

ENVIRONMENTAL MANAGEMENT PLAN

FOR

YANGON DISTILLERY PLANT (GRGICL)



PREPARED BY:

**ENVIRONMENTAL CONSERVATION CONSULTING ENGINEERS
ASSOCIATION**

MYANMAR ENGINEERING SOCIETY (MES)

PREPARED FOR:

GRAND ROYAL GROUP INTERNATIONAL COMPANY LIMITED

JULY 2022 (Revision III)

LETTER OF ENDORSEMENT BY THE PROJECT PROPONENT

This Environmental Management Plan (EMP) for Yangon Distillery Plant (GRGICL) was prepared by Environmental Conservation Consulting Engineers Association of MES on behalf of Grand Royal Group International Company Limited. I hereby issue my letter of endorsement to confirm:

- (a) the accuracy and completeness of the EMP.
- (b) that the EMP has been prepared in strict compliance with applicable laws including the EIA Procedure; and
- (c) that the Project will at all times comply fully with the commitments, mitigation measures, and plans in the EMP Report.

Signed

Name :
Position :
Organization :

LETTER OF ENDORSEMENT BY THE THIRD PARTY

This Environmental Management Plan has been done with reasonable skills, care and diligence in accordance with the stipulations of Environmental Impact Assessment Procedure (Paragraph 76-82). I hereby signed this report on behalf of the Environmental Conservation and Consulting Engineers Association (ECCEA) of Myanmar Engineering Society (MES) to certify that all the information in it are true and convincing to the best of our knowledge.



Signed

Name : U.Yan Naing.Aung.....

Position : Public Relation Officer
:

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LIST OF ABBREVIATIONS

BOD	Biochemical Oxygen Demand
CFD	Cooking Fermentation and Distillation
CIP	Cleaning in Place
COD	Chemical Oxygen Demand
D&D	Design and Development
DMP	Decommissioning Management Plant
EMP	Environmental Management Plan
GRGICL	Grand Royal Group International Company Limited
HOD	Head of Department
HSE	Health, Safety and Environment
MEMs	Mitigation and Enhancement Measures
NaOH	Sodium Hydroxide
NEQG	National Environmental Quality (Emissions) Guidelines
NSRs	Noise Sensitive Receivers
OSH	Occupational Safety and Health
PAC	Poly-Aluminium Chloride
RS	Rectified Spirits
SLM	Sound Level Meter
TSS	Total Suspended Solid
UV	Ultraviolet
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

အနှစ်ချုပ် အစီရင်ခံစာ

နိဒါန်း

ရန်ကုန် အရက်ချက် စက်ရုံကို ရန်ကုန်တိုင်းဒေသကြီး၊ မှော်ဘီမြို့နယ်၊ လိပ်ပုတ်ကျေးရွာအနီးတွင် ၂၀၁၀ ခုနှစ် အစောပိုင်း၌စတင် တည်ဆောက်ခဲ့ပြီး ၂၀၁၂ခုနှစ်တွင် တည်ဆောက်ရေး လုပ်ငန်းများပြီးစီး၍ အဆိုပါစက်ရုံအားစတင်လည်ပတ်ခဲ့ပါသည်။ ရန်ကုန်အရက်ချက် စက်ရုံသည် လက်ရှိတွင် တစ်နေ့လျှင် အရက်ပြင်း ဂါလံပေါင်း ၁၀၀၀၀ ခန့် ထုတ်လုပ်လျှက်ရှိပါသည်။

တည်နေရာ

ရန်ကုန် အရက်ချက် စက်ရုံသည် အမှတ် ၅၆၀(ဂ) ၊ အထက်သဲကုန် ကျေးရွာအုပ်စု ၊ အမှတ် (၄) လမ်းမကြီး၊ မှော်ဘီမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီးတွင် တည်ရှိပြီး စက်ရုံ၏ အကျယ်အဝန်းမှာ ၃၀.၄၅ဧက ဖြစ်ပါသည်။

ဥပဒေရေးရာသုံးသပ်ချက်

ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း လုပ်ငန်းများ ဆောင်ရွက်ရာတွင် အောက်ဖော်ပြပါ ပြဌာန်းချက်များ၊ လမ်းညွှန်ချက်များနှင့် အပြည်ပြည်ဆိုင်ရာ လမ်းညွှန်ချက်များအား ကိုးကားလုပ်ဆောင်ခဲ့ပြီး Grand Royal Group International Co., Ltd မှ ထိုဥပဒေပြဌာန်းချက်များကို လိုက်နာဆောင်ရွက် ရမည်ဖြစ်ပါသည်။

(၁) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဥပဒေ (၂၀၁၂)၊ ပုဒ်မ ၇ (ဏ)၊ ၁၄၊ ၁၅၊ ၂၄၊ ၂၉

(၂) ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ (၂၀၀၄) (နည်း ၆၉)

(၃) ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ် ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများ၊ ၂၀၁၅ (အပိုဒ် ၁၀၂ မှ ၁၁၀၊ ၁၁၃၊ ၁၁၅၊ ၁၁၇)

(၄) အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး(ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅)

(၅) တိုင်းရင်းသားလူမျိုးများ အခွင့်ရေးကာကွယ် စောင့်ရှောက်ရေးဥပဒေ(၂၀၁၅) (ပုဒ်မ ၅)

(၆) မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ဥပဒေ၊ ၂၀၁၆ (ပုဒ်မ ၅၀(ဃ)၊ ၅၁၊ ၆၅(စ) မှ (ထ)၊ ၇၃)

(၇) မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှုနည်းဥပဒေများ၊ ၂၀၁၇(နည်း ၂၀၂၊ ၂၀၃၊ ၂၀၆၊ ၂၁၂)

(၈) ပုပ္ဖလိကစက်မှုလုပ်ငန်းဥပဒေ၊ ၁၉၉၀(ပုဒ်မ ၄၊ ၁၃(ခ)(စ)(ဆ)၊ ၁၅(က)(ခ))

(၉) ဓာတုပစ္စည်းနှင့် ဆက်စပ်ပစ္စည်းများ အန္တရာယ်မှ တားဆီးကာကွယ်ခြင်းဥပဒေ၊ ၂၀၁၃ (ပုဒ်မ ၁၅၊ ၁၆၊ ၁၇၊ ၂၂၊ ၂၇)

(၁၀) မြန်မာ့မီးသတ်တပ်ဖွဲ့ဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၂၅)

- (၁၁) ရေနံနှင့်ရေနံထွက်ပစ္စည်းဆိုင်ရာဥပဒေ၊ ၂၀၁၇ (ပုဒ်မ ၉ (က) (င)၊ ၁၀(ခ)၊ (လောင်စာဆီ/ သယ်)
ပုဒ်မ ၁၁၊ (ကန် ဖြင့်လောင်လျှင်) ပုဒ်မ ၁၀(က)(ဂ)(ဃ))
- (၁၂) မော်တော်ယာဉ်ဥပဒေ၊ ၂၀၁၅
- (၁၃) စံချိန်စံညွှန်းသန်မှတ်ခြင်းဆိုင်ရာဥပဒေ ၊ ၂၀၁၄ (ပုဒ်မ ၁၇၊ ၁၉၊ ၂၆)
- (၁၄) ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများ ကာကွယ်ထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၃၇၊ ၃၄)
- (၁၅) မြန်မာအင်ဂျင်နီယာကောင်စီဥပဒေ၊ ၂၀၁၃ (ပုဒ်မ ၃၇၊ ၃၄)
- (၁၆) ရှေးဟောင်းဝတ္ထုပစ္စည်းကာကွယ်ထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၁၂)
- (၁၇) ရှေးဟောင်းအဆောက်အအုံကာကွယ်ထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၁၅ (ပုဒ်မ ၁၂၊ ၁၅၊ ၂၀(ခ))
- (၁၈) ပို့ကုန်သွင်းကုန်ဥပဒေ၊ ၂၀၁၂ (ပုဒ်မ ၇) (ရှိလျှင်)
- (၁၉) အလုပ်သမားအဖွဲ့အစည်းဥပဒေ၊ ၂၀၁၁
- (၂၀) အလုပ်သမား အငြင်းပွားမှုဖြေရှင်းရေးဥပဒေ၊ ၂၀၁၂
- (၂၁) အလုပ်အကိုင်နှင့် ကျွမ်းကျင်မှုဖွံ့ဖြိုး တိုးတက်ရေးဥပဒေ၊ ၂၀၁၃
- (၂၂) အနည်းဆုံးအခကြေးငွေဥပဒေ၊ ၂၀၁၃
- (၂၃) အခကြေးငွေပေးချေရေးဥပဒေ၊ ၂၀၁၆
- (၂၄) Workmen Compensation Act, 1983
- (၂၅) ခွင့်နှင့်အလုပ်ပိတ်ရက်များဥပဒေ၊ ၁၉၅၁
- (၂၆) လူမှုဖူလုံရေးဥပဒေ၊ ၂၀၁၂
- (၂၇) မြန်မာနိုင်ငံ ပြည်သူ့ကျန်းမာရေးဥပဒေ၊ ၁၉၇၂(ပုဒ်မ ၃၊ ၅)
- (၂၈) ကူးစက်ရောဂါများကာကွယ်နှိမ်နင်းရေးဥပဒေ၊ ၁၉၉၅ (ပုဒ်မ ၃(က)(င)၊ ၄ ၊ ၁၁)
- (၂၉) ဆေးလိပ်နှင့်ဆေးရွက်ကြီးထွက်ပစ္စည်း သောက်သုံးမှုထိန်းချုပ် ရေးဥပဒေ၊ (ပုဒ်မ ၉)
- (၃၀) ရန်ကုန်တိုင်းဒေသကြီးစည်ပင်သာယာရေးအဖွဲ့ဥပဒေ၊ ၂၀၁၈
- (၃၁) ရေအရင်းအမြစ်နှင့် မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ၊ ၂၀၀၆ (ပုဒ်မ ၈(က)၊ ၁၁၊ ၁၉၊ ၂၁(ခ)၊ ၂၂၊
၂၄(ခ))
- (၃၂) ရေချိုငြိမ်းလုပ်ငန်းဥပဒေ (၁၉၉၁)
- (၃၃) စားသုံးသူအကာအကွယ်ပေးရေးဥပဒေ (၂၀၁၄)
- (၃၄) လုပ်ငန်းခွင်အန္တရာယ်ကင်းရှင်းရေးနှင့်ကန်းမာရေးဆိုင်ရာဥပဒေ (၂၀၁၉)
- (၃၅) လျှပ်စစ်ဥပဒေ (၂၀၁၄)

ထို့အပြင် Grand Royal Group International Co., Ltd. သည် ISO 14001-2015, ISO 9001-2015, ISO 22000-2018, ISO 45001-2018, ရက/ကြီး/၇၆၈, ရက/ကြီး/၄၂၄၂, Excise Form D1A (Temporar), D1 License, D2 License, ဘေးအန္တရာယ် လုပ်ငန်းလိုင်စင် နှင့် Recommendation for Food Manufacturing Permission များကို လည်းရရှိထားပြီးဖြစ်ပြီး APPENDIX-L တွင်ဖော်ပြထားပါသည်။

ရန်ကုန်အရက်ချက်စက်ရုံ၏ အရက်ပြင်းထုတ်လုပ်ခြင်း နည်းစဉ်

ရန်ကုန် အရက်ချက် စက်ရုံသည် တစ်နေ့လျှင် အရက်ပြင်း ဂါလံပေါင်း ၁၀၀၀၀ ခန့် ထုတ်လုပ် လျှက်ရှိပါသည်။ အရက်ပြင်းထုတ်လုပ်ရာတွင် ကုန်ကြမ်းအနေဖြင့် ဆန်ကွဲအားအသုံးပြုလျက် ရှိပါသည်။ ရန်ကုန်အရက်ချက် စက်ရုံ၏ အရက်ပြင်းထုတ်လုပ်မှု နည်းစဉ်မှာ အောက်ပါအတိုင်းဖြစ်ပါသည်။

(၁) ကုန်ကြမ်းကြိတ်ခွဲခြင်း

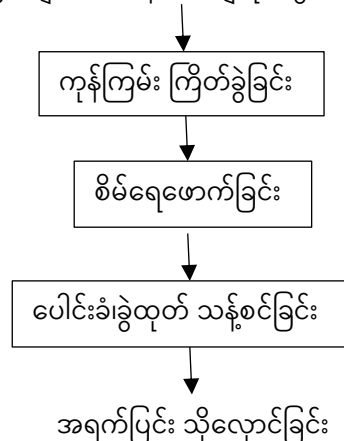
(၂) ကျိုချက်ခြင်း

(၃) စိမ်ရေဖောက်ခြင်း

(၄) ပေါင်းခံ၊ ခွဲထုတ်သန့်စင်ခြင်း

ရန်ကုန် အရက်ချက် စက်ရုံသည် ပတ်ဝန်းကျင်ထိခိုက်မှုလျော့နည်းစေရန်အတွက် ရေဆိုးသန့်စင် စနစ်၊ အရက်ပြင်း ထုတ်လုပ်ရာတွင်အသုံးပြုသောရေအား ကျန်းမာရေးနှင့်ညီညွတ်၍ သန့်ရှင်းမှုရှိစေရန် ရေသန့်စင်စနစ် အစရှိသော စနစ်များကိုလည်းတပ်ဆင်ထားသည့်အပြင် ဘွိုင်လာနှင့် အခြားသောလျှပ်စစ် ပစ္စည်းများကိုလည်း စနစ်တကျ အသုံးပြုလျက်ရှိပါသည်။ ရန်ကုန် အရက်ချက်စက်ရုံ၏ အရက်ပြင်း ထုတ်လုပ်ပုံ အဆင့်ဆင့်ကို အောက်ဖော်ပြပါပုံတွင် တွေ့ရှိနိုင်ပါသည်။

ကုန်ကြမ်းများအား စနစ်တကျကိုင်တွယ် သိုလှောင်ခြင်း



ပုံ(က) ရန်ကုန်အရက်ချက် စက်ရုံ၏ အရက်ပြင်းထုတ်လုပ်ပုံအဆင့်ဆင့်

လက်ရှိပတ်ဝန်းကျင်အခြေအနေ**(၁) လေအရည်အသွေး**

လက်ရှိစက်ရုံပတ်ဝန်းကျင်၏ လေထုအရည်အသွေးသိရှိနိုင်စေရန်အတွက် လေထုဖိအား၊ ကာဗွန်ဒိုင်အောက်ဆိုဒ်၊ ဟိုက်ဒရိုဂျင် ဆာလဖိတ်၊ မီသိန်း၊ နိုက်ဒရိုဂျင်ဒိုင်အောက်ဆိုဒ်၊ အိုဇုန်း၊ PM_{10} ၊ $PM_{2.5}$ ၊ စိုထိုင်းဆ၊ ဆာလဖာဒိုင် အောက်ဆိုဒ်၊ ဆိုလာဓာတ်ရောင်ခြည်၊ အပူချိန်၊ လေတိုက်နှုန်း နှင့် လေတိုက်ရာ အရပ်တို့ကို တိုင်းခဲ့ပါသည်။

လေထုအရည်အသွေးအား အမှတ် (၁) မှတ်လျှင် (၂၄) နာရီတိုင်းတာခဲ့ပြီး စက်ရုံဧရိယာနှင့် ဧရိယာ အနီးပတ်ဝန်းကျင်တွင်ရှိသောကျေးရွာများဖြစ်သည့် လိပ်ပုတ် နှင့် သဲကုန်ကျေးရွာ တို့အပြင် စက်ရုံဧရိယာ အတွင်း၌ပါ တိုင်းတာမှုများပြုလုပ်ခဲ့ပါသည်။ တိုင်းတာမှုများရလဒ်များကို Table (28) တွင်အသေးစိတ်ဖော်ပြ ထားပါသည်။

(၂) ရေအရည်အသွေး

ရန်ကုန်အရက်ချက်စက်ရုံ လုပ်ငန်းတွင် အသုံးပြုရန်အတွက် ရေကို စက်ရုံဧရိယာအတွင်းရှိ မြေအောက်ရေမှ ရယူသုံးစွဲပါသည်။ စက်ရုံပတ်ဝန်းကျင်၏ လက်ရှိရေအရည်အသွေး နှင့် ရေဆိုးအရည် အသွေးကိုသိရှိနိုင်စေရန် အတွက် စက်ရုံဧရိယာအတွင်းရှိ မြေအောက်ရေ နှင့် ရေဆိုးသန့်စင်စနစ် အဝင်၊ စွန့်ထုတ်ရေ တို့မှ ရေနမူနာ (၃) ခု ကောက်ယူခဲ့ပြီး ရေအရည်အသွေး တိုင်းတာမှုများ ပြုလုပ်ခဲ့ပါသည်။ ရေအရည်အသွေးတိုင်းတာရာတွင် ရေဆိုးသန့်စင်စနစ် အဝင်၊ စွန့်ထုတ်ရေ ၏ ချဉ်ဖန်ကိန်း၊ ဇီဝဆိုင်ရာ အောက်ဆီဂျင်လိုအပ်ချက်၊ ဓာတုဆိုင်ရာအောက်ဆီဂျင်လိုအပ်ချက်၊ ဆိုင်းကြွအနည်၊ စုစုပေါင်းနိုက်ဒရိုဂျင်၊ မီးစုန်းဓာတ်၊ စက်ဆီနှင့် ချောဆီ၊ စုစုပေါင်းပိုးအရေအတွက် တို့အားတိုင်းတာပြီး တိုင်းတာမှုရလဒ်များကို Table (24 နှင့် 25) တို့တွင် ဖော်ပြ ထားပါသည်။

(၃) မြေအရည်အသွေး

Table (29) နှင့် (30) တို့တွင် ဖော်ပြထားသော ရန်ကုန်အရက်ချက်စက်ရုံ အနီးပတ်ဝန်းကျင်ရှိ လိပ်ပုတ် နှင့် သဲကုန်တို့မှ ကောက်ယူထားသည့်မြေကို တိုင်းတာထားသော မြေတိုင်းတာမှုရလဒ်များအရ လက်ရှိမြေအရည်အသွေးမှာ အက်စစ်ဓာတ်များလျက် ရှိကြောင်း တွေ့ရှိရပါသည်။

(၄) ဇီဝဝန်းကျင်

စက်ရုံတည်ရှိရာ မှော်ဘီမြို့နယ် နှင့် စက်ရုံနှင့်နီးကပ်လျက်ရှိသော ရွှေပြည်သာမြို့နယ် အတွင်းတွင် သဘာဝပေါက်ပင်များ၊ တောရိုင်းတိရစ္ဆာန်များနှင့် သစ်တောပြုန်းတီးမှုများ မရှိသည်ကို တွေ့ရှိ ရပါသည်။

(၅) မြေမျက်နှာသွင်ပြင်

မှော်ဘီမြို့နယ်သည် အရှေ့မြောက်ဘက်တွင်ရှိသည့်ပဲခူးရိုးမမှ နိမ့်လျောလာသော တောင်ကုန်း၊ တောင်ပူဇာငယ်များကြောင့် မြောက်ဘက်နှင့် တောင်ဘက်တို့တွင် မညီညာသောကုန်းမြင့်များကို တွေ့ရှိရပြီး မှော်ဘီမြို့နယ်ကိုဖြတ်သန်းသွားသည့် ရန်ကုန်-ပြည် ကားလမ်းမကြီး အနောက်ဘက်သို့ နိမ့်ဆင်းသွားပါသည်။ မှော်ဘီမြို့နယ်၏ မြောက်ဘက်အဆုံးတွင် လှိုင်မြစ်တည်ရှိပြီး မှော်ဘီချောင်း၊ ဒွန်းတပဲ့ချောင်းနို့ မြောင်းတကာချောင်းတို့သည် လှိုင်မြစ်အတွင်းသို့စီးဝင်ပါသည်။ မှော်ဘီမြို့နယ်သည် ပင်လယ်ရေ မျက်နှာပြင်အထက် ပျမ်းမျှအမြင့် (၂၇) ပေအထက်တွင် တည်ရှိပါသည်။

(၆) ရာသီဥတု

မှော်ဘီမြို့နယ်သည်ပူအိုက်စွတ်စိုသောရာသီဥတုရှိပြီး နှစ်စဉ်ပျမ်းမျှအပူချိန် (၃၂.၃) ဒီဂရီစင်တီဂရိတ် ရှိပါသည်။ ဧပြီလသည် မှော်ဘီမြို့နယ်၏ အပူဆုံးလဖြစ်ပြီး အပူချိန် ၃၇ ဒီဂရီစင်တီဂရိတ်ရှိ၍ ဇန်နဝါရီလမှာမူ မှော်ဘီမြို့နယ်၏ အအေးဆုံးလဖြစ်ပြီး အပူချိန် ၁၇.၉ ဒီဂရီစင်တီဂရိတ် ရှိပါသည်။ နှစ်စဉ်ပျမ်းမျှမိုးရေချိန်မှာ ၂၂၃.၄၂ မီလီမီတာဖြစ်ပါသည်။ ဇူလိုင်လသည် မိုးရွာသွန်းမှုအများဆုံးလဖြစ်ပြီး ထိုလအတွင်း ၂၆.၂ ရက်ခန့် မိုးရွာသွန်းပါသည်။ ဖေဖော်ဝါရီလသည် မိုးရွာသွန်းမှုအနည်းဆုံးလဖြစ်ပြီး ပျမ်းမျှမိုးရေချိန်မှာ ၂ မီလီမီတာခန့် ရှိပါသည်။ မှော်ဘီမြို့နယ်၏ မိုးလေဝသနှင့် ဇလဗေဒဆိုင်ရာအချက်အလက်များကို အခန်း (3.5) တွင် အသေးစိတ်ဖော်ပြထားပါသည်။

(၇) လူမှုစီးပွားပတ်ဝန်းကျင်

မှော်ဘီမြို့နယ်သည် ရပ်ကွက် (၄) ခု၊ ကျေးရွာ (၃၉) ရွာဖြင့်ဖွဲ့စည်းထားသော မြို့နယ်တစ်ခု ဖြစ်ပါသည်။ မှော်ဘီမြို့နယ်အတွင်းတွင် အိမ်ခြေ ၄၀၄၄၀ အိမ်ရှိပြီး လူဦးရေ ၁၉၃၃၁၀ ဦး ရှိပါသည်။ ဗမာ

လူမျိုးအများစုနေထိုင်ကြပြီး ဗုဒ္ဓဘာသာကိုးကွယ်သူများဖြစ်ကြပါသည်။ ကရင်လူမျိုးများ ဒုတိယ အများဆုံး နေထိုင်ကြပြီး ဗုဒ္ဓဘာသာကိုးကွယ်ကြပါသည်။ ခရစ်ယာန်ဘာသာကိုးကွယ်သူအနည်းငယ် ရှိပြီး အစ္စလာမ်နှင့် ဟိန္ဒူဘာသာကိုးကွယ်သူအနည်းစုရှိပါသည်။

မြို့နယ်အတွင်းရှိဒေသခံ ပြည်သူလူထုအများစုမှာ လယ်ယာ၊ သစ်တောနှင့် ငါးလုပ်ငန်း ကျွမ်းကျင်သူများ ဖြစ်ကြပြီး ဒုတိယအများဆုံးမှာ အခြေခံအလုပ်သမား များဖြစ်ကြပါသည်။ မှော်ဘီမြို့နယ်သည် ရန်ကုန်တိုင်းဒေသကြီးအတွင်းတွင် တည်ရှိပြီး စီးပွားရေးအရ ဖွံ့ဖြိုးတိုးတက်မှုရှိသော မြို့နယ်တစ်ခု ဖြစ်ပါသည်။ မြို့နယ်အတွင်းရှိဒေသခံပြည်သူလူထုသည် စိုက်ပျိုးရေးလုပ်ငန်းကိုအဓိကလုပ်ကိုင် ဆောင်ရွက် ကြပါသည်။ မှော်ဘီမြို့နယ်မှ ရန်ကုန်တိုင်းဒေသကြီးသို့ ကုန်းလမ်း၊ ရေလမ်း၊ ရေကြောင်းလမ်း များဖြင့် သွားလာနိုင်ပြီး လမ်းပန်းဆက်သွယ်ရေး ကောင်းမွန်သောမြို့နယ်ဖြစ်ပါသည်။ မြို့နယ်၏အဓိက ထွက်ကုန် များမှာ ဆန်စပါးဖြစ်ပြီး ရန်ကုန်တိုင်းဒေသကြီးအတွင်းသို့ အများဆုံးတင်ပို့ရောင်းချပါသည်။ မှော်ဘီ မြို့နယ်တွင် အစိုးရဝန်ထမ်း ၂၃၂၉ ဦး၊ စိုက်ပျိုးရေးလုပ်ငန်းတွင်လုပ်ကိုင်သူ ၃၀၄၄၈ ဦး၊ မွေးမြူရေး လုပ်ငန်းတွင် လုပ်ကိုင်သူ ၃၂၀၀၀ ဦး၊ အရောင်းအဝယ်လုပ်ငန်းတွင်လုပ်ကိုင်သူ ၁၄၅၀၀ ဦး၊ စက်မှုလက်မှု လုပ်ငန်းတွင် လုပ်ကိုင်သူ ၉၀၉၁ ဦး၊ ရေလုပ်ငန်းတွင်လုပ်ကိုင်သူ ၁၀၀ ဦး၊ ကျပန်းလုပ်ကိုင်သူ ၈၀၀၀ ဦး နှင့် အခြားလုပ်ငန်းလုပ်ကိုင်သူ ၁၀၀၀၀ ဦးခန့် ရှိပါသည်။

မှော်ဘီမြို့နယ်တွင် နည်းပညာတက္ကသိုလ် (၁) ကျောင်း၊ အထက်တန်းကျောင်း (၁၄) ကျောင်း၊ အလယ်တန်းကျောင်း (၆) ကျောင်းနှင့် မူလတန်းကျောင်း (၁၂၄) ကျောင်း၊ ဘုန်းတော်ကြီးသင်ပညာရေးကျောင်း (၈) ကျောင်း နှင့် မူလတန်းကြိုကျောင်း(၁) ကျောင်းတို့ တည်ရှိပါသည်။ မှော်ဘီမြို့နယ်၏ ကျောင်းနေအရွယ် ကလေးများကျောင်းအပ်နှံမှုရာခိုင်နှုန်းမှာ (၇၃) ရာခိုင်နှုန်းဖြစ်ပြီး ၂၀၁၇ ခုနှစ်စစ်တမ်းများအရ တက္ကသိုလ်ဝင်တန်းအောင်မြင်မှုမှာ (၂၆.၃၃) ရာခိုင်နှုန်းဖြစ်ပါသည်။ မြို့နယ်အတွင်း အသက် (၁၅) နှစ် နှင့်အထက်လူဦးရေ ၁၂၈၀၁ ဦး ရှိပြီး စာတတ်မြောက်သူဦးရေ ၁၂၈၀၁ ဦး ဖြစ်ပါသဖြင့် စာတတ်မြောက်မှု ရာခိုင်နှုန်းမှာ (၁၀၀) ရာခိုင်နှုန်းဖြစ်ပါသည်။

မှော်ဘီမြို့နယ်တွင် အဝီစိတွင်းရေ၊ ပိုက်လိုင်း နှင့် ရေတွင်း(အုတ်စိ) ကန်များမှရေကို အဓိကထား အသုံးပြုကြသည်။ ထို့အပြင် အိမ်ထောင်စုများ၏ (၈၉) ရာခိုင်နှုန်းသည် သောက်ရေအတွက် ရေကောင်း ရေသန့် (ရေပိုက်လိုင်း၊ အဝီစိတွင်း၊ ရေတွင်း (အုတ်စိ)၊ ရေသန့်စက်/ရေသန့်ဘူး) ကို အသုံးပြုပါသည်။ လျှပ်စစ်မီးကိုအဓိကအသုံးပြုကြပြီး လျှပ်စစ်မီးမရရှိသည့် ကျေးရွာများတွင် ဖယောင်းတိုင်မီး၊ ရေနံဆီမီး နှင့်

ဆိုလာမီးတို့ကိုအသုံးပြုကြပါသည်။ ထမင်း၊ဟင်း ချက်ပြုတ်ရန် လောင်စာ အဖြစ် လျှပ်စစ်မီးကိုသာ အဓိကထားအသုံးပြုကြပြီး ကျေးလက်ဒေသများတွင် ထင်းကို အသုံးပြုကြပါသည်။ မှော်ဘီမြို့နယ် အတွင်းတွင် ဆေးရုံ (၃) ရုံ နှင့် ကျေးလက်ဆေးပေးခန်း (၅) ခု နှင့် ကျေးလက်ကျန်းမာရေး ဌာန/ဌာနခွဲ (၃၀)ခု ရှိပါသည်။

သက်ရောက်မှု ဆန်းစစ်ခြင်းနှင့် ကုစားခြင်း

ဇယား (က) ပတ်ဝန်းကျင်အပေါ် သက်ရောက်စေမည့် အကြောင်းအချက်များနှင့် သက်ရောက်မှုများ

စဉ်	လုပ်ငန်းစဉ်	သက်ရောက်မှု ဖြစ်ပေါ်စေသည့် အကြောင်းအချက်	သက်ရောက်မှု
၁	ကုန်ကြမ်းများ ကိုင်တွယ် သိုလှောင်ခြင်း	ကားပေါ်မှ ပစ္စည်းများ တင်၊ ချခြင်း	ထိခိုက်နိုင်မှု၊ ယာဉ်အန္တရာယ်
		ကုန်ကြမ်းပစ္စည်းများအား သန့်ရှင်းရေး ပြုလုပ်ခြင်း	ဖုန်၊ အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း
		အလေးအပင်မခြင်း	ထိခိုက်နိုင်မှု
၂	ကုန်ကြမ်းများ ကြိတ်ခွဲခြင်း	ကုန်ကြမ်းပစ္စည်းများကြိတ်ခြင်း	ဖုန်၊ အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း၊ ဆူညံသံ
		ကုန်ကြမ်းပစ္စည်းများအား စစ်ထုတ်သန့်စင်ခြင်း	ဖုန်၊ အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း၊ ဆူညံသံ
၃	ကျိုချက်ခြင်း	ကျိုချက်သောအိုးနှင့် ထိတွေ့ခြင်း	အပူလောင်နိုင်မှု၊ ထိခိုက်နိုင်မှု
		အင်ဇိုင်းနှင့်ထိတွေ့နိုင်မှု	ဓါတုပစ္စည်းအန္တရာယ်
		စက်ပစ္စည်းများမောင်းနှင်မှု	ဆူညံသံ
၄	စိမ်ရေဖောက်ခြင်း	ကာဗွန်ဒိုင်အောက်ဆိုဒ် ဖြစ်ပေါ်မှု	ကာဗွန်ဒိုင်အောက်ဆိုဒ်ထုတ်လွှတ်ခြင်း
		တဆေး စွန့်ပစ်မှု	အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း

၅	သန့်စင်ဆေးကြောခြင်း	ဓါတုပစ္စည်းများနှင့် ထိတွေ့နိုင်မှု	ထိခိုက်နိုင်မှု
		ဆေးကြောခြင်းမှ ထွက်ရှိလာသော ရေများ	စွန့်ပစ်ရေ
၆	ပေါင်းခံ၊ ခွဲထုတ်သန့်စင် ခြင်း	ပေါင်းခံ၊ ခွဲထုတ်သန့်စင် ခြင်း မှ ထွက်သောရေ	စွန့်ပစ်ရေ
		အနည်အနှစ်	အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း
		စက်ပစ္စည်းများမောင်းနှင်မှု	ဆူညံသံ
		အရက်ပြင်း သိုလှောင်ခြင်း	မီးဘေးအန္တရာယ်
၇	အခြားအသုံးပြုသော နည်းစနစ်များ	ဘွိုင်လာ အသုံးပြုခြင်း	အပူ
			အမှုန်အမွှား
			မီးဘေးအန္တရာယ်
			စွန့်ပစ်ရေ
			အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း
			ဆူညံသံ
		ရေသန့်စင်စနစ်	ထိခိုက်နိုင်မှု
			စွန့်ပစ်ရေ
			ဆူညံသံ
၈	ရေဆိုး သန့်စင်မှု စနစ်	ရေဆိုးသန့်စင်စနစ် လည်ပတ်ခြင်း	အနည်အနှစ်၊ ဓါတုပစ္စည်းများ နှင့် ထိတွေ့နိုင်မှု၊ ထိခိုက်နိုင်မှု၊ ရေ အရည်အသွေး ၊ ဆူညံသံ
၉	ဒီဇယ်သိုလှောင်ခြင်း	စက်သုံးဆီသိုလှောင်ခြင်း	ဆီယိုစိမ့်မှု

ဇယား (ခ) သက်ရောက်မှု လက္ခဏာများ

သက်ရောက်မှု	လက္ခဏာများ							
	သဘာဝ	ရင်းမြစ်	လက်ခံ	ပြင်းထန်မှု	ကြာချိန်	ပျံ့နှံ့မှု	ကြိမ်နှုန်း	ဖြစ်နိုင်ချေ
ဖုန်မှုန့်	ဆိုးကျိုး	<ul style="list-style-type: none"> - ကုန်ကြမ်းပစ္စည်းများအား သန့်ရှင်းရေးပြုလုပ်ခြင်း - ကုန်ကြမ်းပစ္စည်းများကြိတ်ခြင်း - ကုန်ကြမ်းပစ္စည်းများအား စစ်ထုတ်သန့်စင်ခြင်း 	လုပ်သား	အန္တရာယ်ရှိမှု အလွန် နည်းပါး	စက်ရုံ သက်တမ်းတလျှောက်	စက်ရုံ ဧရိယာ	နေ့စဉ် ရံဖန်ရံခါ	ဖြစ်နိုင်ချေရှိ
ထိခိုက်နိုင်မှု	ဆိုးကျိုး	<ul style="list-style-type: none"> - ကားပေါ်မှ ပစ္စည်းများချခြင်း - ပစ္စည်းများ ကြိတ်ခွဲခြင်း - အလေးအပင်မခြင်း - အမြင့်မှပြုတ်ကျ၊ ချော်ကျ နိုင်ခြင်း 	လုပ်သား	အန္တရာယ်ရှိမှု နည်းပါး	စက်ရုံ သက်တမ်းတလျှောက်	သက်ဆိုင်ရာ စက်အစိတ်အပိုင်းအနီး	နေ့စဉ် ရံဖန်ရံခါ	ဖြစ်နိုင်ချေရှိ

		- ကျိုချက်သောအိုး နှင့် ထိတွေ့ခြင်း						
မိတုပစ္စည်း အန္တရာယ်	ဆိုးကျိုး	- အင်ဇိုင်းနှင့်ထိတွေ့ နိုင်မှု - အက်စစ်နှင့် ကော့စတစ် ကဲ့သို့ သော မိတုပစ္စည်း များနှင့် ထိတွေ့မှု	လုပ်သား	အန္တရာယ်ရှိမှု နည်းပါး	စက်ရုံ သက်တမ်း တလျှောက်	သက်ဆိုင်ရာ စက်အစိတ်အပိုင်း အနီး	နေ့စဉ် ရံဖန်ရံခါ	ဖြစ်နိုင်ချေရှိ
ယာဉ် အန္တရာယ်	ဆိုးကျိုး	- ကားပေါ်မှ ပစ္စည်း များချခြင်း - ပစ္စည်းများ ကြိတ်ခွဲ ခြင်း	လုပ်သား	အန္တရာယ်ရှိမှု နည်းပါး	စက်ရုံ သက်တမ်း တလျှောက်	သက်ဆိုင်ရာ စက်အစိတ်အပိုင်း အနီး	နေ့စဉ် ရံဖန်ရံခါ	ဖြစ်နိုင်ချေရှိ
ဆူညံသံ	ဆိုးကျိုး	- ပစ္စည်းများ ကြိတ်ခွဲ ခြင်း - စက်ပစ္စည်းများ မောင်းနှင်ခြင်း	လုပ်သား	အန္တရာယ်ရှိမှု အလွန် နည်းပါး	စက်ရုံ သက်တမ်း တလျှောက်	စက်ရုံ ဧရိယာ	နေ့စဉ် တောက်လျှောက်	ဖြစ်နိုင်ချေရှိ
မီးဘေး အန္တရာယ်	ဆိုးကျိုး	- ဘွိုင်လာ အသုံးပြုခြင်း	လုပ်သားများနှင့် စက်ရုံဝင်း	အန္တရာယ်ရှိ	စက်ရုံ သက်တမ်း တလျှောက်	စက်ရုံ ဧရိယာ	နေ့စဉ် တောက်လျှောက်	ဖြစ်နိုင်ချေရှိ

		- ပစ္စည်းများကြိတ်ခွဲခြင်း						
အပူ	ဆိုးကျိုး	- ကျိုချက်သောအိုးနှင့် ထိတွေ့ခြင်း - ဘွိုင်လာအသုံးပြုခြင်း	လုပ်သား	အန္တရာယ်ရှိမှု အလွန် နည်းပါး	စက်ရုံ သက်တမ်း တလျှောက်	သက်ဆိုင်ရာ စက်အစိတ်အပိုင်း အနီး	နေ့စဉ် တောက်လျှောက်	ဖြစ်နိုင်ချေရှိ
အမှုန်အမွှား	ဆိုးကျိုး	- ဘွိုင်လာ အသုံးပြုခြင်း - ကာဗွန်ဒိုင်အောက်ဆိုဒ် ထုတ်လွှတ်မှု	လုပ်သားများနှင့် အနီး ပတ်ဝန်းကျင်	အန္တရာယ်ရှိမှု အလွန် နည်းပါး	စက်ရုံ သက်တမ်း တလျှောက်	အနီးပတ်ဝန်းကျင်	နေ့စဉ် တောက်လျှောက်	ဖြစ်နိုင်ချေနည်းပါး
အစိုင်အခဲ စွန့်ပစ်ပစ္စည်း	ဆိုးကျိုး	- ကုန်ကြမ်းပစ္စည်းများအား သန့်ရှင်းရေးပြုလုပ်ခြင်း - ကုန်ကြမ်းပစ္စည်းများကြိတ်ခွဲခြင်း - ကုန်ကြမ်းပစ္စည်းများအား စစ်ထုတ်သန့်စင်ခြင်း - တစေး စွန့်ပစ်မှု	လုပ်သားများနှင့် အနီး ပတ်ဝန်းကျင်	အန္တရာယ်ရှိမှု နည်းပါး	စက်ရုံ သက်တမ်း တလျှောက်	အနီးပတ်ဝန်းကျင်	နေ့စဉ် တောက်လျှောက်	ဖြစ်နိုင်ချေရှိ

		- ရေဆိုးသန့်စင်စနစ် ပေါင်းခံ၊ ခွဲထုတ် သန့်စင်ခြင်း၊ အရက်ချက်ခြင်းမှ အနည်အနှစ်များ						
ရေဆိုး	ဆိုးကျိုး	- ပေါင်းခံ၊ ခွဲထုတ် သန့်စင်ခြင်းမှထွက် သောရေ - ရေဆိုးသန့်စင်စနစ်	လုပ်သားများနှင့် အနီး ပတ်ဝန်းကျင်	အန္တရာယ်ရှိမှု နည်းပါး	စက်ရုံ သက်တမ်း တလျှောက်	အနီးပတ်ဝန်းကျင်	နေ့စဉ် တောက်လျှောက်	ဖြစ်နိုင်ချေရှိ

ဇယား (ဂ) ကုစားရန် နည်းလမ်းများ

သက်ရောက်မှု	ရင်းမြစ်	ကုစားခြင်း
မီးဘေးအန္တရာယ်	- ဘွိုင်လာ - စက်ပစ္စည်းများအသုံးပြုခြင်း	- မီးသတ်ကိရိယာများ လုံလောက်စွာ စီစဉ်ထားရှိခြင်း - မီးသတ်တပ်ဖွဲ့ဖွဲ့စည်းခြင်း
ရေဆိုး	- ပေါင်းခံ၊ ခွဲထုတ်သန့်စင် ခြင်း - ဆေးကြောရေများ - ရေဆိုးသန့်စင်စနစ်	- ရေဆိုးများကိုစနစ်တကျသန့်စင်စွန့်ပစ်ခြင်း - ရေဆိုးသန့်စင်မှုစနစ်အား အမြဲမပြတ် စောင့်ကြပ် ကြည့်ရှုခြင်း
ဆူညံသံ	- ကုန်ကြမ်းပစ္စည်းများ ကြိတ်ခွဲခြင်း - စက်ပစ္စည်းများမောင်းနှင်ခြင်း	- စက်ပစ္စည်းများအား ပုံမှန် ပြုပြင် ထိန်းသိမ်းမှုများ ပြုလုပ်ခြင်း - လုပ်သားများအတွက် နားကြပ်များ စီစဉ်ပေးခြင်း - လုပ်သားများ နားကြပ်များ အသုံးပြုမှု ရှိမရှိ စောင့်ကြပ် ကြည့်ရှုခြင်း
လေထုညစ်ညမ်းမှု	- ဘွိုင်လာ - ကာဗွန်ဒိုင်အောက်ဆိုဒ် ထုတ်လွှတ်မှု	- ဘွိုင်လာစနစ်တကျ လည်ပတ်ခြင်း - လေထုအရည်အသွေးအား သတ်မှတ်ထား သော အချိန်များတွင်တိုင်းတာမှုများ ပြုလုပ်ခြင်း
အပူ	- ကျိုချက်သော အိုးနှင့် ထိတွေ့ခြင်း - ဘွိုင်လာ	- လုပ်သားများအတွက် လက်အိတ်များ စီစဉ်ပေးခြင်း - လုပ်သားများ လက်အိတ်အသုံးပြုမှု ရှိ၊ မရှိ စောင့်ကြပ် ကြည့်ရှုခြင်း
အစိုင်အခဲစွန့်ပစ်ပစ္စည်း	- ကုန်ကြမ်းပစ္စည်း များအား သန့်ရှင်းရေး ပြုလုပ်ခြင်း	- YCDC မှခွင့်ပြုချက်ရရှိထားသော အမှိုက်ပုံတွင် စနစ်တကျစွန့်ပစ်ခြင်း

	<ul style="list-style-type: none"> - ကုန်ကြမ်းပစ္စည်း များကြိတ်ခွဲခြင်း - ကုန်ကြမ်းပစ္စည်း များအား စစ်ထုတ် သန့်စင်ခြင်း - တစေး စွန့်ပစ်မှု - ရေဆိုးသန့်စင်စနစ် ပေါင်းခံ၊ ခွဲထုတ် သန့်စင်ခြင်း၊ အရက် ချက်ခြင်းမှ အနည်အနှစ်များ 	<ul style="list-style-type: none"> - ပြန်လည်အသုံးပြု၍ ရသောစွန့်ပစ်ပစ္စည်းများအား တိရိစ္ဆာန်အစာအဖြစ် အသုံးပြုခြင်း
ထိခိုက်နိုင်မှု	<ul style="list-style-type: none"> - ကားပေါ်မှ ပစ္စည်း များချခြင်း - ပစ္စည်းများ ကြိတ်ခွဲ ခြင်း - အလေးအပင်မခြင်း - အမြင့်မှပြုတ်ကျ၊ ချော်ကျ နိုင်ခြင်း - ကျိုချက်သောအိုး နှင့် ထိတွေ့ခြင်း 	<ul style="list-style-type: none"> - လုပ်သားများအတွက် လိုအပ်သည့် လုပ်ငန်းခွင်အန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများ စီစဉ်ပေးခြင်း - လုပ်ငန်းခွင်အန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများ အသုံးပြုခြင်းနှင့်ပတ်သတ်၍ ပညာပေးအစီအစဉ်များပြုလုပ်ပေးခြင်း - လုပ်ငန်းခွင်အန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများ အသုံးပြုမှု ရှိမရှိ စောင့်ကြပ်ကြည့်ရှုခြင်း
ဓါတုပစ္စည်းအန္တရာယ်	<ul style="list-style-type: none"> - အင်ဇိုင်းနှင့်ထိတွေ့နိုင်မှု - အက်စစ်နှင့် ကေ့စတစ် ကဲ့သို့သော ဓါတုပစ္စည်း များနှင့် ထိတွေ့မှု 	<ul style="list-style-type: none"> - ဓါတုပစ္စည်းများနှင့် ဆက်စပ်သောပစ္စည်းများ၏ အန္တရာယ်ရှိပုံများကို လုပ်သားများအား အသိပညာပေးခြင်း
ယာဉ်အန္တရာယ်	<ul style="list-style-type: none"> - ကားပေါ်မှ ပစ္စည်း များချခြင်း - ပစ္စည်းများ ကြိတ်ခွဲ ခြင်း 	<ul style="list-style-type: none"> - မော်တော်ယာဉ်များတွင် ကားနောက်ဆုတ် သတိပေးသံ စနစ် တပ်ဆင်ခြင်း - မော်တော်ယာဉ်များအား အမြဲမပြတ် ထိန်းသိမ်းမှု ပြုလုပ်ခြင်း - လုပ်ငန်းခွင်ဧရိယာအတွင်း တစ်နာရီ ၁၅ ကီလိုမီတာ နှုန်းဖြင့်မောင်းနှင်ရန်

ဖုန်မှုန့်	<ul style="list-style-type: none"> - ကုန်ကြမ်းပစ္စည်း များအား သန့်ရှင်းရေး ပြုလုပ်ခြင်း - ကုန်ကြမ်းပစ္စည်း များကြိတ်ခြင်း - ကုန်ကြမ်းပစ္စည်း များအား စစ်ထုတ် သန့်စင်ခြင်း 	<ul style="list-style-type: none"> - လုပ်သားများအတွက် နှာခေါင်းစည်းများ စီစဉ်ပေးခြင်း - လုပ်သားများ နှာခေါင်းစည်း အသုံးပြုမှု ရှိမရှိ စောင့်ကြပ် ကြည့်ရှုခြင်း - ဖုန်မှုန့်ထွက်ရှိနိုင်သောနေရာများအား ပုံမှန် သန့်ရှင်းရေးပြုလုပ်ပေးခြင်း
မြေတိုက်စားမှု	<ul style="list-style-type: none"> - စက်သုံးဆီသိုလှောင်ခြင်းမှ ဆီယိုစိမ့်မှု - စက်ပစ္စည်းများမောင်းနှင်ခြင်း မှ ဆီယိုစိမ့်မှု 	<ul style="list-style-type: none"> - လောင်စာဆီများကိုစနစ်တကျ သိုလှောင် ထားရှိခြင်း - လောင်စာဆီသိုလှောင်ထားရှိသည့် ပစ္စည်း များအား ပုံမှန်စစ်ဆေးခြင်း - စက်ပစ္စည်း နှင့် အင်ဂျင်များအား စနစ်တကျမောင်းနှင်ခြင်း - စက်ပစ္စည်း နှင့် အင်ဂျင်များအား အမြဲမပြတ်စစ်ဆေးခြင်း

စောင့်ကြပ်ကြည့်ရှုခြင်း

ဇယား (ဃ) စောင့်ကြပ်ကြည့်ရှုခြင်းအစီအစဉ်

စဉ်	စောင့်ကြပ်ကြည့်ရှုရန်	စောင့်ကြပ်ကြည့်ရှုရမည့် နေရာ	ကြိမ်နှုန်း	တာဝန်ရှိပုဂ္ဂိုလ်၊ အဖွဲ့အစည်း
၁	မီးသတ်ကိရိယာများ လုံလောက်စွာ စီစဉ် ထားရှိခြင်း	Grand Royal Group International Factory	လစဉ်	Fire Safety Dept
၂	မီးသတ်ကိရိယာများကို ပုံမှန်ကြည့်ရှုစစ်ဆေးခြင်း	Grand Royal Group International Factory	နှစ်စဉ်	Fire Safety Dept
၃	မီးသတ်အဖွဲ့ဖွဲ့စည်းခြင်း	မီးသတ်တပ်ဖွဲ့ - admin records	နှစ်စဉ်	Fire Safety Dept
၄	မီးသတ်သင်တန်းများ ပို့ချခြင်း	သင်တန်းပို့ချခြင်း မှတ်တမ်း	နှစ်စဉ်	Fire Safety Dept

၅	မီးငြိမ်းသတ်ရေးလေ့ကျင့်ခန်းများအား ပုံမှန်လေ့ကျင့်မှုများ ပြုလုပ်ပေးခြင်း	မီးသတ်တပ်ဖွဲ့ - admin records	နှစ်စဉ်	Fire Safety Dept
၆	ကွန်ကရစ်သိုလှောင်ကန်များဖြင့် ဓါတ်ဆီသိုလှောင်ခြင်း	Grand Royal Group International Factory	တစ်ကြိမ်/ ပြန်လည်စစ်ဆေးရန်	Operation Manager
၇	ကွန်ကရစ်သိုလှောင်ကန်များအား ပုံမှန်စစ်ဆေးခြင်း	Grand Royal Group International Factory	နေ့စဉ်	GM
၈	စက်ပစ္စည်းများစနစ်တကျ မောင်းနှင်ရန် လုပ်သားများအား အသိပညာပေးခြင်း	Admin records	နှစ်စဉ်	Management Officer
၉	စက်ပစ္စည်းများအား ပုံမှန် ပြုပြင် ထိန်းသိမ်းမှုများ ပြုလုပ်ခြင်း	Grand Royal Group International Factory Admin records	တစ်နှစ် လေးကြိမ်	Management Officer
၁၀	ဇီဝဆိုင်ရာ အောက်ဆီဂျင် လိုအပ်ချက်	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	လစဉ်	D&D Dept
၁၁	ဓာတုဆိုင်ရာအောက်ဆီဂျင် လိုအပ်ချက်	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	နေ့စဉ်	D&D Dept
၁၂	ချဉ်ဖန်ကိန်း	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	နေ့စဉ်	D&D Dept
၁၃	စုစုပေါင်းပိုးအရေအတွက်	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	နေ့စဉ်	D&D Dept
၁၄	ဆိုင်းကြွအနည်	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	အပတ်စဉ်	D&D Dept
၁၅	စုစုပေါင်းနိုက်ဒရိုဂျင်	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	အပတ်စဉ်	D&D Dept
၁၆	မီးစုန်းဓါတ်	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	အပတ်စဉ်	D&D Dept
၁၇	စက်ဆီနှင့် ချောဆီ	ရေဆိုးသန့်စင်စနစ်မှ စွန့်ထုတ်ရေ	၆လ တစ်ကြိမ်	D&D Dept
၁၈	ဆူညံသံ	Grand Royal Group International Factory	သုံးလ တစ်ကြိမ်	Plant Manager
၁၉	ပြုပြင်ထိန်းသိမ်းမှုမှတ်တမ်း	Grand Royal Group International Factory	တစ်နှစ် လေးကြိမ်	Plant Manager

၂၀	လုပ်ငန်းခွင်အားနေ့စဉ်ကြည့်ရှုစစ်ဆေးခြင်း	Grand Royal Group International Factory	နေ့စဉ်	Plant Manager
၂၁	လုပ်သားများအတွက် နားကြပ်များ စီစဉ်ပေးခြင်း	ဆူညံသံမြင့်မားသော ဧရိယာတွင် အလုပ်လုပ်သော အလုပ်သမားများ	လိုအပ်သလို	Admin Dept
၂၂	နားကြပ်များ ပျက်စီးမှု ရှိမရှိ ပုံမှန်စောင့်ကြပ်ကြည့်ရှုခြင်း	အသံဆူညံသောဧရိယာ တွင် အလုပ်လုပ်သော အလုပ်သမားများ	နေ့စဉ်	Plant Manager
၂၃	လုပ်သားများ နားကြပ်တပ်ဆင်မှု ရှိ၊ မရှိ စစ်ဆေးခြင်း	အသံဆူညံသောဧရိယာ တွင် အလုပ်လုပ်သော အလုပ်သမားများ	နေ့စဉ်	Plant Manager
၂၄	နိုက်ဒရိုဂျင်ဒိုင်အောက်ဆိုဒ်	Grand Royal Group International Factory	တစ်နှစ် နှစ်ကြိမ်	HSE Dept
၂၅	အိုဇုန်း	Grand Royal Group International Factory	တစ်နှစ် နှစ်ကြိမ်	HSE Dept
၂၆	PM ₁₀	Grand Royal Group International Factory	တစ်နှစ် နှစ်ကြိမ်	HSE Dept
၂၇	PM _{2.5}	Grand Royal Group International Factory	တစ်နှစ် နှစ်ကြိမ်	HSE Dept
၂၈	ဆာလဖာဒိုင် အောက်ဆိုဒ်	Grand Royal Group International Factory	တစ်နှစ် နှစ်ကြိမ်	HSE Dept
၂၉	လုပ်သားများအတွက် လက်အိတ်များ စီစဉ် ပေးခြင်း	ကျိုချက်သော အိုးနှင့် ဘွိုင်လာတို့အား ထိတွေ့ ကိုင်တွယ် ရသော အလုပ်သမားများ Admin Record	လစဉ်	Admin Dept
၃၀	လုပ်သားများ လက်အိတ် အသုံးပြုမှု ရှိ၊ မရှိ စစ်ဆေးခြင်း	Grand Royal Group International Factory အတွင်းရှိ အလုပ်သမား များ	နေ့စဉ်	HSE Dept
၃၁	လုပ်ငန်းခွင်အန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများ အသုံးပြုခြင်း နှင့် ပတ်သတ်၍ ပညာပေး အစီအစဉ်များ ပြုလုပ်ပေးခြင်း	သင်တန်းပို့ချခြင်း မှတ်တမ်း	နှစ်စဉ်	HSE Dept

၃၂	လုပ်ငန်းခွင်အန္တရာယ်ကာကွယ်ရေး ပစ္စည်းများ အသုံးပြုမှု ရှိမရှိ စစ်ဆေးခြင်း	Grand Royal Group International Factory အတွင်းရှိ အလုပ်သမား များ	နေ့စဉ်	HSE Dept
၃၃	လုပ်ငန်းခွင်ဧရိယာအတွင်း တစ်နာရီ ၁၅ မိုင်နှုန်းဖြင့် မောင်းနှင်ရန် စည်းကမ်းများ ချမှတ်ခြင်း	Grand Royal Group International Factory အတွင်းရှိ ယာဉ်များ	နေ့စဉ်	Maintenance Dept
၃၄	ဒရိုင်းဘာများအား လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေး ပညာပေး အစီအစဉ် များအား ပြုလုပ်ပေးခြင်း	Grand Royal Group International Factory မှ ဒရိုင်းဘာများ	တစ်ကြိမ်	Maintenance Dept
၃၅	လုပ်ငန်းခွင်ဧရိယာအတွင်း တစ်နာရီ ၁၅မိုင် နှုန်းဖြင့် မောင်းနှင်ရန် ပုံမှန်ကြည့်ရှု စစ်ဆေးခြင်း	Grand Royal Group International Factory အတွင်းရှိ ယာဉ်များ	နေ့စဉ်	Maintenance Dept
၃၆	မော်တော်ယာဉ်များတွင်ကား နောက်ဆုတ် သတိပေးသံ စနစ် တပ်ဆင်ခြင်း	Grand Royal Group International Factory အတွင်းရှိ ယာဉ်များ	တစ်ကြိမ်	Maintenance Dept
၃၇	စက်ပစ္စည်းများအား ပုံမှန် ပြုပြင် ထိန်းသိမ်းမှုများ ပြုလုပ်ခြင်း	Grand Royal Group International Factory အတွင်းရှိ ယာဉ်များ	လစဉ်	Maintenance Dept
၃၈	ဘွိုင်လာမှထွက်ရှိသော ပြာများအား သတ်မှတ်ထားသော ဧရိယာတွင်စွန့်ပစ်ခြင်း	စွန့်ပစ်ဧရိယာ	နေ့စဉ်	Boiler Dept
၃၉	စွန့်ပစ်ဧရိယာအားပုံမှန်စစ်ဆေးခြင်း	စစ်ဆေးမှုမှတ်တမ်း	နေ့စဉ်	Boiler Dept
၄၀	စွန့်ပစ်ဧရိယာတွင် ဘွိုင်လာမှ ထွက်ရှိသော ပြာများပျံ့လွင့်မှု မရှိစေရန် စောင့်ကြပ်ကြည့်ရှု စစ်ဆေးခြင်း	စစ်ဆေးမှုမှတ်တမ်း	အပတ်စဉ်	Maintenance Dept
၄၁	YCDC မှခွင့်ပြုချက်ရရှိထားသော ထိန်ပင် အမှိုက်ပုံတွင် စနစ်တကျ စွန့်ပစ်ခြင်း	Cullet plant	နေ့စဉ်	CFD & WWT Dept
၄၂	ပြန်လည်အသုံးပြု၍ ရသော စွန့်ပစ် ပစ္စည်း များအား တိရိစ္ဆာန် အစာအဖြစ်အသုံးပြုခြင်း	Cullet plant	နေ့စဉ်	CFD & WWT Dept

၄၃	ခါတုပစ္စည်းများနှင့် ဆက်စပ်သော ပစ္စည်း များ၏ အန္တရာယ်ရှိပုံများကို လုပ်သားများ အား အသိပညာပေးခြင်း	သင်တန်းပို့ချခြင်း မှတ်တမ်း	တစ်ကြိမ်	Plant Manager
၄၄	ခါတုပစ္စည်းကိုင်တွယ်အသုံးပြုမှုအတွက် လိုအပ်သော လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေး အထောက်အကူပြုပစ္စည်းများ အား ထောက်ပံ့ပေးခြင်း	- PPE အသုံးပြုမှုမှတ်တမ်း	လိုအပ်သလို	HSE Dept
၄၅	လုပ်သားများအတွက် နှာခေါင်းစည်းများ စီစဉ်ပေးခြင်း	ဖုန်းမှုန့်ထွက်ရှိနိုင်သော ဧရိယာတွင် အလုပ်လုပ်သော အလုပ်သမားများ Admin Record	လစဉ်	HSE Dept
၄၆	ဖုန်းမှုန့်ထွက်ရှိနိုင်သောနေရာများ အား အမြဲမပြတ် သန့်ရှင်းရေး ပြုလုပ်ပေးခြင်း	Grand Royal Group International Factory	နေ့စဉ်	HSE Dept
၄၇	စက်ရုံမှ ယာဉ်များအား ကားကြပ်နိုင်သောနေရာများအားရှောင်းရှား မောင်းနှင်စေခြင်း	အလုပ်သမားများ	နေ့စဉ်	Driver
၄၈	အနီးပတ်ဝန်းကျင်ရှိကျေးရွာများ အား နှစ်စဉ် ကျန်းမာရေး စောင့်ရှောက်မှုပေးခြင်း	အနီးပတ်ဝန်းကျင်	နှစ်စဉ်	HSE Dept

ခန့်မှန်း ကုန်ကျစရိတ်

သက်ရောက်မှု ကုစားရန်နည်းလမ်းများ၊ အကောင်အထည်ဖော်ဆောင်ရွက်ရမည့် အစီအစဉ် များကို EMP အစီရင်ခံစာတွင် အသေးစိတ်တင်ပြထားပါသည်။ ရန်ကုန်အရက်ချက်စက်ရုံ အနေဖြင့် တစ်လုံးတည်း ကုန်ကျစရိတ် ကျပ် ၅,၇,၀၀,၀၀၀ နှင့် နှစ်စဉ်ကုန်ကျစရိတ် ၄၉,၀၀၀,၀၀၀ ကျပ်ကို EMP အကောင်အထည် ဖော်ရာတွင် အသုံးပြုရန် လျာထားပါသည်။

စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသည့် ဒေသခံပြည်သူများအတွက် ဆောင်ရွက်ပေးခဲ့သည့်ဒေသဖွံ့ဖြိုးရေးအစီအစဉ်များ၊ စီမံကိန်းကြောင့် ထိခိုက်ခံစားရသည့် ဒေသခံပြည်သူများအတွက် ဆောင်ရွက်ပေးမည့်ဒေသဖွံ့ဖြိုးရေးအနာဂတ်အစီအစဉ်များနှင့် သတ်မှတ်ရန်ပုံငွေလျာထားချက်လုံလောက်ခြင်းမရှိပါက ဖြည့်စွက်ဆောင်ရွက်မည့်အစီအစဉ်များကို APPENDIX-H တွင်ထည့်သွင်းဖော်ပြထားပါသည်။

ဇယား (င) EMP အကောင်အထည်ဖော်ရန်နှင့် စောင့်ကြပ်ကြည့်ရှုရန် ခန့်မှန်း ကုန်ကျစရိတ်

စဉ်	စီမံခန့်ခွဲမှု ဆောင်ရွက်ချက်	ကုန်ကျစရိတ်
၁	မီးသတ်ပစ္စည်း ကိရိယာများ လုံလောက်အောင် တပ်ဆင်ခြင်း	၃၀၀၀၀၀/yr
၂	မီးသတ်ပစ္စည်း ကိရိယာများ ပုံမှန်စစ်ဆေးခြင်း	၅၀၀၀၀၀/yr
၃	မီးသတ်တပ်ဖွဲ့ဖွဲ့စည်းခြင်း	၅၀၀၀၀၀/yr
၄	မီးသတ်သင်တန်းပေးခြင်း	၁၀၀၀၀၀/yr
၅	မီးသတ်ပစ္စည်း အသုံးပြုမှုသင်တန်းပေးခြင်း	၃၀၀၀၀၀/yr
၆	ရေဆိုးသန့်စင်စနစ်အား စနစ်တကျလည်ပတ်ခြင်း	၁၂၀၀၀၀၀၀/yr
၇	စွန့်ပစ်ရေ အရည်အသွေးကိုပုံမှန်စောင့်ကြပ်ကြည့်ရှုခြင်း	၂၀၀၀၀၀၀/yr
၈	လုပ်ငန်းခွင်အတွင်း အသံဆူညံမှုကို ပုံမှန် တိုင်းတာ စစ်ဆေးခြင်း	၁၀၀၀၀၀
၉	စက်ပစ္စည်းများကိုပုံမှန် ပြုပြင်ထိန်းသိမ်းမှုများပြုလုပ်ခြင်း	၅၀၀၀၀၀၀/yr
၁၀	နားကြပ်များစီစဉ်ပေးခြင်း	၁၀၀၀၀၀/yr
၁၁	လေထုအရည်အသွေး တိုင်းတာ စစ်ဆေးမှုများ ပုံမှန် ပြုလုပ်ခြင်း	၂၀၀၀၀၀၀/yr
၁၂	လုပ်သားများအတွက် လက်အိတ်များစီစဉ်ပေးခြင်း	၁၀၀၀၀၀/yr
၁၃	လုပ်သားများအတွက် လုပ်ငန်းခွင် အန္တရာယ် ကင်းရှင်းရေး သင်တန်းပေးခြင်း	၅၀၀၀၀၀/yr
၁၄	မော်တော်ယာဉ်များတွင် ကားနောက်ဆုတ်သတိပေးသံ စနစ် တပ်ဆင်ခြင်း	၆၀၀၀၀၀
၁၅	မော်တော်ယာဉ်များအား ပုံမှန်စစ်ဆေးခြင်း	၃၀၀၀၀၀၀/yr
၁၆	ဘွိုင်လာမှထွက်ရှိသောပြာများကို စနစ်တကျစွန့်ပစ်ခြင်း	၃၀၀၀၀၀/yr
၁၇	အမှိုက်များအား သတ်မှတ်ထားသောအမှိုက်ပုံတွင်စနစ်တကျစွန့်ပစ်ခြင်း	၂၂၀၀၀၀၀/yr
၁၈	ဓါတုပစ္စည်းနှင့် ဆက်စပ်သောပစ္စည်းဆိုင်ရာများ အသိပညာပေးခြင်း	၃၀၀၀၀၀/yr
၁၉	ဓါတုပစ္စည်းများကိုင်တွယ်ရသောလုပ်သားများအတွက် လိုအပ်သော လုပ်ငန်းခွင်အန္တရာယ် ကာကွယ်ရေး ပစ္စည်းများ စီစဉ်ပေးခြင်း	၃၀၀၀၀၀/yr
၂၀	လုပ်သားများအတွက် လိုအပ်သော လုပ်ငန်းခွင်အန္တရာယ် ကာကွယ်ရေး ပစ္စည်းများ စီစဉ်ပေးခြင်း	၆၀၀၀၀၀/yr
၂၁	ဖုန်မှုန့်ထွက်ရှိနိုင်သောနေရာများအား ပုံမှန် သန့်ရှင်းရေးပြုလုပ်ပေးခြင်း	၃၀၀၀၀၀/yr
၂၂	လောင်စာဆီများကို ကွန်ကရစ် သိုလှောင်ကန်များဖြင့်သိုလှောင်ခြင်း	၅,၀၀၀,၀၀၀
၂၃	ဒေသခံများအားနှစ်စဉ်ကန်းမာရေးစောင့်ရှောက်မှုများပြုလုပ်ပေးခြင်း	၅,၀၀၀,၀၀၀/yr
၂၄	စက်ရုံဝင်းအတွင်းရှိယာဉ်များအား ပုံမှန်စစ်ဆေးမှုများပြုလုပ်ပေးခြင်း	၃,၀၀၀,၀၀၀/yr
၂၅	စက်ရုံဝင်းအတွင်းရှိယာဉ်များအား အဖုံး၊ အကာများတပ်ဆင်ပေးခြင်း	၁,၀၀၀,၀၀၀

၂၆	စက်ရုံတွင်းချမှတ်ထားသောစည်းကမ်းများအားနားလည်သဘောပေါက်စေရန် သင်တန်းများ ပို့ချခြင်း	၅၀၀,၀၀၀/yr
တစ်လုံးတည်းကုန်ကျငွေ		၇၀၀၀၀၀
နှစ်စဉ် ကုန်ကျငွေ		၄၉,၀၀၀,၀၀၀

ပတ်ဝန်းကျင်ထိခိုက်မှုအစီအစဉ်စီမံခန့်ခွဲမည့်အဖွဲ့အစည်း

Grand Royal Group International Co., Ltd သည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီရင်ခံစာ တွင် ပါရှိသည့် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်များ အကောင်အထည်ဖော်ရာတွင် စောင့်ကြပ်ကြည့်ရှုရန် ပတ်ဝန်းကျင် ထိခိုက်မှု စီမံခန့်ခွဲရေးအဖွဲ့အစည်းအား ဖွဲ့စည်းခဲ့ပါသည်။ ပတ်ဝန်းကျင် ထိခိုက်မှု စီမံခန့်ခွဲရေးအဖွဲ့အစည်း၏ ဖွဲ့စည်းပုံဇယားအား ပုံ (၅၇) တွင်ဖော်ပြထားပြီး ဖွဲ့စည်းပုံဇယားတွင်ပါဝင်သောအဖွဲ့ဝင်များ၏ တာဝန်နှင့် ဝတ္တရားများကို Appendix E တွင်ဖော်ပြထားပါသည်။

ဇယား(၈). ပတ်ဝန်းကျင်ထိခိုက်မှုစီမံခန့်ခွဲရေးအဖွဲ့

Sr.	Representative	Number
1	Plant Manager	1
2	Project Manager	1
3	HSE Manager	1
4	Head of Department (Admin Dept)	1
5	Head of Department (HR Dept)	1
6	Head of Department (Finance Dept)	1
7	Head of Department (CFD & WWT Dept)	1
8	Head of Department (Store Dept)	1
9	Head of Department (D&D Dept)	1
10	Head of Department (Maintenance Dept)	1

လူထုတွေ့ဆုံပွဲ (ဒေသခံပြည်သူများနှင့် တိုင်ပင်ဆွေးနွေးခြင်း)

ဒေသခံပြည်သူများနှင့် တိုင်ပင်ဆွေးနွေးခြင်း ကို ၂၀၁၉ခုနှစ်၊ ဒီဇင်ဘာလ၊ (၈) ရက်နေ့တွင် စက်ရုံ ဧရိယာဝင်း အတွင်းရှိ စက်ရုံစားသောက်ခန်းမ တွင် ပြုလုပ်ကျင်းပခဲ့ပါသည်။ အခန်းအနားကို Grand Royal Group International Co., Ltd. မှ စက်ရုံမှူး ဦးစိုးမိုး မှ အဖွင့်နှုတ်ခွန်းဆက်စကားပြောကြားခြင်းနှင့်

လက်ရှိစက်ရုံ၏ လုပ်ငန်းလည်ပတ်ဆောင်ရွက်မှု အခြေအနေများကို ရှင်းလင်းတင်ပြခဲ့ပါသည်။ ထို့နောက် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး အတိုင်ပင်ခံ အသင်းမှ ဦးရန်နိုင်အောင် မှ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်ရေး ဆွဲခြင်း လုပ်ငန်းဆိုင်ရာများကို ရှင်းလင်းတင်ပြပြီး၊ ကြွရောက်လာသော ဒေသခံ ပြည်သူများနှင့် အပြန်အလှန် မေးမြန်းဆွေးနွေးခြင်းများပြုလုပ်ခဲ့ပါသည်။ လူထုတွေ့ဆုံပွဲသို့ စက်ရုံပတ်ဝန်းကျင်ရှိ ကျေးရွာ များမှ ဒေသခံများ၊ စက်ရုံမှတာဝန်ရှိသူများ၊ ဝန်ထမ်းများ၊ ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးအတိုင်ပင်ခံ အင်ဂျင်နီယာ အသင်း (ရန်ကုန်) မှ တာဝန်ရှိသူများ အပါအဝင် စုစုပေါင်း (၅၀) ဦးတက်ရောက်ခဲ့ပြီး သက်ဆိုင်ရာ တာဝန်ရှိသူများနှင့် ဆွေးနွေးမှုများ ပြုလုပ်ခဲ့ပါသည်။ တွေ့ဆုံပွဲတွင် ဒေသခံလူထုမှ ဆွေးနွေးအကြံပြုချက်များ မရှိခဲ့ပဲ အကြံပြုစာ (၈) စောင်သာ ရရှိခဲ့ပါသည်။

ဒေသခံပြည်သူများနှင့် တိုင်ပင်ဆွေးနွေးခြင်း မှ ရရှိသည့် အကြံပြုချက်များအကျဉ်းချုပ်မှာ အောက်ဖော် ပြပါ အတိုင်း ဖြစ်ပါသည်။

- Grand Royal ၏ မီးဘေးအန္တရာယ် ကြိုတင်ကာကွယ်မှု အစီအစဉ်၊ စက်ရုံမှ ထွက်သော ရေဆိုးများ ကြောင့် သီးနှံပင်များ ပျက်စီးသွားသော လယ်သမားများအတွက် လျော်ကြေးကိစ္စ နှင့် လယ်သမားများကို ကူညီဆောင်ရွက် ပေးရန် တောင်းဆိုခြင်း။
- စက်ရုံပတ်ဝန်းကျင် လယ်မြေ (၅၀) ဧကခန့်ကို စက်ရုံမှ ဝယ်ယူပေးပါရန်။
- စက်ရုံအနေနှင့် အနံ့အသက် ထွက်ရှိမှုသက်သာစေရန် ခေတ်မီနည်းစနစ်များနှင့် ကြိုးစားလုပ်ကိုင် နေကြောင်း၊ ကျေးရွာလိုအပ်ချက်ဖြစ်သည့် လျှပ်စစ်မီး၊ သောက်ရေသန့်တို့ကို အထောက်အကူပေး၍ ဝမ်းသာကြောင်း၊ အထက်သဲကုန်ကျေးရွာတွင် ပေ ၇၅၀ ခန့်လမ်းခင်းပေးစေလိုကြောင်း၊ ဘာသာရေး ကျောင်းဆောင်သစ် အတွက် အလှူငွေထည့်ဝင်ပေးပါရန်၊ အောက်သဲကုန်ကျေးရွာကွင်း လိပ္ပာတ် ကျေးရွာ အတွက် သောက်ရေသန့်စက် တစ်လုံး လှူပေးပါရန်။
- စက်ရုံရှိကားလမ်းအား ပိတ်ဆို့မှုမရှိစေရန် ဆောင်ရွက်ပေးရန် တောင်းဆိုခြင်းတို့ဖြစ်ပါသည်။

အသေးစိတ် အကြောင်းအရာများကို အခန်း (၆) နှင့် APPENDIX F (Public Meeting) တွင်ဖော်ပြထားပါသည်။

နိဂုံး

နိဂုံးချုပ်အနေဖြင့် စီမံကိန်းအကောင်အထည်ဖော်ဆောင်ရွက်သူသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အစီအရင် ခံစာတွင်ပါရှိသည့်အဆိုပြုချက်များကိုအပြည့်အဝ လိုက်နာဆောင်ရွက် အကောင်အထည်ဖော် ဆောင်ရွက်ရမည် ဖြစ်ပြီး၊ ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်၏ လမ်းညွှန်ချက်များ၊ ပတ်ဝန်းကျင် ဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေ၊ စည်းမျဉ်းစည်းကမ်း နှင့် ချမှတ်ထားသော မူဝါဒ လမ်းညွှန်ချက်များအတိုင်း ပတ်ဝန်းကျင် ဆိုင်ရာ စီမံခန့်ခွဲမှု အလေ့အကျင့်များ၊ လုပ်ငန်းစဉ်များ နှင့် လိုက်နာဆောင်ရွက် ကျင့်သုံးရန် တာဝန်များကို လည်း လိုက်နာဆောင်ရွက်ရမည်ဖြစ်ပါသည်။

EXECUTIVE SUMMARY

Introduction

Yangon Distillery Plant (GRGICL) was established in 2010 at the Hmawbi Township. Plant operation was started at 2012. The plant is located on Field No. 560 of Upper Thae Kone Village group, Hmawbi Tsp. The plant boundary is at the west of the No. (4) Main Road. The total area of the plant is (30.45) acres. Current production capacity of the plant is 10000 gal/day Rectified Spirits.

Factory Location

The plant is located on Field No. 560 of Late Pote Village group and Upper Thae Kone Village group, Hmawbi Township. The plant boundary is at the west of the No. (4) Main Road as shown in figure 2. The total area of the plant is (30.45) acres. The plant is located approximately 25 km from Yangon and 12 km from Hmawbi Township. The factory is located at the North of the Yangon. It is about 20 km from Yangon airport. The factory site is located at the opposite side of APB Brewery Plant.

There are four villages around the factory area in close proximity as shown in figure and which are Upper Thae Kone, Lower Thae Kone, Late Pote and Kwin Late Pote. Late Pote Stream started near the Factory area and flows into Hlaing River at the South-West of the factory site (approximately 7 km away from the factory).

Policies and Legal Framework Overview

The Laws, Rules and Procedures should be compliance from Yangon Distillery Plant (GRGICL) is as follows. Automobile Law (2015)

1. City of Yangon Development Law (2018)
2. Environmental Conservation Law (2012)
3. Environmental Conservation Rules (2014)
4. EIA Procedures (2015)
5. Employment and Skill Development Law (2013)
6. Factory Act (1951)
7. Foreign Investment Law (2012)
8. Leave and Holiday Act (1951)
9. Myanmar Engineering Council Law (2013)
10. Myanmar Fire Bridgate Law (2015)

11. Myanmar Investment Law (2016)
12. Myanmar Investment Rules (2017)
13. Myanmar Insurance Business Law (1993)
14. Myanmar Occupational Safety and Health Law (15.3.2019)
15. National Standards and Guidelines (2015)
16. The Conservation of Water Resources and River Law (2006)
17. Prevention of Hazard from Chemical and Related Substances Law (2013)
18. The Control of Smoking and Consumption of Tobacco Product Law (2006)
19. The Electricity Law (2014)
20. The Ethnic Rights Protection Law (2015)
21. The Export and Import Law (2012)
22. The Freshwater Fisheries Law (1991)
23. The Labour Organization Law (2011)
24. The Labour Dispute Settlement Law (2012)
25. The Law on Standardization (2014)
26. The Minimum Wages Law (2013)
27. The Myanmar Marine Fisheries Law (1990)
28. The Private Industrial Enterprise Law (1990)
29. The Prevention and Control of Communicable Diseases Law (2013)
30. The Petroleum and Petroleum Product Law (2017)
31. The Protection and Preservation of Cultural Heritage Regions Law (1998)
32. The Protection and Preservation of Antique Objects Law (2015)
33. The Protection and Preservation of Ancient Monuments Law (2015)
34. The Payment of Wages Act (2016)
35. The Public Health Law (1972)
36. The Prevention and Control of Communicable Disease Law (1995)
37. The Social Security Law (2012)
38. Ward or Village Tract Administration Law
39. Workmen Compensation Act (1923)

Moreover, Grand Royal Group International Co., Ltd. It has obtained ISO 14001-2015, ISO 9001-2015, ISO 22000-2018, ISO 45001-2018, Yaka / Gyi / 768, Yaka / Gyi / 4242, Excise Form D1A (Temporar), D1 License, D2 License, Disaster Business License and Recommendation for Food Manufacturing Permission is mentioned in APPENDIX-L.

Yangon Distillery Plant Operation Process Description (GRGICL)

Production capacity of Yangon Distillery Plant is 10000 gal/day Rectified Spirits.

The plant can be mainly divided into four sections which are;

- Crushing (milling) section
- Liquefaction and saccharification (Cooking) section
- Fermentation Section and
- Distillation Section.

There are other auxiliary sections such as wastewater treatment plant and cooling tower section. Current raw material for the entire plant is broken rice and for the near future proposed raw materials will be not only broken rice but also corn and tapioca. Estimated water usage for the distillery plant is 1190 m³ per day. The process flow diagram of the existing plant is shown in following figure.

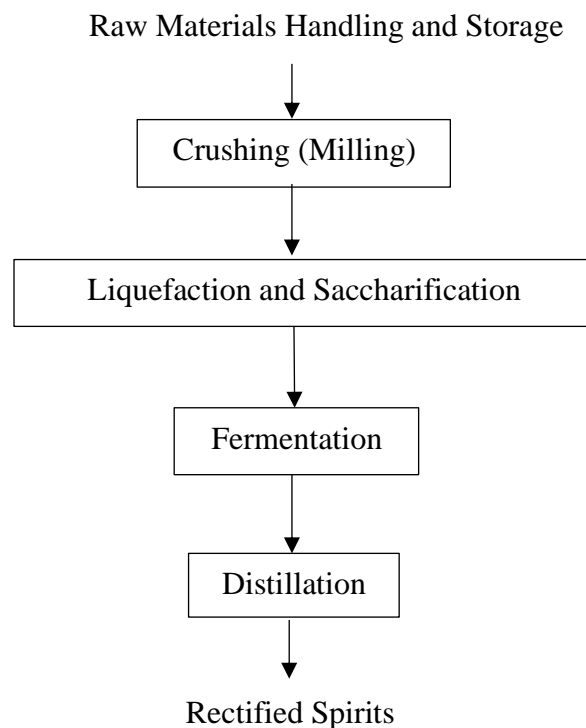


Figure A. Block Diagram for Production Process of Yangon Distillery Plant

Description of the Environment

(a) Air Quality

The parameters for air Quality surveys were atmospheric pressure, CO₂, H₂S, CH₄, NO₂, O₃, PM₁₀, PM_{2.5}, Relative Humidity, SO₂, solar radiation, Temperature, Wind direction, and Wind speed.

The air quality survey results obtained every minute at each survey site were combined to make daily average values (24 hours or 8 hours or 1 hour or 10 minutes) for further evaluation and comparison with corresponding standard values. The result from Air Quality Survey is shown in Table 28.

(b) Water Quality

Tubewell from WTP, Inlet and outlet Wastewater from the WWTP were collected from the factory compound and analyzed. The quality of treated Wastewater could be seen in Wastewater outlet column. PH, BOD, COD, TSS, Total Nitrogen, Total Phosphorus and Oil and Grease were analyzed for current Wastewater quality. All water samples were analyzed for their physiochemical properties in Golden Dowa Ecosystem Myanmar Laboratory and the result are as shown in Table 24 and Table 25.

(c) Soil Quality

According to test results as shown in Table 29 and 30, pH value of SS1 and SS2 which were collected from the collected at 20 m from the boundary of Yangon Distillery Plant is 4.63 and 4.95 which falls under classification of strongly acidic conditions.

(d) Biodiversity

Biodiversity includes two portions, which are the study of vegetation (flora) and the study of living animals (fauna). There is no natural vegetation, wildlife and deforestation in the Hmawbi Township and around the factory area.

(e) Topography

Hmawbi township is found on the north and south due to the steep hills of the lower Bago Yoma on the northeast and down to the west of the Yangon-Pyay highway. Hlaing river is located at the end of the northern boundary of the township. Hmawbi creek, Doontapae creek and Myaungtagar creek are flow into the Hlaing River. Hmawbi Township is located at an average height of 27 feet above sea level.

(f) Climate and Precipitation

Hmawbi has a wet and dry climate with an average annual temperature of 32.3°C. April is the hottest month of the year with 37°C and January is the coldest month of the year with 17.9°C. The average annual precipitation is about 223.42 mm. Rainfall has its top in July with the highest number of 26.2 days. The lowest rainfall occurs during February, with an average of 2 mm.

(g) Socio Economic Component

(i) Living Condition

The factory area is located on Field No. 560 of Late Pote Village tract and Upper Thae Kone Village tract, Hmawbi Tsp and the Northern District of Yangon Region. The plant boundary is at the west of the No. (4) Main Road. The total number of households in Hmawbi is 40440 only. The following table and figure show the household numbers in the study area. The average household size in the study area is shown in the following figure. All the villages have significantly higher rate of population per household compared to that of Hmawbi Township. For the whole study area, average household size of village in Hmawbi Township is about 4147 which is remarkably higher than the household sizes of Hmawbi city (39456).

Total number of populations in the study area is depicted in Population Matrix. The matrix shows the distribution of both sexes (male and female) counted by their age (0 to 100). The total population of Hmawbi Township is 193310. According to the matrix, the highest number of populations in both sexes is young and reproductive age, 18 and the older population, under age 18, is the lowest.

(ii) Education and Infrastructure

6.9% of the population 25 years of age and older are completely out of school. Only 7.1% of the population aged 25 years and over were out of school. 4.5% of men over 25 years old and 9.1% of women are out of school. 20.7% of the population aged 25 and above had completed primary schooling, with 10.1% in university / college. Current educational attainment levels show the local community's past education condition. Hospitality and tourism business need a fair to high level of educational

attainment. Background educational attainment of local community shows that the factory needs to concentrate capacity building of local community so that they could participate in the development process.

Impact Assessment and Mitigation

Rating matrix method is used to assess the significance level of the identified environmental impacts of the Yangon Distillery Plant (GRGICL) on its environment. There are five parameters considered for the activities of the factory and the consequences resulted from the said activities. System of rating is described in detailed as follows.

Table A. Environmental Aspect and Impact

Sr.	Activity List	Aspect	Impact
1	Raw materials handling and storage	Unloading from truck	Physical and vehicle hazard
		Loading to hopper	Physical and vehicle hazard
		Cleaning raw materials	Dust and solid waste
		Ergonomic injury from overweight lifting	Physical hazard
2	Milling	Crushing raw materials	Dust, solid waste and noise
		Screening raw materials	Dust, solid waste and noise
3	Liquefaction and Saccharification	Contact with cooker	Heat and physical hazard
		Contact with enzymes	Chemical hazard
		Driving machines	Noise
4	Fermentation	CO ₂ generation	CO ₂ emissions
		Yeast waste	Solid waste
5	Distillation	Discharge water	Waste water
		Sludge	Solid waste

		Driving machines	Noise
		Storage RS	Fire hazard
6	Clean in place (CIP)	Contact with chemical reagent	Chemical hazard
		Washing water	Waste water
7	Utilities	Boiler Operation	Heat
			Emission to air
			Fire hazard
			Waste water
			Solid waste
			Noise
		Water treatment plant	Physical hazard
			Waste water
			Noise
8	Wastewater Treatment Plant	WWTP Operation	Sludge, Chemical hazards, Physical hazards, Water quality, Noise
9	Storage of Diesel	Storage of diesel for driving machines	Oil leakage

Characteristics of the impacts are evaluated based on eight particular basis five of which are used in the assessment of the significance level of the impacts.

Table B. Characteristics of the Impacts

IMPACTS	CHARACTERISTICS							
	Nature	Impact Source	Impact Receptor	Severity	Duration	Spatial Scope	Frequency	Probability
Dust	Negative	-Cleaning raw materials - Crushing raw materials - Screening raw materials	Workers	Impact severity is small as broken rice dust quantity is small	Dust & particulate will be emitted in factory life	Impact will occur within factory area	Activity that causes the impact occurs daily intermittently in operation	Emission of dust and particulate are possible
Physical hazard	Negative	-Unloading from truck -Injury from overweight lifting -Fall and slip -Fall from height	Workers	Impact severity is significant for operation workers	Physical hazard will occur in factory life	Physical hazard will occur at the factory area of activity	Activity that causes the impact occurs daily intermittently	Physical hazards are possible

		-Loading to hopper -Contact with cooker						
Chemical hazard	Negative	- Contact with enzymes - Contact with chemical reagents, acid and caustic	Workers	Impact severity is significant for operation workers	Chemical hazard will occur in factory life	Chemical hazard will occur at the factory area of activity	Activity that causes the impact occurs daily intermittently	Chemical hazards are possible
Vehicle hazard	Negative	- Unloading from truck - Loading to hopper	Workers	Impact severity is significant for operation workers if accident by car	Vehicle hazard will occur in factory life	Vehicle hazard will occur within right of way	Activity that causes the impact occurs daily intermittently	Vehicle hazard is unlikely to occurs
Noise	Negative	- Crushing raw materials - Driving machines	Workers	Impact severity is potentially harmful as dust emission occurs almost continuously and	Noise hazard will occur in factory life	Noise hazard will occur within the whole factory compound	Activity that causes the impact occurs daily continuously	Noise hazard are possible

				most of the workers are subjected to exposure				
Hazardous materials and oil	Negative	- Oil leakage from storage of diesel - Oil Leakage from driving machines and vehicles	Local environment	Impact severity is significant on local environment	Hazardous materials and oil hazards will occur in factory life	Hazardous materials and oil hazard will occur at the local environment	Activity that causes the impact occurs daily continuously	Hazardous materials and oil hazards possible
Fire hazard	Negative	- Boiler - Material handling	Workers and the whole plant	Impact severity is harmful	Fuel has to be carried out the whole factory life	If a fire broke out, the whole factory is likely to be affected	Using the fuel for the plant is done daily continuously	A fire hazard is possible
Heat	Negative	-Contact with cooker -Boiler	Workers	Impact severity is small if injured by heat	Source of heat for the impact will exist for the whole factory life	Impact is activity specific as hot objects exists only at wort kettle and boiler	Operation of heated components occur daily continuously	Heat injuries are possible to occur

Emission to air	Negative	-Boiler - CO ₂ emissions	Workers and local environment	Impact severity is potentially harmful if air emissions are out of NEQG limit	Air emission will occur in factory life	Air emission could spread to local area	Air emissions occur daily continuously in operation	According to current condition, air emission out of NEQG limit is unlikely to occurs
Solid Waste	Negative	-Cleaning raw materials - Crushing raw materials - Screening raw materials - Yeast waste -Sludge from fermentation, distillation and WWTP	Workers and local environment	Impact severity is potentially harmful if solid wastes are discharged systematically	Impact from solid waste will occur in factory life	Local area could be affected by solid waste mismanagement	Solid waste impact occurs daily intermittently	Impact from solid wastes are possible
Wastewater	Negative	- Discharge water from distillation - Washing water -WWTP	Workers and local environment	Impact severity is slightly harmful if wastewater is discharged with NEQG guideline	Impact from wastewater will occur in factory life	Local area could be affected by discharged wastewater directly	Impact on wastewater occurs daily intermittently	Impact from wastewater is possible

Table C. Mitigation and Enhancement Measures (MEMS)

IMPACTS	Impact Source	Mitigation
Fire hazard	-Boiler - Material handling	1. Providing necessary equipment for fire fighting 2. Organizing a fire fighting team
Soil Erosion	- Oil leakage from driving machines and vehicles	1. Systematic storage of fuel 2. Regular inspections of fuel storage warehouse 3. Systematic operation of driving machines and engines 4. Regular inspections and monitoring of driving machines and engines
Wastewater	- Discharge water from distillation -Washing water -WWTP	1. Systematic operation of WWTP 2. Regular monitoring and control of discharge water from WWTP
Noise	-Crushing raw materials -Driving machines and washing	1. Carrying out regular maintenance works so that unnecessary mechanical noise could be prevented 2. Providing earmuffs for workers at high noise area 3. Supervising regular use of earmuffs at high noise area
Emission to air	-Boiler emission - CO ₂ emissions	1. Systematic Operation of Boiler 2. Carrying out regular ambient air quality monitoring
Heat	-Contact with cooker -Boiler	1. Providing necessary PPE for workers working at wort kettle and boiler 2. Regular inspection and supervision of the use of PPE

Solid Waste	<ul style="list-style-type: none"> -Cleaning raw materials - Crushing raw materials - Screening raw materials - Yeast waste - Boiler ash -Sludge from fermentation, distillation and WWTP 	<ol style="list-style-type: none"> 1. Disposing the boiler ash systematically at designated waste disposal site 2. Systematic disposal of non-recycle waste at waste disposal site provided by YCDC 3. Recycle waste and animal feed licensed waste collector for animal feed
Physical hazard	<ul style="list-style-type: none"> -Unloading from truck -Ergonomic injury from overweight lifting -Fall and slip -Fall from height -Contact with moving machinery -Contact with cooker 	<ol style="list-style-type: none"> 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Educating workers with workplace safety practices 4. Regular inspection and supervision for following workplace safety practices
Chemical hazard	<ul style="list-style-type: none"> - Contact with enzymes - Contact with cleaning reagent, acid and caustic 	<ol style="list-style-type: none"> 1. Carrying out preventive measures for hazard from chemicals and related materials
Vehicle hazard	<ul style="list-style-type: none"> -Loading to/Unloading from truck 	<ol style="list-style-type: none"> 1. Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within plant compound 2. Installing and regular maintenance of back gear warning alarm in every vehicle 3. Regular maintenance of vehicles
Dust	<ul style="list-style-type: none"> - Cleaning raw materials - Crushing raw materials - Screening raw materials - Loading to hopper 	<ol style="list-style-type: none"> 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Regular sweeping of material handling areas

Impact Monitoring Plan

Sr.	Parameter	Location	Frequency	Responsibility
1	Providing adequate fire extinguishers at necessary places	Plant compound	Monthly	Fire Safety Dept
2	Regular inspection of fire hydrants	Plant compound	Annually	Fire Safety Dept
3	Organizing a firefighting team	Firefighting team - admin records	Annually	Fire Safety Dept
4	Providing firefighting trainings	Training records	Annually	Fire Safety Dept
5	Conducting regular fire drill	Firefighting team - admin records	Annually	Fire Safety Dept
6	Fuels should be stored with concrete fuel storage tank	Plant compound	Once/ annual recheck	Operation Manager
7	Regular inspections of fuel storage materials for oil leakage	Plant compound Records	Daily	GM
8	Educating the employees for the systematic operation of driving machines and engines	Records	Once	Management Officer
9	Regular inspections and monitoring of driving machines and engines	Plant compound Records	Daily	Management Officer
10	5- day Biochemical Oxygen Demand	Final discharge from WWTP	Monthly	D&D Dept
11	Chemical Oxygen Demand (COD)	Final discharge from WWTP	Daily	D&D Dept
12	pH	Final discharge from WWTP	Daily	D&D Dept
13	Total Coliform bacteria	Final discharge from WWTP	Monthly	D&D Dept
14	Total Suspended solids	Final discharge from WWTP	Weekly	D&D Dept
15	Total Nitrogen	Final discharge from WWTP	Weekly	D&D Dept

16	Total Phosphorous	Final discharge from WWTP	Weekly	D&D Dept
17	Oil and Grease	Final discharge from WWTP	6 Monthly	D&D Dept
18	Noise level	12 locations within plant compounds	Quarterly	Plant Manager
19	Maintenance record	The whole plant	4 times per year	Plant Manager
20	Checking workplace daily	The whole plant	Daily	Plant Manager
21	Providing earmuffs	Workers at high noise area	Whenever required	Admin Dept
22	Regular inspection of general conditions of ear muffs	Workers at high noise area	Daily	Plant Manager
23	Regular inspection and supervision for wearing ear muffs at high noise areas	Workers at high noise area	Daily	Plant Manager
24	Nitrogen dioxide	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept
25	Ozone	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept
26	PM ₁₀	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept
27	PM _{2.5}	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept
28	Sulfur dioxide	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept

29	Providing hand gloves for workers working at wort kettle and boiler for heat protection	- Workers contacting with kettle and boiler Admin Record	Monthly	Admin Dept
30	Regular inspection and supervision of the use of PPE	Workers within the plant compound	Daily	HSE Dept
31	Providing necessary OSH training as shown in Table 80	Training record	Annually	HSE Dept
32	Daily inspection and supervision for conforming workplace safety practices	Workers within the plant compound	Daily	HSE Dept
33	Setting vehicle speed limit of 15 km/hr within plant compound	Vehicles within the plant compound	Daily	Maintenance Dept
34	Educating drivers for safe driving practice within drive compound	Drivers within the plant compound	Once	Maintenance Dept
35	Monitoring and control of the vehicle speed limit of 15 km/hr within plant compound	Vehicles within the plant compound	Daily	Maintenance Dept
36	Installing of back gear warning alarm in every vehicle	Every vehicle at the plant	Once	Maintenance Dept
37	Carrying out regular maintenance of vehicles	Every vehicle at the plant	Monthly	Maintenance Dept
38	Dumping boiler ash at designated area	Disposal site	Daily	Boiler Dept
39	Regular inspection of ash disposal site	Inspection record	Daily	Boiler Dept
40	Maintenance of boiler ash disposal site for tidiness and dust suppression requirements	Maintenance record	Weekly	Maintenance Dept

41	Systematic disposal of non-recycle waste at waste disposal site provided by YCDC	Cullet plant	Daily	CFD & WWT Dept
42	Recycle waste and animal feed (30-40) tons per month are collected by licensed waste collector for animal feed	Cullet plant	Daily	CFD & WWT Dept
43	Sending appropriate employers to prevention of hazards from chemicals and related materials training	Training records	Once	Plant Manager
44	Providing necessary PPE for workers handling chemicals	- Workers - Record	Annual	HSE Dept
45	Providing training for systematic use of PPE	Training record	Once	HSE Dept
46	Regular inspection and supervision of the use of PPE	Admin record	Daily	HSE Dept
47	Avoiding high hazard routes and crowded periods in local communities	Workers within the plant compound	Daily	Driver
48	Provide health care services yearly for local communities	Local community	Yearly	HSE Dept

Projected Budgets

Projected budget for implementation of EMP management actions and monitoring requirements could be summarized from detailed particulars described in previous section of the report. Yangon Distillery Plant (GRGICL) will allocate 5,700,000 kyats total of one-time cost and 49,000,000 kyat of annual recurring cost for successful implementation and monitoring of the EMP. If the estimated budget isn't enough, Grand Royal Group International Co., Ltd. will be used by adding the enough budgets as necessary.

Table D. Project Budgets for Implementation and Monitoring of EMP

Sr.	Management Actions	Budget
1	Providing adequate fire extinguishers at necessary places	300,000/yr
2	Regular inspection of fire hydrants	500,000/yr
3	Organizing a firefighting team	500,000/yr
4	Providing firefighting trainings	100,000/yr
5	Conducting regular fire drill	300,000/yr
6	Systematic Operation and maintenance of the wastewater treatment	12,000,000/yr
7	Regular monitoring of wastewater	2,000,000/yr
8	Regular noise level measurement at workplaces	100,000
9	Carrying out annual overall maintenance work	5,000,000/yr
10	Providing earmuffs	100,000/yr
11	Carrying out regular ambient air quality monitoring	2,000,000/yr
12	Providing necessary OSH training	500,000/yr
13	Providing hand gloves for workers working at wort kettle and boiler for heat protection	100,000/yr
14	Installing of back gear warning alarm in every vehicle	600,000
15	Carrying out regular maintenance of vehicles	3,000,000/yr
16	Maintenance of boiler ash disposal site for tidiness and dust suppression requirements	300000/yr
17	Systematic disposal of non-recycle waste at waste disposal site provided by YCDC	7,200,000/yr
18	Sending appropriate employers to prevention of hazards from chemicals and related materials training provided by relevant government departments	300,000/yr
19	Providing necessary PPE for workers handling chemicals	300,000/yr
20	Providing face mask, hand glove, safety boot and helmet adequately for workers working at material handling areas	600,000/yr
21	Regular sweeping at material handling areas	300,000/yr
22	Fuels should be stored with concrete fuel storage tank	5,000,000
23	Provide health care services yearly for local communities	5,000,000/yr

24	Providing systematic vehicle management for incoming and outgoing vehicles	3,000,000/yr
25	Covered all conveyors/vehicles for the transportation from all side	1,000,000
26	Providing awareness training	500,000/yr
Total One Time Cost		5,700,000
Total Recurring Cost		49,000,000

Local development programs and future local development programs for local people affected by the project and supplement budget plan if there is insufficient budget are shown in APPENDIX-H.

Environmental Management Team

GRGICL is organized environmental management team for environmental monitoring program of EMP implementation. The organization chart of environmental management team is shown in the following figure and the obligations of the team member is shown in Appendix E.

Table E. Environmental Management Team

Sr.	Representative	Number
1	Plant Manager	1
2	Project Manager	1
3	HSE Manager	1
4	Head of Department (Admin Dept)	1
5	Head of Department (HR Dept)	1
6	Head of Department (Finance Dept)	1
7	Head of Department (CFD & WWT Dept)	1
8	Head of Department (Store Dept)	1
9	Head of Department (D&D Dept)	1
10	Head of Department (Maintenance Dept)	1

Public Meeting (Consultation with local people)

Consultation with local people was held on December 8th, 2019. It was held at the factory dining hall in the Grand Royal factory compound. The session was hosted by U Soe Moe, Plant Manager of Yangon Distillery Plant, Grand Royal Group International Co., Ltd. and he gave an opening speech and explained the current operation of the factory. Then, U Yan Naing Aung from Environmental Conservation

Consultant Association explained about environmental management plan. After that, question and answer section with visiting local people was conducted. There were 50 people attended the public meeting including local people from villages around the factory, factory officials, employees, and officials from Environmental Conservation Consultant Association (Yangon) and held discussions with the relevant authorities. At the public meeting, there were no comments from the local community and only eight letters of recommendation were received.

The following summarizes is the recommendations obtained from consultation with local people. Request to pay Compensation for farmers who have lost their crops due to factory effluents and assistance to farmers and to set Fire Prevention Program by Grand Royal.

- Request to buy by Grand Royal factory about 50 acres of farmland around the factory.
- The factory is working with modern methods to reduce odors. We are happy for providing clean drinking water and electricity that the village needed. Request to donate and construct about 750 feet of road need in the Upper Thae Gone village. Request to donate to the new religious building and to donate a drinking water purifier for Kwin Late Pote Village.
- Please arrange not to be a traffic jam in front of the factory.

Details are provided in Chapter 6 and APPENDIX F (Public Meeting).

Conclusion

In conclusion, the project implementer must fully implement the proposals contained in the Environmental Management Plan report, Guidelines of the Republic of the Union of Myanmar, Environmental law, Rules, and regulations of Environmental management practices in accordance with the rules and regulations, Procedures and responsibilities must be followed.

Environmental Management Plan

For

Yangon Distillery Plant (GRGICL)

1 Introduction

1.1 Project Background

Yangon Distillery Plant (GRGICL) was established in 2010 at the Hmawbi Township. Factory operation was started at 2012. The plant is located on Field No. 560 of Upper Thae Kone Village Group, Leik Poke Village Tract, Hmawbi Tsp. The plant boundary is at the west of the No. (4) Main Road. The total area of the plant is (30.45) acres. Current production capacity of the plant is 10000 gal/day Rectified Spirits. GRGICL was made two of EMP for Yangon Distillery Plant and Yangon Bottling Plant. EMP of Yangon Bottling Plant was submitted to ECD in 27th February 2019. The permission of FDA and other approval is described in Appendix L.

Environmental Management Plan for the project was prepared by Environmental Conservation and Consulting Associations of Myanmar Engineering Society (MES) from September to October 2018. The EMP was prepared in accordance with the stipulations in paragraph 76 – 82 of the EIA procedures.

1.2 Project Owner

Grand Royal Group International Company Limited is a Private Company Limited incorporated under the Myanmar Companies Act. In grand Royal Group, 50% of shared is owned by Alliance Strategic Investments Pte Limited, 20% is owned by Alliance Asia Investment Private Limited, 5% is owned by International Beverages Holding (Singapore) Pte Limited and 25% is owned by Myanmar Winery and Distillery Co., Ltd. The company head quarter is located at No. (33), Pyay Road, 6 ½ miles, (11) Quarter, Haling Township, Yangon. The list of Directors of the project owner is shown in following table. The estimated investment for the Grand Royal Group International Plant is US\$ 7,759,314.

Table 1. Information of Grand Royal Group International Co., Ltd

Sr.	Particular	Name/ Address
1	Company Name	Grand Royal Group International Co., Ltd

2	Location Plant	No.560, No (4) Main Road, Upper Thae Kone Village Group, Leik Poke Village Tract, Hmawbi Township, Yangon, Myanmar
3	Company Address	No. (33), Pyay Road, 6 ½ miles, (11) Quarter, Haling Township, Yangon, Myanmar
4	Company Ph: no/Fax; no	01-654938-654948,01-534986
5	Website	www.grandroyal-group.com
6	Type of Investment	JV
7	Project Start Date	2010
8	Project End Date	2012
9	EMP Established Date	27.2.2019
10	MIC Permit No	554/13

Table 2. List of the Directors

Sr.	Name	Nationality, NRC No. / PP No.	Position
1.	U Aung Moe Kyaw	Myanmar 12/MaYaKa (N) 106397	Director and Co-chairman
2.	Mr. Ueychai Tantha-obhas	Thai PP N0. AA7536939	Director and Co-chairman
3.	Mr. Chew Leong Chee	Singapore PP No. E3342979E	Director
4.	Mr. Polapatr Suvarnazorn	Thai PP N0. AA3284268	Director
5.	Mr. Prapakon Thongtheppairot	Thai PP N0. AA3892107	Director
6.	Mr. Michael Chye Hin Fah	Singapore PP No. E6491786J	Director
7.	Mr. Pramote Hassamontr	Thai PP N0. AA4906311	Director
8.	Mr. Karoon Sirivichittranond	Thai PP N0. AA4275166	Director

Table 3. Project Contact Person of GRGICL

Sr	Name	Contact No	Email Address
1	U Phyo Wail Lwin	095179683	phyowailwin@grandroyal-group.com
2	Daw Moe Moe Kyaw	095139816	moemoekyaw@grandroyal-group.com

1.3 Presentation of the Environmental and Social Experts

Environmental Conservation and Consulting Engineers Association (ECCEA) will be the third party for EMP study and reporting for Yangon Distillery Plant. ECCEA EMP team consists of the following core team and sector-wise participants.

Table 4. ECCEA Team Member

Sr.	Name	Registration/ License No by ECD	Contac Detail	Area of Expertise
1.	U Soe Myint	0165	N0.92, Kant Kaw Myaing Lane 2, Block 33, Nort dagon Tsp, Yangon (09-401600255)	Facilitation, Socio-Economy & OSH
2.	Dr. Maung Maung Hlaing	0191	N0. 14 (I), Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-5052179)	Cultural Heritage Impact Assessment
3.	U Khin Maung Htaey	0151	N0. 660 (B), 9 th Street South, East Gyogone Qtr, Insein Township, Yangon (09-51801824)	Sanitation System
4.	Daw Htay Htay Win	0145	No. 140/7, U Wizarya Lane, Myaynigone, San chaung Township, Yangon (09-5301824)	Soil Assessment

5.	Daw Mu Mu Aye	0049	No.10, Block (52), May Flower Street, Nawaday Garden Housing, Hlaing Tharyar Tsp, Yangon (095028189)	Biodiversity Assessment
6.	U Yan Naing Aung	0107	N0. 14 (A), Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-797508797)	Waste Management, Impact Assessment & Mitigation Plan
7.	Dr. Htin Lin	0214	6 (A), Staff housing, Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-400410533)	Traffic Impact Analysis
8.	U Myint Maung Maung Than	0159	F Hall Teachers Hostel, Y.T.U Compound, East Gyogone, Insein Township, Yangon (09-400410533)	Noise & Vibration Air Quality Assessment & EMP Drafting
9	U Phyo Maung Maung	0162	No.36, Room 12, Baho Road, Aung Chan Thar Ward, Sanchaung Tsp, Yangon (09-420069013)	Public Consultation & Social Survey
10	U Lin Thura Aung	0157	N0.36, Thuta Street, Ward No.4, South Okkalapa Tsp, Yangon (09-402644319)	Pollution Control Scoping & TOR Drafting
11	U Kyae Zin Latt	0154	MES Buiding, Hlaing Universities Campus, Hlaing Township, Yangon (09-4202644319)	Geological Assessment

12	U Aung Kyaw Lin	0117	No.99, 1 st Floor, Seikkanthar Street, Kyauktata Township, Yangon (09-4505442734)	Legal Analysis
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Table 5. Project Contact Person of ECCEA

Sr	Name	Contact number	Email Address
1	U Soe Myint	(959)401600255	<u>Sm260859@gmail.com</u>
2	U Yan Naing Aung	(959)797508797	<u>yannaingaung123@gmail.com</u>

1.4 Mission of Grand Royal Group International Co., Ltd.

The mission of GRGICL Is to be the most admired Consumer Products company in Myanmar with clear market leadership, through a constant focus on their consumers and Innovation, whilst being responsible towards their stakeholders for their long-term sustainability.

2 Project's Policies, Legal Requirements, and Institutional Arrangements

2.1 Environmental Policy

Grand Royal Group International Co., Ltd. (GRGICL) is committed to sustain business excellence in quality of environment. GRGICL will take lead in the industry in providing products and services of highest quality and minimizing the impact of the activities on the environment.

The following key points of the strategy:

- Strict implementation of food safety standards based on statutory and regulatory requirements
- Ensuring total customer satisfaction in products and services
- Minimize waste by evaluating operations and ensuring as efficient as possible
- Consistency measures the impact on the environment and conduct regular management review on objectives and targets for continuous improvement

- Activity promotes recycling both internally and among the customers and supplier. Source and promote a product range to minimize the environmental impact of both production and distribution
- Comply with environmental legislation that relates to the company
- Implement a training program for the staffs and support enlist in implementation continual improvement in the company's environmental performance
- Communicate to all concerned parties and allow public, knowledge of the policy by any available means in order to raise the awareness environmental performance
- Keep a documented system for both quality and environment, ensure implementation, maintained and updated accordingly

2.2 Project Commitments

Grand Royal Group International Company Limited is committed to carry out its distillery operation activities in compliance with standing laws, rules, procedures, orders, guidelines and notifications of the Republic of the Union of Myanmar.

2.2.1 Laws and Rules

The project proponent will be followed the following Laws, Rules and Procedures.

1. Automobile Law (2015)
2. City of Yangon Development Law (2018)
3. Environmental Conservation Law (2012)
4. Environmental Conservation Rules (2014)
5. EIA Procedures (2015)
6. Employment and Skill Development Law (2013)
7. Factory Act (1951)
8. Foreign Investment Law (2012)
9. Leave and Holiday Act (1951)
10. Myanmar Engineering Council Law (2013)
11. Myanmar Fire Bridgate Law (2015)

12. Myanmar Investment Law (2016)
13. Myanmar Investment Rules (2017)
14. Myanmar Insurance Business Law (1993)
15. Myanmar Occupational Safety and Health Law (15.3.2019)
16. National Standards and Guidelines (2015)
17. The Conservation of Water Resources and River Law (2006)
18. Prevention of Hazard from Chemical and Related Substances Law (2013)
19. The Control of Smoking and Consumption of Tobacco Product Law (2006)
20. The Electricity Law (2014)
21. The Ethnic Rights Protection Law (2015)
22. The Export and Import Law (2012)
23. The Freshwater Fisheries Law (1991)
24. The Labour Organization Law (2011)
25. The Labour Dispute Settlement Law (2012)
26. The Law on Standardization (2014)
27. The Minimum Wages Law (2013)
28. The Myanmar Marine Fisheries Law (1990)
29. The Private Industrial Enterprise Law (1990)
30. The Prevention and Control of Communicable Diseases Law (2013)
31. The Petroleum and Petroleum Product Law (2017)
32. The Protection and Preservation of Cultural Heritage Regions Law (1998)
33. The Protection and Preservation of Antique Objects Law (2015)
34. The Protection and Preservation of Ancient Monuments Law (2015)
35. The Payment of Wages Act (2016)
36. The Public Health Law (1972)
37. The Prevention and Control of Communicable Disease Law (1995)
38. The Social Security Law (2012)
39. Ward or Village Tract Administration Law
40. Workmen Compensation Act (1923)
41. National Food Law (1993)

2.2.2 National Standards and Guidelines

National Environmental Quality (Emission) Guidelines (NEQG) for wastewater and noise levels are referenced in this EMP report. Followings are the environmental standards and guidelines adopted by EMP team. The project proponent will be discharged the wastewater from the plant by following the National Standard and Guidelines.

Table 6. Environmental Standards for Wastewater Discharge (NEQG)

Sr.	Parameter	Unit	Guideline Value
1	5-day BOD	mg/l	50
2	COD	mg/l	250
3	Oil and grease	mg/l	10
4	pH	Standard unit	6-9
5	Temperature increase	°C	<3
6	Total coliform bacteria	100 ml	400
7	Total nitrogen	mg/l	10
8	Total phosphorus	mg/l	2
9	Total suspended solids	mg/l	50

Table 7. Noise Level Standard (NEQG)

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

Table 8. Air Quality Standard (NEQG)

Sr.	Parameter	Averaging Period	Guideline Value $\mu\text{g}/\text{m}^3$
1	Nitrogen dioxide	1-year	40
		1-hour	200
2	Ozone	8-hour daily Maximum	100
3	PM ₁₀	1-year	20
		24 hour	50
4	PM _{2.5}	1-year	10
		24 hour	25
5	Sulfur dioxide	24-hour	20
		10-minute	500

2.2.3 International Standards and Guidelines

The general Environmental, Health, and Safety (EHS) Guidelines of IFC is technical reference document with general examples of Good International Industry Practice (GIIP). The EHS Guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. The applicability of the EHS Guidelines is tailored for Yangon Distillery Plant (GRGICL) by taking accounts the results of the environmental assessment.

Internationally accepted environmental standards and guidelines for ambient air, wastewater, noise levels and environmental monitoring parameters are referenced in this EMP report. Following is the environmental standards and guidelines adopted by EMP team.

Table 9. Environmental Standards and Guidelines Referenced in this Report

Sr.	Standards/Guidelines	Reference
1	Environmental monitoring programmed	IFC
2	Occupational safety and health	IFC

2.2.4 International Convention and Recommendation from ILO

1. Labor Inspection Convention, 1947 (No.81)
2. Employment Injury Benefits Convention, 1964 (No.121)
3. Working Environment (Air Pollution, Noise and Vibration) Convention, (No.148)
4. Occupation Safety and Health Convention, 1981 (No.155)
5. Occupation Safety and Health Services Convention, 1985 (No.161)
6. Safety and Health in Construction Convention, 1988 (No.161)
7. Prevention of Major Industrial Accidents Convention, 1993 (No.174)
8. Labor Inspection Recommendation, 1947 (No.81)
9. Protection of Workers' Health Recommendation, 1953 (No.97)
10. Welfare Facilities Recommendation, 1956 (No.202)
11. Employment Injury Benefits Recommendation, 1964 (No.121)
12. Working Environment (Air Pollution, Noise and Vibration) Recommendation, 1977 (No.156)
13. Safety and Health in Construction Recommendation, 1988 (No.175)
14. Prevention of Major Industrial Accidents Recommendation, 2001 (No.192)

The goal of this principles is to protect safety and health by prevention and controls of hazards. This principle can get not only to ensure the well-being of workers but also contribute positively to productivity. GRGICL will compliance with the convention and recommendation during factory operation life.

2.2.5 Legal Commitment of Grand Royal Group International Co., Ltd

The detail of legal commitment should be compliance from Grand Royal Group International Co., Ltd is as follow.

Table 10. Legal Commitment of Grand Royal Group International Co., Ltd

Sr.	Para-	Stipulation	Commitment
1	Environmental Conservation Law		
1.1	14	A person causing a point source of pollution shall treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.	Wherever a point source of pollution occurs in Yagon Distillery Plant, GRGICL commits to treat, emit, discharge and deposit the substances which cause pollution in the environment in accord with stipulated environmental quality standards.
1.2	15	The owner or occupier of any business, material or place which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, it shall be arranged to dispose the wastes in accord with environmentally sound methods.	GRGICL makes a commitment to ensure the owner or occupier of any business, material or place within Yangon Distillery Plant which causes a point source of pollution shall install or use an on-site facility or controlling equipment in order to monitor, control, manage, reduce or eliminate environmental pollution. If it is impracticable, arrangements shall be made to dispose the wastes in accord with environmentally sound methods.

1.4	22	The owner or occupier of the category of business, worksite or factory, workshop stipulated by the Ministry under section 21 shall apply for the prior permission to the Ministry in accord with the stipulations.	GRGICL commits to apply for the prior permission to the Ministry of Natural Resources and Environmental Conservation in accord with the stipulations.
1.5	26	The holder of the prior permission shall effect insurance according to the category of his business, worksite or factory, workshop for any accident that may cause impact on the environment, in accord with the existing law.	GRGICL upon receiving the prior permission of MONREC shall effect insurance according to the category of its factory for any accident that may cause impact on the environment, in accord with the existing law.
1.6	28	No one shall, without the prior permission, operate business, work-site or factory, workshop which is required to obtain the prior permission under this Law.	GRGICL shall never, without the prior permission, operate business, work-site or factory, workshop which is required to obtain the prior permission under the Environmental Conservation Law.
1.7	29	No one shall violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under this Law.	GRGICL shall never violate any prohibition contained in the rules, notifications, orders, directives and procedures issued under the Environmental Conservation Law.
1.8	30	No one shall, without permission of the Ministry, import, export, produce, store, carry or trade any material which causes impact on the environment prohibited by the Ministry.	GRGICL shall never, without permission of the Ministry, import, export, produce, store, carry or trade any material which causes impact on the environment prohibited by the Ministry (MONREC).

2	Environmental Conservation Rules		
2.1	69	<p>(a) No one shall emit, ask to emit, dispose, ask to dispose, pile and ask to pile, by any means, hazardous waste or hazardous substances stipulated by notification according to any rules in this rules at any place which may affect the public directly or indirectly.</p> <p>(b) No one shall, except for the permission of the Ministry for the interests of the people, carry out any activity which can damage the ecosystem and ecosystem services.</p>	<p>(a) GRGICL shall never emit, ask to emit, dispose, ask to dispose, pile and ask to pile, by any means, hazardous waste or hazardous substances stipulated by notification according to any rules in the environmental conservation rules at any place which may affect the public directly or indirectly.</p> <p>(b) GRGICL shall never, except for the permission of the Ministry for the interests of the people, carry out any activity which can damage the ecosystem and ecosystem services.</p>
3	Environmental Impact Assessment Procedures		
3.1	3	Pursuant to Section 21 of the Law and Articles 52, 53 and 55 of the Rules, all Projects and Project expansions undertaken by any ministry, government department, organization, corporation, board, development committee and organization, local government or authority, company, cooperative, institution, enterprise, firm, partnership or individual (and/or all Projects, field sites, factories and businesses including expansions of	GRGICL makes a commitment to undertake EIA to obtain an ECC in accordance with EIA Procedure.

		such Projects, field sites, factories and businesses identified by the Ministry, which may cause impact on environmental quality and are required to obtain Prior Permission in accordance with Section 21 of the Law, and Article 62 of the Rules) having the potential to cause Adverse Impacts, are required to undertake IEE or EIA or to develop an EMP, and to obtain an ECC in accordance with this Procedure.	
3.2	84	All Projects and activities, whether categorized in Annex 1 ‘Categorization of Economic Activities for Assessment Purposes’ as requiring an IEE, an EIA, nor neither: (i) are obliged to obtain all required authorizations, permits, licenses and approvals and to comply with all applicable laws, regulations, procedures, ministerial directives, zoning, planning requirements, and other governmental requirements, and (ii) shall remain subject to any environmental and/or social conditions which the Ministry may impose as a condition to the	GRGICL committed as: (i) to obtain all required authorizations, permits, licenses and approvals and to comply with all applicable laws, regulations, procedures, ministerial directives, zoning, planning requirements, and other governmental requirements, and (ii) to remain subject to any environmental and/or social conditions which the Ministry may impose as a condition to the commencement or continuation of construction or operation of that Project or activity.

		commencement or continuation of construction or operation of that Project or activity.	
3.3	87	Upon receipt of the written approval from the relevant authority, the Project Proponent shall commence implementation of the Project strictly in accordance with the conditions attached to the ECC and including the EMP, within such time as may be prescribed by the Ministry.	Upon receipt of the written approval from the relevant authority, GRGICL shall commence implementation of the Project strictly in accordance with the conditions attached to the ECC and including the EMP, within such time as may be prescribed by the Ministry.
3.4	102	<p>The Project Proponent shall bear full legal and financial responsibility for:</p> <p>a) all of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project; and</p> <p>b) PAPs until they have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project, and shall support</p>	<p>GRGICL committed to bear full legal and financial responsibility for:</p> <p>a) all of the Project Proponent's actions and omissions and those of its contractors, subcontractors, officers, employees, agents, representatives, and consultants employed, hired, or authorized by the Project acting for or on behalf of the Project, in carrying out work on the Project; and</p> <p>b) PAPs until they have achieved socio-economic stability at a level not lower than that in effect prior to the commencement of the Project, and shall support programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts.</p>

		programs for livelihood restoration and resettlement in consultation with the PAPs, related government agencies, and organizations and other concerned persons for all Adverse Impacts.	
3.5	106	The Project Proponent shall, during all phases of the Project (pre-construction, construction, operation, decommissioning, closure and post-closure), engage in continuous, proactive and comprehensive self-monitoring of the Project and activities related thereto, all Adverse Impacts, and compliance with applicable laws, the Rules, this Procedure, standards, the ECC, and the EMP.	GRGICL makes a commitment during all phases of the Project (pre-construction, construction, operation, decommissioning, closure and post-closure), engage in continuous, proactive and comprehensive self-monitoring of the Project and activities related thereto, all Adverse Impacts, and compliance with applicable laws, the Rules, this Procedure, standards, the ECC, and the EMP.
3.6	108	The Project Proponent shall submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry.	GRGICL makes a commitment to submit monitoring reports to the Ministry not less frequently than every six (6) months, as provided in a schedule in the EMP, or periodically as prescribed by the Ministry.
3.7	110	Within ten (10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the Project	Within ten (10) days of completing a monitoring report as contemplated in Article 108 and Article 109 in accordance with the EMP schedule, the GRGICL shall make such report (except as may relate to National

		Proponent shall make such report (except as may relate to National Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Project offices. Any organization or person may request a digital copy of a monitoring report and the Project shall, within ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.	Security concerns) publicly available on the Project's website, at public meeting places (e.g. libraries, community halls) and at the Factory office. Any organization or person may request a digital copy of a monitoring report and the Project shall, within ten (10) days of receiving such request, submit a digital copy via email or as may otherwise be agreed upon with the requestor.
3.8	113	For purposes of monitoring and inspection, the Project Proponent: a) shall grant to the Ministry and/or its representatives, at any time during normal working hours, access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed; and b) from time to time as and when the Ministry may reasonably require, shall grant the Ministry access to the Project's offices and to the Project site and any other	For purposes of monitoring and inspection, the GRGICL: a) shall grant to the Ministry and/or its representatives, at any time during normal working hours, access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed; and b) from time to time as and when the Ministry may reasonably require, shall grant the Ministry access to the Project's offices and to the Project site and any other location at which the Project activities or activities related to the Project are performed.

		location at which the Project activities or activities related to the Project are performed.	
3.9	115	In the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, the Project shall grant full and immediate access to the Ministry at any time as may be required by the Ministry.	In the event of an emergency, or where, in the opinion of the Ministry, there is or may exist a violation or risk of violation of the compliance by the Project with all applicable environmental and social requirements, the GRGICL shall grant full and immediate access to the Ministry at any time as may be required by the Ministry.
4	National Environmental Quality (Emissions) Guidelines		
4.1	6	Provisions of the general and applicable industry-specific Guidelines shall be reflected in project environmental management plan (EMP) and environmental compliance certificate (ECC) and together constitute a project's commitment to take necessary measures to avoid, minimize and control adverse impacts to human health and safety, and the environment through reducing the total amount of emissions generation; to adopting process modifications, including waste minimization to lower	The GRGICL committed to take necessary measures to avoid, minimize and control adverse impacts to human health and safety, and the environment through reducing the total amount of emissions generation; to adopting process modifications, including waste minimization to lower the load of pollutants requiring treatment; and as necessary, to apply treatment techniques to further reduce the load of contaminants prior to release or discharge.

		the load of pollutants requiring treatment; and as necessary, to apply treatment techniques to further reduce the load of contaminants prior to release or discharge.	
4.2	7	Recognizing that these Guidelines are intended to prevent pollution through reducing the mass of pollutants emitted to the environment, dilution of air emissions and effluents to achieve maximum permitted values is not acceptable. Specified guideline values should be achieved, without dilution, at least 95 percent of the time that a project is operating, to be calculated as a proportion of annual operating hours.	The GRGICL shall not use a dilution of air emissions and an effluent to achieve maximum permitted values is not acceptable.
4.3	9	As specified in the EIA Procedure, all projects are obliged to use, comply with and refer to applicable national guidelines or standards or international standards adopted by the Ministry. These Guidelines will henceforth be applied by the Ministry in satisfying this requirement until otherwise modified or succeeded by other guidelines or standards.	The GRGICL complies with and refers to applicable national guidelines or standards or international standards adopted by the Ministry.

4.4	12	As specified in the EIA Procedure, projects shall engage in continuous, proactive and comprehensive self-monitoring of the project and comply with applicable guidelines and standards. For purposes of these Guidelines, projects shall be responsible for the monitoring of their compliance with general and applicable industry-specific Guidelines as specified in the project EMP and ECC.	As specified in the EIA Procedure, the GRGICL shall engage in continuous, proactive and comprehensive self-monitoring of the project and comply with applicable guidelines and standards.
4.5	13	Air emissions, noise, odor, and liquid / effluent discharges will be sampled and measured at points of compliance as specified in the project EMP and ECC.	Air emissions, noise, odor, and liquid/effluent discharges will be sampled and measured at points of compliance as specified in the project EMP and ECC.
5	The Ethnic Rights Protection Law		
5.1	5	The matters of projects shall completely be informed, coordinated and performed with the relevant local ethnic groups in the case of development works, major projects, businesses and extraction of natural resources will be implemented within the area of ethnic groups.	GRGICL committed to completely be informed, coordinated and performed the matters of GRGICL project with the relevant local ethnic groups.
6	Myanmar Investment Law		

6.1	50	d) The investor shall register the land lease contract at the Office of Registry of Deeds in accordance with the Registration Act.	d) The GRGICL makes a commitment to register the land lease contract at the Office of Registry of Deeds in accordance with the Registration Act.
6.2	51	<p>The investor:</p> <p>a) may appoint of any citizen who is a qualified person as senior manager, technical and operational expert, and advisor in his investment within the Union in accordance with the Laws.</p> <p>b) shall appoint them to replace, after providing for capacity building programs in order to be able to appoint citizens to different level positions of management, technical and operational experts, and advisors.</p> <p>c) shall appoint only citizens for works which does not require skill.</p> <p>d) shall appoint skilled citizen and foreign workers, technicians, and staff by signing an employment contract between employer and employee in accordance with the labor laws and rules.</p>	<p>The GRGICL committed:</p> <p>a) to appoint of any citizen who is a qualified person as senior manager, technical and operational expert, and advisor in his investment within the Union in accordance with the Laws.</p> <p>b) to appoint them to replace, after providing for capacity building programs in order to be able to appoint citizens to different level positions of management, technical and operational experts, and advisors.</p> <p>c) to appoint only citizens for works which does not require skill.</p> <p>d) to appoint skilled citizen and foreign workers, technicians, and staff by signing an employment contract between employer and employee in accordance with the labor laws and rules.</p> <p>e) to ensure to obtain the entitlements and rights in the labor laws and rules, including minimum wages and salary, leave, holiday, overtime fee, damages, compensation of the workman, social welfare, and other insurance relating to workers in stipulating the</p>

		<p>e) shall ensure to obtain the entitlements and rights in the labor laws and rules, including minimum wages and salary, leave, holiday, overtime fee, damages, compensation of the workman, social welfare, and other insurance relating to workers in stipulating the rights and duties of employers and employees and occupational terms and conditions in the employment contract.</p> <p>f) shall settle disputes arising among employers, among workers, between employers and workers, and technicians or staff in the investment in accordance with the applicable laws.</p>	<p>rights and duties of employers and employees and occupational terms and conditions in the employment contract.</p> <p>f) to settle disputes arising among employers, among workers, between employers and workers, and technicians or staff in the investment in accordance with the applicable laws.</p>
6.3	65	<p>The Investor:</p> <p>f) shall not make any significant alteration of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the Commission.</p> <p>g) shall abide by applicable laws, rules, procedures and best standards practiced internationally for this</p>	<p>The GRGICL committed:</p> <p>f) not to make any significant alteration of topography or elevation of the land on which he is entitled to lease or to use, without the approval of the Commission.</p> <p>g) to abide by applicable laws, rules, procedures and best standards practiced internationally for this investment so as not to cause damage,</p>

	<p>investment so as not to cause damage, pollution, and loss to the natural and social environment and not to cause damage to cultural heritage.</p> <p>h) shall list and keep proper records of books of account and annual financial statement, and necessary financial matters relating to the investments performed by permit or endorsement in accordance with internationally and locally recognized accounting standards.</p> <p>i) shall close and discontinue the investment only after payment of compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce.</p> <p>j) shall pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason.</p> <p>k) shall pay compensation and indemnification in accordance with applicable laws to the relevant</p>	<p>pollution, and loss to the natural and social environment and not to cause damage to cultural heritage.</p> <p>h) to list and keep proper records of books of account and annual financial statement, and necessary financial matters relating to the investments performed by permit or endorsement in accordance with internationally and locally recognized accounting standards.</p> <p>i) to close and discontinue the investment only after payment of compensation to employees in accordance with applicable laws for any breach of employment contracts, closure of investment, sale and transfer of investment, discontinuation of investment, or reduction of workforce.</p> <p>j) to pay wages and salaries to employees in accordance with applicable laws, rules, procedures, directives and so forth during the period of suspension of investment for a credible reason.</p> <p>k) to pay compensation and indemnification in accordance with applicable laws to the relevant employee or his successor for injury, disability, disease and death due to the work.</p> <p>l) to supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar.</p>
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	<p>employee or his successor for injury, disability, disease and death due to the work.</p> <p>l) shall supervise foreign experts, supervisors and their families, who employ in their investment, to abide by the applicable laws, rules, orders and directives, and the culture and traditions of Myanmar.</p> <p>m) shall respect and comply with the labor laws.</p> <p>n) shall have the right to sue and to be sued in accordance with the laws.</p> <p>o) shall pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement.</p> <p>p) shall allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment.</p>	<p>m) to respect and comply with the labor laws.</p> <p>n) to have the right to sue and to be sued in accordance with the laws.</p> <p>o) to pay effective compensation for loss incurred to the victim, if there are damage to the natural environment and socioeconomic losses caused by logging or extraction of natural resources which are not related to the scope of the permissible investment, except from carrying out the activities required to conduct investment in a permit or an endorsement.</p> <p>p) to allow the Commission to inspect in any places, when the Commission informs the prior notice to inspect the investment.</p> <p>q) to take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.</p>
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		q) shall take in advance permit or endorsement of the Commission for the investments which need to obtain prior approval under the Environmental Conservation Law and the procedures of environmental impact assessment, before undertaking the assessment, and shall submit the situation of environmental and social impact assessment to the Commission along the period of activities of the investments which obtained permit or endorsement of the Commission.	
6.4	73	The investor shall insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entitled to carry out insurance businesses within the Union.	The GRGICL shall insure the types of insurance stipulated in the provision of the rules at any insurance enterprise which is entitled to carry out insurance businesses within the Union.
7	Myanmar Engineering Council Law		
7.1	34	If, whoever has received a registration certificate, is found to have breached any rules contained in the registration certificate or violated any prohibition contained in a rule, order or directive enacted under this law or in any stipulation of this law, the executive	(a) The GRGICL distillery construction site shall not perform any engineering work and technological work without an engineer who has received a registration certificate issued by the council.

		<p>committee may take the following administrative actions-</p> <ul style="list-style-type: none"> (a) giving a warning. (b) assessing a suitable fine. (c) suspending the registration certificate (d) cancelling the registration certificate. 	
8	The Export and Import Law		
8.1	7	A person who obtained any license shall not violate the conditions contained in the license.	The GRGICL makes a commitment not to violate the conditions contained in any Export/Import license.
9	The Labour Organization Law		
9.1	17	The labour organizations shall have the right 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. The Labour Organizations have the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to submit demands to	The GRGICL committed to follow the labour organizations law which grant the labour organizations to have the right 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, to have the right to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labour laws and to submit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached.

		the employer and claim in accord with the relevant law if the agreement cannot be reached.	
9.2	18	The labour organization has the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities or were not in conformity with the labour laws.	The GRGICL committed to follow the labour organizations law which grant the labour organizations the right to demand the relevant employer to re-appoint a worker if such worker is dismissed by the employer and if there is cause to believe that the reasons of such dismissal were based on labour organization membership or activities or were not in conformity with the labour laws.
9.3	29	The employer shall recognize the labour organizations of his trade as the organizations representing the workers	The GRGICL committed to recognize the labour organizations of his trade as the organizations representing the workers
9.4	30	The employer shall allow the worker who is assigned any duty on the recommendation of the relevant executive committee to perform such duty not exceeding two days per month unless they have agreed otherwise. Such period shall be deemed as if he is performing the original duty of his work.	The GRGICL committed to allow the worker who is assigned any duty on the recommendation of the relevant executive committee to perform such duty not exceeding two days per month unless they have agreed otherwise. Such period shall be deemed as if he is performing the original duty of his work.
9.5	31	The employer shall assist as much as possible if the labour organizations request for help for the interest of his workers. However, the employer shall not exercise	The GRGICL committed to assist as much as possible if the labour organizations request for help for the interest of his workers. The GRGICL shall not exercise any acts designed to promote the

		any acts designed to promote the establishment or functioning of labour organizations under his domination or control by financial or other means.	establishment or functioning of labour organizations under its domination or control by financial or other means.
9.6	43	No employer shall, without permission of the relevant conciliation body, lock-out a public utility service or service which is not included in public utility service.	The GRGICL committed never, without permission of the relevant conciliation body, lock-out a public utility service or service which is not included in public utility service.
9.7	44	<p>No employer shall:</p> <p>(a) lock-out a work due to such dispute during the pendency of a trade dispute settlement.</p> <p>(b) carry out an illegal lock-out which is involved with any provision contained in sub sections (a) and (c) of section 41.</p> <p>(c) dismiss a worker who opposes an illegal lock-out which is involved with any provision contained in sub-sections (a) and (c) of section 41.</p> <p>(d) dismiss a worker for his membership in a labour organization for the exercise of organizational activities or participating in a strike in accord with this Law.</p>	<p>The GRGICL will never:</p> <p>(a) lock-out a work due to such dispute during the pendency of a trade dispute settlement.</p> <p>(b) carry out an illegal lock-out which is involved with any provision contained in sub sections (a) and (c) of section 41; (c) dismiss a worker who opposes an illegal lock-out which is involved with any provision contained in sub-sections (a) and (c) of section 41.</p> <p>(d) dismiss a worker for his membership in a labour organization for the exercise of organizational activities or participating in a strike in accord with this Law.</p>
10	The Settlement of Labour Dispute Law		

10.1	38	No employer shall fail to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause.	The GRGICL makes a commitment for never failing to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause.
10.2	39	No employer shall alter the conditions of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately.	The GRGICL makes a commitment for never altering the conditions of service relating to workers concerned in such dispute at the consecutive period before commencing the dispute within the period under investigation of the dispute before the Arbitration Body or Tribunal, to affect the interest of such workers immediately.
10.3	40	Any employer who violates any prohibition contained in sections 38 and 39 shall, on conviction, be punished with a fine for a minimum of one lakh kyats.	The GRGICL makes a commitment for never failing to negotiate and coordinate in respect of the complaint within the prescribed period without sufficient cause.
11	Employment and Skill Development Law (2013)		
11.1	5	(1) If the employer has appointed the employee to work for an employment, the employment agreement shall be made within 30 days. But it shall not be related with government department and organization for a permanent employment.	(1) The GRGICL makes a commitment to make the employment agreement within 30 days if it has appointed the employee to work for an employment.

11.2	14	The employer shall carry out the training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present.	The GRGICL committed to carry out workers training program in accord with the work requirement in line with the policy of the skill development team to develop the skill relating to the employment for the workers who are proposed to appoint and working at present.
11.3	15	<p>The Employer:</p> <p>(a) shall carry out the training for each work or compounding the work individually or group-wise by opening on-job training, training systematically at worksite, sending outside training and training by using information technology system, for arranging the training program to enhance the employment skill of the workers.</p> <p>(b) appointing the youths of 16 years as apprentice, shall arrange the training for technology relating to the employment systematically in accord with the regulations prescribed by the skill development team.</p>	<p>The GRGICL committed.</p> <p>a) to carry out the training for each work or compounding the work individually or group-wise by opening on-job training, training systematically at worksite, sending outside training and training by using information technology system, for arranging the training program to enhance the employment skill of the workers;</p> <p>(b) for appointing the youths of 16 years as apprentice, to arrange the training for technology relating to the employment systematically in accord with the regulations prescribed by the skill development team.</p>
11.4	29	The fund management committee shall have the right to use the fund for any of the following matter in accord	The GRGICL committed to use the fund for any of the following matter in accord with the regulation stipulated by the skill development team:

		<p>with the regulation stipulated by the skill development team:</p> <p>(a) sending to any part time or full-time training for the skill development of the employee, opening the training and supporting or giving loan to the employer who shall extend the training program.</p> <p>(b) reissuing after scrutinizing in accord with the stipulations if asking to pay the expenses incurred relating to the training for the said employees.</p> <p>(c) performing other matters stipulated by the skill development team</p>	<p>(a) sending to any part time or full-time training for the skill development of the employee, opening the training and supporting or giving loan to the employer who shall extend the training program.</p> <p>(b) reissuing after scrutinizing in accord with the stipulations if asking to pay the expenses incurred relating to the training for the said employees.</p> <p>(c) performing other matters stipulated by the skill development team</p>
11.5	30	<p>(a) The employer of the industry and service business shall put in to the fund monthly as put in fees without fail for the total wages of the subordinates and the supervisors' salary for not less than 0.5%;</p> <p>(b) Put in money paid under sub-section</p> <p>(c) shall not be deducted from the wage and salary of the employees.</p>	<p>(a) The GRGICL committed to put in to the fund monthly as put in fees without fail for the total wages of the subordinates and the supervisors' salary for not less than 0.5%;</p> <p>(b) Put in money paid under sub-section</p> <p>(c) not to be deducted from the wage and salary of the employees.</p>
11.6	31	The skill development team:	The GRGICL should be made to development team:

		<p>(a) relating to the put in money which is to be paid to the fund by the employer under section 30, sub-section</p> <p>(b) shall specify based on the work sector, type of work, size of work and number of employees.</p> <p>(c) shall have the right to exempt from putting into the fund if any employer can submit secure reason.</p>	<p>(a) relating to the put in money which is to be paid to the fund by the employer under section 30, sub-section</p> <p>(b) shall specify based on the work sector, type of work, size of work and number of employees.</p> <p>(c) shall have the right to exempt from putting into the fund if any employer can submit secure reason.</p>
11.7	38	<p>If any employer is convicted of committing any of the following matters, he shall be punished with imprisonment for not more than six months or with a fine or with both:</p> <p>(a) failing to sign employment agreement under section 5, sub-section (a);</p> <p>(b) failing to pay put in money under section 30, sub-section</p>	<p>The GRGICL should be convicted of committing any of the following matters, he shall be punished with imprisonment for not more than six months or with a fine or with both:</p> <p>(a) failing to sign employment agreement under section 5, sub-section</p> <p>(b) failing to pay put in money under section 30, sub-section</p>
12	Minimum Wages Law		
12.1	12	<p>The employer:</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law.</p>	<p>The GRGICL company:</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law.</p> <p>(b) may pay more than the minimum wage stipulated under this Law;</p>

	<p>(b) may pay more than the minimum wage stipulated under this Law.</p> <p>(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law.</p> <p>(d) shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker.</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker</p>	<p>(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law.</p> <p>(d) shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker.</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker</p>
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12.2	13	<p>The employer:</p> <p>(a) shall not pay wage to the worker less than the minimum wage stipulated under this Law;</p> <p>(b) may pay more than the minimum wage stipulated under this Law;</p> <p>(c) shall not have the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;</p> <p>(d) shall pay the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such</p>	<p>The GRGICL committed for:</p> <p>(a) not paying wage to the worker less than the minimum wage stipulated under this Law;</p> <p>(b) paying more than the minimum wage stipulated under this Law;</p> <p>(c) not having the right to deduct any other wage except the wage for which it has the right to deduct as stipulated in the notification issued under this Law;</p> <p>(d) paying the minimum wage to the workers working in the commercial, production and service business in cash. Moreover, if the specific benefits, interests or opportunities are to be paid, it may be paid in cash or partly in cash and partly in property, with prevailing regional price, jointly according to the desire of the worker;</p> <p>(e) in paying minimum wage to the workers working in the agricultural and livestock business, some cash and some property at prevailing regional price may be paid jointly according to local custom or desire of the majority of workers or collective agreement. Such payment shall be for any personal use and benefit of the worker</p>
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		payment shall be for any personal use and benefit of the worker	
12.3	22	<p>Any employer:</p> <p>(a) shall not fail to pay the workers the minimum wage stipulated under this Law;</p> <p>(b) shall not pay to the workers less than the minimum wages and other benefits which is entitled by the worker under section 14;</p> <p>(c) relating to the accounts, schedules, documents and lists of wage of the workers:</p> <p>(i) shall not make false entry, deceitful recording or false and deceitful reporting;</p> <p>(ii) shall not fail to report to the relevant department in accord with the stipulations;</p> <p>(iii) shall not fail to produce when required by the inspection officer;</p> <p>(d) shall not fail to go and accept inspection when summoned by the inspection officer;</p>	<p>The GRGICL committed for:</p> <p>(a) not failing to pay the workers the minimum wage stipulated under this Law;</p> <p>(b) not paying to the workers less than the minimum wages and other benefits which is entitled by the worker under section 14;</p> <p>(c) relating to the accounts, schedules, documents and lists of wage of the workers:</p> <p>(i) not making false entry, deceitful recording or false and deceitful reporting;</p> <p>(ii) not failing to report to the relevant department in accord with the stipulations;</p> <p>(iii) not failing to produce when required by the inspection officer;</p> <p>(d) not failing to go and accept inspection when summoned by the inspection officer;</p> <p>(e) not obstructing or interfering with the inspection officer who inspects on duty.</p>

		(e) shall not obstruct or interfere with the inspection officer who inspects on duty.	
12.4	23	Any employer who violates any of the prohibitions contained in section 22 shall, on conviction, be punished with imprisonment for a term not exceeding one year or with fine not exceeding 5 lakhs or with Both.	The GRGICL company committed for never violating any of the prohibitions contained in section 22.
12.5	24	Any employer: (a) shall not violate any term and condition contained in the minimum wage notification; (b) shall not fail to inform the workers relating to the rates of minimum wage concerning to his workers among the rates of minimum wage stipulated under this Law and announce at the place where the workers are able to see it in the work centre and workplace.	The GRGICL company makes a commitment for: (a) not violating any term and condition contained in the minimum wage notification; (b) not failing to inform the workers relating to the rates of minimum wage concerning to his workers among the rates of minimum wage stipulated under this Law and announce at the place where the worker are able to see it in the work centre and workplace;
12.6	25	Any employer who violates any prohibition contained in section 24 shall, on conviction, be punished with imprisonment for a term not exceeding six months or with fine not exceeding kyat 3lakhs or with both.	The GRGICL company committed for never violates any prohibition contained in section 24.

13	The Payment of Wages Law		
13.1	3	<p>The employer must</p> <p>(a) Pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee.</p> <p>(b) Moreover, pay can be in the means of...</p> <p>(1) Totally in cash or half the cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors.</p> <p>(2) Totally in cash or half the cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors. But, this must be for the sake of the employees and their families. And, it also must be reasonable/fair.</p> <p>(3) An employee shall receive the payment for 60 days when he/she is in Alternative Civil Service.</p>	<p>The GRGICL company must</p> <p>(a) Pay in local currency or foreign currency recognized by the Central Bank of Myanmar. This may be in cash, check or deposit into the bank account of Employee.</p> <p>(b) Moreover, pay can be in the means of...</p> <p>(1) Totally in cash or half the cash and half in things set according to the local price to those employees working in trade, manufacturing and service sectors.</p> <p>(2) Totally in cash or half the cash and half in things set as local price according to local traditions or common agreement to those working in agriculture and livestock sectors. But, this must be for the sake of the employees and their families. And, it also must be reasonable/fair.</p> <p>(3) An employee shall receive the payment for 60 days when he/she is in Alternative Civil Service.</p>
13.2	4	An employer must pay for	The GRGICL company have to pay for

	<p>(a) Part-time, daily, weekly or other part-time job, temporary or piecework when the work is done OR at the agreed time.</p> <p>(b) According to the Article (a), the time frame shall not exceed one month.</p> <p>(c) Wages for the permanent work must pay per monthly basis. If so...</p> <p>(1) Must pay at the end of the payment period when there are not more than 100 workers.</p> <p>(2) If there are 100 workers and above, pay must not be administered later than 5 days after the end of the payment period.</p> <p>(d) Upon termination, wages must be paid within 2 days from the date of termination.</p> <p>(e) If a resignation letter is submitted, wages must be paid at the ending day of the payment period.</p> <p>(f) If an employee dies, wages must be paid to the legally recognized heir within 2 working days after the day he/she has died.</p> <p>(g) All wages must be paid during the working day.</p>	<p>(a) Part-time, daily, weekly or other part-time job, temporary or piecework when the work is done OR at the agreed time.</p> <p>(b) According to the Article (a), the time frame shall not exceed one month.</p> <p>(c) Wages for the permanent work must pay per monthly basis. If so...</p> <p>(1) Must pay at the end of the payment period when there are not more than 100 workers.</p> <p>(2) If there are 100 workers and above, pay must not be administered later than 5 days after the end of the payment period.</p> <p>(d) Upon termination, wages must be paid within 2 days from the date of termination.</p> <p>(e) If a resignation letter is submitted, wages must be paid at the ending day of the payment period.</p> <p>(f) If an employee dies, wages must be paid to the legally recognized heir within 2 working days after the day he/she has died.</p> <p>(g) All wages must be paid during the working day.</p>
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13.3	5	If the owner encounters difficulty to pay the wages according to Section 4 sub-section (c) because of significant happenings, including natural disaster, the employer must report to the Department with solid evidence that wages will be paid at the mentioned day upon the workers' agreement.	The GRGICL company is agreed encounters difficulty to pay the wages according to Section 4 sub-section (c) because of significant happenings, including natural disaster, the company must follow the report to the Department.
13.4	7	<p>The Employer</p> <ul style="list-style-type: none"> (a) Can deduct from wages for absences except when such absence is during a public holiday or entitled leave, according to the law. (b) Accommodation charges and transportation charges, meal allowances, charges for water and electricity, taxes and errors in payment shall be allowed for deduction. (c) Can deduct from pre-issued, expensed and saved (or) contributed amount according to the law upon the employee contract. (d) The Employer can deduct with the judgment of the Court of Arbitrator Jury Council. 	<p>The GRGICL company</p> <ul style="list-style-type: none"> (a) Can deduct from wages for absences except when such absence is during a public holiday or entitled leave, according to the law. (b) Accommodation charges and transportation charges, meal allowances, charges for water and electricity, taxes and errors in payment shall be allowed for deduction. (c) Can deduct from pre-issued, expensed and saved (or) contributed amount according to the law upon the employee contract. (d) The Employer can deduct with the judgment of the Court of Arbitrator Jury Council.

13.5	8	The Employer cannot deduct except the deduction in accordance with Section 7 and Section 11.	The GRGICL company cannot deduct except the deduction in accordance with Section 7 and Section 11.
13.6	9	The total amount of other deductions, except when the employee fails to perform their duties, shall not be more than 50% of the employee's wages.	The total amount of other deductions, except when the employee fails to perform their duties, GRGICL company agreed not be more than 50% of the employee's wages.
13.7	10	<p>The Employer must</p> <p>(a) According to Section 11 of this Act, get permission from the Department concerning “why” and “how” prior to making deductions from wages.</p> <p>(b) Permissions stated in sub-section (a) shall be publicly posted.</p> <p>(c) Fines must not exceed the value of damage caused by the action or cost of performance failure of the employee.</p> <p>(d) According to Section 4 of this Act, when making a specific deduction</p> <p>(1) Do not deduct without allowing an appeal from the Employee.</p> <p>(2) Do not deduct more than 5% of the monthly wages.</p>	<p>The GRGICL company must</p> <p>(a) According to Section 11 of this Act, get permission from the Department concerning “why” and “how” prior to making deductions from wages.</p> <p>(b) Permissions stated in sub-section (a) shall be publicly posted.</p> <p>(c) Fines must not exceed the value of damage caused by the action or cost of performance failure of the employee.</p> <p>(d) According to Section 4 of this Act, when making a specific deduction</p> <p>(1) Do not deduct without allowing an appeal from the Employee.</p> <p>(2) Do not deduct more than 5% of the monthly wages.</p> <p>(e) No deduction is allowed from a worker under 16 years old.</p> <p>(f) The timeframe for deductions shall be set upon an agreement from both sides.</p>

		<p>(e) No deduction is allowed from a worker under 16 years old.</p> <p>(f) The timeframe for deductions shall be set upon an agreement from both sides.</p> <p>(g) Deductions shall be carried out within the limited timeframe upon the agreement of the Township Arbitration Council set in accordance with Law.</p> <p>(h) Every deduction must be well documented.</p> <p>(i) You must submit a monthly report to the Department concerning deductions.</p> <p>(j) Fines deducted according to Section 11 sub-section (b) must be used for the social welfare of the employees upon discussion with a registered labor organization</p>	<p>(g) Deductions shall be carried out within the limited timeframe upon the agreement of the Township Arbitration Council set in accordance with Law.</p> <p>(h) Every deduction must be well documented.</p> <p>(i) You must submit a monthly report to the Department concerning deductions.</p> <p>(j) Fines deducted according to Section 11 sub-section (b) must be used for the social welfare of the employees upon discussion with a registered labor organization</p>
13.8	11	<p>Employers shall fine for the following actions or performance failure by the employees...</p> <p>(a) Direct damage which is either intentional or due to negligence or due to the failure of the employee</p>	<p>The GRGICL company will fine for the following actions or performance failure by the employees</p> <p>(a) Direct damage which is either intentional or due to negligence or due to the failure of the employee concerned with company property to take proper care.</p>

		<p>concerned with company property to take proper care.</p> <p>(b) A breach of the employment contract or breach of any rules for which a fine had been previously set.</p>	(b) A breach of the employment contract or breach of any rules for which a fine had been previously set.
13.9	22	All Employers are not allowed to breach any terms stated in Sections 4,5,8,9 and 11.	The GRGICL company is never committed to breach any terms stated in Sections 4,5,8,9 and 11.
14	The Social Security Law		
14.1	48	<p>(a) The employer shall effect insurance by registering for employment injury benefit insurance system contained in section 45 at the relevant township social security office and pay contribution to employment injury benefit fund in accord with stipulations in order that workers applied to provisions of compulsory registration may obtain the employment injury benefits;</p> <p>(b) The employers may effect insurance by registering voluntarily for insurance of the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system, by</p>	<p>(a) The GRGICL company shall effect insurance by registering for employment injury benefit insurance system contained in section 45 at the relevant township social security office and pay contribution to employment injury benefit fund in accord with stipulations in order that workers applied to provisions of compulsory registration may obtain the employment injury benefits;</p> <p>(b) The GRGICL may effect insurance by registering voluntarily for insurance of the workers who are not applied to provisions of compulsory registration for employment injury benefit insurance system, by paying stipulated contribution to employment injury benefit insurance fund;</p>

		<p>paying stipulated contribution to employment injury benefit insurance fund;</p> <p>(c) When registering to effect insurance for employment injury benefit in accord with sub-sections (a) and (b), the worker shall submit medical certificate.</p>	<p>(c) When registering to effect insurance for employment injury benefit in accord with sub-sections (a) and (b), the worker shall submit medical certificate.</p>
14.2	51	<p>The employer:</p> <p>(a) shall pay contribution monthly to Employment Injury Benefit Fund at the rates stipulated under section 50. Moreover, he shall also bear the expenses for paying as such;</p> <p>(b) shall pay defaulting fee stipulated under section 88, in addition to the contribution if fails to contribute after effecting insurance for employment injury benefit.</p>	<p>The GRGICL Company makes a commitment for:</p> <p>(a) paying contribution monthly to Employment Injury Benefit Fund at the rates stipulated under section 50. Moreover, he shall also bear the expenses for paying as such;</p> <p>(b) paying defaulting fee stipulated under section 88, in addition to the contribution if fails to contribute after effecting insurance for employment injury benefit.</p>
14.3	53	<p>(a) The employers and workers shall co-ordinate, co-operate and carry out with the Board or insurance agent departments in carrying out workers' occupational safety measures and keeping health plan in order to prevent employment accident, or</p>	<p>The GRGICL company is made this following rule;</p> <p>(a) The employers and workers shall co-ordinate, co-operate and carry out with the Board or insurance agent departments in carrying out workers' occupational safety measures and keeping health plan in order to prevent employment accident, or</p>

		<p>employment injury or disease contracting and death in addition to safety and educational work of the workers.</p> <p>(b) The costs of medical care regarding employment injury resulting from criminal action or omission of the employer, or resulting from employer's failure to keep occupational safety plans and protections; and other benefits under this Law shall be borne without fail by the employer in accord with the stipulations.</p>	<p>employment injury or disease contracting and death in addition to safety and educational work of the workers.</p> <p>(b) The costs of medical care regarding employment injury resulting from criminal action or omission of the employer, or resulting from employer's failure to keep occupational safety plans and protections; and other benefits under this Law shall be borne without fail by the employer in accord with the stipulations.</p>
14.4	54	<p>(a) The employer shall report to the relevant township social security office immediately if a serious employment accident occurs to his insured worker. There shall not be any delay without sufficient cause to report as such.</p> <p>(b) A team of officers and other staff who inspect the establishments, if it is found out the employment injury, death, and contracting disease, shall report to</p>	<p>The GRGICL company is made this following rule;</p> <p>(a) The employer shall report to the relevant township social security office immediately if a serious employment accident occurs to his insured worker. There shall not be any delay without sufficient cause to report as such.</p> <p>(b) A team of officers and other staff who inspect the establishments, if it is found out the employment injury, death, and contracting disease, shall report to the relevant township social security office in accord with the stipulations.</p>

		the relevant township social security office in accord with the stipulations.	
14.5	55	The insured person who, by reason of employment injury, became incapable to work which involves reduction or suspension of earnings; free medical care and temporary disability benefit of 70 per cent of average wage during four months prior to employment accident shall be entitled, commencing from the date of incapacity for work, to a maximum of 12 months upon medical certificate.	The GRGICL company must made the insured person who, by reason of employment injury, became incapable to work which involves reduction or suspension of earnings; free medical care and temporary disability benefit of 70 per cent of average wage during four months prior to employment accident shall be entitled, commencing from the date of incapacity for work, to a maximum of 12 months upon medical certificate.
14.6	56	<p>(a) The temporary disability benefit under section 55 shall be terminated from the date on which the insured person becomes capable for work within 12 months.</p> <p>(b) If an insured person continues to be incapable to work after the expiration of 12 months' period of temporary disability benefit, it shall be converted into permanent disability pension.</p> <p>(c) If permanent disability for work of an insured person can be expected by the medical certificate even</p>	<p>The GRGICL company is committed this following rule;</p> <p>(a) The temporary disability benefit under section 55 shall be terminated from the date on which the insured person becomes capable for work within 12 months.</p> <p>(b) If an insured person continues to be incapable to work after the expiration of 12 months' period of temporary disability benefit, it shall be converted into permanent disability pension.</p> <p>(c) If permanent disability for work of an insured person can be expected by the medical certificate even during 12 months while</p>

		during 12 months while temporary disability benefit has been enjoyed, it has the right to terminate the temporary disability benefit, convert into permanent disability benefit and enjoy it.	temporary disability benefit has been enjoyed, it has the right to terminate the temporary disability benefit, convert into permanent disability benefit and enjoy it.
14.7	57	The insured person has the right to enjoy, owing to an employment accident, permanent partial disability cash benefit if there is likely to cause partial loss of capacity for work; or permanent total disability cash benefit if there is likely to cause total loss of capacity for work. As regards that benefit, fixation for a month benefit which may be enjoyed in accord with section 58 shall be calculated upon 70 per cent of a months' average wage during four months before employment injury occurs, in relation to percentage of loss of capacity for work decided by the Medical Board.	The GRGICL company must be committed to make the insured person has the right to enjoy, owing to an employment accident, permanent partial disability cash benefit if there is likely to cause partial loss of capacity for work; or permanent total disability cash benefit if there is likely to cause total loss of capacity for work. As regards that benefit, fixation for a month benefit which may be enjoyed in accord with section 58 shall be calculated upon 70 per cent of a months' average wage during four months before employment injury occurs, in relation to percentage of loss of capacity for work decided by the Medical Board.
14.8	58	The person who suffers loss of capacity to work may enjoy permanent disability benefit calculated basing upon 70 per cent of a months' average wage contained	The GRGICL company will never committed to breach section 58.

	<p>in section 57, in relation to percentage of loss of capacity for work, as specified hereunder:</p> <p>(a) in cases in which the degree of incapacity is less than 20 per cent, the right to enjoy monthly cash benefit entitled to such person for five years in lump sum;</p> <p>(b) in cases in which the degree of incapacity is above 20 per cent to 75 per cent, the right to enjoy monthly cash benefit entitled to such person for seven years in installment or in lump sum, according to the desire of that person;</p> <p>(c) in cases in which the degree of incapacity is above 75 per cent, the right to enjoy monthly cash benefit entitled to such person for nine years in installment or in lump sum or in monthly installment until death, according to the desire of that person;</p> <p>(d) if the medical certificate is submitted that permanently disabled person contained in sub-section (c) requires the constant attendance of another person, the right to enjoy the supplement of 10 per cent of his</p>	
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		benefit in installment, or in lump sum, or in monthly installment until death, according to the desire of that person, in addition to the benefit contained in sub-section (c).	
14.9	65	<p>The employer:</p> <p>(a) has the right to reimbursement out of benefits granted under this Law, for payments made as social obligation for an insured person in cases of health care, medical treatment and other matters entitled to benefit;</p> <p>(b) if the total amount of wages and cash benefit paid to the insured person during a period of sickness benefit, or maternity benefit, or employment injury benefit under this Law exceeds the normal wages of that insured person; may deduct the amount in excess out of benefits granted under this Law. Such payment of excess amount shall be informed to the relevant township social security office.</p>	<p>The GRGICL company will be committed this following rule;</p> <p>(a) has the right to reimbursement out of benefits granted under this Law, for payments made as social obligation for an insured person in cases of health care, medical treatment and other matters entitled to benefit;</p> <p>(b) if the total amount of wages and cash benefit paid to the insured person during a period of sickness benefit, or maternity benefit, or employment injury benefit under this Law exceeds the normal wages of that insured person; may deduct the amount in excess out of benefits granted under this Law. Such payment of excess amount shall be informed to the relevant township social security office.</p>
14.10	66	(a) The employer, subject to health care and medical treatment in accord with sections 67 and 68:	The GRGICL company will be committed this following rule;

		<p>(i) shall not remove or terminate the insured person from work or reduce his wage level during the period during which an insured person is enjoying any of the sickness benefit or maternity benefit or temporary disability benefit due to employment injury under this Law;</p> <p>(ii) shall not reduce or deduct wages and fees of his worker because of liability for contribution payable under this Law;</p> <p>(b) The insured person, as regards his injury due to employer's violation of restrictions under sub-section (a), may submit the matter to the relevant township social security office for settlement in accord with the stipulations.</p>	<p>(a) The employer, subject to health care and medical treatment in accord with sections 67 and 68:</p> <p>(i) shall not remove or terminate the insured person from work or reduce his wage level during the period during which an insured person is enjoying any of the sickness benefit or maternity benefit or temporary disability benefit due to employment injury under this Law;</p> <p>(ii) shall not reduce or deduct wages and fees of his worker because of liability for contribution payable under this Law;</p> <p>(b) The insured person, as regards his injury due to employer's violation of restrictions under sub-section (a), may submit the matter to the relevant township social security office for settlement in accord with the stipulations</p>
15	Factory Act		
15.1	13	<p>(1) Every factory and the compound there of shall be kept clean and kept free from effluvia arising from any drain, privy or other nuisance, and in particular-</p>	<p>The GRGICL company makes a commitment for this following rule;</p> <p>(1) Every factory and the compound there of shall be kept clean and kept free from effluvia arising from any drain, privy or other nuisance, and in particular-</p>

	<p>(a) Accumulations of dirt and refuse shall be removed daily by sweeping or by any other effective method from the floors, benches of work-rooms and from stair-cases and passages, and disposed of in a suitable manner;</p> <p>(b) The floor of every work-room shall be cleaned at least once a week by washing, using disinfectant where necessary, or by some other effective method,</p> <p>(c) When there is likelihood of water collecting on the floor in the course of any manufacturing process, effective means of drainage shall be provided and maintained;</p> <p>(d) All inside walls and partitions, all ceilings or reverse side of roof of work rooms, all walls, reverse side of roof of passages and all staircases shall either :-</p> <p>(i) Be kept whitewashed or colourwashed and such washing shall be repeated at least once in every twelve months; or</p>	<p>(a) Accumulations of dirt and refuse shall be removed daily by sweeping or by any other effective method from the floors, benches of work-rooms and from stair-cases and passages, and disposed of in a suitable manner;</p> <p>(b) The floor of every work-room shall be cleaned at least once a week by washing, using disinfectant where necessary, or by some other effective method,</p> <p>(c) When there is likelihood of water collecting on the floor in the course of any manufacturing process, effective means of drainage shall be provided and maintained;</p> <p>(d) All inside walls and partitions, all ceilings or reverse side of roof of work rooms, all walls, reverse side of roof of passages and all staircases shall either: -</p> <p>(i) Be kept whitewashed or colourwashed and such washing shall be repeated at least once in every twelve months; or</p> <p>(ii) Where they are painted or varnished, be repainted or revarnished at least once in every three years. In such cases where they have smooth and unwashable surface, they shall at least once in every 12months, be</p>
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		<p>(ii) Where they are painted or varnished, be repainted or revarnished at least once is every three years. In such cases where they have smooth and unwashable surface, they shall at least once in every 12months, be washed with hot water and soap or other suitable detergent or cleaned by such other method as may be approved by the Chief Inspector.</p> <p>(e) The dates on which white or colour washing, paintings or varnishings as required by clause (d) are carried out shall be entered in the register prescribed by the President.</p> <p>(2) The President may by order exempt any factory or class of factories from any of the provisions of sub-section (1) and specify alternative methods for keeping the factory in a clean state.</p>	<p>washed with hot water and soap or other suitable detergent or cleaned by such other method as may be approved by the Chief Inspector.</p> <p>(e) The dates on which white or colour washing, paintings or varnishings as required by clause (d) are carried out shall be entered in the register prescribed by the President.</p> <p>(2) The President may by order exempt any factory or class of factories from any of the provisions of sub-section (1) and specify alternative methods for keeping the factory in a clean state</p>
15.2	14	<p>(1) Effective arrangements shall be made in every factory for the disposal of wastes and effluences due to the manufacturing process carried on therein.</p>	<p>The GRGICL company makes a commitment to follow the laws and regulations approved in section 14.</p>

		<p>(2) The President may make rules prescribing the arrangements to be made under subsection</p> <p>(1) requiring that the arrangements made in accordance with sub-section (1) shall be approved by such authority as may be prescribed.</p>	
15.3	23	<p>In every factory the following shall be securely fenced by safe-guards of substantial construction which shall be constantly maintained and kept in position while the parts of the machinery they are fencing are in motion or in use; -</p> <p>(a) Prime movers; -</p> <p>(i) Every moving part of a prime mover and every flywheel directly connected to a prime mover whether the prime mover or flywheel is in the engine house or not.</p> <p>(ii) The headrace and tailrace of every water –wheel and water turbine.</p> <p>(iii) Every part of an electric generator, motors or rotary converters will not be fenced unless it is in such</p>	<p>The GRGICL company makes a commitment to follow the laws and regulations approved in section 23.</p>

		<p>position or of such construction as to be as safe to every person employed or working in the factory as it would be if securely fenced.</p> <p>(b) Transmission machinery; -</p> <p>Every part of transmission machinery unless it is in such position or of such construction as to be as safe to every person employed in the factory as it would be if securely fenced.</p> <p>(c) Other machinery; -</p> <p>(i) Every dangerous part of any other machinery unless it is in such position or of such construction as to be as safe to every person employed or working in the factory as it would be if securely fenced.</p> <p>(ii) Any part of a stock-bar which projects beyond the head-stock of a lathe.</p>	
15.4	37	In respect of any such manufacturing process carried on in any factory as may be prescribed, being a process which involves-	The GRGICL company makes a commitment to follow the laws and regulations approved in section 37.

		<p>(a) Risk of injury to the eyes from particles or fragments thrown off in the course of the process, or</p> <p>(b) Risk to the eyes by reason of exposure to excessive light, the President may by rules require that effective screens or suitable goggles shall be provided for the protection of persons employed on, or in the immediate vicinity of, the process.</p>	
15.6	60	<p>(1) No adult worker shall be required to work in a factory on a Sunday unless-</p> <p>(a) he has had or will have a full holiday on one of the three days immediately before or after that Sunday, and</p> <p>(b) the manager of the factory has, before that Sunday or the day substituted therefore, under clause (a), whichever is earlier</p> <p>(i) delivered at the office of the Inspector a notice of his intention to require the worker to work on the Sunday and of the day to be substituted therefore, and</p>	The GRGICL company makes a commitment to follow the laws and regulations approved in section 60.

		<p>(ii) displayed in the factory a notice to that effect for not less than 24hours before any of such two days whichever is earlier and until the expiry of such two days whichever is later. Provided that no substitution shall be made, which will cause any worker to work for more than ten consecutive days without a full holiday.</p> <p>(2) Notices given under sub-section (1) may be cancelled by a notice delivered at the office of the Inspector and a notice displayed close to notice of working period put up under section67, not later than the day before the Sunday or the holiday to be cancelled, whichever is earlier.</p> <p>(3) Where in accordance with the provision of sub-section (1), any worker works on a Sunday and has had a holiday on one of the three days immediately before the same, that Sunday shall, for the purpose of calculating his weekly hours of work, be included in the preceding week.</p>	
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15.7	73	<p>(1) Where a worker in a factory works for more hours than those specified in section 59 and 62, he shall in respect of the overtime so worked be entitled to be paid at the rate of twice his ordinary rate of wages and shall also be entitled to C.L.A. if any at the usual rate for the days he has so worked overtime.</p> <p>(2) Where workers in a factory are paid on a piece rate-basis, the Chief Inspector, in consultation with the employer concerned and the representative of the workers, shall fix time rates as nearly as possible, equivalent to the average rate of earnings of those workers, and for the purposes of this section, the section, the rates so fixed shall be deemed to be the ordinary rates of wages of those workers.</p> <p>(3) The President may prescribe the registers to be maintained in a factory for the purpose or securing compliance with the provisions of this section.</p> <p>Explanation: - The term "Wages" shall, for the purpose of calculating wages for overtime payable under this section, mean the bare wages without any allowances</p>	The GRGICL company makes a commitment to follow the laws and regulations approved in section 73.
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15.8	75	No child who has not completed his thirteen year shall be required or allowed to work in any factory	The GRGICL company makes a commitment to follow the laws and regulations approved in section 75.
16	The Workman's Compensation Act		
16.1	3	(1) If personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer shall be liable to pay compensation in accordance with the provisions of this Chapter : 3 Provided that the employer shall not be so liable in respect of any injury, not resulting in death, caused by an accident which is directly attributable to (i) the workman having been at the time thereof under the influence of drink or drugs, or (ii) the willful disobedience of the workman to an order expressly given, or to a rule expressly framed, for the purpose of securing the safety of workmen, or (iii) the willful removal or disregard by the workman of any safety guard or other device which he knew to have been provided for the purpose of securing the safety of workmen	The GRGICL company makes a commitment to follow the laws and regulations approved in section 3.

		<p>(2) If a workman, whilst in the service of an employer in whose service he has been employed for a continuous period of not less than six months in any employment specified in [List A of] 1 2 3 Schedule III. contracts any disease specified therein as an occupational disease peculiar to that employment, the contracting of the disease shall be deemed to be an injury by accident within the meaning of this section and, unless the employer proves the contrary, the accident shall be deemed to have arisen out of and in the course of the employment.</p> <p>(3) If a workman contracts any disease specified in List B of Schedule III. and it is certified by a qualified medical practitioner that the disease is directly due to the nature of any employment in which the workman was employed at any time within the twelve months previous to the date of disablement, the contracting of the disease shall be deemed to be an injury by accident within the</p>	
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		<p>meaning of this section, and unless the employer proves the contrary the accident shall be deemed to have arisen out of and in the course of the employment aforesaid : Provided that the compensation shall be recoverable front the employer who last employed the workman during the said twelve months in the employment to the nature of which the disease was due.</p> <p>(4) The President of the Union, after giving, by notification in the Gazette, not less than three months' notice of his intention so to do, may, by a like notification, add any description of employment to the employments specified in [List A of] 2 Schedule III, and shall specify in the case of the employments so added the diseases which shall be deemed for the purposes of this section to be occupational diseases peculiar to those employments respectively, and the provisions of sub-section (2) shall thereupon apply as if such diseases had been declared by this Act to be</p>	
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		<p>occupational diseases peculiar to those employments.</p> <p>(5) The President of the Union, after giving, by notification, not less than three months' notice of his intention to do so. may. by a like notification add any diseases to the occupational diseases specified in List B of Schedule III. and the provisions of sub-section (i) shall thereupon apply as if such diseases had been declared by this Act to be occupational diseases.</p> <p>(6) Save as provided by sub-sections (2) and (i), no compensation shall be payable to a workman in respect of any disease unless the disease is directly attributable to a specific injury by accident arising out of and in the course of his employment.</p> <p>(7) Nothing herein contained shall be deemed to confer any right to compensation on a workman in respect of any injury if he has instituted in a civil Court a suit for damages in respect of the injury against the employer or any other person ; and no</p>	
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		<p>suit for damages shall be maintainable by a workman in any Court of law in respect of any injury (a) if he has instituted a claim to compensation in respect of the injury before a Commissioner ; or (b) if an agreement has been come to between the workman and his employer providing for the payment of compensation in respect of the injury in accordance with the provisions of. this Act.</p>	
16.2	8	<p>(1) No payment of compensation in respect of a workman whose injury has resulted in death, and no payment of a lump sum as compensation to a woman or a person under a legal disability, shall be made otherwise than by deposit with the Commissioner, and no such payment made directly by an employer shall be deemed to be a payment of compensation : Provided that, in the case of a deceased workman, an employer may make to any dependant advances on account of compensation not exceeding an aggregate</p>	<p>The GRGICL company makes a commitment to follow the laws and regulations approved in section 8.</p>

		<p>of one hundred rupees, and so much of such aggregate as does not exceed the compensation payable to that dependant shall be deducted by the Commissioner from such compensation and repaid to the employer.</p> <p>(2) Any other sum amounting to not less than ten rupees which is payable as compensation may be deposited with the Commissioner on behalf of the person entitled thereto.</p> <p>(3) The receipt of the Commissioner shall be a sufficient discharge in respect of any compensation deposited with him.</p> <p>(4) On the deposit of any money under sub-section (1) as compensation in respect of a deceased workman the Commissioner shall deduct therefrom the actual cost of the workman's funeral expenses, to an amount not exceeding twenty-five rupees, and pay the same to person by whom such expenses were incurred, and shall, if he thinks necessary, cause notice to be published or to be served on each dependant in such manner as he thinks fit. calling upon the dependants to</p>	
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		<p>appear before him on such date as he may fix for determining the distribution of the compensation. If the Commissioner is satisfied after any inquiry which he may deem necessary, that no dependant exists, he shall repay the balance of the money to the employer by whom it was paid. The Commissioner shall, on application by the employer, furnish a statement showing in detail all disbursements made.</p> <p>(5) Compensation deposited in respect of a deceased workman shall, subject to any deduction made under sub-section (4). be apportioned among the dependants of the deceased workman or any of them in such proportion as the Commissioner thinks fit, or may, in the discretion of the Commissioner, be allotted to any one dependant.</p> <p>(6) Where any compensation deposited with the Commissioner is payable to any person, the Commissioner shall, if the person to whom compensation is payable is not a woman or a person</p>	
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		<p>under a legal disability, and may in other cases, pay the money to the person entitled thereto.</p> <p>(7) Where any lump sum deposited with the Commissioner is payable to a woman or a person under a legal disability, such sum may be invested, applied or otherwise dealt with for the benefit of the woman, or of such person during his disability, in such manner as the Commissioner may direct: and where a half-monthly payment is payable to any person under a legal disability, the Commissioner may, of his own motion or on an application made to him in this behalf, order that the payment be made during the disability to any dependant of the workman or to any other person whom the Commissioner thinks best fitted to provide for the welfare of the workman(fl) Where, on application made to him in this behalf or otherwise, the Commissioner is satisfied that, on account of neglect of children on the part of a parent or on account of the variation of the circumstances of any dependant or for any other sufficient cause, an order of the</p>	
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		<p>Commissioner as to the distribution of any sum paid as compensation, or as to the manner in which any sum payable to any such dependant is to be invested, applied or otherwise dealt with, ought to be varied, the Commissioner may make such orders for the variation of the former order as he thinks just in the circumstances of the case : Provided that no such order prejudicial to any person shall be made unless such person has been given an opportunity of showing cause why the order should not be made, or shall be made in any case in which it would involve the repayment by a dependant of any sum already paid to him.</p> <p>(9) Where the Commissioner varies any order under sub-section (<S) by reason of the fact that payment of compensation to any person has been obtained by fraud, impersonation or other improper means, any amount so paid to or on behalf of such person may be recovered in the manner hereinafter provided in section 31.</p>	
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17	The Leave and Holidays Act		
17.1	3	<p>(1) Every employee shall be granted by his employer the following public holidays with full wages or pay.</p> <p>(2) If any public falls on any weekly day of rest or on any other holiday, an alternative holiday shall not be allowed, but that weekly day of rest or holiday (as the case may be) on which the public holiday</p>	GRGICL shall be granted by his employer the following public holidays with full wages or pay.
18	Public Health Law		
18.1	10	<p>Any person referred to in section 9(1) under the law to any health and related provisions</p> <ul style="list-style-type: none"> - Failure to comply or - If a violation occurs or - If an attempt is made to commit a crime or - Whether it is knowable or not, there are good reasons- either to violate that law or to violate it. <p>The person to break the law while the company is a corporation. Each person in charge of the company</p>	The GRGICL company makes a commitment to follow the laws and regulations approved in section 10.

		shall be deemed to have committed the offense. Accordingly, such prosecution.	
19	Prevention and Control of Communicable Diseases Law		
19.1	3	In order to prevent the outbreak of Communicable Diseases, the Department of Health shall implement the following project activities: - (a) immunization of children by injection or orally	In order to prevent the outbreak of Communicable Diseases, the GRGICL makes a commitment to implement the following project activities: - (a) immunization of children by injection or orally
19.2	4	When a Principal Epidemic Disease of a Notifiable Disease occurs; - (a) immunization and other necessary measures shall be undertaken by the Department of Health, in order to control the spread thereof; (b) the public shall abide by the measures undertaken by the Department of Health under sub-section (a).	When a Principal Epidemic Disease of a Notifiable Disease occurs; - (a) GRGICL shall be undertaken by the Department of Health, in order to control the spread thereof; (b) GRGICL shall abide by the measures undertaken by the Department of Health under sub-section (a).
19.3	11	In order to prevent and control the spread of a Principal Epidemic Disease, the Health Officer may undertake the following measures; - (a) investigation of a patient or any other person required;	In order to prevent and control the spread of a Principal Epidemic Disease, the Health Officer may undertake the following measures; - (a) investigation of a patient or any other person required; (b) medical examination; (c) causing laboratory investigation of stool, urine, sputum and

		(b) medical examination; (c) causing laboratory investigation of stool, urine, sputum and blood samples to be carried out; (d) causing investigation by injection to be carried out; (e) carrying out other necessary investigations;	blood samples to be carried out; (d) causing investigation by injection to be carried out; (e) carrying out other necessary investigations;
20	The Control of Smoking and Consumption of Tobacco Product Law		
20.1	9	The person-in-charge shall: (a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in section 6 in accordance with the stipulations. (b) arrange the specific place where smoking is allowed as mentioned in section 7, and keep the caption and mark also referring that it is a specific place where smoking is allowed, in accordance with the stipulations. (c) supervise and carry out measures so that no one shall smoke at the non-smoking area. (d) accept the inspection when the supervisory body comes to the place for which he is responsible	The GRGICL makes a commitment to: (a) keep the caption and mark referring that it is a non-smoking area at the place mentioned in section 6. (b) arrange the specific place where smoking is allowed as mentioned in section 7, and keep the caption and mark also referring that it is a specific place where smoking is allowed. (c) supervise and carry out measures so that shall never smoke at the non-smoking area. (d) accept the inspection when the supervisory body comes to the place for which he is responsible

21	Yangon City Development Committee Laws (2018)		
21.1	322	<p>Prohibition of the cleaning and its operations</p> <p>(D) Construction work in the city boundaries; business and factories whether own a workshop or not. Do not neglect the responsibility of taking necessary measures so as not to pollute the environment as a result of our activities.</p> <p>(G) Business within the city boundaries; factory who wants to set up the workshop it complies with environmental regulations business, not factory establishment shall be established.</p>	<p>Prohibition of the cleaning and its operations</p> <p>(D) GRGICL makes a commitment, not to neglect the responsibility of taking necessary measures so as not to pollute the environment as a result of our activities.</p> <p>(G) GRGICL shall obey the environmental regulations.</p>
22	Freshwater Fisheries Law		
22.1	33	No one shall operate a fishery without a lease license or permission issued under this Law	GRGICL will never operate a fishery without a lease license or permission issued under this Law
22.2	34	<p>No one shall do the following in any freshwater fisheries waters: -</p> <p>(a) catching fish or causing mischief with explosive substance, poison, chemicals and dangerous material of a like nature;</p>	<p>GRGICL will never do the following in any freshwater fisheries waters: -</p> <p>(a) catching fish or causing mischief with explosive substance, poison, chemicals and dangerous material of a like nature;</p> <p>(b) catching fish by a prohibited method and fishing implement;</p> <p>(c) catching fish of a prohibited species and size;</p>

		<p>(b) catching fish by a prohibited method and fishing implement;</p> <p>(c) catching fish of a prohibited species and size;</p> <p>(d) catching fish during a prohibited period and at a prohibited place.</p>	(d) catching fish during a prohibited period and at a prohibited place.
22.3	35	No one shall, after purchasing by fishery auction or after being granted tender license fail to pay within the prescribed period fishery rent, tender fee, license fee and fines due, without the permission of the Department.	GRGICL will never, after purchasing by fishery auction or after being granted tender license fail to pay within the prescribed period fishery rent, tender fee, license fee and fines due, without the permission of the Department.
22.4	36	No one shall erect, construct, place, maintain or use any obstruction such as a dam, bank or weir in a fresh water fisheries waters without the permission of the Department.	GRGICL will never erect, construct, place, maintain or use any obstruction such as a dam, bank or weir in a fresh water fisheries waters without the permission of the Department.
22.5	37	A person who has obtained permission to operate a fishery shall not violate any condition contained in a lease, tender license or fishing implement license.	GRGICL who has obtained permission to operate a fishery will not violate any condition contained in a lease, tender license or fishing implement license.
22.6	38	No one shall do the following within the boundary of a fishery or fishery creek: -	<p>GRGICL will never do the following within the boundary of a fishery or fishery creek: -</p> <p>(a) cutting undergrowth or setting on fire habitate of fish;</p>

		(a) cutting undergrowth or setting on fire habitate of fish; (b) impairing the natural condition of a fishery so as to disrupt the flow of water in the main fishery.	(b) impairing the natural condition of a fishery so as to disrupt the flow of water in the main fishery.
22.7	39	No one shall cultivate agricultural crops within the boundary of a fishery creek.	GRGICL will never cultivate agricultural crops within the boundary of a fishery creek.
22.8	40	No one shall cause harassment of fish and other aquatic organisms or pollution of the water in a freshwater fisheries water.	GRGICL will never cause harassment of fish and other aquatic organisms or pollution of the water in a freshwater fisheries water.
22.9	41	No one shall alter the quality of water, volume of water or the water-course in a leasable fishery, reserved fishery and creeks contiguous thereto or in water-courses.	GRGICL will never alter the quality of water, volume of water or the water-course in a leasable fishery, reserved fishery and creeks contiguous thereto or in water-courses.
23	The Conservation of Water Resources and Rivers Law		
23.1	8	No person shall: (a) carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks.	GRGICL will never: (a) carry out any act or channel shifting with the aim to ruin the water resources and rivers and creeks.
23.2	11	No person shall:	GRGICL will never:

		<p>(a) dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk.</p> <p>(b) catch aquatic creatures within river-creek boundary, bank boundary or waterfront boundary with poisonous materials or explosives.</p> <p>(c) dispose of disposal soil and other materials from panning for gold, gold mineral dredging or resource production in the river and creek, into the river and creek or into the water outlet gully which can flow into the river and creek.</p>	<p>(a) dispose of engine oil, chemical, poisonous material and other materials which may cause environmental damage, or dispose of explosives from the bank or from a vessel which is plying, vessel which has berthed, anchored, stranded or sunk.</p> <p>(b) catch aquatic creatures within river-creek boundary, bank boundary or waterfront boundary with poisonous materials or explosives.</p> <p>(c) dispose of disposal soil and other materials from panning for gold, gold mineral dredging or resource production in the river and creek, into the river and creek or into the water outlet gully which can flow into the river and creek</p>
23.3	19	No one shall dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel which is plying, vessel which has berthed, anchored, stranded or sunk.	GRGICL makes a commitment to never dispose of any substance into the river-creek that may cause damage to waterway or change of watercourse from the bank or vessel which is plying, vessel which has berthed, anchored, stranded or sunk.
23.4	21	No one shall:	GRGICL will never:

		(b) drill well or pond or dig earth without the permission of the Directorate.	(b) drill well or pond or dig earth without the permission of the Directorate.
23.5	22	No one shall, without the permission of the Directorate, pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area.	GRGICL will never, without the permission of the Directorate, pile sand, shingle and other heavy materials for business purposes in the bank area and waterfront area.
23.6	24	No one shall: (b) violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks.	GRGICL will never: (b) violate the conditions prescribed by the Directorate so as not to cause water pollution and change of watercourse in rivers and creeks.
24	Boiler Act		
24.1	12	The owner shall: (a) apply to the respective inspector to obtain certificate in accord with the prescribed manner; (b) apply to register only for the boiler constructed in accord with Myanmar standards or international standards; (c) the prescribed fee shall be paid when the application is made under sub-section (a).	GRGICL makes a commitment to: (a) apply to the respective inspector to obtain certificate in accord with the prescribed manner; (b) apply to register only for the boiler constructed in accord with Myanmar standards or international standards; (c) the prescribed fee shall be paid when the application is made under sub-section (a).

24.2	13	<p>The owner shall:</p> <p>(a) apply to the respective inspector to renew certificate in accord with the prescribed manner for a boiler of which the use certificate is void;</p> <p>(b) The prescribed fee shall be paid when application is made under sub section (a).</p>	<p>GRGICL makes a commitment to:</p> <p>(a) apply to the respective inspector to renew certificate in accord with the prescribed manner for a boiler of which the use certificate is void;</p> <p>(b) The prescribed fee shall be paid when application is made under sub section (a).</p>
24.3	14	<p>The owner shall apply to the respective inspector in advance in order to obtain permission though he or she has obtained the certificate or the provisional order if desirous to carry out any of the following matters:</p> <p>(a) using of the boiler at more than allowable pressure;</p> <p>(b) repairing, altering, adding or renewing any steam-pipe, feed-pipe or any mounting or other fitting attached to such steam pipe, feed-pipe or mounting or other fitting attached to the boiler.</p>	<p>GRGICL makes a commitment to apply to the respective inspector in advance in order to obtain permission though he or she has obtained the certificate or the provisional order if desirous to carry out any of the following matters:</p> <p>(a) using of the boiler at more than allowable pressure;</p> <p>(b) repairing, altering, adding or renewing any steam-pipe, feed-pipe or any mounting or other fitting attached to such steam pipe, feed-pipe or mounting or other fitting attached to the boiler.</p>
24.4	18	<p>The owner shall inform immediately to the inspector if any accident occurs</p>	<p>GRGICL will inform immediately to the inspector if any accident occurs</p>
24.5	19	<p>The owner shall not:</p>	<p>GRGICL makes a commitment not to:</p>

		<p>(a) use a boiler at a pressure higher than allowable pressure;</p> <p>(b) repair and alter or force to repair and alter the safety valve to exceed allowable pressure;</p> <p>(c) do any act contained in sub-section (b) of section 14 without permission.</p>	<p>(a) use a boiler at a pressure higher than allowable pressure;</p> <p>(b) repair and alter or force to repair and alter the safety valve to exceed allowable pressure;</p> <p>(c) do any act contained in sub-section (b) of section 14 without permission</p>
24.6	20	<p>The owner shall not use the following boiler:</p> <p>(a) boiler without certificate or provisional order;</p> <p>(b) boiler of which certificate or provisional order is void;</p> <p>(c) boiler of which certificate or provisional order is revoked.</p>	<p>GRGICL will not use the following boiler:</p> <p>(a) boiler without certificate or provisional order;</p> <p>(b) boiler of which certificate or provisional order is void;</p> <p>(c) boiler of which certificate or provisional order is revoked.</p>
24.7	21	<p>The owner shall engrave the register number specified by the chief inspector in accord with the prescribed manner.</p>	<p>GRGICL will engrave the register number specified by the chief inspector in accord with the prescribed manner</p>
24.8	22	<p>The owner:</p> <p>(a) has the right to use a boiler in accord with the prescribed manner if he or she obtains certificate or provisional order;</p>	<p>GRGICL</p> <p>(a) has the right to use a boiler in accord with the prescribed manner if he or she obtains certificate or provisional order;</p>

		(b) may, if desirous to alter the term of the certificate or provisional order, apply in advance for inspection before the expiry of the term of such certificate or provisional order	(b) may, if desirous to alter the term of the certificate or provisional order, apply in advance for inspection before the expiry of the term of such certificate or provisional order.
24.9	24	<p>The owner shall not:</p> <p>(a) carry out with the person who has not boiler repairer certificate on the receipt of notice to repair, alter, add or renew any boiler, steam-pipe, feed-pipe or any mounting or other fitting attached to such boiler, steam-pipe and feed-pipe;</p> <p>(b) assign any person to charge the boiler used in the work except the person who operates and maintains the boiler.</p>	<p>GRGICL will not:</p> <p>(a) carry out with the person who has not boiler repairer certificate on the receipt of notice to repair, alter, add or renew any boiler, steam-pipe, feed-pipe or any mounting or other fitting attached to such boiler, steam-pipe and feed-pipe;</p> <p>(b) assign any person to charge the boiler used in the work except the person who operates and maintains the boiler.</p>
24.10	64	The owner who fails to comply with any provision contained in sub-section (a) of section 19 and section 20 shall, on conviction, be punished with a fine from a minimum of five hundred thousand kyats to a maximum of ten hundred thousand kyats.	GRGICL would be complied with any provision contained in sub-section (a) of section 19 and section 20 shall, on conviction, be punished with a fine from a minimum of five hundred thousand kyats to a maximum of ten hundred thousand kyats.

24.11	65	The owner who fails to comply with any provision contained in section 18, sub-sections (b) and (c) of section 19, section 21 and sub-section (a) of section 24 shall, on conviction, be punished with a fine from a minimum of five hundred thousand kyats to a maximum of ten hundred thousand kyats.	GRGICL would be complied with any provision contained in section 18, sub-sections (b) and (c) of section 19, section 21 and sub-section (a) of section 24 shall, on conviction, be punished with a fine from a minimum of five hundred thousand kyats to a maximum of ten hundred thousand kyats.
24.12	66	The owner who fails to comply with the provision contained in sub-section (b) of section 24 shall, on conviction, be punished with a fine from a minimum of one hundred thousand kyats to a maximum of two hundred thousand kyats	GRGICL would be complied with the provision contained in sub-section (b) of section 24 shall, on conviction, be punished with a fine from a minimum of one hundred thousand kyats to a maximum of two hundred thousand kyats
25	Electricity law		
25.1	46	No person shall operate the electrical installation and repair without obtaining the electrical professional certificate.	The GRGICL wouldn't operate the electrical installation and repair without obtaining the electrical professional certificate
25.2	47	No person shall operate the generation, transmission, connection of electric power without obtaining the electrical safety certificate.	The GRGICL wouldn't operate the generation, transmission, connection of electric power without obtaining the electrical safety certificate

25.3	50	No permit holder shall sell, mortgage, lease, exchange or transfer by any other means the permit the whole or any part of the business contained in the permit without the approval of the relevant Government department or Government organization which has issued the permit.	The GRGICL company shouldn't be committed to breach section 50.
25.4	56	Whoever violates the prohibition contained in section 46 shall, on conviction, be punished with fine from a minimum of fifty thousand kyats to a maximum of three hundred thousand kyats.	The GRGICL company wouldn't be committed to breach section 56
25.5	57	Whoever violates the prohibition contained in section 47 shall, on conviction, be punished with fine from a minimum of three hundred thousand kyats to a maximum of one million kyats	The GRGICL company wouldn't be committed to breach section 57
25.6	60	Any permit holder who violates the prohibition contained in section 50 shall, on conviction, be punished with fine from a minimum of one hundred thousand kyats to a maximum of five hundred thousand kyats. If he violates subsequently such	The GRGICL company wouldn't committed to breach section 60

		offence, he shall be punished with imprisonment from a minimum of one year to a maximum of three years and shall also be liable to a fine	
26	Fire Bridge Law		
26.1	24	No person shall fail to abide by the directives of fire safety issued under section 16 by the head of the relevant Township Department of Fire Services.	GRGICL wouldn't fail to abide by the directives of fire safety issued under section 16 by the head of the relevant Township Department of Fire Services.
26.2	25	The owner or manager of the factory, workshop, bus terminal, airport, port, hotel, motel, lodgings, condominium, market, department, organization or business exposed to fire hazard shall, in accord with the directive of the Department of Fire Services: (a) not fail to form the Reserve Fire Brigade; (b) not fail to provide fire safety equipment.	GRGICL will, in accord with the directive of the Department of Fire Services: (a) not fail to form the Reserve Fire Brigade; (b) not fail to provide fire safety equipment.
26.3	30	No person shall remove, clear or transfer the evidence from the specified area of the place razed by fire before the place of starting fire on and cause of fire are inspected confirmed by whom it concerns	GRGICL wouldn't remove, clear or transfer the evidence from the specified area of the place razed by fire before the place of starting fire on and cause of fire are inspected confirmed by whom it concerns

26.4	31	No person shall form, reorganize or dissolve the Auxiliary Fire Brigade without the direction or permission of the Department of Fire Services.	GRGICL wouldn't form, reorganize or dissolve the Auxiliary Fire Brigade without the direction or permission of the Department of Fire Services.
26.5	32	No person shall form or dissolve the Reserve Fire Brigade without the direction or permission of the Department of Fire Services.	GRGICL wouldn't form or dissolve the Reserve Fire Brigade without the direction or permission of the Department of Fire Services.
27	Prevention of Hazard from Chemical and Related Substances Law		
27.1	33	No one shall produce, treat and formulate, use, possess, store, distribute, sell, transport, import or export the chemical or related substances prohibited by the Central Leading Board.	GRGICL will never produce, treat and formulate, use, possess, store, distribute, sell, transport, import or export the chemical or related substances prohibited by the Central Leading Board.
27.2	34	No one shall operate the chemical and related substances business without licence.	GRGICL will never operate the chemical and related substances business without licence.
27.3	35	No one shall use the chemical or the related substances which are unregistered or annulled from the registered list or not met to the quality and norm in the chemical and related substance business.	GRGICL will never use the chemical or the related substances which are unregistered or annulled from the registered list or not met to the quality and norm in the chemical and related substance business.
28	Automobile Law		

28.1	45	<p>No one is allowed to drive, request someone to drive, or park, motor vehicles in public places under the following conditions:</p> <p>(a) The motor vehicle is not registered.</p> <p>(b) The registration has been suspended, revoked or expired; the registration card is not displayed</p> <p>(c) The registration card has been revoked or is expired.</p>	<p>GRGICL will not be allowed to drive, request someone to drive, or park, motor vehicles in public places under the following conditions:</p> <p>(a) The motor vehicle is not registered.</p> <p>(b) The registration has been suspended, revoked or expired; the registration card is not displayed.</p> <p>(c) The registration card has been revoked or is expired.</p>
28.2	46	<p>No one is allowed to drive, or allow to drive, motor vehicles in public places without risk insurance for others. This prohibition does not extend to passengers.</p>	<p>GRGICL will not be allowed to drive, or allow to drive, motor vehicles in public places without risk insurance for others. This prohibition does not extend to passengers.</p>
28.3	47	<p>(a) No one is allowed to drive a motor vehicle in public places without carrying the driving license with him/her.</p> <p>(b) No one is allowed to drive a motor vehicle in public places without a driving license.</p> <p>(c) The owner of, and the person responsible for, a motor vehicle is not allowed to give permission to</p>	<p>The GRGICL will comply the section 47.</p>

		someone without a driving license to drive in public places.	
28.4	48	No one is allowed to drive, or allow to drive, a motor vehicle in public places if the vehicle does not match with the drivable types as recorded in the driving license.	The GRGICL is not allowed to drive, or allow to drive, a motor vehicle in public places if the vehicle does not match with the drivable types as recorded in the driving license.
28.5	49	No one is allowed to do the following in public places: (a) Driving above the speed limit or below the minimum speed. (b) Driving a motor vehicle which endangers others. (c) Driving a motor vehicle after the consumption of narcotic drugs or alcohol.	The GRGICL is not allowed to do the following in public places: (a) Driving above the speed limit or below the minimum speed. (b) Driving a motor vehicle which endangers others. (c) Driving a motor vehicle after the consumption of narcotic drugs or alcohol.
28.6	50	No one is allowed: (a) To operate a business of manufacturing, selling or equipping motor vehicles without a business license. (b) To operate a business of maintaining or repairing motor vehicles without a business license	The GRGICL is not allowed: (a) To operate a business of manufacturing, selling or equipping motor vehicles without a business license. (b) To operate a business of maintaining or repairing motor vehicles without a business license.
28.7	51	No one is allowed to offer motor vehicle driving training without business driving license.	The GRGICL is not allowed to offer motor vehicle driving training without business driving license

28.8	52	No one is allowed to operate a private business of inspecting motor vehicles without a business license	The GRGICL isn't allowed to operate a private business of inspecting motor vehicles without a business license.
28.9	53	No one is allowed to do the following: (a) Making a motor vehicle registration number plate undistinguishable. (b) [Altering] a motor vehicle registration number plate so that it can be confused [with others]. (c) Using a fake motor vehicle registration number plate on the vehicle.	The GRGICL company will be complied described in section 53
28.10	54	No one is allowed to do the following: (a) Working as a motor vehicle assistant without assistant permit. (b) Driving a motor vehicle while in an inappropriate mental or physical state. (c) Driving a motor vehicle loaded above the loading capacity. (d) Failing to wear a helmet while driving a motor-cycle.	The GRGICL company will be complied described in section 54

		<p>(e)Failing to wear a safety belt while driving vehicles; this includes passengers.</p> <p>(f)Driving a motor vehicle in places reserved for pedestrians.</p> <p>(g)Changing, without legal permission or reasons backed up by evidence, the original type of a vehicle, its main parts, or the facts in a motor vehicle inspection certificate.</p> <p>(h)Driving a motor-cycle without back mirror or silencer over the shock absorber.</p>	
28.11	55	<p>The law prohibits anyone who has motor vehicle from doing the following:</p> <p>(a) Failing to request to change the name of the registered person within 30 days starting from the date of selling or transferring the motor vehicle from one owner to another.</p> <p>(b) Failing to request to change the name of the registered person within 30 days starting from the date</p>	The GRGICL company will be complied described in section 54

		<p>of the inheritance if the motor vehicle has been inherited.</p> <p>(c) Describing wrong facts, changing or excluding the real facts in a motor vehicle sale and transfer contract when applying to change the registered person.</p>	
28.12	56	No one is allowed to use, or request to use, an official document for one motor vehicle if this document was given by the administration department for another vehicle.	The GRGICL will not be allowed to use, or request to use, an official document for one motor vehicle if this document was given by the administration department for another vehicle.
28.13	57	No one is allowed to drive, or work as an assistant, by using the driving license or assistant permit of another person.	The GRGICL will not be allowed to drive, or work as an assistant, by using the driving license or assistant permit of another person.
29	Foreign Investment Law		
29.1	17	<p>The duties of investor are as follows:</p> <p>(a) To abide by the existing law of the Republic of the Union of Myanmar.</p> <p>(b) To form the company and do business as per the existing law.</p>	The GRGICL will be complied described in section 17 of the Foreign Investment Law.

		<p>(c) To follow the law rules, procedures, notification, order, directive and condition of the permit.</p> <p>(d) To utilize the land rented or granted by the commission as per designated conditions and the condition of the contract.</p> <p>(e) To sublet mortgage, transfer share and transfer of business to the other individual, during the term of business, for the invested activities, the land and buildings allowed by the approval, with the approval of the commission.</p> <p>(f) Not to change the significant topography and the formation of the land permitted to utilize without the approval of commission.</p> <p>(g) To report to the commission at once when the mineral resources or antique material or treasure trove not permitted in the contract on and the underground of the land permitted to utilize, if permitted by the commission work may continue on the said land, otherwise move to a substituted land that may request by the investor.</p>	
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		<p>(h) To perform not to affect environmental pollution and spoilage as per existing law in connection with the investment activities.</p> <p>(i) If all share of foreign investment company is transferred to citizen or a foreigner outright, the prior permit shall be taken from the commission and the approval permit is returned only then the share transfer shall be registered as per existing law.</p> <p>(j) If some share of foreign investment company is transferred to citizen or a foreigner outright, the prior permit shall be taken from the commission and the approval permit is returned only then the share transfer shall be registered as per existing law.</p> <p>(k) To transfer the high-tech competency technology functioned by him to the concerning works department or organization systematically as per the provision of the contract.</p>	
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29.2	19	The investor or sponsor, if wanted to do foreign investment, shall submit the proposal as designated to the commission to get approval.	The GRGICL will be complied section 19 in the Foreign Investment Law.
29.3	23	The investor shall place the designated type of insurance at any insurance agency which has the right of the insurance in the country.	The GRGICL will follow the place of designated type of insurance at any insurance agency which has the right of the insurance in the country.
29.4	24	<p>The investor –</p> <p>(a) Shall appoint, when appointing citizen skilled workers, technicians and staff, at least 25% of citizen within first 2 years from the commencement date, at least 50% within second two years, at least 75% within third 2 years however in the academic basis works the time limit may be extended as deemed to be suitable by the commission.</p> <p>(b) Shall arrange to provide training and courses for the citizen employee to be appointed under section (a) for the progress of competency.</p> <p>(c) Only citizen shall be appointed and the unskilled works.</p>	The GRGICL will be complied described in section 24 of the Foreign Investment Law.

		<p>(d) When recruiting labour, it may be exercised from the government labour exchange or internal labour agencies at the discretion of the investor.</p> <p>(e) When appointing citizen skilled workers, technicians and employee the appointment contract shall be signed between employer and employee as per the existing the labour law and rules.</p> <p>(f) Shall arrange salary standard without segregation the citizen employee shall be provided the same as foreigner employee as proportionate division of professional level.</p>	
29.5	25	The foreigner working at the investment activities with approval shall apply to the commission for the work permit and stay permit issued by the state.	The GRGICL will be complied described in section 25 of the Foreign Investment Law.
29.6	26	<p>The investor –</p> <p>(a) Shall sign the appointment agreement as designated when employing staff and labour.</p> <p>(b) Shall perform to get the right as per existing labour law and rules including minimum wages in salary,</p>	The GRGICL will be complied described in section 26 of the Foreign Investment Law.

		<p>leave, holiday, overtime charges, grievances, compensation, social security and other labour related insurance, when defining rights in duties of the employer and employee under the appointment agreement and conditions of works.</p> <p>(c) The disputes arising amount employer, employee, employer and employee, workers and technicians or among the staff shall be settled according to existing law.</p>	
29.7	39	<p>The investor has the right to remit abroad, through the foreign bank in the country according to the exchange rate of the concerning foreign currency –</p> <p>(a) The foreign currency entitled by the investor of foreign currency.</p> <p>(b) The foreign currency approved by the commission to with draw by the foreign capital carrier.</p> <p>(c) The net profit after deducting taxes and funds from the annual profit entitled by the investor.</p>	The GRGICL will be complied described in section 39 of the Foreign Investment Law.

		(d) Due remaining money after deducting taxes and reserving living expenses from the salary and allowance received by the foreign employee.	
29.8	40	<p>The investor –</p> <p>(a) Can remit abroad through any foreign bank according to exchange rate of the concerning currency.</p> <p>(b) Shall exercise the monetary matters of works by opening foreign currency bank account or kyat currency bank account and the currency accepted by the foreign bank and Myanmar.</p>	The GRGICL will be complied described in section 40 of the Foreign Investment Law.
29.9	43	<p>If any dispute arises out of investment activities</p> <p>(a) The disputes among personal shall be amicably settled.</p> <p>(b) Unless settled by subsection (a)</p> <p>(1) Unless method of solution is included in the contract, the existing laws of the country shall be followed. (2) If method of solution is stipulated in the contract, the said method of solution shall be followed.</p>	The GRGICL will be complied described in section 43 of the Foreign Investment Law.
30	Myanmar Investment Rule		

30.1	7	<p>The investor does not require applying for a permit under subsection (d) of section 36 of the Law in the following circumstances:</p> <p>(a) leasing or receiving a license for the land or building for a term of 5 years or less;</p> <p>(b) sub-leasing such state-owned land or building by the investor from any of the following persons in a manner permitted under lease agreement, agreement or other agreement:</p> <p>(i) a person who has previously obtained the right to use the stateowned land or buildings from the government department and government organization in accordance with the laws of the Union, including the Law; and</p> <p>(ii) a person authorized to sub-lease or sub-license the state-owned land or building in accordance with the approval of the government department and government organization.</p>	The GRGICL will be complied described in section 7 of the Myanmar Investment Rule.
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30.2	28	<p>A person who desires to invest may submit an investment screening application to the Commission for non-binding guidance on the kinds of the following proposed investments:</p> <ul style="list-style-type: none"> (a) businesses required to submit a proposal to the Commission under section 36 of the Law; (b) businesses likely to be submitted to the Pyidaungsu Hluttaw for approval under section 46 of the Law; (c) investment activities restricted under section 42 of the Law and its related notification; (d) investment activities involved in investment promoted sectors; or (e) investment activities prohibited under section 41 of the Law. 	The GRGICL will be complied described in section 28 of the Myanmar Investment Rule.
30.3	29	<p>In the investment screening application, the investor shall:</p> <ul style="list-style-type: none"> (a) fully disclose the nature of the investment; (b) disclose all information which appropriate person may consider in the assessment of the Commission; <p>and</p>	The GRGICL will be complied described in section 29 of the Myanmar Investment Rule.

		(c) right fully disclose information	
30.4	96	<p>Where the investor makes investment in more than one zone;</p> <p>(a) the zone in which more than 65% of the value of the investment is invested shall be deemed as the location of investment.</p> <p>(b) if more than 65% of the total value of the investment is invested in:</p> <p>(1) zone 1 and zone 2, the investment shall be deemed to be in zone 2;</p> <p>(2) zone 2 and zone 3, the investment shall be deemed to be in zone 3; and</p> <p>(3) zone 1 and zone 3, the investment shall be deemed to be in zone 3.</p>	The GRGICL will be complied described in section 96 of the Myanmar Investment Rule.
30.5	113	Before to the investor enjoys benefits of any tax exemption or relief under sections 75 and 78 of the Law, the investor shall apply the Internal Revenue Department to accept the tax assessment for the relevant assessment year.	The GRGICL will be complied described in section 113 of the Myanmar Investment Rule.

30.6	116	The investor who is in the application process or has already obtained the permit or endorsement may submit the land use application for investment.	The GRGICL will be complied described in section 116 of the Myanmar Investment Rule.
30.7	117	<p>The following facts shall be included at least in the land use application and the Commission may request the other necessary facts from the investor;</p> <p>(a) area, type and location of the land or buildings;</p> <p>(b) the facts relating to the owners of the land or buildings;</p> <p>(c) recommendation or similar document or permission obtained from Region or State Government, the government department or government organization to approve the change of land use to perform investment;</p> <p>(d) whether investors require to make significantly alteration of topography or elevation of the proposed land according to the subsection (f) of section 65 or not;</p> <p>(e) the period for right to use the proposed land; and</p>	The GRGICL will be complied described in section 117 of the Myanmar Investment Rule.

		(f) the land or buildings lease agreements (draft).	
30.8	157	The investor may also submit an endorsement application to the Commission as well as Region or State Committee for investments that the Region or State Committees can be issued endorsement under rule 155.	The GRGICL will be complied described in section 157 of the Myanmar Investment Rule.
30.9	170	<p>The investor shall deliver the notice to the Investment Assistance Committee if he has a grievance or dispute matters relating to the following facts:</p> <p>(a) a decision made incorrectly by the government department and government organization relating to the investment;</p> <p>(b) wrongfully refusal on the application to obtain the permit and license, to register or to obtain approval, by the government department and government organization; or</p> <p>(c) causing any legal right, protection or approval void.</p>	The GRGICL will be complied described in section 170 of the Myanmar Investment Rule.
31	Occupational Safety and Health Law		

31.1	26	<p>The Employer shall be responsible to: -</p> <ul style="list-style-type: none"> (a) arrange as required to assess the risks of Workplace, Process and machines and materials used thereat; (b) arrange as required to assess the likelihood of occurrence of hazards at the Workplace and to the environment; (c) arrange to have Workers medical checked-up by the Recognized Doctor in accordance with stipulations whether they suffer from any Occupational Disease; (d) arrange to improve the Workplace until it is safe and good for health based on the findings as per sub-sections (a), (b) and (c); (e) provide Workers with sufficient number of personal protective clothing, materials and facilities prescribed and approved by the Department on free of charge basis and cause Workers to wear them while working; (f) prescribe precautionary plans and plans for emergency; 	<p>GRGICL will be followed to: -</p> <ul style="list-style-type: none"> (a) arrange as required to assess the risks of Workplace, Process and machines and materials used thereat; (b) arrange as required to assess the likelihood of occurrence of hazards at the Workplace and to the environment; (c) arrange to have Workers medical checked-up by the Recognized Doctor in accordance with stipulations whether they suffer from any Occupational Disease; (d) arrange to improve the Workplace until it is safe and good for health based on the findings as per sub-sections (a), (b) and (c); (e) provide Workers with sufficient number of personal protective clothing, materials and facilities prescribed and approved by the Department on free of charge basis and cause Workers to wear them while working; (f) prescribe precautionary plans and plans for emergency; (g) provide a clinic, appoint the Registered Doctors and nurses and provide medicines and supporting equipment for any Industry/Business where the number of Workers is not less than the number determined by the Ministry;
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	<p>(g) provide a clinic, appoint the Registered Doctors and nurses and provide medicines and supporting equipment for any Industry/Business where the number of Workers is not less than the number determined by the Ministry;</p> <p>(h) make necessary arrangements for managers, Workers and members of the Occupational Safety and Health Committee including (Employer) himself/herself to attend Occupational Safety and Health training courses stipulated by the Ministry in accordance with their departments or types of work;</p> <p>(i) make necessary arrangements to enable immediate reporting to the Person In-charge for Occupational Safety and Health or manager in case where a Worker suffers an Occupational Accident or his/her life or health is likely to be in danger;</p> <p>(j) arrange to prevent any persons in the Workplace from Occupational Safety and Health risks occurred due to materials, machines or wastes used in the Workplace or Process;</p>	<p>(h) make necessary arrangements for managers, Workers and members of the Occupational Safety and Health Committee including (Employer) himself/herself to attend Occupational Safety and Health training courses stipulated by the Ministry in accordance with their departments or types of work;</p> <p>(i) make necessary arrangements to enable immediate reporting to the Person In-charge for Occupational Safety and Health or manager in case where a Worker suffers an Occupational Accident or his/her life or health is likely to be in danger;</p> <p>(j) arrange to prevent any persons in the Workplace from Occupational Safety and Health risks occurred due to materials, machines or wastes used in the Workplace or Process;</p> <p>(k) immediately stop the Process, evacuate Workers and conduct necessary rescue plans if any Occupational Accident is about to occur. If possible, Workers will be relocated to another appropriate safe Workplaces;</p> <p>(l) display Occupational Safety and Health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations;</p>
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	<p>(k) immediately stop the Process, evacuate Workers and conduct necessary rescue plans if any Occupational Accident is about to occur. If possible, Workers will be relocated to another appropriate safe Workplaces;</p> <p>(l) display Occupational Safety and Health instructions, danger signs, notices, posters and signage for directions in accordance with stipulations;</p> <p>(m) arrange to be complied with precautions when entering restricted hazardous Workplaces;</p> <p>(n) arrange to disseminate Occupational Safety and Health manuals and guidelines issued by the relevant Ministries for knowledge, technology, information and skills not only to Workers but also to related persons or raise their awareness or knowledge thereof;</p> <p>(o) lay down the fire safety plan, perform fire drilling and train Workers to use fire extinguishers systematically;</p>	<p>(m) arrange to be complied with precautions when entering restricted hazardous Workplaces;</p> <p>(n) arrange to disseminate Occupational Safety and Health manuals and guidelines issued by the relevant Ministries for knowledge, technology, information and skills not only to Workers but also to related persons or raise their awareness or knowledge thereof;</p> <p>(o) lay down the fire safety plan, perform fire drilling and train Workers to use fire extinguishers systematically;</p> <p>(p) allow the Chief Inspection Officer and Inspection Officers to enter Workplaces, inquire, request documents and information or seize exhibits;</p> <p>(q) cause Workers to work only for the specified working hours if they have to work in Hazardous Industry/Business and Workplace; and</p> <p>(r) Incur the expenses for Occupational Safety and Health matters.</p>
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		<p>(p) allow the Chief Inspection Officer and Inspection Officers to enter Workplaces, inquire, request documents and information or seize exhibits;</p> <p>(q) cause Workers to work only for the specified working hours if they have to work in Hazardous Industry/Business and Workplace; and</p> <p>(r) Incur the expenses for Occupational Safety and Health matters.</p>	
31.2	27	<p>No Employer shall dismiss or demote a Worker: -</p> <p>(a) during any period before a medical certificate is issued by the Registered Doctor for occupational injury or by the Recognized Doctor for contact with Occupational Disease;</p> <p>(b) because the said Worker has addressed a complaint for hazardous or health detrimental condition;</p> <p>(c) because the said Worker has conducted the responsibilities of Occupational Safety and Health Committee; or</p>	<p>GRGICL will never dismiss or demote a Worker: -</p> <p>(a) during any period before a medical certificate is issued by the Registered Doctor for occupational injury or by the Recognized Doctor for contact with Occupational Disease;</p> <p>(b) because the said Worker has addressed a complaint for hazardous or health detrimental condition;</p> <p>(c) because the said Worker has conducted the responsibilities of Occupational Safety and Health Committee; or</p> <p>(d) because the said Worker has refused to work in any condition where an Occupational Accident or Occupational Disease is about to occur.</p>

		(d) because the said Worker has refused to work in any condition where an Occupational Accident or Occupational Disease is about to occur.	
31.3	28	If any Worker who has been injured due to an Occupational Accident or contacted with Occupational Disease is not covered under the Social Security Law 2012, the Employer must pay for medical expenses to check the extent of capacity reduction and class of disability of such Worker	If any Worker who has been injured due to an Occupational Accident or contacted with Occupational Disease is not covered under the Social Security Law 2012, GRGICL must pay for medical expenses to check the extent of capacity reduction and class of disability of such Worker
31.4	29	<p>The Employer: -</p> <p>(a) can prohibit or restrict any Worker to work if he/she does not meet the health standards due to medical check-up results done by the Registered Doctor in accordance with the needs and nature of the Industry/Business;</p> <p>(b) must, without delay, employ any Worker who has been prohibited or restricted to work subject to sub-section (a) in his/her original position or at the relevant</p>	<p>The GRGICL: -</p> <p>(a) will prohibit or restrict any Worker to work if he/she does not meet the health standards due to medical check-up results done by the Registered Doctor in accordance with the needs and nature of the Industry/Business;</p> <p>(b) will, without delay, employ any Worker who has been prohibited or restricted to work subject to sub-section (a) in his/her original position or at the relevant Workplace upon his/her submission of health improvement evidence; and</p>

		Workplace upon his/her submission of health improvement evidence; and (c) must make necessary arrangements in the Workplace in order not to damage health of female Workers who are pregnant or breast-feed.	(c) will make necessary arrangements in the Workplace in order not to damage health of female Workers who are pregnant or breast-feed.
32	The Private Industrial Enterprise Law		
32.1	26	No one shall conduct a private industrial enterprise contained in section 4. Without obtaining registration under this Law.	GRGICL will conduct a private industrial enterprise contained in section 4. Without obtaining registration under this Law.
32.2	27	An entrepreneur: (a) in distributing and selling the goods he has produced shall not sell without a trade mark; (b) shall not violate any provision of section 13; (c) shall not fail to comply with any order or decision passed by the Minister and the Director General	GRGICL (a) in distributing and selling the goods thst has produced will not sell without a trade mark; (b) will not violate any provision of section 13; (c) will not fail to comply with any order or decision passed by the Minister and the Director General
33	The Prevention and Control of Communicable Diseases Law		
33.1	11	In order to prevent and control the spread of a Principal Epidemic Disease, the Health Officer may undertake the following measures; -	In order to prevent and control the spread of a Principal Epidemic Disease, GRGICL Health Officer may undertake the following measures; -

		(a) investigation of a patient or any other person required; (b) medical examination; (c)causing laboratory investigation of stool, urine, sputum and blood samples to be carried out; (d)causing investigation by injection to be carried out; (e)carrying out other necessary investigations	(a) investigation of a patient or any other person required; (b) medical examination; (c)causing laboratory investigation of stool, urine, sputum and blood samples to be carried out; (d)causing investigation by injection to be carried out; (e)carrying out other necessary investigations
33.2	12	The Health Officer has the right to do laboratory investigation of any food, water and their necessary materials.	GRGICL Health Officer will be done laboratory investigation of any food, water and their necessary materials.
33.3	13	The Health Officer shall report immediately the source to the relevant Department of Health, of the Principal Epidemic Disease	GRGICL Health Officer will report immediately the source to the relevant Department of Health, of the Principal Epidemic Disease
34	The Petroleum and Petroleum Product Law		
34.1	30	Any person shall, without the relevant licence, not carry out any business activities or measures required to obtain licence under this law	GRGICL will, without the relevant licence, not carry out any business activities or measures required to obtain licence under this law

34.2	31	<p>Any licensee:</p> <ul style="list-style-type: none"> a. shall not violate any prohibition contained in the rules, regulations, bye-laws, notifications, orders, directives, procedures and conditions or fail the duty to implement; b. shall not use a receptacle and transport vehicles and pipelines that contains any dangerous petroleum and petroleum product without saliently mentioning in writing of warning signs; c. shall not import, transport, store and sell and distribute the dangerous petroleum and petroleum product, or non-dangerous petroleum and petroleum product except by the means stipulated in this law; d. shall not have the right to carry out without undertaking the environmental impacts, in operating petroleum and petroleum product business activities; e. shall not distribute and sell petroleum and petroleum products which do not fulfill or are not in conformity with the standard, quality and measurement 	<p>GRGICL:</p> <ul style="list-style-type: none"> a. will not violate any prohibition contained in the rules, regulations, bye-laws, notifications, orders, directives, procedures and conditions or fail the duty to implement; b. will not use a receptacle and transport vehicles and pipelines that contains any dangerous petroleum and petroleum product without saliently mentioning in writing of warning signs; c. will not import, transport, store and sell and distribute the dangerous petroleum and petroleum product, or non-dangerous petroleum and petroleum product except by the means stipulated in this law; d. will not have the right to carry out without undertaking the environmental impacts, in operating petroleum and petroleum product business activities; e. will not distribute and sell petroleum and petroleum products which do not fulfill or are not in conformity with the standard, quality and measurement
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34.3	32	Any person who carries out a petroleum and petroleum product business activities shall not refuse if an authorized officer or organization asks to provide suitable help, to inspect the petroleum and petroleum product, receptacle, and machine-powered vehicle, machinery, vessel or pipeline that transports and to take sample of petroleum and petroleum product at any place of import, export, storage, refining, sale and distribution of any petroleum and petroleum product, or at the time of transport .	GRGICL will be carried out a petroleum and petroleum product business activities will not refuse if an authorized officer or organization asks to provide suitable help, to inspect the petroleum and petroleum product, receptacle, and machine-powered vehicle, machinery, vessel or pipeline that transports and to take sample of petroleum and petroleum product at any place of import, export, storage, refining, sale and distribution of any petroleum and petroleum product, or at the time of transport .
34.4	33	Any person who manages a petroleum and petroleum product business activities shall not fail to report immediately to the nearest authority concerned and provide information relating to any accident if an explosion or fire occurs due to any petroleum and petroleum product business activities, or it is likely to cause fire at or near to the place where petroleum and petroleum product is stored	GRGICL will be managed a petroleum and petroleum product business activities will not fail to report immediately to the nearest authority concerned and provide information relating to any accident if an explosion or fire occurs due to any petroleum and petroleum product business activities, or it is likely to cause fire at or near to the place where petroleum and petroleum product is stored
35	The Protection and Preservation of Cultural Heritage Regions Law.		

35.1	22	No person shall construct a building which is not in conformity with the conditions prescribed region wise by the Ministry of Culture in the cultural heritage region.	GRGICL will never construct a building which is not in conformity with the conditions prescribed region wise by the Ministry of Culture in the cultural heritage region.
35.2	23	No person shall plough and cultivate or carry out any activity which may cause damage to the cultural heritage within the boundary notified by the Department in the cultural heritage region	GRGICL will never plough and cultivate or carry out any activity which may cause damage to the cultural heritage within the boundary notified by the Department in the cultural heritage region
36	The Protection and Preservation of Antique Objects Law		
36.1	12	The person who finds any object which has no owner or custodian, he shall promptly inform the relevant Ward or Village-Tract Administrator if he knows or it seems reasonable to assume that the said object is an antique object	GRGICL will prompt to inform the relevant Ward or Village-Tract Administrator in finding any object which has no owner or custodian, he if he/she knows or it seems reasonable to assume that the said object is an antique object
37	The Protection and Preservation of Ancient Monuments Law		
37.1	18	No one shall carry out any performance in Sections 14 and 15 without permission of the Department.	GRGICL will never carry out any performance in Sections 14 and 15 without permission of the Department.

37.2	20	<p>No one shall carry out any of the following acts which is assumed to cause damage to an ancient monument within the specified area of an ancient monument or of a listed ancient monument without a written prior permission:</p> <p>(b) using machines which causes vibration within the specified place of an ancient monument and running various types of vehicles;</p> <p>(d) emission of gas such as hot-air balloon which can affect an ancient monument;</p> <p>(f) discarding chemical substance and rubbish which can affect an ancient monument and the environment.</p>	<p>GRGICL will never carry out any of the following acts which is assumed to cause damage to an ancient monument within the specified area of an ancient monument or of a listed ancient monument without a written prior permission:</p> <p>(b) using machines which causes vibration within the specified place of an ancient monument and running various types of vehicles;</p> <p>(d) emission of gas such as hot-air balloon which can affect an ancient monument;</p> <p>(f) discarding chemical substance and rubbish which can affect an ancient monument and the environment</p>
38	The Law on Standardization		
38.1	17	A person desirous of obtaining certificate of certification shall apply to the department and organization which has obtained the accreditation.	GRGICL will be complied section 17 of the law on standardization
38.2	18	The department and organization which has obtained the accreditation is entitled to issue the following	GRGICL will be complied section 18 of the law on standardization

		categories of certificate of certification, after examining in accordance with stipulations: (a) product certificate of certification; (b) production process certificate of certification; (c) service certificate of certification;	
39	Myanmar Insurance Business Law		
39.1	8.	A company desirous of writing one or more of the following insurance classes shall apply for business licence to the Supervisory Board in accordance with the stipulations: (a) Life Assurance;(b) Fire Insurance;(c) Comprehensive Motor Insurance;(d) Cash-in-transit Insurance;(e) Cash-in-safe Insurance;(f) Fidelity Insurance;(g) Classes of insurance permitted by the Ministry from time to time, by notification, with the approval of the Government.	GRGICL will follow the rules described in section 8 of Myanmar Insurance Business Law
39.2	9	A company desirous of acting as an underwriting agent or insurance broker shall apply for business licence to the Supervisory Board in accordance with the stipulations.	GRGICL will follow the rules described in section 9 of Myanmar Insurance Business Law

2.3 Institutional Arrangements

There are eight departments such as HSE Dept, Admin Dept, HR Dept, Finance Dept, CFD and WWT Dept, Store Dept, D&D Dept and Maintenance Dept which are led by CEO, plant manager and head of departments. Plant Manager is responsible for fostering the whole plant to be in smooth operation.

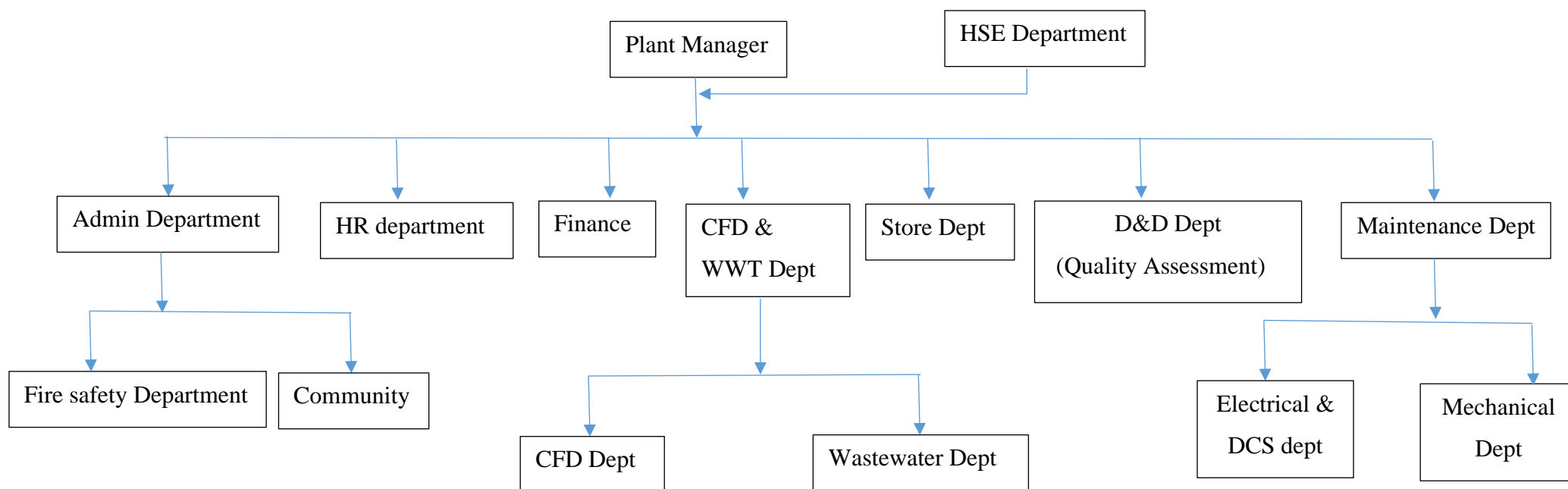


Figure 1. Yangon Distillery Plant Organization Chart

3 Project Description

3.1 Introduction

Yangon Distillery Plant (GRGICL) was established in 2010 at the Hmawbi Township. The preconstruction and construction work of the project site was prepared within 2010 to 2012. After construction work, the factory operation was started at 2012. The plant is located on Field No. 560 of Upper Thae Kone Village Group, Leik Poke Village Tract, Hmawbi Tsp. The plant boundary is at the west of the No. (4) Main road. The total area of the plant is (30.45) acres. Current production capacity of the plant is 10000 gal/day Rectified Spirits.

3.2 Project Location

The plant is located on Field No. 560 of Upper Thae Kone Village group, Hmawbi Tsp. The plant boundary is at the west of the No. (4) Main road as shown in figure 2. The total area of the plant is (30.45) acres. The plant is located approximately 25 km from Yangon and 12 km from Hmawbi Township. The factory is located at the North of the Yangon. It is about 20 km from Yangon airport. The factory site is located at the opposite side of APB Brewery Plant.

There are four villages around the factory area in close proximity as shown in figure and which are Upper Thae Kone, Lower Thae Kone, Late Pote and Kwin Late Pote. Late Pote Stream started near the Factory area and flows into Hlaing River at the South-West of the factory site (approximately 7 km away from the factory). The GRGICL Existing Distillery plant is located at 17°01' 24.24"N Latitude and 96°01' 44.26"E Longitude.

Table 11. Coordinate Points of Yangon Distillery Plant (GRGICL) Boundary

Sr	Point	Coordinate	
		Lattitude	Longtitude
1	A	17° 1'21.47"N	96° 4'23.96"E
2	B	17° 1'17.17"N	96° 4'35.04"E
3	C	17° 1'20.53"N	96° 4'44.08"E
4	D	17° 1'29.35"N	96° 4'42.01"E
5	E	17° 1' 27.20"N	96° 4' 33.40"E

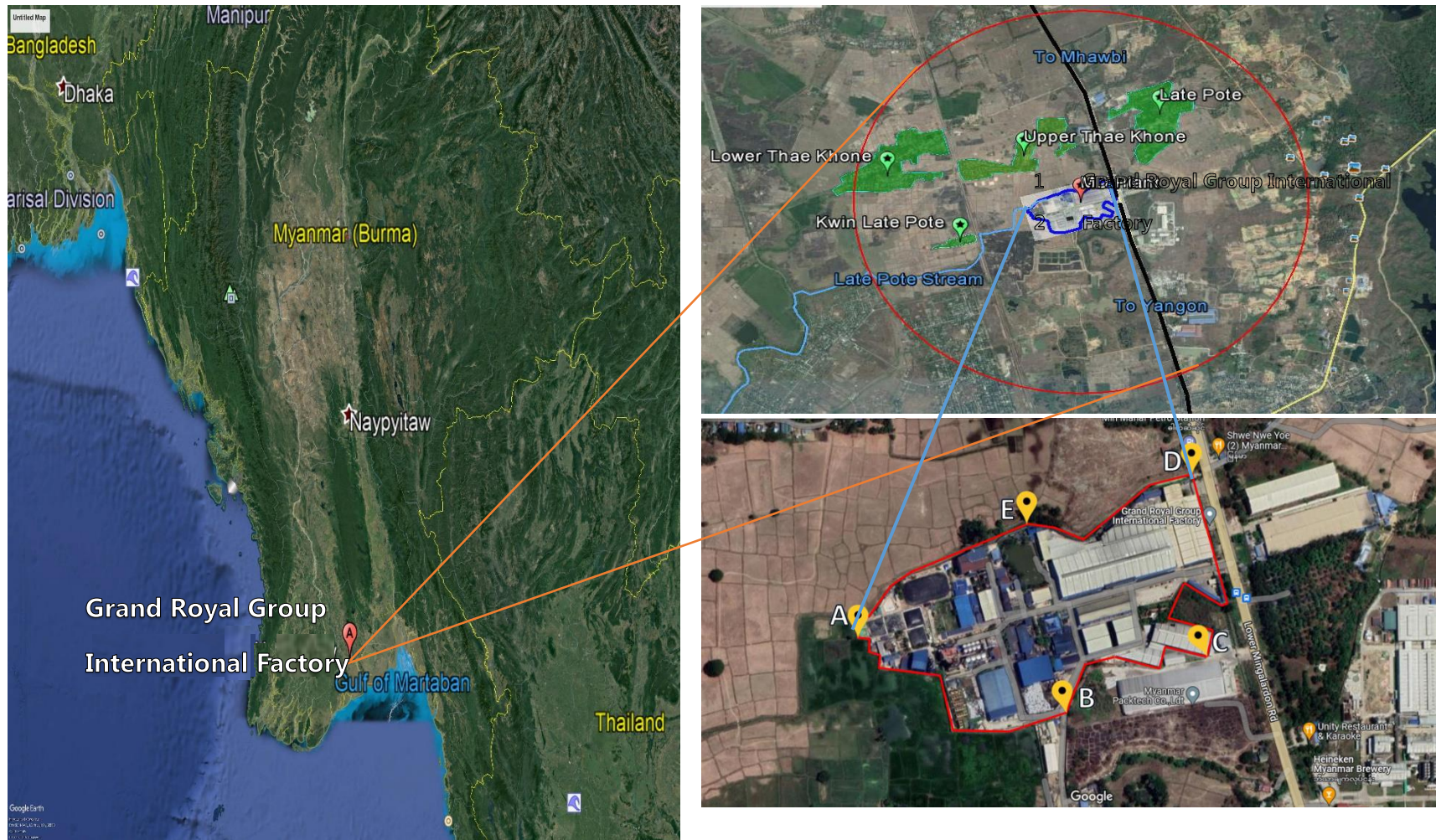


Figure 2. Location of Yangon Distillery Plant (GRGICL)

3.3 Process and Layout of Yangon Distillery Plant (GRGICL)

Production capacity of Yangon Distillery Plant is 10000 gal/day Rectified Spirits.

The plant can be mainly divided into four sections which are;

- Crushing (milling) section
- Liquefaction and saccharification (Cooking) section
- Fermentation Section and
- Distillation Section.

There are other auxiliary sections such as wastewater treatment plant and boiler operation. Current raw material for the entire plant is broken rice and for the near future proposed raw materials will be not only broken rice but also corn and tapioca. Estimated water usage for the distillery plant is 1190 m³ per day. The machines operation days of the plant were 28 days/month and 300 days/yr. The process flow diagram of the existing plant is shown in following figure.

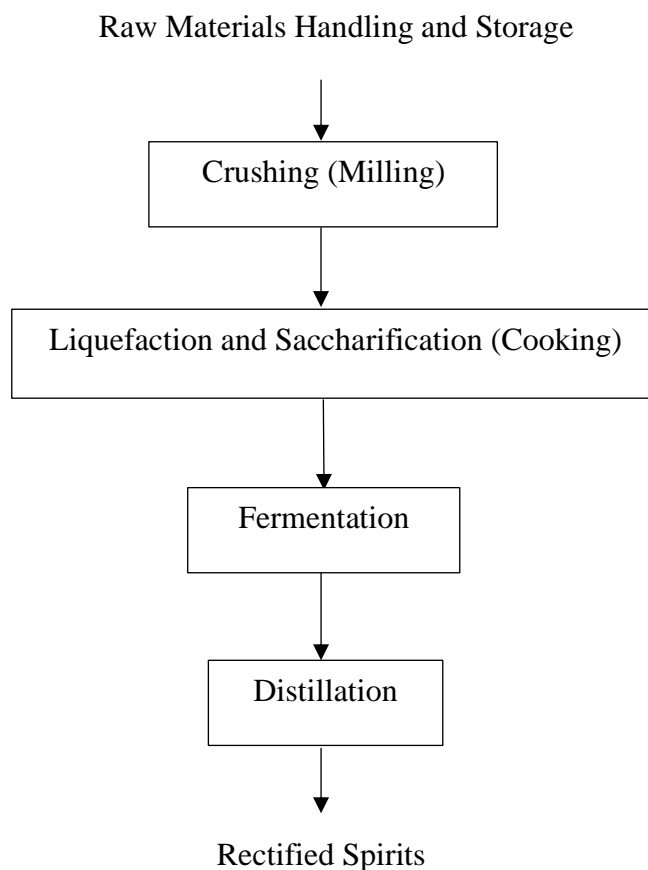


Figure 3. Block Diagram for Production Process of Yangon Distillery Plant

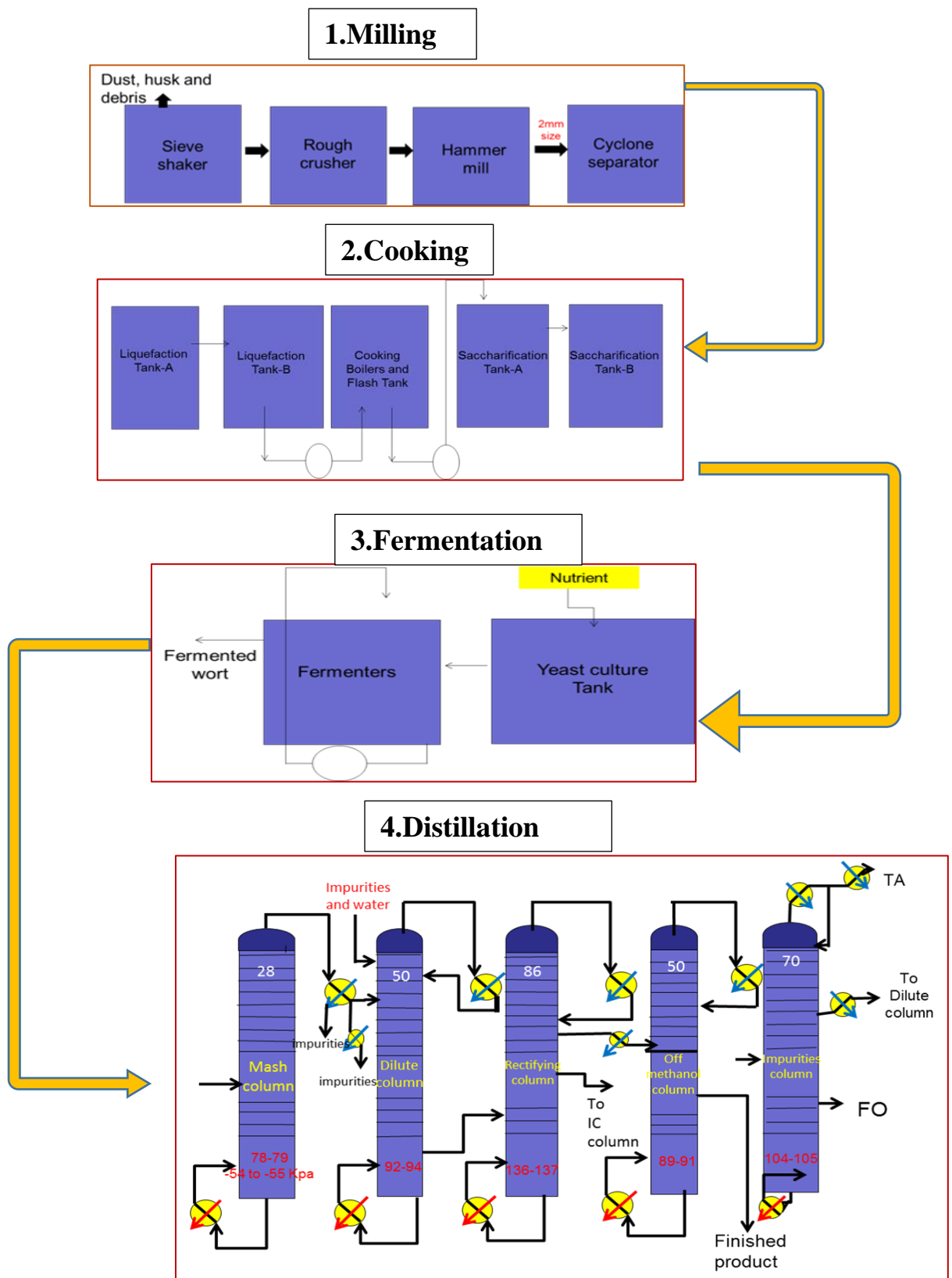


Figure 4. Process Flow Diagram of Yangon Distillery Plant (GRGICL)

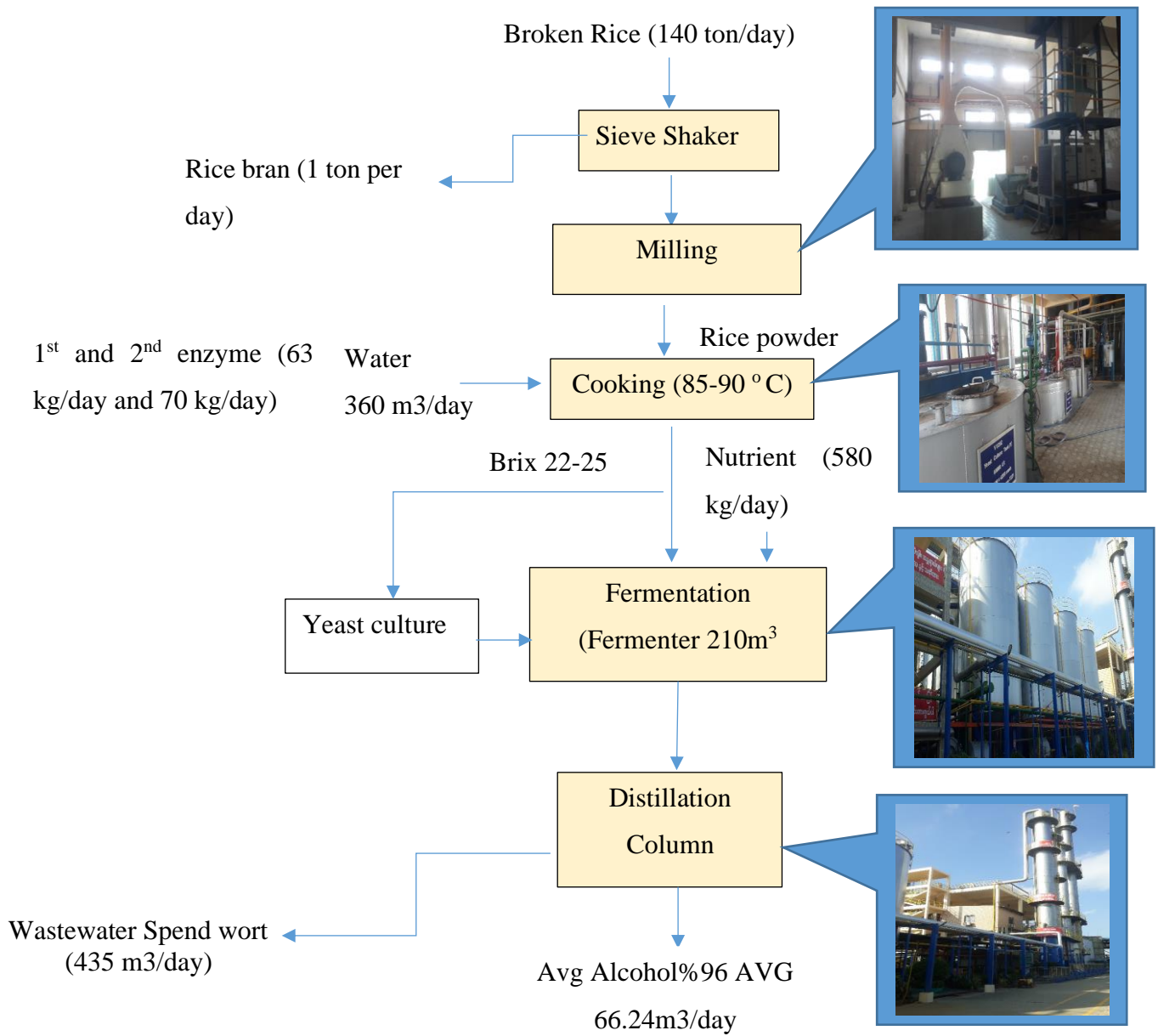


Figure 5. Process Flow Chart of Yangon Distillery Plant (GRGICL)



Figure 6. Layout Plan of Yangon Distillery Plant

Table 12. Indications for the Layout Plan

Sr.	Particular	Sr.	Particular
1	Finished Goods Warehouse Area	10	Wastewater Treatment Plant
2	Bottling Plant	11	Coal Storage Area
3	Blending Area	12	Broken Rice Warehouse
4	Truck Car Parking	13	Distillery Plant
5	Empty Bottle Warehouse	14	R/S Storage Area
6	Oak Cask Warehouse	15	RO Water Treatment
7	Main Office	16	Decanter & Evaporator
8	Canteen	17	Workshop
9	M & E Building		

3.4 Land Use

Total area of the Grand Royal Group International Plant is 30.45 acres. Factory footprint area is about 26.5 acres, 0.22 acre for main office area, 0.23 acre for canteen, 1.1 acres for coal storage area, 0.79 acre for broken rice warehouse area, 3.79 acres for wastewater treatment plant area, 0.22 acre for new cooling tower area, 1.1. acres for CFD area, 0.17 acre for M&E area and 0.17 acre for water treatment plant area. The remaining area is bottling plant area and green area.

3.5 Description of Raw Materials

The primary raw materials used in Yangon Distillery Plant (GRGICL) are broken rice, corn, starchy grain, water and yeasts. Broken rice is procured from local market and stored in the warehouse with plastic woven bags. Broken rice is transported by truck and 25 tons of rice are included in one carry.

Table 13. Raw Material List of Yangon Distillery Plant

Sr.	Raw Materials	Amount	Source	Storage
1	Broken Rice	30481.9 ton/yr	Local	Warehouse
2	Yeast	4572.3 kg/yr	Overseas	Cold Room

3	1 st Enzyme	10668.67 kg/yr	Overseas	Tank
4	2 nd Enzyme	18289.14 kg/yr	Overseas	Tank
5	Nutrient	60963.8 kg/yr	Overseas	Cold Room

Table 14. Raw Materials and Chemicals Usage of Yangon Distillery Plant

Group	Items	Unit	Average daily usage	Average monthly usage	Average yearly usage	Section	Purchase
Raw Materials	Production	Gal	16000.00	400000.00	4800000.00		
	Broken Rice	Ton	140.35	3508.77	42105.26	Milling	Local
	Rice husk pellet	Ton	15.00	375.00	4500.00		Local
	Coal	Ton	15.00	375.00	4500.00	Boiler	Oversea
Chemicals	Dry Yeast Angel	Kg	29.47	736.84	8842.11	Fermentation	Oversea
	1st Enzyme	Kg	63.16	1578.95	18947.37	Fermentation	Oversea
	2nd Enzyme	Kg	70.18	1754.39	21052.63	Fermentation	Oversea
	Diammonium Phosphate	Kg	119.30	2982.46	35789.47	Fermentation	Local company
	Ammonium Sulphate	Kg	463.16	11578.95	138947.37	Fermentation	Local company
	Caustic	kg	210.53	5263.16	63157.89	Cleaning	Local company
	Lime	kg	56.14	1403.51	16842.11		Local company
	Caustic	kg	560.00	14000.00	168000.00	Wastewater treatment	Local company
	Lime	kg	480.00	12000.00	144000.00	Wastewater treatment	Local company
	Polymer	kg	80.00	2000.00	24000.00	Wastewater treatment	Local company
	Chloring	kg	80.00	2000.00	24000.00	Wastewater treatment	Local company

	Feric Chloride Acid	kg	150.00	3750.00	45000.00	Wastewater treatment	Local company
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Remark; Chemical usage mainly based on Factory production Target volume. This is AVG volume is based on Capacity volume. Actually, not produce this amount and use these chemical amounts. But add max to reduce conflict when produce maximum output.

3.6 Manufacturing Process of the Yangon Distillery Plant (GRGICL)

3.6.1 Milling

Milling is required to reduce the particle size of raw material. The milling section of the plant has the necessary equipment for cleaning of raw materials and screening the final flour so as to get the desired particle size. The raw material is first milled to get flour in the milling section. The smaller particle size increases the total surface area per unit weight and helps during slurry preparation. The slurry is prepared from milled raw materials in water and sent to liquefaction. Raw material was first cleaned by sieve shaker and then followed by rough crusher, hummer mill and cyclone separators. Mesh size of milling machine is 2-3 mesh and the capacity of this machine is 6 tons per hour. Milling section generate two tons per hour of rice bran which is sell for animal food. Daily usage of broken rice is 107-130 tons per day depend on starch percent. At raw mater conveying stage, GRGICL has been installed the dust removal filter bags system before going to the milling section. Conveyer is properly covered by metal sheet and raw material drop down height is also low to reduce dust pollution. At Out let of sieve shaker, second filter bags system with air suction to catch all final dust and light particle. GRGICL has been release to wear proper mask, proper PPE when run the milling for all operator. Almost of time, operator operate milling process by control room. Milling section has built in close type building and all access door is cover by plastic shelter. GRGICL was cleaned the floor regularly by cleaning schedule.

3.6.2 Liquefaction and Saccharification

This section can mainly be divided into liquefaction and saccharification. Liquefaction initiates the conversion of starch into simple molecules of dextrin. It is divided into three sub processes. These are,

- Preliquefaction
- Jet cooking and
- Post liquefaction.

Preliquefaction involves partial liquefaction of starch, in presence of enzyme, at a temperature 67°C which is well below the gelatinization temperature. Jet cooking involves the cooking of starch slurry with live steam so as to instantaneously raise it's temperature. This gelatinises and opens up starch molecules, thus making it accessible to enzyme action. Jet cooking also sterilizes the slurry. And in post liquefaction the jet cooked slurry is again held at high temperature of 100°C in presence of enzyme to complete the process of liquefaction.

Saccharification is the formation of sugars which is done enzymatic breakdown of dextrin. Then the dextrin is acted upon by a second enzyme for further breakdown and release of sugars.

Table 15. Components List for Milling and Cooking Section

No	Items	Specs and Parameters	Main Materials	Qty	kW
1	Spiral Conveyor	JLS400-00 dai400 *3500	S30408	1	
2	Vibration feeder	6t/hr	Q235-B	1	1.5
3	Milling Machine	12 ton/hr	Q235-B	1	90
4	Cyclone separator	Dia 1200 *3500	Q235-B	1	
5	Cyclone	GFY-45 Q=10t/h	HT	1	3
6	Air Blower	9-19-7 ID Q=4640-7376 m3/h	Q235-B	1	37
7	Water droplet Deduster	ø 1600 x 5000	Q235-B	1	
8	Circulating Water Pump	Q= 25 m3/h, H=16 m, Double Sealed	SS	2	
9	Crusher motor	12 ton per hr	Q235-B	1	90
10	Replace for electrical control system of existing crushing section			1	

11	Pre-liquefying Mash Pump	Q=60 m ³ /h, H=40 m, Double Sealed	SS	2	15
12	Low-pressure Liquified Mash Pump	Q=60 m ³ /h, H=60 m, Double Sealed	SS	2	18.5
13	Jet Liquefier	HYB-D-8, Q=37-50m ³ /h	S30408	1	
14	Thin Paster Pre-heater	F=60m ²	S30408	1	
15	1-4# Cooking Pot	Ø 1500×6000	Q235-B	4	
16	Flash Tank	Ø 1500×8000	Q235-B	1	
17	Flash Mash Pump A/B	Q=60m ³ /h, H=40m Double sealed	ss	2	15
18	Saccharified Mash Pump	Q=60m ³ /h, H=50m Double sealed	ss	2	18.5
19	Saccharified Mash Cooler	F=180m ²	S30408	2	
20	Vacuum tank	Ø 1400×2500	Q235-B	1	
21	Terminal condenser	F=120m ²	S30408	1	
22	Liquefied enzyme tank	V=0.2m ³ , Ø 600×800	S30409	1	
23	Saccharifying tank	V=0.2m ³ , Ø600×800	S30410	1	
24	Metering pump, Liquefying enzyme	Q=0-13L/h	PVC	1	
25	Metering pump, Saccharifying enzyme	Q=0-35L/h	PVC	2	
26	Concentrated sulfuric acid feed tank	V=0.2m ³ , Ø 600×800	Q235-B	1	
27	Concentrated Alkali feed tank pump	V=0.2m ³ , Ø 600×801	S30408	1	
28	Concentrated sulfuric acid storage tank	Φ1600×2500	Q235-B	1	
29	Lye tank	Φ1600×2500	S30408	1	

30	Submerged pump, Concentrated sulfuric acid	Q=3.6 m ³ /h H=20m	Cast steel	1	
31	Submerged pump, Concentrated alkali	Q=3.6 m ³ /h H=20m	Stainles steel	1	
32	Metering pump, Concentrated alkali	Q=0-23L/h	PVC	1	
33	Metering pump, Concentrated sulfuric	Q=0-23L/h	PP	1	

3.6.3 Fermentation

Saccharified slurry from Saccharification section is pumped into Fermenter. It is then inoculated with required quantity of suitable yeast. Temperature in the fermenter is maintained at (35 - 37) °C with the help of heat exchanger. The fermented mash is recirculated continuously. Recirculation also helps in proper mixing of fermented mash. The rate of fermentation reaction gradually increases, and fermentation completes after 60 to 66 hours. There are 8 numbers of fermenters which 250m³ capacity each.

After completion of reaction the fermented mash is delivered to mash holding tank. The fermented mash collected in the Clarified Wash Tank is then pumped to Mash or Primary column for distillation. A closed loop cooling tower system with an induced draft-cooling tower with circulation pumps is also provided to ensure higher cooling efficiency and to minimize water wastages.

Since the fermented materials is broken rice, CO₂ released from fermentation section is renewable biomass (cereal grains). Therefore, its carbon emission factor is zero because CO₂ circle is close loop system and it cannot be impacted to the environment like fossil fuel combustion CO₂. But CO₂ generating line of all fermenters from GRGICL has been connected to CO₂ scrubber tank in which water are spraying to catch all condensable volatile gas and to control the smell. Therefore, the outlet of CO₂ scrubber gas from GRGICL has been already purified.

Table 16. Components List for Fermentation Section

No	Items	Specs and Parameters	Main Materials	Qty	kW
1	Yeast Activation Tank	V=1m ³ , Ø 1000×1200	Q235-B	1	0.55

2	Yeast Tank A/B	V=35m ³ , Ø 3100×4500, Equipped with 15m ² Stainless steel coil	Q235-B/S30408	2	5.5
3	Fermentation Tank	V= 250m ³ (Workng volume)	Q235-B	8	
4	Fermenting Mash Circulation Pump	Q=150 m ³ /h, H=25 m Double-sealed	ss	8	15
5	Fermenting Mash Transfer Pump	Q=150 m ³ /h, H=25 m Double-sealed	ss	2	18.5
6	Fermenting Mash Cooler	F=80m ²	S30408	6	
7	Light Wine Absorber Tower	Ø 1600×10	S30408	1	
8	Mature Mash Pump	Q=60 m ³ /h, H=60 m Double-sealed	ss	2	18.5
9	Spray Ball			9	
10	Yeast mash pump	Q=35 m ³ /h, H=50 m Double-sealed	ss	2	

3.6.4 Distillation

Distillation of fermented mash is the next important step in production of alcohol after fermentation. This step consumes a considerable amount of energy and is also a deciding factor in the quality of RS produced. Hence, in line with the demand of the industry, efforts have always been to minimize requirement of energy and to improve the basic quality of alcohol produced. Ease of operation, reliability, lower down time and flexibility of operations are other parameters considered since the design.

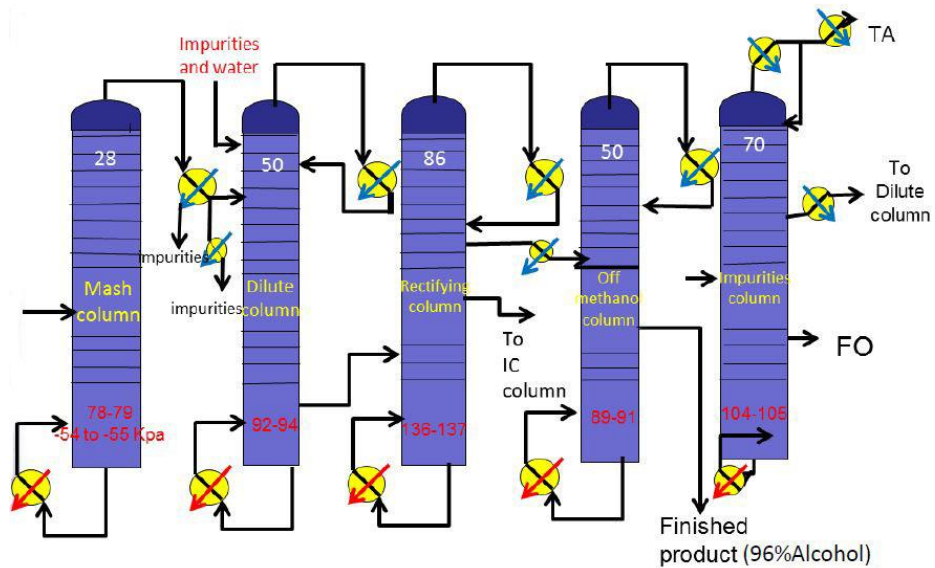


Figure 7. Distillation Section

The distillation of fermented mash is based on the fractional distillation. Ethyl alcohol and other impure alcohol are separated at respective boiling point. The distillation process involves,

1. Separation of alcohol from fermented mash.
2. Concentration of alcohol.
3. Separation of RS and impure spirit.

The whole process of distillation section is shown in above figure.

Table 17. Components List for Distillation Section

No	Items	Specs and Parameters	Main Materials	Qty	kW
1	Mash Column	$\Phi 1600 \times (24+4+2)$ Ht=550/350	S30408	1	
2	Mash Column	$\Phi 1600 \times 6$ Ht=450	S30408	1	
3	Mash Column	$\Phi 1200 \times 6$ Ht=350	S30408	1	
4	Dilute Column	$\Phi 1200 \times 50$ Ht=350	S30408	1	
5	Rectification Column	$\Phi 1400 \times 86$ Ht=380	S30408	1	
6	Off Methanol Column	$\Phi 1200 \times 50$ Ht=350	S30408	1	
7	Impurity Column	$\Phi 700 \times 70$, Ht=300	S30408	1	
8	Air Scrubbing Column	$\Phi 400 \times 3000$	S30408	1	

9	Mash Column Reboiler	F=200m ² Φ38×2×6000	S30408	1	
10	Mash Column Reboiler	F=200m ² Φ38×2×6001	S30408	1	
11	Mash Preheater I	F=85m ² Φ38×2×6000	S30408	1	
12	Mash Preheater II	F=60m ²	S30408	1	
13	Mash Column Condenser I	F=200m ² , Φ32×1.5×6000	S30408	1	
14	Mash Column CondenserII	F=150 m ² , Φ32×1.5×6000	S30408	1	
15	Mash Column Condenser II	F=50m ² , Φ32×1.5×2000	S30408	1	
16	Mash Column Condenser II of Steam Stripping Section	F=60m ² , Φ32×1.5×2000	S30408	1	
17	Mash Column Condenser II of Steam Stripping Section	F=50m ² , Φ32×1.5×2001	S30408	1	
18	Rectification column reboiler	F=150m ² , Φ32×1.5×3000	S30408	1	
19	Dilute Column Reboiler	F=280m ² , Φ32×1.5×4000	S30408	1	
20	Off Methanol Column Reboiler	F=220m ² , Φ32×1.5×4000	S30408	1	
21	Off Methanol Column Auxiliary CondenserI	F=15m ² , Φ32×1.5×2000	S30408	1	
22	Off Methanol Column Auxiliary CondenserII	F=10m ² , Φ32×1.5×2000	S30408	1	
23	Dilute Column Auxiliary Condenser	F=40m ² , Φ32×1.5×2000	S30408	1	
24	Impurity Column Condenser I	F=65m ² , Φ32×1.5×2000	S30408	1	
25	Impurity Column CondenserII	F=40m ² , Φ32×1.5×2000	S30408	1	
26	Impurity Column CondenserIII	F=20m ² , Φ32×1.5×2000	S30408	1	
27	Impurities Remove Condens	F=5m ² , Φ32×1.5×2000	S30408	1	
28	Raw Alcohol Preheater I	F=15m ²	S30408	1	
29	Raw Alcohol Pre-heater II	F=12m ²	S30408	1	
30	Light Wine Preheater	F=50m ²	S30408	1	
31	Finished Product cooler	F=15m ²	S30408	1	

32	Impurity Alcohol	F=8m2	S30408	1	
33	Aldehyde Wine Cooler	F=2m2	S30408	1	
34	Fusel Oil Cooler	F=5m2	S30408	1	
35	Hot Water Cooler	F=20m2	S30408	1	
36	Fusel Oil Separator	Φ800×1500	S30408	1	
37	Condensates Tank	Φ1000×1200, V=1.0m3	Q235-B	1	
38	Hot Water Tank, Rectification Column	Φ1200×3000, V=3.5m3	S30408	1	
39	Reflux Tank A, Rectification Column	Φ1000×1200, V=1.0m3	S30408	1	
40	Reflux Tank B, Rectification Column	Φ1000×1200, V=1.0m3	S30408	1	
41	Reflux Tank B, Off Aldehyde Section	Φ1000×1200, V=1.0m3	S30408	1	
42	Reflux Tank, Dilute Column	Φ1000×1200, V=1.0m3	S30408	1	
43	Reflux Tank, Off Methanol Column	Φ1000×1200, V=1.0m3	S30408	1	
44	Impurity Alcohol Tank	Φ1000×2000, V=1.5m3	S30408	1	
45	Steam condensate water separator	Φ426×1000, V=0.15m3	20	1	
46	Reflux Tank, Impurity Column	Φ1000×1200, V=1.0m3	S30408	1	
47	Jet Heater		S30408	1	
48	Water circulation Pump	Q=400m3/h explosion-proof		2	11
49	Stillage Circulating Pump	Q=300m3/h,H=15m Double-sealed, explosion-proof	ss	3	18.5
50	Stillage Pump	Q=35m3/h,H=30mDouble-sealed,explosion-proof	ss	2	11
51	Raw Alcohol Pump	Q=7.2m3/h,H=50mDouble-sealed, explosion-proof	ss	2	5.5
52	Reflux Pump, Off Aldehyde Pump	Q=12.5m3/h,H=50mDouble-sealed, explosion-proof	ss	2	7.5

53	Reflux Pump, Rectification Column	Q=14.4m ³ /h,H=56mDouble-sealed, explosion-proof	ss	3	11
54	Hot Water Pump	Q=25m ³ /h,H=40mDouble -	ss	2	7.5
55	Condensate Pump	Q=7.2m ³ /h,H=42mDouble-sealed, explosion-proof	Cast steel	2	5.5
56	Rectification Column feed pump	Q=35m ³ /h,H=50mDouble-sealed, explosion-proof	ss	2	15
57	Reflux Pump, Dilute Column	Q=7.2m ³ /h,H=42mDouble-sealed, explosion-proof	ss	2	5.5
58	Off Methanol Column Reflux Pump	Q=14.4m ³ /h,H=42mDouble-sealed, explosion-proof	ss	2	5.5
59	Feed Pump, Impurity Column	Q=3.6m ³ /h,H=32mDouble-sealed, explosion-proof	ss	2	1.5
60	Reflux Pump, Impurity Column	Q=7.2m ³ /h,H=42mDouble-sealed, explosion-proof	ss	2	3

3.6.5 Clean in Place (CIP) System

This process is important for all process equipment and pipes which are needed to be kept clean and disinfected. Cleaning is supported by means of CIP systems, where cleaning agents are circulated through the equipment or sprinkled over the surface of the tanks. Caustic soda (3% caustic solution) and acid are used as cleaning agents. Substantial amount of energy, water, cleaning agents, and disinfectants are used for the cleaning and disinfection of the equipment. The CIP design is fully automatic systems consisting of tanks for water and cleaning solutions that make it possible to reuse some water and cleaning solutions. Wastewater from CIP systems are reused in boosting pH.

Components List for Distillation Section

No	Items	Specs and Parameters	Main Materials	Qty	kW
1	CIP washing tank CIP	V=35m ³ , Ø 3100×4500	Q235-B	1	
2	CIP washing pump CIP	Q=35 m ³ /h, H=50 m Double-sealed	ss	2	15
3	Spray Ball	S30408	S30408	6	
4	Electrical control system of CIP system CIP			1	

3.7 Decommissioning Phase of the Factory

If not only Land Lease agreement and the other relevant agreements are not extended or renewed but also design life of plant is terminated, the plant will be decommissioned. If retrofitting is not feasible and the operational life of plant expires, the plant will be decommissioned according to the requirements of the authorities at that time according to best industry practices.

3.8 Electricity Supply

Yangon Distillery Plant purchase electricity from government power source. The plant installed 1500 kVA transformer and 3 nos of 500 kVA generators. Yangon Distillery Plant (GRGICL) is used diesel as generator fuel. GRGICL was storage (800-1000) gal diesel with steel storage tank. The diesel was transported by truck from local. The electrical power consumption of the distillery is about 685 kW as shown in the following table.

Table 18. Electrical Power Consumption of Yangon Distillery Plant (GRGICL)

No	Section	Power Consumption(kW)		Total (kW)
		Lighting	Power	
1	Office	9.88		9.88
2	GDP + Generator	3.604		3.604
3	Milling & Cooking	3.568	233.35	236.918
4	Fermentation	1.719	41	42.719
5	Distillation	4.191	99.5	103.691
6	Boiler	1.849	77.5	79.349
7	Water Treatment	0.43	55.61	56.04
8	Waste Water Treatment	0.1	6.5	6.6
9	Water Cooling System		153.5	153.5
10	Kitchen	0.72		0.72
11	Security	1.39		1.39
	Total	17.451	666.96	684.411

3.9 Water Supply and Discharge Water from the Process Steps

Water supply for Yangon Distillery Plant (GRGICL) is obtained from the groundwater via 5-tube wells. Estimated raw water usage for the plant is 320,296 m³/yr, treated water usage is 97792 m³/yr, RO water usage is 49994 m³/yr. The water supply for the process steps and the water discharge from the process steps are shown in following table.

Table 19. Water Supply and Discharge Water Amount

Sr	Section	Supply water Sources	Supply Water consumption(m ³ /day)	Used for	Discharge water volume from Process(m ³ /day)	Remark
1	Boiler	Treated water use from tube well	175	Steaming for Cooking and distillation and evaporator	0	200m ³ condensate return to boiler
2	Cooking	Cooling Tower water line	270	To mix with grain powder	0	Go along with process
3	Fermentation	Cooling Tower water line	20	Cleaning process	20	Send to aeration process
4	Distillation	Cooling Tower water line	24	Vacuum process	384(24 from vacuum water and 360 from spent wort)	After solid separation in decanter (solid has moisture content 40%)

5	Pump seal water	Water treatment	10	Cooling process	0	Blow down to normal drain line
6	Cooling Tower	Tube well	500	Cooling for distillery processing		10% loss from evaporation
7	Evaporator	Cooling Tower water line	100	Vacuum process	100	Send to normal drain line
8	Gardening and road cleaning	From water treatment	10	Gardening and road cleaning	10	Retaining and absorption from soil small to normal drain line
Total water volume from tube well			685		514	High COD is come from 360m3 distillation process

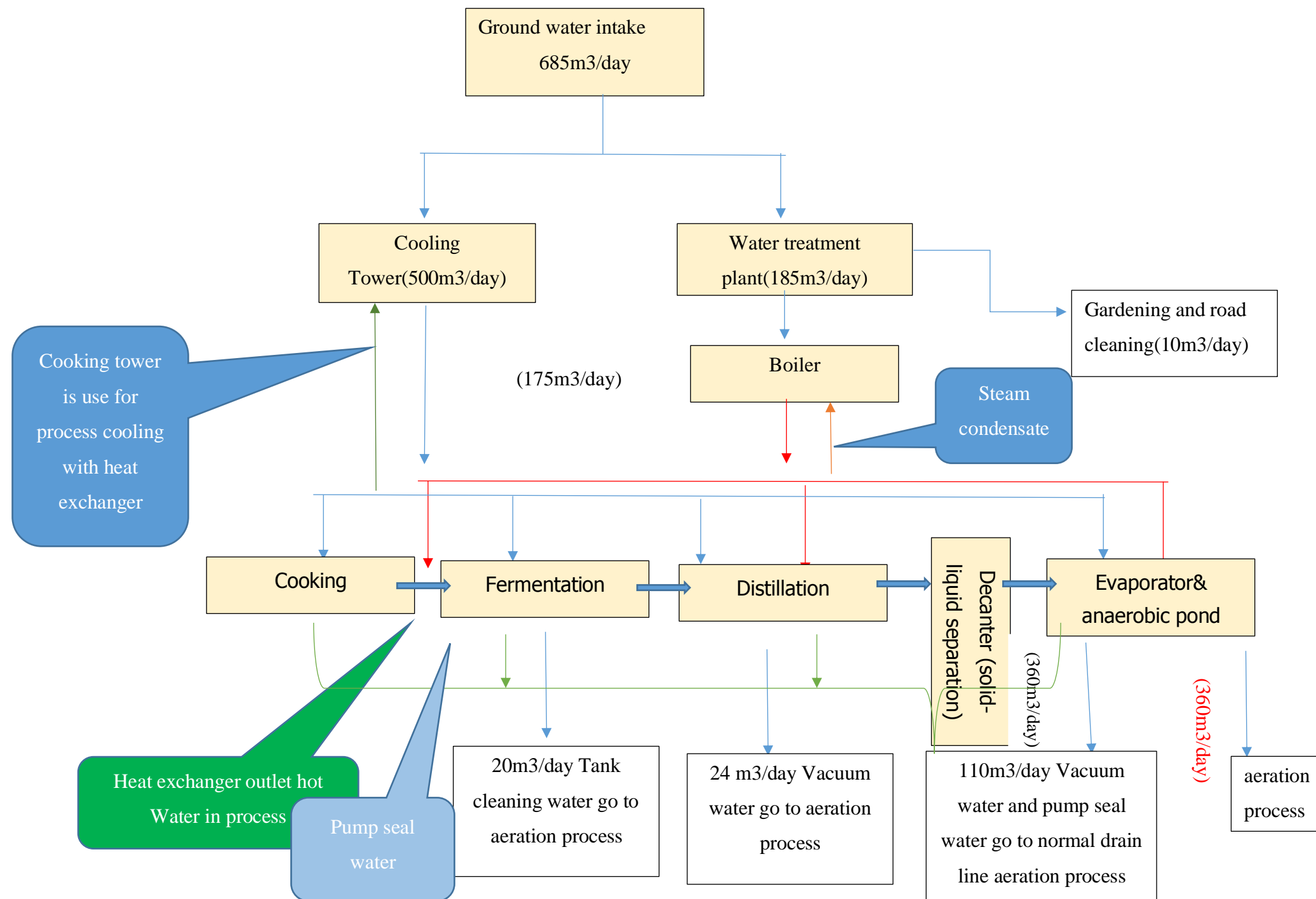
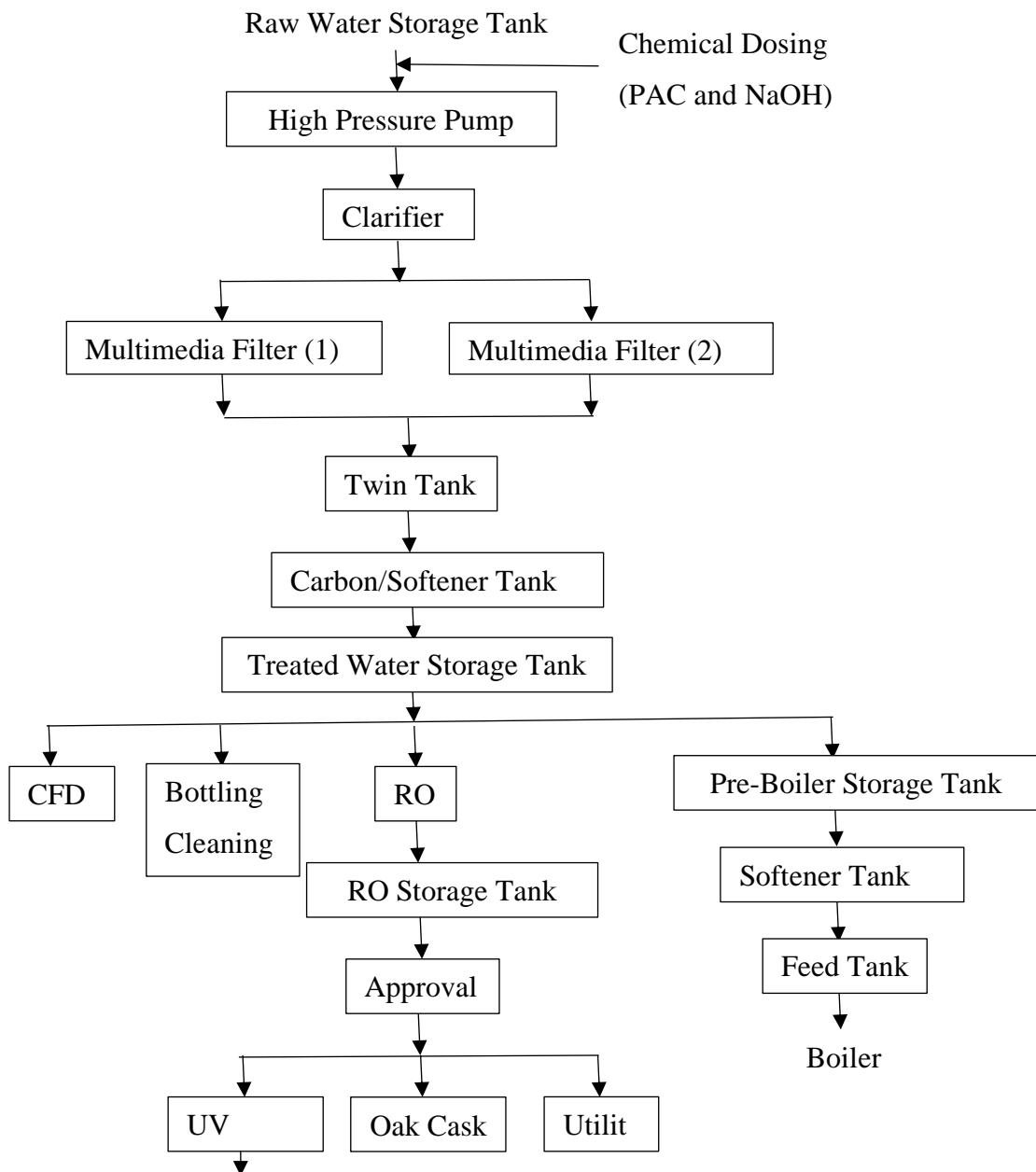


Figure 8. Water Usage Flow Chart of Yangon Distillery Plant (GRGICL)

3.10 Water Treatment Plant

The raw water source for the distillery plant is tube well water. Estimated raw water usage for the plant is 320,296 m³/yr, treated water usage is 97792 m³/yr, RO water usage is 49994 m³/yr. Yangon Distillery Plant (GRGICL) installed water treatment plant for treated water and RO water. The water treatment plant is located in the plant boundary. 10% of treated water is used for CFD and the remaining 90% is used for Bottling Plant. Water Treatment Process of Yangon Distillery Plant (GRGICL) is shown in the following figure



Bottling and Blending
Figure 9. Flow Chart for Water Treatment Plant and Water Distribution

Table 20. Water Consumption of the Plant

Source	Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total	YTD Ave
Raw	2015-2016										22,715	20,315	21,342	64,372	21,457
	2016-2017	22,384	9,369	29,949	26,856	30,829	33,584	38,277	38,627	42,554	43,869	39,163	38,142	393,603	32,800
	2017-2018	11,759	34,719	28,652	14,897	19,032	20,091	18,673	34,967	34,238	35,401	35,725	32,142	320,296	26,691
	2018-2019	32,648	32,571	19,308	27,419									111,946	27,987
Treated Water	2015-2016										2904	2800	3034	8,738	2,913
	2016-2017	1338	2088	2598	2738	2253	4605	4795	4832	6103	6150	6346	7495	51,341	4,278
	2017-2018	3399	7079	7101	6541	8734	10153	7537	7157	9528	10785	10297	9481	97,792	8,149
	2018-2019	6690	6800	4672	7212									25,374	6,344
RO Water	2015-2016										8746	8522	7005	24,273	8,091
	2016-2017	4717	2279	3654	3543	2706	3153	3821	3381	4067	4577	4676	4503	45,077	3,756
	2017-2018	2887	3809	4169	3244	6240	3956	3428	3128	3874	5722	5471	4066	49,994	4,166
	2018-2019	4129	3247	3349	3551									14,276	3,569

Table 21. Components List for Water Treatment Plant

No.	Items	Specs & parameters	Qty	Model No
1	Treated Supply Pump	45 m ³ /hr, 30m	2	-
2	Dozing Pump	8.5L/hr	2	-
3	Back Wash Pump		1	-
4	Process Feed Pump		2	-
5	Clarifier Pump		2	-
6	8" tube well Submersible pump 1	Qmax:700L/min,7.5KW(3phase), Hmax:92,Speed:2850rpm,outlet discharge pipe=3inches	1	-
7	8" tube well Submersible pump 2		1	-

3.11 Boiler

Yangon Distillery Plant has one boiler of 10-ton capacity. The boiler uses about 20-26 tons of coal as fuel daily. 10000 ton of coal will be stored in the coal storage warehouse. The type of the coal is Sub-bituminous US Coal. The coal will be imported from overseas by ship and transported from local by truck with cover. The detail transportation system of coal used in GRGICL is shown in the Appendix K.

Table 22. Components List for Boiler Section

No.	Items	Specs & parameters	Qty	Model No
1	Centrifugal Fan (IDFan)	3055-4086Pa 41773-21578 m ³ /hr	1	Y6-41-11
2	Centrifugal Fan (FDFan)	2535-3391Pa 18137-9369 m ³ /hr	1	G6-41-11
3	Dragging Slag Removal		1	010
4	Water Feed Pump	12.5m ³ /hr,115m	2	DG12-25X
5	Grate	16t/hr	1	GL-16P
6	Coal Feeder			

3.12 Transportation System of Yangon Distillery Plant

Table 23. Transportation System of Yangon Distillery Plant (GRGICL)

No.	Materials	Source From	Made of Transport	Amount	Storage
1	Broken Rice	Local	By Truck	32 trucks (17-34) Tons	Concrete Warehouse
2	Boiler Fuel	Local/Oversea	By Truck	84 trucks (10-40) Tons	Steel Structure Concrete Building
3	Rectified Spirits	-	By Pipe line	-	Steel Storage Tank
4	Diesel	Local	By Truck	3 trucks (800-1000) gal	Steel Storage Tank

3.13 Diesel Usage and Storage of Yangon Distillery Plant (GRGICL)

The plant installed 1500 kVA transformer and 3 nos of 500 kVA generators. Yangon Distillery Plant (GRGICL) is used diesel as generator fuel. GRGICL was storage (800-1000) gal diesel with steel storage tank. The diesel was transported by truck from local.

FY 2018-2019	
Gensets Diesel Usage (Liter)	
Year	Month
225,610	18,801





Figure 10. Generators of Yagon Distillery Plant (GRGICL)



Figure 11. Diesel Storage Tank of Yangon Distillery Plant (GRGICL)

Table 24. Average Lubricant Oil Usage Per Month

Sr No.	Items	Unit	Usage
1	Gear Oil-90°	liter	28.290
2	Engine Oil-50°	liter	8.625
3	Engine Oil-40°	liter	19.665

4	Engine Oil-15-40	liter	5.175
5	Hydroulic Oil-VG-46	liter	5.175
6	Gear Oil-85 W-90	liter	1.725
7	Hight Performance Polyureagrease 2/0.4 kg	kg	12.083
8	Lubricants Oil-320 Grade Oil-4 Liter	liter	0.080
9	Lubricants Oil-CRB-40 or HPCL-HDX-40-20 Liter	liter	15.000
10	Pressure Grease-5 kg	kg	8.333
11	70 ° C Over Temperature Grease-5 kg	kg	2.917
12	Gear Oil 220 (shell) OMALS2GX	liter	0.345

3.14 Storm Water and Drainage System of Yangon Distillery Plant

Rain water or storm water collected from the buildings through roof gutter are directed into systematically built storm water drainage system. The rain water from the surface of the ground and the building during heavy rain will be carried into fresh water ponds located inside the plant compound. The two ponds have water gates into the nearby water drain adjacent to the fence.



Figure 12. Storm Water Drainage System of Yangon Distillery Plant (GRGICL)

3.15 Key Environmental Emission and Management System

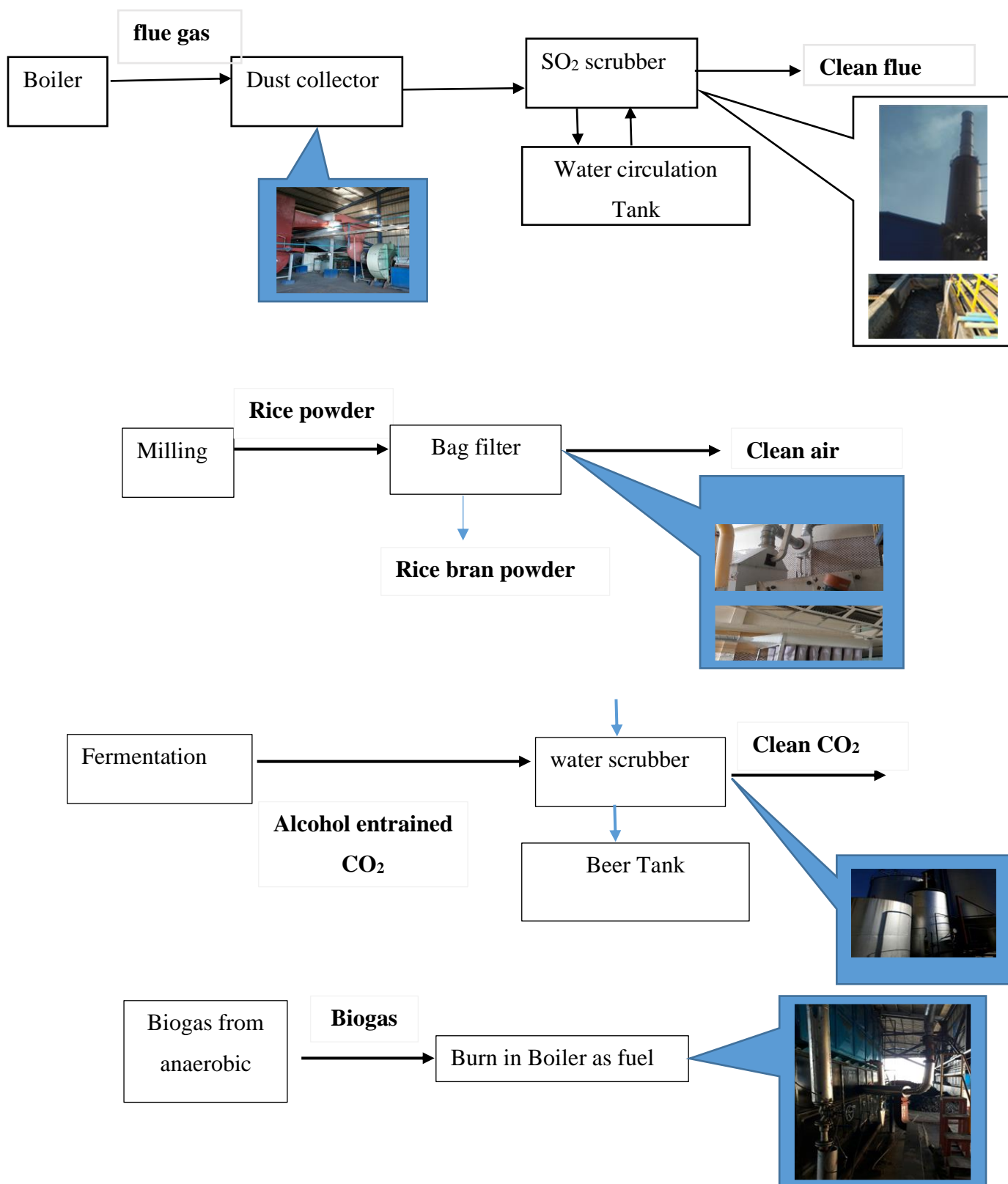


Figure 13. Key Emissions and Management of Yangon Distillery Plant (GRGICL)

3.16 Waste Generation and Management System of Yangon Distillery Plant

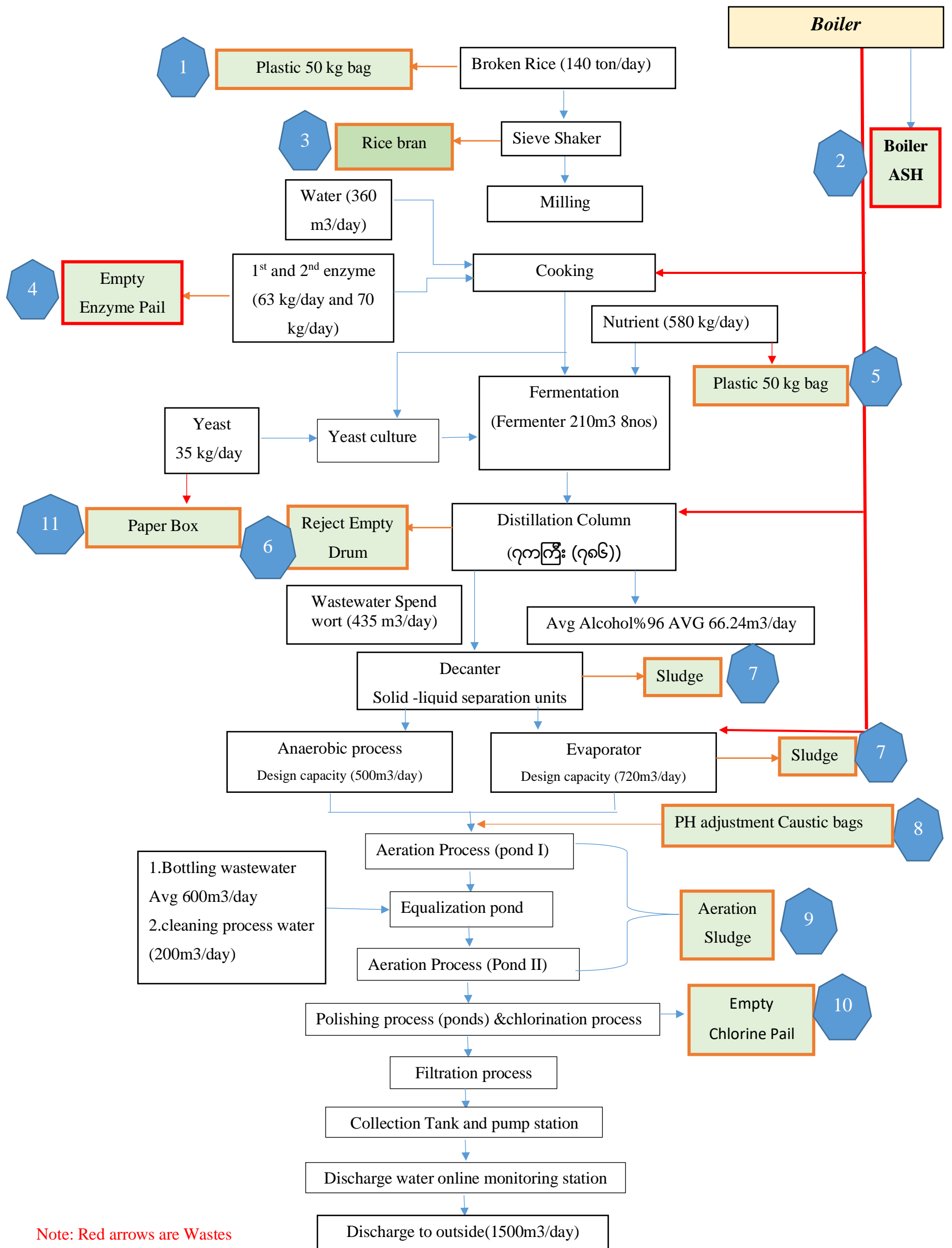


Figure 14. Solid Waste Generation from the Production Process Step

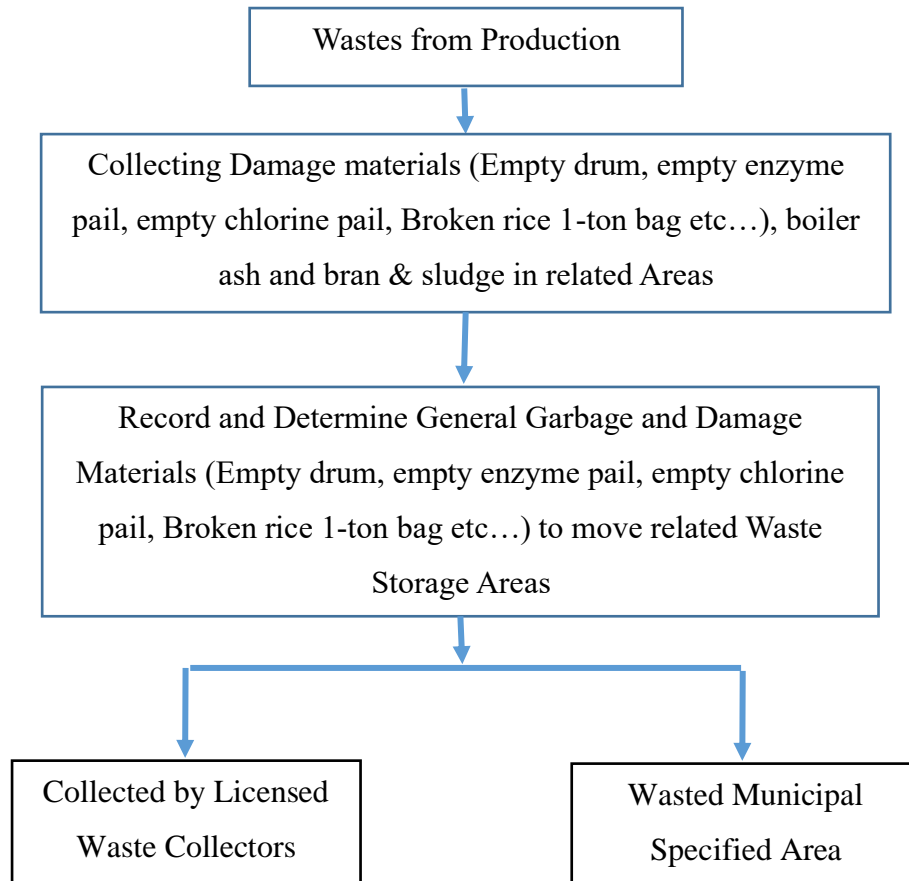


Figure 15. Waste Management Process of Yangon Distillery Plant

Reducing methods of generating solids waste from Process

To reduce generating solids waste from Process. Plant will implement based on the following matter.

1. Make a priority to use good quality of raw material and packaging material. Using good quality that can reduce generating waste from process.
2. Some types of waste are sold as by product and Some types of waste are reused in process to minimize additional new materials usage.
3. Set up norm for incoming raw material to control quality stability that can be reducing solid waste.
4. To substitute Boiler fuel with renewable biomass to reuse in land filling and plantation.
5. To innovate efficient process to reduce waste from process.
6. To follow the good manufacturing practice and ISO, QMS and safety.

Factory cannot eliminate the solid waste from process but will be reduced by the following above Criteria.

Table 25. Discharge Waste Amount of Yangon Distillery Plant

Wastes of YGN Distillery Plant and reducing methods				
Sr. No.	Non-Hazardous Waste	Average Waste/month (kg)	Reduction methods	Implementation Status
1	Broken Rice Bag (50kg bag)	257.00	Reuse to pack Sludge from Distillation separated by Decanter and evaporator. It can reduce additional packaging materials	Implemented
2	Boiler Ash (Coal Sludge)	174,243.00	Will change with biomass and biomass ash will use in land filling and plantation	Substitute with 90% rice husk pellet
3	Bran	4,050.00	Mixing with sludge from distillery in decanter process and sell as byproduct	Implemented
4	Empty Enzyme Pail	273.00	Collected by licensed pail collector to reuse in other	Implemented
5	Nutrient Plastic bags	100	Reuse To pack aeration sludge. It can reduce additional packaging materials	Implemented
6	Reject Empty Drum per year	1,066.00	Collected by licensed drum collector .it can use as open container	Implemented
7	Sludge from Distillation	1,847,580.00	Collected by Animal feed licensed waste collector for animal feed	Implemented
8	Caustic bags	24	Wash and neutralized with low pH wastewater and reuse to pack for aeration sludge	Implemented
9	Digested aeration sludge	Not measure	Use in plantation	Implemented
10	Empty Chlorine Pail	27.00	Collected by licensed pail collector to reuse as other container	Implemented
11	Other non-hazardous compound wastes and paper box	Other non-hazardous compound wastes	Systematic disposal at waste disposal site provided by YCDC	Implemented
Remarks		Innovation activities will emphasize continuously to improve process and reduce waste from operation		

3.17 Operational Workforce and Machine

The work force during operation for the distillery plant is 113 members including plant manager, HSE manager, permanent workers (92) members and daily wages (21) members. The plant operates in three shifts per day and the workers work 8 hrs per

shift. The workers are working 26 days per month and 312 days per year. The plant operates the machine in 24 hr per day, 28 days per month and 300 days per year. The employment list for the Yangon Distillery Plant (GRGICL) is shown in following table.

Table 26. Employment List of Yangon Distillery Plant (GRGICL)

No.	Position	No. of Employee
1.	Plant Manager	1
2.	Milling and Cooking Dept	9
3.	Fermentation Dept	8
4.	Distillation Dept	8
5.	Wastewater Treatment Dept	14
6.	Boiler Dept	13
7.	Admin Dept	7
8.	Planning & Store Dept	9
9.	Maintenance Dept	18
10.	Fire Safety Dept	5
11.	Daily Wages	21
Total		113

3.18 Effluent Liquid and Wastewater Treatment System

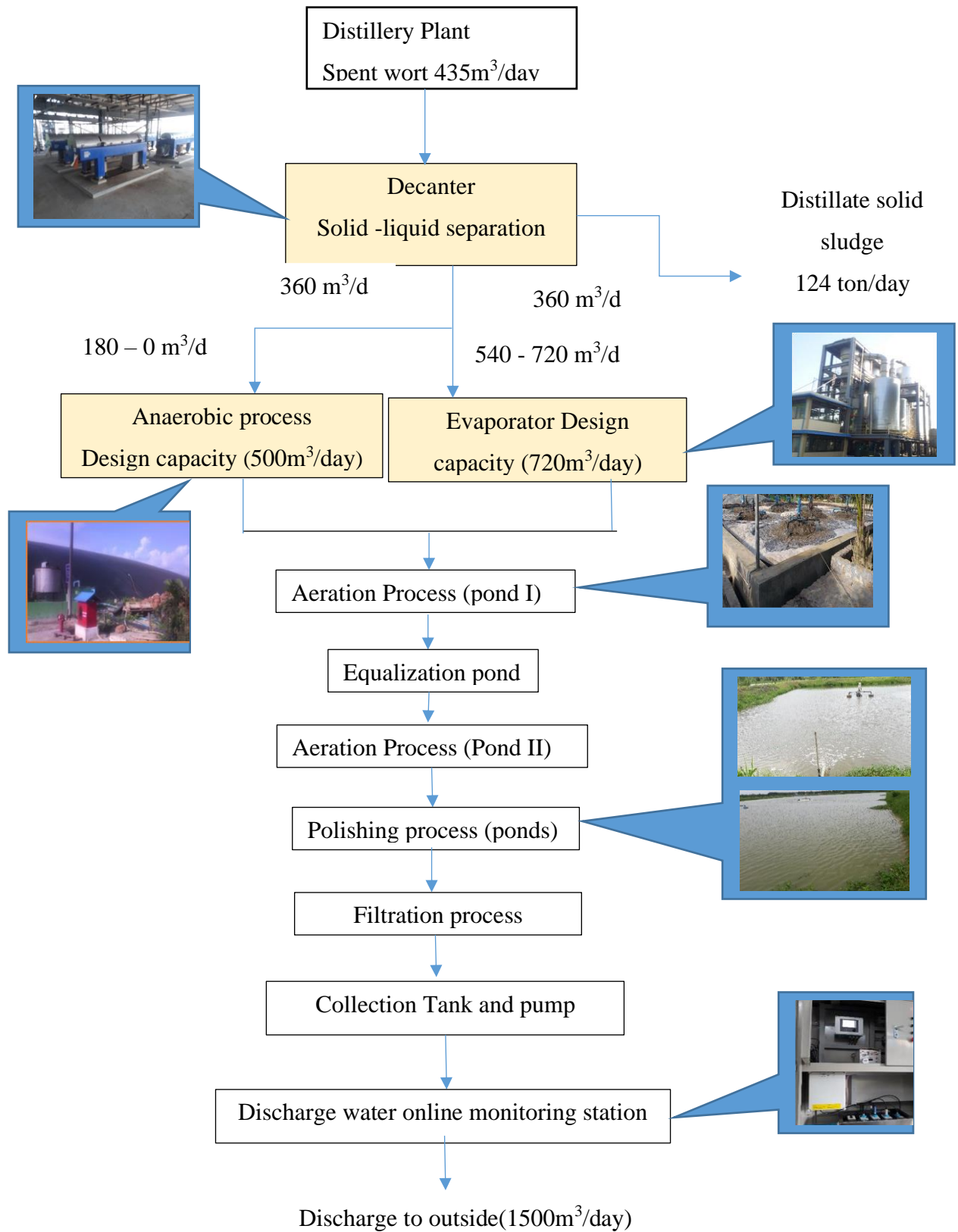


Figure 16. Wastewater Generation and Treatment System of Yangon Distillery Plant

The daily water discharge amount and parameters of Yangon Distillery Plant (GRGICL) is provided in APPENDIX-C.

Table 27. Components List for Wastewater Generation and Treatment System

No.	Description	Capacity	Number
Wastewater Treatment Solid Liquid Separation Section			
1	Decanter centrifuge Model SGDM 305	22KW, 12 m ³ /hr	5
2	Spent wort Tank with agitator and gear box	60m ³	1
3	Spent wort centrifugal pump	7.5 kW 40m ³ /hr	2
4	DWGS Mxer	6.6 ton/hr	1
Evaporation Unit			
5	Centrifugal Pump	Q=220m ³ /hr H=25m	1
6	Centrifugal Pump	Q=630m ³ /hr H=32m	1
7	Centrifugal Pump	Q=220m ³ /hr H=18 m	1
8	Centrifugal Pump	Q=220m ³ /hr H=18 m	1
9	Feed Pump	Q=35m ³ /hr H=20m	2
10	Vinasse Pump	Q=40m ³ /hr H=32m	2
11	Pour pump	Q=30m ³ /hr H=20m	1
12	condensate water pump	Q=1500m ³ /min, Pr=0.097Mpa	1
Biological Treatment Section			
13	Chemical dosing pump	0.26 kW	1
14	Submersible pump	2.2 KW	2
15	Submersible Mixer (propeller type)	15Kw	4
16	Submersible pump (SUMP)	2.2 KW	1
17	Submersible Mixer (propeller type)	15 KW	2
18	Submersible Mixer (propeller type)	15 KW	2
19	Submersible pump	3.7 KW	1
20	Submersible pump	3.7 KW	1
21	Submersible pump	3.7 KW	2
22	Surface aerator	7.5 KW	5
23	Surface aerator	7.5 KW	7

24	Surface aerator	7.5 KW	3
25	Centrifugal Pump		3
26	Online Discharge monitoring station		1

4 Description of the Surrounding Environment

4.1 Setting the Study Limits

The EMP study focusing the project area and its vicinity within the range 1 km around the project from the centerline of the project area that can be directly affected by project construction, operation and decommissioning activities which includes Late Pote village is 0.58 km distance in the north-east of the project, Kwin Late Pote village is 0.68 km distance in the west of the project, Upper Thae Kone is 0.37 km distance and Lower Thae Kone Village is 0.84 km distance in the northern west from the project.

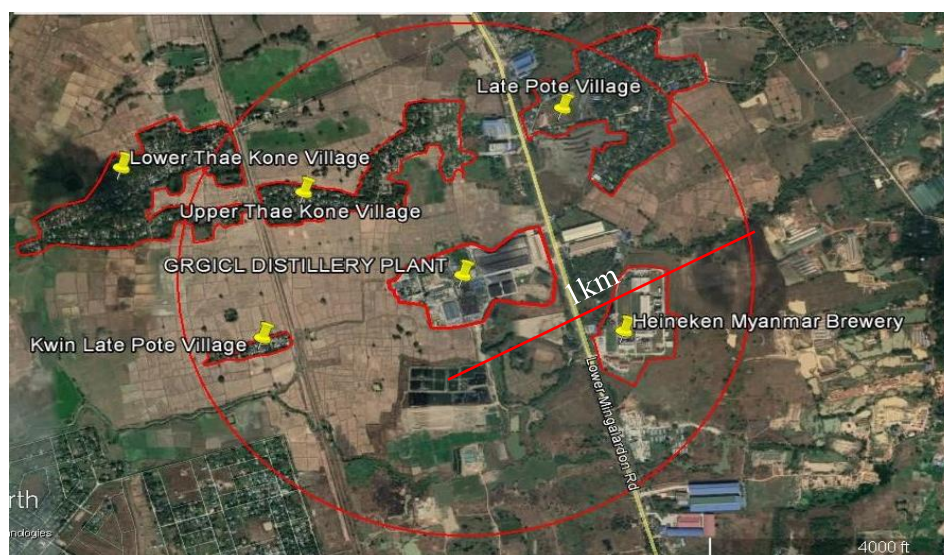


Figure 17. EMP Study Area for Yangon Distillery Plant

4.2 Methodology and Objectives

The EMP study for the project includes analysis on baseline data from local, government organization, MIC proposal of the Grand Royal Group International Company Limited, and the master plan and other documents obtained from the project proponent. Primary data collections include direct observation, interview, individual/target group consultation, public meeting, sampling and laboratory analysis on physicochemical parameters of water from the project area, listing biological

resources such as flora and fauna, secondary data collection on demography, socioeconomics, occupation, education, and health.

4.3 Stakeholder Analysis

Stakeholders are categorized in four groups who can be affected directly or indirectly by project construction, operation and decommissioning activities such as local people, government organizations, project proponent and other interested groups such as NGOs. Analysis was based on primary impact factors such as involvement in land acquisition, vicinity to the project, common use of utilities such as water and infrastructures.

Table 28. Stakeholders of Yangon Distillery Plant

Sr.	Stakeholder Group	Stakeholder	Interest Level		Interest
			Level	Reason	
1	Local People	Upper Thae Kone village	High	Close Vicinity	<ul style="list-style-type: none"> - Pollution - Nearby farmlands - Job opportunity - CSR
		Lower Thae Kone village	High	Close Vicinity	
		Kwin Leike Poke village	High	Close Vicinity	
		Leik Poke village	High	Close Vicinity	
2	Government Organization	General Administration Office Department	Medium	- For administrative relation	<ul style="list-style-type: none"> - Administration - Coordination - CSR
		Department of Irrigation	High	- Storm water issue	
		Township Educational Office	Low	- Only relevant for CSR	
		Land Records Department	Low	- No land related issue	
		Township Health Department	Low	- Only relevant for CSR	

		Township Environmental Conservation Department	Not yet estd:	-	
		Township Firebrigade	Low	-	
3	Proponent	Project management Project construction contractor	High	- Project Owner	- Operation and Management - Construction - EMP
4	Other Interested Party	None	-	-	-

4.4 Project Affected Area

Project affected area is demarcated based on the results of stakeholder analysis. Affected human settlements, noise environment, biological environment, hydrological regime and land environment are shown in the following table. From the description of GRGICL Project Operation Activities, the environmental impact for GRGICL can be affected within 1 km of the project centerline except the activities of waste water discharging. If waste water discharge directly to the Leik Pote Stream, the impact of waste water can be affected to the local people along the leik Pote Stream but GRGICL is constructed the waste water treatment plant and discharge the waste water by compliance with NEQG guidelines. The detail of waste water quality and GRGICL's waste water treatment plant will be described in section 4.5.

Table 29. Project Affected Area of Yangon Distillery Plant

Sr.	Category	Location	Distance from Factory	Factor
1	Human Settlements	Late Pote	0.58 km	- Access road
		Thae Kone	0.37 km	

2	Land Environment	Adjacent farmlands Plant compound	Within 1 km around the Project	<ul style="list-style-type: none"> - Waste - Irrigation channels - Soil
3	Biological Environment	Within 5 km around the Project Late Pote Stream	Within 1 km around the Project	<ul style="list-style-type: none"> - Pollution - Loss of fauna that living in the Lake Pote Stream
4	Air and Noise Environment	Within plant compound and nearby community	Within 1 km around the Project	<ul style="list-style-type: none"> - Noise levels
5	Water Environment	Within plant compound and nearby community	Within 1 km around the Project	<ul style="list-style-type: none"> - Water usages - Water quality - Waste water
6	Others	To be studied in EIA	To be studied in EIA	To be studied in EIA



Figure 18. Project Affected Area of Grand Royal Extension Distillery Plant

4.5 Water Quality

For analysis of Physiochemical properties of tube well water, inlet waste water and outlet waste water of Yangon Distillery Plant (GRGICL), water were sampling from three points. Water and wastewater test results are provided in APPENDIX-J.

Table 30. Location of Water Sampling Point

Sr.	Sample Name	Coordinates		Location
		Latitude(N)	Longitude(E)	
1	TW	17° 1'24.72"N	96° 4'31.64"E	Tube Well
2	WWS1	17° 1'22.05"N	96° 4'29.95"E	Waste Water Inlet
3	WWS2	17° 1'25.22"N	96° 4'29.84"E	Waste Water Outlet
4	WS3	17° 1'36.7"N	96° 4'30.61"E	Thae Kone Village

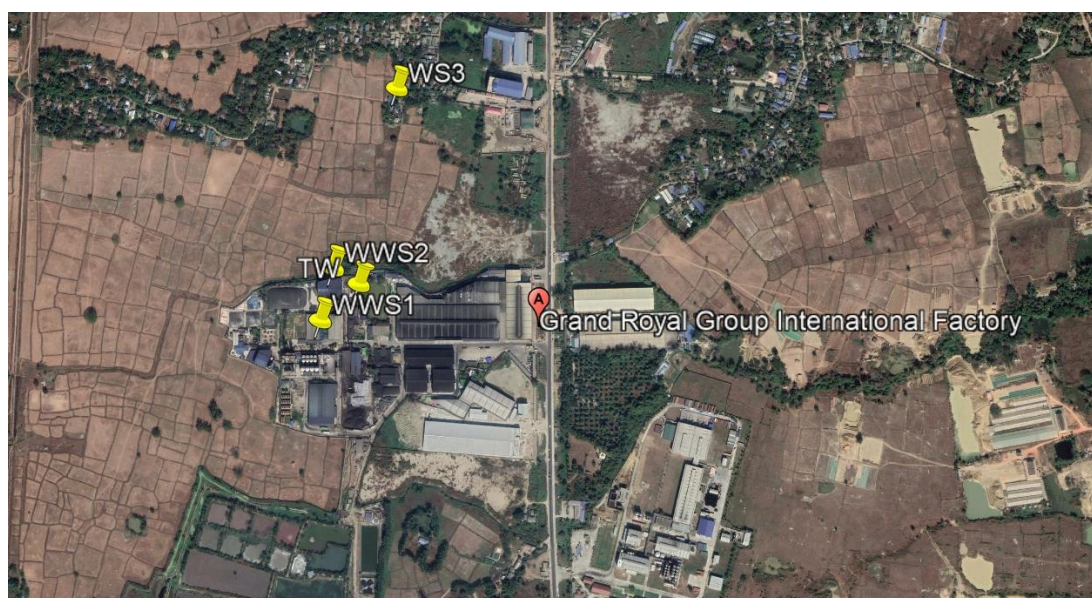


Figure 19. Water Sampling Point

4.5.1 Tube Well Water

Water supply for Yangon Distillery Plant (GRGICL) is obtained from the groundwater via 5-tube wells. To analyze current conditions of water quality, the tube well water was sampled and analyzed. The pH of the water is 6.46 and other parameter results are as the following Table 31. The sample is analyzed by Myonmar Innotndon Group of Co., Ltd (PRO LAB ANALYTICAL LABORATORY). Water quality result is provided in APPENDIX-J.

Table 31. Water Analysis Results

No.	Parameter	Tube Well Water Result	Unit	WHO STD 2018	Method
1	Alkalinity	106	mg/L	NA	Hanna (HI 97104) - Alkalinity Photometer
2	Calcium Hardness	41.16	mg/L	NA	EDTA Titrimetric Method
3	Chloride	28.19	mg/L	250 mg/L	Argentometric Method
4	Conductivity	388	$\mu\text{S}/\text{cm}$	2500 $\mu\text{S}/\text{cm}$	Hanna (HI 991300) - pH, EC, TDS, and Temperature Meter
5	Iron	5.84	mg/L	0.3 mg/L	Phenanthroline Method
6	Magnesium Hardness	49.00	mg/L	NA	EDTA Titrimetric Method
7	pH	6.46	-	6.5-8.5	Hanna (HI 2211) - pH & Temperature Meter
8	Total Dissolved Solids	262	ppm	1000 mg/L	Hanna (HI 991300) - pH, EC, TDS, and Temperature Meter
9	Total Hardness	90.16	mg/L	500 mg/L	EDTA Titrimetric Method



Figure 20. Water Smpling from Tube Well



- Tube well for existing distillery plant

4.5.2 Wastewater Quality

Current wastewater treatment system in Yangon Distillery Plant (GRGICL) involves 4 parts that are (1) solid -liquid separation process, (2) multi-effect evaporation process and (3) biological process. Evaporation unit is advanced technology which can reduce foot-print area a lot comparing with biological treatment process. Evaporator can reduce COD to 1000- 1500 mg/l. Yangon Distillery Plant was installed biological wastewater treatment Plant in 2012. In 2015 existing waste treatment Plant was modified again to treat more capacity and discharge treated water within the government guideline. Wastewater treatment plant successfully completed in 2015. Yangon Distillery Plant has got ISO 14001 certificate in 2016. Yangon Distillery Plant (GRGICL) also installed real time online monitoring system. GRGICL has built latest technology that can treat the generated wastewater treatment system in compliance with international standards. Detail process of wastewater treatment plant design and real time online monitoring system are shown in Appendix A.

Current condition of the quality of treated wastewater could be seen in wastewater effluent column. In first column, NEQG guideline values for distillery wastewater could be seen. The second column is influent wastewater. The water quality difference could be seen for the influent and effluent of wastewater treatment plant. The BOD and COD result of inlet wastewater to wastewater treatment plant is about 595 and 60100 mg/l respectively. BOD and COD value of discharge wastewater is in the range of NEQG about 13.05 mg/l and 58 mg/l. All the samples are analyzed by Golden Dowa Ecosystem Myanmar Co., Ltd. Wastewater test result is provided in APPENDIX-J. In APPENDIX-N, it is mentioned how to treat wastewater to meet NEQG guidelines.

Table 32. Wastewater Quality Analysis Results

Sr.	Particular	Unit	NEQG	Waste water Inlet	Discharge Wastewater	Lain Kone Stream Water
1	5-day BOD	mg/l	50	595	13.05	1.05
2	Chemical oxygen demand	mg/l	250	60100	58	20.16
3	Oil and grease	mg/l	10	34.82	<3.1	2.2
4	pH	S.U ^a	6-9	3.68	8.01	7.8
5	Total coliform bacteria	100ml	400	800	80	18
6	Total nitrogen	mg/l	10	2170	5.7	5
7	Total phosphorous	mg/l	2	429	2.64	9
8	Total suspended solids	mg/l	50	21145	6	15

Table 33. Environmental Water Quality Analysis Result

Sr.	Particular	Unit	NEQG	Thae Kone Water
1	pH	S.U	6-9	7
2	Colour	HU	NG	40
3	Turbidity	FAU	NG	12
4	Conductivity	microS/cm	NG	264
5	Total Alkalinity	mg/l	NG	120
6	Total Suspended Solid	mg/l	50	10
7	Salinity	mg/l	NG	0.1

Table 34. Daily Inlet and Discharge Wastewater from Process Steps

Sr	Description	Install ed Nos	Total Design Feeding Capacity (9m3/day)	Actual Average inlet Feed (m3/day)	Inlet COD (mg/l)5	Actual inlet Feed (m3/day)6	Outlet COD	Remark
1	Decanter (solid-liquid separation)	4	1150	950	80,000-100,000	720	45,000-60,000	Take out solid so reduce waste
2	Anaerobic	3	400	0-180	45,000-60,000	0-180	5000-8000	
3	Evaporator	1	720	540 -720	45,000-60,000	500-550	1000-1500	Take out solid so reduce waste
4	Aeration	2	2500	780	5,000	780	1000-2000	
5	Clarification	2	1000	780	1500	780	500 - 800	
6	Polishing process with air	15	3000	1500	500 - 8000	1500	150-180	15 polishing ponds use 12 acres

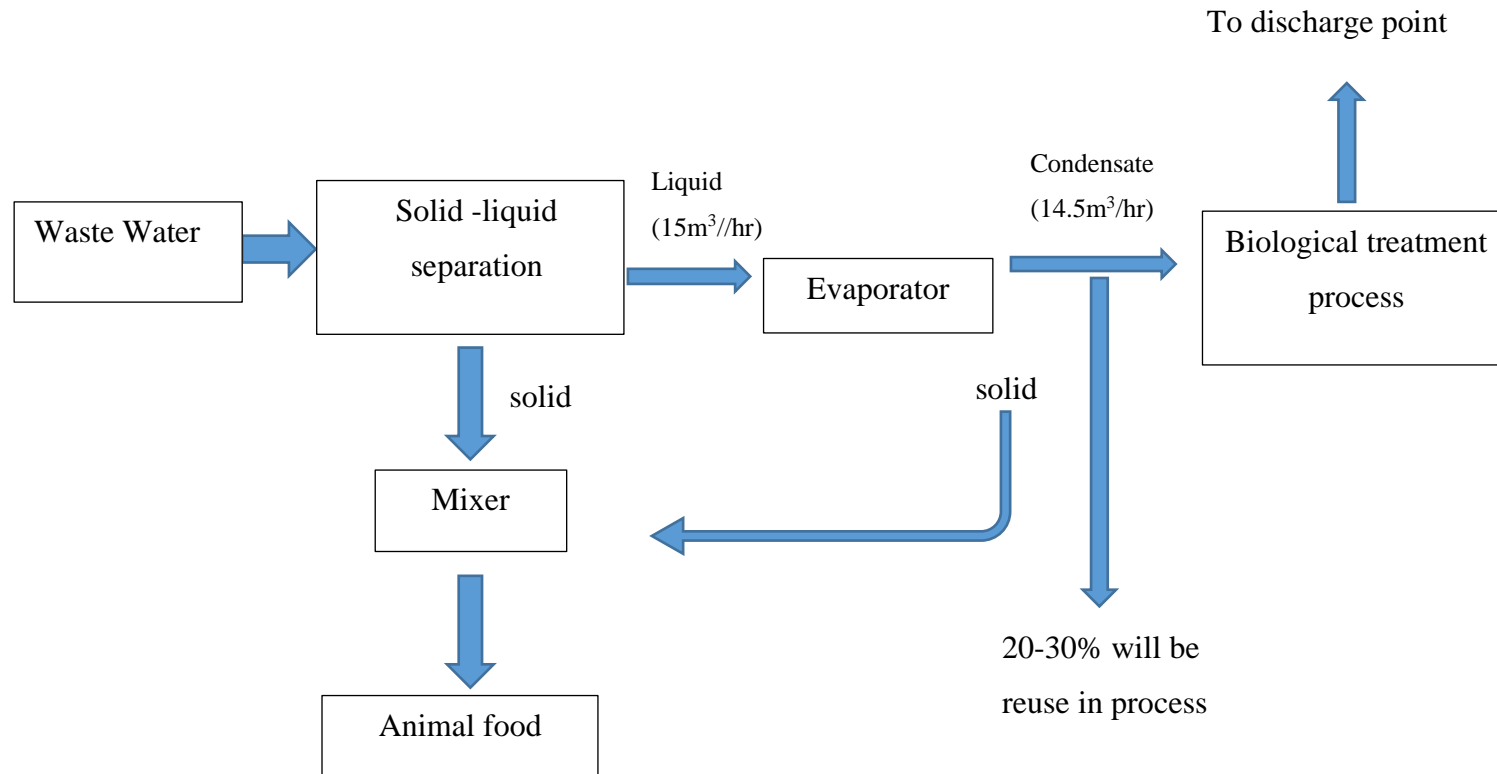


Figure 22. Wastewater Treatment Plant Flow Chart

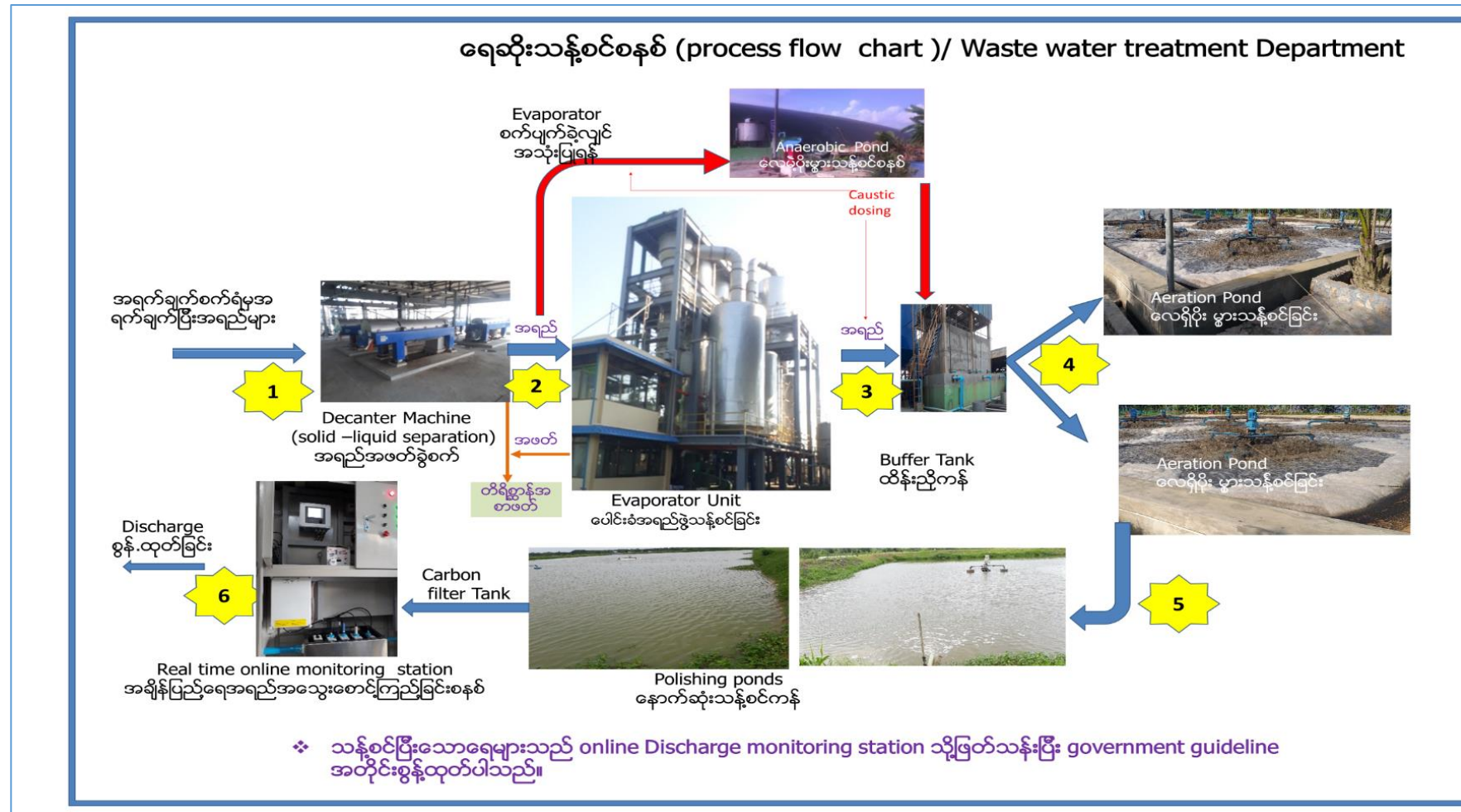


Figure 23. Waste Water Treatment Process of GRGICL



Figure 24. Multi-Effect Evaporator from Yangon Distillery Plant (GRGICL)



Figure 25. Wastewater Sampling from Wastewater Treatment Plant

4.6 Air Quality

4.6.1 Survey Item

The parameters for air Quality surveys were atmospheric pressure, CO₂, H₂S, CH₄, NO₂, O₃, PM₁₀, PM_{2.5}, Relative Humidity, SO₂, Solar radiation, Temperature, Wind direction, Wind speed and Power.

Air Monitoring was measured in one location in the Factory Campus. Location one is near treatment plant area.

Table 35. Location of Air Sample (AS) of the Project

Sr.	Sample Name	Coordinates		Location
		Latitude(N)	Longitude(E)	
1	AS-1	17° 1'23.60"N	96° 4'34.28"E	Plant Area

2	AS-2	17° 1'13.51"N	96° 4'13.79"E	(Leik Poke Village)
3	AS-3	17° 1'34.42"N	96° 4'23.78"E	(Near Upper Thae Kone)

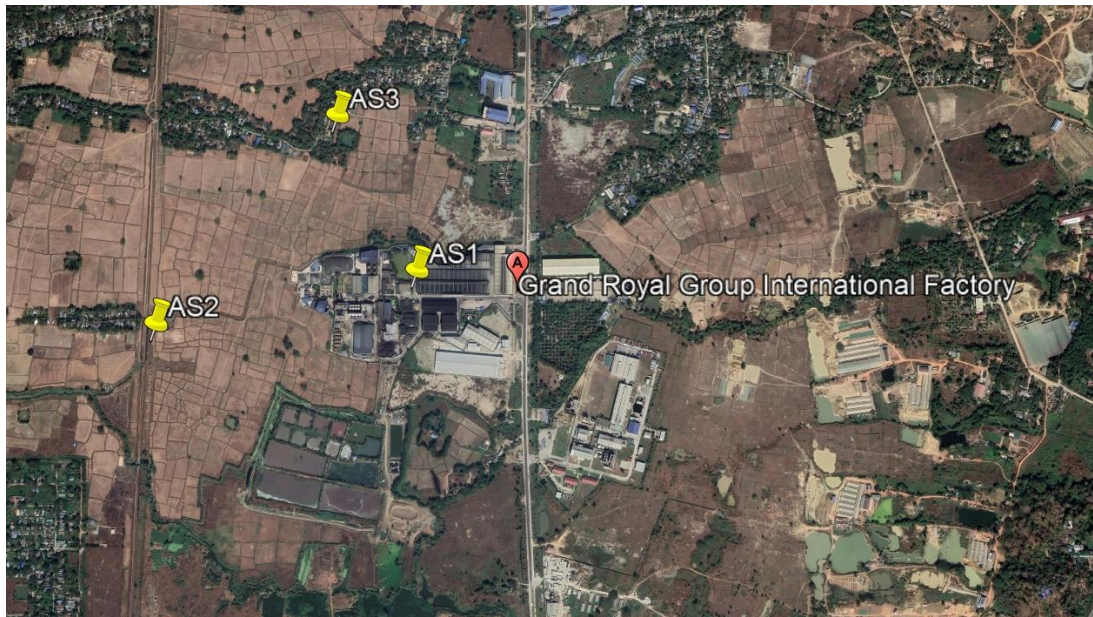


Figure 26. Air Monitoring Point



Figure 27. Air Quality Monitoring

4.6.2 Survey Methodology

Sampling and analysis of ambient air quality were conducted by referring to the recommendation of the United States Environmental Protection Agency (U.S. EPA). The Haz-Scanner Environmental Perimeter Air Station (EPAS) was used to collect ambient air survey data. Sampling rate or air quality data were measured automatically every one minute and directly read and recorded onsite for measured parameters (SO₂, NO₂, CO₂, CO, H₂S, O₃, CH₄, PM₁₀, PM_{2.5}), as shown in following table. Sampling pump was operated at 2 L/min. Different analysis methods are integrated in the instrument, such as Particulates 90° Infrared Light Scattering for particulate matters (PM₁₀, PM_{2.5}), electrochemical sensors for toxic gases (SO₂, NO₂, CO, H₂S), NDIR (optional sensor) for (CO₂, CH₄) and Gas Sensing Semiconductor- GSS technology (optional sensor) for O₃. For the datalogging capabilities of Haz Scanner (EPAS), it can be captured optional wireless data transmission up to 5 miles.

Table 36. Sampling and Analysis Method for Air Quality

No	Parameter	Analysis Method
1	Atmospheric pressure	On site reading
2	Carbon Dioxide (CO ₂)	On site reading
3	Hydrogen Sulfide(H ₂ S)	On site reading
4	Methane (CH ₄)	On site reading
5	Nitrogen Dioxide (NO ₂)	On site reading
6	Ozone (O ₃)	On site reading
7	PM (2.5)	On site reading
8	PM (10)	On site reading
9	Relative Humidity	On site reading
10	Sulphur Dioxide (SO ₂)	On site reading
11	Solar Radiation	On site reading
12	Temperature	On site reading
13	Wind Direction	On site reading
14	Wind Speed	On site reading

4.6.3 Identification of Air Pollutants and Its Impacts

The proposed Grand Royal Group International is operating the machines by the time monitoring the air quality. Therefore, the air station is set on to collect data of the current air quality impacted by operational works and moving vehicles for the

transportation of loads. Therefore, the site has to measure the surrounding air quality to know whether SO₂, NO₂, CO₂, CO, H₂S, PM_{2.5} and PM₁₀ are exceeding the limiting amount of National Environmental Quality Emission Guideline or not. The impacts of pollutants are defined below.

Carbon Monoxide (CO) is a toxic gas that cannot be seen or smelled. All people are at risk for CO poisoning. Unborn babies, infants, the elderly, and people with chronic heart disease, anemia, or respiratory problems are generally more at risk than others. Breathing CO can cause headache, dizziness and vomiting nausea. If CO levels are high enough, unconscious or death may be become. Exposure to moderate and high levels of CO over long periods of time has also been linked with increased risk of heart disease.

Carbon Dioxide (CO₂) is the primary greenhouse gas pollutant, accounting for nearly three-quarters of global greenhouse gas emissions. Carbon pollution leads to long lasting changes in our climate, such as rising global temperatures, rising sea level, changes in weather and precipitation patterns and changes in ecosystems, habitats and species diversity. Children, older adults, people living in poverty may be at risk from the health impacts of climate change.

Nitrogen Dioxide (NO₂) is a nasty-smelling gas. The main effect of breathing in raised levels of nitrogen dioxide is the increased likelihood of respiratory problems. Nitrogen dioxide inflames the lining of the lungs, and it can reduce immunity to lung infections. This can cause problems such as wheezing, coughing, colds, flu and bronchitis. Increased levels of nitrogen dioxide can have significant impacts on people with asthma because it can cause more frequent and more intense attacks. Children with asthma and older people with heart disease are most at risk.

Sulfur Dioxide (SO₂) is an invisible gas and has a nasty, sharp smell. It reacts easily with other substances to form harmful compounds, such as sulfuric acid, sulfurous acid and sulfate particles. Sulfur dioxide affects human health when it is breathed in. It irritates the nose, throat and airways to cause coughing, wheezing, shortness of breath, or a tight feeling around the chest. The effects of sulfur dioxide are felt very quickly and most people would feel the worst symptoms in 10 or 15 minutes after breathing in. Those most at risk of developing problems if they are exposed to sulfur dioxide are people with asthma or similar conditions.

Ozone (O₃) has a strong odor. Breathing ozone can trigger a variety of health problems including chest pain, coughing, throat irritation, and congestion. It can worsen bronchitis, emphysema, and asthma. It can also reduce lung function and inflame the linings of the lungs. Repeated exposure may permanently scar lung tissue.

Particulate matter (PM) consists of microscopically small solid particles or liquid droplets suspended in the air. The smaller the particles, the deeper they can penetrate in to the respiratory system and the more hazardous they are to breathe. Long-term exposure to current ambient PM concentrations may lead to a marked reduction in life expectancy. The reduction in life expectancy is primarily due to increase cardio-pulmonary and lung cancer mortality. Increases are likely in lower respiratory symptoms and reduced lung function in children, and chronic obstructive pulmonary disease and reduced lung function in adults.

4.6.4 Measurement of Air Quality Comparing with the Air Quality Guidelines

The regional air quality within and surrounding factory area is overwhelmingly dominated by industries and residential. As the proposed factory is located in the industrial zone. The air quality assessment with the air quality parameters including particulates (PM₁₀, PM_{2.5}), and CO₂, H₂S, CH₄, NO₂, O₃, PMA, PMB, Relative Humidity, SO₂, Solar radiation, Temperature, Wind direction, Wind speed would be monitored. The air quality impact assessment will consider air emissions in accordance with ECD's National Environmental Quality (Emission) Guidelines, WHO air quality standards and IFC air emissions standards. To assist relevant authorities to improving baseline information, simple air quality sampling was conducted at one site for 8 hours.

Table 37. Air Quality Results of Yangon Distillery Plant

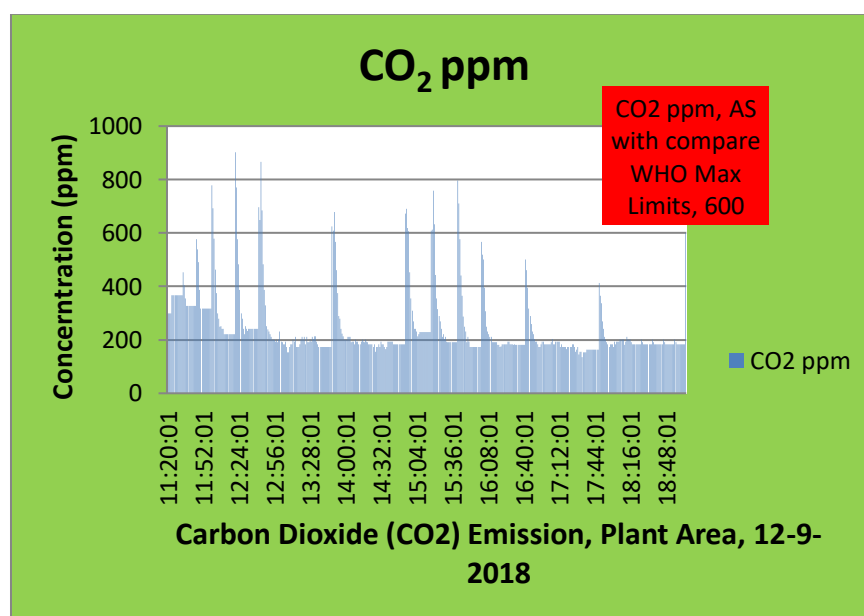
Parameters	NEQG (Averaging Period)	NEQG Guideline Value (µg/m ³)	Average Location One	Average Location Two	Average Location Three
Nitrogen dioxid	1-hour	200	95.37	27.6	27.92
Ozone	8-hour daily maximum	100	233.78	173.6	229.8
Particulate matter PM ₁₀	24-hour	50	10.1783	2	8.86
Particulate matter PM _{2.5}	24-hour	25	10.8782	5.8	8.23
Sulfur dioxide	10-minute	500	2.66	2.66	2.79
BarM (m Bar)	NG	NG	1008.89	981.1	987.2
CO ₂ (ppm)	NG	NG	122.891	114.8	52.3
CO (ppb)	NG	NG	86.2868	87.7	101.8
H ₂ S (ppb)	NG	NG	0	0	0

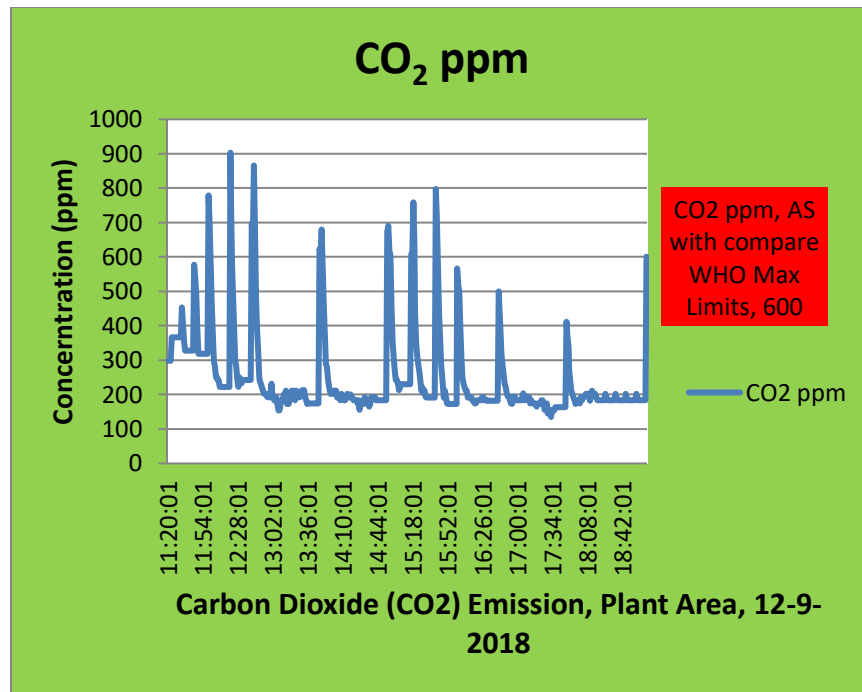
CH ₄ (ppm)	NG	NG	-1182.5	-1416.8	-2098.9
RH (%)	NG	NG	4.8088	88.4	84.78
WDir (Deg.)	NG	NG	276.062	294.25	203.2

4.6.5 Comparison with Standard and Guidelines

4.6.5.1 Average Concentration of CO₂

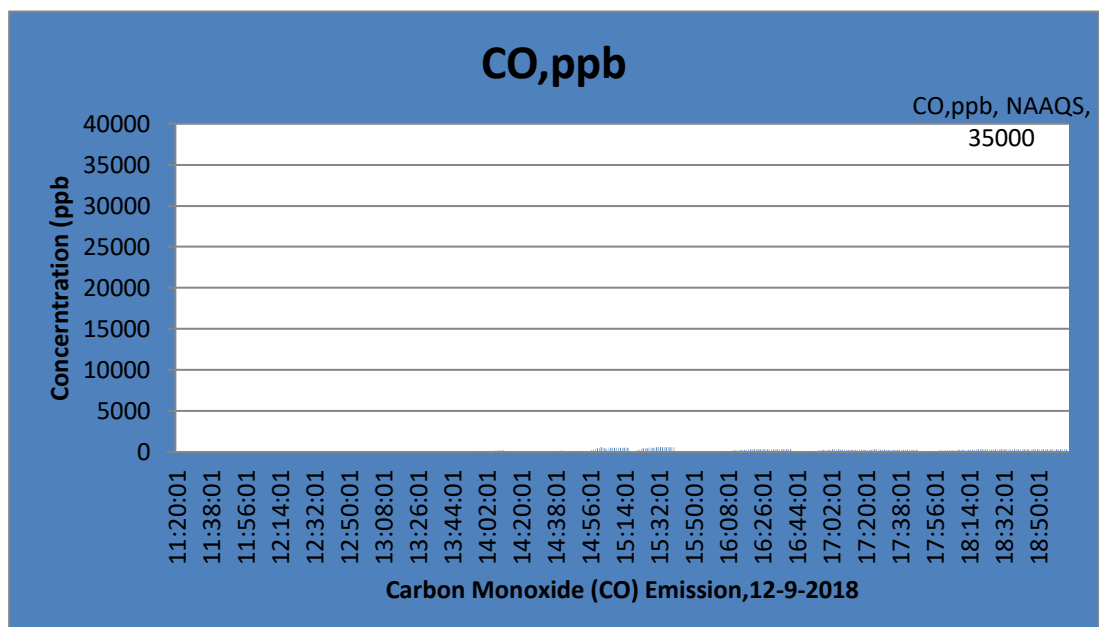
Following figure shows that the concentration of carbon dioxide (CO₂) measured in that sampling locations was between the ranges of 0 ppm-800 ppm. The concentration of CO₂ measured in most of the sampling times was below the World Health Organization (WHO) Guidelines, which specifies 600 ppm for the limitation of CO₂ concentration. The highest concentration of CO₂ was 903 ppm lowest concentration of CO₂ was 153 ppm.



Figure 28. Average Concentration of CO₂

4.6.5.2 *Average Concentration of CO*

Following shows that the concentration of carbon monoxide (CO) measured in all sampling locations was between the ranges of 0.00 ppm-0.550 ppm. The concentration of CO measured in all the sampling stations was below the National Ambient Air Quality Standards (NAAQS), which specifies 35 ppm for the limitation of CO concentration. The highest concentration of CO was 0.550 ppm and the lowest concentration of CO was 0.05 ppm.



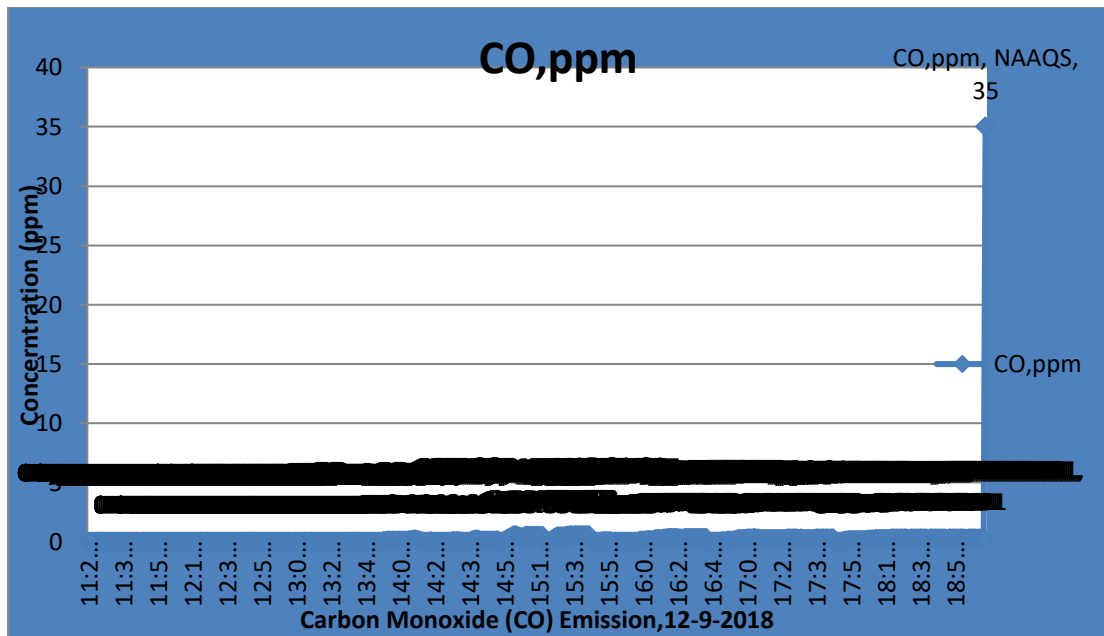
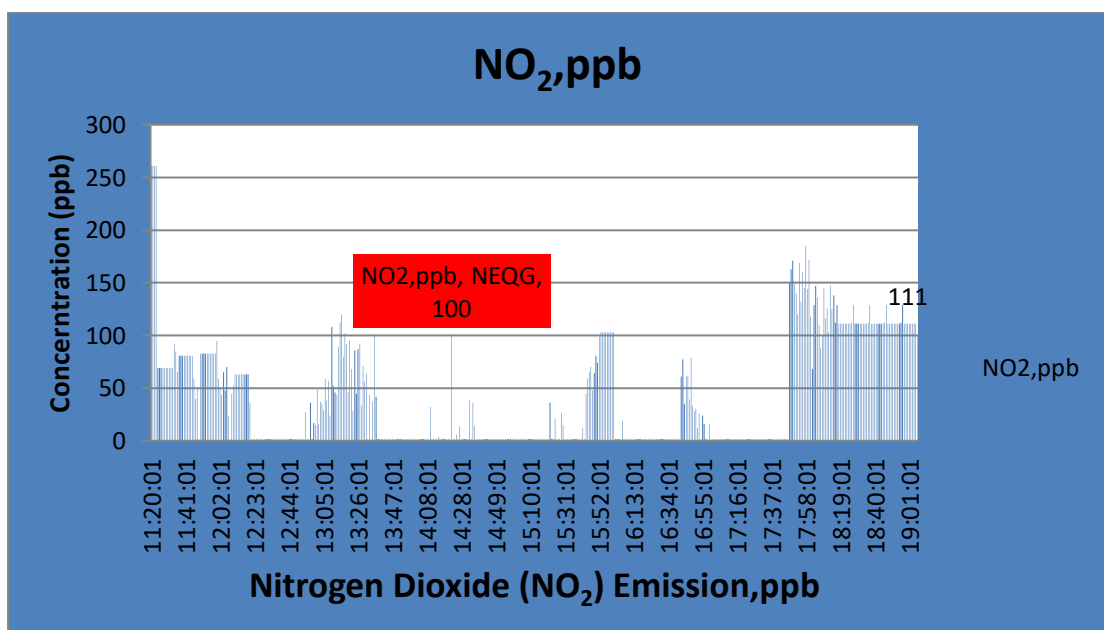
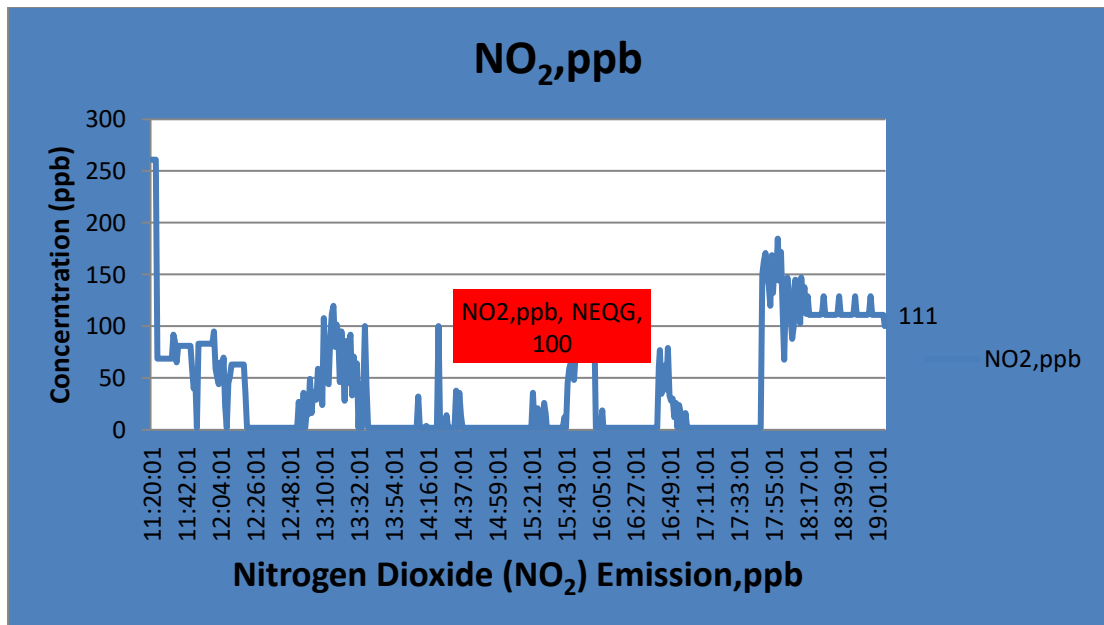


Figure 29. Average Concentration of CO

4.6.5.3 *Average Concentration of NO₂*

Following figure shows that the concentration of nitrogen dioxide (NO₂) measured in all sampling locations was between the ranges of 2 ppb-147 ppb. The concentration of NO₂ measured in all the sampling stations was above the National Ambient Air Quality Standards (NAAQS) at some time, NAAQS which specifies 100ppb for the limitation of NO₂ concentration.

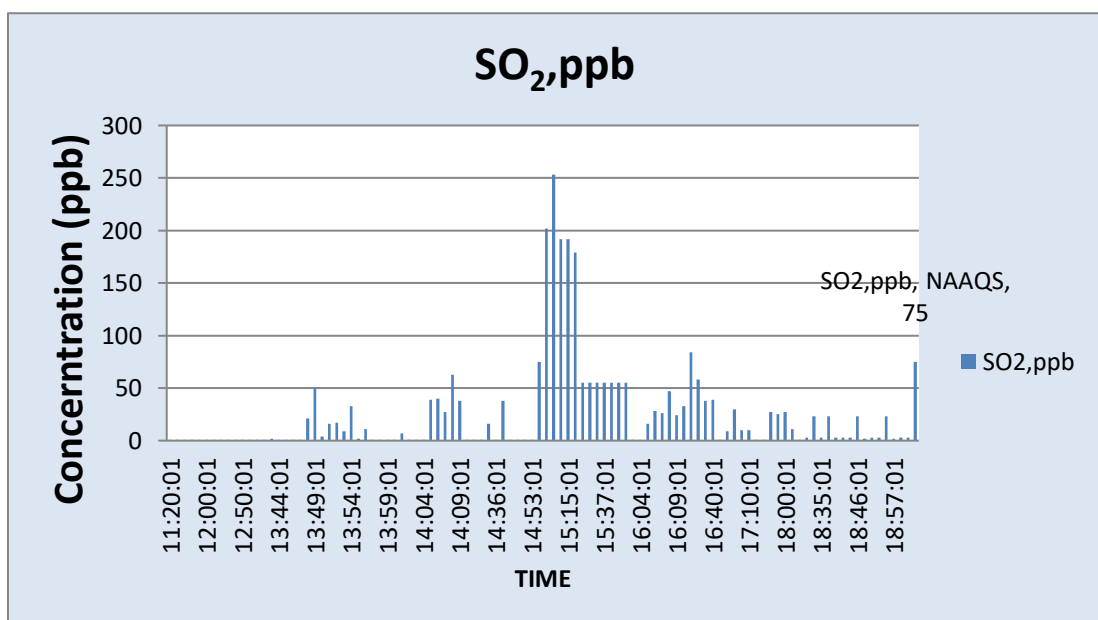


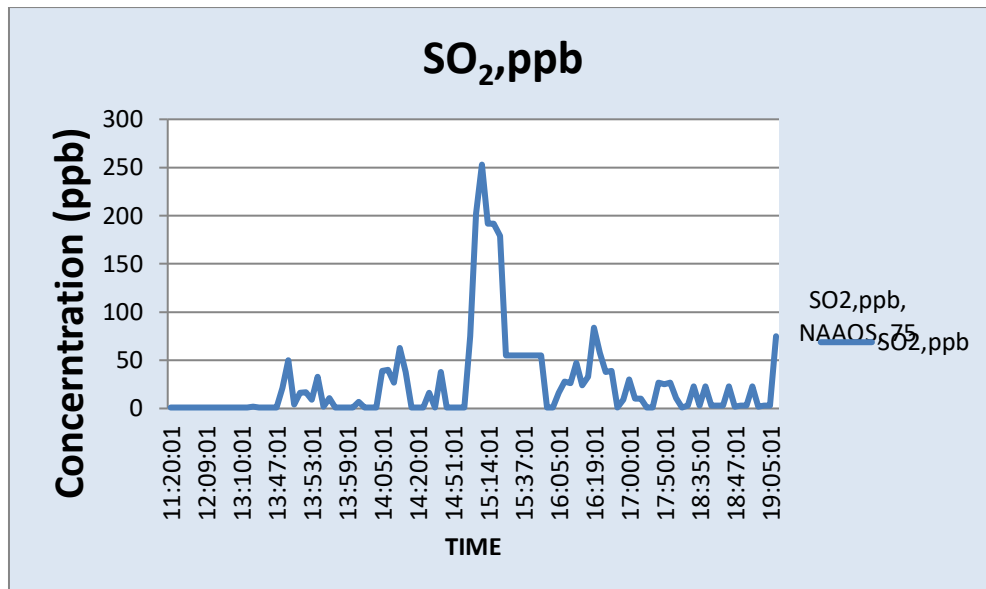
Figure 30. Average Concentration of NO₂

4.6.5.4

Average Concentration of Sulphur Dioxide (SO₂)

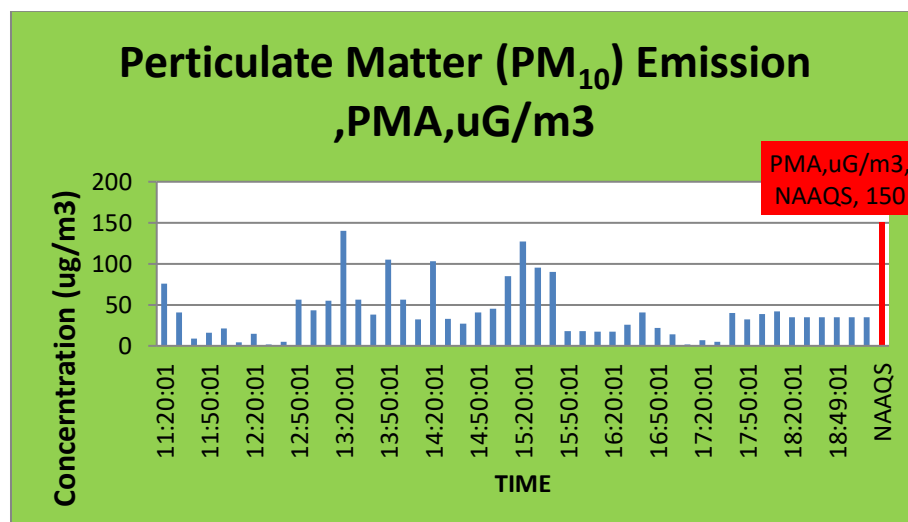
Following figure shows that the concentration of sulfur dioxide (SO₂) measured in all sampling locations was between the ranges of 1 ppb-250 ppb. The concentration of SO₂ measured in most of the sampling data was below the National Ambient Air Quality Standards (NAAQS), which specifies 75 ppb for the limitation of SO₂ concentration.

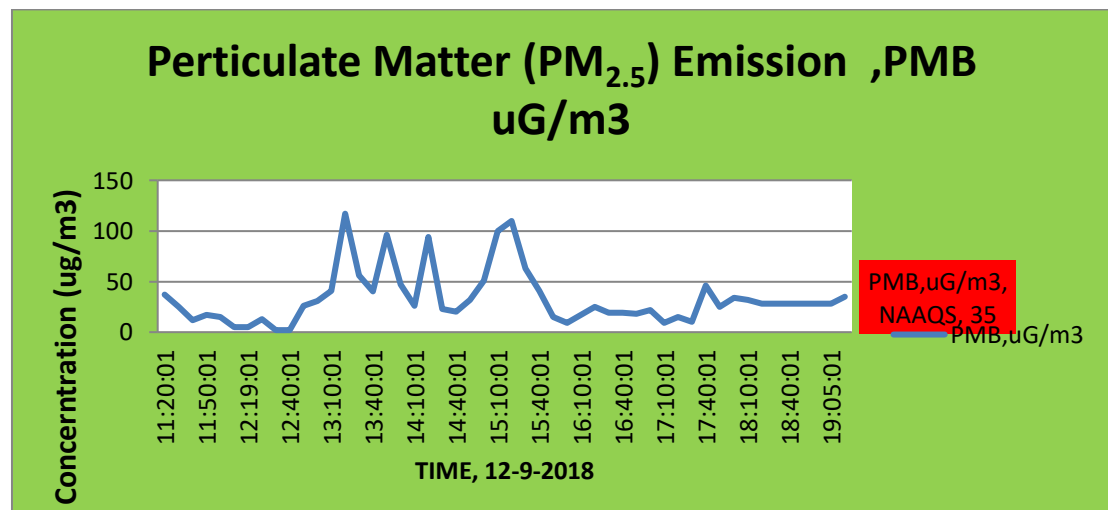
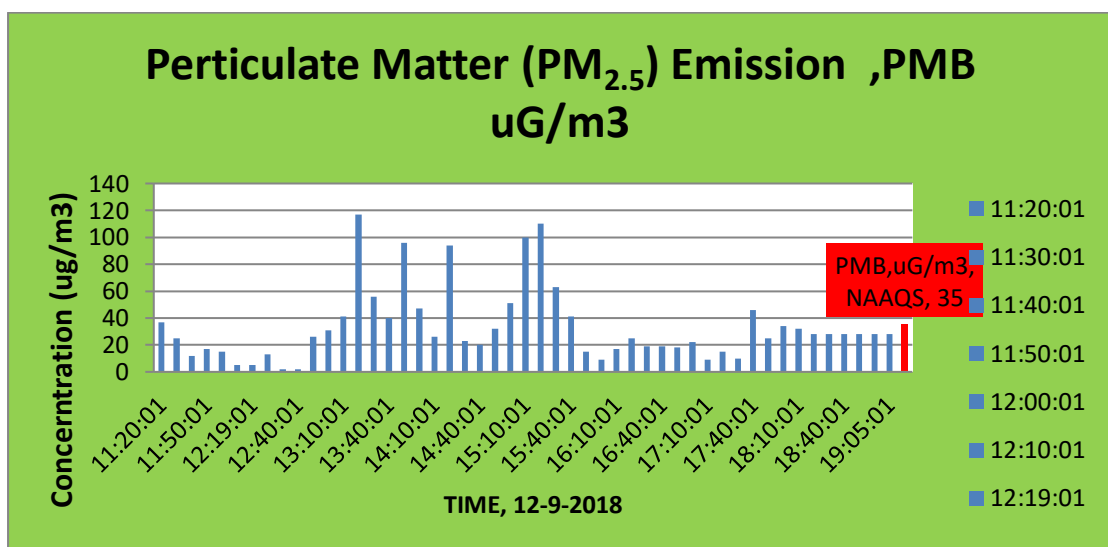
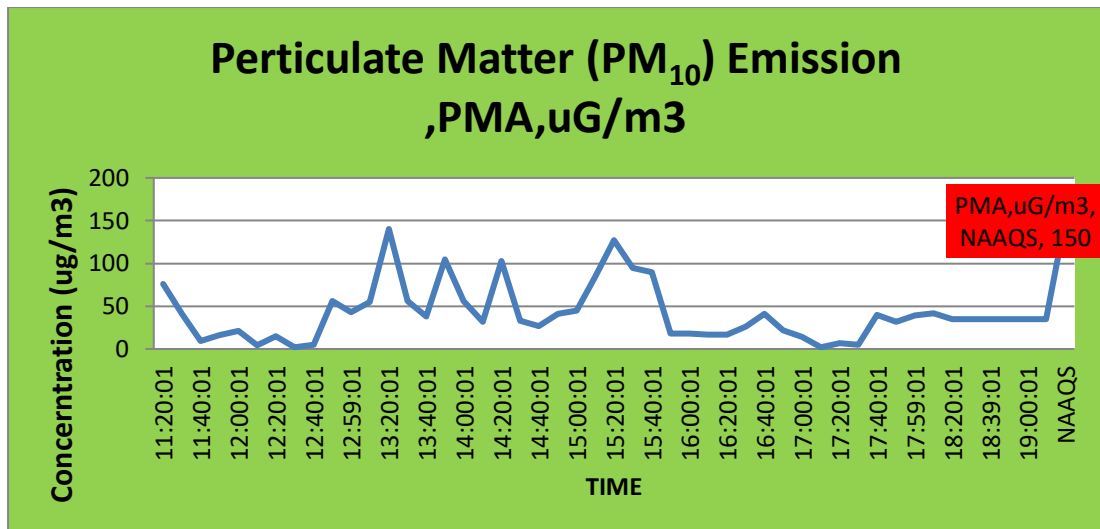


Figure 31. Average Concentration of SO₂

4.6.5.5 *Concentration of Particulate Matter PM₁₀ and PM_{2.5}*

Following figures show that the concentration of particulate matter (PM₁₀) measured in all sampling locations was between the ranges of 2 $\mu\text{g}/\text{m}^3$ -140 $\mu\text{g}/\text{m}^3$. The concentration of PM₁₀ measured in all the sampling stations was below the National Ambient Air Quality Standards (NAAQS), which specifies 150 $\mu\text{g}/\text{m}^3$ for the limitation of PM₁₀ concentration. The highest concentration of 140 $\mu\text{g}/\text{m}^3$ was at the location one, near the building, while the lowest concentration of 2 $\mu\text{g}/\text{m}^3$ was at the location. The concentration of particulate matter (PM_{2.5}) measured in all sampling locations was between the ranges of 2 $\mu\text{g}/\text{m}^3$ -115 $\mu\text{g}/\text{m}^3$. The concentration of PM_{2.5} measured in all the sampling stations was below the National Ambient Air Quality Standards (NAAQS), which specifies 35 $\mu\text{g}/\text{m}^3$ for the limitation of PM_{2.5} concentration. The highest concentration of 115 $\mu\text{g}/\text{m}^3$ was at the location, while the lowest concentration of 2 $\mu\text{g}/\text{m}^3$ was at the location.



Figure 32. Average Concentration of PM₁₀ and PM_{2.5}

4.6.5.6

Level of Humidity, Temperature and Wind Speed

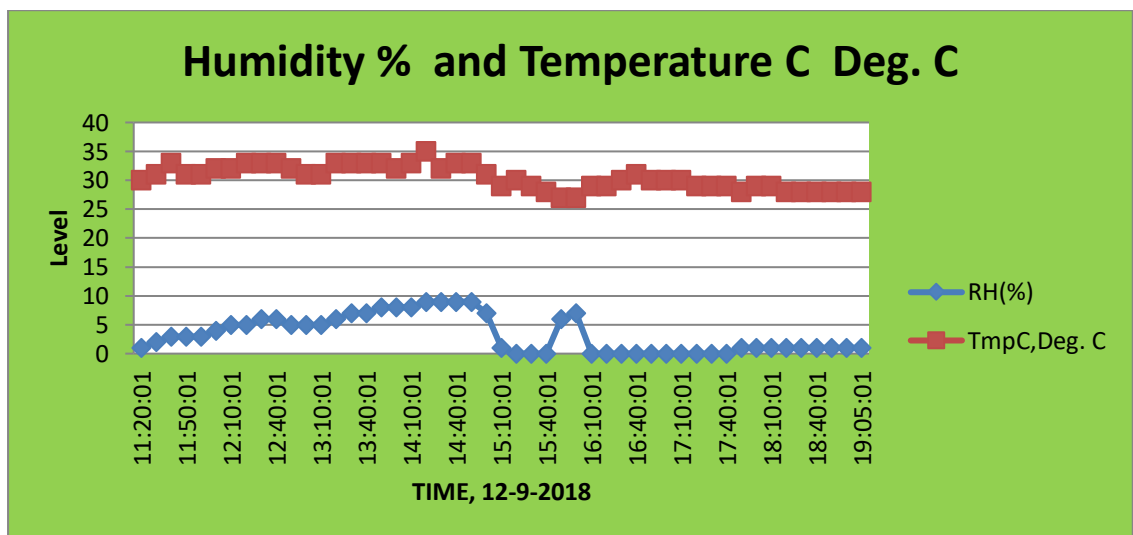
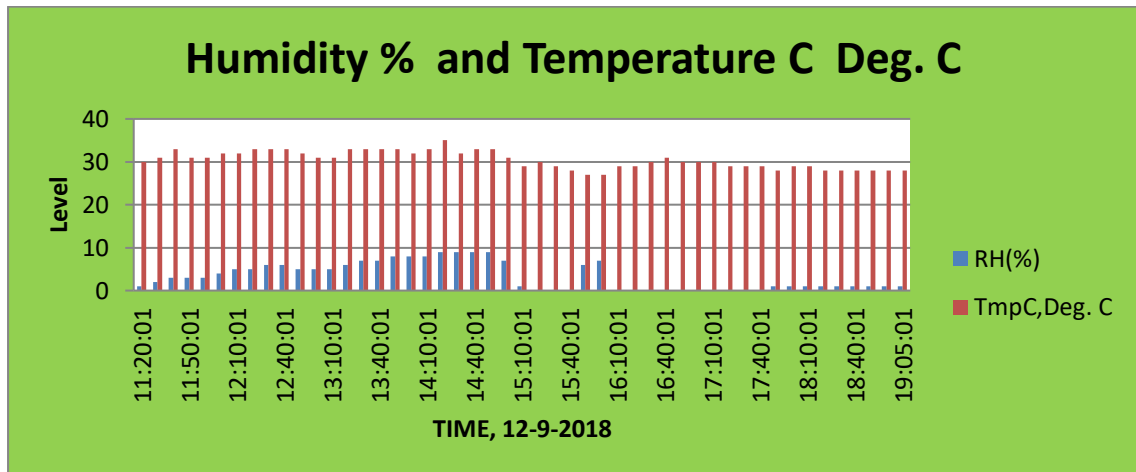


Figure 33. Average Humidity, Average Temperature

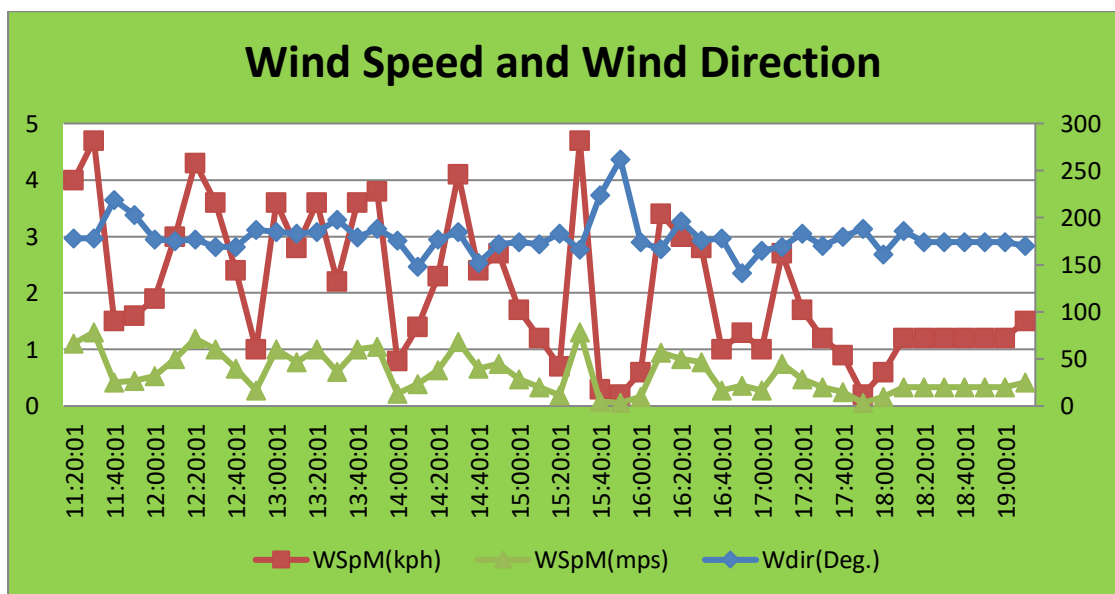


Figure 34. Average Wind Speed and Wind Direction

Time	Wdir (Deg.)	WSpM (kph)	WSpM (mps)	Time	Wdir (Deg.)	WSpM (kph)	WSpM (mps)
11:20:01	178	4	1.11	13:20:01	185	3.6	1.00
11:30:01	178	4.7	1.31	13:30:01	198	2.2	0.61
11:40:01	219	1.5	0.42	13:40:01	179	3.6	1.00
11:50:01	203	1.6	0.44	13:50:01	188	3.8	1.06
12:00:01	177	1.9	0.53	14:00:01	176	0.8	0.22
12:10:01	175	3	0.83	14:10:01	148	1.4	0.39
12:20:01	177	4.3	1.19	14:20:01	177	2.3	0.64
12:30:01	169	3.6	1.00	14:30:01	185	4.1	1.14
12:40:01	169	2.4	0.67	14:40:01	152	2.4	0.67
12:50:01	187	1	0.28	14:50:01	172	2.7	0.75
13:00:01	185	3.6	1.00	15:00:01	174	1.7	0.47
13:10:01	183	2.8	0.78	15:10:01	172	1.2	0.33

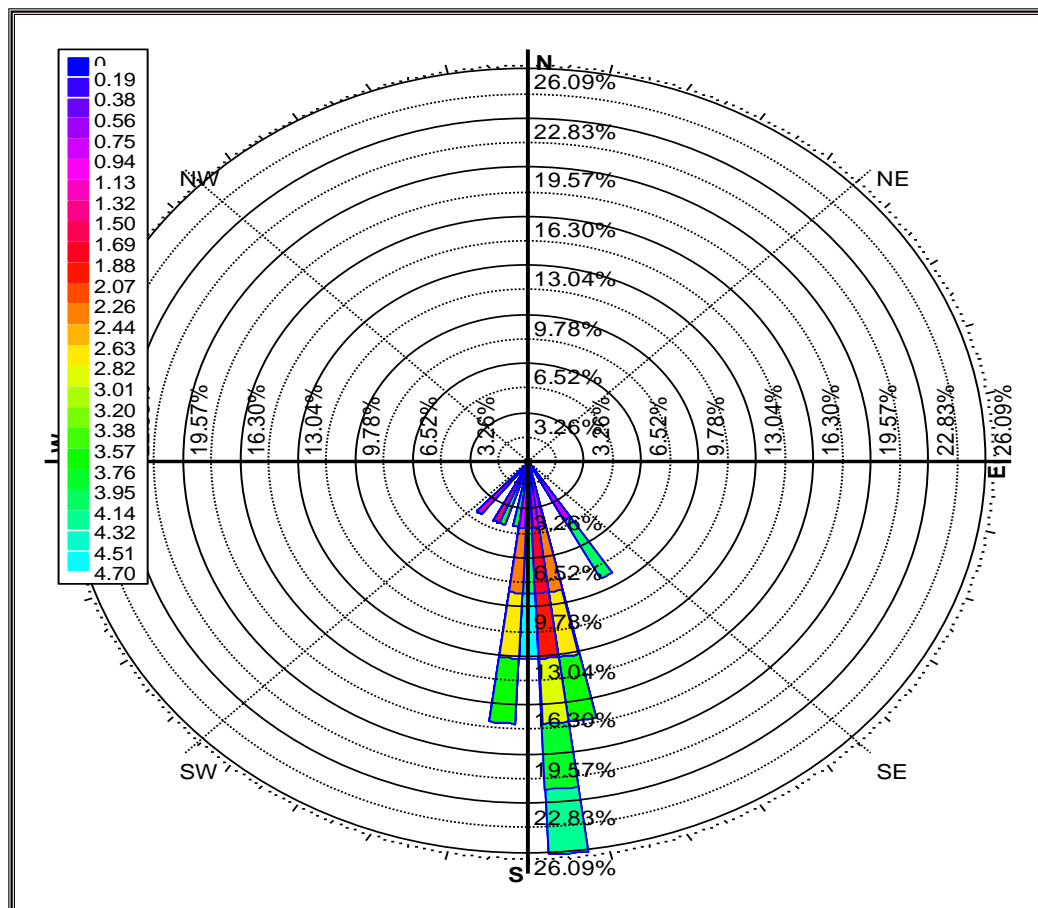


Figure 35. Wind Rose Diagram, 11:00am to 15:00pm

4.7 Emission to Air of Odour

There are two main sources of odour emission from the plant: CO₂ emission from fermenters and WWTP. The odour management system of Yangon Distillery is described in following figure.

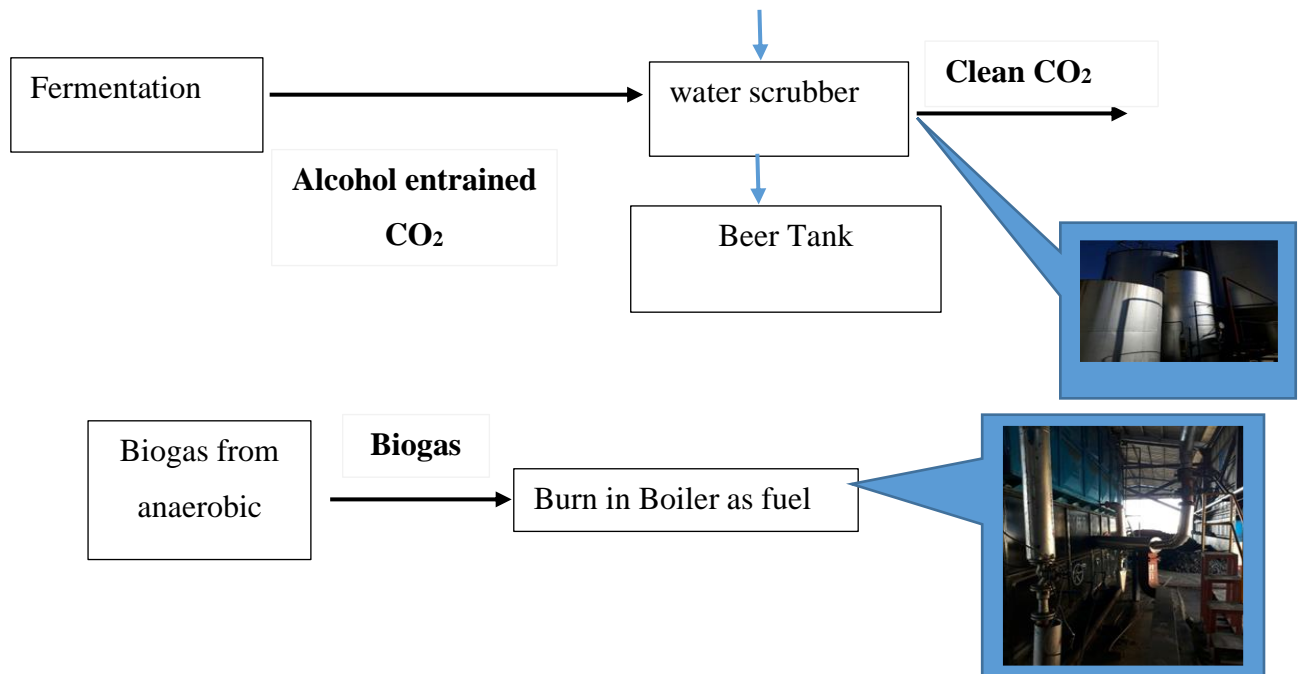


Figure 36. Odour Management system of Yangon Distillery Plant (GRGICL)

4.8 Soil Quality

Two samples of soil were collected around the existing Yangon distillery plant to record the current condition of soil. The samples were analyzed for their physiochemical properties in Soil Laboratory, Land Use Department of Ministry of Agriculture and Irrigation.

According to test results, pH value of SS 1 (17°1'22.00"N 96°4'23.34"E) and SS-2 (17°1'16.56"N 96°4'11.03"E) which were collected at 20 m from the boundary of Yangon distillery plant are 4.63 and 4.95 and which fall under classification of strongly acidic conditions. Under this condition, following phenomena would occurs:

- Possible Aluminum toxicity and excess availability of Cobalt, Copper, Iron, Manganese, and Zinc
- Deficient in Calcium, Potassium, Nitrogen, Magnesium, Phosphorous, and Sulphur

- Molybdenum becomes more available with decreasing pH
- Bacterial and actinomycete activity is reduced along with a predominance of fungi
- Mineralization of organic matter and nitrification are restricted

Soil analysis data is provided in APPENDIX-J.

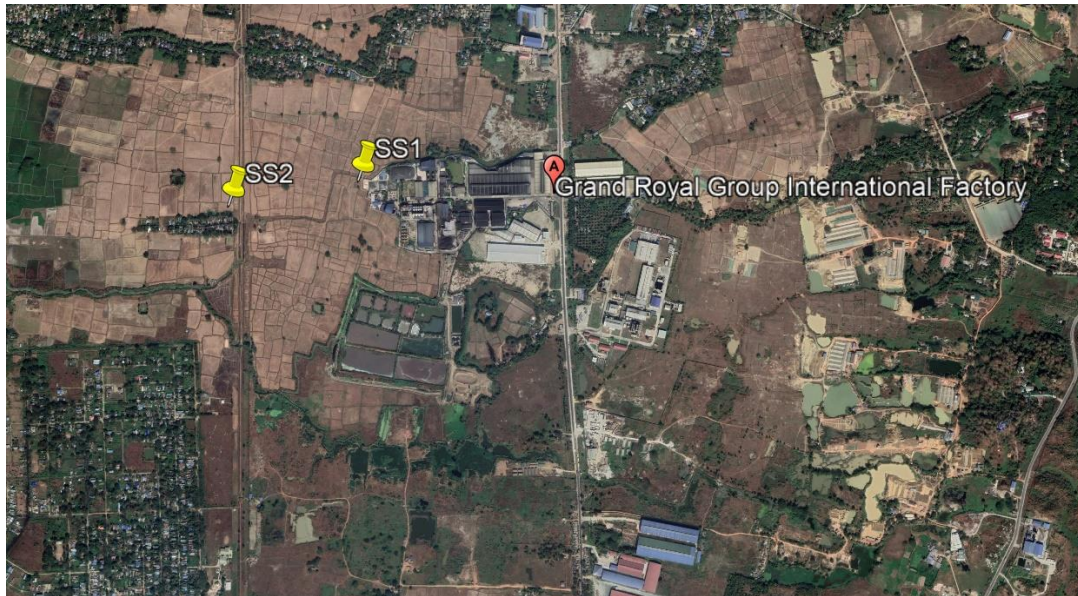


Figure 37. Soil Quality Sampling Point

Table 38. Soil pH and Associated Impacts

pH value	Soil classification	Impact interpretation
≤ 5.5	Strongly acidic	<ul style="list-style-type: none"> • Possible Aluminum toxicity and excess availability of Cobalt, Copper, Iron, Manganese, and Zinc • Deficient in Calcium, Potassium, Nitrogen, Magnesium, Phosphorous, and Sulphur • Boron deficiency below pH of 5 • Molybdenum becomes more available with decreasing pH • Bacterial and actinomycete activity is reduced along with a predominance of fungi • Mineralization of organic matter and nitrification are restricted • Below a pH of 3, functioning of cell membranes is impaired, resulting in leakage of elements

5.5 - 7.3	Moderately acidic, slightly acidic, and neutral soils	<ul style="list-style-type: none"> • Preferred pH range for most crops, lower end of range may be too acidic for some • pH between the range of 6.0 and 7.0 hampers phosphorous fixation • Neutral pH favors the fixation of molecular Nitrogen by free living soil microorganisms and by symbiotic microorganisms • Above a pH value of 7.0 the availability of Iron, Manganese, Zinc, Cobalt, and Copper declines
7.3 - 8.5	Slightly alkaline and Moderately alkaline soils	<ul style="list-style-type: none"> • Above a pH of 7.0 there is an increase in the availability of Iron, Manganese, Zinc, Cobalt, and Copper • Increased risk of ammonia volatilization • First increasing availability of Phosphorus and Boron, but deficiencies may occur at higher pH values • Insoluble Calcium-Phosphates may be formed at higher pH • Electric conductivity is generally high at higher pH values
≥ 8.5	Strongly to very strongly alkaline	<ul style="list-style-type: none"> • Calcium and magnesium are liable to become unavailable to most crops • Often high sodium levels lead to toxicity and structural damage • Toxicity of bicarbonates and other anions • Possible Boron toxicity common in saline and or sodic soils • Availability of most micronutrients and of Iron, Manganese, Zinc, Copper, and Cobalt is reduced, except for Molybdenum • Decreased

Table 39. Results of Soil Quality Analysis

Sample	Moist- ure %	pH Soil: Water 1:2:5	Texture				Organic Carbon	Humus %	Total N	Exchangeable cations			Available Nutrients	
			Sand %	Silt %	Clay %	Total %				Ca	Mg	K	P	K ₂ O
SS-1	5.47	4.63	65.48	27.00	7.52	100.00	1.59	2.74	0.13	1.41	1.41	0.11	16.54	5.08
SS-2	1.94	4.95	37.48	30.00	32.52	100.00	1.21	2.09	0.27	5.44	0.68	0.13	3.63	6.12

Table 40. Interpretation of Soil Quality Results

Sample	pH Soil: Water	Texture	Organic Carbon	Total N	Exchangeable cations			Available Nutrients	
					Ca	Mg	K	P	K ₂ O
SS-1	Strongly Acidic	Loam	Low	Low	Very Low	Low	Low	Medium	Low
SS-2	Strongly Acidic	Clay Loam	Low	Medium	Low	Very Low	Low	Low	Low

4.9 Biodiversity

Biodiversity includes two portions, which are the study of vegetation (flora) and the study of living animals (fauna). Technical experts conducted the field survey for the construction site within sufficient time to get reliable data of impacts on existent biodiversity.

4.9.1 Materials and Methods

4.9.1.1 *Methods (Flora)*

The floristic data and ecological data collection were conducted by the following methods in the study Area.

(a) Sample Plotting

The Global Positioning System was used to navigate and mark the coordinates of the sample plots. In order to obtain essential data for predicting of tree species composition in the mangrove forest, 30x30 meter quadrants were set up and tree species in the plot were collected and population of each species were also counted. The species identification was carried out by using key to families of flowering plants and appropriate literature and confirmed by matching with herbarium specimens of Department of Botany, University of Yangon.

(b) Mapping

Location maps are set by the method based on the Google map and mark the GPS position of vegetation survey.

4.9.1.2 *Methods (Fauna)*

Biodiversity of fish, amphibians, reptiles, birds and mammals are assessed at the present study. The survey is carried out by specimen collections for the insects (dragonflies and butterflies), fish, frogs, toads, snakes (Herpetofauna), rodents (mice and rats) as voucher specimens. Butterflies, dragonflies, amphibians and reptiles were caught for the voucher specimens to identify down to species taxa level. Birds were studied by watching with the aid of field guide book and binoculars. Voucher specimens of all taxa were identified based on systematic taxonomic keys. References for the specific fauna for taxonomic for taxonomic keys are included.

4.9.2 Results and Finding

4.9.2.1 Flora

The factory area is located at Shwe Pyi Thar Township, Yangon Region. The factory area comprises main factory shop, warehouse, canteen, main office, and car parking. All most all vegetations in the area was cleaned up in the past. There are some trees which were cultivated for shade on road side and fruits trees.

At presnts there are 12 tree species, 28 small tree species, 30 shrubs, 42 herbs, 28 climbers, 10 grass, 2 ferns and 7 aquatics within the study area.

Table 41. Species and Aquatic Species Lists in Direct Impact Zone

No.	Common Name	Scientific Name	Family Name
1	Aw-za	<i>Annona squamosa</i> L.	Annonaceae
2	Bama-kokko	<i>Albizia lebbek</i> (L) Benth.	Mimosaceae
3	Ban-da	<i>Terminalia catappa</i> L.	Combretaceae
5	Baw-di-nyaung	<i>Ficus religiosa</i> L.	Moraceae
6	Baw-za-gaing	<i>Leucaena leucocephala</i> (L am.) De.Wit	Mimosaceae
10	Chin-paung-phyu	<i>Hibiscus surratensis</i> L.	Malvaceae
11	Chin-ya	<i>Flueggea leucopyrus</i> Willd	Euphorbiaceae
12	Dan-gywe	<i>Senna tora</i> (L) Roxb	Caesalpiniaceae
14	Dan-tha-lun	<i>Moringa pterygosperma</i> Gaertn.	Moringaceae
15	Gaw-tha-zin	<i>Citharexylum suberratum</i> Sw.	Verbenaceae
16	Hti-ka-yon	<i>Mimosa pudica</i> L.	Mimosaceae
17	Japan-hti-ka-yon	<i>Mimosa diplotricha</i> C.	Mimosaceae
18	Japan-zi	<i>Muntingia calabura</i> L.	Tiliaceae
19	Ka-du-byan	<i>Cyanthillium cinereum</i> (L) H. Robinson	Asteraceae
20	Kaing	<i>Saccharum spontaneum</i> L.	Poaceae
21	Kala-ma-gyi	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Mimosaceae
22	Ka-na-phaw-yaing	<i>Alternanthera nodiflora</i> R.Br.	Amaranthaceae
23	Ka-zaw-poke	<i>Cassia occidentalis</i> L.	Caesalpiniaceae

24	Ket-si-nae-gyi	<i>Urea lobata</i> L.	Malvaceae
25	Ket-si-nae-thay	<i>Triumfetta bartramia</i> L.	Tiliaceae
26	Kha-aung	<i>Ficus hispida</i> L.	Moraceae
27	Kha-yan-chin	<i>Lycopersicon esculentum</i> Mill.	Solanaceae
28	Kha-yan-ka-zawt	<i>Solanum torvum</i> Swartz	Solanaceae
29	Khwe-lae-ya	<i>Canavalia cathartica</i>	Fabaceae
30	Khwe-thay-pan	<i>Ageratum conyzoides</i> L.	Asteraceae
31	Kin-pon	<i>Coccinia grandis</i> (L) J. Voigh.	Cucurbitaceae
32	Ko-kko	<i>Samanea saman</i> (Jacq.) Merr.	Mimosaceae
33	Kon-ka-zun	<i>Ipomoea sagittata</i> Poir.	Convolvulaceae
34	Kon-tha-phan	<i>Ficus racemosa</i> L.	Moraceae
35	Kyan	<i>Saccharum officinarum</i> L.	Poaceae
36	Kyar-hin-nwee	<i>Operculina turpethum</i> (L) Silva Mansa	Convolvulaceae
37	Kyauk-kwe	<i>Evolvulus nummularius</i> L.	Convolvulaceae
38	Kyaung-pan	<i>Vitex trifolia</i> L.	Verbenaceae
39	Kyaung-say-pin	<i>Acalypha indica</i> L.	Euphorbiaceae
40	Kyeik-hman	<i>Eclipta alba</i> (L.) Hassk.	Asteraceae
41	Kyet-gaung- chake	<i>Anisomeles ovata</i> R.Br.	Lamiaceae
42	Kyet-hin-kha	<i>Momordica charantia</i> L.	Cucurbitaceae
43	Kyet-mauk-sue- pyan	<i>Achyranthes aspera</i> L.	Amaranthaceae
44	Kyet-mauk-sue- pyan	<i>Achyranthes bidentata</i> Bl.	Amaranthaceae
45	Kyet-tha-hin	<i>Phyllanthus niruri</i> L.	Euphorbiaceae
47	Lay-gya-myet	<i>Chloris barbata</i> Sw.	Poaceae
48	Le-hmoe	<i>Ceiba pentandra</i> Gaertn.	Bombacaceae
49	Let-pan	<i>Bombax ceiba</i> L.	Bombacaceae
50	Ma-gyi	<i>Tamarindus indica</i> L.	Caesalpiniaceae
51	Ma-la-kar	<i>Psidium guajava</i> L.	Myrtaceae
52	Ma-lar	<i>Curcuma</i> sp.	Zingiberaceae

53	Myay-zi-phyu	<i>Phyllanthus urinaria</i> L.	Euphorbiaceae
54	Myay-zi-phyu	<i>Phyllanthus maderaspatensis</i> L.	Euphorbiaceae
55	Mye-na-ga	<i>Euphorbia thymifolia</i> L.	Euphorbiaceae
56	Myet-kyut	<i>Commelina nudiflora</i> L.	Commelinaceae
57	Nauk-poe-myet	<i>Chrysopogon acicularis</i> (Retz) Trin	Poaceae
58	Not known	<i>Indigofera miniata</i> L.	Fabaceae
59	Not known	<i>Desmodium triflorum</i> DC.	Fabaceae
60	Not known	<i>Drynaria fortunei</i> (Kunze) J.Sm.	Polypodiaceae
61	Not known	<i>Paspalidium flavidum</i> Retz.	Poaceae
62	Not known	<i>Eragrostis papposa</i> Duf.	Poaceae
63	Not known	<i>Eragrostis tremula</i> Hochst. ex. Steud.	Poaceae
64	Not known	<i>Hedyotis diffusa</i> Willd.	Rubiaceae
65	Not known	<i>Lindernia crustacea</i> (L.) F.Muell.	Scrophulariaceae
66	Not known	<i>Cyperus exaltatus</i> Retz	Cyperaceae
67	Not known	<i>Fimbristylis ferruginea</i> Vahl.	Cyperaceae
68	Not known	<i>Alysicarpus ovalifolius</i> (Schum.) J. Leonard	Fabaceae
69	Not known	<i>Aeschynomene indica</i> L.	Fabaceae
70	Nwa-hta-min	<i>Smithia sensitiva</i> Ait.	Fabaceae
71	Ohn	<i>Cocos nucifera</i> L.	Arecaceae
72	Pa-de-gaw-gyi	<i>Alpinia conchigera</i> Griff.	Zingiberaceae
73	Pauk-pan-phyu	<i>Sesbania grandiflora</i> (L) Poir.	Fabaceae
74	Pa-zun-sar-yaing	<i>Alternanthera sessilis</i> (L.) R.Br.	Amaranthaceae
75	Pein	<i>Colocasia antiquorum</i> Schott.	Araceae
76	Pein	<i>Colocasia esculenta</i> (L) Schott	Araceae
77	Pein-kyar	<i>Caladium humboldtii</i>	Araceae
78	Pe-le-nyin	<i>Acmella calva</i> (DC.) R.K. Jansen	Asteraceae
79	Pe-yin	<i>Phaseolus calcaratus</i> Roxb.	Fabaceae
80	Phet-ya-gyi	<i>Urtica nivea</i> L.	Urticaceae

81	Phet-yar-lay	<i>Urtica dioica</i> L.	Urticaceae
82	Phi-gyan-nget-pyaw	<i>Musa malaccensis</i> Ridl.	Musaceae
83	Pilaw-yaing	<i>Corchorus olitorius</i> L.	Tiliaceae
84	Pin-sein-yaing	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae
85	Pyaung-phu-pin	<i>Zea mays</i> L.	Poaceae
86	Sa-be	<i>Jasminum</i> sp.	Oleaceae
87	Sa-byit-yaing	<i>Ampelocissus barbata</i> Planch.	Vitaceae
88	Sar-tha-kwar	<i>Gymnopetalum conchinchinense</i> Kurz	Cucurbitaceae
89	Seik-noe-ma-htwet	<i>Euphorbia hypericifolia</i> L.	Euphorbiaceae
90	Sin-hna-maung	<i>Heliotropium indicum</i> L.	Boraginaceae
91	Sin-ngo-myet	<i>Eleusine indica</i> Gaertn.	Poaceae
92	Su-la-na-pha	<i>Oldenlandia corymbosa</i> L.	Rubiaceae
93	Swe-daw	<i>Bauhinia acuminata</i> L.	Caesalpiniaceae
94	Ta-byet-si-ywet-gyi	<i>Sida mysorensis</i> Wight & Arn.	Malvaceae
95	Ta-byet-si-ywet-shae	<i>Sida acuta</i> Burm f	Malvaceae
96	Ta-byet-si-ywet-wine	<i>Sida rhombifolia</i> L.	Malvaceae
97	Taing-lon-chantha	<i>Portulaca grandiflora</i> Hook.	Portulacaceae
98	Ta-ma	<i>Azadirachta indica</i> A.Juss.	Meliaceae
99	Taw-hin-galar	<i>Cleome burmanii</i> Wight & Arn.	Capparaceae
100	Taw-lay-nyin	<i>Jussiaea suffruticosa</i> L.	Onagraceae
101	Taw-monla	<i>Elephantopus scaber</i> L.	Asteraceae
102	Taw-su-ka	<i>Passiflora foetida</i> L.	Passifloraceae
103	Tha-but-kha	<i>Luffa aegyptiaca</i> Mill.	Cucurbitaceae
104	Tha-bye	<i>Syzygium grande</i> (Wight) Walp	Myrtaceae
105	Tha-man	<i>Hibiscus similis</i> Blum.	Malvaceae
106	Tha-yet	<i>Mangifera indica</i> L.	Anacardiaceae

107	Thit-yay-gyi	<i>Peperomia pellucida</i> (L.) H.B.K.	Piperaceae
108	Thone-daunt-myet	<i>Kyllinga melanosperma</i> Nees.	Cyperaceae
109	Wet-kyut	<i>Commelina bengalensis</i> L.	Commelinaceae
110	Yakhaing-nget-pyaw	<i>Musa sapientum</i> L.	Musaceae
111	Ye-ka-zun	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae
112	Yon-padi	<i>Hibiscus esculentus</i> L.	Malvaceae
113	Zi	<i>Zizyphus jujuba</i> Lam.	Rhamnaceae

Table 42. Cultivated Species in Study Area

No.	Common Name	Scientific Name	Family Name
1	Aw-za	<i>Annona squamosa</i> L.	Annonaceae
2	Ban-da	<i>Terminalia catappa</i> L.	Combretaceae
3	Baw-za-gaing	<i>Leucaena leucocephala</i> (Lam) De.Wit	Mimosaceae
4	Chan-si-yoe-kyet-su	<i>Jatropha curcas</i> L.	Euphorbiaceae
5	Chin-paung-ni	<i>Hibiscus sabdariffa</i> L.	Malvaceae
6	Chin-paung-phyu	<i>Hibiscus surratensis</i> L.	Malvaceae
7	Dan-gyi	<i>Lawsonia inermis</i> L.	Lythraceae
8	Dan-tha-lun	<i>Moringa pterygosperma</i> Gaertn.	Moringaceae
9	English-me-za-li	<i>Peltophorum pterocarpum</i> (DC.) Back.ex K.	Caesalpiniaceae
10	Gaw-tha-zin	<i>Citharexylum suberratum</i> Sw.	Verbenaceae
11	Gwe-dauk	<i>Wattakaka volubilis</i> (L. f.) Stapf.	Asclepiadaceae
12	Ka-zun-gyi	<i>Ipomoea batatas</i> Lam.	Convolvulaceae
13	Kha-yae	<i>Mimusops elengi</i> L.	Sapotaceae
14	Kha-yan-chin	<i>Lycopersicon esculentum</i> Mill.	Solanaceae
15	Kha-yan-ka-zawt	<i>Solanum torvum</i> Swartz	Solanaceae

16	Ko-kko	<i>Samanea saman</i> (Jacq.) Merr.	Mimosaceae
17	Kyan	<i>Saccharum officinarum</i> L.	Poaceae
18	Kyaung-sha	<i>Oroxylum indicum</i> (L.) Kurz.	Bignoniaceae
19	Kyet-hin-kha	<i>Momordica charantia</i> L.	Cucurbitaceae
20	Le-hmoe	<i>Ceiba pentandra</i> Gaertn.	Bombacaceae
21	Ma-gyi	<i>Tamarindus indica</i> L.	Caesalpiniaceae
22	Ma-ho-gany	<i>Swetenia macrophylla</i> King	Meliaceae
23	Mai-daw-gyi-gamon	<i>Syngonium podophyllum</i> Schott	Araceae
24	Ma-la-kar	<i>Psidium guajava</i> L.	Myrtaceae
25	Me-za-li	<i>Senna siamea</i> (Lam.) Irwin & Barneby	Caesalpiniaceae
26	Nat-pan-nyo	<i>Justica oreophila</i> Clarke.	Acanthaceae
27	Ngu	<i>Cassia fistula</i> L.	Caesalpiniaceae
28	Ohn	<i>Cocos nucifera</i> L.	Arecaceae
29	Pauk-pan-phyu	<i>Sesbania grandiflora</i> (L) Poir.	Fabaceae
30	Pein-kyar	<i>Caladium bicolor</i> (L) Vent.	Araceae
31	Pein-kyar	<i>Caladium humboldtii</i>	Araceae
32	Pein-ne	<i>Artocarpus heterophyllus</i> Lam.	Moraceae
33	Pe-zaung-yar	<i>Dolichos tetragonolobus</i> L.	Fabaceae
34	Phi-gyan-nget-pyaw	<i>Musa malaccensis</i> Ridl.	Musaceae
35	Pinle-ga-bwe	<i>Casuarina equisetifolia</i> Forst.	Casuarinaceae
36	Pin-ma-ywet-gyi	<i>Lagerstroemia macrocarpa</i> Kurz	Lythraceae
37	Pon-nyet	<i>Calophyllum inophyllum</i> L.	Hypericaceae
38	Pwe-say-mezali	<i>Senna alata</i> L.	Caesalpiniaceae
39	Pwint-tu-ywet-tu	<i>Mussaenda erythrophylla</i> Schum. & Thonn.	Rubiaceae
40	Pyaung-phu-pin	<i>Zea mays</i> L.	Poaceae
41	Pyin-ma-ywet-thay	<i>Lagerstroemia speciosa</i> (L) Pers.	Lythraceae
42	Sa-be	<i>Jasminum</i> sp.	Oleaceae

43	Swe-daw	<i>Bauhinia acuminata</i> L.	Caesalpiniaceae
44	Taing-lon- chantha	<i>Portulaca grandiflora</i> Hook.	Portulacaceae
45	Taing-taung-pe	<i>Vigna peduncularis</i> (Kunth)Fawc. & Rendle	Fabaceae
46	Ta-ma	<i>Azadirachta indica</i> A.Juss.	Meliaceae
47	Taung-htan	<i>Livistona</i> sp.	Arecaceae
48	Tha-bye	<i>Syzygium grande</i> (Wight) Walp	Myrtaceae
49	Tha-yet	<i>Mangifera indica</i> L.	Anacardiaceae
50	Yakhaing-nget- pyaw	<i>Musa sapientum</i> L.	Musaceae
51	Ye-hmwe-pan	<i>Angelonia cornigera</i> Hook.	Scrophulariaceae
52	Ye-yo	<i>Morinda angustifolia</i> Roxb.	Rubiaceae
53	Yon-padi	<i>Hibiscus esculentus</i> L.	Malvaceae
54	Ywet-hla-pan	<i>Codiaeum variegatum</i> (L) Blume	Euphorbiaceae
55	Zi-za-war	<i>Gardenia lucida</i> Roxb.	Rubiaceae

Table 43. Species Lists in Indirect Impact Zone

No.	Common Name	Scientific Name	Family Name
1	Alo-lay	<i>Capparis tenera</i> Dalzell	Capparaceae
2	Alo-lay	<i>Caesalpinia crista</i> L.	Caesalpiniaceae
3	Aw-za	<i>Annona squamosa</i> L.	Annonaceae
4	Bama-kokko	<i>Albizia lebbek</i> (L.) Benth.	Mimosaceae
5	Ban-da	<i>Terminalia catappa</i> L.	Combretaceae
6	Bauk-thi-pin	<i>Physalis minima</i> L.	Solanaceae
7	Baw-di-nyaung	<i>Ficus religiosa</i> L.	Moraceae
8	Baw-za-gaing	<i>Leucaena leucocephala</i> (Lam.) De.Wit	Mimosaceae
9	Be-da	<i>Eichhornia crassipes</i> (Mart.) Solms	Pontederiaceae
10	Bi-zet	<i>Chromolaena odorata</i> (L.) R.M. King & H Robinson	Asteraceae

11	Bi-zet-new	<i>Mikania micrantha</i> H.B.K.	Asteraceae
12	Bi-zet-pho	<i>Synedrella nodiflora</i> (L) Gaertn.	Asteraceae
13	Chan-si-yoe- kyet-su	<i>Jatropha curcas</i> L.	Euphorbiaceae
14	Chin-paung-ni	<i>Hibiscus sabdariffa</i> L.	Malvaceae
15	Chin-paung- phyu	<i>Hibiscus surratensis</i> L.	Malvaceae
16	Chin-ya	<i>Flueggea leucopyrus</i> Willd	Euphorbiaceae
17	Dan-gyi	<i>Lawsonia inermis</i> L.	Lythraceae
18	Dan-gywe	<i>Senna tora</i> (L.) Roxb	Caesalpiniaceae
19	Da-ni	<i>Nypa fruticans</i> Wurm	Arecaceae
20	Dan-na-thu-kha	<i>Scoparia dulcis</i> L.	Scrophulariaceae
21	Dan-tha-lun	<i>Moringa pterygosperma</i> Gaertn.	Moringaceae
22	Duck week	<i>Lemna minor</i> L.	Lemnaceae
23	English-me-za-li	<i>Peltophorum pterocarpum</i> (DC.) Back.ex K.	Caesalpiniaceae
24	Gwe-dauk	<i>Wattakaka volubilis</i> (L. f) Stapf.	Asclepiadaceae
25	Hta-ma-soke	<i>Glochidion</i> sp.	Euphorbiaceae
26	Hti-ka-yon	<i>Mimosa pudica</i> L.	Mimosaceae
27	Japan-hti-ka-yon	<i>Mimosa diplotricha</i> C.	Mimosaceae
28	Ka-dauk-set	<i>Monochoria vaginalis</i> (Presl) Kunth	Pontederiaceae
29	Ka-det	<i>Crateva adansonii</i> DC.	Capparaceae
30	Ka-du-byan	<i>Cyanthillium cinereum</i> (L) H. Robinson	Asteraceae
31	Kaing	<i>Saccharum spontaneum</i> L.	Poaceae
32	Kala-ma-gyi	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Mimosaceae
33	Ka-na-phaw- yaing	<i>Alternanthera nodiflora</i> R.Br.	Amaranthaceae
34	Ka-thit	<i>Erythrina</i> sp.	Fabaceae
35	Kat-ma-lar	<i>Sonneratia apetala</i> Buch. -Ham	Sonneratiaceae

36	Ka-zaw-poke	<i>Cassia occidentalis</i> L.	Caesalpiniaceae
37	Ka-zun-gyi	<i>Ipomoea batatas</i> Lam.	Convolvulaceae
38	Ka-zun-nwee	<i>Ipomoea pilosa</i> Sweet	Convolvulaceae
39	Ket-si-nae-gyi	<i>Urea lobata</i> L.	Malvaceae
40	Ket-si-nae-thay	<i>Triumfetta bartramia</i> L.	Tiliaceae
41	Kha-aung	<i>Ficus hispida</i> L.	Moraceae
42	Kha-ru	<i>Pluchea indica</i> (L.) Less.	Asteraceae
43	Kha-yae	<i>Mimusops elengi</i> L.	Sapotaceae
44	Kha-yar	<i>Acanthus ilicifolius</i> L.	Acanthaceae
45	Khwe-lae-ya	<i>Canavalia cathartica</i>	Fabaceae
46	Khwe-sha	<i>Trema orientalis</i> (L.) Blume	Urticaceae
47	Khwe-thay-pan	<i>Ageratum conyzoides</i> L.	Asteraceae
48	Kin-pon	<i>Coccinia grandis</i> (L.) J. Voigh.	Cucurbitaceae
49	Ko-kko	<i>Samanea saman</i> (Jacq.) Merr.	Mimosaceae
50	Kon-ka-zun	<i>Ipomoea sagittata</i> Poir.	Convolvulaceae
51	Kon-tha-phan	<i>Ficus racemosa</i> L.	Moraceae
52	Kyar-hin-nwee	<i>Operculina turpethum</i> (L.) Silva Mansa	Convolvulaceae
53	Kyar-ni	<i>Nymphaea pubescens</i> Willd.	Nymphaeaceae
54	Kyar-phyu	<i>Nymphaea nouchali</i> Byrn. f.	Nymphaeaceae
55	Kyauk-kwe	<i>Evolvulus nummularius</i> L.	Convolvulaceae
56	Kyaung-say-pin	<i>Acalypha indica</i> L.	Euphorbiaceae
57	Kyaung-sha	<i>Oroxylum indicum</i> (L.) Kurz.	Bignoniaceae
58	Kyeik-hman	<i>Eclipta alba</i> (L.) Hassk.	Asteraceae
59	Kyet-gaung- chake	<i>Anisomeles ovata</i> R.Br.	Lamiaceae
60	Kyet-mauk-sue- pyan	<i>Achyranthes aspera</i> L.	Amaranthaceae
61	Kyet-mauk-sue- pyan	<i>Achyranthes bidentata</i> Bl.	Amaranthaceae
62	Kyet-tha-hin	<i>Phyllanthus niruri</i> L.	Euphorbiaceae
63	Kyet-thon-pin	<i>Ipomoea violacea</i> L.	Convolvulaceae

64	Kyi-ah	<i>Trichosanthes cordata</i> Roxb.	Cucurbitaceae
65	La-mu	<i>Sonneratia caseolaris</i> (L) Engl.	Sonneratiaceae
66	La-tha-ka-zun	<i>Ipomoea fistulosa</i> Mart.ex Choisy	Convolvulaceae
67	Lay-gya-myet	<i>Chloris barbata</i> Sw.	Poaceae
68	Le-pa-dauk	<i>Monochoria hastaefolia</i> Presl	Pontederiaceae
69	Le-pa-du	<i>Sphenoclea zeylanica</i> Gaertn.	Sphenocleaceae
70	Let-pan	<i>Bombax ceiba</i> L.	Bombacaceae
71	Ma-gyi	<i>Tamarindus indica</i> L.	Caesalpiniaceae
72	Ma-ho-gany	<i>Swetenia macrophylla</i> King	Meliaceae
73	Mai-daw-gyi-gamon	<i>Syngonium podophyllum</i> Schott	Araceae
74	Ma-la-kar	<i>Psidium guajava</i> L.	Myrtaceae
75	Ma-lar	<i>Curcuma</i> sp.	Zingiberaceae
76	Me-za-li	<i>Senna siamea</i> (Lam.) Irwin & Barneby	Caesalpiniaceae
77	Mi-chaung-kun-phet	<i>Hygrophila phlomoides</i> Nees	Acanthaceae
78	Mi-chaung-pan	<i>Derris trifoliata</i> Lour.	Fabaceae
79	Myauk-kyein	<i>Flagellaria indica</i> L.	Flagellariaceae
80	Myauk-u	<i>Dioscorea sativa</i> L.	Dioscoreaceae
81	Myay-byt	<i>Portulaca oleracea</i> L.	Portulacaceae
82	Myay-zi-phyu	<i>Phyllanthus urinaria</i> L.	Euphorbiaceae
83	Myay-zi-phyu	<i>Phyllanthus maderaspatensis</i> L.	Euphorbiaceae
84	Myet-kyut	<i>Commelina nudiflora</i> L.	Commelinaceae
85	Nat-pan-nyo	<i>Justica oreophila</i> Clarke.	Acanthaceae
86	Nauk-poe-myet	<i>Chrysopogon acicularis</i> (Retz) Trin	Poaceae
87	Ngu	<i>Cassia fistula</i> L.	Caesalpiniaceae
88	Not known	<i>Alysicarpus ovalifolius</i> (Schum.) J. Leonard	Fabaceae
89	Not known	<i>Indigofera miniata</i> L.	Fabaceae
90	Not known	<i>Desmodium triflorum</i> DC.	Fabaceae

91	Not known	<i>Melanthera biflora</i> (L.) Wild	Asteraceae
92	Not known	<i>Drynaria fortunei</i> (Kunze) J.Sm.	Polypodiaceae
93	Not known	<i>Adiantum trapeziforme</i>	Adiantaceae
94	Not known	<i>Hedyotis diffusa</i> Willd.	Rubiaceae
95	Not known	<i>Tylophora flexuosa</i> R.Br.	Asclepiadaceae
96	Not known	<i>Utricularia</i> sp.	Lentibulariaceae
97	Not known	<i>Paspalidium flavidum</i> Retz.	Poaceae
98	Not known	<i>Aeschynomene indica</i> L.	Fabaceae
99	Not known	<i>Cayratia trifolia</i> (L.) Domin	Vitaceae
100	Not known	<i>Eragrostis papposa</i> Duf.	Poaceae
101	Not known	<i>Eragrostis tremula</i> Hochst. ex. Steud.	Poaceae
102	Not known	<i>Crinum</i> sp.	Amaryllidaceae
103	Not known	<i>Cyperus exaltatus</i> Retz	Cyperaceae
104	Not known	<i>Pontederia</i> sp.	Pontederiaceae
105	Not known	<i>Fimbristylis ferruginea</i> Vahl.	Cyperaceae
106	Not known	<i>Sarcolobus globosus</i> Wall.	Asclepiadaceae
107	Not known	<i>Lindernia ciliata</i> Colsm.) Pennell	Scrophulariaceae
108	Not known	<i>Lindernia crustacea</i> (L) F.Muell.	Scrophulariaceae
109	Not known	<i>Lindernia antipoda</i> (L.) Alston	Scrophulariaceae
110	Not known	<i>Dactyloctenium aegyptium</i>	Poaceae
111	Nwa-ha-min	<i>Smithia sensitiva</i> Ait.	Fabaceae
112	Nyan	<i>Sesbania paludosa</i> Roxb.	Fabaceae
113	Ohn	<i>Cocos nucifera</i> L.	Arecaceae
114	Ohn-hne	<i>Streblus asper</i> Lour.	Moraceae
115	Pa-de-gaw-gyi	<i>Alpinia conchigera</i> Griff.	Zingiberaceae
116	Pa-zun-sar-yaing	<i>Alternanthera sessilis</i> (L.) R.Br.	Amaranthaceae
117	Pein	<i>Colocasia antiquorum</i> Schott.	Araceae
118	Pein	<i>Colocasia esculenta</i> (L) Schott	Araceae

119	Pein	<i>Alocasia macrorrhizos</i> (L) G.Don	Araceae
120	Pein-kyar	<i>Caladium bicolor</i> (L) Vent.	Araceae
121	Pein-ne	<i>Artocarpus heterophyllus</i> Lam.	Moraceae
122	Pe-le-nyin	<i>Acmella calva</i> (DC.) R.K. Jansen	Asteraceae
123	Pe-yin	<i>Phaseolus calcaratus</i> Roxb.	Fabaceae
124	Pe-zaung-yar	<i>Dolichos tetragonolobus</i> L.	Fabaceae
125	Pha-lan-taung-hmwe	<i>Costus speciosus</i> Sm.	Costaceae
126	Phet-ya-gyi	<i>Urtica nivea</i> L.	Urticaceae
127	Phet-yar-lay	<i>Urtica dioica</i> L.	Urticaceae
128	Phi-gyan-nget-pyaw	<i>Musa malaccensis</i> Ridl.	Musaceae
129	Pilaw-yaing	<i>Corchorus olitorius</i> L.	Tiliaceae
130	Pinle-ga-bwe	<i>Casuarina equisetifolia</i> Forst.	Casuarinaceae
131	Pin-ma-ywet-gyi	<i>Lagerstroemia macrocarpa</i> Kurz	Lythraceae
132	Pin-sein-yaing	<i>Hyptis suaveolens</i> (L.) Poit.	Lamiaceae
133	Pon-nyet	<i>Calophyllum inophyllum</i> L.	Hypericaceae
134	Pwe-say-mezali	<i>Senna alata</i> L.	Caesalpiniaceae
135	Pwint-tu-ywet-tu	<i>Mussaenda erythrophylla</i> Schum. & Thonn.	Rubiaceae
136	Pyin-ma-ywet-thay	<i>Lagerstroemia speciosa</i> (L) Pers.	Lythraceae
137	Sa-byit-yaing	<i>Ampelocissus barbata</i> Planch.	Vitaceae
138	Sar-tha-kwar	<i>Gymnopetalum conchinchinense</i> Kurz	Cucurbitaceae
139	Seik-noe-ma-htwet	<i>Euphorbia hypericifolia</i> L.	Euphorbiaceae
140	Sein-na-gyet	<i>Phyla nodiflora</i>	Verbenaceae
141	Shwe-nwee	<i>Cassytha filiformis</i> L.	Lauraceae
142	Sin-hna-maung	<i>Heliotropium indicum</i> L.	Boraginaceae

143	Sin-ma-hmwe-soke	<i>Malachra capitata</i> L.	Malvaceae
144	Sin-ngo-myet	<i>Eleusine indica</i> Gaertn.	Poaceae
145	Su-la-na-pha	<i>Oldenlandia corymbosa</i> L.	Rubiaceae
146	Swe-daw	<i>Bauhinia acuminata</i> L.	Caesalpiniaceae
147	Ta-byet-si-ywet-shae	<i>Sida acuta</i> Burm f	Malvaceae
148	Ta-byet-si-ywet-wine	<i>Sida rhombifolia</i> L.	Malvaceae
149	Taing-taung-pe	<i>Vigna peduncularis</i> (Kunth)Fawc.& Rendle	Fabaceae
150	Ta-ma	<i>Azadirachta indica</i> A.Juss.	Meliaceae
151	Taung-htan	<i>Livistona</i> sp.	Arecaceae
152	Taw-hin-galar	<i>Cleome burmanii</i> Wight & Arn.	Capparaceae
153	Taw-kyaung-pan	<i>Clerodendrum inerme</i> Gaertn.	Verbenaceae
154	Taw-lay-nyin	<i>Jussiaea suffruticosa</i> L.	Onagraceae
155	Taw-monla	<i>Elephantopus scaber</i> L.	Asteraceae
156	Taw-paik-san	<i>Crotalaria mucronata</i> L.	Fabaceae
157	Taw-pe-di-sein	<i>Atylosia crassa</i> Prain	Fabaceae
158	Taw-su-ka	<i>Passiflora foetida</i> L.	Passifloraceae
159	Tha-but-kha	<i>Luffa aegyptiaca</i> Mill.	Cucurbitaceae
160	Tha-khut	<i>Dolichandrone spathacea</i> (L. f.) K. Schum.	Bignoniaceae
161	Tha-man	<i>Hibiscus similis</i> Blum.	Malvaceae
162	Tha-me-ywet-leit	<i>Avicennia marina</i> (Forsk)Vierh.	Avicenniaceae
163	Tha-me-ywet-wine	<i>Avicennia officinalis</i> L.	Avicenniaceae
164	Tha-nat	<i>Cordia myxa</i> L.	Boraginaceae
165	Than-ma-naing-kyauk-ma-naing	<i>Alysicarpus vaginalis</i> (L) Dc.	Fabaceae
166	Tha-yaw	<i>Excoecaria agallocha</i> L.	Euphorbiaceae

167	Tha-yet	<i>Mangifera indica</i> L.	Anacardiaceae
168	Thit-yay-gyi	<i>Peperomia pellucida</i> (L.) H.B.K.	Piperaceae
169	Thone-daunt-myet	<i>Kyllinga melanosperma</i> Nees.	Cyperaceae
170	Wet-kyut	<i>Commelina bengalensis</i> L.	Commelinaceae
171	win-u	<i>Millettia</i> sp.	Fabaceae
172	Yakhaing-nget-pyaw	<i>Musa sapientum</i> L.	Musaceae
173	Ye-hmwe-pan	<i>Angelonia cornigera</i> Hook.	Scrophulariaceae
174	Ye-ka-zun	<i>Ipomoea aquatica</i> Forssk.	Convolvulaceae
175	Ye-yo	<i>Morinda angustifolia</i> Roxb.	Rubiaceae
176	Ye-za-lat	<i>Pistia stratiotes</i> L.	Araceae
177	Yin-hnaung	<i>Vitis japonica</i> Thunb.	Vitaceae
178	Yon-padi	<i>Hibiscus esculentus</i> L.	Malvaceae
179	Ywet-hla-pan	<i>Codiaeum variegatum</i> (L) Blume	Euphorbiaceae
180	Zi	<i>Zizyphus jujuba</i> Lam.	Rhamnaceae
181	Zi-za-war	<i>Gardenia lucida</i> Roxb.	Rubiaceae

4.9.2.2 *Fauna*

A total of 99 species representing butterfly (13 specie), dragonfly and damselfly (15 species), fish (130 species), frog and toad (8 species), lizard and skink (4 species) and birds (22 species) are recorded. There is not included the any endangered and endemic species under IUCN Redlist category. The significance of biodiversity in an ecosystem and complex interrelations with other components determines the structure and productivity of ecosystems, as well as contributing to their functionality. All living existing organisms inhabiting in the direct zones definite will disappear after this factory. Industries based on organic raw materials are the largest contributors of organic pollution. Then industrial waste production can flow into Thakone creek. Much of industrial wastewater is discharged without treatment to open water resources, reducing the quality of larger volumes of water. Water is critical to many industries process such

as cooling, generating steam and cleaning and as a constituent part of beverages. These effects will cause aquatic habit destruction, loss of biodiversity and water pollution.

Table 44. Summary of Fauna Species Recorded

Fauna	Order	Family	Species
Butterfly	1	5	13
Dragonfly and Damselfly	1	2	15
Fish	3	8	13
Frog and Toad	1	4	8
Lizard and skink	1	3	4
Snake		1	2
Arthropod	6	6	12
Bird	6	13	22
Mammal	5	5	10
Total	24	47	99

Table 45. Butterfly Species (Order Lepidoptera) Collected from Survey Area

No.	Family Name	Scientific Name
1	Danaidae	<i>Danaus genutia genutia</i> <i>Danaus limniace limniace</i>
2	Pieridae	<i>Eurema hecabe contubernalis</i> <i>Leptosia nina nina</i> <i>Appias lalassis lalassis</i> <i>Euremalaeta pseudolaeta</i> <i>Atrophaneura latreillei kabrua</i>
3	Satyridae	<i>Lethe philemon</i>
4	Nymphalidae	<i>Junonia atlites</i> <i>Junonia almana almanac</i> <i>Hypolimnas bolina jacintha</i> <i>Neptis hylas kamarupa</i>
5	Papilionidae	<i>Papilio cressphontes</i>

Table 46. Dragonfly & Damselfly of Lepidoptera Collected from Survey Area

Order/ Suborder	Family	Scientific Name
Order-Odonata Sub-order Zygoptera	Coenagriidae	<i>Ceriagrion coromandelinum</i> <i>Ceriagrion praetermissum</i> <i>Ceriagrion nigroflavum</i> <i>Ischnura senegalensis</i> <i>Agriocnemis dabreui</i>
Sub- order Anisoptera	Libellulidae	<i>Orthetrum Sabina</i> <i>Acisoma panorpoides</i> <i>Diplacodes trivialis</i> <i>Bradinopyga geminate</i> <i>Neurothemis tullia</i> <i>Brachythemis contaminata</i> <i>Rhodothemis rufa</i> <i>Trithemis kirby</i> <i>Rhyothemis phyllis</i> <i>Pantala flavescens</i>

Table 47. Systematic Position of Fish Fauna Collected from Survey Area

No.	Family Name	Scientific Name	Common Name	Local Name
1	I.Polynemisformes Polynemidae	<i>Polynemus paradiseus</i>	Mango fish	Nga-pon-nar
2	II.Cypriniformes Bagridae	<i>Mystus bleekeri</i> <i>Mystus seenghala</i> <i>Johnius gangeticus</i>	- River catfish	Nga-zin-yine Nga-jaung Nga-pot-thin
3	Cyprinidae	<i>Puntius clavatus</i> <i>Labeo rohita</i> <i>Amblypharyngodon mola</i>	- Rohu -	Nga-khone-ma Nga-myt-chin Nga-bae
4	Anabantidae	<i>Anabas testudineus</i>	Climbing perch	Nga-pya-ma

5	Cobitidae	<i>Nemachelus rubidipinnis</i>	-	Nga-tha-lae-hto
6	Exocoetidae	<i>Exocoetus poecilopterus</i>		Nga-pyan
7	III. Ophiocephaliformes Ophiocephalidae	<i>Monoptera javanensis</i> <i>Puntius gonionotus</i>	Eel -	Nga-shint Nga-khone-ma
8	Clariidae	<i>Clarias batracus</i>	Cat fish	Nga-khu

Table 48. Systematic Position of Recorded Herpetofauna from Survey Area

Family	Scientific Name	Common Name	Local Name	Habit
Bufonidae	<i>Bufo melanostictus</i> <i>Bufo macrotis</i>	Common toad Large ear toad	Phar-pyok Hpar pyok thay	Near pond On the ground
Microhylidae	<i>Kaloula pulchra</i> <i>Microhyla ornate</i>	Common bull frog Ber narrow mouthed frog	Phar-kyaung The' phar	On the ground Near pond
Ranidae	<i>Rana limnocharis</i> <i>Rana tigerina</i> <i>Ocidozyga sp.</i>	Paddy frog Khaing land frog Swamp floating frog	Sar-phar Kaing-phar Phar-han-lat	In the pond Mud pond
Rhacophoridae	<i>Polypedates leucomystax</i>	Common tree frog	Phar-pyan	Crevice of roof
Geckkonidae	<i>Hemidactylus frenatus</i>	Common house gecko	Eing-myaung	House
Agamidae	<i>Calotes versicolor</i> <i>Calotes mystaceus</i>	Garden fence lizard Blue crested lizard	Tat-too Poat-thin-nyo	On the trunk On the trunk

Scincidae	<i>Mabuya multifasciata</i>	Common sun skink	Kyal-pyar-kin-late-shaw	Storage house
Colubridae	<i>Xenochrophis piscstor</i> <i>Ptyas mucosus</i>	Chequered keel back Banded rat snake	Yal-mway-pyauk-ma Lin-mway	In the water pond

Table 49. Systematic Position of Recorded Avifauna Collected from Survey Area

Order/Family	Scientific Name	Common Name	Vernacular Name
Anseriformes 1.Dendrocygriidae	<i>Dendrocygna javanica</i>	Lesser whistling duck	Sit-sa-li
II.Piciformes 2.Picidae	<i>Dendrocopos macei</i>	Fulvous-breasted woodpecker	Thit-tauk-nghet
III.Coraciiformes	<i>Alcedo atthis</i>	Common kingfisher	Pain-nyin
IV.Columbiformes 3.Columbidae	<i>Columba livia</i> <i>Streptopelia chinensis</i>	Rock pigeon Spotted dove	Kho Jo-lay-pyauk
V.Pelicaniformes 4.Phalacrocoracidae	<i>Phalacrocorax niger</i>	Little cormorant	Din -kyi
VI.Passeriformes 6.Corvidae 7.Aegithinidae 8.Muscicapidae 9.Sturnidae 10.Hirundinidae 11.Sylviidae 12.Passeridae 13.Zosteropidae 14. Alcedines	<i>Corvus splendens</i> <i>Corvus macrorhynchos</i> <i>Copsychus saularis</i> <i>Aegithiria tiphia</i> <i>Copsychus saularis</i> <i>Acridotheres tristis</i> <i>Acridotheres fuscus</i> <i>Hirundo striolata</i> <i>Orthotomus sutorius</i> <i>Passer domesticus</i> <i>Passer montanus</i> <i>Ploceus philippinus</i> <i>Lonchura striata</i> <i>Lonchura punctulata</i> <i>Zosterops palpebrosus</i> <i>Coraciiformes</i>	House crow Large –billed crow Common iora Oriental magpie robin Common myna Jungle myna Red-rumped swallow Common tailor bird House sparrow Eurasian tree sparrow Baya weaver White-rumped-munia Scaly-breasted munia Oriental white eye	Kyi-kan Taw-kyi-kan Shwe-pyi-soe Tha-paik-lwe Myo-za-yet Taw-za-yet Pyan-hlwar Hnan-pyi-soak Eain-sar Thit-pin-sar Sar-wa-tee Sar-pa-tee Sar-pa-tee Sar –pa tee King fisher

4.10 Meteorology

The study area is located in Field No. 560 of Late Pote Village group and Upper Thae Kone Village group, Hmawbi Township, Yangon Region, Myanmar. The proposed site is currently occupied by near villages, cultivated land. Therefore, the topography is no major differences in altitude. The climate of project area is located in tropical wet and dry climate. The reference of the information is from weather and climate.com (average monthly weather), Myanmar Burmar, climate in Yangon.

4.10.1 Topography and Climate

The study area is located in Field No. 560 of Late Pote Village group and Upper Thae Kone Village group, Hmawbi Township, Yangon Region, Myanmar. The proposed factory is currently occupied by near villages, cultivated land. Therefore, the topography is no major differences in altitude. The climate of factory area is located in tropical wet and dry climate.

4.10.2 Temperature

Yangon has a tropical monsoon climate with very wet summers due to the southwest monsoon which starts from mid-May and lasts until mid-October. The warmest month with the highest average high temperature is April (37°C) and the month with the lowest average high temperature is August (29.6°C). The month with the highest average low temperature is May (25°C) and the coldest month with the lowest average low temperature is January (17.9°C).

Table 50. Average Temperature of Yangon

Sr	Month	Average High Temperature	Average Low Temperature
1	January	32.2°C	17.9°C
2	February	34.5°C	19.3°C
3	March	36°C	21.6°C
4	April	37°C	24.3°C
5	May	33.4°C	25°C

6	June	30.2°C	24.5°C
7	July	29.7°C	24.1°C
8	August	29.6°C	24.1°C
9	September	30.4°C	24.2°C
10	October	31.5°C	24.2°C
11	November	32°C	22.4°C
12	December	31.5°C	19°C

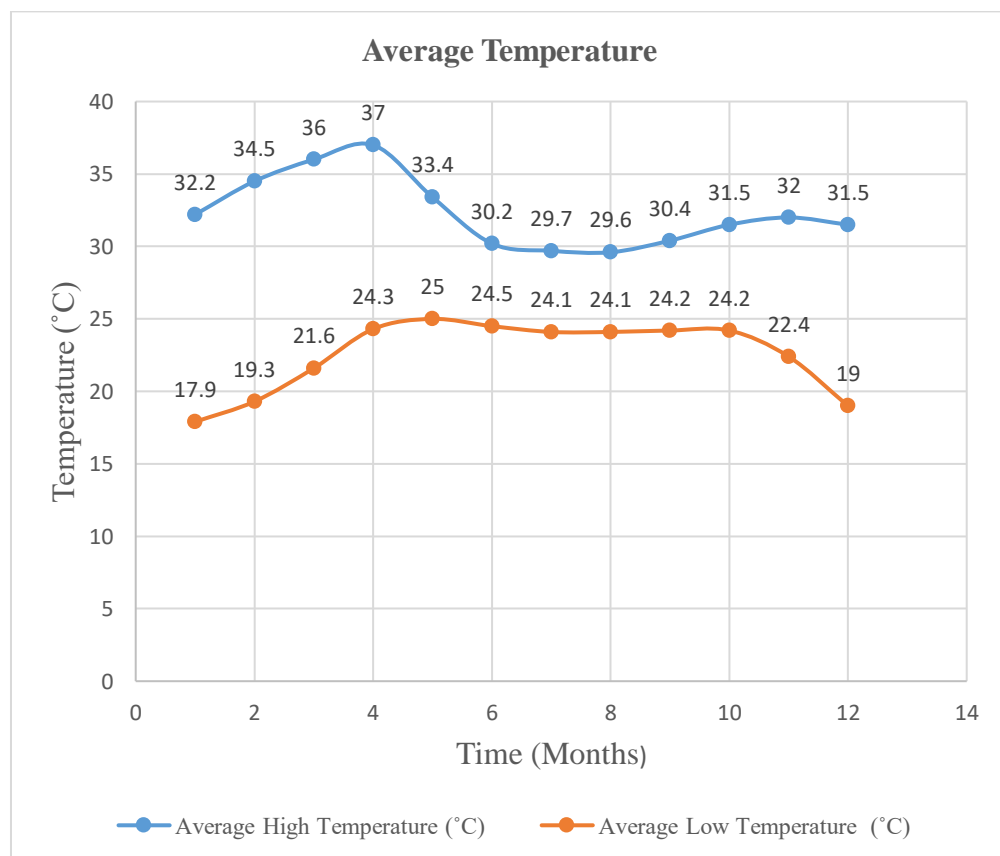


Figure 38. Temperature Graph of Yangon

4.10.3 Rainfall

A lot of rain falls in the months of May, June, July, August, September and October. Yangon has dry periods in December January, February, March and April. The wettest month with the highest rainfall is August (602 mm) and the driest month with the lowest rainfall is February (2 mm). The month with the highest number of

rainy days is July (26.2 days) and the months with the lowest number of rainy days are January, February and December (0.2 days).

Table 51. Average Rainfall and Rainfall Days of Yangon

Sr	Month	Average Rainfall	Average Rainfall Days
1	January	5 mm	0.2 days
2	February	2 mm	0.2 days
3	March	7 mm	0.4 days
4	April	15 mm	1.6 days
5	May	303 mm	12.6 days
6	June	547 mm	25.3 days
7	July	559 mm	26.2 days
8	August	602 mm	26.1 days
9	September	368 mm	19.5 days
10	October	206 mm	12.2 days
11	November	60 mm	4.8 days
12	December	7 mm	0.2 days

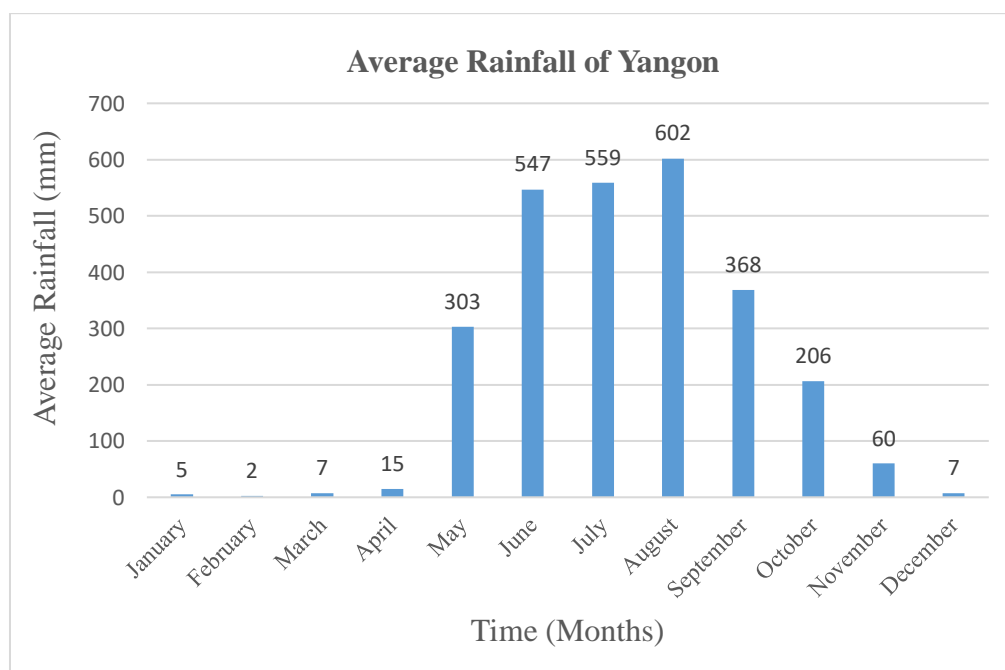


Figure 39. Rainfall Graph of Yangon

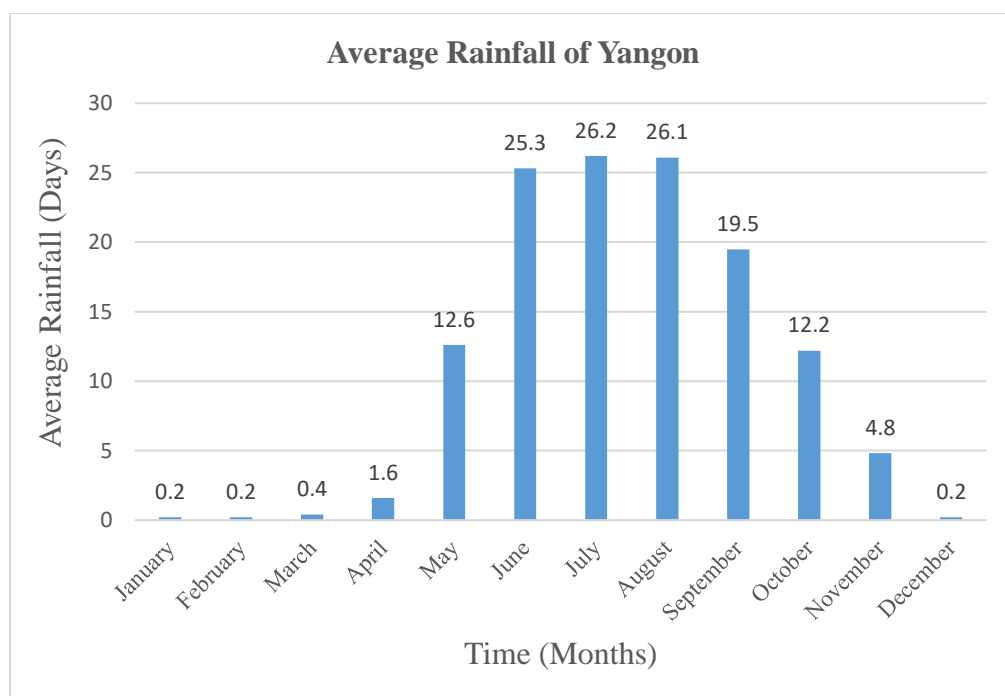


Figure 40. Rainfall Days Graph of Yangon

4.10.4 Humidity

In 2019, August is the most humid and January is the least humid month in Yangon. The month with the highest relative humidity is August (87%) and the lowest relative humidity is January (62%).

Table 52. Average Humidity of Yangon

Sr	Month	Average Relative Humidity
1	January	62%
2	February	66%
3	March	69%
4	April	66%
5	May	73%
6	June	85%
7	July	86%
8	August	87%
9	September	85%
10	October	78%
11	November	71%
12	December	65%

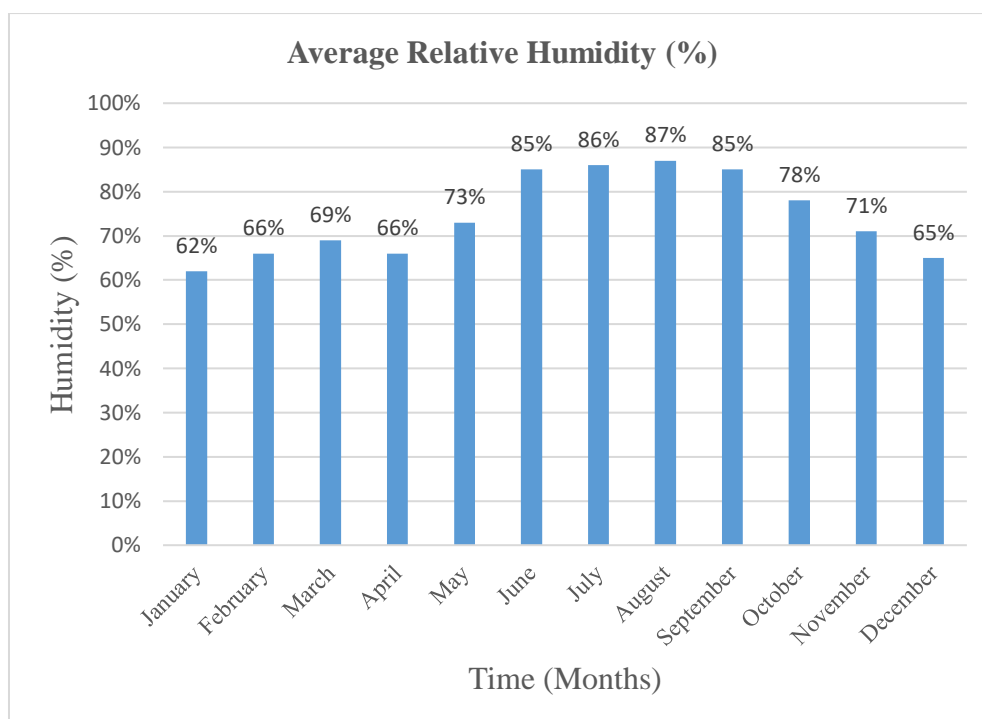


Figure 41. Humidity Graph of Yangon

4.10.5 Daylight/ Sunshine

Sunshine hours of Yangon is range from 2:29 daily in July to 9:44 to each day in January. The longest day of the year is 13:10 hr and the shortest day is 11:1 hr long. The longest day is 2:00 longer than the shortest day. The month with the longest day in June (average daylight: 13.1 h) and the month with the shortest day in December (average daylight: 11.1 h). Months with the most sunshine are January, February and April (average sunshine: 9.7 h) and the month with the least sunshine is July (average sunshine: 2.5 h).

Table 53. Average Daylight and Sunshine Hours of Yangon

Sr	Month	Average Daylight	Average Sunshine
1	January	11.3 hr	9.7 hr
2	February	11.6 hr	9.7 hr
3	March	12.1 hr	9.4 hr
4	April	12.5 hr	9.7 hr
5	May	12.9 hr	5.8 hr
6	June	13.1 hr	2.7 hr

7	July	13 hr	2.5 hr
8	August	12.7 hr	3 hr
9	September	12.2 hr	3.2 hr
10	October	11.8 hr	6.5 hr
11	November	11.3 hr	9.3 hr
12	December	11.1 hr	9.3 hr

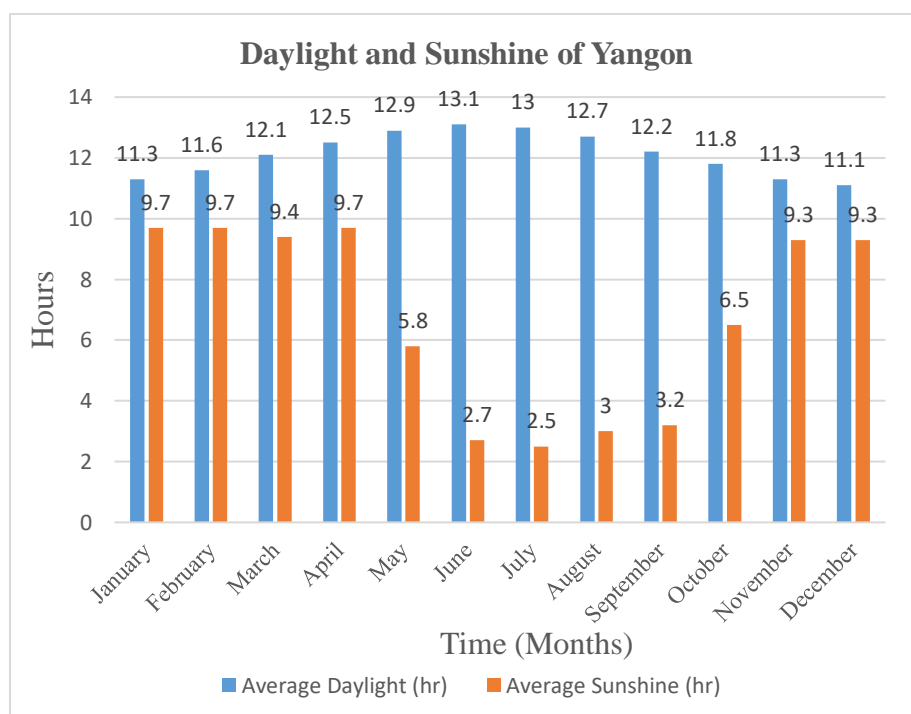


Figure 42. Day Light and Sunshine Hours graph of Yangon

4.10.6 UV Index

Months with the highest UV index of Yangon are March, April, May, June, July, August and September (UV index 12) and the month with the lowest UV index is December (UV index 8).

Table 54. Average UV Index of Yangon

Sr	Month	Average UV Index
1	January	9
2	February	11
3	March	12
4	April	12

5	May	12
6	June	12
7	July	12
8	August	12
9	September	12
10	October	11
11	November	9
12	December	8

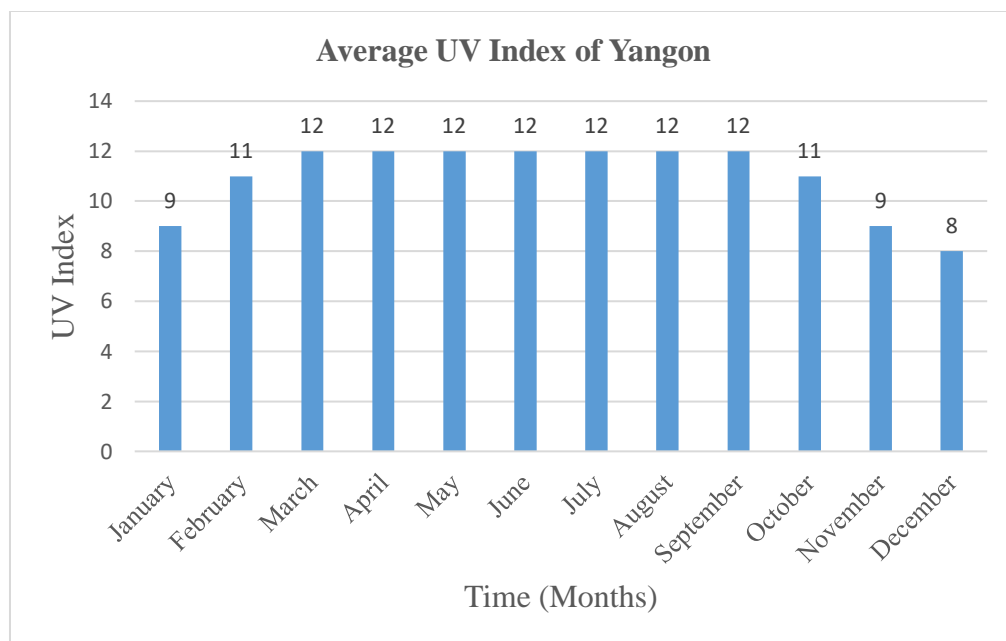


Figure 43. UV Index Graph of Yangon

4.10.7 Earthquakes

Two times of earthquakes are occurred in Yangon within 2018. The following table shows the detail description of earthquake occurring in Yangon.

Table 55. Earquakes in Yangon

Date	Magnitude	Depth	Distance	Location
Monday, June 18, 2018 3:56 PM	4.3	67.29	48km	39 km on the southeast of Yangon District, Burma
Wednesday, April 18, 2018 9:55 AM	4.2	20	35km	12km on the northwest of Twante, Burma

4.11 Noise

4.11.1 Sources of the noise

Since the place for measuring noise levels is a factory which produces whiskey, the noises produced are governed by the sound of the machine operated and by the workers.

4.11.2 Noise Measurement Method

Handheld quick assessment method is used for the sound level by measuring the sound pressure. A tripod is used for mounting the SLM where the SLM is mounted and pointed towards the source of the noise.

4.11.3 Noise Measurement Location

Normally, when undertaking a noise assessment, it is essential to make note of the following on a site map:

- location of noise source
- background noise measurement location
- source noise measurement location
- topography between noise source and sensitive receivers.

The location of noise measurements for the factory is shown in following figure and table.



Figure 44. Location of NSRs within Project Compound

Table 56. Location of NSRs within Project Compound

Sr.	NSRs	Locations	
		Latitude	Longitude
1	P1	17°1'24.69"N	96°4'43.15"E
2	P2	17°1'24.65"N	96°4'43.10"E
3	P3	17°1'21.93"N	96°4'34.45"E
4	P4	17°1'23.18"N	96°4'33.90"E
5	P5	17°1'24.26"N	96°4'31.77"E
6	P6	17°1'22.26"N	96°4'26.44"E
7	P7	17°1'21.42"N	96°4'32.33"E
8	P8	17°1'21.32"N	96°4'31.35"E
9	P9	17°1'21.71"N	96°4'31.31"E

4.11.4 Results of the noise

The result of the noise is totally governed by the factory operation and at P1 and P2, and the workers, the wind and the Lorries there as very few cars pass through. Measurements results are shown in Table.

Table 57. Noise Measurement Results

Sr.	NSRs	Location	One Hour LAeq (dBA)	NEQG Guideline Value (LAeq (dBA)) (Industrial, commercial)
1	P1	At the gate (Normal)	65dB	70
2	P2	At the gate (Car)	53dB	70
3	P3	Main Office	55dB	70
4	P4	Canteen	53dB	70
5	P5	Water Treatment Plant	81dB	70
6	P6	Wastewater Treatment Plant	66dB	70
7	P7	Boiler	81dB	70
8	P8	Inside Milling Section	86dB	70
9	P9	Outside Milling Section	69dB	70



Figure 45. Noise Level Meter for Measuring Noise



Figure 46. Noise levels Measuring around Project Area

4.12 Socio-Economic Components

Socio-economic factors are lifestyle components and measurements of both financial viability and social standing. They directly influence social privilege and levels of financial independence. Factors such as health status, income, environment

and education are studied by sociologists in terms of how they each affect human behaviors and circumstances.

4.12.1 Land Use of Hmawbi Township

The scope of land use in Hmawbi Township is as follows.

Table 58. The scope of land Use in Hmawbi Township

Sr	Land Type	Area (Acre)
1	Total net land area	66970
	Farmland	47872
	Land	-
	Land / Island	379
	Garden land	18729
2	Allotment of land	2684
	Farmland	2596
	Land	-
	Land / Island	-
	Garden land	88
	Grazing land	5659
	Industrial Land	4089
	Towns and other land	96
	Forest area	630
	Wild land	79
	Cultivated area	37376
	Total	117619

4.12.2 Living conditions

The factory area is located in Hmawbi Township, the Northern District of Yangon Region. The total number of households in Late Pote, Upper Thae Kone and Lowe Thae Kone is only 263. Upper Thae Kone village is the smallest village in the study area with a total household of 48 when the largest village Late Pote has 129 households. The following table and figure show the household numbers in the study area.

Table 59. Household Numbers in the Study Area

Sr.	Village	House Hold
1	Lower Thae Kone	86
2	Upper Thae Kone	48
3	Late Pote	129
Total		263

Total House Hold in Study Area

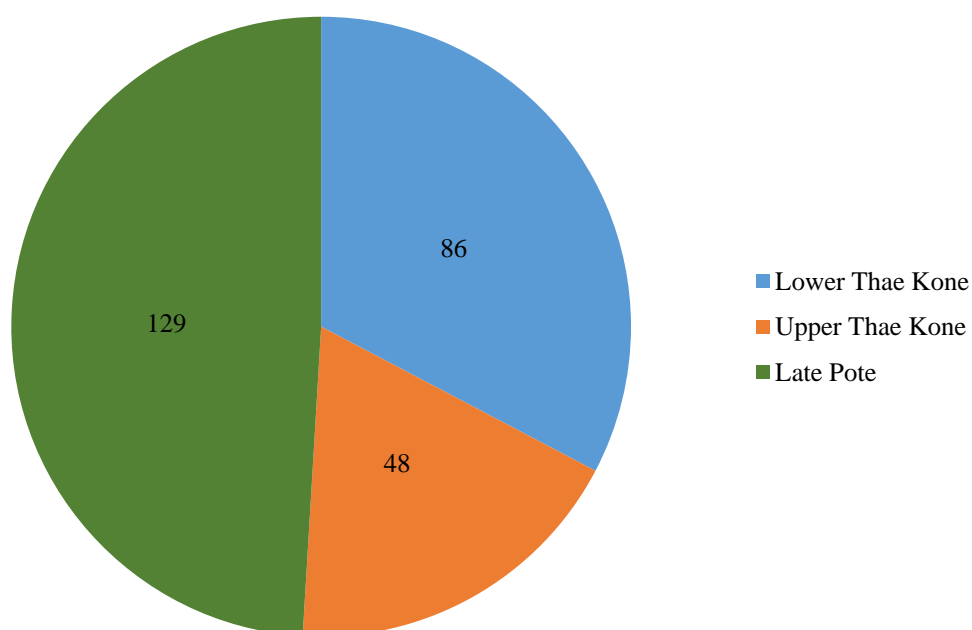


Figure 47. Household Numbers in the Study Area

The average household size in the study area is shown in the following figure. All the villages have significantly higher rate of population per household compared to that of Hmawbi Township (4.1). For the whole study area, average household size is about 4.62 people per household which is remarkably higher than the household sizes of Myanmar (4.4). Upper Thae Kone and Upper Thae Kone has higher house hold size than Late Pote with household sizes of 4.69, 4.67 and 4.52 respectively.

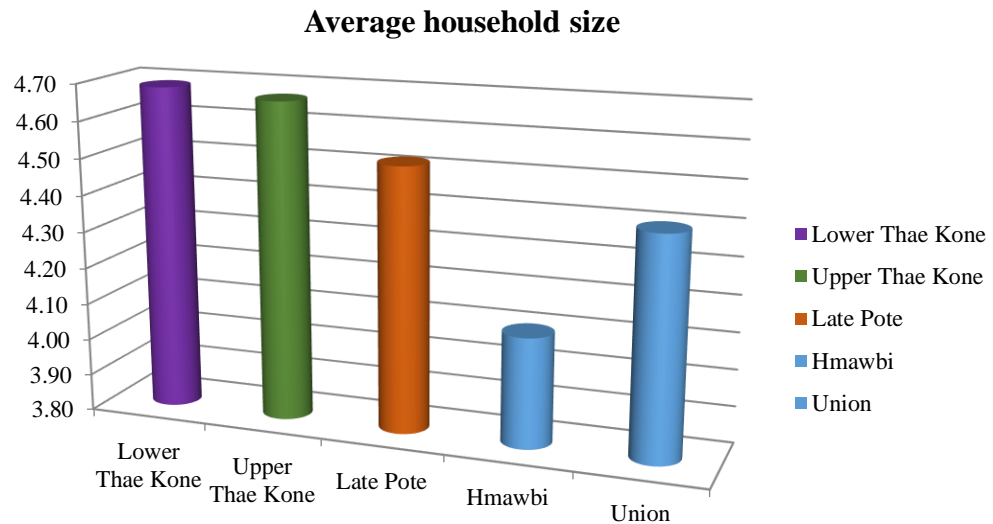


Figure 48. Average Household Sizes in the Study Area

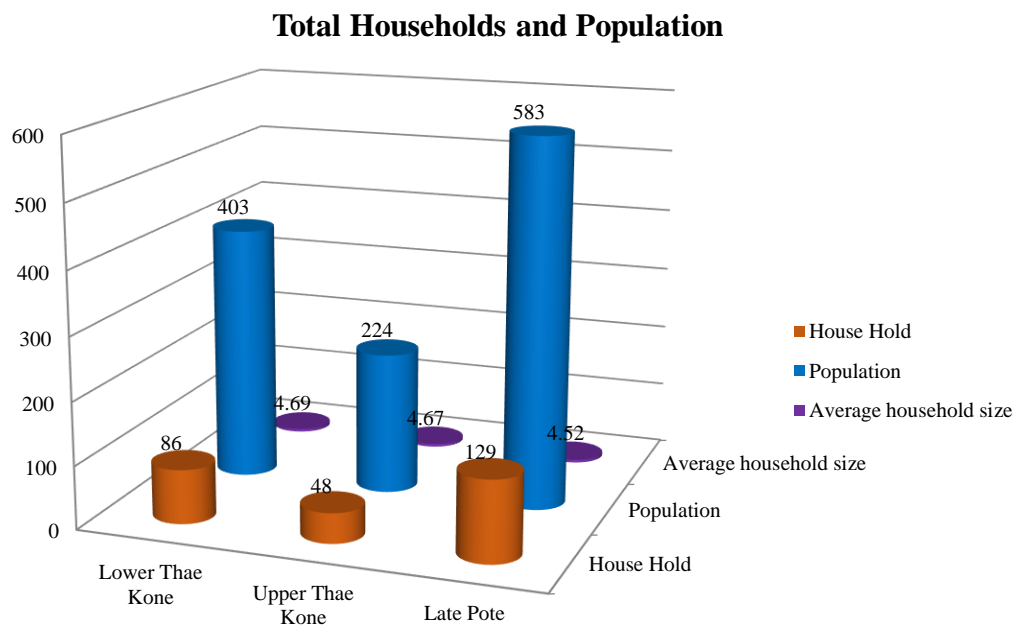


Figure 49. Total Household and Population in the Study Area

Total number of populations in the study area is depicted in Population Matrix. The matrix shows the distribution of both sexes (male and female) counted by their age (0 to 100). According to the matrix, the highest number of populations in both sexes is young and reproductive age, 20 and the older population, age 65 and above, is the lowest.

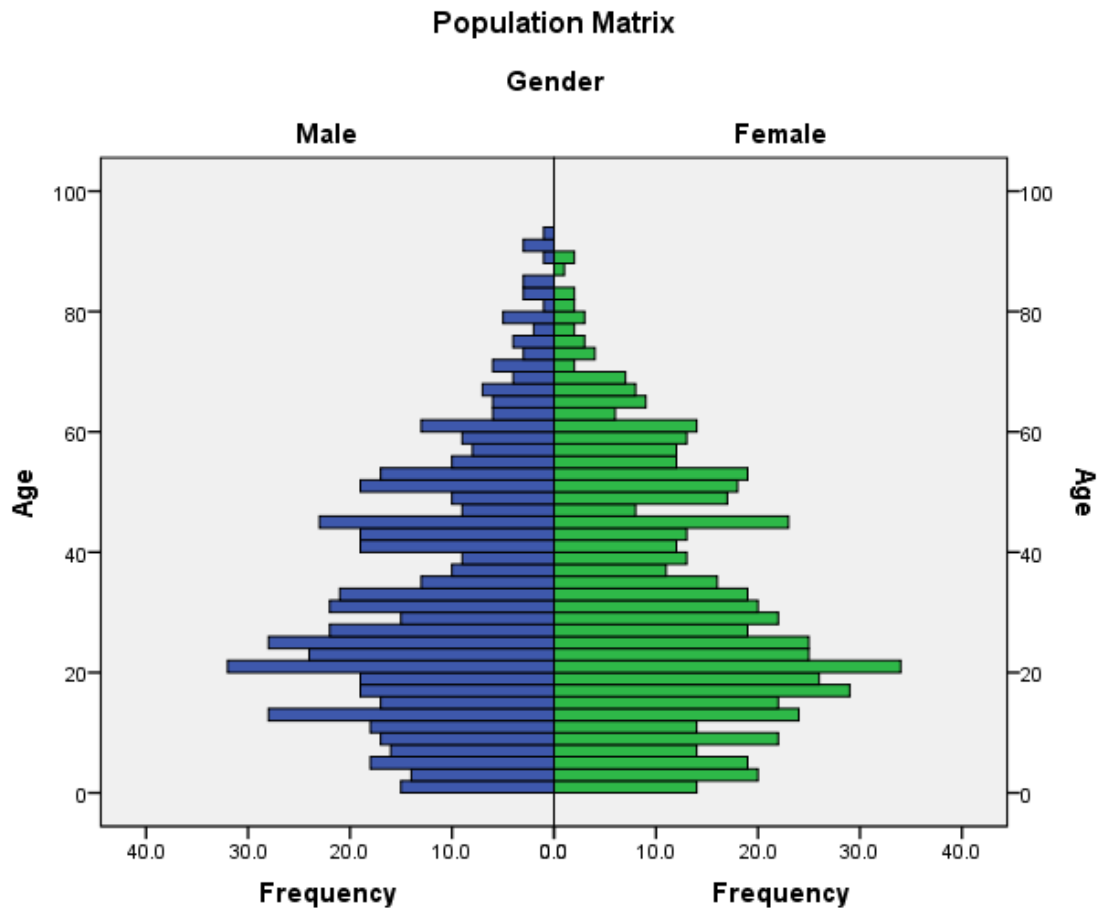


Figure 50. Population Matrixes in the Study Area

4.12.3 Dependency Ratio and Occupation Distribution

Income is money that an individual or business receives in exchange for providing the goods or service or through investing capital. Income is consumed to fuel day-to-day expenditures. Most people age 65 and under receive the majority of their income from a salary or wages earned from a job.

The total dependency ratio tells the proportion of the population not in the work-force who are 'dependent' on those of working-age, it's a calculation which groups those aged under 15 with those over 65 years as the 'dependents' and classifying those aged 15-64 years as the working-age population. Dependency ratio is a measure of the portion of a population which is composed of dependents (people who are too young or too old to work). The dependency ratio is equal to the number of individuals aged below 15 or above 64 divided by the number of individuals aged 15 to 64, expressed as a percentage. The following pie chart shows age distribution of study area.

Age Distribution Chart

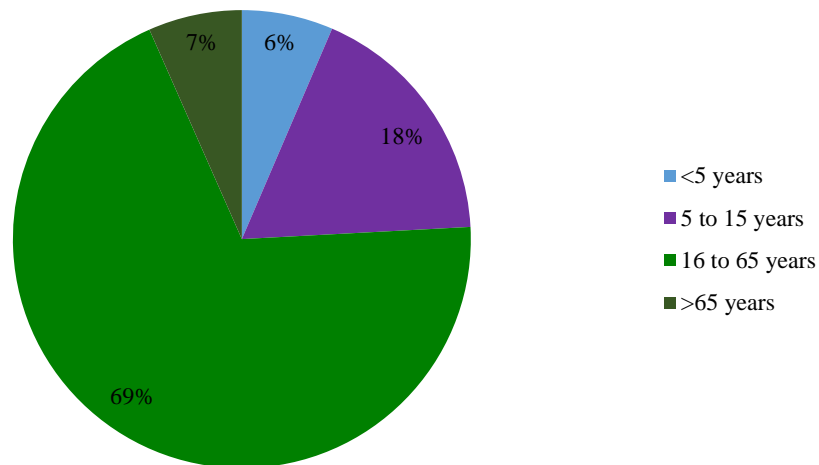


Figure 51. Age Distribution in the Study Area

The percentage of children = 24 %
(age under 15 years)

The older population = 7 %
(aged 65+)

The working-age population = 69 %
(age 15-64 years)

$$\text{Dependency ratio} = \frac{(24+7)}{69} \times 100$$

$$= 44.93$$

So, in theory, roughly 55 percents of the population is of working-age and supporting the other 45 percents of the population, who are either children or retired. The higher the dependency ratio, the more people who are not of working age and the fewer the labor force is.

The following pie chart shows the distribution of occupation in the study area. Most of the workers are private employee working in companies, shops and servicing jobs with the percentages of 35. Daily wages, agriculture and running private business stand with 21, 14 and 13 percent of total occupation.

Occupation Distribution

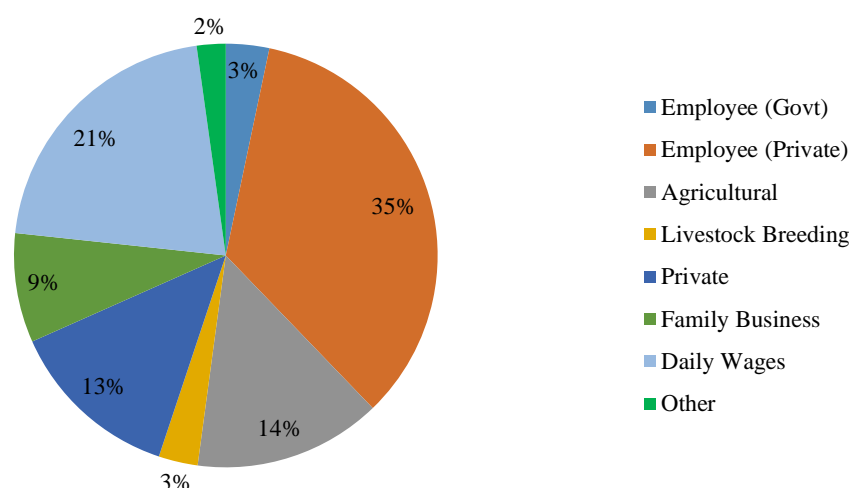


Figure 52. Occupation Distributions in the Study Area

Table 60 is the descriptive table of occupation of entire population in the study area including dependent people, schooling children and ill-health. Table 61 shows the age groups of local community.

Children under five years are 6.45% of total population where elderly over 65 years count to 6.62%. Together these two age groups which are solely dependent on other age groups sum up more than thirteen percentage of total population in the area. More than 69% of the people living in the study area fall under the age group of 16 years to 64 years. This group is mainly consisting of workforces of local community.

Table 60. Occupation Descriptive Table of Entire Population in the Study Area

Occupation	Count	Percent	Valid Percent	Cumulative Percent
Employee (Gov)	21	1.7	1.7	1.7
Employee (Private)	219	18.1	18.1	19.9
Agricultural	91	7.5	7.5	27.4
Livestock Breeding	19	1.6	1.6	28.9
Private	84	6.9	6.9	35.9
Family Business	53	4.4	4.4	40.3
Dependent	329	27.2	27.2	67.5
Ill-Health	4	.3	.3	67.8

Daily Wages	134	11.1	11.1	78.9
Schooling	241	19.9	19.9	98.8
Other	14	1.2	1.2	100.0
Total	1209	100.0	100.0	

Table 61. Age group of Local Community

Sr.	Age Group	Count	Percent
1	<5 years	78	6.45%
2	5 to 15 years	214	17.70%
3	16 to 65 years	837	69.23%
4	>65 years	80	6.62%
Total		1209	100.00%

4.12.4 Employment

Private employee is the most conspicuous living with about 35% of the people in the local area is working. Second most dominant type is daily wages with about 21% of the working force. Approximately 28% of the people in the resident area is working in agriculture and running private business. Following figures show the employment of local community.

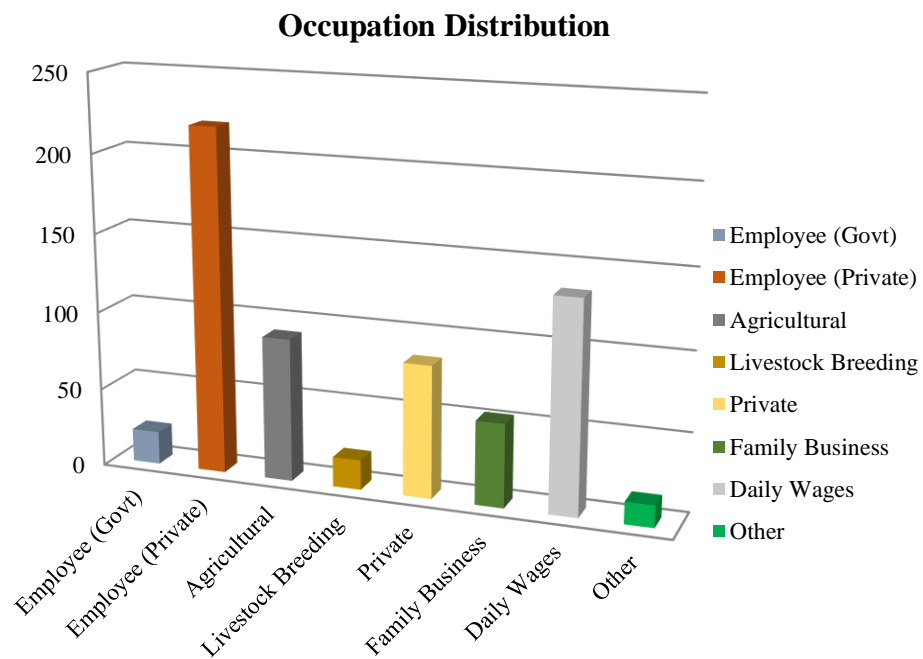


Figure 53. Employments in the Study Area

4.12.5 Religion Distribution

The most dominant religion in the study area is Buddhism with approximately 98 % of total population. The other religion shares the remaining two percentages with 1.3% of Christian, 0.3% and 0.4 % of Hindu and Islam respectively. Table 62 is the descriptive table of Religion distribution of local community with frequency, percentage and Cumulative percentages values.

Table 62. Religion Distributions of Local Community

Religion	Frequency	Percent	Valid Percent	Cumulative Percent
Buddhism	1184	97.9	97.9	97.9
Christian	16	1.3	1.3	99.3
Hindu	4	0.3	0.3	99.6
Islam	5	0.4	0.4	100.0
Total	1209	100.0	100.0	

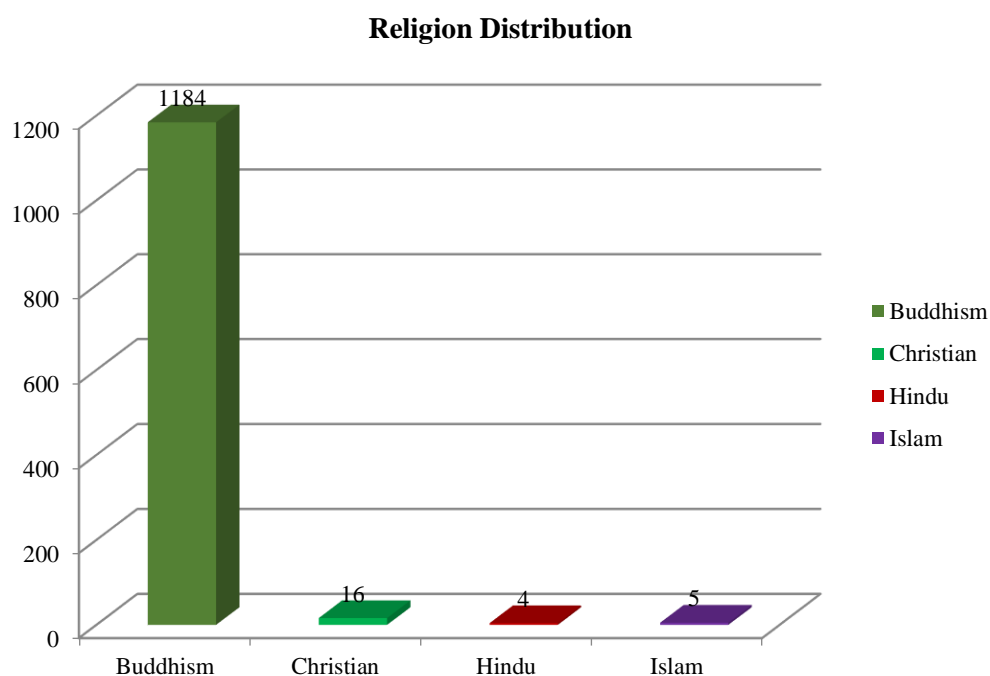


Figure 54. Religion Distributions in the Study Area

The number of people per religion is described in Figure 54. Buddhism got the highest count with 1184 people and the other religions are very few compared to Buddhists.

4.12.6 Educational Attainment

Around 41.6% the people in local community attained only primary level education. Only 2.32% of the local people reach to University and 3.47% are graduated. About 24% remaining are middle and 19% are in high school levels. It could be noted that more than half (55.8%) of local population attained more than primary education. Approximately 10% of population is illiterate. Current educational attainment levels show the local community's past education condition. Hospitality and tourism business need a fair to high level of educational attainment. Background educational attainment of local community shows that the project needs to concentrate capacity building of local community so that they could participate in the development process. Figure (55) shows the educational attainments of local community.

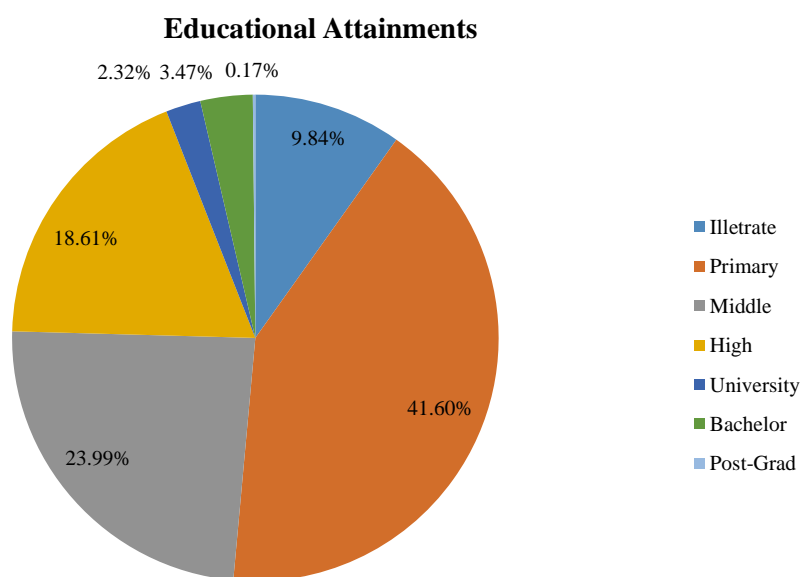


Figure 55. Educational Attainments of Local Community

Education level of both sexes in local community is described in Table 63 with individual frequencies, total count and in percentiles. From the Figure 56, the most obvious education level is primary, secondary and high school levels which mean most of school-age children are learning at basic education schools. University and bachelor degree holders stand around 6% of total educational attainments in the local community. Both male and female education attainment are almost in the same count.

Table 63. Educational Attainment of Both Sexes of Local Community

		Gender		Total	Percent
		Male	Female		
Education	Illiterate	58	61	119	9.8
	Primary	238	265	503	41.6
	Middle	150	140	290	24.0
	High	110	115	225	18.6
	University	10	18	28	2.3
	Bachelor	21	21	42	3.5
	Post-Grad	2	0	2	0.2
Total		589	620	1209	100.0

Educational Attainments by Gender

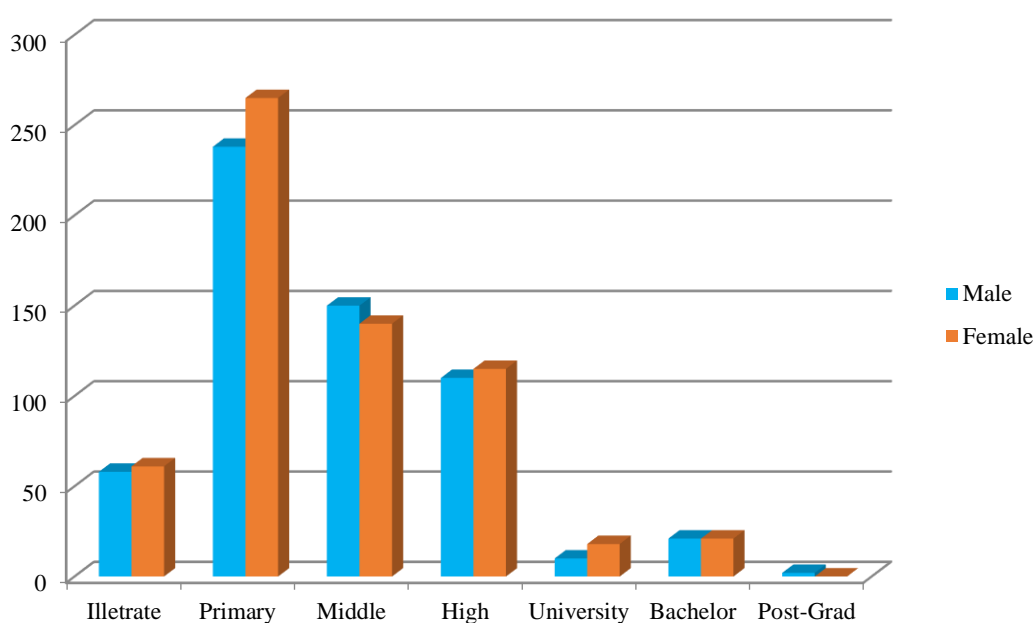


Figure 56. Educational Attainments by Gender in the Study Area

4.12.7 Cultural Heritage Region of Hmawbi Township

From the following table, the prominent pagodas and prominent monastery in Hmawbi Township were not situated within the factory area and within 1 km around the factory area.

Table 64. Prominent Pagodas

Sr	Name of prominent pagodas	Location
1	Shwe Maw Tin pagoda	No (2) Quarter
2	Kyit Day lon pagoda	Banbaykoun

Table 65. Prominent Monastery

Sr	Name of prominent monastery	Location
1	Damaduta Zattawon Tawya monastery	Bottom Warnat Chaung
2	Aung Zatbu Tawya monastery (Dama yite thar)	Innlyat Village

4.12.8 Health Components of Hmawbi Township

There are three government hospitals in the health sectors of Hmawbi Township where the factory is located. There are 40 rural health centers and rural health centers. Outbreaks in Hmawbi Township include malaria and cholera. Diarrhea was caused by diarrhea and no deaths from the disease. There were 42 HIV / AIDS cases but no deaths.

5 Impact Assessment and Mitigation

Rating matrix method is used to assess the significance level of the identified environmental impacts of the Yangon Distillery Plant (GRGICL) on its environment. There are five parameters considered for the activities of the factories and the consequences resulted from the said activities. System of rating is described in detailed as follows.

Table 66. Impact Rating Table

Severity	Value	Duration	Value	Spatial Scope	Value	Frequency	Value	Probability	Value
Insignificant/non-harmful	1	One day to one month	1	Activity specific	1	Annual or less	1	Almost impossible	1
Small/potentially harmful	2	One month to one year	2	Within right of way	2	Bi-annual	2	Highly unlikely	2
Significant/slightly harmful	3	One year to ten years	3	Local area	3	Monthly	3	Unlikely	3
Great/ harmful	4	Life of operation	4	National	4	Daily Intermittence	4	Possible	4
Disastrous/ deadly harmful	5	Permanent	5	Global	5	Daily Continuous	5	Definitely	5

Table 67. Rating Matrix

	Consequence (Severity + Spatial Scope + Duration)														
Activity (Frequency + Probability)	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
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	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 68. Significance Levels

Sr.	Color Code	Value	Rating
1		1-25	Very Low
2		26-50	Low
3		51-75	Low-Medium
4		76-100	Medium-High
5		101-125	High
6		126-150	Very High

Table 69. Environmental Aspect and Impact

Sr.	Activity List	Aspect	Impact
1	Raw materials handling and storage	Unloading from truck	Physical and vehicle hazard
		Loading to hopper	Physical and vehicle hazard
		Cleaning raw materials	Dust and solid waste
		Ergonomic injury from overweight lifting	Physical hazard
2	Milling	Crushing raw materials	Dust, solid waste and noise

		Screening raw materials	Dust, solid waste and noise
3	Liquefaction and Saccharification	Contact with cooker	Heat and physical hazard
		Contact with enzymes	Chemical hazard
		Driving machines	Noise
4	Fermentation	CO ₂ generation	CO ₂ emissions
		Yeast waste	Solid waste
5	Distillation	Discharge water	Waste water
		Sludge	Solid waste
		Driving machines	Noise
		Storage RS	Fire hazard
6	Clean in place (CIP)	Contact with chemical reagent	Chemical hazard
		Washing water	Waste water
7	Utilities	Boiler Operation	Heat
			Emission to air
			Fire hazard
			Waste water
			Solid waste
			Noise
		Water treatment plant	Physical hazard
			Waste water
			Noise
8	Waste Water Treatment Plant	WWTP Operation	Sludge, Chemical hazards, Physical hazards, Water quality, Noise
9	Storage of Diesel	Storage of diesel for driving machines	Oil leakage

Characteristics of the impacts are evaluated based on eight particular basis, five of which are used in the assessment of the significance level of the impacts.

Table 70. Characteristics of the Impacts

IMPACTS	CHARACTERISTICS							
	Nature	Impact Source	Impact Receptor	Severity	Duration	Spatial Scope	Frequency	Probability
Dust	Negative	-Cleaning raw materials - Crushing raw materials - Screening raw materials	Workers	Impact severity is small as broken rice dust quantity is small	Dust & particulate will be emitted in factory life	Impact will occur within factory area	Activity that cause the impact occurs daily intermittently in operation	Emission of dust and particulate are possible
Physical hazard	Negative	-Unloading from truck -Injury from overweight lifting -Fall and slip -Fall from height	Workers	Impact severity is significant for operation workers	Physical hazard will occur in factory life	Physical hazard will occur at the factory area of activity	Activity that cause the impact occurs daily intermittently	Physical hazards are possible

		-Loading to hopper -Contact with cooker						
Chemical hazard	Negative	- Contact with enzymes - Contact with chemical reagents, acid and caustic	Workers	Impact severity is significant for operation workers	Chemical hazard will occur in factory life	Chemical hazard will occur at the factory area of activity	Activity that cause the impact occurs daily intermittently	Chemical hazards are possible
Vehicle hazard	Negative	- Unloading from truck - Loading to hopper	Workers	Impact severity is significant for operation workers if accident by car	Vehicle hazard will occur in factory life	Vehicle hazard will occur within right of way	Activity that cause the impact occurs daily intermittently	Vehicle hazard is unlikely to occurs
Noise	Negative	- Crushing raw materials - Driving machines	Workers	Impact severity is potentially harmful as dust emission occurs almost continuously and most of the workers	Noise hazard will occur in factory life	Noise hazard will occur within the whole factory compound	Activity that cause the impact occurs daily continuously	Noise hazard are possible

				are subjected to exposure				
Hazardous materials and oil	Negative	- Oil leakage from storage of diesel - Oil Leakage from driving machines and vehicles	Local environment	Impact severity is significant on local environment	Hazardous materials and oil hazards will occur in factory life	Hazardous materials and oil hazard will occur at the local environment	Activity that cause the impact occurs daily continuously	Hazardous materials and oil hazards possible
Fire hazard	Negative	- Boiler - Material handling	Workers and the whole plant	Impact severity is harmful	Fuel have to be carried out the whole factory life	If a fire broke out, the whole factory is likely to be affected	Using the fuel for the plant is done daily continuously	A fire hazard is possible
Heat	Negative	-Contact with cooker -Boiler	Workers	Impact severity is small if injured by heat	Source of heat for the impact will exist for the whole factory life	Impact is activity specific as hot objects exists only at wort kettle and boiler	Operation of heated components occur daily continuously	Heat injury are possible to occur

Emission to air	Negative	-Boiler - CO ₂ emissions	Workers and local environment	Impact severity is potentially harmful if air emissions are out of NEQG limit	Air emission will occur in factory life	Air emission could spread to local area	Air emissions occur daily continuously in operation	According to current condition, air emission out of NEQG limit is unlikely to occurs
Solid Waste	Negative	-Cleaning raw materials - Crushing raw materials - Screening raw materials - Yeast waste -Sludge from fermentation, distillation and WWTP	Workers and local environment	Impact severity is potentially harmful if solid wastes are discharged systematically	Impact from solid waste will occur in factory life	Local area could be affected by solid waste mismanagement	Solid waste impact occurs daily intermittently	Impact from solid wastes are possible
Waste Water	Negative	- Discharge water from distillation - Washing water -WWTP	Workers and local environment	Impact severity is slightly harmful if waste water is discharged with NEQG guideline	Impact from waste water will occur in factory life	Local area could be affected by discharged waste water directly	Impact on waste water occurs daily intermittently	Impact from waste water is possible

Table 71. Assessment of the Significance of the Impacts without MEMs

Sr	Impact	Severity	Duration	Spatial Scope	Frequency	Probability	Total Rating	Significance Level
1	Fire hazard	4	4	2	5	4	90	Medium-High
2	Soil Erosion	3	4	3	5	4	90	Media-High
3	Waste water	3	4	3	4	4	80	Medium-High
4	Noise	2	4	2	5	4	72	Low-Medium
5	Emission to air	2	4	3	5	3	72	Low-Medium
6	Heat	2	4	2	5	4	72	Low-Medium
7	Solid waste	2	4	3	4	4	72	Low-Medium
8	Physical hazard	3	4	1	4	4	64	Low-Medium
9	Chemical hazard	3	4	1	4	4	64	Low-Medium
10	Vehicle hazard	3	4	2	4	3	63	Low-Medium
11	Dust	2	4	1	4	4	56	Low-Medium

5.1 Summary of Impacts and Mitigation Measures

Table 72. Mitigation and Enhancement Measures (MEMs)

IMPACTS	Impact Source	Mitigation
Fire hazard	-Boiler - Material handling	1. Providing necessary equipment for fire fighting 2. Organizing a fire fighting team
Soil Erosion	- Oil leakage from driving machines and vehicles	1. Systematic storage of fuel 2. Regular inspections of fuel storage warehouse 3. Systematic operation of driving machines and engines 4. Regular inspections and monitoring of driving machines and engines
Waste Water	- Discharge water from distillation -Washing water -WWTP	1. Systematic operation of WWTP 2. Regular monitoring and control of discharge water from WWTP
Noise	-Crushing raw materials -Driving machines and washing	1. Carrying out regular maintenance works so that unnecessary mechanical noise could be prevented 2. Providing ear muffs for workers at high noise area 3. Supervising regular use of ear muffs at high noise area
Emission to air	-Boiler emission - CO ₂ emissions	1. Systematic Operation of Boiler 2. Carrying out regular ambient air quality monitoring
Heat	-Contact with cooker -Boiler	1. Providing necessary PPE for workers working at wort kettle and boiler 2. Regular inspection and supervision of the use of PPE

Solid Waste	<ul style="list-style-type: none"> -Cleaning raw materials - Crushing raw materials - Screening raw materials - Yeast waste - Boiler ash -Sludge from fermentation, distillation and WWTP 	<ol style="list-style-type: none"> 1. Disposing the boiler ash systematically at designated waste disposal site 2. Systematic disposal of non-recycle waste at waste disposal site provided by YCDC 3. Recycle waste and animal feed licensed waste collector for animal feed
Physical hazard	<ul style="list-style-type: none"> -Unloading from truck -Ergonomic injury from overweight lifting -Fall and slip -Fall from height -Contact with moving machinery -Contact with cooker 	<ol style="list-style-type: none"> 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Educating workers with workplace safety practices 4. Regular inspection and supervision for following workplace safety practices
Chemical hazard	<ul style="list-style-type: none"> - Contact with enzymes - Contact with cleaning reagent, acid and caustic 	<ol style="list-style-type: none"> 1. Carrying out preventive measures for hazard from chemicals and related materials
Vehicle hazard	<ul style="list-style-type: none"> -Loading to/Unloading from truck 	<ol style="list-style-type: none"> 1. Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within plant compound 2. Installing and regular maintenance of back gear warning alarm in every vehicle 3. Regular maintenance of vehicles
Dust	<ul style="list-style-type: none"> - Cleaning raw materials - Crushing raw materials - Screening raw materials - Loading to hopper 	<ol style="list-style-type: none"> 1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Regular sweeping of material handling areas

Table 73. Assessment of the Significance of the Impacts with MEMs

Sr.	Impact	Severity	Duration	Spatial Scope	Frequency	Probability	Total Rating	Significance Level
1	Fire hazard	3	4	2	5	2	63	Low-Medium
2	Soil erosion	2	5	3	4	2	60	Low-Medium
3	Waste water	2	4	3	4	2	42	Low
4	Noise	1	4	2	5	2	49	Low
5	Emission to air	2	4	1	5	2	49	Low
6	Heat	2	4	1	5	2	49	Low
7	Solid waste	2	4	1	4	2	49	Low
8	Physical hazard	2	4	1	4	2	42	Low
9	Chemical hazard	2	4	1	4	2	42	Low
10	Vehicle hazard	2	4	2	4	2	48	Low
11	Dust	2	4	1	4	2	42	Low

5.2 Management and Monitoring Plan

Management and Monitoring Plans are to address and satisfy directly for all applicable environmental management and monitoring issues which are

1. Fire hazard
2. Soil Erosion
3. Waste water
4. Noise
5. Emission to air
6. Heat
7. Solid waste
8. Physical hazard
9. Chemical hazard
10. Vehicle hazard
11. Dust
12. Impact on CSH
13. Impact from Decommissioning

5.2.1 Fire Hazard

Common ignition sources include improper or poorly maintained electrical equipment and function of grain-moving machinery. Boiler is also associated with fire hazard. GRGICL Company Limited is organized a firefighting team within the plant for the plant.

Table 74. Objective and Legal Requirements for Fire Hazard

1	Objectives	To prevent and reduce fire hazard by the implementation of a systematic management and monitoring plan
2	Legal Requirements	1. Myanmar Fire Brigade Law Paragraph (14 C, 25)
3	Mitigation Measure	1. Providing necessary equipment for fire fighting
		2. Organizing a fire fighting team

Table 75. Management Actions for Fire Hazard

Sr.	Mitigation Measures	Management Actions
1	Providing necessary equipment for fire fighting	1. Providing adequate fire extinguishers at necessary places
		2. Regular inspection of fire hydrants
2	Organizing a firefighting team	1. Organizing a firefighting team with the guidance of relevant firefighting department
		2. Providing firefighting trainings
		3. Conducting regular fire drill

Table 76. Implementation Plan for Fire Hazard

Sr.	Management Action	Frequency	Duration	Responsibility
1	Providing adequate fire extinguishers at necessary places	Once/ annual recheck	Factory life	Fire Safety Dept
2	Regular inspection of fire hydrants	Annually	Factory life	Fire Safety Dept
3	Organizing a firefighting team with the guidance of relevant firefighting department	Once/ annual reform	Factory life	Fire Safety Dept
4	Providing firefighting trainings	Once	Factory life	Fire Safety Dept
5	Conducting regular fire drill	Quarterly	Factory life	Fire Safety Dept

Table 77. Monitoring plan for Fire Hazard

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Providing adequate fire extinguishers at necessary places	Plant compound	Monthly	Inspection and review	Fire Safety Dept

2	Regular inspection of fire hydrants	Plant compound	Annually	Third Party Inspection	Fire Safety Dept
3	Organizing a firefighting team	Firefighting team - admin records	Annually	Inspection	Fire Safety Dept
4	Providing firefighting trainings	Training records	Annually	Inspection and review	Fire Safety Dept
5	Conducting regular fire drill	Firefighting team - admin records	Annually	Inspection and review	Fire Safety Dept

Table 78. Projected Budget for OSH

Sr.	Management Actions	Budget
1	Providing adequate fire extinguishers at necessary places	300,000/yr
2	Regular inspection of fire hydrants	500,000/yr
3	Organizing a firefighting team	500,000/yr
4	Providing firefighting trainings	100,000/yr
5	Conducting regular fire drill	300,000/yr

5.2.2 Soil Erosion

The storage of fuels can cause the leakage or accidentally releases from tanks, and pipes during loading of fuel and driving machines. The storage of fuel can also be the risk of fire, soil erosion and explosion due to the flammable and combustible nature of the materials stored.

Table 79. Objective and Legal Requirements for Soil Erosion

1	Objectives	To carry out safety for petroleum and petroleum product activities without environmental impacts
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2	Legal Requirements	1. Petroleum and petroleum products law paragraph (11,12, 16, 17, 18)
3	Mitigation Measure	1. Systematic storage of fuel 2. Regular inspections of fuel storage materials 3. Systematic operation of driving machines and engines 4. Regular inspections and monitoring of driving machines and engines

Table 80. Management Actions for Soil Erosion

Sr.	Mitigation Measures	Management Actions
1	Systematic storage of fuel	1. Fuels should be stored with concrete fuel storage tank
2	Regular inspections of fuel storage materials	1. Regular inspections of fuel storage materials for oil leakage
3	Systematic operation of driving machines and engines	1. Educating the employees for the systematic operation of driving machines and engines
4	Regular inspections of driving machines and engines	1. Regular inspections and monitoring of driving machines and engines

Table 81. Implementation Plan for Soil Erosion

Sr.	Management Action	Frequency	Duration	Responsibility
1	Fuels should be stored with concrete fuel storage tank	Once/ annual recheck	Project operation life	Operation Manager
2	Regular inspections of fuel storage materials for oil leakage	Daily	Project operation life	GM
3	Educating the employees for the systematic	Once	Project operation life	Management Officer

	operation of driving machines and engines			
4	Regular inspections and monitoring of driving machines and engines	Daily	Project operation life	Management Officer

Table 82. Monitoring Plan for Soil Erosion

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Fuels should be stored with concrete fuel storage tank	Plant compound	Once/ annual recheck	Implementing	Operation Manager
2	Regular inspections of fuel storage materials for oil leakage	Plant compound Records	Daily	Visual inspection	GM
3	Educating the employees for the systematic operation of driving machines and engines	Records	Once	Inspection and recheck	Management Officer
4	Regular inspections and monitoring of driving machines and engines	Plant compound Records	Daily	Inspection and review	Management Officer

Table 83. Projected Budget for Soil Erosion

Sr.	Management Actions	Budget
1	Fuels should be stored with concrete fuel storage tank	5,000,000
2	Regular inspections of fuel storage materials for oil leakage	-

3	Educating the employees for the systematic operation of driving machines and engines	-
4	Regular inspections and monitoring of driving machines and engines	-

5.2.3 Waste Water

Waste water from Yangon Distillery Plant (GRGICL) was discharged water from distillation, washing water and water from WWTP. Grand Royal Group International Plant installed CIP system which use caustic and cleaning agent to clean fermenters, tanks, vessels, pipe lines and other parts of the plant. The whole system is controlled from computerized central control station. Literally every part of the plant subjected to cleaning is connected with the CIP system. Wash water from the CIP system and discharged water from all sections are discharged to waste water treatment plant. Primary treatment method is aeration which can reduce the waste water of COD 60100 to the acceptable level of 58 as per laboratory analysis results. GRGICL was installed online monitoring system to control discharge waste water quality. Daily discharge waste water quality of the effluent of online monitoring system from September to December 2019 is shown in the Table 87.

Table 84. Objective and Legal Requirements for Waste Water Treatment

1	Objectives	To carry out operation and maintenance of existing waste water treatment system so that treated water is in compliance with NEQG guideline values
2	Legal Requirements	1. Environmental Conservation Law Paragraph (14, 15) 2. NEQG Paragraph (2.3.1.8)
3	Mitigation Measure	1. Systematic operation of WWTP 2. Regular monitoring and control of discharge water from WWTP

Table 85. Management Actions for Waste Water Mitigations

Sr.	Mitigation Measures	Management Actions
1	Systematic operation of WWTP system	Systematic Operation and maintenance of the waste water treatment system so treated waste water is in compliance with NEQG guidelines value

2	Regular monitoring and control of discharge water from WWTP	Regular monitoring of waste water
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Table 86. Implementation Plan for Waste Water Treatment

Sr.	Management Action	Frequency	Duration	Responsibility
1	Systematic Operation and maintenance of the waste water treatment system so treated waste water is in compliance with NEQG guidelines value	Daily	Factory life	Waste Water Treatment Dept
2	Regular monitoring of waste water	Daily	Factory life	Waste Water Treatment Dept

Table 87. Monitoring Plan for Waste Water Treatment

Sr.	Parameter	Location	Frequency	Responsibility
1	5- day Biochemical Oxygen Demand	Final discharge from WWTP	Monthly	D&D Dept
2	Chemical Oxygen Demand (COD)	Final discharge from WWTP	Daily	D&D Dept
3	pH	Final discharge from WWTP	Daily	D&D Dept
4	Total Coliform bacteria	Final discharge from WWTP	Monthly	D&D Dept
5	Total Suspended solids	Final discharge from WWTP	Weekly	D&D Dept
6	Total Nitrogen	Final discharge from WWTP	Weekly	D&D Dept
7	Total Phosphorous	Final discharge from WWTP	Weekly	D&D Dept
8	Oil and Grease	Final discharge from WWTP	6 Monthly	D&D Dept

Table 88. Effluent Waste Water Quality from Online Monitoring System of GRGICL

Date	Average pH	Average TSS (mg/l)	Average BOD (mg/l)	Average COD (mg/l)
12.9.2019	7.94	4.7	37.1	92.9
13.9.2019	7.9	11.1	42.3	105.8
14.9.2019	7.8	11.9	41.9	104.7
15.9.2019	7.8	10.7	42.8	106.9
16.9.2019	7.8	7.4	42.9	107.3
17.9.2019	7.9	7.5	47.1	118.1
18.9.2019	8.0	6.4	46.2	115.6
19.9.2019	7.9	7.6	45.8	114.5
20.9.2019	7.9	7.6	46.6	116.5
21.9.2019	8.1	8.4	46.3	104.1
22.9.2019	8.1	8.7	45.4	113.6
23.9.2019	7.9	8.9	48.8	122
24.9.2019	7.86	8.4	50.2	126.4
25.9.2019	7.9	20	49	122.5
26.9.2019	8	8.1	48.3	120.6
27.9.2019	8	8	47.2	118.1
28.9.2019	7.8	8.4	45.2	113.6
29.9.2019	7.8	8.2	43.9	110
30.9.2019	7.7	7	43.3	108.8
1.10.2019	7.9	7.3	44.1	110.3
2.10.2019	7.8	8	44.1	110.4
3.10.2019	7.8	8.2	43.7	109.5
4.10.2019	7.8	8.6	43.3	108.1
5.10.2019	7.8	7.4	42.1	105.3
6.10.2019	7.7	8.6	42.2	105.5
7.10.2019	8,2	6.2	42	104.9
8.10.2019	7.9	7.04	44.1	110.2
9.10.2019	8	5.56	43.1	107.8
10.10.2019	8	5.5	41.7	104.3

11.10.2019	8	5.9	42.7	106.7
12.10.2019	7.8	5.7	42.8	107.1
13.10.2019	7.8	6.6	42.9	107.4
14.10.2019	7.8	6.5	41.5	103.7
15.10.2019	8	4.4	40.5	101.3
16.10.2019	7.8	5.03	40.7	101.9
17.10.2019	8	10	45.3	126.8
18.10.2019	8.3	10	54	134.9
19.10.2019	8	6.2	52.7	131.8
20.10.2019	8.2	4.4	48.6	121.6
21.10.2019	8	13.2	52.1	130.2
22.10.2019	8	25.4	53.6	134.1
23.10.2019	8	8.6	50.8	127
24.10.2019	7.7	7	48.4	120.9
25.10.2019	7.8	10.8	50.8	127.2
26.10.2019	7.9	8.2	50.3	125.7
27.10.2019	8.1	7.5	50.2	125.7
28.10.2019	8	6.8	50.4	126
29.10.2019	8	9	50	125
30.10.2019	7.8	8.7	47.8	118.6
31.10.2019	7.9	6.1	45.3	113.2
1.11.2019	7.9	8.4	48.4	121.1
2.11.2019	7.8	8.5	49.4	111.1
3.11.2019	7.9	7.3	49.5	123.7
4.11.2019	8	8.5	49.5	123.8
5.11.2019	8	9	49.5	123.7
6.11.2019	7.9	8	49.3	123
7.11.2019	8	8.2	48.5	121
8.11.2019	8	7.5	48.3	121
9.11.2019	8	8.9	53.6	133.2
10.11.2019	8	9.1	67.1	127.5
11.11.2019	8	8.4	49.8	124.5

12.11.2019	8	8	49.1	122.7
13.11.2019	8.3	7.6	48.3	121.7
14.11.2019	8.3	6.2	46.7	115.6
15.11.2019	8.3	3.6	44.3	110.7
16.11.2019	7.8	8.9	50.6	126.5
17.11.2019	7.9	8.6	50	125
18.11.2019	8	5.9	49.3	123.8
19.11.2019	7.7	13	51.7	129
20.11.2019	7.8	12.8	51.7	129.3
21.11.2019	7.9	12.8	51.7	129.3
22.11.2019	7.8	16.1	51.9	129.7
23.11.2019	7.8	7.3	52.2	129.9
24.11.2019	7.9	6.1	53.1	132.9
25.11.2019	7.9	7.9	52.7	131.7
26.11.2019	7.9	8.6	53	132.4
27.11.2019	8	8.8	54	134.9
28.11.2019	8.1	9.1	54.5	136.2
29.11.2019	8.1	9.5	54	134.7
30.11.2019	7.9	7.6	53.7	122.2
1.12.2019	7.9	8.5	53.4	133.6
2.12.2019	7.8	5.9	54.2	135.6
3.12.2019	8.2	3.4	53.7	134.3
4.12.2019	8.1	8.8	53.8	134.4
5.12.2019	8.1	1.4	51.1	127.6
6.12.2019	8	8	56.8	138
7.12.2019	8.1	4.8	58.3	145.8
9.12.2019	7.9	9.9	55.7	139
10.12.2019	8.4	4.2	57.7	145.5
11.12.2019	7.8	9.7	57.3	143.8
12.12.2019	7.7	6.6	29	72.1
13.12.2019	7.9	7.4	37.4	92.1
14.12.2019	8	14.5	56.9	142.7

16.12.2019	8	9.3	46.1	115.5
17.12.2019	8	8	46.2	115.7
18.12.2019	7.8	9.7	45	112.5
19.12.2019	7.9	6.2	45.8	114.4
20.12.2019	7.9	7.2	46.3	116.1
21.12.2019	7.8	7.3	47.3	117.6
22.12.2019	7.9	6.1	48.4	120.9
23.12.2019	7.8	7.2	49.8	124.6
24.12.2019	7.9	10.2	47.4	118.45
NEQG Guideline Value	6-9	50	50	250

Table 89. Projected Budget for Waste Water Treatment

Sr.	Management Actions	Budget
1	Systematic Operation and maintenance of the waste water treatment	12,000,000/yr
2	Regular monitoring of waste water	2,000,000/yr

5.2.4 Noise

Most parts of the distillery plant are subjected to noise. High noise areas are milling. Workers working in these areas are needed to provide with necessary PPE such as earmuffs.

Table 90. Objective and Legal Requirements for Noise

1	Objectives	To prevent and reduce occupational hazard from noise by implementing a systematic management plan
2	Legal Requirements	1. NEQG paragraph (1.3)
3	Mitigation Measure	1. Carrying out regular maintenance works so that unnecessary mechanical noise could be prevented 2. Providing ear muffs for workers at high noise area 3. Supervising regular use of ear muffs at high noise area

Table 91. Management Actions for Noise

Sr.	Mitigation Measures	Management Actions
1	Carrying out regular maintenance works	1. Carrying out regular noise level measurement
		2. Carrying out annual overall maintenance work
		3. Checking workplace daily
2	Providing ear muffs for workers at high noise area	1. Providing ear muffs for workers at high noise areas
3	Supervising regular use of ear muffs at high noise area	1. Regular inspection and supervision for wearing ear muffs at high noise areas

Table 92. Implementation Plan for Noise

Sr.	Management Action	Frequency	Duration	Responsibility
1	Carrying out noise level measurement regularly	Monthly	Factory life	Plant Manager
2	Carrying out annual overall maintenance work	Annually	Factory life	Plant Manager
3	Checking workplace daily	Daily	Factory life	Plant Manager
4	Providing ear muffs for workers	Biannually	Factory life	Admin Dept
5	Regular inspection and supervision for wearing ear muffs	Daily	Factory life	Plant Manager

Table 93. Monitoring Plan for Noise

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Noise level	12 locations within plant compounds	Quarterly	Handheld noise level meter	Plant Manager

2	Maintenance record	The whole plant	4 times per year	Inspection	Plant Manager
3	Checking workplace daily	The whole plant	Daily	Visual Inspection	Plant Manager
4	Providing earmuffs	Workers at high noise area	Whenever required	Inspection	Admin Dept
5	Regular inspection of general conditions of ear muffs	Workers at high noise area	Daily	Visual Inspection	Plant Manager
6	Regular inspection and supervision for wearing ear muffs at high noise areas	Workers at high noise area	Daily	Visual Inspection	Plant Manager

Table 94 . Projected Budget for Noise

Sr.	Management Actions	Budget
1	Regular noise level measurement at workplaces	100,000
2	Carrying out annual overall maintenance work	5,000,000/yr
3	Checking workplace daily	-
4	Providing earmuffs	100,000/yr
5	Regular inspection and supervision for wearing ear muffs at high noise areas	-

5.2.5 Emission to Air

There are two main sources of emission from the plant: boiler emission, CO₂ emission from fermenters and WWTP. Yangon Distillery Plant (GRGICL) use 10 tons of saturated boiler which run on solid fuel. Since the GRGICL is dust collector, the monitoring points for the Yangon Distillery Plant is enough for the air quality impact caused by factory operation activities.

Table 95. Objective and Legal Requirements for Air Quality

1	Objectives	To provide a regular air quality monitoring and gas leakage detection system
2	Legal Requirements	1. Environmental Conservation Law Paragraph (14, 15) 2. NEQG Paragraph (1.1)
3	Mitigation Measure	1. Systematic Operation of Boiler 2. Carrying out regular ambient air quality monitoring 3. Systematic operation of WWTP 4. Regular monitoring and maintenance of WWTP

Table 96. Management Actions of Impact on Air Quality

Sr.	Mitigation Measures	Management Actions
1	Systematic Operation of Boiler	1. Relevant certificate for boiler and boiler operators from boiler relevant department 2. Disposing the boiler ash systematically at designated waste disposal sites
2.	Carrying out regular ambient air quality monitoring	1. Carrying out regular ambient air quality monitoring
3.	Systematic operation of WWTP	Systematic Operation and maintenance of the waste water treatment system so treated waste water is in compliance with NEQG guidelines value
4.	Regular monitoring and maintenance of WWTP	Regular monitoring of waste water

Table 97. Implementation Plan of Impact on Air Quality

Sr.	Management Action	Frequency	Duration	Responsibility
1	Relevant certificate for boiler and boiler operators from boiler relevant department	Once	Factory life	HSE Dept

2	Disposing the boiler ash systematically at designated waste disposal sites	Weekly	Factory life	M&E Dept
3	Carrying out regular ambient air quality monitoring	Quarterly	Factory life	HSE Dept
4	Systematic Operation and maintenance of the waste water treatment system so treated waste water is in compliance with NEQG guidelines value	Daily	Factory life	Waste Water Treatment Dept
5	Regular monitoring and maintenance of waste water	Daily	Factory life	Waste Water Treatment Dept

Table 98. Monitoring Plan of Impact on Air Quality

Sr.	Parameter	Location	Frequency	Responsibility
1	Nitrogen dioxide	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept
2	Ozone	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept
3	PM ₁₀	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept
4	PM _{2.5}	Within plant compound at 17° 1'23.60"N	Bi-annually	HSE Dept

		96° 4'34.28"E		
5	Sulfur dioxide	Within plant compound at 17° 1'23.60"N 96° 4'34.28"E	Bi-annually	HSE Dept

Table 99. Emission Gas and Dust Management System of GRGICL

Sr	Emission/ Waste	Mitigation Measures from EIA Report (2014)	Status
1	Odor from waste water Treatment	By treating waste water with process (1) solid liquid separation (2) evaporation system and the bacterial action of digesting the organic matter in the anaerobic and (3) aerobic lagoon (4) polishing process and filtration process all treated water pass through the online discharge treated water station. make measure all parameters (COD, BOD, TSS, PH)	Already implemented
2	Odor from fermentation	Installation of CO ₂ scrubber	Finished
3	Dust and Crushed grain	Dust catching filter bags system 2 nos has been installed	Finished
5	CO ₂ from fermentation	To use CO ₂ scrubber with water and recycled	Finished
6	Methane from waste water plant	To use biogas as fuel in boiler	Finished
7	Emissions from boiler	Installation of dust collector and SO ₂ scrubber in boiler chimney	Finished

8	Emissions from DG sets	A safe stack height of 6 meters above the roof top should be provided for each D.G sets. Proper regular maintenance	Finished
9	Centralized waste water treatment system for distillery plants and bottling plant	by treating waste water with process (1) solid liquid separation (2) evaporation system and the bacterial action of digesting the organic matter in the anaerobic and (3) aerobic lagoon (4) polishing process and filtration process all treated water pass through the online discharge treated water station. make measure all parameters (COD, BOD, TSS, PH)	Finished but continual improvement to maintain the process
10	Boiler ash	Boiler ash is reuse village road filling. Some are disposing in internal located area	
11	Energy consumption	To make energy conservation program for reducing energy requirements. Plan proper maintenance and install efficient energy saving device and yearly make Kaizen factorys	Finished, make continual improvement and also DJSI (Dow jones sustainability index)
12	Water consumption	(a) Reducing process water use, (b) Reducing cleanup water use, and(c) Minimizing domestic water consumption. yearly make Kaizen factorys	Finished, make continual improvement and also DJSI (Dow jones sustainability index)

Table 100. Projected Budget of Impact on Air Quality

Sr.	Management Actions	Budget
1	Relevant certificate for boiler and boiler operators from boiler relevant department	-
2	Disposing the boiler ash systematically at designated waste disposal sites	-
3	Carrying out regular ambient air quality monitoring	2,000,000/yr

5.2.6 Heat, Physical and Vehicle Hazard

Prevention and reduction of occupational hazard by the implementation of a systematic OSH management plan is a must for every factory. Grand Royal Group International Co., Ltd will carry out the Occupational Safety and Health management plan systematically.

Table 101. Objective and Legal Requirements for Heat, Physical and Vehicle Hazard

1	Objectives	To prevent and reduce occupational hazard by the implementation of a systematic OSH management and monitoring plan
2	Legal Requirements	1. Myanmar Fire Brigade Law Paragraph (14 C, 25) 2. 1951 Factory Act (Chapter 3, Chapter 4)
3	Mitigation Measure	1. Providing necessary PPE for workers working at wort kettle and boiler 2. Regular inspection and supervision of the use of PPE 3. Educating workers with workplace safety practices 4. Regular inspection and supervision for following workplace safety practices 5. Setting, educating, monitoring and control of a vehicle speed limit of 15 km/hr within plant compound 6. Installing and regular maintenance of back gear warning alarm in every vehicle 7. Regular maintenance of vehicles

Table 102. Management Actions for Heat, Physical and Vehicle Hazard

Sr.	Mitigation Measures	Management Actions
1	Providing necessary PPE for workers working at wort kettle and boiler	1. Providing hand gloves for workers working at wort kettle and boiler for heat protection
2	Regular inspection and supervision of the use of PPE	1. Regular inspection and supervision of the use of PPE
3	Educating workers with workplace safety practices	1. Providing necessary OSH training as shown in Table 80
4	Regular inspection and supervision for conforming workplace safety practices	1. Daily inspection and supervision for conforming workplace safety practices
5	Setting, educating, monitoring and control of a vehicle speed limit of 10 km/hr within plant compound	1. Setting vehicle speed limit of 10 km/hr within plant compound
		2. Educating drivers for safe driving practice within drive compound
		3. Monitoring and control of the vehicle speed limit of 15 km/hr within plant compound
6	Installing back gear warning alarm in every vehicle	1. Installing of back gear warning alarm in every vehicle
7	Regular maintenance of vehicles	1. Carrying out regular maintenance of vehicles

Table 103. Implementation Plan for Heat, Physical and Vehicle Hazard

Sr.	Management Action	Frequency	Duration	Responsibility
1	Providing hand gloves for workers working at wort kettle and boiler for heat protection	Monthly	Factory life	Admin Dept
2	Regular inspection and supervision of the use of PPE	Daily	Factory life	HSE Dept

3	Providing necessary OSH training as shown in Table 80	Annually	Factory life	HSE Dept
4	Daily inspection and supervision for conforming workplace safety practices	Daily	Factory life	HSE Dept
5	Setting vehicle speed limit of 15 km/hr within plant compound	Once	Factory life	Maintenance Dept
6	Educating drivers for safe driving practice within drive compound	Once	Factory life	Maintenance Dept
7	Monitoring and control of the vehicle speed limit of 15 km/hr within plant compound	Daily	Factory life	Maintenance Dept
8	Installing of back gear warning alarm in every vehicle	Once	Factory life	Maintenance Dept
9	Carrying out regular maintenance of vehicles	Monthly	Factory life	Maintenance Dept

Table 104. Monitoring Plan for Heat, Physical and Vehicle Hazard

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Providing hand gloves for workers working at wort kettle and boiler for heat protection	- Workers contacting with kettle and boiler - Admin Record	Monthly	Inspection	Admin Dept

2	Regular inspection and supervision of the use of PPE	Workers within the plant compound	Daily	Inspection	HSE Dept
3	Providing necessary OSH training as shown in Table 80	Training record	Annually	Inspection	HSE Dept
4	Daily inspection and supervision for conforming workplace safety practices	Workers within the plant compound	Daily	Inspection	HSE Dept
5	Setting vehicle speed limit of 15 km/hr within plant compound	Vehicles within the plant compound	Daily	Inspection	Maintenance Dept
6	Educating drivers for safe driving practice within drive compound	Drivers within the plant compound	Once	Inspection	Maintenance Dept
7	Monitoring and control of the vehicle speed limit of 15 km/hr within plant compound	Vehicles within the plant compound	Daily	Inspection	Maintenance Dept
8	Installing of back gear warning alarm in every vehicle	Every vehicle at the plant	Once	Inspection	Maintenance Dept
9	Carrying out regular maintenance of vehicles	Every vehicle at the plant	Monthly	Inspection	Maintenance Dept

Table 105. Projected Budget for Heat, Physical and Vehicle Hazard

Sr.	Management Actions	Budget
1	Providing hand gloves for workers working at wort kettle and boiler for heat protection	100,000/yr
2	Regular inspection and supervision of the use of PPE	-
3	Providing necessary OSH training as shown in Table 80	500,000/yr
4	Daily inspection and supervision for conforming workplace safety practices	-
5	Setting vehicle speed limit of 15 km/hr within plant compound	-
6	Educating drivers for safe driving practice within drive compound	-
7	Monitoring and control of the vehicle speed limit of 15 km/hr within plant compound	-
8	Installing of back gear warning alarm in every vehicle	600,000
9	Carrying out regular maintenance of vehicles	3,000,000/yr

5.2.7 Solid Waste

Solid waste generative can be divided into three types as non-recycle waste, recycle waste and animal feed. Non-recycle wastes are landfilled at the municipal specified area in final disposal site. Recycle waste and animal feed are collected by licensed waste collectors. The following solid wastes are generated from Yangon Distillery Plant (GRGICL) by keeping daily record and sell or dispose depend on the waste type.

- (1) Spent wash from distillation column
- (2) Office waste
- (3) Canteen waste
- (4) Coal sludge waste
- (5) Metal scraps or damage equipment

Table 106. Solid Waste Generation and Management

Sr.	Waste Type	Management Systems
1	Spent wash from distillation column	Sent to solid liquid separation unit, take out solid and sell as animal food. Selling process is yearly called tender and contract with buyer.
2	Office waste	Collect solid waste as two types (biodegradable and non -biodegradable). Some are use as recycle and reused or sell to buyer. Non-applicable waste is sent to municipal waste area by municipal disposal license or sent to waste to energy plant.
3	Canteen waste	Sell to buyer for pig food.
4	Coal sludge waste	It is used as road filling material in flooded plant area and give village asked for road filling. Some are kept in boiler solid waste area.
5	Metal scraps or damage equipment	It is collected and take write out order approved by management team. Call buyer and sell it.
6	Solid waste from distillery process wastes	Now selling the wet cake as fish feed and use digested sludge as fertilizer in plant gardening
7	Domestic waste	Following the ISO 14001 and DJSI (Downjone sustainability index)

Table 107. Objective and Legal Requirements for Solid Wastes

1	Objectives	To prevent and reduce environmental impacts from solid waste by providing a systematic management plan
2	Legal Requirements	1. Environmental Conservation Law Paragraph (14, 15) 2. 1951 Factory Act Paragraph (14A)
3	Mitigation Measure	1. Disposing the boiler ash systematically at designated waste disposal site

		2. Systematic disposal of non-recycle waste at waste disposal site provided by YCDC at final disposal site 3. Recycle waste and animal feed licensed waste collector for animal feed
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Table 108. Management Actions for Solid Wastes

Sr.	Mitigation Measures	Management Actions
1.	Disposing the boiler ash systematically at designated waste disposal site	1. Dumping boiler ash at designated area
		2. Regular inspection of ash disposal site
		3. Maintenance of boiler ash disposal site for tidiness and dust suppression requirements
2	Systematic disposal of non-recycle waste at waste disposal site provided by YCDC	1. Systematic disposal of 100 tons per month of non-recycle waste at waste disposal site provided by YCDC
3	Recycle waste and animal feed licensed waste collector for animal feed	1. Recycle waste and animal feed (30-40) tons per day are collected by licensed waste collector for animal feed

Table 109. Implementation Plan for Solid Wastes

Sr.	Management Action	Frequency	Duration	Responsibility
1	Dumping boiler ash at designated area	Daily	Factory life	Boiler Dept
2	Regular inspection of ash disposal site	Daily	Factory life	Boiler Dept
3	Maintenance of boiler ash disposal site for tidiness and dust suppression requirements	Weekly	Factory life	Maintenance Dept
4	Systematic disposal of 100 tons per month of non-recycle waste at	Daily	Factory life	CFD & WWT Dept

	waste disposal site provided by YCDC			
5	Recycle waste and animal feed (30-40) tons per month are collected by licensed waste collector for animal feed	Daily	Factory life	CFD & WWT Dept

Table 110. Monitoring Plan for Solid Wastes

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Dumping boiler ash at designated area	Disposal site	Daily	Inspection	Boiler Dept
2	Regular inspection of ash disposal site	Inspection record	Daily	Inspection	Boiler Dept
3	Maintenance of boiler ash disposal site for tidiness and dust suppression requirements	Maintenance record	Weekly	Inspection	Maintenance Dept
4	Systematic disposal of non-recycle waste at waste disposal site provided by YCDC	Cullet plant	Daily	Inspection	CFD & WWT Dept
5	Recycle waste and animal feed (30-40) tons per month are collected by licensed waste collector for animal feed	Cullet plant	Daily	Inspection	CFD & WWT Dept

Table 111. Projected Budget for Solid Wastes

Sr.	Management Actions	Budget
1	Dumping boiler ash at designated area	-
2	Regular inspection of ash disposal site	-
3	Maintenance of boiler ash disposal site for tidiness and dust suppression requirements	300000/yr
4	Systematic disposal of non-recycle waste at waste disposal site provided by YCDC	7,200,000/yr
5	Recycle waste and animal feed licensed waste collector for animal feed	-

5.2.8 Chemical Hazard

CO₂ is hazardous in two ways: either by displacing O₂, leading to rapid asphyxiation, or as a toxin in its own. Exposure to 0.5% volume CO₂ represents a toxic hazard while concentrations greater than 10% volume can lead to death. CO₂ is odourless and colourless and no physical indication of danger could be observed until it is usually too late.

CO₂, which is a by-product of the fermentation and waste water treatment process is heavier than air. It collects at the bottom of containers and confined spaces and can even spill out of fermenting tanks and WWTP.

Table 112. Objective and Legal Requirements for Chemical Hazard

1	Objectives	To prevent and reduce harmful effect of chemical and related materials on workers and environment
2	Legal Requirements	1. Environmental Conservation Law Paragraph (14, 15) 2. Prevention from the Hazard of Chemicals and Related Materials Law Paragraph (15 B, 16 B, 16 C, 16 D, 16 H, 16 K)
3	Mitigation Measure	1. Carrying out preventive measures for hazard from chemicals and related materials

Table 113. Management Actions for Chemical Hazard

Sr.	Mitigation Measures	Management Actions
1	Carrying out preventive measures for hazard from chemicals and related materials	1. Sending appropriate employers to prevention of hazards from chemicals and related materials training provided by relevant government departments
		2. Providing necessary PPE for workers handling chemicals
		3. Providing training for systematic use of PPE
		4. Regular inspection and supervision of the use of PPE

Table 114. Implementation Plan for Chemical Hazard

Sr.	Management Action	Frequency	Duration	Responsibility
1	Sending appropriate employers to prevention of hazards from chemicals and related materials training provided by relevant government departments	Once	Factory life	Plant Manager
2	Providing necessary PPE for workers handling chemicals	Whenever required	Factory life	HSE Dept
3	Providing training for systematic use of PPE	Once	Factory life	HSE Dept
4	Regular inspection and supervision of the use of PPE	Daily	Factory life	HSE Dept

Table 115. Monitoring Plan for Chemical Hazard

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Sending appropriate employers to prevention of hazards from chemicals and related materials training	Training records	Once	Inspection	Plant Manager
2	Providing necessary PPE for workers handling chemicals	- Workers - Record	Annual	Inspection	HSE Dept
3	Providing training for systematic use of PPE	Training record	Once	Inspection	HSE Dept
4	Regular inspection and supervision of the use of PPE	Admin record	Daily	Inspection	HSE Dept

Table 116. Projected Budget for Chemical Hazard

Sr.	Management Actions	Budget
1	Sending appropriate employers to prevention of hazards from chemicals and related materials training provided by relevant government departments	300,000/yr
2	Providing necessary PPE for workers handling chemicals	300,000/yr
3	Providing training for systematic use of PPE	-
4	Regular inspection and supervision of the use of PPE	-

5.2.9 Dust

Impact on air quality by dust and particulate emissions occurs at raw material handling, unloading and preparation area. Type of dust is mostly broken rice dust.

Minimal requirement such as wearing necessary PPE (mask and hand glove) and carrying out regular sweeping at the area have to be carried out.

Table 117. Objective and Legal Requirements for Dust

1	Objectives	To provide adequate dust and particulate control system so that occupational health hazard relating to dust is minimal
2	Legal Requirements	1. Environmental Conservation Law Paragraph (14, 15) 2. NEQG Paragraph (1.1)
3	Mitigation Measure	1. Providing necessary PPE for workers 2. Regular inspection and supervision of the use of PPE 3. Regular sweeping of material handling areas

Table 118. Management Actions for Dust

Sr.	Mitigation Measures	Management Actions
1	Providing necessary PPE for workers	1. Providing face mask, hand glove, safety boot and helmet adequately for workers working at material handling areas
2	Regular inspection and supervision of the use of PPE	1. Educating workers about workplace safety practices and use of PPE 2. Regular inspection and supervision of PPE usage
3	Regular sweeping at material handling areas	1. Regular sweeping at material handling areas 2. Regular inspection and supervision of sweeping and cleaning works

Table 119. Implementation Plan of Dust Management

Sr.	Management Action	Frequency	Duration	Responsibility
1	Providing face mask, hand glove, safety boot and helmet adequately for	Bi-annually	Factory life	Admin Dept

	workers working at material handling areas			
2	Educating workers about workplace safety practices and use of PPE	Once	Factory life	Plant Manager
3	Regular inspection and supervision of PPE usage	Weekly	Factory life	Plant Manager
4	Regular sweeping at material handling areas	Weekly	Factory life	CFD Dept
5	Regular inspection and supervision of sweeping and cleaning works	Weekly	Factory life	Plant Manager

Table 120. Monitoring Plan for Dust

Sr.	Parameter	Location	Frequency	Responsibility
1	PM ₁₀	Within plant compound at 17° 1'23.60"N, 96°4'34.28"E	Bi-annually	Plant Manager
2	PM _{2.5}	Within plant compound at 17° 1'23.60"N, 96° 4'34.28"E	Bi-annually	Plant Manager
3	Regular inspection	Within plant compound at 17° 1'23.60"N, 96° 4'34.28"E	Daily	Plant Manager

Table 121. Projected Budget of Dust

Sr.	Management Actions	Budget
1	Providing face mask, hand glove, safety boot and helmet adequately for workers working at material handling areas	600,000/yr
2	Educating workers about workplace safety practices and use of PPE	-
3	Regular inspection and supervision of PPE usage	-
4	Regular sweeping at material handling areas	300,000/yr
5	Regular inspection and supervision of sweeping and cleaning works	-

5.2.10 Impact on Community Safety and Health

Many communities' health and safety impacts during the construction of Yangon Distillery Plant are common to those of most nonhazardous industrial and commercial activities. These impacts include dust, noise, and vibration from construction vehicle and communicable disease and adverse impacts associated with the influx of temporary construction labor. The plant compound is located step aside of the No (4) Main Road and main entrance of the plant is about 100 feet far from the road and the length of the entrance is about 100 feet. The traffic hazard could not be critical but the appropriate mitigation such as conducting awareness program for traffic hazard if necessary. The occupational health and safety plan and activities are described in APPENDIX-M.

Table 122. Objective and Legal Requirements for CSH

1	Objectives	To prevent and reduce occupational hazard by the implementation of a systematic OSH management and monitoring plan
2	Legal Requirements	1. Myanmar Fire Brigade Law Paragraph (14 C, 25) 2. 1951 Factory Act (Chapter 3, Chapter 4)
3	Mitigation Measure	1. Providing systematic vehicle management for incoming and outgoing vehicles 2. All the conveyors/vehicles for the transportation should be covered from all side 3. Conducting awareness program for traffic hazard in local community and drivers so that project related traffic incidents could be prevented or reduced on roads 4. Avoiding high hazard routes and crowded periods in local communities 5. Waste water must be treated in compliance with NEQG Waste water quality standards 6. Provide health care services for local communities

Table 123. Management Actions for CSH

Sr.	Mitigation Measures	Management Actions
1	Providing systematic vehicle management for incoming and outgoing vehicles	1. Providing systematic vehicle management for incoming and outgoing vehicles
2	All the conveyors/vehicles for the transportation should be covered from all side	1. Covered all conveyors/vehicles for the transportation from all side
3	Conducting awareness program for traffic hazard in local community and drivers so that project related traffic incidents could be prevented or reduced on roads	1. Providing awareness training
4	Avoiding high hazard routes and crowded periods in local communities	1. Avoiding high hazard routes and crowded periods in local communities
5	Waste water must be treated in compliance with NEQG Waste water quality standards	1. Compliance with the instruction of waste water impact
6	Provide health care services for local communities	1. Provide health care services yearly for local communities

Table 124. Implementation Plan for CSH

Sr.	Management Action	Frequency	Duration	Responsibility
1	Providing systematic vehicle management for incoming and outgoing vehicles	Weekly	Factory life	Maintenance Dept
2	Covered all conveyors/vehicles for the transportation from all side	Once	Factory life	Maintenance Dept

3	Providing awareness training	Annually	Factory life	Plant Manager
4	Avoiding high hazard routes and crowded periods in local communities	Daily	Factory life	Driver
5	Provide health care services yearly for local communities	Yearly	Factory life	HSE Dept

Table 125. Monitoring Plan for CSH

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Providing systematic vehicle management for incoming and outgoing vehicles	Factory compound	Weekly	Inspection	Maintenance Dept
2	Covered all conveyors/vehicles for the transportation from all side	Vehicles from factory compound	Once	Inspection	Maintenance Dept
3	Providing awareness training	Training record	Annually	Inspection	Plant Manager
4	Avoiding high hazard routes and crowded periods in local communities	Workers within the plant compound	Daily	Inspection	Driver
5	Provide health care services yearly for local communities	Local community	Yearly	Inspection	HSE Dept

Table 126. Projected Budget for CSH

Sr.	Management Actions	Budget
1	Providing systematic vehicle management for incoming and outgoing vehicles	-

2	Covered all conveyors/vehicles for the transportation from all side	-
3	Providing awareness training	-
4	Avoiding high hazard routes and crowded periods in local communities	-
5	Provide health care services yearly for local communities	5,000,000/yr

5.2.11 Impact from Future Work/Decommissioning Work

Air quality from dust and particulate, noise, solid waste generation and occupation safety and health impact can be occurred upon the decommissioning.

Table 127. Impact Mitigations Table

Sr.	Impact	Mitigation/Enhancement Measures
1	Impact on Air Quality by Dust and Particulate	1.Sprayed with water during decommissioning
2	Noise and Vibration from Demolitions	1.High noise decommission work must be avoided the night time 2.Providing necessary PPE for workers at high noise area
3	Solid Waste Generation	1.Disposing the decommissioning solid waste systematically at waste disposal site provided by respective YCDC 2. Disposing the decommissioning solid waste must be separated reuse materials and non-reuse materials.
4	Impact on Occupational Safety and Health (OSH)	1.Providing necessary PPE adequately while the decommissioning

Table 128. Management Action

Sr.	Mitigation Measures	Management Actions
1	Sprayed with water during decommissioning	1. Checking workplace daily

2	High noise decommission work must be avoided the night time	1. Checking workplace daily 2. Carrying out noise to NEQG
3	Providing necessary PPE for workers at high noise area	1. Regular sweeping at material handling areas 2. Regular inspection and supervision of sweeping and cleaning works
4	Disposing the decommissioning solid waste systematically at waste disposal site provided by respective YCDC	1. Negotiation of a waste disposal site with township development committee 2. Disposal of decommissioning solid waste to designated site
5	Disposing the decommissioning solid waste must be separated reuse materials and non-reuse materials	1. Disposing the decommissioning solid waste must be separated reuse materials and non-reuse materials.
6	Providing necessary PPE adequately while the decommissioning	1. Providing necessary PPE adequately while the decommissioning 2. Planning work site layout to minimize the need for manual transfer of heavy loads

Table 129. Implementation Plan

Sr.	Management Action	Frequency	Duration	Responsibility
1	Checking workplace daily for earth work	Daily (for decommissioning)	Decommissioning	Plant Manager
2	Checking workplace daily for high noise	Daily (for decommissioning)	Decommissioning	Plant Manager
3	Carrying out noise to NEQG	Daily (for decommissioning)	Decommissioning	Plant Manager
4	Checking workplace daily for systematic usage of PPE	Daily (for decommissioning)	Decommissioning	Plant Manager
5	Negotiation of a waste disposal site with	Daily (for decommissioning)	Decommissioning	Project Manager

	township development committee			
6	Disposal of decommissioning solid waste to designated site	Daily (for decommissioning)	Decommissioning	Project Manager
7	Disposing the decommissioning solid waste must be separated reuse materials and non-reuse materials.	Daily (for decommissioning)	Decommissioning	Project Manager
8	Providing necessary PPE adequately while the decommissioning	Once	Decommissioning	Admin Dept
9	Planning work site layout to minimize the need for manual transfer of heavy loads	Daily (for decommissioning)	Decommissioning	Plant Manager

Table 130. Monitoring Plan

Sr.	Parameter	Location	Frequency	Method	Responsibility
1	Checking workplace daily for earth work	Admin record	1 Month	Inspection	Plant Manager
2	Checking workplace daily for high noise	Admin record	1 Month	Inspection	Plant Manager
3	Carrying out noise to NEQG	Project compound	1 Month	Inspection	Plant Manager
4	Checking workplace daily for systematic usage of PPE	Admin record	1 Month	Inspection	Plant Manager

5	Negotiation of a waste disposal site with township development committee	Township development Committee	1 Month	Inspection	Project Manager
6	Disposal of decommissioning solid waste to designated site	Admin record	1 Month	Inspection	Project Manager
7	Disposing the decommissioning solid waste must be separated reuse materials and non-reuse materials.	Admin record	1 Month	Inspection	Project Manager
8	Providing necessary PPE adequately while the decommissioning	Admin record	1 Month	Inspection	Admin Dept
9	Planning work site layout to minimize the need for manual transfer of heavy loads	Project compound	1 Month	Inspection	Plant Manager

Table 131. Projected Budget

Sr.	Management Actions	Budget
1	Checking workplace daily for earth work	-
2	Checking workplace daily for high noise	-
3	Carrying out noise to NEQG	-
4	Checking workplace daily for systematic usage of PPE	-
5	Negotiation of a waste disposal site with township development committee	-

6	Disposal of decommissioning solid waste to designated site	-
7	Disposing the decommissioning solid waste must be separated reuse materials and non-reuse materials.	-
8	Providing necessary PPE adequately while the decommissioning	-
9	Planning work site layout to minimize the need for manual transfer of heavy loads	-

5.3 Project Budgets

Projected budget for implementation of EMP management actions and monitoring requirements could be summarized from detailed particulars described in previous section of the report. Yangon Distillery Plant (GRGICL) will allocate 5,700,000 kyats total of one-time cost and 49,000,000 kyat of annual recurring cost for successful implementation and monitoring of the EMP. If the estimated budget isn't enough, Grand Royal Group International Co., Ltd. will be used by adding the enough budgets as necessary.

Table 132. Project Budgets for Implementation and Monitoring of EMP

Sr.	Management Actions	Budget
1	Providing adequate fire extinguishers at necessary places	300,000/yr
2	Regular inspection of fire hydrants	500,000/yr
3	Organizing a firefighting team	500,000/yr
4	Providing firefighting trainings	100,000/yr
5	Conducting regular fire drill	300,000/yr
6	Systematic Operation and maintenance of the waste water treatment	12,000,000/yr
7	Regular monitoring of waste water	2,000,000/yr
8	Regular noise level measurement at workplaces	100,000
9	Carrying out annual overall maintenance work	5,000,000/yr
10	Providing earmuffs	100,000/yr
11	Carrying out regular ambient air quality monitoring	2,000,000/yr

12	Providing necessary OSH training	500,000/yr
13	Providing hand gloves for workers working at wort kettle and boiler for heat protection	100,000/yr
14	Installing of back gear warning alarm in every vehicle	600,000
15	Carrying out regular maintenance of vehicles	3,000,000/yr
16	Maintenance of boiler ash disposal site for tidiness and dust suppression requirements	300000/yr
17	Systematic disposal of non-recycle waste at waste disposal site provided by YCDC	7,200,000/yr
18	Sending appropriate employers to prevention of hazards from chemicals and related materials training provided by relevant government departments	300,000/yr
19	Providing necessary PPE for workers handling chemicals	300,000/yr
20	Providing face mask, hand glove, safety boot and helmet adequately for workers working at material handling areas	600,000/yr
21	Regular sweeping at material handling areas	300,000/yr
22	Fuels should be stored with concrete fuel storage tank	5,000,000
23	Provide health care services yearly for local communities	5,000,000/yr
24	Providing systematic vehicle management for incoming and outgoing vehicles	3,000,000/yr
25	Covered all conveyors/vehicles for the transportation from all side	1,000,000
26	Providing awareness training	500,000/yr
Total One Time Cost		5,700,000
Total Recurring Cost		49,000,000

6 Public Consultation and Disclosure

6.1 Objectives

In order to acquire public opinion on the operation of Yangon Distillery Plant, public consultation works were done firstly disclosing related project information in local community. Public consultation and information disclosure work for Yangon Distillery Plant operation were carried out with the following objectives:

- (a) To disseminate the project information, benefits and disadvantages of the plant to general public so that they could understand the trade-offs;
- (b) To be able to gain meaningful contribution of informed public; and
- (c) To achieve greater trust of general public with the plant proponent by disseminating relevant information.

6.2 Public Consultation Methodology and Approach

6.2.1 Personal Interviews

Personal interviews with local authorities around plant area were exercised to collect their opinion and suggestion. Then, interested persons from local community were consulted firstly disseminating plant information to them and then acquiring their comments and suggestions.

6.2.2 Open Discussion

An agenda was provided for open discussion with local people and representatives from EMP team and plant proponent in both public meetings. Results from these open discussion sessions were shown in later section.

6.2.3 Information Disclosure

(a) Presentation

Representatives from project proponent and EMP teams gave presentations about their respective scope of works before general public in the public meetings.

(b) Translated Executive Summary

After the draft EMP report was compiled, executive summary of the report was translated into Myanmar and the translated documents were delivered to local people and local authorities for their review and comments. The summary was expressed in first section of EMP report.

6.3 Public Consultation Meetings

Public meeting for releasing EMP study results to general public requesting their comments and suggestions on the Yangon Distillery Plant was carried out on 8th December, 2019 at Canteen of GRGICL Plant Compound. There were (50) people from

nearby Leik Poke, Kwin Leik Poke, Upper Thae Kone and Lower Thae Kone villages. Representative from Grand Royal Group International Company Limited gives the information concerned with Yangon Distillery Plant operation and representative from ECCEA(MES) explained EMP processes and participated in open discussion.

6.4 Results from Public Consultation

There was no discussion from local people. But Eight comments and suggestions letters were achieved from public meeting. Suggestion Letters for GRGICL is shown in Appendix H.

6.5 Information Disclosure

Following activities were performed to disseminate the information relating to the Yangon Distillery Plant operation process and EMP works for general public in various stages of EMP works.

- A. Representative from the GRGICL Speaking with the Yangon Distillery Plant operation process and safety procedure of GRGICL in public meeting





B. Representative from ECCEA (MES) Explaining EMP Process to be performed by ECCEA (MES) EMP team and results and finding from EMP study



C. Public Comments and Suggestion

- (a) Open discussion and consultation works were exercised in public meetings but there was no comments and suggestions in open discussion section

D. Dissemination of Results from EMP Studies

- (a) Executive summary of EMP reports translated into Myanmar was delivered to general public in public meeting
- (b) Translated executive summary was also delivered to ward administration office so that local community could be freely accessible

6.6 CSR Activities of Grand Royal Group International Company Limited

(a) For Internal Employees

- Providing training to staff for work place improvement
- Establish ISO 14001 for better controlling our impact on local environment
- Safety training and personal protective equipment is provided to all their employees
- Recognition on achievement with special lunch /dinner
- Yearly April month Buddha donation ceremony
- Provide health training, disease prevention and yearly medical check-up

(b) For Local Communities

Providing based on-

- Educational programs
- Health care and medical check-up program
- Environmental program
- Support sport programs

(c) For University and College Student Training

Provided students from local college and university site visit to understand their commitment to “Green Environment”

- Provided technical training and support for other distilleries on waste water treatment operation
- Permit on on-job training and site study training (2 week and 2 months)

7 Environmental and Social Management Plan

7.1 Environmental Management Team

An Environmental Management Team will be established for successful implementation of the environmental management plan. Grand Royal Group International Company limited is responsible for complete implementation of the EMP and will carry out environmental monitoring programme which is part of the EMP. The team consists of plant manager, project manager, HSE manager and seven head of departments. The objectives of the Environmental Management Team are:

- (a) To assure systematic implementation of EMP throughout project life, and
- (b) To monitor and review effectiveness of EMP regularly

Table 133. Environmental Management Team

Sr.	Representative	Number
1	Plant Manager	1
2	Project Manager	1
3	HSE Manager	1
4	Head of Department (Admin Dept)	1
5	Head of Department (HR Dept)	1
6	Head of Department (Finance Dept)	1
7	Head of Department (CFD & WWT Dept)	1
8	Head of Department (Store Dept)	1
9	Head of Department (D&D Dept)	1
10	Head of Department (Maintenance Dept)	1

7.1.1 Organization Chart of Environmental Management Team from GRGICL

GRGICL is organized environmental management team for environmental monitoring program of EMP implementation. The organization chart of environmental management team is shown in the following figure and the obligations of the team member is shown in Appendix E.

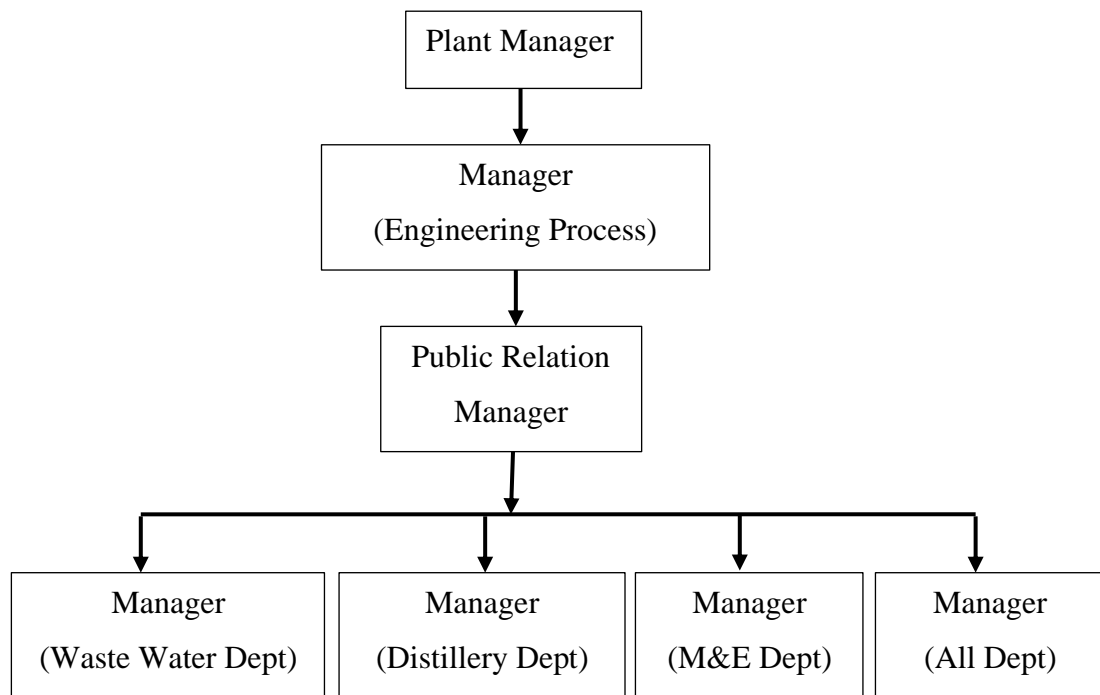


Figure 57. Organization Chart of GRGICL's Environmental Management Team

7.1.1.1 *Roles and Responsibilities*

7.1.1.1.1 Plant Manager

Plant Manager is responsible for overall achievement of environmental management objectives. He has to report to Chief Executive Officer for regular progress, compliance, non-compliance and corrective actions for the course of implementation of EMP. He has to lead the regular EMP review process together with the environmental management team so that effectiveness of EMP is assured.

7.1.1.1.2 Engineering Process Manager

The project manager is responsible for overseeing day to day activities of the EMP. He has to direct HODs to the right path of implementation of EMP and report back to plant manager for progress, compliance, non-compliance and corrective actions for the course of implementation of EMP.

7.1.1.1.3 Heads of Departments

Heads of Departments (HODs) are responsible for carrying out day to day activities of the EMP. They have to direct employees or carrying out inspection works

of the implementation of EMP and report back to deputy plant managers and plant manager for progress, compliance, non-compliance and corrective actions for the course of implementation of EMP.

7.2 Training, Awareness and Competence

This plan describes the provisions of training to ensure that any people working for or on behalf of GRGICL involved in the activities covered by the scope of the EMP are properly trained to carry out their assigned duties in a manner that will not cause deviation from company environmental policy.

This procedure applies to EMP related training for staff and any persons working for or on behalf of GRGICL involved in the activities covered by the scope of the EMP. GRGICL will ensure that all people performing tasks for or on behalf of the organization have had an appropriate assessment for their potential to cause a significant environmental impact and the associated competence required.

The HODs shall ensure that people working for or on behalf of the company within the scope of EMP are competent on the basis of appropriate education, training or experience. The Plant Manager shall identify training needs for people working for or on behalf of the company to ensure individual competence to implement the EMP effectively.

Table 134. Training Requirement

Sr.	Training Topics	Trainee	Duration
1	OSH Training	Supervisors, Operators, Workers and Security	40 hours
2	EMP Training	Environmental management team	40 hours
3	Emergency Response Training	All employee	16 hours
4	First Aid Training	All employee	20 hours
5	Fire Fighting Training	All employee	40 hours

Grand Royal Group International Company Limited is provided each of the staff in all departments for all training. And then, company is cared for the workers and local people's health by supporting free clinic.

Budget for training requirements could be summarized from detailed particulars described in section 5 of the report. GRGICL will allocate 5,700,000 kyats of annual recurring cost for successful implementation and monitoring. If the estimated budget isn't enough, GRGICL Co., Ltd. will be used by adding the enough budgets as necessary.

Table 135. Budget for Training of GRGICL

Sr.	Management Actions	Budget
1	Providing firefighting trainings	100,000/yr
2	Conducting regular fire drill	300,000/yr
3	Providing necessary OSH training	500,000/yr
4	Carrying out regular ambient air quality monitoring as shown in table 93	2,500,000/yr
5	Fund for monitoring of biodiversity	2,000,000/yr
6	Sending appropriate employers to prevention of hazards from chemicals and related materials training provided by relevant government departments	300,000/yr
Total Cost		5,700,000/yr

Table 136. Training of Grand Royal Group International Company Limited

Sr.	Name of Training	Trainer	Training Center	Date
1	Fire Drill	U Than Htay	Mdy Bottling Plant	4-Apr-17
2	Fire Fighting Equipment Training	U Aung Zaw Oo	Mdy Distillery Canteen	25-Apr-17
3	Fire Safety	U Than Htay	Mdy Bottling Plant	30-Apr-17
4	Fire Drill	U Saw Lwin Myint	Mdy Distillery Canteen	25-May-17
5	Fire Drill	U Than Htay	Mdy Bottling	27-May-17

6	Fire Safety Training (How to Used Fire Equipment)	U Han Win	Dining Hall	13-May-17
7	Fire Safety Training (How to Used Fire Equipment)	U Han Win	Dining Hall	15-May-17
8	Fire Safety Training (How to Used Fire Equipment)	U Han Win	Dining Hall	17-May-17
9	Food Safety (GMP & HACCP)	Daw Khin Sandar Tu & Daw Min Min Thu	Ygn Bottling Meeting Room	11-May-17
10	Fire Safety Training (How to Used Fire Equipment)	U Han Win	Dining Hall	19-May-17
11	Fire Safety Training (How to Used Fire Equipment)	U Han Win	Dining Hall	22-May-17
12	Fire Safety Training (How to Used Fire Equipment)	U Han Win	Dining Hall	24-May-17
13	Fire Safety Training (How to Used Fire Equipment)	U Han Win	Dining Hall	29-May-17
14	Safety Induction	U Myint Kyaw	Ygn Bottling Meeting Room	28-Jun-17
15	Fire training	U Aung Zaw Oo	Mdy Distillery	28-Jun-17
16	Fire Drill	U Than Htay	Mdy Bottling	28-Jun-17
17	Safety Induction	U Myint Kyaw	Ygn Bottling Meeting Room	30-Jun-17
18	Safety Induction	U Myint Kyaw	Ygn Bottling Meeting Room	21-Jul-17
19	Safety Training	U Zaw Moe Aung	Meeting Room	29-Jul-17
20	Fire Drill	U Aung Zaw Oo	Mdy Distillery	26-Jul-17
21	Washing Machine Operation and Safety	U Aung San Myint	Mdy Bottling	4-Jul-17

22	Incident / Accident Investigation Training	U Kyaw Swar Shin	Mdy Bottling	6-Jul-17
23	Fire Training	U Than Htay	Mdy Bottling	21-Jul-17
24	About H1N1	Daw Khin Wai Myint	Mdy Bottling	8/10/2017
25	Fire Drill	U Than Htay	Mdy Bottling	23-Aug-17
26	About H1N1	Daw Khin Wai Myint	Mdy Distillery	9-Aug-17
27	Classification of fire	U Saw Lwin Myint	Mdy Distillery	28-Aug-17
28	Working Area Safety & Cleaning	U Kyaw Swar Linn & U Win Han	Ygn Bottling Meeting Room	21-Aug-17
29	Safety Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	22-Aug-17
30	Safety Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	23-Aug-17
31	Role & Responsibilities for Line Leader & Accident Communication	U Chit Wai Oo	Ygn Bottling Meeting Room	24-Aug-17
32	General Machine Safety	U Zaw Moe Aung	Ygn Bottling Meeting Room	26-Aug-17
33	Machine Safety Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	29-Aug-17
34	Safety Awareness	U Kaung Nyunt Win	Ygn Bottling Meeting Room	29-Aug-17
35	'Occupational Safety & Health Specialist Course'	Mr. Win Bo & Mr.San Nyunt	MICT Park	19~23-Aug-2017
36	Fire Fighting with Extinguisher	U Than Htay	Mdy Bottling	27-Sep-17
37	Safety Training	U Zaw Moe Aung	Mdy Distillery Meeting room	13/Sep/17
38	Fire Drill	U Aung Zaw Oo	Mdy Distillery Meeting room	27/Sep/17
39	Fire Wet Drill	U Myint Wai	CFD Front	28.9.17

40	Machine Safety Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	1-Sep-17
41	Machine Safety Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	1-Sep-17
42	Machine Operation Training	U Chit Wai Oo	Ygn Bottling Meeting Room	4-Sep-17
43	Machine Operation Training	U Chit Wai Oo	Ygn Bottling Meeting Room	5-Sep-17
44	Basic HSE Awareness Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	7-Sep-17
45	Basic HSE Awareness Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	8-Sep-17
46	Machine Operation Training	U Chit Wai Oo	Ygn Bottling Meeting Room	11-Sep-17
47	Machine Operation Training	U Chit Wai Oo	Ygn Bottling Meeting Room	12-Sep-07
48	Machine Operation Training	U Chit Wai Oo	Ygn Bottling Meeting Room	13-Sep-17
49	Basic HSE Awareness Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	16-Sep-17
50	Basic HSE Awareness Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	19-Sep-17
51	Basic HSE Awareness Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	21-Sep-17
52	Occupational Health Safety	U Toe Maung	Ygn Bottling Meeting Room	12~13-10-2017
53	Occupational Safety & Health Specialist Program	Mr. Win Bo & Mr.San Nyunt	OSHE Training Center	14~18-Oct- 2017
54	Hand Safety	U Chit Wai Oo	Ygn Bottling Meeting Room	16-Oct-17
55	Hand Safety	U Chit Wai Oo	Ygn Bottling Meeting Room	17-Oct-17
56	Hand Safety	U Chit Wai Oo	Ygn Bottling Meeting Room	18-Oct-17

57	Hand Safety	U Chit Wai Oo	Ygn Bottling Meeting Room	31-Oct-17
58	Fire Wet Drill	U Myint Wai	CFD Front	30.10.17
59	Fire Safety Talk	U Myint Wai	CFD Front	31.10.17
60	Fire Fighting with Extinguisher	U Than Htay	Mdy Bottling	10/24/2017
61	Fire Training	U Kyaw San	Mdy Bottling	28-Oct-17
62	Safety Training	U Aung Zaw Oo, U Lin Maung Thin	Mdy Distillery	12~13-Oct-2017
63	Fire Fighting Drill Training	U Than Htay	Mdy Bottling Plant	11/27/2017
64	Fire Safety training	U Saw Lwin Myint	Mdy Distillery	28/11/2017
65	Occupational Health and Safety training	Mr. Toe Maung	Mdy Distillery	29~30/11/2017
66	Hand & Safety	U Chit Wai Oo	Ygn Bottling Meeting Room	8-Nov-17
67	Hand & Safety	U Chit Wai Oo	Ygn Bottling Meeting Room	9-Nov-17
68	Hot Work Safety Training	U Zaw Moe Aung	Ygn Bottling Meeting Room	18-Nov-17
69	Fire Drill	U Han Win	Ygn Bottling Area	25-Nov-17
70	ISO 22000 Food Safety Internal Audit Training	Ms. Kang Jia Hui	Singapore	16~17/11/2017
71	Water Drill	U Than Htay	Mdy Bottling Plant	22-12-2017
72	Fire Drill	U Aung Zaw Oo	Mdy Distillery Plant	27-12-2017
73	How to use trolley training	U Aung Zaw Oo	Mdy Distillery Plant	27-12-2017
74	Occupational Health & Safety	Mr. Toe Maung	Hotel Dinger (Mdy)	1~2-12-2017
75	Fire Fighting with Extinguisher	U Than Htay	Mdy Bottling	1/30/2018
76	Fire Drill	U Aung Zaw Oo	MDY Dist.;	1/30/2018
77	Road Safety Training	U Moe Kyaw Kyaw	Head Office	31-1-2018
78	Fire Drill	U Aung Zaw Oo	Mdy Dist.;	28-2-2018

79	Fire Training	U Than Htay	Mdy Bottling Plant	28-2-2018
80	Fire Drill	U Than Htay	Mdy Bottling Plant	28-2-2018
81	Fire Fighting	U Than Htay	Mdy Bottling Plant	28-2-2018
82	Fire Wet Drill	U Myint Wai	CFD Front	15-2-2018
83	Safety Awareness Training	U Wai Yan Phy	Ygn Bottling Meeting Room	7-Mar-18
84	Safety Awareness Training	U Wai Yan Phy	Ygn Bottling Meeting Room	9-Mar-18
85	Safety Awareness Training	U Wai Yan Phy	Ygn Bottling Meeting Room	9-Mar-18
86	Safety Awareness Training	U Wai Yan Phy	Ygn Bottling Meeting Room	14-Mar-18
87	Fire Drill Training	U Than Htay	Bottle Warehouse	3/19/2018
88	Fire & Health Safety Training	U Than Htay & U Aung San Myint	Mdy Bottling	3/28/2018
89	Fire & Health Safety Training	U Than Htay & U Aung San Myint	Mdy Bottling	3/29/2018
90	Fire & Health Safety Training	U Than Htay & U Aung San Myint	Mdy Bottling	30-Mar-18
91	Fire Drill Training	U Aung Zaw Oo	Mdy Distillery	3/28/2018





Figure 58. Emergency Assembly Drill





Figure 59. Fire Fighting Training of GRGICL



Figure 60. First Aid Training of GRGICL

7.3 Communication

This plan ensures a consistent and efficient approach to internal communication and external complaints relating to the environment. The procedure applies to all documents established under the EMP of Yangon Distillery Plant (GRGICL). The documents under the EMP include but are not limited to:

- EMP Report
- Mitigation Measures and Management Actions
- Environmental Monitoring Programme
- Registers of Legal and Other Requirements
- External documents including legislation, professional guides and code of practices, etc.

7.3.1 Responsibility

- The plant manager is responsible for dealing with complaints.
- The project manager is responsible for ensuring that all communications relating to the environment are processed correctly.
- All staffs are responsible for putting forward suggestions on environmental matters.

7.3.2 External Communications

Communications to be handled according to this procedure include correspondence, conservations and meeting with relevant interested parties.

The person receiving the communication shall be noted the time and date, relevant address/telephone number and details of communication. Details shall be passed to the plant manager who will determine the response and whether the corrective action is required. If the communication is significant, the plant manager shall inform the chief executive officer as soon as possible.

The project manager shall be responsible for maintaining records, responses and corrective action in a separate file designated for that purpose.

7.3.3 Internal Communications

The primary means of communication is through team briefings, supported as appropriate by use of notice boards and memos. Suggestions for environmental improvements are made through the company suggestion scheme.

7.4 Document Management

This procedure describes the control system for preparing, approving, distributing, revising and updating documents that are required under the Environmental Management Plan (EMP). Yangon Distillery Plant (GRGICL) should be reporting to environmental monitoring report in every 6 months after the completion of EMP process.

This procedure applies to all documents established under the EMP of Yangon Distillery Plant (GRGICL). The documents under the EMP include but are not limited to:

- Impact Mitigation
- Management Actions
- Environmental Monitoring Programme as per Section 7.5
- EMP Forms, Checklists and Guidelines
- Registers of Legal and Other Requirements
- External documents including legislation, professional guides and code of practices, etc.

7.4.1 Responsibility

7.4.1.1 *Plant Manager*

The Plant Manager shall approve and sign all EMP documents, include the Environmental Policy, EMP report and Other Requirements. In the absence of plant manager assistant plant manager shall approve and sign the EMP documents.

7.4.1.2 *Project Manager*

The project manager is responsible for the EMP document control system. The project manager shall ensure that only controlled and current copies of documents are

used and distribute the controlled EMP documents to relevant personnel. The assistant plant manager shall also maintain and update the Master List of Documents.

7.4.1.3 *Heads of Departments (HODs)*

HODs shall review relevant EMP documents and procedures, ensure that their subordinates are familiar with the EMP documents related to them, and report any proposed changes to the EMP documents and forms to the Environmental Management Team.

7.5 Environmental Management and Monitoring Plan

Table 137. Waste Water Quality Monitoring Plan

Sr.	Parameter	Location	Frequency	Analysis Method
1	5- day Biochemical Oxygen Demand	At waste water treatment plant effluent outlet	Monthly	Estimated by Eco-lab with Jenway Dissolved Oxygen Meter (Model 970)
2	Chemical Oxygen Demand (COD)	At waste water treatment plant effluent outlet	Daily	Lovibond SpectroDirect Method No.130-132
3	pH	At waste water treatment plant effluent outlet	Daily	pH Meter
4	Total Coliform bacteria	At waste water treatment plant effluent outlet	Monthly	Total Plate Count Method
5	Total Suspended solids	At waste water treatment plant effluent outlet	Weekly	Lovibond SpectroDirect Method No.383
6	Total Nitrogen	At waste water treatment plant effluent outlet	Weekly	Lovibond SpectroDirect Method No.256-257

7	Total Phosphorous	At waste water treatment plant effluent outlet	Weekly	Lovibond SpectroDirect Method No.320-321
8	Oil and Grease	At waste water treatment plant effluent outlet	6 Monthly	US EPA Method by using SPE-DEX 1000
9	Final discharged water quality	At final water discharge point, Lane Kone creek	Monthly	-

Table 138. Air Quality Monitoring Plan

Sr.	Parameter	Location	Frequency	Analysis Method
1	Nitrogen dioxide	17° 1'23.60"N 96° 4'34.28"E	Bi-annually	Haz-Scanner Environmental Perimeter Air Station (EPAS)
2	Ozone	17° 1'23.60"N 96° 4'34.28"E	Bi-annually	Haz-Scanner Environmental Perimeter Air Station (EPAS)
3	PM ₁₀	17° 1'23.60"N 96° 4'34.28"E	Bi-annually	Haz-Scanner Environmental Perimeter Air Station (EPAS)
4	PM _{2.5}	17° 1'23.60"N 96° 4'34.28"E	Bi-annually	Haz-Scanner Environmental Perimeter Air Station (EPAS)
5	Sulfur dioxide	17° 1'23.60"N 96° 4'34.28"E	Bi-annually	Haz-Scanner Environmental Perimeter Air Station (EPAS)

Table 139. Soil Quality Monitoring Plan

Sr.	Parameter	Location	Frequency	Analysis Method
1	Moisture	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
2	pH	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
3	Texture	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
4	Organic Carbon	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
5	Humus (%)	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
6	Total N	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
7	Ca (wt.%)	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
8	Mg (wt.%)	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
9	K (wt.%)	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
10	P (wt.%)	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department
11	K ₂ O(wt.%)	17°1'22.00"N 96°4'23.34"E 17°1'16.56"N 96°4'11.03"E	Annually	Sending Soil Sample to Land Use Department

7.5.1 Monitoring Budget

Projected budget for implementation of Air, Water, Soil, Biodiversity and Social management actions and monitoring requirements could be summarized from detailed particulars described in section 5 of the report. GRGICL will allocate 7,300,000 kyats of annual recurring cost for successful implementation and monitoring. If the estimated budget isn't enough, GRGICL Co., Ltd. will be used by adding the enough budgets as necessary.

Table 140. Budget for Implementation of Monitoring Plan

Sr.	Management Actions	Budget
1	Regular monitoring of waste water	2,000,000/yr
2	Regular noise level measurement at workplaces	100,000/yr
3	Regular monitoring of soil quality	1,200,000/yr
4	Carrying out regular ambient air quality monitoring	2,000,000/yr
5	Fund for monitoring of biodiversity	2,000,000/yr
Total Cost		7,300,000/yr

7.6 Emergency Preparedness and Response Plan

The plant prepared a systematic fire prevention and emergency response plan. The emergency response plan of Yangon Distillery Plant (GRGICL) is following;

- (a) Establishing an emergency team and their responsibilities
- (b) Appointment of an emergency coordinator who will direct the execution of emergency procedures in accordance with the situation
- (c) Procedures for notification and raising of alarms
- (d) Procedures for evacuation, rescue and First-Aid Treatment
- (e) Means of communication with the relevant government response agencies such as FBD, Police, MOL and GRG key personnel
- (f) The firefighting team exits within the plant compound
- (g) Fire extinguishing equipment is provided for all buildings
- (h) GRGICL provided medical doctors and nurses for all workers and local people

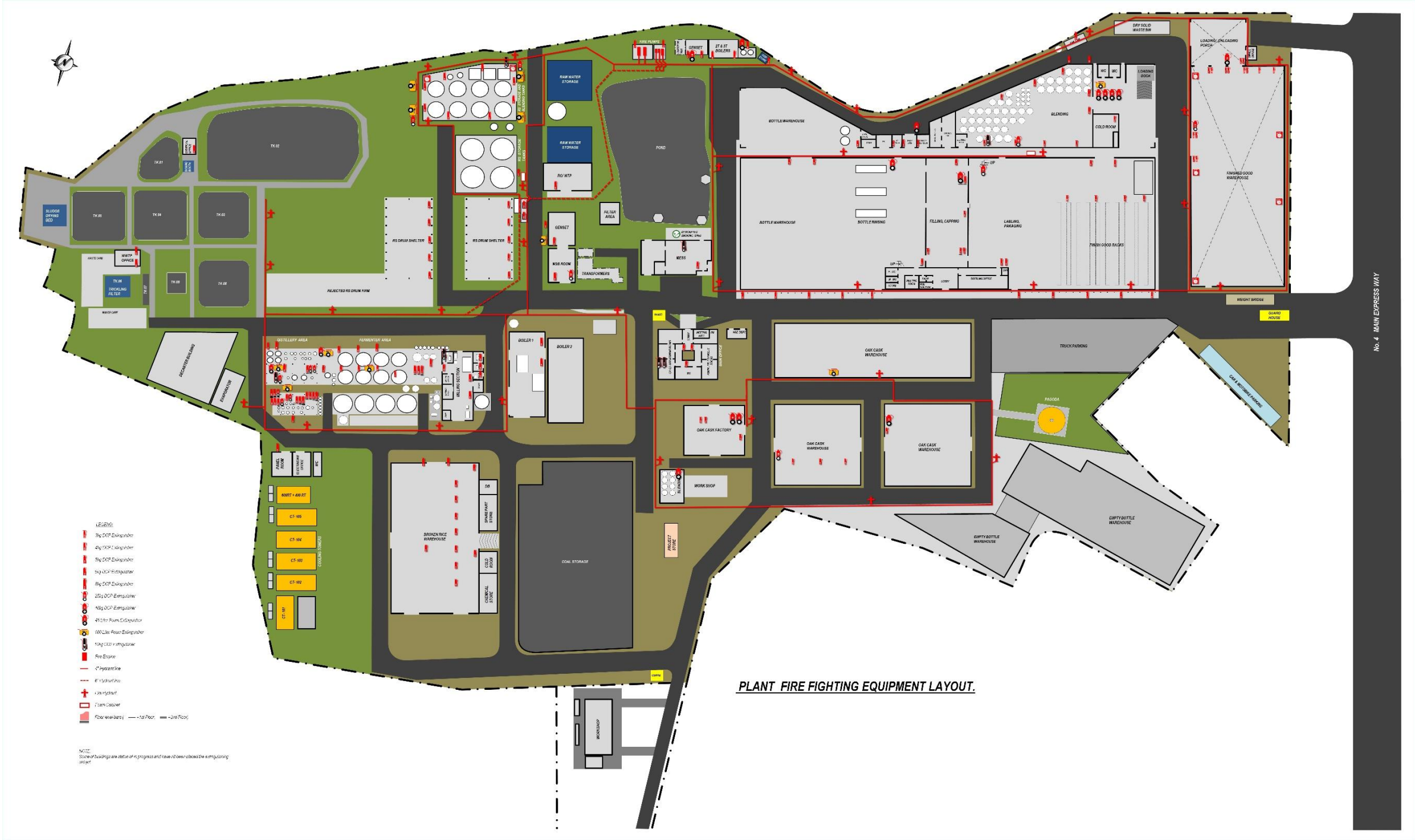


Figure 61. Plant Firefighting Equipment Layout of GRGICL


 MDC MYANMAR DISTILLERY CO., LTD A SUBSIDIARY OF IBTC GROUP																			
HSE TRAINING MATRIX																			
No.	<div> <div>TRAINING TITLES</div> <div>ATTENDEE LEVEL</div> </div>	New Employee induction	Basic HSE awareness training	Emergency evacuation	PPE	Fire Safety	Electrical Safety	Chemical Safety	Hot work safety	Work at high	LOTO	Hazard Identification and reporting (SOC)	Incident investigation & reporting	RA/JSA	PTW	Office Ergonomic	Confined space safety	Forklift safety	Remarks
1	Management		✓	✓	✓	✓	✓								✓	✓			
2	Admin staff		✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓			
3	HR staff		✓	✓	✓	✓						✓	✓	✓	✓	✓			
4	All trade supervisor/ In Charge		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓				
5	Staff of Hot work		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓				
6	M & E (Maintenance)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		
7	Electrician		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓				
8	General maintenance		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓				
9	Store		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
10	Staff of Chemical process		✓	✓	✓	✓	✓	✓				✓	✓			✓			
11	Laboratory staff		✓	✓	✓	✓	✓	✓				✓	✓			✓			
12	Blending Staff		✓	✓	✓	✓	✓	✓				✓	✓				✓		
13	Bottling (Rinsing)		✓	✓	✓	✓	✓	✓				✓	✓						
14	Bottling (Fill/lable/pack)		✓	✓	✓	✓	✓	✓				✓	✓						
15	Distillery (Milling/ cooking)		✓	✓	✓	✓	✓	✓				✓	✓						
16	Distillery (Fermentation)		✓	✓	✓	✓	✓	✓				✓	✓						
17	Distillery (Distillery)		✓	✓	✓	✓	✓	✓				✓	✓						
18	Distillery (WWTP)		✓	✓	✓	✓	✓	✓				✓	✓				✓		
19	Oak cask (Blending)		✓	✓	✓	✓	✓	✓				✓	✓						
20	Oak cask (Casking)		✓	✓	✓	✓	✓	✓				✓	✓						
21	Forklift operators																	✓	

Figure 62 . HSE Training Matrix of GRGICL

7.6.1 Organization Structure of Emergency Team

A Main Committee, known as the Emergency Planning Committee, which shall be responsible for all decisions, connected with the handling of the emergency.

An Action Committee, which shall be responsible for carrying out the decisions of the Emergency Planning Committee.

7.6.1.1 *Emergency Planning Committee*

Chairman : HOD
Deputy Chairman : Plant Manager

(Note: In the absence of HOD, the Plant Manager shall be the Chairman to act on his upon)

Members:

- Human Resource / Admin. Manager
- HSE Manager
- P&T Manager
- Maintenance Manager
- Plant Manager
- Warehouse Manager
- Security Manager
- Project Manager

7.6.2 *Action Committee*

The decisions of the Emergency Planning Committee shall be translated into action by the Action Committee.

Head : Plant Manager
Deputy Head : HSE Executive

Members:

- Environmental Executive
- Admin Assistant
- Maintenance Supervisor
- Security Supervisor

- Warehouse Supervisor
- Plant Supervisor
- Operation Supervisor

7.6.3 Duties and Responsibilities of Emergency Team

7.6.3.1 *Emergency Coordinator / Assistant Emergency Coordinator*

1. To co-ordinate all evacuation activities to ensure all staff and workers are safely evacuated from Plant and assembled at the assembly area
2. To take position at assembly area
3. Be at the assembly area to receive information and direct activities
4. To ensure that Plant security is adhered

7.6.3.2 *Fire Warden (Safety Personnel / Senior Engineers)*

1. To assist the Emergency Coordinators/Asst Emergency Coordinators in his duties.
2. To take position at assembly area
3. To collect attendance sheet from various trade supervisors and contractors
4. To cross-check and co-ordinate with trade supervisor and contractors regarding roll-call / head count
5. To report to Emergency Coordinators/Asst Emergency Coordinators on attendance and other matters
6. To co-ordinate clean-up and salvage activities

7.6.3.3 *Supervisors*

1. To ensure complete and save evacuation of all his/her men and contractors by taking roll-call when assembled and to locate his/her men if found missing
2. To report and submit strength and attendance of his/her men and sub-contractors to safety supervisor
3. To instruct his/her men and contractors to leave the workplace and meet at the assembled area
4. To ensure his/her men and contractors behave orderly while assembled
5. Assist in clean-up and salvage activities

7.6.3.4 *Canteen Staff*

1. To shut off all gas cooking appliances
2. To remove the LPG cylinders from the kitchen and store
3. To evacuate to assembly area
4. To assist in clean-up and salvage activities as necessary

7.6.3.5 *Security Guards*

1. In case of emergency, immediately to call 191
2. Attempt to control fire or situation
3. To notify key organization personnel as soon as possible
4. When an emergency occurs after office hours, make a log of all incoming calls, from whom, what company, when contact number, so that response could be made to them when the appropriate personnel reach the Plant
5. To crowd Control
6. Direct FBD fire engine or ambulance to the location of incident
7. Screening of the people entering and leaving the Plant
8. Log the movement of all vehicles
9. Provide Plant lay out plan to the first FBD fire engine to arrive at the plant.
10. Do not allow any press people or Police unless otherwise permission granted by the Security Manager

7.6.3.6 *Fire Fighting Team*

1. Know the location of all fire extinguishers and their proper usage
2. To ascertain the location of the emergency scene and proceed to that area
3. To control the fire or situation without taking personal risk before the arrival of the FBD
4. Assist in clean-up and salvage activities

7.6.3.7 *First-Aiders / Rescuers*

1. Rescuers to rescue of injured person(s)
2. First Aiders to render first aid to the injured while waiting for the arrival of the ambulance

7.6.3.8 *Plant Admin*

1. To notify Police, FBD, Ambulance and Company's key personnel
2. Refuse all in-coming calls
3. No information should be given to the press
4. Know the emergency telephone numbers of key organization and personnel
5. Know the location of alternate phones in case the Plant Office phones are out of order

7.6.3.9 *Operator*

1. Shut off equipment, gas and electricity
2. Know locations of all shut off and familiar with proper procedures for shutting off
3. Evaluate upon completing above procedures
4. After emergency, restore shut-off utilities, making repairs as necessary

7.6.3.10 *Contractors*

1. To ensure complete and save evacuation of all his men and contractors by taking roll-call when assembled and to locate his men if found missing
2. To report and submit strength and attendance of his/her men and contractors to EOSH Manager/Executive
3. To instruct his/ men to leave the workplace and meet at the assembled area
4. To ensure his/her men and sub-contractors behave orderly while assembled
5. Assist in clean-up and salvage activities

7.6.3.11 *Vehicles Drivers*

1. All drivers to proceed to their respective vehicles immediately
2. Vehicles to be cleared from fire engine access (surface level) for fire engines or ambulances

7.6.3.12 *Workers*

1. Stop all work and shut off machines, power and / or gas supplies
2. Leave the workplace by the nearest escape route
3. Walk quickly and proceed orderly to the assembly area for head counts
4. Do not return to the workplace for valuables

5. Do not make use of the lift
6. Do not panic, rush or push one another
7. Do not disperse but remain at assembly area unless instructed otherwise

7.7 Factory Decommissioning Management Plan

7.7.1 Production Area Decommissioning Management Plan

The DMP for production area will consist of the following actions

- All products will be sent for suitable re-use, recovery, treatment or disposal.
- Shutting off unnecessary services to the building. Heating and ventilation capability would be maintained.
- The instrumentation will be disconnected and rendered safe.
- Cleaning and decontamination of all floor drains.
- All remaining specialized equipment will be sent for suitable re-use or sold to an interested party. Obsolete equipment will be recycled where possible or otherwise disposed of.

7.7.2 Utilities Area Decommissioning Management Plan

The DMP for the utilities area would consist of shutting down the following systems

- Removal of any associated chemicals, oils or any other materials used in the utilities area for redistribution, return to vendor or disposal.
- Waste oils, lubricants and diesel will be sent for suitable re-use, recovery, treatment or disposal as appropriate. Any hazardous waste arising from the plant and utilities areas will be removed from site and disposed of.

7.7.3 Warehouse Area Decommissioning Management Plan

The DMP for the stores warehouse would consist of the following actions

- Cancellation of all orders for incoming materials to the site.
- Negotiation with other plants with a view to distribution of unused materials.
- Negotiation with relevant suppliers to return unused materials to supplier.
- Dispatch of opened containers and non-returnable or out-of-date goods for appropriate treatment or disposal.
- Cleaning and decontamination of the storage areas.

7.7.4 Site Decommissioning Management Plan

The following actions would be required to ensure the implementation of the site DMP

- Cessation of any construction project work on site so that the site is left in a safe and orderly condition. Contractors will be required to decommission any construction compounds and remove all construction equipment, construction materials and waste, storage units and temporary offices from the site at the completion of construction projects.
- Disbandment of contract personnel, facilities and equipment.
- Termination of all non-essential maintenance and other contracts.
- Removal from site any temporary offices or storage areas.
- Rationalization of the site electricity supply. This would involve removing transformers from service, allowing remaining site operations to run from one transformer.
- The boilers onsite will be decommissioned.

7.8 Grievance Redress Mechanism (GRM)

GRGICL will deal with public comment and suggestion by implementation of Grievance Redress Mechanism.

7.8.1 Objectives of GRM

The fundamental objectives of GRM are

- To resolve any environmental and related grievance locally in consultation with the aggrieved party to facilitate smooth implementation of the project
- To democratize the development process at the local level and
- To establish accountability to the stakeholder

7.8.2 Grievance Redress Mechanism Process

The grievance redress process from GRGICL will include the following four major steps

1. Registration
2. Sorting
3. Processing

4. Feedback/Reporting

In grievance redress mechanism, any person/group affected by project implementation can complaints to GRGICL whenever the affected person feels the grievance even before the starting of the project to the end of the project by throughing voice massages on hotline phone, email, social media account, postal with GRM form, compliant and feed back box. The detail information to contact AGRGICL is shown in section 1.2 of this report. Moreover, GRGICL will consulted with the public in the project affected area as necessary.

Local development programs and future development programs for local people affected by the project and supplement budget plan if there is insufficient budget are shown in APPENDIX-H.

8 Management Review

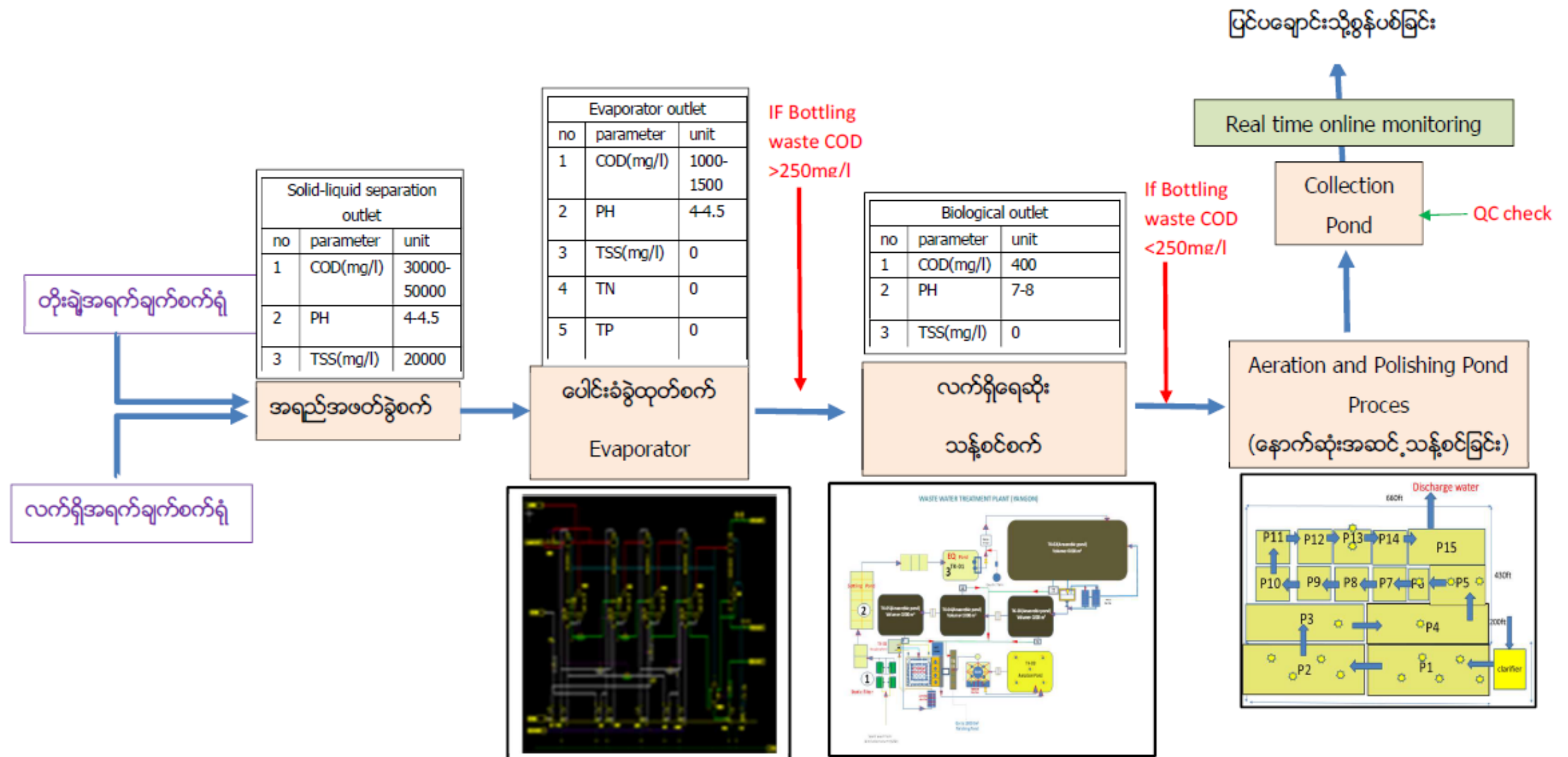
A process that will review the results of the implementation of EMP by the analysis of the monitoring results to ensure that the mitigation measures and management actions are fully satisfied with the minimum side effects to the environment is required. The plant manager shall work with all HODs to carry out analysis and evaluation of monitoring results in compliance with set environmental standard values. The plant manager has the overall responsibility for ensuring that this EMP is implemented to ensure the factory operation is in compliance with applicable environmental legislations.

The Plant Manager of Yangon DistilleryPlant (GRGICL) will be the responsible person of management review process. He shall be supported by all HODs and various functional heads. GRGICL will be operated without effected on the environment and local people.

APPENDIX A

Real Time Online Monitoring System of Yangon Distillery Plant (GRGICL)

တိုးချဲ့မွမ်းမံတည်ဆောက်မည့်စွန့်ပစ်ရေဆိုးသန့်စင်စနစ်သစ်၏သန့်မှူနည်းစဉ်အဆင့်ဆင့်ပုံ



ရေဆိုးသန့်စင်စနစ်နည်းစဉ်နှင့် Real time online monitoring system

1000



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ခရိုင်အုပ်ချုပ်ရေးမှူး နှင့်အဖွဲ့မှ discharge real-time online monitoring system
တပ်ဆင်ထားမှုအားလာရောက်စစ်ဆေးကြည့်နေစဉ်



ရန်ကုန်တိုင်းဒေသကြီး လွှတ်တော်လူမှုရေးရာ စစ်ဆေးရေးကော်မရှင်ဥက္ကဋ္ဌ နှင့် မြို့နယ်
ကိုယ်စားလှယ်များ ၁၀.၇.၂၀၁၈တွင် ရန်ကုန်အရက်ချက်စက်ရုံ၏ ရေဆိုးသန့်စင်မှုစနစ်အား
လာရောက်စစ်ဆေးစဉ်



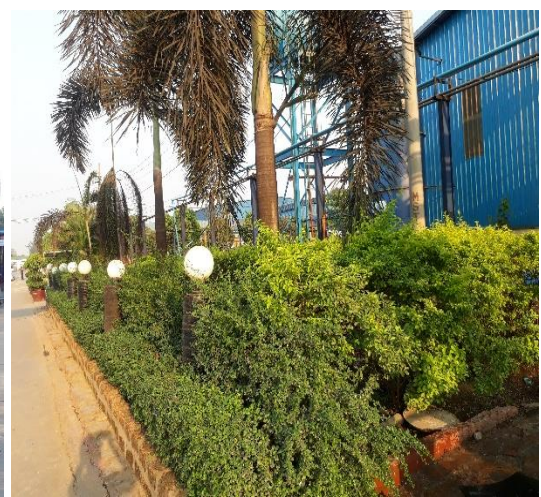
APPENDIX B

Greening Plan of Yangon Distillery Plant (GRGICL)

၂၀၁၇-၂၀၁၈ခုနှစ် အတွင်း ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု
စီမံကိန်းရေးအတွက်အပင်များစိုက်ပျိုးခြင်း









သန့်စင်ပြီးစွန့်ပစ်ရည်ဖြင့်စိုက်ပျိုးထားမိုးစပါးစိုက်ပျိုးမှုမှတ်တမ်း-၂၀၁၇

2017-year, Paddy Yield Record by using treated waste water
as an irrigated water

Paddy Field location: Back side Land of Yangon Distillery Plant

Sr.	Paddy species	Unit acre	Paddy Yield (kg/acre)	Paddy Yield (Tin/acre)	Cultivated acre	Paddy product Output (kg)	Remark
1	Sin Thu Kha	1	1133.98	50	4	4535.92	YDP paddy field
2	Pearl Paw San	1	1258.72	55.5	8	10069.75	
3	Sin Thu Kha	1	793.78	35			Villagers field near around the plant

Season

Manson

Farmer

U Soe Nyein

If YDP farmer mil 2267.9kg of Pearl Paw San paddy (100 tin) , get (1) 990kg rice , (2)165kg of broken rice and other are rice bran and rice husk.



Harvested Paddy pile



Harvested Paddy Pile



Rice from YDP paddy



field

သန့်စင်ပြီးစွန့်ပစ်ရည်ဖြင့်စိုက်ပျိုးထား သော နွေ စပါးစိုက်ပျိုးမှုမှတ်တမ်း- ၂၀၁၈

စိုက်ဧက-၂

စပါးမျိုး-အညာသား

အထွက်နှုန်း-၆၅ တင်း/ဧက

သွင်းရေ-သန့်စင်ပြီးစက်ရုံရေဖြင့်စိုက်ပျိုး



စက်ရုံမှသန့်စင်ပြီးရေဖြင့်နှွေစပါးစိုက်ပျိုးထားသောအခြေအနေအားရှာသားများ
ဖိတ်ခေါ်ပြသခြင်း (၂၉.၃.၂၀၁၈)



သန့်စင်ပြီးစွန့်ပစ်ရည်ဖြင့်စိုက်ပျိုးထားသော မိုးစပါးစိုက်ပျိုးမှု မှတ်တမ်း-၂၀၁၈

စိုက်ဧက-၁၀

စပါးမျိုး-ပေါ်ဆန်း

အထွက်နှုန်း-၇၀တင်း/ဧက



သန့်စင်ပြီးစွန့်ပစ်ရေနှင့် စိုက်ပျိုးထားသော သီးနှံစိုက်ခင်းများနှင့်
ငါးမွေးမြူခြင်း မှတ်တမ်း- ၂၀၁၈



APPENDIX C

Daily Discharge Water Amount and Parameters of Yangon Distillery Plant (GRGICL)

Parameter		1.4.17	2.4.17	3.4.17	4.4.17	5.4.17	6.4.17	7.4.17	8.4.17	9.4.17	10.4.17	11.4.17	23.4.17	24.4.17	25.4.17	26.4.17	27.4.17	28.4.17	29.4.17	30.4.17
Discharge Volume		630	630	560	630	630	630	630	630	665	630	210	560	630	560	630	630	560	210	210
Chemical oxygen demand(COD)(ppm)	250 max	80	90	140	100	60	80	60	100	80	140	120	80	220	190	60	90	90	80	60
pH	6.0 - 9.0	7.55	8.15	8.23	7.94	8.13	8.12	8.25	8.12	8.09	8.16	8.09	8.1	8.17	8.15	7.99	8.11	8.1	8.06	7.85
Suspended Solids(SS)(ppm)	50 max	38	45	50	30	20	30	15	40	20	40	30	20	50	40	15	20	20	20	15

Parameter		1.5.17	2.5.17	3.5.17	4.5.17	5.5.17	6.5.17	7.5.17	8.5.17	9.5.17	10.5.17	11.5.17	12.5.17	13.5.17	14.5.17	15.5.17	16.5.17	17.5.17	18.5.17	19.5.17	20.5.17	21.5.17	22.5.17	23.5.17	24.5.17	25.5.17	26.5.17	27.5.17	28.5.17	29.5.17	30.5.17	31.5.17
Discharge Volume		560	245	245	630	560	630	560	665	665	560	665	665	665	665	665	665	665	665	665	665	560	455	560	455	665	630	560	665	665		630
Chemical oxygen demand(COD)(ppm)	250 max	80	80	90	80	60	80	60	60	80	80	90	60	120	100	100	110	100	80	60	80	100	200	140	160	40	200	120	100	120	120	100
pH	6.0 - 9.0	8.22	7.35	7.21	7.44	7.86	7.5	6.5	7.85	7.91	7.88	7.9	7.99	7.93	7.94	8.08	8.06	7.97	7.92	8.02	7.79	7.75	8.08	7.73	7.85	7.35	7.89	8.76	7.95	7.47	7.8	7.93
Suspended Solids(SS)(ppm)	50 max	25	20	20	20	20	25	20	20	20	20	25	20	20	40	35	40	35	20	10	20	40	50	40	50	10	50	40	40	40	40	40

[illegible]

Parameter		1.7.17	2.7.17	3.7.17	4.7.17	5.7.17	6.7.17	7.7.17	8.7.17	9.7.17	10.7.17	11.7.17	12.7.17	13.7.17	14.7.17	15.7.17	16.7.17	17.7.17	18.7.17	19.7.17	20.7.17	21.7.17	22.7.17	23.7.17	24.7.17	25.7.17	26.7.17	27.7.17	28.7.17	29.7.17	30.7.17	31.7.17
Discharge Volume		630	630	630	630	560	630	630	560	630	630	630	560	630	630	630	630	630	630	630			630	610	560	630	630	630	630	630		-
Chemical oxygen demand(COD)(ppm)	250 max	100	80	120	100	80	20	60	80	80	100	90	100	80	80	110	100	80	60	100	80	60	80	60	120	80	100	120	160	110	100	140
pH	6.0 - 9.0	7.81	7.51	7.61	7.8	7.8	7.68	6.89	8.28	7.73	7.05	7.23	7.79	7.68	7.4	7.98	7.92	7.77	7.7	7.76	7.62	7.69	7.76	7.65	8.38	7.96	7.83	8.17	7.78	7.86	8.19	8.13
Suspended Solids(SS)(ppm)	50 max	40	30	50	40	40	20	30	30	30	40	30	45	20	20	40	40	20	15	20	20	10	20	20	45	20	30	40	40	30	30	45

Parameter		1.8.17	2.8.17	3.8.17	4.8.17	5.8.17	6.8.17	7.8.17	8.8.17	9.8.17	10.8.17	11.8.17	12.8.17	13.8.17	14.8.17	15.8.17	16.8.17	17.8.17	18.8.17	19.8.17	20.8.17	21.8.17	22.8.17	23.8.17	24.8.17	25.8.17	26.8.17	27.8.17	28.8.17	29.8.17	30.8.17
Discharge Volume		245	245	210	210	245	630	560	560	630	560	630	245	560	560	630	560	630	630	560	630	560	560	630	630	630	630	630	630	630	630
Chemical oxygen demand(COD)(ppm)	250 max						80	100	80	60	100	80	80	100	40	60	20	40	80	100	80	240	120	100	80	60	80	100	100	80	80
pH	6.0 -9.0						7.45	7.87	7.85	7.87	7.84	7.78	8.01	7.68	7.4	7.53	8	7.65	7.99	8.08	7.78	8.22	7.89	8.12	8.01	7.86	7.98	7.96	8.03	8.09	8.05
Suspended Solids(SS)(ppm)	50 max						20	40	20	15	40	20	20	30	15	25	15	15	20	30	20	50	40	40	25	15	20	30	40	25	20
Biological oxygen demand(BOD)(ppm)	50 max																36.75									38	-	-	-	-	-

[illegible]

Discharge Water			1.10.17	2.10.17	3.10.17	4.10.17	8.10.17	9.10.17	10.10.17	11.10.17	12.10.17	13.10.17	14.10.17	15.10.17	16.10.17	18.10.17	19.10.17	20.10.17	21.10.17	22.10.17	23.10.17	24.10.17	25.10.17	26.10.17	27.10.17	28.10.17	29.10.17	30.10.17	31.10.17
Discharge Volume			630	665	665	595	665	595	665	665	700	630	665	595	665	700	595	665	700	665	700	700	700	700	700	700	700	595	595
Chemical oxygen demand(COD)(ppm)	250 max	Daily	40	60	80	60	80	140	80	20	20	20	40	40	20	20	40	100	80	70	100	60	140	80	120	80	90	120	60
pH	6.0 - 9.0	Daily	7.69	7.82	7.98	8.08	8	8.13	7.85	8.2	7.83	7.94	7.12	7.77	7.15	7.79	7.84	7.51	7.74	7.84	7.4	8	8.13	8.1	8.03	8.09	8.12	8.36	8.23
Suspended Solids(SS)(ppm)	50 max	Daily	20	20	20	15	20	50	20	10	10	10	15	15	10	10	15	40	20	20	40	20	50	50	10	10	20	50	v
Biological oxygen demand(BOD)(ppm)	50 max	2 time/M	-	-	-	-	-	-	-	-	-	35.66	-	-	-	-	-	31.75	-	-	-	-	-	-	-	-	-	-	-

Discharge Water	Nom		1.11.17	2.11.17	3.11.17	4.11.17	5.11.17	6.11.17	7.11.17	8.11.17	9.11.17	10.11.17	11.11.17	12.11.17	13.11.17	14.11.17	15.11.17	16.11.17	17.11.17	18.11.17	19.11.17	20.11.17	21.11.17	22.11.17	23.11.17	24.11.17	25.11.17	26.11.17	27.11.17	28.11.17	29.11.17	30.11.17
Discharge Volume			595	665	595	665	665	650	595	630	665	700	665	700	665	700	700	700	700	665	595	700	665	630	700	665	630	665	595	630	700	665
Chemical oxygen demand(COD)(ppm)	250 max	Daily	60	80	20	60	20	80	80	60	80	20	80	100	120	60	80	240	160	60	110	220	80	40	40	40	60	40	40	60	60	100
pH	6.0 - 9.0	Daily	8.19	7.89	7.79	7.97	7.87	8.2	7.98	8.15	8.05	7.69	8	8.15	8.11	8.09	8.32	8.16	9	8.12	7.92	8.19	8.09	8.28	7.68	8.22	7.89	7.88	7.92	8.74	7.5	7.95
Suspended Solids(SS)(ppm)	50 max	Daily	10	15	15	20	15	20	20	10	15	10	15	20	50	10	15	50	40	15	40	50	15	15	20	20	20	20	20	20	20	40
Biological oxygen demand(BOD)(ppm)	50 max	2 time/M	-	-	-	-	-	-	-	-	-	29.5	-	-	-	-	-	-	-	-	-	33.25	-	-	-	-	-	-	-	-	-	-

Discharge Water			1.12.17	2.12.17	3.12.17	4.12.17	5.12.17	6.12.17	7.12.17	8.12.17	9.12.17	10.12.17	11.12.17	12.12.17	13.12.17	14.12.17	15.12.17	16.12.17	17.12.17	18.12.17	19.12.17	20.12.17	21.12.17	22.12.17	23.12.17	24.12.17	25.12.17	26.12.17	27.12.17	28.12.17	29.12.17	30.12.17	31.12.17
Discharge Volume			665	665	665	665	700	630	665	630	630	630	700	595	665	700	630	700	735	630	665	595	665	630	630	630	700	630	595	630	665	630	630
Chemical oxygen demand(COD)(ppm)	250 max	Daily	80	60	100	140	110	120	80	60	80	80	80	20	20	40	20	60	60	40	60	40	60	60	80	100	140	70	100	80	20	100	80
pH	6.0 - 9.0	Daily	8.19	8.09	8.23	8.16	8.15	7.81	8.19	9	8.54	8.25	8.91	6.94	6.95	7.2	7.2	7.65	7.58	6.98	8.02	7.72	7.49	8.74	8.82	8.23	8.22	7.95	7.9	8.39	7.74	8.16	8.15
Suspended Solids(SS)(ppm)	50 max	Daily	30	10	40	40	30	50	20	10	20	30	25	10	10	20	10	20	20	20	20	20	20	20	30	40	50	20	40	20	10	30	20
Biological oxygen demand(BOD)(ppm)	50 max	2 time/M	-	-	-	-	38.33	-	-	-	-	-	-	-	-	-	-	-	-	42	-	-	-	-	-	-	-	-	.	.	.	.	.

Discharge Water			1.1.18	2.1.18	3.1.18	4.1.18	5.1.18	6.1.18	7.1.18	8.1.18	9.1.18	10.1.18	11.1.18	12.1.18	13.1.18	14.1.18	15.1.18	16.1.18	17.1.18	18.1.18	19.1.18	20.1.18	21.1.18	22.1.18	23.1.18	24.1.18	25.1.18	26.1.18	27.1.18	28.1.18	29.1.18	30.1.18	31.1.18	
Discharge Volume			665	595	700	665	630	665	735	595	665	700	700	735	735	735	735	700	700	700	700	700	700	735	700	665	630	595	700	735	735	700	595	
Chemical oxygen demand(COD)(ppm)	250 max	Daily	140	80	40	60	60	40	40	60	60	80	60	80	60	90	60	80	60	80	60	80	100	60	50	60	60	40	60	60	80	70	60	
pH	6.0 - 9.0	Daily	8.19	8.09	7.05	6.92	6.87	7.63	7.18	7.29	7.41	7.36	7.32	7.32	8.29	8.42	7.48	8.23	8.42	8.45	7.9	8.12	8.29	7.32	7.33	7.14	7.14	7.32	7.74	7.66	7.43	7.5	7.51	
Suspended Solids(SS)(ppm)	50 max	Daily	30	20	20	20	20	15	20	20	20	20	20	10	10	15	20	30	20	30	15	20	30	20	20	20	20	10	20	20	20	20	20	
Biological oxygen demand(BOD)(ppm)	50 max	2 time/M	39

Discharge Water			1.2.18	2.2.18	3.2.18	4.2.18	5.2.18	6.2.18	7.2.18	8.2.18	9.2.18	10.2.18	11.2.18	12.2.18	13.2.18	14.2.18	15.2.18	16.2.18	17.2.18	18.2.18	19.2.18	20.2.18	21.2.18	22.2.18	23.2.18	24.2.18	25.2.18	26.2.18	27.2.18	28.2.18
Discharge Volume			700	735	700	735	700	735	700	665	630	665	735	700	735	630	700	665	630	700	665	630	665	595	700	665	700	595	595	595
Chemical oxygen demand(COD)(ppm)	250 max	Daily	60	60	80	100	220	140	60	80	100	100	80	60	80	60	70	80	60	60	40	100	80	60	120	80	100	80	60	100
pH	6.0 - 9.0	Daily	7.65	7.99	7.97	8.02	9	8.25	8.32	8.29	7.65	8.09	8.23	7.65	7.8	7.75	7.72	7.36	7.74	7.89	7.7	7.69	7.6	7.86	8.91	8.68	8.42	8.26	8.32	7.98
Suspended Solids(SS)(ppm)	50 max	Daily	20	25	20	30	40	30	20	25	40	40	30	20	20	20	20	20	20	20	20	40	30	20	50	20	30	20	20	30
Biological oxygen demand(BOD)(ppm)	50 max	2 time/M	.	.	.	.	.	.	.	.	.	.	.	.	36.5	.	.	.	.	.	.	.	.	.	43.5	.	.	.	.	.

APPENDIX D

Spillage Control System of
Yangon Distillery Plant (GRGICL)

Purpose

To describe the steps involved in spill control procedure and Emergency response of chemical spill, solid spill, engine oil spill, gas, and biogas and odor leakage.

Scope

To control chemicals, solid, oil and gas and biogas leakage.

Definition

PM	Plant Manager
PE	Process Engineer
WWT	Wastewater Treatment
CFD	Cooking, Fermentation and Distillation
QC	Quality Control
All Others	Departments

Responsibility

PE (All departments) is responsible for controlling spill and leakages

Spill and leakage Prevention

The first step in chemical spill, solid spill, engine oil spill, gas , biogas and odor leakage response is to prevent from happening in the first place.

Identify spillage and leakage sources

Storage

Store manager must regularly check following the step

1. To sure shelving units are sturdy, and not overcrowded with containers.
Shelves used for chemical storage must be securely fastened to the wall or floor to provide added stability.
2. To ensure chemicals are stored within easy reach of everyone in the store, and no higher than eye

Level large bottles and containers should be stored as close to floor level as possible.

1. Do not store chemical containers directly on the floor where they might be knocked over and

2. Broken, unless they are in approved safety cans or still in their original shipping carton and packing.
3. Do not store chemical containers on top of flammable storage or acid storage cabinets.
4. Ensure that lighting and ventilation is adequate in the storage area.
5. Regularly inspect chemicals in storage to ensure there are no leaking or deteriorating containers.
 - a. Some items to note:
 - b. Keep the outside of containers clean and free of spills and stains.
 - c. Check that caps and closures are secure and free of deformation.
 - d. Ensure that metal containers are free of rust, bulges or signs of pressure buildup.
6. Do not store incompatible chemicals together (e.g. acids with bases). Chemicals must be stored by hazard category and not alphabetically (except within a hazard group).
7. Purchase solvents in containers with a plastic safety coating.
8. Ensure that all gas cylinders are securely fastened and upright.

Transport

Assign manager and staff must follow these steps.

- When transporting large, heavy or a multitude of containers use a cart suitable for the load with high edges or spill trays that must contain any spills or leaks. Two people should be involved when transporting large amounts of chemicals.
- Carry glass containers in bottle carriers or another leak resistant, unbreakable secondary container.
- Use a gas cylinder handcart when transporting large gas cylinders. Ensure cylinder is securely strapped to the cart.
- Comply with Transportation of Dangerous Goods Regulations when transporting hazardous material on public roads.

Decanting

Branch Manager and operators must follow this procedure

- When transferring chemicals between containers, pay careful attention to the size of the receiving container to prevent overfilling it.
- When transferring liquids from large containers, use pumps, siphoning (not initiated by mouth) or other mechanical means instead of pouring
- Use spill containment trays to catch leaks and spills when transferring liquids.
- When transferring flammable liquid from drums, ensure that both the drum and receptacle are grounded and bonded together to avoid an explosion initiated by a static electric spark. And hand phone, smoking and any sparks are not allowed. Responsible person must also prohibit irresponsible person not to talk with phone and smoke.

Handling & Use

Plant operating site must follow these steps.

- Inspect I using containers for cracks or defects before using it.
 - Secure using containers to prevent them from tipping over.
 - Ensure the work area is free of unnecessary clutter.
 - Select equipment that has a reduced potential for breakage
-
- When handling, anticipate possible accidents and provide controls to deal with problems that may occur.
 - If you must work alone, ensure the working alone protocol addresses chemical spill response as part of the emergency procedures
 - Check gas cylinder valves and gas tubing for leakage before use.
 - Ensure you have access and know the location of a suitable chemical spill kit before you start working with chemicals.

Disposal

- Must be disposed according to the MSDS
- Do not mix incompatible wastes together to avoid uncontrolled chemical reactions.
- Properly identify the contents of all waste containers to avoid inappropriate disposal.

- Leave at least 20% air space in bottles of liquid waste to allow for vapor expansion and to reduce the potential for spills due to overfilling.
- When not in use, keep waste containers securely closed or capped. Do not leave funnels in waste containers.

Dispose of waste on a regular basis; do not allow excess waste to accumulate in the work area.

Undertaking Risk Assessments

The assessment is including three factors:

- the nature of the spilled chemical (low/high risk)
- the quantity spilled (small/large amounts)
- the location of the spill (difficult access, public site/ banded area)

When evaluating risks associated with spills, the following must be considered:

- Is special training required to handle the situation?
- Is special equipment required to clean up the spill (e.g. PPE, etc.)?
- Are special procedures required to clean up the spill (e.g. pumps, etc.)?

Where the response is HIGH to any of the first three factors, or YES to any of the second three questions then the spill must be considered as HIGH RISK.

Generally, spills of less than 1 litre of most chemicals can be considered LOW RISK unless the material is highly toxic or reactive.

All high risk spills must be managed by the Emergency Services response team. Low risk spills may be managed by area workers under direct supervision.

Spill Response Preparation

Training

Have a plan to give for emergency response, for specific chemical spill, liquid spill ,oil spill gas leakage and odor control response plan development, instruction in spill cleanup techniques and leakage control techniques , and review of hazards found in the work area (chemical, physical, biological) which may be of concern during response.

Hazard Information

Giving a Information on the chemical hazards, gas or odor leakage present at the worksite must be kept up-to-date and readily available Sources of information

include Material Safety Data Sheets, signs, Chemical Inventory, container labels, posters, and reference books.

Equipment

Giving adequate supply of spill response equipment is maintained in each Department. The equipment required includes; first-aid equipment, personal protective equipment, spill cleanup supplies.

Response control Procedures

The procedures provide general guidance for responding to chemical spills, solid spill, oil spill, gas biogas and odor leakages and this document includes a flow chart summarizing the actions which will be taken.

Alcohol Liquids spill

Flammable liquids include ethanol; fuel oil spills of flammable liquids may require a response by the fire department if vapor concentration exceeds the lower explosion limit (LEL). A spill of more than 500 mL is an emergency that requires area evacuation and notification of the fire safety officer. Spills of less than 500mL can be cleaned-up by local personnel who are adequately trained and have the proper spill response equipment available. If this is the case, proceed as follows: If spill is low very low amount, need to follow only, procedure No. (from 4 to 10)

- 1) If spill absorbent is available in the immediate area, dike around the spill (if it is safe to do so. This will prevent the spill from spreading further.
- 2) Immediately extinguish any open flames and, and isolate and evacuate the spill area.
- 3) If the area's ventilation system recalculates the air throughout the building, Shut down the ventilation to prevent the spread of vapor throughout the building. In addition, close any open doors to also help prevent the spread of vapors.
- 4) Assemble spill team members and the spill response kit outside the spill area. **Obtain and read the MSDS** for the substance to determine the hazards associated with it and any special precautions that will need to be take.

Don't the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:

- a. Gloves **as recommended by MSDS or glove manufacturer.**
- b. Splash goggles or face shield.
- c. Shoe covers or rubber boots.
- d. Lab coat or TyvekTM coveralls.
- e. Half mask air-purifying respirator with **organic vapor or combination** cartridges, or **as otherwise recommended by the MSDS or respirator manufacturer.**

If not already done, dike around the spill using spill absorbent or spill pillows. Do not use paper towels to absorb the spill since this increases the rate of evaporation and vapor concentration of the liquid.

Carefully cover the spill area with spill absorbent or spill pillows, starting at the outside and working inward.

Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Store for disposal as hazardous waste.

Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer.

Once the spill has been cleaned up, the area should not be reentered until it has been purged of all remaining vapor. In the absence of air monitoring equipment, wait at least **1 hour** before reentering the area.

Combustible & Other Nonflammable Organic Liquids

Combustible liquids (e.g. mineral spirits) have **flash points above 37.8°C but below 93.3 °C** and are not fire hazards at room temperature. The principal hazard from non-flammable, volatile liquid spills is exposure to the vapor by inhalation or skin absorption. A spill of more than 1 litre is an emergency that requires area evacuation and notification of Safety officer. Spills of less than 1 liter can be cleaned up by site engineer and operator who are adequately trained and have the proper spill response equipment available. If spill is low very low amount, need to follow only ,procedure No.(from 4 to 10)

1. If spill absorbent is available in the immediate area, dike around the spill (if it is safe to do so. This will prevent the spill from spreading further.
2. Immediately extinguish any open flames, and isolate and evacuate the spill area.
3. If the area's ventilation system recalculates the air throughout the building, call the shut down ventilation shut down to prevent the spread of vapor throughout the building. In addition, close any open doors to also help prevent the spread of vapors.
4. Assemble spill team members and the spill response kit outside the spill area.
Obtain and read the MSDS for the substance to determine the hazards associated with it and any special precautions that will need to be taken.
5. Don the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:

Gloves as recommended by MSDS or glove manufacturer.

- a. Splash goggles or face shield.
 - b. Shoe covers or rubber boots.
 - c. Lab coat or TyvekTM coveralls.
 - d. Half mask air-purifying respirator with **organic vapor or combination** cartridges, or **as otherwise recommended by the MSDS or respirator manufacturer.**
6. If not already done, dike around the spill using spill absorbent or spill pillows. Do not use paper towels to absorb the spill since this increases the rate of evaporation and vapor concentration of the liquid.
 7. Carefully cover the spill area with spill absorbent or spill pillows, starting at the outside and working inward.
 8. Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Save for disposal as hazardous waste.
 9. Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer

Enzyme Liquids

1. Assemble spill team members and the spill response kit outside the spill area.
Obtain and read the MSDS for the substance to determine the hazards associated with it and any special precautions that will need to be taken.
2. Don the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - i. must be wear PPE as per MSDS instruction
3. If not already done, dike around the spill using spill absorbent or spill pillows. Do not use paper towels to absorb the spill since this increases the rate of evaporation and vapor concentration of the liquid.
4. Carefully cover the spill area with spill absorbent or spill pillows, starting at the outside and working inward.
5. Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Save for disposal as hazardous waste.
6. Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer

Acid Spills

The principal concern is the corrosive effect of these substances. Dilute solutions irritate the skin, while concentrated solutions can result in burns and also react violently with water.

A spill of more than 1 litre of liquid or 500g of solid acid is an emergency that requires area evacuation and notification of the safety officer and require outside assistance. Spills of less than 1 litre / 500g can be cleaned up under manager control who are adequately trained and have the proper spill response equipment available. If this is the case, proceed as follows for a ~~hila~~ acid spill: If spill is low very low amount, need to follow only, procedure No. (from 4 to 10)

- 1) If spill absorbent is available in the immediate area, dike around the spill if it is safe to do so. This will prevent the spill from spreading further
- 2) Isolate & evacuate the spill area.

- 3) If the spilled chemical is volatile, and the area's ventilation system recalculates the air throughout the building, shut down ventilation shut down to prevent the spread of vapor throughout the building. In addition, close any open doors to also help prevent the spread of vapors.
- 4) Assemble spill team members and the spill response kit outside the spill area. **Obtain and read the MSDS** for the substance to determine the hazards associated with it and any special precautions that will need to be taken.
- 5) Don the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - a. Gloves **as recommended by MSDS or glove manufacturer.**
 - b. Splash goggles or face shield.
 - c. Shoe covers or rubber boots.
 - d. Lab coat or TypeTM coveralls.
 - e. Half mask air-purifying respirator with **acid gas or combination** cartridges, or **as otherwise recommended by the MSDS or respirator manufacturer.**
- 6) If not already done, dike around the spill using spill absorbent or spill pillows. Ideally, use spill absorbent that contains a mild neutralizing agent such as sodium carbonate (soda ash).
- 7) Carefully cover the spill area with spill absorbent or spill pillows, starting at the outside and working inward.
- 8) Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Store for disposal as hazardous waste.
- 9) Check the pH of the spill area. If it is less than pH6, then neutralize with a dilute solution of 5%
 - a. sodium bicarbonate (baking soda)
- 10) Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer.
- 11) Remove and bag personal protective equipment for cleaning or disposal.

Once the spill has been cleaned up, the area should be free of any acid fumes or vapors. However, if odors or irritation is still noted, isolate the area and wait at least **1 hour** before reentering.

Alkali & Base Spills

Like acids, the principal concern is the corrosive effect of these substances. Dilute solutions irritate the skin, while concentrated solutions can result in burns. Concentrated alkali compounds can penetrate deeply and damage underlying tissue.

A spill of more than 1 litre of liquid or 500g of solid alkali or base is an emergency that requires area evacuation and notification of safety officer. Spills of less than 1 litre / 500g can be cleaned up by local personnel who are adequately trained and have the proper spill response equipment available. If this is the case, proceed as follows for a liquid alkali or base spill: If spill is low very low amount, need to follow only ,procedure No.(from 4 to 10)

1. If spill absorbent is available in the immediate area, dike around the spill if it is safe to do so. This will prevent the spill from spreading further.
2. Isolate and evacuate the spill area.
3. If the spilled chemical is volatile, and the area's ventilation system recirculates the air throughout the building, shut down ventilation to prevent the spread of vapor throughout the building. In addition, close any open doors to also help prevent the spread of vapors.
4. Assemble spill team members and the spill response kit outside the spill area.
Obtain and read the MSDS for the substance to determine the hazards associated with it and any special precautions that will need to be taken.
5. Don't the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - i. **Gloves as recommended by MSDS or glove manufacturer.**
 - ii. Splash goggles or face shield.
 - iii. Shoe covers or rubber boots.
 - iv. Lab coat or TyvekTM coveralls.

- v. Half mask air-purifying respirator with cartridges/filters as recommended by the MSDS
6. If not already done, dike around the spill using spill absorbent or spill pillows. Ideally, use spill absorbent that contains a mild neutralizing agent such as sodium carbonate (soda ash)
7. Carefully cover the spill area with spill absorbent or spill pillows, starting at the outside and working inward.
8. Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Store for disposal as hazardous waste.
9. Check the pH of the spill area. If it is greater than pH10, then neutralize with a dilute solution of 5% citric acid.
10. Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer.

For a solid alkali or base spill;

- 1) Isolate the spill area, and assemble spill team members and the spill response kit outside the spill area. **Obtain and read the MSDS** for the substance to determine the hazards associated with it and any special precautions that will need to be taken. If spill is low very low amount, need to follow only ,procedure No.(from 4 to 10)
- 2) Don the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - a. **Gloves as recommended by MSDS or glove manufacturer.**
 - b. Safety glasses or goggles.
 - c. Lab coat.
 - d. Half mask air-purifying respirator with **N95 or greater protection** particulate filter or as

Recommended by the MSDS

If necessary, slightly moisten the solid, to minimize dust production. Use water, or if the material is water reactive, another inert liquid (e.g. ethylene glycol).

Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Store for disposal as hazardous waste.

Remaining solid alkali or base residue may be neutralized using a dilute solution of 5% citric acid.

Check the pH of the spill area; the final pH should be between pH 6 and pH 10. Use spill absorbent or spill pillows to absorb the neutralized residue.

Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer.

Remove and bag personal protective equipment for cleaning or disposal.

Yeast or solid spill:

1. Isolate the spill area, and assemble spill team members and the spill response kit outside the spill area. **Obtain and read the MSDS** for the substance to determine the hazards associated with it and any special precautions that will need to be taken.
2. Don the appropriate personal protective equipment. Depending on the scale of the spill and properties of the spilled substance, this can include:
 - a. **Gloves as recommended by MSDS or glove manufacturer.**
 - b. Safety glasses or goggles.
 - c. Lab coat.
 - d. **Half maskas recommended by the MSDS or respirator manufacturer.**
3. Slightly moisten the solid, to prevent the spread of dust. Use water, or if the material is water reactive, another inert liquid (e.g. ethylene glycol).
4. Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Store for disposal as hazardous waste.
5. Remove any remaining residue using minimal detergent and water. Absorb this wash water using spill absorbent or spill pillows, and dispose of as hazardous waste.

6. Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer.
7. Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Store for disposal as hazardous waste.
8. Remove any remaining residue using minimal detergent and water. Absorb this wash water using spill absorbent or spill pillows, and dispose of as hazardous waste.
9. Mop the affected area using detergent and water. Dispose of this water to the sanitary sewer.

Pressurized Gas or odor leakage

The following procedure should be followed:

- 1) If a leak is suspected, perform a leak test with a commercial leak detection solution or a non- reactive, detergent solution. If the leak is detected or is obvious, proceed to **Step 2**.
- 2) contact safety officer and maintenance engineer and provide information on the nature, extent and exact location of the leak.
- 3) If the cylinder leakage cannot be stopped by closing the cylinder valve, and it is **an inert atmospheric gas** (e.g. nitrogen, carbon dioxide, etc) clear the affected area and/or floor. If the leak is of a **flammable, toxic, or corrosive gas** and is outside of a ventilated enclosure that will contain the gas, immediately activate the building fire alarm system and evacuate the building.
- 3) If the biogas pond cannot stop the ponds leakage by closing with HDPE filler, blow off by blower and burn in flare step until any gas is left, and then leakage must be closed with HDPE filler gun.

Odor leakage waste water treatment plant

- 1) Stop the running machine
- 2) First, dilute by adding water or 10% sulfuric acid solution in trickling filter
- 3) If cannot control, adding effective microorganism (EM) in trickling filter and aerobic pond
- 4) If odor is come from sludge, spray with lime or effective microorganism (EM)

Soil spill control

Soil Coal, rice power solid spill

Preventive action

- Gate must be check coal, soil, raw material container leakage or not and well cover or not before go to the plant
- After Loading and unloading, coal or soil containers will be made with water spray
- After Loading and unloading, truck must be made wet sweeping
- Transferring point (dropping height) must be low
- when the material transferring, transferring machine with be cover with plastic sheet

Response procedure

- 1) Slightly moisten the solid, to prevent the spread of dust. Use water, or if the material is water reactive, another inert liquid (e.g. ethylene glycol).
- 2) Sweep up the residue using spark-proof tools and place the residue into a labeled, plastic, waste container (plastic pail with lid or double heavy duty plastic bags). Store for disposal as hazardous waste.
- 3) Otherwise, must be made wet sweeping.

Record

1. Spill Control Record
2. Record of Personal Protective Equipment (PPE)
3. Corrective Action Request Form
4. Preventive Action Request Form
5. Training Record

APPENDIX E

Obligations of Environmental Management Team from Yangon Distillery Plant (GRGICL)

စဉ်	အမည်	ရာထူး	တာဝန်ဝတ္တရားများ
၁	ဦးစိုးမိုး	Plant Manager	EMP နှင့်ပတ်သက်သောကိစ္စများအား ညွှန်ကြား ဆိုဖြတ်ပေးရန်နှင့် ပံ့ပိုးဖြည့်ဆည်းပေးရန်
၂	ဦးဖြိုးဝေလွင်	Manager (engineering process)	Waste water treatment process အားနည်းပညာထိန်း : ကြောင်းပေးရန်နှင့် EMP ပါ ညွှန်ကြားချက်များအား အကောင်အည်ဖော်ဆောင်ရွက်ရန်။ပတ်ဝန်းကျင်အားပုံမှန်စစ်ဆေးရန် နှင့် report တင်ရန်။ Environmental Manager အဖြစ်ဦးဆောင်ဆောင်ရွက်ရန်။
၃	ဦးသောင်းထွဋ်တိုး	Manager (waste water department)	Waste water treatment process လည်ပတ်ဆောင်ရွက်ရန်နှင့် EMP ပါ ညွှန်ကြားချက်များအားလိုက်နာဆောင်ရွက်ရန်။ပတ်ဝန်းကျင်အားပုံမှန်စစ်ဆေးရန်။
၄	ဦးမျိုးအောင်	Manager (Distillery ဌာန)	မိမိပတ်ဝန်းကျင်သန့်ရှင်းရေးနှင့် မိမိဌာနမှ ရေဆိုးများ ပင်မရေမြောင်းအတွင်းသို့မရောက်ရှိရန် တာဝန်ယူဆောင်ရွက်ရန်။
၅	ဦးနေလင်းအောင်	Manager (M&E ဌာန)	မိမိပတ်ဝန်းကျင်သန့်ရှင်းရေးနှင့် မိမိဌာနမှ ရေဆိုးများ ပင်မရေမြောင်းအတွင်းသို့မရောက်ရှိရန် တာဝန်ယူဆောင်ရွက်ရန်။
၆	Manager	သက်ဆိုင်ရာဌာနများ	မိမိပတ်ဝန်းကျင်သန့်ရှင်းရေးနှင့် မိမိဌာနမှ ရေဆိုးများ ပင်မရေမြောင်းအတွင်းသို့မရောက်ရှိရန် တာဝန်ယူဆောင်ရွက်ရန်။
၇	Manager	ဆက်ဆံရေး	ပတ်ဝန်းကျင်ကျေးရွာများဖြင့်ချိတ်ဆက်ဆောင်ရွက်ရန်နှင့်ဒေသခံရွာများဖွံ့ဖြိုးရေးလုပ်ငန်းများအကောင်အည် ဖော်ဆောင်ရွက်ရန်
	ဌာန Manager များဦးဆောင်ပြီးအပတ်စဉ်ပတ်ဝန်းကျင်အားစောင့်ကြည့်လေ့လာပြီးမှတ်တမ်းထားရှိဆောင်ရွက်သွားရန်။		