and populated areas. development of an medical surveillance program for project employees to monitor the trend and pattern of communicable disease and foresee health awareness raising campaigns as part of their heal and safety induction 	Project proponent	Cost for extension/education
9	Stakeholder Engagement	• Community engagement for the management of risks, impacts and mitigation measures on local communities.	 Regular implementation and update of the SEP Company to implement an adequate grievance mechanism addressed to communities and affected persons 	Project proponent	Logistics and other miscellaneous cost
10	Occupational Health and Safety (OHS)	• The health and safety risks in a Captive Coal Power plant during demolition period include potential for respiratory diseases, burns, allergies and	 development and adoption of an appropriate OHS Plan covering all Project decommission phase; adoption and training all personnel (including contractor workers) in the use of PPE and 	Project proponent	Cost for extension/educa tion and OHS trainings

Table 8.2-3: Social and OHS Management Plan- Decommission Phase

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost Categories
		industrial accidents as well as from the handling of chemicals in the process and explosive materials used in quarrying activities.	 chemical handling; clear marking of work site hazards (especially close to high temperatures and open tanks) and training in recognition of hazard symbols; adoption of work site hazards signage both in Burmese language and others; training of all personnel in health and safety risk prevention and protection; development of and training in site emergency response plans both for the construction and operation phase 		
11	Labor and Working Condition	 labor conditions during the decommission phase have to comply with IFC requirements and Myanmar labor legislation; they have to apply to temporary and permanent workers, construction workers, operation workers, third- party and supply chain workers 	 follow the developed HR policies, procedures and employment contracts to include: a human resources policy; working conditions and terms of employment, to be clearly communicated to workers on the commencement of their employment and to be applied also to migrant workers (including anticipated duration of the contract for temporary workers); measures to guarantee fair treatment both for local and migrant workers, non-discrimination & equal opportunity and avoidance of child and forced labor, especially within the supply chain; a grievance mechanism to be disseminated 	Project proponent	Miscellaneous cost

Item	Component	Potential Impacts from Project Activities	Mitigation Measures	Responsible Person	Anticipated Cost Categories
			 among and accessible by all workers (including third party workers); and measures to protect the workforce from health and safety risks 		

8.3 MCL's Pollution Control

8.3.1 Main Pollution Sources and its Characteristics

8.3.1.1 Air Emission

Air emissions in Coal Power Plant are mainly emerged from the operation of coal crushers, conveyor line, CFB boiler and finally the stack.

- Particulate matter (PM) emissions are associated with coal crusher, coal combustion process at CFB boiler, limestone preparation process and FGD stack.
- Nitrogen oxide (NOx) emissions are generated in the high temperature combustion process of CFB boiler.
- Sulfur dioxide (SO₂) emissions in Coal Power Plant are primarily associated with the content of volatile or reactive sulfur in the raw materials (high content of organic sulfur or pyrite (FeS), and although less important, with the quality of fuels for power generation.
- Greenhouse gas emissions, especially carbon dioxide (CO₂), are mainly associated with fuel combustion.
- Carbon monoxide (CO) represents an indicator of the conditions of the process. High CO readings are usually a warning sign that the process is not performing properly, (potentially involving higher fuel consumption).
- Heavy metals (e.g. lead, cadmium, and mercury) can be significant emissions from the use of raw coal materials, fossil fuels, and waste fuel. Nonvolatile metals are mostly bound to the particulate matter. Volatile metal emissions, such as mercury, are usually generated from both the raw materials and the waste fuels.

Equipment	Main O&M issues
Bag Fabric Filter	 2.1 Gas temperature; because fabric filters are designed to operate at optimum temperature (82°C to 260°C, depends on type of filter) - Low temperature resistant filter material for grinding and blending - High temperature resistant filter material for coal burning machine
	2.2 Pressure drop; the average baghouse pressure drop gradually increases as the filter cake builds on the bags

Table 8.3-1: Major O&M Issues Related to Air Pollution Control Device

Major air emissions include particulate matter (PM), Sulfur dioxide (SO_2) and Nitrogen Oxides (NO_x) can be controlled by bag filters, FGD and oxygen and temperature adjustment.

Table 8.3-2: Parameters and Method Measurement	of Emission Standard	(DIW, 2006)
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Parameters	Method Measurement
Particulate	Determination of Particulate Emissions from Stationary Sources (U.S.EPA)
Sulfur Dioxide (SO ₂)	Determination of Sulfur Dioxide Emissions from Stationary Sources or Determination of Sulfuric Acid Mist and Sulfur Dioxide Emissions from Stationary Sources (U.S.EPA)

	Determination	of	Nitrogen	Oxide	Emissions	from	Stationary	Sources
Nitrogen Oxide (NO _x)	(U.S.EPA)							

Table 8.3-3: Sampling and Monitoring Air Pollution at Workplace

Location	Parameters	Frequency
	TSP	
Personal sampling	PM-10	Continuous (8 hr)
	PM-2.5	
Area sampling	TSP	Continuous (8 hr)

8.3.1.1.1 Ambient Air Impacts and Mitigation Measures

During construction phase, suspended particulate matter will be the main pollutant, which would be generated from the site development activities. However, the increase in ambient concentrations of air quality will be negligible. As most of the construction equipment will be mobile, the emissions are likely to be fugitive. The dust generated will also be fugitive in nature, which can be controlled by sprinkling of water.

The impacts will be localized in nature and the areas outside the project boundary are not likely to have any major adverse impact with respect to ambient air quality.

Hence, there will not be any concentration of emissions at any single point. It shall be ensured that both gasoline and diesel-powered construction vehicles are properly maintained to minimize smoke in the exhaust emissions.

Dust generation during construction phase can be reduced by:

- 1. Sprinkling of water shall be done at frequent intervals by preferably using truckmounted sprinklers;
- 2. Sprinkling of water will be done along the roads and work zone areas to reduce the fugitive dust;
- 3. Construction equipment shall be maintained and serviced regularly such that the gaseous emissions from this equipment are maintained within the design specifications; and
- 4. Since electrical power is available within plant site, attempts shall be made to utilize the electrically powered machinery to the extent possible to minimize the emissions of SO_2 and NO_x during construction.
- 5. implementing speed limits on heavy traffic,
- 6. Limiting the traffic of peoples and machines to the construction area.

8.3.2 Continuous Emission Monitoring System (CEMS)

Continuous Emission Monitoring system (CEMS) are mainly used as a tool to monitor flue gas for sulfur dioxide, nitrogen oxide, oxygen, particulate matter, temperature flow rate and velocity to provide information for combustion control in industrial settings for monitoring within the stack which presents a number of problems due to extremes of temperature, velocity of sample and pressure. The standard CEMS consists of a sample probe, filter, sample line (umbilical), gas conditioning system, calibration gas system, and a series of gas analyzers which reflect the parameters being monitored.



The extractive dilution technique is one of the most widely used method for continuous emission monitoring of SO_2 and NO_x it is also ideal for use in monitoring CO, CO_2 , H_2S and NH3. It can be combined with a zirconium oxide sensor for the continuous measurement of O_2 . The benefit of MCL CEMS is Unheated Sample Lines and Reduced Maintenance.

8.4 Wastewater Treatment

MCL use proper circulation system for water and all of the discharge water from raw coal storage will be circulated for cooling purpose and there will be no discharge of process water into the surface water and ground water as shown Water Recirculation System in Figure 7.4-2: Water Balance Diagram of Power Plant in page 277 and Figure 7.4-3 in Page 278.

Table 8.4-1: Effluent	Levels of MCL Wastewater
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Pollutants	Units	Guideline Value
рН	S.U	6-9
Total Suspended Solids	mg/l	50
Temperature Increase	°C	<31

Parameter	Unit	Pretreatment	Cooling	Demin	Boiler	Boiler	Boiler
		Target	Tower	Water	Feed	Drum	Steam
			Water	Target	Water	Target	Target
			Target		Target		
рН			7.8-8.5	6.0-8.0	8.5-9.6	9.0-10.5	8.5-9.6
Conductivity	µS/cm		≤3000	≤1.0	<10	<150	<10
Turbidity	NTU	≤2 NTU	≤15				
Chloride	ppm		≤400				
Silica	ppm		≤150	< 0.02	< 0.02	<8	< 0.02
Iron	ppm		≤3	< 0.02	< 0.02	<0.5	< 0.02
Phosphate	ppm		2.0-5.0			2.0-10.0	
Alkalinity	ppm		≤250				
Total hardness	ppm		≤900				
Calcium hardness	ppm						
Free Residual Chlorine	ppm	0.1-0.5	0.1-0.5				
Cycle of Conc.			4.0-5.0				
LSI			0-<1.5				

Table 8.4-2: Water Quality Control Parameters in Process in Coal Power Plant

¹ At the edge of a scientifically established mixing zone which considers ambient water quality, receiving water use, potential receptors and assimilative capacity.

Parameter	Unit	Pretreatment Target	Cooling Tower Water Target	Demin Water Target	Boiler Feed Water Target	Boiler Drum Target	Boiler Steam Target
рН			7.8-8.3	6.0-8.0	8.8-9.6	9.5-11.0	8.8-9.6
Conductivity	µS/cm		≤3000	≤ 5	<15	<250	<10
Turbidity	NTU	≤3 NTU	≤10				
Chloride	ppm		≤250				
Silica	ppm		≤150	<0.02	< 0.02	<8	<0.1
Iron	ppm		≤3	< 0.02	< 0.02	<1	<0.01
Phosphate	ppm		2.0-5.0			5.0-25.0	
Alkalinity	ppm		≤250				
Total hardness	ppm		≤900				
Calcium hardness	ppm						
Free Residual Chlorine	ppm	0.1-0.5	0.1-0.5				
Cycle of Conc.			4.0-5.0				
LSI			0-<1.5				

Table 8.4-2: Water Quality Control Parameter in Process in WHG

8.5 Solid Waste

Sources of solid waste, mainly composed of spoil rocks, which are removed from the raw materials during the raw meal preparation. Another potential waste stream involves the dust removed from the bypass flow and the stack, if it is not recycled in the process. Limited waste is generated from plant maintenance (e.g. used oil and scrap metal).

A Waste Management Plan (WMP) will be prepared for managing the waste during the construction phase, to minimize the potential negative impact on the environment and community health. The following main environmental standards for waste management will be adopted:

- all types of waste generated during the construction phase should be inventoried and scheduled;
- local waste management facilities will be identified and evaluated;
- waste will be sorted into several waste streams (groups of waste requiring common handling methods, i.e. re-use, decontamination/processing, authorized disposal, etc.);

- waste storage facilities must be fenced on the perimeter, properly lighted and with access constraints for unauthorized people;
- no uncontrolled disposal of waste will be carried out during the construction phase, as all waste streams will be directed to proper treatment;
- disposal of waste and hazardous materials will be performed by authorized in-country contractors according with local legislation;
- maximization of reuse and recycle, for example by returning the materials to the original vendor for commercial regeneration. When no market or capability exists for a given waste, the waste will be temporarily stored on site and sent to an appropriate off-site treatment/disposal facility;
- specific disposal procedures for all waste streams will be identified (transporting, auditing, recording, monitoring, etc);
- transporting vehicles will be properly marked and drivers will carry the appropriate documents describing nature of the transported waste and its hazardous degree. A register of the quantities and characteristics of the waste sent to landfill, indicating origin, type, quantities and landfill locations will be maintained;
- all vehicles and containers will be designed to prevent leakage of transported liquid and solid waste; drivers will have specialized training license related to handling and disposal of cargo;
- incineration of combustible waste and construction debris is prohibited; and
- construction site will be periodically cleaned.

8.6 Noise Control

Noise pollution is related to several phases, including raw material extraction; grinding and storage; raw material, intermediate and final product handling and transportation; and operation of exhaust fans.



Figure 8.6-1: Noise Control Measures in MCL

8.7 Natural Hazards

As discussed earlier in Chapter 4, section 4.10, natural disaster such as earthquake, Cyclone, Tsunamis, etc are rarely occur in Mon state. However, the seasonal floods are frequently occurred due to the higher precipitation. The maximum water level of Ataran River during flooding was used to rise at 510 cm. Thus, major natural hazards in this project area can be considered as flood.

8.7.1 Road Map for Flood Protection Management

Geographical and site survey was conducted for flood way at the project site with the continuous monitoring system.



Figure 8.7-1: Watershed Model (Normal Condition without Project)



Figure 8.7-2: Watershed Model (Flood Condition without Project)



Figure 8.7-3: Drainage Model (Normal Condition with Project)



Figure 8.7-4: Drainage Model (Flood Condition without Project)

8.7.2 Stormwater Management Plan





- Related Drainage System 2 Lines
 - Eastern line
 - Western line
- Sediment Pond System 2 Ponds (50X50X7 m)

Figure 8.7-5: Overview of Drainage Lines at Plant Site Area



- Left Space between the plant and clay storage 100 m (A)
- Left Space of floodway to prevent the flow to the community (B)

Figure 8.7-6: Space Left Area for Flood Prevention

8.8 Occupational Health and Safety Management Plan

Mawlamyine Cement Limited (MCL) has a Health and Safety policy of which all personnel are briefed on and are consulted in its development through their representatives.

Mawlamyine Cement Limited (MCL) Works Health and Safety policy (See in Annex-8-1) highlights the importance of individual and collective behavior and of action undertaken by all the employees to prevent industrial accidents and work-related illnesses.

Implementation of a Health and Safety Management System has significantly improved Mawlamyine Cement Limited (MCL) Works Safety performance in all operations. This has been facilitated consequently by Management's strong involvement and commitment intensify Safety concerns and awareness at all levels on matters of health and safety.

Consequently, Mawlamyine Cement Limited Works has demonstrated its resolve to create a safe and healthy work environment for its employees, contractors and visitors through:

- The application of proven occupational Health and Safety technologies, standards and operating procedures to minimize exposure to risk
- > The reporting and investigation of potential accident situations within the workplace and the implementation of mitigation plans to prevent reoccurrence
- The provision of adequate financial and human resources, employee training and awareness raising to facilitate the continual improvement in Safety performance.

An OHS Management Plan will cover all the Project components and phases to provide a clearly written statement of intent and plan of action for the prevention of accidents and occupational illness and injury. Based on the risks and hazard assessment (e.g. HAZOP), it will include:

- strategies to control, respond rapidly to and prevent accidents, illness and injury resulting from each of the identified hazards and risks (e.g. introduction of a Permit to Enter system, effective housekeeping, safety walkthrough, wearing of PPE, etc);
- prevention and response strategies and clear and documented rules and safety procedures for health and safety in the workplace (both in Myanmar and Chinese language);
- staff safety education and training (including toolbox talks and inductions);
- measures to promote workers' safety culture via periodic HSE training, induction, toolbox talks to focus workers' attention on particular and specific safety issues;
- emergency response plan; and
- documentation, monitoring and reporting requirements, including daily monitoring and monthly review of near-misses, incidents, occupational diseases, dangerous occurrences, accidents at project activity areas.

In conclusion, taking into account the mitigation measures listed above, the impacts related to OHS both during the construction and operation phase are considered having a medium significance.

8.8.1 Occupational Health (Coal Power Plant)

MCL Company Works has implemented an HIV/AIDS awareness and prevention program in consultation with local HIV/AIDS organizations and government initiatives to inform and counsel employees regarding the dangers of HIV/AIDS and how to reduce the spread of the disease.

- Pre-employment and regular medical examinations shall be carried out on all plant employees.

- Mawlamyine Cement Limited Works shall provide well-equipped sanitary facilities for its employees.

- Workers in areas of high temperature and other high-risk areas shall be allowed to take shorter shifts.

8.8.1.1 Occupational Safety

The general safety of employees while at work is the responsibility Mawlamyine Cement Limited, except in cases where the employee was acting in a negligent and dangerous manner. To that effect the following measures are in place.

□ Conveyors and similar machinery shall be provided with a means of stopping them at any point.

□ Guards shall be fitted to all drive belts, pulley, gears and other moving parts to protect workers.

 \Box Raised platforms, walkways, gantries, scaffolds, stairways and ramps shall be equipped with handrails and non-slip surfaces.

□ All electrical equipment shall be grounded, well insulated and conform to applicable codes.

□ Plant site piping shall be colour-coded for acid, water, compressed air and process solution.

 \Box Mine and plant employees shall be provided with hardhats, safety boots, overalls, ear and eye protection, dust masks and gloves as appropriate, Table 8.7-1.

 \Box The company shall ensure that The Mining Explosives Regulations governing the safe storage, handling and transport of explosives to, in and around the mine is strictly enforced.

□ Only qualified and certified personnel shall be allowed to carry out blasting operations.

 \Box Hazard and warning signs shall be erected or posted around the plant site to warn employees and contractors of potential dangers.

Objective	Work place Hazards	Suggested PPE	
Eye and face protection	Flying particles, molten metal,	Safety Glasses with side-shield,	
	liquid chemicals, gases or	protective shades, etc.	
	vapors, light radiation.		
Head protection	Falling objects, inadequate	Plastic Helmets with top and side	
	height clearance and overhead	impact protection	
	power cords.		
Hearing protection	Noise, ultra sound	Hearing protectors (ear plugs or	
		ear muffs)	
Foot protection	Falling or rolling objects,	Safety shoes and boots for	
	pointed objects, corrosive or hot	protection against moving &	
	liquid	falling objects, liquids and	
		chemicals	
Hand protection Hazardous materials, cuts or		Gloves made of rubber or	
	lacerations, vibrations, extreme	synthetic materials (Neoprene)	
	temperatures	leather, steal, insulating materials,	

Table 8.7-1: Summary of Recommended Personal Protective Equipment According to Hazards

		etc.
Body/leg protection	Extreme temperatures,	Insulating clothing, body suits,
	hazardous materials, biological	aprons etc. of appropriate
	agents, cutting and laceration.	materials.

8.9 Occupational Safety Training

8.9.1 Occupation Health and Safety Training

Mawlamyine Cement Limited shall provide Occupation Health and Safety orientation training to all new employees to ensure they are appraised of the basic site rules of work at/on site and of personal protection and preventing injury to fellow employees.

Training shall consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use shall be thoroughly reviewed as part of orientation training.

8.9.2 Visitor Orientation

Where visitors to the site can gain access to areas where hazardous conditions or substances may be present, a visitor orientation and control program shall be established to ensure visitors do not enter hazard areas unescorted.

8.9.3 Basic Occupational Health and Safety (OHS) Training

Mawlamyine Cement Limited will institute a basic OHS training as follows;

 \Box A basic occupational training program and specialty courses shall be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments.

 \Box Training shall generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.

 \Box Workers with rescue and first-aid duties shall receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their coworkers.

 \Box Training would include the risks of becoming infected with blood-borne pathogens through contact with bodily fluids and tissue.

□ Through appropriate contract specifications and monitoring, Mawlamyine Cement Limited management shall ensure that service providers, as well as contracted and subcontracted labor, are trained adequately before assignments begin.

8.10 Emergency Response and Rescue Plan

8.10.1 Objective

The following constitute the main objectives of the Emergency Response and Rescue Plan.

- > Ensure employees are aware of their responsibilities in an emergency situation.
- > Outline basic procedures to follow during safety related emergencies.

8.10.2 Activities

8.10.2.1 Maintenance of Emergency Contacts

1) The Central Control Room operator should prepare and maintain an updated list of the following:

a) Key Plant Management Team Members

b) External emergency service contacts such as the Fire Services Department of Kyaikmaraw, Township Police Department, company-subscribed clinics and township hospitals, including contact numbers of the doctors in charge.

Internal Contact (Mawlamyine Cement Limited) Contacts				
NAME & DESIGNATION	Contact Number			
CSR Department Manager	-09796093056			
HR Department Manager	-09769832204			
MCL Clinic Doctor	-09788903438			
External Emergency Contacts				
Kyaikmaraw Police Station	057-860-04			
Kyaikmaraw Fire Service Department	057-860-15			
Doctor, Kyaikmaraw Township Hospital	057-860-08			
Department of Relief and R, Mon State	057-248-25			

Table 8.10-1: Contact Numbers for Emergency Response

2) Update and post all Safety Notice Boards in various sections of the Plant with:

a) Emergency Plans which will clearly indicate exit routes, location of first aid boxes, fire extinguishers and Assembly Points.

- b) Emergency Tool boxes/rescue equipment.
- c) Company Ambulance contact numbers.

8.10.2.2 Emergency Assembly Points

There shall be clearly marked and designated Emergency Assembly Points in both the Plant and the Quarry Works areas.

8.10.2.3 Fire Fighting Equipment

Mawlamyine Cement Limited will institute the following measures in order to enhance fire safety preparedness:

1) All offices shall be fitted with smoke detectors to offer early warning to employees in case of fire. The workplaces will be provided with fire alarms which will be activated in case of fire.

2) Electrical substations and other critical installations such as the cement packing plant, poly-bag warehouses, etc. shall be equipped with specialized automatic fire protection and control systems to detect and trigger the fire extinguishing agent.

3) All working areas will be provided with suitable fire extinguishers which shall be mounted in easily accessible locations.

4) At least a square meter of the area where a fire extinguisher has been mounted shall be kept clear.

5) Fire Extinguisher locations shall be posted with "Fire Extinguisher" signs and will be mounted at eye level.

6) In addition to fire extinguishers, there shall be designated points for connecting fire hoses around the plant. These points shall be regularly serviced as per fire regulatory requirements.

8.10.2.4 Incident Management

The following shall constitute key management interventions in response to each respective emergent situation.

8.10.2.4.1 Fire

In the event of fire, the person discovering the fire should:

a) Raise the alarm.

- b) Call the Central Control Room and or the Fire Brigade on.
- c) If safe to do so tackle the fire, if in doubt get out.
- e) Evacuate the premises and report to your designated assembly point.

8.10.2.4.2 Accidents

In case of an accident in the workplace:

a) The involved, if they are able to do so, should immediately report to their supervisor. Alternatively, the person discovering the accident should report it immediately to the Central Control Room Operator, who should in turn inform the Shift Manager.

b) The Shift Manager shall immediately go to the accident scene to assess its nature.

c) If the accident is a major one, that is, resulting in serious personal injury, and or property damage, the Shift Manager shall mobilize the required emergency services, including first aiders and inform the Safety Manager, Plant Manager, and others, accordingly.

d) If the accident occurs after-hours, the Shift Manager shall inform all the required personnel as per Plant Call Out procedure.

e) Information pertaining to the accident shall be released to the public through the Corporate Affairs Department or the Plant Manager.

f) During any emergency all communication on phones will be restricted to personnel handling the emergency.

8.10.2.4.3 Road Traffic Accidents

In case of a Road Traffic Accident:

a) Render assistance to any person injured, if practical.

b) Report the accident to the nearby Kyaikmaraw Police Station.

c) Do not accept responsibility for the accident but cooperate with the Police who will investigate the accident.

d) Obtain the particulars of the other involved parties, i.e. vehicle registration number, driver's name, witnesses etc.

e) Inform immediate supervisor and Safety Manager.

8.10.2.4.4 Hazardous Material Spills

In case of major hazardous material spills the following procedure will apply in order to minimize the impact on the environment:

a) Contain

The spilled oil shall be contained by constructing a bund around the affected area.

The trapped oil shall be pumped/collected into suitable containers, such as sealed drums and kept in a bounded area while awaiting removal from site.

b) Notify

The spill incident shall be reported to the supervisor who shall assess the situation and notify the relevant senior officials as per Incident Reporting Procedure.

In all cases where the oil spill is on ore, that is, in the pit or at the Run of Mine (ROM) pad, the senior officials will be consulted to recommend the best remedial action.

c) Dispose

Contaminated soil and absorbent material shall be disposed off in accordance with the waste management procedure.

d) Maintain

The affected area shall, as soon as is reasonably practicable, be cleaned up and replaced with fresh soil.

8.10.2.5 Responsibility

All supervisors are responsible for ensuring effective implementation of the Emergency Response Plan and will act as key respondents.

Designated assistants will act in the absence of substantive supervisors and will act as key respondents in that case.

Table 8.10-2 is a summarized Emergency Response Plan aimed at guiding response to emergency situations which may arise as stipulated above. The plan identifies likely emergency situations together with their causative factors followed by an elaboration of the proposed response. The plan finally identifies the respondents in order of priority. It is anticipated that implementation of the plan would safeguard the health and safety of workers and prevent excessive loss of property.

	Emergent	Cause	Proposed Response	Respondents
	Situation			
1	Staff Injury	Unskilled labour	□ Apply appropriate First Aid	Key Respondents: Immediate supervisor or person first
		□ Neglect of safety	□ Document incidence	arriving at accident scene and Safety and Health Manager
		procedures	□ Take to hospital if necessary	Other Respondents: First Aid
		□ Faulty equipment and tools	□ Investigate causative factor and institute	Attendant on Duty Immediate Supervisor, Factory Manager.
			appropriate measures to prevent similar occurrences	
2	Chemical	□ Unskilled labour	□ Apply appropriate First Aid	Key Respondents: Immediate supervisor or person first
	Poisoning	□ Neglect of safety	□ Document incidence	arriving at accident scene and Safety and Health Manager
		procedures	□ Take to hospital if necessary	Other Respondents: First Aid
		□ Faulty equipment and tools		Attendant on Duty Immediate Supervisor, Factory Manager.
3	Fire Outbreak	□ Neglect of safety	□ Sound alarm and instruct all to assemble at Fire	Key Respondent: Fire Discoverer, immediate supervisor and
		procedures	Assembly point	Safety and Health Manager
			□ Conduct roll Call	Other Respondents: Emergency Response Team.
			□ Fight the fire using appropriate tools (fire	
			extinguisher, sand, water)	
			□ Inform Kyaikmaraw Fire Brigade and Police	
			□ Document incidence	
4	Chemicals and	□ Neglect of safety	□ Contain material by bunding around with sand or	Key Respondent: Immediate supervisor and Environmental
	other material	procedures	any other suitable material to	Manager
	Spillage	□ Poor containment/storage	stop material flow and spread	Other Respondents: Emergency Response Team.
		facilities	□ Clean up affected areas	
			□ Document incidence	

Table 8.10-2: Emergency Response Plan
8.11 Public Relation Activities

MCL Open House Activities and Public Relation Program were conducted in 25th June 2019 in 8 villages around MCL project area including the key persons such as villages' heads, heads of schools and village health care officer together with MCL authorities and staffs. These open house activities included the open discussion among the MCL authorities and the villages and planting trees along the village boundary and school area.

Sr. No.	Village	Participants from Villages	Participants from MCL
1	Kaw Pa Naw	5	
2	Me Ka Ro	4	
3	Kwan Ngan	9	
4	Pauk Taw	5	
5	Village Healthcare Centre	3	MD and Staffs
6	Ka Don Sit	3	
7	We Nge	1	
8	Kaw Wan	7	
9	Kaw Dun	1	
	Total	38	

Table 8.11-1:	List of Villages	Involved in	Onen House	Activities
1 abic 0.11-1.	List of vinages	myorycu my	Open mouse	Activities



There were 38 participants in the public relation activities (seen in above Table) and 9 concerned questions in total about the MCL supports in villages' facilities in development and improvement activities.

Villages	Village Representatives	Questions	Solutions by MCL	Representatives from MCL	
Kaw Dun	U Ye Win	MCL should concern about the Cement Transportation vehicles speed and if accident happened, MCL should involve to solve the problems. (accident with Me Ka Ro villager and cement transport car hadn't get agreement for compensation yet. Like that case MCL should involve deeply).	In the future, like that accident cases, MCL, villagers and owner of car should cooperate and solve the problem.	Mr. Hatsacchai (MD, MCL)	
Kaw Wan	U Sein Aung	Villagers would like to request MCL to support their village cemetery repairing process.	Villagers' should request with detail calculation and design in order to consider by MCL with the fully or partially supports.	Mr. Hatsacchai (MD, MCL)	
		Villagers would like to request MCL to provide water drainage along the village.		Mr. Hatsacchai (MD, MCL)	
Pauk Taw	U Thein Tun	Would like to request MCL to support school's window repairing from glass to other materials.	MCL will think about it.	Mr. Hatsacchai (MD, MCL)	
		Would like to request MCL to support school signboard repairing process.	MCL will think about it.	Mr. Hatsacchai (MD, MCL)	
Me Ka Ro	U Soe Myint	Villagers would like to request MCL to support village road which has 4000 feet length repairing	Villager should request with the detail calculation of amount of stone, amount of	Mr. Hatsacchai (MD, MCL)	

 Table 8.11-2: Villages' Concerns on Project in Public Relation Meeting

		and concreting process. Estimated 2000 cement bags have to be used.	cement bags, length/ width/ height of road so that MCL will consider about fully or partially support.	
Ka Don Sit	Daw Nyo Nyo	Would like to request MCl to support school entrance road concreting process.	MCL request head of villagers to calculate detail expenses.	Mr. Hatsacchai (MD, MCL)
Kwan Ngan	U San Thein	Would like to request MCl to support school fence repairing process.	MCL request head of villagers to calculate detail expenses with design.	Mr. Hatsacchai (MD, MCL)

8.11.1 Future Social Management Plan

MCL will make this kind of open house activities in the future along with the project implementation as necessary and the concerned authorized persons from Government sector and Regional sector will be invited to the work site visiting tour in Thailand so that the concerned stakeholders can understand the project activities and the control management actions of Siam Cement Plant (SCG) operation processes with the sustainable measures on coal fired power plant.

CHAPTER 9 ENVIRONMENTAL MONITORING PLAN

9.1 Implementation of Environmental and Social Monitoring Plan

Successful implementation of Environmental Monitoring Plan (EMP) depends on regular monitoring, documenting and reporting. Mawlamyine Cement Limited (MCL) should have provision of Health, Safety and Environmental Department for monitoring the EMP implementation during construction and operation phase of the project.

The environmental monitoring officer should monitor the EMP implementation and submit a quarterly report to the concerned department. Additionally, another yearly monitoring report with quarterly monitoring data should be submitted to the Environmental Conservation Department for renewing the Environmental Clearance Certificate. The institutional arrangement for implementation of EMP and Monitoring Plan is described in Section 2.9 (Chapter-2). The detail environmental monitoring plan has been presented in Table 9.1-1.

Indicator (Survey item)	Location of Data Collection	Method and Frequency	Institution	
Construction Phase				
MonitoringEMPimplementationMitigation measuresEnhancement measuresContingencyCompensation	Project area	Daily monitoring and documenting, and quarterly reporting	SOD Department	
Air quality (NO ₂ , SO ₂ , CO, TSP, PM_{10})	3 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	
Noise	4 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	
Surface Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are same as baseline data collection	Quarterly (March, July, November)	Third Party	
Ground Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are (same as baseline data collection)	Quarterly (March, July, November)	Third Party	
Soil Quality	Locations and number of samples are (same as baseline data collection)	Yearly (March)	Third Party	
Operation Phase				
Air quality (NO ₂ , SO ₂ , CO, PM _{2.5} , PM ₁₀)	3 locations (same as baseline data collection locations) and the other receptors locations including Me Ka Than village, Me Ka Ro, Ka Don Sit village, Shwe Wa Gyaung Village	Quarterly (March, July, November)	Third Party	

Table 9.1-1: Environmental Monitoring Plan

Indicator (Survey item)	Location of Data Collection	Method and Frequency	Institution		
Air quality (Heavy Metals Emission, Hg)	Laboratory Analysis of fly and bottom ash	Quarterly (March, July, November)	Third Party		
Dispersion of monitored pollutants (NO ₂ , SO ₂ , CO, TSP, PM ₁₀)	Stack, Township Meteorological Department	Once a yar	Third Party		
Wind Speed and Wind Direction	HOBO wind sensor is suggested to install at the power plant to know the local wind speed and wind direction	Continuous monitoring system	SOD Department		
(Temperature, Velocity, SO ₂ , SPM, NOx, HC, CO)	Stack Monitoring	Quarterly (March, July, November)	SOD Department		
Noise	4 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party		
Surface Water Quality Analysis (As, Cd, Cr, Cu, Fe, Hg, Oil & grease, pH, Temp, TRC, TSS, Zn)	 W-1 Upstream of Ataran River, W-2 Middle Stream of Ataran River, W-3 Downstream of Ataran River, W-4 In the Creek, near Entrance of Kwangan Village, Township, W-5, Sedimendation pond at power plant 	Quarterly (March, July, November)	Third Party		
Emission Control Systems (Bag filters, FGD Tower)	Bag filter inlet and outlet, FGD Tower outlet	Quarterly (March, July, November) Note: All emission control systems/devices are being monitored at Control Room on daily basis.	SOD Department		
Ground Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are (same as baseline data collection)	Quarterly (March, July, November)	Third Party		
Implementation of Air quality management plan, Noise Management plan, Waste management plan	Within factory area (Stack)	Daily monitoring and quarterly reporting	SOD Department		
Implementation of Ecosystem Management plan	Within project area	Regular monitoring and quarterly reporting	SOD Department or Third Party		
Whether people and workers	Project site and surrounding the	Quarterly	SOD		

Indicator (Survey item)	Location of Data Collection	Method and Frequency	Institution
suffer from health risk	area		Department
Occupational Health and Safety	Cement Plant and Compound (Work site and offices)	Twice per year Record of accidents and infectious diseases	SOD Department
Community Health and Safety	5 villages nearby the project sites	Twice per year Record of accidents and infectious diseases related to the community	SOD Department
The implementation status for CSR activities such as community support program	5 villages nearby the project sites	Once per year	SOD Department
Usage of chemicals	Cement Plant and Compound (Work site and offices)	Biannually Record of the type and quantity of chemicals and implementation status of control measures through self- inspection	SOD Department

9.2 Monitoring and Reporting

Compliance monitoring is the prudent element of Environmental Monitoring Plan that ensures effective implementation of the Environmental Management Plan, compliance of all project related activities with relevant environmental rules and regulations and safety procedure.

Monitoring of the compliance will be carried out by the SOD Department but should be audited yearly by the external auditor. The monitoring activities and results should be well documented and followed by the standard monitoring checklist.

9.2.1 Internal Monitoring

MCL SOD team will take over for internal monitoring activities. The principle approach of the step by step monitoring involves:

- Walkthrough inspection: quick survey of the activities, operations, equipment, and facilities
- Through inspection: visual observation activities, operation, equipment and facilities and review of related documents, previous records, reports, etc.
- Interview of relevant personnel: interviewing of related employees, key personnel, etc.
- Consultation with local people: consultation with local people to understand community perception on the project related activities and to identify social issues related with the project

The specific objectives of the internal monitoring are to:

- Verify that the baseline information of all the affected area that have been stated in EIA report and that the valuation of impacts or damaged by the project activities that was carried out in accordance with the approved EMP plan;
- Oversee that the environmental monitoring plan is implemented as designated and approved; and
- Verify that funds/cost for implementation of the EMP are provided by the Project management in a timely manner and in amounts sufficient for their purposes, and such funds are used in accordance with the provisions of the EMP.

The main indicators to be monitored regularly are:

- The measurements of ambient air quality are in accordance with the list of parameters and monitoring locations mentioned in and that the analysis period is carried out in line with agreed procedures;
- The measurements of surface water and ground water quality are in accordance with the list of parameters and monitoring locations mentioned in and that the analysis period is carried out in line with agreed procedures;
- The measurements of noise quality are in accordance with the monitoring locations mentioned in and that the analysis period is carried out in line with agreed procedures;
- The measurements of soil quality are in accordance with the list of parameters and monitoring locations mentioned in and that the analysis period is carried out in line with agreed procedures;
- Implementation of ecological preservations such as plantation and backfilling of soil into the pits etc. which will be degraded by the mining activities such as forest clearance and soil digging and removal of top soil during construction period;
- Compliance monitoring in storage of fuels and equipment and handling of machines to be alliance with the safety guidelines;
- Continuous monitoring of occupational health safety of workers and community health and safety at the surrounding villages mentioned in EMP report;
- Receiving the community grievance or complaints over any damage or impact by the related mining activities and verify and evaluate the proposed impacts and give the adequate explanation and control measures to reduce or avoid it;
- Managing the CSR activities are carried out in line with agreed procedures in EMP;

9.2.2 External Monitoring

Potentially this monitoring has to be made by government officers or independent group and/or altogether that the implementation works are in accordance with the agreed procedures.

External monitoring should be periodically carried out by an independent monitoring agency to provide an independent view on the achievement of the EMP. The external monitoring will focus on the outcomes and results of control measures and mitigation activities such as the changes in environmental setting and socioeconomic of the project area, the effectiveness, impact and sustainability of control measures, the need for further mitigation measures if any, and to learn strategic lessons for future policy formulation and planning.

The external monitoring can adopt some of the following indicators:

- Full payment to be made to all affected persons sufficiently before land acquisition.
- Completion of land acquisition before the construction starts.
- Public consultation and awareness of environmental emission policy: (a) all the villages nearby project, especially the affected villages should be fully informed and consulted about the project activities, b) Ongoing of public consultation meeting in accordance with the agreed period mentioned in EMP on the regarding problem, issue or grievance related to the project activities and impacts.
- The operation of the mechanisms for grievance redress, and the speed of grievance redress will be monitored.

- The level of satisfaction of the affected villages/persons with various aspects of the livelihood support program or providence of community health and educational facilities will be monitored and recorded.
- Throughout the implementation process, the trends of the new possible impacts and current impacts mitigation level will be observed and surveyed around the project area and community area. Any potential problems in the study area will be reported, and recommendation for further adjustment of the plan and approach should be made if necessary.

The following activities are the standard functions of the external monitors:

- Verification of internal monitoring reports, by field check of the following:
- Oversee the complement of implementation works
- Evaluate the results and outputs of control measures
- satisfaction of affected community towards the project EMP implementation
- Check the type of grievance issues and the functioning of grievance redress mechanisms by reviewing processing of appeals at all levels and interviewing aggrieved persons.
- Survey the completed implementation works how they have been improved or maintained.
- Advise Project management regarding possible improvements in the implementation of the EMP.
- Regular external monitoring should begin along with implementation activities and carry on until the end of the EMP and Project phasing out.

The inspection, observation, consultation and reporting should be followed by an organized checklist. The checklist of the monitoring should be developed during operation phase of the project.

The target areas of monitoring are:

- Compliance of project related activities with national and international (if required) environmental rules and regulation as described in chapter 2 during preconstruction, construction and operation phases
- Compliance of the project related activities with the Suggested EMP during construction and operation phases
- Compliance of the Plant operation (noise, emission, waste disposal, waste water discharge, etc.) with relevant national and international (if required) standards
- Compliance of the Environmental Monitoring Activities with suggested Environmental Monitoring Plan
- Record each of incidents

9.2.3 Annual Reporting Schedule for EMP

Monitoring and evaluation (M&E), including reporting, will be regularly carried out as a major element of the management of the EMP implementation throughout the period of EMP implementation.

The compliance monitoring report along with the checklist should be indexed and annexed with the monthly and annual monitoring report. It may be required to submit the annual monitoring report to Department of Environmental Conservation (ECD) for renewing of the Environmental Clearance Certificate each year.

Task														Ye	arly F	EMPI	Repor	ting S	Sched	ule											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Jan																															
Feb																															
Mar																															
Apr																															
May																															
Jun																															
Jul																															
Aug																															
Sep																															
Oct																															
Nov																															
Dec																															

 Table 9.2-1: Target Schedule for Monitoring Report

Public Holiday

Target Reporting Period

9.3 Estimated Cost for Implementation of EMP and Environmental Monitoring

The Project cost is inclusive of cost for implementing Environmental Management Plan and installation of pollution abatement and mitigation measures described in the this ESIA report. The costs for Environmental Management Plan and responsible institute has been estimated in Table 8-2.

The main cost for Environmental Monitoring during construction and operation phases are cost for field measurements such as air quality, water, and noise quality. MCL cement plant and associated facilities have been constructed and the present condition is test run phase so the annual costs for field measurements in the construction and operation phase are estimated, as shown in Table 9.2-1.

Table 9.3-1: Estimated Environmental Management Plan and Monitoring Cost

Indicator (Survey item)	Location of Data Collection	Method and Frequency	Institution	Annual Cost (USD)
Construction Phase				
MonitoringEMPimplementationMitigation measuresEnhancement measuresContingencyCompensation	Project area	Daily monitoring and documenting, and quarterly reporting	SOD Department	14,400
Air quality (NO ₂ , SO ₂ , CO,TSP, PM_{10})	3 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	19,500
Noise	4 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	10,755
Surface Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are same as baseline data collection	Quarterly (March, July, November)	Third Party	8,715
Ground Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are (same as baseline data collection)	Quarterly (March, July, November)	Third Party	10,455
Soil Quality	Locations and number of samples are (same as baseline data collection)	Yearly (March)	Third Party	8,475
Operation Phase				
Air quality $(NO_2, SO_2, CO, PM_{2.5}, PM_{10})$	3 locations (same as baseline data	Quarterly (March, July, November)	Third Party	19,500

(Operation Phase)

Indicator (Survey item)	Location of Data Collection	Method and Frequency	Institution	Annual Cost (USD)
	collection locations)			
(Temperature, Velocity, SO ₂ , SPM, NOx, HC, CO)	Stack/Chimney Monitoring	Quarterly (March, July, November)	SOD Department	6,450
Noise	4 locations (same as baseline data collection locations)	Quarterly (March, July, November)	Third Party	10,755
Surface Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are same as baseline data collection	Quarterly (March, July, November)	Third Party	8,715
Ground Water Quality Analysis (Parameter are same as IFC standard)	Locations and number of samples are (same as baseline data collection)	Quarterly (March, July, November)	Third Party	10,455
Implementation of Air quality management plan, Noise Management plan, Waste management plan	Within factory area (Stack)	Daily monitoring and quarterly reporting	SOD Department	14,440
Surface water pollution monitoring (DO, BOD, COD, Heavy metal,	1. Effluent discharge point	Quarterly (March, July, November)	Third Party	4,250
pH, salinity, Total hardness, Nitrate, TDS, TSS, Temperature, etc.)				
Implementation of Ecosystem Management plan	Within project area	Regular monitoring and quarterly reporting	SOD Department or Third Party	10,350
Occupational Health and Safety	Cement Plant and Compound (Work site and offices)	Twice per year Record of accidents and infectious diseases	SOD Department	1,250
Community Health and Safety	5 villages nearby the project sites	Twice per year Record of accidents and infectious diseases related to the community	SOD Department	14,250
The implementation status for CSR activities such as community support program	5 villages nearby the project sites	Once per year	SOD Department	2 percent of annual net profits
Usage of chemicals	Cement Plant and Compound (Work site	Biannually Record of the type and	SOD Department	4,600

Indicator (Survey item)	Location of Data Collection	Method and Frequency	Institution	Annual Cost (USD)
	and offices)	quantity of chemicals and implementation status of control measures through self- inspection		

9.4 Corporate Social Responsibility

The annual report must contain a section on CSR activities detailing activities, spent amounts, impact and a sustainability assessment.

Executive management should set out a strategy or an annual plan, through which it will deliver the company's CSR philosophy, policies, and community-based principles. The strategy must outline:

- Allocated budget
- Available support and ways to participate
- The values and principles the company wants to establish and spread
- The community segments and social fields to be targeted

9.4.1 MCL CSR Program and Monitoring Plan

Expecting part of the profit of the project to share the social benefit of the community, the project company "MCL" would manage to fulfill the following CSR program for the local residents, 2 percent of annual net profits will be formulated.

MCL encouraged to push the company CSR strategy for every benefited project in accordance with the followings;

Design CSR Strategy	
₹۶	
Design high impact projects compliant with	regulations
V.	
Develop a monitoring and evaluation fra	amework
35	
Develop an association strategy	/
Advise on suitable implementation str	uctures
Design tax approach and efficience	ies

MCL CSR monitoring implementations will be managed by SOD team with the following monitoring plan.



Annual CSR reporting will be prepared as the followings;

- Prepare and file annual CSR reports according to regulatory guidelines
- Tax inputs for accurate representation
- CARE tool services.

9.4.2 MCL CSR Activities

- 1. Public health & medical programs
- 2. Clinic and mobile medical care service especially near cement plant operating areas.
- 3. Public benefit activities
- 4. Support and contribute appropriately to society and communities, especially near cement plant operating areas i.e. recondition public road, school, temple & pagoda, government office etc.
- 5. Education/ religion
- 6. Encourage and promote activities/programs related to helping young people realize their potential and capability in education, science, technology, sport and art, and instill ethics and moral sense, thus creating smart and ethical people i.e. scholarships, playground, sport area, science camp, English language camp etc.
- 7. Occupational development
- 8. Occupational development program according to sufficient economy i.e. Integrated Farming System, biogas, Bio-fertilizer, Non-toxic vegetables etc.
- 9. Community activities
- 10. Provide opportunities to communities and relevant parties to collaborate in activities and many different programs i.e. open-house program, One Cell One Project (OCOP) etc.
- 11. Join traditional activities i.e. Thingyan festival

The amount of budget spent on past CSR activities are provided in the following figure and the photos of CSR program conducted by MCL are attached in Annex-9-1.



Figure 9.4-1: Budget Allocation on CSR Program from 2014 to 2018

9.5 Decommissioning and Closure Plan

This Decommissioning and Closure Plan has been developed as part of the overall Environmental Management Plan for MCL in line with the company's Environmental, Health and Safety (EHS) Policy. The Plan covers a description of all activities that need to be carried out to effect

decommissioning and closure in an environmentally friendly and socially acceptable manner. To this effect work standards have been stipulated to achieve the decommissioning and closure objectives in line with the overall EHS policy.

Key considerations in the development of the Plan have been the envisioned state of environmental setting within the mining license area particularly the plant area, the limestone quarry area at the time of closure. It is this vision that characterize the rehabilitation works and standards to which the said works will have been done together with monitoring requirements. It should however be noted that preparation of this plan is based on the information available as of now. The current quarry mine and manufacturing plant has an estimated lifespan of more than 30 years.

Over this period operational and environmental conditions may differ requiring adjustment to the proposed plan in view of the above this plan is hereby presented to serve the purpose of initial planning subject to perfection at the time of actual decommissioning and closure.

9.5.1 Rationale for Development of A Decommissioning and Closure Plan

Every project has a start and end time. Cement manufacturing works at MCL Cement plant are not an exception. The mine and plant which have been operating since 2014 will have exhausted its useful lifespan and thus will be decommissioned and finally closed.

The plant will undergo decommissioning where mining operations and cement production and coal power generation will cease followed by removal of all infrastructure on site, clean up and rehabilitation after which a period of rehabilitation and restoration to acceptable standards of alternative use will follow and finally monitoring will take place to ensure stability of the site before final closure.

9.5.2 Industrial Use

The project site under discussion is an industrial/mining operation and the zoning for the area is compatible with this type of land use. The site does not present any limitations to use of the site as an industrial facility apart from the safety aspects associated with the quarry and pollution concerns for some types of industries in view of proximity to a water body. However, adequate mitigation measures can easily be put in place to render the safety risks insignificant for safe use of the site. The only limitation is that it is difficult to guarantee investor availability to take up the site and operate a viable industry.

9.5.3 Decommissioning and Closure Activities

9.5.3.1 Removal and Disposal of Movable Equipment

Movable equipment both motorized such as motor vehicles, tippers, loaders, drill rig, etc. and nonmotorized such as furniture, computers and other office equipment, etc. would be moved to a central location and auctioned on site. Thereafter they will be moved from site within one month of purchase by the buyers. Disposal will however take consideration of works that will need to be carried out in site rehabilitation and any equipment and tools found to be valuable for carrying out rehabilitation works will be retained and only be disposed of after completion of rehabilitation works associated with the said equipment. This equipment includes tippers, front end loaders, drilling machines, folk lifters, etc.

9.5.3.2 Dismantling, Removal and Disposal of Immovable Equipment and Infrastructure

The first activity to be carried out in this regard will be to carry out an inventory of all available equipment and infrastructure with a view to identifying usable ones in line with the chosen land use

option for the site. The result of this activity will be a listing of equipment and infrastructure that will be reserved for post closure use and those which require dismantling/demolition and removal from site. To this effect the principle of universal usage will be applied. Some type of facilities is such that regardless of the type of land use to be put in place they will serve a purpose. These include buildings such as offices, canteen, shower rooms, storerooms/warehouses, sheds, water treatment and supply facilities, sewer facilities, electricity, roads, workshop (excluding fittings and equipment), electricity substation, etc. These facilities will be reserved for post-closure use. In this regard usage may vary in specific terms but will generally have the same purpose of housing. For example, the canteen may not necessarily be used as a canteen but may be converted into a lecture room. Similarly, the engineering workshop may not be used as a workshop but can be partitioned into offices. A more detailed inventory would be worked out at the time of decommissioning.

Other facilities, installations and equipment with specialized usage may not have universal use and as such may not be required for use post closure and as such would require removal from site. These include crushing units, grinding/milling/blending units, conveyer units, rail line, overhead cranes, weigh bridge, mobile workshop, explosives storage facilities, etc. The following procedures and methods will be used in removing these facilities and equipment from site.

- Adherence to Best Practices in Waste Management by ensuring maximum use of equipment and facilities to be removed from site thereby reducing on waste designated for disposal.
- Auctioning the equipment, installations and facilities as whole units followed by removal from site by buyers under the company supervision.
- Encouraging removal of equipment and facilities capable of being removed from site as whole units to be removed as such without dismantling/disassembling them.
- Engagement of specialized services for dismantling of units which could not be removed as whole units in such a manner as to maintain their usability and easy assembling (piece by piece dismantling). This approach would enhance both personal and environmental health and safety. The dismantled material should then be stored in isolated units (in respect of each unit).

• Enforcement of MCL safety standards on all agents carrying out the required dismantling/removal works to maintain a healthy and safe working environment.

• Negotiation with buyers for removal of equipment from site within a specified period, e.g. 3 months.

Once all usable equipment and facilities have been removed from site the next step would be the dismantling of the remaining equipment and segregation of components into various material types for sale as scrap. This work shall be done with due consideration to environmental concerns e.g. by ensuring that equipment with oil is drained appropriately and the oil stored safely pending disposal as per standard procedures governed by law.

Once the dismantling exercise has been completed the materials will be sold as scrap to the various scrap users.

9.5.3.3 Demolition of Non Usable Structures, Building Foundations and Removal of Debris

Apart from usable equipment and facilities as noted above a lot of other infrastructure on site could not be recovered and these will require demolition for easy clean up and removal from site for disposal. These include concrete (standard and reinforced) basements and columns for crushers, grinders, milling plants and other removed units. Demolitions will be done using various equipment including drilling machines, cranes, bulldozers, excavators, manual and hydraulic hammers, etc. Once demolition is completed the debris can then once more be assessed and sorted as appropriate for disposal after recovery of usable materials. Disposal would then be carried out in consultation with the relevant authorities.

9.5.3.4 Rehabilitation of the Plant Surface Area

The beginning point in rehabilitation works will be the carrying out of safety, environmental and health risk assessment in relation to the preferred land use option - social amenities/farming in this case. This will include pollution assessment of the area to establish nature and degree of remedial works needed.

After assessment has been done and pollution status established the next step would be the application of appropriate pollution remedial measures to detoxify the area. This may include general cleanup of the area to remove any debris, vacuum sweeping of all cement dust deposition, soil excavation for areas assumed to be heavily contaminated, liming or bioremediation e.g. in cases of moderate pollution by hydrocarbons. Once pollution remediation has been done follow up would include levelling, re-grassing, reforesting, etc. landscaping of disturbed open sites.

9.5.3.7 Rehabilitation of Solid Waste Dump

The cement plant area has solid waste dumps. Rehabilitation works will be done in line with the rehabilitation objectives as far much as can be achieved under the obtaining circumstances together with compliance to commitment that described in Contract with national or regional and international rules and guidelines.

- Physical Stabilization
- Chemical Stabilization
- Erosion and Dust Control
- ➢ Re-vegetation

9.5.4 Budgetary Provisions

The budget for plant decommissioning and closure will be committed to relevant ministry after discussion with Ministry of Mine and Ministry of Industry. Specific cost lines are as follows:

- □ Disposal of Equipment and Installations both movable and immovable as
 - well as salvaged scrap –
- \Box Demolition works and disposal of demolition waste –
- □ Plant Surface Area Rehabilitation –
- □ Limestone Quarry Site Rehabilitation –
- □ Solid Waste Dump Site -

The following considerations were taken into account on working the budget:

- \Box First consideration for disposal of equipment and materials with use value
 - would be sale by auctioning
- □ First line option for disposal of equipment/machinery/instillations, furniture
 - and scrap would be sale by auctioning
- □ Plant surface area needing rehabilitation will depend on area contaminated.

The proposed Environmental Management Plan and Monitoring Plan are scheduled for implementation effective after approval from MIC. The ongoing activities have now been consolidated in this Management Plan to provide a holistic approach to the management of environmental aspects of the project.

It shall be the responsibility of each supervising Head of Department to ensure that the EMP provisions are effectively implemented starting with he/herself down the line of command. Day to day monitoring and evaluation of EMP implementation will however be the responsibility of the

Environmental Manager of Mawlamyine Cement Limited. Mawlamyine Cement Limited will ensure that annual audits are internally conducted to assess implementation of the EMP and its effectiveness. Feedback from the audit will be used to review the EMP with a view to strengthening aspects not yielding the intended results. The EMP will be subjected to External Auditing every after three years with the same objectives.

Results of the External Audits will be shared with the Ministry of Natural Resources and Environmental Conservation and safety agencies. Suffice to say so the authorizing agencies have the mandate to demand for an audit where it is grossly noted that the environmental aspects of the plant and or quarries are not being managed according to the commitments made in this EMP.

CHAPTER 10

CONCLUSION

10.1 List of Commitments

A consolidated summary list of environmental and social impacts and mitigation measures commitments that Mawlamyine Cement Limited (MCL) will be expected to adopt in order to manage and mitigate potential impacts associated with the project development is provided below in Table.

Table 10.1-1	Project Key	Commitments
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Commitment Source	Commitment		
Chapter II	Mawlamyine Cement Limited (MCL) commits to follow National and international Laws, By Laws, Regulations and Guidelines Relevant to Coal-fired Power Plant operation process. Also, the project will meet the national emission and effluent standards		
Chapter II	Mawlamyine Cement Limited (MCL) commits to specifically commit itself to the prevention of pollution through the implementation of processes, practices, and techniques to avoid, reduce and control the creation, emission and discharge of any type of pollutant and waste.		
Chapter II, Use of Natural Resources	Mawlamyine Cement Limited (MCL) commits to specifically commit itself to minimize the use of consumptive resources and promote the reduction and recycling of waste products where possible.		
Chapter II, Air quality standard	Mawlamyine Cement Limited (MCL) commits to follow National Environmental Quality (Emission) Guideline, Industry Specific Guideline, <i>Thermal Power Plant, Table 2.3</i> and IFC General EHS Guidelines for the ambient air quality especially for coal power plant in operation phase.		
Chapter II, Wastewater Effluent	Mawlamyine Cement Limited (MCL) commits to follow National Environmental Quality (Emission) Guideline expressed in Table 2.2 and Table 2.7: IFC Effluent Guideline for Thermal Power Plant.		
Chapter II, Ambient Noise Standard	Mawlamyine Cement Limited (MCL) commits to follow NEQG,: NEQG Ambient Noise Level, Table 2.4 for the ambient and industrial noise standard during construction and operation phase and IFC General EHS Guideline for Noise Level Table 2.8.		
International Standard Industrial Air Emission	Mawlamyine Cement Limited (MCL) commits to follow International Finance Corporation's EHS Standard for air emissions as in Table 2.6.		
Chapter II Commitments	Mawlamyine Cement Limited (MCL) commits to prepare an EIA report with fully compliment with EIA procedure 2015 in timely and precisely manner as in Table 2.1, subsection 4.		
	Mawlamyine Cement Limited (MCL) commits to follow all the policy, rules, regulations, procedures and guidelines illustrated in Table 2.1		
Chapter III Designs and Equipment	Mawlamyine Cement Limited (MCL) commits to utilize and maintain the facilities' designs and modernized equipment and machinery as described in Project description for power plant construction and operation.		
Chapter IV Existing Environmental Conditions	Mawlamyine Cement Limited (MCL) commits not to disturb the Existing Environmental Conditions described in Chapter IV.		

Chapter V Environmental Socioeconomic Baselines	Mawlamyine Cement Limited (MCL) commits to consider the baseline condition of environmental and socioeconomic of the area during the operation phase.
Chapter VI	Mawlamyine Cement Limited (MCL) commits to follow the Stakeholder
Stakeholder Engagement Plan	Engagement Plan described in section 6.2
Chapter VII	Mawlamyine Cement Limited (MCL) commits to precisely follow the
Impact Assessments and	environmental and socio-economic impacts potentially generated by the
Mitigation Measures	Project during both the construction and operation phases.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Ambient Air Emission	measures for ambient air emission in sections 7.3 and 7.4 (during construction and operation period) with the regular monitoring plan.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Noise Emission	measures for operation phase as mentioned in sections 7.3.2 and 7.4.2 (during construction and operation period).
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Wastewater Effluents	period.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Solid Wastes	(during construction and operation period).
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Soil	regional soil fertility.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Biodiversity	to the project.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Visual/Landscape	measures in section 7.8 to reduce the impact for visual change.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Cultural Heritage	heritage value.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Decommissioning Phase	measures as described in section 7.10 while decommissioning the project.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Cumulative Impacts	measures as shown in section 7.11 considering on the cumulative impacts.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Traffic Issue	measures expressed in section 7.6.4.1 for facilitation of transportation.
Chapter VII	Mawlamyine Cement Limited (MCL) commits to implement mitigation
Social cohesion	measures as in 7.12 to avoid social cohesion in the region.

Chapter VII Socioeconomic	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as in 7.6 for reduce impacts on socioeconomic.		
Chapter VII Community Health	Mawlamyine Cement Limited (MCL) commits to implement mitigation measures as in 7.7.1 for community health.		
Chapter VII Possibility of employment	The labor recruitment policy must be formulated in such a way that local laborers can easily get chance of employment in the project.		
opportunities			
Chapter VII Occupational health hazard	Arrangement of personal protective equipment such as gloves, helmet, mask, glasses and other tools, safety boots and uniforms for each worker so that the workers can keep themselves safe from any kinds of accident and the occupational health training will also be provided.		
Chapter VIII, Responsibilities of Implementation Team for Environmental and Social Management Plan	Mawlamyine Cement Limited (MCL) commits to follow up Main Tasks for Environmental and Social Consideration of implementation team at MCL expressed in Table 8.2-1.		
Chapter VIII, Environmental and Social Management Plan	Mawlamyine Cement Limited (MCL) commits to follow the discussed mitigation measures for each component illustrated in Table 8.2-2.		
Chapter VIII, MCL's Pollution Control	Mawlamyine Cement Limited (MCL) commits to follow MCL's pollution control policy presented in section 8.3.		
Chapter VIII, Occupational Health and Safety Management Plan	Mawlamyine Cement Limited (MCL) commits to follow Occupational Health and Safety Management Plan presented in section 8.8.		
Chapter VIII, Emergency Response and Rescue Plan	Mawlamyine Cement Limited (MCL) commits to follow Emergency Response and Rescue Plan presented in section 8.10 and table 8.10-2.		
Chapter IX, Environmental Monitoring Plan	The compliance monitoring report along with the checklist will be indexed and annexed with the monthly and annual monitoring report. It may be required to submit the annual monitoring report to Department of Environmental Conservation for renewing of the Environmental Clearance Certificate each year.		
Chapter IX, Monitoring and Reporting	Mawlamyine Cement Limited (MCL) will develop and implement a monitoring and reporting plan as presented in Section 9.1 and table 9.1-1.		
Chapter IX, CSR Program	Mawlamyine Cement Limited (MCL) plan and reserve for cooperate social responsibility (CSR) (during operation period), two percent (2%) of yearly net profit of the project and CSR will be implemented as shown in Section 9.4.1		
Chapter IX, CSR Program	Mawlamyine Cement Limited (MCL) plan and reserve for cooperate social responsibility (CSR) (during operation period), two percent (2%) of yearly net profit of the project.		

10.2 Conclusions

Mawlamyine Cement Ltd. (MCL) has been incorporated as a joint venture between SCG Cement (SCG) and Pacific Link Cement Industry (PLCI) to produce cement, distribute and sell cement and cement-related products, and operate limestone quarry and power plant (for self-purpose used for the cement production).

The Resource & Environment Myanmar Ltd. has been invited by, SCG and PLCI to study Environmental, Social and Health Impact Assessment for the proposed captive coal-fired power plant at Pya Taung area, Mon State of the southeastern part of Myanmar.

In support and approval of EIA, the Resource & Environment Myanmar Ltd. had collected and analyzed physical, biological and social data such as people's perceptions, concern, opinion, and expectation on the project for the approval of clean environment and guiltless society during and after the development of the project.

Any type of development activity has both beneficial and adverse impacts on the environment in which it operates. The impacts are identified and evaluated by the project proponents to reduce their negative impacts and maximize the positive effects on the surrounding environment. The proposed project is being expected to meet the cement requirement for the construction and industries in the surrounding areas and also in different parts of Myanmar. The proposed project will generate an optimum employment generation for the local population. Full pledged Environmental Management Plan for the proposed cement project shall be constituted with qualified Engineers and Technicians.

According to the technical study and the environmental, social and health impacts assessment, the MCL Cement project will have positive impact on the Environment if the recommended Environmental Monitoring, Health, Safety & Environmental Management Plan (EMP) are fully implemented in high spirit by the project proponents.

List of Annexes

Annex 1-1 CV of EIA Experts

Annex 3-1 Factory Layout Plan

Annex 3-2 Stack Monitoring Report

Annex 3-3 CEMS Specification

Annex 3-4 CEMS Calibration Report

Annex 3-5 CEMS Weekly and Monthly Data

Annex 3-6 Safety Design Guidelines

Annex 3-7 Industrial Land Use Right and Drawing

Annex 4-1 Recommended Clearance for Ancient Monument Area

Annex 5-1 Lab Results

Annex 6-1 Stakeholder Consultation Meetings

Annex 6-2 Public Consultation and Disclose Meetings

Annex 6-3 Questionnaire Survey Forms

Annex 7-1 WI-P-EU-003 Steam Production

Annex 7-2 WI-P-EU-004 Turbine and Generator Operation

Annex 8-1 OHS Manual

Annex 9-1 CSR Activities

Annex 10 Overall Shutdown Plan

Curriculum Vitae

Proposed Position	-	Director		
Name of Firm	-	Resource & Environment Myanmar Co., Ltd.		
Name of Staff	-	Win Maung (Dr.)		
Profession	-	Principal Consultant (Ecology, Flo	ora and Fauna)	
Date of Birth	-	3 July 1954		
Years with Firm/Entity	-	2006	Nationality	- Myanmar
Membership in Profess	sional So	and science academy, Academic Exchange Service DAAD alumni (Myanmar);	ogical Society; memb member of the DAA Alumni) (Myanmar), National Review G	er of Myanmar arts D alumni (German and chairman of the roup Member of a

Detailed of Tasks Assigned - Ecology and Biodiversity Conservation, Marine Ecosystem Programme, , Zoologist, Wildlife Conservation Society (Myanmar), Offshore Baseline Environmental Survey, Environmental Impact Assessment, Conducted different fauna surveys, Terrestrial Environmental Baseline Study, and teaching Ecology at Myanmar Environmental Institute.

Key Qualification

Selected Relevant Experience in Present Employment Since 1982

FAO.

2006 to date	Principal Consultant/ Patron, Resource and Environment Myanmar Co., Ltd.
2011 to date	Founder and President, Myanmar Environment Institute (MEI)
2010-2010	Pro-Rector, Sittway University, Rakhine State, Myanmar
2007-2010	Professor, Department of Zoology, University of Yangon, Myanmar
1982-2007	Demonstrator, Assistant Lecturer and Associate Professor in Department of
	Zoology, University of Yangon, Myanmar

Environmental Impact Assessment and Environmental Management on:

Collaboration on "Environmental Impact Assessment", "Environmental Baseline study" and "Environmental Monitoring Survey" with Myanmar Ivanhoe Company Ltd.

2001-2008) (Kyisintaung Coppermine project and Modi-taung Gold Mine project), and on animal ecology and Biodiversity Conservation with Smithsonian Institute, USA (2003-2005).

Published a book namely "Turtles and tortoises of Myanmar" published by Wildlife Conservation Society (Myanmar).

Published "A guide book to fauna and flora of some parts of total pipeline area, Tanintharyi Division" (2004).

Conducted different fauna surveys along the Total pipeline area (1997-2004);

EIA for MICCL Copper Mine Project (2002),

Ivanhoe Gold Mine Project (2003),

Namkok Hydropower Project (1995),

Yeywa Hydropower Project (2002),

Shwe and Mya Yakhine Offshore Baseline Environmental Survey (2007).

Terrestrial Environmental Baseline Study for Onshore Midstream Facilities and Pipeline Landing (Shwe Gas pipeline (Daewoo), Rakhine State)(2008),

CNPC Myanmar-China Gas Pipe Line EIA (2009),

Mong Hkok Coal Fire Power Plant EIA (2010),

Upper Yeywar-Shwesaryan and Baluchaung - Shwemyo Power Transmission Line EIA (2011),

ESIA of Modi taung gold deposit

EIA for the 5,000 tons/year Electrolytic Zinc Factory and associated facilities

Ngaw Chang Hka Hydro power project at Kachin Satate. 2014, May.

EducationPh.D, Wuerzburg University, Germany (1990)M.Sc. (Zoology), Mandalay University, Myanmar (1982)B.Sc. (Zoology), Mandalay University, Myanmar (1977)

Name:	U MYINT AUNG	
Present Position:	Principal Consultant	
Nationality:	Myanmar	
Profession:	Botany, Forest Ecology and Biodiversity	
Specialisation:	 Mangrove forest of Okinawa, Vegetation study in Aomori Prefecture, Vegetation study in Nagoya, Japan, Phytosociological study of mangrove vegetation, Ecological study of mangrove vegetation, Floristic diversity, land degradation and conservation in agricultural land, Mangrove Soil and Growth Performance of Cultivated Mangrove Species, Diversity of plant species in Letpadaung hills and their socio-economic status in surrounding villages, Geobotanical analysis on the associated plant species and relationship to rocks and mineralization. 	
Qualifications:	 B.Sc. (Hons.), University of Yangon, 1991 M.Sc. (Tissue Culture), University of Yangon, 1995 Ph.D. (Environment and Natural Sciences), Yokohama, National University, Japan, 2004s 	



Related Research Experience

- Mangrove forest of Okinawa, Japan (with Japanese Scientists) 2001
- Vegetation study in Aomori Prefecture, Japan (with Japanese Scientists) 2001
- Vegetation study in Nagoya, Japan (with Japanese Scientists) 2001
- Mangrove forest of Phuket, Thailand (with Japanese Scientists) 2003
- Mangrove forest of Ayeyarwady Delta, Myanmar (with Japanese Scientists) 2002-2003
- Vegetation study in Oita, Japan (with Japanese Scientists) 2003
- Phytosociological study of mangrove vegetation in Byone-hmwe Island, Ayeyarwady Delta, Myanmar - Relationship between floristic composition and Habitat- (2004)
- Ecological study of mangrove vegetation in the Ayeyarwady Delta, Myanmar (2004)
- Floristic diversity in the Yangon Division (2005)
- The study of land degradation and conservation in agricultural land in Magway Township, Magway Division (2005)
- The Study of Mangrove Soil and Growth Performance of Cultivated Mangrove Species in the Pyindaye Reserve Forest Area, Bogalay Township, Ayeyarwady Delta (2005)
- Diversity of plant species in Letpadaung hills and their socio-economic status in surrounding villages (2005)
- Geobotanical analysis on the associated plant species and relationship to rocks and mineralization at Kyaukmyet area, Salingyi Township, Sagaing Division (2006)
- Biodiversity impact assessment in Tamanthi hydro-power and multipurposes dam, Sagaing Division (2006)
- Ex situ conservation of Dipterocarpus species in the Taninthari Nature Reserve Forest

(2008)

- Geobotanic study on plant community and accumulation of trace elements in plants and soils with special reference to Khwayaiktaung, Heho, Southern Shan State (2008)
- Vegetation study on Kelatha Mountain, Bilin Township, Mon State (2008)

Language

Burmese mother tongue and English and Japan Languages.

Name:	U NGWE MOE
Present Position:	Principal Consultant
Nationality:	Myanmar
Profession:	Safety and Environmental Management
Specialisation:	Risk Assessment, Permit To Work Supervisor Level, Mechanical And Electrical Isolation, Confine Space Entry, Emergency Response Plan, Waste Management, Fire Safety, Manual Handling, Identification, Evaluation And Control Of Hazards, Use Of Breathing Apparatus, Gas Tester, Site Defensive Driving, Environmental Management Plan.
Qualifications:	 Bachelor of Chemical Engineering (YIT) Diploma in Environmental Engineering (Yangon Technological University)

Selected Relevant Experience in Present Employment Since 2000

June 2000 – Sept 2003	Environmentalist (onshore), Premier Oil Myanmar Limited,
	Yetagun Offshore Project (Gas Production),
September 2003 – June 2004	Safety Officer (onshore), Petronas Carigali Myanmar Limited, Yetagun Offshore Gas Project, Union of Myanmar
June 2004 – April 2005	HSE Supervisor, 22-KM MOL Reroute Project, Al Hashedi,
	Sana'a, Yemen
October 2007 – November 2011	Environmental & Safety Coordinator, Daewoo International
	Corporation (Myanmar E&P), Development of Shwe Gas Fields,
	Yangon
Jan 2012 – October 2012	Environmental & Safety Advisor, Hyundai Heavy Industries, Barzan Offshore Project, Raslaffan Industrial City, Qatar
October 2012 – to date	Principal Consultant, Resource & Environment Myanmar Co. Ltd.

Employment History

June 2000 – Sept 2003	Environmentalist (onshore), Premier Oil Myanmar Limited, Yetagun Offshore Project (Gas Production),
September 2003 – June 2004	Safety Officer (onshore), Petronas Carigali Myanmar Limited, Yetagun Offshore Gas Project, Union of Myanmar
June 2004 – April 2005	HSE Supervisor, 22-KM MOL Reroute Project, Al Hashedi , Sana'a, Yemen
October 2007 – November 2011	Environmental & Safety Coordinator, Daewoo International Corporation (Myanmar E&P), Development of Shwe Gas Fields, Yangon
October 2012 – to date	Principal Consultant, Resource & Environment Myanmar Co. Ltd.

Language

Burmese mother tongue and English

Curriculum Vitae (CV) for Key Expert

1. General:

Position Title and No.:	Director	
Name of Key Expert:	Kyaw Zin Win (Mr)	
Name of the Firm proposing the Key Expert:	Resource & Environment Myanmar Co., Ltd.	
Date of Birth:	01 May, 1972	
Nationality:	Myanmar	
Country of Citizenship/Residence:	Myanmar	
2. Education:	- B.Sc. (Geology) (Yangon University, Myanmar)	
	- PgD (GIS) (Yangon University, Myanmar)	
	- M.Sc. (GIS) (Serbarg University, Austria)	

3. Employment Record relevant to the assignment:

<XX years professional experience since 2008> Period Employing organization and Summary of activities performed relevant to the Country your title/ position Assignment: 2008 -Resource & Environment Myanmar Responsible for natural resources and environmental Present Myanmar Co., Ltd., data handling, GIS/RS mapping for specific projects. GIS Consultant, Director Contact information for reference: Soe Thura Tun, Managing Director of Resource & Environment Myanmar Co.,Ltd. soethuratun@enviromyanmar.net Ivanhoe Mines 2001 - 2012Myanmar/ Responsible for field data handling, regional/local **GIS** Geologist Thailand/ geological mapping, underground tunneling mapping, Philippines drill hole mapping

4. Membership in Professional Associations and Publications:

- Member of Myanmar Geosciences Society (M.MGS)
- Member of Myanmar Computer Professional Association (M.MCPA)
- Member of Society of Economic Geologists (M.SEG)

5. Language Skills:		Speaking	Reading	Writing
	English	Good	Good	Good
	Myanmar	native	native	native

Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks (Example)

No.	Title	Client	Poisson	Period
1	Land Inventory Mapping for Thilawa SEZ Phase I	JICA	Support compensation	2013
2	Myanmar National Electrification Plan (NEP)	World Bank	Least-Cost Geospatial Electrification Planning	2013
3	Hanthawady International Airport (Bago)	JICA	Support compensation	2015

Curriculum Vitae (CV) for Key Expert

1. General:

Position Title and No.:	Project Manager/Senior Consultant (Physical Environment)
Name of Key Expert:	Thura Aung (Mr)
Name of the Firm proposing the Key Expert:	Resource and Environment Myanmar Co., Ltd.
Date of Birth:	2 nd May, 1976
Nationality:	Myanmar
Country of Citizenship/Residence:	Myanmar

2. Education:

B.Sc. (Honours) (Geology), M.Sc. (Geology), M.Res. (Geology)

3. Employment Record relevant to the assignment:

Period	Employing organization and your title/ position	Country	Summary of activities performed relevant to the Assignment:
2012 to date	Resource & Environment Myanmar Co., Ltd. Project Manager	Myanmar	Responsible for studies on environmental and social fields including EIA in Myanmar.
2009 - 2011	Resource & Environment Myanmar Co., Ltd. Consultant	Myanmar	Responsible for studies on environmental and social fields including EIA in Myanmar.
	Contact information for reference:	Soe Thura Tun, Managing Director of Resource & Environment Myanmar Co.,Ltd. soethuratun@enviromyanmar.net	

4. Membership in Professional Associations and Publications: Secretary (Myanmar Earthquake Committee)

			Life Member (Myanmar Geosciences Society) Member (AOGS)	
5. Language Skills:	English Myanmar	<i>Speaking</i> Good Native	Reading Writing Good Intermediate Native Native	

Curriculum Vitae (CV) for Key Expert

No.	Title	Client	Poisson	Period
1	ESIA of Upper Yeywa Hydropower Project	Department of Hydropower Implementation (DHPI), Ministry of Electric Power (MOEP).	Project Manager	2015
2	Environmental and Social Survey for Environmental Impact Assessment Studies under the Project for Electric Power Development in the Thilawa Area	Nippon Koei Co., Ltd.	Project Manager	2014
3	IEE for the project of Manufacturing of Garment at Dagon South, Yangon	Myanmar Sein Pann Manufacturing	Project Manager	2014
4	Actual Environmental Survey for Feasibility Study for the Construction of Bago River Bridge	ALMEC Corporation, NIPPON KOEI Co., Ltd.	Project Manager	2013-2014
5	Actual Environmental Survey for Feasibility Study for the Construction of Thaketa River Bridge	ALMEC Corporation, NIPPON KOEI Co., Ltd.	Project Manager	2013-2014
6	Survey for Preparation of Abbreviated Resettlement Plan for Feasibility study for the construction of new Thaketa and Bago River Bridge	Nippon Koei Co., Ltd.	Project Manager	2013-2014
7	ESIA for Baseline study of Thilawa Special Economic Zone Class A	Nippon Koei Co., Ltd.	Project Director	2013
8	IEE for the project of Manufacturing of Garment at Hlaingtharyar, Yangon	South Bay Manufacturing Co., Ltd	Project Manager	2013
9	IEE for the project of Manufacturing of Garment at Intagaw, Bago	Hung Kiu (Myanmar) Garment Manufacturing	Project Manager	2013
10	Environmental and Social Information Collection Survey for the Project for the Strategic Urban Development Plan of The Greater Yangon	Nippon Koei Co., Ltd	Project Manager	2012
11	EIA of 500 MW CCPP at Hlawga	Htoo & HIE, China	Project Manager	2012
12	Environmental Impact Assessment of Shweli River II Hydropower Project	HydrolancangInternationalEnergy Company Ltd. and KHIDI	Project Manager	2012
13	EIA of Myanmar-China Gas Pipeline Project	CNPCIEM(Intern.EnvironmentalManagementCo.Ltd.)	Consultant	2009-2010

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks

End of document

Curriculum Vitæ

Position Title and No.	Environmental Engineer
Name of Firm	Resource & Environment Myanmar Co. Ltd.
Name of Expert	Thiha Soee (Dr.)
Date of Birth	23.11.1973
Citizenship	Myanmar
	MSc (Environmental Studies), ME (Geological Engineering),
Education	PhD (Economic Geology), Dip (GIS & ES)

Employment Record relevant to the Assignment					
Period	Employing organization Title/position Contact information for ref.	Country	Summary of activities performed relevant to the Assignment		
2009	Suntact Techonologies Co. Consultant & Senior Geologist	Myanmar	Detail geological and Engineering Geological mapping for Upper Balu chaung hydropower project		
2010	Golden Dragon mining Co. Chief geologist	Myanmar	Detail geological and gold exploration at Paunglong area		
2011	Suntact Technologies Co. For Korea company Consultant & Senior Geologist	Myanmar	Detail geological investigation for antimony exploration at Loikaw area		
2011	National prosperity Co., Ltd. Consultant & chief Geologist	Myanmar	Gold mining at Modi taung area		
2011	National Prosperity Co., Ltd. Consultant & chief Geologist	Myanmar	Exploration on iron and coal at Kayin State		
2012	PTTEPI, Thailand Senior Geologist	Myanmar	Detail geological mapping at Block PSCG and EP-2 area		
2012	Shee cement Group, India Project manager	Myanmar	Investigation on limestone prospect for cement industry		

2012-13	Wai international Co., Project manager	Myanmar	Exploration & feasibility studies on Tin-Tungsten mining at Taninthayi area
2014	KHIDI, China Project manager	Myanmar	Environmental and social impact assessment on Ngawchanka hydropower project
2014	KHIDI, China Project manager	Myanmar	Environmental and social impact assessment on upper Yeywa hydropower project
2014	National Prosperity Co., Project manager	Myanmar	Environmental and social impact assessment on Modi taung gold mine project
2014	Nipppon Korei, Japan Project manager	Myanmar	Environmental impact assessment on Thakata Electric power sector project
2014-15	World bank Project manager	Myanmar	Preparation of Myanmar National Electrification least cost geospatial planning
2014	Asia Development bank Consultant	Myanmar	Replacement cost survey and inventory loss on the Asia road (Eidu- Kawkaleik) project
2014-15	PTTEPI, Thailand Project manager	Myanmar	Geological investigation on MOGE-3 block for oil & gas exploration project
2015	Thaninthayi mining Co., Project manager	Myanmar	Tin-tungsten mining at Thabawleik area
2015	Carmeuse, Europe Project manager	Myanmar	Geological investigation on limestone and dolostone at Mon, Kayin and Shan State
2015	Siam Cement Group, Thailand Project manager	Myanmar	Limestone & sand exploration for cement business at Bago, Mon & Kayin State and Mandalay Region
2016	Siam Cement Group, Thailand Project manager	Myanmar	Site investigation and limestone sampling for cement business at Mon, Kayin State and Mandalay Region

Membership in
prof. AssociationsAssociation of the Austrian Engineers

Language Skills		Reading	Writing	Speaking
I	English	Good	Good	Good

Adequacy for the Assignment

Detailed Tasks assigned on Consultant's Team of Experts

Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks

2009 Suntact Techonologies Co.

Consultant & Senior Geologist

Detail geological and Engineering Geological mapping for Upper Balu chaung hydropower project

- Geological mapping (1:50000)
- Detail geological mapping (1:2500)
- Rock mass rating classification

2010 Golden Dragon mining Co.

Chief Geologist

Detail geological and gold exploration at Paunglong area

- Geological mapping (1:50000)
- Detail geological mapping (1:2500)
- Site investigation
- Geochemical interpretation and site selection

2011 Suntact Technologies Co.

Consultant & Senior Geologist Detail geological investigation for antimony exploration at Loikaw area For Korea company

- Geological mapping (1:50000)
- Detail geological mapping (1:2500)
- Site investigation (trenching)
- Geochemical interpretation and drill site selection

2011 National prosperity Co., Ltd.

Consultant & chief Geologist

Gold mining at Modi taung area project

- Detail geological mapping (1:2500)
- Site investigation & underground mapping
- Geochemical interpretation
- Mining planning

2011 National Prosperity Co., Ltd.

Consultant & chief Geologist

Exploration on iron and coal at Kayin State

- Site investigation
- Investigation on iron and coal prospects

2012 PTTEPI, Thailand

Senior Geologist

Detail geological mapping at Block PSCG and EP-2 area for oil & gas exploration

- Detail surface geological mapping
- Study on sedimentology

2012 Shee cement Group, India

Project manager

Investigation on limestone prospect for cement industry

- Site investigation on limestone prospect
- Geochemical sampling & analysis

2012-13 Wai international Co.,

Project manager

Exploration & feasibility studies on Tin-Tungsten mining at Taninthayi area

- Geological mapping (1:50000)
- Detail geological mapping (1:2500)
- Site investigation (trenching, piting & stream sediment sampling)
- Geochemical interpretation and site selection

2014 KHIDI, China

Project manager

Environmental and social impact assessment on Ngawchanka hydropower project

- Environmental geological investigation
- Physical environment investigation (soil, air & water quality)
- Engineering geological mapping

2014 KHIDI, China

Project manager

Environmental and social impact assessment on upper Yeywa hydropower project

- Environmental geological investigation
- Physical environment investigation (soil, air & water quality)

2014 National Prosperity Co.,

Project manager

Environmental and social impact assessment on Modi taung gold mine project

- Environmental geological investigation (treatments & mining impact)
- Physical environment investigation (soil, air & water quality)

2015 Nipppon Koei, Japan

Project manager

Environmental impact assessment on Thakata Electric power sector project

- Physical environment investigation (soil, air & water quality)

2014-15 World bank

Project manager

Preparation of Myanmar National Electrification least cost geospatial planning

- GIS data digitizing
- Geospatial planning for electrical power supply

2014 Asia Development bank

Consultant

Replacement cost survey and inventory loss on the Asia road (Eidu- Kawkaleik) project

- Survey on right of way along Asia road (Eidu- Kawkaleik)
- Field inventory of loss survey (IOL)
- Calculation the replacement cost survey (RCS)

2014-15 PTTEPI, Thailand

Project manager

Geological investigation on MOGE-3 block for oil & gas exploration project

- Detail surface geological mapping
- Study on sedimentology

2015 Thaninthayi mining Co.,

Project manager

Tin-tungsten mining at Thabawleik area

- Detail geological mapping (1:2500)
- Site investigation (trenching, piting & stream sediment sampling)
- Geochemical interpretation and site selection

2015 Carmeuse, Europe

Project manager

Geological investigation on limestone and dolostone at Mon, Kayin and Shan State

- Site investigation on limestone & dolostone prospect
- Geochemical sampling & analysis

2015 Siam Cement Group, Thailand

Project manager

Limestone & sand exploration for cement business at Bago, Mon & Kayin State and Mandalay Region

- Site investigation on limestone & sand prospect
- Geochemical sampling & analysis

2016 Siam Cement Group, Thailand

Project manager

Site investigation and limestone sampling for cement business at Mon, Kayin State and Mandalay Region

- Site investigation on limestone prospect
- Geochemical sampling & analysis
- Site selection

Expert's contact information: e-mail: thiha.soe.u@gmail.com phone: +95 (9) 49289720

Certification:

I, the undersigned, certify to the best of my knowledge and belief that

(i) This CV correctly describes my qualifications and experience

(ii) I am not a current employee by the Executing or the Implementing Agency

(iii) In the absence of medical incapacity, I will undertake this assignment for the duration and in terms of the inputs specified for me in Form TECH 6 provided team mobilization takes place within the validity of this proposal.

(iv) I was not part of the team who wrote the terms of reference for this consulting services assignment

(v) I am not currently debarred by a multilateral development bank

(vi) I certify that I have been informed by the firm that it is including my CV in the Proposal for the Project Implementation Consultant (PIC) Power Transmission Improvement Project (RFP No. 86(T)/MEPE(PTP)/2015-2016). I confirm that I will be available to carry out the assignment for which my CV has been submitted in accordance with the implementation arrangements and schedule set out in the Proposal.

Or [If CV is signed by the firm's authorized representative and the written agreement attached]

(vii) I, as the authorized representative of the firm submitting this Proposal for the Project Implementation Consultant (PIC) Power Transmission Improvement Project (RFP No. 86(T)/MEPE(PTP)/2015-2016) certify that I have obtained the consent of the named expert to submit his CV, and that he/she will be available to carry out the assignment in accordance with the implementation arrangements and schedule set out in the Proposal, and confirm his compliance with paras (i) to (v) above.

I understand that any willful misstatement described herein may lead to my disgualification or dismissal, if engaged.

my

Date: 27.04.2016

[Thiha Soee]

Day/Month/Year
Name:	Dr. NYOMIE RAZAK		
Present Position:	Principal Consultant		
Nationality:	Myanmar		
Profession:	Consultant (Cultural Assessment)		
Specialisation:	 Cultural impact assessment for 860 km Myanmar- China Gas Line (CNPC) Social impact assessment for Mong Hkok Coal Power Project Social impact assessment for Dawei Deep Sea Port and Industrial Zone Cultural assessment for Yangon City Immediate Cultural Assessment for Letpadaung Copper Project Cultural impact assessment for Rehabilitation of Taungoo Education College, 		
Qualifications:	 B.A. (1995); MA (History)(2003); M.Res. (2004); Univ. of Yangon PhD (History)(2009) 		
Selected Relevant Experience in Present Employment Since 2006			
2006 to 2009	Research Assistant Grade 2; Universities' Historical Research Department		
2009 – 2011	Senior Consultant; Resource & Environment Myanmar Co. Ltd.		
2012-2013	Principal Consultant; Resource & Environment Myanmar Co. Ltd.		

Professional Experiences				
Experience in Environmental Research	 Cultural impact assessment for 860 km Myanmar-China Gas Line (CNPC) (2009) Social impact assessment for Mong Hkok Coal Power Project (2010) Social impact assessment for Dawei Deep Sea Port and Industrial Zone (2012) Cultural assessment for Yangon City (2012) Immediate Cultural Assessment for Letpadaung Copper Project (2012) Cultural impact assessment for Mawlamyine Cement Project (2013) Cultural impact assessment for Rehabilitation of Taungoo Education College, Taungoo, Bago Region (2013) 			
Employment History	 2006 to 2009; Research Assistant Grade 2; Universities' Historical Research Department 2009 – 2011: Senior Consultant; Resource & Environment Myanmar Co. Ltd. 2012-2013: Principal Consultant; Resource & Environment Myanmar Co. Ltd. 			
Other Research	 History of Myanma Oil Industry (1962-2002) (2009) (PhD thesis) History of Social Welfare of Mann Oilfield Workers (1970-88) (2004) (M.Res. thesis) 			
Employment History	/			

2006 to 2009	Research Assistant Grade 2; Universities' Historical Research Department
2009 – 2011	Senior Consultant; Resource & Environment Myanmar Co. Ltd.

_

2012-2013 Principal Consultant; Resource & Environment Myanmar Co. Ltd.

Language

1. Burmese mother tongue and English as Second Language.

Curriculum Vitae (CV) for Key Expert

1. General:

2. Education:	B.Sc (Zoology)
Country of Citizenship/Residence:	Myanmar
Nationality:	Myanmar
Date of Birth:	30 th November, 1985
Name of the Firm proposing the Key Expert:	Resource & Environment Myanmar Co., Ltd.
Name of Key Expert:	Kyaw Naing Oo (Mr)
Position Title and No.:	Senior Consultant (Ecology)

3. Employment Record relevant to the assignment:

Period	Employing organization and	Country	Summary of activities performed relevant to the
	your title/ position		Assignment:
2015 - Present	Resource & Environment	Myanmar	Responsible for studies on environmental and social
	Myanmar Co., Ltd.		fields including EIA and environmental management.
	Senior Consultant (Fauna)		
2009 - 2015	Biodiversity and Nature	Myanmar	Responsible for studies on environmental and social
	Conservation Association		fields including EIA and environmental management.
	(BANCA)		
	Mammlogist		
Contact information for reference:		Zaw Naing	Oo, Director of Resource and Environment Myanmar
		Ltd. zawn	aingoo@enviromyanmar.net

4. Membership in Professional Associations and Publications: BANCA (Biodiversity and Nature Conservation Association)

5. Language Skills:	<i>Language</i>	<i>Speaking</i>	<i>Reading</i>	<i>Writing</i>
	English	Fair	Fair	Fair
	Burmese	native	native	native

No.	Title	Client	Poisson	Period
1	EIA and SIA of Myintsone Project	BANCA (Biodiversity And Nature Conservation Association	Mammalogy	From 2009 January to 2009 may
2	EIA and SIA of Kunlon Project	BANCA (Biodiversity And Nature Conservation Association	Mammalogy	From 2010 March to 2010may
3	RAP of Myintsone	BANCA (Biodiversity And Nature Conservation Association	Mammalogy	From 2010 January to 2010 February
4	Thayet Cement Project (EIA)	Myanmar Jidong	Mammalogy	2015 Setember
5	Thilawa (SEZ) Class B Development (EIA)	Nippon KOEI	Mammalogy	January 2015
6	Biodiversity in Tanintharyi Lenya National Park	FFI (Fauna and Flora International)	Mammalogy	May 2015
7	Gurney Pitta Project from Tanintharyi	FFI (Fauna and Flora International)	Fauna	From 2012 to 2014

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks

End of document

Curriculum Vitae (CV) for Key Expert

1. General:

Position Title and No.:	Environmental Technician (Air Quality)
Name of Key Expert:	Soe Yu Htun (Mr)
Name of the Firm proposing the Key Expert:	Resource & Environment Myanmar Co., Ltd.
Date of Birth:	28th February, 1989
Nationality:	Myanmar
Country of Citizenship/Residence:	Myanmar
2. Education:	B.Sc. (Geology)

3. Employment Record relevant to the assignment:

3 years professional experience since 2012				
Period	Employing organization and your title/ position	Country	Summary of activities performed relevant to the Assignment:	
2010 -	Resource & Environment	Myanmar	Responsible for studies on environmental and air	
Present	Myanmar Co., Ltd.		monitoring fields including EIA in Myanmar.	
	Environmental Technician			
	Contact information for reference:	Zaw Naing	Oo, Director of Resource and Environment Myanmar Ltd.	
		zawnaingoo	o@enviromyanmar.net	

4. Membership in Professional Associations and Publications: Life Member, Myanmar Geosciences Society

5. Language Skills:		<i>Speaking</i>	<i>Reading</i>	<i>Writing</i>
English		Intermediate	Intermediate	Intermediate
	Myanmar	Native	native	native

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks (Example)

No.	Title	Client	Poisson	Period
1	Mandalay EMP project	Mandalay ECD (Environmental	Assistant project	Nov. 2014 to
		Conservative Department)	manager	Oct.2015
2	Myin Gyan IPP project (Independent Power	ERM Co,.ltd	Assistant project	June.2014 to May
	Plan) (EIA)		manager	2015
3	Thaung Khone Core Fire Power Plant project	JICA	Assistant project	August.2014 to
	(EIA)		manager	Nov 2014
4	Thilawa SEZ Zone A Development Monitoring	MJTD	Assistant project	Jan.2014 to Dec
	project (EIA) Phase_1 construction stage		manager	2015

End of document



Khin Ohnmar Htwe

Senior Consultant Social Impact Assessment

Personal Data	
Date of Birth	25 July 1965
Gender	Female
Marital Status	Married
NRC Number	12/ Ah Sa Na (N) 105339
Present Employment	Senior Consultant, R&E Myanmar
Postal Address	No. 1, Shwe Mann St. University Estate, University of Mandalay, Maha Aung Myay Ts' Mandalay
C + +	02-72615: 09-5190112
Contacts: Tel/ Fax/ e-mail	khinohnmarhtwe@gmail.com

Educational Achievement

MA (Geography), BA (Geography), Univ. of Yangon

Professional Experiences

Experience in Environmental	 Environmental Images of Rural People in Maubin Township, Ayeyawaddy Division 			
Research	 Assessing Cooperation among villagers before and after natural disaster in Maubin Township, Ayeyarwaddy Division 			
	• Traffic Survey for Myanmar-China Gas Pipeline Project (Myanmar Section) (with IEM Thailand Ltd.) (CNPC) (2009)			
	• Social and Health impact assessment for Mong Hkok Coal-fire Power Plant (460MW) Project (Italian-Thai Development) (2010)			
	 SIA of the Yeywar-Shwesaryan Power Transmission Line – Ministry of No.2 Electric Power (with Gunkul Power Systems Ltd.) (2011) 			
	• SIA of the Baluchaung-Shwemyo Power Transmission Line – Ministry of No.2 Electric Power (with Gunkul Power Systems Ltd.) (2011)			
	• SIA of the Dawei Deep Sea Port and Industrial Development Project – Italian-Thai Development Co. Ltd. (with TEAM Consultant.) (in progress)			
Other Professional experiences	Tutor, Department of Geography, University of Yangon Assistant Teacher, Shinpo Japanese Language School			
Research Project and Work Concerning	 Analysis on Periodic Market System in Rural Shan State, The Case of Inle Lake (2003-2005) Environmental Images and Conservation Practices of Rural Society, The Case of 			
Laix Iillay	Inle Lake (2003-2005) 3. Spatial Seasonal Variation of Agriculture in Inle Lake (2003- 2005)			

- 4. Adaptation to Nature: House Types and House Styles in Inle Lake (2007)5. Adaption to Nature : House Types and House Styles in Rural Environment, Phase I, Inle Lake (Pet Research) (2008)

1. General:

	Position Title and No.:	Director/Principal Consultant (Physical Environment)
	Name of Key Expert:	Zaw Naing Oo (Mr)
	Name of the Firm proposing the Key Expert:	Resource and Environment Myanmar Co., Ltd.
	Date of Birth:	22 nd March, 1968
	Nationality:	Myanmar
	Country of Citizenship/Residence:	Myanmar
2.	Education:	Diploma in Environmental Management
		M.Sc., Yangon University, 1998 (Geology/ Economic Geology)
		B.Sc., Yangon University, 1992
		Environmental Management Systems Auditor/Lead Auditor Training
		Course (ISO 14001:2004)

3. Employment Record relevant to the assignment:

Period	Employing organization and your title/ position	Country	Summary of activities performed relevant to the Assignment:
2009 to date	Director, Principal Consultant, EIA and EMP, Resource & Environment Myanmar Co., Ltd.	Myanmar	Management of multi-disciplinary planning, environmental monitoring and audit and environmental management projects
2007 – 2009	Project Manager, Soil Investigation Pte. Ltd., Singapore	Myanmar	Site Investigation for Downtown Line MRT Project, Site Investigation for Project C916- Construction of Station and Tunnel at Beauty World Station
			Reporting SI work and Rock Mass Quality for design and construction of MRT Station and Tunnel
			Additional SI Work for C-855 Tunnel Section Reporting for SI work for design and construction of Station and Tunnel, Supervise & reporting CPT test, Supervise and reporting geophysical works (resistivity and surface wave) along the tunnel line.
1997 – 2007	Demonstrator, Assistant Lecturer, Geology Department, Yangon University		Practical works on petrology, aerial photo interpretation and remote sensing for undergraduate students Feasibility study, surveying, geotechnical investigation, geological mapping, data base and reporting of Ta-sang Hydropower project, Union of Myanmar
			Conduct lecture on Petrology and Mineralogy of Gold
			Application in mineral exploration Field leader for
			undergraduate geology students, field training in various
			parts of Myanmar, Geology and geotechnical
			investigation of upper Bu village multipurpose dam
			project, Union of Myanmar.
	Contact information for reference:	Soe Thura Myanmar (Tun, Managing Director of Resource & Environment Co., Ltd. soethuratun@enviromyanmar.net
4. Membership	o in Professional Associations and	Publication	S:Myanmar Geosciences Society (MGS), Faculty Member of Myanmar Environment Institute (MEI).

5. Language Skills:	English	<i>Speaking</i> Good	<i>Reading</i> Good	<i>Writing</i> Good
	Myanmar	native	native	native

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks

No.	Title	Client	Poisson	Period
1	EIA of Myanmar-China Gas Pipeline Project	CNPCIEM(Intern.)EnvironmentalManagementCo.)Ltd.)Ltd.)Ltd.)	Project Director	2009-2010
2	ESHIA of Mai Khot Coal Power Project	IPC (Italian Thai Power Co. Ltd.)	Project Director	2011
3	ESHIA of Upper Yeywar – Shwezaryan 230 kV Transmission Line	Ministry of Electric Power (1) & GK Power Systems Ltd.	Project Director	2011
4	ESHIA of Baluchaung- Shwemyo 230 kV Transmission Line	Ministry of Electric Power (1) & GK Power Systems Ltd.	Project Director	2011
5	Socioeconomic Assessment for Rakhine Region	Myanmar Engineering Society	Project Director	2012
6	Environmental Baseline Survey of Dawei Deep Sea Port and Industrial Development	Italian Thai Devlopment and Team Engineering Consultant	Project Director	2012
7	ESHIA of Thaketa Gas Turbine Project	BKB Co. Ltd.	Project Director	2012
8	SIA of Main Road Project, Dawei	Italian Thai Development and Seatac Group	Project Director	2012
9	ESHIA of Modi Taung Gold Project	National Prosperity Co. Ltd.	Project Director	2012
10	EIA of 500 MW CCPP at Hlawga	Htoo & HIE, China	Project Director	2012
11	EIA of MCC Cement Plant, Mawlamyaing	SCG Thailand & Pacific Link Myanmar	Project Director	2013
12	IEE for the Project of Manufacturing of construction materials and factory utensils (Welded H-Beams and Pipes)	Prime Metal Company Ltd.	Project Director	2013
13	IEE for the project of Manufacturing of Garment at Hlaingtharyar, Yangon	South Bay Manufacturing Co., Ltd	Project Director	2013
14	IEE for the project of Manufacturing of Garment at Intagaw, Bago	Hung Kiu (Myanmar) Garment Manufacturing	Project Director	2013
15	IEE for the project of Manufacturing of Garment at Pathein City	Hakers Enterprise (Myanmar) Co., Ltd.	Project Director	2013
16	IEE for the project of Manufacturing of Garment at Dagon South, Yangon	Myanmar Sein Pann Manufacturing	Project Director	2014
17	Environmental Impact Assessment of Shweli River II Hydropower Project	Hydrolancang International Energy Company Ltd. and KHIDI	Project Director	2012
18	Environment And Social Consideration Study on The Project for Rehabilitation of Education Colleges in the Republic of the Union of Myanmar	Yamashita Sekkei Inc. and KRI International Corp.	Project Director	2013

No.	Title	Client	Poisson	Period
19	Environmental and Social Information Collection Survey for the Project for the Strategic Urban Development Plan of The Greater Yangon	Nippon Koei Co., Ltd	Project Director	2012
20	Actual Environmental Survey for Feasibility Study for the Construction of Bago River Bridge	ALMEC Corporation, NIPPON KOEI Co., Ltd.	Project Director	2013-2014
21	Actual Environmental Survey for Feasibility Study for the Construction of Thaketa River Bridge	ALMEC Corporation, NIPPON KOEI Co., Ltd.	Project Director	2013-2014
22	ESIA for Baseline study of Thilawa Special Economic Zone Class A	Nippon Koei Co., Ltd.	Project Director	2013
23	Environmental and Social Survey for Environmental Impact Assessment Studies under the Project for Electric Power Development in the Thilawa Area	Nippon Koei Co., Ltd.	Project Director	2014
24	Survey for Preparation of Abbreviated Resettlement Plan for Feasibility study for the construction of new Thaketa and Bago River Bridge	Nippon Koei Co., Ltd.	Project Director	2013-2014
25	ESIA of Upper Yeywa Hydropower Project	DepartmentofHydropowerImplementation(DHPI),MinistryofElectricPower(MOEP).	Project Director	2015

End of document



Present Position	- Principal Consultant, Ecologist (Flora)		
Name	- Dr. Tin Tin Khaing		
Date of birth	- 13 th August, 1966		
Religion	- Buddhist		
Position	- Lecturer		
Department	- Botany, Sagaing University		
Education	- B.Sc(Hons), Yangon University		
	M.Sc, Yangon University Ph.D, Mandalay University		
Home address	- Teacher Hostel, Sagaing University		
Phone No	- 09 444036432		
Email	- tintinkhaing@gmail.com		

ESIA Experiences:

- Floristic Study on Angiospermae of Kyaukse Township in Mandalay Region.
- ESIA study for Coal Fired Power Plant Project in Tachilaik Township, 2014
- ESIA study for 5000 ton/day Cement Project in Kyaukse Township, 2014

Present Position	- Principal Consultant, Ecologist (Fauna)	
Name	- Dr. Sandar Win	
Date of birth	- 30 April 1968	
Religion	- Buddhist	
Employment record		

Position	- Lecturer			
Department	- Zoology, Kyaukse University			
Education	- Ph.D (Zoology)			
Field Study	- Environmental pollution and fish diseases			
Responsibility	- Teaching and guide to graduate and MSc (Supervisor)			
Guide to Ph.D (Co-su	pervisor) and some research papers were writing.			
Advisor of Fisheries	Federation, Mandalay Region			
Publication	- Journal of Myanmar Academy of Arts and Science,			
	Vol (8)4, 2009, 2010			
	Universities Research Journal Vol (3)4, 2010			
Home address	- No 2/38, 66x16 Street, Nanshae Pyitawthar, Mandalay			
	00.400514001			

fionic adul ess	- INO 2/30, OOXTO SHOOL, INdiishao I yilawillar, Mahuda
Phone No	- 09 402514981
Email	- dr.sandarwinphd@gmail.com

ESIA Experiences:

- Floristic Study on Angiospermae of Kyaukse Township in Mandalay Region.
- ESIA study for Coal Fired Power Plant Project in Tachilaik Township, 2014
- ESIA study for 5000 ton/day Cement Project in Kyaukse Township, 2014



Chit Myo Lwin

Name of Consultant	-	Chit My	yo Lwin		
Present Position	-	Project I	Manager		
Name of Firm	-	Resourc	e and Environment Myanmar Co.,	Ltd. (REM)	
Nationality	-	Myanma	ar		
Profession	-	Environ	mental Geology		
Date of Birth	-	19 Septe	ember 1988		
Years with Firm/Entity	-	2009		Nationality	- Myanmar
Membership in Profession	nal Societ	у	 Myanmar Geosciences Society (N Faculty Member of Myanmar En 	AGS) vironment Institut	e (MEI)
Detailed of Tasks Assigned	ed	- Collect	t Environmental Baseline Data and	prepare baseline d	lata report
		- Manag	ge baseline data team and co-ordina	tion with Client	

Profile

Mr. Chit Myo Lwin obtained his B.Sc. degree in geosciences and became professional geologist in Myanmar since 2009. At present he is a project manager of Sustainable Environment Myanmar Co., Ltd. He has six years of experience in the field of Geosciences and EIA, and currently he works as a project team leader of environmental baseline data collection team in an area of Environmental Impact Assessment and Environmental Management in various projects.

Professional History

2014 to date	- Project Manager, Principal Consultant, EIA and EMP, Resource & Environment Myanmar Co., Ltd.
2013 - 2014	- Geoscientist and project coordinator in Siam Cement Company (SCG)
2009 - 2013	- Physical Environmental Consultant, Resource and Environment Myanmar Co., Ltd.
Geoscientist	· Conduct project on gold mineral exploration in Ba Mauk Townshin (Upper Sagaing Region)

Geoscientist : Conduct project on gold mineral exploration in Ba Mauk Township (Upper Sagaing Region), Limestone exploration in Mon and Kayin States, geology and geotechnical investigation of Tanintharyi hydropower project, raw material exploration for cement in MCL cement plant (Mawlamyine) in Union of Myanmar.

Coordinator : Project coordinator between developer and contractors for cement plant (Siam Cement Plant in Mawlamyine) and negotiation with government and local people for project development at site as well.

Consultant : Physical environmental consultant in EIA surveys of different projects such as oil and gas sector, multi-hydropower project, gas turbine project, cement plant, city development, deep sea port project and so on.

Project Manager: EIA study for Kyaukse Cement Plant, Sittwe Reclamation for city development

Selected Relevant Experience in the Environmental and Social Impact Assessment, and Geoscience Environmental Impact Assessment and Environmental Management on:

S/n	Project name	Owner of the project	Person to contact and telephone	Completio n time	Remarks
1	Gold exploration in Bank Mauk Tsp.	Care Mineral Cooperation (CMC)	Than Tun (MD) 959 5151309	June, 2009	Submitted to Ministry of Mine
2	EIA of Myanmar- China Gas Pipeline Project	CNPC IEM (Intern. Environmental Management Co. Ltd.)	Ron Livingston (MD) 662 6366390	November , 2010	Submitted to Myanma Oil and Gas Enterprise
3	Geotechnical and geological surveys in Hydropower project at Taninthar yi	ITD (Italian Thai Development Co. Ltd.)		April, 2011	ITD (Italian Thai Development Co. Ltd.)
4	ESHIA of Mai Khot Coal Power Project	IPC (Italian Thai Power Co. Ltd.)	Vudtichai Eksangsri (CVO) 66 85 2495 655	October, 2010	Submitted to Ministry of Energy
5	ESHIA of Upper Yeywar – Shwezaryan 230 kV Transmission Line	Ministry of Electric Power (1) & GK Power Systems Ltd.	Zeya Thura Mon (MD) +(95-1) 502016-18	September , 2011	Submitted to Ministry of Electric Power Enterprise
6	ESHIA of Baluchaung- Shwemyo 230 kV Transmission Line	Ministry of Electric Power (1) & GK Power Systems Ltd.	Zeya Thura Mon (MD) +(95-1) 502016-18	November , 2011	Submitted to Ministry of Electric Power Enterprise
7	Socioeconomic Assessment for Rakhine Region	Myanmar Engineering Society	U Than Myint +95 9 5136467	November , 2011	UNDP Multi Hazard Project
8	Environmental Baseline Survey of Dawei Deep Sea Port and Industrial Development	Italian Thai Devlopment and Team Engineering Consultant	Dr. Sirinimit Boonyuen (MD, Env Unit) +662-509-9000 ext. 2305	May, 2012	Submitted to the Special Economic Zone Committee
9	ESHIA of Thaketa Gas Turbine Project	BKB Co. Ltd.	Dr. Sone Han (Local Rep./ Proj. Director) +95 9 5183631	May, 2012	Submitted to MIC
10	SIA of Main Road Project, Dawei	Italian Thai Development and Seatac Group	Pracha Jantarasarsophon tsiajao@yahoo.com	July, 2012	Submitted to the Special Economic Zone Committee
11	ESHIA of Modi Taung Gold Project	National Prosperity Co. Ltd.	Thiha Zaw Lin Project Director	March, 2012	Submitted to MIC
112	EIA of 500 MW CCPP at Hlawga	Htoo & HIE, China	Zhuang Jinxiang 18669086755 zhuangjx_love@126. com	Feb. 2013	Submitted to MIC
13	5000 t/d cement plant in Mawlamyine as geoscientist and coordinator	Siam Cement Company	Mongkon Pornchunchoovongm ongkonp@scg.co.th	Oct 2013- May 2014	
14	FSIA for Baseline				
15	study of Thilawa Special Economic	Nippon Koei Co., Ltd.	-	December , 2013	MOECAF

	Zone Class A			
16	Environmental and Social Survey for Environmental Impact Assessment Studies under the Project for Electric Power Development in the Thilawa Area	Nippon Koei Co., Ltd.	September , 2014	MOECAF
17	Environmental Baseline Survey for environmental and social consideration for energy sector rehabilitation program in Myanmar	Nippon Koei Co., Ltd.	October, 2014	MOECAF
18	Survey for Preparation of Abbreviated Resettlement Plan for Feasibility study for the construction of new Thaketa and Bago River Bridge	Nippon Koei Co., Ltd.	September , 2014	Ministry of Construction
19	ESIA of Upper Yeywa Hydropower Project	Department of Hydropower Implementation (DHPI), Ministry of Electric Power (MOEP).		MOEP
20	5000 t/d cement plant of Kyaukse	Myanmar Conch Co., Ltd.	2015	MOECAF
21	Reclamation project for city development in Sittwe	Su Htoo San Co., Ltd.	2015	MOECAF

Education - Diploma in Geographic Information System & Remote Sensing B.Sc. (Geology)

Language - Burmese mother tongue and English

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks (Example)

No.	Title	Client	Poisson	Period
1	Mandalay EMP project	Mandalay ECD (Environmental	Assistant project	Nov. 2014 to
		Conservative Department)	manager	Oct.2015
2	Myin Gyan IPP project (Independent Power	ERM Co,.ltd	Assistant project	June.2014 to May
	Plan) (EIA)		manager	2015
3	Thaung Khone Core Fire Power Plant project	JICA	Assistant project	August.2014 to
	(EIA)		manager	Nov 2014
4	Thilawa SEZ Zone A Development Monitoring	MJTD	Assistant project	Jan.2014 to Dec
	project (EIA) Phase_1 construction stage		manager	2015

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Curriculum Vitae (CV)

1. General:

Position Title and No.:	Consultant (Microbiology)
Name of Key Expert:	Nyan Linn Maung (Mr)
Name of the Firm proposing the Key Expert:	Resource & Environment Myanmar Co., Ltd.
Date of Birth:	8 th June, 1988
Nationality:	Myanmar
Country of Citizenship/Residence:	Myanmar

2. Education:

B.Sc (Microbiology)

3. Employment Record relevant to the assignment:

Period	Employing organization and your title/ position	Country	Summary of activities performed relevant to the Assignment:
2015 - present	Resource &Environment Myanmar Co., Ltd. Consultant (Microbiology)	Myanmar	Responsible for ecology survey for IEE and EIA studies.
2012 - 2014	Resource and Environment Myanmar Co., Ltd. Assistant Environmental Technician	Myanmar	Responsible for physical environment for IEE and EIA studies.
Contact information for reference:		Zaw Naing zawnaingoo	Oo, Director of Resource and Environment Myanmar Ltd.

4. Membership in Professional Associations and Publications:

5. Language Skills: Lan	<i>guage Speaking</i>	<i>Reading</i>	<i>Writing</i>	
Eng	glish Fair	Fair	Fair	
Муа	nmar Native	Native	Native	

No.	Title	Client	Poisson	Period
1	Shweli Hydropower project	KHIDI Kunming Engineering Co., Ltd.	Assistant Environmental	September
			Technician	2012
2	Letpadaung Taung Ecology and	-	Assistant Environmental	December
	Traffic Survey		Technician	2012
3	Dawei new Terminal	-	Assistant Environmental	2014
			Technician	
4	Naw Chan Hka Hydropower	Power China Kunming Cooperation Co.,	Assistant Environmental	2014
		Ltd.	Technician	
5	Air, Noise, Soil and water quality	Nippon Koei	Assistant Environmental	2014
	survey for Thilawa (SEZ)		Technician	
6	Myingyan (IPP) project	-	Assistant Environmental	-
			Technician	
7	Tachileik coal mine	-	Assistant Environmental	-
			Technician	
8	Upper Yeywa environmental survey	-	Assistant Environmental	-
			Technician	
9	Miela Hydropower project	Special Region No.4 Government	Consultant	February
				2015
10	Sittwe reclamation project	Su Htoo San Co.,Ltd and BXT	Consultant	September
		Construction and Development Company		2016
11	Star City Yangon Resident	Thanlyin Estate Development Ltd.	Consultant	September
				2015
12	Upper Baluchaung Hydropower	Neo Energy Co., Ltd.	Consultant	June 2015
	Project			
13	Thilawa SEZ Class B	Nippon Koei	Consultant	October
				2015
14	Thayet Cement Plant	Myanmar Jidong Co., Ltd.	Consultant	September
				2016
15	Namtu-Bawdwin Mining Project	Win Myint Mo Co., Ltd.	Consultant	December
				2016

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks

End of document

No.	Title	Client	Poisson	Period
1	Air quality, vibration and noise	Joint with private company	Assistant Environmental	June 2014
	measure for Domestic Terminal,		Technician (Air quality, noise and	
	Yangon.		vibration)	
2	Caustic Soda Plant, Tha Htone	Joint with MSR (Myanmar Survey	Assistant Environmental	July 2014
		Research)	Technician (Air quality)	
3	Yangon Circular Railway Upgrade	JICA	Assistant Environmental	29 Aug
	Project		Technician (Air quality, noise)	2014
4	Thilawa SEZ Class A	Nippon Koei	Assistant Environmental	15 Aug
			Technician (Air quality & noise)	2014
5	Miela Hydropower Project	Special Region No.4 Government	Consultant (Forest & vegetation)	February
				2015
6	Sittwe Reclamation Project	Su Htoo San Co.,Ltd and BXT	Consultant (Forest & vegetation)	April 2015
		Construction and Development		
		Company		
7	Star City Yangon Resident	Thanlyin Estate Development Ltd.	Consultant (Forest & vegetation)	September
				2015
8	Upper Baluchaung Hydropower	Neo Energy Co., Ltd.	Consultant (Forest & vegetation)	June 2015
	Project			
9	Thilawa SEZ Class B	Nippon Koei	Consultant (Forest & vegetation)	October
				2015
10	Thayet Cement Plant	Myanmar Jidong Co., Ltd.	Consultant (Forest & vegetation)	September
				2016
11	Namtu-Bawdwin Mining Project	Win Myint Mo Co., Ltd.	Consultant (Forest & vegetation)	December
				2016

6. Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks

End of document

Curriculum Vitae

A. Personal Data

1.	Name:	Miss Lai Lai Win			
2.	Date of Bir	th: 22^{nd} Nove	ember, 1983		
3.	Age:	(34) Years			
4.	Gender (m	ale/female): Fo	emale		
5.	Nationality	: Myanmar	r		
6.	Marital Sta	tus:	Single		
7. 8.	Qualification Current Act Township, Y	on: 1) B.S (B Idress: Yangon	 Biotechnology), 2) M.S (Bioinformatics), 3) Ph.D (Molecular Biotechnology), 4) M.S (Environmental Engineering and Management), AIT, Thailand. Room 20, Building 24, U Wisara Housing, Dagon 		
9.	Permanent	Address:	Kyaukpadaung Township, Mandalay		
			Division, Myanmar		
10. 12.	Permanent Office Add	E-mail: <u>k</u> ress:	ailaiwyn@gmail.com, lailaiwin@enviromyanmar.net B-702, Delta Plaza, Bahan Township, Yangon,		
			MYANMAR		
13.	Office Pho	ne No.:	+95 9 73013448		
14. 15.	Fax: Mobile No.	:	+95 1 552901 +95 9797241421, +95 9969113803		

B. Academic Background

Year Attend	led		Major Fields of	Name of Institution/	
From	То	Degree/Diploma	Study	Place/Country	
2015	2017	Master of Science M.S	Environmental Engineering and Management	Asian Institute o Technology, Thailand.	of
			1		

2008	2011	Doctoral	Molecular	Mandalay Technological
		Ph.D (Molecular	Biotechnology	University, Myanmar
		Biotechnology)		
2006	2008	Master of Science	Bioinformatics	Mandalay Technological
		M.S(Bioinformatics)		University, Myanmar
2002	2005	Bachelor of Science	Biotechnology	Yangon Technological
		B.S(Biotechnology)		University, Myanmar.

C. Professional Experiences

Year		Position	Name of Institution/ Place/Country
From	То		
2004	2006	Demonstrator	Department of Biotechnology, YTU, Myanmar
2006	2007	Tutor	Department of Biotechnology, YTU, Myanmar
2008	2013	Assistant Lecturer	Department of Biotechnology, MTU, Myanmar
2013	2015	Lecturer	Department of Biotechnology, MTU, Myanmar
2017	Present	Principal Consultant, EIA Report Preparation Section	Resource & Environment Myanmar (REM), Yangon

D. Meetings and Workshop

- Technical review and ESIA meeting about Lithium Research at Pyin Gyi Mountain (19-22nd August 2013)
- First meeting on research collaboration between Thailand BIOTEC and Mandalay Technological University for ASEAN network on microbial utilization (12-13th November 2013)
- Review meeting on ESIA report for Lapadaung Copper Mine (June 2014)
- Training on EIA guidelines organized by Vermont University (29th July 2014)
- Workshop on Application of Nuclear Technologies in Agriculture and Life Sciences (11-15th August 2014), Mandalay Technological University, Myanmar.
- DAAD ProGrant DIES Proposal Writing Program, Hochiminh City/Hanoi City,

Vietnam (25-31st January 2015/Online Learning (6-Months)/16-22th August 2015).

- Urban Environment and Health in Asia (UEHAS) and Graduate Program in Sustainable Science Global Leadership Initiative (GPSS-GLI) of the University of Tokyo in collaboration with Chulalongkorn University, Integrated Management of Urban Environment for Sustainable Development, Thailand (111th August 2016).
- Short Term Training on Safety and Quality and Innovative Food Production Systems, collaborated by ASIFOOD and Asian Institute of Technology, funded by the Erasmus+ Program of the EU (20-26th May 2018)
- ISO 9001:2015 Quality Management System Awareness and Implementation Course by Guardian Independent Certification (Myanmar) Co., Ltd., 19-20th June 2018.
- Occupational First Aid Course by WIN OSHE Safety Academy on 2nd July 2018

E. EIA Activities

- Preparation of EIA reports including EMP and Resettlement Action and Waste Management Plans
- Baseline Survey for Existing Physical Environmental Parameters (Air, Noise, Water, Solid wastes, Soil, etc.) and Social Community Studies
- Preparation of Environmental Impact Assessments
- Facilitation of Stakeholder Consultation and Public Disclosure Meetings
- Preparation of Comments Responses and Review Meetings with the Project Proponents, Government Authorities and NGO organizations, etc.
- Questionnaire Survey of community's concerns on Thailand Drinking water quality with international colleagues from Japan, China, Vietnam and Thailand
- Implementation of EIA operation processes in compliance with National and International Guidelines & Standards

F. Previous Projects

- 1) Lapadaung Mountain Copper Mine
- 2) Pyin Gyi Mountain Lithium Mine
- 3) YTL Cement Plant
- 4) Mawlamyine Cement Plant
- 5) Limestone Quarry

- 6) Shwe Ayeyar Nadi Soap Factory
- 7) Coal Fire Power Plant
- 8) Jetty and Canal
- 9) Transmission Line Project
- 10) EIA Implementation for Hydropower Project in compliance with WB and IFC Standards

G. Language Proficiency

	Myanmar (Mother tongue)			English			
	Spoken	Written	Reading	Spoken	Written	Reading	
Fair/Basic Knowledge							
Working Knowledge				*			
Excellent Knowledge	*	*	*		*	*	

H. Paper published

- Lai Lai Win: "Study on the Cellulolytic Activity of Trichoderma spp. and their Application in Rapid Composting Process for Bio-organic Fertilizer", December 2009, The 1st International Conference on Science and Engineering, Sedona Hotel, Yangon, Myanmar.
- 2. Lai Lai Win: "Isolation and Identification of Serratia marcescens and Implementation of Serratia species Identification Program Using Java Language", July 2007, Mandalay Technological University, Mandalay, Myanmar.
- **3.** Lai Lai Win: "Environmental Sustainability of Aerated Lagoons Treatment Processes for Community Wastewater", May 2017, Asian Institute of Technology, Thailand.
- **4.** Lai Lai Win: "Formulation of the Biostimulator Product from Fungal Species, *Aquilaria* for Agarwood Oil Formation", Department of Biotechnology, Mandalay Technological University, Myanmar.





Metrological Center

SCI ECO Services Company Limited

33/2 Moo 3, Banpa, Kaeng Khoi, Saraburi 18110, Thailand Environment Telephone : +66 (0) 3627 3099 Fax : +66 (0) 3627 3100 Calibration Telephone : +66 (0) 3627 3096 Fax : +66 (0) 3627 3100

www.scieco.co.th E-Mail: environmentalmkt@scg.com, calibrate@scg.com

Stack Monitoring Results

Sampling point : FGD (EU Plant)

Report No. AA 18/0415

<u>Plant/Company</u>	Mawlamyine Cem	ent Limited				
Address	Kayon Gu-chaungh	nakwa Road, Kv	van Ngan Village, Kyaikmaraw	Township, M	lon State, Myanm	ar
Receive Date	10/08/18		Analytical Date	10 - 1	5/08/18	
<u>Detail of Stack</u>						
- Diameter	2.90	m	- Flow Rate	27.28	m³/s	
- Shape	Circular		- Oxygen (O ₂)	8.67	%	
- Pressure (F	Ps) 752.34	mmHg	- CO	38.00	ppm	
- Moisture (E	Bws) 13.95	%	- Temperature (Ts)	47.58	°C	
- Excess Air	(EA) 68.87	%	- Gas Velocity (Vs)	5.69	m/s	
- UTM	(X): 0375	5325	- UTM	(Y): 18097	09	

Analytical Results

No.	Parameter (Sample ID)	Sampling Date (Time)	Result ^{III}	Standard Value	unit	Measurement Method
1.	Particulate (AR18/17868)	06/08/18 (12:55 PM - 01:44 PM)	5	≤ 50 ¹	mg/Nm ³	U.S.EPA Method 5
2	Sulfur dioxide	06/08/18	97	≤ 900 ^I	mg/Nm ³	U.S.EPA Method 6
2.	2. (AR18/17870)	(12:55 PM – 01:44 PM)	37	- 11	ppm	U.S.EPA Method 6
2	Oxides of Nitrogen (as NO ₂)	06/08/18	99	≤ 510 ^I	mg/Nm ³	U.S.EPA Method 7
5.	(AR18/17872)	(01:55 PM)	53	- ^{II}	ppm	U.S.EPA Method 7
	Carbon monoxide	06/08/18	52	- II	mg/Nm ³	Electrochemical Method
4.	(AR18/17875)	(12:00 PM)	46	- 11	ppm	Electrochemical Method

Remark:

I. Myanmar : National Environmental Quality (Emission) Guidelines (December, 2015).

(2.1.1 Thermal Power)

II. No Notify Standard Value

III. The reported values are converted to standard condition at temperature 0 °C, 1 atm.

: Mr. Thawatchai Tongtan/ SCI ECO Services Co., Ltd.

Sampling Name/Company Recorder Name **Review Name**

: Mr. Thawatchai Tongtan

: Miss Penpisut Audomrat

(The results relate only to the samples tested)

Review by

A. Penpisut

Approved by

(Miss Penpisut Audomrat)

(Mr. Thongchai Assanuk)30...../.....08...../....18.....

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FM-EN14 I13/01-03-61



Chongqing Chudnýi Andlyzar (D., Lit) PROJECT NAME : PS7400 CEMS ANALYSIS SYSTEM (BOILER FLUE GAS OUTLET) USER NAME : CONCH KAWASAKI MCL PROJECT NO.: 15华东HO31 MEASUREMENT COMPONENT : EL3020 -- S02: 0-1000 ppm NO: 0-500 ppm 02: 0-21 % DT600 -- DUST: 0-200 mg/m3 PT-1D -- TEMP.: 0-300 ℃ PRE: 0-30 KPa FLOW: 0-40 m/s HMS535C -- HUMIDITY: 0-20 % Chongqing Chuanyi PS7400 Continous Emission Analyzer CO.,LTD Monitoring System PROJECT NAME: Mawlamyine Cement Lited(MCL) PROJECT INFORMATION DESCRIPTION DWN CHKD APPD RFV. PATTERN MARK HEIGHT SCALE APPD DWN

S

SHT. NO.

DATE

CHKD

CF 15华东H031

REV.

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元 历过角。蒋子丽 梅门房。\$P\$ 首下座 查广河

		فأحده فأشادهم		- 11.4.8.X		
S (1945) (19			۸Ü1	349 ie 1	AHALYZUK	EI 3020 GAS ARALYZER, 220VAC, 6017; EMPRODED MOUNTED
			A02		DUST METER	OPACITY MONITOR; 24VDC: IN-SITU MOUNTED
<u>`</u>			A03	1	TEMP./PRE./FLOW	SIGNAL 24VDC, WITH PURGE VALVE (220VAC, 50Hz); IN-SITU MOUNTED
	•		A04	1	HUMIDITY METER	2201AG, 50Hz, W-SITU WOUNTED
			FR		FILTER REGULATOR	MAX.: 1.OMPa
	· ·		VABE	1	BALL VALVE	CUT OFF COMPRESSED GAS FOR TEMP./PRE./FLOW METER
			RV	1	REGULATOR	MAX.: [0.4MPa
		, 	нст	10m	sample tube	PTFE 2-08X1, WITH HEATER; 220VAC,50Hz
			HC?		PROBE HEATER	220VAC, 50Hz, 200W
					SOLENOID VALVE	220VAC, 50Hz, 2/2 WAY SOLENOID VALVE; FOR PURGE PROBE FILTER
		11	V/P2		SOLENOID VALVE	220VAC, 50Hz, 2/2 WAY SOLENOID VALVE; FOR PURGE PROBE TUBE
					SOLENOID VALVE	220VAC, 50Hz, 2/2 WAY SOLENOID VALVE; FOR SAMPLE GAS
	-		 	$\left \begin{array}{c} \cdot \\ \cdot \\ \cdot \end{array} \right $	SOLENOID VALVE	220VAC, 50Hz, 2/2 WAY SOLENOID VALVE; FOR SAMPLE GAS VENTING
				$\frac{1}{1}$	SWITCH VALVE	3 WAY SWITCH VALVE
	-				COOLER	ELECTRONIC COOLER; 220VAC, 50Hz; WITCH 2 PERISTALTIC PUMP
	-	15			GAS PUMP	220 AC, 50Hz
	-	10			FLOW INDICATOR	GLASS TUBE INDICATOR WITH INLET NEEDLE VALVE, MAX.
	-				FLOW INDICATOR	GLASS TUBE INDICATOR WITH INLET NEEDLE VALVE, MAX.
		18			SAMPLE FILTER	FIBER FILTER ELEMENTS
		19			MEMBRANE FILTER	FLOW RATE: 250L/H, FILTER SURFACE: 24cm3, WALL MOUNTING
	-1 -1	20		+	WITH ALARM	P WATER STOP
		. ['		1 PS7400 Continuus Emission Chongqing Chuanyi
						Monitoring System Analyzer CO.,LTD
	-					REV. DESCRIPTION DWN CHKDIAPPD Mawtamyine Cement Lited(MCL) CODE LIST
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cone	- Aity -	NAME	TERCERTATION CONTRACTOR AND A CONTRACTOR A	Ne Mente
		24V 'POWER	220VAC, 50Hz, INPUT; 24VOC, OUTPUT; 150W	
POW	<u> </u>	SUPPLY	220080 50042	
HL1	1	DOOR LAMP		
S1	1	POSITION SWITCH	CONTACT: 2A	· ·
HL2	1	FAULT LAMP	24VDC, 0.5W	
S2	1 1	RESET BUTTON	RESET HUMIDITY ALARM	
TC	2	HEATER TEMP.	POWER: 220VAC, 50Hz; SENSUR: PTUG, CONTON THE STATE RELAY	
7CJ	1,	FAN TEMP	OUTPUT: DRY CONTACT, FOR FAN	
SSR	2	SOLID STATE RELA	POWER: 24VDC, OUTPUT: TRANSISTOR CONTACT, 40A/25A	
PLC		CPU MODLE	CPU 216, 220VAC, 50Hz; DI 24DC/DO 16 RELAY	
FM	2	EXTENSION MODE	EM231, 24VDC; AI X 4, 4-20mA	
	1	DP MODLE	EM2P7, 24VDC; PROFBUS-DP	
		TOUCH PANEL	TP700 COMFORT, TOUCH PANEL	-
CAN	- <u> -</u> ,	FAN	COQLING FAN	
C01		GAS BOTTLE	8L GAS BOTTLE WITH REGULATOR	
		L CIRCUIT BREAKE	R 324/16A/10A	
SP			R 1 NPUT, 2 OUTPUT; 4-20mA	
150			FLOW CONTROLLER	·
DEF	· · · · ·		SURGE PROTECTIVE DEVICE	· ·
SPC	` <u> </u>			·
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29	EM	
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OUTPUT; 150W					
•					
R: PT100; OUTPUT: 24VDC CONTRO	L SOLID	·			
FAN					
ISISTOR CONTACT, 40A/25A					
24DC/DO 16 RELAY					
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	PS7	7400 Contino Monitoring	us Emission System	Chongqing Chuan Analyzer CO.,LTC	yi.
DESCRIPTION DWN CHKC	PRQ. APPD Maw	ECT NAME: amyine Cem	ent Lited(MCL)	CODE LIST.	
DWN DODIAL APPD DE	S PATT	ERN MARK		CF 15华东H031	
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SCI ECO SERVICES CO., LTD.

Continuous Emission Monitoring System (CEMS) Calibration Report

Company :	Mawlamyine Cement Limited
Address :	Kayon Gu-chaunghnakwa Road, Kwan Ngan Village,
	Kyalkmaraw Township, Mon State
Analyzer Brand :	ABB Model : EL3020 Serial No. : 3.255653.5
Date of Calibration :	27 September 2016 Calibrated By : Wittaya Boonhong

Calibration Results :

Zero Point Calibration										
Parameters	Expected Value	Analyzer Reading	Error	Acceptance Criteria						
SO ₂ , ppm	0	0	0	<u>+</u> 25						
NO, ppm	0	0	0	± 25						
02,%	0	0	0	<u>+</u> 0.5 ·						

	Spar	n Point Calibration		
Parameters	Expected Value	Analyzer Reading	Error	Acceptance Criteria
SO ₂ , ppm	500	500.0	0.0	<u>+</u> 25
NO, ppm	943	957.8	14.8	<u>+ 25</u>
0, %	21.0	21.0	0.0	± 0.5

Remarks :

1. SO_2 and NO Acceptance Criteria is $\pm\,2.5\%$ of Measurement Range

2, O_2 Acceptance Criteria is \pm 0.5%

3. SO2 Measurement Range is 1,000 ppm

4. NO Measurement Range is 1,000 ppm

Approved By :

T. Jasipan

(Mr.Sasipong Thammaraksasit) Environmental Engineer <u>30,09,16</u>.

1 Siam Cement Rd., Bangsue, Bangkok, Thailand, 10800, Website: www.scieco.co.th

Power Plant (December 2018 SOx Emission)



Power Plant (January 2019 SOx Emission)


Power Plant (February 2019 SOx Emission)



Power Plant (December 2018 NOx Emission)



Power Plant (January 2019 NOx Emission)



Power Plant (February 2019 NOx Emission)



Power Plant (December 2018 Dust Emission)



Power Plant (January 2019 Dust Emission)



Power Plant (February 2019 Dust Emission)





Safety Design Guideline

SDC SCG Cement Version 08 -01/Mar/2013





Safety Design Guideline

Content						
1) General specification	3					
2) Machine safety specification	8					
3) Electrical safety specification	20					
4) Noise control specification	23					



General specification

1. Main passage way, such as main entrance and walkway should be at least 140 cm. in width, while other passage way (walkway around machines and conveyor) should be 80 cm. wide except access exit must be keep it follow law and regulation. In case there are devices installed and blocked this way, it should be considered to extend this area to specific distance. However, should the extension couldn't be done the distance can be reduced but not less than 60 cm.





If the floor is platform, the walkway should be made of steel plate such as checker plate not use a shredding guard because it could not to protect materials or tools falling. In case the height of platform is less than 250 cm. It could be use open grating substitute.



Checker plate



Open grating



2. Ladder should be at least 80 cm. in width and its steep should not be over 45°. Moreover, ladder rung should be 25.5 cm. wide and ladder's height should be 22.5 cm. and its overlap should be 3.0 cm. except access exit must be keep it follow law and regulation.



- 3. Ladder should not be a vertical ladder except in the narrowed area. Vertical ladder should be designed with the following specification:-
 - 3.1 Ladder should be at least 60 cm. in width
 - 3.2 Ladder rung's diameter should be 19 mm. (3/4 in.) and its height should be 30 cm. each.
 - 3.3 In case the height of vertical ladder is over 4 meters, it is needed to have cage installed for the area which its height is over 200 cm. until end of the ladder.
 - 3.4 Platform is needed for every 9 m. and its width should not be less than 60 cm.







3.5 Vertical ladder should not be installed inside the working area but fixed at the far-sided area. There should also be a barrier with open door to avoid the falling



4. In case the working area is 120 cm. above the ground, the barrier is also needed. This barrier should be divided into 3 parts; top rail, mid rail and toe board respectively. While top rail should be 100 cm. in height, mid rail and toe board should be 10 cm. high. In addition, toe board should be installed and its height should not be over 1.0 cm. from platform. The distance between each pole should not be over 120 cm.







5. The space between machine and passage way should be less than 5 cm. and its barrier should not be less than 5 cm. high.



6. Working area of each floor should not be less than 200 cm. high. In case the space is limited, this height can be reduced but not less than 130 cm.



Height of this working area is under standard



7. Storage of oil and chemical tanks must have bund (concrete wall) to control spillage. The size of bund could have to contain all volume of biggest tank (110%) if more than one. The height of concrete wall should be more than 45 degree from top tank level.







Machine safety specification

1. Guard should be designed to cover a rolling part of machine, such as shaft, pulley and conveyor. To properly design, this guard is needed to be easily removed and assembled for cleaning and maintenance on regular basis. However, this guard should be removed and assembled by using specific tools and instrument. In case this guard is not positioned to protect the danger from accidental running machine, the interlock is needed to hold its hinges. In addition, signage should be posted to inform the danger of this area.









2. To design and consider a location of guarding installation, the following should be considered:-



In case of tip toe standing, the maximum reachable range for the vertical distance should be at least 250 cm. except it is not standing on floor such as stand, ladder, platform.





3. To standardize a space between each guard and its size, it should be considered the following details:



Formula for general distance - Identify relationship between suitable guard size and distance between the guard and danger point







4. Guard should be designed for the safe point with the reachable range as follows



Figure 3.6. Factors to consider in designing a protective barrier: A = height of the danger zone, B = height of the protective barrier, C = horizontal distance to the danger zone.

	Height of fixed barrier or protective structure (B),* mm (in)								
Height of danger	1000 (40)	1120 (44)	1400 (55)	1600 (63)	1800 (71)	2000 (78)	2200 (86)	2400 (94)	2500 (98)
zone (A), mm (In)			Horiza	ontal distanc	e to danger	zone (C), n	nm (in)		
2500 (98)	-	-	-	-	-	-	-	-	-
2400 (94)	100 (4)	100 (4)	100 (4)	100 (4)	100 (4)	100 (4)	100 (4)	100 (4)	-
2200 (86)	600 (24)	600 (24)	500 (20)	500 (20)	400 (16)	350 (14)	250 (10)	-	-
2000 (78)	1100 (43)	900 (36)	700 (28)	600 (24)	500 (20)	350 (14)			
1800 (71)	1100 (43)	1000 (40)	900 (36)	900 (36)	600 (24)	-	-	-	-
1600 (63)	1300 (51)	1000 (40)	900 (36)	900 (36)	500 (20)	-	-	-	-
1400 (55)	1300 (51)	1000 (40)	900 (36)	500 (20)	100 (4)	-	-	-	-
1200 (48)	1400 (55)	1000 (40)	900 (36)	500 (20)	-	-	-	-	-
1000 (40)	1400 (55)	1000 (40)	900 (36)	300 (20)					
800 (32)	1300 (51)	900 (36)	600 (24)	-	-	-	-	-	-
600 (24)	1200 (48)	500 (20)	-	-	-	-	-	-	-
400 (16)	1200 (48)	300 (12)	-	-	-	-	-	-	-
200 (8)	1100 (43)	200 (8)	-	-	-	-	-	-	-
0	1100 (43)	200	-	-	-	-	-	-	-

Table shows the appropriate distance "a", "b" and "c"

Remark: Barrier should not be installed at the elevated area which might reduce the safe distance







Distance between guard and floor should not be more than 25 cm.



Guard should be designed to protect the danger point at the counter weight area and to comply with the safe reachable range as specified in the table.



5. Manhole should be designed and can be opened at the safe point by considering the safe range from the rolling or moving machine. As for the distance, please follow item no. 2. Especially the feeding area should be separated from the danger point and have a cover for the opening area to feed raw material back into the system













6. The door must be locked and opened with tools only and have a signage posted with "Not to be opened, removed during operation" Except at manhole at the danger point, there must be limit switch installed to shut down the machine operation, such as at the screw conveyor, mixer or chipper etc.





7. In case there might be solid fuel spilled out when the manhole is opened, loop-eye splices should be formed to protect the explosive opening from the pressure. This equipment should be apply during unload of any materials between Existing pipe and connecting hose.





Eye-loop splice is immediately opened



8. Conveyor guard should be installed at the entire length of conveyor according to guarding standard. If necessary, the guard should be installed at the middle of conveyor, for example, at the narrowed walkway which its area is limited or at the gravity bends pulleys etc.



THIS ILLUSTRATION SHOWS THE NUMEROUS DANGER POINTS ON A STANDARD CONVEYOR.













Enlarged-detail Area "C"





Concept design for guarding at head and tail pulley must keep 100 cm. from center line





Unsafe design guarding and covering at head and tail pulley



If necessary, guard should be installed at every danger point



At the take-up pulley, the safety guard is needed to be installed.



Improper guarding



9. The conveyor is installed 50 cm. above the floor, guard installation at return idlers are needed from the entire length of conveyor to its height not over 250 cm. Except it over the walk way or road way, It must be installed protection plate along the conveyor which across the way.













Guarding design to protect the return idlers







10. There should be two walkways alongside the belt conveyor and equipped with emergency stop cord, such as pull rope switch for the entire conveyor at both sides. In case a short belt conveyor, a barrier is needed to protect a contact of danger point. Slopping walkways should have small bar to protect slip or rolling of materials.















Electrical safety specification

1. Electrical system which distributes electrical current to every machine must have the circuit breaker with position to Log out -Tag out (electrical isolation).







Circuit Breaker with Electrical Isolation system



- 2. Distribution box should be designed for easy maintenance and cleaning without any electrical current left in the working area. In case electrical current is needed, the distribution should be from other point.
- 3. Signage should be posted at every danger point from electricity.
- 4. Machine, devices and distribution box with metal need to have the ground line.
- 5. Every electrical device must be connected from electrical distribution with ground line or earth leakage circuit breaker







6. Electrical plug must be designed not to connect any plug with different electrical voltage.







7. Substation building or electrical control room should be equipped with fire alarm system and fire extinguisher such as portable fire extinguisher or gas system. In case using gas system with Total Flooding, such building should be designed to protect the air leakage. For example, the door should be a fire door and should not have window. As for the ventilation, it should have damper to close and interlock the fire extinguisher system.











Noise control specification

- 1. Sound pressure level of the machine should not be over 85 dB(A) at 100 cm. around this machine.
- 2. In case the noise is louder over the standard requirement, it is needed to install enclosure to reduce this noise.
- 3. To reduce noise from the air duct, absorptive silencer and Plenum chamber are needed.
- 4. Operator room or control room need to control sound pressure level under 70 dB(A) at all time.





And Arvenue I. Form of Lease Proceedings No. 1 (1000) Former Pro	(Ruie-5! A of the Ruies under the U.B. Land and Revenue Regulation, 1889) (Ruie 29 of the Ruies under the L.B. Town and Village Land: Act, 1898) THIS LEASE made on the DG AD day of Second Act, 1898) one thousand nine hunder and DG AD day of Second Retween THE Uniton OF MYANMAR (hereinalter called the Lator which expression shall be taken to mean and include the said UNION OF MYANMAR, and his successors in Office and assigns except when the context requires another and different meaning) of the take part; 690 ppost of 060 on 00 (p) 600 pp op meaning); 600 cm b;	AND AND AND OF AND OF APPENDENCE SOUTH SON OF A GENOP (ADD ELO) (hereinelicer called 's the Lease 'Which expression shall be taken to mean and include the said of the Lease 'Which expression shall be taken to mean and 's the reaction of the corner by the context requires another and different. meaning) of the other part, with assert requires another and the react hereinsiter reserved and of the covenants by the Lessee hereinsiter companing the Lessor DOTH here by lesse unto the Lessee all that piece of and described in the schedule here to together with all rights easement. and products burled treasure coal petroleum oil and quarter whistones 'id mines' or within the said land with liberty for the Lesson and his lesses licenses' return and workmen and all other persons acting on his behalf to dig search 'i' bitain aufface of any disturbance or damage that may be caused thereby to the sufface of any disturbance or damage that may be caused thereby to the sufface of the and and that such compensation so the sea on	as nearly as may be in accordance with the provisions of the Lind Acquisition Acts or Regulations for the time being in force TO HOLD the suid land write the Lessee for the tarm of thirty years from the date of this lease "with the option for the Lessee to renew this lease for 7 two suessive terms of this lease "with the option hereinafter provided " YIBLDING and PAYING therefor the clear years 7 as hereinafter provided " YIBLDING and PAYING therefor the clear years 7 as hereinafter provided " YIBLDING and PAYING therefor the clear yearly rent of sanuary of dath years may run with the said land and may bind the owners thereof for the time being covenant with the Lessor. I. To pay the said rent on the days and in the maner hereinbeice	There now are or may hereafter during the said term be imposed upon the said that now are or may hereafter during the said term be imposed upon the said fand or any building that may be erected thereon or upon the lesser in respect thereof. (mj0305:00560000 6(5) m007 9050005600005; 20660005; 30600000). 2. To commence to erect upon the said land within months from the date hereof the buildings the measurnents elevation and materials of which shall receive the previous appoval 7 in writing of the months from the date hereof and during the currency of this lease to: the months from the date hereof and during the currency of this lease to: the such building in good repair to the satisfaction of the side Deputy Commis- sioner.	and the words with the option of thirty lears' should be substituted at the vords "with the option" of thirty lears' should be substituted at the first renewal.	
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f Strick out alsermative not required.

...of the sers. of the erect buildings on more than Nor ro 3, N said land, said 4. Not to after the position mode of construction or materiales of the said building or of any other buildings that may hereafter be arected on the said land without the consent in writing of the said Deputy Commissioner and not to arect any other building upon the said land without first obtaining such consent.

Alternative

4. Not to erect any other building on the said land without first obtaining consent in writing of the said Deputy Commissioner. the

j Strike out alternative not required.

5

in the event of the lease obtaining subject to any further restrictions and conditions or subject to enhanced reat the consent of the Deputy Commissioner to arect maintain keep or use buildings on the land for the purpose of a lodging-liouse or a cooly-barrack to comply with all such restrictions and conditions and to pay on the dates aforesaid such onhanced reat as if they were part of this indenture,

o. Without first obtaining such consent not to subdivide the said land or to part with the possession of transfer or sublease a part only of the said land. Without first obtaining such Ś

7. To register all changes in the pousession of the whole of the said land whether by, transfer otherwise than by registered document succession or other-wise in the register of the said Deputy Commissioner within one calender month from the respective dates of such changes and if the Lessee shall without sufficient cause neglect to register such changes the said Deputy Commissioner may impose on him for each such case of neglect a penalty not exceeding K 100 and a further monthly penalty not exceeding K 50 for each month that such breach shall continue and the said Deputy Commissioner may enforce the payment of such penalties in the same manner as arrears of revenue on land may be recovered. To register all changes

T in Municipal areas the buildings plans should also be submitted to the Municipal Committee (See Section 115, BURMA Municipal Act, 1898)

i persons acting under his orders day time during the said term may be erected thereon for any and all she buildings chat 8. That the said Deputy Commissioner an shall be at liberty at all reasonable? time an to enter upon the said land or any buildings it purpose connected with this lease.

s or fixtures r shall re-enter upon to surrender. fixtures and buildings and quielty 9. At the expiration of the said term hereby granted quideliver up possession of said land but not the buildings then be thereon to the Lessor provided that if the lessor said land and determine this lease under clause 10 hereof reupon quietly deliver up possession of the said land and buildings may then be thereon Lessor; chereupon Acus and 242 2843

arrear and unpaid for one calender month after the same shall have become due whether the same shall have been demanded or not or if the Lessee shall not observe and perform the covenants hereinbefore contained the said Deputy Comm-issioner may immédiately and notwithstanding the waiver of any previous breach or right of re-entry cancel this lease and take possession of the land and the 0 pc any part thereof shall 20 rone of re-entry cancel this lease and cake and fixtures that may them be thereon. the said always that if PROVIDED buildings 4000

And the Lessor down hereby covenant with the Lessee-

It. That the Lessee may at the expiration of the said term hereby granted if this lease shall not have been previously cancelled under clause 10 hereof and of the lessee shall have paid the said rent and duly observed and performed the covenants by the Lessee herein contained up to the expiration of the said term take away and dispose of all buildings and fixtures that may then be erected and fixed to the said land provided that the Lessee makes good and repairs any damage that may be caused to the said land by such removal.

1.2. That if the Lessee shall be desirous of taking a renewed lease of the said piece of land for the further term of thirty years from the expiration of the said term hereby granted and of such desire shall prior to the expiration of such last-mentioned term given to the Lessor three calendar month's previous notice in writing and shall pay the rent hereby reserved and observed and perform the several covenants and conditions herein contained and on the part of the Lesser to be observed and performed up to the expiration of the said term hereby granted the Lessor will upon the request and at the expense of the Lessee and upon his signing and delivering to the Lessor a counterpart thereof sign and deliver to: the Lessor will upon the request and at the expense of the Lessee and upon his signing and delivering to the Lessor a counterpart thereof sign and deliver to: the Lessor will upon the request and subject to similar covenants and vpon his visions or such of them as shall be then subsisting or capable of taking effect provided that a lease for a thirty years shall not contain this pres-ent covenant for renewal:

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and it is hereby agreed that the Lessor his successers expiration of the said term hereby granted if the Lessee a renewal of this lease under clause 12 hereof elect to ings and fixtures that may then be in or upon the said te lessee one calender month's previous notice in writing and the price shall in case of dispute be determined by of the said district according to the actual value of such and his decision shall be final and conclusive and on the Lessee:	OF aLDORGARG DEMENDER DI DE P. S. COD ehalf of the LGOVERNONDOP UNION OF MYANNAR and Egostop op. (1): 05 Cm and: 6000 c 1 20 C. P. D. 1 9 R. P.	IS SCHRDULE ABOVE REFERRED TO.	land signate in the merch emperior proportion as month block North Containing Containini	responding and an and an and a second and a second an application and application application application and application applica	(God Gra) gran Balling Balling 200 200 200 200 200 200 200 200 200 20	သိုးဖြတ်ကူး စနိုင် ၁၇ ဂီချုပ် အရာ (၅: ၁နာ့က်ကျော်းသက်ကောက်ခွေ ကြားရော် ၅:	Deputy accommentationer.	ာန ကြင့္ရန္က ကြင့္ရန္က	1. 2220	Signalure of Lessee.		Su Su Khim Director Pacific Link Cement Industries Ltd.	pliane 2800 propa	
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	္ေနာင်းစရက္ ေဆာက်တွင္ ေရာက်မွားကြီးကြပ်တူ၌ အတိုးပြီးသည့်တတ္ထု ကိနိယာမွဲ။ ၎နီးမြင့္ ေဆာက်တွင္ ေဆာက်တွင္ ေဆာက်တွင် ေဆာက်တွင္ ေဆာက်တွင္ ေဆာက်တွင္ ေဆာက်တွင္ အသက္က ကို ကို ကို ကို ကို ကို ကို ကို ကို ကိ	^က ား ကိုမ်သည့်အခစား က်ဆဉ်မျ ားမှုစ၍၊ ၎င်းမြေတွင် ရွေးဆဘိုဆောက်လှမ်းညှိ အစစာာက်ဆဉ် အရေ ^{အသစ} ္စလျင်းမြောင်းထဲမြင်ဆင်ခြင်း မရှိရေရး တို့ခဲ့သည့်အတိုက်မိုင်း အမိန့်စစ်မရှိသဲ၊ ၎င်း <u>မြေတွင်</u> အခြားအဆောက်ဆည့် စာစုံထရာ ဖေစာာက်မလုန်ရှိ၊ သစုံထရာ ဖေစာာက်မလုန်ရှိ၊ ရေးများရှိသည့်ဆရုပ်စန်၏ အဘောစူက်ဆမိန့်စစ်ကို ရွေးဦးစွာမရရှိတဲ၊ ထိုခဲ့သည့်မြေမေး ကြင်း မခြား မည်ဆည့်အတောက်မှုလုန်၏ အဘောစစ္စရက်အမိန့်စင်္သရီ သမ္မာကွက် ရွေးဦးစွာမရရှိတဲ၊ ထိုခဲ့သည့်မြေမေး ကြင်း မခြား	ခည်းကမ်းအချက် ၂-ရပ်အနက် မလိုအောက်ကြက်ကြက်ကြက်ကြက်လည်း အနိုင် "ဘေရိုက်ပါတာစာအာပိုင်းဆခြင်းစာတွင်း၊ ၎င်းမြေးနှင့် ခြေတွင်စောအစိတုပ်မည့် စားကက်ဆဉ်များ အနိုင် "အေရိုက်ပါတာစာအာပိုင်းဆခြင်းစာတွင်း၊ ၎င်းမြေးနှင့် ခြေတွင်စောအစိတုပ်မည့် စားကက်ဆဉ်များ ထိမ့်ထက်ကြင်းထက္က ထန့်ဆက်ချက်များနှင့် စည်းကမ်းစာချက်များကိုပြစ်စေး တိုးတက်ထက္ စာနှန်တွက် မြတ်စ် အစောက်ကက်ကေားကြမ်းကက် စောက်ကုပ်ထားနှင့် စည်းကမ်းစာချက်များကိုပြစ်စေး တိုးတက်ထက္ စာနှန်တွက် မြတ်စ် အစောက်ကက်မှာကြင်းအာကို ကန့်ဆတ်ချက်များနှင့် စည်းကမ်းစာချက်များကိုပြစ်စေး တိုးတက်ထက္ စာနှန်တွက် မြတ်စ် အစောက်စောက်မှာကျောင်းစာကို ကန့်ဆတ်ချက်များနှင့် စည်းကမ်းစာချက်များကိုပြစ်စေး တိုးတက်ထက် စာနှန်တွက် မမြတ်စ် အစောက်ကက်မှာကြောက်များနှင့် စည်းကမ်းစာချက်များကိုပြစ်စေး တိုးတက်ထက် စာရာမိတွက် မမြတ်စ် အစောက်စာကြောက် စောက်ကုပ်ထားရန်သော်ရှင်း၊ ဆမ်းမြစ်စောင်ရှင်း၊ ခန့်မိုင်ရှာစာစာဘာတူမှက် မမြတ်စ် အစောက်များကို စောက်ကုပ်ထားရန်သော်ရမ်း၊ ဆမ်းများကို လိုအနားချက်းလျက် ပါဘိုးစားထဲသည် မမြတ်စ် အစောက်များကို စောက်ကုပ်ထားနှစ်ထားနေရာက်များများမှာ ကျော်များကို လိုအနားချက်မှားမှာ ရောက်မှာကို	ရာည်ငြင်း ရင်းရောက်ထားဆာဘာရာရက်စာမိန့်ခောကို ထင်ရင်မရှိသ ခာချင်ပါခြက္ကကို ခွဲခြားခြင်းများ 2. ေလိုခဲ့ဆည့်ခြမ်းနားရားကို ဂိုစစ်ခြင်းခြင်း၊ တစာင့်ငှာ ဂျည်းခြင်း၊ တက်ထွက်ခြင်းများ မပ္ပာလာမိရ အည်း လို့မြောင်းခြင်ဆော်ရက်း၊ အာနောက်ခြင်းခြင်းမောင်နောက် ကက်ထွက်ခြင်းများ မင္ဂြားနား အစုစ်ခုစ်င်းခြင်ဆော်ရက်း၊ အာနောက်ခြင်းခြင်ဆော်ဂုင်း၊ အတင်တုံးခြင်းနောက်ဆောက်ခွာ ရြာရန်နားရာက်များကို စာရမ်းစက် အရုတ်နှင်ဆောက်ကားရှိ ကောင်ကြန်တွေ၊ သောက်သူ လူမ်ခြင်းနောက်ဆောက်ခွာ မြောနောက်နောက်ဆောက်နေ စစ်ခုစ်င်ရှိသင်းခြင်ဆောက်ကားသင် စေကြောင်းမှာတဲ့ သောင်ကည် လူမ်ခြင်းနောက်ဆောက်ခွာ မြောနောက်ဆောက်နောက် စစ်ခုစ်င်ရန်ကန်ကောက်ကား၊ ကာကယာတင်း တစ်ကြန်တွေ၊ သေဝင်းထန်မှာတဲ့မှာသင်း၊ ဆက်နောက်ဆက်များကို မှာထို စစ်ခုစ်င်ရန်က ရင်းထွ အမောက်ဆင်း စေကြောက်မှာတစ်ကြန်တွင်၊ နောက်ရာသည်နောက်များကို မက်က်က်ကြန်းရာ ကိုး၊ မျက်ကက်သား၊ ကာကယာတင်း တစ်ကောက်ချင်း၊ အနောက်ချင်းခြင်းမှာ အနောက်များကို တက်ကက်မျက်ကာက်ခြန်းရှင် ကိုး၊ မျက်ကက်သား၊ ကာကယာတင်း တစ်ကောက်သွား အရားမကများကို တယ်စာရနေစေမည်း ရင်းက်စည်း ကိုး၊ ရက်ကက်သား၊ ကာကကောက်သား၊ ကောက်ကာသင်း ဆစ်ရောက်ချင်းရာက် ကာက်မကာမိန်ကောက် ကိုးရန်နေရာက်များကို ကာက်များမှာကို အနိုင်ရောက် အက်ကက်များကို ကမ်းချင်းရာကို ကက်ကိုက်မှာကို ကမ်းမာသည်။ မျက်ကက်သား၊ ကာကတာတက်ချင်းမည်က ကိုနေတာက်မာမာနေရာက် အက်ကက်များမှာကို ကြောက်ကိုက်သား၊ ကာကတာဆင်း ဆစ်ရက်သို့ အရာက်သားမှာ စေရာက် အက်ကက်မျက်ကာက်ခြင်းရာရာ ကမ်းမာသည်။ မျက်ကက်သား၊ ကာကောက်သားရောက်သို့သား၊ အနိုင်မန်နေရာ ဆောင်ရက်သာ ကြန်ရာနှင်ကားကို ကိုးရောက်ကို ကာက်ကားမှာ အရှင်းသည်။ နှင်ရက်ကာ အာနောက်မာက်ကောက်မှာ ကုန်ရာက်သား၊ မက်ကက်သား၊ ကာကောက်သား၊ မရာသားဆားမှာကောက်ကို ကာက်ကောက်သားစားမှာ ရောက်သားမှာ ရောက်သောက် ကန်ရာနောက်သည်။ အမင်းကောက်နောက်ကောက်နောကာကိုကောက်မှာသားစာခောင်မည်။ အစ်ရမာဘက်ကောက်မှာ၊ သာဂတ်ကောက်ကောက်သည်သာများကရာနက်မာဆာရာမာရာသောကောင်ခြေးမရာသေး အာက်ကရာသော စစ်မာရာသောကောက် မာရာသာကောက်ကောက်ကောက်မာမာကောက်မာရာခောက်များကို တက်ကောက်မာကက်မာက် ကိန်နောက်သည်ကောက်မားကောက်ကောက်မာသာကာကိုကောက်မာမာကောက်မားစက်မားရာနက်မာက်မာက်ကောက် စက်ရာရာသာကက်သည်။ အပြက်ကောက်မာတက်ကောက်မာမာကောက်မာမာကကာကိုကာရာခောက်မာရာသောက်မာက်မာက် ကိန်နောက်သောကာကာကောက်မာကောက်မာကာကကားမာရာကကာကကာမာကောက်မာမာမာမာမာရာသောကောကာကာရာမာရာနောက်သောကောက် မ
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geoge ဖို့ ဗျစ်ထိုကြာတည် စေဖျစ်။ (အငှါးရလု အနေထိ စစ်ပါယ် ကမ္မန်ရန် မတိုသည့် အဝ¹၊ လွဲစေစ်ခံသူတို့ပင် ဆိုတိုတည် မှတ်ဟူရမည်။ ရက်ကမ္မလေရန် ဥပစ္စေများပေါ် မြဌာနီးချက်များနှင့် ကိုက္ကမ်နိုင်ကမျှ ဘိုက္ကတိတောင် ယာမ္မလဲရဟည်း ယိုမိုကည်မြောကို ယခုစေရျစ်ဆိုထက္ကစေရတာတဲ့ နှစ်ပေါင်း အရေ ဆဂ္ဂါရာထက်နှိုင်လိုင်ရင် မစေမကြင်း 1 စရွတ် 1 ထစ်ကြမ်ကျင် နှစ်စပ်ပြင်း po ကျေး နှစ်ကြစ် 1 ဆက်ယက်ရှိ အက်နှိုင်တိုင်ရန် မြဌာနဲ့ ယူထူးယည်အတိုင်း စသူ၊စ်ဆောစ် ထံလှမရီ ချစ်တိုလ်မျင်လည်း ချင်ဆိုစွင့်ရတည်။ နို ဝှစ်းမြောဆတ္တက် နှစ်စဉ် သူတို့ ယည်အတိုင်း စသူ၊စ်ဆောစ် ထံလှမရီ ချစ်တိုလ်မျင်လည်း ချင်ဆိုစွင့်ရတည်။ နို ဝှစ်းမြောဆတ္တက် နှစ်စဉ် အင်ရင်ထမ်းစောင် ခံစနီမျက်များကိုထည်း၊ မြေလက်မှိပြစ်ဆပျ စာဘထစာတွင်း ထည်စေရှိ၊ ရင်းမြေစာတွက် နှစ်စဉ် သူတို့က ကည်ထဲခံဝန်မျက်များစေရိုင်း လိုက်နာ ဘောင်ရွက်ရန် စာငှါးရေးနှင့် ဆင်အက္ခာကို စေနန်နှင့် ကိုင်ဆိုင် ကြစ်ည်း ထည်ထဲခံဝန်မျက်များစေရိုင်း လိုက်နာ ဘောင်ရွက်ရန် စာငှါးရေးနှင့် ဆင်အက္ခာကို စေနန်နှင့်လိုင်ဆိုင် စုနှစ်၊ ရက်) မမ္မာ ဗမာဒက်၌ "ဆဝှ ဖရသူ" စေ၊ ထွင်ရစောည်၊ ခြည်စထားစိုင်မြန်မာ)[ငိင် အရိုးရနှင့် စအားက်၌ မိုက်) မမ္မာ ဗမာဒက်၌ "ဆဝှ ဖရသူ" စေ၊ ထွင်ရစောည်၊ ခြည်စထားစိုင်မြန်မာ)[ငိင် အရိုးရနှင့် စအားက်၌ ទេព្ល ្ ្រ លេងជាស្ត្រី៖ ប្រវេងឆេះវាលេងចំណើម និងឆេងលក្ល ខ្លុំនឹងឆេងកាប់ផ្លូនខ្លុំនិងនៃ ខ្លឹសន៍ទៀន លិក្សព្ទទេក្រហ ား ။။။ မရှိနေရကို အမ်းဆောင်ရန် ဆယက်အတ်မှတ်ဆည့် ခုည်းလမ်းအတိုင်၊ ထတ်မှတ်ကဉ် မန္ဒရက်များ တွင် ရမ်းစဏ္ဏေလ်ရမည်မြင်း ၎င်းမြေတွင်ဖြစ်ရေး မြေမွှာစ်ဆေးက်လုမ်မည့် အားောက်အခွံများတွင်ခြစ်မေး ၎ဂ်းမြေ နှင့် စပ်လျဉ်း၍ အတူဒီးရသူအမော်၊ တွင်ဖြစ်ရေး အငှားရူထားအညီ ကာလအဝိုင်းအခြားမဟာင်း စည်းကြစ်ထောက် ခုသိ ကောက်ခံလတ္တံ့ဆောင် အစွန်ထတုတ် အရောင်စိုးဆိုသည်း ထမ်းစဆာင်ရမည်။ ္နီ ။ယခုစၥချ ပ်ပါ စန္ဒရက်မ္ လ အတွင်း စရိုင်ဝန် သဘောတချက် ဦ အမိန့်စၥကို အဝင်ရင် ဗုရိမမည့် အကျယ်အဝန်း ဆနိုင် ဗေမြင့် အတိုင်းစာတွား၊ အောက်လှစ်ရန် ဝတ္ထု ကိမိယာဒများ နှင့် အညီ အစအာဒက်အဦကို စတင်သောက်လုင်၍ စာချုပ်ပါနေ့ရက်မှ ယ အတွစ်း ပြီးစီးငော်ရပည်မြင်း ယခုထင္ပါးစၥချုပ် အထည်မြစ်သည့် ကာဒလအပိုင်းယခြား အတွင်းတွင်လည်း ဝှင်းစာသောက်ဆဦများကို စရိုင်ဝန် အခအာဒကျ ကောင်းမွန်စူာ ပြုပြစ်တားရမည်။ ဒုတိယ အကြိမ် စာချုပ်စာဆစ်လဲလှယ်ရာတူမ် "ရွှေသို့ တစ်ကြိမ်ထူမ် ချုံစို့ဆိုခွင့် ရသည်" ဆိုထည့် ကေား မြန်စီပါယ် ကော်မထိထံ တင်သွင်း စ စာဝး ဗုဝွ ဟွ -0229 ange eine Uferföhrenninden Bergenerigene mig schlossen bergenerige in genomen in sin ander an an an an an an an က္ခဲလူအညီ အနတ် စာမိပ္ပါသည် ခရေးစီ။ ကိုလူအညီ အနတ် စာမိပ္ပါသည် အမူနီရန် မ Self ang ha call fift နိုင်ဆန်း အနိုင်ကို သားကြန်း သိုလည် စာထောက်ဆဦ ပုံစံများကို ထည်း *(Coc စာအစ်ထဲလွယ် ချုပ်ဆိုခွရှိရစာညှိ ငှင်းရာ့ထူးတွင် ဆက်ခံသူ၊ နီစီပါယ်ဧရိယာ ရုပ်ကွက်မှူသတွင် စာထောက်ဆဦ ပုံစံမျ ၁ဂ၉ဂ=ခုနှစ်၊ မြန်မာနိုင်ငံ ငြူနီစီပါယ် ဆက်ဥပစေပုစ်မ တို့စာည့် စဏားမှာ၁၊ . မန္ဒ စနာ့က် ကောားစဉ်ကို တေ**ာင်ရှိ၊** ပြည်ထောာင်ဖူ ဖြန့်မာနိုင်ငံ အမိုးရနှင့် ထက္ခၤ ၎ဝ်းရာ**ရားတွ**င် ပဌမအကြင် စာချုပ်အဆစ် လဲလှယ်ရာတွင် al most auo6 6009 း စေ ၊ တွင်စေစည်း နှစ်ဝပါဝိန 040 မြန်စီပါယ်ရှေိယာ အစာန ထည့်ဘူင်းရမည်။ "genteglogite "mog liga" () ang ** 1. Jacos 00000 guz. de co ** aller

Original)

(To be attached to
၁၈။ ။သိုခဲ့သည် စာစွန်ဖဋ္ဌအားလုံး၊ သိုမဟုတ် အချို့စာဝက်မှာ မခပြမကောင္ခြမန္န၍ ၎င်းနေ့လို တောင်းခံ သည်ဖြစ်စေး မတောင်းမခံသည်ဖြစ်စေး ထမ်းသောင်သင့် နေရက် ကုန်ထွန်ဆည့်နောက် မြက္စစိန့်လ တိန်လသိုင် မထမ်းသောင်ကြန့်ကြားလျစ်စောင်၎င်း၊ အငှါးရသူက စာချုပ်ပါးဝင်နှု**ရှင်းဆည့်နောက် မြက္စစိန့်**လ တိန်းလသိုင် စာထက်က မျက်ကွက်သည်စောင်ရင်း၊ အငှါးရသူက စာချုပ်ပါးဝင်နှု**ရှင်းဆည့်မနာတိုင်းမသည်မှုက်ကွက်တွင်တော်၎င်း** စာထက်က မျက်ကွက်သည်စောင့်စားမျမ်းသာစစေဒူစုံး မြေကိုမြန်၌ ထိမ်းမျက်ရှင်ရာ တွက်ငြိမ်နှစ်းကားစတွင် မည်သို့မင်ခြစ်ဆင်လည်း ဆိုခဲ့သည့်စေရာ လူစုစေဒချုပ်ကို **ရက်ချင်းမျက်ဆိန်း မြေနှင့်စာကူ မြေတွင်တည်ရှိဆည်** မက်မန်း တာစရအစစောင်ကစ်ခံများကို မြန်၌ ထိမ်းမှာခွင့်ရသည်။

အင္ဒါးရသူကၤ အင္ဒါးရအူအား ခံ၀န်ချုမ်ဆိုသည်မှာ..

2.3 លោក សម្តារ សម្តារ សម្តារ សម្តារ សម្តារ សម្តេរ សម្តេរ សម្តារ សម្តេរ សម្តារ សម្តារ សម្តរ សមត្ថ សម្តរ ស

မြာက်ဆလာ:

ရုပ်ကျင် စည်ရှိသည် စကူကိ စေ (၊ စ္စောက်တွင် နယ်နိုင်တံစာထိမ္မတ်ရာပါ

စာမှတ် စန့်မှိ ပူးတွဲ ပါနယ်ပုံတွင် စနိုစရာင်နှင့် ရေးသားပြာဘည့်စမြေး

အထက်အရှည်ညွှန်းရာပါစာရှင်း

လက်မှတ်ရေးထိုးကြံသည်။

ေသာင် အလာ ။ 30001 Sec.

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	ခံ ခခံ သော လ လက်ခံ	ု က က က မြည်ထောင် ရှိးခွ	poomlo comp			බුරි අදිතුවි/ ශූරි කළුවු		Colora Colora	5,002	2. Co.	ပရ	ဒိုက်ဆိုင်စစ်ဆေးပြီ တက်ထောဂ
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ලං - ඉ	န်ကန်ကြောင်	A	2007 1925 90	ုမြုနယ္ရန သင်္သာတွေက 🖈 သူတိုးအမှတ်နှ အကွက်အမှတ်နှ	ာမှတ်/ မြေကွက်	5 35 395		No sector contraction	သားသူအမည်	လွှာတင်သည့်နေ့ ထားသူသို့ ထုတ် ် ် ် ် ိ	mage gayer	
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ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော် ယဉ်ကျေးမှုဝန်ကြီးဌာန ရှိနှံတောင်းသုတေသန၊အမျိုးသားပြတိုက်နှင့်စာကြည့်တိုက်ဦးစီးဌာန ည္ထန်ကြားရေးမျှုးချုပ်ရုံး ရုံးအမှတ်-၃၅၊ နေပြည်တော်



သို့

စာအမှတ်၊ *စာာဝ | ၎ - င* ရက်စွဲ၊၂၀၁၁ခုနှစ်၊ မတ်လ ဆ ရက်

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ဝန်ကြီး ယဉ်ကျေးမှုဝန်ကြီးဌာန

အကြောင်းအရာ။ တိုုက်မရောမြို့နယ်၊ ပျားတောင်ရှိ လုပ်ကွက်များအတွင်း ပါရှိနေသော ရှေးဟောင်း စေတီများအတွက်ထိခိုက်မှုကင်းလွတ်စေမည့်ဧရိယာလျာထားသတ်မှတ်ချက် တင်ပြခြင်း။

ာ။ အထက်အကြောင်းအရာပါကိစ္စနှင့်စပ်လျဉ်း၍ ရှေးဟောင်းသုတေသန၊ အမျိုးသားပြတိုက်နှင့် စာကြည့်တိုက်ဦးစီးဌာန(မော်လမြိုင်) ဌာနခွဲမှ လက်ထောက်ညွှန်တြားရေးမှူး ဦးအောင်နိုင်မိုးနှင့် အဖွဲ့၏ ကွင်းဆင်း စစ်ဆေးချက်အရ မွန်ပြည်နယ်၊ ကိျက်မရောမြို့နယ်၊ ပျားတောင်မှ စက်မှုကုန်ကြမ်းထုံးကျောက်များ ထုတ်ယူနိုင်ရန် ပူးတွဲပါမြေပုံအရ June Industry Ltd.၏ လုပ်ကွက်ဧရိယာမှာ မြောက်ပြေးမျဉ်း-၈၄၁မှ မြောက်ပြေးမျဉ်း-၈၂၂ အတွင်းရှိ နေရာနှင့် PAC Link Trading Limited၏ လုပ်ကွက်ဧရိယာမှာ မြောက်ပြေးမျဉ်း-၈၂၂မှ မြောက်ပြေးမျဉ်း-၈ဝ၁ အတွင်းရှိ လိမ္မော်ရောင်ခြယ်ထားသောနေရာများသည် ရှေးဟောင်းစေတီများရှိရာနေရာဖြစ်နေသဖြင့် ကာကွယ်ထိန်းသိမ်းထား ရှိသဲ့ငံ့သော နယ်နိမိတ်ဖြစ်ပါသည်။

၂။ အဆိုပါကာကွယ်ထိန်းသိမ်းသင့်သောဧရိယာ၌ တည်ရှိသော ဘုရားစေတီများမှ ပေ(၁၂၀၀)စီ ကွာဝေး ပါသည်။ ဘုရားစေတီများသည် သီးခြားတောင်ပူစာငယ်များပေါ် တွင်တည်ရှိခြင်း၊ လောလောဆယ်ထုံးကျောက် ထုတ်ယူမည့်နေရာများသည် ပေ(၃၀၀၀)ကျော်ကွာဝေးခြင်း၊ သတ်မှတ်ထားသော ကာကွယ်ထိန်းသိမ်းသင့်သည့် ဧရိယာစပ်အထိ ရောက်ရှိရန်မှာ နှစ်ပေါင်း(၁၀၀)ခန့် အထိကြာရှိနိုင်ကြောင်း သတ္တုတွင်းဝန်ကြီးဌာနမှ ပညာရှင်များနှင့် ပူးပေါင်းတွက်ချက်ကြည့်ရှုသိရှိရခြင်းတို့ကြောင့် ယခုတင်ပြသော လိမ္မော်ရောင်ဧရိယာပြင်ပ၌ ထုတ်လုပ်ပါက ဌာနမှကန့်ကွက်ရန်မရှိပါကြောင်း စိစစ်တင်ပြအပ်ပါသည်။ ၃။ သို့ပါ၍ လိမ္မော်ရောင်ဖြင့် ပြထားသောဧရိယာနှင့် ကင်းလွတ်သောနေရာများတွင် ကျောက်ထုတ်လုပ် ပါက ရှေးဟောင်းစေတီများကို ထိခိုက်နိုင်ခြင်းမရှိပါသဖြင့် ဌာနမှကန့်ကွက်ရန်မရှိပါကြောင်း လမ်းညွှန်မှုပြုနိုင်ပါရန် တင်ပြအပ်ပါသည်။

ma (ကျော်ဦးလွင်) ညွှန်ကြားရေးမျှုးချုပ်

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တအမှတ်၊ ၂ / ၄ – ၅ / ၂၀၁၁ (🤊 🏹) ရက်စွဲ၊ ၂၀၁၁ ခုနှစ်၊ ဗေဖော်ဝါရီလ 💪 ရက်

သတ္ထုတွင်းဝန်ကြီးဌာန

အကြောင်းအရာ ။ ရည် ညွှန်း ချက် ။

သို့

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roject.

သဘောထားမှတ်ချက်ပြန်ကြားခြင်းကိစ္စ သတ္တုတွင်းဝန်ကြီးဌာန၊ ဝန်ကြီးရုံးအံ(၃၁..၁၂..၂၀၁၀) ရက်စွဲပါ စာအမှတ်၊ ၁၅ စွဲ (၂) ၁၀ (ရဂရဂု)

၁။ မွန်ပြည်နယ်၊ ကိုုက်မရောမြို့နယ်၊ ကော့ပနောကျေးရွာအနီး များတောင်ဒေသမှ ထုံးကျောက် လုပ်ကွက်အနီး ဘိလပ်မြေစက်ရုံအတွက် အသုံးပြုရန် ထုံးကျောက်လုပ်ကွက်တည်ရှိရာနေရာတွင် ရှေးဟောင်း စေတီများတည်ရှိနေပါသဖြင့် ရှေးဟောင်းအထိမ်းအမှတ်အဆောက်အအုံတည်ရှိရာဇုန်အဖြစ်သတ်မှတ်ရန် ပြင်ဆင်နေဆဲဖြစ်သောကြောင့်ကင်းလွှတ်မည့်ရေိယာကိုသတ်မှတ်ပြန်ကြားပေးနိုင်ပါရန်အထက်ရည်ညွှန်း ပါစာဖြင့် ညိနိုင်းလာပါသည်။

၂။ အဆိုပါကိစ္စနှင့်စပ်လျဉ်း၍ ကွင်းဆင်းစစ်ဆေးရက်အရ မွန်ပြည်နယ်၊ ကျိုက်မရောမြို့နယ်၊ ပျားတောင်မှစက်မှုကုန်ကြမ်းထုံးကျောက်များထုတ်ယူနိုင်ရန်အတွက် PAC Link Trading Ltd. နှင့် June Industry Ltd. ကုမ္ပဏီ (၂)ခု၏ လုဗ်ကွက်များအား လျာထားသတ်မှတ်ပေးခဲ့ရာ၌ ကုမ္ပဏီများ၏ လုဗ်ကွက် အတွင်းတွင်ရှိသော ရှေးဟောင်းစေတီများနှင့် လုဗ်ကွက်ပြင်ပတွင်ရှိသော ရှေးဟောင်းစေတီများကို ကျောက်ထုတ်လုစ်ရာမှ ဖြစ်ပေါ်လာသော တုန်ခါမှုမရှိစေရန်အတွက် ကာတွယ်ထိန်းသိမ်းထားရှိသင့်သော နယ်နိမိတ်ကို အောက်ပါ အတိုင်းလျာထားသတ်မှတ်ထားပါသည် –

> (က) June Industry Ltd. ကုမ္ပဏီ၏ လုပ်ကွက်အနီးရှိ ခမ (S - 442884) မယ်ကရိုစေတီမှာ လုဝ်ကွက်ပြင်ပတွင်ရှိနေသော်လည်း လုပ်ကွက်နှင့်နီးကပ်နေပါသဖြင့် ကျောက်ထုတ် လုဝ်ရာမှဖြစ်ပေါ်လာသော တုန်ခါမှုများကြောင့် ရှေးဟောင်းစေတိအား ထိခိုက်လာနိုင်ပါ၍

ကာကွယ်ထားရှိသင့်သောနယ်နိမိတ်အဖြစ် အမှတ် (A) ခမ (S - 429835) ကျောက် တောင် ၏ နယ်နိမိတ်အတိုင်း မြောက်ဘက် ပျားတောင်၏ အစွန်အမှတ် (B) ခမ (S-426850⁻⁻ အထိ၊ ၎င်းမှမြောက်သားမျဉ်း (၈၅) အတိုင်းအမှတ် (C) ခမ(S - 436850) အထိ၊ ၎၏းမှ အမှတ် (D) ပျားတောင် ခမ (S-433844) အထိ၊ ၎င်းမှ ပျားတောင်၏ နယ်နိမိငင်္ကအတိုင်း တောင်ဘက် အမှတ် (E) ခမ (S - 437835) အထိ၊ နယ်နိမိတ်အား ကာကွယ်ထိန်းသိမ်းထားရှိသင့်သော နယ်နိမိတ်အဖြစ်လျာထားသတ်မှတ်ထားပါသည်။

- (ခ) ထိုနည်းတူ PAC Link Trading Ltd. ၏ လုပ်ကွက်အတွင်းပါရှိနေသော ခမ (S 429819) ရှိ ရှေးဟောင်းစေတီနှင့် ခမ (S-429815) ရှိ ရှေးဟောင်းစေတီ (၂)ဆူတို်းအတွက် ကာကွယ် ထားရှိသင့်သော နယ်နိမိတ်မှာ တင်ပြပါအမှတ် (A) ခမ (S - 428 i22) မှာ မြောက်ဘက် အမှတ် (B) ခမ (S - 440822) အထိ၊ ၎င်းမှာရှေ့သားမျဉ်း (၎၎) အင်္ခင်း တောင်ဘက် အမှတ် (C) ခမ (S - 440810) အထိ၊ ၎င်းမှ မြောက်သားမျဉ်း (ရ၁)အ၏င်း အနောက်ဘက်အမှတ် (D) ခမ (S - 426810) အထိ၊ ၎င်းမှ အတ္တရံမြောကမ်းအတိုင်း အမှတ် (A) နှင့်ဆုံရာနေရာတို့အား ထိန်းသိမ်းထားရှိသင့်သော နယ်နိမိင်ာများအဖြစ်လျာထားသတ်မှတ်ပါသည်။ ပူးတွဲ မြေပုံ (က)
- (ဂ) ၎င်းအပြ် မြေပုံပေါ်တွင်ပါရှိခြင်းမရှိသော်လည်း ကွင်းဆင်းစစ်ဆေးစဉ် ပျားတောင်၏ တောင်ထက် ကွာငန်းရွာအနီး ခမ (S - 433797) ရှေးဟောင်းစေတီတစ်ဆူနှင့် ဗုန္ဓရုဝ်ပွင်းတော်များ တည်ထားသော အလျား (ဂျခ)ပေ၊ အမြင့် (၁၀)ပေ၊ ဂူအဝအကျယ် (၁၀)ပေ ၊နို့ရှိ ဂူတစ်လုံးအားထဝ်မံတွေ့ရှိရပါသည်။ ၎င်းဂူထဲတွင် ဗုန္ဓရုဝ်ပွားတော် (၂၁)ရာထည်ထား သည်ကို တွေ့ရှိရပါသည်။ ကွာငန်းရွာမှ လက်ရှိတိုးကွယ်လျက်ရှိသော စေတီနှင် ဂူများ ဖြစ်ပါသည်။ ၎င်းစေတီနှင့် ဂူအတွင်း ကာကွယ်ထားရှိသင့်သော နယ်နိမိင်္တော့အမှတ် (A) ခမ (S - 434806) မှ ကျောက်တောင်နယ်နိမိတ်အတိုင်း တောင်ထက်အစွန်ဆုံးအမှတ် (B) ခမ (S - 433798) အထိ၊ ၎င်းမှ မြောက်ဘက် ကျောက်တောင်၏ နယ်နိမိတ်အတိုင်း အမှတ် (C) ခမ (S - 436806) အထိအားကာကွယ်ထိန်းသိမ်းထားရှိသင့်သော နယ်နိမိတ်ဖြင့် လျာထားသတ်မှတ်ပါသည်။

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ဥ။ သို့ပါ၍ ခွန်ပြည်နယ်၊ ကိုက်မရောမြို့နယ်၊ ပျားတောင်ရှိ ရှေးဟောင်းစေတီ (၄)ဆူနှင့် အသစ်ထစ်မံ တွေ့ရှိရသော ရှေးတောင်းစေတ⁶ (၁)ဆူ၊ ဗုဒ္ဓရှစ်ပွားတော်များတည်ထားသော ဂုတစ်လုံးတို့အတွက် ကာကွယ် ထားရှိသင့်သောနယ်နိုမိတ်များ အား အထက်ပါအတိုင်း လျာထားသတ်မှတ်ထားရှိပြီးဖြစ်ပါ၍ ယင်းလျာထား သတ်မှတ်ထားသော နယ်နိုမိတ်၏ ပြင်ပတွင် ကျောက်ထုတ်လုဝ်ပါက ရှေးဟောင်းစေတီများကို မထိခိုက်နိုင်ပါ ကြောင်းအကြောင်းပြန်ကြားအ-ပဲပါသည်။

ဝန်ကြီး (ကိုယ်စား) မှ (အောင်နိုင်မြင့် – ရုံးအဖွဲ့မျုံး) 5/1

പ്പെടും

ည္တန်ကြားရေးမျူးရျုပ်

ရှေးတောင်းသုတေသနာ၊ အချိုးသားပြတိုက်နှင့် စာကြည့်တိုက်ဦးစီးဌာန



N. Constanting and

Laboratory Results



Report No.	: 2013-00255 / 001 (Page 1 of 1)	Issued date : March 13, 2
CLIENT CONTACT ADDRESS	 RESOURCE AND ENVIRONMENT MYANMAR CO., I Mr. Thura Aung B-702 Delta Plaza, Shwegondaing Rd., Bahan, Yangor Tel. +959-73013448 Fa E-mail : thura@enviromyanmar.net 	-TD. n, Myanmar x. +951-552901

Analysis Report

PROJECT NAME :	Mawlamyine Cement Project, Myanmar		
SAMPLE DESIGNATED AS :	Water Quality	SAMPLING DATE	: February 22, 2013
SAMPLING LOCATION :	Mon State, Myanmar	SAMPLING BY	: Client

Stations	Unit	Results of Oil and Grease
1. W1T	mg/L	<1
2. W1B	mg/L	<1
3. W 2 T	mg/L	1
4. W 2 B	mg/L	1
5. W 3 T	mg/L	<1
6. W 3 B	mg/L	1
7. W 4	mg/L	<1

Analysis Methods followed to Standard Methods for the Examination of Water and Wastewater, Remark : recommended by APHA-AWWA-WEF.

Detection Limit: Oil and Grease = <1 mg/L

Sinpp 2. (Siriporn Imwilaiwan) (ประเทศไทย) (Thepson Yommana) License ID : 2-010-A-1793 License ID : 2-010-A-333 THAILAND) L MITED SGS (THAILAND)

TY/VN/PI

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THE REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF LIVESTOCK & FISHERIES DEPARTMENT OF FISHERIES FISH INSPECTION AND QUALITY CONTROL DIVISION YANGON, MYANMAR ANALYTICAL LABORATORY SECTION



Test Report for Microbiological Analysis

Name of Project : Mawlamyaing Cement plant, Pya Taung , ,Myanmar

Name of Company : Resource And Environment Myanmar Co., Ltd.

Date of Received : 1.3.2013

Date of Analysis : 4.3.2013

Test Method : AOAC Petrifilm Method

No	Date of Analysis	Detail of Samples (Water)	Total Coliforms cfu/100ml	Fecal Coliforms cfu/100ml	<i>E.coli</i> cfu/100ml	Remarks
1	4.3.13	W 1 T	1.4×10^{3}	1.4×10^{3}	0	
2	4.3.13	W 1 B	4 x 10 ²	4 x 10 ²	0	
3	4.3.13	W 2 T	1 x 10 ²	1 x 10 ²	0	
4	4.3.13	W 2 B	2 x 10 ²	2 x 10 ²	0	
5	4.3.13	W 3 T	2x10 ²	2x10 ²	0	
6	4.3.13	W 3 B	2 x 10 ²	2 x 10 ²	0	
7	4.3.13	W 4	7.4 x 10 ⁴	7.4 x 10 ⁴	0	
8	4.3.13	W 5	6 x 10 ³	6 x 10 ³	0	
9	4.3.13	W 6	4 x 10 ²	4×10^{2}	0	Nex 141
10	4.3.13	W 7	4 x 10 ²	4 x 10 ²	0	

Reference : The International Commission on Microbiological Specification for foods (ICMSF,1986), 98/93 EC, Guidelines for drinking water quality WHO 1997 (2nd Edition).

Analyzed by :

(Than Than Myint) Mict

Evaluated by:

(Dr.Su Myo Thwe) Ph.D Japan TM, Head of Micro Lab Approved by :

ORIGINAL

(Zaw Win) B.V.S (Ygn), D.F.T(Y.I.T), QMR Deputy Director Analytical Laboratory Section Department of Fisheries

Remarks: This result is responsible for the sample in the lab.



THE REPUBLIC OF THE UNION OF MYANMAR MINISTRY OF LIVESTOCK & FISHERIES DEPARTMENT OF FISHERIES FISH INSPECTION AND QUALITY CONTROL DIVISION YANGON, MYANMAR ANALYTICAL LABORATORY SECTION



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Test Method : AOAC Petrifilm Method

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No	Date of Analysis	Detail of Samples (Water)	Total Coliforms cfu/100ml	Fecal Coliforms cfu/100ml	<i>E.coli</i> cfu/100ml	Remarks
11	4.3.13	W 8	1.2×10^{3}	1.2 x 10 ³	0	
12	4.3.13	W 9	1.1×10^{3}	1.1 x 10 ³	0	
						100 Mar 11
						THE PARTY IN

Reference : The International Commission on Microbiological Specification for foods (ICMSF,1986), 98/93 EC, Guidelines for drinking water quality WHO 1997 (2nd Edition).

Analyzed by :

(Than Than Myint) Micro Lab

Evaluated by:

(Dr.Su Myo Thwe) Ph.D Japan TM, Head of Micro Lab Approved by

ORIGINAL

(Zaw Win)

(Zaw Win) B.V.S (Ygn),D.F.T(Y.I.T),QMR Deputy Director Analytical Laboratory Section Department of Fisheries

Remarks: This result is responsible for the sample in the lab.

MINISTRY OF LIVESTOCK AND FISHERIES **DEPARTMENT OF FISHERIES AQUACULTURE DIVISION** FRESHWATER AQUACULTURE RESEARCH WATER AND SOIL EXAMINATION LABORATORY



RESULT ON CHEMICAL EXAMINATION OF WATER

Mawlamyaing Cement Plant, Pya Taung, Myanmar

sender's refer	ence : Re	esources &	e En	vironment
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Myanmar Co.,Ltd.

Location

: Pya Taung

Arrival Date & Time : 1.3.2013 & 2:00

Parameter	Unit	W1T	W1B	W2T	W2B
Suspended Solid(SS)	mg/l	185	177	171	170
Biological Oxygen Demand	mg/l	1	1.5	0.5	0.5
Salinity	ppt	nil	nil	nil	nil
Total Hardness	mg/l	180	216	120	144
Manganese	mg/l	129.5	182.35	88.05	102
Iron	mg/l	nil	nil	nil	nil
Dissolved Oxygen	mg/	5.5	5	5.0	4.5
Nitrate Nitrogen	mg/l	nil	nil	nil	0.009
Total Alkalinity	mg/l	100	102	108	108
Sulphate	mg/l	0.4	4.16	4.48	0.68
Fluoride	mg/l	nil	nil	0.01	nil
Caicium	mg/l	50.41	33.64	31.95	42

Analysed by - Htay Htay Kyi

- San San Soe
- Khaing Khaing Oo
- Thuya Win

Approved b

(Aye Aye Thein)

Head of Water & Soil Examination Laboratory

MINISTRY OF LIVESTOCK AND FISHERIES DEPARTMENT OF FISHERIES AQUACULTURE DIVISION FRESHWATER AQUACULTURE RESEARCH WATER AND SOIL EXAMINATION LABORATORY



RESULT ON CHEMICAL EXAMINATION OF WATER

Mawlamyaing Cement Plant, Pya Taung, Myanmar

Sender's reference : Resources & Environment

Myanmar Co.,Ltd.

Location : Pya Taung

Arrival Date & Time : 15.2.2013 & 2:00

Parameter	Unit	1 W-6	W-7	97.8	W.A.
Parameter	Unit	W3T	W3B	W4	W5
Suspended Solic(SST	The last	160 *			
Suspended Solid(SS)	mg/l	166	165	171	102
Biological Oxygen Demand	mg/l	1.75	3	2.5	2.25
Salinity	ppt	nil	nil	nil	nil
Total Hardness	mg/l	120	140	160	88
Manganese	mg/l	85.56	106.4	106.23	59.44
Iron	mg/l	0.01	3.1	1.02	5.0
Dissolved Oxygen	mg/	5.0	5.0	5.5	5.5
Nitrate Nitrogen	mg/l	nil	nil	nil	nil
Total Alkalinity	mg/l	84	96	108	64
Sulphate	mg/l	0.36	0.28	4.24	0.28
Fluoride	mg/l	0.01	nil	nil	nil
Calcium	mg/l	34.44	33.6	53.77	28.56

Analysed by - Htay Htay Kyi

- San San Soe
- Khaing Khaing Oo
- Thuya Win

Approved by

(Aye Aye Thein)

Head of Water & Soil Examination Laboratory

MINISTRY OF LIVESTOCK AND FISHERIES DEPARTMENT OF FISHERIES AQUACULTURE DIVISION FRESHWATER AQUACULTURE RESEARCH WATER AND SOIL EXAMINATION LABORATORY



RESULT ON CHEMICAL EXAMINATION OF WATER

Mawlamyaing Cement Plant, Pya Taung, Myanmar

Sender's reference : Resources & Environment

Myanmar Co., Ltd.

Location : Pya Ta	ung		Arrival Date & Time : 15.2.2013 & 2:00				
Parameter	Unit	W-6	W-7	W-8	W-9		
Suspended Solid(SS)	mg/l	160	35	80	43		
Biological Oxygen Demand	mg/l	3.25	4.5	4.0	3.0		
Salinity	ppt	nil	nil	nil	nil		
Total Hardness	mg/l	120	80	36	56		
Manganese	mg/l	86.4	76.64	27.6	47.6		
Iron	mg/l	1.12	1.5	1.1	0.015		
Dissolved Oxygen	mg/	6.0	6.5	6.0	6.0		
Nitrate Nitrogen	mg/l	nil	nil	0.01	0.007		
Total Alkalinity	mg/l	96	32	20	20		
Sulphate	mg/l	0.48	0.36	0.52	0.36		
Fluoride	mg/l	nil	nil	nil	0.01		
Calcium	mg/l	33.6	3.36	8.4	8.4		

Analysed by - Htay Htay Kyi

- San San Soe
- Khaing Khaing Oo
- Thuya Win

Approved by

(Aye Aye Thein)

Head of Water & Soil Examination Laboratory

APPLIEDE GEOLOGY DEPARTMENT GEOCHEMISTRY LABORATORY

Technician	: Dr. Han Sein	Project	: Mawlamyaing Cement Project
Sample Type	: Sea Bed Sediments	Requested by	: Resource & Environment
Method	: Atomic Absorption		Myanmar Ltd.
	Spectrophotometer	Date	: 27.2.2013
Digestion	: Aqua-regia		

No.	Sample Name	As	Cu	Pb	Zn	Cr	Ni	Cd	Hg
1	SB1 (MLM)	ND	120	75	115	15	7	0.007	ND
2	SB 2 (MLM)	ND	130	85	120	20	12	0.004	ND
3	SB 3 (MLM)	ND	125	80	105	10	8	0.004	ND

Note - Data unit in ppm

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ND means Not Detected.

Dr. Han Sein Associate Professor Applied Geology Department.

Myanmar Agricultrure Service (Land Use) Soil Analytical Data Sheet

Division -

2

Township - Mawlamying

Resource and Environment Myanmar Ltd.

 Sheet No.
 1

 Lab No.
 1-16/12-13

Sr.No.	Sa	mple	Moisturo	Organic	Humus	NO-N	Total	Water Soluble	Excha	ngeable Ca mg/kg	itions	Water	Available	Nutrients
	Plot	Depth (m)	%	Carbon %	%	%	N %	SO ₄ mg/kg	++ Ca	++ Mg	+ K	Na mg/kg	P ppm Bray	K ₂ O mg/kg
1	S1	0.1-0.3	1.595	1.031	1.77	0.071	0.178	112.8	226.5	ND	35.58	9.89	5.91	4.26
2	S2	0.2-0.4	1.307	0.395	0.681	0.057	0.248	118.8	533	ND	25.02	7.36	22.65	3.04
3	<u>S3</u>	0.15-0.3	5.922	0.415	0.715	0.105	0.186	106.7	533	80.25	53.17	10.81	31.27	6.37
4	S4	0.2-0.4	1.123	0.473	0.815	0.045	0.142	1200	533	323.4	14.17	6.44	23.87	1.82
5	S5	0.1-0.3	0.969	0.866	1.493	0.092	0.177	112.8	799.5	161.7	19.94	5.29	8.28	2.42
6	S6	0.2-0.4	0.934	0.699	1.153	0.091	0.124	106.7	533	161.7	9.775	3.91	20.6	1.21
7	S7	0.15-0.3	3.807	0.811	1.398	0.029	0.236	106.7	799.5	161.7	30.88	8.28	10.83	3.74
8	<u>S8</u>	0.15-0.4	3.912	0.446	0.769	0.115	0.146	118.8	533	ND	10.16	5.29	9.58	1.24
9	S9	0.2-0.35	5.525	0.289	0.498	0.011	0.129	106.7	1068	161.7	36.75	15.87	8.51	4.44
10	S10	0.2-0.35	3.944	0.933	1.608	0.135	0.164	112.8	1322	ND	30.88	12.88	7.29	3.74
11	S11	0.2-0.4	5.896	0.911	1.571	0.011	0.167	118.8	2136	161.7	37.14	14.59	2.12	4.46
12	S12	0.2-0.4	9.805	0.735	1.267	0.081	0.194	112.8	1869	161.7	38.7	20.47	3.55	4.65
13	S13	0.3-0.5	9.805	1.729	2.981	0.202	0.252	234.7	2136	323.4	4.418	42.78	1.77	5.32
14	S14	0.2-0.45	7.233	1.304	2.248	0.123	0.208	115.3	3472	161.7	37.53	22.08	1.3	4.53
15	S15	0.2-0.4	6.417	0.833	1.436	0.101	0.168	115.6	2404	323.4	58.65	37.49	3.22	7.05
16	S16	0.2-0.4	6.073	0.54	0.931	ND	0.149	112.8	3472	323.4	63.73	34.5	1.07	7.66

Summary of Stakeholder Consultation and Public Consultation Meetings

A series of meetings were conducted for various purposes.

No.	Date	Name of	Participation	Arranged by
		Town/Village/Ward	•	
Year	r 2013 (1 st	Stakeholder Consul	tation and Disclose	of Project Relevant
Info	rmation)			-
1.	23.2.2013	Head of Village	-MCL Authorities	MCL
		Tract Office	-REM Consultants	
			-Kaw Pa Naw	
			Villagers	
			-Pauktaw Village	
			Villagers	
2.	24.2.2013	Village's Head	-MCL Authorities	MCL
		Office	-REM Consultants	
		Kwanngan Village	-Me Ko Ro Villagers	
			-Kwan Nyan	
			Villagers	
			-Hni Don Villagers	
3.	25.2.2013	Village's Head	-MCL Authorities	MCL
		Office	-REM Consultants	
		Ka Don Sit Village	-Kadonsit Villagers	
			-KawDon Villagers	
4.	25.2.2013	Administrator,	-Heads of Village	MCL
		General	Tracts in	
		Administrative	Kyaikmaraw	
		Department,	Township	
		Kyaikmaraw	-REM Consultants	
		Township	-MCL Authorities	
5	26.2.2013	GAD Office,	-REM Consultants	MCL
		Kyaikmaraw		
1		Township		

1st Stakeholder Consultation and Disclose of Project Relevant Information

The social team from Resource and Environment Myanmar (REM) presented about the cement plant project with its associated facilities, such as Coal fired power plant, Limestone quarry and canal and Jetty and relevant activities.

The main critical information presented about the project;

-possible project activities

-increase number of vehicles in the area

-increase number of people for construction and operation activities

-the possible impacts to community nearby by the project activities, whether positive and/or negatives -mitigation measures and management

Villagers' comments on MCL

Our village needs electricity. Roads need to be mended. Mine explosion noises from MCL are being heard. Some elderly people suffer from it. Gravels/small stones from mine explosion get to the plantations and they harm our farms. The fields of 3 villagers (about 20 acres – 10 acres, 3 acres and 7 acres respectively) are destroyed by them. The walls of some houses are cracked by the intensity of noise from mine explosion. Due to the alert warning system, some villagers cannot get sound sleep at night as it makes alarm sounds for crossing under cables.

MCL do not buy (stones) from our villages, instead they get them from other places.

MCL built a primary school for Pauktaw village and donated stationery and offered Kahtina robes in the school season.

"Our village needs electricity for development. In addition, roads need to be well-built as well," said the villagers.

MCL's responses

That warning system is for the safety of the villages, not to pass under the cables.

The (stones) from the villages are not used because the amount of magnesium contained in them are not sufficiently enough to be used.

1. Why do you like MCL?

We don't know much about MCL. They didn't explain about them either. We will continue living at our places till the situations are okay. If not, we will protest. They also give supports to our village our value to some extent, like building school, to get electricity at the monastery, and donating cement (100 bags) for building compounds of the monastery. They also monitor water quality of our village once in every four month and explain about the water quality whether it is drinkable, clean and so on. 2. Why don't you like MCL?

There is no like or dislike. If many of us think it is good, I also agree with them. Some people come and talk about the negative impacts that MCL have. Likewise, MCL also come and do cooperation with us. As our village do not have a lot of households, we also have to listen to the employees from our village who are working at MCL.

3. Concerns

Mine explosion makes noises. It should be reduced as much as possible. When explode, our houses also vibrate. In the past, they exploded the mines two times, but now 1 time. But the noise is very loud. We also understand the dangers of mines. That's why, we have some concerns about that.

4. What did MCL do for the village development? What developments are needed for the village now?

School, electricity and roads are our first priorities. MCL donated 100 cement bags to the monastery. As we use our own generator for electricity, we need to spend about 50000 MMK per month.

5. If you have any suggestions, please tell us.

The main thing is about mine explosion. We are very afraid when it is exploded. It is also an undesirable matter when a pregnant woman is giving birth a baby. It is important to reduce its noise intensity. Now, in times of mine explosion, water in the rice pot on the fireplace is vibrating.

MCL monitors the water quality of our village once in every four months. They should tell us the results and give suggestions about the water quality. Dust and particles get to our village if it is windy. "Kawkit" pagoda is very near to the place to mine explosion. So, we want MCL to take great care of the stability of the pagoda. As the ground shake when they explode mines, we are afraid that it will destroy the pagoda.

The villagers considered that the project is acceptable for the rural and regional development and the respondents hoped that the project will support the economy of the country.

There are some requirements of rural and regional development as follows;

- 1. To prepare the roads
- 2. To be free of change in the health services
- 3. To create job opportunities
- 4. To construct the new school's building
- 5. To supply the water and electricity



Stakeholder Meeting in General Administrative Department, Kyaikmaraw Township



Pauktaw Village, Kyaikmaraw Township



Kaw Pa Naw and Kaw Don Village, Kyaikmaraw Township



Ka Don Sit Village, Kyaikmaraw Township



Kawn Nyan Village, Kyaikmaraw Township



Hni Don Village, Kyaikmaraw Township



MeKoRo Village, Kyaikmaraw Township

No.	Date	Name of		Participation	Arranged by
		Town/Vill	age/Ward		
Year	r 2013 (2 nd Sta	akeholder N	Meeting on	Road Access)	
1	28.10.2013	Village's	Head	-REM Consultants	MCL
	10:00-	Office,	Kadonsit	-MCL Authorities	
	11:00	Village			
2	29.10.2013	Village's	Head	-REM Consultants	MCL
	11:00 AM	Office,	Kawdon	-MCL Authorities	
	- 12:00	Village		-Villagers	
	PM			-	
3	29.10.2013	Village's	Head	-REM Consultants	MCL
	1:00 PM -	Office,	Wenge	-MCL Authorities	
	2:00 PM	Village		-Villagers	
4	30.10.2013	Village's	Head	-REM Consultants	MCL
	9:30 AM -	Office,	KawWon	-MCL Authorities	
	10:30 AM	Village		-Villagers	
5	30.10.2013	Village's	Head	-REM Consultants	MCL
	11:00 AM	Office,	Angazine	-MCL Authorities	
	-12:00 PM	Village		-Villagers	
6	30.10.2013	Village's	Head	-REM Consultants	MCL
	1:00 PM -	Office,	Taranar	-MCL Authorities	
	2:00 PM	Village		-Villagers	
7	30.10.2013	Village's	Head	-REM Consultants	MCL
	2:30 PM -	Office,		-MCL Authorities	
	3:30 PM	Kaw Thet		-Villagers	

2nd Stakeholder Consultation Meeting on Road Access

1. Introduction

Social Impact Assessment Team from REM conducted a survey and held public stakeholder meetings in 7 Villages in Kyaiukmaraw Township between 28th October and 31st October, 2013. From the SIA group, 2 members participated in the survey team. These team members took the role of consultants in that meeting.

2. Objective of the Public Consultation

The team conducted the public consultation to introduce the project information to the stakeholders. The information distributed and expected to receive from the stakeholders include: objectives, explanation on road plan and time schedule, road station and section, project billboard, measure taking, equipment and traffic and safety sign board, for and key benefit for community and discussion.

Mawlamyine Cement Limited (MCL) will improve the road following:

1.Road A to B ,Distance = 7.00 kilometer

November 2013 – February 2014 , by Capital Development ltd

2.Road B to C ,Distance = 2.00 kilometer

November 2013 – February 2014 , by Capital Development ltd

3. Road C to D ,Distance = 0.50 kilometer

November 2013 – February 2014 , by Capital Development ltd

4.Road D to E ,Distance = 17.80 kilometer

November 2013 – January 2014 , by DTCN Holding (Myanmar) ltd

5.Road E to H ,Distance = 3.00 kilometer

• November 2013 – May 2014, by DTCN Holding (Myanmar) ltd

6.Road F to G ,Distance = 5.50 kilometer November 2013 – January 2014 ,November 2013 – January 2014

3. CSR for Road Work

- Project bill board must provide to show project information and update it every day.
 - 1. Name of owner
 - 2. Name of Contractor
 - 3. starting and finishing time, number of days from start or numbers of day until road will be finished
 - 4. Name of Site engineer who in charged
 - 5. Number code of this road.
 - 6. Accident and safety report (Number of days of No accident) etc.
- Working time is allowed only day time 8:00-17:00.
- Water carrier truck must be provided to ensure dust controlling during construction.
- To make it to be convenient traffic and safety during construction. The road will be constructed only in half section (3 m. from 6 m.) and another half is allowed for traffic. The longest construction road will not be more than 2 km.
- All driver must obey to all rules and regulations and the velocity will be limited at 40 km/hr
- All traffic and safety sign, including lighting sign, must be provided enough to indicate where repairing and construction area
- Contractor must hire local labor for construction.
- Contractor should arrange the proper area for parking. It should not obstruct the traffic.
- If the accident occurs, Contractor has to take responsible for it. Contract need contractor to make Insurance to protect other persons.

Stakeholder Meeting (1)

Venue : Head of Village's House, Kadonsit Village Date : 28-10-2013 (Tuesday) Time : 10:00 to 11:00 AM Participant : 16 persons

Sr.	Date / Time/ Place	Name	Name of Village
1	Kadonsit + Shwe Wargyaung	U Kyaw Than	Kadonsit
2	Village	U Hlaing	Kadonsit
3		U Than Shwe	Kadonsit
4		U Min San Hlaing	Kadonsit
5		U Maung Khin	Kadonsit
6		U Sayar Kyaw Than	Kadonsit
7		U Shwe	Kadonsit
8		U Tun Aung Gyi	Kadonsit
9		U Saw Tin	Kadonsit
10		U Tun Aung Lay	Kadonsit
11		U Tun Aung	Kadonsit
12		U San Phyo	Kadonsit
13		U Soe Win	Shwe War Chaung
14		U Maung Khine	Shwe War Chaung
15		U Thein Aung	Shwe War Chaung
16		U Ye Tun	Shwe War Chaung

Question	Answer

The villager asked 1.Can Mawlamyine Cement Limited (MCL)repair a small bridge?

2. Please repair the entrance of Shwe War Chaung Village. Yes, Mawlamyine Cement Limited (MCL)can repair all small bridges along the access road.

Mawlamyine Cement Limited (MCL)will consider it because Shwe War Chaung Village is near the project area.



Stakeholder meeting in Kadonsit Village, Kyaikmaraw Township

Stakeholder Meeting (2)

Venue : Head of Village's Office, KawDun Village Date : 29-10-2013 (Tuesday) Time : 11:30 AM to 12:00 Participant : 16 persons

Sr.	Date / Time/ Place	Name	Name of Village
1	29.10.2013, 11:00 AM,	U Min Win Sein	Kawpanaw
2	Kawpanaw + KawDun Village	U Thet Zaw Oo	Kawpanaw
3		U Shwe Myint	Kawpanaw
4		U Kyaw Hlaing	Kawpanaw
5		U Tun Thar	Kawpanaw
6		U Swan Shein	Kawpanaw
7		U Khin Maung Lay	Kawpanaw
8		U La Lay	Kawpanaw
9		U Nge	Kawpanaw
10		U Lay	Kawdun
11		U Maung Htaw	KawDun
12		U Aung Kyaw	KawDun
13		U Tun Aung	KawDun
14		U Iwin	KawDun
15		U Kyaw Aye	KawDun
16		U Maung Shein	KawDun

Question	Answer
The villager asked	Yes, Surely. Mawlamyine Cement Limited
1.Can Mawlamyine Cement Limited	(MCL)has to repair along the access road. Don't
(MCL)repair the access road, surely?	worry about it. It will start from 15th November
	2013 to 31st May,2014.



Stakeholder meeting in KawDun Village, Kyaikmaraw Township

Stakeholder Meeting (3) Venue : Head of Village's House, Wenge Village Date : 29-10-2013 (Tuesday) Time : 1:00 to 2:00 PM Participant : 23 persons

Sr.	Date / Time/ Place	Name	Name of Village
1	29.10.2013, 12:30 PM, Wenge	U Than Tun	Wenge
	Village		_
2		U Tun Tun	Wenge
3		U Aung Min Khine	Wenge
4		U Kyaw Lwin	Wenge
5		U Maung Zaw	Wenge
6		U Ngo	Wenge
7		U Kyaw Naing	Wenge
8		U Aung Htu	Wenge
9		U Soe Phine	Wenge
10		U Myint Aye	Wenge
11		U Min Aung	Wenge
12		U Tint Lwin	Wenge
13		U Win Tun	Wenge
14		U Min Sein	Wenge
15		U Kalar	Wenge
16		U Ba Gyi	Wenge
17		U Min Soe Moe	Wenge
18		U Nyunt Sein	Wenge
19		U Kyaw Htoo	Wenge
20		U Thein Zaw win	Wenge
21		U Than Htwe	Wenge
22		U Myint Htwe	Wenge
23		Daw Nam Kyi	Wenge

Question/Concern	Answer
The villager asked:	Yes, Mawlamyine Cement Limited (MCL) will
Will Mawlamyine Cement Limited (MCL)give	give the chance of jobs of access road because this
the job opportunities of access road?	is CSR's program of Mawlamyine Cement
The villagers said that thank for coming and	Limited (MCL).
supporting the village.	



Stakeholder meeting in Wenge Village, Kyaikmaraw Township

Stakeholder Meeting (4)

Venue : Head of Village's Office, Kaw Won Village Date : 30-10-2013 (Wednesday) Time : 9:30 to 10:30 AM Participant : 13 persons

Sr.	Date / Time/ Place	Name	Name of Village
1	30.10.2013, 9:30 AM, Kaw won	U Own Than	Kaw won
	Village		
2		U Hla Aung	Kaw won
3		U Chit Maung	Kaw won
4		U Tin Win	Kaw won
5		U Nyein Aung	Kaw won
6		U Myint Than	Kaw won
7		U Khine	Kaw won
8		U San Nyo	Kaw won
9		U Kyaw	Kaw won
10		U Kyaw Win	Kaw won
11		U Chit Tin	Kaw won
12		Daw Tin Oo	Kaw won
13		U Aung Ban	Kaw won

Question/Concern	Answer
The villagers said that thank for coming and	This is CSR's program of Mawlamyine Cement
supporting the village.	Limited (MCL)before construction period.



Stakeholder meeting in KawWon Village, Kyaikmaraw Township

Stakeholder Meeting (5) Venue : Head of Village's House, Angazing Village Date : 30-10-2013 (Wednesday) Time : 11:00 to 12:00 PM Participant : 11 persons

Sr.	Date / Time/ Place	Name	Name of Village
1	30.10.2013, 11:00 AM, Angazing	U San Myint	Angazing
	Village		
2		U Kun Pyine	Angazing
3		U Kyaw Thu	Angazing
4		U Than Oo	Angazing
5		U Pan Thie	Angazing
6		U An	Angazing
7		Daw Aung Sein	Angazing
8		Daw Zwe	Angazing
9		U Tun Thein	Angazing
10		U Own Maw	Angazing
11		U Kyaw Hla	Angazing

Question/Concern	Answer
The villager asked	Yes, Mawlamyine Cement Limited (MCL)will
Will Mawlamyine Cement Limited (MCL)give	give the chance of jobs of access road because this
the job opportunities of access road?	is CSR's program of Mawlamyine Cement
The villagers said that thank for coming and	Limited (MCL).
supporting the village.	



Plate 5: Stakeholder meeting in Angazing Village, Kyaikmaraw Township

Stakeholder Meeting (6) Venue : Head of Village's Office, Tarana Village Date : 30-10-2013 (Wednesday) Time : 1:00 to 2:00 PM Participant : 17 persons

Sr.	Date / Time/ Place	Name	Name of Village
1	30.10.2013, 1:30 PM, Tarana	U Than Aung	Tarana
	Village		
2		U Maung Maung Ya	Tarana
3		U Min Lwin	Tarana
4		U Win Hlaing	Tarana
5		U Ha Mu	Tarana
6		U Light	Tarana
7		U Min Tun	Tarana
8		U Mate	Tarana
9		U Thein Zan	Tarana
10		U Tun Sein	Tarana
11		U Aung	Tarana
12		U Aung Than	Tarana
13		U Shwe Htee	Tarana

14	U Nyunt Win	Tarana
15	U Naing Hla Tin	Tarana
16	U Than Shwe	Tarana
17	U Han Mu	Tarana

Question/Concern	Answer
1.The villager asked Can Mawlamyine Cement	Yes, Mawlamyine Cement Limited (MCL)can
Limited (MCL)repair the entrance of village	repair the entrance of village road next step.
road?	
	Yes, I will apply to enter the report.
2. The villagers request to build the drainage	^
system of village diversion road.	



Stakeholder meeting in Tarana Village, Kyaikmaraw Township

Stakeholder Meeting (7) Venue : Head of Village's Office, Kaw Thet Village Date : 30-10-2013 (Wednesday) Time : 2:30 to 3:30 PM Participant : 15 persons

Sr.	Date / Time/ Place	Name	Name of Village
1	30.10.2013, 2:20 PM, Kaw Thet	U Hlaing	Kaw Thet
	Village		
2		U Maung Nge	Kaw Thet
3		U Aung Khine	Kaw Thet
4		U Ka Lay	Kaw Thet
5		U Puu	Kaw Thet
6		U Pyoo	Kaw Thet
7		U Ba Aye	Kaw Thet
8		U Win	Kaw Thet
9		U Naing Maung Yay	Kaw Thet
10		U Lwin Gyi	Kaw Thet
11		U Aung Min	Kaw Thet
12		U Min Nar Out	Kaw Thet
13		U Pan Thain	Kaw Thet
14		U Chit Thein	Kaw Thet
15		U Kyaw Lin	Kaw Thet

Question/Concern	Answer
1.The villager asked	Yes, Mawlamyine Cement Limited (MCL)can
Can Mawlamyine Cement Limited (MCL)repair the drainage system along the access road?	repair the drainage system along the access road.

2. The villagers said that thank for coming a	and
supporting the village.	



Stakeholder meeting in Kaw Thet Village, Kyaikmaraw Township

3rd Stakeholder Consultation Meetings

No.	Date	Name of Town/ Village/Ward	Participation	Arranged by
Year	2016 (3 rd Stak	(keholder Consultation)		
1.	7.2.2016	KawPaNaw Monastery	-Villagers	MCL
2.	7.2.2016	Kaw Dun Monastery	-REM Consultants	
3.	7.2.2016	We Nge Monastery	-MCL Authorities	
			-Kaw Pa Naw	
			-Kaw Dun	
			-We Nge	
4.	7.2.2016	Kwan Nyan Monastery	-Villagers	
			-REM Consultants	
			-MCL Authorities	
5.	8.2.2016	KaDonSit Monastery	-Villagers	MCL
6.	8.2.2016	Shwe War Gyaung	-REM Consultants	
		Monastery	-MCL Authorities	
7.	8.2.2016	MeKaRo Monastery	-Shwewarchaung	
			-Mekaro	
8.	10.2.2016	MCL Meeting Room	-REM Consultants	MCL
			-MCL Authorities	

Opinions on the project

- In the Mawlamyine Cement Project, to reduce the environmental impacts, there are measures to be taken like-
 - 1. Using the system of semi-open limestone cut.
 - 2. Being a green factory
 - 3. Using the system of getting electricity from waste and dust
 - 4. Using the CSR system. This system will be available for;
 - First stage- villages around the factory

Second stage- villages besides Tarana road near the factory Third stage- villages alongside the Ataran River

Advantages of the Project

- In this project, the plans concerning the factory are being informed to the villagers openly.
- This project will be beneficial for the education, health, social and transportation system of the surrounding villages as CSR is recognized to be 2% of the company's profits.
- It is so good that CRS is giving supports for the education, health, social and transportation system of the surrounding villages before the project actually runs.

Issues to be aware

- There are concerns relating to the Coal Industry to supply electricity for the factory. Thus, there should be other ways that are less harmful to the environment.
- The Ataran River will be used for transportation. And before the plan, there should be discussions with the villages along the river.
- Most of the villagers are relying on the Ataran River for their livings. So, there should be meetings with the villagers about the conditions and get advice for the use of the river. There should be meetings and discussions with Directorate Water Resources and Improvement of River System, Mawlamyine and get advice.
- During and after the project, it is needed to use Tarana Road for transportation and thus the road should be repaired.
- Resource Preservation group and get advice.
- During and after the project, it is needed to use Tarana Road for transportation and thus the road should be repaired.
1st Public Consultation and Disclose Relevant Project Information

Social Impact Assessment Team from REM conducted a survey and held second public consultation meeting in Kyaikmaraw on 25th May 2013. From the SIA group, 4 members participated in the survey team.

The consultants identified stakeholders and carried out the public consultation activities to the practicable extent with local stakeholders. The local stakeholders who included in the public participation process were from the affected communities and fishermen.

Stakeholder identification included the following key stakeholder groups:

- (1) Project affected persons from 7 villages inside the project boundary, which will be resettled. These 7 villages in the project area are: Pauktaw, Kaw Dun, Kaw Pa Naw, Hni Don, Kwan Nyan, Ka Don Sit and Me Ko Ro villages.
- (2) Fishermen from Nyaungpinseik Village which is located at the mouth of Attaran River in which vessels from the project will be used for water transport.

No.	Date	Name of	Participation	Arranged by
		Town/Village/Ward		
Year	2013 (1 st Pub	lic Consultation and D	sclose Project Relevant In	formation)
1	25.5.2013	Meeting Hal	, -Government	MCL
		Kyaikmaraw	Stakeholders	
		Administrative Office	-MCL Authorities	
			-Villagers	
			-REM Consultants	

Presentation

Slide presentation about the project covers -

- 1. Objectives of Public Consultation
- 2. Previous Investigations of EIA and SIA
- 3. Findings
- 4. Management of Air Pollution and Dust,
- 5. Waste Management System,
- 6. Noise Control System,
- 7. Management of Public Health and Safety measures,
- 8. Information from the Public,
- 9. Welfare of CSR office, and
- 10. Recommendations and Concerns.

Table: List of Participants

No.	Name of Village	Name of Participants	Date/ Time
1	KaDonSit	U Shwe Thein	25.5.2013, 10:30AM
2		U Than Shwe	
3		U Kyaw Than	
4	MeKoRo	U Thaik	
5		U Ba Thant	
6		U Shwe Man Tin	
7		U Nyein Aung	

8		U Sein Hla Win
9		U Kyaw Win
10		U Tun
11	KwanNyan	U Shwe
12		U Win
13	KaDonSit	U Kyaw Htay Aung
14	HniDon	U Moe Myint Shein
15		U Khin Taung
16		U Soe Myint
17		U Shwe Htay
18		U Kyin Thein
19	KaPaNaw	U Min Win Sein
20	KawPaNaw	U Khin Mg Lay
21		Daw Nyein Aung
22		U Aung Kyaw
23		U Mg Htaw
24		U San Shein
25		U Shwe Kayin
26		U Hla
27		U Sein Than
28		U Myint Tun
29	KwanNyan	U Min San Hlaing
30		U Aung Naing
31		U Nyo Tway
32		U Kyaw Aung
33	NyaungPinSeik	U Thet Aung Htwe
34	Hnidon	U Pan Chaint
35		U Win
36		U Mg Ni
37	Pacific Link Co.	U Htay
38	MCC	U Chit Myo Lwin
39	MCC	Mr. Gumpolsak
40	NyaungPinSeik	U Aung Soe Tun
41		U Thein Hla
42		U Soe Myint
43		U Ye Win Myaing
44		U Ohn Shwe
45		U Myo Naing
46		U Soe Aung
47		U Kalar
48		U Zaw Aung
49		U Aung Twin
50	GAD, Kyaukmaraw office	U Myint Zaw Aung
51		Daw Chit Nyunt
	4	· · · · · · · · · · · · · · · · · · ·

53	REM Co.Ltd.	Dr. Saw Pyone Naing	
54		Daw Khin Ohnmar Htwe	
55		Dr. Kyaw Linn Oo	
56		Daw Katta Soe	



Stakeholder Meeting in Kyaukmaraw General Administrative Office (25.5.2013)



Discussion with the fisherman of Nyaungpinseik Village (25.5.2013)

Table: Summary of Discussions

Chairperson - Daw Khin Ohnmar Htwe		Date: 25.5.2013, 10:30 AM	
Recorded by – Daw Katta Soe		Venue – Meeting Hall, Kyaikmaraw	
		Administrative Office	
	Opinion/ questions/	Responses and Countermeasures	
	Comment	expressed by REM	
U Min Win Sein Head of	1. Electricity supply for neighboring	1. We have informed to the authorities of the project since the first meeting	
KawPaNaw Village	villages of the project area	was finished. They will arrange the electricity supply for villages when the project is started.	
	2. It is almost two years. The villagers asked when will be the	2. It is in the land acquisition stage. Land area for the project site is still required. If the land area is enough, the canal will be constructed first. At	

project started. that time project developers	will meet
 3. Will the land plots, which are sold, be returned if the project is canceled? 3. Will the land plots, which are sold, be returned if the project is canceled? 3. The project will be continued report should be submitted to first. After that, it will be subthe the Ministry of Environment Conservation. After the auther signed the reports and propo project will be started as soo possible. 	d. ESIA the MIC omitted to al orities sals, the n as
 4. The roads should be repaired immediately. 4. The roads should be repaired first. After that, late will be constructed between and project site. The bridges be repaired and new roads w constructed before and after project. 	be ritic road Tharanan should ill be the
U Myo Naning and U Soe Aung1. What is the route of ships in the river?1. The average width of Attaran about 360 feet (120 meters). width of vessel is 60 feet (20 and the length is about 150 feet meters). Therefore, the river enough for the vessels and th nets are safe.	n River is The meters) eet (50 is wide ne fishing
 2. Time schedule of the ships should be announced. 2. There will be alarm and sign systems for fishermen. For the matter, responsible persons with fishermen again. The offineet and discuss with 350 fineet and discuss with 350 fin for the requirements related to project. If the fishing nets are damaged due to the vessels, company will have responsible compensate for these. 	al nis vill meet icials will shermen to the e the bility to
U Taik, Head of MeKoRo Village1. The villagers need village health care centre.1. It is a part of the project. Mawlamyine Cement Compa already done the following w - Donation to maintain pag - Donation to monasteries installed solar lighting sy - Donated teaching materia (10) schools - Support mobile clinic to Village and gave medica treatments to 170 patient	any has yorks. godas and ystem als to Pauktaw l
U Soe Myint 1. The project should 1. The project will be applied Head of HniDon use the methods modernized techniques to m	nimize

Village	minimizing the	the potential impacts. Environmental
	environmental	Monitoring Plan (EMP) has already
	impacts.	been prepared for this project.

Common interests of all respondents include;

- 1. To provide fair compensations among villagers,
- 2. To supply infrastructures such as school, clinic, roads and bridges,
- 3. To provide electricity supply systems,
- 4. To create job opportunities, good employments and trainings for respective jobs,
- 5. To provide regional development by supporting infrastructure requirements.

2nd Stakeholder Consultation and Public Participation Meeting

No.	Date	Name of	Participation	Arranged by
		Town/Village/Ward		
Year	r 2013 (2 nd P	ublic Consultation and	Disclose on Scoping R	eport)
1	3.9.2013	Kyaikmaraw office	-Government	MCL
			Officers	
			from Kyaikmaraw	
			office	
			-MCL Authorities	
			-REM Consultants	
			-Heads of Village	
			tracts	
2	4.9.2013	Kawpanaw	-MCL Authorities	MCL
			-REM Consultants	
			-Wegne	
			-Kawpanaw	
			-Kaw Dun	
3	4.9.2013	Ka don sit	-MCL Authorities	MCL
			-REM Consultants	
			-Ka Don Sit	
			-Shwe war gyaung	
4	5.9.2013	Kyan Nyan	-MCL Authorities	MCL
			-REM Consultants	
			-Kyan Nyan	
			-Pauk Taw	
5	5.9.2013	Hni Don	-MCL Authorities	MCL
			-REM Consultants	
			-Hni Don	
6	6.9.2013	Mekaro	-MCL Authorities	MCL
			-REM Co. Ltd.	
			-Mekaro	
7	6.9.2013	Shin Zaw Pu Ward	-MCL Authorities	MCL
			-REM Consultants	
			-Shin Zaw Pu Ward	
			(Kyaikmara)	
8	7.9.2013	Tarana	-MCL Authorities	MCL
			-REM Consultants	
			-Tarana	
			-Kyun Gon	
9	7.9.2013	Kaw That	-MCL Authorities	MCL
			-REM Consultants	
			-Kaw That Villagers	

No.	Date	Name of	Participation	Arranged by
		Town/Village/Ward		
10	8.9.2013	Kaw Wan	-MCL Authorities	MCL
			-REM Consultants	
			-Ang Ka Zaing &	
			Kaw Wan	
11	8.9.2013	Nyaung Bin Seik	-MCL Authorities	MCL
			-REM Consultants	
			-Nyaung Bin Seik	
			(village Tract)	
12	8.9.2013	Kyonewan Village	-MCL Authorities	MCL
		Monastery	-REM Consultants	
			-Villagers	

Process of Meeting

(1) Consultations were made with the monks, village headmen and village members at all affected villages to provide information related to project. Feedbacks from all the stakeholders will be summarized and considered for the study.

The Consultants propose these activities in addition to public consultation meetings to ensure that the affected stakeholders will be able to express their mitigation measurement of the project, concerns about the project, and to distribute information and communicate relevant information of the project to local stakeholders.

Consultation to the stakeholders about Potential Impacts of the Project

The team discussed with the villagers on potential impacts of this project. Discussions are as follows:

- To provide the job opportunities for the villagers
- To support the fishermen's livelihood along the Ataran River
- To give a vocational training for villagers
- To protect from the side- effects of factory
- To give the awareness of health impact
- To inform the project to the villagers transparently
- To give the information of mitigation measurement methods for Cement Industry

Concerns from Stakeholders

Several concerns arose from representative villagers which involved in the project. Most of the concerns are overlapping and some are very specific.

1. Stakeholder Meeting

Place: Kyaukmaraw General Administrative Office, 3-9-2013 (10:00 to 11:00 AM)

Participants : 66 persons (attachment 1)

	Representative	Question	Answer
1.	U Tin Hla, Village	Wish to have field discussion	REM: We will join fishermen
	Development Committee,	also with fishermen	and villagers along the river on
	Nyaungbinseik		8 th September 2013
2.	U Than Aung, Village	Will repair the road to be	U Zaw Lin Aung (Pacific Link
	Head, Tarana Village Tract	bitumen ones	Co.): Roads across the villages
			will be upgraded into bitumen
			road. The others will be added

		rocks and laterite to be applicable the whole seasons
3. U Naing Ron Thein,	He advised	REM: I will report your wish to
Myanmar Newspaper	-To reconstruct of old cannel	the project to take action
Association	between Atrran River and	
	Gyaing River because of the	
	preventing of flood	

Figure 1: Project Discussion in Kyaukmaraw GAD Office Hall

No.	Name	Village
1	U Mvint Htav	Ka Line Ka Naing Village
2	U Ave Twine	Ka Line Ka Naing Village
3	U Maung Kyaw	Ka Line Ka Naing Village
4	U Chit Thein	Ka Line Ka Naing Village
5	Daw Hla Myint	Ka Line Ka Naing Village
6	U Hla Htay	Chaung Na Kwa Village
7	U Zaw Ko Ko Oo	Chaung Na Kwa Village
8	U Soe Myint	Chaung Na Kwa Village
9	Daw Khin Ohnmar Htwe	REM Co.
10	Daw Kattar Soe	REM Co.
11	Daw Nan Thazin Oo	REM Co.
12	U Phay Than	Shin Saw Pu Ward
13	U Tin Hlaing	Shin Saw Pu Ward
14	U Kyaw Oo	Shin Saw Pu Ward
15	U Than Myint	Shin Saw Pu Ward
16	Daw Lwin Lwin Maw	Shin Saw Pu Ward
17	U Tite	Mekaro Village
18	U Aung Win	Mekaro Village
19	U Shwe Man Tin	Mekaro Village
20	U Nyine Aung	Mekaro Village
21	U Kyaw Win	Mekaro Village
22	Daw Ei Ei War	Mekaro Village
23	U Min Win Sein	Kawpanaw Village
24	U Maung Htaw	Kawpanaw Village
25	U Khin Maung Lay	Kawpanaw Village
26	U San Shein	Kawpanaw Village
27	U Maung Soe	Kawpanaw Village
28	Daw Nyine Aung	Kawpanaw Village
29	U Pan Shwe	Katonsi Village
30	U Thein Aung	Katonsi Village
31	U Shwe	Katonsi Village
32	U Kyaw Htay Aung	Katonsi Village
33	U Shwe	Kwanngan Village
34	U Win	Kwanngan Village
35	U Hlaing	Kwanngan Village
36	U Min San Hlaing	Kwanngan Village
37	U Soe Myint	Hnidon Village
38	U Khin Thaung	Hnidon Village
39	U Kyin Thein	Hnidon Village
40	U Thein Han	Hnidon Village
41	U Aye Maung	Hnidon Village
42	U Kon Soe	Hnidon Village
43	U Moe Myint Shein	Hnidon Village
44	U Aung Soe Tun	Nyaung Pin Seik Village
45	U Tin New	Nyaung Pin Seik Village
46	U Soe Hlaing	Nyaung Pin Seik Village
47	U Lon Tin	Nyaung Pin Seik Village
48	U Tin Hla 8	Nyaung Pin Seik Village
49	U Than Phay	Kyonwan Village

50	U Aung Phay	Kyonwan Village
51	U Win Aung	Kyonwan Village
52	U Tin Shwe	Kyonwan Village
53	Daw San San Lwin	Kyonwan Village
54	U Than Aung	Tharanar Village
55	U Sein Myint	Tharanar Village
56	U Myittar	Tharanar Village
57	U Min Lwin	Tharanar Village
58	Daw Nge Saw	Tharanar Village
59	U Min Nar Out	Kawtat
60	U San Myint	Kawtat
61	U Min Han Thein	Kawtat
62	U Aung Ann	Kawbee
63	U Aung San	Kawbee
64	U Shein	Kawbee
65	U Huu Sein	Kawbee
66	Daw Tin Oo	Kawbee

Place: Kawpanaw Village (Primary School), 4.9.2013 (10:30 to 11:30 AM)

Participants : 90 (Listed) + 120 (non-listed) persons (attachment 2)

	Representative	Question	Answer
1.	U Tun Naing (Kawpanaw)	Villages need electricity	REM: we will try to have
			electricity for the villages, after
			completion of the factory
2.	U Myint Tun (Kawdun)	To repair the roads	REM: We have already
		_	planned to upgrade the roads
			part by part
3.	Villagers of Kawpanaw	We need job opportunity	REM: True, there will be job
	and Kawdun		opportunities for the
			construction and operation



Figure 2: Project Discussion in Kawpanaw Village (Primary School)

No.	Name	Address
1	U Min Win Sein	Kawpanaw Village
2	U Lar Lav	Kawpanaw Village
3	U Tun Gyaung	Kawpanaw Village
4	U San Tun	Kawpanaw Village
5	U Aung Thaung	Kawpanaw Village
6	U Nyunt Shwe	Kawpanaw Village
7	U Nyunt Shwe	Kawpanaw Village
8	U Bee	Kawpanaw Village
9	U Tun Ya	Kawpanaw Village
10	U Aung Kyaw Lay	Kawpanaw Village
11	U Kyaw Nge	Kawpanaw Village
12	U Hlaing	Kawpanaw Village
13	U Date	Kawpanaw Village
14	U Than Hlaing	Kawpanaw Village
15	U Soe Nyunt	Kawpanaw Village
16	U Sein Aung	Kawpanaw Village
17	U Yit	Kawpanaw Village
18	U Toe Ka Lat	Kawpanaw Village
19	U Chit Thaung	Kawpanaw Village
20	U Aung Kyi	Kawpanaw Village
21	U Khin Maung Lay	Kawpanaw Village
22	U Ba Tun	Kawpanaw Village
23	U Win Nyut	Kawpanaw Village
24	U Tin Nge	Kawpanaw Village
25	U Yay Chan	Kawpanaw Village
26	U Aung Min	Kawpanaw Village
27	U Htay	Kawpanaw Village
28	U Pan Shwe	Kawpanaw Village
29	Daw Chit Su	Kawpanaw Village
30	Daw Sein	Kawpanaw Village
31	U Tun Naing	Kawpanaw Village
32	U Yit	Kawpanaw Village
33	U Nawe	Kawpanaw Village
34	U Tun	Kawpanaw Village
35	U Aung	Kawpanaw Village
36	U Aung Kyaw	Kawpanaw Village
37	U Shwe Aye	Kawpanaw Village
38	U Pha Lon	Kawdun Village
39	Daw Yee	Kawdun Village
40	Daw Pan Zin	Kawdun Village
41	Daw Win Aye	Kawdun Village
42	Daw Hla Win	Kawdun Village
43	Daw Pan	Kawdun Village
44	U Chit Oo	Kawdun Village
45	U Ni	Kawdun Village
46	U Mee	Kawdun Village
47	U Ha Dun	Kawdun Village
48	U Myint Oo	Kawdun Village
49	U Tun	Kawdun Village
50	U Lav	Kawdun Village

List of Participants in Kawpanaw Village

51	U Shein	Kawdun Village
52	U Tun Aung	Kawdun Village
53	U Soe	Kawdun Village
54	U Tun Sein	Kawdun Village
55	U Ba San	Kawdun Village
56	U Hlay	Kawdun Village
57	U Shwe Ka Yin	Kawdun Village
58	U Aung Win	Kawdun Village
59	U Htaw	Kawdun Village
60	U Tun	Kawdun Village
61	U Kyaw Aye	Kawdun Village
62	UI	Kawdun Village
63	U Hla	Kawdun Village
64	U Aung	Kawdun Village
65	U Khin	Kawdun Village
66	U Aung Thet	Kawdun Village
67	U Shwe	Kawdun Village
68	U Ka Lay	Kawdun Village
69	U Aung Myint	Kawdun Village
70	U Khine	Kawdun Village
71	U Ywe	Kawdun Village
72	U Myine	Kawdun Village
73	U Kyin	Kawdun Village
74	U Tun	Kawdun Village
75	Daw Shin	Kawdun Village
76	Daw San Wai	Kawdun Village
77	Daw Win	Kawdun Village
78	U Soe Myint	Kawdun Village
79	Daw San Aye	Kawdun Village
80	U Aung Suu	Kawdun Village
81	U Win Myint	Kawdun Village
82	U Tun Aye	Kawdun Village
83	U Soe	Kawdun Village
84	U Gyat	Kawdun Village
85	Daw Yaung	Kawdun Village
86	Daw Tar Nay	Kawdun Village
87	Daw Sandar Win	Kawdun Village
88	Daw San New	Kawdun Village
89	U Tin Lin	Kawdun Village
90	U Ba Tun	Kawdun Village

Place: Kadonsit Village (Monastery), 4.9.2013 (1:00 to 2:30 PM)

Participants : 101 persons (attachment 3)

Representative	Question	Answer
1. Kadonsit	How many locals will get job	REM: we estimated to be more
	in the factory?	than 5000, not exactly. It would
		be good if villagers who want job
		should be listed in the village
		administration office

2. Kadonsit	Will roads be repaired or	MCL (SCG): Firstly, roads will
	widened?	be upgraded from earthroad, to
		laterite road, then to bitumen road
		step by step. Will be widened to 4
		meters in the side

Figure 3: Project Discussion in Kadonsit and Shwe War Chaung Village (Monastery)

List of Participants in Kadonsit Village

No.	Name	Village
1	U Shwe	Kadonsit Village
2	U Soe Tin	
3	U Chit Tin	
4	U Tun Aung	
5	U Nyine	
6	U Maung Khin	
7	U Kyaw Myint	
8	U Shwe Thein	
9	U Kyaw Than	
10	Daw Mwe Don	
11	Daw Tut	
12	Daw San Tin	
13	Daw Aung	
14	Daw Swee	
15	Daw Nge Tin	
16	Daw Kyin Sein	
17	Daw Thaung Khin	
18	U Sein Min	Shwewarchaung Village
19	U Hla Myo	
20	U Myo Nyein	
21	U Tun Ohn	
22	U Zaw Zaw	
23	U Dayouk Gyi	
24	U Wai Zin Tun	
25	U Aye Min (1)	
26	U Aye Min (2)	
27	U Kyi Naing	
28	U Soe Aung	Kadonsit Village
29	U Thaung Nyunt	
30	U Tun Yin	
31	U Ngwe Tin Aung	
32	U Tun Ngwe	
33	U Thein Aung	Shwewarchaung Village

34	U Thein Soe Lay	
35	U Than Kyi	
36	Daw War Nu	Kadonsit Village
37	Mg Zaw Htet Aung	
38	Mg Than Htike Aung	
39	Daw Yinn	
40	Ma Hla Yee	
41	Ma Yin Ave	
42	Daw Mya kyi	
43	Daw Nge	
44	Ma Thida	
45	Ma Saw Myine	
46	Daw Win Kyi	
47	Daw Hnin Kyi	
48	Daw Mya Kyi	
49	Daw Saw Min	
50	Daw Hla Ave	
51	Daw Tin Myint	
52	Daw Mi Ngwe	
53	Daw Saw Myine	
54	Daw Mee	
55	Daw Ma Ngwe	
56	Daw Ohne Shin	
57	Daw Mya Than	
58	Daw Hla Kvin	
59	Daw Halae	
60	Daw Hla Kvi	
61	Daw Kyin	Kadonsit Village
62	Daw Shoe	
63	Daw Mya Aye	
64	Daw khin sein	
65	Daw Myint	
66	Daw Khin Than Shwe	
67	Daw Ma Ngwe	
68	Daw Saw Shin	
69	Daw Kyu	
70	Daw Aung Shein	Kadonsit Village
71	Daw Aye Shin	
72	Daw Mee	
73	Daw Aye Than	
74	Daw Mi Tin	
75	Daw ohn Kyi	
76	Daw Khin Hla	
77	Daw Aung Nyein	
78	Daw Saw Yin	
79	Daw Ohnn Gyi	
80	Daw Cho	
81	Daw Cho Oo	
82	Daw Khin Than	
83	Daw kyaw La	
84	Daw Khin Htwe	
85	Daw Than Ave	
86	Daw Than Nu	

87	Daw Mee	
88	U Aung Sein	
89	U Win Khaing	Shwewarchaung Village
90	U Thar Gyi	Kadonsit Village
91	U Tun Aung	
92	U Maung	
93	U Kyaw Tin	
94	U Kyaw Than	
95	U Sein Myint Aung	
96	U Thaung Kyi	Kadonsit Village
97	U Naing Oo	
98	U Pan Shwe	
99	U Kyaw Htay Aung	
100	Daw War Nu	
101	Daw Pan Ngwe	Kadonsit Village

Place: Kyan Nyan Village (Monastery), 5.9.2013 (10:30 to 11:30 AM)

Participants : 94 persons (attachment 4)

Representative

1. U Aung Chaw (Nursery Association, KyanNyan Village) Question We need Pre-school for the children, and staff quarter for primary school teachers Answer MCC (SCG): Will make fence of the school in this summer. Partition between school rooms will be constructed. REM: Will report your wish to the project to take action



Figure 4: Project Discussion in KyanNyan and PauktawVillage (Monastery)

List of Participants in KyanNyan Village

No.	Name	Village
1	U Tun	Pauktaw Village
2	U Paing	
3	U Ha Po	
4	U Kin	
5	U Shwe	Pauktaw Village
6	U Wal	
7	U Balar	
8	U Ha Taw	
9	U Thit	Pauktaw Village
10	U Aung Chaw	Kanngan Village

11	U Thit	
12	U Hluu	
13	U Hla	
14	U San Ahan	
15	U Soe Thin	
16	U Shwe	
17	U Hunn Kalay	
18	U Tun Myint	
19	U Yaw	
20	Daw Ngew	
21	U Pae Lauk	
22	U Aung Myint	
23	U Than Oo	
24	Daw Shwe	
25	DawThan Htwe	
26	U Maung Oo	
27	Daw Lon	Kanngan Village
28	Daw Lone	
29	Daw Nge	
30	Ma Ave	
31	Daw Karwar	
32	Daw Mya Han	
33	Daw Ngwe	
34	Daw Lauk	
35	Daw Than Sein	
36	Daw Alae	Kanngan Village
37	Daw Shauk	
38	Daw Pa Aung	
39	Daw NgweKvi	
40	Daw San Tin	
41	Daw Khwe	
42	Daw Khin	
43	Daw Khin Ave	
44	Daw Mee	
15	Dow Khin Shwa	
45	Daw Killi Silwe	
40	Daw May	
47	Daw Selli Tee	
40	Daw Killi Way	
49 50	Daw Tee	
51	Daw Nyulit Daw Aya Hia	
52	Daw Aye Illa	
52	Daw 1011 Daw Hlo Tin Myint	
54		
55		
56		
57		
58	U Maung Oo	
50	Daw Kyin Mwa	
57 60		
61	Daw Till Till Daw Tayoko Ma	
62	LI Aung Thoung	
02	O Aung Thaung	

63	Daw Hnin Yi	
64	Daw Ngwe Aye	
65	Daw Yi	
66	Daw Aye Kyi	
67	Daw Ohn Kyi	
68	U Aung	
69	Daw Cho Win	
70	Daw Myint Kyi	
71	Daw Lonn Twe	
72	Daw Chin	
73	Daw Than	
74	Daw Tin Myint	
75	Daw Lon Tin	
76	U Aung Myint Sein	Kanngan Village
77	Daw Myint	
78	Daw Kyae	
79	Daw Myint	
80	Daw San Tin	
81	Daw Khin Shwe	
82	Daw Wuu	
83	Daw Hla Win	
84	Daw Ha Aee	
85	Daw Htwe Aein	
86	Daw Khin Soe	
87	Daw Nge	Kanngan Village
88	Daw Yin	
89	Daw Khye Ma	
90	Daw Cho	
91	Daw Pyouk	
92	U Kyi Win	
93	U Aung Aye	
94	Daw Lae	Kanngan Village

5. Stakeholder Meeting Place: Hnidon Village (Monastery), 5.9.2013 (10:30 to 11:30 AM) Participants: 131 persons (attachment 5)

Rep	presentative	Question	Answer
1.	Hnidon Villager	We need: (1) road upgrading/	REM: We know the Project
		maintenance; (2) Fence for	has plans for social welfare.
		School; (3) entrance road of the	We will report what you need.
		school to be upgrade; (4)	
		maintenance of school	



Figure 5: Project Discussion in Hnidon Village (Monastery)

Appendix 5 List of Participants in Hnidon Village

No.	Name	Village
1	U Ba Laing	Hnidon Village
2	U Aung Naing Oo	
3	U Cho	
4	U Khin Shein	
5	U Aung Htoo	
6	U Khin Maung Maung	
7	U Kayin	
8	U Ajan	
9	U Win Shwe	
10	U Mit	
11	U Ye Aung	
12	U Kayin	
13	U Ngwe Lar	
14	U Wan	
15	U Nyun	
16	Daw Kyaw Myine	
17	U Paw	
18	Ma Sein Shwe	
19	U Ngwe Hlaing	
20	U San Aye	
21	U Myine	
22	U Nyein Aung	
23	Daw Nan Shin	
24	Daw Saw	
25	Ma New	
26	Ma Zin Mar	
27	Mg Chit	
28	U Kyaw Mon	
29	U Myint Oo	
30	Daw Ya Boe	
31	Daw khin Kyi	
32	Daw a noe	
33	U Pan Ngwe	
34	U Win	
35	Daw Sein Than	
36	Daw Hla Win Shein	
37	U Myint	
38	Daw Hnin Pwint	

39	U Aung San	
40	U Khin Maung	
41	U Chit Thaung	
42	Daw Pan Shwe	
43	U Ngwe Win	
44	Daw Moe	
45	U Phein Aung	
46	U Sein Bin Bar	
47	U San Nyein	
48	U Tun Shein	
49	U Silk	
50	U Chit Aung	
51	U Sein Aung	
52	U Mya Aung	
53	U Myint Oo	
54	Daw Hnin Pwint	
55	Daw Kyin Aung	
56	Daw Sae Khaing	
57	Daw Saw Mya	
58	Daw Tin Gyi	
59	Daw Ha Lae	
60	U Soe Mvint	
61	Daw Tun Kyi	
62	Daw Shin	
63	Daw Pan Shwe	
64	Daw Tin Shwe	
65	Daw Nyein Si	
66	U Khaing	
67	U Phee	
68	Daw Win Yi	
69	Daw Mya	
70	U Lae	
71	Daw Mya Shin	
72	Daw Htwe Nyo	
73	Daw Yin Kyi	
74	U Taw	
75	U Mg Myint	
76	Daw Toe	
77	U Maung Baung	
78	U Moe	
79	Daw Tin Win	
80	U Ba Win	
81	Daw Ohn Myint	
82	U Pawe	
83	U Aung Kyaw shin	
84	Daw Ye	
85	U Lick	
86	U Ba Sean	
87	U Aung Kyaw Shin	
88	U Hunn	
89	Daw Khin Yi	
90	Ma San Oo	
91	Mg Ku	

92	U Pan Aung
93	U Maung Aye
94	U Kyaw Hla Win
95	U Khin Maung
96	U Soe Myint
97	U Moe Myint Shan
98	U Thein Han
99	Daw Han Oo
100	U Chit
101	U Aung Myint
102	U Win Tun
103	Daw Pan Khin
104	Daw Myint Aye
105	Daw Nyein Tin
106	U Taung Lay
107	U Kyaw Hlaing
108	U Pauk
109	Daw Aye Pu
110	Daw Khaing
111	Ma Aye
112	U Ngwe Tun
113	U Tin Aye
114	U Maung Paw
115	U San Aung
116	Daw Htar Aye
117	Daw Pan Nu
118	Daw San Hla
119	Daw Tun
120	U Kyaw Win
121	Daw Mee
122	U Thar Aye
123	U Chae
124	Daw Saw Aye
125	Daw San Hla
126	Daw Tun
127	Daw Khin Kyi
128	U Aung Thar Phay
129	U Ngwe
130	Daw Mya

Place : Mekaro Village (Monastery), 6.9.2013 (9:00 to 10:30AM)

Participants :105 persons (attachment 6)

	Representative	Question	Answer
1.	Mekaro (Villager)	School in our village has to be	REM: WE will report to the
		closed during the flood time, so	Project for your need
		it would be good if the Project	
		can repair/ upgrade the road	
		from ferry to School	
2.	Mekaro (Villager)	This year, village school was	REM: The project has not been

primary, but no sufficient building for more students. There also need to appoint a school guard. Because of flood disaster, village could not afford these expenses	to share your social expenses by step
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Figure 6: Project Discussion in Mekaro Village (Monastery)

List of Participants in Mekaro Village

No.	Name	Village
1	U Tun Kyi	Mekaro Village
2	U Kyaw Thit	
3	U Tun Thaung	
4	U Sein Hla Win	
5	U Aung Win	
6	U Shwe Man Tin	
7	U Ba Than	
8	U Kyaw Soo	
9	U Kalo	
10	U Tin Aung	
11	U Lein	
12	U Aye Thauk	
13	U Pank	
14	U Aung Than Tin	
15	U Lein	
16	U San Chaung	
17	U Khin Ngwe	
18	U Htaw	
19	U Lin Khaing	
20	U Ye Nyunt Aung	
21	U Gayar	
22	U Shwe Kayin	
23	U Htein Win	
24	U Pain	
25	U Naung	
26	U Kack	
27	U Kyae	
28	U Myint Tun	
29	U Nyein Aung	
30	U Tun Thant	

31	U Khaing	
32	U Tun Thaung	
33	U Ngwe Soe Win	
34	U Lane	
35	U Bin	
36	U Kyaw Thit	
37	U Saw	
38	U Aung Sein	
39	U Pan Kvan	
40	U Hein Aung	
41	U Ave Soe	
42	U Kon Pa Laing	
43	U Gvi Sein	
44	U Tin Oo	
45	U Zin Ko Ko	
46	U Sein Shein	
47	U Soe Than	
48	U Chan Sawn	
49	U Lwin Saw Oo	
50	U Ye Ko Ko	
51	Daw Me	
52	Daw Shin	
53	Daw Zar	
54	Daw Mee	
55	Daw Pan Myin	
56	Daw Hla Ave	
57	Daw Thu	
58	Daw Mya	
59	Daw Shwe	
60	Daw Khin	
61	Daw Win Sein	
62	Daw Shwe Htay	
63	Daw Than Shin	
64	Daw Thamee	
65	Dwa Hla Tae	
66	Daw Phar Tin	
67	Ma Htar Aye	
68	Daw Kyan	
69	Daw Aye Sein	
70	Daw San Ye	
71	Daw Htoo	
72	Daw Tin Win	
73	Daw Kon Kalay	
74	Ma Shein	
75	Daw Maung	
76	Daw Ngwe Aein	
77	Daw Tin Tin	
78	Daw Than	
79	Daw Yin Sein	
80	Ma San Kyi	
81	Ma Aye Tawe	
82	Daw Tin Oo	
83	Daw Mee	

84	Daw Myint Than
85	Ma San Mu
86	Daw Nan Tawe
87	Ma Lay Tin
88	Daw Than Sint
89	Daw Aye Tin
90	Daw Tin Oo
91	Daw Myint
92	Daw San Tin
93	Daw Tun Taung
94	Daw Myein
95	Ma Yi
96	Daw Kayan
97	Daw Pain
98	Daw Pan Tin
99	Daw New
100	Daw San Nu
101	Daw Bon
102	Daw Mu Mu
103	Daw Shwe
104	U Tin
105	U Ba Sein

Place: Shinsawpu Ward, Kyaukmaraw Town (Cinema Hall), 6.9.2013 (1:00 to 2:30PM)

Participants: 129 persons (attachment 7)

	Representative	Question	Answer
1.	U Aung Tin Oo (Fisherman, Shinsawpu Ward)	Today there present 74 out of 88 total fishermen. We like to know how many times the vessels will use the river every day. What would be the speed of vessel? Will solve if there are problem to disturb fishing nets?	REM: We estimate 1 or 2 times daily. There will be compensation if dismantling of fishing nets. There will also be support and training to fishermen for your safety
2.	U HlaKo (Yan MyoAung Ward)	How will you use coal?	REM: Cement factory has to be operated 24 hours and consistent and continuous power is essential. So 40 MW Coal fire power plant will be operated for electricity
3.	U Kyaw Myaing, Shinsawpu Ward (2), Kyaukmaraw Town	Welcome to SCG co. because it is good cement project in Myanmar. Kyaukmaraw Township is flooded area. He requested -to reduce the negative impact of Cement factory -to construct the new road from Kyaukmaraw port to Tarana	REM: noted your will and to report to the Project personnel

		village for good transportation	
4.	Dr. Myint Swe,	Is air pollution 100% secure?	REM: Our team always mornitor
	Yanmyolone Ward,	There is more cabondaioxide in	the environmental impact. They
	Kyaukmaraw Town	the air, lung desease and	have EMP plan.
		respiratoray disease can be	The project developer will build
		suffered.	hospital forworkers and
		What would be in Longterm	neighbouring villages.
		condition?	Our team also suggested to cure
		We are happy for this project.	dental problems in the villages.
		It is suggested that instead of	
		mobile clinic, small hospital	
		should be build for health care	
		of factory workers and	
		villagers.	
5.	Member of NLD Party,	NLD wants to know the impact	REM: The project developer
	Kyaukmaraw Town	of transport on fishery, loss of	will meet and discuss with
		farm land, and consideration	fishermen under CSR program.
		for building staff quarter and	
		land area for factory.	



Figure 7: Project Discussion in Shinsawpu and Yanmyolon Ward (Cinema Hall)

List of Participants in Shinsawpu Ward, Kyaukmaraw Town

No.	Name	Village
1	U Myint Naing	
2	U Aung Shwe	
3	U Myint Soe	
4	U Zin Min	
5	U Myint Soe	
6	U Kyaw That Naing	
7	U Myint Wai	
8	U Kon Ba Lar	
9	U Thein Tun	
10	Mg Ye Naing Win	
11	Mg Wana Tun	
12	U Hut Maung	
13	U Win Tun	
14	Daw Htar Shwe	
15	Mg Yin Htwe	
16	Ko Myint Aye	
17	U Shwe Yon	
18	U Maung Win	
19	U Hlaing	

21U Myint Soe22Daw Tin Tin Aye23U Myo Thein Tun24U Kyaw Soe Lwin25Daw Khin Htay26Daw Khin Myint27Daw Sandar28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
22Daw Tin Tin Aye23U Myo Thein Tun24U Kyaw Soe Lwin25Daw Khin Htay26Daw Khin Myint27Daw Sandar28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
23U Myo Thein Tun24U Kyaw Soe Lwin25Daw Khin Htay26Daw Khin Myint27Daw Sandar28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
24U Kyaw Soe Lwin25Daw Khin Htay26Daw Khin Myint27Daw Sandar28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
25Daw Khin Htay26Daw Khin Myint27Daw Sandar28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
26Daw Khin Myint27Daw Sandar28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
27Daw Sandar28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
28Daw Gyi Htay Lat29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
29Daw Tin Htay30Daw Tin Tin Hla31Daw Aye Win32Daw Khin Ma Ma
30 Daw Tin Tin Hla 31 Daw Aye Win 32 Daw Khin Ma Ma
31Daw Aye Win32Daw Khin Ma Ma
32 Daw Khin Ma Ma
33 Ma San Mvint
34 Daw Than Ave
35 Ma Min Myat Yi
36 U Yae Kyua
37 Ma Mi Yae Moe
38 U Than Tun
39 Ma Thandar
40 Daw Khin Lav Kyu
40 Daw Kilin Edy Kyd 41 Daw Kyi Kyi Mya
4? U Ohne L win
43 U Khin Kyaw Aung
44 U Aung Thein Oo
45 U Maung Gyi
46 Mg Win Naung Soe
47 II Ye Win
48 U Kyaw Thein
49 U Aung Tin Oo
50 U Aung Thein Htay
51 U Zaw Thein
52 U Han Thein
53 U Soe Myint
54 Mg Kyaw Thein
55 Daw Hla Hla New
56 Ma Khin San Yee
57 U Hla Ko
58 U Kyaw Myine
59 U Than Win
60 Daw Cho Myint
61 Daw Ave Win
62 Ma Zin Htwe
63 Ma Khin Myint Maw
64 Ma Htwe
65 Ma Win Htay
66 Ma Ni Ni Soe
67 Ma Khaing Ave
68 Daw Than Myint
69 Daw Than Ave
70 Daw Tin Moe Khaing
71 Ko Win Zaw Maung
72 U Naing Win Htay

73	U Phoe Ngoe	
74	Ko Soe	
75	U Zaw Oo	
76	Daw Monn Shwe Ye	
77	Daw Kyi Win	
78	U Soe Win	
79	Daw Cho Lwin	
80	U Myo Zaw	
81	Ma Yin Thein	
82	Ma Yin Thein	
83	Ma Win Htay	
84	U Myine	
85	Daw Nyaunt Nyaunt Than	
86	Daw Shwe Zin Aye	
87	Daw Ni Ni Win	
88	Ma San Maw	
89	Daw Ave Khaing	
90	U Sein Aung	
91	U Ohne Nyunt	
92	Mg Nae Myo	
93	U Myo Aung	
94	U Kan Thein	
95	U Aung Aung	
96	U Than Tun	
97	Daw Hla Hla Win	
98	U Phay Than	
99	Daw Htar Htar Maw	
100	Daw Lwin Lwin Mar	
101	Daw Than Than New	
102	U Tin Hlaing	
103	Daw Nyo Nyo Thein	
104	U Kyaw Win	
105	Ma Phyu Phyu Myint	
106	U San Thaung	
107	КоВо Во	
108	Mg Htwe	
109	U Kyo	
110	U Tin Hlaing	
111	U Zaw Myint	
112	U Soe	
113	Ma Cho Htwe	
114	Ma Nge Nge	
115	Ma Khin Moe Shwe	
116	Ma Aye Aung	
117	Ma Mi Aye	
118	Daw hla Kyi	
119	U Paye Phyo Aung	
120	Ko Hla Shwe	
121	Mg Than Myint	
122	Mg Myo	
123	U Kaung Gyi	
124	U Khin Shwe	
125	Ko Tin Aye	

126	U Tun Oo	
127	U Aung Myint	
128	U San Thaung	
129	U Maung Lay	

Place: Kawthat Village (GAD Office), 7.9.2013 (9:00 to 10:30 AM)

Participants: 119 persons (attachment 8)

Representative	Question	Answer
1. U Aung Tun (Kawthat)	School in our village is High	REM: noted your will and to
	School (branch) with 800	report to the Project personnel
	students and 32 teachers. It is a	
	two-shift school. We request	
	the Project to support building	
	and fence for the school.	



Figure 8: Project Discussion in Kawthat Villlage

List of Participants in Kawthat Village

No.	Name	Village
1	Mg Ba Aye	Kawthat Village
2	Daw San	
3	Ma Nan Win	
4	Ma Min Chan Mon	
5	Mg Min Zaw Min	
6	U Chit Thein	
7	U Khaing Shwe Ba	
8	U Bu	
9	U Naing Maing	
10	U Thae	
11	U Maung Zawe	
12	Daw Kyein	
13	Ma Ni Ni Mon	
14	Ma Tae Mi	
15	Ma Mi Ngwe Paing	
16	Ma Mi Ngwe Nu	
17	Ma Mi Ngwe Hla	
18	Daw Kact	
19	U Ka Yaw	

20	Ma Kyi Hlaing	
21	Daw Ma Lay	
22	Ma Mi Khin Lay	
23	Ma Mi Yin Khaing	
24	Ma Mi Dadic	
25	Daw Win	
26	Daw Thauk	
27	Daw Ma Pee	
28	Daw Halack	
29	Daw Maine Yaw	
30	Daw Wan	
31	Daw Pu	
32	Daw Lann	
33	Daw Aa	
34	Daw Kalopoe	
35	Daw Ngwe Sar	
36	Daw Nyi	
37	Daw Hlaing	
38	Daw Konn Pae	
39	Ma Thar Pooh	
40	Daw Ha Kat	
41	Daw Lae	
42	U Pooh	
43	U Kvut	
44	U Yine Oo	
45	U Aung Sein	
46	U Hlaing	
47	U Tun Ave	
48	U Chit Thaung	
49	U Japan	
50	U Aung Tun	
51	U Ba Lu	
52	U La Mat	
53	U Pae	
54	U Savae	
55	U Zay	
56	U Win	
57	U Kyaut	
58	U Pan Thein	
59	U Laein	
60	U Mitta	
61	U Hlike	
62	U Min Chan Lon	
63	U Min Tun Shwe	
64	U Sa Kaung	
65	U Zaw Win	
66	Daw Zaye	
67	Daw Pyant	
68	U Khin Maung Than	
69	Daw Pauk	
70	Daw Khaing	
71	Daw Ngwe Thee	
72	Daw Yein	

73	Ma Mi Aye Su
74	Daw Yin
75	Daw Khin Than
76	Daw Ha Thime
77	U Pu
78	Daw Ngwe Win
79	Daw Kanee
80	U Moak
81	U Pange
82	U Aung Ha Lu
83	U Kyauk
84	Daw Swant Tae
85	Ma Yaine
86	U Pa Lo
87	U Than Tun
88	U Min Aye Tun
89	Daw Ka Laine
90	U Tun
91	Daw Chee
92	Daw Hit
93	Daw Lie
94	U Pa Laine
95	U Sean
96	Daw Sein Chit
97	Daw San Myint
98	Daw Like
99	Daw Pu
100	U Kaing
101	U Jein
102	U Tin Maung
103	U Yae
104	U Naing
105	U San Like
106	U Naing Lwin
107	U Aung Bo
108	U Shine
109	U Mauk
110	U Naing Pa Yan
111	U Naing Hun Thein

Place: Tarana Village (GAD office), 7.9.2013 (10:30 to 11:30 AM)

Participants: 44 persons (attachment 8)

Representative		Question	Answer
1.	U Naing Hla Aung (Vice-	Can we make trial if there are	REM: There is EMP Plan in the
	Chairman, Mon Regional	pollution by the Project?	Project. Monitoring will be
	Democratic Party)	Electricity should be supported	throughout the construction and
		by the Project, especially for	operation periods.
		the villages between factory	There will also be a CSR office

	and Taranar?	in the near future and can complain for every problem of the project. We will report about your need for electricity
2. U Than Aung, Head of Village Tract, Tarana	We wish to upgrade entrance road of the village as first priority	REM: All will go step by step once construction operation starts



Figure 9: Project Discussion in Tarana Villlage

List of Participants in Tarana Village

No.	Name	Village
1	U Than Aung	Tarana Village
2	Daw Ngwe Saw	
3	U Than Kyi	
4	U Ka Yae	
5	U Mitta	
6	Daw Mae	
7	U Achan	
8	U Sein Myint	
9	U Chit Maung	
10	U Nyunt Aung	
11	U Maung Maung Ya	
12	U Win Myint	
13	U Mon Chan	
14	U Min Lwin	
15	U Thein Line	
16	U Tin Aung	
17	U Shwe Htee	
18	U Hauk San	
19	U Tun Tin	
20	U Shwe Ban	
21	U Min Win Zaw Oo	
22	U Ba Than	
23	U Tun Sein	
24	U Mg Lar	
25	U Than Tun	
26	U Wa Gyi	
27	U Paw	
28	U Naing Hla Aung	

29	U Maung Ngwe
30	U Mitta
31	U Ngew Sai
32	U Min Tun
33	U Maung Maung
34	U Tae
35	U Tin Ngwe
36	U Ka Chit Naing
37	U Nyunt Win
38	U Kasea
39	U Hyar Man
40	U Sein Hla
41	U Soe Min
42	U Pain Lay
43	U Than Phay
44	U Aung Myint

Place: Kawwan Village (GAD office), 7.9.2013 (2:00 to 3:00PM)

Participants: 100 persons (attachment 10)

Representative	Question	Answer
1. U Hu Sein (Supporting	Wish to upgrade the Taranar	REM: There are plans. Please
Committee, Kawbwee)	Road	be patient. Will report also
		again to the Project



Figure 10: Project Discussion in KawwanVilllage

List of Participants in Kawwan Village

No.	Name	Village
1	U Aung Ban	Kawwan Village
2	Daw Tin Oo	
3	U Hla Aung	
4	U Aung Phay	
5	U Soe Thein	
6	U Kyaw	
7	U San Myint	
8	U San Nyo	
9	U Paye	
10	Mg Soe Paing	

11	U Tin Htay	
12	U Hu Sein	
13	U Kvan	
14	Mg Tin Tun	
15	U Aung Pan	
16	Daw Kyaut Shin	
17	Ma Mi Ngwe	
18	Ma Hla Thuzar	
19	Ma Aye Myine	
20	Daw Zin	
21	Daw Yin	
22	Daw Hla Pon	
23	Daw Kyan Than	
24	Ma Win	
25	Ma Tae	
26	Ma Aye May	
27	Ma Lae Lae Khaing	
28	Ma Aye Maw	
29	U Ba Kyaw	
30	U Win	
31	U Chit Naing	
32	U Kyaw Win	
33	U Hu Sein	
34	U Yazar Tin	
35	U Chit Tin	
36	U Aung San	
37	U Shein	
38	U Hla Haung	
39	U Bo Gyi	
40	U Kyan	
41	U Phay	
42	U Tun	
43	Mg Tin Hein	
44	Mg Soe Aung	
45	Daw Pan Sein	
46	Ma Than Dar	
47	U Palae	
48	U Are Min	
49	U Tun Hlaing	
50	U Nyein Aung	
51	U Han Sein	
52	U Kyaw Phay	
53	U He	
54	U Sa Rat	
55	Mg Sein Win	
56	U Ka Law	
57	U Maung	
58	U Sho Yi Pho Tin	
59	Mg Ba Gyan	
60	U Ko Bi	
61	Ma Hla	
62	Ma Win Nu	
63	Ma Aye Soe	

64	Daw Shwe
65	Daw Pan Mawe
66	Daw Ma La
67	Daw Yin May
68	Daw Thik Chan
69	Daw Yu
70	Ma Khin Myint
71	Ma Sin
72	Ma Moe
73	Ma Cho Thoo
74	Ma San Yee
75	Daw Chit
76	Daw Yauk
77	Ma Khaing Win
78	Ma Lay Lay Myint
79	Ma Nyunt Tin
80	Ma Thein Hlaing
81	Daw Mya Thein
82	Daw Sein Pwint
83	Daw Yin Ma
84	Daw Aye May
85	Ma Khin
86	Ma Payae
87	Daw Tin Tin Wai
88	Daw Ma Htay
89	Ma San Wai
90	Daw Lon Sawe
91	Daw Wu
92	Ma Khin Htwe Yi
93	Ma Kyi
94	U Ngwe
95	Aupadujali
96	U Hu Sein
97	Daw Par Nu
98	U Kalar
99	Ma Nyo
100	U Maung Hu

Place: Nyaungbinseik Village (Monastery), 8.9.2013 (9:00 to 10:30 AM)

Participants : 51 persons (attachment 11)

Representative	Question	Answer
1. U Soe Aung, Fisherman	Fishing is their traditional business and only 30 % of villagers have their own finishing net and 70 % have to hire the net. As cargo ships will have to be traversed along the Atrran River for carrying cement product and raw materials, they	REM: the ships will be traversed 1 to 4 times per day and REM suggested doing the time-table and schedules for traversing of those ships. If the finishing nets are damaged by those
	want to know how size of those	6 5

	ships and what speed they have to sail. Moreover, they want to get the information of traversing of the ships early by communication. Their finishing seasons are between December to January.	ships, compensation will be settled.Moreover, another meeting will be held together with fisher men around Atrran River. And also, local people can complain their needs when the CSR office will be opened.
2. U Soe Aung, Fisherman	It is impossible to remove their finishing nets urgently when the cargo ships enter the river by siren.	REM: time-table and schedules for traversing of those ships will be prepared by guidance of Department of Inland Water Transportation.
 U Tin New, Committee of Nyaungpinseik Village 	Communication devices like cordless phones, walky-talky, have to be provided to local fishermen for above matter.	REM: we will submit that matter to project owner.
 U Thein Hla, Committee of Nyaungpinseik Village 	There is a 160 KV transformer and it can't supply the electricity to whole village. So, they want company to provide the sufficient electricity to their village and they want the job opportunities for their villagers not only graduate persons but also general works.	REM: we will submit the electricity matter. For the job opportunities, please list the persons who want the job to head/chairman of village first.
 U Myint Aung, Committee of Nyaungpinseik Village 	Where they can get the application form for job.	REM: company will deliver those application forms directly to the village.
6. U Soe Aung, Fisherman	Fisherman said that there is two important issues; (i) Regular Fishermen (2) Auction Please consider their livelihood	REM: we will submit that matter to project owner and discuss with Directorate of Water Resource and Improvement of River System



Figure 11: Project Discussion in Nyaungbinseik Villlage

List of Participants in Nyaungpin Seik

1	U Lon Tin	Nyaung Pin Seik Village
2	U Tin New	
3	U Aung Tun Myint	
4	U Chit Nyut	
5	U Aung Soe Tun	
6	U Soe Aung	
7	U Zaw Lin Maw	
8	U Soe Naing	
9	U Myo Naing	
10	U Win Aye	
11	U Zaw Maw	Nyaung Pin Seik Village
12	U Win Soe	
13	U Maung Two	
14	U Kyaw	
15	U Aung Twe	
16	U Thein Hla	
17	U Maung Win	
18	U Mu Sar	
19	U Own Shwe	
20	U Mya Aung	
21	U Soe Myint	
22	U Ye Win Myine	
23	U Aung Two	
24	U Shwe Tun	
25	U Tin Myint	
26	U Myint San	
27	Daw Khin Yee	
28	Daw Aye Myint	
29	U Kyaw Win	
30	U Par Mwon	
31	U Myint Oo	
32	U Thein Myint	
33	U Naing	
34	U Phone Myint Oo	
35	U Ye Win	
36	U San Thaung	
37	U Min Naung Zaw	
38	U Ar Si Ton	
39	U Nge	

40	U Tun Min Soe
41	U Thein Tun
42	U Soe Hlaing
43	U Myint Aung
44	U Tin Yu
45	U Aye Lwin
46	U Chit Than
47	U Min Min Win
48	U Maung Win
49	U Kyaw Min Oo
50	U Thet Aung Htwe
51	U Tin Hla

Place: Kyonewan Village (Monastery), 8.9.2013 (9:00 to 10:30 AM)

Participants :90 persons (attachment 12)

Representative	Question	Answer
1. U Pan Myaing,	There is a monastery on the	REM: If there is any damage,
Committee of Kyonewan	Atrran river bank. When the	the company will take
Village	ships entering the river, there	responsibility. Now I will go
	can be bank erosion. The	there and take photo.
	villagers worried about the	_
	damage of the monastery.	



Figure 12: Project Discussion in Kyonewan Villlage

List of Participants in Kyonewan

No.	Name	Village	
1	U Than Phay	Kyonwan Village	
2	Daw San San Lwin		
3	U Ba Than		
4	U Kyaw Win		
5	U Than Myint		
6	U Wia		
7	U Aung		
8	U Than Maung		
9	U Hla Win		
10	U Lin Kyi		
11	U Kwin		
12	U Maung Aye		
13	U Tun		
14	U Tin Myint		
15	U Own Mot		
16	U Nge Kaing		
17	U Dat Sawe		
18	U Pan Myine		
19	U Ba Si		
20	Daw Nge Kyin		
21	Daw Tin Sein		
22	U Shan		
23	U Hla Aung		
24	U Na		
25	U Nyine Maung		
26	U Soe Lwin		
27	U Tun Hlaing		
28	U Thein Lwin		
29	U Soe Tin		
30	U Than Tun		
31	Daw Khin Than		
32	Daw Hla Thaung		
33	U Paw Tit		
34	U Kyan Hla		
35			
30	U Wiyini Aung		
3/	U Knin Maung Aye		
30			
39	U Mon Htaw		
40	U Moli Htaw		
41	U Sain Hla		
42	U Thein	-	
44	Daw Yin Phay		
45	II Yat		
46	U Aung Nyein		
47	Daw San Yee		
48	Daw Twe		
49	Daw Hla Mvine		
50	Daw Kyin Ave		
51	U Win Aung		
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52	Daw Aye Myint		
53	Daw Own Shin		
54	Daw Shwe Myint		
55	Daw Khin Kyi		
56	U Tun Myine		
57	U Aye Twin		
58	U Chit Aung		
59	Daw Myine		
60	Daw Pan Sein		
61	U Thein Phay		
62	Daw War War		
63	U Kyaw Oo		
64	U Kyaw Lwin		
65	U Swee		
66	U Soe Shien		
67	U Par Soe		
68	Daw Mi Nge		
69	U Aung Win		
70	Daw Shan Ma		
71	Daw Shan		
72	Daw Win Kyi		
73	U Aung Phay		
74	U Soe Naing		
75	Daw Yin Aye		
76	Daw Pwot		
77	Daw Won Khin		
78	U Aung Soe		
79	U Han Aye		
80	U Hla Maung		
81	Daw Shwe Myine Kyi		
82	Daw Kyi		
83	U Tin Aung	Kyonwan Village	
84	U Mya Hlaing		
85	U San Chine		
86	U Tin Shwe		
87	U Tin Hla		
88	U Kyan Khin		
89	U Aung		

Year	: 2017 (Public	Disclosure on EIA Repo	rt Submission)	
1	17.8.2017	Rheymonya Hotel,	-Chief Minister of Mon	MCL
	9:00 AM -	Mawlamyine	State	
	12:40 PM		-State Governmental	
			Officers	
			-Kyaikmaraw	
			Township GAD officer	
			-Local people project	
			surrounding villagers	
			-Media	
			-NGOs and interested	
			persons	
			-REM Consultants	
			-MCL Authorities	
2	18.8.2017,	Kaw Pa Nor new	-Kaw Pa Naw	MCL
	9:00 AM -	Monastery	Villagers	
	12:00 PM		-REM Consultants	
			-MCL Authorities	
3	18.8.2017,	Kaw Dun New	-Kaw Dun Villagers	MCL
	2:00 PM –	Monastery	-Mekaro Villagers	
	5:00 PM		-REM Consultants	
			-MCL Authorities	
4	19.8.2017	Kaw-Krid Monastery	-Kwan Ngan Villagers	MCL
	9:00 AM -		-Pauk Taw Villagers	
	12:00 PM		-REM Consultants	
			-MCL Authorities	
5	19.8.2017	Shwe War Chaung	-Kadonsit Villagers	MCL
	2:00 PM –	Monastary	-Shwe War Chaung	
	5:00 PM		Villagers	
			-REM Consultants	
6	20.8.2017	Hnidon Village	-Hnidon Villagers	MCL
	9:00 AM-	Administrative office	-REM Consultants	
	12:00 PM		-MCL Authorities	

3rd Public Consultation and Disclose Meeting on EIA Submission

Objective

- To publicize MCL's Kyeikmaraw Cement Plant
- To disclose the ESIA report conducted in 2013
- To explain the Project Description of Mawlamyine Cement Limited, MCL
- To discuss the Clean Coal Technology used by Coal fired Power Plant
- To implement the Environmental Monitoring and Management Plan in MCL
- To get more insights and concerns about the MCL project from the local people

Meeting Minutes (1)

Stakeholder Consultation and Public Disclosure Meeting of Mawlamyine Cement Limited, Kyiekmaraw Cement Plant's Environmental and Social Impact Assessment in accordance with EIA procedures

Date	: 17.8.2017
Time	: 9:00 AM to 2:40 PM
Venue	: Rehomomya Hotel, Mawlamyine
Participants	: 200 persons

• Opening remark by Mon State Chief Minister, Dr. Aye San

I would like to say "Mingalabar" to Mawlamyine regional parliamentarians, representatives from Mawlamyine regional government, members of natural resources conservation committee, officials from various government departments, CSO members, local people, and all those who attended this public consultation.

MCL hired REM Co.Ltd as the third party to carry out ESIA. With REM's guidance, MCL already submitted ESIA to Myanmar Investment Commission and Department of Environmental Conservation. MCL started commercial operations from April 1, 2017. In accordance with legal procedures, REM has been testing air, water, ground and noise conditions around MCL for every four months. MCL also formed a watch group of administrators, officials and local people so that there could not be any problematic issues or threats to the environment. Regarding CSR, MCL has built schools in "Pyar Taung" area, clinics, roads, donated stationeries, done religious deeds, and donated cement for regional development activities.

This meeting is for the public to give opinions and put ideas to ESIA. Our country is still at the starting phase to form Federal Union. One essence of democracy is natural environment. In democracy, we must foresee sustainable development without harming the environment. We must leave next generation with the environment of greater quality. We also received oppositions of the local people on the development of coal-fired power plant. We went and studied the cement plant in Thailand. They are located in forests far away from the city. In the case of coal-fired power plant in Japan, there is a population of 30 million people living around. They can reduce CO_2 emissions to 78; no SO₂ and NO₂ emissions. CO2 is absorbed by the forests which is rich in biodiversity. Responsible persons inform the local people in a timely manner. If their emissions go beyond national emission standards, they have to pay fines to the government, even for 0.1 percent. If you ask why Clean Coal Technology is not used, it is the technology easily available in every county. It was not available in the past, but now it is. You have every right to oppose. But what I want to encourage you is to read and study. We must think of how we balance things. We need electricity. ESHIA has come into use in our county in 2015. Feel free to ask anything. We shall not hold our own standing points always. In democracy, we must respect the majority's wills while listening to the minority's. Although you have the rights to be different, it is not democracy if you hold your ideas whatever it takes without having prosperous considerations.

In conclusion, I would like to encourage all of you to give constructive ideas and suggestions, which may support to the development of our country which mainly needs to be balanced socially and economically.

- Introduction and Description of MCL, Kyaukmaraw Cement Plant by U Zaw Lwin Oo
- Explanation of ESIA that was carried out in 2013 by Daw Khin Ohnmar Htwe, Social Consultant from REM
- Explanation of EMP by Mining Department Manager, Mr. Parinya
- Questions, Answers and Suggestions by Participants

Discussion by U Naing Ye Zaw from Kyaikmaraw

I invited U Soe Aung from Greenfield International Cooperation, USA who is on a short visit in Myanmar from USA. Experts do not lie while politicians may. I studied about it yesterday. As it is known that using coal is not suitable in the future, most countries have been reducing using coal. Coal is used temporarily, according to economic conditions. Meanwhile, they are thinking of using renewable energy. It was signed by 60 countries not to use coal. This ESIA was carried out in 2013 and submitted in 2017. So, I would say that this ESIA is invalid, owing to the fact that there are many changes and differences. It is found that it flouts EIA procedures. My friend will put his thoughts

soon. I also concern about the canal. How was it allowed to dig so easily? The river course will change its way completely. Local people do not know details about 20 MW coal-fired power plant. It can be assumed that it is not included in EIA report as well. Coal can be cleaned up to 70 % but not completely.

Answer by U Zaw Lwin Oo(MCL)

The canal is 3km long, including jetty. Its main purpose is to transport raw materials and cement. It was built with the official permit from department of water resources. It was allowed by the government and MCL gave taxes to the government. Regarding using coal, electrical power has not been able to provide to MCL since the previous government. MCL needs power to operate and it must be stable too. We are negotiating with the national government too. We have graduates from GTC and GTI, who are now working at MCL. In case of EIA, EIA was stipulated in 2012. We did not know about EIA before. But we submitted EIA to MIC and we started our activities with their permission. As we were asked to do EIA again, we discussed about it with the Director General yesterday. EIA is supposed to conduct before the operation of the plant. We presented four chapters as directed by ECD.

Discussion by U Soe Aung (Greenfield International Cooperation, USA)

After submitting EIA report to ECD, it was not disseminated to the public. Please explain EIA procedures.

Answer by Daw Khin Ohnmar Htwe (REM)

National Commission for Environmental Affairs (NCEA) was formed under Ministry of Foreign Affairs in 1994.Environmental Conservation law (2012), Environmental Conservation Rules (2014) and Environmental Impact Assessment Procedure (2015) were enacted by Ministry of Natural Resources and Environmental Conservation. We conducted EIA of MCL in 2013. Our EIA work was all done in 2013.

We are third party organization. We play our role of third party well. We also tell MCL now and again that they are weak in being transparent. But we cannot ask them what to do or what not to do. We can just give them recommendations on how to mitigate for the current plants.

We had the baseline data in 2013 in order to reduce the environmental impacts in this factory. So, we can do and we have to give recommendations of environmental mitigation, management plan and regional development to them together with the public.

I am here this time because I done this EIA report since 2013 and I think I am still responsible for it. We have already submitted four EIA reports based on 2013 EIA to ECD, Nypyitaw. I really appreciated Sayar U Soe Aung' suggestion. If the ministry asks us to develop EMP again, we can do it. We will have to think what we can do collaboratively.

Discussion by U Soe Aung

EIA must be done in accordance with the articles from the EIA procedures. If not, it is invalid. We don't have either ESIA or ESHIA. I have only IEE, EMP and EIA. If this report is named "ESHIA" it is not suitable. In the executive summary section, there are a lot of pages. It must be presented in the Myanmar language only. There must be only 3 facts in introduction. There must be transparency. For the suggestion box, it is not okay because some people are still illiterate. Do they explain you in person? So, there is still no transparency. Monks protest for 'no coal', you should wait for some time. EIA report must be conducted again to be more reliable. I would like to say "Please wait for some time".

Answer by Daw Khin Ohnmar Htwe (REM)

TOR is very important for projects. Our country has already been late to pay attention to environmental conservation. Environmental conservation subjects are also not in place too. Formats

are still loose. That ESIA report you mentioned was to be done before the project. As it is 2017 now, it is not valid, I accept. As MCL was already established, it should design a very good EMP. Regarding developing EMP, if MCL wants to hire REM for that, we will continue doing it. If MCL wants to find other agency, we welcome that too. If a well-designed EMP could be done and MCL could completely abide by all Environmental Conservation Laws, Rules and regulations, I believe that it can be a project for our country and for the public. EIA procedures (2015) will be of great help for us. Do not worry for that. I would like all of you to welcome as we follow all rules and regulations.

Discussion by U Win Min Ko

As you said that ESHIA format is not well-designed, I would like to know when fixing it will be finished and when it will start. Will the cement plant operate only after fixing it?

Explanation by U Soe Aung

The first step is to develop EMP. The cement plant is already at stage 3, the operation stage. We will not ask it to go back to stage 1 and 2. EMP is already in EIA. We will have to find mitigation measures.

Suggestion by Dr. Min Aung Pan, Professor, Geography Department, Bago University

In search of regional development, it must also foresee sustainable development. How we will conserve our environment matters to be sustainable? I expect that MCL will do well to support the sustainable livelihood of the local people and to minimize any impacts it can pose to the environment.

Question from villager: Did the ministry already permit 2013 EIA? Are you going to do it again and resubmit?

Answer by U Zaw Lwin Oo: We have already submitted EIA report to the ministry. But the committee still does not reply back. It will take some time for review.

Question from monk: We have health problems due to explosion of mines. How will you mitigate this impact?

Answer by Mr. Parinya : To minimize this effect, we won't do it continuously. We will pause at certain intervals. And we won't do that activity on Sabbath days. We are agree about the noise pollution.

Question from Mi Sandi, Local people: I feel sorry to hear the feelings of local monks. As SCG is based in Thailand, I wonder if there are similar situations there. MCL must hold many responsibilities for that. How can you promise accountability and responsibility to make sure that there is no lie?

Answer by U Zaw Lwin Oo: The mine explosion process is the same in Thailand – one in the afternoon and one in the evening. And it is not carried out on every Sabbath day. I also hear the noise of mine explosion at other times of the day. It is not by MCL. But we also don't know who is doing this.

Answer by U Soe Aung: When I went to Sayadaw yesterday, I also heard that noise. It was too loud. **Answer by Mr. Parinya**: We don't do it in the morning. We just do it in the evening. You will need to investigate about it.

Question from a local person near Pyar Taung Area: Do you have any criteria in recruiting teachers for students? How does MCL make choice in supporting students?

Answer by MCL: It was not by us. It was June Organization.

Question from local person: How was the household survey done?

Answer by Daw Khin Ohnmar Htwe (REM): We submitted our plan to the township GAD chief officer. We did not select participants to attend. It was arranged by him.

Question from local person: Due to the passage of ships of MCL, there arise problems in fishing. Fishing net sank in the deep water because of these ships.

Answer by U Zaw Lwin Oo: We can't reply to that question right now. We will discuss with the authority.

Question from local person: As MCL is helping for development of villages, is there any plan to supply electricity?

Answer by MCL: We are discussing about it with State government and State electricity Department. We have already informed the village administrators. We support and open monasteries, schools and clinics. But for electricity, we need permission from the State government.

Question from local person: There is no permit from the Union government. It is only mentioned that whether it is allowed by the Hluttaw committee or not. How is this different?

Answer by U Zaw Lwin Oo: You'd better ask it to the authority. We cannot do anything without permission. We have permission for 20 MW.

Question from local person: As you said you would share 2 % of benefit to the local people. Does it mean only 2 % for all year?

Answer by MCL: Annual Net profit 2 % means that MCL will have cooperation with the state government in development activities of the state.

Question from local person:: For electricity distribution, can it not be funded by this 2 % benefit and get from Ngantay electricity plant?

Answer by U Zaw Lwin Oo: If we want electricity, we will need to inform the Ministry of Electricity. Ngantay power plant is just generating power. It cannot distribution. Distribution is under the Ministry's administration. We are still discussing about it with the ministry.

Question from local person: EIA is not accepted by the local people. Will MCL do it again in accordance with 2015 laws? How will you continue? ECD also still do not reply.

Answer by U Zaw Lwin Oo: As ECD asked us to have 4 chapters, we have already done that. They have review committee. We are waiting for that. We already requested them to hire other review team if possible. We also want to get it very soon. We will pay every cost for that. We are glad we have a chance to discuss all frankly. Thank you.

Meeting Minutes (2) Date: 18.8.2017 Time: 9:00 AM – 12:00 Venue: Kaw Pa Nor new Monastery Participants: 121 persons

U Zaw Lwin Oo from MLC Company introduces the cement factory. I would like the locals to talk to MCL Company without any barrier. All the locals are invited to the Company and the factory at any time.

Prof. Dr. Min Aung Pan explains about ESIA (2013) to the communities in Mon language.

Mr. Parinya, manager in Mining Department from MLC Company invites questions and comments from the villagers. Questions and comments from the villagers are welcomed since we are here to get advices and comments from the villagers.

Question by a villager My boat got sink. We were going at night in Ataran River and the wave from MCL Company ships make his boat sink. I would like to reduce the MCL Ships speed. What will you do about the boat that get sink because of the wave as it normally cost up to 60000 kyats. I would like the MCL to solve the boats situations.

Answer : There are two main reasons for this case. The first one is about binding boats with poles. Please do not tie your boats with the poles so tight. When it is too tight, it creates tension. The river is very strong and fast and at the same time it is quite narrow, so we would like to suggest you loosen you boats a little when you tie to the pole.

The second is the MCL Company will held talk with the locals boat owners about the possibility after the meeting. They also invite the locals to come and talk with them.

Managing Director from MCL: We are discussing about the possibility of giving electricity to the area too.

Meeting Minutes (3) Date: 18.8.2017 Time: 2:00 PM -5:00PM Venue: Kaw Dun new Monastery

Participants : 84 persons

U Zaw Lwin Oo from MLC Company introduces the cement factory.

Prof. Dr. Min Aung Pan explains about ESIA (2013) to the communities in Mon language.

A representative from Mon National Party's remark:

I am very sorry to see only very few people attend this meeting, why don't they attend this meeting although they agree to sign in the eastern part with MCL? I would like the MCL to listen the community's voice so that I could also stand with the community. But I think the company is also stubborn. I would like the community to see the EIS/SIA. I would to see that EIA/SIA explain like we are doing now with experts. This is too shallow.

Answer: Thanks for the question and comments. We cannot do anything about the public not attending this meeting. We do ask the village administrative to inform the community. We would like to do as we did in Mawlayaine yesterday. We have now advertised in Daily Eleven.

Answer: I am Dr. Min Aung Pan and I am studying Geography majoring in social and human environment. People are not perfect, we are always learning. I am also still learning till now and I have to help my people and my area for development.

Question: We know you are expert, but we also know that environment degradation will not happen right now. We are focusing on the next generation, the second generation and third generation. We and our generation are the ones that will suffer.

Answer: (Dr. Min Aung Pan) we did many assessments and we found out also that we need sustainable Development. We also believe that sustainable development and environment conservation is the key.

Question: I would like to request one thing. I wanted this eastern part to have electricity. But Ko Zaw Lwin Oo bluntly refused. I would like to tell the villagers that the Regional Minister has promised to give electricity to all the 45 villages in this area within one year. But now I am not going to ask again. I did many times in the past.

Answer: (MLC Company) It is true that we could not provide electricity when you asked. The situation at that time was very complex and we were not at the position to provide. We have talked with the village administration about the possibility of proving electricity and the Minister is also in contract with the situation at the moment. We are doing step by step according to the law and requirement. We have to get permission too.

Question: Ministry of Mining said they cannot put two 20 megawatts. But it is to do with the government. I also would like to ask what was discussed in the parliament, when will the local (kyaitmayaw) can use the 2% percent profits. It was said that when they starts making profit.

Answer: I have not remembered answering this question in the parliament. I would like to tell you that I have never said this in the Parliament. We cannot come in and go out in the parliament as we wish. Everything has to be done accordingly; it has to go through the local and regional government. So the regional government and MCL will discuss about this matter and use the 2%. The profit would come within April and March 31. But we have to discuss with the regional government.

Mr. Parinya, Mining Department Manager from MCL Company said anyone can participate in giving comments or advises as they want to be as transparency as possible.

U Zaw Lwin Oo continue to explain more about coal.

Question from one of the villager:

Question: How does the company take responsible for any possible problem in term of the factory? Is there any plan for respond to the emergency?

Answer: You do not need to worry about this because the factory will be here for at least 50 years and you can come in and go out at any time. You can also check with the Environmental Conservation Department for any uneasiness or doubt.

Question: We as locals are worried about coal as most of us are uneducated?

Answer: Coal is dangerous only when meet with fire. In general, there is no danger in itself.

Meeting Minutes (4) Date: 19.8.2017 Time: 9:00 AM -12:00

Venue: Kaw Krid Monastery

Participants : 150 persons

U Zaw Lwin Oo from MLC Company introduces the cement factory.

Prof. Dr. Min Aung Pan explains about ESIA (2013) to the communities in Mon language.

Mr. Parinya, Manager in Mining Department from MLC Company invites questions and comments from the villagers. Questions and comments from the villagers are welcome since we are here to get advices and comments from the villagers.

I would like to clarify about a few things,

1. We will only do one mine explosion per day between 4:30-5:30.

2. We will use coals in the safest and most advance way to minimize any danger. We also have LED screen all day which will update any important information.

3. We might raise a question that is it harmful if we put water and coal together? The answer is No, only when we burn coal it can be harmful if we are not careful. Demonstration of mixing water and coal to proof that it is not dangerous.

Question by a villager: I would like to ask you to upgrade the roads, electricity for the communities and renovate the schools in the areas.

Answer: Thanks for the question; it is good to know what the communities need. We would like to help with electricity, but we need to work together with the local government and if they agree, we are very happy to help. With concerning the road, we need to clarify and do some examination and we will get them back to you.

Managing Director of MCL company introduce himself.

Meeting Minutes (5)

Date: 19.8.2017

Time: 2:00 PM -5:00PM

Venue: Shwe War Chaung Monastery

Participants : 171 persons

U Zaw Lwin Oo from MLC Company introduces the cement factory.

I would like the locals to talk to MCL Company without any barrier.

All the locals are invited to the Company and the factory at any time.

Prof. Dr. Min Aung Pan explains about ESIA (2013) to the communities in Mon language.

Mr. Parinya, Manager in Mining Department, MCL Company

We only do mine explosion twice a day at 11:45-12:45AM and 4:30-5:30 PM. If you hear anything apart from this time frame, that would be someone else.

Mr. Parinya Vilaithum requested to Mr. Hatsachai to explain about the emission,

Question: How do the operators know how much emission they produce?

Answer: Operator will have to be very careful about looking into the emission.

Question: What would the operator do if the emission level is high?

Answer: They will have to stop the operation straightaway.

Question: Have you ever seen any other factory like this?

Answer: Yes, there is one the middle part of Myanmar but not exactly like this one.

Question: That means this is the only one?

Answer: Yes, this is the only Cement Factory with EIA.

Advises and comments from the locals are very welcome and we would like you to ask MCL Company what you want to know too.

MCL Company Managing Director: We are negotiating about the possibility of giving electricity to the locals too.

Question of Mg San San Tun I would like to ask about a rise of daily earning from 7500 kyats.

Answer: We will hold talk about this matter. We also would like to suggest the locals to be educated. Sometimes it is hard for the company in term of getting the right qualifications.

Meeting Minutes (6)

Date: 20.8.2017

Time: 9:00 AM -12:00

Venue: Hnidon Village Administrative Office

Participants : 70 persons

U Zaw Lwin Oo from MLC Company introduces the cement factory.

Prof. Dr. Min Aung Pan explains about ESIA(2013) to the communities in Mon language.

Mr. Parinya, manager in Mining Department from MLC Company invites questions and comments from the villagers. Questions and comments from the villagers are welcome since we are here to get advices and comments from the villagers.

Mr. Parinya, Manager of Mining Department in MCL Company would like to clarify about a few things,

1. We will only do one mine explosion per day around 4:30pm.

2. Explaining about air emission. (Production Manager) we will always display the result parameters. We also have Myanmar national in the working teams. You are welcome to come and go at the factory.

Question: What happen if the factory get destroyed?

Answer: We will have to stop the operation.

Question: What is the percentage of Oxygen in the waste water? Because it is important for the aquatics.

Answer: We normally freeze our waste water and we do not throw the water away. We have recycling system.

Question: Is coal harmful? The locals are worried.

Answer: Coal is dangerous only when use as fuel. When is get burn it produces Sulphur therefore we burn them together with Lime which help to produce Gawdan. We use Gawdan in factory.

Now, we would like to demonstrate about coal mixing with water, we are going to drink it. Because we want you to know that coal by itself is not dangerous it is dangerous only when burn.

Managing Director from the MCL Company: Thank you for the local participation in asking questions and comments. We will make sure both parties are happy. We will always works with the interest of the community. In the future, this factory will become the Mons'. And these areas do not have electric at the time, but we will try to provide. It will take about three years. We will also build Monastery, School and Clinic. It could cost about 500 kyats per unit. We cannot give them straightaway because of the laws and regulations. We also would like your help in this too.

Question: Can you control the dust and Sulphur up to 100%?

Answer: We will reduce to the lowest level in line with the Myanmar standard.

Question: In case of emergency, what would the MCL do?

Answer: We will try our best to reduce any possible emergency.

Question: We can see dust in the summer?

Answer: We will come and measure, but you have to tell us where we need to go.







Public Consultation Meeting at Kaw Dun New Monastery 18.8.2017)





Public Consultation Meeting at Shwe War Chaung Monastery (19.8.2017)





List of Participants Rheymonya Hotel, Mawlamyine Stakeholder Meeting (17.8.2017)

No	Name	Participants	Phone No.
1	U Toe Naing	MWD	09-43004878
2	U Se Rar	Reporter	09-425274606
3	Me Ngwe Ne Nan	MRTV/NRC	09-250245100
4	Me Aung Swan	MRTV/NRC	09-250106005
5	Yinn Sa Naing	Dawi Watch	09-425312657
6	Me Ne Ne Win	HURPOM	09-789850631
7	Ma Myat Min Htay	Myanmar Alin	09-250290073
8	Aung Ko	Observer	09-26428638
9	Aung Moe Oo	Observer	09-797709543
10	Toe Toe Aung	Observer	09-252025981
11	Yin Nyein Chan	Hintar	09-792360841
12	Kyaw Soe	DVB	09-425347495
13	Myo Than Dar Oo	NNA	09-785213542
14	Tharr Gyi	Hinthun	09-449010309
15	Taung Htun	Eleven	09-43005493
16	Ba Htoo	SKY NET	09-255701386
17	U Aung Han Phyo	MWD (Daily)	09-293225571
18	Hintaroo / Myitzema	Tha Irrawaddy	09-780000822
19	Khin Oo Ba Khan	The Voice Daily	09-780000811
20	Min Wa Ra	Mon News Agency	09-775617178
21	Myo Min Aung	Myitzema	09-978792186
22		moethecho	-
23	U Myint Htay	Mawlamyine	09-49249645
24	Kyaw Lwin Oo	Mawlamyine	09-450029720
25	Hein Htet Aung	Mawlamyine	09-790156349
26	Ba Nyar Thurain	Hinthar Media	09-255961833
27	Than Dar Hlaing	7 Days News	09-974066609
28	Parami Mon	Mon Era News	09-790465784
29	U Htun Htun Oo	NLD Reply	09-793562808

30	Maung Aye Chan Aung	TU (MLM)	09-788266305
31	U Htun Aung	Mae Ga Ro	-
32	U Aung Sein	Mae Ga Ro	09-255941152
33	U Aung Win	Mae Ga Ro	-
34	U Aye Soon	Mae Ga Ro	-
35	U Sein Hla Win	Mae Ga Ro	-
36	Than Than Htay	Maw Dou	09-777799141
37	Mr. Thet Naing Oo	CHAUNGZONE	09-255772080
38	U Shwe Thaung	Kayin Literary	09-773699328
39	U Shwe Phae	Kayin Literary	-
40	U Minn Hla Than	Zalat kone	09-773909558
41	U Hein	Zalat kone	-
42	U Ka Ran	Zalat kone	-
43	U Zar Ko	Zalat kone	-
44	U Maung Ra	Zalat kone	-
45	U Thein Aung	Swe War Kyaung	09-792419689
46	U Thint Wai	Kaw Pa Naw	-
47	U Pan Shwe	Ka Win Se	09-790469566
48	Nar Sain Htun	Kon War New	-
49	U Ngwe	Kon War New	-
50	Saw Oo	Kaut Dum	-
51	Awan	Kone Ngan	-
52	U Thin	Mae Ga Ro	-
53	U Aung Thin Oo	Kyautmayaw	09-779282547
54	U Min Win	Mudom	09-777799151
55	U Aung	Mawlamyine	-
56	U Min Win Sein	Kaw Pa Naw	-
57	U Hla Lay	Kaw Pa Naw	-
58	U Par Gyi	Wae Ngae	-
59	U Thar Aung	Kaut Dum	09-979272334

60	U San Thin	Kaut Dum	-
61	U Aung Win	Kaw Pa Naw	09-79431508
62	U Thaung Nyunt Soe	Pain Nae Kone	09-449233755
63	U Win Aung	Kaw Pa Naw	-
64	U Aung Myae	Kaut Dum	-
65	U Pan Hlaing	Kaw Pa Naw	-
66	Phone Myat Moe	TU (MLM)	09-792360446
67	U Soe	Kom Ngan	09-261570528
68	Ye Aung	Kayin	09-255705398
69	U San Htwe	Kom Ngan	09-977072791
70	U Maung Oo	Kom Ngan	-
71	U Min Aung	Ni Ton	09-255716994
72	U Thaung Sein	Shwe War Chaung	09-780432291
73	U Hla Aung	Kaw Wom	-
74	U Home Mon	Ka Lol Tae	-
75	U Aung Myint	-	-
76	U Nyunt Aung	-	-
77	Naing Htun Kyi	Mae Ga Ro	09-782191049
78	Aung Htwe	Kaw Pa Naw	-
79	Than Hteik Aung	Ka Ton Si	09-772974702
80	Me Su Mon	Ka Ton Si	-
81	Me Gar Thae Nom	Ka Ton Si	09-788094008
82	U Htun Shew	Kaut Ngan	09-49164203
83	Min Oo	Kaut Ngan	97734504432
84	U Thu Ya Soe	Motetama	09-793579545
85	Naing Ye Zaw	MLM	09-49234016
86	U Win Htun	Ne Ton	09-255802625
87	U Ngwe Htun	Ne Ton	09-973366591
88	U Htun Shin	Ne Ton	-
89	U Kyaw Hla Win	Ne Ton	09-42414244

90	U Myo Thu Ya	MLM	09-771396200
91	U Maung Aye	Ne Ton	09-971999669
92	U Hla Ngwe	Swe War Kyaung	09-976690185
93	Daw Ngwe Si	Kaw Pa Naw	-
94	U Maung Myint	Kaut Dum	09-773914656
95	Maung Myat Naing Mon	Ne Ton	9925335295
96	Naing Maw	Ka Ton Si	09-781143673
97	U Kyae Than	Ka Ton Si	-
98	U Maung Khin	Ka Ton Si	-
99	U Shwe Thain	Ka Ton Si	-
10 0	U Kyae Myint	Ka Ton Si	-
10 1	U Nu Htin	Shwe War Chaung	-
10 2	Aung Kyaw Pait	Shwe War Chaung	-
10 3	Thaw Khae	Shwe War Chaung	-
10 4	Aung Zaw Win	Ka Ton Si	-
10 5	U Htun Aung	Kaw Pa Naw	09-98678154
10 6	U Shwe	Sae Pal	-
10 7	U Kyaw Htun	Kaut Dum	09-774267728
10 8	U Moe Myint Sein	Kaut Dum	09-736176956
10 9	U Min Lwin Oo	Kaut Ngan	-
11 0	U Aung Ban	Kaut Ngan	09-255736255
11 1	U Myint Than	Kaut Ngan	-
11 2	U Nyein Aung	Kaut Ngan	-
11 3	U Hla Thaung	Kaut Ngan	09-425335262
11 4	U Htun Naing	Ka Lol Tae	09-451466778
11 5	Min Khant Zin Min	Ka Lol Tae	09-979048513

11 6	Aung Kyae Htay	Ka Lol Tae	-
11 7	Hlwar	Ka Lol Tae	-
11 8	Thin Htun	Kaut Ngan	-
11 9	Maung Noe Thet Lwin	Mudom	09-790151761
12 0	U Maung Hlaing	Kaunt Ngan	09-255705398
12 1	U Htun	Paut Tal	-
12 2	U Wal	Paut Tal	-
12 3	U Thit	Paut Tal	-
12 4	U Tain	Paut Tal	-
12 5	U Aung Ko Win Than	Presence Peace	09-784659588
12 6	Kyaw Kyaw Oo	C-So Kyaiknew	09-780589145
12 7	Naing Shwe Win	Pyar Taung area	09-82662259
12 8	Naing Thein Oo	Pyar Taung area	-
12 9	Win Kyawt Muee	Huma Life	09-979342741
13 0	U Zin Aung Kyaw Htin	ENRLF	09-423005569
13 1	U Win Bo	၀ ုံငုငံရေးအင္အားစု	09-255774665
13 2	Naing Thint Kyaw	A.F.F.M	09-255800246
13 3	Min Win Bo	Wild	09-255235788
13 4	Byu Har Mon	Wild	09-25803279
13 5	Ye Nan Htay	Loka Alin	09-968962421
13 6	Naw Beauty	KDN	09-250165467
13 7	U Sein Thi	MSDN	09-254252704
13 8	U Zaw Htun	C&M	09-793842799
14 0	Minn Htay Aung	Pace Myanmar	09-425274742
14 1	U Naing Win	ႀကီးၾကပ္ေရးမွဴး	09-2037061

14 2	U Min Thant	ႀကီးၾကပ္ေရးမွဴး	09-8153846
14 3	U Toe Hla	အုပ္ခ်ဴပ္ေရးမွဴး	09-566286
14 4	U Zaw That Aung	ျပည္နနယ္ဦးစီးမွဴးရေၾေကာင္းညႊန္ၾကားေရးဦးစီးဌ ာန	09-250037970
14 5	U Aung Toe	ခရိုင္ငငါးဦးစီး	09-789329363
14 6	Daw Kyin Mwe	ျပည္နယ္စီမံကိန္းရုံး	09-975889884
14 7	U Thein Zaw	ျပည္နနယ္လလႊတ္ေတာ္	09-5191273
14 8	U Муо Ко	ျပည္နယ္အခန္စြားစီးမွဴးရုံး	09-49293167
15 0	U Min Thein Myint	ျပည္နနယ္သစ္ေတာ	09-977276111
15 1	U Thin Nyo	ျပည္နနယ္သစ္ေတာ	09-43129102
15 2	Daw Su Ye Mon	အလုပ္သမားဥပဒေစစ္ေဆးေရး	09-402675459
15 3	Daw Khine Zar Win Thin	အလုပ္သမားဥပဒေစစ္ေဆးေရး	09-43107289
15 4	Daw Sein Hlae Phyu	ျပည္နယ္စက္မမႈႀကီးႀကပ္	09-784134804
15 5	U Pan Ngwe		09-2019347
15 6	U That Paing Oo	လွ်ပ္စစ္	09-8725571
15 7	Ye Ott Naing Win	ဝန္ႀႀကီးခ်ဳပ္ ဆကရ	09-255803545
15 8	U Than Htut Naing	ဝန္ႀႀကီးခ်ဳပ္ တိုင္ပင္ေရးအရာရွိ	09-255803545
15 9	U Thu Ya		09-492922458
16 0	Dr. Thaphaytheim	ျပည္နယ္ျပည္နသူ႕က်န္းမာေရး	09-786618460
16 1	U Win Myint	ငါးဦးစီး - ကမာဝက္ၿမိဳ႕	09- 448012015
16 2	U Hla Minn	သတၱဳတင္မြးဦးစီး-ကရင္	09-448535116
16 3	U Soe Naing	ျပည္နနယ္ပတ္ဝန္းက်င္	09-254686261
16 4	U Naing Moe	ျပည္နနယ္အစိုးရအဖဲြြုံး	09-402527896
16 5	U Saw Ka That	ျပည္နနယ္ဆိပ္ကကမ္းအာဏာပိုင္	09-792368643
16 6	Daw Myat Myat Htae	ညႊန္နမွဴး-အလုပ္သမားညႊန္းၾကားေရး	09-43035785

16 7	Daw Toe Toe Chit	လ/ထ ညႊန္ဒၾကားေရးမွဴး	09-632218
16 8	Daw Win Mar Oo	ဒုတိယညႊန္အၾကားေရးမွဴး	9448356845
16 9	Daw Ohnmar Maw	လက္ထောက္ညႊန္ဒၾကားေရးမွဴး	09-401557560
17 0	U Myint Lwin	ရင္းႏွီးျမဳပ္ဥံမႈဦးစီးဌာန	09-250537243
17 1	Daw Khin That win	ခရိုင္စစက္မမႈႀကီးၾကပ္	09-255730163
17 2	Daw San San Htay	ခရိုင္စစက္မမႈႀကီးၾကပ္	09-760835275
17 3	Daw Khine Khine Soe	ဒ ု- ျပည္နယ္ဥပဒေအရာရွိ	09-420015569
17 4	Ko Ohn Myint	အုပ္ခခ်ိပ္ေရးမွဴး	09-42526219

Kaw Pa Now Public Consultation Meeting (18.8.2017)

No	Name	Participants	Phone No.
1	U Myint Wai	June Company	09-5060515
2	U Kyu Shin Htun	June Company	09-920726828
3	U Phar Htun	Kaw Pa Naw	-
4	Ma Sann	Kaw Pa Naw	-
5	Ma Ngwe Sein	Kaw Pa Naw	-
6	U Than Aye	Kaw Pa Naw	-
7	Moe Khine	Kaw Pa Naw	-
8	Ma Myint Than	Kaw Pa Naw	-
9	Ko Kyi Win	Kaw Pa Naw	-
10	U Maung Thaung	Kaw Pa Naw	-
11	U Aung Khaung	Kaw Pa Naw	-
12	Ma Htay	Kaw Pa Naw	-
13	Daw Chaut	Kaw Pa Naw	-
14	Daw Mya Win	Kaw Pa Naw	-
15	U Aung Myo That	Kaw Pa Naw	09-2557099078
16	Daw Aye Kyi	Kaw Pa Naw	-
17	Daw Hinn Yee	Kaw Pa Naw	-
18	Daw Ma Omm	Kaw Pa Naw	-

19	U Aung Kyaw	Kaw Pa Naw	-
20	U Ngwe Aung	Kaw Pa Naw	-
21	U Htun Shwe	Kaw Pa Naw	-
22	U Myo Naing Win	Kaw Pa Naw	-
23	U Ngwe	Kaw Pa Naw	-
24	Daw Ka Lae	Kaw Pa Naw	-
25	U Kyun Kyaw	Kaw Pa Naw	-
26	Daw Than Monn	Kaw Pa Naw	-
27	U Htun Gown	Kaw Pa Naw	-
28	Daw Win Htwe	Kaw Pa Naw	-
29	Daw Thet Pyone	Kaw Pa Naw	-
30	Daw Nyunt San	Kaw Pa Naw	-
31	Mg Aye Aung	Kaw Pa Naw	-
32	U Zaw Win	Kaw Pa Naw	-
33	U Boe Shwe	Kaw Pa Naw	-
34	Daw Thu Zar	Kaw Pa Naw	-
35	Daw Sa Bae	Kaw Pa Naw	-
36	Daw Yee	Kaw Pa Naw	-
37	Daw Me	Kaw Pa Naw	-
38	U Soe Minn Aung	Kaw Pa Naw	-
39	Daw Yee	Kaw Pa Naw	-
40	Daw Hla	Kaw Pa Naw	-
41	Daw Thin Hla	Kaw Pa Naw	-
42	Daw Nyei Ngwe	Kaw Pa Naw	-
43	Daw Mya Win	Kaw Pa Naw	-
44	Daw Thin Kyi	Kaw Pa Naw	-
45	Daw Lon Thin	Kaw Pa Naw	-
46	Daw Aye Sein	Kaw Pa Naw	-
47	Daw Kon Wote	Kaw Pa Naw	-
48	Daw Khin Myint	Kaw Pa Naw	-

49	Daw Man Aye	Kaw Pa Naw	-
50	U Aung Win	Kaw Pa Naw	-
51	U Htun Oo	Kaw Pa Naw	-
52	Daw Kone Pa Yae	Kaw Pa Naw	-
53	Daw Omm Thin	Kaw Pa Naw	-
54	U Aye Ko	Kaw Pa Naw	-
55	Daw Thu Zar Tin	Kaw Pa Naw	-
56	Daw Aye Khine	Kaw Pa Naw	-
57	Me Yin Yin Chan	Kaw Pa Naw	-
58	Me Moe Moe	Kaw Pa Naw	-
59	Daw Thin Aye	Kaw Pa Naw	-
60	Daw Thin Ngwe	Kaw Pa Naw	-
61	Me Thin Mom	Kaw Pa Naw	-
62	U Thin Htwe	Kaw Pa Naw	-
63	U Na	Kaw Dunn	-
64	U Hla Lay	Kaw Pa Naw	-
65	U Kyaw Kyaw	Kaw Pa Naw	-
66	U Kyi Win Lwin	Kaw Pa Naw	-
67	U Soe Kyaw Thu	Kaw Pa Naw	-
68	Daw Khin Sein	Kaw Pa Naw	-
69	Daw Myint Khine	Kaw Pa Naw	-
70	U Win Nyunt	Kaw Pa Naw	-
71	U Aung Win	Kaw Pa Naw	-
72	Naing Su	Kaw Pa Naw	-
73	Pan Kyin	Kaw Pa Naw	-
74	U Gar	Kaw Pa Naw	-
75	Thar hote	Kaw Pa Naw	-
76	Khin Maung Htun	Kaw Pa Naw	-
77	U Thin Wai	Kaw Pa Naw	-
78	U Hla Wai	Kaw Pa Naw	-

79	Yae Chan	Kaw Pa Naw	-
80	Ma Aye Myint	Kaw Pa Naw	-
81	Ei Nyein	Kaw Pa Naw	-
82	Daw Thann Sote	Kaw Pa Naw	-
83	Ma Pu	Kaw Pa Naw	-
84	U Aye	Kaw Pa Naw	-
85	Shwe Ba	Kaw Pa Naw	-
86	U Aung Htun	Kaw Pa Naw	-
87	U Par Gyi	Ware Ngwe	-
88	U Nyunt Sein	Ware Ngwe	-
89	U Dae	Ware Ngwe	-
90	U Than Winn	Ware Ngwe	-
91	U Thate Han	Ware Ngwe	-
92	U Nyoe Win	Ware Ngwe	-
93	U Win	Ware Ngwe	-
94	U Thein Hun	Ware Ngwe	-
95	U Ngwe	Ware Ngwe	-
96	U Thein Zaw	Ware Ngwe	-
97	U Pint	Ware Ngwe	-
98	U Ka Lar	Ware Ngwe	-
99	Par Maw Za	Kaw Pa Naw	-
100	U Aung Soe	Kaw Pa Naw	-
101	U Kyaw Htun	Ware Ngwe	-
102	Maung Are Lu	Kaw Pa Naw	-
103	U Aung	Kaw Pa Naw	-
104	U Ba Hlaing	Kaw Pa Naw	-
105	U Thaung Myint	Kaw Pa Naw	-
106	A Htun	Kaw Pa Naw	-
107	U Hla Aung	Kaw Pa Naw	-
108	Daw Yin Shwe	Kaw Pa Naw	

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109	Daw San Hla	Kaw Pa Naw	-
110	Daw Win	Kaw Pa Naw	-
111	U Thit	Kaw Pa Naw	-
112	U San Shein	Kaw Pa Naw	-
113	Daw Than Kyi	Kaw Pa Naw	-
114	U Kyaw Hlaing	Kaw Pa Naw	-
115	U Ngwe Soe	Kaw Pa Naw	-
116	U Ba Nyein	Kaw Pa Naw	-
117	U Thin Hla	Kaw Pa Naw	-
118	U Min Linn Sein	Kaw Pa Naw	-
119	U Aung Win	Kaw Pa Naw	-
120	U Thein Myo	Kaw Pa Naw	-
121	U Soe Min	Kaw Pa Naw	-

Kaw Dun and Mekaro Villages' Public Consultation Meeting (18.8.2017)

No	Name	Participants	Phone No.
1	Daw Shwe Htay	Mekaro	-
2	Daw Sandar Win	Mekaro	-
3	Daw Myint Myint cho	Mekaro	-
4	U Win Htwe	Mekaro	-
5	U Yar Thar Htun	Mekaro	-
6	U Win Thu	Mekaro	-
7	Daw Zar Le Lar	Mekaro	-
8	Daw Hla Than	Kaw Dun	-
9	Daw Myint Htay	Kaw Dun	-
10	Daw Thin Aye	Kaw Dun	-
11	Me Nyan Than	Kaw Dun	-
12	Daw Aung Myint	Kaw Dun	-
13	Daw Me	Kaw Dun	-
14	Daw Cho	Kaw Dun	-
15	Daw Su Mom	Kaw Dun	-

16	Daw Khin Yee	Kaw Dun	-
17	Daw Htwe	Kaw Dun	-
18	Daw Nyein Thin	Kaw Dun	-
19	Daw Pyit	Kaw Dun	-
20	U San Nyunt	Mekaro	-
21	U Thein Kyaw	Mekaro	-
22	U Aye Soon	Mekaro	-
23	U Hla Win	Mekaro	-
24	U Aye Thaung	Mekaro	-
25	U Htun Win	Mekaro	-
26	U Myoe	Mekaro	-
27	U Hun Naing	Mekaro	-
28	Daw Pan	Mekaro	-
29	Win Kyi	Mekaro	-
30	Daw Nyunt	Mekaro	-
31	Tin Phuu	Mekaro	-
32	Daw Soe	Mekaro	-
33	A Naing	Mekaro	-
34	Toe Aung	Mekaro	-
35	Aung Win	Mekaro	-
36	Ba Ann	Mekaro	-
37	Htun Aung	Mekaro	-
38	Aung Kyaw Moe	Mekaro	-
39	Kyaw Thet Wai	Mekaro	-
40	Nay Linn Htun	Mekaro	-
41	Myo Ye Htun	Mekaro	-
42	Kon Ga Lal	Kaw Dun	-
43	Daw Lon Sa Dom	Kaw Dun	-
44	Daw Lon No Ka	Kaw Dun	-
45	Thi La Shin	Kaw Dun	-

46	U Aung Kyaw Hla	Kaw Dun	-
47	Thein Naing	Kaw Dun	-
48	Ngwe Soe	Kaw Dun	-
49	Htun Aung	Kaw Dun	-
50	Than Zaw Htwe	Kaw Dun	-
51	Aye Kyaw	Kaw Dun	-
52	U Nyein Chan	Kaw Dun	-
53	U Aaung Win Khine	Kaw Dun	-
54	U Htun Aung	Kaw Dun	-
55	U Htun Thaung	Mekaro	-
56	U Thein	Mekaro	-
57	U Kyaw Zuu	Mekaro	-
58	U Htun Thaung	Mekaro	-
59	U Aung Sein	Mekaro	-
60	U Aung Naing	Mekaro	-
61	U Maung Sea	Mekaro	-
62	U Thin Win Htun	Mekaro	-
63	U Wing Naing	Kaw Dun	-
64	U Moe Myint Shein	Kaw Dun	-
65	U Htung Maung	Kaw Dun	-
66	U Thaung Lwin	Kaw Dun	-
67	Daw Hla Ei	Mekaro	-
68	Daw Nyunt	Mekaro	-
69	Daw Thin Ye	Mekaro	-
70	Daw Khin Sein	Mekaro	-
71	Daw Mya Mya Khine	Mekaro	-
72	Daw Myo Myint Ngwe	Kaw Dun	-
73	Daw Aye Lay San	Kaw Dun	-
74	U Chit Kyi	Kaw Dun	-
75	U Kyaw Htay	Kaw Dun	-

76	Daw Mya Than	Kaw Dun	-
77	Daw Omm Kyin	Kaw Dun	-
78	Daw Aye Thi	Kaw Dun	-
79	Daw Sawe	Kaw Dun	-
80	Daw Moe	Kaw Dun	-
81	U Maung Lay	Kaw Dun	-
82	U Htun Htun Oo	Mon Party	09-793562808
83	Daw Win Than	Guest	-
84	Daw Khin Myo Myint	Senator	09-961169526

Pauk Taw and Kwan Ngan Villages' Public Consultation Meeting (19.8.2017)

No	Name	Village	Phone No.
1	Daw Mee	Pauk Taw	-
2	Daw Mi	Pauk Taw	-
3	Ma Aye Yin	Pauk Taw	-
4	Ma Htwa	Kon Bo	-
5	Mg Yar Zar	Ba Tauk Kone	09-971839010
6	Aung Naing Soe	Shaung Kan	09-774960506
7	Sandar Aye	Pauk Taw	-
8	Daw Mee	Pauk Taw	-
9	Daw Ngwe Gyi	Pauk Taw	-
10	Mi Htet	Pauk Taw	-
11	Daw Myint Khin	Kwan Ngan	-
12	Daw Ohn May	Kwan Ngan	-
13	U Aung Myint	Kwan Ngan	-
14	Mon Chan	Kwan Ngan	-
15	U Soe	Kwan Ngan	-
16	U Hlaing	Kwan Ngan	-
17	U Wam	Kwan Ngan	-
18	U Htoo	Kwan Ngan	-

19	U Aung	Kwan Ngan	-
20	U Min	Kwan Ngan	-
21	U Aung Din	Kwan Ngan	-
22	U Maung Shein	Kwan Ngan	-
23	U Maung Oo	Kwan Ngan	-
24	Ye Lin Soe	Pauk Taw	-
25	Chit Paing Oo	Pauk Taw	-
26	Daw Wai	Pauk Taw	-
27	Daw Ma Nge	Pauk Taw	-
28	Daw Myint	Pauk Taw	-
29	Daw Aye Myint	Pauk Taw	-
30	Daw Aye Mon	Pauk Taw	-
31	Daw Thi	Pauk Taw	-
32	Daw Yi	Pauk Taw	-
33	Daw San Hla	Pauk Taw	-
34	Daw Hla Win	Pauk Taw	-
35	Daw San Maw	Pauk Taw	-
36	Daw Hla Than	Pauk Taw	-
37	Daw Naing	Pauk Taw	-
38	Daw Soe Gyi	Pauk Taw	-
39	Min Soe Aung	Kwan Ngan	-
40	U Shwe	Pauk Taw	-
41	Daw Su Maw	Kwan Ngan	-
42	Daw Shwe	Kwan Ngan	-
43	Daw Ohn Gyi	Kwan Ngan	-
44	Daw Pyone	Kwan Ngan	-
45	Daw Mya Taung	Pauk Taw	-
46	Daw Khin Than Cho	Pauk Taw	-
47	U Aung Sein	Kwan Ngan	-
48	U Ni	Kwan Ngan	-

49	U Kyaw Min	Kwan Ngan	-
50	U Ba San	Kwan Ngan	-
51	U A Win	Kwan Ngan	-
52	Daw Masa	Kwan Ngan	-
53	Daw Tu	Kwan Ngan	-
54	Daw Win Shwe	Pauk Taw	-
55	Daw Aye Myint	Pauk Taw	-
56	Ma Sandar	Pauk Taw	-
57	Ma San San Lwin	Pauk Taw	-
58	Ma Hnin Wai Oo	Pauk Taw	-
59	Ma San Kyu	Pauk Taw	-
60	Ma Nge	Pauk Taw	-
61	Ma Thu Zar Myint	Pauk Taw	-
62	Mg Thin Min Oo	Pauk Taw	-
63	Mg Naing Myo Aung	Pauk Taw	-
64	Daw Yi Shwe	Pauk Taw	-
65	Mg Soe Moe Kyaw	Pauk Taw	-
66	Thu Zar Kyaw	Pauk Taw	-
67	U Than Win	Pauk Taw	-
68	Mg Zin Ko Win	Pauk Taw	-
69	Daw San Htay	Pauk Taw	-
70	U Did	Pauk Taw	-
71	U Naing Soe	Pauk Taw	-
72	U Zaw Myint Khaing	Pauk Taw	-
73	U Aung Tun Win	Pauk Taw	-
74	U Aung Min	Pauk Taw	-
75	U Khin Mg Win	Pauk Taw	-
76	Ma Thandar Aye	Pauk Taw	-
77	Ma Hnin Kalar	Pauk Taw	-
78	Ma That Oo	Pauk Taw	-

79	Ma Cho Marlar	Pauk Taw	-
80	Ma Aye Moe	Pauk Taw	-
81	Ma Win	Pauk Taw	-
82	Ma Ei Ei Myo	Pauk Taw	-
83	Daw Sai Yi	Pauk Taw	-
84	Ma Ni Lar Win	Pauk Taw	-
85	Ma Thein Thein Moe	Pauk Taw	-
86	Daw Thinzar Myo	Pauk Taw	-
87	U Naing Htet Lin	Pauk Taw	-
88	U Nay Soe Hteik	Pauk Taw	-
89	U Aung Aung	Pauk Taw	-
90	U Zaw Ye	Pauk Taw	-
91	U Pyae Phyo Wai	Pauk Taw	-
92	U Zaw Lwin	Pauk Taw	-
93	Daw Khin Mar Aye	Pauk Taw	-
94	Daw Khaing Zin Oo	Pauk Taw	-
95	U Mg Zaw	Pauk Taw	-
96	U Khaing Soe Lay	Pauk Taw	-
97	U Kyaw Naing Win	Pauk Taw	-
98	U Zaw Naing Lay	Pauk Taw	-
99	U Phoe Thein	Pauk Taw	-
100	Daw Aye Win	Kon Ngang	-
101	U Thiha Htwe	Pauk Taw	-
102	U Shwe Naing	Kaw Pa Naw	-
103	U Myo	Pauk Taw	-
104	U Han Min Htet	Pauk Taw	-
105	U Naing Lin Tun	Pauk Taw	-
106	U Ye Ko	Pauk Taw	-
107	U Myo Min Tun	Pauk Taw	-
108	U Naing	Pauk Taw	-

109	U Thiha Soe	Pauk Taw	-
110	U Saw Say Aung	Pauk Taw	-
111	U Min Soe	Pauk Taw	-
112	Daw Hnin Wai Khaing	Pauk Taw	-
113	Daw Khin San Win	Pauk Taw	-
114	Daw Aye Thet Mar	Pauk Taw	-
115	Daw ThinZar Oo	Pauk Taw	-
116	Soe Moe Khaing	Kon Ngang	-
117	Min Zaw	Ayeyarwaddy	-
118	Adag	Kwan Ngan	-
119	Yan Lin Aung	Ka Nyut Kwin	-
120	Chit Min	Kaw Pa Naw	09-796093220
121	Thein Naing Win	Pauk Taw	-
122	Soe Aung	Kwan Ngan	09-793890
123	Kyi Win	Kwan Ngan	-
124	Ma Ngwe Yi	Kwan Ngan	09-761185700
125	Win Naing	Kwan Ngan	-
126	Bae	Kwan Ngan	-
127	Daw Tin Ngwe	Kwan Ngan	-
128	Ma War	Kwan Ngan	-
129	Nar Ae	Kwan Ngan	-
130	Soe Thein	Kwan Ngan	09-780009213
131	Mg Wai Phyo	Pauk Taw	-
132	Daw Mar Lae	Pauk Taw	-
133	U Nu	Pauk Taw	-
134	U Aung Sein	Kwan Ngan	-
135	U Aung Than Win	Pauk Taw	-
136	Nar Ngwe	Pauk Taw	-
137	U Zaw Khin	Pauk Taw	-
138	U Ngwe Tun	Pauk Taw	-

139	Mg Saw Thant Zin	Pauk Taw	-
140	Mya Htwe Tin	Pauk Taw	-
141	U Zaw Win	Oak Twin	-
142	Nay Lin Oo	Oak Twin	-
143	Ma Moe New	Pauk Taw	-
144	Ma Ka Yin Ma	Pauk Taw	-
145	Ma Ohnmar San	Pauk Taw	-
146	Ma Shwe Zin Win	Pauk Taw	-
147	Ma Ei Ei Khaing	Pauk Taw	-
148	Ma Hwim	Kwan Ngan	-
149	Zaw Khin	Pauk Taw	-
150	lin	Pauk Taw	-

Shwe War Chaung and Kadonsit Villages' Public Consultation Meeting (19.8.2017)

No	Name	Participants	Phone No.
1	Ma Thin Thin	Kadonsit	-
2	U Taung Sein	Shwe War Chaung	-
3	U Taung Kyaw	Shwe War Chaung	-
4	Ma Lin	Shwe War Chaung	-
5	Mg Than Tun	Shwe War Chaung	-
6	Sa Yar Lay	Shwe War Chaung	-
7	Ma Htwe Yi	Shwe War Chaung	-
8	Daw Mi Ni	Shwe War Chaung	-
9	Daw Than Zin	Shwe War Chaung	-
10	Daw Than Htay	Shwe War Chaung	-
11	U Aung Lin	Shwe War Chaung	-
12	Daw Tin Yi	Shwe War Chaung	-
13	Than Hteik Soe	Kadonsit	-
14	Ma Thu Zar	Shwe War Chaung	-
15	Daw Than Nyut	Shwe War Chaung	-
16	U Win Khaing	Shwe War Chaung	-

17	Daw Hla Win	Shwe War Chaung	-
18	U Hla Win	Shwe War Chaung	-
19	U Soe Win	Shwe War Chaung	-
20	U Mg Nyan	Shwe War Chaung	-
21	Hay Mar Win	Shwe War Chaung	-
22	A Tun	Shwe War Chaung	-
23	U Mg	Shwe War Chaung	-
24	U Soe Nyut	Shwe War Chaung	-
25	Daw Chit	Shwe War Chaung	-
26	Myint Aye	Shwe War Chaung	-
27	Daw Ohn Thin	Shwe War Chaung	-
28	Daw Hla Yi	Shwe War Chaung	-
29	Daw Chit Ngwe	Shwe War Chaung	-
30	Daw Myint Khaing	Shwe War Chaung	-
31	Daw Saw Kyin	Shwe War Chaung	-
32	Daw Than Tin	Shwe War Chaung	-
33	Mi Tin Aye	Shwe War Chaung	-
34	Daw Pyone Kyi	Shwe War Chaung	-
35	Ma Yi Cho	Shwe War Chaung	-
36	Daw Ohn Kyi	Shwe War Chaung	-
37	Daw Tae Tae	Shwe War Chaung	-
38	Daw Khin Kyi	Shwe War Chaung	-
39	Htwe Than	Shwe War Chaung	-
40	Mi Tin Aye	Shwe War Chaung	-
41	Aye Win San	Shwe War Chaung	-
42	Daw Hla Min	Shwe War Chaung	-
43	Pi Cho	Shwe War Chaung	-
44	Daw Chit Ngwe	Shwe War Chaung	-
45	Daw Hinn Aye	Shwe War Chaung	-
46	Daw Win Nmyiint	Shwe War Chaung	-

47	Daw Than Chit	Shwe War Chaung	-
48	Daw Pa Lal	Shwe War Chaung	-
49	Daw Thin	Shwe War Chaung	-
50	Daw Maw	Shwe War Chaung	-
51	Daw Than Win	Shwe War Chaung	-
52	Daw Thae Thae	Shwe War Chaung	-
53	Daw Saw Hla	Shwe War Chaung	-
54	Daw Bote Sone	Shwe War Chaung	-
55	Daw Thein Kyi	Shwe War Chaung	-
56	Htun Htun Khine	Shwe War Chaung	-
57	U Htun Myint	Shwe War Chaung	-
58	U Aye That	Shwe War Chaung	-
59	U Zayyar Htun	Shwe War Chaung	-
60	Mg San San Thein	Shwe War Chaung	09-428325343
61	U Ja Pain	Shwe War Chaung	-
62	U Shwe Thein	Kadonsit	09-79995494
63	Daw win	Kadonsit	-
64	Daw Hla Thin	Kadonsit	-
65	U Aung Shwe	Kadonsit	-
66	U Htun Aung	Kadonsit	-
67	U Thein Aung	Kadonsit	09-792919687
68			0, 1, 2, 1, 001
	U Ko Myint	Kadonsit	-
69	U Ko Myint U Cho	Kadonsit Kadonsit	-
69 70	U Ko Myint U Cho U Htun Aye	Kadonsit Kadonsit Kadonsit	-
69 70 71	U Ko Myint U Cho U Htun Aye U Hla Moe Oo	Kadonsit Kadonsit Kadonsit Kadonsit	
69 70 71 72	U Ko Myint U Cho U Htun Aye U Hla Moe Oo Soe Maw	Kadonsit Kadonsit Kadonsit Ya Wa Kha	- - - - -
69 70 71 72 73	U Ko Myint U Cho U Htun Aye U Hla Moe Oo Soe Maw Daw Mya Sein	Kadonsit Kadonsit Kadonsit Kadonsit Ya Wa Kha Shwe War Chaung	- - - - - - - -
69 70 71 72 73 74	U Ko Myint U Cho U Htun Aye U Hla Moe Oo Soe Maw Daw Mya Sein Ma Pa Pa	Kadonsit Kadonsit Kadonsit Kadonsit Ya Wa Kha Shwe War Chaung Shwe War Chaung	- - - - - - - - - -
69 70 71 72 73 74 75	U Ko Myint U Cho U Htun Aye U Hla Moe Oo Soe Maw Daw Mya Sein Ma Pa Pa U Kyi Soe	KadonsitKadonsitKadonsitKadonsitYa Wa KhaShwe War ChaungShwe War ChaungKadonsit	- - - - - - - - - - - - - - - - - - -
69 70 71 72 73 74 75 76	U Ko Myint U Cho U Htun Aye U Hla Moe Oo Soe Maw Daw Mya Sein Ma Pa Pa U Kyi Soe Moe Moe Aye	KadonsitKadonsitKadonsitKadonsitYa Wa KhaShwe War ChaungShwe War ChaungKadonsitKadonsit	- - - - - - - - - - 09-766354255

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107	U Kyi Win	Shwe War Chaung	-
108	U Nyunt Tin	Shwe War Chaung	-
109	U Maung Gyi	Shwe War Chaung	-
110	U Chit San Naung	Kadonsit	-
111	U Maung Gyi	Shwe War Chaung	-
112	Daw Toe	Shwe War Chaung	-
113	Daw San Htay	Shwe War Chaung	-
114	Daw Win Shwe	Shwe War Chaung	-
115	Daw Saw Thin	Shwe War Chaung	-
116	Daw Yin Yin Aye	Kadonsit	-
117	Phye Hla Win	Shwe War Chaung	-
118	U A Paing	Shwe War Chaung	-
119	U Thein Shwe	Shwe War Chaung	-
120	U Hla Ngwe	Shwe War Chaung	-
121	U Thin Win	Shwe War Chaung	-
122	Daw Htay Myint	Shwe War Chaung	-
123	Daw Saw Yee	Shwe War Chaung	-
124	Daw Hla Thuzar	Shwe War Chaung	-
125	Daw Than Myint	Shwe War Chaung	-
126	Daw Aye Soe	Shwe War Chaung	-
127	Daw Phyu Phyu Khine	Shwe War Chaung	-
128	Daw Ei Hinn Wai	Shwe War Chaung	-
129	Daw Pan Sabal	Shwe War Chaung	-
130	Daw Wai Wai Soe	Shwe War Chaung	-
131	U Kyaw Shwe Than	Kadonsit	-
132	Daw Khin San Myint	Shwe War Chaung	-
133	Daw Thu Zar Aye	Shwe War Chaung	-
134	Dw Thin Win	Shwe War Chaung	-
135	U Thein Kyi	Shwe War Chaung	-
136	U Ngwe Thein	Shwe War Chaung	-
e	Shwe War Chaung	-	
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U Saw Min	Shwe War Chaung	-	
U Ko Win	Shwe War Chaung	-	
U Soe Thint	Kadonsit	-	
U Pan Aung	Kadonsit	-	
U Hlaing	Kadonsit	-	
U Aung Shwe	Kadonsit	-	
U Nu Thin	Kadonsit	-	
U San Myaint	Kadonsit	-	
U Htun Aye	Kadonsit	-	
Ma Khine Cho	Shwe War Chaung	-	
Ma Ne Ne Khine	Shwe War Chaung	-	
Ma Moe Moe Than	Shwe War Chaung	-	
Ma Ei Nander Moe	Shwe War Chaung	-	
Daw Myint Myint Hlaing	Shwe War Chaung	-	
Ma Khine Thazin Win Oo	Shwe War Chaung	-	
Htet Htet	Shwe War Chaung	-	
Zaw Htet Aung	Kadonsit	-	
Yan Naing Htun	Kadonsit	-	
U Ohm Shwe	Shwe War Chaung	-	
II Htun Nyein			
o mun ryem	Shwe war Chaung	-	
U Phoe Shein	Shwe War Chaung	- 09-792420177	
U Phoe Shein U Win Thein	Shwe War Chaung Shwe War Chaung Shwe War Chaung	- 09-792420177 09-814205	
U Phoe Shein U Win Thein U Myo Gyi	Shwe War Chaung	- 09-792420177 09-814205 -	
U Phoe Shein U Win Thein U Myo Gyi Daw Nye Nye	Shwe War Chaung	- 09-792420177 09-814205 - -	
U Phoe Shein U Win Thein U Myo Gyi Daw Nye Nye U Ngwe Thein	Shwe War Chaung	- 09-792420177 09-814205 - - -	
U Phoe Shein U Win Thein U Myo Gyi Daw Nye Nye U Ngwe Thein Daw Me Nge	Shwe War ChaungShwe War Chaung	- 09-792420177 09-814205 - - - - -	
U Phoe Shein U Win Thein U Myo Gyi Daw Nye Nye U Ngwe Thein Daw Me Nge Daw Hla Win	Shwe War ChaungShwe War Chaung	- 09-792420177 09-814205	
U Phoe Shein U Win Thein U Myo Gyi Daw Nye Nye U Ngwe Thein Daw Me Nge Daw Hla Win Daw Moe Cherry	Shwe War ChaungShwe War Chaung	- 09-792420177 09-814205	
	U Ko Win U Soe Thint U Pan Aung U Pan Aung U Pan Aung U Hlaing U Aung Shwe U Aung Shwe U Nu Thin U San Myaint U San Myaint U Htun Aye Ma Khine Cho Ma Ne Ne Khine Ma Ne Ne Khine Ma Noe Moe Than Ma Ei Nander Moe Daw Myint Myint Hlaing Ma Khine Thazin Win Oo Htet Htet Zaw Htet Aung Yan Naing Htun U Ohm Shwe	C Daw HainDaw C Hain C HainingU Ko WinShwe War ChaungU Soe ThintKadonsitU Pan AungKadonsitU HaingKadonsitU HaingKadonsitU Aung ShweKadonsitU Aung ShweKadonsitU Nu ThinKadonsitU San MyaintKadonsitU Htun AyeKadonsitMa Khine ChoShwe War ChaungMa Ne Ne KhineShwe War ChaungMa Moe Moe ThanShwe War ChaungMa Ei Nander MoeShwe War ChaungDaw Myint Myint HlaingShwe War ChaungMa Khine Thazin Win OoShwe War ChaungHtet HtetShwe War ChaungZaw Htet AungKadonsitYan Naing HtunKadonsitU Ohm ShweShwe War Chaung	

167	Daw Mya Ye Shwe War Chaung		-
168	Ma Than Mar	Shwe War Chaung	-
169	Daw Ohn Nge	Shwe War Chaung	-
170	Daw Theuin Thin	Shwe War Chaung	-

Hnidon Village' Meeting (20.8.2017)

No	Name	Participants	Phone No.
1	U Than Maung	Mya Kone	-
2	U Mya Aung	Hnidon	-
3	U San Ni	Hnidon	-
4	U San Thein	Hnidon	-
5	U Hla Htun	Hnidon	-
6	U Taung Shwe	Mya Kone	-
7	U Htun Taung	Mya Kone	-
8	U Kyaw Hla	Hnidon	-
9	U Kyaw Hla Win	Hnidon	-
10	U Chit Aye	Chan Kone	-
11	U Shwe	Chan Kone	-
12	U Maung Aye	Hnidon	-
13	U Maung Thein	Chan Kone	-
14	Daw Mi Nge	Mya Kone	-
15	U Kyaw	Mya Kone	-
16	U Maung Shwe	Shan Ywar Lay	-
17	Daw Pan Aye	Chan Kone	-
18	U Soe Aung	Chan Kone	-
19	U Soe Aung	Mya Kone	-
20	Daw Tin Than	Mya Kone	-
21	Daw Mi	Mya Kone	-
22	Daw Kyi Win	Mya Kone	-
23	U Moe Lwin	Shan Ywar Lay	-
24	U Khin Oo	Shan Ywar Lay	-

25	U Thin Soe	Chan Kone	-
26	Daw Than Myint	Mya Kone	-
27	U Tun Hla	Mya Kone	-
28	Ahti	Mya Kone	-
29	Daw Ngwe	Mya Kone	-
30	U Tun Shin	Hnidon	-
31	U Ngwe Tun	Hnidon	-
32	U Soe Myaing	Hnidon	-
33	U Soe Myint	Hnidon	-
34	U Kyaw Tun	Hnidon	-
35	U Mg Ngwe	Hnidon	-
36	Daw Pan Shwe	Hnidon	-
37	Myo Win	Mya Kone	-
38	U Kyi Aye	Hnidon	-
39	U Ba San	Hnidon	-
40	U Chit	Hnidon	-
41	U Kyin Thein	Hnidon	-
42	U Khin Taung	Hnidon	-
43	U Min Aung	Hnidon	09-256716994
44	U Yein Bo Bo Lwin	Hnidon	-
45	U San Lwin	Hnidon	-
46	U Thar Aung	Hnidon	-
47	Mg Zaw	Hnidon	-
48	U Hla Than	Hnidon	-
49	U Hla Tun	Hnidon	-
50	U San Aung	Hnidon	-
51	U Ngwe Tun	Hnidon	-
52	U Tun Gyi	Mya Kone	-
53	U Myint Mg	Mya Kone	-
54	Daw Myint San	Chan Kone	-

55	Daw Thein Khin	Mya Kone	-
56	U Nyut Shwe	Chan Kone	-
57	Daw Htwe Pain	Chan Kone	-
58	U Aung Win	Mya Kone	-
59	U Thin Aye	Hnidon	-
60	U Tun Min	Chan Kone	-
61	Mg Myo Aung	Chan Kone	-
62	U Thant Sin Kyaw	June	-
63	U Thin Oo	June	-
64	U Hla Myint	June	-
65	U Lwin Myo Ko	June	-
66	U Win Nyut	June	-
67	U Kayin	Chan Kone	-
68	U Kyaw Bala	Chan Kone	-
69	U Hla Mg	Chan Kone	-
70	U Win	Chan Kone	-

QUESTIONNAIRE FOR SOCIAL and HEALTH I	MPACT ASSESSMENT (SIA & HIA)
---------------------------------------	------------------------------

Name Village/Township						
No						
Date of interview						
Name of interviewee						
Part A: Interviewee in	nformation					
A.1. Sex						
1)Male			2) Female			
A.2. Age(years)						
1) 20-34	2) 35-49	3)50-64	4) >65			
A.3.Religion						
1) Buddhism	2) Christian		3) Others (please spec	cify)		
A.4. Marital status						
1) Single			2) Married			
3) Windowed			4) Divorced			
A.5. Level of educati	on					
1) No Schooling	2) Primary se	chool	3) Middle school	4) Hight school		
5) Bachelor Degree6) University Student7) Monastic						
A.6. Occupation						
		••••				
Part B: Household In	formation					
B.1. Please give us so	ome brief informa	tion about y	our family:			
1. Member in your ho	ousehold now					
B.2. Now, what type	of living standard	ls is your ho	usehold in?			
1. poor	2. Normal		3. Well-off			
B.3. Please let me know your household income sources per month or year?						
Sou	Kyats					

B.4. Please inform your household monthly expenses?

-----Kyats

B.5. What is your household house ownership? 1.owned 2. Rented

3. Other

B.6.If your HH owns the house, what is its type?

Concrete	
Semi-concrete	
Wooden	
Hut	

B.7. Which asset below your HH owns?

Asset	No	Asset	No
1.Car		7.Electricity generator	
2.Rowed Boat		8.Television	
3.Electric fan		9.DVD player	
4.Homephone		10.Fridge	
5.Mobile phone		11.Washing Machine	
6.Sewing Machine			

Part C: Transportation/Movement information

C.1 How often do you use this alignment?

Every day	
Sometime per week	
Sometime per month	
Less than once per month	

C.2. Which purpose do your household members uses the alignment for?

Go to visit	
Go to paddy	
Go to markets	
Transport products out of commune/ward	
Go to school	
Go health services, to other civil institutions	
Other (note down)	

C.3. Now, do the roads meet your demands?

1.	Yes	2. No		
C.4	4. How is your t	ransportation state	in your community?	
1.0	Good	2. Normal	3. E	Bad
Par	rt D: Opinions ι	pon the project		
D.1	1. Do you know	this project?		
	Yes	No		
If Y	Yes(any sou	ırce)		
D.2	2. Are you satis	fied about the proje	ect?	
No)	2) Yes		
If Y	Yes, specify			
If N	No, specify			
D.3	3.Do you feel w	orried about enviro	onmental impact during	g operational phase of the project?
1.N	No 2. Yes, spec	cify		
D.4	4.Do you feel w	orried about social	impact during operation	onal phase of the project?
1.N	No			
2.Y	Yes, specify			
D.5	5. Do you feel v	vorried about healt	h impact during operat	ional phase of the project?
1.N	No			
2.Y	Yes, specify			
1.	Do your house 1. Yes 2.1	ehold have diseases No.	s previous 6 months?	
If Y	Yes, (What dise	ases)		
2.	Where did you	ı go treatment?		
3.	Which person	did you meet treat	ment if you unhealthy?)
4.	Do your home	have nearest place	e following treatment p	lace?
(1)	GP	(2) Government (Clinic	(3) Hospital

5. Have you use following behaviors?

(1) Smoking (2) Betel							
(3) Dani/ Alcohol / I	Beer						
(4) Yama							
6.Where do you get domestic water?							
7.Where do you get	drinking water?						
8.Which water wher	e are you drinking	?					
9.How do you drink	?						
(1) Natural water	2) Boiled	Water	(3) Purified Water				
10. Using Toilets	10. Using Toilets						
(1) No	(2) fly	(3) open pit					
(1) No 11.How do you thro	(2) fly w the waste?	(3) open pit					
(1) No 11.How do you thro	(2) fly w the waste?	(3) open pit					

Community Questionnaire: Village Socio-economic Survey (Village leader)

Location Details							
Village:		Township:					
Village Tract:		District:					
State/Region		Coordinates:					
VTL Name		VTL Signature					

Villag	Village Level Primary Information									
1.	Population	a.	Total		b. M	lale		c. Fem	ale	
2.	Number of hous	ehc	olds							
3.	Ethnicity		Ethnicity	No. of HHs			Ethnicity		No. of HHs	
		a.	Bamar			b.	Rakhine			
		с.	Kachin			d.	Shan			
		e.	Kayah			f.	Indian			
		g.	Kayin			h.	Chinese			
		i.				j.	Other			
			Chin				())	
		k.				1.	Other			
			Mon		-		())	
4.	When was the v	illa	ge founded?		_					
5.	Are there any ri	ver	cross the village?							
6.	How far is the r	iver	from your village	e habitation?						
	(Name of river)									
7.	Are there any in	star	nces of disaster in	the village,						
	please mention	yea	r? Can you remer	nber how it						
	affected the com	nmu	inity?							
I ivolil	hood What do ne	onla	a do to support th	omsolvos?						
8	Number of peor	ole	Source of live	lihood			Number o	fHHs	Primary Role of	
0.	engaged in these	2	Source of hive	inioou			engaged		Man ¹ and Woman ²	
	sources of		a. Cultivator				00			
	livelihood		b. Agricultur	ral laborers						
			c. Fishing							
			d. Business	(SME, shop, tra	ding					
			etc.)	_	-					
			e. Hunting							
			f. Making co	oal						
			g. Livestock	rearing						
			h. Casual La	bour/ temporary	/ work					
			i. Other							
			j. Governme	nt service						
			k. Private con	mpanies						

		1. N (Money remitta	from relati ance)	ves							
Fishin	g								1			
8	How do you cl	lassify the bo	ats?									
	Type of Boats	Size (feet)	Carr Capa	ying acity	Mo cap	tor Distance pacity covered (in kms)		Usually Depth o	moves in of (in mts.)	Number of HHs		
	1)											
	2)											
	3)											
9	How many households in the village are full time fishermen and have no land											
10	How many fan	nilies are fish	ermen	and also ha	ave ag	gricul	tural la	and				
11	What are the n	nain types of	fish ca	tch		D	1 . ()	6 1'		D :		
	Type of Fish Specific season/ round the year			e	Big Boa	boat/ N t/ Smal	Mediu ll Boa	m it	Distance f they are u	sually found	r at which	
	1.											
	2.											
	3.											
	4.											
	5.											
	0. 7											
	8.											
12	8. What is the main market for selling fish? 2. National			l (villa nal rt	age)			·				
13	What is the us	ual kind of fi	shing 1	nethod?		1.	Net Fis	shing				
			U			2.	Line F	ïshing	5		□ 	
						3.	Other]	Fishir	ng			
Land	- ·				2							
14	Do people eng	age in cultiva	ation in	this villag	je?			a.	Yes, □]	b. No □	
15	Do families own the land that they cultivate / farm? And if so do they also live on the land?If they don't own the land, who do they lease from and how i the system managed?					d if so, how is						
16	If the answer to families are en	o the previou gaged in agri	s quest culture	tion is yes, e?	how	many						

17	What is the average (<i>mention in acres o</i>	e land holdin or any other	and holding size per family in the village? any other unit but specify)						
	Provide the approximation proportion of land	imate under	і. Туре	e of land	ii.	Proportion		iii.	Utilization
	each category		a. LE (wet)					
			b. Ya (dry)					
	Specify the utilizati	on of the	c. Kair	g (cultivable waste					
	land according to i	ts	land	, island etc.)					
	categorization. E.g.	a	d. Tau	ngya (shifting					
	nlaysround recrea	g, tional etc	culti	vation)					
	<i>p cu y g c cu cu y y c cu cu</i>		e. Gard	len					
		-	I. Rese	erved forest					
		ŀ	g. Curr	ent failow					
10	Do noonlo yoo ony	imication ma	II. Out	their field?					
18	Do people use any irrigation methods for their field?								
19	How many families	s use irrigatio	on source	s for their field?					
20	What percentage of	f the total ag	ricultural	land will be irrigated?					
Crops					l				
21	Sample crops: Mo	nsoon Paddy	/ Summe	r Paddy Oil Seeds Pea	s Pu	lses Maize V	Wheat P	otat	nes Sweet
21	Potato, Onion, Garl	lic. Ginger. 7	Furmeric.	Chili, Fruits, Vegetable	es. Si	igar cane. Nir	pa Palm	. Co	conut. Betel
	nut/ leaf, Toddy.	.,	,	, , , , , , , , , , , , , , , , , , , ,	,,	0	I	,	· · · · · · · · · · · · · · · · · · ·
	We should just stre	ss on getting	the impo	rtant crops which are ei	ither	important for	the surv	ival	of the HHs or
	are important for th	e income it l	brings to	he household. Please pi	ick fi	om the option	ns mentio	oned	l above, if the
	Community needs h								
	what are the	1 2	• • • • • • • • • • • • •	•••••					
	grown in the	3	•••••						
	village.	4							
	U	5		•••••					
Livest	ock	•							
22	Number of households	Туре	Nı liv	ımber of Households h estock holdings	navir	ng the	Main U	Use	Eat ¹ / Trade ²
	rearing these	Buffalo							
	livestock (tick the	Goats/Shee	ep 🗆						
	appropriate	Horse							
	option)	Cattle							
		Ducks							
		Chickens							
		Pigs							
-		Others							
Incom	e/ Expenditure	I aval of	onthin :-	20070		Number	e LIII e-	118	a under the
23	now many	Level of n	ionuny n	icome		categorie	л пн Ia s	m	g under the
	into these Annual					categories	,		
	Income Levels?	a. Less th	nan 25,00	0 Kyats					
		b. 25-50,	000 Kyat	S					

[c. 50-100.000 Kvats								
		d. 100,000-200,	d. 100,000-200,000 Kyats							
		e. 200,000-300,	000 Kyats							
		f. More than 30	0,000 Kyats							
Villag	e Infrastructure									
24	Distance to the foll	owing facilities (in	time mile)							
	Infrastructure i	. Facilities available . (Yes/ No)	iii. Distance from Village (in Minutes)	m iv. Pref Trar	erred mode of 1sport	Mode of Transport	;			
	Health Center					1) Walkir 2) Bicycle	ıg e,			
	Seed/grain bank					3) Motor- 4) Car	-cycle			
	Cyclone shelter					5) Boat				
	Hand pumps									
	Grocery shops									
	Chemist /Pharmecy									
	Post office									
	Bank									
	Other (specify)									
25	Access to Road Facilities in the village (tick the appropriate)	 a. No Road (reach b. Rough Track (I c. Accessible by t d. Accessible by c e. Accessible by c 	hing all the way to Bullock Cart or Wa rawlargee but not o car/ truck in dry we car/truck in all-wea	the village); alking only); cars/trucks; eather only; ther						
Availa	bility, access and	i. Facility		ii. Distance	e (km iii.	Ouality				
proxin	nity to the			or mile)	×	(Good ¹ /bad ² /n	0			
educat	tion services					comments ³)				
26	Operational	a. Nursery								
	Education System	b. Primary								
		c. Middle								
		d. Secondary								
		e. University								
		f. Vocational t	raining institute							
		g. Religious Sc	chool							
27	Market (when and	a. Every day ma	arket							
	where)	b. Weekly mark	et (for basic							
		provisions)								
		c. Monthly mar	ket (for trade)							
20	Operational Health	u. Occasional m	1							
20	System	a. I OWII COUNCI	I tal							
	System	o. Station nospi	ıaı							

		c. Rural health center						
		d. Rural health Sub-center R	ıral					
		health Sub-center (eg loca						
		mid-wife)						
		e. Village health committee						
29	Credit Facility							
А	How do people	1. Family						
	borrow money?	2. Friends/ Neighbours						
		3. Licensed creditor						
		4. Bank						
		5. Savings group						
		6. Other (specify):						
В	What is the	Interest Rate = 0.8 kyat						
	interest rate?							
C	Why do people	1. Repairing/buying boats						
	borrow money?	2. Repairing or buying fishing	equipment					
		3. Food						
		4. Medical facilities						
		5. For Marriage						
		6. For house construction						
		7 For Business						
		7. FOI DUSINESS 8. Others (education land etc)						
		8. Others (education, land etc).					
30	Identify the five	8. Others (education, land etc). b. Especially among	c. Especially among				
30	Identify the five main health	8. Others (education, land etca. General). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the	8. Others (education, land etca. General). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according	8. Others (education, land etca. GeneralA.Diarrhoea). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc a. General A.Diarrhoea B.Malaria). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc a. General A.Diarrhoea B.Malaria C.Respiratory tract infection). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc)). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis E. HULLA DEC). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. G. i.). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Secolusion). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittadinfaction). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure I. Sciencel (itches)). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure J. Skinrash/itches K. Other). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure J. Skinrash/itches K. Other a. Type of electricity). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following Access to Electricity	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure J. Skinrash/itches K. Other a. Type of electricity supply). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following Access to Electricity	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure J. Skinrash/itches K. Other a. Type of electricity supply). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following Access to Electricity	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure J. Skinrash/itches K. Other a. Type of electricity supply a. Government Electricity/). b. Especially among women	c. Especially among children				
30	Identify the five main health challenges in the village according to the following Access to Electricity	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure J. Skinrash/itches K. Other a. Type of electricity supply a. Government Electricity/ National Grid). b. Especially among women	c. Especially among children 				
30	Identify the five main health challenges in the village according to the following Access to Electricity	 8. Others (education, land etc. a. General A.Diarrhoea B.Malaria C.Respiratory tract infection (cold, coughetc) D. Cholera E. Tuberculosis F. HIV/AIDS G. Guineaworm H. Sexually transmittedinfection I. High bloodpressure J. Skinrash/itches K. Other a. Type of electricity supply a. Government Electricity/ National Grid b. Electricity Organized by). b. Especially among women	c. Especially among children children c. Especially among children c. Power Consumption/day				

		c. Electri	icitv bv 1	orivat	e/					
		comm	ercial ge	nerato	or					
		d. Solar	0							
		e. No ele	ctricity							
32	Cooking fuel	What type	of cook	ing fu	el is					
	6	used in the	e commu	nitv?						
		1) Firewo	boc							
		2) Charce	oal							
		3) Electri	icity							
		4) Other								
		.) 0000								
Water	· Services									
33	Water sources	a River								
55	Where do people	h Creek								
	get drinking	c Pond								
	wotor?	d Brick W	Vall							
	water :	a Hand	Dug							
		f. Tubo W	Dug Vall (Mo	tor Dr	ump)					
		a Tube W	$V_{\rm OII}$ (1010) $V_{\rm OII}$ (1010)	d Du	mp)					
		g. Tube w	Water (r	iu r ui atural	np)					
		i. Spring	Water (1	torod	1) \					
		i Dublic V	Water Su	nnly)					
		J. Fublic V	otor Stor	ppiy aga T	onk					
		K.Kalli W	aler Slor	age 1	alik					
		1. Other (2	specify).	•••••	•••••	Ontion 2		1	Ontion 2	
		Option 1.	•••••	• • • • • • • •	•••	Option 2		••	Option 3	
	a Distance from									
	a. Distance from									
	the village									
	b. Availability of									
	water (In									
	months)									
	c. Quality (Good/									
	Average/ Bad)									
34. Pi	riority wise Key expe	ctations for	r the vill	age						
	i. Men			ii.	Wor	nen			iii. Y	louth
А			A					А		
В			В					В		
С			С					С		
Social	Group Support									
Try to	understand the social	networks in	the villa	age. T	ry to und	lerstand through	a dis	cussi	ion on the ex	tistence of these
groups	s, role they perform an	d then try to	o fill in t	he inf	ormation	in the table belo	ow.			
Use th	ese codes for the foll	owing one	question	:						
Nature	e of support – 1. None	II. Monetar	y III. Fa	rming	g IV. Hou	use Construction	V. 0	ther	(specify)	
35	Type of Group		Numbe	r of	Freque	ency of	Nat	ure o	of Support	Any
			Membe	rs	Meetin	ig (In months)	Rec	eive	ł	contribution to
										group
	a. Youth Group									
	b. Fishing Group						l			

	c. Farming Group									
	d. Hunter Group									
	e. Community Grou	up								
	f. Religious Group									
	g. Low Interest Mic	cro								
	Credit group									
	h. Other (specify)									
36	Does the village have	e some kind of fi	ishing							
	association or cooper	ative?								
	How does the fishing	s association wor	rk?							
Non-g	overnmental Organiz	ations Operation	onal in t	he community						
Use th	Use these options for the following questions:									
Nature	e of Work – Health, Sar	nitation, Educati	on, Live	lihood, Water supply, M	licro-ci	redit, Environme	nt conservation,			
Other	(specify),									
Benefi	its Received – Technica	al training, Medi	ical Supp	olies, Other Capacity Bui	ilding,	Credit Group Fo	rmation, Other			
(specif	fy)									
37	Are their NGOs or	CSOs	a. Yes,	b. No						
	operational in the area?									
			If the a	if the answer is <u>yes</u> , move to the next question, otherwise skip						
38	i NCO name /	CSO name	ii N	Nature of Work iii. Benefits Received						
50	I. HOO lialle /	CSO name	II. 13		111.	Delicities Receiv	cu			
Sacre	d sites, graves and her	ritage sites . No	I							
39	i. Object	ii. Location'	s liii.	Distance from village	e (in	iv. Likely to fa	all within the			
•••		Name		mins or kms or mile)	(Project are	a or not			
				,		Ð				
Infor	mation Scheme about	t the Project								
40	Do you have any infor	rmation regardin	g a.	Yes, I know about the l	Project	c. No				
_	the proposed Project?	6	b.	Yes, somewhat	5	d. No respor	ise			
	_									
41	If Yes, from where did	d you hear about	a.	Government Department	e. Communi	ty Elders/				
	the Project? If No. how	w would like to	be b.	Technical Surveyors		Traditiona	al leaders			
	communicated about t	he project?				f. Direct Co	ntact with the			
			c.	Newspapers		communit	ty member			
			d.	Neighbors		g. Radio				
						h. Any Other(specity)			

Inform	Information Disclosure Scheme					
42	Information Disclosure system in the village. How					
	information made available to the community? To the					
	community?					

	Radio	
	Television	
	Public Address System	
	Newspapers	
	Notice	
	• Meetings in the community etc.	
43	Grievance redressal system in the village What kind of	
	grievance situations arises for the community?	
	a. How are these grievances settled? What is the role of	
	village level institutions in addressing these	
	grievances?	
44	What kinds of grievances are typically raised by the	
	community? What is the role of the related department in	
	handling these grievances?	
	a. What is the role of the Client in handling the	
	grievances?	
	Are they handled in a similar fashion like the general	
	grievances in the community?	
Vulne	rability	
45	General understanding of vulnerability in the village What	
	is the understanding of vulnerability in the village?	
	• Poor	
	• Disabled	
	• Old age	
	• Widow	
	• Why are they considered vulnerable by the	
	community?	
	• What are the support systems (if any) to help these	
	people?	
46	Previous experience of any project in the area. Are there	
	past experiences of other projects in the area? Or	
	engagement with other operators or large companies?	
	a Was there any issue with the community?	

Any Special observations from the village



WORK INSTRUCTION

STEAM PRODUCTION

WI-P-EU-003 (00)

Revision No.	Effective Date	Issued by	Approved by
00	15/06/2016	Min Hlaing Mon	Hatsachai Prahanphap

STEAM PRODUCTION

1. Objective

This document is the guideline for CFB boiler operation. It describes procedure of steam production since the preparation to start-up and shut-down procedure of boiler. All employees shall strictly follow this guideline for safety operation and for the high efficiency operation.

2. Scope

This document covers CFB boiler working procedure of EU section, production department, Mawlamyine Cement Limited. The document is set up under quality control system which includes preparation modification, cancellation, approval, distribution, destruction of the document.

3. Reference Document

141886SM1 HBG: Instructions for the Care and Operation of Circulating Fluidized Bed

4. Personal Protective Equipment

- Safety shoes
- Safety helmet
- Thermal protective glove





- Hot dust protective mask



- Ear plug





- Respirator



- 5. Tools and Equipment
 - Valve handle



LED Lamp



- Cart







- Bucket



- Crowber



6. Procedure

A. General precaution

- 1. All doors at lower furnace must be closed.
- 2. Furnace pressure limits
 - The furnace draft, as measured at the balance point at the furnace exit, should be monitored constantly and automatically controlled to be between -130 to 250 Pa.
 - The Main Fuel Trip (MFT) is set at ± 2500 Pa pressure at the furnace exit (cyclone inlet) with a 5 second delay.

Note: When MFT occurs, Drum level and an adequate flow of steam to control pressure should be maintained all times.

- The FD and ID fan trips should be set at \pm 3750 Pa pressure in the furnace area with no time delay.
- 3. Drum water level and temperature differential

- The normal drum water level is 100 mm below the centerline of the drum.
- The alarms are set at \pm 75 mm from normal water level
- The trips are set at ± 250 mm from normal water level This condition initiates a main fuel trip (MFT) and the FD and ID fans are tripped to protect the drum from undue thermal stress; the metal temperature differential between top and bottom of the drum should not exceed 40 °C. The drum metal temperature should be monitored and indicated in the control room.
- The reliability of drum level shall be checked at least once per shift.
- 4. The furnace bed fluidizing velocity should not be allowed to drop below 1.2m/sec.
- 5. Safety valve operating pressure shall be rechecked every year.
- 6. Excess Air Requirement
 - The excess air requirement at 100% MCR load is measured at the HRA outlet and corresponds to an oxygen measurement of approximately 3.1% by volume on a wet basis.
- 7. Bed temperature profile
 - Normal operating bed temperature 790 920 °C
 - High bed temperature alarm 955 °C
 - Low bed temperature alarm 760 °C
 - MFT at 955 °C





Operating Parameter of Boiler

Operating Parameter of Boiler Steam



B. Pre-condition check

- 1. Check all safety interlocks for proper operation
- 2. Ensure drum water level is normal (-50 to 50 mm)
- 3. Ensure drum water level indicators function properly
- 4. Make sure the test gags and/or plugs are removed from all safety valves.
- 5. Check all drainage and vent valves position
- 6. Check position dampers in the air ducts and gas flues
- 7. Close all access doors and observation ports after it is proven that no one is inside the unit
- 8. Check lubricating and cooling systems for all driving facilities
- 9. The furnace bed should be charged with bed material, either sand or burned material of 0-6mm size, to a static bed depth of 500 mm. Stop charging when bed pressure indicates 3500Pa.



Economizer Recirculation Valve : Open before start boiler

C. Start up procedure

1) <u>Valve condition before start</u>

Valve Description	Postion
Steam Drum Safety Valve	Set at 6.62 MPa
Main Steam Safety Valve	Set at 5.62 MPa
Main Feed Stop Valve (11ZM010M)	Closed
Main Feed Check Valve (11ZM010M)	Automatic
Economizer Recirculation Valve (11ZM011M)	Open
Drum Steam Connection Vent	Open
All instrument and level measurement manual valve	Open
Drum Water Gage Shut off (Sight Glass)	Open
Drum Chemical Feed	Closed
Drum Emergency Drain (11ZM020M/21M)	Closed
Drum Continuous Blowdown (11ZM026M/27M)	Closed

Closed
Closed
Closed
Closed
Open
Open 1/2
Open
Open
Open 1/2
Open
Open
Open
Closed

2) Damper condition before start

<u>No.</u>	Damper Description	Position	
1	ID Fan Inlet Vanes (12ZV013/22ZV013)		
2	Primary Fan Inlet Vanes (22ZV001/12ZV001)	Close	
3	Secondary FD Fan Inlet Vanes	Close	
4	Limestone Inlet	Close	
5	Upper Secondary Air	Close	
6	Lower Secondary Air	Close	
7	Under-bed Burner (12ZV007/12ZV004) and (22ZV007/22ZV004)	Open	
8	Furnace Fluidizing Air Damper (12ZV006/12ZV003) and (22ZV006/22ZV003)	Close	
9	J-Valve Fluidizing Air	Open	
10	Fuel Sweep Air	Open	
11	Fuel Feeder Seal Air	Open	



3) <u>Purging before start</u>

- 3.1) Ensure that the fuel supply valve to the under-bed burner is closed.
- 3.2) Limestone feeder and bed removal system is off.
- 3.3) Start ID Fan
- 3.4) Start ID Fan Damper
- 3.5) Start Root Blower
- 3.6) Start PA Fan
- 3.7) Start PA Fan Damper
- 3.8) Purge the unit by 25-40% (12.5 20 Hz of ID Fan) of total air flow for at least 5 minutes.

Remark: For VVVF motor, it needs to start power supply (C) before start motor (M) Purge the unit by 25-40% (12.5-20 Hz) of total air flow for at least 5 minutes.

- 4) Start up
 - 4.1) Close windbox air damper (12ZV003/12ZV006 or 22ZV003/22ZV006)
 - 4.2) Every time that the bed material quantity and size are changed, the fluidization test shall be taken place.
 - 4.3) Open ignition air damper (12ZV004/12ZV007 or 22ZV004/22ZV007) for 100%
 - 4.4) In case that the bed height is 500 mm
 - Adjust ID fan speed to be 8.5 Hz
 - Adjust primary air fan speed to be 33 Hz
 - Pressure of wind box shall be around 7600 Pa (it should be stable if the fluidization condition is achieved)
 - See whether fluidization occurs (check onsite)
 - Adjust fan speed if it's needed in order to ensure that fluidization condition can be achieved
 - 4.5) Light-off the under-bed burner. Observe the light-off via the observation ports for good flame quality.
 - Machine description
 - Air inlet damper



- Valve

12ZV004M/12ZV007M 1#Boiler ignition burner inlet control valve 22ZV004M/22ZV007M 2#Boiler ignition burner inlet control valve 12ZV003M/12ZV006M 1#Boiler air chamber inlet control valve 22ZV003M/22ZV006M 2#Boiler air chamber inlet control valve





Boiler ignition burner inlet control valve



Boiler air chamberinlet control valve

- Ignition oil pump



- Return oil valve



- Ignition control cabinet



- Burner ignition gun



- Flame detector with air cooling pipe



- Air pipe for purge oil



Flame inspection port



- Ignition procedure
 - 1. Before start up, open Boiler ignition burner inlet control valve 100% and close Boiler air chamber inlet control valve 0%
 - 2. Open inlet air damper 10-20%
 - 3. Open all manual oil valves
 - 4. Open ignition oil pump and control oil pressure around 1.3-1.5 MPa by adjusting returning oil valve
 - 5. Press "Advance burner ignition gun" on control cabinet
 - 6. Open oil valve before burner and then Press "burner igniter ignition" on control cabinet
 - 7. Look at inspection hole if igniting press "Back burner ignition gun" on control cabinet
 - 8. Increase inlet air damper gradually until open 100% (look at flame can not extinguish)
- If the system can't be ignited
 - 1. Close oil valve before burner



2. Open air valve for purging



- 3. Wait 2-3 min for clearing the oil inside burner
- 4. Open oil valve and igniting again

- 4.6) In the manual mode, place limestone feeder systems in service at minimum speed per instructions.
- 4.7) Monitor the %O2 to ascertain complete combustion is taking place. (3-6%)
- 4.8) While the unit is heating up and building drum pressure, always check drum metal temperature, drum level, and furnace pressure.
- 4.9) While raising the bed temperature to 450 °C, the drum level will rise. Maintain the drum level within the range by using
 - the continuous blow down valve (11ZM026M- 11ZM027M for Boiler 1 or 21ZM026M- 21ZM027M for Boiler 2)
 - the feed water control valve (11PV008M for Boiler 1 or 21PV008M for Boiler 2)
- 4.10) When the drum pressure reaches 0.69 1.03 bar,
 - Close the following vent
 - Drum vents
 - HRA front wall upper header vents
 - HRA rear wall upper header vents
 - SH wing wall outlet header vents
 - Main steam outlet header vents (On transfer steam pipes between High Temp. SH and Main steam Outlet Header)

Close the following drain valves

- HRA Front Wall Lower Header Drains
- SH Wing Wall Inlet Header Drains
- High Temp. SH Inlet Header Drains

Remark: the drain valve of the main steam outlet header should remain open to ensure that all water is drained from the steam circuit.

- 4.11) When the drum pressure reaches 0.69 -1.03 bar, place the drum level control loop in automatic control in the single element control <u>Remark</u>:
 - Whenever steam drum water level is low and it needs to fill water into the drum, economizer recirculation valve shall be closed before starting boiler feed pump and open feed water control valve. (Before place PID control for water level in operation)



- 4.12) Continue increase the bed temperature until it reaches 450 °C. (The temperature increasing rate shall be around 3 °C/min
- 4.13) Place the steam temperature control loop on automatic.
- 4.14) Start open windbox air damper (12ZV003/12ZV006 or 22ZV003/22ZV006) (Increase % open gradually by 5% each time)
- 4.15) Open coal feeder inlet and outlet damper respectively
- 4.16) Start coal feeder (each coal feeder feeding rate is 0.5 tph)
- 4.17) Maintain bed temperature increasing rate
- 4.18) If the bed temperature increasing rate is too fast, coal feeder shall be stopped for a while.
- 4.19) After the bed temperature is stable, coal feeder can be started again.
- 4.20) Follow step 4.15) to 4.18) until the bed temperature reaches 800 $^{\circ}$ C
- 4.21) Coal feeder can be left in operation and the boiler load can then be increased by increasing both coal feeding rate and % windbox damper opening.
 <u>Remark</u>: %O2 and the steam drum pressure shall be the controlled parameter while increasing boiler load.
- 4.22) When main steam temperature reaches 400 °C and steam pressure reaches 4.1 MPa, start the Turbine
- 4.23) As the amount of steam delivered to the turbine approaches 10% of boiler steam generator capacity, close the drain valves of main steam.

5) Boiler combustion adjustment

When the following phenomenon occurs, operators shall follow the guideline action to ensure smooth operation of boiler.

Phenomenon		Cause	Action
Bed temperature	slightly increase		increase secondary air
			decrease coal feeding
	slightly decrease		decrease secondary air
			increase coal feeding
	increase	higher coal heating value	decrease coal feeding
			increase primary air
		larger coal size	decrease secondary air
	decrease	lower coal heating value	increase coal feeding
			decrease primary air
		smaller coal size	increase secondary air
		too much slag	drain slag
Windbox pressure	increase	too much slag	drain slag
Furnace diff pressure	increase	too much slag	drain slag at loop seal
			(control wind-box pressure < 9000 Pa)
Furnace outlet temp	increase	higher coal heating value	decrease coal feeding
	decrease	lower coal heating value	increase coal feeding
Steam temp	increase	higher coal heating value	decrease coal feeding
	decrease	lower coal heating value	increase coal feeding
Oxygen content	decrease	higher coal heating value	decrease coal feeding
	increase	lower coal heating value	increase coal feeding
Load change	increase		increase secondary air
			increase primary air
			increase coal feeding
			increase return material quantity
	decrease		decrease secondary air
			decrease primary air
			decrease coal feeding
			decrease return material quantity
Localized defluidized		ash melting or blockage	stop boiler and check
Localized low bed temp		of nozzle grid	

D. Shut down

- Reduce unit load to the minimum stable operating point and maintain the load for approximately 30 minutes to help cool cyclone refractory, otherwise cyclone tube temperatures will rise to greater than 420 °C. In such case, opening the cyclone upper header vent system
- 2) Close all fuel silo hopper outlet shut-off valves and run all fuel out of the feeder. Also, empty the fuel storage silos to their lowest safe levels.
- 3) Stop limestone feeder system
- 4) Monitor boiler oxygen levels and bed temperatures; when oxygen starts to increase and bed temperature starts to decrease, closing off the windbox control damper.
- 5) As the load is reduced below approximately 10 percent of rated boiler capacity, open drain valves of the main steam line and H/T superheater outlet header. Pay attention to the control

of the furnace cooling rate and these drain valves should not be completely closed off as long as steam is still generated during the process.

- 6) After all fires have been extinguished, leave the FD and ID fans in operation for at least five minutes to purge the setting of combustibles.
- 7) Shut down the fans after purging the unit. Close any associated fan dampers to retain heat (When boiler is to be out of service for short period of time). Be sure bottom ash coolers have been emptied of material. When the drum pressure has fallen below the lowest set safety valves, and there is insufficient heat remaining in the setting to pop the safety valves, close the drain valves of the H/T superheater. The drain and vent valves should remain closed when not firing the unit.
- 8) If the boiler is to be out of service for an extended period or entered for maintenance, continue to cool down the unit using the fans, while removing bed material via the bottom ash cooler. The H/T superheater outlet header downstream drain valves may be regulated along with other superheater drains to decrease drum pressure at the desired rate. Cool the unit as uniformly as possible. The residual heat in the setting and the boiler components will continue to generate steam for considerable time. During this period, the boiler water level should be maintained near the upper limit of gage glass visibility. Once all bed material is removed from the unit, purge the boiler setting for five (5) minutes. The bottom ash cooler should then be removed from service. When the unit is cool enough for entry, the fans can be taken out of service.
- 9) The J-valve blower should remain in operation after the FD and ID fans are shut down. To prevent damage to J-valve components, the J-valve blower should remain on until the valve cools to below 260 °C.

E. <u>Action in emergency case</u>

Stop boiler if the following conditions occur

- Serious shortage of water (After feed water, it still can't see the drum water level)
- Serious full of water (After emergency drain, it still can't see the drum water level)
- Boiler piping is broken
- Secondary combustion occurs at out of furnace zone
- Clinkering or coking at bed or loop-seal
- Overpressure

1) Boiler water level abnormal – Serious Water Shortage

Action

- If steam drum water level still declines and finally can't see the drum water level. Then it needs to stop boiler immediately and continuously feed water into boiler.
- If electrode level gauge can't show drum level, it needs to stop boiler <u>without feeding</u> <u>water into the drum</u>. When checkup water level already and water reappear in the level gauge, It can increase feed water into boiler

2) Boiler water level abnormal – Serious Water Full

Action

Immediately stop boiler

- Close main steam valve and open all drainage valve
- When stop feeding water, open economizer recirculation valve
- After water level returns to normal, restart boiler system

3) **Boiler piping is broken**

Phenomenon

- Feed water flow increases
- When it has serious damage, the tube explosion has an obvious blasting sound. Furnace negative pressure becomes positive pressure, and the feed water flow is much greater than steam flow.
- The steam pressure and feed water pressure drop.
- Combustion is instability which can be seen from the decreasing bed temperature and flue gas temperature.
- ID fan frequency and current increase.

Action

- In the case that slightly tube damage occurs, reduce boiler load or stop the boiler follow the normal procedure
- In the case that serious tube damage occurs
 - Emergency shutdown boiler and stop feed water to boiler;
 - Keep ID fan running and blow out the steam from furnace Remark: If the bed temperature decreasing rate exceeds the allowable value, stop ID fan.
 - After boiler shutdown, clean the bed as soon as possible

4) <u>Clinkering or coking at bed</u>

Phenomenon

- Bed temperature suddenly increases and exceeds ash melting temp (1200 °C)
- Air chamber pressure increases, primary air quantity decreases, or gas duct has vibration
- Circulation materials decrease

Action

- Before start boiler, for local small slagging, it can increase primary air flow and clear the clinkering by tools, then continue running.
- If operator can notice the coking trend in time, stops coal feeding, increases the primary air and draft air flow, find out the reason, adjust the combustion, when bed temperature return to 900 °C, adjust the coal feeding, and continue running
- For serious clinkering condition while running boiler, stop boiler immediately

5) <u>Blocking at loop seal</u>

Phenomenon (Opposite to the phenomenon of clinkering at bed)

- Windbox pressure sharply reduces
- Bed temperature increases
- Primary air flow increases substantially
- Return feeder upper pressure becomes positive pressure

Action

- Discharge the ash from return feeder immediately to make the upper return feeder pressure becomes negative
- Stop coal feeder, stop slag discharging, when the bed temperature back to normal range, start coal feeding

6) <u>Electrical system fault</u>

6.1) Load sharply decrease

Phenomenon

- Boiler steam pressure sharply increases
- Boiler steam flow reduces
- Steam drum water level decreases at moment and then rises
- Superheated steam temperature rises
- For serious condition, drum and superheater safety valve action.

Action

- According to the load reduced condition, decrease the coal feed in a large range, reduce the secondary air flow, and maintain the boiler normal combustion (change all the automatic control into manual control)
- Adjusting the primary and secondary air flow ratio properly
- If steam pressure continues to rise, open superheater steam exhaust valve immediately, maintaining the normal pressure. When two boiler parallel run, open one boiler steam exhaust valve, if the steam pressure still high, open the other one.
- According to the changing superheater outlet steam temperature, open desuperheat drain valve if necessary
- According to the drum water level, steam flow and water flow, keep the drum level slightly below normal water level, to waiting for increase the boiler load

6.2) Load sharply increase

Phenomenon

- Boiler steam pressure sharply reduces
- Boiler steam flow increases
- Steam drum water level increases at moment and then reduce
- Superheated steam temperature reduces

Action

- According to the load increased condition, increase the coal feed in a large range, increase the secondary air flow before feed coal, and maintain the boiler normal combustion
- Appropriate to increase the primary air flow, keep oxygen content in the controlled range

6.3) Electrical power break off Phenomenon

• All motors stop running, voltage, electrical current indications are zero, MFT action

• Boiler steam flow, steam pressure, steam temperature, water level all sharply reduce

Action

- Turn off breaker for every motors
- Keep steam drum water level is lower than middle water level -100 mm
- After electrical power recovers, startup each motor in order, prevent all the motor startup at the same time to cause voltage decreases and power breaks off again



WORK INSTRUCTION

TURBINE AND GENERATOR OPERATION

WI-P-EU-004 (00)

Revision No.	Effective Date	Issued by	Approved by
00	15/07/2016	Min Hlaing Mon	Hatsachai Prahanphap

STEAM PRODUCTION

1. Objective

This document is the guideline for Turbine and Generator operation. It describes procedure of operation since the preparation to start-up and shut-down procedure of Turbine and Generator. All employees shall strictly follow this guideline for safety operation and for the high efficiency operation.

2. Scope

This document covers Turbine and Generator working procedure of EU section, production department, Mawlamyine Cement Limited. The document is set up under quality control system which includes preparation modification, cancellation, approval, distribution, destruction of the document.

3. Reference Document

83R31-0311 Steam Turbine Instruction Manual for Operation and Maintenance
22016-Y11101 Technical Specification of Generator
22016-T0E052 Turbine and AUX. Equipment Commissioning Test Procedure at Site

4. Personal Protective Equipment

- Safety shoes
- Safety helmet
- Thermal protective glove
- Hot dust protective mask



- Ear plug



มุตโตรงมีต+กระมังหน้า มุตโตรงมีต

- 5. Tools and Equipment
 - Valve handle



6. Procedure

A. Machine specification





• Turbine specification

(1) Design / Guarantee condition

Generator output	20,000 kW
Main steam flow (at main stop valve inlet)	78.87 t/h

Under following conditions

•	Main steam(at main st	op valve inle	et)
	Pressure / Temperatur	e:	5.2 MPaA / 480 °C
*	1 st extraction (at extrac	tion port)	
	Pressure		0.80 MPaA
	Steam flow		3.39 t/h
	2 nd extraction(at extrac	tion port)	
	Pressure		0.275 MPaA
	Steam flow		5.94 t/h
•	3rd extraction(at extrac	tion port)	
	Pressure		0.06 MPaA
	Steam flow		4.0 t/h
•	Exhaust pressure		9.0 kPaA
Spee	be	\$	5,586 min ⁻¹
Gene	erator efficiency	:	more than 97.2%

• Turbine steam parameter

Steam pressure at main stop valve inlet

Rated pressure	5.2 MPaA
Continuous max. pressure	5.72 MPaA
Instant. max. pressure	6.24 MPaA

(Annual total period to be less than 12 hours)

The average pressure at the turbine inlet over any twelve (12) months of operation shall not exceed the rated pressure 5.2 MPaA.

Steam temperature at main stop valve inlet

Rated temperature	480	°C
Continuous max. temperature	488	°C
Instant, max, temperature	494	°C
(Annual total period to be less than	400	hours)
Instant. max. temperature	508	°C

(Annual total period to be less than 80 hours)

The average temperature at the turbine inlet over any twelve (12) months of operation shall not exceed the rated temperature 480 °C.

• Generator specification

(1) Quantity	: 2
(2) Type form	: Totally Enclosed, Salient type rotor, brushless type, with PMG
(3) Enclosure	: IP-54
(4) Output	25000kVA (20000kW)
(5) Phase	Three (3) phase three(3) wire
(6) Power factor	: 80% Lagging (Operation range: 80% Lagging ~ 95% Leading)
(7) Voltage	: 10500V
(8) Frequency	50Hz
(9) No. of pole	4
(10) Speed	: 1500rpm
(11) Current	: 1375Å
(12) Rating	: Continuous
(13) Connection	: Star (Neutral brought out)
(14) Insulation class	: Class F (Temp. rise: Class B)
(15) Bearing	: Sleeve metal, forced lubrication.
	(Lub. oil shall be supplied by turbine side)
(#)	(Lub. oil inlet temp. : 45±5°C, Pressure : 0.1MPa,
	Q'ty: 34 & /min, Type: ISO VG46)
(16) Excitation system	Brush-less type with PMG
(17) Applicable standard	IEC 60034-1
(18) Cooling Water	Industrial water is supplied for cooling system
	Inlet temperature : 35°C.
	Maximum outlet temperature : Approx. 4K
222	Pressure (ID 21MPa)(Max. 0.5MPa)
	Q'ty :2×700 £ /min
	Water quality : Cooling water
	Material of Cooling Water Pipe : Deoxidized Copper
	Capacity of one(1) set of cooler : 50% × 2 cooler(s)

B. Auxiliary equipment and control value

	_	ur	D	n	e Trip	Fun	ction					
	31	GNAL				-						
NAME/ANNUNC LATOR	IND	TP	ON P GP	DCS	DETECTOR	TAG No.	LOCATION	ON/OFF AT ABNORMAL	NORMAL VALUE	SET VALUE	UNIT	TIMER
TURBINE MANUAL TRIP (STP)	0	ANN	ANTS	0	EMERGENCY SW		STP	ON	-	-	-	-
TURBINE MANUAL TRIP (CCR)	0	-	1	0	ENERGENCY SW		DCS	ON	<u></u>		-	1.12
HAND TRIP (LOCAL)	0	-	-	0	LIMIT SW	Z8-*1508	LOCAL	ON	-	-		
OVER SPEED (ELECTRICAL)	0	-	-	0	PROTECH GI	-	STP	DN	1500	1650	nin"	-
OVER SPEED (TURBINE CONTROLLER)	0	-	-	0	TURBINE	-	STP	DN	1500	1658	mtin ^{−t}	-
ACCELERATION ABNORMAL	0		-	0	TURBINE	-	STP	ON	-	⊿ S>45	nin"	2
TURBINE EXHAUST STEAM PRESS HH	0	-	-	0	PRESS. SW	PS-#1106	LOCAL	DN	9	34. 6	kPaA	2sec
LUBE OIL PRESS. LL	0	10	-	0	PRESS. SW	PS-#1301A	LOCAL	ON	0.1	0.05	MPaG	2sec
TRIP OIL PRESS. LL	0	-	-	0	PRESS. SW	PS-#1304	LOCAL	ON	1.0	0.2	MPaG	200msec
TURBINE ROTOR POSITION HH	0	1	2	0	POSITION	Z1A-#1502	STP	ON	<u> </u>	±1.0	mm	1sec
TURBINE FRONT SHAFT VIBRATION (X-DIRECTION) HH	0	-	-	0	VIBRATION	VIA-#1503A	STP	ON	15	200	шmР-Р	1sec
TURBINE FRONT SHAFT VIBRATION (Y-DIRECTION) HH	0	×	-	0	VIBRATION MONITOR	VIA-*1503B	STP	ON	-	200	шmР-Р	1sec
TURBINE REAR SHAFT VIBRATION (X-DIRECTION) HH	0	-	-	0	VIBRATION MONITOR	VIA-*1504A	STP	ON	S.	200	ШmР-Р	1sec
TURBINE REAR SHAFT VIBRATION (Y-DIRECTION) HH	0	-	-	0	VIBRATION	VIA-*1504B	STP	DN	-	200	#mP-P	1sec
TURBINE CONTROLLER HEAVY FAULT	2	0	-	0	TURBINE	-	STP	DN	-	-	-	-
TURBINE CONTROL SIGNAL HEAVY FAULT (TURBINE SPEED SIGNAL FAIL)	0	2	-	0	TURBINE	-	STP	ON	-	-	-	-
TURBINE CONTROL SIGNAL HEAVY FAULT	0	-	-	0	TURBINE	-	STP	ON	-	-		1.00
TURBINE CONTROL SIGNAL HEAVY FAULT (HP_GDV. CONTROL SIGNAL FAIL)	0	1	-	0	GOVERNOR AMPLIFIER	ZI-#1509	STP	ON			-	1 -
GENERATOR HEAVY FAULT	0	3	-	0	86G-1		GP	ON			1.00	1.5
CONTROL POWER SUPPLY HEAVY FAULT		0	-	0	RELAY		STP	ON	-	-) - e
BOILER TRIP	0	-	-	0	RELAY	1	DCS	ON	-		-	1.14
GENERATOR TURBINE SIDE SHAFT VIBRATION OX-DIRECTION HH	0	-	-	0	VIBRATION MONITOR	VIA-#8201A	STP	ON	<i>.</i>	200	#m₽~P	1sec
GENERATOR TURBINE SIDE SHAFT VIBRATION (Y-DIRECTION) HH	0	2	-	0	VIBRATION MONITOR	VIA-*82018	STP	ON	-	200	штР-Р	1sec
GENERATOR EXICITER SIDE SHAFT VIBRATION X-DIRECTION HH	0	2	-	0	VIBRATION MONITOR	VIA-#8202A	STP	ON	-	200	<i>ш</i> тР−Р	lsec
GENERATOR EXICITER SIDE SHAFT VIBRATION (Y-DIRECTION) HH	0	-	=	0	VIBRATION MONITOR	VIA-#8202B	STP	ON	17.	200	µтр-Р	lsec
CONLY WHEN 52G2 52DG1 AND 52DG2 ARE OPEN	0	-	-	0	TURBINE	. н	STP	ON	-		14) - ÷

ITEMS	HEAVY	LIGHT	REMARKS
Speed signal fail (2 out of 3)	0		Loss of two of three speed pick up signal
Generator output signal fail (1 of 1)	0		Analog input signals failure detected (outside of ±10% of 16mA)
Governor control signal fail	0		Analog output signal for governing valve failure detected
Speed signal-A fail		0	Loss of speed pick up-A output signal
Speed signal-B fail		0	Loss of speed pick up-B output signal
Speed signal-C fail		0	Loss of speed pick up-C output signal
Gland seal steam press. signal fail		0	Analog input signals failure detected (outside of ±10% of 16mA)

Tag No.	Control	Normal Value	Setting Value		
SIA_1501HH	Over Speed	1500 rpm	1650 rpm - Trip		
SA_1501ABN	Turbine Acceleration Abnormal	-	45 rpm/min or - Trip Start speed > 600 rpm		
ZIA_1502HH	Turbine Rotor Position HH	•	± 1 mm - Trip		
ZIA_1502H	Turbine Rotor Position H	-	± 0.5 mm		
XDIA_1505H	Turbine Differential Expansion H	-	+2.1 mm -1.2 mm		
TDIA_1143H	Turbine Casing Differential Temp H	-	100 °C		
VIA_1503A/BHH VIA_1504A/BHH	Turbine Shaft Vibration HH	-	200 µm - Trip		
VIA_1503A/BH VIA_1504A/BH	Turbine Shaft Vibration H	-	100 µm		
VIA_8201A/BHH VIA_8202A/BHH	Generator Shaft Vibration HH	-	200 µm - Trip		
VIA_8201A/BH VIA_8202A/BH	Generator Shaft Vibration H	-	150 µm		

Turbine Control Value

Turbine Control Value



		STEAM TURBINE CONTROL PAN	IEL (S	STP)	ŀ	1			DETECTOR		1		SETTING		
NO. TAG NO.		INDICATION		BUNNUR	TPD	LED	T R I P	INSTRUMENT TO DETECT	EQUIPMENT TO DETECT	EQUIPMENT TO ANNOUNCE	NORMAL WALUE	BETTIN G VALUE	TOLERANCE	UNIT	DELAY
ન	PV_1101H	TURBINE MAIN STEAM FRESS, H		0	0			PRESS.	TURBINE	TURBINE	10	5.55 1	40.05	МРи	25HC
-2	PK_*1101L	TURBINE MAIN STEAM PRESS. L		0	0			TRANSMITTER	CONTROLLER	CONTROLLER	0,1	4.334	AD.05	мра	2880
-3	TIA_1101L	TURBINE MAIN STEAM TEMP, L		0	0			THERMO	TURBINE	TURBINE CONTROLLER	480	455.1	#3	°C	2805
-4	PA_*1107HH	EXHAUST STEAM PRESS. HH	0		0		0	PRESS, SWITCH	TURBINE CONTROLLER	TURBINE		34.61	*1~~~4	kPaA	2500
-5	PIA_*1109H	EXHAUST STEAM PRESS, H		0	0			PRESS. TRANSMITTER	TURDINE	TURBINE CONTROLLER	8	21.3 t	±1	kPa4	2580
-8	PICA_*11aaL	GLAND SEAL STEAM PRESS, L		o	0		1	PREBB, TRANSMITTER	TURBINE	TURBINE	20	51	#1	RPo	2560
-4	PIA_*1128L	GLAND CONCERSER INLET WATER PRESS.		o	0			PRESS. TRANSMITTER	DCS	pes	ंत्र स्ट	3 3	# #3	MPa	2500
-5	TIA_1160H	EXHAUST STEAM TEMP, H		0	0			RTD	TURBINE	TURBINE	43.8	120 1	±2	τ	2500
-0	LA_*1103HH	CONDENSER WATER LEVEL HIL		0	0			LEVEL	100		NL.	150 †	±10	mm	(008)
-10	LA_*110SLL	CONDENSER WATER LEVEL LL		0	0			BWITCH	DCS	DCS	NL	150 1	±10	лim	(008)
-11	LIA_*1102H	CONDENSER WATER LEVEL H		0	0	0		LEVEL	DCS	2552	NL	100 †	#6	mm	(CCS)
-12 LIA_1102L	UA_*1102L	GONDENSER WATER LEVEL L		0	0			TRANSNITTER		DCS	NL.	100↓	45	mm	(0.05)
-13	PDA_H134HH	BALL STRANER DIFF. PRESSURE HH		0	0			DIFF PRESS	TUBE CLEANING	TUBE CLEANING	з	91	40.2	kPa	2sec
-14 PDA_1134H	BALL STRAINER DIFF. PRESSURE H	L STRAINER DIFF. PRESSURE H 0 0				SWITCH	CONTROLLER	CONTROLLER	3	61	±0.2	kPa	2580		

Turbine Control Value

Turbine Control Value



Steam Seal Balance Receiver



Function : Maintain steam steal pressure to be around 20 kPa by adding or extracting steam seal out of turbine front and rear shaft



Gland Condenser and Ejector



DC Power for TG House

UPS (AC Power)	Battery (DC Power)
DCS	DC Oil Pump
STP / GP	MV Switch Gear
Electronic Control Card	Protection Relay
	Sync Panel

	STEAM TURBINE CONTROL FAI	NEL (STP		- 19		DETECTOR.		5	SETTING				
TAG NO.	INDICATION E 2 L 2 L E		B U T L T E L Z E D D		LED	T R INSTRUMENT I TO DETECT P	EQUIPMENT TO DETECT	EQUIPMENT TO ANNOUNCE	NORMAL VALUE	SETTIN G VALUE	TOLERANCE	UNIT	DELAY	REMARKS
PIA_*1801L	LUBE OIL PRESS. L		0	0		PRESS. TRANSMITTER	TURBINE	TURBINE	100	801	÷	kPa	2sec	AUX. OIL PUMP AUTO START
PIA_*1302L	CONTROL OIL PRESS, L		0	0		PRESS. TRANSMITTER	TURBINE	TURBINE	t,	18.0	±0,05	МРи	2xec	AUX. OIL PUMP AUTO START
91A_41308L	GOVERNOR SUPPLY OIL PRESS. L		0	0		PRESS. TRANSMITTER	TURBINE CONTROLLER	TURBINE	10	0.0 L	±0.05	MPa	2000	
74_11004	TRIP OIL PRESS. LL.	0		0		0 PRESS. SWITCH	TURSINE	TURBINE	1	0.2.1	40,08	MPa	200maa 0	
XDA_HISI4H	LUBE OIL STRAINER DIFF. PRESS. H		o	0		DIFF.FREBS. SWITCH	TURBINE	TURBINE	60	100 1	±10	10 th a	7,960	
PA_1320H	OR PURIFER INLET PRESS, H		0	0		PRESS. SWITCH	TURBINE	TURBINE	0.1	0.2 †	40.05	MPa	2260	
па_чарен	LUBE OIL TIMP. H		0	0		QTSI	TURBINE CONTROLLER	TURBINE	40~45	501	±2	10	2505	
.A_*1321L	LUBE OIL TANK LEVEL I.		0	0		LEVEL SWITCH	TURBINE CONTROLLER	TURBINE CONTROLLER	NL	-100 [A10	mn	Inec	
A_1301A	LUBE OIL PRESS, LL.	0		0		D PRESS. SWITCH	TURBINE	TURBINE	100	601	-0,+10	кры	2eec	EMERGENCY OIL PUMP AUTO START
A_*1301B	LUBE OIL PRESS. H					PRESS. SWITCH	TURBINE CONTROLLER	TURBINE CONTROLLER	100	60 T	-0,+10	kPa	Osec	TURNING INTERLOCK
H0061*_A0	TURGINE FRONT BEARING OL RETLINN TEMP, H		c	0		RTD	TURBINE	TURBINE	50~70	77 †	±2	*C	2960	JIS 88101-2012
/IA_*1307H	TURBINE REAR BEARING OIL RETURN TEMP. H		o	0		RTD	TURBINE	TURBINI CONTROLLER	50~70	77.1	62	°C	284C	JIS 00101-2012
ЛA_°1305H	TURBINE THRUST BEARING OIL RETURN TEMP. H		0	0	T	RTD	TURBINE CONTROLLER	TUREINE	50~70	771	#2	°c	2sec	JIS 88101-2012
TA_1308H	REDUCTION TURBINE SIDE PINION GEAR BEARING OL RETURN TEMP, H		0	0		RTD	TURBINE CONTROLLER	TURBINE	50~70	85 1	±2	°C	2500	
неоснл	REDUCTION GEN. SIDE PINION GEAR BEARING OIL RETURN TEMP. H		a	0		RTD	TURBINE	TURBINE	£q~-70	85 †	- 12	ής	7sec	
14_4310H	REDUCTION TURBINE SIDE WHEEL GEAR BEARING OL RETURN TEMP, H		0	o		RTD	TURBINE CONTROLLER	TURINNE CONTROLLER	50~70	85 †	#2	°C	2sec	
NA_M3118	REDUCTION GEN. SIDE WHEEL GEAR BEARING OIL RETURN TUMP, H		0	0		RTD	TURBINE	TURBINE	6070	85 †	#2	ъ	2auc	

Oil System Control Value





C. Pre-condition check

- Boiler system is ready to supply steam to Steam Turbine.
- Piping system warm up shall be done.
- Valve condition before startup shall be according to the below table.

VALVE	ALVE DESCRIPTION		STEA	M & WATE	ER SYSTEM ON	REMARKS
NO,	(VALVE NAME)	CONE	NOITION	CHECK	CHECKED BY	
*1VA068	*1VA133 GLAND SEAL WATER VALVE	0				
*1VA069	*1VA082 GRAND SEAL WATER VALVE	0				
*1VA070	*1VA083 GRAND SEAL WATER VALVE		с			
		-				6
*1VA073	MAIN STEAM PIPE WARMING UP VALVE A	_	C			
*1VA074	MAIN STEAM PIPE WARMING UP VALVE B		С			
*1VA075	GLAND SEAL STEAM STRAINER DRAIN VALVE		С			
*1VA076	GLAND SEAL WATER VALVE I	0				
*1VA077	GLAND SEAL WATER VALVE C	0				3
*1VA078	MAIN CONDENSER LEVEL HEADER DRAIN VALVE		с			
*1VA079	MAIN CONDENSER LEVEL GAUGE DRAIN VALVE		с			
*1VA080	*1003CV GRAND SEAL WATER VALVE	0				
*1VA082	INTER CONDENSER EJECTOR 1 AIR INLET VALVE	0				
*1VA083	INTER CONDENSER EJECTOR 2 AIR INLET VALVE		С			
*1VA084	AFTER CONDENSER EJECTOR 1 AIR INLET VALVE	0				
*1VA085	AFTER CONDENSER EJECTOR 2 AIR INLET VALVE		с			
*1VA086	GLAND STEAM CONDENSER FAN 1 OUTLET VALVE	I	+			
*1VA087	GLAND STEAM CONDENSER FAN 2 OUTLET VALVE	-	-			
*1VA107	BALL STRAINER OUTLET VALVE	0				
*1VA108	BALL COLLECTOR INLET VALVE	0				
*1VA109	BALL INJECTION NOZZLE STOP VALVE	o				
*1VA110	BALL INJECTION NOZZLE STOP VALVE	0				
*1VA111	MAIN CONDENSER WATER CHAMBER RETURN SIDE AIR VENT VALVE		с			
*1VA112	MAIN CONDENSER WATER CHAMBER RETURN SIDE AIR VENT VALVE		с			
*1VA113	MAIN CONDENSER WATER CHAMBER SIDE AIR VENT VALVE		С			
*1VA114	MAIN CONDENSER WATER CHAMBER SIDE AIR VENT VALVE		с			
*1VA115	MAIN CONDENSER WATER CHAMBER RETURN SIDE DRAIN VALVE		с			
*1VA116	MAIN CONDENSER WATER CHAMBER RETURN SIDE DRAIN VALVE		С			
*1VA117	MAIN CONDENSER WATER CHAMBER SIDE DRAIN VALVE		С			
*1VA118	MAIN CONDENSER WATER CHAMBER SIDE DRAIN VALVE		с			

(Production/EU)

VALVE	VE DESCRIPTION (VALVE NAME)		STEA	M & WAT	ER SYSTEM ON	REMARKS
NO.			DITION	CHECK	CHECKED BY	1.E.WANTO
*1VA129	STRAINER *1FU26 DRAIN VALVE		с			
*1VA130	GLAND SEAL STEAM PRESS. CONTROL		с			
*1VA131	GLAND SEAL STEAM PRESS, CONTROL	0				
*1VA132	GLAND SEAL STEAM PRESS, CONTROL	0				
*1VA133	GLAND SEAL STEAM PRESS, CONTROL	0				
*1VA134	GLAND SEAL STEAM PRESS, CONTROL		с	N		
*1VA135	INTER CONDENSER EJECTOR 1 STEAM	0				
*1VA136	INTER CONDENSER EJECTOR 1 STEAM	0				
*1VA137	AFTER CONDENSER EJECTOR 1 STEAM	0				
*1VA138	AFTER CONDENSER EJECTOR 1 STEAM	0				
#1VA139	INTER CONDENSER EJECTOR 2 STEAM		с			
*1VA140	INTER CONDENSER EJECTOR 2 STEAM		с			
*1VA141	AFTER CONDENSER EJECTOR 2 STEAM		с			
*1VA142	AFTER CONDENSER EJECTOR 2 STEAM		с		2	
*1VA143	STRAINER *1FU22 DRAIN VALVE		с			
*1VA144	STRAINER *1FU24 DRAIN VALVE		с			
*1VA145	STRAINER *1FU23 DRAIN VALVE		с			
*1VA146	STRAINER *1FU25 DRAIN VALVE		с			
*1VA147	AFTER CONDENSER C.W. AIR VENT VALVE		С			
*1VA148	INTER CONDENSER C.W. AIR VENT VALVE		с			
*1VA149	GLAND STEAM CONDENSER FAN 1 INLET VALVE	0				Opening to be adjusted
*1VA150	GLAND STEAM CONDENSER FAN 2 INLET VALVE	0				Opening to be adjusted
*1VA151	AFTER CONDENSER U-SEAL DRAIN VALVE		с			
*1VA152	AFTER CONDENSER C.W. DRAIN VALVE		с			
*1VA153	INTER CONDENSER C.W. DRAIN VALVE		с			
*1VA154	AFTER CONDENSER DRAIN TRAP INLET VALVE	0				
*1VA155	AFTER CONDENSER DRAIN TRAP OUTLET VALVE	0				
*1VA156	INTER CONDENSER DRAIN TRAP OUTLET	0				2
*1VA157	INTER CONDENSER DRAIN TRAP INLET VALVE	0			1	
*1VA158	INTER CONDENSER DRAIN TRAP BYPASS VALVE		С			
*1VA159	INTER CONDENSER DRAIN TRAP AIR VENT VALVE	0				
*1VA160	AFTER CONDENSER DRAIN TRAP AIR VENT VALVE	0				

(Production/EU)

VALVE	DESCRIPTION (VALVE NAME)		STEA	M & WAT	ER SYSTEM ON	REMARKS
NO.			DITION	CHECK	CHECKED BY	
*1VA562	BALL RECIRCULATION PUMP DRAIN		С			
*1VA563	BALL COLLECTOR DRAIN VALVE		с			
*1VA564	BALL COLLECTOR CHECK VALVE		э.			
*1VA565	BALL COLLECTOR AIR VENT VALVE		с			
*******	LUB. OIL COOLER 1 WATER CHAMBER		1922			7
*1VA646	SIDE AIR VENT VALVE	-	С			
*1VA647	RETURN SIDE AIR VENT VALVE	_	С			
*1VA648	RETURN SIDE DRAIN VALVE	a - 1	С			
*1VA649	SIDE DRAIN VALVE		С			
*1VA651	LUB. OIL COOLER 2 WATER CHAMBER		с			
*1VA652	LUB. OIL COOLER 2 WATER CHAMBER		с			
*1VA653	LUB. OIL COOLER 2 WATER CHAMBER		с			
*1VA654	LUB. OIL COOLER 2 WATER CHAMBER		с			
*1VA701	TURBINE 1TS STAGE PRESS. GAUGE	0				1
*1VA702	TURBINE EXHAUST STEAM PRESS.	0				
*1VA703	MAIN CONDENSER LEVEL HEADER STOP	0				
*1VA704	MAIN CONDENSER LEVEL HEADER STOP	0				
*1VA705	MAIN CONDENSER LEVEL GAUGE STOP	0		1		
*1VA706	MAIN CONDENSER LEVEL GAUGE STOP VALVE (LOWER)	0				
*1VA707	MAIN CONDENSER LEVEL TRANSMITTER STOP VALVE (H)	0				
*1VA708	MAIN CONDENSER LEVEL TRANSMITTER STOP VALVE (L)	0				
*1VA709	INTER CONDENSER PRESS. DETECTING VALVE	0				
*1VA710	INTER CONDENSER EJECTOR AIR INLET PRESS. DETECTING VALVE	0				2- 1-
*1VA711	INTER CONDENSER EJECTOR 2 STEAM INLET PRESS. DETECTING VALVE	0				9- 10-
*1VA712	INTER CONDENSER EJECTOR 1 STEAM INLET PRESS. DETECTING VALVE	0				
*1VA713	AFTER CONDENSER EJECTOR 2 STEAM INLET PRESS. DETECTING VALVE	0				
*1VA714	AFTER CONDENSER EJECTOR 1 STEAM INLET PRESS. DETECTING VALVE	0				
*1VA715	AFTER CONDENSER PRESS. DETECTING VALVE	0				
*1VA716	STARTING EJECTOR STEAM INLET PRESS. DETECTING VALVE	0				
*1VA717	STARTING EJECTOR AIR INLET PRESS. DETECTING VALVE	0				
*1VA718	GLAND SEAL STEAM PRESS. TRANSMITTER STOP VALVE	0				
*1VA719	GLAND SEAL STEAM PRESS. GAUGE STOP VALVE	0				
*1VA720	BALL STRAINER DIFF. PRESS. DETECTING	0				

(Production/EU)

VALVE	DESCRIPTION	AT	STEA	M & WAT	REMARKS	
NO.	(VALVE NAME)	COND	ITION	CHECK	CHECKED BY	200004936969696969696969
*1VA721	BALL STRAINER DIFF. PRESS. DETECTING VALVE (H)	0				
*1VA722	BALL STRAINER DIFF. PRESS. BYPASS VALVE		С			
*1VA723	BALL STRAINER DIFF, PRESS, DETECTING VALVE (L)	0				
*1VA724	BALL STRAINER DIFF. PRESS. DETECTING VALVE (H)	0				
*1VA725	BALL RECIRCULATION PUMP INLET PRESS. GAUGE STOP VALVE	0				
*1VA726	BALL RECIRCULATION PUMP OUTLET PRESS. GAUGE STOP VALVE	0				

Drainage Valve (Open when Start Up Turbine)





Drainage Valve (Open all the time)







D. Start up procedure

• Turbine start up diagram



(continue in the next page)





OUTPUTKW







Steam Ejector Operation Onsite



- · Gland steam condenser fan must be run before start starting ejector
- When vacuum pressure reaches 34 kPaA, then start main steam ejector
- 1. Open vent valve and close when water spill out from the vent valve (VA147 or VA148)
- 2. Ensure drainage valve of steam trap open (VA154,VA155,VA156, and VA157)
- Open suction and discharge valve of vacuum of main ejector 2nd stage (VA084 and VA138 or VA085 and VA142)
- 4. Open motive steam valve of main ejector 2nd stage (VA137 or VA141)
- Open suction and discharge valve of vacuum of main ejector 1st stage (VA082 and VA136 or VA083 and VA140)
- When vacuum pressure reach 26.1 kPa, open motive steam valve of 1st ejector (VA135 or VA139)

START

Turbine Start Up

Pre Condition

1		
1-	TURBINE OPERATION MODE	= AUTO
2-	TURBINE HEAVY FAULT = NO	NE
3-	TURNING DEVICE = RUN & A	UTO or NOT 0 min-1
4-	GOVERNING VALVE = FULL C	LOSE or TURBINE on RESET
5-	MAIN STOP VALVE = FULL CL	OSE or TURBINE on RESET
6-	TURBINE MAIN STEAM = >4.1	MPaG & >400°C
7-	AUXILIARY OIL PUMP = RUN	& AUTO & REMOTE
8-	EMERGENCY OIL PUMP = AU	TO & NORMAL
9-	OIL VAPOR FAN = RUN & AUT	O & REMOTE
10-	- GLAND CONDENSER FAN = F	RUN & AUTO & REMOTE
11-	1- CONDENSATE PUMP = RUN (from DCS)
12-	2- GLAND SEAL STEAM PRESS.	= ESTABLISHED
13	3 TURBINE RESET CONDITION	ESTABLISHED



• See Synchronization Procedure in WI-P-EU-005

Synchronizing Mode

- Speed Droop : MW is proportional to speed setting value (4% at rated)
- Speed Isochronous : Fix speed
- When start up turbine, initial power output must be 1 MW

Case	DG1	DG2	TG1	TG2	Condition
1	Load Control	Load Control	Speed Droop	•	Before start up TG
2	Stop	Stop	Speed Isochronous	572	Already start one TG
3	Stop	Stop	Speed Isochronous	Speed Droop	Start both TG TG1 control frequency
4	Stop	Stop	Speed Droop	Speed Droop	Start both TG Frequency control at DCS by raise or lower speed
	Load Control		Speed Isochronous / Speed Droop		Before stop TG

E. Operation concern

• Daily check

8-1	Daily	Checking	Manual	
-----	-------	----------	--------	--

Check Item	Check Location	Check Interval	Criteria		Results	Judge- ment
Unusual noise	Casing	Once a day	To ur	To be free from unusual noise,		//
Bearing temperature	Bearing thermometer	Every 6 hours	Lubricati	ng temp. +35°C max r 80°C max.		
			Accept- able	100 kPa		-
Lubricating oil inlet	Lubricating oil pressure gauge	Every 6 hours	Alarm	80 kPa under Watch carefully,		
pressure			Shut- down	50 kPa under Examine the cause.		
Lubricating oil inlet temperature	Lubricating Oil thermometer	Every 6 hours		45±5 ℃		
Vibration	Casing	Every 6 hours	Max 30 μ m peak–to–peak.			
Oil leaks	Periphery of gear box	Once a day	To be fi	ree from oil leaks,		

TG Operation Concern

No.	Control	Result if Over Limited Value
1	Main Steam Temp and Pressure (4.1 Mpa, 400 C)	Droplet entering in Turbine can cause erosion
2	Drainage is not enough	The turbine casing may be deformed and the turbine may be heavily damaged.
3	Turbine Exhaust Steam Pressure	If the exhaust pressure is too low stage blades may be shortened or broken due to excessive force
4	Low load operation (< 5 MW)	Windage Loss \rightarrow Overheat at last stage blade Turbulent Flow \rightarrow Induce excessive blade virbation
5	Critical Speed Area	Damage from vibration
6	Start Up Curve	If Turbine start up time is not follow the start up curve Rotors deformation and inner touching accident and shorten the lifetime of turbine casing.

Stop TG immediately if it is found that

- 1. Bearing return oil temp is abnormal high
- 2. Generator stator temp is abnormal high
- 3. Noise or vibration become excessive
- 4. Oil or steam leak
- 5. Cause of alarm is unknown

Critical speed Turbine Rotor (Rated speed 5,586 min⁻¹) {1} Lateral critical speed 1st 3,529 min⁻¹ (63.2 %) 2nd 13,807 min⁻¹ (224.3 %) {2} Torsional vibration 1st 1,206 min⁻¹ (80.4 % of generator rotor rated speed) 2nd 3,932 min⁻¹ (70.4 % of turbine rotor rated speed}

Drainage

If drainage is not enough, it can notice from the following situation

- a. When main steam temperature is lower than the normal value.
- b. When output is small in comparing with inlet steam flow rate
- c. When indication of the inlet steam flow meter fluctuates greatly
- d. When vibration of the turbine is higher than usual
- When return oil temperature of the thrust bearing and the turbine bearing is raised abruptly
- f. When indication of turbine rotor casing differential expansion detector fluctuates abruptly
- g. When indication of the rotor position detector fluctuates abruptly

Low Load Operation

Generator load must be more than 5 MW from 20 MW (And Steam flow rate must be more than 22 tph)



<u>Result from Low Load Operation</u> Windage Loss → Overheat at last stage blade Turbulent Flow → Induce excessive blade virbation



F. Stop procedure





It is necessary to satisfy all of the following state to start this sequence.

1-	TURBINE OPERATION MODE = AUTO
2-	VACUUM BREAKER VALVE = AUTO
3-	GLAND SEAL STEAM RECEIVER INLET STOP VALVE = AUTO
4-	GLAND SEAL STEAM PRESS. CONTROL VALVE = AUTO
5-	BYPASS STEAM CONTROL VALVES = FULL CLOSE (from DCS)
6-	TURBINE TRIP CONDITION
7-	TURNING DEVICE = RUN & ENGAGE POSITION
8-	MAIN STEAM EJECTOR & STARTING EJECTOR = AUTO





Oil System Stop

It is nece	essary to s	satisfy all of	f the f	following	state to	start ti	his sequence	e
------------	-------------	----------------	---------	-----------	----------	----------	--------------	---

- 1- TURBINE OPERATION MODE = AUTO
- 2- VACUUM SYSTEM = STOPPED (VACUUM BREAKER VALVE = NOT CLOSE &
 - GLAND SEAL STEAM RECEIVER INLET STOP VALVE = CLOSE & EXHAUST STEAM PRESS. = HIGH HIGH)
- 3- AUXILIARY OIL PUMP = AUTO & REMOTE
- 4- OIL VAPOR FAN = AUTO & REMOTE
- 5- TURNING DEVICE = AUTO & REMOTE
- 6- EMERGENCY OIL PUMP = REMOTE
- 7- TURBINE CASING INSIDE TEMP. < 150°C







Occupational Health and Safety Manual

Mawlamyine Cement Company Limited (MCC)

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1. Objectives

In order to comply with Occupational Health and Safety Best Practice for contractors awarded by Mawlamyine Cement Company Limited

2. Scope of the Manual

This regulation shall be in force to all contractors working with Mawlamyine Cement Company Limited This regulation will be a part of Contractor's Agreement which they are required to comply with. For the highest benefit of safety, the Contractor must thoroughly study and comply with all regulation as specified with no compromising.

3. Policy on Occupational Health and Safety

- 1) MCC set safety of employees and contractors as a top priority therefore, there are uncompromising safety standards.
- 2) MCC view that safety is everybody's accountability and regard as a part of his performance.
- 3) MCC management are committed to set an example for their safety standard and implement the Good Practice as a visible safety behavior.
- 4) MCC encourage safety's behavior in the workplace and create the value of caring culture.
- 5) MCC control, prevent and reduce risks in the workplace in an acceptable level.
- 6) MCC strictly comply with laws and regulations relevant to the Occupational Health and Safety.

MCC provide adequate and proper resources in order that the objectives and goal of occupational health and safety could be achieved.

4. Occupational Health and Safety's Goals

- 1. There will be no risks in workplace and zero accident.
- 2. There will be no complaints on environment issues from companies, organizations, government agents and local communities.

Part One: General Regulation

1. Personnel and Documentation

- 1.1 Contractor shall provide personnel and organization chart indicating structure of management which includes managers or authorized person, engineers, supervisors, electricians, and safety officers. Contractor shall select the personnel who has an experience and understand the risk he may encounter in the workplace.
- 1.2 Safety officers who position in the workplace must be at least complied with the regulation as stipulated by laws as follows:-

No. of workers	Safety Officers as stipulated by Laws
 General works: at least 2 but not over 20 workers 	Safety Supervisors
 High risk activities such as working at height, working with heavy load, working in confined spaces: at least 2 but not over 20 workers 	Safety Officer (Technical Level)
At least 20 but not over 50 workers	Safety Officer (Technical Level)
At least 50 but not over 100 workers	Senior Safety Officer
Over 100 workers	Safety Officer (Professional Level)

Remarks: In case of high risk activities, MCC reserve the right to specify the level of safety officers higher than the above mentioned table as deems appropriate.

- 1.3 Supervisors and safety officers must be fulltime staff and positioned at the workplace as long as there are employees on-site. However, any officer who is required by laws must attach necessary document as stipulated and inform the names to the government agency as indicated by laws.
- 1.4 Contractor must prepare the safety working plan and follow up its performance as planned.
- 1.5 Contractors should inform the numbers of employees, names and copies of supervisors' ID cards to MCC in order that the safety guidelines should be informed to them before starting the operation.
- 1.6 Contractor shall apply the social security for all employees and submit their documents, such as contribution form, other documents, receipts or social security cards to the MCC' supervisors for verification.
- 1.7 Contractors' employees should be at least 18 years old but not over 55 years old. In case the age is over 55 years old, the contractor must clarify the necessity and inform MCC for consideration.
- 1.8 Contractor must provide trained and capable employees for each work assignment.
- 1.9 Contractor must monitor the working hours of his own employees as stipulated by Labor Acts.

2. Occupational Health and Safety Management

- 2.1 Contractor shall be complied with Safety Laws and any regulations on safety in each assigned works as mentioned in Part 2 of this document and strictly perform with the procedures as specified by MCC.
- 2.2 Contractor shall implement in risk assessment, job safety analysis or prepare work method statements in risk activities as assigned and submit such documentation to MCC' supervisors to investigate and perform according to any risk control measure. In addition, contractor shall communicate the risk assessment and any measure to control risk to all employees for their operation.
- 2.3 Contractor shall provide safety training and inform MCC's guidance on safety to employees before starting the operation.
- 2.4 Before starting the operation, contractor shall identify any hazard that may occur during the work and measures to prevent such hazardous activities to all employees.
- 2.5 Contractor must conduct safety inspection to evaluate the operating conditions with MCC's safety officers every day and submit the report to MCC's supervisor every week.
- 2.6 Contractor must provide tools, equipment and machineries with the standard as set by MCC and pass the safety's inspection carried out by responsible officers of MCC.

3. Working Place and on-site area

- 3.1 Contractor is required to set up a barrier for the project with durable material. The entrance and exit of the working place should be easily controlled. (Details as shown in the regulation on working place and on –site area)
- 3.2 Contractor must set designated assembly area so that in case of emergency, contractor is able to head count the number of employees
- 3.3 Contractor must put up signage showing "Working Area", "Staff Only Area", "Safety Signage", "Prohibited Signage", "Controlled Area Signage" and any "Safety Warning Signage" or other signage as stipulated by Laws within 7 days after the starting date.
- 3.4 In case there is a high risk in some working places, for instance, any area where the object may fall down, an opening hole, high level area without guardrail, the Contractor must fence a barrier for the "Dangerous Area" with durable metal pipe. However, should some area can not be done, the Contractor is required to put up the reflective tape or any equipment with warning sign as well as a warning signage on site.

4. Clothing

Contractor must provide a reflective waistcoat and PPE such as helmet and safety shoes for all workers. In addition, appropriate PPE should be given to workers according to an assigned job such as full body harness safety belt with 2 hangers for workers who work at height or goggles or welding helmets for welding, cutting and grinding jobs. Contractor must ensure that all workers wear PPE at all times during work.



5. Safety Responsibility

Contractor must be ensured that all employees are informed and complied with any regulations and safety guidance as required by MCC.

6. Drug Control and Blood Alcohol Level of Contractor's Employee

Contractor must be ensured that there are no drug and alcohol usage among employees (it must be zero alcohol). MCC shall randomly test all employees' blood and if found, such employee shall be prohibited to work and be punished according to the Safety Regulations specified by MCC.

7. Accidental Report

In case of accident or near miss incident, contractor must perform the followings:-

- 7.1 Reporting accident or near miss incident to the MCC's supervisor immediately
- 7.2 Preparing the report form as specified by MCC in writing within 3 days
- 7.3 Engaging in an investigation process with relevant parties and set any measure to solve and prevent any accident that may occur in the future

Part Two: Regulation on Operation

Working Regulation on the Construction Site or On-site area

1. Contractor must set up the construction site by putting 2 meter fences around the construction area. The fence must be stable and firm. In addition, the "Construction Site" signage should be put up and clearly seen on-site.

Sample of MCC' construction site



Entrance of the Construction and canvas fence



- 2. Contractor must identify "Dangerous Zone" in the construction site or in working area by putting up a fence or form a barrier with suitable material or using the falling protection plate. "Dangerous Zone" signage must be easily seen and hanged with Red light during the night all the time.
- 3. Contractor must prepare the signage to display the description of work in front of the construction site and also put up the safety statistic signage where it can be seen easily.
- 4. Contractor must provide security guards and their booth in front of the construction site to guard, check and prohibit those who are not employees to enter the site.
- 5. Staying overnight in the construction site is definitely prohibited.

Regulation on Machinery Operation

1. Machineries

- 1.1 Machineries using electricity must be installed ground wire in order to protect the electrical leakage.
- 1.2 Guard should be designed to cover a rolling part of machine with electricity, such as shaft, pulley and conveyor belts etc.
- 1.3 Machineries used in the workplace must pass the Safety standard set by MCC and contractor must be ensured that the machineries are in good and safe condition.
- 1.4 Where there might be a risk or hazard from working machines, contractor must fence the working area with fence or barriers and surround it with the red-white ribbon in order to be easily visible.
- 1.5 Contractor must comply with the regulation regarding "Working with Machines Safely" as specified by MCC or according to the local regulation.

2. Crane Operation

Crane must be inspected and passed the check-list of safety standard. Any equipment such as sling, shackle, or hook must be certified by mechanic engineers.

- As for weigh of safety load not over 3 tons, any component and equipment must be tested every 6 months.
- As for weigh of safety load over 3 tons, any component and equipment must be tested very 3 months.
- 3. Crane driver, signaler to crane operator, holder to material, and controller must be trained in "Crane Operation" and reviewed their knowledge with MCC's supervisor before starting their operation.
 - 3.1 In case of high risk assignment, the contractor must prepare Lifting Plan and get a Work Permit from MCC's supervisor every time.
 - 3.2 Contractor must comply with "Safely Crane Operation" as specified by MCC or according to local regulation.

4. Forklift Operation

- 4.1 Forklift used in the workplace must be in good condition and be equipped with necessary appliance as specified by Laws as well as pass the Safety Standard of MCC.
- 4.2 Forklift must have a firm structure with a weigh of load signage and sound or light signal while operating.
- 4.3 Forklift driver must be trained and passed the standard as specified by Laws.
- 4.4 Contractor must prepare operation manual, checking list and maintenance plan for his employee to learn and perform accordingly.

4.5 Contractor must comply with "Safely Forklift Operation" as specified by MCC.

5. Bulldozer Operation

- 5.1 Before using the bulldozer, it must be inspected its operation and have a maintenance plan for its engines, electrical and dynamic system so that it can be safe throughout its operation.
- 5.2 Bulldozer must be installed a ladder or stepping ladder with handrail so that the operator can go up to the control area.

6. Truck Operation

6.1 Truck used for metal pipe loading must be installed a metal structure in front and at the back of the truck to prevent the material fall down. The design of structure shown in the picture would help carrying material in horizontal level. Such structure must be firm and stable while the truck is moving. In case the size of material is longer than the truck's body, bright cloth should be tied up to the material so that it can be seen easily.





- 6.2 Before using the truck, it must be inspected its operation and have a maintenance plan for its engines, electrical and dynamic system so that it can be safe throughout its operation.
- 6.3 In case of loading, all material must be tied up and tightened with chain, sling, rope or other equipment as long as the moving is complete.
- 6.4 In case there are passengers sitting at the back of Contractor's truck, guardrail along side of the truck should be installed to prevent the fall of his passenger.
Regulation on Electricity

- 1. Power converter
 - Secondary winding must be connected as Y with the pressure of 220/380 Vac
 - Neutral winding (central wire) must be connected with Star-point of the power converter which is also connected ground wire.



2. Electrical Main Switchboard



3. Electric sub panel used in the project must be equipped with ground wiring and all electrical switchboard with 220 Vac must be installed with Earth Leakage Circuit Breaker or ELCB. To connect the electricity, Schuko outlet and Schuko Plug must be used.





Switch board with 220 Vac equipped with ELCB

4. Mobile Plug with 220 Vac must be equipped with ELCB.



PM:ES-001 (01) Effective on 01/08/2012 5. All electrical equipment such as hand grinder and drill which its voltage of 220 Vac must be double insulation or be connected with ground wiring and installed with ELCB at the control panel to prevent electrical leakage.





- 6. Plug for electrical equipment
 - a. Welding plug should be used with Power Plug according to IEC 309.
 - b. Other electrical equipment (220Vac) must be used with Schuko plug only.



Welding Plug with 380 Vac

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Welding Plug with 220 Vac





Schuko Plug for electrical appliance with 220 Vac

Overview of Electrical System



- 7. Lighting must be direct current and its pressure should not be over 24 V. In case the usage of down light of 220 Vac is required, it must be equipped with ELCB. Red down light is definitely prohibited.
- 8. Electrical cable across the street must be covered with durable material and it must be only CV or NYY cords.
- 9. Electrical equipment must be thoroughly inspected by MCC before using in the site project or on-site area.
- 10. Electrical wiring must be safely placed. Any cords exposed to the metal or sharp material must be covered with insulation.



Sample of electrical wiring onsite



Sample of electrical wiring in a temporary building such as canteen or storage





11. All electrical equipment, such as spotlight must be securely kept. Any part exposed to metal or sharp material should be insulated.



Regulation on Hot works and spark; Welding, Cutting and Grinding

1. Any equipments used for welding, its cutting torch and portable welding (4 points) must be installed with Flashback arrestors at the tip of cutting torch and portable welding.



- 2. Other equipment such as gauge, regulation, welding cable and cutting torch must be in good condition and not be broken.
- 3. Should the welding gas or air tank can be removed, the contractor must install in a cart which its structure is firm and stable.





4. Contractor must provide storage space to keep a pressure container and it should be securely strapped and have a warning sign.



- 5. Employees working with welding, cutting and grinding must attend the Safety Training course and pass the test.
- 6. In case some operation such as welding, cutting, grinding in the risky area or near the petrol tank which may cause heat or spark, the Contractor must get a Work Permit from MCC's Supervisor or MCC's employee who works in such area.
- 7. The Contractor must prepare a dry chemical fire extinguisher not less than 10 pounds at least one tank to be installed in front of the site or in the cart.
- 8. Any equipment on welding, cutting, and grinding must be thoroughly checked its safety standard by MCC and have Work Permit sticker attached to such equipment before using in the site.

PM:ES-001 (01) Effective on 01/08/2012 9. As for welding at height, the Contractor must provide a box or flame resistant sheet to protect any spark that may fall down to the floor.







10. When cutting with fiber cutting machine, the Contractor must prepare a shade box to shield any spark from a cutting operation.



11. The Contractor must comply with regulation on welding, cutting and grinding as specified by MCC or according to the local regulations.

100

Regulations on Working at Height

- 1. When working at height over 2 meters, the Contractor must elect scaffolding or ladder which is safe and appropriate for the nature of such task.
- 2. When working at height over 2 meters, the Contractor must provide a full body harness with double lanyard for all employees who work at height.



- 3. Any equipment used for scaffolding, such as metal pipe, frame and cramp must be in good condition and not be broken.
- 4. Scaffolding used in the site must be complied with MCC's standard. The Contractor must be ensured that such scaffolding is equipped with ladder, handrail, and platform. In addition, its structure must be securely elected. Such scaffolding must pass a Safety Standard and be verified by MCC's supervisor. A tag should be labeled all the time. (As detailed in the Safety Standard on Scaffolding of MCC)





- 5. Scaffolding with wheel must comply with the following standard:-
 - 5.1 Its height should not be 3 times over its width.
 - 5.2 Its urethane wheel with 8 inched diameters must be in good condition and not be broken. Interlock for the wheel is required (as shown in the picture). When locked, the interlock would stop the movement and the rotation of the wheel completely.



Sample of wheel permitted to use



Sample of unacceptable wheel

5.3 Detail and types of scaffolding with wheel, which can be used in the site is shown in the picture. A suspension structure, ladder, slope, platform and handrail etc. are required for a safe scaffolding.





6. Should the scaffolding be higher than 21 meters, the Contractor is required to have an engineer with License for Professional Practice to design and identify details of scaffolding's structure. In addition, the Contractor must get a written permission from MCC before starting the operation.

7. When working on roof or any area where employee could not hang his harness, the Contractor must provide a lifeline which is firm and stable for harness restraint. Safety net must also be installed.



Sample of installation of Lifeline with sling



Sample of Safety Net's installation



Lifeline and Safety Net's installation and working at height



Ladder installation for working at height

- 8. When working on roof tiles, a thick wooden platform with appropriate length should be installed to pave the walkway during the operation.
- 9. Any area where employee might fall down, such as, edge of the building, and floor opening must be securely covered or provided with guardrails.





Install guardrail for prevent fall from height

10. Any area where material can fall down, it should be installed a safety net.



Sample of Safety Net Installation

11. The Contractor must comply with regulation on Working at Height as specified by MCC or according to local regulation.

PM:ES-001 (01) Effective on 01/08/2012

Regulation on Working in Confined Space

- 1. All employees working in confined space must be in good health and do not have a cardiovascular diseases, asthma, seizure or any other disease which doctors view that there is a risk when working in confined space. In addition, such employee must attend the training and pass the test as specified by laws.
- 2. When working in confined space, the Contractor must provide the following equipments:
 - a. Any equipment used in confined space such as Tripod
 - b. Communication devices
 - c. Ventilation fan (industrial type)
 - d. Life saving equipment, such as rope, self-containing breathing apparatus (SCBA)
 - e. Oxygen and chemical monitor/detector

- f. PPE
- 3. Before working in confined space, the Contractor must get a Work Permit from the authorized person in such area as specified by MCC.
- 4. The Contractor must comply with regulation on working in confined space as specified by MCC or according to local regulation.

Regulation on Pilling Work

- 1. Employee who operates the pile driver machine must attend the safety training.
- 2. Pile driver machine must be in good condition. The Contractor must comply with MCC's Instruction Manual regarding its assembly, testing, maintenance and inspection before operating.
- 3. Weigh of load signage and its operation manual should be placed where the operator can easily see.
- 4. In case the pilling work must be operated at night, the Contractor must provide enough light around the working area until the operation is completed.
- 5. Before operation, the Contractor must provide a supervisor to inspect the safety standard of pilling work every time so that the highest standard shall be met under the supervision of engineer.
- 6. The Contractor must comply with regulation on pilling work as specified by MCC or according to local

Regulation on Digging and Drilling Operation

- 1. When drilling or digging any hole or pond, the Contractor must set up a barrier, light up the area and place the warning sign around the around. During the night, there must be lightened with yellow light (Alert Signal Light) or reflective warning sign.
- 2. When drilling or digging for a hole or pond with its depth is over 2 meters, the Contractor must have an engineer to calculate, design and specify the work instruction. There should be a safe descend way and land slide protection.
- 3. In case there is some water in the hole, there must be a submergible pump (or Bibo pump) to remove water out of the hole. When the pump is operated, there must not be any employee in the hole. The submergible pump must be installed with ELCB and there must be a plastic rope to pull up the submergible pump.



The installation of ELCB to the pump's cable cord

4. Around the hole or pond, the Contractor must install sheet pile and ladder for safely descending.



5. The Contractor must comply with regulation on digging and drilling operation as specified by MCC or according to local regulation.

Regulation on Environment and Sanitary

1. The Contractor must fix an area for material's storage and clearly identify what kind of material to be kept.



Spacing the area for storage and enclosure for piece of metal

- 2. The Contractor must prepare a storage box to keep materials such as piece of metal, in front of the site and do 5S (housekeeping) regularly.
- 3. The Contractor must provide a waste bin and storage space within the site. The waste collection must be done regularly.
- 4. The Contractor must destroy any piece of material from the operation as specified by MCC or according to the Laws.
- 5. The Contractor must build up a canteen and fix a smoking area within the site clearly.
- 6. The Contractor must provide the sanitary system and drinking water with the following:
 - a. One point for drinking water for 15 employees
 - b. Separate restroom for both male and female employee







"วังโนตุเป็นสูนข์" เริ่มที่ตัวคุณ zer Accident

Part Three: Regulation on Daily Management

Regulation on Daily Management

The Contractor must fully co-operate and follow the daily management in construction project as specified by MCC as follows:-

1. All contractors must attend the Safety meeting every morning.



Supervisors of all contractors must communicate each other about the assigned work, any risk that may occur and how to prevent the danger of such work. They are also required to do exercising for self-preparation before working.



2. The Contractors must hold Toolbox Meeting where the supervisor will emphasize on the risk that may occur and how to prevent the danger from assigned work to all employees.



3. At 10.00 AM of each day, Safety officers of all contractors must inspect the safety operation within the work site together with those of MCC.



4. In the afternoon, the supervisors of all contractors must attend the meeting to summarize the task which shall be done tomorrow in order to assess any risk of such task and prepare a prevention measure. Then, they are required to communicate to their employee the next day.



Breach of Practice and Safety Rule

The manual is a part of Contractor's Agreement and contractor is required to practice according to the regulation. The Contractor must be ensured that their employees are strictly complied with regulations and this Occupational Health and Safety's Manual. Should the Contractor violate the practice as specified in this manual and there are some unsafe conditions or operations, MCC would pursuit the following measures:-

As for Employees

The employees will be prohibited to work immediately and get a written warning from their respective company.

As for Company/ Contractors

1st Time: they will receive a written warning

2nd Time: In case there is no amendment or prevention of a repeated accident, MCC will fine or delay the payment relating to the safety work.

Remark: MCC could not cover all the regulation regarding Occupational Health and Safety. The Contractors and employees should follow the safety standard in each operation and strictly comply with Safety Laws stipulated in the country as well as any regulation specified by MCC during the project's operation





MCL's CSR Activities

2014-2017



Communities Area Nearby MCL





Access Road Improvement (Kagon Gu to Kadonsit and Kwangan)

Access Road	Туре	Distance
A-B	Bitumen	7.0 Km.
B-C	Bitumen	2.0 Km
C-D	Bitumen	0.5 Km.
D-E	Laterite + Bitumen(4km.)	17.80 Km.
F-G	Laterite	5.50 Km.
E-H	Bitumen	3.0 Km.
	Total	35.80 Km.

Total budget 2014-2015 = 4,210,000 USD



TARANA VILLAGE TO WOOD BRIDGE



AHLAT VILLAGE TO ANG KA ZAING VILLAGE



KAW WAN VILLAGE TO WEI NYIANG VILLAGE



WOOD BRIDGE TO AHLAT VILLAGE



ANG KA ZAING VILLAGE TO KAW WAN VILLAGE



WEI NYIANG VILLAGE TO PLANT SITE (E POINT)



Provide land and build new Pauk Taw school





MCL buy land and built new Puak Taw school for support education of community



Monk Trip to Siam Cement (Lampang)



MCL provied Head Monk of Villages around our Cement Plant to visit Thailand Cement Plant (Lampang). We invited 20 Head Monk including Kyaik Pa Ran Head Monk (president of Monk Organization of Kyeik Ma Yaw Township). Our purpose of creating this trip is to better present the complete picture of cement factory operation, as well as the environmental protection measures and social community management. Perhaps, Monks were warmly welcome to

Open house activities for Head Monks nearby MCL



Open House activity for monks nearby MCL factory and Head Monks from Mawlamyine. We provided praying ceremony, offer lunch, donation some stuffs and



that the













Participation at local monasteries' ceremonies







Participation at local monasteries' ceremonies





 MCL family getting pray from Head monks of Monasteries around MCL at MCL main office. After getting pray by monks, MCL family donate sacred food stuffs to monks at the walkway of MCL Buddha hall.



Warso Donation around MCL



MCL employees from respective departments provide the pre donation for Warso Full moon day. Total 27 Monasteries around MCL received the donation. But Ka Don Sit old monastery, Rubber garden monastery from Kaw Pa Naw, Kwan Ngan and two Monasteries from Me Ka Ro refused to accept our donation by some reason.



Ka Htain Donation around MCL



Our CSR team provided MCL Ka Htain robe offering ceremony at Kaw Pa Naw New Monastery. We have donated 3 endowments and dozen of Ka Htain robes present baskets and fund donation. All total expense would be 3,568,500 kyats.


War so and Ka Htain Donation around MCL





















Activities for Education support



According to the beginning of the another Educational years, MCL supported the stationaries to the students and schools of the villages nearby and Kyaikmaraw township. Total of 45 schools was provided stationary donation.



MCL CSR team and GTI internship students participated Kaw Pa Naw High School's Toilet renovating program. Also MCL provided sport facilities such as football, volley ball and batminton.



Activities for Education support



Activities for Education support



Government Technical Institute students' internship program.



School Facilities Improvement Activities



MCL Education Center (English Class)



02.07.16 -Opening Ceremony of MCL Education Center (English class)

English class started with 25 students from the gvillages nearby



MCL Education Center(Computer Class)



Our MCL Education Center is providing the basic computer class. Currently we have divided into two sessions due to additional students. Total 30 of students from the villages around MCL attended to our computer class.



Kaw Pa Naw Road concreting process has been started. Total 440m3 of concrete will be used .





MCL CSR team and GTI internship students participated Kaw Pa Naw High School's Toilet renovating program. Also MCL provided sport facilities such as football, volley ball and batminton.



One village one project



As a One village one project, Our CSR Team organized a volunteering at Kaw Pa Naw New Monastery. Around 30 Staff participated in this volunteering joyfully. They did cleaning the Pagoda, monastery compound and also helping at the New Temple construction.







MCL staffs participated at the road repairing of Kaw Pa Naw Old monastery and Kyun CL Gone Canal Repairing process. 24

Currently CSR team Supporting the water supply to the villages which are needed for useable water such as Shwe wa chaung, Ka Don Sit, Kaw Dun, Kaw Pa Naw, Kaw Wan and An Ka Sin during summer season.

















Our CSR team provided open house activities for the medical students from Mandalay who were coming for excursion tour. U Zaw Min from Kaw Pa Naw Village Medical center requested MCL to provide open House for them. Total of 25 students, 2 Medical officer from Kyaik Ma Raw Township and one Ka Don Sit village medical officer

Mon National Day Participation







Our MCL Support the celebration of Kyaik Ma Raw Township and Nyaung Bin Seik Quarter Thingyan festival



Public and Government coordination



Presentation to Dr Min Kyi Win, Minister of the ministry of Environmental conservation and resource Mon State and his committee. 29





MCL Support the disasters' awareness training Session from Rescue and Reinstate Department. These Training Sessions had been provided in 3 township of Mon State. Expenses for this training session is 10 lakhs and also MCL distribute rain Coat with MCL logo to the trainee and Trainers



Open House Activities



























Open House Activities

Medias and Journalist from Mon State Trip to MCL





















Students and Teachers from Mawlamyine Technological University trip to MCL



Open House Activities























Inspection committees from Mon State Government for MCL has came to MCL factory. We provided presentation, reception and Site Tour for them.





MCL showed the big concern for public and government community support today by donating 2000 test run cement bags to Mon state government office. H.E U Min Min Oo, Chief of Mon received and welcome MCL's participating in local developing projects.





After donation at Mon State government office, MCL continuously donated 1000 test run cement bags to South East Command. Commander of South East Command, received and welcome MCL's paricipation and donation to communities.





- MCL donated 7 ton garbage truck to Mon State Government office.
- Total value 166 lakhs



























































Collaborated Activities with SCG team



CSR Team and MCL employees participated sharing the dream program at Mawlamyine. MCL Staffs coordinated with SCG yangon staff and participated in some activities



Collaborated Activities with SCG team



MCL CSR team cooperated with SCG yangon for Sharing the brighter vision program at Mawlamyine General Hospital.



Collaborated Activities with SCG team



Our MCL team participated at SCG sharing a brighter vision program at Mawlamyine general hospital which is provided by SCG. Total 200 cataract patients got operation to get back their vision.



SCG Sharing a brighter vision 2017





ကြည်လင်သောအမြင်အာရုံကို မျှဝေခြင်း

Sharing a Brighter Vision



Activities for Communities Health Care

Mobile Clinc activity at Shwe Wa Chaung Village






Activities for Communities Health Care

Mobile Clinic activity at Kaw Dun Village







Activities for Education support



Activities for Education support



Stationary support to local schools





Activities for public relation

Support villages' facilities improvement









Activities for public relation

Greenite Factory's performances















MCL Tree Plantation





ether

Re Can Sal

"World Environment Day 2017"









SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish I	Pre Resource	%	23	3 Apr '18	07 Ma	ay '18	
								Names	Complete	23-04	28-04 03-05	08-05	13-05	18-05
0	03_MCL1_Overall Kiln	Shutdown Plan for Ma	y 2018_ 06_05_	2018_A02	10.49 day	06-05-18 6:00	16-05-18 17:49		92%	_				
1	1 Stop Kiln to Feed				9.42 days	06-05-18 6:00	15-05-18 16:00		100%	-	1000/			
2	1.1 Stop Kiln				24 hrs	06-05-18 6:00	07-05-18 6:00		100%	_	100% 📥	1000		
3	1.2 Feed				24 hrs	14-05-18 16:00	15-05-18 16:00		100%	_		100%		
4	2 Stop Kiln				10.49 days	06-05-18 6:00	16-05-18 17:49		100%	-				
5	2.1 Cool Down				24 hrs	06-05-18 6:00	07-05-18 6:00		100%		100% 📥			
6	2.2 Prepare before	e Kiln Stop			0.58 days	06-05-18 8:00	06-05-18 21:55		100%					
7	2.2.1 Clear cylon	e system			2.5 hrs	06-05-18 8:00	06-05-18 10:30	Production	100%		100% F	roduction		
8	2.2.2 Open kiln d	loor			1 hr	07-05-18 11:20	07-05-18 12:20	CIVIL+ME	100%		100%	CIVIL+ME		
9	2.2.3 Install sma	II brigde			0.5 hrs	07-05-18 12:20	07-05-18 12:50	8 CIVIL	100%	-	100%	CIVIL		
10	2.2.4 Insert flang	g down pipe floor 2 and 4	(confirm)		4 hrs	06-05-18 8:00	06-05-18 12:00		100%	-	100%			
11	2.2.5 Check cond	lition inside kiln			2 hrs	08-05-18 9:00	08-05-18 11:00	Prod+Civil	100%	_	100%	Prod+Civil		
12	2.3 Assembly Kiln	Burner (After Refracto	ry and Castable	finised)	4.33 days	06-05-18 8:00	10-05-18 15:55		100%	-				
13	2.3.1 remove blin	d flange at cyclone			4 hrs	06-05-18 8:00	06-05-18 12:00		100%		100%	1000/		
14	2.3.2 take out brid	dge			2 hrs	14-05-18 8:00	14-05-18 10:00		100%			100%	•	
15	2.3.3 close kiln bu	urner door			4 hrs	14-05-18 14:00	14-05-18 18:00		100%	-		100%	•	
16	2.4 Heat up				22 hrs	15-05-18 19:49	16-05-18 17:49		100%			100	% 🗕	
17	3 Test Run Group				2.92 days	12-05-18 0:00	14-05-18 22:00		0%				12-0	5
18	3.1 Limestone Cru	shing Test Group (1)			0 hrs	14-05-18 22:00	14-05-18 22:00	136	0%				▲ 14-0	5
19	3.2 Mix-Mat & Rav	v Material Test Group	(2)		0 hrs	12-05-18 0:00	12-05-18 0:00	155	0%			12	2-05	
20	3.3 Raw Mill Feed	Hopper & Raw Mill Tes	t Group (3)		0 hrs	14-05-18 16:00	14-05-18 16:00	173	0%	_			14-05	ł
21	3.4 Homosilo & Kil	n Feeding Test Group	(4)		0 hrs	12-05-18 22:00	12-05-18 22:00	304	0%	_			12-05	
22	3.5 Coal Storage &	Coal Mill Test Group (5)		0 hrs	12-05-18 22:00	12-05-18 22:00	370	0%	_			12-05	
23	3.6 Kiln Test Grou	p (6)			0 hrs	14-05-18 8:00	14-05-18 8:00	421	0%				14-05	
24	3.7 Clinker Cooler	& Upper Clinker Silo To	est Group (7)		0 hrs	14-05-18 17:00	14-05-18 17:00	477	0%				14-05	Š
25	3.8 WHG Test Grou	up (8)			0 hrs	14-05-18 8:00	14-05-18 8:00	505	0%				14-05	
26	4 Civil (Refractory &	Castable)			8.63 days	06-05-18 8:00	14-05-18 23:00		95%					
27	4.1 Kiln Inlet Chut	e			4.88 days (08-05-18 15:00	13-05-18 12:00		100%	-	100			
28	4.1.1 Breaking Cas	stable			8 hrs	08-05-18 15:00	08-05-18 23:00	CIVIL1	100%	_	100%			
29	4.1.2 Prepare area	a and Open Manhole			14 hrs	09-05-18 10:00	10-05-18 0:00	CIVIL1	100%	-	100			
30	4.1.3 Cutting out o	old Y-anchor			8 hrs	10-05-18 0:00	10-05-18 8:00	29 CIVIL1	100%	-	10			
31	4.1.4 Install Steel	Plate + Install Y-anchor			28 hrs	10-05-18 8:00	11-05-18 12:00	30 CIVIL1	100%	_	10			
32	4.1.5 Install HN Bo	oard + formwork + Pouri	ng Castable		32 hrs	11-05-18 12:00	12-05-18 20:00	31 CIVIL1	100%	-				
33	4.1.6 Setting Time	<u>)</u>			4 hrs	12-05-18 20:00	13-05-18 0:00	32 CIVIL1	100%	-		100%	IVIL1	
34	4.1.7 Remove form	nwork & Scaffolding			12 hrs	13-05-18 0:00	13-05-18 12:00	33 CIVIL1	100%	_		100%	CIVILI	
35	4.2 Kiln Cooler (@	Crusher Area)			3.67 days	08-05-18 9:00	12-05-18 1:00	CIVIL2	100%					
		Task		Rolled Up Task		External Milestone	•	Start-only	Ý	C				
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-or	lly	C				
		Split	LI	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline		۵				
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary	\bigtriangledown	Baseline						
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	C	Critical T	ask					
		Summary	~	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical T	ask Progress	_				
		Project Summary	~	Rolled Up Progress		 Manual Summary R 	Rollup							
		Group By Summary	••	External Tasks		Manual Summary	-							



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	23	3 Apr '18		07	May '18	
								Names	Complete	23-04	28-04 0	3-05	08-05	13-05	18-05
36	4.2.1 Cleaning ma	aterial			1.46 days	08-05-18 9:00	09-05-18 20:00	Production	100%			100%	Produ	ction	
37	4.2.2 Breaking Ca	astable			12 hrs	09-05-18 20:00	10-05-18 8:00	36 CIVIL2	100%			100	% <mark>★</mark> CIVI	2	
38	4.2.3 Cutting old	& Install new Y-Anchor			13 hrs	10-05-18 8:00	10-05-18 21:00	37 CIVIL2	100%			10	0% 🗙сі	IL2	
39	4.2.4 Install HN B	Board			7 hrs	10-05-18 21:00	11-05-18 4:00	38 CIVIL2	100%			1	00% <mark>*</mark> Ct	/IL2	
40	4.2.5 Install Form	work + Pouring Castable			15 hrs	11-05-18 4:00	11-05-18 19:00	39 CIVIL2	100%			1	00% 📩	IVIL	
41	4.2.6 Setting Time	e			4 hrs	11-05-18 19:00	11-05-18 23:00	40 CIVIL2	100%				100% 📩	1VIL2	
42	4.2.7 Remove For	rmwork			4 hrs	11-05-18 23:00	12-05-18 3:00	41 CIVIL2	100%				100% 🛉	IVI 2	
43	4.2.8 Cleaning ma	aterial			2 hrs	12-05-18 17:00	12-05-18 19:00	CIVIL2	100%				100%	CIVIL2	
44	4.3 Kiln Hood (Ur	nder Modify Area)			4.67 days	08-05-18 9:00	13-05-18 1:00	CIVIL3	100%					A	
45	4.3.1 Cleaning ma	aterial			1 day	08-05-18 9:00	09-05-18 9:00	Production	100%			100%	Produc	tion	
46	4.3.2 ME Check G	Frate Plate & Repair (Near	Modify Area)		35 hrs	09-05-18 9:00	10-05-18 20:00	45 ME_KILN	100%			100	% 📥 ме	<u>kiln</u>	
47	4.3.3 Install Scaff	olding			10 hrs	10-05-18 20:00	11-05-18 6:00	46 CIVIL3	100%			1	00% _	/IL3	
48	4.3.4 Breaking Ca	stable			6 hrs	11-05-18 6:00	11-05-18 12:00	47 CIVIL3	100%			1	00% 📩	VIL3	
49	4.3.5 Cutting old	& Install new Y-Anchor			10 hrs	11-05-18 12:00	11-05-18 22:00	48 CIVIL3	100%				100% 📩	IVILI	
50	4.3.6 Install HN B	Board			9 hrs	11-05-18 17:00	12-05-18 2:00	49 CIVIL3	100%				100% 📩	CIVIL3	
51	4.3.7 Install Form	work + Pouring Castable			11 hrs	12-05-18 2:00	12-05-18 13:00	50 CIVIL3	100%				100% 🛓	¢IVI 3	
52	4.3.8 Setting Time	e			4 hrs	12-05-18 13:00	12-05-18 17:00	51 CIVIL3	100%				100%		
53	4.3.9 Remove For	rmwork			4 hrs	12-05-18 17:00	12-05-18 21:00	52 CIVIL3	100%				100%	CIVIL3	
54	4.3.10 Remove So	caffolding			4 hrs	12-05-18 21:00	13-05-18 1:00	53 CIVIL3	100%				100%	CIVIL3	
55	4.4 Kiln Cooler (U	ppper Part) Bull Nose			3.42 days 1	0-05-18 23:00	14-05-18 9:00)	100%	-			_	┿┓║	
56	4.4.1 Install Scaff	oldina			5 hrs	10-05-18 23:00	11-05-18 4:00) 47S	100%	-		1	00%		
57	4.4.2 Breaking Ca	astable			30 hrs	11-05-18 9:00	12-05-18 15:00)	100%				00%		
58	4.4.3 Cutting old	plate & Y-Anchor			5 hrs	12-05-18 15:00	12-05-18 20:00) 57	100%				100%		
59	4.4.4 Install new	plate and Welding Y-anch	or		4 hrs	13-05-18 4:00	13-05-18 8:00	58	100%				100%		
60	4 4 5 Install HN B	Board			14 hrs	13-05-18 8:30	13-05-18 22:30	59	100%				100%		
61	4 4 6 Install Form	work + Pouring Castable			5 5 hrs	13-05-18 22:30	14-05-18 4.00	60	100%				1009		
62	4 4 7 Setting Time				4 hrs	14-05-18 4:00	14-05-18 8:00) 61	100%	-			1009	4 -	
63	4 4 8 Remove For	rmwork			0.5 hrs	14-05-18 8:00	14-05-18 8:30	162	100%	-			100		
64	4 4 9 Pemove Sca				0.5 hrs	14-05-18 8:30	14-05-18 0.00	163	100%				100		
65	4 5 WHG Inlet Set	tting Chamber			3 58 days 1	0-05-18 17:00	14-05-18 7:00		100%	-			100		
66	4 5 1 Install Scaff				7 hrs	10-05-18 17:00	11-05-18 0.00		100%	-		1(0% c		
67	4.5.2 Pemove dar	mage castable			15 hrs	12-05-18 9.00	13-05-18 0.00		100%			Ľ.	100%		
68	4.5.3 Install Painf	force			13 5 hrs	12.05.18 9.00	13-05-18 22:30		100%				100%		
60	4.5.4 Install Form	work + Pouring Castable			15.5 hrs	13-05-18 22:30	14_05_18 4.00		100%				1009		
70		affolding			3 hrs	14-05-18 4:00	14-05-18 7:00		100%				100		
70	4.5.5 Remove 3ca	anolding			1 46 days 1	2-05-18 17:00	14-05-18 /.00		100%				100		
/1	4.0 LO BUIICI #1				1.40 uays 1	2-03-18 17.00	14-05-10 4.00		100 70						
		Task		Rolled Up Task		External Milestone	•	Start-onl	у	C					
		Task Progress		Polled I In Critical Task		Inactive Task		Finish or	alv	г					
		Task i Togress				Indelive Task		1 111311-01	iiy	-					
		Split	.	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline	•	۵					
Project	03 MCI 1 Ovorall Kila Shutda	Milestone	•	Baseline Summary	-	Inactive Summary		Baseline				8			
Doto: 1		Wilestone	•	Dascine Gunnary	•		~								
Date: 1	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	Ľ	Critical T	ask						
		Summary		Rolled I In Baseline Milestone	\diamond	Duration-only		Critical T	ask Progress			_			
		Cummary	• •	Read of paseline milestone	~	Duration-Only		Chucal I	uon i iugiess			-			
		Project Summary	\frown	Rolled Up Progress		 Manual Summary Ro 	ollup								
		Group By Summary	◄────₹	External Tasks		Manual Summary									



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish P	re Resource	%	2	3 Apr '18		07	May '18	
								Names	Complete	23-04	28-04	03-05	08-05	13-05	18-05
72	4.6.1 Inside Bo	iler			1.29 days	12-05-18 17:00	14-05-18 0:00		100%				•	┿━║	
73	4.6.1.1 Cleanin	g material			2 hrs	12-05-18 17:00	12-05-18 19:00	Prod	100%				100%	Prod	
74	4.6.1.2 Fill Cas	table			15 hrs	13-05-18 9:00	14-05-18 0:00	CIVIL	100%				100%	divil	
75	4.6.2 Inside Up	per Cyclone			0.46 days	13-05-18 17:00	14-05-18 4:00		100%						
76	4.6.2.1 Cleanin	g material			7 hrs	13-05-18 17:00	14-05-18 0:00	Prod	100%				100%	prod	
77	4.6.2.2 Fill Insu	ulation			4 hrs	14-05-18 0:00	14-05-18 4:00 7	6 CIVIL	100%				1009	6 🕇 IVIL	
78	4.7 R1S01 Raw M	ill Separator Cast Filling	9		1.33 days	13-05-18 9:00	14-05-18 17:00		62%						
79	4.7.1 Prepare wo	rking area			7.5 hrs	13-05-18 9:00	13-05-18 16:30		100%				100%		
80	4.7.2 Filling Casta	able			9 hrs	14-05-18 8:00	14-05-18 17:00		30%				300	16 n	
81	4.8 EU Boiler #2 F	Red Spot			5.42 days	06-05-18 8:00	11-05-18 18:00		16%			-			
82	4.8.1 Install Scaff	olding			3 hrs	11-05-18 15:00	11-05-18 18:00	CIVIL	100%				100% c	IVIL	
83	4.8.2 Install Form	Iwork			6 hrs	06-05-18 8:00	06-05-18 14:00	ME EU	0%			۱ړ %0	1E_EU		
84	4.8.3 Pouring Ca	stable			8 hrs	06-05-18 14:00	06-05-18 22:00 8	3 CIVIL	0%			0% 📩	CIVIL		
85	4.8.4 Remove Sca	affolding			2 hrs	06-05-18 22:00	07-05-18 0:008	4 CIVIL	0%			0%	CIVIL		
86	4.9 Scaffolding Jo	bs			2.63 davs	07-05-18 9:00	10-05-18 0:00		100%						
87	4.9.1 Kiln Support	ting Roller No.2			13 hrs	07-05-18 9:00	07-05-18 22:00		100%			100%			
88	4 9 2 Kiln Outlet	Seal			5 5 hrs	07-05-18 17:30	07-05-18 23:00		100%			100%	1		
89	4 9 3 Kiln Support	ting Roller No 3			9.5 hrs	08-05-18 9:00	08-05-18 18:30		100%			100%			
90	4 9 4 Kiln Suppor	ting Roller No.1			9 hrs	08-05-18 9:00	08-05-18 18:00 8	92	100%			100%			
01		1 Chamber			15 hrs	00 05 10 5:00	10-05-18 0.00	55	100%			100	%		
02	4 10 Pemove Scat	folding lobs			2 33 days	12-05-18 15:00	14-05-18 23:00		61 %						
03	4 10 1 Kiln Sunno	orting Poller No 2			2.55 uays	12-05-18 15:00	12-05-18 18:00		100%				100%		
95	4.10.1 Kiln Suppo				1 5 hrs	12 05 10 15.00	14-05-18 10:30		100%				100	1	
94	4.10.2 Kill Outlet	sting Pollor No 2			1.5 IIIS 2 brc	14-05-16 9.00	14-05-10 10.30	1	100%				100		
95	4.10.3 Kill Suppo	sting Dollar No.1			2 IIIS	12 05 10 10.30	12 05 10 13.30 9	4	100%				1004		
90	4.10.4 KIIII Suppo	Chamber			2 1115 12 hrs	13-05-16 15:00	14 05 10 22:00		100%	-			100%		
97	4.10.5 AQC Settir								30%						
98	4.11 TAD (@ TWO				U days	00.05.10.0.00	00.05.10.0:00	CIVILI	0%						
99	4.11.1 Install Sca	molding			0 hrs	08-05-18 8:00	08-05-18 8:00		0%			ſ			
100	4.11.2 Breaking C	astable			0 nrs	08-05-18 8:00	08-05-18 8:00 9	9 CIVILI	0%						
101	4.11.3 Cutting old	a & Install new plate			0 nrs	08-05-18 8:00	08-05-18 8:00 1	00 Piece Work	0%				08-05		
102	4.11.4 Install Y-A	Anchor			0 hrs	08-05-18 8:00	08-05-18 8:00 1	01 CIVIL1	0%				08-05		
103	4.11.5 Install HN	Board			0 hrs	08-05-18 8:00	08-05-18 8:00 1	02 CIVIL1	0%				08-05		
104	4.11.6 Install For	mwork + Pouring Castable			0 hrs	08-05-18 8:00	08-05-18 8:00 1	03 CIVIL1	0%				● 08-05		
105	4.11.7 Setting Tin	ne			0 hrs	08-05-18 8:00	08-05-18 8:00 1	04 CIVIL1	0%				● 08-05		
106	4.11.8 Remove Fo	ormwork			0 hrs	08-05-18 8:00	08-05-18 8:00 1	05 CIVIL1	0%				08-05		
107	4.11.9 Remove So	caffolding			0 hrs	08-05-18 8:00	08-05-18 8:00 1	06 CIVIL1	0%				• 08-05		
		Task		Rolled Up Task		External Milestone		Start-on	у	C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-o	nly	כ					
		Split	II	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline)	۵					
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	♦	Baseline Summary	•	Inactive Summary	\bigtriangledown	Baseline	2						
Date: 19	HUT-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task		Critical 1	⁻ ask						
		Summary	•	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical	ask Progress	_					
		Project Summary		Rolled Up Progress		 Manual Summary F 	Rollup								
		Group By Summary		External Tasks		Manual Summary									



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ID	Task Name				Duration	Start	Finish F	Pre Resource	%	2	3 Apr '18		07 N	4ay '1	8	
								Names	Complete	23-04	28-04	03-05	08-05	13-0)5 <u>18</u>	-05
108	4.12 TAD (@ Near	Manhole area)			0 days	08-05-18 8:00	08-05-18 8:00	CIVIL2	0%	-			• 08-05			
109	4.12.1 Breaking C	lastable			0 hrs	08-05-18 8:00	08-05-18 8:00 9	99S CIVIL2	0%	-			08-05			
110	4.12.2 Cleaning n				0 nrs	08-05-18 8:00	08-05-18 8:00 1	LU9 CIVIL2	0%	-						
111	4.12.3 Cutting oid	a & Install new plate			0 nrs	08-05-18 8:00	08-05-18 8:00 1	LIU PIECE WORK	0%	-						
112	4.12.4 Install Y-A	Anchor			0 nrs	08-05-18 8:00	08-05-18 8:00 1		0%	-						
113	4.12.5 Install HN	Board			0 nrs	08-05-18 8:00	08-05-18 8:00 1		0%	-						
114	4.12.0 Install For	mwork + Pouring Castable	2		0 nrs	08-05-18 8:00			0%	-						
115	4.12.7 Setting Th	ne			0 nrs	08-05-18 8:00			0%	-			08-05			
110	4.12.8 Remove F	OFFINWOFK			0 nrs	08-05-18 8:00			0%	-						
11/	4.12.9 Cleaning in					00-05-10 0:00	00-05-10 0:00		0%	-			08-05			
110	4.13 KIIN Main Bu	folding			U days t	00 0F 10 10:00	08-05-18 18:00	CIVIL3	0%	-			08-05			
119	4.13.1 Ilisidii Sca 4.12.2 Brooking (noiuing Sostable			0 hrs	00-05-10 10:00	00-05-10 10:00		0%	-			00-05			
120	4.13.2 Diedking C				0 11/5	00-05-10 10:00	00-05-10 10:00		0%	-						
121	4.13.3 Cutting Oil	Roard			0 IIIS	00-05-10 10:00	00-05-10 10:00		0%	-						
122	4.13.4 IIISIdii Fin 4.12 E Install For	DUdiu mwark I Douring Costable			0 hrs	00-05-10 10:00	00-05-10 10:00		0%	-			00-05			
123	4.13.5 Ilistali Full	niwork + Pouring Castable	:		0 hrs	00-05-10 10:00	00-05-10 10:00		0%	-			00-05			
124	4.13.0 Setting Til	ne			0 hrs	00-05-10 10:00	00-05-10 10:00		0%	-			08-05			
125	4.13.7 Remove F	coffolding			0 hrs	00-05-10 10.00	00-05-10 10.00		0%	-		-	08-05			
120	4.13.0 Relilove So	canolully	Chambor			00-05-10 10.00	00-05-10 10.00		0%	-			08-05			
127	4.14 Kill Inetall cos	offolding	Chamber		0 uays	00-05-10 0:00	00 0E 10 6:00		0%	-		-				
120	4.14.1 IIISIdii Sid	anoiuny actable by band braker			0 hrs	08-05-18 6:00	08-05-18 6:00 1		0%	-			08-05			
129		tool structure ± Install V-r	anchor		0 hrs	08-05-18 6:00	08-05-18 6:00 1	120 CIVILT	0%	-		-	08-05			
130	4 14 4 Install inst	lation board + Install For	mwork + Pouring (<u>actable</u>	0 hrs	08-05-18 6:00	08-05-18 6:00 1		0%	-			08-05			
132	4 14 5 Setting Tin			Lastable	0 hrs	00 05 10 0.00	08-05-18 6:00 1		0%	-			08-05			
132	4 14 6 Pemove Fr	ormwork			0 hrs	08-05-18 6:00	08-05-18 6:00 1	132 CIVIL4	0%	-			08-05			
133	4 14 7 Cleaning n	natorial			0 hrs	08-05-18 6:00	08-05-18 6:00 1	132 CIVIL4	0%	-			08-05			
135	4 14 8 Pemove S	caffolding			0 hrs	08-05-18 6:00	08-05-18 6:00 1		0%	-			08-05			
136	5 Limestone Crushir	a Test Group (1)			8 58 days2	06-05-18 8:00	14-05-18 22:00		0.00	-						
137	5 1 Machine Outs	tanding List (MF)			8 58 days	06-05-18 8:00	14-05-18 22:00		99%	-						
138	5 1 1 A1101 Apro	n Conveyor Change Gearh	0		2 58 days	12-05-18 8.00	14-05-18 22:00		100%	-		•	100%			
139	5 1 2 A1I 01 Hopr	per Steel Plate & Concrete	Need to install & r	enair	0 days	06-05-18 8:00	06-05-18 8:00	Piecework	0%	-			06-05			
140	5 1 3 A1101 Apro	n Conveyor Check & Chan	ge Chain Link and	Roller	0 days	06-05-18 8:00	06-05-18 8:00	Kvaw Win	10%	-			06-05			
141	5 1 4 A1C01 Lime	estone Crusher Grate Bar r	peed to replace		0 hrs	06-05-18 8:00	06-05-18 8:00	Kyaw Win	20%	-			06-05			
142	5.1.5 A1C01 Lime	stone Crusher Hammer &	Shaft need to che	ck & Repair Anvil	0 hrs	06-05-18 8:00	06-05-18 8:00 1	140 Kyaw Win	10%	-		, i	06-05			
143	5.1.6 A1C01 Lime	stone Crusher Need to re	pair liner		0 hrs	06-05-18 8:00	06-05-18 8:00 1	141 Kvaw Win	20%			. A	06-05			
		Task		Rolled Up Task		External Milestone	•	Start-onl	y	C	I I	- 11				
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-o	ıly	כ						
		Split	kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline	•	۵						
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary	\bigtriangledown	Baseline								
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	E	Critical 1	ask							
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only		Critical 1	ask Progress	-		_				
		Project Summary	~	Rolled Up Progress		 Manual Summary R 	ollup									
		Group By Summary		External Tasks		Manual Summary	-									



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish P	re Resource	%	23	3 Apr '18		07 M	ay '1	8
		<u> </u>				06.05.40.0.00		Names	Complete	23-04	28-04 0	3-05	08-05	13-0	5 18-05
144	5.1.7 A1J06 Belt (Conveyor Counter weight	sling need to chang	je	0 hrs	06-05-18 8:00	06-05-18 8:00 1	42 Kyaw Win_:	10%			 ♦ 06- ♦ 06- 			
145	5.1.8 B1H01 Stac	ker Check & Prevent mate	erial falling to Swing) gear	0 hrs	06-05-18 8:00	06-05-18 8:00 1	44 Kyaw Win_:	10%			• 06-			
146	5.1.9 AIJU9 Belt	Conveyor Cut & Reconnec	t Beit joint		0 nrs	06-05-18 8:00	06-05-18 8:00 1	43 Kyaw Win_4	20%			● Ub- 1 (A/im D
14/	5.1.10 BIH01 Cha	ange Stacker Belt			16 hrs	11-05-18 12:00	12-05-18 12:00 1	46 Kyaw Win_A	2 100%					yaw v	vin_z
148	5.1.11 Check AIC	UI Rotor & Main Drive Be	arings Clearances		0 nrs	06-05-18 8:00	06-05-18 8:00 1	45 Kyaw Win_	10%			♦ Ub- 1000/	US		:
149	5.1.12 A1J03 Belt	Conveyor Modify Skirt Bo	ard		2 days	09-05-18 8:00	12-05-18 0:00	Kyaw Win_A	2100%			100%		awiwi	n_2
150	5.2 Time Based M	aintenance Part Replac	cement List (ME)		U days	06-05-18 8:00	06-05-18 8:00		0%			♦ U6-			
151	5.2.1 A1C01M1 L	TM Change V-belt of Lime	stone Cruhser		0 hrs	06-05-18 8:00	06-05-18 8:00		0%			♦ 06-			
152	5.2.2 AICOIM2 L	IM Change V-belt of Lime	stone Crunser		0 nrs	06-05-18 8:00	06-05-18 8:00		0%			● U0-	us		
153	5.3 Machine Outs	tanding List (EE)	•		1 day?	06-05-18 8:00	07-05-18 8:00		100%		100	0/			
154	5.3.1 AIXCUI OV	ernead Crane cannot oper	ate		1 day?	06-05-18 8:00	07-05-18 8:00		100%		100	⁷⁰			
155	6 MIX-Mat & Raw M	aterial Test Group (2)			5.67 days	06-05-18 8:00	12-05-18 0:00		99%						
156	6.1 Machine Outs				5.67 days	06-05-18 8:00	12-05-18 0:00		99%		100				
15/	6.1.1 CIHUI Chai	nge and repair stacker wn	eel		2 days	06-05-18 8:00	08-05-18 8:00		100%		100	%			
158	6.1.2 EICUI Addi	tive Crusher change all be	arings		0 nrs	06-05-18 8:00	06-05-18 8:00	La Min Htet	0%			 Ub 10 	05	M	lhat D
159	6.1.3 CIHUZ RECI	almer Trolley Need to rep	air and alignment		16 hrs	11-05-18 8:00	12-05-18 0:00	La Min Htet	100%						ilet z
160	6.1.4 BILUI Stee	Feed Bin repair material	Іеакаде		0 hrs	06-05-18 8:00	06-05-18 8:00	Khun Win F	10%			● U6-			
161	6.1.5 CICUI Clay	Crusher need to check be	earing clearance		U nrs	06-05-18 8:00	06-05-18 8:00		0%		10				
162	6.1.6 CICUI Clay	Crusher weiding wear po	bint of the teeth		4.42 days	07-05-18 8:00	11-05-18 18:00 1	59 Piece Work	100%		100	0/		cervo	rK
163	6.1.7 CIJU6 Belt	Conveyor change outlet cr	nute		22 nrs	06-05-18 8:00	07-05-18 6:00		100%		100	70			
164	6.1.8 CIJUS Belt	conveyor need to change	ing up of conv		U nrs	06-05-18 8:00	06-05-18 8:00		0%		100	● U0 ⁻			tot 3
105	6.1.9 CIHUZ REC	almer need to make weld	ing rack car	t and muta and beautage	2 uays	06-05-18 8:00	11-05-18 12:48	La Min Hiel	100%		100	70		MIIIIIII	el 2
166	6.1.10 EIJUI Apr	on Conveyor need to chec	k and retighten boi	t and nuts and bearings	U Nrs	06-05-18 8:00	06-05-18 8:00	La Min Htet	1000/			1000/-	us II		
167	6.1.11 BIJ04 Cut	& reconnecting beit conve				09-05-18 8:00	10-05-18 16:00		100%			100%			
108	6.2 TIME Based M	aintenance Part Replac			U days	06-05-18 8:00	00-05-18 8:00		0%			 00 06 			
109	6.2.1 CICUIMI L	TM Change V-belt of Clay	Cruhser		0 nrs	06-05-18 8:00	06-05-18 8:00		0%			• 06	05		
170	6.2.2 CICUIM2 L	TM Change V-belt of Cidy	ciulisei ita Crubaar		0 hrs	06-05-16 6:00	06-05-18 8:00		0%			• 06	05		
171	6.2.3 EICUIMI L	TM Change V-belt of Later	ite Cruhser		0 hrs	06-05-16 6:00	06-05-18 8:00		0%			• 06	n5		
172	7 Paw Mill Food Hor	The Change V-Delt of Later	ite Crunser		0 1115	06-05-18 8:00	14-05-19 16:00		0%						
173	7 1 Machine Oute	tonding List (ME)	oup (3)		9 22 days	06-05-18 8:00	14-05-18 16:00		90%						
175	7.1.1 P1W/01 Cha	unde Bearing and Penair S	haft at Drive Side		24 brc	06-05-18 8:00	07-05-18 8:00		100%		100	%			
175	7.1.1 R1W01 Cha	inge bearing and Shaft at D	rivo Sido		27 1115 8 brc	06-05-18 8:00	06-05-18 16:00		100%		100	%			
170	7.1.2 R1W02 Che	nge Belt of Belt Weight E	nive Slue		0 1115 8 brc	06-05-18 8:00	06-05-18 16:00	Soo Wai Va	100%		100	% so	Wai Yan	Jaino	
178	7 1 4 P1W/03 W/oi	inge beit of beit Weight fo	y Chute Design and	t istall new roller	16 hrs	06-05-18 8:00	07-05-18 0.00	Moe Zaw H	h 100%		100	% Mc	e Zaw Hte	-	
170	7 1 5 R1103 Relt	Conveyor Need to Install	new Seal		0 hrs	06-05-18 8:00	07 05 18 0.00	60 Khun Win H			100		05		
175	7.11.5 K1505 Delt				01113	00 05 10 0.00	00 05 10 0.00		1070			• •			
		Task		Rolled Up Task		External Milestone	•	Start-only	/	C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-on	ly	C					
		Split	kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline		۵					
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary		Baseline				3			
Date: 19	-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	🚥 Manual Task	E	Critical T	ask						
		Summary	•	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical T	ask Progress	_		•			
		Project Summary	~	Rolled Up Progress		 Manual Summary R 	collup								
		Group By Summary		External Tasks		Manual Summary	•								



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	23	3 Apr '18		07 N	lay '18	.
								Names	Complete	23-04	28-04	03-05	08-05	13-05	18-0
180	7.1.6 R1J04 Belt	Conveyor Need to Repair	Belt Skirt		4 hrs	07-05-18 8:00	07-05-18 12:0	0 178 Moe Zaw H	Ht 100%			100%	loe Zaw Ht	et	
181	7.1.7 R1J03 Belt	Conveyor Check & Repair			0 hrs	07-05-18 12:00	07-05-18 12:0	0 180 Moe Zaw H	Hti0%			A	37-05		
182	7.1.8 R1G11 Two	Way Chute Need to modi	fy Plate & Linners		16 hrs	07-05-18 20:00	08-05-18 20:0	0 181 Moe Zaw H	Ht 100%			100%	Moe Zaw	Htet	
183	7.1.9 R1J05 Chan	ige New Belt Conveyor			16 hrs	07-05-18 12:00	08-05-18 12:0	0 179 Khun Win	Ht 100%			100%	Khun Win	Htwe	
184	7.1.10 Repair Hot	t Gas Pipe Line			0 hrs	08-05-18 20:00	08-05-18 20:0	0 182 Moe Zaw H	HteO%			•	08-05		
185	7.1.11 R1J06 Belt	conveyor Need to Modify	Slide Gate		8 hrs	09-05-18 14:00	09-05-18 22:0	0 184 Moe Zaw H	lt 100%			100%	🖌 Moe Z	w Htet	
186	7.1.12 J1J01 Scre	ew Conveyor repair shaft a	and change housing	design	0 hrs	06-05-18 8:00	06-05-18 8:0	0 158 Soe Wai Ya	an0%			▲ 06	-05		
187	7.1.13 J1J09 Chai	in Conveyor Need to modi	fy Shaft & slip Ring		0 hrs	06-05-18 8:00	06-05-18 8:0	0 Piece Worl	< 0%			♦ 06	-05		
188	7.1.14 R1M01 Inl	et Hot Gas Line (Check &	Reconfirm) Need to	Install New Corver	0 hrs	09-05-18 22:00	09-05-18 22:0	0 185 Moe Zaw H	Iti0%				● 09-05		
189	7.1.15 R1J14 Air	Slide Change Canvas of Ai	ir Slide		0 hrs	08-05-18 12:00	08-05-18 12:0	0 183 Khun Win	Ht0%				408-05		
190	7.1.16 J1P02 M	ain Bag Filter need to o	change bag filter	and bag cages	48 hrs (09-05-18 20:00	12-05-18 20:0	0 189Khun Wir	1100%			1009	∕₀▾▃▃	Khun Win	ı Htwe
191	7.1.17 R1M01 Ra	w Mill Replace Air Seal of	Roller		6 hrs	06-05-18 8:00	06-05-18 14:0	0 Soe Wai Ya	an 100%		1	100% <mark>-</mark> Soe	Wai Yan I	laing	
192	7.1.18 R1J04 Belt	conveyor Need to repair			0 hrs	09-05-18 22:00	09-05-18 22:0	0 188 Moe Zaw H	lti0%				09-0 5		
193	7.1.19 R1M01 We	elding Raw Mill Lower Casi	ing Crack Part by Pa	art	5.5 days	08-05-18 8:00	13-05-18 20:0	0 Piece Worl	< 100%			100%		Piece V	Vork
194	7.1.20 R1W02 Be	It Weighter Need to repair	r skirt board		4 hrs	11-05-18 18:00	11-05-18 22:0	0 192 Moe Zaw H	Ht 100%			1	00% ★ M	þe Zaw H	tet
195	7.1.21 R1L03 San	nd bin modify hopper			2 days	06-05-18 8:00	09-05-18 0:0	0 Soe Wai Ya	an 100%		1	100%	Soe Wai	Yan Nain	g
196	7.1.22 R1M01 Ra	w Mill change water spray	nozzle (4)sets		8 hrs	11-05-18 22:00	12-05-18 14:0	0 194 Moe Zaw H	It 100%			1	00% 📩	loe Zaw '	Htet
197	7.1.23 R1M01 Ra	w Mill need to change inle	t chute liner		2 davs	06-05-18 8:00	08-05-18 8:0	0 Piece Worl	< 100%		ı İ	100%	Piece Wor	k	
198	7.1.24 R1M01 Ra	w Mill need to adjust gap	between roller and	table	0 hrs	12-05-18 14:00	12-05-18 14:0	0 196 Moe Zaw H	It 0%					12-05	
199	7.1.25 R1M01 Ra	w Mill Separator check we	ar rate		8 hrs	06-05-18 8:00	06-05-18 16:0	00 MA	100%		ļ Į	100% _ MA			
200	7.1.26 R1S01 Ray	w Mill Separator Casing W	eldina		32 hrs	12-05-18 16:00	14-05-18 16:0	0 Soe Wai Ya	an 100%				100%	Soe V	<i>N</i> ai Yan N
201	7.1.27 R1M01 Ra	w Mill welding Mill Body	y		0 hrs	06-05-18 8:00	06-05-18 8:0	0 Piece Worl	< 100%			♦ 06	-05		
202	7.1.28 R1M01 Ra	w Mill Change Scrapers bl	ades		16 hrs	06-05-18 8:00	07-05-18 0:0	0 Moe Zaw H				100% 🗕 M	e Zaw Hte		
203	7.1.29 R1J51 Buc	ket Elevator need to chan	ge rubber discharge	e lip and retighten bolts &	4 hrs	12-05-18 14:00	12-05-18 18:0	0 196 Moe Zaw H	It 100%				100%	Moe Zaw	Htet
204	7.1.30 11P01 FP I	Need to check hammer an	d CF . DF	s np and reagneen bone of	0 hrs	12-05-18 20:00	12-05-18 20:0	0 190 Khun Win	Ht 0%					12-05	
205	7 1 31 11F02 Bag	Filter Fan bearing housing	a need to change		0 hrs	06-05-18 8:00	06-05-18 8.0	0 Piece Worl	< 0%			♦ 06	-05		
205	7 1 32 11102 Nee	d to Renair Screw Convey	or Bearing joints		24 hrs	12-05-18 16:00	14-05-18 0:0	0 Khun Win	Ht 100%			•	100%	khun V	Min Htwe
207	7 1 33 R1M01 che	eck hearing clear of swime	1 lever		48 hrs	08-05-18 8:00	10-05-18 8.0		100%			100%			
208	7 1 34 Check & R	enair Chain conveyor of 1	1103		8 hrs	13-05-18 8:00	13-05-18 16.0	0 La Min Hte	t 100%				100%	La Min	Htet 2
200	7 1 35 Check & R	enair Chain conveyor of 1	1104		8 hrs	13-05-18 8:00	13-05-18 16:0	0 La Min Hte	t 100%				100%	La Min	Htet 2
210	7 1 36 Check & R	enair Chain conveyor of 1	1105		8 hrs	13-05-18 8:00	13-05-18 16:0	0 La Min Hte	et 100%				100%	La Min	Htet 2
211	7 1 37 Check & R	enair Chain conveyor of 1	1106		8 hrs	12-05-18 8:00	12-05-18 16:0	0 La Min Hte	et 100%				100%	a Min Ht	et 2
212	7 1 38 Check & R	enair Chain conveyor of 1	1107		8 hrs	12-05-18 8:00	12-05-18 16:0	0 Moe Zaw H	Ht 100%				100%	Moe Zaw	Htet
212	7 1 39 Check & R	enair Chain conveyor of 1	1108		8 hrs	12-05-18 8:00	12-05-18 16:0	0 Khun Win	Ht 100%				100%	Khun Win	Htwe
213	7 2 Time Based M	aintenance Part Renla	coment List (MF)		0 33 days	06-05-18 8:00	06-05-18 16:0		0%						1
211	7 2 1 R1M01 I TM	Overhaul Change Spray	Nater		0.55 days	06-05-18 8:00	06-05-18 8.0	0	0%			▲ 06	-05		
215	7.2.1 (1101 111	l overhaar enange opray	Water		01113	00 05 10 0.00	00 05 10 0.0		070	<u>I</u>			<u>M° 11</u>		
		Task		Rolled Up Task		External Milestone	•	Start-on	lly	C					
		Task Progress		Rolled Up Critical Task		 Inactive Task 		Finish-c	nlv	г					
		rask i rogičas		Noned of Onnear Task		mactive rask		1 11131-0	any .	-					
		Split		Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadlin	e	۵					
Project:	03 MCI 1 Overall Kiln Shutdo	Milestone	•	Baseline Summary		Inactive Summary		Baselin	۵	1000000					
Date: 10			•	Bacome cummary	•		*		0						
Date. 18	5-07-19 14.10	Baseline Milestone	\diamond	Rolled Up Baseline		Manual Task	E	Critical	Task						
		Summary	— — —	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical	Task Progress			_			
		Project Summary	▽	Rolled Up Progress		 Manual Summary F 	Rollup								
		Group By Summary		External Tasks		Manual Summary									



ID Task	Name				Duration	Start	Finish	Pre Resource	%	23	3 Apr '18	5	1 70	4ay '18	
								Names	Complete	23-04	28-04	03-05	08-05	13-05	18-05
216	7.2.2 R1M01 LTM	Overhaul Change Cylinde	r take up Roller Tir	e #1	0 hrs	06-05-18 8:00	06-05-18 8:00		0%			♦ 06 ⁻	05		
217	7.2.3 R1M01 LTM	Overhaul Change Cylinde	r take up Roller Tir	e #2	0 hrs	06-05-18 8:00	06-05-18 8:00		0%			♦ 06-	05		
218	7.2.4 R1M01 LTM	Overhaul Change Cylinde	r take up Roller Tir	e #3	0 hrs	06-05-18 8:00	06-05-18 8:00		0%			♦ 06-	05		
219	7.2.5 R1M01 LTM	Overhaul Change Cylinde	r take up Roller Tir	e #4	0 hrs	06-05-18 8:00	06-05-18 8:00		0%			♦ 06-	05		
220	7.2.6 J1J05 LTM C	Change V-belt of Chain Co	nveyor		8 hrs	06-05-18 8:00	06-05-18 16:00		0%			0% 🛛			
221	7.2.7 J1J06 LTM (Change V-belt of Chain Co	nveyor		8 hrs	06-05-18 8:00	06-05-18 16:00		0%			0% 🛛			
222	7.3 Machine Outst	anding List (EE)			5.33 days?	06-05-18 8:00	11-05-18 16:00		99%				┿╍╍╼╸╎╿		
223	7.3.1 J1J01 Screw	Conveyor need to install	speed sensor		4 hrs	11-05-18 8:00	11-05-18 12:00		100%			10	0% 📘		
224	7.3.2 R1V52 Dam	per (Need to modify contr	ol system to contro	ol from CCR)	1 day?	06-05-18 8:00	07-05-18 8:00		100%		-	100% 📥			
225	7.3.3 R1M01 moto	or PM and insulation test	/	,	4 hrs	06-05-18 8:00	06-05-18 12:00		100%			100%			
226	7.3.4 R1M01 instr	uments inspection			3 hrs	06-05-18 8:00	06-05-18 11:00		100%			100%			
227	7.3.5 Main drive a	nd inching sensor modify			8 hrs	10-05-18 8:00	10-05-18 16:00		100%			100	1/6		
228	7.3.6 R1F16 moto	r and insulation test			4 hrs	06-05-18 11:00	06-05-18 15:00	226	100%			100% 📩			
229	7.3.7 R1F16 instu	rment inspection			2 hrs	06-05-18 8:00	06-05-18 10:00	228	100%		:	100% 🕂			
230	7.3.8 J1F02 motor	PM and insulation test			4 hrs	08-05-18 8:00	08-05-18 12:00		100%			100%			
231	7.3.9 J1F02 instru	ment inspection			2 hrs	08-05-18 12:00	08-05-18 14:00	230	100%	-		100%			
232	7.3.10 R1151 leve	l sensor modification			0 hrs	11-05-18 12:00	11-05-18 12:00	223	0%					1-05	
233	7.3.11 Motor over	all R1F07M1			6 hrs	07-05-18 17:00	07-05-18 23:00		100%			100%			
234	7.3.12 R1F13M1				6 hrs	08-05-18 8:00	08-05-18 14:00		100%			100%			
235	7.3.13 R1F14M1				6 hrs	09-05-18 8:00	09-05-18 14:00		100%			100%			
236	7.3.14 R1F15AM1				6 hrs	09-05-18 14:00	09-05-18 20:00	235	100%			100%			
237	7.3.15 R1F15BM1				6 hrs	09-05-18 20:00	10-05-18 2:00	236	100%			100%			
238	7.3.16 R1F15CM1				6 hrs	09-05-18 8:00	09-05-18 14:00		100%			100%			
239	7.3.17 R1F15DM1				6 hrs	09-05-18 14:00	09-05-18 20:00	238	100%			100%			
240	7 3 18 R1F51M1				6 hrs	10-05-18 8.00	10-05-18 14:00		100%			100	1/6		
241	7 3 19 C1H01M1 t	n M4			12 hrs	07-05-18 10:00	07-05-18 22:00		100%			100%			
242	7 3 20 C1102M1				6 hrs	07-05-18 8:00	07-05-18 14:00	243	100%			100%			
243	7 3 21 F1102M1				6 hrs	08-05-18 8:00	08-05-18 14:00		100%			100%			
244	7 3 22 11G05M1 to	n M16			18 hrs	08-05-18 8:00	09-05-18 2:00		100%			100%			
245	7 3 23 11107M1				6 hrs	08-05-18 8:00	08-05-18 14:00		100%			100%			
246	7 3 24 Check and	clean temperature sensor	·(1RT1_1RT9)		8 hrs	06-05-18 8:00	06-05-18 16:00		100%			100%			
247	7 3 25 Check leve	switch (11P02L1 12)	(51(11_51(15))		8 hrs	10-05-18 8:00	10-05-18 16:00		100%	-		100'	₩ I		
248	7 3 26 R1W01 Cal	ibration			6 hrs	11-05-18 8:00	11-05-18 14:00		100%			10	0%		
249	7 3 27 R1W02 Cal	ibration			6 hrs	11-05-18 8:00	11-05-18 14:00		100%			10	0%		
250	7 3 28 R1W03 Cal	ibration			6 hrs	11-05-18 8:00	11-05-18 14:00		100%			10	0%		
251	7 3 29 R1W04 Cal	ibration			6 hrs	11-05-18 8:00	11-05-18 14:00		100%	-		10	0%		
201	715125 111101 64				0 1110	11 05 10 0100	11 05 10 1 1100		10070			<u> </u>	<u> </u>		1
		Task		Rolled Up Task		External Milestone	•	Start-o	nly	C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-	only	C					
		Split		Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadlir	ie	0					
Project: 02 MC	CL1. Ovorall Kilp Shutda	Milestope	•	Baseline Summary				Baselin	6			88888			
Date: 19-07-19	14:18		• ^		•	Macuve Summary	~		Taal						
			×	Rolled Up Baseline				_ Critical	I ask						
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only		Critical	I ask Progress	_		_			
		Project Summary	•	Rolled Up Progress		Manual Summary F	Rollup								
		Group By Summary	**	External Tasks		Manual Summary									



ID	Task Name				Duration	Start	Finish	Pre Resourc	e %	2	3 Apr '18		07 /	May '18	
252	7 2 20 0414/02 0 1					11.05.10.0.00	11 05 10 0 00	Names	Complete	23-04	28-04 03	3-05	08-05	13-05	18-05
252	7.3.30 B1W03 Call				0 hrs	11-05-18 8:00	11-05-18 8:00		0%	_		10		1-05	
253	7.3.31 RIW05,EIV				8 hrs	11-05-18 8:00	11-05-18 16:00		100%	-		10	Ψ% Ι	1 05	
254	7.3.32 CIVVUI Call	IDration			0 nrs	11-05-18 8:00	10.05.10.14:00		0%	-		100		1-05	
255	7.3.33 BIHUI PM				6 nrs	10-05-18 8:00	10-05-18 14:00		100%	_	-	1000	70		
256	7.3.34 BIHUZ PM				6 nrs	08-05-18 8:00	08-05-18 14:00		100%	_					
257	7.3.35 CIHUI PM				6 hrs	08-05-18 8:00	08-05-18 14:00	250	100%	-	10				
258	7.3.36 CIHU2 PM				6 hrs	07-05-18 8:00	07-05-18 14:00	259	100%	_	10		H		
259	7.3.37 Check LV m	notor R_line			10 hrs	08-05-18 8:00	08-05-18 18:00		100%	_	-		1 1		
260	7.3.38 Check LV m	notor J_line			10 hrs	08-05-18 8:00	08-05-18 18:00	262	100%	-	10		1		
261	7.3.39 Check LV m				10 hrs	07-05-18 8:00	07-05-18 18:00	262	100%	_	10	1000/	$H \mid$		
262	7.3.40 Check LV m	notor B_line			10 hrs	09-05-18 8:00	09-05-18 18:00		100%	-	1000	100.30			
263	7.3.41 XFMR_104				6 hrs	06-05-18 8:00	06-05-18 14:00		100%	_	100-	1000			
264	7.3.42 XFMR_105	_1 PM			6 hrs	10-05-18 5:00	10-05-18 11:00	264	100%	_		1001	(î <u>-</u>		
265	7.3.43 XFMR_105_	_2 PM			6 hrs	10-05-18 11:00	10-05-18 17:00	264	100%	-	10		20		
266	7.3.44 XFMR_106	PM			6 hrs	07-05-18 8:00	07-05-18 14:00	267	100%	_	10				
267	7.3.45 XFMR_102				6 hrs	08-05-18 8:00	08-05-18 14:00		100%	-	1000	100%	1		
268	7.3.46 Substation	TUSMCC PM			6 hrs	06-05-18 8:00	06-05-18 14:00		100%	-	1004	/0 I			
269	7.3.47 RIF16 VSD	PM			6 nrs	08-05-18 8:00	08-05-18 14:00	260	100%	-		100%	۱ <u>اا</u>		
2/0	7.3.48 J1F02 VSD				6 hrs	08-05-18 14:00	08-05-18 20:00	269	100%	-		100%			
2/1	7.3.49 Substation				6 hrs	10-05-18 8:00	10-05-18 14:00	271	100%	-		1001			
272	7.3.50 Substion 10	J5 switch gear PM			4 hrs	10-05-18 14:00	10-05-18 18:00	2/1	100%	-		1000			
2/3	7.3.51 LV bus bar	PM			6 hrs	10-05-18 5:00	10-05-18 11:00	272	100%	-		1001	(î <u>-</u>		
2/4	7.3.52 HV DUS Dar				6 nrs	10-05-18 11:00	10-05-18 17:00	273	100%	-		1000	10		
275	7.3.53 Substation				6 nrs	09-05-18 8:00	09-05-18 14:00	277	100%	-	10	100%			
270					6 nrs	07-05-18 8:00	07-05-18 14:00	2//	100%	-	10	1000/-	₩		
2//	7.3.55 Substation				6 Nrs	09-05-18 8:00	09-05-18 14:00		100%	-		100%			
278	7.3.50 Substation				6 nrs	10.05.18.8:00	09-05-18 14:00		100%	-		100%			
2/9	7.3.57 Substation				6 nrs	10-05-18 8:00	10-05-18 14:00		100%	-		1001			
280	7.3.58 Substation	102LRS PM			6 hrs	10-05-18 8:00	10-05-18 14:00		100%	-	-	1004			
201	7.3.59 Substituting				0 IIIS	00-05-10 0:00	00-05-10 14:00		100%	-		100%			
202	7.3.60 Substation	102 LV DUS DAF PM				08-05-18 8:00	08-05-18 14:00		100%	-	4	.00%			
203	7.4 TIME Based Ma	bearing DE of Motor			0.25 days	06 0F 19 9:00	06 0F 19 9:00		99%	-		• 06	05		
204	7.4.2 P1E53M Change	bearing DE of Motor			0 hrs	06-05-16 6:00	06-05-16 6:00		0%	_		● 001	05		
200	7.4.2 IXII JSII Change	Dealing NDL of Motor			0 IIIS	06-05-16 6:00	06-05-16 6:00		0%	-		00 ⁻	-05		
200	7.4.5 J1WP01M1 Chan 7.4.4 11WP01M1 Chan	ige DL Motor of Water Pump			0 hrs	06-05-18 8:00	06-05-18 8:00		0%	_		● 00-	05		
207	7.4.4 51WF01F11 Chan				UTIIS	00-05-10 0:00	00-05-16 8:00		0%			• 00-	<u>H2</u>		
		Task		Rolled Up Task		External Milestone	•	Star	-only	C					
		Task Progress		Rolled Lin Critical Task		Inactive Task		Finis	h-only	г					
		rusk i rogičes				mactive rask		T III C	in-only	-					
		Split	k	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Dea	dline	۵					
Proiect:	03 MCL1 Overall Kiln Shutdo	Milestone	•	Baseline Summary		Inactive Summary	\bigtriangledown	Base	eline			a			
Date: 19	9-07-19 14:18	Baseline Milestone	\$	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task		Critic	cal Task			נ			
		Summary	~	Rolled Up Baseline Milestone	\diamond	Duration-only		Critic	al Task Progress						
		Project Summary	~	Rolled Up Progress		- Manual Summary Ro	ollup		-						
				. v		Manual Comments	-								
		Group By Summary	— —— —	External Lasks		Manual Summary									



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	e %	23	Apr '18		07 N	1ay '18	
								Names	Complete	23-04	28-04 (03-05	08-05	13-05	18-05
288	7.4.5 J1WP02M1 Cha	nge DE Motor of Water Pump			0 hrs	06-05-18 8:00	06-05-18 8:00)	0%			06	05		
289	7.4.6 J1WP02M1 Cha	nge NDE Motor of Water Pump			0 hrs	06-05-18 8:00	06-05-18 8:00)	0%			♦ 06	-05		
290	7.4.7 R1F07M1 Chang	ge DE Motor of Seal Air Fan			6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
291	7.4.8 R1F07M1 Chang	ge DE Motor of Seal Air Fan			6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
292	7.4.9 R1F13M1 Chang	ge DE Motor Bearing of Air Slide	Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
293	7.4.10 R1F13M1 Char	nge NDE Motor Bearing of Air Sli	ide Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
294	7.4.11 R1F14M1 Char	nge DE Motor of Air Slide Fan			6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
295	7.4.12 R1F14M1 Char	nge NDE Motor of Air Slide Fan			6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
296	7.4.13 R1F15AM1 Cha	ange DE Motor Bearing of Air Sli	de Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
297	7.4.14 R1F15AM1 Cha	ange NDE Motor Bearing of Air S	Slide Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)% 🔒			
298	7.4.15 R1F15BM1 Cha	ange DE Motor Bearing of Air Sli	de Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)%			
299	7.4.16 R1F15BM1 Cha	ange NDE Motor Bearing of Air S	Slide Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)%			
300	7.4.17 R1F15CM1 Cha	ange DE Motor Bearing of Air Sli	de Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)%			
301	7.4.18 R1F15CM1 Cha	ange NDE Motor Bearing of Air S	Slide Fan		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)%			
302	7.4.19 R1F15DM1 Cha	ange DE Bearing of Air Slide Far	1		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)%			
303	7.4.20 R1F15DM1 Cha	ange NDE Bearing of Air Slide Fa	an		6 hrs	06-05-18 8:00	06-05-18 14:00)	100%		100)%			
304	8 Homosilo & Kiln Fe	eeding Test Group (4)			6.58 days	06-05-18 8:00	12-05-18 22:00		86%						
305	8.1 Civil (Refracto	orv & Castable)			0 days	06-05-18 8:00	06-05-18 8:00		0%			• 06	05		
306	8 1 1 Pouring Cas	stable (Near Expansion loi	int of upper cyclone	Pka 3 2)	0 hrs	06-05-18 8.00	06-05-18 8.00)	0%			♦ 06	-05		
307	8 1 2 Pouring Cas	stable (Near Expansion Joi	int of upper cyclone	Pkh 3 1	0 hrs	06-05-18 8:00	06-05-18 8:00	,)	0%			▲ 06	-05		
308	8 1 3 Pouring Cas	stable (Near air blaster W	$(1\Delta R_{36})$		0 hrs	06-05-18 8:00	06-05-18 8:00	,)	0%	-		▲ 06	-05		
300	8 1 4 Pouring Cas	stable (Near Personal Flev	vator @ 6 floor)		0 hrs	06-05-18 8:00	06-05-18 8:00	/	0%			▲ 06	-05		
310	8 2 Machine Outs	tanding List (ME)			6 58 days	06-05-18 8:00	12-05-18 22:00		83%	-			Ĭ		
311	8 2 1 W1G45 and	d W1G46 Flan valve at cvr	clone Not have flag	valve (need to install new	0.50 days	10-05-18 16:00	10-05-18 16:00	, 1330 Hla Minn	00.0%	_		•	10-	5	
511			cione not nave nag	valve (need to install new	01113	10 05 10 10.00	10 05 10 10.00	550 1110 1111	00070						
312	8 2 2 H1105 and I	H1103 Air slide Pneumatic	valve not Ok		4 hrs	06-05-18 8:00	06-05-18 12:00) Hla Minn	00100%	-	100)%. ны	Minn Oo		
313	8 2 3 H1G12 Gate	of air slide cylinder not y	vorking		4 hrs	06-05-18 12:00	06-05-18 16:00	312 Hla Minn	00 100 %		10		Minn Oo		
314	8 2 4 H1106 Air c	lide Manual slide gate air	loak		4 hrs	06-05-18 16:00	06-05-18 20:00	313 Hla Minn	00 100 %	-	10		a Minn On		
315	8 2 5 H1100 Air si	lide Dividing gate not ok	icak		4 hrs	06-05-18 20:00	07-05-18 0.00	314 Hla Minn	00 100 %	-	10		a Minn On		
316	8 2 6 H1G33 Two	way Chuta Leak			8 hrs	07-05-18 8:00	07-05-18 16:00	315 Hla Minn	00 100 %		1				
317	8 2 7 H1112 Air d	lide man hole air leakage			4 hrs	07-05-18 16:00	07-05-18 20:00	316 Hla Minn	00 100 %	-	-		Hia Minn C		
318	8 2 8 H1002 Pool	t Blower Kiln Feeding Not	Stable		2 hrs	07-05-18 20:00	07-05-18 22:00	317 Hla Minn	00 100 %	-		100%	Ha Minn C		
210	9.2.0 H1Q02 R00	t Blower Mint recuiring Not	oraturo high (Cilo	ncor block)	2 1115 2 bro	07-05-10 20:00	00 05 10 22.00	219 Lla Minn	Oc 100%	-		100%	Hia Minn (
220		Clide Check and change (damaga ang		2 1115 4 brs	07-03-10 22.00	00-03-10 0.00	210 Lla Minn	Oc 100%			100%	HI2 Minn		
220		Slide Check and change (4 1115 4 bro	00-05-10 0.00	00-05-10 12.00		Oc 100%	-		100%	HI2 Minn		
222		Slide Check and change (4 11/5	00-05-10 12:00	00-05-10 10:00	221 HIS Minn	00 100%	-		100%			
322	0.2.12 TIJUS AII				4 11/5	00-05-10 10:00	06-05-16 20:00		00100%			100 70	Ring hund	99	
		Task		Rolled Up Task		External Milestone	۲	Start-	only	C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finisl	n-only	C					
		Split	. I	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Dead	line	۵					
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary	\bigtriangledown	Base	ine	********					
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline		Manual Task	C	Critic	al Task						
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only		Critic	al Task Progress			-			
		Project Summary	▼	Rolled Up Progress		Manual Summary F	Rollup								
		Group By Summary	••	External Tasks		Manual Summary									



SAFER-FASTER-BATTE

ID T	ask Name				Duration	Start	Finish I	Pre Resource	%	23	8 Apr '18	07	May '	18	
								Names	Complete	23-04	28-04 03-05	08-05	13-	05	18-05
323	8.2.13 H1J04 Air	Slide Check and change c	lamage one		4 hrs	08-05-18 20:00	09-05-18 0:00	322 Hla Minn O	o 100%		100%	, 📩 Hla Mir	in Op		
324	8.2.14 H1J05 Air	Slide Check and change c	lamage one		4 hrs	09-05-18 8:00	09-05-18 12:00	323 Hla Minn O	o 100%		100	‰ <mark>∵</mark> ∏Hla Mi	nn Oo		
325	8.2.15 H1J06 Air	Slide Check and change c	lamage one		4 hrs	09-05-18 12:00	09-05-18 16:00	324 Hla Minn O	o 100%		100	% <mark>,</mark> ∼Hla M	inn Oo		
326	8.2.16 H1J07 Air	Slide Check and change c	lamage one		4 hrs	09-05-18 16:00	09-05-18 20:00	325 Hla Minn O	o 100%		100	% <mark></mark> tha M	inn Oc		
327	8.2.17 H1J08 Air	Slide Check and change c	lamage one		4 hrs	09-05-18 20:00	10-05-18 0:00	326 Hla Minn O	o 100%		100	/% <mark>,</mark> ₹Hla M	1inn Dr	o	
328	8.2.18 H1J09 Air	Slide Check and change c	lamage one		4 hrs	10-05-18 8:00	10-05-18 12:00	327 Hla Minn O	o 100%		10		Minn C	Do	
329	8.2.19 H1J10 Air	Slide Check and change c	lamage one		4 hrs	10-05-18 12:00	10-05-18 16:00	328 Hla Minn O	o 100%		10	/0% 🎦 Hia	Minn (Do 🛛	
330	8.2.20 W1G43 Fla	ap valve at cyclone Normal	lly open		0 hrs	10-05-18 16:00	10-05-18 16:00	329 Hla Minn O	o 0%			10	-05		
331	8.2.21 W1AB37,4	2,46 Preheater air blaster	Diaphram not good	d	6 hrs	12-05-18 16:00	12-05-18 22:00	Hla Minn O	o 100%			100%	Hla N	1inn 🔶	0
332	8.2.22 W1G29 Ro	otary Feeder (kiln feed) Ab	normal Sound		3 hrs	06-05-18 8:00	06-05-18 11:00	Hla Minn O	o 100%		100% , н	a Minn Oo			
333	8.2.23 W1J15 Be	It Bucket Elevator PM/ Cha	inge Discharge Rub	br Lip Check Change	8 hrs	06-05-18 8:00	06-05-18 16:00	Kyaw Thu	10%		10% _D K	yaw Thu Or	- c		
	Drive Drum Sleev	eTail Sprocket						Oo							
334	8.2.24 W1J16 Be	It Bucket Elevator PM/ Cha	inge Discharge Rub	br Lip Check Change	0 hrs	06-05-18 16:00	06-05-18 16:00	333 Kyaw Thu	0%)6-05			
	Drive Drum Sleev	eTail Sprocket						Oo							
335	8.2.25 W1G27 Ro	otary Feeder Check Rotary	Gap		6 hrs	06-05-18 16:00	06-05-18 22:00	334 Kyaw Thu (D 40%		40% 📩	yaw Thu Q	'O		
336	8.2.26 W1G28 Ro	otary Feeder Check Rotary	Gap		6 hrs	06-05-18 22:00	07-05-18 12:00	335 Kyaw Thu (D 40%		40% 🏅	Kyaw Thu	Op		
337	8.2.27 W1G29 Ro	otary Feeder Check Rotary	Gap		6 hrs	07-05-18 12:00	07-05-18 18:00	336 Kyaw Thu (0.40%		40%	Kyaw Thu	O o		
338	8.2.28 W1G30 Ro	otary Feeder Check Rotary	Gap		0 hrs	07-05-18 18:00	07-05-18 18:00	337 Kyaw Thu (D 40%		•	07-05			
339	8.2.29 Check Cen	ntral Chute C4,C5			0 days	06-05-18 8:00	06-05-18 8:00	Hla Minn O	o0%		♦ 0	6-05			
340	8.2.30 Change Fla	ap Gate for C4,C5			0 days	06-05-18 8:00	06-05-18 8:00	Hla Minn O	o 0%		♦ 0	6-05			
341	8.2.31 Preheater	Need to Check Flap Valve	Leakage		0 days	06-05-18 8:00	06-05-18 8:00		0%		♦ 0	6-05			
342	8.2.32 H1G31 Ro	tary Feeder Overhaul & Ma	aintenance		2 hrs	06-05-18 8:00	06-05-18 10:00		100%		100%				
343	8.3 Time Based M	laintenance Part Replac	ement List (ME)		0.67 days	06-05-18 8:00	07-05-18 0:00		100%						
344	8.3.1 H1Q01 LTM	I Change V-belt of Root Blo	ower & Realignmer	nt	4 hrs	06-05-18 8:00	06-05-18 12:00	Pyae Sone	100%		100% P	yae Sone			
345	8.3.2 H1002 LTM	Change V-belt of Root Blo	ower & Realignmer	nt	4 hrs	06-05-18 12:00	06-05-18 16:00	, 344 Pvae Sone	100%		100% T P	yae Sone			
346	8.3.3 H1003 I TM	Change V-belt of Root Blo	ower & Realignmer	nt	4 hrs	06-05-18 16:00	06-05-18 20:00	345 Pyae Sone	100%		100% 🚽	vae Sone			
347	8.3.4 H1004 LTM	Change V-belt of Root Blo	ower & Realignmer	nt	4 hrs	06-05-18 20:00	07-05-18 0:00	346 Pvae Sone	100%		100%	vae Sone			
348	8.4 Machine Outs	tanding List (EE)	j		0.08 days	06-05-18 8:00	06-05-18 10:00	,	73%			ſ			
349	8.4.1 W1G55 Divi	idng Gate of Kiln feed Can	t adjust from CCR		0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•	6-05			
350	8.4.2 W1G31 Slid	le gate No have solenoid v	alve& air pipe (op	en with manual)	1 hr	06-05-18 8:00	06-05-18 9:00		100%		100%				
351	8.4.3 W1AB35 Pr	eheater air blaster solenoi	d valve not good		0.5 hrs	06-05-18 8:00	06-05-18 8:30		100%		100%				
352	8.4.4 W1AB38 Pr	eheater air blaster solenoi	d valve not good		0.5 hrs	06-05-18 8:00	06-05-18 8:30		100%		100%				
353	8 4 5 W1AB40 Pr	eheater air blaster solenoi	d valve not good		0.5 hrs	06-05-18 8:00	06-05-18 8:30		100%		100%				
354	8 4 6 W1A05aT3	C5a Outlet temperature N	ot correct data (ov	veride)(Sensor not have)	2 hrs	06-05-18 8:00	06-05-18 10:00		50%		50%				
355	8 4 7 H1F08 Air s	lide fan Breaker Not Ok			1 hr	06-05-18 8:00	06-05-18 9:00		100%		100%				
356	8 4 8 W1AD01T1	Teritary air temp Sensor r	not OK (need to ch	ange)	2 hrs	06-05-18 8:00	06-05-18 10:00		50%		50%				
550					21113		00 00 10 10100		5070						
		Task		Rolled Up Task		External Milestone	•	Start-onl	у	C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-o	nly	C					
		Split		Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline	•	۵					
Project: 03	3 MCI 1 Overall Kiln Shutdo	Milestone	•	Baseline Summary		Inactive Summary		Baseline			*****				
Date: 19-0)7-19 14:18	Receire Milectore	•	Delled Up Receipe			÷	Critical	-ook						
			~						ask						
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only		Critical 1	ask Progress						
		Project Summary	~	Rolled Up Progress		 Manual Summary R 	ollup								
		Group By Summary	*	External Tasks		Manual Summary									



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	23	Apr '18	07 M	1ay '18	
~								Names	Complete	23-04	28-04 03-05	08-05	13-05	18-05
357	8.5 Time Based Ma	aintenance Part Replac	cement List (EE)		1 day	07-05-18 8:00	08-05-18 8:00		100%	-	1000/			
358	8.5.1 HIF06M Change	DE Motor Bearing of Air Slide P	-dri		l nr	06-05-18 8:00	06-05-18 9:00		100%	-	100%			
359	8.5.2 H1F00M Clidilge	DE Motor Bearing of Air Slide	- Fdii Fan		1 nr	06-05-18 8:00	06-05-18 9:00)	100%		100%			
261	8.5.4 H1E03M Change	NDE Motor Bearing of Air Slide	Fan		1 III 1 br	06-05-18 8:00	06-05-16 9:00		100%		100%			
301	8.5.5 H1F04M Change	DE Motor Bearing of Air Slide	- 1 dil 		1 NF	06-05-18 8:00)	100%	-	100%			
262	8 5 6 H1F04M Change	NDF Motor Bearing of Air Slide	Fan		1 III 1 br	06-05-16 6:00	06 05 18 0:00		100%		100%			
264	8 5 7 H1F05M Change	DE Motor Bearing of Air Slide	Fan		1 III 1 br	00-05-18 8.00	06 05 18 9.00		100%		100%			
265	8.5.8 H1F05M Change	NDE Motor Bearing of Air Slide	Fan		1 III 1 br	06-05-18 8:00			100%	-	100%			
366	8.5.9 H1F07M Change	DE Motor Bearing of Air Slide	Fan		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%		100%			
367	8 5 10 H1E07M Change	e NDF Motor Bearing of Air Slid	le Fan		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%		100%			
368	8 5 11 H1F08M Change	e DE Motor Bearing of Air Slide	Fan		1 III 1 br	06-05-18 8:00	06-05-18 9:00)	100%		100%			
360	8.5.12 H1F08M Change	e NDF Motor Bearing of Air Slid	le Fan		1 hr	06-05-18 8:00	06-05-18 9:00)	100%		100%			
370	9 Coal Storage & Coa	al Mill Test Group (5)			6 58 days	06-05-18 8:00	12-05-18 22:00		93%	-	100 /0			
371	9 1 Machine Outst	anding List (MF)			6 58 days	06-05-18 8:00	12-05-18 22:00		89%			I		
372	9 1 1 Replace Roll	er Tire Bearing of Coal M	ill (Roller No 2)		0 days	06-05-18 8:00	06-05-18 8:00) Piece Work	0%		▲ 0€	-05		
373	9 1 2 Replace Oil	Seal of Coal Mill Roller No			0 days	06-05-18 8:00	06-05-18 8:00) Piece Work	0%		▲ 06	-05		
374	9.1.2 KEpidee On C	Mill Open side cover and	check condition of	hearing Roller No 2	4 hrs	07-05-18 8:00	07-05-18 12:00) 347 Pyae Sone	100%	-	100%	vae Sone		
375	9 1 4 K1XP01 Scre	w Pump Change NDF Se	al and Bearing		32 hrs	06-05-18 8:00	08-05-18 0:00	Naing Win	100%	-	100%	Naing Win		
376	9 1 5 K11 05 Coal F	Rin Chute Modify with ha	rdfacing		16 hrs	06-05-18 8:00	07-05-18 0:00) Aung Htay	N100%		100% A	ng Htav M	on	
377	9 1 6 K1G17 Two-	Way Chute Two-Way Chu	ite		8 hrs	07-05-18 12:00	07-05-18 20:00) 374 Pyae Sone	100%		100%	a Sone		
378	9 1 7 11V10 Shut-	off Damper Can't open or	r close		0 hrs	07-05-18 20:00	07-05-18 20:00	377 Pyae Sone	0%			07-05		
379	9.1.8 K1V35 Shut-	off Damper Does not rea	ch limit position		0 hrs	07-05-18 20:00	07-05-18 20:00	378 Pyae Sone	0%			07-05		
380	9.1.9 K1W08 Chai	n Feeder Need to repair t	the chain cleanear s	capper	8 hrs	08-05-18 20:00	09-05-18 12:00	379 Pvae Sone	80%		80%	Pyae Sr	ne	
381	9.1.10 K1G26.27.2	28.29.30.31 Rotary Feede	r Oil Leak the gear	box	8 hrs	09-05-18 12:00	09-05-18 20:00	380 Pvae Sone	100%		100%	Pyae \$	one	
382	9.1.11 K1J18.K1J1	9.K1J20 Screw Conveyor	Need to check join	t and bolt /nuts	8 hrs	09-05-18 20:00	10-05-18 12:00	381 Pvae Sone	100%		100	o Ypae	Some	
383	9.1.12 K1LO03 Gr	ease Pipe Need to change	e pipe socket		8 hrs	10-05-18 12:00	10-05-18 20:00) 382 Pvae Sone	100%		100		Sone	
384	9.1.13 K1M01 Dan	n Ring Need to repair at	Dam Ring		8 hrs	10-05-18 20:00	11-05-18 12:00) 383 Pvae Sone	100%		10	0% 🛨 Py:	e Sone	
385	9.1.14 K1M01 Coa	I Reject Bin Production d	ata		12 hrs	11-05-18 12:00	12-05-18 0:00) 384 Pvae Sone	0%			0% 🔨 P	ae Sone	
386	9.1.15 K1M01 Roll	er No.3 Oil Drain Bolt car	n not take out		0 hrs	12-05-18 0:00	12-05-18 0:00	385 Pyae Sone	0%				2-05	
387	9.1.16 K1XD03 Be	It Belt Need to change			0 hrs	12-05-18 0:00	12-05-18 0:00	386 Pyae Sone	0%				2-05	
388	9.1.17 K1H04 Rec	laimer Tightening and Ch	ecking bearing		6 hrs	08-05-18 8:00	08-05-18 14:00) 375 Naing Win	60%		60%	Naing Wi	h	
389	9.1.18 K1M01 Coa	I Mill Countersunk Bolt fo	or Dam Ring		8 hrs	08-05-18 14:00	08-05-18 22:00	388 Naing Win	100%		100%	Naing W	in	
390	9.1.19 K1G24 Dub	le Flap Valve Cylinder no	t working		4 hrs	12-05-18 8:00	12-05-18 12:00	387 Pyae Sone	0%			0%	yae Sone	
391	9.1.20 K1H03 Stac	cker Chute Frame need to	o modify		4 hrs	12-05-18 12:00	12-05-18 16:00	390 Pyae Sone	100%			100%	Pyae Sone	
392	9.1.21 K1W08 Coa	al Feeder Scraper Blade C	Change		6 hrs	12-05-18 16:00	12-05-18 22:00	391 Pyae Sone	80%			80%	Pyae Sone	
		Task		Rolled Up Task		External Milestone	۲	Start-only	ý	C				
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-or	lly	Э				
		Split	kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline		۵				
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary		Baseline						
Date. 18		Baseline Milestone	♦	Rolled Up Baseline		Manual Task	C	Critical T	ask					
		Summary	— ———————————————————————————————————	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical T	ask Progress					
		Project Summary		Rolled Up Progress		 Manual Summary F 	Rollup							
		Group By Summary		External Lasks		Manual Summary								



ID	Task Name				Duration	Start	Finish	Pre Resource	%	23	3 Apr '18		07	May '18	
								Names	Complete	23-04	28-04	03-05	08-05	13-05	18-05
393	9.1.22 K1M01 Coa	I Mill Coal Mill Reject Chu	te & Bin Install CO	2 Purging System	0 hrs	07-05-18 0:00	07-05-18 0:0	0 376 Aung Htay	N0%				07-05		
394	9.1.23 K1M01 Coa	I Mill Rocker Arm adjustm	ent and thrust pac	l gap adjustment	24 hrs	07-05-18 0:00	08-05-18 0:0	00 393	100%			100% 📩			
395	9.1.24 K1XP01 Scr	ew pump bush for bearin	g seal change		24 hrs	08-05-18 0:00	09-05-18 0:0	00 394	100%			100%			
396	9.1.25 K1J06 outle	t chute modify			0 hrs	09-05-18 0:00	09-05-18 0:0	00 395	0%				09-05		
397	9.2 Time Based Ma	intenance Part Replac	ement List (ME)		0.83 days 0	7-05-18 16:00	08-05-18 12:0	0	100%						
398	9.2.1 K1Q01A LTM	I Change V-belt of Root B	lower & Realignme	ent	4 hrs	07-05-18 16:00	07-05-18 20:0	0 396 Aung Htay	▶100%			100%	Aung Htay	Mon	
399	9.2.2 K1001B LTM	I Change V-belt of Root B	lower & Realignme	ent	4 hrs	07-05-18 20:00	08-05-18 0:0	0 398 Aung Htay	▶100%			100%	Aung Hta	Mon	
400	9.2.3 K1S01 LTM (Change V-belt of Coal mill	separator & Reali	anment	4 hrs	08-05-18 8:00	08-05-18 12:0) 0 399 Aung Htay	▶100%			100%	Aung Hta	iy Mon	
401	9.3 Machine Outst	anding List (EE)			8 hrs	06-05-18 8:00	06-05-18 16:0)0	99%						
402	9.3.1 K1G17 Two-	Way Chute Recheck wirin	a Svstem		0 hrs	06-05-18 8:00	06-05-18 8:0	00	0%			• 06	-05		
403	9.3.2 K1G24 Doub	le Flap Valve Recheck wir	ina System		0 hrs	06-05-18 8:00	06-05-18 8:0	00	0%			• 06	-05		
404	9.3.3 K1V35 Shut-	off Damper Need to Adju	st damper or limit	switch	1 hr	06-05-18 8:00	06-05-18 9:0	00	100%		1	.00%			
405	9.3.4 K1W04 Weig	ht Feeder Need to Calibra	ation		0 hrs	06-05-18 8:00	06-05-18 8:0	00	0%			♦ 06	-05		
406	9.3.5 K1FR01 CO2	purging system Can't op	erate in CCR/ Insta	allation not complete	0 hrs	06-05-18 8:00	06-05-18 8:0	00	0%			• 06	-05		
407	9.3.6 K1H03 Stack	er And Reclaimer Need to	check the electric	al controller	1 hr	06-05-18 8:00	06-05-18 9:0	00	100%		1	.00%			
408	9.3.7 K1H04 Stack	er And Reclaimer Need to	check the electric	al controller	1 hr	06-05-18 8:00	06-05-18 9:0	00	100%		1	00%			
409	9.3.8 K1A2 Bag filt	er outlet O2 sensor Bad o	condition		0 hrs	06-05-18 8:00	06-05-18 8:0	00	0%			♦ 06	-05		
410	9.3.9 K1O2 Bag filt	ter outlet O2 sensor Bad	condition		0 hrs	06-05-18 8:00	06-05-18 8:0	00	0%			• 06	-05		
411	9.4 Time Based Ma	intenance Part Replac	ement List (EE)		1.67 days	09-05-18 8:00	11-05-18 0:0	0	100%			•			
412	9.4.1 K1WP01M Chang	e DE Motor of Bearing Water P	ump		1 hr	09-05-18 8:00	09-05-18 9:0	00	100%			100%			
413	9.4.2 K1WP01M Chang	e NDE Motor of Bearing Water	Pump		1 hr	09-05-18 8:00	09-05-18 9:0	00	100%			100%			
414	9.4.3 K1F20M DE Moto	or Bearing of Seal Air Fan Coal N	ı 1ill		1 hr	09-05-18 8:00	09-05-18 9:0	00	100%			100%			
415	9.4.4 K1F20M NDE Mot	tor Bearing of Seal Air Fan Coal	Mill		1 hr	09-05-18 8:00	09-05-18 9:0	00	100%			100%			
416	9.4.5 Motor drive	/VVF			16 hrs	10-05-18 8:00	11-05-18 0:0	00	100%			100	%		
417	9 4 6 Motor drive	soft starter			16 hrs	10-05-18 8:00	11-05-18 0.0	00	100%			100	9/6 -		
418	9 4 7 Transformer				16 hrs	10-05-18 8:00	11-05-18 0.0	0	100%			100	% -		
419	9 4 8 Capacitor				16 hrs	10-05-18 8:00	11-05-18 0:0	0	100%			100	%		
420	9 4 9 Battery				16 hrs	10-05-18 8:00	11-05-18 0.0	0	100%			100	%		
421	10 Kiln Test Group (6	5)			8 days?	06-05-18 8:00	14-05-18 8.0		97%						
422	10.1 Civil (Refracto	ory & Castable)			6.71 days	06-05-18 8:00	13-05-18 1:0		0%						
423	10 1 1 TAD (@ Tw	o Way Chute)			0 hrs	08-05-18 8.00	08-05-18 8.0	0 98	0%				08-05		
424	10.1.2 TAD (@ Ne	ar Manhole area)			0 hrs	08-05-18 8:00	08-05-18 8.0	00 108	0%				08-05		
425	10.1.2 Hite (@ He	urner Door			0 hrs	08-05-18 18:00	08-05-18 18:0	0 118	0%				08-05		
426	10 1 4 Kiln Inlet Ri	iser Pine			0 hrs	08-05-18 6:00	08-05-18 6.0	0 127	0%				08-05		
427	10.1.5 Combustion	hochamber			0 hrs	06-05-18 8:00	06-05-18 8:0	0	0%			▲ 06	-05		
428	10.1.6 Kiln Hood (Under Modify Area)			0 hrs	13-05-18 1:00	13-05-18 1.0	0 44	0%			•		13-05	
120					0 1110	15 05 10 1100	10 00 10 10		0,0						1
		Task		Rolled Up Task		External Milestone	•	Start-or	ly	C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-c	nly	C					
		Split	kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadlin	е	۵					
Project:	03 MCI 1 Overall Kiln Shutdo	Milestone	•	Baseline Summary		Inactive Summary		Baselin	9						
Date: 19	-07-19 14:18	Receipe Milectore	•	Delled Up Receipe			Ť	Critical	Took						
			~		<u>^</u>										
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only		Critical	I ask Progress						
		Project Summary	~	Rolled Up Progress		 Manual Summary R 	Rollup								
		Group By Summary	••	External Tasks		Manual Summary									



SAFER-FASTER-BATTE

ID T	ask Name				Duration	Start	Finish	Pre Resource	%	23	3 Apr '18		07 N	4ay '18	
420							14 05 10 0 00	Names	Complete	23-04	28-04	03-05	08-05	13-05	18-05
429	10.2 Machine Out	standing List (ME)			8 days?	06-05-18 8:00	14-05-18 8:00	121 K T O	96%	-					-
430	10.2.1 WIEUI Ad	Just Kiln Outlet Seal			0 nrs	13-05-18 16:00	13-05-18 16:00	431 Kyaw Thu O	100%	-				▲ 13-05	
431	10.2.2 WIEUIMI	GIRIN Gear Oll Leakage	u a avadula a in ata	a black	U nrs	07-05-18 18:00	14 05 10 0:00	338 Kyaw Thu U	1000/	-		1000/	-07-05	Diaco	Mork
432	10.2.3 WIEUI KI	n Roller Tyer stop block Ha	ave cracking in sto	D DIOCK	6 days?	08-05-18 8:00	14-05-18 8:00	Piece Work	100%	-		100%			WORK
433	10.2.4 WIE01 KI	n Girth Gear Grinding Girth	i Gear		0 nrs	06-05-18 8:00	06-05-18 8:00	Piece Work	0%	_		● U6	<i>i</i> -05		
434	10.2.5 WIE01 KI	n Burner Change Kiin Burn	er		0 nrs	13-05-18 16:00	13-05-18 16:00	430 Kyaw Thu O	0%	-				• 13-05	-
435	10.2.6 WIEUI RO	iler 1 - 4 Oli Seal need to r	repair		0 nrs	13-05-18 16:00	13-05-18 16:00	440 Kyaw Thu O	0%	-		004	Naina		
436	10.2.7 WIEUI IN	et Seal Support Repair the	support		8 nrs	08-05-18 22:00	09-05-18 14:00	389 Naing Win	0%	-		0%		win	
437	10.2.8 WIQU3 Sta	andby Unit Install			0 nrs	09-05-18 14:00	09-05-18 14:00	436 Naing Win	0%	-		1000		~ 14/5	
438	10.2.9 W1Z01 PT	ster Adjust Gap/Iow down	wear of rotor/uppe	er lower plate	16 Nrs	09-05-18 14:00	10-05-18 14:00	437 Naing Win	100%	-		100			
439	10.2.10 WIE01 F	ixed grate Plate Check Cra	CK / Condition		16 Nrs	10-05-18 14:00	12.05-18.14:00	438 Naing Win	100%	-		10	J 70 🎽 Na		
440	10.2.11 WIEUI K	IIN MOULY KIIN SHELL& KIIN		<u>`</u>		13-05-18 16:00	13-05-18 10:00	434 Kyaw Thu O	0%					• 15-05	
441	10.3 Time Based	Maintenance Part Repla	icement List (ME)	0.17 days	06-05-18 8:00	06-05-18 12:00	Nie in a Milia	99%	-			ing Min		
442	10.3.1 W1Q06 L1	M Change V-belt of Root E	Blower & Realignm	ent	4 nrs	06-05-18 8:00	06-05-18 12:00	Naing Win	100%	_	4				
443	10.3.2 W1Q07 LT	M Change V-Deit of Root E	Blower & Realignin	ent	4 nrs	06-05-18 8:00	06-05-18 12:00	Naing Win	100%		4		ing win		
444	10.3.3 W1Q03 L1	M Change V-Delt of Root E	Slower & Realignin		4 nrs	06-05-18 8:00	06-05-18 12:00		100%	-	4				
445	10.3.4 WIJUO LII	M Change V-belt of Chain (2 Dealignment	iment	4 NFS	06-05-18 8:00	06-05-18 12:00	Kyaw Thu O	95%	_	-		aw Thu Op		
440	10.3.5 W1Z01 L1	M Change V-Deit of Prister	& Realignment		4 nrs	06-05-18 8:00	06-05-18 12:00	Kyaw Thu O	100%		4		aw Thu Op		
447	10.3.6 W1206 L1	M Change V-Deit of Prister	& Realignment			06-05-18 8:00	06-05-18 12:00	Kyaw Thu O	100%	-	4		aw mu Op		
448	10.4 Machine Out	standing List (EE)	and would		0.33 days	06-05-18 8:00	00-05-18 10:00		1000/	_	1	0006			
449		air blaster some air blaster			4 Nrs	06-05-18 8:00	06-05-18 12:00		100%		1				
450	10.4.2 WILUIT K	In HOOU Temp NOL WORK(I	Install new sensor	out can't use)	2 NFS	06-05-18 8:00	06-05-18 10:00		100%	-	1				
451	10.4.3 WILUIPI_	1/P Kiln inlet chamber pre	ssure (bottom) Sei		L Nr	06-05-18 8:00	06-05-18 9:00		100%		1	J070 I			
452	10.4.4 WILUIPI_	1/ I Kiin iniet champer pre	ssure (bottom) Se	nsor not UK	1 nr	06-05-18 8:00	06-05-18 9:00		100%	-	Τι	JU%			
453	10.4.5 WIE011/1	1 Kiin Tail chamber tempe	rature sensor		U nrs	06-05-18 8:00	06-05-18 8:00		U%	-	-		5-05		
454	10.4.6 WIEUI M2	Kiin inching limit switch	Lan't use (100 %)(nousing of inching also	1 nr	06-05-18 8:00	06-05-18 9:00		100%		4	00%			
455		EO Taple Haatar Nat work) hro	06 0F 19 9:00	06 0F 19 10:00		1000/	-	1	100%			
455	10.4.7 H01X05 H	al Feeder Need to calibrate	<u> </u>		2 1115 8 brs	06-05-18 8:00	06-05-18 16:00		100%	-	1				
450	10.4.6 W1201 C0	Al reeuel Neeu to Calibrate	= comont List (EE)	N		00-05-10 8.00	00-05-18 10.00		100%	-	T	JU 70			
457	10.5.1 W1F21-M Cha	nge DE Motor Bearing Cooling Ea)	0.07 uays	06 0E 19 9:00	06 05 19 0:00		100%	-	1	10%			
450	10.5.2 W1F21-M Cha	nge NDE Motor Bearing Cooling E	an		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%	-	1	10%			
460	10.5.2 W1F52M1 Cha	inge DE Motor Bearing Cooling Fa	an		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%	-	1	10%			
461	10.5.5 W1F52M1 Cha	inge NDF Motor Bearing Cooling I	Fan		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%		1	10%			
462	10.5.1 W1F32H1 Cha	inge DE Motor Bearing Cooling Fa	an		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%		1	0.0%			
463	10.5.6 W1F47M1 Cha	inge NDF Motor Bearing Cooling I	Fan		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%		1	00%			
105	10.010 111 1711 010				111	00 05 10 0.00	00 05 10 5.00		100 /0			JO 70			
		Task		Rolled Up Task		External Milestone	\diamond	Start-only		C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-on	v	г					
		0.111			<u>^</u>		<u>^</u>		,	_					
		Split		Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline		۵					
Project: 0	3_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary	\bigtriangledown	Baseline		000000	******	89698			
Date: 19-0	07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline		Manual Task		Critical Ta	ask						
		Summary	— — •	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical Ta	ask Progress						
		Project Summary	▽▽	Rolled Up Progress		Manual Summary F	Rollup								
		Group By Summary		External Tasks		Manual Summary	-								



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	23	8 Apr '18	07 N	1ay '18	
161	10 5 7 W/1650M1 Cha	ungo DE Motor Booring Cooling Er	20		1 hr	06 05 19 9.00	06 0F 19 0.00	Names	Loop	23-04	28-04 03-05	08-05	13-05	18-05
404	10.5.8 W1F50M1 Cha	inge DE Notor Bearing Cooling 1	Fan		1 III 1 br	06 05 19 9:00	06 05 18 9.00		100%	-	100%			
466	10.5.9 W1F51M1 Cha	inge DE Motor Bearing Cooling Fa	an		1 III 1 br	06-05-18 8:00	06-05-18 9:00		100%	-	100%			
467	10.5.10 W1F51M1 Ch	ange NDE Motor Bearing Cooling	ı Fan		1 hr	06-05-18 8:00	06-05-18 9:00		100%		100%			
468	10.5.11 W1F46M1 Ch	ange DE Motor Bearing Cooling F	Fan		1 hr	06-05-18 8:00	06-05-18 9:00		100%		100%			
469	10.5.12 W1F46M1 Ch	ange NDE Motor Bearing Cooling	ı Fan		1 hr	06-05-18 8:00	06-05-18 9:00		100%	-	100%			
470	10.5.13 W1F49M1 Ch	ange DE Motor Bearing Cooling F	Fan		1 hr	06-05-18 8:00	06-05-18 9:00		100%		100%			
471	10.5.14 W1F49M1 Ch	ange NDE Motor Bearing Cooling	Fan		1 hr	06-05-18 8:00	06-05-18 9:00		100%		100%			
472	10 5 15 Motor dri	ve VVVF	·		16 hrs	06-05-18 8:00	07-05-18 0:00		100%		100%			
473	10.5.16 Motor dri	ve soft starter			8 hrs	06-05-18 8:00	06-05-18 16:00		100%		100%			
474	10.5.17 Transform	ner			8 hrs	06-05-18 8:00	06-05-18 16:00		100%		100%			
475	10.5.18 Capacitor	•			16 hrs	06-05-18 8:00	07-05-18 0:00		100%		100%			
476	10.5.19 Battery				8 hrs	06-05-18 8:00	06-05-18 16:00		100%		100%			
477	11 Clinker Cooler &	Upper Clinker Silo Test	Group (7)		8.38 days	06-05-18 8:00	14-05-18 17:00		75%		-	┿╾╾╾┿		
478	11.1 Civil (Refrac	tory & Castable)			0 days	12-05-18 1:00	12-05-18 1:00		0%			•	12-05	
479	11.1.1 Kiln Cooler	r (@ Crusher Area)			0 hrs	12-05-18 1:00	12-05-18 1:00	35	0%			*	12-05	
480	11.2 Machine Out	standing List (ME)			8.38 days	06-05-18 8:00	14-05-18 17:00		72%			++		
481	11.2.1 W1HS01 C	Cooler Hydraulic Repair the	support		2 days	06-05-18 8:00	08-05-18 8:00	Piece Work	: 0%		0%	Piece Wor	'k	
482	11.2.2 W1J02-06	Chain Conveyor Change th	ne liner and chain		90 hrs	08-05-18 17:00	14-05-18 17:00	Aung Htay	№95%		95%	ő	Aung	Htay Mor
483	11.2.3 W1J03 Dra	ag Chain Oil Seal Change			0 hrs	06-05-18 8:00	06-05-18 8:00	Aung Htay	№0%		•	J6-05		
484	11.2.4 W1C01 Cli	nker crusher Check Gearbo	ox No 4		3 hrs	14-05-18 9:00	14-05-18 12:00	Kyaw Thu	0 30%			309	6 Kyaw	Thu Oo
485	11.2.5 Cooling Fa	n Repair Oil leak			8 hrs	06-05-18 8:00	06-05-18 16:00	Aung Htay	▶100%		100% 🖕	ung Htay Mr	on	
486	11.2.6 W1G80 Cli	nker Chute Modify clinker	chute		0 hrs	06-05-18 8:00	06-05-18 8:00	Aung Htay	№0%		• (J6-05		
487	11.2.7 W1J01 Par	n Conveyor Change Air Pip	е		0 hrs	06-05-18 8:00	06-05-18 8:00	Kyaw Thu	0 100%		• (16-05		
488	11.2.8 W1J01 Par	n Conveyor PM Tail bearing	g Change ,Check P	an Wheel	0 hrs	06-05-18 8:00	06-05-18 8:00		100%		• (16-05		
489	11.2.9 Hydraulic	cylinder change grate cool	er 1 & 2		24 hrs	06-05-18 8:00	07-05-18 8:00		100%		100% 📥			
490	11.2.10 Kiln inlet	chute change with civil tea	am		24 hrs	06-05-18 8:00	07-05-18 8:00		100%		100% 📥			
491	11.3 Machine Out	standing List (EE)			0.67 days	06-05-18 8:00	07-05-18 0:00		99%					
492	11.3.1 HV01 EP c	ooler cabinet Local run an	d CCR cannot start	so EP cooler can't group s	0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•)6-05		
493	11.3.2 HV02 EP c	ooler cabinet Local run an	d CCR cannot start	so EP cooler can't group s	0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•	/6-05		
494	11.3.3 HV07 EP c	ooler cabinet Local run an	d CCR cannot start	so EP cooler can't group s	0 hrs	06-05-18 8:00	06-05-18 8:00		0%		• (/6-05		
495	11.3.4 W1K01T4/	T4 Cooler Temp Sensor no	ot OK		0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•	6-05		
496	11.3.5 W1K01T3/	T3 Cooler Temp Sensor no	ot OK		0 hrs	06-05-18 8:00	06-05-18 8:00		0%		• (6-05		
497	11.3.6 W1K01T2/	T2 Cooler Temp Sensor no	ot OK		0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•	6-05		
498	11.3.7 W1K01T1/	T1 Cooler Temp Sensor no	ot OK		0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•	6-05		
499	11.3.8 W1J03 Cha	ain conveyor of EP Now ov	veride speed switch	sensor	1 hr	06-05-18 8:00	06-05-18 9:00		100%		100%			
		Task		Rolled Up Task		External Milestone	•	Start-on	ly	C				
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-o	nly	כ				
		Split	II	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline	e	۵				
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary		Baseline	9	80808				
Date. 18	-vi-13 14.10	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task		Critical	Fask					
		Summary	~	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical	Fask Progress	_				
		Project Summary		Rolled Up Progress		 Manual Summary R 	Rollup							
		Group By Summary	~	External Tasks		Manual Summary	-							



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	2	3 Apr '18	07	May '18	3
								Names	Complete	23-04	28-04 03-0	5 08-05	13-05	5 18-05
500	11.3.9 U1P01 Bag	j filter of clinker silo Conta	ctor not good		16 hrs	06-05-18 8:00	07-05-18 0:00		100%		100%			
501	11.3.10 W1HS01/	A Grate hydraulic pump ci	rculation pump Ov	eride in CCR	2 hrs	06-05-18 8:00	06-05-18 10:00		100%		100%			
502	11.3.11 W1G14 D	icharge hopper Motor not	have		3 hrs	06-05-18 8:00	06-05-18 11:00		100%		100%			
503	11.3.12 W1HS06	HMI System for Hydraulic	Pump Can not use	2	0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•	06-05		
504	11.3.13 W1G19 S	lide Gate Not have gear (I	1otor EE Kiln)		0 hrs	06-05-18 8:00	06-05-18 8:00		0%		•	06-05		
505	12 EU & WHG Test G	Group (8)			8 days?	06-05-18 8:00	14-05-18 8:00		88%		•		-	
506	12.1 Machine Out	standing List (ME)			7.58 days?	06-05-18 8:00	13-05-18 22:00		91%		•			
507	12.1.1 Cooling	Tower			2.58 days	06-05-18 8:00	08-05-18 22:00		100%		•			
508	12.1.1.1 VT1K0)1.01			0 hrs	06-05-18 8:00	06-05-18 8:00		100%		•	06-05		
509	12.1.1.2 Gearb	ox Maintenance (Oil Chan	ge)		14 hrs	08-05-18 8:00	08-05-18 22:00	Saw Than	Se100%		100	% 🗧 Saw T	han Sein	
510	12.1.1.3 Retigh	ten blade of Cooling fan			7 hrs	07-05-18 8:00	07-05-18 15:00	Arkar Heir	n 100%		100%	🔒 Arkar Hei	n	
511	12.1.1.4 Inspec	ction of Nozzle			7 hrs	07-05-18 8:00	07-05-18 15:00	Arkar Heir	n 100%		100%	Arkar Hei	n	
512	12.1.1.5 Inspec	ction diffuser			7 hrs	07-05-18 8:00	07-05-18 15:00	Arkar Heir	n 100%		100%	🔒 Arkar Hei	n	
513	12.1.1.6 VT1K0)1.02			0 hrs	06-05-18 8:00	06-05-18 8:00		100%		•	06-05		
514	12.1.1.7 Gearb	ox Maintenance (Oil Chan	ge)		14 hrs	08-05-18 8:00	08-05-18 22:00	Saw Than	Se100%		100	% 🗧 Saw T	han Sein	
515	12.1.1.8 Retigh	ten blade of Cooling fan			7 hrs	07-05-18 8:00	07-05-18 15:00	Arkar Heir	n 100%		100%	🔒 Arkar Hei	n	
516	12.1.1.9 Inspec	ction of Nozzle			7 hrs	07-05-18 8:00	07-05-18 15:00	Arkar Heir	n 100%		100%	🔒 Arkar Hei	n	
517	12.1.1.10 Inspe	ection diffuser			7 hrs	07-05-18 8:00	07-05-18 15:00	Arkar Heir	n 100%		100%	🔒 Arkar Hei	n	
518	12.1.2 Raw Wa	ter Tank			1.29 days	06-05-18 8:00	07-05-18 15:00		100%		•			
519	12.1.2.1 VW1C	01			0 hrs	06-05-18 8:00	06-05-18 8:00		100%		•	06-05		
520	12.1.2.2 Chan	ge inlet valve			6 hrs	06-05-18 15:00	06-05-18 21:00	Khum Kya	w 100%		100%	Khum Kyav	v Ye Htut	
521	12.1.2.3 install	new valve for cleaning RC)		7 hrs	07-05-18 8:00	07-05-18 15:00	Khum Kya	w 100%		100%	Khum Ky	aw Ye Htu	t
522	12.1.3 Circulati	on pump			5.42 days	06-05-18 8:00	11-05-18 18:00	Saw Tha	n \$100%		•			
523	12.1.3.1 VT1P0)1.01			0 hrs	06-05-18 8:00	06-05-18 8:00		100%		•	06-05		
524	12.1.3.2 Disass	embly pump			4 hrs	07-05-18 18:00	07-05-18 22:00		100%		1009	6		
525	12.1.3.3 PM				0.58 days	08-05-18 8:00	08-05-18 22:00		100%		100	% 🗧		
526	12.1.3.4 coatin	g			0.58 days	08-05-18 8:00	08-05-18 22:00		100%		100	% 🗧		
527	12.1.3.5 reasse	ebly pump			0.42 days	11-05-18 8:00	11-05-18 18:00		100%			100% 🖕		
528	12.1.3.6 VT1P0)1.02			0 hrs	06-05-18 8:00	06-05-18 8:00		100%		•	06-05		
529	12.1.3.7 Disass	embly pump			0.17 days	07-05-18 18:00	07-05-18 22:00		100%		1009	6		
530	12.1.3.8 PM				0.58 days	08-05-18 8:00	08-05-18 22:00		100%		100	% 🗧		
531	12.1.3.9 coatin	g			0.58 days	08-05-18 8:00	08-05-18 22:00		100%		100	% 🗧		
532	12.1.3.10 rease	sebly pump			0.42 days	11-05-18 8:00	11-05-18 18:00		100%			100% 🔒		
533	12.1.4 Cooling	Tower			2.58 days?	06-05-18 8:00	08-05-18 21:55	Khum Ky	a v100%		•			
534	12.1.4.1 VT1K0	1.01 overflow pipe uphigh	1		0.58 days	08-05-18 8:00	08-05-18 21:55		100%		100	% 🗧		
535	12.1.4.2 VT1K0	1.02 overflow pipe uphigh	1		1 day?	06-05-18 8:00	07-05-18 8:00		100%		100%	•		
		Task		Rolled Up Task		External Milestone	۲	Start-o	nly	C				
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-	only	ב				
		Split	kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadlir	ie	۵				
Project:	03_MCL1_Overall Kiln Shutdo -07-19 14:18	Milestone	•	Baseline Summary	•	Inactive Summary		Baselin	e	000000				
5410.10		Baseline Milestone	♦	Rolled Up Baseline		Manual Task		Critical	Task					
		Summary	· · · · · · · · · · · · · · · · · · ·	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical	Task Progress	_				
		Project Summary		Kolled Up Progress		Manual Summary R	koliup							
		Group by Summary	·			Ivianual Summary								



ID	Task Name				Duration	Start	Finish	Pre Resource %	23	3 Apr '18	07	May '18	
								Names Complete	23-04	28-04 03-05	08-05	13-05	18-05
536	12.1.5 Turbine				4.58 days	06-05-18 8:00	10-05-18 22:00	Minn Ko+S100%		-	05.05		
53/	12.1.5.1 VM110)] 			0 hrs	06-05-18 8:00	06-05-18 8:00	100%		100	06-05		
538	12.1.5.2 UISasse	embly bearing #4			2.58 days	08-05-18 8:00	10-05-18 22:00	100%		100	/0		
539	12.1.5.3 COVER a				2.58 days	08-05-18 8:00	10-05-18 22:00	100%		100	0		
540	12.1.5.4 LOP CIE				2.58 days	08-05-18 8:00	10-05-18 22:00	100%		100			
541	12.1.5.5 Side di	earance check			2.58 days	08-05-18 8:00	10-05-18 22:00	100%		100	0 //		
542	12.1.5.0 Ddll Se	t area chack			2.50 uays	00-05-10 0:00	10.05.10.22:00	100%		100	0 //		
545	12.1.5.7 COIILdC				2.50 udys	00-05-10 0:00	10.05.10.22:00	100%		100	//		
545	12.1.5.0 Dabbit	embly bearing #2			2.30 udys	10-05-18 22:00	10-05-18 22:00	100%		100	1(1-05	
546	12.1.5.9 disasso	r and can fit check			0 hrs	10-05-18 22:00	10-05-18 22:00	100%			▲ 10	-05	
547	12.1.5.10 Cover	learance check			0 hrs	10-05-18 22:00	10-05-18 22:00	100%			▲ 10	-05	
548	12.1.5.11 top c	clearance check			0 hrs	10-05-18 22:00	10-05-18 22:00	100%	·		▲ 10	-05	
549	12.1.5.12 side (eat check			0 hrs	10-05-18 22:00	10-05-18 22:00	100%			▲ 10	-05	
550	12.1.5.15 boll 3	act area check			0 hrs	10-05-18 22:00	10-05-18 22:00	100%			▲ 10	-05	
551	12.1.5.11 conta	it check			0 hrs	10-05-18 22:00	10-05-18 22:00	100%	·		▲ 10	-05	
552	12.1.5.15 babb	rnor valve lock nin ren:	air		0 hrs	10-05-18 22:00	10-05-18 22:00	100%			▲ 10	-05	
553	12.1.6 Condense	er			6.29 days	06-05-18 8:00	12-05-18 15:00	70%					
554	12.1.6.1 VM1K0)1			0 days	06-05-18 8:00	06-05-18 8:00	0%			06-05		
555	12.1.6.2 install	scaffolding			0.29 days	06-05-18 15:00	06-05-18 22:00	Aung Naing 100%		100%	Aung Naing	Oo	
556	12.1.6.3 disasse	embly condenser			0.58 days	07-05-18 8:00	07-05-18 22:00	Min Hlaing M100%		100%	Min Hlaing	Mon+Khur	n Kyaw Y
557	12.1.6.4 cleanir	na inside			0.58 davs	07-05-18 8:00	07-05-18 22:00	Min Hlaing M100%		100%	Min Hlaing	Mon+Khur	n Kyaw Y
558	12.1.6.5 coating	a			0.58 davs	07-05-18 8:00	07-05-18 22:00	Min Hlaing N30%		30%	Min Hlaing	Mon+Khur	n Kyaw Y
559	12.1.6.6 remov	e scaffolding			0.29 days	12-05-18 8:00	12-05-18 15:00	Aung Naing 0%			0%	Aung Naing	Oo
560	12.1.7 Oil Coole	er s			0.58 days	07-05-18 8:00	07-05-18 22:00	100%					
561	12.1.7.1 VM1C0	01 cleaning cooler			0.58 days	07-05-18 8:00	07-05-18 22:00	Saw Than Se100%		100%	Saw Than	Sein	
562	12.1.7.2 VM1C0	02 cleaning cooler			0.58 days	07-05-18 8:00	07-05-18 22:00	Saw Than Se100%		100%	Saw Than	Sein	
563	12.1.8 PH Boiler	r			0.58 days	09-05-18 8:00	09-05-18 22:00	Saw Than \$100%					
564	12.1.8.1 Stea	m durm balance con	tainer pipe (steam	leakage)	0.58 days	09-05-18 8:00	09-05-18 22:00	100%					
565	12.1.8.1.1 re	pair leakage			0 days	09-05-18 8:00	09-05-18 8:00	100%			09-05		
566	12.1.8.2 Emer	rgency valve dischai	rge water HP drum	(valve passing)	0.58 days	09-05-18 8:00	09-05-18 22:00	100%					
567	12.1.8.2.1 re	pair leakage			0 days	09-05-18 8:00	09-05-18 8:00	100%			• 09-05		
568	12.1.8.3 Emer	rgency mamnual dis	charge water valve	HP drum (valve	0.58 days	09-05-18 8:00	09-05-18 22:00	100%					
	passing)												
569	12.1.8.3.1 re	epair leakage			0 days	09-05-18 8:00	09-05-18 8:00	100%			♦ 09-05		
570	12.1.9 AQC Boile	er			7.58 days?	06-05-18 8:00	13-05-18 22:00	89%			<u></u>		
		Task		Rolled Up Task		External Milestone	•	Start-only	C				
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-only	C				
		Solit		Rolled I In Milestone	~	Inactive Milestone		Deadline	•				
		Opint Milastana	•	Roned op Milestone	`		~	Deadline					
Project:	03_MCL1_Overall Kiln Shutdo	IVIIIESTONE	•	Baseline Summary	•	 Inactive Summary 		Baseline	(0101010)	2022/01/10/10/10/2010/01/			
	J-01-13 14.10	Baseline Milestone	\diamond	Rolled Up Baseline		Manual Task	Ē	Critical Task					
		Summary	₹₹	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical Task Progress	_				
		Project Summary	▼▼	Rolled Up Progress		Manual Summary R	Rollup						
		Group By Summary	••	External Tasks		Manual Summary							



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	23	8 Apr '18	07	May '18	
								Names	Complete	23-04	28-04 03-0	5 08-05	13-05	18-05
571	12.1.9.1 Chair	n Conveyor			4.58 days	07-05-18 8:00	11-05-18 22:00	Min Pan H	l 86%					
572	12.1.9.1.1 VA	A1N01			110 hrs	07-05-18 8:00	11-05-18 22:00		86%		86%			
573	12.1.9.1.2 dis	sassembly chain			4.58 days	07-05-18 8:00	11-05-18 22:00		86%		86%			
574	12.1.9.1.3 re	place liner			4.58 days	07-05-18 8:00	11-05-18 22:00		86%		86%			
575	12.1.9.1.4 re	pair chain			4.58 days	07-05-18 8:00	11-05-18 22:00		86%		86%			
576	12.1.9.1.5 m	odify tail sprocket			4.58 days	07-05-18 8:00	11-05-18 22:00		86%		86%			
577	12.1.9.1.6 re	assembly chain and line	r		4.58 days	07-05-18 8:00	11-05-18 22:00		86%		86%			
578	12.1.9.2 Setti	ng Chamber			5.38 days	08-05-18 8:00	13-05-18 17:00		100%					
579	12.1.9.2.1 sc	affolding			14 hrs	08-05-18 8:00	08-05-18 22:00	Aung Naing	100%		100	% 🗧 Aung I	Vaing Oo	
580	12.1.9.2.2 cle	eaning			0.58 days	09-05-18 8:00	09-05-18 22:00	Min Hlaing	C100%		10	00% 🖕 Min	Hlaing Oo	
581	12.1.9.2.3 fa	brication			2.58 days	10-05-18 8:00	12-05-18 22:00	Min Pan Hla	ni 100%			100%	Min Pan H	laing
582	12.1.9.2.4 re	move scaffolding			0.58 days	13-05-18 8:00	13-05-18 22:00	Aung Naing	100%			100%	o 🗧 Aung N	aing Oo
583	12.1.9.3 Safe	ty valve LP drum(Ste	am Leakage)		4.58 days?	06-05-18 8:00	10-05-18 22:00	Saw Than	100%					
584	12.1.9.3.1 la	pping safety valve			0.58 days	10-05-18 8:00	10-05-18 22:00		100%			100% 🗧		
585	12.1.9.3.2	BFW pump line outlet	to HP drum (wa	ter leakage)	4.58 days	06-05-18 8:00	10-05-18 22:00	Saw Than	100%					
586	12.1.9.3.2	.1 VA1P01			0 days	06-05-18 8:00	06-05-18 8:00		100%		•	06-05		
587	12.1.9.3.2	.2 repair leakage			0.58 days	10-05-18 8:00	10-05-18 22:00		100%			100% 🗕		
588	12.1.9.3.3	HP main steam pipe li	ne (steam leakag	je)	0.58 days	10-05-18 8:00	10-05-18 22:00	Saw Than	100%					
589	12.1.9.3.3	.1 repair leakage	•		0.58 days	10-05-18 8:00	10-05-18 22:00		100%			100% 🗧		
590	12.1.9.3.4	HP superheater manu	al vent valve (ste	am leakage)	0.58 days	10-05-18 8:00	10-05-18 22:00	Saw Than	100%					
591	12.1.9.3.4	1 repair leakage	•		0.58 days	10-05-18 8:00	10-05-18 22:00		100%			100% 🗧		
592	12.1.9.3.5	HP superheater outle	t valve (steam le	akage)	4.58 days?	06-05-18 8:00	10-05-18 22:00	Saw Than	100%					
593	12.1.9.3.5	.1 VA1DZ01	•		1 day?	06-05-18 8:00	07-05-18 8:00		100%		100%			
594	12.1.9.3.5	.2 repair leakage			0.58 days?	10-05-18 8:00	10-05-18 22:00		100%			100% 🗧		
595	12.1.10 Primary	Air Fan (remark : Wa	ait EE Team Motor	·)	3.58 days	06-05-18 8:00	09-05-18 22:00	Wai Yan N	90%					
596	12.1.10.1 12FN	01			0 hrs	06-05-18 8:00	06-05-18 8:00		.0%			06-05		
597	12.1.10.2 disas	sembly casing and expa	insion ioint		2.58 davs	07-05-18 8:00	09-05-18 22:00		100%		100%			
598	12.1.10.3 disas	sembly fan from shaft	,		2.58 davs	07-05-18 8:00	09-05-18 22:00		100%		100%			
599	12.1.10.4 disas	sembly shaft from bearing	na housina		2.58 days	07-05-18 8:00	09-05-18 22:00		100%		100%			
600	12.1.10.5 chanc	ae bearing	. <u></u>		2.58 days	07-05-18 8:00	09-05-18 22:00		100%		100%			
601	12.1.10.6 reas	sembly and check alignment	nent		2.58 days	07-05-18 8:00	09-05-18 22:00		50%		50%			
602	12.1.11 Seconda	arv Air Fan (remark :)	Wait EE Team Mo	tor)	1 day?	06-05-18 8:00	07-05-18 8:00	Wai Yan N	90%					
603	12.1.11.1 12FN	02			0 davs	06-05-18 8:00	06-05-18 8:00		0%			06-05		
604	12.1.11.2 disase	sembly casing and expa	insion ioint		0 davs	06-05-18 8:00	06-05-18 8:00		100%			06-05		
605	12.1.11.3 disase	sembly fan from shaft			1 day?	06-05-18 8:00	07-05-18 8:00		100%		100%			
606	12.1.11.4 disas	sembly shaft from bearing	na housina		1 day?	06-05-18 8:00	07-05-18 8:00		100%		100%	I		
		Task		Rolled Up Task		External Milestone	•	Start-onl	/	E				<u> </u>
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-or	lv	2				
		Split		Rolled Up Milestone	\diamond	Inactive Milestone	\$	Deadline	,	_				
Project:	03 MCI 1 Overall Kiln Shutdo	Milestone	•	Baseline Summary		Inactive Summary		Baseline						
Date: 19	9-07-19 14:18	Baseline Milestone	♦	Rolled Up Baseline		Manual Task		Critical T	ask					
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only		Critical T	ask Progress					
		Project Summany	· · ·	Rolled I in Progress	×	Manual Summary E	Rollun	Ontiodi I	ack i rogiood					
		Group By Summary		External lasks		ivianuai Summary		_						



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	2	3 Apr '18		07 1	1ay '18	
								Names	Complete	23-04	28-04	03-05	08-05	13-05	18-05
607	12.1.11.5 chan	nge bearing			1 day?	06-05-18 8:00	07-05-18 8:00		100%		1	00% 📥			
608	12.1.11.6 reas	ssembly and check alignme	ent		1 day?	06-05-18 8:00	07-05-18 8:00		60%			60% 📥			
609	12.1.12 ID Fan				0 days	10-05-18 8:00	10-05-18 8:00	Wai Yan	N)0%				12-0)5	
610	12.1.12.1 12FN	N05			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
611	12.1.12.2 insta	all blind flange			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
612	12.1.12.3 remo	ove coupling and motor			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
613	12.1.12.4 disas	ssembly casing and expar	nsion joint		0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
614	12.1.12.5 disas	ssembly fan from shaft			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
615	12.1.12.6 disas	ssembly shaft from bearing	g housing		0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
616	12.1.12.7 chan	nge bearing			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
617	12.1.12.8 rease	sembly and check alignme	ent		0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
618	12.1.13 ID Fan				0 days	10-05-18 8:00	10-05-18 8:00	Khum Ky	a \0%				♦ 12-€	5	
619	12.1.13.1 12F	N05			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
620	12.1.13.2 disas	ssembly damper			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
621	12.1.13.3 fabri	ication of damper			0 days	12-05-18 22:00	12-05-18 22:00		0%				•	12-05	
622	12.1.13.4 rease	sembly damper			0 days	12-05-18 22:00	12-05-18 22:00		0%	-			•	12-05	
623	12.1.14 Ash Tra	ansporter			0 days	08-05-18 8:00	08-05-18 8:00	Arkar Hei	n 0%				08-05		
624	12.1.14.1 12FA	A01 PM of ash transporter	•		0 days	08-05-18 22:00	08-05-18 22:00		0%				08-05		
625	12.1.14.2 12FA	A02 PM of ash transporter	•		0 days	08-05-18 22:00	08-05-18 22:00		0%	-			08-05		
626	12.1.14.3 12FA	A03 PM of ash transporter	•		0 days	08-05-18 22:00	08-05-18 22:00		0%	1			08-05		
627	12.1.14.4 12FA	A04 PM of ash transporter	•		0 days	08-05-18 22:00	08-05-18 22:00		0%				08-05		
628	12.1.14.5 12FA	A05 PM of ash transporter	•		0 days	08-05-18 22:00	08-05-18 22:00		0%	-			08-05		
629	12.1.14.6 12FA	A06 PM of ash transporter	•		0 days	08-05-18 22:00	08-05-18 22:00		0%	1			08-05		
630	12.1.15 Bicolor	of steam drum			0.29 days?	10-05-18 8:00	10-05-18 15:00	Khum Ky	av 100%						
631	12.1.15.1 chan	nge bicolor part			0.29 days?	10-05-18 8:00	10-05-18 15:00		100%	1		10	0% 🔒		
632	12.1.16 Slag Co	oler			0 days	06-05-18 8:00	06-05-18 8:00	Khine Mir	nr 100%	1		• (09-05		
633	12.1.16.1 12SE	D02 make man hole			1.54 days	09-05-18 19:00	11-05-18 8:00		100%			100)% 👝		
634	12.1.17 Turbine	e			0.58 days	09-05-18 8:00	09-05-18 22:00	Thet Pain	g 100%	1					
635	12.1.17.1 11TC	G01 clean oil filter			0.58 days	09-05-18 8:00	09-05-18 22:00		100%	1		1009	% 🗧		
636	12.1.18 Turbine	e			0.58 days	09-05-18 8:00	09-05-18 22:00	Thet Pain	g 100%						
637	12.1.18.1 11T	G01 cleaning cooling wate	er filter		0.58 days	09-05-18 8:00	09-05-18 22:00		100%	1		1009	% 🗕		
638	12.1.19 Boiler F	Feed Water			0.58 days	09-05-18 8:00	09-05-18 22:00	Thet Pain	q 100%	1					
639	12.1.19.1 11W	P03 clean oil filter			0.58 days	09-05-18 8:00	09-05-18 22:00		100%			1009	% 🗧		
640	12.1.20 Main B	ag Filter			1.58 days	09-05-18 8:00	10-05-18 22:00	Hnin Mg	M(0%)	1					
641	12.1.20.1 12BF	F01 inspection of bag filter	•		1.58 days	09-05-18 8:00	10-05-18 22:00		0%			00	%		
642	12.1.21 Coal Fe	eeder			0.58 days	06-05-18 8:00	06-05-18 22:00		100%			. 🚽			
		Task		Rolled Up Task		External Milestone	•	Start-on	ly	C			······		<u>.</u>
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-c	nly	C					
		Split	l	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadlin	е	۵					
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary		Baseline	e						
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	🖽 Manual Task	Ľ	Critical	Task						
		Summary	•	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical	Task Progress	_		-			
		Project Summary	▼⊽	Rolled Up Progress		Manual Summary R	Rollup								
		Group By Summary	••	External Tasks		Manual Summary	-								



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	Pre Resource	%	2	3 Apr '18	07	May '18	
								Names	Complete	23-04	28-04 03-05	08-05	13-05	18-05
643	12.1.21.1 12PC	01			0.58 days	06-05-18 8:00	06-05-18 22:00		100%		100% 🖕			
644	12.1.21.2 repair	r scraper chain			0.58 days	06-05-18 8:00	06-05-18 22:00		100%	_	100% 🗧			
645	12.1.21.3 replace	ce belt cleaner			0.58 days	06-05-18 8:00	06-05-18 22:00		100%	_	100% 🗧			
646	12.1.22 Coal Fee	eder			0.58 days	06-05-18 8:00	06-05-18 21:55	Hnin Mau	າ 100%	_		-		
647	12.1.22.1 12PC	202			0.58 days	07-05-18 8:05	07-05-18 22:00		100%	_	100%			
648	12.1.22.2 repair	r scraper chain			0.58 days	07-05-18 22:00	08-05-18 11:55		100%	_	100%	-		
649	12.1.22.3 replace	ce belt cleaner			0.58 days	07-05-18 22:00	08-05-18 11:55		100%	-	100%	-		
650	12.1.23 Pressur	e Reducing Valve			0.58 days	08-05-18 8:00	08-05-18 22:00	Khum Kya	\100%	-				
651	12.1.23.1 11VA	128 repair pressure redu	cing valve		0.58 days	08-05-18 8:00	08-05-18 22:00		100%	-	100%) <mark>=</mark>		
652	12.2 Machine Outs	standing List (EE)			8 days	06-05-18 8:00	14-05-18 8:00		75%	-			06-0	Ċ
653	12.2.1 Turbine 8	& Generator (EU)			7 days	06-05-18 8:00	13-05-18 8:00	Nyan Lin I	183%	-				
654	12.2.1.1 Check	insulation & construction	Earth		1 day	06-05-18 8:00	07-05-18 8:00		100%	-	100%			
655	12.2.1.2 Motor	Overhual Service (high s	speed)		1 day	06-05-18 8:00	07-05-18 8:00		0%	-	0%			
656	12.2.1.3 Motor	PM			1 day	06-05-18 8:00	07-05-18 8:00		100%	-	100%			
65/	12.2.1.4 Actuat	or vavle PM			1 day	06-05-18 8:00	07-05-18 8:00		100%	-	100%			
658	12.2.1.5 Instrur	ment PM & Calibration			1 day	06-05-18 8:00	07-05-18 8:00		100%	-	100%			
659	12.2.1.6 DCS PI	M 1			1 day	06-05-18 8:00	07-05-18 8:00	NI	100%	-	100%			
660	12.2.2 WHG TUP	Dine & Generator			/ days	06-05-18 8:00	13-05-18 8:00	Nyan Lin I		-	1000/			
661	12.2.2.1 DCS &	UPS System			3.5 days	06-05-18 8:00	09-05-18 20:00		100%	-	100%			
002	12.2.2.2 Prepar	ed VSD program			3.5 days	06-05-18 8:00	09-05-18 20:00	A.ma Thu	0%	-	0 %			
664	12.2.3 Boller	al Convice VCD for main	machina		/ days	06 0E 19 9:00		Aung Inu	100%	-		06-05		
00 4	12.2.3.1 Overnit	a Bearing Drimony Air For	Motor		0 days	06-05-16 6:00	06-05-16 6:00		100%	-	•	00-05		
666	12.2.3.2 Change	e Bearing Primary Air Far	1 MOLOF Fon Motor		0 days	06-05-18 8:00	06-05-18 8:00		100%	-		16-05 16-05		
667	12.2.3.3 Change	e Bearing Secondary All			0 days	06-05-16 6:00	06-05-16 6:00		100%	-		0-05 06-05		
669	12.2.3.4 Change	e bedring Coal Feeder Mi	JUI		0 days	06 05 19 9:00	06-05-16 6:00		100%	-		10-03 16-05		
660	12.2.3.5 CdIIDId	Northual Service (high (mood)		0 days	06 05 19 9:00	06-05-16 6:00		100%	-		10-03 16-05		
670	12.2.3.0 MOLOI	or vavla PM	peeu)		0 days	06 05 19 9:00	00-05-10 8.00		100%	-		16-05		
671	12.2.3.7 Actuat	nent DM & Calibration			0 days	06-05-18 8:00	06-05-18 8:00		100%	-		05-05 06-05		
672	12.2.3.0 Institut					06-05-18 8:00	13-05-18 8:00		100%	-				
673	12.2.4 WIIG Val	Tower three combination	n probe change		0 days	06-05-18 8.00	06-05-18 8:00	Ading Tha	100%	-		06-05		
674	12.2.1.1 COOM		n probe change			06-05-18 8:00	06-05-18 8:00	Zaw Myo	H100%	-		06-05		
675	12 2 5 1 Check	Function for ash transpo	rt & PM		0 days	06-05-18 8:00	06-05-18 8:00	Lawriyo	100%	-		06-05		
676	12.2.5.1 enteck	or vavle PM			0 days	06-05-18 8:00	06-05-18 8:00		100%	-		06-05		
677	12.2.5.3 Check	Main Bag Filter cabinet P	M & Solenoid		0 days	06-05-18 8:00	06-05-18 8:00		100%	-		06-05		
678	12.2.5.4 Check	Pneumatic valve and fun	ction		0 days	06-05-18 8:00	06-05-18 8:00		100%			06-05		
		Task		Rolled Up Task		External Milestone	•	Start-onl	/	E			1	<u>.</u>
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-or	lly	כ				
		Split	LI	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline		۵				
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary		Inactive Summary	\bigtriangledown	Baseline			*********			
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	C	Critical T	ask					
		Summary	••	Rolled Up Baseline Milestone	• أ	Duration-only		Critical T	ask Progress	_				
		Project Summary	♥────♥	Rolled Up Progress		Manual Summary R	Rollup							
		Group By Summary		External Tasks		Manual Summary								



03_MCL1_Overall Kiln Shutdown Plan for May 2018_ 06_05_2018_A02

06-05-18 6:00 to 16-05-18 17:49

ID	Task Name	Duration	Start	Finish Pr	re Resource %	23 Apr '18 0	7 May '18	.
					Names Complete	23-04 28-04 03-05 08-0	5 13-05	18-05
679	12.2.6 EU Boiler	0 days	06-05-18 8:00	06-05-18 8:00	Zaw Myo H100%	♦ 06-05		
680	12.2.6.1 Repair & Change Boiler Furnace temperature	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
681	12.2.7 EU Water System	7 days	06-05-18 8:00	13-05-18 8:00	Zaw Myo H97%		-	
682	12.2.7.1 Water Treatment Repair Auto System and Cabinet PM	1 day	06-05-18 8:00	07-05-18 8:00	80%	80% 💼		
683	12.2.7.2 Motor PM	3 days	06-05-18 8:00	09-05-18 8:00	100%	100%		
684	12.2.7.3 Instrument PM & Calibration	3 days	06-05-18 8:00	09-05-18 8:00	100%	100%		
685	12.2.8 WHG water system	7 days	06-05-18 8:00	13-05-18 8:00	Zaw Myo H100%	•••••••	-	
686	12.2.8.1 Water Treatment PM and change level Switch	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
687	12.2.8.2 Turbine and Generator house check earth system	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
688	12.2.9 EU Substation and Local PM	8 days	06-05-18 8:00	14-05-18 8:00	Aung Kyaw 100%			
689	12.2.9.1 Transformer & Check Bus Bar	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
690	12.2.9.2 Cooling Tower motor PM	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
691	12.2.9.3 DG Government Electrical Inspection	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
692	12.2.9.4 Water substation	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
693	12.2.9.5 Coal Substation	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
694	12.2.9.6 Main Substation	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
695	12.2.9.7 Auxiliary Substation	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
696	12.2.9.8 FGD & DG Substation	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
697	12.2.9.9 Limestone injection PM	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
698	12.2.9.10 Cooling Tower PM	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
699	12.2.9.11 FGD & Coal Transportation PM	0 days	06-05-18 8:00	06-05-18 8:00	100%	♦ 06-05		
700	12.2.10 WHG Turbine	2 days	06-05-18 8:00	08-05-18 8:00	Aung Kyaw60%			
701	12.2.10.1 Change Carbone Brush	8 hrs	06-05-18 8:00	06-05-18 16:00	100%	100% 🛓		
702	12.2.10.2 Check Turbine Shield bearing temperature	8 hrs	06-05-18 8:00	06-05-18 16:00	0%	0% 🛛		
703	12.2.10.3 Vibration Control panel fan installation	8 hrs	06-05-18 8:00	06-05-18 16:00	100%	100% 🛯		
704	12.2.10.4 Actuator valve calibration and Change motor VB1V02	16 hrs	06-05-18 8:00	07-05-18 0:00	50%	50%		





Update : 14-Sep-2016

SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish		21 Ma	ay '18		04 Jun	'18		18 Jun '1	18
								18-05	23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
0	03_MCL1_Overall Kiln	Shutdown Plan for Ma	<mark>ay 2018_ 06_05</mark> _	2018_A02	10.49 day	06-05-18 6:00	16-05-18 17:49									
1	1 Stop Kiln to Feed				9.42 days	06-05-18 6:00	15-05-18 16:00									
2	1.1 Stop Kiln				24 hrs	06-05-18 6:00	07-05-18 6:00									
3	1.2 Feed				24 hrs	14-05-18 16:00	15-05-18 16:00									
4	2 Stop Kiln				10.49 days	06-05-18 6:00	16-05-18 17:49									
5	2.1 Cool Down				24 hrs	06-05-18 6:00	07-05-18 6:00									
6	2.2 Prepare before	e Kiln Stop			0.58 days	06-05-18 8:00	06-05-18 21:55				-					
7	2.2.1 Clear cylon	e system			2.5 hrs	06-05-18 8:00	06-05-18 10:30									
8	2.2.2 Open kiln o	loor			1 hr	07-05-18 11:20	07-05-18 12:20									
9	2.2.3 Install sma	ll brigde			0.5 hrs	07-05-18 12:20	07-05-18 12:50									
10	2.2.4 Insert flang	g down pipe floor 2 and 4	ł (confirm)		4 hrs	06-05-18 8:00	06-05-18 12:00									
11	2.2.5 Check cond	lition inside kiln			2 hrs	08-05-18 9:00	08-05-18 11:00				-					
12	2.3 Assembly Kiln	Burner (After Refracto	ory and Castable	finised)	4.33 days	06-05-18 8:00	10-05-18 15:55									
13	2.3.1 remove blin	d flange at cyclone			4 hrs	06-05-18 8:00	06-05-18 12:00									
14	2.3.2 take out bri	dge			2 hrs	14-05-18 8:00	14-05-18 10:00									
15	2.3.3 close kiln bu	urner door			4 hrs	14-05-18 14:00	14-05-18 18:00									
16	2.4 Heat up				22 hrs	15-05-18 19:49	16-05-18 17:49									
17	3 Test Run Group				2.92 days	12-05-18 0:00	14-05-18 22:00 ⁵									
18	3.1 Limestone Cru	shing Test Group (1)			0 hrs	14-05-18 22:00	14-05-18 22:005				-					
19	3.2 Mix-Mat & Ray	v Material Test Group	(2)		0 hrs	12-05-18 0:00	12-05-18 0:00									
20	3.3 Raw Mill Feed	Hopper & Raw Mill Te	st Group (3)		0 hrs	14-05-18 16:00	14-05-18 16:00									
21	3.4 Homosilo & Ki	n Feeding Test Group	(4)		0 hrs	12-05-18 22:00	12-05-18 22:00									
22	3.5 Coal Storage 8	Coal Mill Test Group	(5)		0 hrs	12-05-18 22:00	12-05-18 22:00									
23	3.6 Kiln Test Grou	p (6)			0 hrs	14-05-18 8:00	14-05-18 8:00									
24	3.7 Clinker Cooler	& Upper Clinker Silo T	est Group (7)		0 hrs	14-05-18 17:00	14-05-18 17:00							1		
25	3.8 WHG Test Gro	up (8)			0 hrs	14-05-18 8:00	14-05-18 8:00									
26	4 Civil (Refractory &	Castable)			8.63 days	06-05-18 8:00	14-05-18 23:00									
27	4.1 Kiln Inlet Chut	e			4.88 days	08-05-18 15:00	13-05-18 12:00									
28	4.1.1 Breaking Cas	stable			8 hrs	08-05-18 15:00	08-05-18 23:00									
29	4.1.2 Prepare area	and Open Manhole			14 hrs	09-05-18 10:00	10-05-18 0:00				-					
30	4.1.3 Cutting out of	old Y-anchor			8 hrs	10-05-18 0:00	10-05-18 8:00									
31	4.1.4 Install Steel	Plate + Install Y-anchor			28 hrs	10-05-18 8:00	11-05-18 12:00				-					
32	4.1.5 Install HN Bo	oard + formwork + Pour	ing Castable		32 hrs	11-05-18 12:00	12-05-18 20:00									
33	4.1.6 Setting Time	2			4 hrs	12-05-18 20:00	13-05-18 0:00									
34	4.1.7 Remove forr	nwork & Scaffolding			12 hrs	13-05-18 0:00	13-05-18 12:00									
35	4.2 Kiln Cooler (@	Crusher Area)			3.67 days	08-05-18 9:00	12-05-18 1:00									
		Taak		Dollad Lin Took		External Milestone			Stort only		Г					
		Task		Rolled Up Task		External Milestone	•		Start-only		L					
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only		C					
		Split		Rolled I In Milestone	<u>ہ</u>	Inactive Milestone			Deadline		•					
		Opin		Rolled Op Milestolle	\checkmark	mactive milestone	\checkmark		Deauline		Δ					
Project	: 03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary	\bigtriangledown	\neg	Baseline		60000					
Date: 1	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	C		Critical Tasl	ĸ						
		Summary	~~	Rolled Up Baseline Mileston	e 🗇	Duration-only			Critical Tasl	k Progress	_					
		Project Summary	·	Rolled Up Progress		Manual Summary	Rollup			0						
			· ·	External Tasks		Manual Summer										
		Group by Summary		EALEITIAI TASKS			V									



Update : 14-Sep-2016

SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish		21 May '18		04 Jun ':	18		18 Jun '1	8
1 4 4		<u> </u>	P 11 1		0.1	06.05.10.0.00	06 05 10 0 00	18-05	23-05 28-05	02-06	07-06	12-06	17-06	22-06	27-06
144	5.1./ AIJU6 Belt (Conveyor Counter weight	sling need to chang	je	0 nrs	06-05-18 8:00	06-05-18 8:00								
145	5.1.8 BIRUI SIdC		t Polt joint	j gear	0 nrs	06-05-18 8:00	06-05-18 8:00								
140	5.1.9 AIJU9 Dell (conveyor cut & Reconnec			16 brs	11 05 19 12:00	12 05 19 12:002	,							
147	5.1.10 DINUI Che 5.1.11 Check A1C	1199 Slacker Deil 101 Potor & Main Drive Be	arings Clearances		10 IIIS	06-05-18 8:00	06-05-18 8:00	-							
1/0	5 1 12 A1102 Bolt	Conveyor Modify Skirt Bo	arings clearances		2 days	00-05-18 8:00	12-05-18 0:00								
150	5 2 Time Based M	aintenance Part Renla	cement l ist (MF)			05 05 10 0.00	06-05-18 8:00								
151	5 2 1 A1C01M1 L	TM Change V-belt of Lime	stone Cruhser		0 hrs	06-05-18 8:00	06-05-18 8:00								
152	5.2.1 AICOINT E	TM Change V-belt of Lime	stone Cruhser		0 hrs	06-05-18 8:00	06-05-18 8:00								
153	5.3 Machine Outs	tanding List (EE)			1 dav?	06-05-18 8:00	07-05-18 8:00								
154	5.3.1 A1XC01 Ove	erhead Crane cannot oper	ate		1 day?	06-05-18 8:00	07-05-18 8:00								
155	6 Mix-Mat & Raw M	aterial Test Group (2)			5.67 days	06-05-18 8:00	12-05-18 0:00								
156	6.1 Machine Outs	tanding List (ME)			5.67 days	06-05-18 8:00	12-05-18 0:00								
157	6.1.1 C1H01 Char	nge and repair stacker wh	eel		2 days	06-05-18 8:00	08-05-18 8:00								
158	6.1.2 E1C01 Addi	tive Crusher change all be	arings		0 hrs	06-05-18 8:00	06-05-18 8:00								
159	6.1.3 C1H02 Recl	aimer Trolley Need to rep	air and alignment		16 hrs	11-05-18 8:00	12-05-18 0:002	2							
160	6.1.4 B1L01 Steel	Feed Bin repair material	leakage		0 hrs	06-05-18 8:00	06-05-18 8:00								
161	6.1.5 C1C01 Clay	Crusher need to check be	earing clearance		0 hrs	06-05-18 8:00	06-05-18 8:00								
162	6.1.6 C1C01 Clay	Crusher welding wear po	oint of the teeth		4.42 days	07-05-18 8:00	11-05-18 18:00								
163	6.1.7 C1J06 Belt (Conveyor change outlet ch	nute		22 hrs	06-05-18 8:00	07-05-18 6:00								
164	6.1.8 C1J05 Belt (Conveyor need to change			0 hrs	06-05-18 8:00	06-05-18 8:00								
165	6.1.9 C1H02 Rec	aimer need to make weld	ing rack car		2 days	06-05-18 8:00	11-05-18 12:48								
166	6.1.10 E1J01 Apr	on Conveyor need to chec	k and retighten bo	t and nuts and bearings	0 hrs	06-05-18 8:00	06-05-18 8:00								
167	6.1.11 B1J04 Cut	& reconnecting belt conve	eyor 3 joints		32 hrs	09-05-18 8:00	10-05-18 16:00								
168	6.2 Time Based M	aintenance Part Replac	cement List (ME)		0 days	06-05-18 8:00	06-05-18 8:00								
169	6.2.1 C1C01M1 L	I M Change V-belt of Clay	Cruhser		0 hrs	06-05-18 8:00	06-05-18 8:00								
170	6.2.2 CICUIM2 L	TM Change V-belt of Clay	Crunser		0 nrs	06-05-18 8:00	06-05-18 8:00								
171	6.2.3 EICUIMI L	TM Change V-belt of Later	ite Cruhser		0 nrs	06-05-18 8:00	06-05-18 8:00								
172	7 Paw Mill Food Hor	The Change V-Delt of Later	ite Cruiser		0 111S	06-05-18 8:00	14-05-18 16:00								
174	7 1 Machine Outs	tanding List (ME)	oup (3)		8 33 dave	06-05-18 8:00	14-05-18 16:00								
175	7 1 1 R1W01 Cha	nge Bearing and Repair S	haft at Drive Side		24 hrs	06-05-18 8:00	07-05-18 8.00								
176	7.1.1 R1W01 Cha	ck Bearing and Shaft at D	rive Side		8 hrs	06-05-18 8:00	06-05-18 16:00								
177	7.1.3 R1W03 Cha	nge Belt of Belt Weight Fe	eder		8 hrs	06-05-18 8:00	06-05-18 16:00								
178	7.1.4 R1W03 Wei	aht Feeder Need to modif	v Chute Design and	d istall new roller	16 hrs	06-05-18 8:00	07-05-18 0:00								
179	7.1.5 R1J03 Belt	Conveyor Need to Install	new Seal		0 hrs	06-05-18 8:00	06-05-18 8:00								
		Task	[]	Rolled Up Task		External Milestone	•		Start-only	C	·				
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only	ב					
		Split	kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond		Deadline	۵					
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	♦	Baseline Summary	•	Inactive Summary	\bigtriangledown	\neg	Baseline	63355					
Date: 1	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline		Manual Task			Critical Task						
		Summary	•	Rolled Up Baseline Milestone	\diamond	Duration-only			Critical Task Progress	-		_			
		Project Summary		Rolled Up Progress		 Manual Summary R 	collup								
		Group By Summary	~~~~ ~	External Tasks		Manual Summary									



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish		21 M	ay '18		04 Jun '	18		18 Jun '1	8
								18-05	23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
180	7.1.6 R1J04 Belt C	onveyor Need to Repair I	Belt Skirt		4 hrs	07-05-18 8:00	07-05-18 12:00									
181	7.1.7 R1J03 Belt C	onveyor Check & Repair			0 hrs	07-05-18 12:00	07-05-18 12:00									
182	7.1.8 R1G11 Two	Way Chute Need to modi	fy Plate & Linners		16 hrs	07-05-18 20:00	08-05-18 20:00									
183	7.1.9 R1J05 Chang	je New Belt Conveyor			16 hrs	07-05-18 12:00	08-05-18 12:00									
184	7.1.10 Repair Hot	Gas Pipe Line			0 hrs	08-05-18 20:00	08-05-18 20:00	l								
185	7.1.11 R1J06 Belt	conveyor Need to Modify	Slide Gate		8 hrs	09-05-18 14:00	09-05-18 22:00	l								
186	7.1.12 J1J01 Screw	v Conveyor repair shaft a	ind change housing	ı design	0 hrs	06-05-18 8:00	06-05-18 8:00									
187	7.1.13 J1J09 Chair	n Conveyor Need to modi	fy Shaft & slip Ring		0 hrs	06-05-18 8:00	06-05-18 8:00									
188	7.1.14 R1M01 Inle	t Hot Gas Line (Check &	Reconfirm) Need to	o Install New Corver	0 hrs	09-05-18 22:00	09-05-18 22:00	l l								
189	7.1.15 R1J14 Air S	lide Change Canvas of Ai	r Slide		0 hrs	08-05-18 12:00	08-05-18 12:00	l								
190	7.1.16 J1P02 Ma	in Bag Filter need to c	hange bag filter	and bag cages	48 hrs 0	9-05-18 20:00	12-05-18 20:00 Ht	we								
191	7.1.17 R1M01 Raw	Mill Replace Air Seal of	Roller		6 hrs	06-05-18 8:00	06-05-18 14:00									
192	7.1.18 R1J04 Belt	conveyor Need to repair			0 hrs	09-05-18 22:00	09-05-18 22:00	i.								
193	7.1.19 R1M01 Wel	ding Raw Mill Lower Casi	ng Crack Part by P	art	5.5 days	08-05-18 8:00	13-05-18 20:00prl	<								
194	7.1.20 R1W02 Belt	Weighter Need to repair	r skirt board		4 hrs	11-05-18 18:00	11-05-18 22:00st	l								
195	7.1.21 R1L03 Sand	bin modify hopper			2 days	06-05-18 8:00	09-05-18 0:00	l								
196	7.1.22 R1M01 Ray	/ Mill change water sprav	nozzle (4)sets		8 hrs	11-05-18 22:00	12-05-18 14:00 te	t								
197	7.1.23 R1M01 Raw	/ Mill need to change inle	t chute liner		2 days	06-05-18 8:00	08-05-18 8:00									
198	7.1.24 R1M01 Raw	/ Mill need to adjust gap	between roller and	table	0 hrs	12-05-18 14:00	12-05-18 14:00									
199	7.1.25 R1M01 Raw	/ Mill Separator check we	ar rate		8 hrs	06-05-18 8:00	06-05-18 16:00									
200	7.1.26 R1S01 Raw	Mill Separator Casing We	eldina		32 hrs	12-05-18 16:00	14-05-18 16:00ai	Yan Na	aing							
201	7.1.27 R1M01 Raw	/ Mill welding Mill Body	elainig		0 hrs	06-05-18 8:00	06-05-18 8:00		-							
202	7.1.28 R1M01 Ray	/ Mill Change Scrapers bla	ades		16 hrs	06-05-18 8:00	07-05-18 0:00									
203	7.1.29 R1151 Buck	et Flevator need to chan	ge rubber discharg	e lip and retighten bolts &	4 hrs	12-05-18 14:00	12-05-18 18:00 te	t								
204	7 1 30 11P01 FP N	eed to check hammer an	d CF DF		0 hrs	12-05-18 20:00	12-05-18 20:00	l								
205	7 1 31 11E02 Bag	Filter Fan bearing housing	n need to change		0 hrs	06-05-18 8:00	06-05-18 8:00									
206	7 1 32 11102 Need	to Repair Screw Convey	or Bearing joints		24 hrs	12-05-18 16:00	14-05-18 0:00in	Htwe								
207	7 1 33 R1M01 che	ck hearing clear of swimp	1 lever		48 hrs	08-05-18 8:00	10-05-18 8:00									
207	7 1 34 Check & Re	nair Chain conveyor of 1	1103		8 hrs	13-05-18 8:00	13-05-18 16:00lte	t 2								
200	7 1 35 Check & Re	pair Chain conveyor of 1	1104		8 hrs	13-05-18 8:00	13-05-18 16:00 te	t 2								
210	7 1 36 Check & Re	pair Chain conveyor of 1	1105		8 hrs	13-05-18 8:00	13-05-18 16:00 te	t 2								
210	7 1 37 Check & Re	pair Chain conveyor of 1	1106		8 hrs	12-05-18 8:00	12-05-18 16:00t 2									
211	7 1 38 Check & Re	pair Chain conveyor of 1	1107		8 hrs	12-05-18 8:00	12-05-18 16:00lte	t								
212	7 1 39 Check & Re	pair Chain conveyor of 1	1108		8 hrs	12-05-18 8:00	12-05-18 16:00 th	Ne								
215	7 2 Time Based Ma	intenance Part Penlac	coment List (ME)		0 33 days	06-05-18 8:00	06-05-18 16:00									
214	7 2 1 R1M01 I TM	Overhaul Change Sprav V	Nater		0.55 days	06-05-18 8:00	06-05-18 8:00	Ì								
215	7.2.1 (101 101		Mater		01113	00 05 10 0.00	00 05 10 0.00									
		Task		Rolled Up Task		External Milestone	•		Start-only		C					
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only		C					
		Split	L	Rolled Up Milestone	\diamond	Inactive Milestone	\$		Deadline		^					
Draiaati	02 MCL1 Overall Kila Shutda	Milestone	•	Baseline Summany		Inactive Summary	Ŷ		Baseline							
Date: 19	03_MCL1_OVERAILKIIN Shutdo		•				~		Daseille							
			×	Rolled Up Baseline		- manuai lask			Critical Las	ĸ						
		Summary	-	Rolled Up Baseline Milestone	\diamond	Duration-only			Critical Tas	k Progress	_					
		Project Summary	•	Rolled Up Progress		 Manual Summary F 	Rollup									
		Group By Summary	**	External Tasks		Manual Summary	•									



Update : 14-Sep-2016

SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish		21 Ma	'18		04 Jun	'18		18 Jun '1	8
								18-05	23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
323	8.2.13 H1J04 Air	Slide Check and change of	damage one		4 hrs	08-05-18 20:00	09-05-18 0:00									
324	8.2.14 H1J05 Air	Slide Check and change of	damage one		4 hrs	09-05-18 8:00	09-05-18 12:00									
325	8.2.15 H1J06 Air	Slide Check and change of	damage one		4 hrs	09-05-18 12:00	09-05-18 16:00									
326	8.2.16 H1J07 Air	Slide Check and change of	damage one		4 hrs	09-05-18 16:00	09-05-18 20:00									
327	8.2.17 H1J08 Air	Slide Check and change of	damage one		4 hrs	09-05-18 20:00	10-05-18 0:00									
328	8.2.18 H1J09 Air	Slide Check and change of	damage one		4 hrs	10-05-18 8:00	10-05-18 12:00									
329	8.2.19 H1J10 Air	Slide Check and change of	damage one		4 hrs	10-05-18 12:00	10-05-18 16:00									
330	8.2.20 W1G43 Fla	ap valve at cyclone Norma	lly open		0 hrs	10-05-18 16:00	10-05-18 16:00									
331	8.2.21 W1AB37,4	2,46 Preheater air blaster	Diaphram not good	d	6 hrs	12-05-18 16:00	12-05-18 22:00 ⁰)								
332	8.2.22 W1G29 Ro	tary Feeder (kiln feed) Ab	normal Sound		3 hrs	06-05-18 8:00	06-05-18 11:00									
333	8.2.23 W1J15 Belt Bucket Elevator PM/ Change Discharge Rubbr Lip Check Change				8 hrs	06-05-18 8:00	06-05-18 16:00									
	Drive Drum Sleev	eTail Sprocket														
334	8.2.24 W1J16 Bel	t Bucket Elevator PM/ Cha	ange Discharge Rub	br Lip Check Change	0 hrs	06-05-18 16:00	06-05-18 16:00									
	Drive Drum Sleev	eTail Sprocket														
335	8.2.25 W1G27 Ro	tary Feeder Check Rotary	Gap		6 hrs	06-05-18 16:00	06-05-18 22:00									
336	8.2.26 W1G28 Ro	tary Feeder Check Rotary	Gap		6 hrs	06-05-18 22:00	07-05-18 12:00									
337	8.2.27 W1G29 Ro	tary Feeder Check Rotary	Gap		6 hrs	07-05-18 12:00	07-05-18 18:00									
338	8.2.28 W1G30 Ro	tary Feeder Check Rotary	Gap		0 hrs	07-05-18 18:00	07-05-18 18:00									
339	8.2.29 Check Cen	tral Chute C4,C5	•		0 days	06-05-18 8:00	06-05-18 8:00	Ì								
340	8.2.30 Change Fla	ap Gate for C4,C5			0 days	06-05-18 8:00	06-05-18 8:00	ļ								
341	8.2.31 Preheater	Need to Check Flap Valve	Leakage		0 days	06-05-18 8:00	06-05-18 8:00									
342	8.2.32 H1G31 Rot	tary Feeder Overhaul & M	2 hrs	06-05-18 8:00	06-05-18 10:00											
343	8.3 Time Based M	aintenance Part Replac	0.67 days	06-05-18 8:00	07-05-18 0:00											
344	8.3.1 H1O01 LTM	Change V-belt of Root Bl	ower & Realignmer	nt	4 hrs	06-05-18 8:00	06-05-18 12:00	Ì								
345	8.3.2 H1O02 LTM	Change V-belt of Root Bl	ower & Realignmer	nt	4 hrs	06-05-18 12:00	06-05-18 16:00	Ì								
346	8.3.3 H1003 I TM	Change V-belt of Root Bl	ower & Realignmer	nt	4 hrs	06-05-18 16:00	06-05-18 20:00	ļ								
347	8.3.4 H1004 I TM	Change V-belt of Root Bl	ower & Realignmer	nt	4 hrs	06-05-18 20:00	07-05-18 0:00	ļ								
348	8.4 Machine Outs	tanding List (FF)			0.08 days	06-05-18 8:00	06-05-18 10:00									
349	8 4 1 W1G55 Divi	dng Gate of Kiln feed Can	't adjust from CCR		0 hrs	06-05-18 8:00	06-05-18 8:00									
350	8 4 2 W1G31 Slid	e gate No have solenoid v	alve& air nine (on	en with manual)	1 hr	06-05-18 8:00	06-05-18 9:00									
351	8 4 3 W14B35 Pre	e gate no nave sciencia v eheater air blaster solenoi	d valve not good		0.5 hrs	06-05-18 8:00	06-05-18 8:30									
352	8 4 4 W1AB38 Pre	eheater air blaster solenoi	d valve not good		0.5 hrs	06-05-18 8:00	06-05-18 8:30									
353	8 4 5 W1AB40 Pre	eheater air blaster solenoi	d valve not good		0.5 hrs	06-05-18 8:00	06-05-18 8:30									
354	8.4.6 W1A05aT3	C5a Outlet temperature N	lot correct data (ov	veride)(Sensor not have)	2 hrs	06-05-18 8:00	06-05-18 10:00									
355	8 4 7 H1F08 Δir s	lide fan Breaker Not Ok			2 m3	06-05-18 8:00	06-05-18 9:00									
356	8 4 8 W1AD01T1	Teritary air temn Sensor (not OK (need to ch	ande)	2 hrs	06-05-18 8:00	06-05-18 10:00									
330	0.7.0 WIADUITI	Teritary air terrip Sensor i		ange)	21115	00 05 10 0.00	00 05 10 10.00							1		
		Task		Rolled Up Task		External Milestone	•		Start-only		C					
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only		C					
		Split	kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond		Deadline		۵					
Project:	roject: 03_MCL1_Overall Kiln Shutdo Milestone			•	Inactive Summary	\bigtriangledown	$\neg $	Baseline								
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	C]	Critical Task							
		Summary	₹₹	Rolled Up Baseline Milestone	\diamond	Duration-only			Critical Task	Progress	_					
	Project Summary			Rolled Up Progress		Manual Summary R	Rollup									
		Group By Summary		External Tasks		Manual Summary										



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish		21 Ma	iy '18		04 Jun '	18		18 Jun '1	.8
	357 8.5 Time Based Mai							18-05	23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
357	8.5 Time Based Ma	aintenance Part Replac	cement List (EE)		1 day	07-05-18 8:00	08-05-18 8:00									
358	8.5.1 HIF06M Change	DE Motor Bearing of Air Slide F	-an		1 hr	06-05-18 8:00	06-05-18 9:00									**
359	8.5.2 HIFU6M Change	NDE Motor Bearing of Air Side	: Fan		1 nr	06-05-18 8:00	06-05-18 9:00									
360	8.5.3 HIFU3M Change	DE Motor Bearing of Air Side r	-dn		1 nr	06-05-18 8:00	06-05-18 9:00									**
361	8.5.4 HIFU3M Change	NDE Motor Bearing of Air Side	: Fan		1 hr	06-05-18 8:00	06-05-18 9:00									*****
362	8.5.5 HIFU4M Change	DE Motor Bearing of Air Silde F	-an		1 hr	06-05-18 8:00	06-05-18 9:00									*****
363	8.5.0 HIFU4M Change	DE Motor Bearing of Air Slide	- Fan 		1 nr	06-05-18 8:00	06-05-18 9:00									*****
364	8.5.7 HIFUSM Change	DE Motor Bearing of Air Side r	-dn		1 nr	06-05-18 8:00	06-05-18 9:00									*****
365	8.5.8 HIFUSM Change	DE Motor Bearing of Air Slide	Fan		I nr	06-05-18 8:00	06-05-18 9:00									*****
366	8 E 10 H1E07M Change	DE MOLOF Dearing of Air Slide r			I nr	06-05-18 8:00	06-05-18 9:00									*****
367	0.5.10 HIF0/M Cliding	JE NDE MOLOI Dediling of Air Slide			I nr	06-05-18 8:00	06-05-18 9:00									*****
308	0.5.11 HIFUOM Cliding	ie DE Motor Boaring of Air Slide			1 Nr	06-05-18 8:00	06-05-18 9:00									******
369						06-05-18 8:00	06-05-18 9:00									
3/0	9 Coal Storage & Coa	al Mill Test Group (5)			6.58 days	06-05-18 8:00	12-05-18 22:00									
3/1	9.1 Machine Outst	canding List (ME)			0.58 days	06-05-18 8:00										**
372	9.1.1 Replace Roll	Ier Tire Bearing of Coal M	III (Roller No.2)		0 days	06-05-18 8:00	06-05-18 8:00									******
3/3	9.1.2 Replace OII	Seal of Coal Mill Roller INC).3	heaving Delley No. 2	0 days	06-05-18 8:00	00-05-18 8:00									*****
374	9.1.3 KIMUI COal	Mill Open side cover and		bearing Roller No 2	4 NFS	07-05-18 8:00	07-05-18 12:00									******
3/5	9.1.4 KIXPUI SCR	ew Pump Change NDE Se	al and bearing		32 NFS	06-05-18 8:00	08-05-18 0:00									******
3/0	9.1.5 KILU5 COal	Bin Chute Modify With ha			10 NFS	00-05-18 8:00	07-05-18 0:00									******
3//	9.1.6 KIG1/ IW0-	-way Chute Two-way Chu	Jte		8 hrs	07-05-18 12:00	07-05-18 20:00									
3/8	9.1.7 J1V10 Shut-	off Damper Can't open of			0 nrs	07-05-18 20:00	07-05-18 20:00									
3/9	9.1.8 K1V35 Shut-	-oπ Damper Does not rea	Cn limit position		0 nrs	07-05-18 20:00	07-05-18 20:00									
380	9.1.9 KIW08 Char	In reeder Need to repair t	The chain cleanear s	scapper	8 nrs	08-05-18 20:00	09-05-18 12:00									
381	9.1.10 K1G26,27,2	28,29,30,31 Rolary Feede	r Oli Leak the gear	DUX	8 nrs	09-05-18 12:00	10 05 10 12:00									
382	9.1.11 KIJ18,KIJ	19,K1J20 Screw Conveyor	Need to check joir	it and doit / nuts	8 nrs	09-05-18 20:00	10-05-18 12:00									
383	9.1.12 KILQU3 GF	ease Pipe Need to change	e pipe socket		8 nrs	10-05-18 12:00	10-05-18 20:00									
384	9.1.13 KIMUI Dar	In Ring Need to repair at a			8 NFS	11.05.18.20:00	12.05-18 12:00									
202	9.1.14 KIMUI COd	lor No. 2 Oil Drain Poluction u	dld		12 IIIS	12 05 18 0:00	12-05-16 0:00									
200	9.1.15 KIMUI KUI	IEI NO.3 OII DIdill Doil Cai			0 hrs	12-05-16 0:00	12-05-16 0:00									
207	9.1.10 KIAD03 BE	lit Delt Neeu to change			0 TIIS	12-05-10 0.00	12-03-16 0.00									
200	9.1.17 K1H04 Ket	Mill Countercurk Bolt fo			0 IIIS 8 brc	00-05-10 0:00	00-05-10 14:00									
200	9.1.10 KIMUI Cua	al Mill Countersunk Boit To			0 111S	12 05 19 9:00	12 05 19 12:00									
390	9.1.19 KIG24 Dub	ole riap valve Cylinder no	<u>t working</u>		4 11/S	12-05-10 0:00	12-05-10 12:00									
202	9.1.20 K1103 Stat	al Fooder Scraper Blade (4 111S	12-05-18 12:00	12-05-18 10.00									
392	9.1.21 KIW00 C00	ai i eeuei Scrapei Didue C	Jildilye		01115	12-05-10 10.00	12-05-10 22.00									<u> </u>
		Task		Rolled Up Task		External Milestone	•		Start-only		C					
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only		C					
		Split	kI	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond		Deadline		۵					
Proiect:	03 MCL1 Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary			Baseline		000000					
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline		II Manual Task	-	-	Critical Taek	r						
			`		^					Drogene						
		Summary			\checkmark				Untical Task	riogress						
		Project Summary		Rolled Up Progress		 Manual Summary F 	Rollup									
		Group By Summary	~	External Tasks		Manual Summary	-									



Update : 14-Sep-2016

SAFER-FASTER-BATTE

ID T	D Task Name			Duration	Start	Finish		21 May '18		04 Jun	'18		18 Jun '1	8	
								18-05	23-05 28-05	02-06	07-06	12-06	17-06	22-06	27-06
429	10.2 Machine Out	standing List (ME)			8 days?	06-05-18 8:00	14-05-18 8:00								
430	10.2.1 W1E01 Ad	just Kiln Outlet Seal			0 hrs	13-05-18 16:00	13-05-18 16:00								
431	10.2.2 W1E01M1	Girth Gear Oil Leakage			0 hrs	07-05-18 18:00	07-05-18 18:00								
432	10.2.3 W1E01 Kil	n Roller Tyer stop block Ha	ave cracking in stop	block	6 days?	08-05-18 8:00	14-05-18 8:00	/ork							
433	10.2.4 W1E01 Kil	n Girth Gear Grinding Girth	n Gear		0 hrs	06-05-18 8:00	06-05-18 8:00								
434	10.2.5 W1E01 Kil	n Burner Change Kiln Burr	ner		0 hrs	13-05-18 16:00	13-05-18 16:00								
435	10.2.6 W1E01 Ro	ller 1 - 4 Oil Seal need to	repair		0 hrs	13-05-18 16:00	13-05-18 16:00								
436	10.2.7 W1E01 Inl	et Seal Support Repair the	e support		8 hrs	08-05-18 22:00	09-05-18 14:00								
437	10.2.8 W1Q03 Sta	andby Unit Install			0 hrs	09-05-18 14:00	09-05-18 14:00								
438	10.2.9 W1Z01 Pfi	ster Adjust Gap/low down	wear of rotor/upper	r lower plate	16 hrs	09-05-18 14:00	10-05-18 14:00								
439	10.2.10 W1E01 F	ixed grate Plate Check Cra	ick / Condition		16 hrs	10-05-18 14:00	11-05-18 14:00								
440	10.2.11 W1E01 K	iln Modify Kiln Shell & Kiln	Tire Fan Damper		0 hrs	13-05-18 16:00	13-05-18 16:00								
441	10.3 Time Based	Maintenance Part Repla	acement List (ME)		0.17 days	06-05-18 8:00	06-05-18 12:00								
442	10.3.1 W1Q06 LT	M Change V-belt of Root I	Blower & Realignme	nt	4 hrs	06-05-18 8:00	06-05-18 12:00								
443	10.3.2 W1Q07 LT	M Change V-belt of Root I	Blower & Realignme	nt	4 hrs	06-05-18 8:00	06-05-18 12:00								
444	10.3.3 W1Q03 LT	M Change V-belt of Root I	Blower & Realignme	nt	4 hrs	06-05-18 8:00	06-05-18 12:00								
445	10.3.4 W1J06 LTI	M Change V-belt of Chain	Conveyor & Realign	ment	4 hrs	06-05-18 8:00	06-05-18 12:00								
446	10.3.5 W1Z01 LT	M Change V-belt of Pfister	& Realignment		4 hrs	06-05-18 8:00	06-05-18 12:00								
447	10.3.6 W1Z06 LT	M Change V-belt of Pfister	& Realignment		4 hrs	06-05-18 8:00	06-05-18 12:00								
448	10.4 Machine Out	standing List (EE)			0.33 days	06-05-18 8:00	06-05-18 16:00								
449	10.4.1 Kiln hood a	air blaster some air blaster	r can't work		4 hrs	06-05-18 8:00	06-05-18 12:00								
450	10.4.2 W1L01T K	iln Hood Temp Not work(install new sensor b	ut can't use)	2 hrs	06-05-18 8:00	06-05-18 10:00								
451	10.4.3 W1L01P1_	1/P Kiln inlet chamber pre	essure (bottom) Sen	sor not OK	1 hr	06-05-18 8:00	06-05-18 9:00								
452	10.4.4 W1L01P1_	1/T Kiln inlet chamber pre	essure (bottom) Sen	sor not OK	1 hr	06-05-18 8:00	06-05-18 9:00								
453	10.4.5 W1E01T/T	1 Kiln Tail chamber tempe	erature sensor		0 hrs	06-05-18 8:00	06-05-18 8:00								
454	10.4.6 W1E01 M2	2 Kiln inching limit switch	Can't use (100 %)(housing of inching also	1 hr	06-05-18 8:00	06-05-18 9:00								
	not stable)														
455	10.4.7 H01X05 H	FO Tank Heater Not work			2 hrs	06-05-18 8:00	06-05-18 10:00								
456	10.4.8 W1Z01 Co	al Feeder Need to calibrat	e		8 hrs	06-05-18 8:00	06-05-18 16:00								
457	10.5 Time Based	Maintenance Part Repla	acement List (EE)		0.67 days	06-05-18 8:00	07-05-18 0:00								
458	10.5.1 W1F21-M Cha	nge DE Motor Bearing Cooling Fa	an		1 hr	06-05-18 8:00	06-05-18 9:00								
459	10.5.2 W1F21-M Cha	nge NDE Motor Bearing Cooling I	Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
460	10.5.3 W1F52M1 Cha	nge DE Motor Bearing Cooling Fa	an		1 hr	06-05-18 8:00	06-05-18 9:00								
461	10.5.4 W1F52M1 Cha	nge NDE Motor Bearing Cooling	Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
462	10.5.5 W1F47M1 Cha	nge DE Motor Bearing Cooling Fa	an		1 hr	06-05-18 8:00	06-05-18 9:00								
463	10.5.6 W1F47M1 Cha	nge NDE Motor Bearing Cooling	Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
		Task		Rolled Up Task		External Milestone	٠		Start-only	C					
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only	J					
		Split	ll	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond		Deadline	۵					
Project: (oject: 03_MCL1_Overall Kiln Shutdo Milestone Milestone Baseline Summary		•	Inactive Summary	\bigtriangledown	\Box	Baseline	60000		5055055					
Date: 19-	07-19-14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	Ľ		Critical Task						
		Summary	•	Rolled Up Baseline Milestone	\diamond	Duration-only			Critical Task Progress	_					
		Project Summary	•	Rolled Up Progress		 Manual Summary F 	Rollup								
Group By Summary External Tasks				External Tasks		Manual Summary	-								



Update : 14-Sep-2016

SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish	21 Ma	ay '18		04 Jun	'18		18 Jun '1	18
							18-0	5 23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
464	10.5.7 W1F50M1 Cha	nge DE Motor Bearing Cooling	Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
465	10.5.8 W1F50M1 Cha	nge NDE Motor Bearing Cooling	g Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
466	10.5.9 W1F51M1 Cha	nge DE Motor Bearing Cooling	Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
467	10.5.10 W1F51M1 Ch	ange NDE Motor Bearing Coolir	ng Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
468	10.5.11 W1F46M1 Ch	ange DE Motor Bearing Cooling	g Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
469	10.5.12 W1F46M1 Ch	ange NDE Motor Bearing Coolir	ng Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
470	10.5.13 W1F49M1 Ch	ange DE Motor Bearing Cooling	g Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
471	10.5.14 W1F49M1 Ch	ange NDE Motor Bearing Coolir	ng Fan		1 hr	06-05-18 8:00	06-05-18 9:00								
472	10.5.15 Motor dri	ve VVVF			16 hrs	06-05-18 8:00	07-05-18 0:00								
473	10.5.16 Motor dri	ve soft starter			8 hrs	06-05-18 8:00	06-05-18 16:00								
474	10.5.17 Transform	ner			8 hrs	06-05-18 8:00	06-05-18 16:00								
475	10.5.18 Capacitor	•			16 hrs	06-05-18 8:00	07-05-18 0:00								
476	10.5.19 Battery				8 hrs	06-05-18 8:00	06-05-18 16:00								
477	11 Clinker Cooler &	Upper Clinker Silo Tes	t Group (7)		8.38 days	06-05-18 8:00	14-05-18 17:00								
478	11.1 Civil (Refrac	tory & Castable)			0 days	12-05-18 1:00	12-05-18 1:00								
479	11.1.1 Kiln Cooler	r (@ Crusher Area)			0 hrs	12-05-18 1:00	12-05-18 1:00								
480	11.2 Machine Out	standing List (ME)			8.38 days	06-05-18 8:00	14-05-18 17:00								
481	11.2.1 W1HS01 C	Cooler Hydraulic Repair th	e support		2 days	06-05-18 8:00	08-05-18 8:00								
482	11.2.2 W1J02-06	Chain Conveyor Change	the liner and chain		90 hrs	08-05-18 17:00	14-05-18 17:00 Htay Mo	n							
483	11.2.3 W1J03 Dra	ag Chain Oil Seal Change			0 hrs	06-05-18 8:00	06-05-18 8:00								
484	11.2.4 W1C01 Cli	nker crusher Check Gearl	box No 4		3 hrs	14-05-18 9:00	14-05-18 12:00 hu Oo								
485	11.2.5 Cooling Fa	n Repair Oil leak			8 hrs	06-05-18 8:00	06-05-18 16:00								
486	11.2.6 W1G80 Cli	nker Chute Modify clinker	r chute		0 hrs	06-05-18 8:00	06-05-18 8:00								
487	11.2.7 W1J01 Par	n Conveyor Change Air Pi	ipe		0 hrs	06-05-18 8:00	06-05-18 8:00								
488	11.2.8 W1J01 Par	n Conveyor PM Tail bearin	ng Change ,Check Pa	an Wheel	0 hrs	06-05-18 8:00	06-05-18 8:00								
489	11.2.9 Hydraulic o	cylinder change grate coo	oler 1 & 2		24 hrs	06-05-18 8:00	07-05-18 8:00								
490	11.2.10 Kiln inlet	chute change with civil te	eam		24 hrs	06-05-18 8:00	07-05-18 8:00								
491	11.3 Machine Out	standing List (EE)			0.67 days	06-05-18 8:00	07-05-18 0:00								
492	11.3.1 HV01 EP c	ooler cabinet Local run a	nd CCR cannot start	so EP cooler can't group s	0 hrs	06-05-18 8:00	06-05-18 8:00								
493	11.3.2 HV02 EP c	ooler cabinet Local run a	nd CCR cannot start	so EP cooler can't group s	0 hrs	06-05-18 8:00	06-05-18 8:00								
494	11.3.3 HV07 EP c	ooler cabinet Local run a	nd CCR cannot start	so EP cooler can't group s	0 hrs	06-05-18 8:00	06-05-18 8:00								
495	11.3.4 W1K01T4/	'T4 Cooler Temp Sensor r	not OK		0 hrs	06-05-18 8:00	06-05-18 8:00								
496	11.3.5 W1K01T3/	T3 Cooler Temp Sensor r	not OK		0 hrs	06-05-18 8:00	06-05-18 8:00								
497	11.3.6 W1K01T2/	T2 Cooler Temp Sensor r	not OK		0 hrs	06-05-18 8:00	06-05-18 8:00								
498	11.3.7 W1K01T1/	T1 Cooler Temp Sensor r	not OK		0 hrs	06-05-18 8:00	06-05-18 8:00								
499	11.3.8 W1J03 Cha	ain conveyor of EP Now c	overide speed switch	sensor	1 hr	06-05-18 8:00	06-05-18 9:00								
		Task		Rolled Up Task		External Milestone	♦	Start-only		C					
		Task Progress		Rolled Up Critical Task		Inactive Task		Finish-only		C					
		Split	II	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond	Deadline		۵					
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	♦	Baseline Summary	•	Inactive Summary	\bigtriangledown	Baseline		536		888888			
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline	000000000000000000000000000000000000000	Manual Task	[]	Critical Tasl	K						
		Summary	•	Rolled Up Baseline Milestone	\diamond	Duration-only		Critical Tasl	<pre> Progress</pre>	-		_			
		Project Summary	•	Rolled Up Progress		 Manual Summary F 	Rollup								
		Group By Summary	•	External Tasks		Manual Summary	•								



SAFER-FASTER-BATTE

ID	Task Name				Duration	Start	Finish		21 Ma	ay '18		04 Jun	'18		18 Jun '1	.8
E26	12 1 5 Turbino				4 59 days	06-05-19 8:00	10-05-19 22:00	18-05	23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
530	12.1.5 TUIDINE	11			4.50 udys	06 0E 19 9:00	06 0E 19 9:00									
539	12.1.5.1 VM110	ombly bearing #4			2 58 days	08-05-18 8:00	10-05-18 22:00									
530	12.1.5.2 uisassa	and can fit check			2.30 days	08-05-18 8:00	10-05-18 22:00									
539	12.1.5.5 COVER of	and cap in check			2.50 uays	00-05-10 0.00	10.05.18.22.00									
540	12.1.5.4 top cle				2.50 uays	00-05-10 0.00	10.05.10.22.00									
541	12.1.5.5 Side di	edidite check			2.50 udys	00-05-10 0:00	10.05-10.22:00									
542	12.1.5.0 Ddll Se	t area chack			2.50 uays	00-05-10 0.00	10.05.18.22.00									
545	12.1.5.7 COILdC				2.50 udys	00-05-10 0:00	10-05-16 22:00									
544	12.1.5.0 DaDDIL	ombly booring #2			2.50 udys	10 05 19 22:00	10.05-10.22:00									
546	12.1.5.9 UISd556	cond can fit chack			0 hrs	10.05.10.22.00	10.05.10.22.00									
540	12.1.5.10 COVER				0 hrs	10-05-16 22.00	10.05.10.22.00									
540	12.1.5.11 top c				0 hrs	10.05.10.22.00	10.05.10.22.00									
540	12.1.3.12 Side (0 hrs	10.05.10.22.00	10.05.18.22.00									
550	12.1.5.15 Dall 5	edi ulleuk			0 hrs	10-05-18 22:00	10-05-18 22:00									
551	12.1.3.14 CONd	it check			0 hrs	10-05-18 22:00	10-05-18 22:00									
551		n check			0 hrs	10.05.10.22.00	10.05.10.22.00									
552	12.1.5.10 yover	ar			6 29 days	10-05-18 22.00	12-05-18 22.00									
554	12.1.0 Condense	כו 11			0.29 days	06-05-18 8:00	06-05-18 8:00									
555	12.1.6.1 VMIRU	coffolding				06 05 19 15:00	06 05 19 22:00									
555	12.1.0.2 IIIStall	amply condensor			0.29 days	07 05 10 10.00	07 05 19 22.00	Kvaw Ye	Htut							
550	12.1.0.3 UISdSSt				0.56 days	07-05-10 0.00	07-05-16 22.00	Kyaw Va								
557	12.1.0.4 Cledini 12.1.6 E contine				0.56 days	07-05-10 0.00	07-05-18 22.00m									
550	12.1.0.5 COduling	y e scaffolding			0.30 days	12-05-18 8:00	12-05-18 15:00									
559	12.1.7.0il Coolo					07_06_19.9.00	07-05-19 22:00	00								
500	12.1.7 OII COOLE	a 1 desping cooler			0.50 uays	07 0E 10 9:00	07 05 19 22:00									
562	12.1.7.1 VMICC)2 cleaning cooler			0.58 days	07-05-18 8:00	07-05-18 22:00									
502	12.1.7.2 VMICC					07-05-18 8.00	07-05-18 22.00									
505	12.1.0 PH Bullet	ı m durm hələncə conta	inor nino (ctoon	lookago)	0.50 days	09-05-18 8:00	09-05-18 22:00									
565	12.1.0.1 Sled	nair leakage	iner pipe (stean	i leakaye j	0.50 uays	09-05-18 8:00	09-05-18 22:00									
566	12.1.0.1.1 Te	raency valve dischara	o wator HD drum	(valve passing)		09 05 10 0.00	09 03 10 0.00									
567	12.1.0.2 LINE	nair leakage	e water fir urum	(valve passing)	0.50 days	09-05-18 8:00	09-05-18 22.00									
568	12.1.0.2.1 Te	rgency mampual disch	argo wator valvo	HD drum (valve		09-05-18 8:00	09-03-18 8.00									
500	nassing)	igency mannual disci	large water varve		0.50 days	09-05-10 0.00	09-05-10 22.00									
569	12 1 8 3 1 re	nair leakage			0 days	09-05-18 8.00	09-05-18 8.00									
570	12.1.0.0.1 PC				7 58 days	06-05-18 8:00	13-05-18 22:00									
0.0		•.			7.00 aujo:								11		I	1
		Task		Rolled Up Task		External Milestone	\diamond		Start-only		C					
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only		כ					
		Split	- kl	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond		Deadline		۵					
Project:	03_MCL1_Overall Kiln Shutdo	Milestone	•	Baseline Summary	•	Inactive Summary	\bigtriangledown	\neg	Baseline		00000					
Date: 19	9-07-19 14:18	Baseline Milestone	\diamond	Rolled Up Baseline		🖼 Manual Task			Critical Tasl	k						
		Summary	••	Rolled Up Baseline Milestone	• 🛇	Duration-only			Critical Tasl	k Progress	-		_			
		Project Summary	▼▼	Rolled Up Progress		 Manual Summary R 	Rollup									
		Group By Summary	••	External Tasks		Manual Summary										



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ID Task	< Name				Duration	Start	Finish		21 Ma	ay '18	. .	04 Jun	'18		18 Jun '1	.8
							1	8-05	23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
571	12.1.9.1 Chai	n Conveyor			4.58 days	07-05-18 8:00	11-05-18 22:00									
5/2	12.1.9.1.1 V/	A1N01			110 hrs	07-05-18 8:00	11-05-18 22:00									
5/3	12.1.9.1.2 di	sassembly chain			4.58 days	07-05-18 8:00	11-05-18 22:00									
5/4	12.1.9.1.3 re				4.58 days	07-05-18 8:00	11-05-18 22:00									
5/5	12.1.9.1.4 re	pair chain			4.58 days	07-05-18 8:00	11-05-18 22:00									
5/6	12.1.9.1.5 m	odity tall sprocket			4.58 days	07-05-18 8:00	11-05-18 22:00									
5//	12.1.9.1.6 re	assembly chain and liner			4.58 days	07-05-18 8:00	11-05-18 22:00									
5/8	12.1.9.2 Setti				5.38 days	00.05.10.0.00										
5/9	12.1.9.2.1 SC	anoluling			0.59 days	00 05 18 8:00	00.05-10.22:00									
500	12.1.9.2.2 Ci	brication			2.58 days	10-05-18 8:00	12-05-18 22:00	a								
582	12.1.9.2.3 Id				0.58 days	13-05-18 8:00	12-05-18 22:00 inn	9								
583	12.1.9.2.4 PC	ty valve I P drum(Stea	m Leskade)		4 58 days	06-05-18 8:00	10-05-18 22:00									
584	121031	nning safety valve			0.58 days:	10-05-18 8.00	10-05-18 22:00									
585	121937	BFW nump line outlet	to HP drum (wa	ter leakage)	4 58 days	06-05-18 8:00	10-05-18 22:00									
586	121932	1 VA1P01		ter leukuge j	0 days	06-05-18 8.00	06-05-18 8:00									
587	12.1.9.3.2	2 renair leakage			0 58 days	10-05-18 8:00	10-05-18 22:00									
588	12.1.9.3.3	HP main steam pipe lin	ne (steam leakad	le)	0.58 days	10-05-18 8:00	10-05-18 22:00									
589	12,1,9,3,3	.1 repair leakage		, , ,	0.58 days	10-05-18 8:00	10-05-18 22:00									
590	12.1.9.3.4	HP superheater manua	al vent valve (ste	am leakage)	0.58 days	10-05-18 8:00	10-05-18 22:00									
591	12.1.9.3.4	.1 repair leakage	(0.58 days	10-05-18 8:00	10-05-18 22:00									
592	12.1.9.3.5	HP superheater outlet	valve (steam le	akage)	4.58 days?	06-05-18 8:00	10-05-18 22:00									
593	12.1.9.3.5	.1 VA1DZ01	•		1 day?	06-05-18 8:00	07-05-18 8:00									
594	12.1.9.3.5	.2 repair leakage			0.58 days?	10-05-18 8:00	10-05-18 22:00									
595	12.1.10 Primary	Air Fan (remark : Wai	it EE Team Motor)	3.58 days	06-05-18 8:00	09-05-18 22:00									
596	12.1.10.1 12FN	01			0 hrs	06-05-18 8:00	06-05-18 8:00									
597	12.1.10.2 disas	sembly casing and expar	nsion joint		2.58 days	07-05-18 8:00	09-05-18 22:00									
598	12.1.10.3 disas	sembly fan from shaft			2.58 days	07-05-18 8:00	09-05-18 22:00							1		
599	12.1.10.4 disas	sembly shaft from bearing	g housing		2.58 days	07-05-18 8:00	09-05-18 22:00									
600	12.1.10.5 chang	ge bearing			2.58 days	07-05-18 8:00	09-05-18 22:00							1		
601	12.1.10.6 reas	sembly and check alignme	ent		2.58 days	07-05-18 8:00	09-05-18 22:00									
602	12.1.11 Second	ary Air Fan (remark : V	Vait EE Team Mo	tor)	1 day?	06-05-18 8:00	07-05-18 8:00							1		
603	12.1.11.1 12FN	02			0 days	06-05-18 8:00	06-05-18 8:00									
604	12.1.11.2 disas	sembly casing and expar	nsion joint		0 days	06-05-18 8:00	06-05-18 8:00							1		
605	12.1.11.3 disas	sembly fan from shaft			1 day?	06-05-18 8:00	07-05-18 8:00									
606	12.1.11.4 disas	sembly shaft from bearing	g housing		1 day?	06-05-18 8:00	07-05-18 8:00									
		Task		Rolled Up Task		External Milestone	٠		Start-only		C					
		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only		ב					
		Split		Rolled Up Milestone	♦	Inactive Milestone	\$	_	Deadline		۵					
Project: 03_M Date: 19-07-1	ICL1_Overall Kiln Shutdo 9 14:18	Milestone	•	Baseline Summary		Inactive Summary			Baseline		60000		*******			
246. 10-07-1		Baseline Milestone	♦	Rolled Up Baseline		Manual Task	C		Critical Task	<						
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only			Critical Task	<pre> Progress</pre>	_					
		Project Summary		Rolled Up Progress		Manual Summary F	Rollup									
		Group By Summary		External Lasks		Manual Summary										


03_MCL1_Overall Kiln Shutdown Plan for May 2018_06_05_2018_A02 06-05-18 6:00 to 16-05-18 17:49

SAFER-FASTER-B	BATTE	
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ID	Task Name			Duration	Start	Finish		21 May '18		04 Jun '18				18 Jun '1	.8 Jun '18	
								18-05	23-05	28-05	02-06	07-06	12-06	17-06	22-06	27-06
643	12.1.21.1 12PC	201			0.58 days	06-05-18 8:00	06-05-18 22:00									
644	12.1.21.2 repa	ir scraper chain			0.58 days	06-05-18 8:00	06-05-18 22:00									
645	12.1.21.3 repla	ice belt cleaner			0.58 days	06-05-18 8:00	06-05-18 22:00									
646	12.1.22 Coal Fe	eder			0.58 days	06-05-18 8:00	06-05-18 21:55									
647	12.1.22.1 12P	C02			0.58 days	07-05-18 8:05	07-05-18 22:00									
648	12.1.22.2 repa	ir scraper chain			0.58 days	07-05-18 22:00	08-05-18 11:55	1								
649	12.1.22.3 repla	ice belt cleaner			0.58 days	07-05-18 22:00	08-05-18 11:55									
650	12.1.23 Pressu	re Reducing Valve			0.58 days	08-05-18 8:00	08-05-18 22:00	1								
651	12.1.23.1 11VA	128 repair pressure reduc	cing valve		0.58 days	08-05-18 8:00	08-05-18 22:00									
652	12.2 Machine Outstanding List (EE)					06-05-18 8:00	14-05-18 8:00	1								
653	12.2.1 Turbine	& Generator (EU)			7 days	06-05-18 8:00	13-05-18 8:00									
654	12.2.1.1 Check	insulation & construction	Earth		1 day	06-05-18 8:00	07-05-18 8:00	1								
655	12.2.1.2 Motor	Overhual Service (high s	peed)		1 day	06-05-18 8:00	07-05-18 8:00									
656	12.2.1.3 Motor	PM			1 day	06-05-18 8:00	07-05-18 8:00	1								
657	12.2.1.4 Actua	tor vavle PM			1 day	06-05-18 8:00	07-05-18 8:00									
658	12.2.1.5 Instru	ment PM & Calibration			1 day	06-05-18 8:00	07-05-18 8:00	1								
659	12.2.1.6 DCS P	M			1 day	06-05-18 8:00	07-05-18 8:00									
660	12.2.2 WHG Tu	rbine & Generator			7 days	06-05-18 8:00	13-05-18 8:00	1								
661	12.2.2.1 DCS 8	UPS System			3.5 days	06-05-18 8:00	09-05-18 20:00									
662	12.2.2.2 Prepa	red VSD program			3.5 days	06-05-18 8:00	09-05-18 20:00	1								
663	12.2.3 Boiler				7 days	06-05-18 8:00	13-05-18 8:00	1								
664	12.2.3.1 Overh	ual Service VSD for main	machine		0 days	06-05-18 8:00	06-05-18 8:00									
665	12.2.3.2 Chang	je Bearing Primary Air Fan	Motor		0 days	06-05-18 8:00	06-05-18 8:00	1								
666	12.2.3.3 Chang	je Bearing Secondary Air F	an Motor		0 days	06-05-18 8:00	06-05-18 8:00									
667	12.2.3.4 Chang	je Bearing Coal Feeder Mo	otor		0 days	06-05-18 8:00	06-05-18 8:00	1								
668	8 12.2.3.5 Calibration Weight Feeder				0 days	06-05-18 8:00	06-05-18 8:00									
669	12.2.3.6 Motor Overhual Service (high speed)				0 days	06-05-18 8:00	06-05-18 8:00	1								
670	670 12.2.3.7 Actuator vavle PM				0 days	06-05-18 8:00	06-05-18 8:00									
671	671 12.2.3.8 Instrument PM & Calibration				0 days	06-05-18 8:00	06-05-18 8:00	1								
672	572 12.2.4 WHG Valve				7 days	06-05-18 8:00	13-05-18 8:00									
6/3	12.2.4.1 Coolin	g Tower three combinatio	n probe change		0 days	06-05-18 8:00	06-05-18 8:00									
6/4	12.2.5 1 EU Ash				0 days	06-05-18 8:00	06-05-18 8:00									
6/5	12.2.5.1 Check	Function for ash transpor	t & PM		0 days	06-05-18 8:00	06-05-18 8:00	1								
6/6	12.2.5.2 Actual	tor vavle PM			0 days	06-05-18 8:00	06-05-18 8:00									
6//	12.2.5.3 Check	Main Bag Filter cabinet Pl	M & Solenoid		0 days	06-05-18 8:00	06-05-18 8:00	1								
678	12.2.5.4 Check	Pheumatic valve and fund	ction		0 days	06-05-18 8:00	06-05-18 8:00									
		Task		Rolled Up Task		External Milestone			Start-only		C					
Project: 03_MCL1_Overall Kiln Shutdo Date: 19-07-19 14:18		Task Progress		Rolled Up Critical Task		Inactive Task			Finish-only		ב	Ì				
		Split	LI	Rolled Up Milestone	\diamond	Inactive Milestone	\diamond		Deadline		۵					
		Milestone	♦	Baseline Summary	•	Inactive Summary			Baseline		63					
		Baseline Milestone	♦	Rolled Up Baseline		Manual Task			Critical Task	¢						
		Summary		Rolled Up Baseline Milestone	\diamond	Duration-only			Critical Task	Progress	-					
		Project Summary		Rolled Up Progress		 Manual Summary R 	ollup									
		Group By Summary		External Lasks		Manual Summary										

Maintenane Planning : Maintenance Dept.