BASF Myanmar Manufacturing Co., Ltd

Environmental Impact Assessment (EIA) Report for Manufacturing of Construction Chemical Admixture Project

EIA Report

August, 2019

Prepared by E Guard Environmental Services Co., Ltd

Disclaimer

This report has been prepared by third party; E Guard Environmental Services Co., Ltd. for BASF Myanmar Manufacturing Co., Ltd. for the project of Manufacturing of Construction Chemical Admixture located at Plot No.159, Then Chet Wun U Myu Road, East Dagon Industrial Zone (1), East Dagon Township, Yangon, Myanmar. The report preparation was done inside the framework of Myanmar EIA procedure 2015.

The analysis works had been done based on the provided data of the proposed plan of project from (the client) and onsite observation of environmental parameters guide by Myanmar Government Environmental Authority, Environmental Conservation Department, hereinafter ECD.

The impact assessment and mitigation measure are prepared based on the facts and figures of detail plan/ process of the project obtained from (the client).

Moreover, this report has been prepared in line with the prevailing active laws, rules, procedure, guidelines, and standards etc. of Myanmar legal system on (August/ 2019).

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Report Review Form

Report Title: Environmental Impact Assessment (EIA) Report **For Manufacturing of Construction Chemical Admixture Project**	
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List of Abbreviations

EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
MONREC	Ministry of Natural Resources and Environmental Conservation
NEQ	National Environmental Quality (emission) Guideline
EMOP	Environmental Monitoring Plan
ECD	Environmental Conservation Department
ECC	Environmental Compliance Certificate
IFC	International Finance Corporation
MIC	Myanmar Investment Commission
BASF MM	BASF Myanmar Manufacturing
GIIP	Good International Industry Practice
WHO	World Health Organization
USEPA	United States Environmental Protection Agency
YCDC	Yangon City Development Committee
EPA	Environmental Protection Agency
YESC	Yangon Electricity Supply Corporation
ACGIA	American Conference of Governmental Industrial Hygienists
NAAQS	National Ambient Air Quality Standards
OSHA	Occupational Safety and Health Administration
KPI	Key Performance Indicator
PM10	Particulate Matters Equal to or Less than 10µm
PM2.5	Particulate Matters Equal to or Less than 2.5µm
mph	Miles per hour
RH	Relative Humidity
dB (A)	Decibels A Weight
kV	Kilo Volt
kVA	Kilo Volt Ampere
kWh	Kilo Watt Hour
mg/l	Microgram per liter
mg/NM^3	Milligram per normal cubic meter (the volume of gas under standard condition)

ppb	Parts per billion
ppm	Parts per million by volume
IBC	Intermediate bulk containers
EC	Electrical conductivity
POPs	persistent organic pollutants
HSE	Health and Safety Executive
CCTV	Closed-circuit Television
CFCs	Chlorofluorocarbon
HCFC	Hydro chlorofluorocarbons
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods

၁။ အကျဉ်းချုပ်အစီရင်ခံစာ

၁။ နိဒါန်း

BASF Myanmar Manufacturing Co., Ltd. မှ အကောင်အထည်ဖော်ဆောင်ရွက်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ဓာတုပစ္စည်းထုတ်လုပ်ခြင်း နှင့် ဖြန့်ဖြူးရောင်းချမည့် စက်ရုံစီမံကိန်းနှင့် ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) အစီရင်ခံစာအား E Guard Environmental Services မှ ပြင်ဆင်ရေးသားခဲ့ပါသည်။ မြန်မာနိုင်ငံသည် အာရှပစိဖိတ်ဒေသတွင် ဆောက်လုပ်ရေးသုံး ဓာတုပစ္စည်းဈေးကွက် တည်ဆောက်မှု ၌ တစ်ဟုန်ထိုး တိုးတတ်လာသော နိုင်ငံတစ်ခု ဖြစ်လာသည်နှင့် အညီ BASF ကုမ္ပဏီသည် မြန်မာနိုင်ငံတွင် ၂၀၁၇ ခုနှစ်၌ စတင်ပေါ်ပေါက်လာသော ပထမဆုံး ဆောက်လုပ်ရေးလုပ်ငန်းသုံး အားဖြည့် ဓာတုပစ္စည်း (Chemical Admixture) စီမံကိန်းတစ်ခုဖြစ်သည်။ နယ်ပယ်သတ်မှတ်တိုင်းတာခြင်း နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းစဉ်တွင် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း ၏ အဓိကရည်ရွယ်ချက်သည် ပတ်ဝန်းကျင်ဆိုင်ရာ လိုက်လျောညီထွေဖြစ်မှု နှင့် အဓိကသက်ရောက်နိုင်မှုများကို လေ့လာမှုပြုလုပ်ပြီး တိကျသော သတင်းအချက်အလက်များကို အသုံးပြုကာ သက်ဆိုင်သူများ၏ သဘောထားများ နှင့် အရေးကြီးသည့် ဆုံးဖြတ်ချက်များကို သက်ဆိုင်သူများ၏ သဘောထားများနှင့် အညီ လိုက်လျောညီထွေရှိစေရန်နှင့် ပတ်ဝန်းကျင်ဆိုင်ရာထိရောက်သော လိုက်နာဆောင်ရွက်မှုနှင့် စီမံလိုက်နာမှုများကို သေချာစေရန် ရည်ရွယ်သည်။ မြန်မာနိုင်ငံ၏ ပတ်ဝန်းကျင်ဆိုင်ရာ ဥပဒေ၊ နည်းလမ်းနှင့် သက်ဆိုင်သော လမ်းညွှန်ချက်များနှင့် အညီ BASF Myanmar Manufacturing Co., Ltd သည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာရေးသား ပြုစုရန် အတွက် အီးဂတ်ပတ်ဝန်းကျင်ဝန်ဆောင်မှုအဖွဲ့အား ရွေးချယ် အပ်နှံခဲ့ပါသည်။

အဆိုပြု ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ဓာတုပစ္စည်းထုတ်လုပ်ခြင်း စက်ရုံစီမံကိန်းအတွက် ကနဦး နယ်ပယ်တိုင်းတာသတ်မှတ်ရန် ၂၀၁၈ ခုနှစ်၊ ဖေဖော်ဝါရီလ (၂၀)ရက်တွင် လက်တွေ့ကွင်းဆင်းလေ့လာခဲ့ပါသည်။ ထို့နောက် အီးဂတ်ပတ်ဝန်းကျင်ဝန်ဆောင်မှုကုမ္ပဏီ လီမိတက်မှ ၂၀၁၅ ခုနှစ်တွင်ပြဋ္ဌာန်းထားသော ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်းများနှင့်အညီ ၂၀၁၈ ခုနှစ် ဂျူလိုင်လတွင် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ ရေးသားပြုစုရန် စတင်ပြင်ဆင်ခဲ့ပြီး ပါဝင်သော လေ့လာဆန်းစစ်ရေး အဖွဲ့ဝင်များအား ဇယား ၂.၁ နှင့် သူတို့၏ အကြံပေးမှတ်ပုံတင်နံပါတ်နှင့် ဆက်သွယ်ရန်လိပ်စာများကို အခန်း (၂) တွင်ဖော်ပြထားပါသည်။

၂။ မူဝါဒ၊ ဥပဒေနှင့် အဖွဲ့အစည်းဆိုင်ရာမူဘောင်

ဤအခန်းတွင် စီမံကိန်း၏ ပတ်ဝန်းကျင်နှင့် လူမှုဝန်းကျင်၏ ရှု့ထောင့်နှင့် ဆက်စပ်သော သက်ဆိုင်ရာ မြန်မာနိုင်ငံ၏ တည်ဆဲ မူဝါဒ၊ ဥပဒေ နှင့် အဖွဲ့အစည်းဆိုင်ရာမူဘောင်များနှင့် အပြည်ပြည်ဆိုင်ရာ စံချိန်စံညွှန်းများ ကိုဖော်ပြထားပါသည်။

ဖွံ့ဖြိုးမှု စီမံကိန်း၏ ပတ်ဝန်းကျင်ဆိုင်ရာ ထိခိုက်မှုများနှင့် လူထုထင်မြင်ချက်သည် အပြန်အလှန် ဆက်သွယ်မှု ရှိနေသဖြင့် ပြည့်စုံသော ပတ်ဂန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်းအစီရင်ခံစာသည် အမျိုးမျိုးသော ကဏ္ဍများအတွက် ဥပဒေ၊ နည်းဥပဒေများ ပါရှိသည်။ သက်ဆိုင်ရာ တိုင်းဒေသကြီး ၊ မြို့နယ် နှင့် ကျေးရွာများမှ ဌာနဆိုင်ရာ အဖွဲ့အစည်း အသီးသီးမှ လုပ်ငန်းအဖွဲ့ဝင်များသည် ပတ်ဂန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်းစဉ်တွင် တစ်နည်းနည်းဖြင့်ပါဂင်ကြသည်။ စီမံကိန်း၏ ပတ်ဂန်းကျင်နှင့် လူမှုစီးပွားထင်မြင်ချက်ဆိုင်ရာ မူဂါဒမှာ မြန်မာနိုင်ငံနှင့် အပြည်ပြည်ဆိုင်ရာ၏ လမ်းညွှန်ချက်များ၏ သက်ဆိုင်ရာ မူဂါဒ၊ ဥပဒေ နှင့် သတ်မှတ်ထားသော ဥပဒေရေးရာ မူဘောင်များကို လေ့လာသုံးသပ်ပြီးဖြစ်ပါသည်။ သို့ဖြစ်ပါ၍ ပတ်ဂန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာကို ပတ်ဂန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း လုပ်ငန်းစဉ် ၂၀၁၅၊ အမျိုးသား အရည်အသွေးထုတ်လုပ်မှုနည်းလမ်း ၂၀၁၅၊ အပြည်ပြည်ဆိုင်ရာ ဘဏ္ဍာရေးကော်ပိုရေးရှင်း ၊ ကမ္ဘာ့ကျန်းမာရေး အဖွဲ့အစည်း၏ လမ်းညွှန်ချက်များနှင့် အညီ ရေးဆွဲထားပါသည်။ ပတ်ဂန်းကျင်ဆိုင်ရာ အဆင့်သတ်မှတ်ခြင်း ၂နှင့် စံနမူနာများသည် ပတ်ဂန်းကျင်နှင့် စီမံကိန်း၏ လူမှု စီမံခန့်ခွဲမှု အတွက် စံအမှတ်အဖြစ် အသုံးပြုပါသည်။

၃။ စီမံကိန်းအကြောင်းအရာ ဖော်ပြချက် အခြားနည်းရွေးချယ်ခြင်း

BASF Myanmar သည် မြန်မာနိုင်ငံ၏ ပြည်တွင်းဆောက်လုပ်ရေးသုံး ဓာတုပစ္စည်းဈေးကွက်အား ထောက်ပံ့ ပေးရ န် အတွက် ၎င်း၏ ကွန်ကရစ်ဖော်စပ်ရာတွင် အသုံးပြုနိုင်သော ဓာတုပစ္စည်းထုတ်လုပ်ခြင်း စက်ရုံစီမံကိန်းအား (၁၀၀%) နိုင်ငံခြားရင်းနှီးမြှုပ်နှံမှုဖြင့် စတင်ခဲ့ပါသည်။ BASF မြန်မာ၏ ဆောက်လုပ်ရေးသုံး ဓာတုပစ္စည်းထုတ်လုပ်သည့် စက်ရုံသည် အမှတ် ၁၅၉၊ သံချက်ဂန် ဦးမြူလမ်း အရှေ့ဒဂုံ စက်မှုဇုန် ၁၊ ရန်ကုန်တိုင်းဒေသကြီး၊ မြန်မာနိုင်ငံတွင် တည်ရှိပါသည်။ အဆိုပါစက်ရုံစီမံကိန်း၏ သတ်မှတ်မြေဧရိယာ (၁.၅) ဧကကို ဒေသခံမြေပိုင်ရှင်ထံမှ ငှားယူခဲ့ပါသည်။ ထိုမြေနေရာ၏ ၀.၅ ဧကတွင် တည်ဆောက်ထားပြီးသော တစ်ထပ်အဆောက်အဦအဟောင်းကို BASF Myanmar ၏ ဓာတုပစ္စည်းစက်ရုံ အဆောက်အဦ ဒီဇိုင်းလမ်းညွှန်ချက်များနှင့် အညီ ပြင်ဆင် ပြုပြင်ခဲ့ပါသည်။ စီမံကိန်းမြေနေရာသည် ယခင်က အုတ်ထုတ်လုပ်သည့် စက်ရုံဖြစ်ပြီး ထိုနေရာရှိ အဓိကတစ်ထပ်အဆောက်အဦကို ငှားရမ်း၍ မွမ်းမံပြင်ဆင်အသုံးပြုမည်ဖြစ်သည့်အတွက် တည်ဆောက်သည့်ကာလ မလိုအပ်ပေ။

စက်ရုံလည်ပတ်သည့်ကာလတွင် အဆိုပြုစီမံကိန်း စက်ရုံသည် နေ့ပိုင်းတွင်သာလည်ပတ်မည်ဖြစ်၍ ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ် တစ်ကြိမ်လည်ပတ်လျှင် ၁ နာရီမှ ၂ နာရီကြာမည်ဖြစ်ပြီး တစ်နှစ်လျှင် ၁,၄၅၉ တန် ထုတ်လုပ်မည်ဖြစ်သည်။ ကုန်ကြမ်းအများစုကို နိုင်ငံခြားမှတင်သွင်းရယူပြီး

အချို့ပစ္စည်းများအား ပြည်တွင်းမှ ဝယ်ယူအသုံးပြုမည်ဖြစ်သည်။ အသေးစိတ်ကုန်ကြမ်းစာရင်း နှင့် အဆိုပြုစီမံကိန်းအတွက် လိုအပ်သော သုံးစွဲမှုနှုန်းအား ဇယား ၄.၅ တွင်ဖော်ပြထားပါသည်။ ရေသည် အားဖြည့်ဓာတုပစ္စည်းထုတ်လုပ်သည့် စက်ရုံ၏ အဓိကပါဝင်ပစ္စည်းဖြစ်ပြီး BNS ၊ Lignin နှင့် အခြား အားဖြည့်ပစ္စည်းများလည်း ပါဝင်သည်။ ကုန်ကြမ်းပစ္စည်းသိုလှောင်သည့် ပစ္စည်းများနှင့် ကုန်ချောပစ္စည်းများအား ဇယား ၄.၅ တွင်ဖော်ပြထားပါသည်။ နောက်ဆုံး ရောစပ်ထားသော ထွက်ကုန်အရည်အား(၂၃၃၀) ကုဗမီတာရှိ သိုလှောင်ကန်၊ ၁၀၀၀ လီတာရှိသော IBC ကန်နှင့် ၂၀၀ လီတာရှိသောစည်ပိုင်းတွင်သိုလှောင်ပြီး ကုန်ချောပစ္စည်းများအား ကုန်လှောင်ရုံအတွင်းရှိ ကုန်ချရန်နေရာတွင် သိုလှောင်ထားမည်ဖြစ်သည်။

ကုန်ထုတ်လုပ်သည့်အဆင့် (၄) ဆင့်ပါဝင်သည်။ ၎င်းတို့မှာ (၁) ကုန်ကြမ်းအဆင့်သတ်မှတ်ခြင်းနှင့် ထည့်သွင်းခြင်း၊ (၂) ကြိတ်စက်ထဲတွင်ရောကြိတ်ခြင်း၊ (၃) အရည်အသွေးထိန်းချုပ်ရန် နမူနာများအား ဓာတ်ခွဲခန်းတွင် စစ်ဆေးခြင်း၊ (၄) နောက်ဆုံးထုတ်ပိုးခြင်းအဆင့်တို့ဖြစ်ပါသည်။ BASF မြန်မာ ကုမ္ပဏီသည် ထွက်ကုန်တစ်ခုချင်းစီတိုင်း စံသတ်မှတ်ချက်များနှင့် အညီထုတ်လုပ်ပြီး ဝယ်သူ၏တောင်းဆိုချက်အရ Master builders solutions brand အောက်ရှိ master Ease ၊ Master Glenium နှင့် Master Rheobuild ၊ Master Pozzolith နှင့် Master Kure brand တို့ဖြင့် ကိုယ်တိုင်ရောစပ်ထုတ်လုပ်သော ထုတ်ကုန်များပြုလုပ်လျက်ရှိပါသည်။

အဆိုပြု ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ဓာတုရောစပ်ပစ္စည်းထုတ်လုပ်ရေးလုပ်ငန်း အတွက် ရေအရင်းအဖြစ်အဖြစ် ၆၅ ရာခိုင်နှုန်းခန့်အား ထုတ်လုပ်မှု လုပ်ငန်းစဉ်တွင်သုံးမည်ဖြစ်ပြီး အဝီစိတွင်းမှ လိုအပ်သောရေကို ရယူမည်ဖြစ်သည်။ အဆိုပြုစီမံကိန်းအတွက် လိုအပ်သော လျှပ်စစ် အား အစိုးရ မဟာဓာတ်အားလိုင်းမှ ရယူထားပါသည်။ လောင်စာ၊ လျှပ်စစ်အသုံးပြုမှု၊ ရေအသုံးပြုမှု စာရင်းအသေးစိတ်အား ဇယား (၄.၉) တွင်ဖော်ပြထားပါသည်။

စီမံကိန်းအဆိုပြုသူသည် စက်ရုံ လည်ပတ်သည့်ကာလတစ်လျှောက်လုံးတွင် စွန့်ပစ်ပစ္စည်း ထုတ်လွှတ်မှု သတ်မှတ်ချက်ကို စနစ်တကျဆောင်ရွက်သွားမည်ဖြစ်သည်။ ကုန်ထုတ်လုပ်သည့် နေရာနှင့် ရုံးပိုင်းတို့မှ ထွက်သော စွန့်ပစ်ပစ္စည်းများအားလုံးအား အန္တရယ်ရှိသော စွန့်ပစ်ပစ္စည်းနှင့် အန္တရယ်မရှိသော စွန့်ပစ်ပစ္စည်း ဟူ၍ သီးခြား ခွဲခြားထားပါမည်။

BASF ဓာတုစက်ရုံ၏ ရည်ရွယ်ချက်ပန်းတိုင်မှာ BASF အုပ်စုတစ်စုလုံးသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုစနစ်နှင့်အညီ တာဝန်ယူမှု တာဝန်ခံမှုတို့ဖြင့် ဆောင်ရွက်မှုပေးသော စက်ရုံဖြစ်လာစေရန်ဖြစ်သည်။ စီမံကိန်းတစ်ခုလုံး၏ ဒီဇိုင်းပုံစံအား ကမ္ဘာအနှံ့မှ BASF စက်ရုံများ၏ အဆင့်နှင့် လမ်းညွှန်ချက်များအတိုင်း ပတ်ဝန်းကျင်နှင့် ကိုက်ညီမှုရှိစေရန် ထည့်သွင်းစဉ်းစားထားပါသည်။

ရင်းနှီးမြှုပ်နှံမှုကာလ နှစ် (၅၀)နှစ် ထပ်တိုးကာလ (၁၀)နှစ် နှစ်ကြိမ်ဖြစ်ပြီး နောက်ပိုင်းကာလ သည် ပိတ်သိမ်းကာလဖြစ်သည်။

၄။ စီမံကိန်းပတ်ဝန်းကျင်ဆိုင်ရာ အခြေအနေ

အခြေခံ ပတ်ဝန်းကျင်အနေအထားလေ့လာမှုများကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနှင့် သစ်တောရေးရာဝန်ကြီးဌာန ၏ ပတ်ဂန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း လုပ်ထုံးလုပ်နည်းနှင့် အမျိုးသားပတ်ဂန်းကျင်ဆိုင်ရာ အရည်အသွေး(ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ (၂၀၁၅) နှင့် အညီ ပြုစုထားပါသည်။ ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေခံအချက်အလက်စုဆောင်းမှု အနေဖြင့် ပတ်ဂန်းကျင်နှင့် လူမှုစစ်တမ်းကောက်ယူမှုအား စီမံကိန်းဇရိယာ နှင့် စီမံကိန်းအနီးပတ်ဂန်းကျင်ဇရိယာများတွင် စက်ရုံပြုပြင်မွမ်းမံနေသည့်ကာလ (ဂျူလိုင် ၉ ရက်နေ့ နှင့် ၁၀ ရက်၊ ၂၀၁၈) တွင်ပြုလုပ်ခဲ့ပြီး အရှေ့ဒဂုံစက်မှုဇုန် (၁) ၏ မြို့နယ်ဆိုင်ရာ အချက်အလက်များအား ရယူစုဆောင်းခဲ့ပါသည်။ စီမံကိန်းဇရိယာရှိ မြေအောက်ရေ (ရေတွင်း) နှင့် ရေဆိုး (အများသုံး ရေမြောင်း) မှ ရေနမူနာကောက်ယူ၍ သက်ဆိုင်ရာ အသိအမှတ်ပြုဓာတ်ခွဲခန်းဆီသို့ ပို့ဆောင်စစ်ဆေးကာ စမ်းသပ်စေခဲ့ပြီး ရလာဒ်များကို လေ့လာစမ်းစစ်ခဲ့ပါသည်။ ဓာတ်ခွဲခန်းမှ ရလာဒ်များအား နောက်ဆက်တွဲ (၉) နှင့် (၁၀) တွင် ဖော်ပြထားပါသည်။

စီမံကိန်းဇရိယာအတွင်းရှိ ပတ်ဂန်းကျင်အခြေအနေ

အကြောင်းအရာ	အသေးစိတ်
လတ္တီကျူ နှင့် လောင်ဂိုကျူ	16°54'38.50"N and 96°14'44.55"E
မြေမျက်နှာသွင်ပြင်အနေအထား	စီမံကိန်းတည်နေရာသည် မြေပြန့်နေရာဖြစ်ပြီး ပင်လယ်ရေမျက်နှာပြင်အထက် အမြင့်ပေ ၃၀ တွင်တည်ရှိပါသည်။
အဆိုပြုစီမံကိန်းရှိ လက်ရှိမြေအသုံးချမှု	စီမံကိန်းမြေဇရိယာသည် စက်မှုဇုန် မြေနေရာဖြစ်ပြီး စက်ရုံများအများအပြားရှိ၍ ဒဂုံမြို့သစ်အရှေ့ နှင့် နယ်နိမိတ်ချင်းထိစပ်လျက်ရှိကာ စက်မှုဇုန်ဇကမှာ ၆၆၆ ဇကရှိပါသည်။
မြေအရည်အသွေး	စီမံကိန်း မြေဇရိယာအတွင်း ရှိ မြေအမျိုးစားအများစုမှာ မြက်ခင်းပြင်အမျိုးအစားဖြစ်၍ အနီးအနားတစ်ဝိုက်တွင် မြစ်ချောင်းရှိပြီး ရံဖန်ရံခါတွင် မြစ်ရေတက်လေ့ရှိသည်။ ကာဗွန်ဒိုင်အောက်ဆိုဒ်မပါဂင်သောမြေဖြစ်ပြီး ဆားပါဂင်မှုများသောမြေဖြစ်သည်။ မြေအရည်အသွေး၏ ဓာတုဂုဏ်သတ္တိပါဂင်မှုအား ဇယား ၅.၃ နှင့် နောက်ဆက်တွဲ ၁၁ တွင်ဖော်ပြထားပါသည်။
ရေအရင်းအမြစ်နှင့် ရေအရည်အသွေး	ပဲခူးမြစ် (စီမံကိန်းဇရိယာမှ ၇၉၀၀ မီတာအကွာ)၊ ငမိုးရိပ်ချောင်း (စီမံကိန်းဇရိယာမှ ၄၅၀၀ မီတာအကွာ)၊ မြေအောက်ရေ နှင့် အများသုံးမြောင်း ရေအရည်အသွေး ဓာတ်ခွဲစစ်ဆေး

	စမ်းသပ် တိုင်းတာမှု ရလဒ်များအား နောက်ဆက်တွဲ ၉ နှင့် ၁၀ တို့တွင်ဖော်ပြထားပါသည်။
လေအရည်အသွေး	စီမံကိန်းဧရိယာအတွင်းရှိ PM10 ၊ PM2.5၊ ကာဗွန်မိုနောက်ဆိုဒ်၊ ကာဗွန်ဒိုင်အောက်ဆိုဒ်၊ ဆာလဖာဒိုင်အောက်ဆိုဒ်၊ နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ် တို့၏ လေအရည်အသွေး အား HAZ-SCANNER (EPAS) စက်ဖြင့် ဂျူလိုင်လ ၉ ရက်နေ့နှင့် ၁၀ ရက်နေ့များတွင် တိုင်းတာခဲ့ပါသည်။ ရရှိလာသောလေအရည်အသွေးများသည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်၏ စံသတ်မှတ်ချက်အတွင်းတည်ရှိနေကြောင်း ဇယား ၅.၈ တွင်ဖော်ပြထားသည်။
ဆူညံမှု အဆင့်တိုင်းတာချက်	စီမံကိန်းဧရိယာအတွင်းရှိ ဆူညံမှုအဆင့်တိုင်းတာရန် အသံတိုင်းကိရိယာအား ဂျူလိုင် ၉ ရက်နှင့် ၁၀ ရက် (၂၀၁၈)ခုနှစ်တွင် ၂၄ နာရီအဆက်မပြတ် တိုင်းတာခဲ့ပြီး နေ့ အချိန် တွင် ၆၆.၀၁ db ဖြစ်ပြီး ညအချိန်တွင် ၅၉.၈၉ db ဖြစ်ပါသည်။ ဆူညံမှု တိုင်းတာချက်ရလဒ်သည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လမ်းညွှန်ချက် ၏ စံသတ်မှတ်ချက်အတွင်းတွင် တည်ရှိပါသည်။
အန္တီးစပ်ဆုံး ရထားဘူတာ	တိုးကြောင်ကလေး ဘူတာ (စီမံကိန်းဧရိယာမှ ၆၃၃ မီတာ အကွာ)တွင်တည်ရှိပါသည်။
အန္တီးစပ်ဆုံး သာသနာ့ဆိုင်ရာ အဆောက်အအုံ	မရှိပါ။
ကာကွယ်တားမြစ်ထားသော အဆောက်အအုံ	မရှိပါ။ စီမံကိန်းဧရိယာ၏ ၁ ကီလိုမီတာပတ်လည်ကို အဓိက သက်ရောက်မှုရှိသောနေရာအဖြစ် သတ်မှတ်ထားရှိပါသည်။

စီမံကိန်းဧရိယာသည် လေးထောင့်ပုံစံဖြစ်ပြီး အရှေ့ဘက်အခြမ်းတွင် လူနေအိမ်ခြေများ နှင့် အခြားစက်ရုံများ၊ ကျန်နေရာများနှင့် စီမံကိန်းအနီး ပတ်ဝန်းကျင် နေရာများတွင် မြေနေရာ အလွတ်များ ရှိသည်။ စီမံကိန်းတည်နေရာပြမြေပုံများအား ပုံ (၄.၂) တွင်ဖော်ပြထားသည်။ စီမံကိန်း၏ အရှေ့ဘက်တွင် ဓာတ်ငွေ့ပိုက်လိုင်းရှိပြီး၊ တောင်ဘက်နှင့် အနောက်ဘက်အခြမ်းတွင် မြေကွက်အမှတ် (၁၅၈) နှင့် မြောက်ဘက်ခြမ်းတွင် မြေကွက်အမှတ် (၁၆၀) တို့အသီးသီး တည်ရှိပါသည်။ ဒဂုံမြို့သစ်အရှေ့ဘက်ခြမ်း၏ ၂၀၁၇ ခုနှစ် မြို့နယ် အချက်အလက်အရ စီမံကိန်းဧရိယာသည် အရှေ့ဒဂုံ စက်မှုဇုန် ၁ တွင် တည်ရှိ၍ မြို့ပြနှင့် နီးစပ်လျက်ရှိပါပြီး သစ်တောများ ကာကွယ်ထားသောမြေနေရာများ၊

ကမ်းရိုးတမ်းဒေသရှိ အရင်းအမြစ်များ၊ တားမြစ်ထားသော အဆောက်အအုံများ စီမံကိန်းဧရိယာတွင် မတည်ရှိပါ။ လူမှုစီးပွားစစ်တမ်းအား စီမံကိန်းဧရိယာ၏ မီတာ ၅၀၀ အတွင်းရှိ နီးစပ်လျက်ရှိ သော လူနေအိမ်များသို့ ဂျူလိုင်လ ၂၀၁၈ တွင် ပြုလုပ်ခဲ့ပါသည်။ ၎င်းအိမ်ယာများအနက်မှ နမူနာ အဖြစ်မေးမြန်းလာသော လူ ၂၉ ယောက်၏ လက်ရှိ လူမှုစီးပွားအခြေအနေနှင့် စီမံကိန်းအပေါ် ထင်မြင်ယူဆချက်များ၏ အသေးစိတ်ကို အခန်း ၄ တွင် ဖော်ပြထားပါသည်။

၅။ သက်ရောက်မှု၊ ထိခိုက်နိုင်မှုနှင့် လျော့ချမှု နည်းလမ်းများ

အဆိုပြုစီမံကိန်းဧရိယာအတွင်းရှိ သတင်းအချက်အလက်များ၊ မြို့နယ်သတင်းအချက်အလက်များ၊ စီမံကိန်းဧရိယာအနီးရှိ ပတ်ဝန်းကျင်အနေအထား အပေါ်အခြေခံ၍ သိသာထင်ရှားသော သက်ရောက်မှုများမှာ အနည်း အဆင့် မှ အလယ်အလတ်အဆင့် အထိ သတ်မှတ်နိုင်ပါသည်။ ဓာတုရောစပ် ဓာတ်ကူပစ္စည်းထုတ်လုပ်မှု စက်ရုံ၏ ပတ်ဝန်းကျင်နှင့် လူထု ထိခိုက်နိုင်မှု အလားအလာများသည် စက်ရုံ၏ အနေအထား၊ ဓာတုထုတ်လုပ်မှု၏ ရုပ်ပိုင်းဆိုင်ရာ အနေအထားပေါ်မူတည်၍ ကြီးမားသောဆုံးရှုံးမှု၊ သိုလှောင်မှု ပစ္စည်း၊ နှင့် အခြား ညစ်ညမ်းသော ပစ္စည်းများပေါင်းစပ်ဖွဲ့စည်းမှု နှင့် ထိခိုက်လွယ်သော အနီးပတ်ဝန်းကျင်ပေါ်တွင်မူတည်ကြောင်း ဖော်ပြထားသည်။

စီမံကိန်း ပြုပြင်မွမ်းမံခြင်းနှင့် တည်ဆောက်ခြင်းကာလသည် ကမ္ဘာအနှံ့ရှိ BASF၏ ပုံစံအတိုင်း မေလ ၂၀၁၈ ခုနှစ်တွင် ဆောက်လုပ်ပြီးစီးခဲ့ပြီးဖြစ်သည်။ သို့ဖြစ်သောကြောင့် စက်ရုံပြုပြင်ခြင်းနှင့် တည်ဆောက်ခြင်းကာလအတွက် ထိခိုက်နိုင်မှုနှင့် လျော့ချရန်နည်းလမ်းများအား ဤအခန်းတွင် ထည့်သွင်းစဉ်းစားရန်မလိုအပ်ပေ။

ကွန်ကရစ် ဓာတုပေါင်းစပ်စက်ရုံ လုပ်ငန်းလည်ပတ်စဉ် ကာလအတွင်း ခန့်မှန်းထားရှိသော သက်ရောက်မှုများတွင် ပါဝင်မှုများမှာ-

ပတ်ဝန်းကျင်ဆိုင်ရာ သက်ရောက်မှု အကျဉ်းချုပ်

၁။ **လေအရည်အသွေးသက်ရောက်မှု** - ထုတ်လုပ်ရေး လုပ်ငန်းစဉ်တွင် မီးခိုးခေါင်းတိုင်ကဲ့သို့သော အဓိက ထုတ်လွှတ်မှုများမရှိပေ။ သို့သော် ဓာတ်ငွေ့များသည် လုပ်ငန်းလည်ပတ်နေစဉ်အတွင်းရှိ ပိုက်လိုင်းများ ယိုစိမ့်မှု၊ အဆို့ရှင်မှ ယိုစိမ့်မှု၊ နှင့် အငွေ့ပြန်လွယ်သော ဓာတုပစ္စည်း များအရည်ပျော်၍ ဆုံးရှုံးခြင်းတို့မှ ထွက်ပေါ်လာနိုင်သည်။ အငွေ့ထိန်းချုပ် စနစ်အားလုပ်ငန်းလည်ပတ်နေသော ဧရိယာအတွင်းတပ်ဆင်မည်ဖြစ်ပြီး အငွေ့ပြန်လွယ်သော ဓာတုပစ္စည်းများယိုစိမ့်မှုလျော့ချရန် လိုအပ်သော နည်းပညာဆိုင်ရာ အထောက်အပံ့များလိုအပ်မည်ဖြစ်သည်။ ကုန်ကြမ်းအရည်အား လုံး၏ကိုင်တွယ်ခြင်းနှင့် ပြောင်းရွှေ့ရာတွင် ပိုက်လိုင်းများနှင့် တပ်ဆင်ထားသော လိုင်းများအတွင်း ဖြတ်သန်းသွားလာစေပြီး လုပ်ငန်းခွင်အတွင်းရှိ အငွေ့ပြန်လွယ်သော ဓာတုပစ္စည်းများ ထိန်းချုပ်မှု စနစ်အား စီစဉ်ထားရန်လိုအပ်သည်။

၂။ **ရေအရည်အသွေးသက်ရောက်မှု** - လုပ်ငန်းလည်ပတ်စဉ်ကာလအတွင်း စက်ရုံတစ်ခုလုံး၏ မြေအောက်ရေသုံးစွဲမှု၊ စက်ရုံမှ ထွက်ရှိသော စွန့်ပစ်ရေ နှင့် ရုံးတွင်းပိုင်းမှ ထွက်ရှိသော စွန့်ပစ်ရေတို့မှ အနှုတ်သဘောဆောင်သော သက်ရောက်မှုများ ဖြစ်နိုင်သည်။ ရေသုံးစွဲမှု ပမာဏအား ရေထိန်းချုပ်မှု အစီအစဉ်အား အသုံးပြုပြီးလျော့ချနိုင်ပါသည်။ လုပ်ငန်းမှထွက်ရှိလာသော အရည်များအား IBC tank များအားအသုံးပြီး နောက်ထပ်အဆင့်များအား ပြန်လည် အသုံးပြုစေပါသည်။ ထွက်ရှိလာသောအရည်များ၏ သက်ရောက်မှုသည် အနည်းငယ်သာ ရှိကြောင်း ခန့်မှန်းထားပါသည်။

၃။ **ဆူညံမှု အဆင့်** - ဆူညံမှုသည် လုပ်ငန်းလည်ပတ်နေစဉ်အတွင်း စက်ရုံမှ စက် အသံများနှင့် သယ်ယူပို့ဆောင်ရေးကားများကြောင့် ဖြစ်သည်။ သို့သော် ဤဆူညံသံများ၏ သက်ရောက်မှု ဆိုးကျိုးသည် နည်းပါးသည်။

၄။ **ပတ်ဝန်းကျင်မြေပြင်အပေါ် သက်ရောက်မှု** - စီမံကိန်းတည်နေရာတွင် စက်ရုံလည်ပတ်စဉ်အတွင်း မြေအနေအထား အပေါ် သက်ရောက်မှုအား ထည့်သွင်းစဉ်းစားရန်မလိုပေ။ အဘယ်ကြောင့်ဆိုသော် အဆိုပြုသူသည် အန္တရာယ်ရှိပစ္စည်းများနှင့် စွန့်ပစ်ပစ္စည်း သိုလှောင်မည့် ဇရိယာအတွက် လိုအပ်သော ထိခိုက်မှုလျော့ချရေး ဆိုင်ရာ ပစ္စည်းများကို ဥပဒေလိုအပ်ချက်များအပြင် BASF ၏ Responsible Care Management System တို့နှင့်အညီ ပြင်ဆင်ထားပါသည်။

ထို့ကြောင့် ထုတ်လုပ်မှု လုပ်ငန်းစဉ်မှ ထွက်ရှိလာသော အန္တရယ်ရှိသော စွန့်ပစ်ပစ္စည်းများအား Dowa အန္တရာယ်ရှိသော စွန့်ပစ်ပစ္စည်း ထောက်ပံ့ရုံသို့ ပို့လွှတ်ခြင်းအားဖြင့် ပြဌာန်းဥပဒေအရ ကိုင်တွယ်ခြင်းနှင့် အန္တရယ်ရှိစွန့်ပစ်ပစ္စည်း၏ လုပ်ငန်းဇရိယာအတွင်း ပတ်ဝန်းကျင်မြေထုအား ထင်ရှားသော သက်ရောက်မှုမရှိပေ။

၅။ **ဂေဟစနစ်အပေါ် သက်ရောက်မှု** - စီမံကိန်းတည်နေရာသည် အပင်နှင့်တိရွစ္ဆာန်များအား ထိခိုက်မှုဖြစ်စေနိုင်သော နေရာနှင့် ဝေးကွာပြီး အခြားလေထုညစ်ညမ်းမှု၊ ဆူညံမှု တို့အား အနီးနားတစ်ဝိုက်တွင်မတွေ့ရှိရပေ။ စီမံကိန်းအနေအထားအရ ဒဂုံမြို့သစ်အရှေ့ဘက် ၏ (၂၀၁၇) ခုနှစ် စစ်တမ်းကောက်ယူမှု အရ ၎င်း ဒေသအတွင်းတွင် ထိခိုက်နိုင်သော အပင်နှင့် တိရွစ္ဆာန်များမရှိပေ။

လူမှုပတ်ဝန်းကျင်သက်ရောက်မှု အကျဉ်းချုပ်

စီမံကိန်းပတ်ဝန်းကျင်ရှိ လူမှုစစ်တမ်းကောက်ယူခြင်း ၊အရ ဒေသခံပြည်သူများသည် စက်ရုံတည်ဆောက်စဉ်နှင့် ဖျက်သိမ်းစဉ်ကာလအတွင်း ယာယီအလုပ်ကိုင်များ၊ စက်ရုံ လည်ပတ်စဉ်အတွင်း အမြဲတမ်း အလုပ်ကိုင်များ ဖန်တီးပေးနိုင်သည်။ ထို့ကြောင့် နေထိုင်မှုနှင့် စားသောက်ရေးအတွက် ကောင်းမွန်သော သက်ရောက်မှုများ အား စီးပွားရေးအားနည်းသော ဒေသခံပြည်သူများ အားရရှိစေနိုင်သည်။

သို့သော် လုပ်ငန်းခွင်ဘေးအန္တရာယ် ဖြစ်ပေါ်ခြင်း၊ မြေအောက်ရေ အရင်းမြစ်သုံးစွဲခြင်း၊ အန္တရာယ်ဖြစ်စေနိုင်သော ပစ္စည်းများအသုံးပြုခြင်း၊ ဓာတုပစ္စည်းများကိုင်တွယ် အသုံးပြုခြင်း၊ သိုလှောင်ခြင်း၊

ဓာတုရောစပ်လုပ်ငန်းလည်ပတ်ခြင်း၊ လုပ်ငန်းလည်ပတ်နေစဉ်အတွင်း မီးနှင့် အခြားပေါက်ကွဲစေနိုင်သော အရာများအား သင့်တော်သောကိုင်တွယ်မှု ပြုလုပ်ခြင်းမရှိသောကြောင့် ပေါက်ကွဲစေနိုင်ခြင်း စသော လူမှု ထိခိုက်စေနိုင်မှု အလားအလာများဖြစ်ပေါ်စေနိုင်ပါသည်။

လူမှုစီးပွားရေးနှင့် ကျန်းမာရေးထိခိုက်နိုင်မှု အလားအလာသည် ဓာတုပစ္စည်းထုတ်လုပ်ခြင်းနှင့် တပ်ဆင် အားဖြင့်သိုလှောင်ခြင်းဖြင့် လုပ်သားများ၏ ကျန်းမာရေးအား သွယ်ဝိုက်၍လည်း ထိခိုက်နိုင်ကြောင်း ထည့်သွင်းစဉ်းစားရမည်။ BASF'S Responsible Care Management စနစ်အရ စီမံကိန်းထောက်ခံအားပေးသူများသည် လုပ်ငန်းလည်ပတ်စဉ်အတွင်း စီမံကိန်းအနီးအနားရှိ သူများအား မျှော်မှန်းထားသော ဆိုးရွားသည့် ထိခိုက်နိုင်မှု၊ ကျန်းမာရေးနှင့် လုံခြုံရေး အခြေအနေများအားများ စီမံဆောင်ရွက်ထားရမည်။ ကမ္ဘာအနှံ့ရှိ BASF ကုမ္ပဏီများသည် ၎င်းတို့၏ထုတ်ကုန်များသည် အလုပ်သမားများ၏ ကျန်းမာရေး၊ ဘေးပတ်ဝန်းကျင်အား ထိခိုက်မှုမရှိစေရေး၊ ဝယ်သူများနှင့် ကမ္ဘာတစ်ပှမ်းလုံးရှိ သုံးစွဲသူများအား လုံခြုံမှု ရရှိစေရန် အခိုင်အမာပြောကြားထားသည်။

အဆိုပြုစီမံကိန်းစက်ရုံ၏ စီမံကိန်းဖျက်သိမ်းဆင့်တွင် ဖြစ်ပေါ်နိုင်ခြေရှိသော ပတ်ဝန်းကျင်နှင့် လူထု သက်မှု ဖြစ်နိုင်ခြေများအား လျော့ချမှု လုပ်ငန်းစဉ်များအား အခန်း ၅ တွင်ဖော်ပြထားပါသည်။

၆။ အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ (၂၀၁၅) ခုနှစ်၊ အပိုဒ်နံပါတ် ၁၀၅ ၏ ဖော်ပြချက်အရ စီမံကိန်းထောက်ခံသူများသည် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာ ရေးဆွဲနေစဉ်အတွင်း ဒေသခံပြည်သူများထံသို့ စီမံကိန်းအတွက် ပတ်ဝန်းကျင်နှင့် လူထုထိခိုက်နိုင်မှု ရလဒ်များအား လူထုတွေ့ဆုံပွဲ ပြုလုပ်၍ သတင်းအချက်အလက်များပေးမျှရမည်။ ဤအခမ်းအနားကို ဇပရယ် ၁၁ ရက်၊ ၂၀၁၉တွင် ရန်ကုန်တိုင်းဒေသကြီး၊ စက်မှုဇုန် စီမံကိန်းကော်မတီရုံး၊ ဒဂုံမြို့သစ်အရှေ့၊ ကနောင်ခန်းမတွင် ကျင်းပပြုလုပ်ပြီး သက်ဆိုင်ရာ အစိုးရဝန်ကြီးများ၊ ဒေသခံပြည်သူများ နှင့် အခြား ဓာတုစက်ရုံ အကြောင်းစိတ်ဝင်စားသောသူများတက်ရောက်ခဲ့ပါသည်။ အစည်းအဝေးပွဲတွင် ဒေသခံပြည်သူများ၏ လူမှုစီးပွားဆိုင်ရာ ဖွံ့ဖြိုးရေးလုပ်ငန်းများ ဆောင်ရွက်မည့် CSR အစီအစဉ်၊ အရေးပေါ် တုံ့ပြန်မှု အစီအစဉ် နှင့် ကုမ္ပဏီ၏ ထုတ်ကုန်များ သတင်းအချက်အလက်နှင့် ဆွေးနွေးမှု၊ အကြံဉာဏ်ပေးမှု အသေးစိတ် အချက်အလက်များအား အခန်း ၉ တွင်ဖော်ပြထားပါသည်။

၇။ ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်

ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း လေ့လာမှုတွင် ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်သည် အစိတ်အပိုင်းတစ်ခု အနေနှင့်ပါဝင်ပြီးဖြစ်သည်။ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်အတွက် လိုအပ်သော ဆောင်ရွက်မှုအစီအစဉ်ကိုပြင်ဆင်ရာတွင် စီမံကိန်းပြင်ဆင်မှုကာလနှင့် ဆောင်ရွက်မှုကာလအတွင်း အဓိကဖြစ်ပေါ်နိုင်သော ဆိုးကျိုးများကိုအခြေခံစဉ်းစား၍ လျော့ချရေးနည်းလမ်းများနှင့်တကွ ကာကွယ်ရေး

လုပ်ဆောင်ရမည့် တာဝန်များကိုပါ လိုအပ်သော ပတ်ဂန်းကျင် စီမံခန့်ခွဲမှု အစီအစဉ်အား ပြင်ဆင်ရန် ထည့်သွင်းရေးဆွဲခဲ့ပါသည်။

ပတ်ဂန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်တွင် အဆိုပြုစီမံကိန်း သည် မျော်မှန်းထားသော သက်ရောက်နိုင်သည့် အခြေအနေ၊ လျော့ချမှု အစီအစဉ်များ၊ စီမံခန့်ခွဲမှု နည်းစနစ်များ၊ စောင့်ကြပ်ကြည့်ရှုသည့် အစီအစဉ်များအား ပြင်ဆင်ခဲ့ပါသည်။

အသေးစိတ် ပတ်ဂန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်တွင် အဆိုပြုစီမံကိန်း၏ စက်လည်ပတ်ချိန်နှင့် ဖျက်သိမ်းဆင့်တွင် ဖြစ်ပေါ်နိုင်သော ပတ်ဂန်းကျင်နှင့် လူမှုထိခိုက်စေနိုင်မှု လျော့ချမှု အစီအစဉ်၊ အရေးပေါ်တုံ့ပြန်မှု အစီအစဉ်၊ ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ် အတွက် အသုံးပြုမည့် ရန်ပုံငွေ လျာထားချက်၊ ဒေသခံပြည်သူများ၏ လူမှုစီးပွားဆိုင်ရာ ဖွံ့ဖြိုးရေး လုပ်ငန်းများဆောင်ရွက်မည့် အစီအစဉ်၊ စီမံကိန်းအတွက် စောင့်ကြပ်ကြည့်ရှု့မည့် အစီအစဉ် နည်းလမ်းများအား ဇယား ၈.၃၊ ၈.၇ နှင့် ၈.၉ တွင် အသီးသီးဖော်ပြထားပါသ BASF Myanmar ၏ ပတ်ဂန်းကျင်ဆိုင်ရာ လိုက်နာမှု နည်းလမ်းများသည် ပတ်ဂန်းကျင် ထိန်းသိမ်းရေး ဌာန၏ လမ်းညွှန်ချက်အတိုင်း ပုံမှန်စစ်ဆေးလုပ်ဆောင်မည်ဖြစ်ပါသည်။

၈။ နိဂုံးချုပ်နှင့် ထောက်ခံအကြံပြုချက်များ

လေ့လာမှုနယ်ပယ်နှင့် တာဂန်ဂတ္တရား (TOR) တွင်ဖော်ပြထားသည့်အတိုင်း ပတ်ဂန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆောင်ရွက်သူအဖွဲ့သည် အဆိုပြု အစီအစဉ်ပေါ်မူတည်၍ ပတ်ဂန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းအားလုပ်ဆောင်ခဲ့ပါသည်။ လုပ်ငန်းလည်ပတ်ချိန်နှင့် ဖျက်သိမ်းချိန် အတွင်းတွင် ဖြစ်ပေါ်နိုင်ခြေရှိသော ပတ်ဂန်းကျင်ဆိုင်ရာ သက်ရောက်မှုများ၊ လျော့ချမှု နည်းလမ်းများ အား ပတ်ဂန်းကျင်စီမံခန့်ခွဲမှု အစီအစဉ်တွင် ဖော်ပြထားပါသည်။ BASF Myanmar ၏ ဆောက်လုပ်ရေးသုံးဓာတုရောစပ်စက်ရုံသစ် သည် ပြည်တွင်းဆောက်လုပ်ရေးစျေးကွက်သို့အရည်အသွေးကောင်းမွန်သော ဆောက်လုပ်ရေးသုံးဓာတုပစ္စည်းများအား ထောက်ပံ့ပေးမည်ဖြစ်ပါသည်။ ဓာတုပေါင်းစပ် ထုတ်လုပ်ရေးလုပ်ငန်းစဉ်အရ နည်းပညာ အသုံးပြုမှု၊ ပတ်ဂန်းကျင်ထိခိုက်နိုင်မှု လျော့ချခြင်း အတိုင်းအတာများ၊ ပတ်ဂန်းကျင်နှင့် စက်ရုံ အနားရှိ လူများ၏လူမှုရေးအခြေအနေများ လေ့လာရရှိမှု အရ စီမံကိန်းကြောင့် အလုပ်သမားများ၏ လူမှု စီးပွားအခြေအနေ အား ကောင်းမွန်သော သက်ရောက်မှု ဖြစ်လာနိုင်သည်။ ဤစီမံကိန်းကြောင့် စက်ရုံအနီးပတ်ဂန်းကျင်သို့ ဆိုးရွားသော သက်ရောက်မှု အနည်းငယ်ဖြစ်စေနိုင်သည်။ အသီးသီးလျော့ချမှု တိုင်းတာချက်များအား အစီရင်ခံစာတွင် ဖော်ပြပြီးဖြစ်ပါသည်။ BASF Myanmar ကုမ္ပဏီသည် ပတ်ဂန်းကျင်စီမံခန့်ခွဲမှု အစီရင်ခံစာတွင်ဖော်ပြထားသည့်အတိုင်း ဘေးပတ်ဂန်းကျင်သို့ သက်ရောက် မှုများအား ပြီးမြောက်အောင် လုပ်ဆောင်မည်ဖြစ်သည်။ ဖော်ပြထားသောစီမံကိန်းအတိုင်းအတာ နှင့် စီမံကိန်း၏ ပတ်ဂန်းကျင်အကျိုးပြုမှုများအား လက်ခံထည့်သွင်းစဉ်းစားခဲ့ပါသည်။ BASF Myanmar ဓာတုပေါင်းစပ် ထုတ်လုပ်သည့် စီမံကိန်း၏ စက်ရုံ အသစ်သည် ပြည်တွင်းဆောက်လုပ်ရေး စျေးကွက်စီးပွားအား အထောက်အပံ့ပေးမည်ဖြစ်ပါသည်။

1. EXECUTIVE SUMMARY

1. INTRODUCTION

This EIA report has prepared by E Guard Environmental Services on behalf of BASF Myanmar Manufacturing Co., Ltd as part of the Environmental and Social impact Assessment (EIA) process for chemical admixture plant. Myanmar is one of the fastest growing construction chemical markets in Asia Pacific for BASF as the new first chemical admixture plant project initiated on 2017. In Scoping and EIA process, Environmental Impact Assessment (EIA) aims to ensure effective compliance and governance concerning the environment, whereas simultaneously focusing on key issues such as stakeholder's empowerment, providing access to relevant and concise information to enable informed decision-making. In line with the Environmental Law, Environmental Rules, and related guidelines in Myanmar, BASF Myanmar Manufacturing Co,. Ltd selected an independent consulting firm, E Guard Environmental Services team to undertake the EIA for this project.

Initial site visit for scoping stage of proposed chemical Admixture production factory carried out on 20 February 2018. E Guard Environmental Services Co., Ltd. started the EIA report preparation on July 2018 in line with Environmental Impact Assessment Procedure (2015), and detail members lists of the EIA studied team listed in Table (2.1) and indicating their ECD Registration Number and the contact address were showed in chapter 2.

2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section reviews the relevant policies, legislations, and institutional framework of Myanmar and International and National guidelines relevant in the context of environmental and socio-economic aspect of the project. The activities carried out under the project are subject to these legal requirements.

As environmental and social aspects of a development project are interrelated issues, EIA and report have to come up with laws and regulations of the various sectors. Various government agencies at the national, region, township, and village are involved in one way or another in the EIA process. The relevant policies, legislations, and institutional framework of Myanmar and International guidelines relevant in the context of environmental and socio-economic aspect of the project have been reviewed. In this regard, the report was prepared with reference to Environmental Impact Assessment procedure (2015), National Environmental Quality Emission Guideline (2015), IFC, WHO standards. The criteria and environmental standards are used as benchmark targets for environmental and social management of the project. (See in chapter 3)

3. PROJECT DESCRIPTION AND ALTERNATIVES

BASF Myanmar initiates its first concrete chemical admixture plant in Myanmar to provide construction chemical admixture to local construction markets as hundred percent foreign investments. BASF Myanmar's construction chemical admixture factory is located at plot No.159, Then Chet Wun U Myu Road, East Dagon Industrial Zone (1), Yangon Region, and Myanmar. The designated land area about (1.50 acres) has been acquired from local landowner.

At project site area, 0.5 acres of one-story old building was renovated in accordance with BASF Myanmar's chemical admixture factory building designs. There is no construction phase needed as the main one-story building is hired and previous land use is brick production factory and was necessary to renovation.

During the Operation phase, proposed plant will operate on daytime, at production rate of 1 to 2 hours per batch targeting 1,459 ton per year. Most of the raw materials will be imported from overseas and some materials will be purchased from local suppliers. Detail list of raw materials and consumption rate required for chemical admixtures manufacturing are mentioned in table (4.5). Water is the major ingredient for chemical admixtures manufacturing and include BNS, lignin, molasses, and other additives. Storage facilities for all raw materials and final goods are showed in table (4.5). Final admixture liquid product stored by using (2x30) cubic meter capacity of storage tank, 1000-liter capacity of IBC tank and 200-liter drum respectively, and finished goods will be stored at loading area of inside the warehouse.

The manufacturing process involves three stages: (i) measuring and feeding of raw materials (ii) Blending in Mixer (iii) Sample inspection for quality control at Laboratory and (iv) Final Packing stage. BASF Myanmar produce standard norm for each product and custom-made performance admixtures under the Master Builders Solutions brand, including product lines such as Master Ease, Master Glenium, and Master Rheo build, Master Pozzolith and Maste Kure as per customer order.

Resources requirement for proposed chemical admixture production includes 65 percent of raw water will be required for production process, and it will be obtained from tube well water supply. The national grid line is the main sources for electricity supply for this project. The detail description of fuel, electricity consumption, and water consumption can be shown in table (4.9).

The project proponent is committed towards waste efficiency regarding the environmental protection requirements for its entire manufacturing site. All of generated waste will be segregated into hazardous and non- hazardous waste and processed through a robust waste management system for production area and office.

BASF has embraced the goals of the chemical industry's voluntary "Responsible Care Initiative and applies them to the entire BASF group. Overall design concept of the project takes into consideration environmentally sustainable features with the adaption of the BASF global chemical admixture industrial standards and guidelines.

Decommissioning phase covers an investment periods of 50 years with extension of two times per 10 years.

4. PROFILE OF THE RECEVING ENVIORNMENT

The guidelines published by MONREC in EIA procedure as well as National Environmental Quality Emission (2015) was followed for the baseline studies. The primary baseline survey of environmental and social at project site and surrounding area during renovation phase on 9th to 10th July 2018 and secondary township data sources of East Dagon Industrial Zone (1) are used

as baseline data. For groundwater (tube well) and storm water (public drainage) collected at project site and sent to respective laboratories for analysis and lab results in appendix (9) to (10).

Environmental Setting of Project Site Area

Particulars	Detail
Latitude and Longitude	16°54'38.50"N and 96°14'44.55"E
Topography	Project site area is flat with elevation from 30 feet above of mean sea level
Present land use at the proposed site	Project site land use is industrial zone land and consists of several industries and border with residential area of East Dagon (Myothit) Township and the industrial zone has 666 acres
Soil Quality	Most soil types found in the project area are meadow soils and meadow alluvial soils, which occur near the river plains, exposed to occasional tidal floods, is non-carbonated, and usually contains a large amount of salt and chemical properties of soil quality showed in table (5.3) and appendix (11)
Water Resources and Water Quality	Bago River (7900 meter distance from project site), Nga Moe Yeik Creek (4500 meter distance from project site) For water quality analysis, ground water and storm water (public drainage) were collected at project site and lab analysis results showed in appendix (9) and (10)
Air Quality	Ambient air quality parameter of PM_{10}, $PM_{2.5}$, CO, CO_2, SO_2, and NO_2 measured on 9 to 10 July 2018 by HAZ-SCANNER (EPAS) at project site. Observed value of ambient air quality are within the acceptable limit of NEQ guideline showed in table (5.8).
Noise Level	Ambient noise level measured at project site by using sound level meter for 24 hours continuously on 9 to 10 July 2018, and daytime noise level is 66.01 dB A and nighttime noise level is 59.89 dB respectively. The observed noise level is with the limit of NEQ guideline
Nearest Railway Station	Toegyaingkalay station (633 meter distance from project site)
Nearest Cultural monuments	Nil
Ecological Layout	There are no protected areas, sensitive receptor within 1 km from project site

The project site are, having a rectangular shape, is bordered with other industrials and residential area at east side and the rest sides and nearest surrounding area of project site area is vacant land. Project site photos are shown in Fig (4.2). A gas pipeline passes the area to the East and to the South sides and West of the project site is block No.158 and North side is block No.160 respectively. According to the East Dagon (Myothit) Township Data (2017), project site is located, adjacent to highly urbanized Yangon city and there are no forests, protected areas, and coastal resources around the project area. Socio-economic survey was carried out on July 2018 at the nearest residential area within 500 meter from the proposed project site. Total numbers of 29 people from the sample households of the area were interviewed to understand their current socio-economic conditions and their opinions upon the proposed project and detail socio-economic status showed in chapter 4.

5. IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES

Based on the project proposal data, township data of project site and onsite survey of the surrounding environment the project site was predicted as less to moderate significant impacts. Potential environmental and social impacts due to the chemical admixture production factory were discussed here widely in widely in terms of their nature, intensity that will depend on the physical characteristics of a chemical production, storage facility, and composition of any pollution materials and sensibility of surrounding the environment.

All of project renovation and construction stage have done on May 2018 according to the standard chemical plant design of BASF global group. Therefore, impact assessment and mitigation measures for renovation and construction were neglect on this chapter.

The anticipated potential impacts during operation of concrete chemical admixture factory may include:

Summary of Environmental Impact

1. Impact on air quality: There are no major emission sources as chimney from production process. However, fugitive emission may likely to occur during operation phase leakage from pumps, valves and pipe or spill from storage tanks/facilities and the solvent loss in form of VOCs are likely to occur as one of emissions from the proposed project. Gas Scrubber System will be installed for operation area and proper engineering controls will also installed at operation area and proper engineering controls will be provided to reduce chances of VOCs leakage. Handling and transfer of all of liquid raw materials is well designed to conveyed through pumps and fixed lines and it is arranged to carry out regular monitoring of VOCs in the workplace area.
2. Impact on water quality: Groundwater consumption for the whole factory during operation phase and discharge of industrial wastewater effluents from production area and domestic wastewater from office use can be anticipated as a negative impact. The water consumption can be reduced by implementing water saving plan. Effluents from processing will be collected by using designed IBC tanks for reuse purpose the next production batch in the system. Impact of the effluents is predict as low impact.

3. Impact of noise level: Noise emission may cause due to the source of transportation activities of vehicles and operation of machineries in operation hours. The noise impact is expected as low significant.
4. Impact on land environment: There may not be any considerable source of impact on land during operation phase because BASF has planned all required structural mitigation measures for designated hazardous materials and waste temperate storage area as per statutory requirement with properly lined floor according to BASF's Responsible Care Management system. Generated hazardous wastes from production area will deliver to Dowa, the hazardous waste disposal service provider, to handle properly and management of hazardous waste following the statutory guidelines ensuring no significant impacts on the land environment of project site.
5. Impact on ecological environment: The project site is located away from the ecological sensitive areas and the anticipated impact of air emission, noise and other source of pollution would not occur. According to the site, survey and East Dagon (Myothit) township data (2017), there is no impacts on flora and fauna due to the project.

Summary of Impacts on Social Environment

Implementation of proposed project may create temporary employment during construction and decommissioning phases and permanent jobs for operation phase. Positive impacts of living and livelihood around the project would help improve the quality of life of the people of the local area.

However, potential social impacts may occur mainly because of the community and occupational health of the project, competing use of groundwater resource, transportation of labors, raw material and chemical admixture or products and risk of fire and explosions due to improper handling or storage of fuel during operation phase.

The potential effect on socio-economic and perceived health impacts arising from chemicals production or storage installation is likely to be considered as significant by the people that may be indirectly affected. All of anticipated negative impacts, health, and safety conditions of the neighborhood during operation will be managed by the project proponent based on their community health and safety standard according to the BASF's Responsible Care Management system. Global group of BASF assure that the production and use of BASF products are safe and do not pose health risks to employees, neighbors, customers, and consumers worldwide.

For all potential environmental and social impact may occur in during decommission phase of this chemical admixture production project and recommended impact mitigation measure mentioned in chapter five.

6. STAKEHOLDERS MEETING

According to EIA procedure (2015), paragraph (105) states that as part of EIA investigation, the project proponent has to undertake public consultation meeting to disclosure information of the Environmental and social impact assessment results for this project to public during the EIA study. The meeting with key stakeholders of government sector, local community and other interested person for chemical admixture plant of BASF Myanmar was successfully held on 11

April 2019 at Kanaung Hall, East Dagon (Myothit) Industrial Zone Management Committee Office, and Yangon Region. In that meeting, mainly discussed comments are about CSR plan, emergency response plan and company's products information and detail discussion and suggestion of meeting record showed in chapter 9.

7. ENVIRONMENTAL MANAGEMENT PLAN

Environmental Management Plan is formulated as a part of the EIA study. The major anticipated impacts of proposed project have been considered to prepare necessary action plan in EMP that has formulated to be implemented considering all necessary mitigation measures to prevent /minimize /eliminate environmental impacts during implementation stage and decommissioning stage respectively.

The Environmental Management Plan (EMP) prepared for the project covers the anticipated impacts of the all the activities of the project, mitigation measures, management and monitoring plans during each of the phases:

EMP plan includes the environmental and social impact mitigation measures plan for operation and decommission phase of the project, monitoring guidelines and standards, Emergency Preparedness Plan, Budget allocations for the EMP and Corporate Social Responsibility (CSR) Plan were mentioned in table (8.3), (8.7) and (8.9) respectively. BASF Myanmar will arrange its organization as per the regulatory guidelines of Environmental Conservation Department (ECD).

8. CONCLUSION AND RECOMMENDATION

The EIA study team carried out the EIA process based on the proposed Plan of study for EIA as described in the TOR. All the anticipated potential affects likely to have effect on the environment have been identified and recommended mitigation measures during operation phase and decommission phase in EMP plan. The new chemical admixture production project of BASF Myanmar will provide quality construction chemical product to local construction market. According to the chemical admixture production process, applied of production technology, provided environmental control measure for all anticipated impacts, observed value of environmental and social status of surrounding environment of project site, there will be positive impact on the socio-economic condition of the area in terms of direct and indirect employment due to the project. The project may have some negative environmental impacts to surrounding environment of the project site. In this aspect respective mitigation measures have been introduced to reduce its magnitudes in this report. BASF MM will implement the Environmental Management Plan as described in this report to reduce the adverse environmental impacts on surrounding environment. Given the project scale and beneficial nature of this Project, the overall environmental impact is considered acceptable. The new chemical admixture production project of BASF Myanmar will provide quality construction chemical product to local construction market.

2. INTRODUCTION

The Environmental and Social Impact Assessment, EIA report for chemical admixture manufacturing project of BASF Myanmar Manufacturing Co., Ltd prepared in line with Myanmar Environmental Impact Assessment Procedure (2015).

According to the Myanmar Environmental Conservation Law (2012), Myanmar Environmental Rules (2014), Environmental Impact Assessment Procedure (2015) issued by the Ministry of Natural Resources and Environmental Conservation (MONREC). BASF Myanmar has to prepare a scoping report with Terms of Reference (TOR) and Environmental Impact Assessment (EIA) report for their project developments.

2.1 Presentation of the Project Proponent

BASF Group is one of the biggest chemical producing company in the world which has operation in about 80 countries, headquartered in Germany and it operates with 115,000 employees. .

BASF has proposed to initiate and investment in manufacturing of construction chemicals (concrete chemical admixtures) including concrete admixtures, construction systems and mining chemicals in Myanmar to provide significant demand of high quality chemical admixtures for booming domestic construction industry, and to fill a need for more advanced materials. The proposed project tends to provide new BASF construction chemical products in growing demand of Myanmar's construction market and planning to invest its first manufacturing plant in Yangon, Myanmar.

The project proponent, BASF Myanmar Manufacturing Co. Ltd holds 100 percent of foreign investment. The major aim of this project is to expend their manufacturing footprint in local construction market and support the rapid growth of Myanmar’s construction industry with durable and energy-efficient products. Moreover, the proponent tends to leverage global BASF technologies and in-depth knowledge of local building needs to develop innovations that help make local developers more successful and drive sustainable construction.

2.2 Presentation of the Environmental and Social Experts

The first stage of the EIA Process is a scoping study of scoping report preparation with an emphasis on public involvement. Initial site visit for scoping stage of proposed chemical admixture production factory was carried out on 20 February 2018. The purpose of site visit was to catch up the project team with the project proposal, to familiarize with affected project area, and to begin the environmental and social screening and scoping process.

E Guard Environmental Services Co., Ltd. started the EIA report preparation on July 2018 in line with Myanmar Environmental conservation law and regulation for chemical admixture manufacturing project. The members of the EIA team are listed in Table (2.1) indicating their ECD Registration No. and the contact address are shown as follows:

- E Guard Environmental Services Co., Ltd
- No.11, Airport Avenue, 10 Miles,
- Insein P.O 11011, Yangon, Myanmar
- Tel: +95-1-9667757, +95-1-9653332
- Fax: +95-1-666512
- info@eguardservices.com
- http://www.eguardservices.com

Table 2. 1 EIA Study Team and Their Responsibility

No.	Name	Position	Transitional Consultant Registration Numbers	Role
	E Guard Environmental Services	EIA Organization	0028	
1	U Soe Min	Team Leader	0067	Project Supervision
2	Daw Yu Yaiw Yan Thein Tan	Senior Consultant	0071	EMP preparation
3	Daw Me Me Maw	Consultant	0074	EMP preparation
4	Daw Jaint Yadanar	Associate Consultant	0098	EMP preparation for Social part
5	Dr. Phyo Naing Zay	Consultant	0100	EMP preparation for Health related part
6	U Naing Zaw Win	Project Associate	-	Stakeholder engagement, social survey, EMP
7	Htet Shwe Sin Aung	Environmental Specialist	-	Zoology, ecology, support biodiversity survey, EMP reparation
8	Hay Marn Hnin	Environmental Specialist	-	Zoology, ecology, support biodiversity survey, EMP reparation
9	Aung Moe Oo	EQ Team Member	-	Environmental Quality Survey
10	Hnin Yee Mon Mon	Project Associate	-	Social survey and data analysis
11	Kyaw Soe Moe	Project Associate	-	Social Survey and EMP preparation

Source: EIA Study Team

U Soe Min (Environmental Engineering Consultant)

U Soe Min is a civil, water resources and environmental engineer by training. He holds Bachelor of Civil Engineering from (RIT), Yangon and Master of Environmental Engineering from (AIT), Bangkok, Thailand. He had worked for ADB and WB as a National Consultant for environmental safeguard capacity building program. He has been working as a National Environmental Consultant for infrastructure projects funded by ADB and JICA in Myanmar. He is currently involved in several EIA projects representing E Guard as a team leader, an environmental specialist and a civil engineer.

Daw Yu Wai Yan Thein Tan (Senior Consultant)

Daw Yu Wai Yan Thein Tan is a Senior Consultant, who holds Master of Engineering with specializing in Environmental Engineering and Management from Asian Institute of Technology in Thailand and Master of engineering with specializing in Chemical Engineering from Mandalay Technology University. She has five-year associate consulting experience, which includes reconnaissance surveys, environmental risk assessment, and remediation. Her responsibilities are concerning with project management and compilation of the report for large-scale infrastructure and development of the projects, including public and stakeholder's consultation.

Daw Me Me Maw (Associate Consultant)

Daw Me Me Maw is a Consultant, who completed Master of Science Degree specialized with Industrial Chemistry at Yadanabon University. She has involved as a team leader in preparation of Initial Environmental Examination (IEE) report and preparation of the environmental management plan to overcome the anticipated impact for project related with industrial sector and involved as a facilitator in public hearing consultation meeting, and cooperates with clients.

Dr. Phyo Naing Zay (Consultant)

Dr. Phyo Naing Zay got MBBS degree from University of Medicine 2 in December 2011 and obtained Master of Science (Environmental Management) in 2014. He worked as Medical Doctor for SRH Project from December 2012 to 2013 February. Also worked as Tutor at Victoria University College from February 2013 to 2014 June. He is working as Acting Assistant Project Manager, Health Coordinator from 2014 July at Help Age International and worked as Health Expert and consultant at eGuard from March 2016 to now.

Daw Jaint Yadanar (Associate Consultant)

Daw Jaint Yadanar is an Associate Consultant, who received her Bachelor Degree in Forestry from the University of Forestry in 2013. She has experienced on environmental site surveys and also socio-economic surveys. Other experiences are to cooperate with clients and to conduct stakeholder engagements and public consultation meetings. Her responsibilities are assess development projects, extracting projects and other large-scale projects which may affect serious environmental/social impacts on environment including communities.

U Naing Zaw Win (Project Associate)

U Naing Zaw Win is a Project Associate who received Bachelor of Science in Forestry (B.Sc. (Forestry). He has more than two-year experiences in conduction stakeholder engagement and public consultation, site visit. His contributions on the preparation of EIA for this project are in conducting stakeholder meeting engagement, in conducting with the social survey, data entry and supporting to implement this report.

Daw Htet Shwe Sin Aung (Environmental Specialist)

Daw Htet Shwe Sin Aung is a Environmental Specialist, who received Bachelor of Science in Zoology from Dagon University in 2014. She also received Master of Science in Zoology from Yangon University in 2017. She has experience in lab fields nearly one year. She has experience in conducting socio-economic surveys and biodiversity assessment.

Daw Hay Marn Hnin (Environmental Specialist)

Daw Hay Marn Hnin work as a Environmental Specialist at E Guard Environmental Services Company. She got a Master of Science Degree in Botany from the Pathein University in 2017. She has experiences in conducting socio-economic surveys and biodiversity assessment for EIA reports.

U Kyaw Soe Moe (Project Associate)

U Kyaw Soe Moe is a Project Associate who received his Bachelor of Civil Engineering from Taunggyi Technological University in 2016. He is now working as a Project Associate in E Guard Environmental Services with one-year experience. His contributions on the preparation of EIA for this project are in conducting stakeholder meeting engagement, in conducting with the social survey, data entry and supporting to implement this report.

Daw Hnin Yee Mon Mon (Project Associate)

Daw Hnin Yee Mon Mon is a Project Associate who received Bachelor of Civil Engineering from Meiktila Technological University in February 2017. She has two-year of experience in conduction stakeholder engagement and public consultation, site visit at eGuard Environmental Services. Her contributions on the preparation of EIA for this project are socio-economic survey and analysis of social conditions and opinions of the respondents.

U Aung Moe Oo (Project Associate)

U Aung Moe Oo is a Project Associate who received his Bachelor of Chemical Engineering from Thanlyin Technological University in 2016. He is now working as a Project Associate in E Guard Environmental Services with more than two year of experience. He is responsible for Environmental Quality such as air quality, water quality, soil quality, noise level and more. He is also responsible for data analysis and interpretation of environmental baseline data.

U Wanna Zaw (surveyor)

U Wanna Zaw is a trained surveyor engaged with the team for more than six months. He is responsible for water quality sampling, on-site air, water, light, odour,and noise quality measurement, data collection, logistic preparation.

3. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

3.1 Introduction

This section reviews the relevant policies, legislations, and institutional framework of Myanmar and International and National guidelines relevant in the context of environmental and socio-economic aspect of the project. The activities carried out under the project are subject to these legal requirements.

3.2 Policy and Legal Framework

3.2.1 Applicable Laws and Rules related with Manufacturing of Construction Chemical Products

The ultimate EIA report will be prepared based on the Myanmar Environmental Impact Assessment Guidelines (2015) and International best practice and guidelines. Specifically, the environmental impact assessment for this "Construction Chemical Admixture Manufacturing Project" shall be conducted following not only the National Environmental Quality (emission) Guidelines but also International Guidelines and Practices such as WHO standards, IFC performance indicators and BASF's global standard for chemical production guidelines for environmental and social considerations.

The following legislations constitute the key components of the legal framework for environmental conservation in Myanmar.

1. **Environmental Conservation Law (2012)**

Purpose: To construct a healthy and clean environment and to conserve natural and cultural heritage for the benefit of present and future generations; to maintain the sustainable development through effective management of natural resources and to enable to promote international, regional and bilateral cooperation in the matters of environmental conservation.

- The project proponent has to pay the compensation for damages if the project will cause injuries to environment, under the sub-section (o) of section 7 of said law
- The project proponent has to purify, emit, dispose and keep the polluted materials in line with the stipulated standards, under section 14 of said law
- The project proponent has to install or use the apparatus which can control or help to reduce, manage, control or monitor the impacts on the environment, under section 15 of said law.
- The project proponent has to allow relevant governmental organization or department to inspect whether performing is conformity with the terms and condition included in prior permission, stipulated by the ministry, or not, under section 24 of said law.
- The project proponent has to comply with the terms and conditions included in prior permission, under section25 of said law.

- The project proponent has to abide by the stipulations included in the rules, regulation, by-law, order, notification and procedure issued by said law, under section 29.

2. The Environmental Conservation Rules (2014)

- The project proponent has to avoid emit, discharge or dispose the materials which can pollute to environment, or hazardous waste or hazardous material prescribed by notification in the place where directly or indirectly injure to public, under sub- rule (a) of rule 68.
- The project proponent has to avoid performing to damage to ecosystem and the environment generated by said ecosystem, under sub-rule (b) of rule 68.

3. Environment Impact Assessment Procedure (2015)

- The project proponent has to be liable for all adverse impacts caused by doing or omitting of project owner or contractor, sub-contractor, officer, employee, representative or consultant who is appointed or hired to perform on behalf of project owner, under sub-paragraph (a) of paragraph 102.
- The project proponent has to support, after consultation with effected persons by project, relevant government organization, government department and other related persons, to resettlement and rehabilitation for livelihood until the effected persons by the project receiving the stable socio-economy which is not lower than the status in pre-project, under sub-paragraph (b) of paragraph 102.
- The project proponent has to fully implement all commitments of project and conditions included in EMP. Moreover, the project proponent has to be liable for contractor and sub-contractor who perform on behalf of him/her have to fully abide by the relevant laws, rules, this procedure, EMP and all conditions, under paragraph 103.
- The project proponent has to be liable and fully & effectively implement all requirements included in ECC, relevant laws and rules, this procedure and standards under rule 104.
- The project proponent has to inform the completed information, after specifying the adverse impacts caused by the project, from time to time, under paragraph 105.
- The project proponent has to monitor all adverse impacts in all project phases, while implementing the EMP abiding the all conditions included in ECC, relevant laws & rules and the procedure, under paragraph 106.
- The project proponent has to report, as soon as possible, the failures of his or her responsibility, other implementation, ECC or EMP. If dangerous impact caused by this failure or failure should be known by the Ministry the project proponent has to submit within 24 hours and other than this situation has to submit within 7 days from knowing it, under paragraph 107.
- The project proponent has to submit the monitoring report dually or prescribed time by Ministry in line with the schedule of EMP, under paragraph 108.
- The project proponent has to prepare the monitoring report in accord with the rule 109.

- The project proponent has to disclose the monitoring report in public place such as library, hall and website and office project for the purpose to let review the report by public for 10 days from the date the report is submitted to the Ministry. Moreover, the proponent has to provide copy of the report, by email or other mans which agreed with the asked person, to any asked person or organization, under paragraph 110.
- The project proponent has to allow inspectors to enter and inspect during operation and if Ministry needs it has to allow inspector to enter and inspect in the office and work place of project and other work-place related to the project any time, under paragraph 113.
- The project proponent has to allow inspectors to immediately enter and inspect in any time if it is emergency or failure to implement the requirements related to social or environment or caused to it, under paragraph 115.
- The project proponent has to allow inspector to inspect the contractor and sub-contractor who implement on behalf of project, under paragraph 117.

4. National Environmental quality (emission) Quality Standards Guideline (2015)

- The project proponent has to emit, discharge or dispose in line with the standards stipulated in said guideline.

5. Myanmar Investment Law (2016)

Purpose: To ensure the appointing of employees, fulfilling the rights of employees, avoiding any injury to environment, social and cultural heritage, insure the prescribed insurance in line with the law.

This law focuses as follows,

- The project proponent has to appoint the Myanmar citizens in the various levels of administrative, technical and expert work by the arrangement to develop their expertise, in line with the sub-section (b) of section 51of the said law.
- The project proponent has to appoint the Myanmar citizens only in normal work without expertise, in line with the sub-section (c) of section51of said law.
- The project proponent has to appoint either foreigner or Myanmar citizens with the appointment agreement in accord with the law, in line with the sub-section (d) of section51of said law.
- The project proponent has to comply with the international best practices, existing laws, rules and procedures to not damage, pollute, and injure to environment, cultural heritage and social, in line with the sub-section (g) of section 65 of the said law.
- The project proponent has to close the project after paying the compensation to the employees in accord with the existing laws if violates the appointment agreement or terminate, transfer or suspend the investment or reduce the number of employees, in line with the sub-section (i) of section65 of the said law.

- The project proponent has to pay the wages or salary to the employees in accord with the laws, rules, order and procedures in the suspension period, in line with the sub-section (j) of section65of the said law.
- The project proponent has to pay the compensation or injured fees to the respected employees or their inheritors if injury in or loss of part of body or death caused by work, in line with the sub-section (k) of section65of the said law.
- The project proponent has to stipulate the foreign employees to respect the culture and custom and abide by the existing laws, rules, orders, directives, in line with the sub-section (l) of section65of the said law.
- The project proponent has to abide by labor laws, in line with the sub-section (m) of section65of the said law.
- The project proponent has to pay the compensation to the injured person for damages if damages of environment or socio-economy are occurred by misuse of project, in line with the sub-section (o) of section65of the said law.
- The project proponent has to allow to inspect in anywhere of project if Myanmar Investment Commission inform to inspect the project, in line with the sub-section (p) of section65of the said law.
- The project proponent has to obtain the permission of MIC before EIA process and report back this process to MIC, in line with the sub-section (q) of section 65of the said law.
- The project proponent has to insure the prescribed insurance by rules, under section 73 of the said law.

6. Private Industrial Enterprise Law (1990)

The State Law and Order Restoration Council enacted this law by Law No.22/90 on 26th November, 1990.According to this law, all private industrial enterprises shall avoid or reduce the use of polluting technology. The Supervisory Body supervises and inspects the enterprise to ensure the following:

- No health threats from the industrial enterprise to the nearby residence;
- No fire threats or hazards;
- No source of nuisance or pollution originating from the enterprise;
- No occupational hazard to the workers and
- Compliance with the existing law.

7. Factory Act (1951)

This act contains the provisions for chemicals management and storage. Some chemicals are likely to require permits. It also requires all factories to have proper pollution control measures such as air pollution, sewage and wastewater treatment system.

8. Prevention of Hazard From Chemical and Related Substances Law (2013)

The Pyidaungsu Hluttaw enacted this law by Law No. 28 of 2013 on the date of 26th August, 2013. This law was enacted with the objectives of:

a. To protect from being damaged the natural environment resources and being hazardous any living beings by chemical and related substances;

b. To supervise systematically in performing the chemical and related substances business with permission for being safety;

c. To perform the system of obtaining information and to perform widely educative and research for using the chemical and related substance systematically;

d. To perform the sustainable development for the occupational safety, health and environmental conservation.

Regarding the chemical management and storage, currently, regulations governing chemicals management are divided between various Acts, mostly dating from colonial times; hence the legislation is in many respects related to the British framework. The Factory Act and the Public Health Act contain the provisions for chemicals management and storage. Some chemicals are likely to require permits.

9. Conservation of Water Resources and Rivers Law (2006)

Purpose: The project proponent will avoid the disposal of stipulated materials into river-creek.

- The project proponent has to avoid any performance to damage to the river, creek and water resource, under sub-section (a) of section 8.
- The project proponent has to avoid the violation of conditions stipulated by the directorate for prevention of water pollution, under sub-section (b) of section 24.

10. Myanmar Fire Force Law (2015)

Purpose: To ensure to prevent the fire, to provide the precautionary material and apparatuses, if the fire caused in the project area to be defeated because the project is business in which electricity and any inflammable materials such as petroleum are used. So, the project owner has to institute the specific fire service in line with the above law.

This law focuses the following

- The project proponent has to institute the specific fire services if it is needed, under sub-section (a) of section 25.
- The project owner has to provide materials and apparatuses for fire precaution and prevention, Sub-section (b) of section 25.

11. Motor Vehicles law (2015) and Rules (1987)

Purpose: When the construction period and if it is needed in operation and production period for the all vehicles.

- The project proponent has to promise to abide by the nearly all provisions of said law and rules, especially the provisions related to air pollution, noise pollution and safety of life.

12. The Myanma Insurance Law

Purpose*:* The project can cause the damages to the environment and injuries to public so to ensure the needed insurances are insured at Myanma Insurance.

This law focuses the following matters;

- If the project proponent uses the owned vehicles the project owner has to insure the insurance for injured person under section 15 of said law.
- The project proponent has to insure the insurance to compensate for general damages because the project may cause the damages to the environment and injury to public under section 16 of said law.

13. Labor Organization Law (2011)

Purpose: To ensure protection the rights of the employees, having good relationships between the employees and employer and enabling to form and carry out the labor organizations systematically and independently.

- The project proponent promises to allow the labor organization to negotiate and settle with the employer if the workers are unable to obtain and enjoy the rights of the workers contained in the labor laws and to summit demands to the employer and claim in accord with the relevant law if the agreement cannot be reached under section 17 of said law.
- The project proponent promises to demand the re-appointment of worker who is dismissed by the employer without the conformity with the labor laws under section 18 of said law.
- The project proponent promises to send the representatives to the Conciliation Body in settling a dispute between the employer and the worker under section 19 of said law.
- The project proponent promises the labor organization to participate and discuss in discussing with the government, the employer and the complaining employees in respect of employee's rights or interest contained in the labor laws under section 20 of said law.
- The project proponent promises the labor organization to participate in solving the collective bargains of the employees in accord with the labor laws under section 21 of said law.
- The project proponent promises the labor organization to carry out the holding the meetings, going on strike and other collective activities in line with the procedure, regulation , by-law and directive of relevant Chief Labor Organization under section 22 of said law.

14. The Settlement of Labor Dispute Law (2012)

Purpose: To ensure negotiation and discussion between employees and project proponent, abiding the decision of tribunal.

This law focuses as follows;

- The project proponent must not absent for negotiation within the stipulated time for complaint, under section 38 of said law.
- The project proponent must not change the existing stipulations for employees within conducting period before tribunal, under section 39 of said law.
- The project proponent must not close the work without negotiation, discussion on dispute in accord with this law, decision by tribunal, under section 40 of said law.
- The project proponent must pay the compensation decided by Tribunal if violates any act or any omission to damage the interest of labor by reducing of product without efficient cause, under section 51 of said Law.

15. Employment and Skill Development Law (2013)

Purpose: To ensure the job security and to develop the employee's skill with the fund of project owner.

- The project proponent has to appoint employees with the contract in line with the provision of section 5 of said law.
- The project proponent has to carry out the training programs with the policy of Skill Development Body to develop the employment skill of employees who are appointed or will be appointed, under section 14 of said law.
- The project proponent has to monthly pay to the fund, which is fund for development of skill of employees, not less below 0.5 percentage of the total payment to the level of worker supervisor and the workers below such level, under sub-section (a) of section 30 of said law.
- The project proponent has to promise not to deduct from the payment of employees for the above mentioned fund, under sub-section (b) of section 30 of said law.

16. The Minimum Wages Law (2013)

Purpose: To ensure the project owner pay the wages not less than prescribed wages and notify obviously this wages in work place, moreover to be inspected.

- The project proponent has to pay the wages in line with section 12 of said law.
- The project proponent has to notify the prescribed wages obviously in work place

under sub-section (a) of section 13 of said law.

- The project proponent has to correctly record the lists, schedules, documents and wages and report these to the relevant department and give if these are asked while inspecting, in accord with the stipulations under sub-section (b)(c)(d) of section13 of said law.
- The project proponent has to allow to be inspected by the inspector, under sub-section (d) and (e) of section 13 and section 18 of said law.
- The project proponent has to allow holiday for medical treatment if the employee' health is not fit to work, under sub-section (f) of section 13 of said law.
- The project proponent has to allow holidays without deducting from the wages if one of the parents or one of the family dies, under sub-section (g) of section 13 of said law.

17. Payment of Wages Law (2016)

Purpose: To ensure the way of payment and avoiding delay payment to the employees. This law focuses as follows;

- The project proponent has to pay the wages in accord with the section 3 and 4 of said law.
- The project proponent has to submit the agreements of employees & reasonable ground to the department if it is difficult to pay because of force majeure included in natural disaster, under section 5 of said law.
- The project proponent has to abide by the provisions of section 7 to 13 in chapter (3) in respect of deduction from wages.
- The project proponent has to pay the overtime fees, prescribed by law, to the employees who work over working hours, under section 14 of said law.

18. Workmen's Compensation Act (1923)

Purpose:To ensure the compensations to injured employees while implementing in line with the above law and pay the prescribed compensations in various kinds of injury.

This law focuses as follow;

- The project proponent has to pay the compensation in line with the provisions of said law based on the kind of injury and case by case under Section 13 of said law.

19. The Leaves and Holiday Act (1951)

Purpose:The employees can take the leaves and get the holidays legally and to ensure the right to get the holidays and leaves.

This law focuses the following matters;

- The project proponent has to allow the leaves and holidays in line with the law.

20. Social Security Law

Purpose: The project proponent has to create the social security for the employees because the project is the business under the Myanmar Citizen Investment Law. To ensure the social security for employees of the project, the project owner has to register to the social security offices and to pay the prescribed fund.

- The project proponent has to register to the respected social security office, under sub- section (a) of section 11 of said law
- The project proponent has to pay the social security fund for at least four types of social security included in sub-section (a) of section 15, under section 15 of said law.
- The project proponent has to pay the fund which has to be paid by him and together with the fund which has to be paid from their salary by the employees. Moreover the project proponent has pay the cost for paying the above mentioned fund only myself under sub-section (b) of section 18 of said law.
- The project proponent has to pay the fund for accident, under sub-section (b) of section 48 of said law. (but this fund is not related to workmen compensation so if it is needed compensation must be separately paid by the Workmen Compensation Act)
- The project proponent has to make correctly and submit the list and record provided in section 75 to respected social security office, under section 75 of said law.

21. Prevention and Control of Communicable Diseases Law (1995)

Purpose: To ensure the healthy work environment and prevention the communicable diseases by the cooperation with the relevant health department.

- The project proponent has to build the housing in line with the health standards, distribute the healthful drinking water & using water and arrange to systematically discharge the garbage & sewage, under clause (9) of sub-section (a) of section 3 of said law.
- The project proponent has to abide by any instruction or stipulation by Department of health and Ministry of Health, under section 4 of said law.
- The project proponent has to inform promptly to the nearest health department or hospital if the following are occurred; (under section 9)

a. Mass death of animals included in birds or chicken;
b. Mass death of mouse;
c. Suspense of occurring of communicable disease or occurring of communicable disease;

d. Occurring of communicable disease which must be informed.

- The project proponent has to allow any inspection, anytime, anywhere if it is need to inspect by health officer, under section 11 of said law.

22. The Control of Smoking and Consumption of Tobacco Product Law (2006)

Purpose: To ensure the creation of smoking area and non-smoking area in the power plant area for health and control of smoking.

- The project proponent has to keep the caption and mark referring that is non-smoking area in the project area under sub-section (a) of section 9 of said law.
- The project proponent has to arrange the specific place for smoking in the project area and keep the caption and mark in accordance with the stipulations under sub-section (b) of section 9 of said law.
- The project proponent has to supervise and carry out the measures so that no one shall smoke at the non-smoking area under sub-section (c) of section 9 of said law.
- The project proponent has to allow the inspection of supervisory body in the power plant area, under sub-section (d) of section 9 of said law.

23. The Law Relating to Petroleum and Products of Petroleum (2017)

Purpose: The project will carry the oil in any phase and may import it. So, to ensure to take the license for importation, transportation, and storage and abide by the stipulations in the license;

- The project proponent has to obtain the license, for importation of the fuel, issued by the Ministry of Commerce and Trade under sub-section (a) of section 7 of said law and abide by the stipulations in the license.
- The project proponent has to abide by the procedure and conditions, which to be safe in transportation and storage, prescribed by the Ministry of Commerce and Trade under sub-section (c) of section 7 of said law. (if you don't need importation delete prescribed ward and sentence in red color)
- The project proponent has to obtain the license for transportation and storage of the fuel under sub-section (a) of section 8 of said law and abide by the stipulations in the license.
- The project proponent has to abide by the procedure and conditions, which to be safe in transportation and storage, prescribed by the Ministry of Electricity and Energy under sub-section (d) of section 8 of said law.
- The project proponent has to transport the fuel by the vehicle or vessel which is licensed by the Ministry of Transportation and Communication under sub-section (a) of section 9 of said law.
- The project proponent has to store the fuel in the tank which is licensed by the Ministry of Natural Resource and Environmental Conservation under sub-

section (a) of section 10 of said law.

- The project proponent has to show the notice of danger on the tank or container of fuel under section 11 of said law.

24. The Petroleum Rules (1937)

Purpose: To ensure the project proponent has to abide by the stipulations for transportation of oil.

- The project proponent has to abide by the provision of chapter (3) of the Petroleum Rules for transportation and the provisions of chapter (4) of said rules for storage.

25. Freshwater Fisheries Law (1991)

Purpose: According to the sub-section (e) of section 2 of said law, the freshwater area includes any river, creek, pond and water area so the project will be near by the river or creek which is freshwater area with the safety of freshwater and aquatics.

This law focuses as follow;

- The project proponent has to avoid any water pollution and disturbing to fish &other aquatic lives in any freshwater such as river, creek under section 40 of said law.

26. The Protection and Preservation of Cultural Heritage Regions Law (1998)

Purpose: To ensure the protection of cultural heritages and the cultural heritage area from the damage by the natural or man-made disaster.

- The project proponent has to apply to get the prior permission of Archaeology and National Museum Department to build the road, bridge or dam in the cultural heritage area under section 13 of said law.
- The project proponent promises not to build the building which is not in line with the stipulations prescribed by the Ministry of Culture in the cultural heritage area under section 22 of said law.

27. The Protection and Preservation of Antique Objects Law (2015)

Purpose: To ensure the protection of ancient monument and information about it if it is in the project area. This law focuses as follow;

- The project proponent has to inform to the village-tract or ward administrator if any antique objects is found in project area under section 12 of said law.

28. The Protection and Preservation of Ancient Monument Law (2015)

Purpose: To ensure the protection of ancient monument and information about it if it is in the project area.

This law focuses as follows;

- The project proponent has to report to the village-tract or ward administrators if the project proponent will find any ancient monument under the ground or on the ground or under the water under Section 12 of said law.
- The project proponent has to obtain the prior permission of Archaeology and National Museum Department if the project area is in the prescribed area of Ancient Monument under Section 15 of said law.
- The project proponent has to obtain the prior permission, by written statement of Department of Ancient Research and National Museum if the project proponent dispose of the chemical and solid waste in the Ancient Monument Area under Sub- section (f) of section 20 of said law.

29. The Engineering Council Law (2013)

Purpose: To ensure the safety in technical and engineering works in the project.

- The project proponent has to appoint the employees, who obtained the registration certificate issued by the Myanmar Engineering Council, in the technical and engineering work, under section 37 of said law.
- The project proponent has to ensure the employees who are engineers abide by to the provisions of Myanmar Engineering Council law, prohibitions included in the rules, order and directive issued under said law, conditions included in the registration certificate issued by the Myanmar Engineering Council, under section 34 of said law.

30. The Protection of Wildlife and Conservation of Natural Areas Law (1994)

Purpose: To conserve and protect the wildlife and protected areas in the Union of Myanmar

- The project proponent who commits water and air pollution, causing damage to a watercourse or putting poison in the water in a natural area has to be punished with imprisonment for a term, which may extend to Kyats 10,000 or with both under sub-paragraph of 35(d).
- The project proponent who is possessing or disposing of pollutants or mineral pollutants in natural area has to be punished with imprisonment for a term which may extend to Kyats 10,000 or with both under sub-paragraph of 35(e).
- The project proponent who is killing, hunting or wounding a normally protected wild animal or seasonally protected wild animal without permission, possessing, selling,

transporting or transferring such wild animal or any part thereof without permission has to be punished with imprisonment for a term which may extend to 5 years or with fine, which may extend to Kyats 30,000 or with both under sub- paragraph (a) of paragraph 36.

- The project proponent who is extracting, collecting or destroying in any manner any kind of protected wild plants within the prescribed area without permission has to be punished with imprisonment for a term which may extend to 5 years or with fine which may extend to Kyats 30,000 or with both under sub- paragraph (b) of paragraph 36.
- The project proponent who is destroying ecosystem or any natural state in the natural area has to be punished with imprisonment for a term which may extend to 5 years or with fine which may extend to Kyats 30,000 or with both under sub- paragraph (c) of paragraph 36.
- The project proponent who is altering, removing, destroying or obliterating without permission. any boundary mark of a natural area or any boundary mark of a zoological garden or botanical garden administered by the Government or in which the Government has to be punished with imprisonment for a term which may extend to 5 years or with fine, which may extend to Kyats 30,000 or with both under sub-paragraph (d) of paragraph 36.
- The project proponent who is killing, hunting or wounding a completely protected wild animal without permission, possessing, selling, transporting or transferring such wild animal or any part thereof without permission has be punished with imprisonment for a term, which may extend to 7 years or with fine which may extend to kyats 50,000 or with both under sub- paragraph (a) of paragraph 37.
- The project proponent who is exporting without the recommendation of the Director General a completely protected wild animal or a protected wild plant or any part thereof has be punished with imprisonment for a term which may extend to 7 years or with fine, which may extend to Kyats 50,000 or with both under sub- paragraph (b) of paragraph 37.

31. Underground Water Act (1930)

Purpose: To conserve and protect underground sources of water supply in the Union of Myanmar.

- The proponent must not sink a tube for the purpose of obtaining underground water except under and in accordance with the terms of a license granted by the water officer under Section (3).

32. Land Acquisition Act (1894)

Purpose: To amend the law for the Acquisition of Land needed for public purposes and for the companies.

- The project proponent must not obstruct in doing any of the acts authorized by section 4 or section 8 or will fully fills up, destroys, damages, or displaces any trench or mark made under section 4 of said law.

33. National Environmental Policy of Myanmar (2019)

National Environmental Policy Vision & Mission

- Vision - A clean environment, with healthy and functioning ecosystems, that ensures inclusive development and wellbeing for all people in Myanmar.
- Mission - To establish national environmental policy principles for guiding environmental protection and sustainable development and for mainstreaming environmental considerations into all policies, laws, regulations, plans, strategies, programmes and projects in Myanmar

3.2.2 International Conventions, Agreements and Treaties (signed/ratified by Myanmar)

The following are the International Conventions, Agreements, and Treaties signed and ratified by Myanmar related to the concrete chemical admixture factory project.

Table 3. 1 Lists of Convention involvement of Myanmar

No.	Name of the Convention	Year of Ratification
1.	Vienna Convention for Protection of the Ozone Layer)	1985,1993
2.	Basel Convention	1989, 2015
3.	London Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, London	1990, 1993
4.	United Nations Framework Convention on Climate Change (UNFCCC), New York	1992,1994
5.	Stockholm Convention on Persistent Organic Pollutions (POPs)	2001,2004

1. Convention on Protection of Ozone Layer : The project proponent must protect the Ozone layer by phasing out the production of numerous substances that are responsible for Ozone depletion.
2. Basel Convention: The project proponent has to minimize the generation of toxic waste and to ensure the environmental sound management as closely as possible to the source of generation.
3. Convention on Protection of Ozone Layer : The project proponent must protect the Ozone layer by phasing out the production of numerous substances that are responsible for Ozone depletion.
4. United Nations Framework Convention on Climate Change (UNFCCC): The proponent has to reduce their Green House Gas (GHG) emissions in line with the agreement made at the UNFCCC.
5. Persistent Organic Pollutants (POP): The proponent has to avoid using persistent organic pollutants (POP) that are resistant to environmental degradation through chemical,

biological, and photolytic processes. Such POPs include pesticides, solvents, pharmaceuticals, and industrial chemicals.

3.3 National and International Environmental Standards and Guidelines

3.3.1 Project's National Environmental and Social Standards

With the promulgation of the EIA Procedure in 29th December 2015, the National Environmental Quality (Emissions) Guidelines were also enacted. These Guidelines provide the basis for regulation and control of noise and air emissions and effluent discharges from projects in order to prevent pollution and protect the environment and public health. Specific Guidelines are shown in below table (3.2), (3.3). (3.4).

Table 3. 2 Ambient Air Quality Standard

Parameters	Guidelines Value	Unit	Averaging Period	Organization
PM_{10}	50	$\mu g/m^3$	24hrs	NEQ
$PM_{2.5}$	25	$\mu g/m^3$	24hrs	NEQ
CO	9	ppm	8hrs	NAAQS
CO_2	5000	ppm	8hrs	ACGIH
SO_2	20	$\mu g/m^3$	24hrs	NEQ
NO_2	200	$\mu g/m^3$	24hrs	NEQ
VOCs (Indoor)	50	mgN/m^3	8hrs	NEQ

Table 3. 3 Noise Level Standard (NEQ Guideline)

Receptor	One Hour LAeq (dBA)[a]	
	Daytime 07:00-22:00 (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 3. 4 Wastewater Effluent Levels for Chemical Admixture Plant

Parameter	Unit	NEQ (emission) Guideline Value
pH	S.U.[a]	6-9

Parameter	Unit	NEQ (emission) Guideline Value
Chemical oxygen demand	mg/l	250
5-day Biochemical oxygen demand	mg/l	50
Ammonia	mg/l	10
Total suspended solids	mg/l	50
Total phosphorus	mg/l	2
Total nitrogen	mg/l	10
Oil and grease	mg/l	10
Temperature increase	°C	<3[b]
Total coliform bacteria	100 ml	400

3.4 Contractual and Other Commitments

Responsible Care is an essential part of ICCA's contribution to the Strategic Approach to International Chemicals Management (SAICM). Through Responsible Care, global chemical manufacturers commit to pursue an ethic of safe chemicals management and performance excellence worldwide. BASF, commitment helps to enhance public confidence and trust in the industry's dedication to safely manage chemicals throughout their lifecycle while ensuring that chemistry can continue to contribute to a healthier environment, improved living standards, and a better quality of life for all.

EHS in BASF Values and Code of Conduct

- ✓ Never Compromise on safety
- ✓ Compliance with all legislation to protect humans and the environment
- ✓ Responsible Care : Act responsibly to protect and preserve our employee, neighbours and business partners' health
- ✓ Incident response: Appropriate emergency response and damage repair measures. Communication flow with authorities and community
- ✓ Report incidence: No fear detrimental consequences.

In Responsible Care Management system applied for BASF Myanmar of chemical admixture manufacturing, the following Code of Conducts includes:

RC Code 1: Product Stewardship

RC Code 2: Transportation & Distribution Safety

RC Code 3: Occupational Safety

RC Code 4: Occupational Health

RC Code 5: Process Safety

RC Code 6: Environmental Protection

3.5 Health Standards for Projects with Health Impacts

BASF's Responsible Care Management System comprises the global directives, standards and procedures for environmental and health protection and safety and security for various stations along our value chain. BASF global requirement on occupational safety provides the necessary framework for safe work in order to protect employees, contractors, visitors, and neighbors of BASF and commit to actions such as conducting safety inspections and risk assessments.

BASF Myanmar will be arranged and provided employee safety for all employees

1. Safety precautions, evacuation procedures, and safety officers on duty
2. Proper and adequate personal protective equipment (PPE) for every employee on our operational site
3. First aid boxes and medical personnel in attendance, in the event of any workplace-related injuries
4. Resting quarters, fully stocked with refreshments and adequate ventilation and cooling system for the employees
5. Dining rooms for employees to have their meals on site during breaks
6. Washrooms and
7. Transport arrangement to and from work

In addition, all of transportation incidents, process safety incidents, health performance index, primary energy use, energy efficiency in production process, total water withdrawal, emission of organic substances to water, emission of nitrogen to water, emission of heavy metals to water, emission of greenhouse gases, waste and operation costs for environmental protection for this project.

4. PROJECT DESCRIPTION AND ALTERNATIVE SELECTION

4.1 Project Background

BASF Myanmar Manufacturing Co., Ltd. has opened a representative office in Yangon since September 2015, to support its growing base of local customers and cater to an increasing demand for high quality and sustainable chemical products and solutions in the country. The Yangon office brings BASF closer to local customers in agriculture, construction, mining, and manufacturing sectors. BASF aims to support Myanmar in managing the challenges associated with rapid development and urbanization. Proponent information and organization chart of BASF Myanmar Co., Ltd. showed in table (4.1) and figure (4.1).

BASF has been supplying concrete admixture, construction systems, and mining chemicals to Myanmar for ten years. Myanmar's construction industry grows more sophisticated and BASF has a successful record of accomplishment in supporting major building and infrastructure projects. BASF has supplied a number of major construction projects in Myanmar, including Thilawa Special Economic Zone, Yeywa hydropower dam, Myingyan steel mill. Its first production plant in Myanmar, located at East Dagon Township, close to Yangon.

The state-of-the-art facility will produce high quality, tailor-made concrete admixtures to meet increasing demand for construction chemicals in Myanmar. The new plant is equipped with production units, warehousing facilities and a laboratory for quality control. BASF produces standard and custom-made performance admixtures under the Master Builders Solutions® brand, including product lines such as MasterEase®, MasterGlenium®, MasterRheobuild®, MasterPozzolith® and MasterKure®. The scale of this plant currently places BASF as the largest local producer of construction chemicals in Myanmar.

Figure 4. 1 Organization Chart of BASF Myanmar Manufacturing Co., Ltd

Table 4. 1 Proponent Information

Company name	BASF Myanmar Manufacturing Co.,Ltd
Office address	Room No.18,4th Floor, Sedona Hotel, Kaba Aye Pagoda road, Yankin Township, Yangon, Myanmar
Factory Location	Plot No.159, Then Chet Wun U Myu Road, East Dagon Industrial Zone (1), East Dagon Township, Yangon, Myanmar
Contact email address and we blink	www.basf.com, monwida.intarasonti@basf.com myintaye.myo@partners.basf.com
Contact phone number	+95- 1 544 041 +95 9 450280469/ 09 797520744

4.2 Project Location, Overview Map and Site Layout Map

BASF Myanmar's construction chemical admixture factory is located at plot No.159, Then Chet Wun U Myu Road, East Dagon Industrial Zone (1), Yangon Region, and Myanmar. The designated land area acquired from local owner that consists of main one-story of old factory building (0.5) acres from the total land use of 1.505 acres. The coordinate point of the proposed project is 16°54'38.50"N and 96°14'44.55"E and location of the designated factory area and site layout map can be seen in figure (4.2), and (4.3).

Figure 4. 2 Overview Map of Project Site

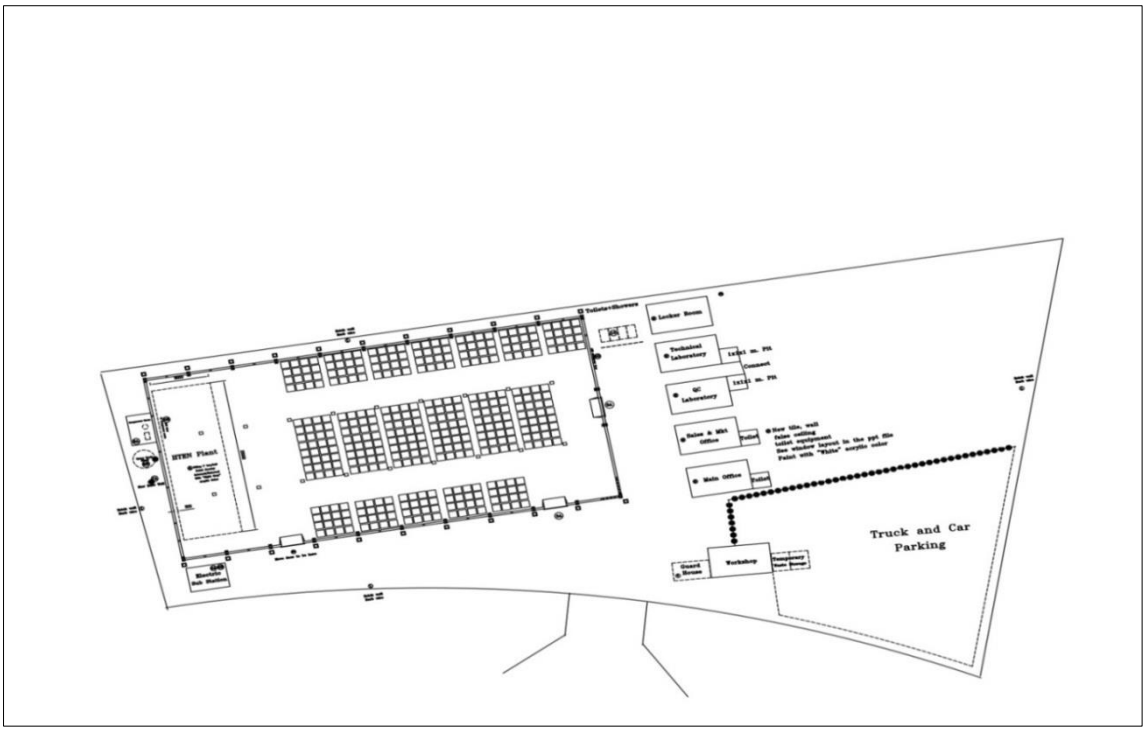

Figure 4. 3 BASF Myanmar Project Site Layout

4.3 Project Development and Implementation Time Schedules

Project operating lease will take 50 years between leaser, Ohn Kywe Co., Ltd and lease, BASF Myanmar Manufacturing Co., Ltd. Project site selection was checked with detail information including original design drawings, previous land use purpose. The project renovation phase started on October 2017, and final installation of machinery and equipment had completed on April 2018. Project renovation and construction stage lasted for six months duration and eight contractors were engaged for full installation of the plant for chemical admixture. Opening ceremony of factory was held on May 2018 and operation phase will start as soon as possible after getting the approval of MIC permit.

4.4 Project Description

4.4.1 Investment Plan

The proponent has submitted an investment proposal of proposed chemical admixture manufacturing development project to Myanmar Investment Commission (MIC) in 2017. BASF Myanmar proposed its initial investment of US$ 1,155,000 million (MMK 1,559,250,000) and investment period is 50 years (including two times extension per ten years). There is no construction phase needed since the main one-story building is hired. However, proposed project site still needed to overhaul in building structure for old building, lightweight brick manufacturing factory. Renovation works include flooring works with an estimated value of US$20,000 (flooring raw materials supplied by BASF), and concrete works for fencing and prepare parking area with an estimated value is US$50,000. The detailed investment plan includes building construction, procurement of machineries and equipments, heavy

machineries, motor vehicles, installation cost, and raw materials. Table (4.2) and (4.3) shows the detail investment plan and salient feature for the development of proposed factory.

Table 4. 2 Foreign Capital Investment

No.	Description	Foreign Currency USD (Million)	Equivalent Myanmar Kyat (Million)
1.	Foreign Currency	443,266.10	598,409,235
2.	Machinery and Equipment	367,783.00	496,507,050
3.	Initial Raw Materials and other similar materials cost	343,950.90	464,333,715
Total Cost		1,155,000	1,559,250,000

Table 4. 3 Salient Feature of Project

Name of Project	Manufacturing and Sale of Chemical Admixture Products
Investment Type	100 % Foreign Investment
Company Name	BASF Myanmar Manufacturing Co., Ltd
Project's Land Area and Land Use	Total Land - 1.505 acre Factory Area – 0.5 acre One story buildings for below facilities i) Locker room – 8x6 m ii) Concrete Lab - 8x6 m iii) Quality Control, QC Lab - 8x6 m iv) Sales office room – 8x6 m v) Meeting room – 8x6 m

4.5 Project Implementation/ Renovation Phase

Previous land use of project site was a lightweight brick-manufacturing factory. Previous owner moved out equipment and other facilities from the premise at the end of August 2015. Renovation and construction phases for this project have lasted for six months. In construction phase, six employees from BASF Myanmar Group were assigned to cooperate with eight contractors to renovate the plant specified with HSE standard of BASF group.

4.6 Operation Phase

Full operation phase will start after getting the required factory operation permits, approval, and licenses from the related Ministry and government departments. During the operation phase, production and administration section will be responsible for all process from raw material collection to the final products distribution. Raw material consumption and production plan, electricity power supply and fuel consumption plan, water consumption plan, pollution control plan, safety, and social security plan were described in the project description.

Chemical admixtures are ingredients to concrete mixture that can help control the setting time and other aspects of fresh concrete. Chemical admixtures reduce the cost of construction, modify properties of hardened concrete, ensure quality of concrete during mixing, transporting, placing, curing, and overcome certain emergencies during concrete operations. Common used of admixtures for concrete are; air entraining agents, water reducers, retarders, and accelerators. Addition of admixture may alter workability, pumping qualities, strength development, appearance etc. in fresh concrete and permeability, strength, durability etc. in hardened concrete. However, use of chemical admixture is necessary for producing high-grade concrete.

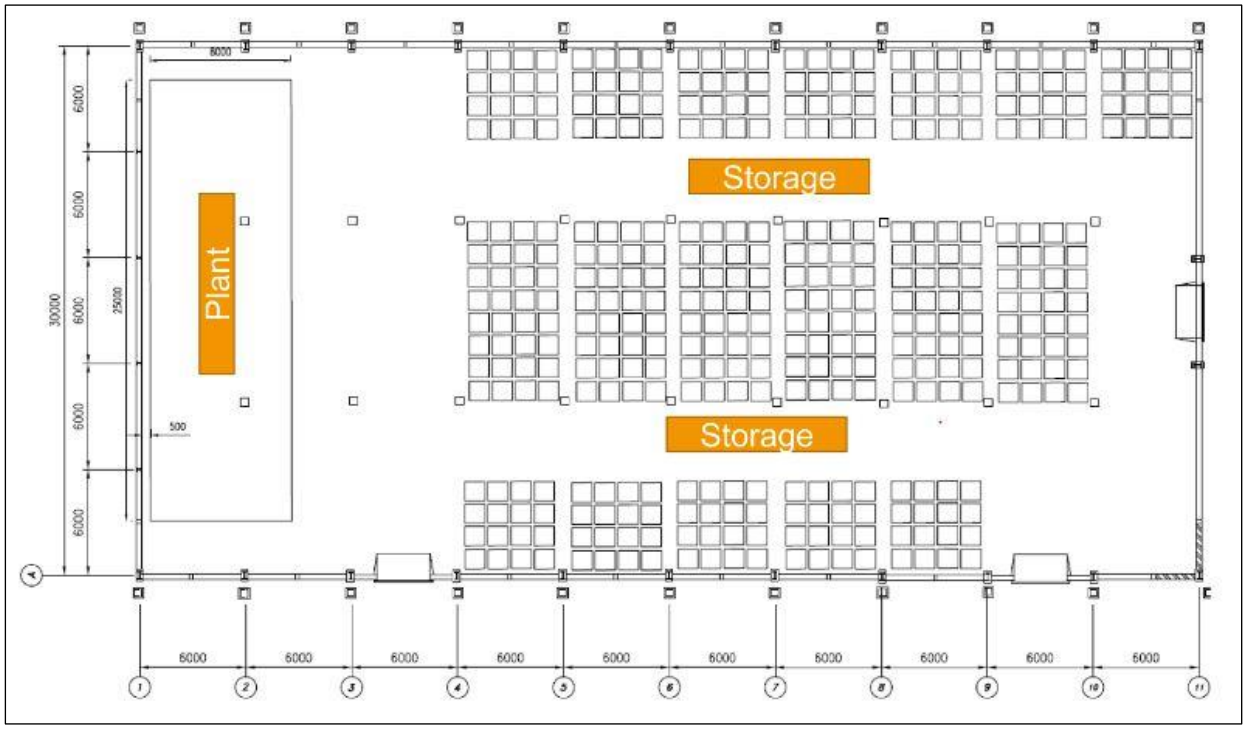

Figure 4. 4 Factory Layout

Figure 4. 5 Small Modular 3D Admixture Plant Design

4.6.1 Collection of Raw Materials, Storage and Handling

Most raw materials are imported from abroad and some are sourcing from local suppliers. Detail list of raw materials and consumption rate required for chemical admixtures manufacturing are mentioned in table (4.5). Major ingredients used for making chemical admixtures are water, BNS, lignin, molasses and other additives and storage facilities for all raw materials shown in table (4.4). All of these are storage in IBC tanks, steel tanks, drums, and bags as well as through tankers. The storage tanks of hazardous flammable substances shall be located within premises in designated storage area will all precautionary process instrumentation and safety appliances. The project area is covered by well-designed warehouse containing store area, raw material store, and finish product store. Personal protective equipment such as hand gloves, safety shoes, goggles, helmet, and clothing will be provided to those handling hazardous chemicals as per specified requirement. In addition, eyewash, shower and spill kits, and safety signage will also be provided to laboratory technicians in handling of chemicals.

Table 4. 4 Storage Type and Storage Facilities for raw materials

Type of Raw Materials	Storage Type	Capacity
Liquid Chemicals	Stainless Steel Tank	1x6 cubic meter tank
	Stainless Steel Tank	2x30 cubic meter tank
	IBC tank	1,000 liter

Powder type Raw Materials	Big bag	Store in warehouse 30x60 m with big bag 1,000/650/600 kg

There is one container truck for delivery of raw materials and 4,6,10 wheeled-trucks to deliver finish goods. At unloading area, all of the raw materials are transported with ramp and stored with MSDS labeled for individual raw materials.

Table 4. 5 Annual Raw Materials Uses

Year	Item	Unit	Quantity	Remark
Major used of Raw Materials				
Year 1	Water,	MT	545	Local
	molasses		49	Local
	formaldehyde		12	Local
Year 2	Water	MT	1,307	Local
	molasses		118	Local
	formaldehyde		30	Local
Year 3	Water	MT	1,764	Local
	molasses		159	Local
	formaldehyde		40	Local
Year 4	Water	MT	2,381	Local
	molasses		215	Local
	formaldehyde		54	Local
Year 5	Water	MT	3,096	Local
	molasses		280	Local
	formaldehyde		70	Local
Year 6	Water	MT	3,715	Local
	molasses		336	Local
	formaldehyde		84	Local
Year 7	Water	MT	4,273	Local
	molasses		386	Local
	formaldehyde		97	Local
Year 8	Water	MT	4,913	Local
	molasses		444	Local
	formaldehyde		111	Local
Year 9	Water	MT	5,651	Local
	molasses		510	Local
	formaldehyde		128	Local
Year 10	Water	MT	6,499	Local

Year	Item	Unit	Quantity	Remark
	molasses		587	Local
	formaldehyde		147	Local
Auxiliaries Raw Materials				
Year 1	Poly carboxylate ether (V 30)	MT	20	Import
	Poly carboxylate ether (V 157)		16	Import
	AQUALOC LA		10	Import
	POLY- DEFOAMER		2	Import
	Sodium Gluconate		10	Import
	Acticide		6	Import
	Sodium hydroxide		12	Import
	Sodium lingo sulfonate Power (lingo)		60	Import
	Tributyl phosphate (TiBP)		2	Import
	Glucose		34	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		392	Import
Year 2	Poly carboxylate ether (V 30)	MT	48	Import
	Poly carboxylate ether (V 157)		38	Import
	AQUALOC LA		24	Import
	POLY- DEFOAMER		5	Import
	Sodium Gluconate		24	Import
	Acticide		14	Import
	Sodium hydroxide		29	Import
	Sodium lingo Sulfonate Power (lingo)		145	Import
	Tributyl phosphate (TiBP)		5	Import
	Glucose		81	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		941	Import
Year 3	Poly carboxylate ether (V 30)	MT	65	Import
	Poly carboxylate ether (V 157)		52	Import

Year	Item	Unit	Quantity	Remark
	AQUALOC LA		32	Import
	POLY- DEFOAMER		6	Import
	Sodium gluconate		32	Import
	Acticide		19	Import
	Sodium hydroxide		39	Import
	Sodium lingo sulfonate Power (lingo)		196	Import
	Tributylphosphate (TiBP)		7	Import
	Glucose		109	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		1,270	Import
Year 4	Poly carboxylate ether (V 30)	MT	87	Import
	Poly carboxylate ether (V 157)		70	Import
	AQUALOC LA		44	Import
	POLY- DEFOAMER		9	Import
	Sodium gluconate		44	Import
	Acticide		26	Import
	Sodium hydroxide		52	Import
	Sodium lingo sulfonate Power (lingo)		264	Import
	Tributylphosphate (TiBP)		9	Import
	Glucose		147	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		1,714	Import
Year 5	Poly carboxylate ether (V 30)	MT	114	Import
	Poly carboxylate ether (V157)		91	Import
	AQUALOC LA		57	Import
	POLY- DEFOAMER		11	Import
	Sodium gluconate		57	Import
	Acticide		33	Import
	Sodium hydroxide		68	Import
	Sodium lingo sulfonate Power (lingo)		343	Import

Year	Item	Unit	Quantity	Remark
	Tributylphosphate (TiBP)		12	Import
	Glucose		191	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		2,229	Import
Year 6	Poly carboxylate ether (V 30)	MT	136	Import
	Poly carboxylate ether (V 157)		109	Import
	AQUALOC LA		68	Import
	POLY- DEFOAMER		14	Import
	Sodium gluconate		68	Import
	Acticide		40	Import
	Sodium hydroxide		82	Import
	Sodium lingo sulfonate Power (lingo)		412	Import
	Tributylphosphate (TiBP)		14	Import
	Glucose		229	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		2,675	Import
Year 7	Poly carboxylate ether (V 30)	MT	157	Import
	Poly carboxylate ether (V 157)		126	Import
	AQUALOC LA		78	Import
	POLY- DEFOAMER		16	Import
	Sodium gluconate		78	Import
	Acticide		46	Import
	Sodium hydroxide		94	Import
	Sodium lingo sulfonate Power (lingo)		474	Import
	Tributylphosphate (TiBP)		16	Import
	Glucose		264	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		3,076	Import
Year 8	Poly carboxylate ether (V 30)	MT	180	Import
	Poly carboxylate ether		144	Import

Year	Item	Unit	Quantity	Remark
	(V 157)			
	AQUALOC LA		90	Import
	POLY- DEFOAMER		18	Import
	Sodium gluconate		90	Import
	Acticide		53	Import
	Sodium hydroxide		108	Import
	Sodium lingo sulfonate Power (lingo)		545	Import
	Tributylphosphate (TiBP)		18	Import
	Glucose		303	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		3,537	Import
Year 9	Poly carboxylate ether (V 30)	MT	208	Import
	Poly carboxylate ether (V 157)		166	Import
	AQUALOC LA		104	Import
	POLY- DEFOAMER		21	Import
	Sodium gluconate		104	Import
	Acticide		61	Import
	Sodium hydroxide		125	Import
	Sodium lingo sulfonate Power (lingo)		627	Import
	Tributylphosphate (TiBP)		21	Import
	Glucose		349	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		4,068	Import
Year 10	Poly carboxylate ether (V 30)	MT	239	Import
	Poly carboxylate ether (V 157)		191	Import
	AQUALOC LA		119	Import
	POLY- DEFOAMER		24	Import
	Sodium gluconate		119	Import
	Acticide		70	Import
	Sodium hydroxide		143	Import
	Sodium lingo sulfonate		721	Import

Year	Item	Unit	Quantity	Remark
	Power (lingo)			
	Tributylphosphate (TiBP)		24	Import
	Glucose		401	Import
	Sodium Naphthalene sulfonate Liquid (BNS liquid)		4,678	Import

4.6.2 Machinery and Equipment Lists

The required lists of machinery and equipment for production of chemical admixture are shown in below table (4.6).

Table 4. 6 Machinery and Equipment Lists

No.	Item	Quantity
1	Storage tanks stainless steel SUS 304 30m^3	4
2	Dosing tank 200 liter for NaOH stainless steel SUS 304	1
3	Storage tanks stainless steel SUS 304 for NaOH 6m^3	1
5	Blender tank 12m^3 SUS304 c/w agitator motor 11kw	
6	Load cell for Blender tank scale 10 ton c/w junction box and weighing indicator	4
7	Water spray ball	2
8	Gas scrubber system c/w water tank, fan 3kW and pump 0.75kW	1
9	Structure frame and support platform	1
10	Hoist Hitachi 2T	1
11	Platform scale 2000 kg with indicator	1
12	Load cell for dosing tank 200L for NaOH c/w junction box and weighing indicator	3
13	Flow meter KMS 102-050F	5
14	Screen ME3000-MC2 controller for output product	3
15	Level sensor	9
16	Flow switch for pump protection	13
17	Pipe SS SUS304 DN80	12
18	Pipe SS SUS304 DN65	30
19	Pipe SS SUS304 DN50	140
20	Pipe SS SUS304 DN40	90
21	Pipe SS SUS304 DN25	18
21	Backflow valve	3
23	Valve manual DN80 Flanges	7
24	Valve manual DN80 Threaded	2
25	Valve manual DN65 Flanges	2
26	Valve manual DN50 Flanges	11
27	Valve manual DN40 Flanges	2
28	Valve manual DN40 Threaded	2
29	Valve manual DN25 Flanges	1
30	Valve manual DN25 Threaded	16
31	Valve manual DN15 Threaded	27

No.	Item	Quantity
32	Valve auto control by compressed air DN65 Flanges	1
33	Valve auto control by compressed air DN50 Flanges	9
34	Valve auto control by compressed air DN40 Flanges	1
35	Valve auto control by compressed air DN25 Flanges	1
36	Filter	9
37	Mechanical installation accessories	1
38	Pipe collector	2
39	Panel	1
40	Centrifugal pump Q=30m3/h, h=20m, 3kW, 2900 RPM	8
41	Centrifugal pump Q=30m3/h, h=20m, 3kW, 2900 RPM (HTM40)	2
42	Centrifugal dosing pump Q=17m3/h, h=10m, 1.5kW, 2900 RPM	2
43	Accessories for Installation pump	3
44	Inverter for Agitator (15KW)	1
45	Screw pump Q=10m3/h, h=10m, 3kW	1
46	Electric panel	1
47	Electric panel components	1
48	Controller PLC S7-1200	1
49	15" XGA 1024 x 768 fan less HMI with Atom N2600 1.6G CPU, 2G DDR3 memory, touch window resistive touch screen, 9-36V DC input with adapter, Aluminum chassis (ARCHMI-715)	1
50	Programming	1
51	Tray cable and cable wiring	1
52	Air Compressor Screw Type Hitachi 15kW c/w Air Dryer	1
53	Flow meter KMS 502P-050F 50mm Mag flows	3
54	Cable, IO card PLC, Installation cost	1
55	Box control, pipe and accessories	3
56	Management cost	1
57	One Automation engineer for commissioning and trial production, included Hotel and Air Ticket	1
58	Cranes for installation at site	1
59	Installation labor and at site: Supervisor, technician, workers, included Hotel and air ticket	1
60	Packing, transport to local port and procedure export	1
61	Transportation cost to Yangon	1
62	Rental cranes for unloading at site	1
63	Insurance	1
64	Safety shower & eyewash	4
65	Jet printer P4 for labeling	1
66	Electronic scale	1
67	pH – Meter	1
68	Solid Content Measurement	1
69	Auxiliaries, Hydrometer, Volumetric flasks, etc.	1
70	Compressing Machine to test concrete cubes	1
71	Concrete Mixer	1
72	Concrete Cylinder	1
73	Concrete Air meter	1
74	Oven memmert for moisture test	1
75	FG & RM weighing scale - 2000 kg	1
76	FG & RM weighing scale - 100kg	1

4.6.3 Chemical Admixture Production Process

The proposed chemical admixture factory products include Master Pozzolith, Master Rheobuild, and Master Glenium SKY and shelf life is one year maximum. Annual production capacity plan is shown in table (4.7). Final admixture liquid products are stored in (2x30) cubic meter of storage tank, 1000-liters capacity of IBC tank and 200-liters drum respectively.

BASF Myanmar's product technology for the ready-mix environment includes:

1. Maser Glenium Sky – its target solution for hyper plasticized and self-consolidating concrete
2. Master Pozzplith _ water reducers for concrete
3. Master Rheobuild - for super plasticized concrete

Production of concrete chemical admixture liquid is very simple in which detail process under the automatic control is shown in below chart. Chemical synthetic and physical blending process will be accomplished in same machine. For ready mixed concrete (RMC), concrete admixtures tailored can be produced directly from raw chemical materials by one unit. The production system will be operated under normal water temperature. No heating source or cooling system is necessary in production line. Production line layout will be adapted to resources and limitations on site. Automatic control system support both guarantees of stable product quality and saves labor hours and troubles.

The manufacturing process involves three stages: (i) measuring and feeding of raw materials (ii) blending in mixer (iii) sample inspection for quality control at Laboratory and (iv) packaging stage.

The bill of materials will be prepared by customized order. Water consumption is the major process which goes from the water storage tank into the blender after switching on the vent suction blower. Raw fluid is then added by using feed pump from storage tank. After that, powder composed of raw materials will be sustained in the sewer vent on the highest point of the tank. The amount of required raw materials to be added into the tank is estimated based on platform scale of 2000 kg. Mixing step takes a few minutes to complete. Quality control is needed obtain the required specifications. After mixing the raw materials inside the tank, agitator will switch on about 60-120 minutes per batch. Finally, packaging will made in the storage tank or IBC drum for finished products in the final storage. Generated wastewater from tank cleaning is stored in IBC tanks, which are reused for next batching process. Production Process Flow Diagram and Plant Design are shown in Figure (4.6), (4.7) and (4.8) respectively.

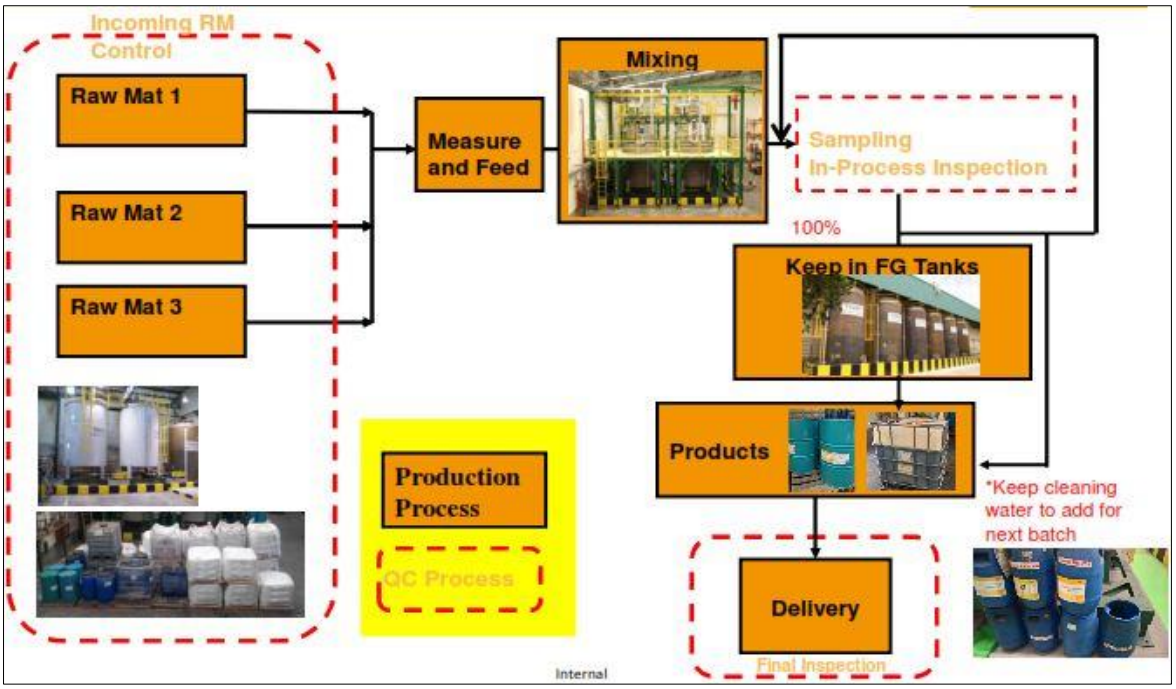

Figure 4. 6 Process Flow Chart for Concrete Chemical Admixture

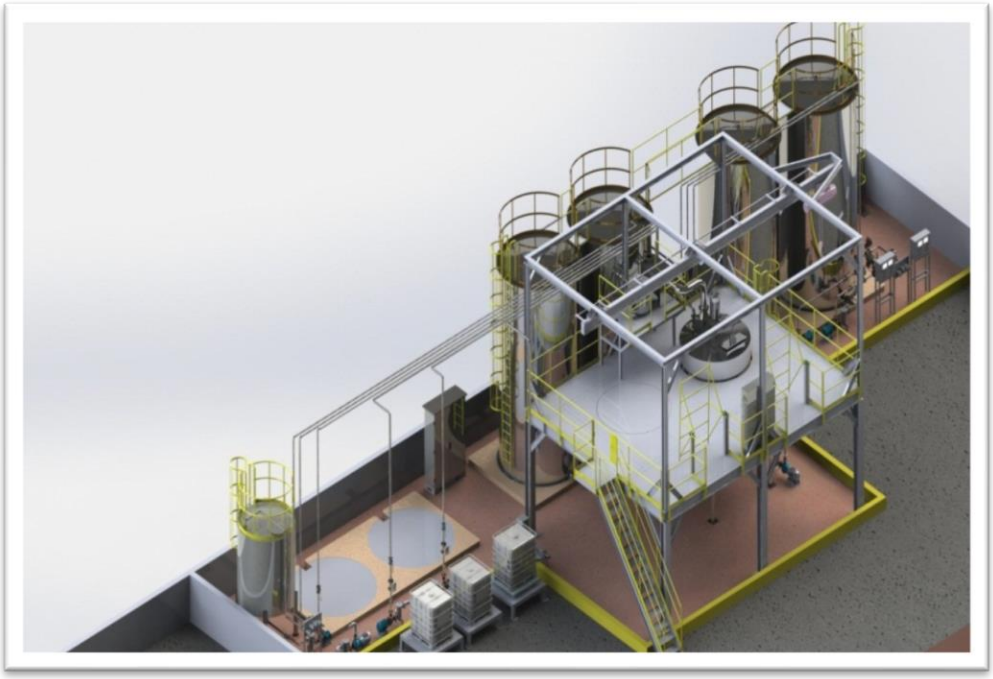

Figure 4. 7 Chemical Admixture Plant Design

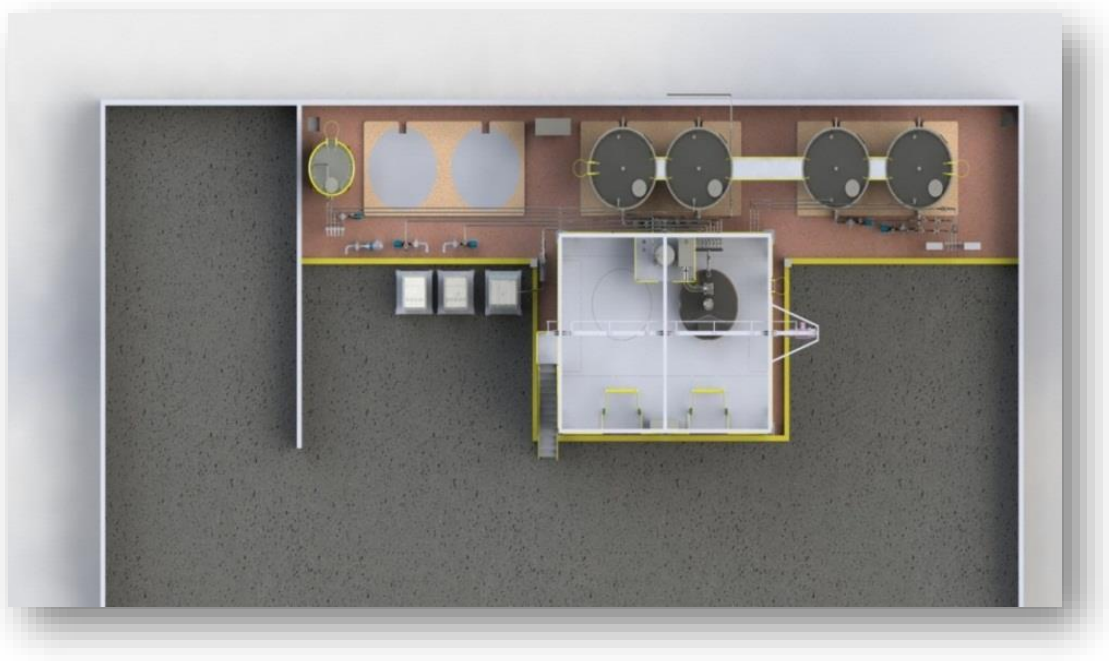

Figure 4. 8 Overview Chemical Admixture Plant Design

Table 4. 7 Type of Products and Production Capacity per annually

Product Categories	Amount to be produced (Metric Ton)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Master Pozzolith	567	1,029	1,432	1,874	2,398	2,700	3,085	3,490	4,208	5,021
Master Rheobuild	613	1,543	1,910	2,603	3,198	3,665	4,113	4,487	4,951	5,523
Master Glenium	279	514	773	937	1,259	1,302	1,440	1,645	1,980	2,310
Total Volume (Metric tons)	1,459	3,086	4,116	5,415	6,855	7,667	8,637	9,622	11,139	12,853

4.6.4 Manpower Requirement

According to the project investment proposal, the proposed project is appointing eight employees for operation phases (both production and administration section). The detail employment plan is shown in table (4.8).

Table 4. 8 Manpower Requirement

Description of Position	Citizen	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		Number of People									
Senior Management	Myanmar	1	1	1	1	1	1	1	1	1	1

Description of Position	Citizen	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
		Number of People									
Other Management Level	Myanmar	2	2	2	3	3	3	4	4	4	4
Technicians	Myanmar	1	1	2	4	4	5	6	6	6	6
Skill labor	Myanmar	3	4	5	6	6	6	6	6	6	6
Worker	Myanmar	1	1	1	1	1	2	2	2	3	3
Total		8	9	11	15	15	17	19	19	20	20

4.6.5 Resource Consumption

Water Consumption

Water consumption for concrete chemical admixture production is 65 percent from tube well, pumping 30 m^3 per hour. The tube is directly connected to water storage tank for production process. Another 2 inches diameter pipe is connected with overhead water tank for office consumption. According to the project proposal, water consumption for production process and office usage requires approximately 5,108.49 liters (1,349.52 gallons) per day.

Electricity Consumption

The proposed project tends to increase electricity consumption due to the use of automatic control machines and equipment. The main source for electricity supply is from national grid which is adjoining from the existing grid 315-kVA, 3 phases 380 V, 50 Hz, automatic voltage regulator transformer with capacitor bank. Main electrical breaker is 400 amps. Overall electricity consumption is approximately 7500 kWh per month and 90,000 kWh per year.

Fuel Consumption

The annual diesel fuel consumption for multipurpose would approximately 200 liters (52.83 gallons) per month. The annual fuel consumptions are shown in table (4.9).

Table 4. 9 Fuel, Electricity, Water for Requirements for 10 years

Year	Annual Requirement			Monthly Requirement			Daily Requirement (365 days per year)		
	Fuel (liters)	Electricity (kw/hr.)	Water (liters)	Fuel Diesel (liters)	Electricity (kW/hr.)	Water (liters)	Fuel (liters)	Electricity (kW/hr.)	Water (liters)
Y1	5,280	90,000	1,864,600	440	7,500	155,383	14.47	246.58	5,108.49
Y2	5,809	108,000	2,627,040	484	9,000	218,920	15.91	295.89	7,197.37
Y3	5,808	129,600	3,084,140	484	10,800	257,012	15.91	355.07	8,449.70
Y4	5,808	155,520	3,833,190	484	12,960	319,433	15.91	426.08	10,501.89

Year	Annual Requirement			Monthly Requirement			Daily Requirement (365 days per year)		
	Fuel (liters)	Electricity (kw/hr.)	Water (liters)	Fuel Diesel (liters)	Electricity (kW/hr.)	Water (liters)	Fuel (liters)	Electricity (kW/hr.)	Water (liters)
Y5	6,098	171,072	4,389,003	508	14,256	365,750	16.71	468.69	12,024.66
Y6	6,403	188,179	5,025,408	534	15,682	418,784	17.54	515.56	13,768.24
Y7	6,723	206,997	5,754,092	560	17,250	479,508	18.42	567.12	15,764.64
Y8	7,060	227,697	6,588,435	588	18,975	549,036	19.34	623.83	18,050.51
Y9	7,413	250,467	7,543,759	618	20,872	628,647	20.31	686.21	20,667.83
Y10	7,783	275,513	8,637,604	649	22,959	719,800	21.32	754.83	23,664.67

4.7 Environmental Pollution Control

Air Pollution Control: There is no significance air emission source such as chimney. However, gas scrubber will be installed for air pollution control in mixing step of processing showed in machineries list table (4.6).

Waste Management Facilities

The project proponent committed to waste efficiency through the environmental production requirements for its entire manufacturing process. Waste will be segregated into hazardous and non- hazardous waste passing through a robust waste management system for production area and office.

i) Industrial discharge wastewater management

In production section, there will be discharged wastewater effluents from cleaning of utensils which is reused in next batch. Moreover, sewage generated from existing infrastructures will be discharged by septic sewerage system while storm water drained into the drainage system.

ii) Solid waste management

For all non-hazardous solid waste such as packaging and concrete waste from the lab (50-500 kg/ month), dustbins are to be provided in line with YCDC guideline as showed in figure (4.9). The collected waste in dustbins will be disposed in temporary storage place within the premises before collected by YCDC. The wastes from concrete testing samples are sold out to outsource buyer. The project proponent has already in touched with the certified hazardous waste (waste treatment service provider, Dowa Co., Ltd) collector for final disposal showed in appendix (6).

Figure 4. 9 Waste collection facilities at project site

All the other wastes are segregated based on their characteristics, collected, and stored in an appropriate manner in above Figure (4.9).

4.8 Selected Alternatives by Project Phase

This section discusses various alternatives considered in developing the project, It also compares the technical, financial, environmental, and social feasibility of the project, where is applicable.

4.8.1 Comparison and Selection of the Preferred Alternatives

Alternative analysis is the process of analyzing the proposed location to operate the plant safety. This analysis also covers the environmental aspect of pollution prevention and improvement in quality of life nearby the project vicinity.

Site alternative: Specific site selection criteria for the proposed project are given below:

- ✓ Availability of facilities like infrastructure, communication, fuel, water, power, unskilled and skilled labor, raw materials etc.
- ✓ There is no rehabilitation and resettlement involved
- ✓ Plant is located at Industrial Zone and very near to No.2 Highway. Hence, transportation is easy.
- ✓ No national park or wildlife habitat falls within 1 km radius distance from proposed project site.
- ✓ Based on the above, reasons, this location is the most suitable for the chemical admixture production and hence there is no other alternative project site.

Process Alternative: BASF used the best available production technology since there is no alteration currently. Project option selecting stages include design alternatives such as the No-Build as well as Built-Out alternatives that are based on the assessments of beneficial, adverse environmental and socio-economic impacts arising from the proposed project.

Considerations of project alternatives are as follows;

i) Process Design/ Technology Alternatives

BASF is one of popular chemical industrial in worldwide and has embraced the goals of the chemical industry's voluntary "Responsible Care Initiative and applies them to the entire BASF group. Overall design concept of the project takes into consideration environmentally sustainable features with the adaption of the BASF global chemical admixture industrial standard guidelines. In which, energy conservation measures including energy saving lighting, minimizing ozone depletion by using CFC and HCFC_ free refrigerant in the chillers and air condition units.

ii) No-Project Alternative

During project implementation stage of renovation/construction and operation phases, significant socio-economic benefits are envisaged. In addition, it is expected that the local people as well as the regional economy will benefit significantly from the proposed project directly and indirectly. However, if the project is not implemented, the benefits describe above will fail to materialize. Furthermore, from an environmental perspective, the potential environmental concerns will cease to exist and there will be no change to the previous environment condition.

iii) Built-Out Alternative

With the implementation of the project, potential environmental impacts are envisaged. However, these impacts are predicted to be localized, short-term, and reversible with implementation of appropriate mitigation measures and by undertaking regular compliance environmental monitoring plan. No adverse irreversible environmental or social impacts are anticipated. By contract, significant positive socio-economic impacts to the local and regional community are envisaged.

iv) On careful consideration of the above alternatives, the project implementation alternative was selected as the result in significant advantages in investment costs, time to market and flexibility of production assets.

5. DESCRIPTION OF THE SURROUDNING ENIVORNMENT

5.1 Scope of the Study Area

The EIA study area for proposed project defined to be the area within 500-meter radius as shown in the figure (5.1). The study area covers potential environmental and social impact issues of the project construction and operation phase. Yellow color circle refers to direct impact zone, Green color circle refers to indirect impact zone, and Red color circle refers cumulative impact zone respectively.

Figure 5. 1 EIA Study Area for Proposed Project

5.2 Methodology and Objective

The EIA study is in line with the requirements of the Environmental Impact Assessment Procedure (2015) developed by MONREC. The study area for the proposed development is within the radius of 500 meter from the center of the development site since most of the potential impacts are most likely to occur within this area and project site is located at industrial zone and there is no sensitive receptor around the project site. The baseline study and primary data of environmental and social data of project site status were collected based on field observation and onsite measurements on July 2018.

Ambient air quality, ground water quality from tube well, storm water quality from public drainage at project site, and soil quality samples were collected at site and analyzed at laboratories.

5.3 Legally Protected National, Regional Areas

According to the field observation and secondary township data of East Dagon (Myothit) township, there is no existence of forest conservation area, public forests and parks, mangrove swamps, any other sensitive costal area, wildlife sanctuaries, scientific reserves, nature

reserves, geophysical significant reserves within 1 km radius of project site. Project site is located at East Dagon Industrial Zone and nearest wards of project site is 118 ward of this township and there is no any other nature reserve nominated by the Ministry, protected cultural heritage area and protected archeological area or areas of historical significance around the project site.

5.4 Physical Environment

Project Site Status

The project site is located at No.159, East Dagon Industrial Zone, East Dagon (Myothit) Township. The total land requirement of the small modular chemical admixture manufacturing facility is 0.5 acre and total plot area is 1.505 acres. The nearest railway station is Toekyaunggalay railway station situated on the Yangon Circular Railway and the nearest water body is Nga Moe Yeik Creek that cross in East Dagon (Myothit) Township.

Table 5. 1 Project Site Status

No.	Particulars	Detail
1	Latitude and Longitude	17°14′ 55.40″ N and 96°27′ 35.47″ E
2	Present land use at the proposed site	Industrial Zone Land Use
3	Nearest Road	Maw Ya Waddi Street (its far 234.07 meter distance from the project site and which is beside of the project area) Number (2) Main Road (706.07 meter distance from the project site)
4	Nearest surface water bodies	Bago River (7900 meter distance from project site) Nga Moe Yeik Creek (4500 meter distance from project site)
5	Nearest Railway Station	Toegyaingkalay Station (633 meter distance from project site)

The physical setting of project is described in this section and it is based on onsite survey and review, a scoping site visit undertaken in 9 July 2018 as well as the environmental baseline data of air quality, noise, ground water, and storm water (factory's drainage).

5.4.1 Topography

The project site area is flat with elevations from 30 feet above the mean sea level.

5.4.2 Geology

The geological condition of the ground surface in Yangon is divided in three categories include Alluvium, Irrawaddy formation and Pegu group.

Generally, the Yangon area is covered by alluvial deposits that are composed of gravel, clay, silts, sands, and laterite which lie upon the eroded surface of the Irrawaddy formation at 3-4.6 meter above mean sea level (MSL). The rock type in Yangon is mainly soft rocks, which consists of sandstone, shale, limestone, and conglomerate. *(Lwin et al, 2012)*

The Irrawaddy formation comprises the bedrock along the Bago Yoma, the Arazamigone Sandstone in the north of the Shwedagon Pagoda, and Dayingone Clay in the east of the Arzamigione Sandstone. The Pegu groups comprise the Besapet Alternation, Thadugan Sandsone, and Hlawga Shale distributed in the north of the Yangon area.

a) Alluvium: The topsoil layer is clayey soil layers, and these layers are brownish grey in color. The thickness of these clayey soil layers is minimum 4.0 m and maximum 8.0 m. It has low to medium plasticity.
b) This formation is yellow ship fine sandstone or sand-rock of the Irrawaddian Group.
c) Pegu Group: This formation is mainly composed of sand and shale inter-beds.

(source: EIA report, for Myanmar-Korea Friendship Bridge (Dala) Construction project, 2017)

In addition, there is no major earthquake recorded in this study area. The project site is located in moderate seismicity zone according to the seismic zoning map of Myanmar 2005. The corresponding assumed basic intensity of earthquake degree is VII in Mercalli Scales.

5.4.3 Soil Quality

There are several soil types in Yangon Region: (1) meadow soils and meadow alluvial soils, (2) clay and clay swampy soils, (3) swampy soils, (4) lateritic soils, (5) yellow brown forest soils, (6) dune forest and beach sand, (7) mangrove forest soils, (8) saline swampy meadow and gray soils. Mostly found soil types in the project area are meadow soils and meadow alluvial soils, which occur near the river plains, exposed to occasional tidal floods, is non-carbonated, and usually contains a large amount of salt. . The soil analysis result can be seen in table (5.3) and appendix (11) and soil map of Yangon is shown in Figure (5.2). *(Lwin et al, 2012)*

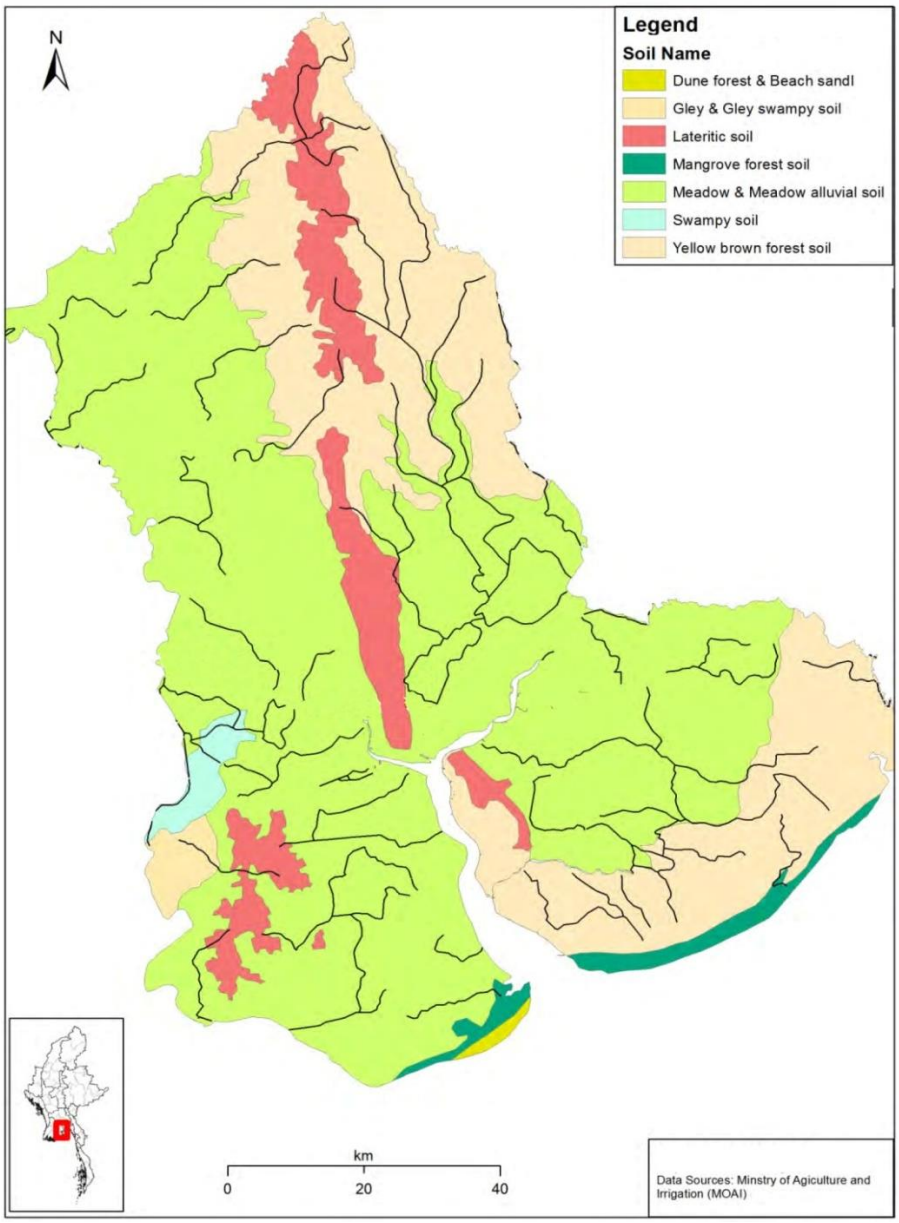

Figure 5. 2 Soil Map of Yangon Region

Source: Ministry of Agriculture and Irrigation (MOAI)

Soil Quality Results of Project Site

The physico-chemical properties of soil were tested by using EDX 8000 Energy Dispersive X-Ray Fluorescence Spectrometer for one sampling point of project site showed in table (5.2), in July 2018.

Table 5. 2 Soil Sampling Points

Test Name	GPS value	Locations
Soil chemical parameter	Latitude : 16°54'36.755"N, Longitude 96°14'38.824"E	**At project site**

Figure 5. 3 Soil Sampling at Project Site

Table 5. 3 Existing Soil Quality Results

Chemical Compositions of Soil Quality	**Laboratory Finding (ppm)**
Calcium (Ca)	356742.8
Silicon (Si)	268193.5
Iron (Fe)	219885.3
Aluminum (Al)	75237.69
Potassium (K)	42553.37
Titanium (Ti)	22326.28
Manganese (Mn)	4489.459

Chemical Compositions of Soil Quality	Laboratory Finding (ppm)
Sulfur (S)	4137.613
Strontium (Sr)	2100.079
Zinc (Zn)	993.064
Rubidium (Rb)	889.382
Vanadium (V)	739.434
Chromium (Cr)	660.559
Nickel (Ni)	483.905
Yttrium (Y)	288.601
Copper (Cu)	278.999

Source: EQ team, E Guard Environmental Services

5.4.4 Climate

The project site is located in East Dagon Township, Yangon region and it has tropical monsoon climate characterized by three distinct seasons, namely, summer, rainy and cool seasons. The mean monthly temperature of East Dagon (Myothit) Township is highest temperature 36ºC and lowest temperature 22ºC.

5.4.4.1 Temperature and Rain Fall

The following are raining days, rainfall, and temperature of 2012 to 2016 obtained from Township data of East Dagon. The secondary rainfall and temperature data are showed in below table (5.4), (5.5) for 2012 to 2017. In addition, average maximum and minimum temperature during 2017 was 39°C and 22°C, respectively.

Table 5. 4 Annual Rainfall and Temperature of East Dagon Township

No.	Year	Rainfall		Temperature	
		Raining Day	Total rainfall (inches)	Summer (ºC)	Winter (ºC)
1	2012	131	105	28	25
2	2013	122	114.05	28	25
3	2014	136	116.25	30	24
4	2015	103	80.00	30	25
5	2016	105	82.00	30	24

Source: East Dagon (Myothit) Township Data, 2017

Table 5. 5 Monthly Temperature, Rainfall, and Rainy Days (2017)

Month/ Year	Max. Temperature (C°)	Min. Temperature (C°)	Ave. Temperature (C°)	Rainfall (mm)	Rainy days
Jan-17	35	24	30	8.9	6
Feb-17	37	24	32	0	0
Mar-17	39	25	34	0.3	1
Apr-17	39	28	35	39.8	8
May-17	38	31	35	137.8	23
Jun-17	34	29	31	258.8	30
Jul-17	32	28	30	365.9	31
Aug-17	33	28	31	565.1	31
Sep-17	32	26	30	520.8	27
Oct-17	32	26	29	492.2	30
Nov-17	33	24	29	95.3	15
Dec-17	33	22	28	1.9	4

Source: https://www.wunderground.com/global/BM.html

5.4.4.2 Wind Speed and Win Direction

Wind speed is based on atmospheric conditions and terrain characteristics. Even in areas that are generally windy, local conditions may determine whether your wind resource is adequate or not. Wind speeds increase with correspondence increased height above the surface. Wind speed and wind direction data were collected for the year 2017 which are mentioned at the table (5.6) in order to compare with the recently collected data which is going to be established as a baseline data.

Table 5. 6 Wind Speed and Wind Gust (mph) 2017

Months/Year	Maximum Wind Speed (mph)	Average Gust (mph)	Average Wind Speed (mph)
Jan-17	8.1	9.4	5.8
Feb-17	9.4	9.4	6
Mar-17	13.4	10.3	7.4
Apr-17	14.5	11.6	8.7
May-17	13.9	11.2	8.3
Jun-17	12.3	11	7.6
Jul-17	11.4	11.4	7.6
Aug-17	10.1	10.1	6.5
Sep-17	8.7	8.9	5.6
Oct-17	7.6	7.4	4.7
Nov-17	7.4	7.8	5.1
Dec-17	8.1	8.5	5.8

Source: https://www.wunderground.com/global/BM.html

Wind speed and wind directions data were collected within the site during air quality and noise data measuring in 9 July 2018.The wind speed and wind direction are equally important as temperature for dispersion of air pollutants from emissions sources into ambient air. Site-specific information of wind speed, wind rose diagram and wind direction and in study period are showed in below figure (5.4) and (5.5).

Figure 5. 4 Wind Speed and Wind Direction (Blowing to) at BASF Myanmar

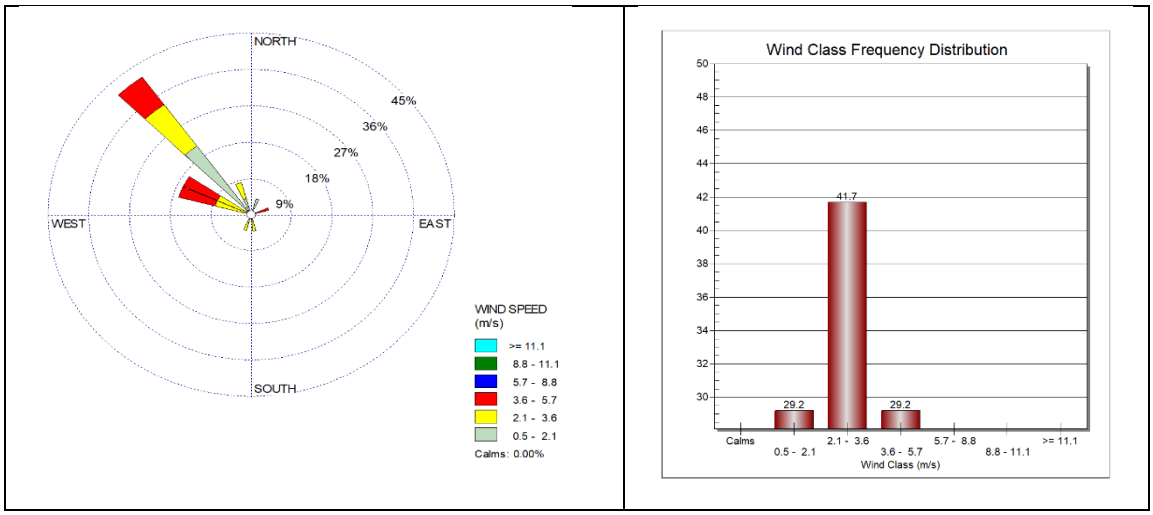

Figure 5. 5 Wind Rose and Wind Class Frequency Distribution at project site

Source: EQ team, E Guard Environmental Services

It can be noted that the predominant wind direction of the study period remains South West to West (SW to W) direction and average with speed is 0- 8.7 m/s.

5.4.5 Ambient Air quality

The study area is bordered with other factories around the site, it is near with ward No.118 of residential area of East Dagon Township, and most of areas are vacant land.

In order to get the baseline ambient air quality parameters such as $PM_{10,}$ $PM_{2.5}$, and gases parameter CO, CO_2, SO_2, NO_2 were measured by using the HAZSCANNER air monitoring station at project site on 9^{th} to 10^{th} July 2018 for 24 hours continuously. In addition, Volatile Organic Compounds (VOCs) is measured at the selected site as indoor air quality by using Aeroqual-(Series 500) which provides direct reading with data logging capabilities.

The HAZ-SCANNER (EPAS) Environmental Perimeter Air Monitoring system manufactured by EDC/SKC (USA), is a light scattering photometer equipped with a filter sampling system. This dual capability allows for simultaneous real-time and filter measurement. Single-jet impactors were used for particulate size selection and the PM_{10} and $PM_{2.5}$ impactors were used for this air quality survey. The highly sensitive EPAS provides real-time determinations and data recordings of airborne particle concentration in $\mu g/m^3$. It provides the minimum, maximum, and time-weighted average (TWA) monitoring of gases as well. This instrument is factory calibrated with the appropriate USEPA certified target gas and correlated with USEPA methods. (Ref: Code of Federal Regulation 40CFR part 53).

During air quality measurement, there are other cumulative air emission sources from surround environment of project site. Therefore, the air quality of the site is not fine due to the cumulative odor of other air emission sources of factories such as plastic products production factories and tamarind cleaning factory.

Table 5. 7 Air Quality Measuring Point

Points	Coordinate	Locations
Ambient Air Quality	Latitude - 16°54'37.984"N, Longitude - 96°14'40.197"E	At Project Site

Figure 5. 6 Ambient Air Quality Measuring and Nearst Point Soure

To reveal the existing status of baseline air quality, the average ambient air quality results compare with National Environmental Quality (Emission) Guideline and international ambient air quality standard (WHO, IFC, NAAQS, ACGIH) guidelines. All this leads to mitigate the potential impact on the environment including general pollution along with implementation of the suitable control measures and to prepare the purpose of the environmental monitoring plan. Observed values of dust and gases level in project site is showed in Table 5.8.

Table 5. 8 Ambient Air Quality Measurement Results at Project Site

Parameters	Observed Value	Guidelines Value	Unit	Averaging Period	Organization
PM_{10}	21.99	50	$\mu g/m^3$	24hrs	NEQ
$PM_{2.5}$	13.51	25	$\mu g/m^3$	24hrs	NEQ
CO	0.00062	9	ppm	8hrs	NAAQS
CO_2	447.02	5000	ppm	8hrs	ACGIH
SO_2	2.63	20	$\mu g/m^3$	24hrs	NEQ
NO_2	53.68	200	$\mu g/m^3$	24hrs	NEQ
VOCs (Indoor)	0.14	50	mgN/m^3	8hrs	NEQ

It was raining day during the air quality monitoring and the average relative humidity in the study area was varying between 25-100% within the study period in the days of 9 to 10 July 2018.

Existing Dust level within the site

The observed average values of PM_{10} and $PM_{2.5}$ are 21.99µg/$m^3$and 13.51µg/m^3 respectively, which is within the acceptable limit of National Environmental Quality (emission) guideline.

Existing Gaseous Level within the site

The ambient concentration of existing gases concentration of CO_2, CO, SO_2, NO_2, and VOCs are within the ambient air quality standards of National Environmental (emission) Guideline.

Carbon Dioxide

Ambient CO_2 concentration measured for 24 hours and the observed average value of CO2 level for 8hrs is within ACGIH international standard. Data for collected CO_2 value was noted within the range of 5000 ppm.

Carbon monoxide: The measurement results of CO are 0.00062 ppm for average 8hrs measurement and it is within the range of NAAQS guideline standard.

Nitrogen Dioxide

Concentration of ambient NO_2 level measured for 24 hours continuously. The average concentration for 24 hr. is 53.68µg/m^3 and it is within the permissible value of ambient air quality for National Environmental Quality (emission) Guideline.

Sulfur Dioxide

Sulfur dioxide emissions from vehicles neglect in this project. The ambient air quality observed values of sulfur dioxide of proposed BASF Myanmar factory site is 2.63µg/m^3 and it is within the range of standard value of National Environmental Quality (Emission) guideline.

Volatile Organic Compounds (VOCs)

Volatile organic compounds (VOCs) are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- term and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. Baseline concentration of indoor VOCs was measured for eight hours by using Aeroqual S 500 handheld meter at production area and the obtained result is 0.14 mg/Nm^3 less than the National Environmental Quality (Emission) guideline.

5.4.6 Ambient Noise Level

The objective of the noise level survey around the project site is to identify existing noise sources and to measure background noise level. Major noise sources in the study are industrials, commercial, and motor cycle and vehicle movement. Ambient noise level for the proposed project measured with digital sound level meter at the project site as showed in figure (5.7) on 9 to 10 July 2018. Measuring period is 24 hours continuously.

Table 5. 9 Ambient Noise Level Monitoring Point

Sample No	GPS Value	Location
Sampling Point 1	16°54'37.984"N and 96°14'40.197"E	At project site

Table 5. 10 Noise Level Monitoring within 24 hours

No.	Date	Time	Observed Mean Value (Source)	Weight	Day/Night	Average Noise Level (dB A)
1	10.7.2018	7:00:13-7:59:13	75.49	A	Day	
2	10.7.2018	8:00:13-8:59:13	68.37	A	Day	
3	10.7.2018	9:00:13-9:59:13	66.21	A	Day	
4	10.7.2018	10:00:13-10:59:13	64.79	A	Day	
5	10.7.2018	11:00:13-11:59:13	71.18	A	Day	
6	9.7.2018	12:00:13-12:59:13	63.97	A	Day	
7	9.7.2018	13:00:13-13:59:13	55.49	A	Day	
8	9.7.2018	14:00:13-14:59:13	65.78	A	Day	66.01
9	9.7.2018	15:00:13-15:59:13	65.56	A	Day	
10	9.7.2018	16:00:13-16:59:13	68.04	A	Day	
11	9.7.2018	17:00:13-17:59:13	65.09	A	Day	
12	9.7.2018	18:00:13-18:59:13	63.26	A	Day	
13	9.7.2018	19:00:13-19:59:13	68.37	A	Day	
14	9.7.2018	20:00:13-20:59:13	65.31	A	Day	
15	9.7.2018	21:00:13-21:59:13	63.27	A	Day	
16	9.7.2018	22:00:13-22:59:13	53.31	A	Night	
17	9.7.2018	23:00:13-23:59:13	70.25	A	Night	
18	10.7.2018	0:00:13-0:59:13	54.79	A	Night	
19	10.7.2018	1:00:13-1:59:13	50.20	A	Night	
20	10.7.2018	2:00:13-2:59:13	47.16	A	Night	59.89
21	10.7.2018	3:00:13-3:59:13	74.57	A	Night	
22	10.7.2018	4:00:13-4:59:13	59.77	A	Night	
23	10.7.2018	5:00:13-5:59:13	64.29	A	Night	
24	10.7.2018	6:00:13-6:59:13	64.66	A	Night	
Average			62.27			

Table 5. 11 Project Site's noise level with NEQ Guideline

Item	Receptor	One Hour L_{Aeq} (dB A)	
		Day time (7:00 AM- 2:00 PM)	Night time (22:00PM-7:00AM)
Proposed Site Noise Level	Industrial Zone	66.01	59.89
NEQ Noise Level guideline	Industrial, Commercial	70	70
	Residential, Institutional, Educational	55	45

Noise monitoring carried out for the purposes of establishing the existing ambient noise level at proposed site and for verifying operational phase noise level. Noise can have negative impact on health. Human ears can be resistant to limited level of noise, not too low and not high, especially to the level of 16-20000 Hz. The sound level of a quiet countryside is about 20 dB, whereas a calm environment has sound levels between 30 and 50 dB Above 70 dB, noise becomes very disruptive (ISO 1969; EPA 1974).

The observed value results of ambient noise level, it appears that the average noise level at project area is 62.72 dB within the limit standards shown in table (5.11). Ambient noise level measured by using sound level meter for 24 hours and daytime noise level is 66.01 dB A and nighttime noise level is 59.89 dB respectively. According to the mean value of noise level of noise source, the results of average noise level are between 60 dB A to 75 dB A for 24 hours. The observed value of some noise level are little higher than National Environmental Quality Emission Guideline for industrial sector because there are cumulative effect of noise sources from raining, two story construction activities from opposite side of project area and moving vehicles moment of surrounding environment of project site during noise level measuring at project site.

Figure 5. 7 Noise Level Measurement at Project Site

5.4.7 Water Environment

Water Quality

Major surface water source of proposed site area in East Dagon Township is Nga Moe Yeik creek, which flows into Bago River from North to South. The project area has fully drainage facilities and effluent of discharge storm water from project site drains into public drainage, and then flows into Nga Moe Yeik creek, which is about 4500-meter distance of proposed project site.

For baseline study of surface water quality, storm water sample from nearest public drainage of project site and ground water sample were collected from tube well of project site as mentioned in (5.8) and (5.9). Onsite water quality of ground water measured by portable multi parameter water quality meter for physical parameters analysis such as pH, electrical conductivity, turbidity, salinity, dissolved oxygen (DO) and Temperature.

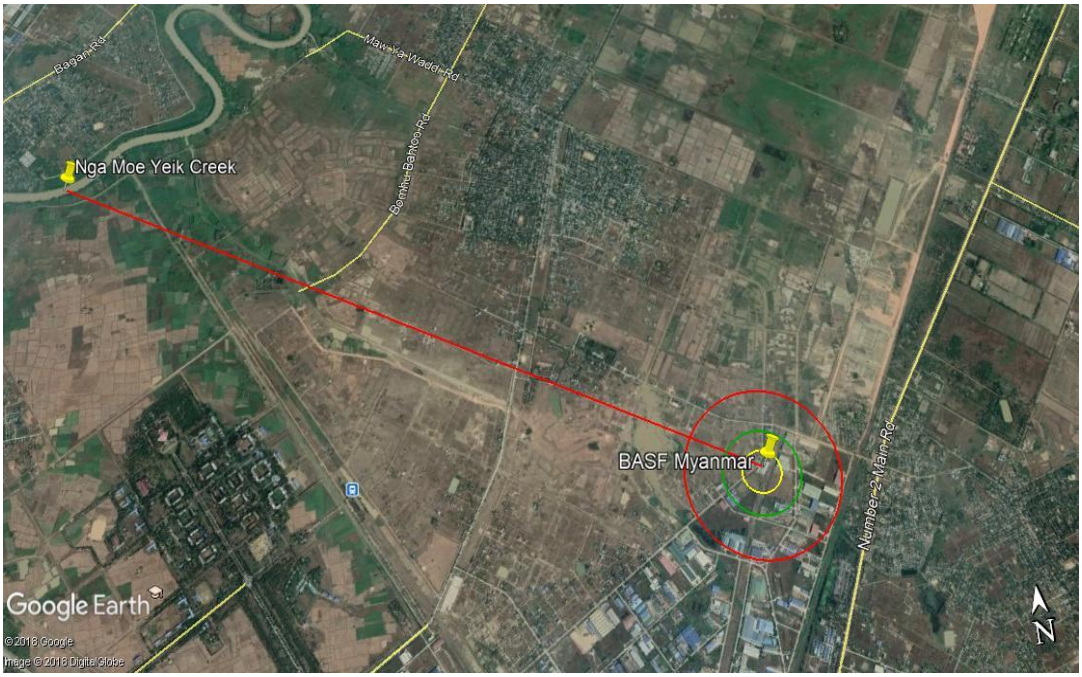

Figure 5. 8 Surface water features near proposed site

Table 5. 12 Water Quality Sampling Point

Sample No	GPS Value	Location
Surface water (storm water)	Latitude : 16°54'37.428"N and Longitude : 96°14'39.593"E	Public Drainage (in front of project site)
Ground Water (tube well)	Latitude : 16°54'38.890"N and Longitude : 96°14'41.158"E	At project site

Figure 5. 9 Ground Water Sampling (Tube well) at project site

Figure 5. 10 Storm Water Sampling (public drainage)

Water samples (ground water, surface water (storm water) was collected on site with appropriate sampling equipment and procedures. The environmental quality-sampling team has pre-arranged with the labs in Yangon for analysis and logistic arrangement made to reach the preserved samples with unique IDs to the designated labs within 48hrs.

Table 5. 13 Laboratories Lists for Water Quality Analysis

No.	Name of Laboratory	Address
1.	Occupational and Environmental Health Laboratory	No.250, Lower Kyeemyindine Road, Ahlone Township, Yangon
2.	ISO Laboratory	No-18, Lanthit Road, Insein Township, Yangon

The observed value of ground water quality results are showed in table (5.14) and most of the water quality parameters meet the WHO standards, however, pH, turbidity, and iron are beyond the range of standard. In Yangon City, groundwater is mostly extracted from valley filled deposits and Ayeyarwady sandstones. According to rock units and water yielding capacity of aquifers, four potential zones of groundwater availability classified in Yangon City (Leiscester, 1959), Win Naing (1972), and Alenimar Htay (2000).The project site areas include in Arzarnigon sand rocks which do not form the principal aquifer but it is a good aquifer. Groundwater discharge from this aquifer moves downwards into Nga Moe Yeik Creek in the east and towards Yangon River in the south. Ground water quality is fresh though slightly

salinity in some places due to the salt-water intrusion and tidal action of Bagon Rivers and Nga Moe Yeik Creek. Total dissolved solid (TDS) generally ranges from 50 to 200 ppm and pH ranges between 7.5 and 9.

Turbidity in water is caused by suspended and colloidal matter, such as clay, silt, finely divided, organic, and inorganic matter and other microscopic organism. Moreover, Iron contents of ground water for a tube well is lower limit WHO Guideline value of 0.3 mg/l.

Table 5. 14 Ground Water Quality Results

No.	Parameters	Unit	Ground Water Quality Result	WHO Drinking water Guideline
Ground Water Quality				
On-site Measurement				
1	pH	pH	8.90	6.5 ~ 8.5
2	Temperature	◦C	27.07	-
3	Electric Conductivity (EC)	µS/cm	0.641	30
4	Total Dissolved Solids (TDS)	mg/l	410	-
5	Salinity	ppt	0.3	-
6	Dissolved Oxygen (DO)	mg/l	10.21	-
Laboratory Finding				
1	pH	pH	8.4	6.5 ~ 8.5
2	Turbidity	NTU	8	5
3	Total Hardness	mg/l as CaCO3	100	500
4	Suspended Solids	mg/l	10	-
5	Total Hardness	mg/l	100	500
6	Iron	mg/l	0.35	0.3
7	Chloride (as Cl)	mg/l	64	250
8	Manganese	mg/l	Nil	0.05
9	Zinc (Zn)	mg/l	Nil	3
10	Copper (Cu)	mg/l	Nil	2
11	Arsenic (As)	mg/l	Nil	0.01
12	Lead (as Pb)	mg/l	Nil	0.01

No.	Parameters	Unit	Ground Water Quality Result	WHO Drinking water Guideline
13	Cadmium	mg/l	0.043	< 1
14	Sulfate	mg/l	11	250

Table 5. 15 Observed Value of Storm Water Quality of Public Drainage

No.	Parameters	Unit	Water quality Result	National Environmental Quality (emission) Guideline
Wastewater Onsite Result				
Laboratory Finding				
1	pH	S.U.[a]	7.5	6-9
2	Turbidity	NTU	102	-
3	Color (True)	TCU	110	-
4	Suspended Solids (TSS)	mg/l	108	-
5	Free Choline	mg/l	Nil	-
6	Total Chlorine (total residual)	mg/l	Nil	0.2
7	Chemical Oxygen Demand (COD)	mg/l	64	250
8	5 Days Biochemical Oxygen Demand (BOD), at 20ºC	mg/l	18	50
9	Total Nitrogen	mg/l	6.5	10
10	Oil & Grease	mg/l	3.4	10
11	Total Coliform Count	CFU/100 ml	32	400
12	Thermo tolerant (fecal) Coliform Count	CFU/100 ml	6	400
13	Chloride	mg/l	40	-
14	Sodium	mg/l	52	-
15	Phosphorous	mg/l	11	-

According to the storm water analysis, main parameters such as Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD) and total nitrogen are good and within the acceptable limit of NEQ, (emission) guidelines and all of observed value of storm water quality results showed in table (5.15) compare with NEQ guideline.

5.5 Natural Hazards

The project site is located in Yangon region, which is near to the southern part of the Sagaing Fault. The fault, which has not been active in the past 50 to 75 years, indicating that the deficiencies might be under accumulating stress. Yangon straddles the boundary between Zone II (Moderate Zone) and Zone III (Strong Zone) in the seismic map. The old and new satellite towns in the eastern part fall in Zone III and the first city in Zone II. However, there is no occurrence of major earthquake in the study area.

Flooding is the most suffering natural hazard in this project area. The monsoonal/rainy season in Myanmar is from May to October and flooding and landslides are common in the country. Nga Moe Yeik Creek is the nearest water resource. Some parts of surrounding area of the creek can be flooded because of high and low tidal condition of Bago River in rainy season. *(East Dagon Township Data, 2017)*

5.6 Description of Ecological/Biological Environment

According to the East Dagon (Myothit) Township Data (2017), project site is located at East Dagon Industrial Zone (1), adjacent to highly urbanized Yangon city. There is no forests, protected areas, and coastal resources around the project area. However, it has grown mangrove trees and thatch in this area. Field survey was conducted on 9 July of 2018 for surrounding area and on site. The project site area was previously a paddy field and it has been industrialized with human activities over the past 2-3 decades. A few local family trees and mangroves species in the vicinity of the project were found. Most lands nearby project site are vacant and the nearest residential areas are households from Ward 118. Nga Moe Yeik Creek and Bago River are significant waterways in the surrounding area of project site.

5.7 Socio-Economic Components

The socio-economic study is to assess the information related with the socio-economic condition of the people living in and near the project area. This information is useful for analyzing the potential impacts caused by the project's activities. Based on the impacts, actions will be taken to mitigate or reduce the potential negative impacts.

5.7.1 Methodology for Socio-Economic Study

Primary data was collected through direct observation and survey with questionnaires for socio-economic status as demographic information (age, sex, education, occupation, ethnical group and income, expenditure, and household assets: housing, livestock holding, land ownership, land use, land tenure, land title, land quality, livelihood zone, natural resource use, infrastructure, public, cultural assets and civilization).

Data Collection and Observation in the Field

The EIA team conducted the social survey with stakeholders for participatory facilitation through quantitative and qualitative study, focus group discussions, and other participatory exercise as follows:

- Individual household interview for qualitative study
- In-depth interviews with key informants utilizing review instruments such as open-ended and closed-ended questionnaires for the collection of both qualitative and quantitative data
- Review activities conducted in the field and initial analysis of findings and feedback to key project staffs
- Data analysis (using appropriate methods for data analysis) data entry, data cleaning, data processing, recording, feedback to key project staffs

5.7.2 Methodology for Determination of Sample Size

EIA team selected the adjacent ward 118 which is the nearest residential area of the project site as the study area for livelihood study. Total 29 samples were sized by stratified random sampling method based on individual household income.

For primary data collection, socio-economic study team selected 29 households along the Than Chet Won U Myu Road as the project site is located in the Indusial zone and to understand the socioeconomic condition of the surrounding environment of project area. The respondents from the sample households were interviewed for their socio-economic status and their opinion for the proposed project.

5.7.2.1 Demographic Aspects

Demography aspects of study area were assessed based on the population figures reported according to this survey in 2017 Township Data publish on online for the gender, age ethnic group, religion status and educational status is showed in table (5.16), (5.17), (5.18) and (5.19). For primary data collection, no.118 Ward of this township has population density of about 200 people and studied the socio-economic characteristics consist of the households size, occupational status, income, type of housing conditions, their health facilities, and source of electricity.

Table 5. 16 Number of Houses and Household Status (2017)

No.	Content	Houses	Household	Quarter	Village group	Village
1	Urban	26904	30409	63	-	-
2	Rural	1836	1824	-	3	-
	Total	28740	32233	63	3	-

East Dagon (Myothit) township data, (2017)

i) Gender

The Social survey results of project site show that the total populations of the 29 sample households were 132: 67 of Male and 65 of Female. In addition, 13 Male and 16 Female in that sample households responded to the surveyor for socio-economic survey. The following graph shows the distribution of respondents by genders, which are 51% Male and 49% Female respectively and showed in figure (5.11).

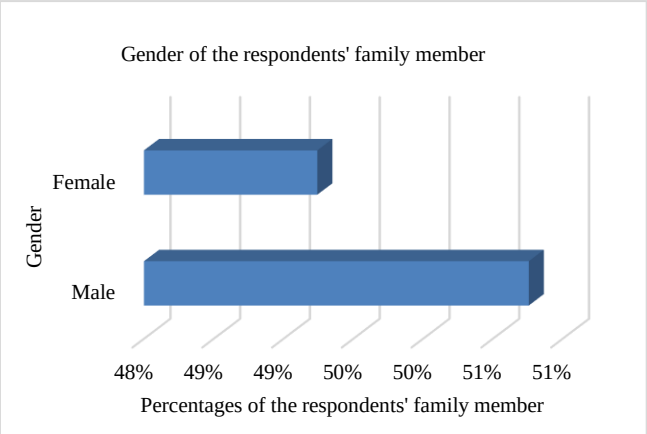

Figure 5. 11 Gender of the respondents' Family Member

ii) Age

Most of the respondents are in the age interval of 31 to 40 with the percentage of 34. It indicates that the respondents are adult and likely to work. Nine of the respondents in the households of 30 lie in the age interval of 41-50. As a result, there is only one respondent for each of the age of 11-20 and over the age of 60. The following figure (5.12), graph shows age intervals of the respondents for 29 sample households in percentage.

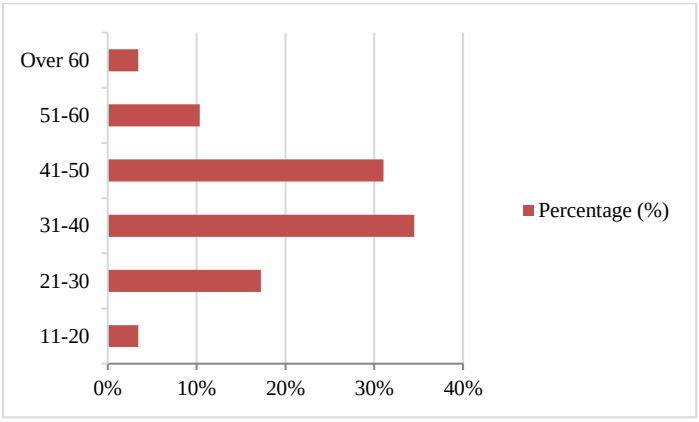

Figure 5. 12 Ages of the respondents

iii) Ethnic group

The respondents who live in near the project site are mostly Bamar with 26 of 29 total households. In the residential area near the project site, there are some other ethnic groups shown in figure (5.13).

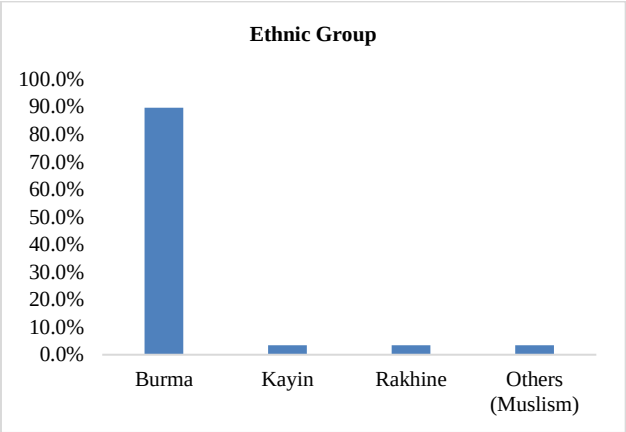

Figure 5. 13 Ethnic Group

iv) Religion

Most of the inhabitants around the project site are Buddhist and some are Islam. Other religions such as Christian and Hindu did not include in the sample household. The following Table (5.17) shows the religions of the household in percentage.

Table 5. 17 Religion status of the households

Religion	Percentage (%)	Numbers of household	Total household
Buddhist	97%	28	29
Christian	0%	0	
Hindu	0%	0	
Islam	3%	1	

Educational Status

According to the township data of East Dagon (Myothit) Township, there are 22 primary schools, 8 middle schools, and 5 high schools in which BEHS No. (5) is located in Ward No.113, and ratio of teachers and students is 1:42. In addition, Dagon University is also located in the East Dagon Township.

As the result of the data, 38% of the respondent dropped out from school after studying Middle school and a very few respondents are illiterate. About 28% and 24% of the respondent had quit from school after higher education and primary education respectively. The educational status of the respondent in the sample households is shown in figure (5.14).

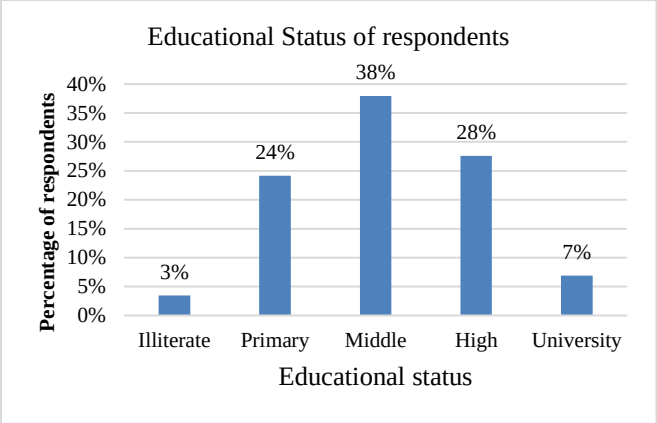

Figure 5. 14 Educational Status of respondents

5.8 Socio-economic Characteristics

Infrastructure services are basic service and act as support for socio-economic development. Therefore, infrastructure facilities play an important role in fostering economic growth and enhancing public welfare. Socio-economic infrastructure including education, health, other community facilities of three adjacent wards were studied by questioning about their household size, type of household, daily income, land ownership and livelihood.

i) The size of Households

According to the result of sample household data, most of the households have 4 to 6 family members. The detail in the size of the household in the following range of the family member are described in Table (5.18).

Table 5. 18 Sample size of households

Range of the family member	Number of households in family member	Total Sample Households
1-3	5	29
4-6	21	
7-9	3	
>9	0	

ii) Occupational status of households

Based on the type of main occupational status of the households, majority income sources are food stalls and vendor shops. In addition, about 3% of the households are working as governmental staff, factory workers, and casual. Some households are farmers. Type of occupational status of the households and type of occupation for the respondents are shown in figure (5.15) and (5.16).

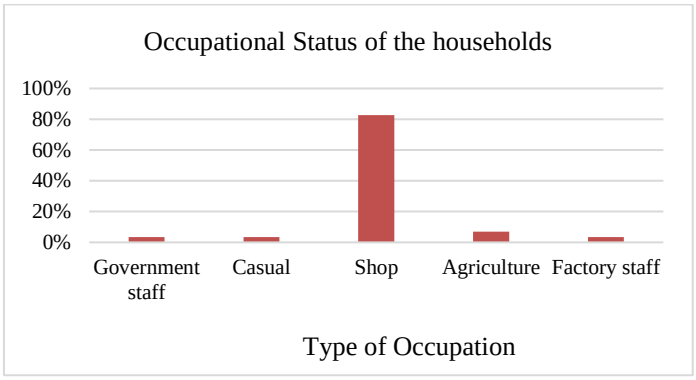

Figure 5. 15 Occupational Status of the households

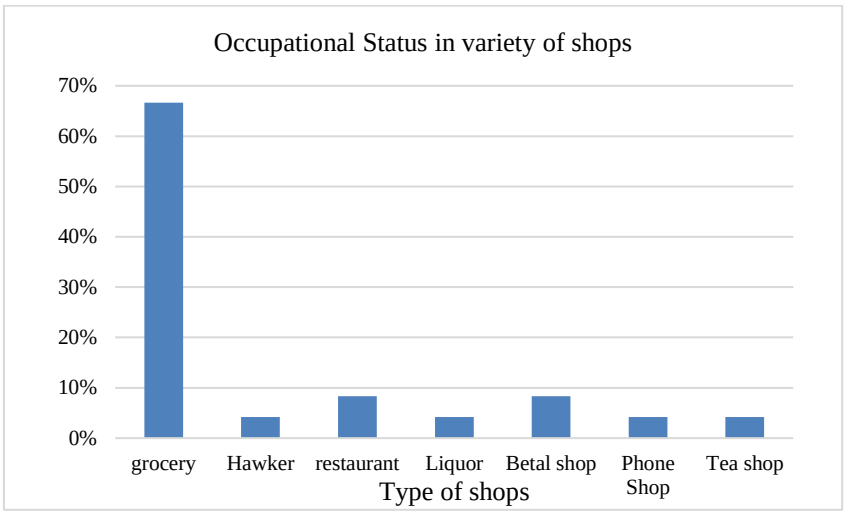

Figure 5. 16 Occupational Status in variety of shops

iii) Income Status

East Dagon (Myothit) Township is developing economic condition in accordance with township data 2017. The key economic sectors include manufacturing, agricultural and livestock, small and medium scale business. Mostly are civil service and others from industrials sectors. Occupational status of employment and unemployment condition is shown in below table (5.19).

Table 5. 19 Occupational Status (2017)

No.	No. of Workable people	Current Employed people	Unemployment people	Unemployment people %
1.	91,889	88,321	3,568	4.04%

Source: East Dagon (Myothit) Township (2017)

As the result of socio-economic data, monthly income of 26 households within the range of 100,000-300,000 kyats. The lowest income would be less than 100,000 kyats per month and there is only one household. All the rest are more than 300,000 kyats per month and these were the highest one in that region. The following graph describes the percentage of the households' income.

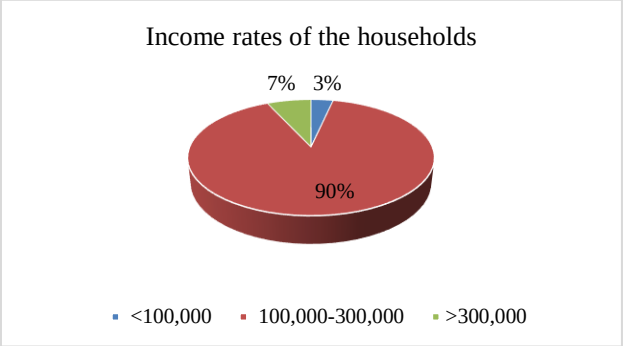

Figure 5. 17 Income Status of Sample Households

iv) Type of Accommodation and land ownership

According to the gathered information, most of the respondents are live in the shop houses. Some tenants in which some own self-owned property with lease, and some are illegal tenants. The following Table (5.20) and Figure (5.18) shows the type of accommodation and land ownership status.

Table 5. 20 Type of Accommodation

Type of Accommodation	Numbers of the households	Total Sample Households
House	12	29
Shop and House	14	
Shop	3	

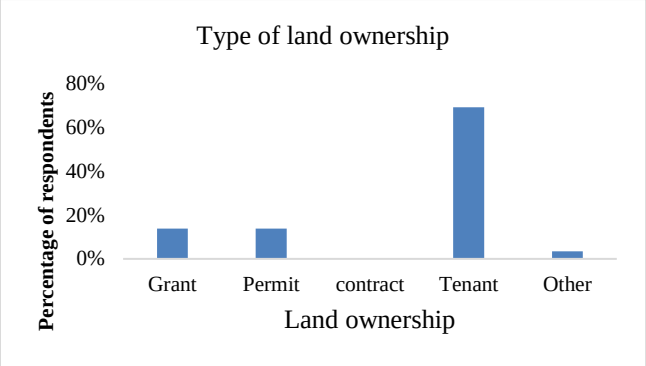

Figure 5. 18 Type of land ownership

v) Water Requirement and Consumption

According to the collected sample households' data, the following figures (5.19) show that most of the respondents utilize purified water for drinking purpose and ground water from tube well for domestic usage. However, 24% of the respondents are still utilizing tube well underground water for drinking purpose.

The main source of water consumption for proposed region, East Dagon (Myothit) Township and its Industrial Zones is only groundwater. Most of the households, factories, and industries are utilizing underground water from their own tube wells.

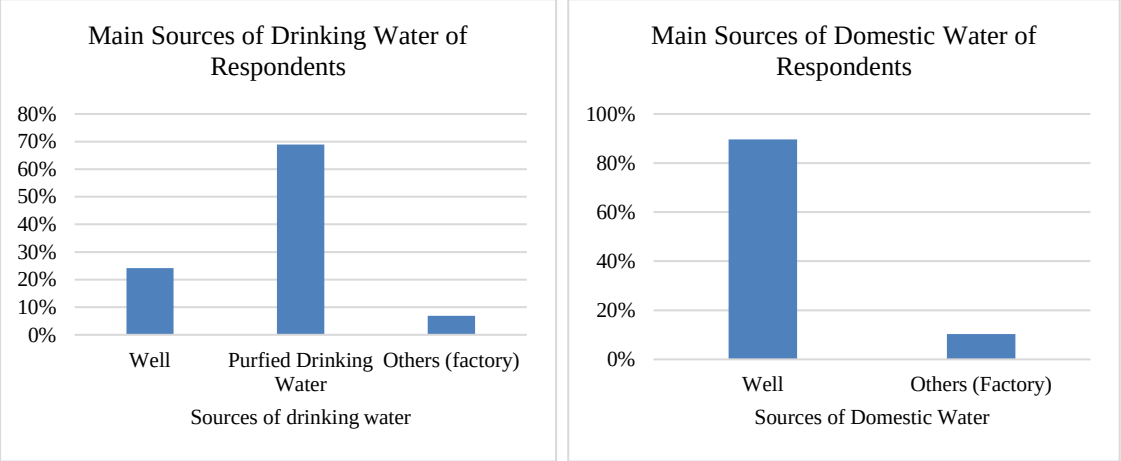

Figure 5. 19 Source of drinking Water and Domestic Water for respondents

vi) Sources of Electricity

More than half of the respondents utilize the electricity from National Grid line and some are using their own solar power sources. Few respondents depend on battery for their electricity needs. A very few respondents do not get electricity yet.

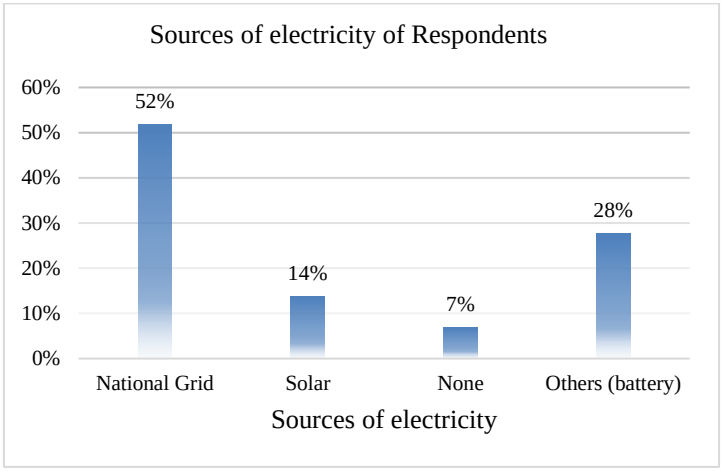

Figure 5. 20 Sources of electricity

vii) Public Health Care Facilities and Health Condition

The Dagon Myothit (Eastern) Public Hospital and Ywar Thar Gyi Mental Health Hospital are the nearest hospitals to the proposed area. Apart from this, there are twenty-five private clinics in each living wards, and eight local health care centers. In addition, most large-scale industrial facilities usually support private clinic or healthcare center in case of emergency at each project site.

Regarding the public health condition of the 29 sample households, most respondents usually go to the public hospitals and private clinics associated with their health problems. Almost 70% of the respondents are healthy and the rest suffer heart diseases, hypertension, and diabetes.

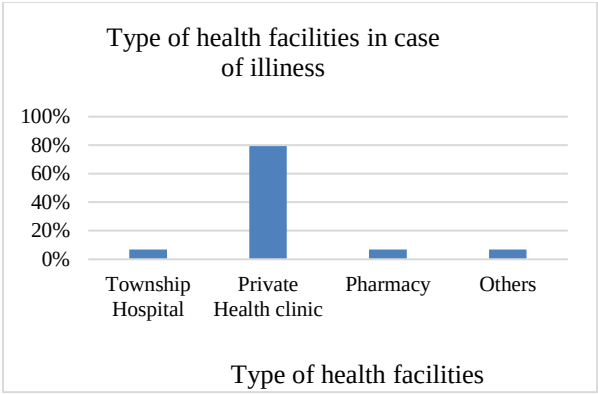

Figure 5. 21 Health Care Facilities Status

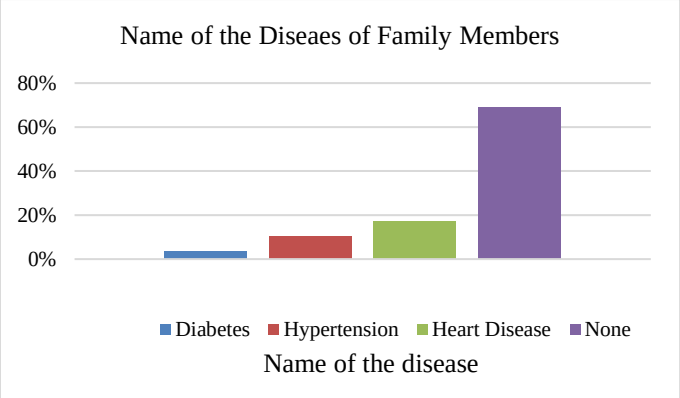

Figure 5. 22 Major Diseases of household

5.8.1 Opinion of the Respondents

The socio-economic study team surveyed the respondents regarding with their opinions based on local/regional development, and environmental benefits related with potential environmental and social positive and negative impact due to proposed chemical admixture production factory. Adjacent areas of the proposed project only get the project information and almost 90% of the respondents did not get information about the project development and its plan.

For the point of environmental benefits related with this project, most of the respondents expected that their environment would be better the socio-economic status and employments opportunities than before. The following figure (5.23) describes that there will benefit in the field of their livelihoods, transportation facilities and occupation regarding with the proposed project assumed that 7% of the respondents from the study area.

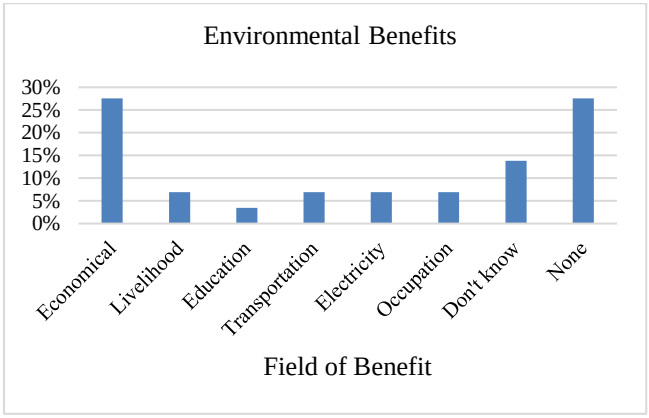

Figure 5. 23 Environmental Benefits

However, regarding the respondents' opinion, nearly 70% of the respondents positively responded the project development that tends to get benefits from the proposed project. Most of the respondents answered that their environment tends to promote regional development, employment opportunities, their socio-economic status would be better than before.

Nevertheless, some respondents worried about the environment impact related with proposed chemical admixture plant. They responded their negative opinions associated with air pollution, emission standard, and unemployment opportunity of casual workers. In addition, the study team gathered data from only 14% of respondents and the other 3% of respondents replied that they did not know about that.

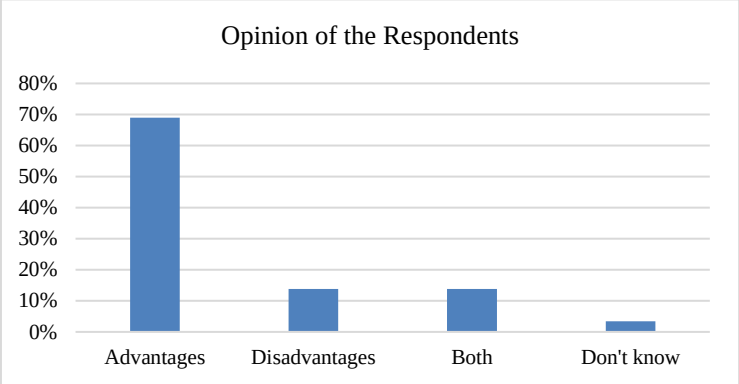

Figure 5. 24 Opinion of the Respondents

Additionally, 28% of the respondents were concerning about impacts on existing environment, where 7% of the respondents concerned that they would suffer from bad odor/smell likewise their previous experiences such as Cashew-Nut plant, Plastic product production factory, and food factory etc. The following figure (5.25) shows the opinions from the respondents about the impact caused in their existing environment.

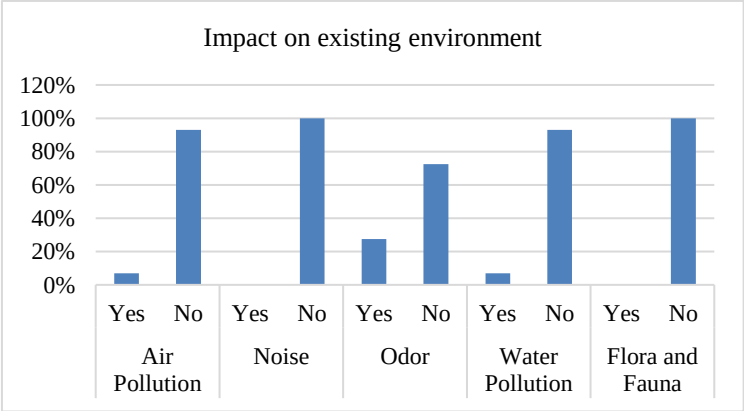

Figure 5. 25 Environmental Impact on existing environment

The respondent opinion deal with the potential impact due to proposed project on air pollution, soil pollution, water pollution, flora, and fauna, it showed almost half of the respondents thought there may not effect on environment and nearly 45% of the respondents answered that they do not know how to answer about that showed in figure (5.26). Besides, some respondents considered that air and water from their surrounding environment could be polluted caused of the proposed project.

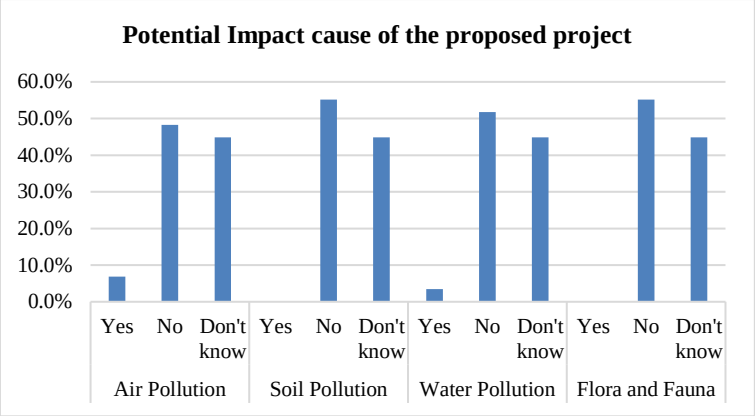

Figure 5. 26 Potential Impact due to propose project

5.8.2 Summary of Potential Impact Due to Proposed Project

Socio-economic survey was conducted on July 2018 at the nearest residential area within 500 meter from the proposed project site. Twenty-nine respondents were interviewed by two options: their current socio-economic conditions and their opinions related on the proposed project. According to the interviewed results, most were expecting job opportunities from this project. There were no significant negative impacts on the social environment. They all believed that there would be no impacts on their health. In addition, they hope to get good drainage system to prevent flooding during rainy season. To summarize, nearly 70% of the total respondents acknowledged their positive opinions on the proposed project.

5.8.3 Transportation and Communication

East Dagon (Myothit) Industrial Zone is located in corner of No-2 High Way Road and Kanaung Min Thar Gyi Road. Major public transportation systems are bus (Yangon Bus Service, YBS) and Yangon Circular Railway line. Eleven bus lines with 410 vehicles are serving in the area. According to the site survey, Toe Kyaung Kalay train station is the most nearest one and major transportation system is only public bus service.

5.9 Land Use

The project study area covers 500 meters radius, with three type of land categories;

(i) Industrial Zone
(ii) Urban and build up Area
(iii) Vacant Industrial Land

Industrial Zone

Total land use area for industrial zones in East Dagon Township is approximately 666 acres. This includes (53) number of variety of manufacturing factories lists that operating at this industrial zone showed in table (5.21). The products from this Industrial Zone are meant for domestic and overseas markets.

Table 5. 21 Factory Lists Located at Industrial Zones

No	Name of industrial zone	Name of Factory	Products
1	East Dagon Industrial zone	SS Cashew Seed	Cashew seeds
2		Mya Thidar	Printing
3		Shwe-Daing	Tissue Paper
4		Aung Tha Phay	Purified drinking water and soft drink
5		Myanmar Hair	Wig
6		Diamond Star	Flour
7		Mwe Kaw Aid	Plastic
8		General Underprice	Garment
9		Citizen	Purified drinking water
10		New super	Plastic printing
11		Kane-Na-Ye	Coffee mix
12		Triple Fish	Various pure beans
13		Shwe-Ta-Sin	Mohair
14		Shwe-Kyee	Breads and biscuits
15		Kalar-Oat	Pasta
16		Top Choice	Exercise books products
17		Summit Plastic	Plastic Products
18		NWI	Furnish Wood
19		NIBBAN	Antenna and safeguard
20		Ye Yint company	Lubricants
21		Kaung Myat (2)	Veneer
22		Johny Brother	Furnish Wood
23		Pwint Oo Plastic	Plastic

No	Name of industrial zone	Name of Factory	Products
24		Pop Pop factory	Lingzhi ointment
25		Pop Pop factory	Oil
26		Pop Pop factory	Roasted Sesame
27		Modern Ice	Ice
28		WN Carton Box	Carton box
29		Star flower	Tissue paper
30		MBU WON	Earphone and speaker
31		Myanmar Ballpen factory	Parts of pens
32		Shwe Asia	Pure tamarind
33		Myanmar Handsome	Garment
34		Crown Calcium	Rock particle
35		Mya-Zin-Yaw	Coconut Oil
36		Royal Pansay	Exercise book
37		Future Win	Lumber
38		Royal Manufacturing	Beverages
39		Pyi-Taw-Aye	Cookware
40		Asia-Thar	Plastic
41		Rotec	Purified drinking water
42		East Star	Disposable cups
43		ZEP	Inverter and generator
44		Shwe-Sal	Garment
45		Kay-Thi-Pan	Traditional medicine

No	Name of industrial zone	Name of Factory	Products
46		Hsu-Htoo-Pan-Kyautmyat	Lapidary
47		TRS	Various rattans
48		Tun Myint Tun (1)	Pasta
49		Tun Myint Tun (2)	Pasta
50		Happy snow	Ice

Source: East Dagon (Myothit) Township, 2017

5.10 Cultural Components

According to the on-site survey, the proposed construction chemical admixture factory is located in industrial zone with some industrial blocks are vacant. In the surrounding area, there are no monuments, and no heritage existences.

6. IMPACT AND RISK ASSESSMENT AND MITIGATION MEASURES

6.1 Impact and Risk Assessment Methodology

The purpose of the impact assessment and mitigation is to identify and evaluate the significance of potential impacts on identified receptors and resources according to defined assessment criteria and to develop and describe the impact mitigation measures to avoid or minimize any potential adverse effects and to enhance potential benefits.

i) Impact Types and Definitions

An impact that may changes to a resource or receptor by the presence of a project component or by the execution of a project related activity. Evaluation of baseline data provides crucial information for the process of evaluating and describing how the project could affect the biophysical and socio-economic environment.

ii) Impact Nature and Type

a) Positive Impact: An impact that is considered as representative of an improvement on the baseline or introduces a positive

b) Negative Impact: An impact that is considered to represent an adverse change from the baseline, or introduces new undesirable factors

c) Direct Impact: Impacts that result from a direct interaction between a planned project activity and the receiving environment/ receptors (e.g. between occupation of a site and the pre-existing habitats or between an effluent discharge and receiving water quality)

d) Indirect Impact: Impacts that result from other activities that are encourage happening because of the project (e.g. in-migration for employment placing a demand on resources.)

e) Cumulative Impact: Impacts that act together with other impacts (including those from concurrent or planned future third-party activities) to affect the same resources and or receptors as the project.

iii) Assessing Significance Impact

Impacts are described in terms of “significance”. Significance is a function of the magnitude of the impact and the likelihood of the impact occurring.

Impact magnitude (like severity) is a function of the extent, duration, intensity of the impact. The criteria used to determine magnitude and likelihood; the impact significance is rated through a matrix process showed in above table (6.1).

The assessment of each impact is based on consideration of the magnitude, duration, spatial and frequency of activities that are going to be carried out during operation and decommissioning phases and characteristics of the project site. The assessment is qualitative and the significance of each impact is classified into five categories in overall.

The following methodology has applied to assess the environmental impacts for industrial related project factory mainly on air, water, soil, biodiversity, including human beings. Each source of impact has assessed by four parameters, magnitude, duration, extent and probability and each assess point have five scales as mentioned below:

Table 6. 1 Impact Assessment Parameters and Its Scale

Assessment	Scale				
	1	**2**	**3**	**4**	**5**
Magnitude (M)	Insignificant	small and will have no effect on working environment	Moderate and will result in minor changes on working environment	High and will result in significant changes on working environment	Very high and will result in permanent changes on working environment
Duration (D)	0-1 year	2-5 year	6-15 year	Life of operation	Post Closure
Extent (E)	Limited to the site	Limited to the local area	Limited to the region	National	International
Probability (P)	Very improbable	Improbable	Probable	Highly probable	Definite

Then, the significant Point (SP) is calculated by following formula.

Significant Point (SP) = (Magnitude + Duration + Extent)* Probability

Impact Significance: Based on calculated significant point, impact significance can be categorized as follows:

Explanation

Significant Point (SP) = (Magnitude + Duration + Extent)* Probability

Table 6. 2 Impact Significance

Significant Point (SP)	Impact Significance
<15	Very Low
15-29	Low
30-44	Moderate
45-59	High
60	Very high

Identification and assessment of key environmental impacts for project of construction/ renovation phase, and operation phase and also decommissioning phase have been prepared according to the nature and scope of the project type, site survey and baseline information of environmental and social condition of project site.

6.1.1 Approach of the Assessment

Impact Assessment Process

The diagram (Figure 6.1) shows the impact identification and assessment process through scoping, screening, and detail impact assessment. The methodology for detailed impact assessment is outlined in below flow chart.

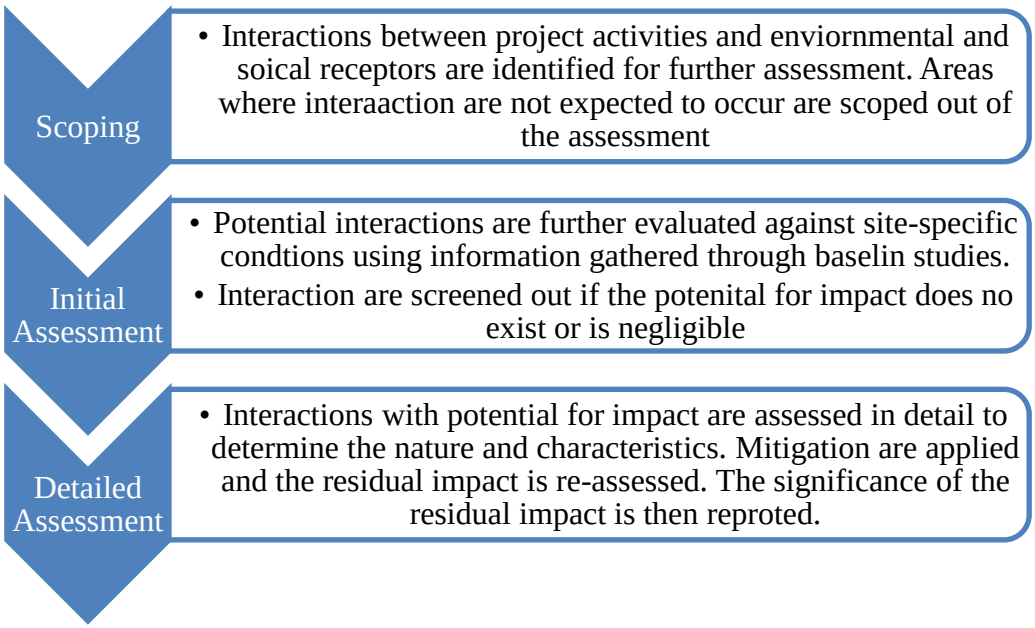

Figure 6. 1 Impact Assessment Process

6.2 Identification of Impacts

For chemical admixture production factory, potential impacts are discussed here widely in terms of their nature, intensity that will depend on the physical characteristics of a chemical production, storage facility and the composition of any polluted materials, and sensitivity of surrounding environment.

Table 6. 3 Overall Environmental and Social Impact Identification

Environmental Component/ Impact	Impact Receptor
Air emissions	Impact on surrounding community Impact on soil
Wastewater discharge, Water Pollution	Impact on soil due to discharge of effluent Impact on surface and ground water bodies due to leakages and drain from plant
Noise emissions	Impact on surrounding community
Generation, storage and disposal of hazardous/non-hazardous waste	Impact on soil and ground water quality Impact on community hygiene
Industrial Accidents	Impact on surrounding community
Occupational Health Hazards	Impact on employees and workers
Socio-economic aspects	Impact on surrounding community

Based on the present environmental status (sensitive receptor), and baseline data, onsite observation has been done to identify and evaluate the impact on the environment of the study area due to the proposed project. The chemical admixture-manufacturing project may influence the environment of the area in three phases:

1. Renovation/ construction Phase
2. Operation Phase
3. Decommissioning Phase

Direct and indirect effect on human beings, fauna, flora, soil, water, air, climate, landscape, material assets, cultural heritage, and the interaction among these factors are to be identified and assessed. Socio-economic issues include social impacts such as local economy, employment and livelihood, utilization of local resources, existing social infrastructures and services, cultural heritage, local conflicts of interest, and working conditions, including occupational health and safety.

6.3 Renovation/Construction Phase

The Project implementation phase includes all process and non-process facilities to be installed at or in the project site in which production lines, loading and unloading area, warehouse, construction of one-story buildings for locker room, concrete testing lab, QC lab, sale office and meeting room and others facilities. Installation of those facilities will involve civil works, mechanical works and electrical works. BASF global group stated that renovation and construction phase had been done on May 2018 according to their chemical plant design.

During renovation /construction phase, the major findings of environmental and social issues might have insignificant impacts. The renovation of main buildings and construction of one-story buildings near the main building, installation of heavy machineries and equipment are

considered as small magnitude. Generation of noise during installation activities is anticipated as low with or without mitigation. The closest built up area to the project site are a few buildings with different type of industries and mostly are vacant land. Most of the above impacts with identified environmental issues are assessed as temporary and reversible impacts. Examples include dust emissions; noise and vibration from heavy machineries during installation work that may not affect public nuisances or disturbances. Construction waste is expected, as minimal waste will be generated during installation of project structures and equipment during the construction phase. Consequently, generation of construction waste is rated as low with and without mitigation. Construction impacts on the environment can be considered as short term impacts compared to the operational impacts.

Specific study of environmental impact assessment and preparation of environmental management plan for renovation/construction phase will not be mentioned in details in this report.

6.4 Operation Phase

During the operation phase, different types of concrete liquid chemical admixture will be produced and small modular chemical production plant design (Conventional Semi-Automated Admixture Plant-HTEN) will be used for this project. The whole production process is simple, and will be operated and monitored by operator under automatic monitoring control screen. The final products will be stored at temporary warehouse of final product before delivery to the customers.

Based on the information of the project nature, process technology and raw materials used, secondary Township data of project site (2017) and onsite survey of project site (receptors), operation activities may have positive or negative impacts on the environment during renovation/construction and operation phases as mentioned in the table below.

6.4.1 Impact on Air Quality

During the operation phase, air emissions from the production area of chemical admixture with the use of small modular admixture are classified as below table (6.4).

Table 6. 4 Emission Sources and Pollutants Parameter

Emission Sources/ Activities	Pollutants
Mixing, storage and handling of powder type raw materials and liquid chemicals in production process	Dust, Particulate Matter, VOCs (formaldehyde)
Use of Vehicles, forklift for transportation	CO_2, NO2, SO_2

The main sources of dust and gas emissions are the storage, handling and processing of chemical raw materials at loading and unloading area, transport activities, and exhaust fumes arising from the transport vehicles. Although, there are no significant air emission sources (e.g.

chimney) from production area, and a gas scrubber system is installed for mixing stage of production process for air pollution control of air pollution. Thus, the impact of air pollution on local community may expect low impact by taking this mitigation measures.

6.4.2 Impact on Noise

Production process of chemical admixture products, using environmental friendly technology generate low noise to the surrounding environmental area. However, there are noise coming from the production process, movement of vehicles, and forklift for transportation purpose. According to the location of the project site and existence of the receptor, the impact induced from noise is minimal.

6.4.3 Impact on Wastewater Effluents

The effluent wastewater will be generated from the cleaning of utensil for operational use and domestic wastewater. The wastewaters from this industry may contain organic and inorganic pollutants, and toxic pollutants. In addition, primary impacts will consist of storm water runoff to surface water. Poor site management and spills or leaks of liquid chemical, fuel, and oil may decrease water quality from routine or accidental release of hazardous substances. However, in order to overcome those impacts of the wastewater effluents from production process, water will be collected in designated tank (IBC) for next batch of processing as water re-used system. Domestic wastewater will be treated by septic tanks. The amount of effluents discharged from the production process will be minimal when compared with other industrial sectors, as there is no wastewater discharge from the production process. It can be said “zero-water discharge” process used in the operation. Discharge wastewater from processing area may not directly affect surface water quality because the surface water source is too far from project site area. Hence, these anticipated impacts are manageable to control the water pollution with relevant mitigation measures.

6.4.4 Impact on Soil Quality

During the operational phase, there is low impact on soil quality due to improper storage and handling of raw materials, liquid chemicals, and accidental leakage of raw materials. In addition, concrete road facilities implemented at the project site can mitigate soil pollution from transportation. There is no significant impact on land during the operation phase because the hazardous waste generated will either be recycled or disposed of as per norms of BASF Myanmar’s Responsible Care Management System.

6.4.5 Impact on Resource Consumption

In operation phase, there will be major water consumption for production process because 65% of water will be needed. In addition, electricity consumption for machines is also the resource consumption. Estimated amount of electricity, water and fuel consumption for production and general use of this project were mentioned in chapter 4. For water use, tube well is the main source of raw water, and estimated water consumption for the whole factory is 1,349.52 gallons

per day. Therefore, long-term use of ground water extraction and electricity consumption may be considered as negative impact on resource consumption.

6.4.6 Impact of Solid / Hazardous Waste

Sources of solid waste in this chemical admixture plant will be classified as namely (i) production waste such as raw material tanks, liquid chemical tanks, containers, (ii) concrete waste, (iii) chemical waste, (iv) packaging waste, rejects, and packing materials, and (v) general office wastes.

The project proponent will implement the solid waste disposal practice by the segregation of waste type such as paper waste, food waste, production waste and hazardous and non-hazardous waste. The rubbish bins will be provided and regularly checked by assigned person of the proposed factory. Before sending to Yangon City Development Committee (YCDC) for general waste and Dowa (waste treatment plant) for hazardous wastes, collected all of hazardous and non-hazardous waste will be stored properly at the project site. The hygiene standard of toilets and septic tanks at the factory is well cleaned and maintained. However, generation of hazardous waste and non-hazardous waste could be negative impacts.

6.4.7 Impact on Human

6.4.7.1 Social Impact Assessment and Socio-economic Benefit

The proposed project is the long-term investment in the industrial sector. Most impacts of the proposed project on socio-economic environment may be positive. According to the social survey, results from surrounding project site condition, implementation of proposed project may create temporary job opportunities during construction and decommissioning phases and permanent jobs for operation phase. Subsequently, socio-economic standards of local people will increase and eventually it may lead to the economic growth at local and regional level. In addition, local economy could improve both directly and indirectly. Positive impacts of living and livelihood around the project site will help in improve the quality of life of economically weaker sections of the local area.

6.4.7.2 Occupational Health and Safety

Impacts of working conditions during operation phase include physical, mechanical hazards and chemical hazards. Transportation and storage of chemicals may also be the risk of chemical hazards to employees and workers on-site. Impacts of occupational health and safety occur due to unpleasant odor of raw materials (formaldehyde), risk of fire and explosions due to improper handling or storage of flammable chemicals at project site. Technicians and workers may expose to electrical hazards due to the presence of electrical equipment. Thus, the proponent provide the appropriate personal protective equipment (PPE) for employees, and workers. In addition, the environmental, health and safety guideline have been prepared for production area according to global standard of BASF group. Health insurance, health care facilities, and first aid training, chemical safety training, transport and distribution safety training will also be

provided for all employees and workers. The whole production area will be checked and monitored with CCTV cameras.

6.4.7.3 Community Health and Safety including Accidents

The anticipated impacts on community health and safety caused by operation work of proposed project were predicted. Related project activities may cause minor negative impacts on community health and safety including accidents during the operation phase.

Hazards posed to the local community/public while accessing project facilities may include:

1. Injuries suffered as a consequence of vehicles accidents during operation phase
2. Fire hazards from explosion of fuel and vehicles
3. Traffic safety on transport of raw materials and finished products
4. Exposure of chemical materials due to the accident release

Potential impacts on human health will include the chemical released can cause dermal, respiratory, and systemic toxic following direct exposure of victims and rescuers. Toxic effects and injuries may also result from environmental contamination, and fire and explosions. The public, rescuers, and those involved in clean-up operations may be exposed to rank hazards, which can be divided into those related to chemicals.

Chemical related health impact on human

- Burns from exposure to spilled corrosive chemicals
- Respiratory tract injury from inhalation of irritant gases, combustion products
- Poisoning from exposure to spilled chemicals and the consumption of contaminated food or water.
- Odor generation and solvent vapours emission into ambient from storage of chemicals, chemical handling and processes shall be negative impact on the health of employees and social environment
- The improper storage and handling facilities of chemicals may result in accidents and ultimately damage the physical and social environment

However, all of anticipated negative impacts, health, and safety conditions of the neighborhood during operation will be managed by the project proponent based on their community health and safety standard according to the BASF's Responsible Care Management system. Global group of BASF assure that the production is safe and do not pose health risks to employees, neighbors. BASF Myanmar Company guidelines committed towards people and the environment. The EMP and the emergency preparedness plan of BASF Myanmar will also greatly reduce the overall impact on human health will be insignificant during operation phase.

6.4.8 Impact on Flora and Fauna

There is no significant impact on Flora and Fauna due to this project because the project site is situated at industrial zone, and it is far from the sensitive habitat like a forest or a surface water

body. However, discharge of wastewater and inadequate wastewater treatment that flows into the nearest water bodies that may cause water pollution and effect on aquatic ecology. The BASF MM's chemical admixture production project could be anticipated as low impact on the aquatic environment and can be reduced by using proper mitigation measures.

6.4.9 Impact on Protected area

There is no protected area, cultural heritage and ethnic minorities identified within the site according to the site survey and East Dagon (Myothit) Township data.

6.5 Project Activities and its Significant Impacts during Operation Phase

Table 6. 5 Evaluation and Perdition of Significant Impacts for Operation Phase

Potential Impacts and Receptors	Activity and Impact Sources	Components	Duration	Magnitude	Extent	Probability	Significance point	Significance Impact
Impact on Air Quality								
Air Pollution	Storage and handling of raw materials, emission of volatile liquid chemicals and other volatile solvent chemicals in production area Mixing of powder type raw materials and liquid chemical in mixer	VOCS, PM 10 PM 2.5	4	3	2	3	27	Low
	Use of operation vehicles, forklift and electricity consumption	CO, SO2, NO2, CO2	4	3	2	3	27	Low
Impact of odor								
Odor impact on surrounding area	Storage room of raw materials such as molasses Storage and handling of raw materials may also be the offensive odor sources	Volatile Organic Compound (VOCs) and Odor	4	2	1	3	21	Low
Impact of Noise								
Noise Loss of public amenity and	Operation of small modular chemical admixture plant	Noise level	4	1	1	3	18	Low
	Noise from lorry movements, vehicles and forklift for transporting purpose	Noise level	4	2	1	3	21	Low

Potential Impacts and Receptors	Activity and Impact Sources	Components	Duration	Magnitude	Extent	Probability	Significance point	Significance Impact
Impact of Ground Water Consumption								
Ground Water consumption	Use of water for processing of chemical admixture in production area	ground water consumption	4	3	2	3	27	Low
	General office use, domestic purpose, canteen and toilet facilities	ground water consumption	4	1	2	2	14	Very Low
Impact of Wastewater Effluents								
Waste water discharge	Discharged wastewater from office, toilet facilities, Lab discharge water	Organic matter in wastewater, heavy metal in wastewater	4	3	2	3	27	Low
Impact on Aquatic Lives								
Nearest surface water bodies	Domestic wastewater from office use Accidental release of chemical and improper storage of chemical	Organic matter in discharge water	4	4	1	2	18	Low
Impact on Soil Quality								
Accidental release and spillage of chemical	Poor site management of chemicals and fuel spillage Accidental release or spillage of improper storage and handling of raw materials from production area	Chemical pollutant	4	3	1	3	24	Low
Impact of Electricity Consumption								
Electricity and Fuel consumption	Production area and general office use Vehicles, forklift etc.	Electricity consumption	4	3	2	4	36	Moderate

Potential Impacts and Receptors	Activity and Impact Sources	Components	Duration	Magnitude	Extent	Probability	Significance point	Significance Impact
Impact of Solid Waste (waste disposal)								
Generation of Hazardous and Non- Hazardous Solid waste	Raw material containers and tank, packaging materials and drum for liquid chemicals, concrete waste and chemical wastes from lab	Production waste and generated lab waste	4	4	3	4	44	Moderate
	Solid waste such as paper, plastic, food waste and other general waste generated from office	Office waste	4	2	2	3	24	Low
Impact on Human								
Socio-economic	Direct and indirect impacts on employment opportunity	Local socio-economic development status	4	4	2	3	30	Moderate Positive impact
Occupational and Community Health and Safety								
Occupational Health impact on employees and workers	Exposure of raw materials, chemicals from storage and handling of chemical admixture production area	Odor and volatile organic compound (VOCs), particulate matter	4	4	1	4	36	Moderate
	Operation noise from production area and operation activities	Noise	4	2	1	3	21	Low
	Movements of Vehicles	Accident	4	2	4	3	27	Low
Community Health Impact on Local People	Accidental spillage and release of chemicals from production process to nearest water bodies	Release of chemical	4	4	1	4	36	Moderate

Potential Impacts and Receptors	Activity and Impact Sources	Components	Duration	Magnitude	Extent	Probability	Significance point	Significance Impact
	Emission of air pollutants from production process	Dust and gases, VOCs	4	3	2	3	21	Low
	Other industrial Accidents	Accident	4	5	1	4	40	Moderate
	Fire Hazards from explosion of fuel storage	Fire hazard	4	5	2	4	44	Moderate

6.6 Decommissioning Phase

The followings are the anticipated impacts during decommissioning phases of this chemical admixture factory;

i) Impact on air quality (dust generation and emissions)
ii) Impact of noise and vibration
iii) Impact on soil quality
iv) Impact of solid waste
v) Impact of wastewater discharge
vi) Occupational health and safety

6.6.1 Impact on Air Quality

Demolition of the factory building and related infrastructure of this small modular chemical production factory will involve the activities such as on-site excavation, movement of transportation of demolition waste, equipment and heavy machines. However, the decommissioning phase is a short-term impact, which may slightly affect on workers as well as the neighboring factories, and it is expected as low impact.

6.6.2 Impact on Noise and Vibration

During decommissioning phase, noise, and vibration may cause by the operation of cranes and the transportation of equipment, materials, and working activities. Activities likely to produce noise during this phase include cutting and demolition of structures. The demolition works will lead to low impact on the acoustic environment within the project site and the nearest environment.

6.6.3 Impact on Soil

Soil quality impact may be caused by excavation activities and accidental spillage of diesel, petrol oil and other hazardous waste. Oil spill equipment and adequate secondary containment have to be provided and managed to reduce soil contamination.

6.6.4 Impact of Solid Waste Disposal

Demolition of the project buildings and related infrastructure will generate large quantities of solid waste. These non-hazardous wastes will consist of demolition debris including concrete, metal, wood and general office waste.

6.6.5 Impact of Wastewater Discharge

During decommissioning phase, discharged wastewater include the sanitary wastewater from workers which depends on the number of workers. If the domestic wastewater discharged from the demolition site is not properly disposed, it will affection nearest water body.

6.6.6 Impact on Human

Employment Opportunities

An assessment of socio-economic environment forms an integral part of an EIA study. Therefore, base-line information for the social impacts was collected during the study period. According to the baseline socio-economic data, this project will also generate direct and indirect employment opportunities for different levels of people. The increasing industrial activities will boost up the commercial and economics status of the local people as well as will lead to develop the livelihood system. Every project with long-term investment can bring changes in socio-economic conditions of the local environment. Most of the impact on socio-economic environment may be not only positive impacts but also negative impacts to local people near the project area. Closed out of the proposed project may create temporary employment and change in income of households during the decommissioning phase.

Occupational Health and Safety

During the decommissioning phase, significant physical hazards may cause due to demolishing of building and transportation of heavy equipment, machines, and other materials. Workers may expose the risks of accidents and injuries. Moreover, the heavy-duty vehicles, machineries, and equipment used for decommissioning can increase the noise level. Therefore, minor negative impacts on occupational health and safety including accidents are inevitable to some extent during closure works. To minimize the negative impacts, working condition during demolition have to be managed by the contractor based on the EHS guidelines by the IFC.

6.7 Project Activities and its Significant Impacts during Decommissioning Phase

Table 6. 6 Evaluation and Perdition of Significant Impacts for Decommissioning phase

Potential Impacts	Activity and Impact Sources	Duration	Magnitude	Extent	Probability	Significance point	Significance
Impact on Air Quality							
Air Pollution	Demolition activities such as excavation activities	1	2	1	3	12	Low
	Transportation of demolished materials	1	3	1	3	15	Low
	Temporary use of Diesel Generator and movement of transportation vehicles	1	1	1	3	9	Very Low
Impact on Noise							
Impact on Noise Disturbance to Employees	Operation of demolishing machinery and equipment	1	3	1	3	15	Low
	Vehicles movements of transporting purpose	1	2	2	2	10	Very Low
Impact on Ground Water and Soil Quality							
Soil Contamination	Accidental leakage of oil or grease from vehicle	1	3	1	3	15	Low

	Excavation activities	1	3	1	4	20	Low
	Improper management of demolished materials on site	1	4	1	3	18	Low
Impact of Solid Waste							
Generation of solid waste	Demolished building materials	1	3	1	3	15	Low
	Domestic waste from temporary workers camp	1	2	1	3	12	Very Low
Occupational Health and Safety							
Incidents and accidents leading to serious injury or fatalities	Transport of equipment, heavy demolish materials	1	5	1	4	28	Low
Exposure of airborne particulate matters, fugitives dust	Demolition of buildings and ancillary structures	1	3	1	4	20	Low
Occupational Noise to employees	Demolition of buildings and ancillary structures	1	3	1	4	20	Low
	Movement of vehicles	1	2	1	3	12	Very Low

6.8 Impact Mitigation Measures

6.8.1 Impact Mitigation Measures for Operation Phase

Although sensitive design of the proposed chemical admixture production project are the primary means for avoiding or reducing its environmental impacts. Further measures are prepared to minimize impacts occurring from the ongoing management of the site throughout the operation phase. An overall consideration for the proposed development project is that its design and operation are in accordance with all other relevant legislation.

The measures have arranged according to their primary receptor, however it should be noted that many of the following mitigation measures table (6.7) are inter-related.

Table 6. 7 Anticipated Impacts Mitigation Measures for Operation Phase

Potential Impact Significance	Recommended Mitigation Measures
Impact on air quality and odor	▪ Regular check and maintain fume wet scrubber system Installed at production area. ▪ Regular inspect and maintain chemical storage tanks ▪ Encase solid waste storage tanks to prevent odour emission
Impact of electricity consumption	▪ Ensure that good housekeeping measures such as turning off equipment and lights when not in use ▪ Energy saving devices have to be installed
Impact of ground water consumption	▪ Water conservation measures have to be implemented for this project ▪ Record the amount of water usage by water meters for production units ▪ Train all staff practices of water usage efficiency in the toilets and other areas of water consumption ▪ Install water saving devices for toilets
Impact of wastewater effluents	• Provide adequate treatment facilities to conform the effluent levels with the NEQ (Emission) Guidelines
Impact on aquatic environment	▪ Provide secondary containment to reduce the amount of materials escaping from containment to the water courses Provide proper wastewater treatment facilities

Potential Impact Significance	Recommended Mitigation Measures
Impact on soil quality	▪ Install and prepare adequate containment measures particularly in chemical storage and transfer area to minimise risk of soil contamination ▪ Use drip trays under machinery to prevent oil and grease spillage ▪ Modify the process or storage condition to reduce the potential consequences of an accidental off-site release of chemicals ▪ Formulate and test through exercises for emergency plan to ensure that procedures to prevent or mitigate impacts due to accidents or spillage are in place and operated effectively
Impact of Waste Disposal	
Non-hazardous waste	▪ Follow and practice the 3R principles (Reduce, Reuse, Recycle)
Hazardous-chemical waste	▪ Collect chemical wastes with designated jerry cans, IBC tanks to avoid possible leakages before delivering to local waste dealers ▪ Monitor and check the chemical storage area to avoid accidental leakage ▪ Ensure adequate lighting and ventilation in the chemical solvents storage area ▪ Provide process modification, including waste minimization and reducing the use of hazardous materials ▪ Any spillage of chemicals on land area of plant demise must be avoided ▪ Used chemical additives and liquid chemical drums and tanks must be checked and stored in water tight receptacles before reuse or recycle ▪ Provide spill mitigation equipment, double wall tanks and dinking storage tanks ▪ Train both operators, technicians and cleaners for good housekeeping practices at production area ▪ Provide “site-specific” training to department members who work with chemicals at laboratory and production area. ▪ Provide trainings for chemical handling and fire prevention
Impact on Human Environment	
Impact on surrounding community	▪ Apply best industry practices to protect the public form major associated with chemical materials incidents or process failure, as well as nuisance issue
Occupational Health and Safety	Adopt Occupational Health and Safety Management as described in IFC Occupational and Health and Safety section 2.0 including: ▪ Identify job safety analysis to specific potential occupational hazards and industrial hygiene surveys, and as appropriate, to monitor and verify chemical exposure

Potential Impact Significance	Recommended Mitigation Measures
	levels, and compare with applicable occupational exposure standards. ▪ Prepare hazard communication and training programs for employee to recognize and response to workplace chemical hazards ▪ Programs should include aspects of hazard identifications, safe operation and materials handling procedures, safe work practices, basic emergency procedures, and special hazards unique to their jobs. ▪ Instruct and train all employees to use control measures properly and tell about the health risk ▪ Replace the hazardous substance with a less hazardous substitute ▪ Implement of engineering and administrative control measure to avoid or minimize the release of hazardous substance to the working area to keep the level of exposure below recognized limits ▪ Plant shall be implement the safety and health program designed to identify, evaluate, monitor and control safety and health hazards ▪ Ensure all rooms are well ventilated and Lighting ▪ Provide and wear of full PPE for handing of hazardous waste

6.8.2 Impact Mitigation Measures of Anticipated Impacts for Decommissioning Phase

Table 6. 8 Anticipated Impacts Mitigation Measures for Decommissioning Phase

Potential Impacts	Recommended Mitigation Measures
Decommissioning Phase	
Impact on air quality	▪ Implement and prepare the dust suppression technique, such as applying water to reduce dust from vehicle movements and demolished activities ▪ Strictly prohibit open burning on the site premises ▪ Provide and enforce the appropriate use of full PPE against dust
Impact of noise and vibration	▪ Use noise control devices, such as earmuff and earplugs for workers ▪ Identify the noisy areas of the project site and put signage where necessary
Impact on soil quality	▪ Plan proper site clearing and disposal of demolished waste materials ▪ Ensure excavated materials in backfilling the trenches or landscaping activities ▪ Clean up any accidental spills of fuel ,oil or other hazardous chemicals immediately

Potential Impacts	Recommended Mitigation Measures
Impact of solid waste	▪ Store any hazardous materials and hazardous waste at the secure area ▪ Dispose of demolished solid wastes in compliance with YCDC regulations ▪ Encourage waste segregation at the source of decommission site ▪ Reuse demolition materials if possible ▪ Implement good housekeeping practices within the site
Impact of liquid waste	▪ Demolish the sewage systems properly to prevent contamination into the environment and ground water ▪ Provide adequate secondary containment for fuel storage tanks and for the temporary storage of other waste fluids such as used lubricating oils and hydraulic fluids ▪ Train workers on the correct transfer and handling of fuels ▪ Provide adequate portable or permanent sanitation facilities at the decommission site.
Impact on local community health and safety	▪ Notify the residents before the decommissioning of the proposed factory buildings and any other facility on site ▪ Provide earlier notice to all affected particles concerning the development of the project
Impact on Occupational Health and Safety	▪ Appoint HSE coordinator to monitor the demolishing activities during demolishing phase ▪ Provide training for workers in lifting and materials handling techniques in decommissioning phase ▪ Prepare a plan for work site layout to minimize the need for manual transfer of heavy loads ▪ Use inspected and well maintained lifting devices appropriate for the load, such as cranes, and securing loads when lifting them to higher job-site elevations. ▪ Use slip retardant foot wear ▪ Provide temporary fall arresters ▪ Maintain clear traffic ways to avoid driving of heavy equipment over loose scrap ▪ Promote safe and healthy working conditions, and prohibit any use of forced labour ▪ Fill all excavations after the plant closure ▪ Provide full PPEs for all employee and workers during decommission phase

7. CUMULATIVE IMPACT ASSESSMENT

In reference to the scope for an impact assessment, IFC's Cumulative Impact Assessment and management guidance for the private sector in emerging markets and performance standards specify that:

Cumulative impacts are those that result from the successive, incremental, and or combined effects of an action, project, or activity when added to other existing, planned, and reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important because of scientific concerns and concerns of affected communities.

Risks and impacts will be analyzed in the context of the project's area of influence. This area of influence encompasses area potentially impacted by cumulative impacts from further planned development of the project. Any existing project or condition, and other project related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken, and areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location" *(IFC, 2006).*

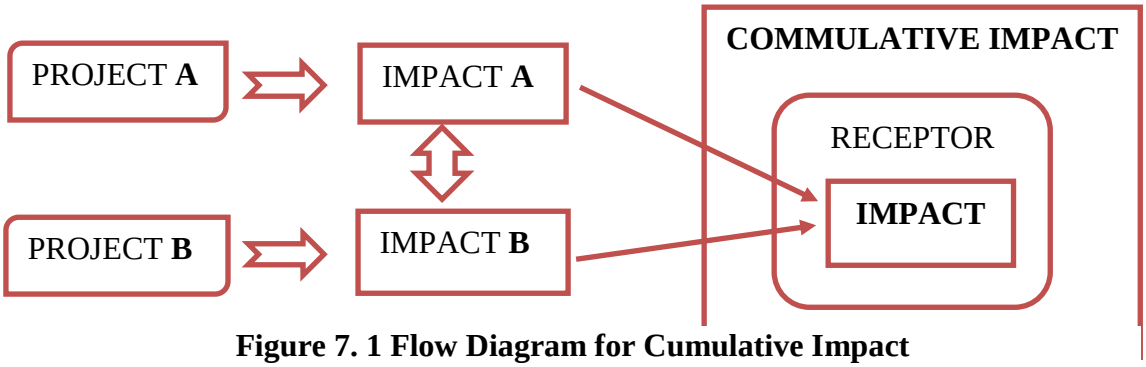

Figure 7. 1 Flow Diagram for Cumulative Impact

7.1 Cumulative Impact

Cumulative effects of the project and other associated impacts in relation to development will be described in this section. During the impact assessment, evaluation of potential cumulative impacts plays an integral part. The proposed project is situated in East Dagon Industrial Zone (1) which is operating around 50 factories in this study area mentioned in baseline data information. The information available to assess cumulative impact of this industrial zone and other related projects is minimal.

Therefore, the following cumulative impact and mitigation measures were prepared based on the limited information available and surrounding environmental conditions of the project site.

7.2 Methodology

The cumulative assessment has been performed based on the following steps: Projects that are either proposed or recently approved but not yet operational and located either are identified within the area of BASF site. The spatial boundary of 500 m will be used for the cumulative impacts. Where existing projects are located away from each other cumulative impacts are likely to be less significant

The temporary boundary (time-frame) to be used for the initiation of the project is defined. Where the operation schedule for projects is not overlapping, the potential cumulative impacts are likely to be less significant.

The significance of the cumulative impacts upon the environment is identified on the basis of the significance criteria defined.

7.2.1 Assessment Matrix

The assessment matrix that has been used for the cumulative impact assessment of the project is presented in Table (7.1).

Table 7. 1 Cumulative Impact Assessment Matrix

Aspect	Relevance Factor		
	Low	Medium	High
Probability	1	2	3
Duration	1	2	3
Magnitude	1	2	3
Sensitivity	1	2	3

The relevance factors have been used to determine impacts in the table on the basis of professional judgments, past experience with similar development projects. Impacts significance criteria used for the cumulative impact assessment are detailed in Table (7.2).

Table 7. 2 Cumulative Impact Significance Criteria

Impact Significance	Sum of Relevance Factors	Consequence
Low	4---6	Negative impact may occur but can be managed if the proponent implements standard environmental management practices. Special approval conditions unlikely to be necessary. Monitoring to be part of a general monitoring program

Impact Significance	Sum of Relevance Factors	Consequence
Medium	7---9	Mitigation measures likely to be necessary and specific management practices to be applied. Specific approval conditions are likely. Target monitoring program required.
High	10---12	Alternative actions should be considered and/or mitigation measures applied to demonstrate improvement. May require collaboration with other proponents/parties to monitor and manage impacts. Specific approval conditions required. Target monitoring program necessary.

7.3 Environmental Values

i) Air quality impact may be increased from joint operations of various factories in the vicinity of site of this industry zone
ii) Noise levels may be increased by combining operation activities of other factories and transportation vehicles.
iii) Wastewater discharge on surface and groundwater contamination may be increased from cumulative operation of factories
iv) Risk of fire explosions and other accidental hazards may be potential Road accidents and traffic congestion may be increased by transportation.

Positive impacts of socio-economic, social infrastructure and livelihoods will arise due to the industrial development. Project's Contribution to Potential Cumulative Impacts.

All of anticipated cumulative impacts relate with proposed development project of chemical admixture production can be reduced and enhanced by using recommended mitigation measures in below;

- ✓ Implement the environmental policy on air emission impact organized by Industrial Zone committee
- ✓ Implement collaborative HSE policy by leading the Industrial Zone committee
- ✓ Properly treat industrial effluents from all factories in this industrial zone to minimize the cumulative impact of the wastewater on nearest water bodies of public drainage, Ngamoeyaike Creek etc.
- ✓ Regular samplings of wastewater have to be taken from the inlet and outlet of the common public drainage and the effluent levels need to be compliance with the National Environmental Quality (Emission) Guideline.

7.4 Project's Contribution to Potential Cumulative Impacts

The cumulative assessment defined the spatial and temporal boundary for assessment and review impact significance based on "Cumulative Impact Assessment Matrix" and "Cumulative Impact Significance Criteria" mentioned in below table (7.3) and (7.4) and considering the impacts from other projects in the vicinity of BASF.

Table 7. 3 Cumulative Impact Assessment Matrix

Nearby Factory	Fire	Air Pollution	Noise	Wastewater	Road Accident	Socio-economic
Gas Pipeline	Yes	No	No	No	No	No
Plastic Products Production factory	Yes	Yes	Yes	Yes	Yes	Yes
Tamarind	No	No	No	Yes	Yes	Yes
Cashewnut	No	Yes	No	Yes	Yes	Yes
Oxygen storage warehouse	Yes	No	No	No	Yes	Yes

Table 7. 4 Cumulative Assessment (BASF)

Aspect	Air Quality	Noise/ Vibration	Waste water	Fire	Road Accident	Traffic	Job Opportunity
Probability of Impact	1	1	1	3	2	2	2
Duration of Impact	1	2	1	1	1	1	2
Magnitude/ Intensity	1	1	2	3	1	1	2
Sensitivity of receiving impact	1	1	2	3	2	1	2
Total	4	5	6	10	6	5	8
Impact Significance	Low	Low	Low	High	Low	Low	Medium (Positive)

According to the assessment results of cumulative impact for this project, there are five low significant cumulative impacts related with air quality, noise pollution, wastewater, road accident, and traffic to surrounding environment and one medium positive impact of job opportunity. However, anticipated high significance cumulative impact is fire because of the surrounding environmental condition of project site.

8. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

8.1 Project Description by Project Phase

The Environmental Management Plan (EMP) is developed to ensure that the project is operated in an environmentally sustainable manner understanding the potential environmental risks arising from the proposed project. The project proponent is to take appropriate actions to manage the mitigation measures properly. The Environmental Management Plan (EMP) prepared for the proposed project covers the anticipated impacts of the said project, mitigation measures, management and monitoring plans during each of the phases:

- Operation
- Decommissioning

There are five main sections in this EMP plan and detailed EMP plan based on the project activities.

1) Impact mitigation measures plan for operation phase and decommissioning phase
2) Environmental monitoring plan including monitoring guidelines and standards for this project
3) Emergency preparedness plan and training program
4) Budget allocation for Environmental Management Plan (EMP)
5) Corporate Social Responsibility (CSR) Plan

8.2 Policies and Commitments, Legal requirements and Institutional Arrangement

In order to effectively implement the Environmental Management Plan, it will be necessary to define the responsibility of various stakeholders. The environmental management activities have to comply with existing environmental policy, laws, rules, procedures, and emission standards of the Republic of the Union of Myanmar.

As part for Environmental Management plan, it is also necessary to set up a permanent organization for ensuring effective implementation. BASF Myanmar has been organized the HSE team to assign the activities concerned with management and implementation of environmental control measures. Team member and organization chart and job description can be seen in below chart Figure (8.1).

The Responsible Care Management System forms the super ordinate structure for the EHS documents and these documents have to apply throughout the BASF Group and cover all EHS topics:

RC-Code 1: Product Stewardship

RC-Code 2: Transportation and Distribution Safety

RC-Code 3: Occupational Safety (see in Medical response plan)

RC-Code 4: Occupational Health

RC-Code 5: Process Safety

RC-Code 6: Environmental Protection

Promote RC within the organization

- Maintain effective Environmental Protection, Health, Safety and Security Management and its appropriate documentation
- Identify and Provide Environmental Protection, Health, Safety and Security management training
- EHS Management review and EHS target set-up and Review

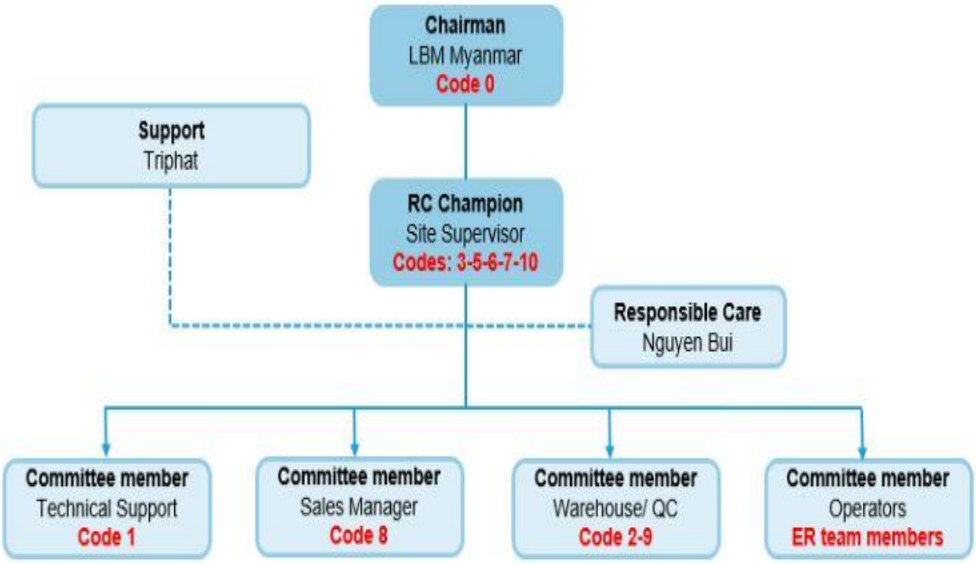

Figure 8. 1 HSE Team of BASF Myanmar

8.3 Environmental and Social Management Plan by Project Phase

Responsibilities of the EMP

In order to ensure the sound development and effective implementation of the EMP, it will be necessary to identify and define the responsibilities. The environmental management practices, procedures, and responsibilities defined herein to get full compliance with the existing environmental policy, laws, rules, and regulations of the Republic of the Union of Myanmar. The following entities should be involved in the implementation of this EMP:

- BASF Myanmar Manufacturing Co., Ltd.
- Environmental Conservation Department, ECD (Yangon Region)
- Third-Party Environmental Consultant

BASF Myanmar Manufacturing Co., Ltd.

The proponent has to implement the Environmental Management Plan with the responsibility for ensuring that the proposed development has been accomplished in an environmentally sound manner. This can be achieved by inclusion of environmental specifications in the tender specifications, selection of environmentally conscious contractors and supervision to ensure that the objectives of this EMP are met.

ECD (Yangon Region): The responsibility of ECD is to exercise general supervision and coordinating over all matters relating to the environment and to be instrumental in providing guidance for recognized regulatory frameworks.

Third Party Environmental Consultant

The environmental consultant will have to ensure that the proposed EMP is up to date and is being followed properly by the proponent. Periodic audits of the EMP will have to be done to ensure that its performance is as expected, by comparing with operating standards so that any corrective actions can be taken.

8.3.1 Environmental Impact Mitigation Plan for the Operation Phase

According to the impact assessment for the operation phase mentioned in chapter (6), environmental issues associated with the operational phase primarily include the following issues:

1. Impact of dust and gases emission
2. Impact of odor from storage of raw materials, chemical additives
3. Impact of noise from operation of auto machines, motors and heavy machines
4. Impact of resource consumption (ground water and electricity)
5. Impact of waste disposal (hazardous and non-hazardous waste) and wastewater discharge
6. Occupational health and safety of employees and workers due to long term exposure of hazardous and non-hazardous chemicals

Although the proposed chemical admixture factory has a number of adverse impacts on the surrounding environment, all of impacts may reduce to some extent by using proper mitigation measures. However, the unavoidable impacts would evolve from occupational health and safety of workers in the aspect of physical hazards with long- term and short-term working due to inhalation of raw materials (hazardous chemicals) and other volatile liquid chemicals. So, mitigation plan of operation phase is mentioned in table (8.1). These activities have to be carried out to show that the factory operations comply with the maximum allowable environmental norms and standards.

8.3.2 Environmental Mitigation Plan for Decommissioning Phase

In this phase, it is necessary to outline some basic mitigation measures that will be required to be undertaken once all operational activities of the project have ceased. Because of proposed plant closure, various environmental and social aspects may be affected. However, all of anticipated can be mitigate by using recommended impact mitigation measures showed in table (8.2)

Environmental Impacts during the Decommissioning Phase;

- Generation of demolishing wastes, electrical cables, electronic device waste and hazardous waste (chemical containers, storage tanks, drums)
- Soil contamination
- Significant noise and vibration from all demolishing activities
  Occupational health and safety for employees and workers

Table 8. 1 Environmental Management Plan for Operation Phase

Potential Impact Source and Components	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
Impact on Air Quality				
Air Pollution ✓ Emission of dust and volatile organic compound (VOCs) from production area during tank cleaning operation time at project site	• Regularly monitor, check and repair all air pollution control system and all of filters installed at production area • Monitor the ambient and indoor air quality as per EMOP in compliance with NEQ guideline • Regular Monitor VOCs using portable monitors • Control the temperature, humidity, and other environmental factors for storage facilities of raw materials, chemical additives to reduce emission	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
Impact on Odor				
✓ Fugitive emissions and odor from storage facilities of raw materials, and chemical (formaldehydes and other smelled chemicals)	• All volatile raw materials must be stored at designated temperature and storage facilities according to their MSDS requirements • Tightly close the cover of liquid chemical drums and storage tanks to avoid odour emission (molasses) • Regularly monitor and check the storage room of solvent materials (hazardous and non-hazardous chemical) to prevent accidental leakage	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
Impact of Noise				

Potential Impact Source and Components	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
Noise Generation source ✓ Operation of machineries and equipment ✓ Noise from pumping of raw materials from tank installations and air vent valves in containers installation ✓ Vehicles, crane and forklift movements	▪ Ensure all the machineries are well maintained to reduce noise ▪ Monitor the ambient and work zone noise level to conform the stipulated norms ▪ Noise level monitoring programme has to be carried out at production area to verify operational phase noise levels in line with NEQ guideline ▪ Install suitable mufflers on engine exhausts and compressor components ▪ Adopt the speed limit for all vehicles within the project site	Very Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
Impact on Ground Water Consumption				
✓ Water Consumption for processing and general office use	▪ Install water meter for internal control of water consumption especially for production area ▪ Compare the regular water consumption with performance targets to identify where action should be taken to reduce water use	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
Impact on Wastewater				
✓ General domestic wastewater from office use	▪ Develop the wastewater discharge facilities in line with NEQ (emission) guideline ▪ Clean the factory's drainage to avoid odour emission and to avoid the block of water flow ▪ Implement the proper drainage facility, efficient land drainage and use of constructed ponds to receive site runoff to reduce impacts of runoff on nearby watercourses	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.

Potential Impact Source and Components	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
✓ Deteriorate water quality due to effect of factory processing discharge of wastewater from chemical tanks, seepage water ✓ Discharge from drainage facilities (precipitation from secondary containment), leaching, cleaning	▪ Use appropriate wastewater collection and storage system which are discharged from production process ▪ Regular monitor IBC tanks for collected wastewater from processing before use for next batch ▪ Adequate wastewater treatment facilities have to be provided to comply with NEQ (emission) guideline ▪ Check the project site drainage facility to prevent flooding during rainy season ▪ Prepare emergency plan for hazardous chemical spillage	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
Impact on Aquatic Lives				
✓ Accidental release and discharge of hazardous chemical into drainage facilities) and cleaning activities in production area for chemical containers and tanks	▪ Monitor the storm water quality (public drainage of project site area) ▪ Provide proper wastewater treatment facilities and wastewater collection system produced from production process ▪ Prevent uncontrolled release of hazardous materials to the environment ▪ Keep the hazardous materials such as liquid chemicals, fuel, oil away from the water courses	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Co., Ltd.
Impact on Soil Quality				
Accidental spillage and release of hazardous chemical	▪ Prepare the suitable storage facilities for chemicals to avoid percolation into the soil ▪ Monitor the soil quality to control soil contamination	low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Co., Ltd.
Impact on Electricity Consumption				

Potential Impact Source and Components	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
✓ Use of electricity for production area of automatic process control machines and general office use	▪ Prepare and regular review the context of energy management of overall consumption patterns for production processes and supporting utilities ▪ Balance between production capacity and energy consumption	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
Impact on Waste Disposal				
Waste Disposal ✓ General waste from office	▪ All waste must be disposed of in line with environmental regulation of Myanmar and YCDC guidelines ▪ Ensure that all inside and outside areas, buildings, facilities and equipment are kept clean and in good state to function as intended and to prevent contamination	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
✓ Chemical residues from containers/ rejected products packaging materials ✓ Hazardous waste such as chemical waste (accidental spill and leakage of chemicals)	▪ Monitor the product losses during processing and optimize process yields ▪ Regular inspection must be carried out for all bulk containment on site to prevent leakage and product loss ▪ Dispose at permitted areas specially designed to receive the hazardous waste and regular check the temporary hazardous waste storage area ▪ Label the waste container as “Hazardous Waste” and attach the complete name of chemical contained in the container ▪ Ensure that contractors handling, treating, and disposing of hazardous waste by following good international industry practice for the waste management ▪ Dispose of hazardous chemical according to special waste regulations compliance with local regulations and international guidelines	Low	Throughout Operation Phase	HSE Officer BASF Myanmar Manufacturing Ltd.
Community Health and Safety				

Potential Impact Source and Components	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
Health and Safety for local community	✓ Manage the operation process to minimise disturbance to adjacent residential and nearest factories ✓ Safety concerns have to be addressed by implementing health and safety procedures on site and installation of adequate fencing and other site security	Low	Throughout operation phase	HSE Officer/ Plant Manger BASF Myanmar Ltd.
Occupational Health and Safety				
✓ Accident and incidents leading to serious injuries ✓ Exposure of VOCs emissions, Odour, ✓ Exposure to hazardous materials (chemicals formaldehyde)	▪ Monitor and inspect all employees and workers to wear full personal protective equipment (PPE) during operation period ▪ Provide air ventilation system to protect employees from air emission exposures that exceed the level permitted by OSHA ▪ Use self-contained breathing apparatus. Avoid direct contact with skin, eyes and clothing for formaldehyde chemical ▪ Arrange appropriate health check-up facilities ▪ Provide the information and training on the use of control measures for exposure of chemical hazards and machine handling to the employees ▪ Measure the VOCs concentration in production area by quarterly and compare with NEQ (emission) guideline ▪ Provide chemical storage and handling training for working at prosecution area and laboratory ▪ Clearly display warning signs or symbols for dangerous and restricted areas at the factory ▪ Regular maintenance of the road and use of traffic signs ▪ Provide the training programs for industrial vehicles operators such as forklifts, including safe loading/unloading, load limits ▪ Provide spill absorbent material/ equipped with secondary containment facility for storage of hazardous materials	Low	Throughout operation phase	HSE Officer/ Plant Manger BASF Myanmar Ltd.

Potential Impact Source and Components	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
	▪ Implement emergency procedures for hazardous chemical spillage at project site ▪ Prepare the on-site emergency plan for storage and handling of hazardous chemicals ▪ The top management has to review the environmental management plan and implement the updated EMP with appropriate safety measures, monitoring, training, and training verification programs			

Table 8. 2 Environmental Management Plan for Decommissioning Phase

Potential Sources of Impact	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
Impact on Air Quality				
Transportation of demolished materials and excavated waste	Ensure that proper notification has to be prepared before demolition Practice dust management techniques, including spraying water and covering excavated solid waste Selectively remove the potential hazardous air pollutants, from existing infrastructure before demolition Strictly avoid the open burning of solid waste at project site	Low	Throughout decommissioning phase	Contractor/ BASF Myanmar Ltd.
Impact on Noise and Vibration				
Noise (short term noise nuisance and hearing loss) Demolishing activities with heavy machinery and vehicle movements	Prepare the planning activities in consultation with local communities before demolishing phase Proponent must be responsible for compliance with the guideline Schedule noisy activities during day time Ensure that machinery is well maintained to reduce noise generation Use of noise control devices, such as temporary noise barriers and exhaust muffling devices for combustion engines	Low	Throughout the decommissioning phase	Contractor/ BASF Myanmar Ltd

Potential Sources of Impact	Recommended mitigation measures	Residual Impact	Time Frame	Responsible Person
Impact on Soil				
Soil and ground water pollution Accidental spillage of diesel and lubrication oil from vehicles Temporary sewage facilities	Ensure that sewage system is functional during demolition to prevent underground and surface water contamination Proper demolish of the sewage system to prevent pollution by contents into the environment and ground water Prepare plans and procedures to response the discovery of contaminated media	Low	Throughout decommissioning phase	Contractor/ HSE Officer BASF Myanmar Ltd.
Impact on Solid Waste				
Solid waste Demolishing materials and construction waste Scraps and other debris onsite	Enforce segregation of waste at the source to encourage reuse and recycling Dispose of solid waste in consultation with YCDC Remove all equipment and debris ready to utilize the site for other uses	Low	Throughout the decommissioning phase	Contractor/HSE Officer of BASF Myanmar Ltd.
Impact on Employees and Workers				
Occupational Health and Safety Incidents and accidents leading to serious injuries or fatalities	Monitor the decommissioning site by HSE Officer to identify and remove waste materials from tanks, vessels, processing equipment or contaminated land Provide the first aid kit at decommissioning site Ensure the planning work site layout to minimize the need for manual transfer of heavy loads Implement good house-keeping practice, such as the sorting and placing loose demolition debris in established area away from the foot paths Use of slip retardant footwear Clean up excessive waste debris and liquid spills regularly Restrict the access to the site without permission Provide PPEs for decommissioning workers	Very Low	Throughout the decommissioning phase	Contractor/ HSE Officer of BASF Myanmar Ltd.

8.4 Environmental Monitoring Plan

Monitoring of the anticipated environmental and social impacts in the receiving environments is important in evaluating the effectiveness of mitigation plan and compliance with the regulatory measures in place. During the operation phase and decommissioning phase, monitoring has to be undertaken to ensure that proposed mitigation measures for negative impacts and enhancement measures for positive impacts are implemented.

Main objectives of environment monitoring plan include;

a) To identify and resolve environmental issues and other functions that may arise during the operation phase
b) To implement water quality, air quality and noise impact monitoring plan during the operation phase
c) To check and quantify the overall environmental performance, implement action plans and recommend and implement remedial actions
d) To conduct regular reviews of monitored data as the basis for assessing mitigation measures are identified, designed and implemented;
e) To assess and interpret all environmental monitoring, data to ascertain whether environmental control measures and practices are functioning in accordance to specifications
f) To predict the unforeseen impacts

Environmental Monitoring plan for operation phase and decommission phase for proposed admixture chemical admixture production project showed in table (8.3) to (8.7).

8.4.1 Environmental Monitoring Plan during Operation Phase

Table 8. 3 Environmental Monitoring Plan during Operation Phase

Phase	Component	Parameter	Target Level	Measurement Method	Monitoring Location	Monitoring Frequency	Responsible Person
Operation Phase	**Environmental Impacts**						
	Air Quality Ambient Air Quality Indoor Air quality	1.Ambient Air Quality PM_{10}, $PM_{2.5,}$ CO, CO_2, $NO_{2,}$ $SO_{2,}$ 2.Indoor Air Quality VOCs	Within NEQ Guideline and International standards limit levels	Relevant Air Quality Monitoring Equipment	Project site of downwind direction and inside the production area	Biannually	HSE Officer / BASF Myanmar Manufacturing Co., Ltd
	Water Quality 1.Ground Water 2. Storm Water	Ground Water Parameter (see in table (5.14) and Wastewater Effluent See in table (8.6)	Within WHO standards limit and NEQ Guideline levels	Relevant Laboratory	Tube well water and final public drainage at project site	Biannually for ground water, Quarterly for storm water	HSE Officer/ BASF Myanmar Manufacturing Co., Ltd
	Soil Quality	pH, Lead (Pb), Mercury (Hg), Ammonia, Arsenic (As), Mn, Zn	-	Relevant Laboratory	Sediment at the project site	Biannually	HSE Officer/ BASF Myanmar

Phase	Component	Parameter	Target Level	Measurement Method	Monitoring Location	Monitoring Frequency	Responsible Person
							Manufacturing Co., Ltd
	Noise Pollution	Noise level (dB(A) scale)	Within standards International limit/ NEQE Guideline	Relevant Noise Meter Equipment dB	, Sensitive spots at the project site	Biannually	HSE Officer/ BASF Myanmar Manufacturing Co., Ltd
	Solid Waste Hazardous and Non-Hazardous waste	Production waste, laboratory waste, rejected products, Packaging waste bags and containers and drums and tanks Domestic refuse, paper and general office waste and domestic waste	Volume of solid waste (ton or Kg)	According to the YCDC guideline	Temporary waste storage areas at the factory	Daily	Waste Collector/ YCDC/ HSE Officer of BASF Myanmar Manufacturing Co., Ltd
	Electricity Consumption	Electricity consumption record for production area and general use	kW/hr.	According to the electricity bill	Production process area and general office use	Monthly	BASF Myanmar Manufacturing Ltd

Phase	Component	Parameter	Target Level	Measurement Method	Monitoring Location	Monitoring Frequency	Responsible Person
	Water Consumption	Tube well water usage for production area	m^3/per batch/day	Benchmark per batch	Production area	Monthly	
	Socio-Economic Impact						
	Occupational, Health and Safety	Short term affect (accidents case of slip, trip and fall) Long term affect (inhalation of hazardous chemicals and exposure of chemical)	Zero accident cases Chemical Safety training for workers and accident reports, community consultations	According to the Occupational Health and Safety Plan of the Government of Union of Myanmar Ministry of Industry (1)	1.Project Site 2. Production area	Monthly	HSE Officer BASF Myanmar Manufacturing Co., Ltd

Environmental Quality Monitoring Guidelines during Operation Phase

BASF Myanmar adopts comprehensive environmental monitoring plan in line with Environmental Quality Guidelines, which is essential to take into account the changes in the environment.

Table 8. 4 Air Monitoring Guideline

Parameters	Guidelines Value	Unit	Averaging Period	Organization
PM_{10}	50	$\mu g/m^3$	24hrs	NEQ
$PM_{2.5}$	25	$\mu g/m^3$	24hrs	NEQ
CO	9	ppm	8hrs	NAAQS
CO_2	5000	ppm	8hrs	ACGIH
SO_2	20	$\mu g/m^3$	24hrs	NEQ
NO_2	200	$\mu g/m^3$	24hrs	NEQ
VOCs (Indoor)	50	mgN/m^3	8hrs	NEQ

Noise Level Monitoring Guideline

Noise prevention and mitigation measures have to be taken by the project where measured noise impacts from a project facility or operation exceed the applicable noise level guideline at the most sensitive point of reception. Noise impacts should not exceed the levels shown below, or result in a maximum increase in background levels of three decibels at the nearest receptor location off-site.

Table 8. 5 Noise Level of NEQ (Emission) Guidelines

Receptor	One Hour LAeq (dBA)[a]	
	Daytime 07:00 - 22:00 (10:00 - 22:00 for Public holidays)	Nighttime 22:00 - 07:00 (22:00 - 10:00 for Public holidays)
Residential, institutional, educational	55	45
Industrial, commercial	70	70

Table 8. 6 Wastewater Effluent Levels for Chemical Admixture Plant

Parameter	Unit	NEQ (emission) Guideline Value
pH	S.U.[a]	6-9
Chemical oxygen demand	mg/l	250
5-day Biochemical oxygen demand	mg/l	50
Ammonia	mg/l	10
Total suspended solids	mg/l	50
Total phosphorus	mg/l	2
Total nitrogen	mg/l	10
Oil and grease	mg/l	10
Temperature increase	°C	<3[b]
Total coliform bacteria	100 ml	400

[a] Standard unit

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

8.4.2 Environmental Monitoring Plan during Decommissioning Phase

Table 8. 7 Environmental Monitoring Plan during Decommissioning Phase

Phase	Component	Parameter	Target Level	Measurement Method	Monitoring Location	Monitoring Frequency	Responsible Person
Decommissioning Phase	**Environmental Impacts**						
	Air Quality Monitoring	PM_{10}, PM 2.5, CO, NO_2, SO_2	Within Ambient standards level of NEQE Guideline and International Standards	Relevant Air Quality Monitoring Equipment	Receptor's Areas near project site	Once after the Decommissioning Activities	Contractor/ BASF Myanmar Manufacturing Co.,Ltd.
	Wastewater Quality Monitoring	Site Runoff wastewater Discharges parameter in NEQ (emission) Guideline	Within standards of NEQ Guideline for Site Runoff	As per Guidelines of NEQ Guideline	At public's drainage near project site	Once, after Decommissioning activities	Contractor/ BASF Myanmar Manufacturing Co.,Ltd.
	Noise Pollution	Noise level (dB(A) scale)	Within standards limit levels/ NEQ Guideline	Relevant Noise Meter Equipment	Sensitive spots	Once, During Decommissioning Phase	Contractor/ BASF Myanmar Manufacturing Co.,Ltd.
	Solid waste	Demolition debris, including concrete, metal, drywall, wood, glass, and other hazardous demolished materials	Volume of solid waste	Kg	Temporary disposal sites of decommissioning phase of project site	Weekly	Contractor/ BASF Myanmar Manufacturing Co.,Ltd.
	Socio-economic impacts						
	Socio-economic aspects	Employment's compensation, local economy, gender issues	Within standard limit levels, Grievance Redress Mechanism (ECD)	Samples	Meeting and discussion with responsible persons	Once after decommissioning phase	Contractor/ BASF Myanmar Manufacturing Co.,Ltd.

8.5 Risk Management Plan

As for the initial emergency risk assessment, taking into consideration of the project description, the following three main emergency risks are chosen and shall be considered:

- Risk of fire
- Risk for flooding in rainy season and
- Accidental release of chemicals

To over-come all kinds of risk that may occur in operation activities of this project, the proponent has prepared the chemical industry's Voluntary Responsible Care Initiative and applied them to the entire BASF Group for risk management to continuous improvement in the areas of environmental protection, health and safety. BASF's Responsible Care Management System comprises the global rules, standards and procedures for environmental and health protection, safety and security for the various steps along our value chain.

Under the Code of Conduct of Responsible Care Management System, the following codes are included.

i) Process Safety

Process safety is a core part of safe and efficient production. BASF Myanmar needs to follow on safety in the construction and operation of plants to meet high safety standards for the design, construction, and operation of plants around the world of BASF global group. Moreover, use of the number of process safety incidents per one million working hours as a key performance indicator, following largely the dentition set by the European Chemical Industry Council (CEFIC). This KPI is mainly used to track the release of substances, in addition to fire and explosions to identify and assess possible risks during the design process of new plants, in periodic reviews during the operation of existing plants and when plant or recipes changes are performed. They have been developed a prevention plan for every plant that considers the key aspects of environmental and health protection and safety and stipulate specific protection measures for each where necessary.

ii) Emergency Response

BASF will be able to handle both on-site and off-site incidents to safe product handling in emergencies (fires, spills), fire prevention and firefighting, transport incident information and support system concepts, emergency and incident response. A new requirement on emergency response planning covers all emergency response responsibilities regarding fires, chemical releases, as well as natural disasters.

All project sites around the world will assess based on a structured and transparent procedure. To implement measures, which meet local requirements and provide a comparable level of safety. For example, this classification results in the drawing up of specific emergency response

plans for production plants, the alarm plans plus the specification of fire and explosion protection facilities.

iii) Hazard identification and risk assessments

By conducting hazard identification and risk assessments of tasks and workplaces, support employees and contractors in becoming aware to potential hazards and thus minimize risks. This also includes assessment of new technologies to ensure that they are handled safely for proposed chemical admixture production plant.

iv) Recommended Hazardous Materials Management Plan

Hazardous materials management plan will be commensurate with the level of potential risks associated with the production, handling, storage, and use of hazardous materials according to the IFC guideline.

Release Prevention and Control Planning

Hazardous materials storage area will be prepared a spill control, perception, and countermeasure plan as a specific component of their Emergency Preparedness and Response Plan. The plan should be tailored to the hazards associated with the project, and include:

- Provide the training for operators on release prevention, including drills specific to hazardous materials as part of emergency preparedness response training
- Implement the inspection plan to maintain the mechanical integrity and operability of pressure vessels, tanks, drums, piping systems, relief and vent valve systems, containment infrastructure, emergency shutdown systems, controls and pumps, and associated process equipment
- Prepare the Standard Operating Procedures (SOPs) for filling containers or equipment as well as for transfer operation by personnel trained in the safe transfer and filling of hazardous materials, and in spill prevention and response
- Identify of locations of hazardous materials and associated activities on an emergency plan site map
- Provide the documents of availability of spill response equipment sufficient to handle at least initial stages of a spill and a list of external resources for equipment and personnel, if necessary, to supplement internal resources
- Describe of response activities in the event of a spill, release, or other chemical emergency including:
    - Internal and external notification procedures
    - Specific responsibilities of individuals or groups
    - Decision process for assessing severity of the release, and determining appropriate actions

- Facility evacuation routes
- Post-event activities such as clean-up and disposal, incident investigation, employee re-entry, and restoration of spill response equipment

1) Process Knowledge and Documentation

Hazardous materials management plan will be incorporated with below;

- Written process safety parameters (hazards of the chemical substances, safety equipment specifications, safe operation ranges for temperature, pressure, and other applicable parameters, evaluation of the consequences of deviations,
- Written operation procedures
- Compliance audit procedures

2) Preventive Measures

Uncontrolled releases of hazardous materials may result from small cumulative events, or from more significant equipment failure associated with events such as manual or mechanical transfer between storage systems or process equipment. Recommended practices to prevent hazardous material release from processes include;

- Use of dedicated fittings, pipes and hose specific to materials in tanks
- Use of transfer equipment that is compatible and suitable for the characteristics for materials transferred and designed to ensure safe transfer
- Regular inspection, maintenance and repair of fittings, pipes and hoses
- Provision of secondary containment, drip trays or other overflow and drip containment measures, for hazardous materials containers at connection points or other possible overflow points.

3) Overfill Protection

- Prepare written procedures for transfer operations that includes a checklist of measures to follow during filling operation and the use of filling operators trains in these procedures
- Install the gauges on tanks to measure volume inside
- Use of drip less house for vehicle tank and fixed connections with storage tanks
- Provision of automatic fill shutoff valves on storage tanks to prevent overfilling
- Use of a catch basin around the fill pipe to collect spills
- Use of piping connections with automatic overfill protection (float valve)
- Secondary Containment measures applied for on site-specific conditions
- Transfer of hazardous materials form vehicles tanks to storage in areas with surfaces sufficiently impervious to avoid loss to the environmental and sloped to a collection or

a containment structure not connected to municipal wastewater/storm water collection system

- Provide the dedicated containment structures for transfer operations, one or more alternative forms of spill containment should be provide, such as portable drain covers, automatic shut-off valves on storm water basins, or shut off valves in drainage or sewer facilities combined with oil-water separators
- Storage of drummed hazardous materials with a total volume equal or greater than 1000 litters in area with impervious surfaces that are sloped to contain a minimum of 25 per cent of the total storage volume.
- Monitor periodic (daily or weekly) reconciliation of tank contents, and inspection of visible portions of tanks and piping for leaks

4) Storage Tank and Piping Leak Detection

- Use of automatic pressure loss detectors on pressurized or long-distance piping
- Use of approved or certified integrity testing methods on piping or tank system, at regular intervals

5) Traffic Safety

For prevention and traffic control system, related injuries and fatalities shall include the adoption of safety measures to protect of project workers and of road users. Adoption of best transport safety practices across all aspects of project operations with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public. Measures should include:

- Emphasise safety aspects among drivers
- Avoid dangerous routes and times of day to reduce the risk of accidents
- Use of speed control device (governors) on trucks and remote monitoring of driving actions
- Regular maintenance of vehicle
- Use of local sourced materials as possible as to minimize to transport distances

6) Transport of Hazardous Materials

General Hazardous Materials Transport

- Project should have procedures in place that ensure compliance with local laws and international requirements applicable to the transport of hazardous materials, including
- IATA requirements for air transport
- IMDG code sea transport
- UN Model Regulations of other international standards as well as local requirements for land transport

- Host-country commitments under the Basel Convention on the control of transboundary movements of Hazardous waste and their disposal and Rotterdam convention of the prior inform consent procedure for certain

The procedures for transportation of hazardous materials (Hazmats) will include:

- Proper labelling of containers, including the identify and quantity of the contents, hazards, and shipper contact information
- Provide a shipping document, which should establish a chain-of-custody using multiple signed copies to show that the waste was properly shipped, transported and received by the recycling or treatment/disposal facility.
- Ensure that the volume, nature, integrity and protection of packaging and containers used for transport are appropriate for the type and quantity of hazardous material and modes of transport involved
- Ensuring adequate transport vehicle specifications
- Provide the training employees involved in the transportation of hazardous materials regarding proper shipping procedures and emergency procedures
- Using labelling and placarding (external signs on transport vehicles) as required
- Providing the necessary means for emergency response on call 24 hours/day

8.6 Emergency Response Plan

8.6.1 Fire Emergency Response Plan

For fire safety plan in one of emergency plan of BASF Myanmar Limited that include team members, providing of firefighting training, installation of sufficient amount of fire extinguishers and firefighting system for the whole project site by following the instructions, techniques, and guidelines in concern with fire emergency matters of Myanmar Fire Services Department. Moreover, getting the fire safety approval for this factory and the smoking inside the building is strongly prohibited to avoid unwanted fire problems.

Figure 8. 2 Fire Safety Facilities at project site

In addition, fire safety is one of the most important factors that are necessary for chemical admixture production factory to minimize and avoid the loss of life and property. fire drill and fire hose reels, manual portable extinguishers also installed since the renovation/construction phase and gave guidance to workers about fire safety and the proper calculation of firefighting system, setting prevention measures, and implementing emergency response were also prepared according to their emergency response plan. At project site area, exist ways, emergency exits fire evacuation place also prepared in proposed factory and fire extinguishers, and firehouses sufficient water also performed at project site of BASF Myanmar Limited and seen in below figure (8.2) of fire safety plan. For firewater, water storage tanks have been built with a capacity of 70 m^3 (18492 gallons) capacity of water storage tank, the 22 number of fire extinguishers, 5 numbers of fire hydrants and already built within the factory compound.

8.6.2 Medical Emergency Response Plan

In chemical admixture production area, there is many risk related with occupation health and safety such as chemical hazards, electrical hazards etc. Therefore, BASF Myanmar have prepared RC-Code 3: Occupational Safety and RC-Code 4: Occupational Health for all employees working in this project before operation activities in which risk assessment for this project by using required appropriate design and technology and related PPE for working area. At project, first aid room will be provided for emergency accident of employee before deliver to hospital and emergency contact phone number can be seen in below.

Figure 8. 3 Personal Protective Equipment (PPE) Facilities for all employees

Nearby Hospitals for emergency health problem

1. PinLon Hospital
   No.9/1, Saya San Road, 27th Quarter, North Dagon Township
   Yangon- 11421
   Phone – 01-583089, 581616
2. East West Parami Hospital Private
   634/635, Khartawmi, St, Ward (36), North Dagon Township, Yangon
   Phone, 01- 580084, 01-584054

Figure 8. 4 Site Emergency Response Team

In addition, health insurance will also provide for all employees before start working and provide the BASF conduct chemical Health Risk Assessment (CHRA) for occupational safety of employees.

8.7 Natural and Non-natural Disasters Emergency Response Plan

According to the baseline data information of East Dagon (Myothit) township, project may suffer from flooding in raining season due to the nearest Nag Moe Yeik creek. In addition, fire hazards occurred in March 2017 in this Township, which has destroyed some houses but did not affect people.

For this chemical admixture production factory, chemical release may be caused directly or indirectly by a natural hazard such as flood. The release may be small or large from a ruptured storage tank. Large-scale releases are particularly likely from pipelines and at fixed chemical installations, where storage vessels and connecting pipes and flages can be damage by earthquakes and floods. All of emergency response plan for this project will be prepared and mitigate by using Responsible Care Management System of BASF global group. Moreover, all of staff with duties related to the management, operation and maintenance or production process and plan gave the required training listed in appendix (8).

8.8 Budget Estimation for EMP Plan

The following table shows the expenditures for the implementation of Environmental Management Plan for operation phase annually. It can change according to the situation and the below table (8.8) mentions the allocation of budget for mitigation measures and monitoring plan throughout the life cycle of 50 years.

Table 8. 8 Budget Estimation for EMP Implementation

No.	Item	Unit	Frequency/ times	Unit Cost (USD)	Cost (USD)
(A) Mitigation Measures					
1.	Maintenance Air pollution control system		annually	Lump sum	3,500
2.	Wastewater Treatment (sewage)		annually	Lump sum	5,000
3.	Purchase of Personal Protective Equipment (PPE)	Nos.	annually	Lump sum	4,000
4.	Medical Check-up and Health Insurances		annually	Lump sum	3,500
5.	Hazardous Disposal Cost		annually	Lump sum	3,500
7.	Emergency Preparedness for fire hazards				
8.	Fire Extinguishers			Lump sum	3,000
9.	PPE and First Aid Kits				
10.	Fire Alarm System				
11	Solid waste disposal (general)	Month	12	10	1,200
	Subtotal				**23,700**
(B) Monitoring					
1.	Air Quality	Year	2	1,000	2,000
2.	Noise Quality	Year	2	300	600
3.	Water Quality 1. Ground Water 2. Wastewater	Year	2	Lump sum	1,500
4.	Environmental Auditing	Year	1	1,500	1,500
	Subtotal				11,200
(C) Environmental Supervision and Advisors					
1.	HSE Coordinator	Month	12	3000	36,000
2.	HSE Assistant	Month	12	1200	14,400
	Subtotal				50,400
	Contingency				3000
Grand Total					88,300

8.9 Grievance Redress Mechanism

People who live in the project affected area or stakeholder can complain about the impacts that they suffer through Grievance Committee, which includes the responsible persons of BASF Myanmar Manufacturing Co., Ltd., ward administrator and representative of GAD of East Dagon Township. If there have no satisfaction in solving problem through the Grievance Committee level, it can be submitted to higher responsible authorities and finally decided by the court in legal terms. Figure (8.5) shows the steps of Grievance Redress Mechanism BASF Myanmar Co., Ltd.

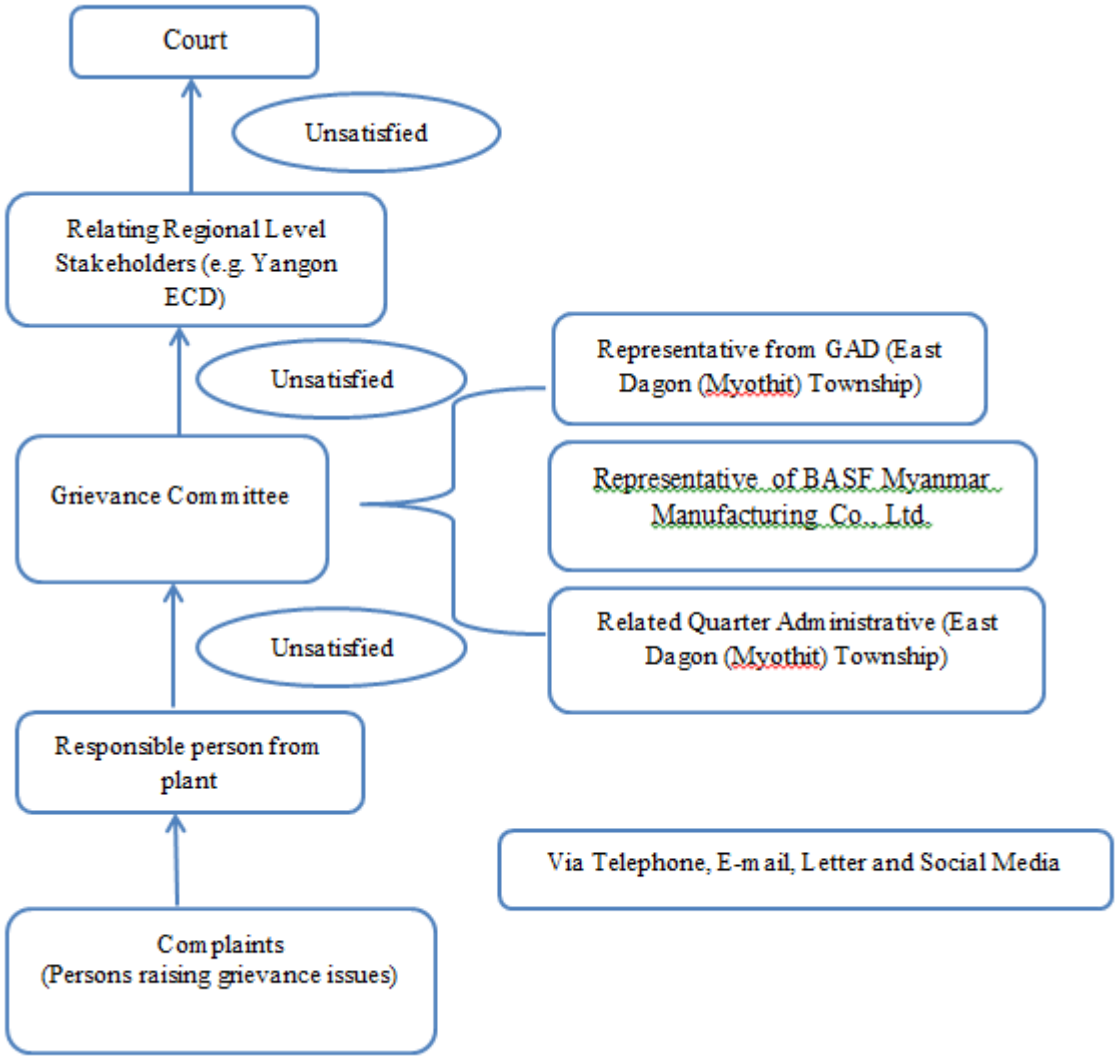

Figure 8. 5 Grievance Redress Mechanism

8.10 Corporate Social Responsibility (CSR) Plan

BASF Myanmar Limited has a plan to implement and use 1 % of the net profits of the company for Corporate Social Responsibility (CSR) for local community.

Table 8. 9 CSR Plan of BASF Myanmar Manufacturing Co., Ltd

Area	Priority Item	Detailed Targets
Compliance to law	CSR Procurement	• Sharing values regarding the promotion of CSR activities with business partners and avoiding procurement risks with key partners • Effect extensive compliance and adherence to laws and regulations with regard to procurement tasks • Continuous compliance to environmental regulations

9. PUBLIC CONSULTATION AND DISCLOSURE

9.1 Objectives of Public Consultation Meeting

The main objective of the Public Consultation Meeting is to incorporate the opinion and suggestions of the all stakeholders including but not limited to potential Project Affected Persons (PAPs), government officials, local communities, NGOs, and other interested persons in line with the Environmental Impact Assessment Procedure (2015). The key objectives of the SHM are as follows:

1) To disclose and inform well about the project information, potential positive and negative impacts due to project activities to the stakeholder in the earliest stage of the implementation of the project
2) To ensure that consultation meetings are undertaken in a meaningful, effective way by actively participation of PAPs, stakeholders and local communities
3) To ensure that the concerns of, and issues raised by the PAPs, stakeholders and local communities are incorporated and adequately addressed in the further ESIA study

9.2 Methodology and Approach

Public consultation and public disclosure is one of the important regulatory tools to ensure the inclusiveness, transparency, and accountability in the project implementation. As such, this is an integral part of the EIA activities. For a public consultation meeting of chemical admixture manufacturing project, following steps were taken;

1) Stakeholder identification

Stakeholder identification was conducted to identify key stakeholders with their respective roles and concerns and characteristics through the following two steps;

i) Prepare a draft potential stakeholders list based on the desktop reviews on existing project location, project type and nature, initial site visit and scoping stage stakeholder meeting outcome results
ii) Finalize and invite the key stakeholders list for consultation and information through internal communication between BASF Myanmar and EIA team

2) Establishment of public consultation meeting activities for identified stakeholders

i) Once key stakeholders such as government sector concerned with regional and township levels and local communities potentially affected person (PAPs) around the project site and other interested people were identified, engagement activities are attributed to each of the stakeholders tailored to the characteristics of each of the stakeholders, their level of interests and influence.

ii) The expected outcome of public consultation meeting is order to properly inform the affected local communities and other key stakeholders related with project in which its predicted positive and negative impacts, mitigation measures that are to be taken, to identify key stakeholders and to deliver the project information and effectively consult as part of the EIA of the project.

9.2 Summary of Consultations and Activities undertaken

The public consultation and information disclosure with the environmental and social impact results outcomes for this project was held on 11 April 2019 at Kanaung Hall, East Dagon Industrial Zone Management Committee Office, East Dagon (Myothit) township, Yangon Region. At meeting ceremony, attended stakeholders includes government officers, administrative, zone committee members, local people and other interested people were participated for this chemical admixture manufacturing project. In which, the presentation was given in Myanmar language and project proponent presented about the company profile, current project situation including the production process, type of products and environmental impact mitigation facilities for this project and future plan. In addition, EIA study part was presented by a responsible person of E Guard Environmental Service Co., Ltd. related with the environmental management plan, monitoring plan for this project and Public Consultation process were summarized in below Table 9.1

Table 9. 1 Summary of Public Consultation Meeting

Project Name	EIA study for Production and Distribution of Concrete Chemical Admixture Products by BASF Myanmar Manufacturing Co., Ltd.
Agenda	1. Opening Ceremony. 2. Opening Remark by U Myint Than, Secretary, of East Dagon Industrial Zone Management Committee Member 3. Presenting about project description and company profile including the their products and technical services by U Chan Tun Aung, Head of Business/ General Manager of BASF Myanmar Manufacturing Co., Ltd 4. Presenting about the Environmental Impact Assessment outcome report for this project by U Soe Min, Director of E Guard Environmental Services. 5. Question and Answer Session 6. Closing Remarks by U Chan Tun Aung, Head of Business/ General Manager of BASF Myanmar Manufacturing Co., Ltd.
Date	11 April, 2019
Time	9:30AM-12:00 PM
Venue	Kanaung Hall, East Dagon Industrial Zone Management Office, Kanaung Min Thar Kyi Road, East Dagon (myothit) Industrial Zone.
Attendees	6 persons of Government Organization 12 persons of Private Sectors 3 persons of Local People 3 persons of Industrial Zone Committee Members Total attendance – 24 people
Materials Provided	Agenda Explanation of Project Background, Objectives, and Company Profile Explanation of EIA report outcome including EIA process, expected potential positive and negatives impacts of the project, and Environmental Management Plan

	Power-Point presentation document on project briefing and environmental and social considerations

Source : EIA study team

9.3 Outcome of Public Consultation Meeting

The opinions and suggestions of all of the participants were showed in table 9.2 and presentation materials, handouts, attendees lists and newspaper announcement record are attached in appendix (13),(14) and (15).

Table 9. 2 Summary of Comments, Opinions, and Suggestion (EIA stage)

Questions by	Answers by
U Myint Than (Secretary of East Dagon Committee) Question: I have found that this public consultation is perfect and good for our community. I would like to know about the CSR plan how it will be benefit to our community and how to corporate by BASF Myanmar for CSR plan.	U Soe Min (Director, E Guard Environmental Services) He explained that 1% of CSR is mentioned in EMP section. If company will do CSR plan, we will put it on EIA report according to information provided by project proponent. U Chan Htun Aung (Head of Business/ General Manager, BASF Myanmar Manufacturing Co., Ltd.) He explained that since our company is foreign company, we do not have to contribute by cash for CSR according to our policy. However, we will do the implementation of CSR program for our project. According to our responsibility to contribute in CSR, we will do whatever for our environment with the equivalence amount of cash. Moreover, we prepared the drainage facilities around the project area site and performed to be good road transportation surrounding for our industrial zone.
U Kyaw Kyaw (Assistant Director, Environmental Conservation Department, Yangon) I have nothing special to say for today Public Consultation meeting. I found that the presentation of EIA section, it is systematically predicted for the impacts on environmental and social environment for this project. In the emergency respond plan, I found that it is planned for fire hazards and earthquake. At first, I haven't recognized well. For example, if earthquake is occurred in this region, how to do and how to draw for emergency plan. But another pages, I found that there is not the matter because the buildings and offices in the factory were built as one story. Therefore, I believe that	Answer: U Chan Htun Aung (Head of Business/ General Manager, BASF Myanmar Manufacturing Co., Ltd.) As for our company, we may not do alone ourselves for environmental monitoring. So, we will consult with third party (Environmental Company) and we will do, follow up according to the Environmental Management Plans and submit the monitoring report to Environmental Conservation Department.

Questions by	Answers by
this project was prepared enough studies thoroughly and planned and assessed for the impacts. And I believe that suitable monitoring plan will be described in the report.	
Question: Daw Shwe Zin Thet (Engineer) I came to here that I want to know the products of BASF Myanmar. I don't found presenting about the detail description of products in the presentation. I would like to give a suggestion that to invite the customers related with company's products and should present about the products. I believe that they can buy easily and they can find their needs and advertise to the attendees for products.	Answers: U Chan Htun Aung (Head of Business/ General Manager, BASF Myanmar Manufacturing Co., Ltd.) At first, I thought about that. But today ceremony is about EIA report preparation for our project to disclose the information of environmental and socials assessment outcome to concern with all of participants. Therefore, BASF Myanmar will give the products presentation in our seminar about the products and I would like to invite all of you to join this seminar.

After finished succefully the meeting, closing remarked was given by U Chan Htun Aung, Head of Business/General Manager, BASF Myanmar Manufacturing Co., Ltd. In which, BASF Myanmar also committed that to follow up the all of suggestion and comments of participants and to improve for their project of production and distribution of chemical admixture production by socially, economically, and environmentally.

9.4 Photo Record of Public Consultation Meeting (EIA) stage

The meeting photo records of EIA stage for BASF Myanmar Chemical admixture manufacturing project are showed in table.

	
Attendee Registration	Attendee Registration

Attendee Registration

Attendee Registration

Opening Speech by U Myint Than (Secretary)

Presented by U Chan Htun Aung (Head of Business/ General Manager, BASF Myanmar)

Presented by U Soe Min (Director, E Guard Environmental Services)

Question by U Myint Than (Secretary of East Dagon Committee)

Opinions and suggestion by U Kyaw Kyaw (Assistant Director, Environmental Conservation Department, Yangon)

Answered by U Soe Min
(Director, E Guard Environmental Services)

Answer by U Chan Htun Aung

Discussion and Suggestion

Suggestions by Daw Shwe Zin Thet (Engineer)

Closing Words by U Chan Htun Aung

9.5 Further Disclosure

This EIA report will be accessible to public and stakeholders via the link of http://www.mediafire.com/folder/52op3cydjzaap/BASF%20Myanmar.

10. CONCLUSIONS AND RECOMMENDATIONS

The EIA study for chemical admixture project is based on the scoping report, initial environmental survey, onsite environmental and social baseline data survey, and stakeholder meeting with main stakeholders (Government, Industrial Zone Committee, Local Community, and Other Interested Parties.

Environmental and social studies were carried out at BASF's chemical admixture production factory site and surrounding area to establish the baseline before the project operation phase. Moreover, the significant potential impacts of the project activities were assessed by formulating of Environmental Management Plan.

Baseline Data for Physical Resource

The existing environmental conditions had been identified through onsite survey and literature review. Existing air quality of surrounding area was also identified by categorizing two types, dust level (particulate matter) and gases concentrations (SO_2, CO, CO_2, NO_2) for the ambient air quality. The observed values of existing ambient and indoor air quality of project site were within the acceptable limit of National Environmental Quality (Emission) Guideline. The noise level of project measured at project site, average result is 62.27 dB and it is the acceptable limit of National Environmental Quality (Emission) Guideline. The results of water quality and soil quality are showed in table (5.13), (5.14) and (5.15) respectively. Although the most observed water quality parameters of ground water meet the WHO standards, some of the parameter such as pH, Turbidity, and Iron are slightly out of the range. In addition, storm water results were within the limit of NEQ (Emission) Guideline. The surrounding area of project site is located at industrialized area and there are no environmentally or ecologically sensitive areas.

Socio-Economic Study

Regarding the social issue, resettlement is unnecessary for this project. Socio-economic survey was carried out, and the survey results shows that there were no significant negative impact on social environment. Regarding to the answers of the respondents, most are expecting the employment opportunities for their family members and friends from the project. They expect to prepare good drainages to control flooding during rainy season and water pollution. In addition, they all believed that there would be no impact on health. The survey results revealed that 70% of the total respondents have their positive opinions on the proposed project.

Significant Impacts

For the project implementation, all potential environmental impacts have been envisaged. The proposed chemical admixture-manufacturing project of BASF Myanmar Co., Ltd. may have no significant impact on local air quality, receiving water bodies, and no impact on noise to local community and surrounding environment of the project site. These impacts are predicted to be localized, short-term, and reversible with implementation of appropriate mitigation measures by undertaking regular environmental monitoring plan.

For operation phase, proposed BASF Myanmar has already prepared environmental pollution control technology for operation of plant. Although there is no emission from the

manufacturing process, there would be ventilation system for fugitive emission control from the raw material mixing stage and vehicle periodically.

Precautions will be taken to the ambient air quality monitoring of the surrounding area for long-term operation. There are no industrial effluents as per the water reuse system in which the discharged wastewater from the production process will be collected from the designated IBC tanks and reuse as raw water for next batch. However, there would be proper monitoring of effluent water quality and storm-water runoff quality before discharging into the public drainage to comply with the NEQ standards. It will be carried out regularly as per the monitoring plan in the EMP of operation phase. For the generated hazardous waste from industrial process, it will send to Dowa waste disposal service provider. Fire hazards and fire safety is taken as the most important factors that are necessary for proposed chemical admixture production factory, which is located adjacent to the gas pipeline. Emergency response plan and procedures for proposed project have been prepared by BASF Myanmar to cover events due to the operational failures and accidents. In this emergency response plan is designed to protect employees during emergencies, including fires, chemical spillages, natural disasters etc.

In conclusion, public consultation meeting with key stakeholders of government sector, local community and other interested person for chemical admixture plant of BASF Myanmar successfully was successfully held on 11 April 2019 at Kanaung Hall, East Dagon (Myothit) Industrial Zone Management Committee Office, and Yangon Region. It can be assumed that the meeting outcome is positive and mainly discussed comments are about CSR plan, emergency response plan, and company's products information.

Recommendations

The following recommendations for efficient and effective implementation of environmental conservation, health and safety and social responsibilities through the lifespan of the proposed project are shown in below;

- ✓ Follow the comments and suggestions given by ECD after reviewing this EIA report.
- ✓ Once concerned authorities approve EMP, strict implementation is essential.
- ✓ For full and proper implementation of EMP, well understanding and supports by proponent and authority is deem necessity.
- ✓ Daily, monthly and annual action plans have to be formulated based on this EMP and practiced at operation level. Budget and human resources are important for the implementation of EMP.
- ✓ Necessary care and environmentally sound practices have to be taken for activities out of the factory site particularly on raw materials collection and transport.
- ✓ Keep full records and document all environmental management activities done. Establishment of EMS system in compliances with the EMP is beneficial for the organization.
- ✓ Follow the comments given by ECD and correct the system as necessary before the next bi-annual report submission.

It is obvious that the proposed chemical admixture production project is important for economic development of the area and has balanced environmental and social considerations. BASF will adhere to the various legislations throughout the project cycle, in addition to carrying out timely audits to address any unforeseen impacts. Given the project scale and beneficial nature of this Project, the overall environmental impact is considered acceptable.

REFERENCES

1. Environmental, Health, and Safety (EHS) Guidelines General EHS Guidelines: Environmental Hazardous Materials Management, 2007
2. Environmental, Health, and Safety (EHS) Guidelines General EHS Guidelines: Environmental Water Conservation, 2007
3. Environmental, Health, and Safety (EHS) Guidelines General EHS Guidelines: Environmental Energy Conservation, 2007
4. Environmental, Health, and Safety (EHS) Guidelines General EHS Guidelines: Environmental Community Health and Safety Conservation, 2007
5. Environmental Impact Assessment Guideline (2014)
6. Environmental Impact Assessment Procedure (2015)
7. East Dagon (myothi) Township Data (2017)
8. Environmental Impact Assessment (EIA) report for Myanmar-Korea Friendship Bridge (Dala) Construction project, 2017
9. IFC International Finance Corporation, Environment, Health and Safety Guidelines, Construction and Decommissioning, World Bank group, 2007
10. IFC International Finance Corporation, Environment, Health and Safety Guideline, Occupational Health and Safety, World Bank group, 2007
11. Lwin, A., & Khaing, M. M. (2012). Yangon River Geomorphology Identification And Its Enviromental Imapacts Analsysi By Optical And Radar Sensing Techniques. *ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, XXXIX-B8*, 175-179. doi:10.5194/isprsarchives-xxxix-b8-175-2012
12. National Environmental Quality (Emission) Guideline (2015)
13. MIC project proposal for construction chemical manufacturing project, BASF Myanmar Co.,Ltd. company limited, 2017
14. https://www.basf.com/
15. https://www.basf.com/cn/en/company/news-and-media/news-releases/asia-pacific/2018/05/myanmar_plant_opening.html
16. https://www.wunderground.com/global/BM.html

Appendix

Appendix 1: ECD Comment Letter for Chemical Admixture Manufacturing Project

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်
မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင်
အမှတ်(၁)၊ သစ္စာလမ်း၊ ရန်ကင်းမြို့နယ်၊ ရန်ကုန်မြို့

☎ - ၀၁-၆၅၈၁၂၈ စာအမှတ်၊မရက- ၃/ခ-၀၀၄/၂၀၁၇(၀၁၉)

🖷 - ၀၁-၆၅၈၁၄၁ ရက်စွဲ၊ ၂၀၁၇ ခုနှစ် ဩဂုတ်လ ၂၉ ရက်

အကြောင်းအရာ။ **ရင်းနှီးမြှုပ်နှံမှု ဌာနဆိုင်ရာ ပူးပေါင်းလုပ်ငန်းအဖွဲ့၏ သဘောထားမှတ်ချက်နှင့်အညီ လိုက်နာဆောင်ရွက်ရန် ကိစ္စ**

ရည်ညွှန်းချက်။ ရင်းနှီးမြှုပ်နှံမှု ဌာနဆိုင်ရာ ပူးပေါင်းလုပ်ငန်းအဖွဲ့၏ ၂၀၁၇ ခုနှစ် ဩဂုတ်လ ၂၃ ရက် နေ့စွဲပါ စာအမှတ် ၀၀၁/MIC(OSS)/၀၁(၁၅၈/၁၇)

၁။ စင်ကာပူသမ္မတနိုင်ငံရှိ BASF South East Asia Pte. Ltd. မှ ၉၉.၉၀% နှင့် ထိုင်းနိုင်ငံရှိ BASF (Thai) Ltd. မှ ၀.၁% ထည့်ဝင်၍ မြန်မာနိုင်ငံတွင် ရာခိုင်နှုန်းပြည့် နိုင်ငံခြား ရင်းနှီးမြှုပ်နှံမှုဖြင့် BASF Myanmar Manufacturing Company Limited တည်ထောင်ကာ မြေကွက် အမှတ်-၁၅၉၊ မြေတိုင်းရပ်ကွက်အမှတ် ၁၁၃၊ စက်မှုဇုန်၊ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ ရန်ကုန်တိုင်း ဒေသကြီး၊ မြေဧရိယာ ၁.၅၀၅ ဧက (၆,၀၉၀.၅၂၅ စတုရန်း မီတာ) ရှိ မြေနှင့် အဆောက်အဦအား ငှားရမ်း၍ ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ဓာတုပစ္စည်းများ ထုတ်လုပ်ရောင်းချခြင်း လုပ်ငန်းအားကို မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှု ဥပဒေနှင့်အညီ ဆောင်ရွက်ခွင့်ပြုပါရန် မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှု ကော်မရှင်သို့ အဆိုပြုတင်ပြလာခြင်းအပေါ် ရင်းနှီးမြှုပ်နှံမှုဌာန ဆိုင်ရာ ပူးပေါင်းလုပ်ငန်းအဖွဲ့မှ အောက်ပါအတိုင်း ဆောင်ရွက်ရန် လိုအပ်မည်ဖြစ်ကြောင်း ရည်ညွှန်းပါ စာဖြင့် သဘောထားမှတ်ချက် ပြန်ကြားထား ပါသည်-

(က) အဆိုပြုလုပ်ငန်းများကြောင့် ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်၊ လူမှုရေးနှင့် ကျန်းမာရေး ထိခိုက်ပျက်စီးမှုများကို လျော့နည်းစေရန်အတွက် လုပ်ငန်းဆိုင်ရာ အချက်အလက်များကို ပြည့်စုံစွာဖော်ပြပြီး လုပ်ငန်းဆောင်ရွက်ရာတွင် ပတ်ဝန်းကျင်ထိခိုက်မှု အနည်းဆုံးဖြစ်စေ မည့်နည်းစနစ်များအား အသုံးပြုရန်နှင့် အဆိုပြုလွှာတွင် ဖော်ပြထားသည့် လူမှုရေးဆိုင်ရာ တာဝန်ခံဆောင်ရွက်မှု (Corporate Social Responsibility-CSR) အတွက် အသားတင် အမြတ်ငွေ၏ ၁% ကိုအသုံးပြုခြင်းအပါအဝင် ဆောင်ရွက်ပေးသွားမည့် ကတိကဝတ်များကို တိတိကျကျလိုက်နာ အကောင်အထည်ဖော်ဆောင်ရွက်ရန်။

(ခ) အဆိုပြုလုပ်ငန်း နှင့်စပ်လျဉ်း၍ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA)ကို ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၄၉၊ ၆၃ နှင့်အညီ ဆောင်ရွက်ရန်။

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(ဂ) ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၄၅၊ ၄၆ တို့အရ စီမံကိန်းအဆိုပြုသူသည် ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်းလုပ်ငန်း (Environmental Impact Assessment-EIA)မစတင်မီအဆိုပါ လုပ်ငန်းကို ဆောင်ရွက်မည့်တတိယပုဂ္ဂိုလ်(သို့မဟုတ်)အဖွဲ့အစည်းနှင့်စပ်လျဉ်း၍ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေး ဝန်ကြီးဌာန၏ ဆုံးဖြတ်ချက်ရယူရန်။

(ဃ) ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ် ၄၇ မှ အပိုဒ် ၅၄ ထိ ဖော်ပြချက်အရ စီမံကိန်းအဆိုပြုသူသည် နယ်ပယ် အတိုင်းအတာ သတ်မှတ်ခြင်း အစီရင်ခံစာနှင့် ဆောင်ရွက်မည့် လုပ်ငန်းတာဝန်များကို လမ်းညွှန်ချက်များနှင့် အညီ လေ့လာဆန်းစစ် ပြုစု၍ ပတ်ဝန်းကျင် ထိန်းသိမ်း ရေး ဦးစီးဌာန၊ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ တင်ပြ အတည်ပြုချက် ရယူရန်။

(င) အတည်ပြုပြီးသော နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်း အစီရင်ခံစာပါ အချက်များ အပေါ် အခြေခံ၍ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း အပိုဒ်၆၃ပါ အချက်များနှင့်အညီ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း အစီရင်ခံစာ (EIA) ကို ဆောင်ရွက်ပြီး သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာနသို့ ရေးဆွဲ တင်ပြရန်။

(စ) အထက်ပါ လေ့လာ ဆန်းစစ်မှု ရလဒ်များကို အခြေခံ၍ ပတ်ဝန်းကျင်နှင့် လူမှုရေးထိခိုက်မှု မဖြစ်ပေါ်စေရေး (သို့မဟုတ်) ထိခိုက်မှုအနည်းဆုံးဖြစ်စေသည့် လုပ်ငန်းဆောင်ရွက်မည့် အစီအစဉ် စွန့်ပစ်ပစ္စည်း/ စွန့်ပစ်အရည် စီမံခန့်ခွဲမှု အစီအစဉ်၊ စောင့်ကြပ်ကြည့်ရှုစစ်ဆေးမည့် အစီအစဉ်၊ ပတ်ဝန်းကျင် ထိခိုက်မှု လျော့ပါးစေရေး ဆောင်ရွက်မည့် လုပ်ငန်းများအတွက် သုံးစွဲမည့် ရန်ပုံငွေ စသည်တို့ ပါဝင်သည့် ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှုအစီအစဉ် (Environmental Management Plan-EMP) ကို ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း ဆိုင်ရာ လုပ်ထုံးလုပ်နည်းပါ အချက်အလက်များနှင့်အညီ ရေးဆွဲတင်ပြရန်နှင့် စီမံချက်ပါ အတိုင်း အကောင်အထည်ဖော်ဆောင်ရွက်ရန်။

(ဆ) ပြဋ္ဌာန်းထုတ်ပြန်ထားပြီးဖြစ်သော ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ၊ ြနည်းဥပဒေ၊ ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၊ အမျိုးသား ပတ်ဝန်းကျင် ဆိုင်ရာအရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များတွင် ဖော်ပြပါရှိသည့် လိုက်နာ ဆောင်ရွက်ရမည့်အချက်များ၊ လုပ်ထုံးလုပ်နည်းများ၊

BASF Forestry Reply Inv-2

လမ်းညွှန်ချက်များနှင့်အညီ လိုက်နာ ဆောင်ရွက်ရန်နှင့် တင်ပြရမည့် အစီအစဉ်အလိုက် လိုအပ်သည့်ပုံစံများ ဖြည့်စွက်၍ တစ်ပါတည်း တင်ပြရန်။

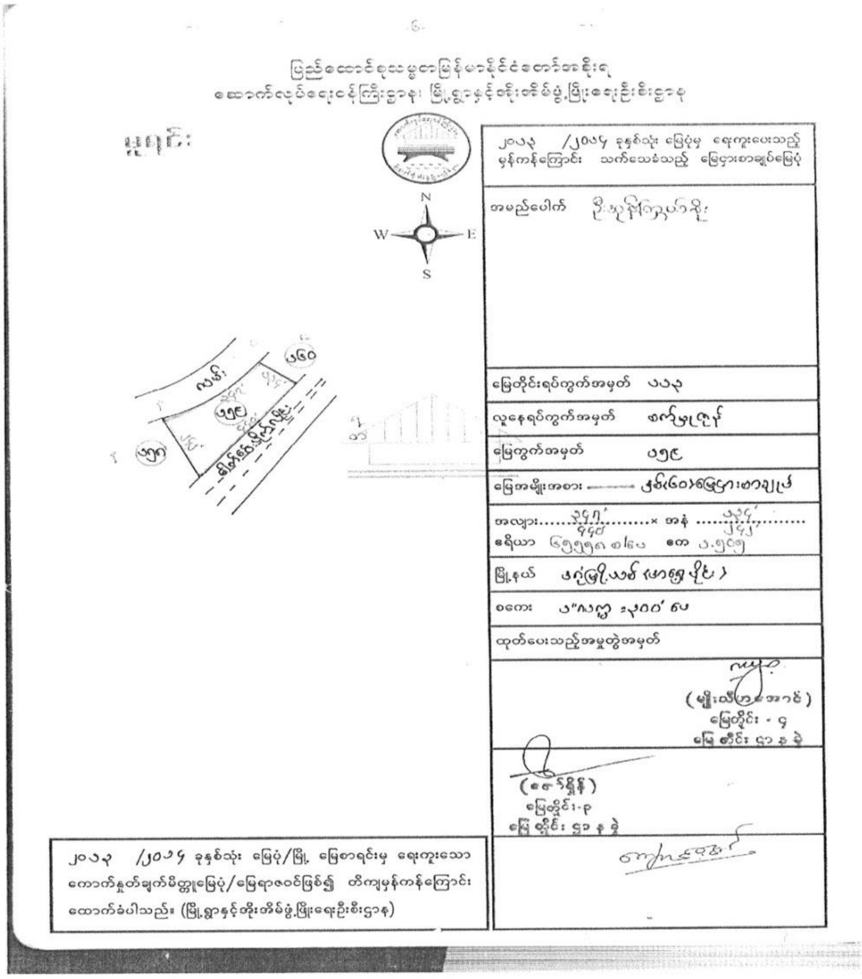
၂။ သို့ဖြစ်ပါ၍ သယံဇာတနှင့် သဘာဝပတ်ဝန်းကျင် ထိန်းသိမ်းရေးဝန်ကြီးဌာန၊ ရင်းနှီးမြှုပ်နှံမှု ဌာနဆိုင်ရာ ပူးပေါင်းလုပ်ငန်းအဖွဲ့၏ သဘောထားမှတ်ချက်ကို သိရှိ လိုက်နာ ဆောင်ရွက် နိုင်ပါရန်နှင့် **ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း** (Environmental Impact Assessment-EIA)နှင့် **ပတ်ဝန်းကျင် စီမံခန့်ခွဲမှု** အစီအစဉ် (Environmental Management Plan-EMP)အစီရင်ခံစာတို့ကို သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာနသို့ ပေးပို့ရန် အကြောင်းကြားပါသည်။

အတွင်းရေးမှူး (ကိုယ်စား)
(ဆန်းမြင့်၊ ဒုတိယညွှန်ကြားရေးမှူးချုပ်)

BASF Myanmar Manufacturing Company Limited
မြေကွက် အမှတ်-၁၅၉၊ မြေတိုင်းရပ်ကွက်အမှတ် ၁၁၃၊
စက်မှုဇုန်၊ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ ရန်ကုန်တိုင်း ဒေသကြီး

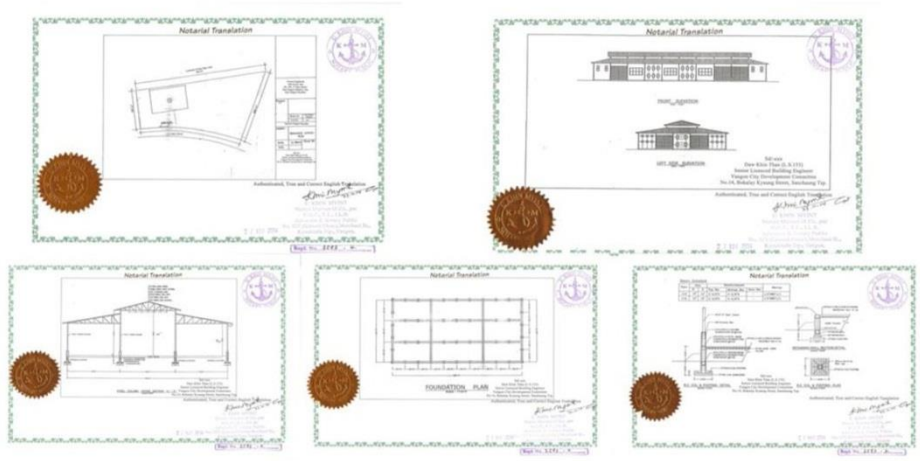
မိတ္တူကို
ရုံးလက်ခံ/ မျှောစာတွဲ

Appendix 2: Land Ownership Documents and Project Site Conditon



Appendix 3: Land Permission for BASF project site

APPENDIX C
Details of the Premises

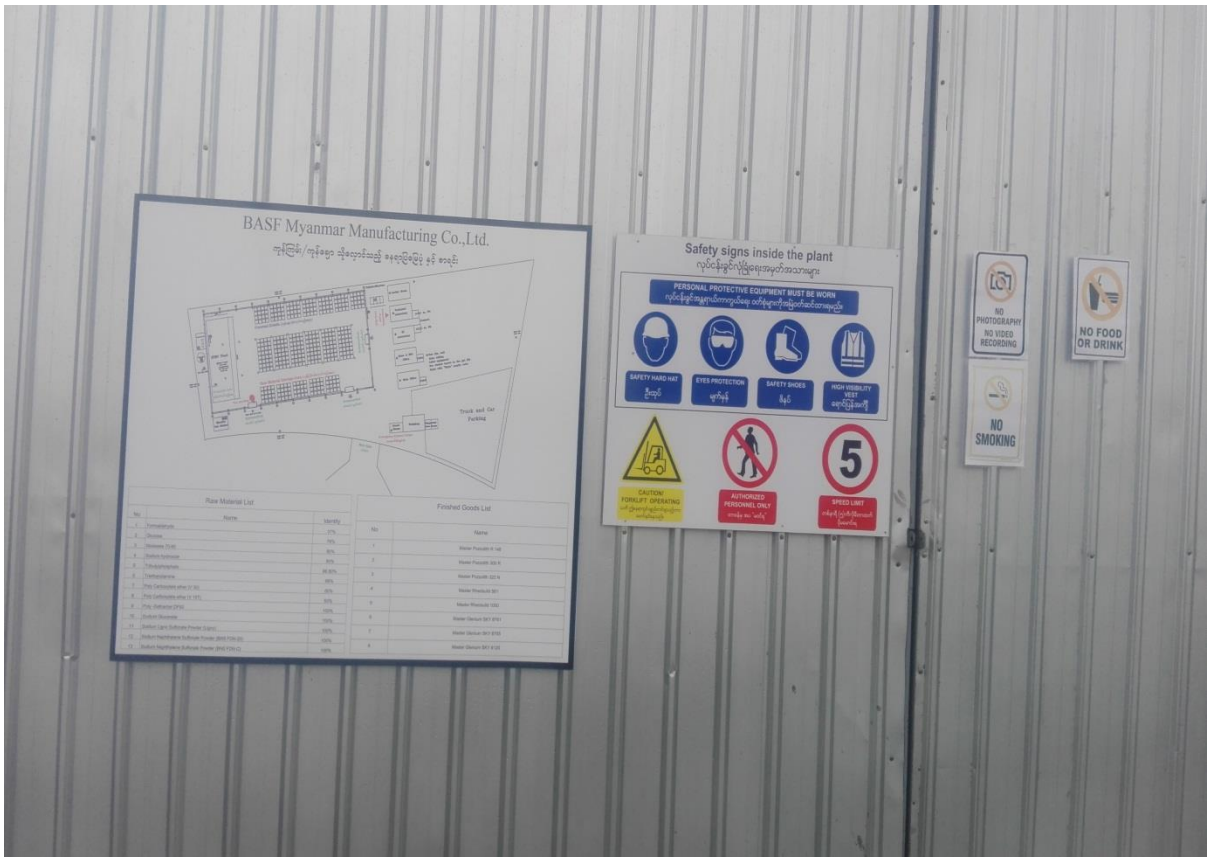


1. **Fencing and Gate**
   Painted brick walls fencing for minimum height of 2 m; including security barb wires on all four sides.

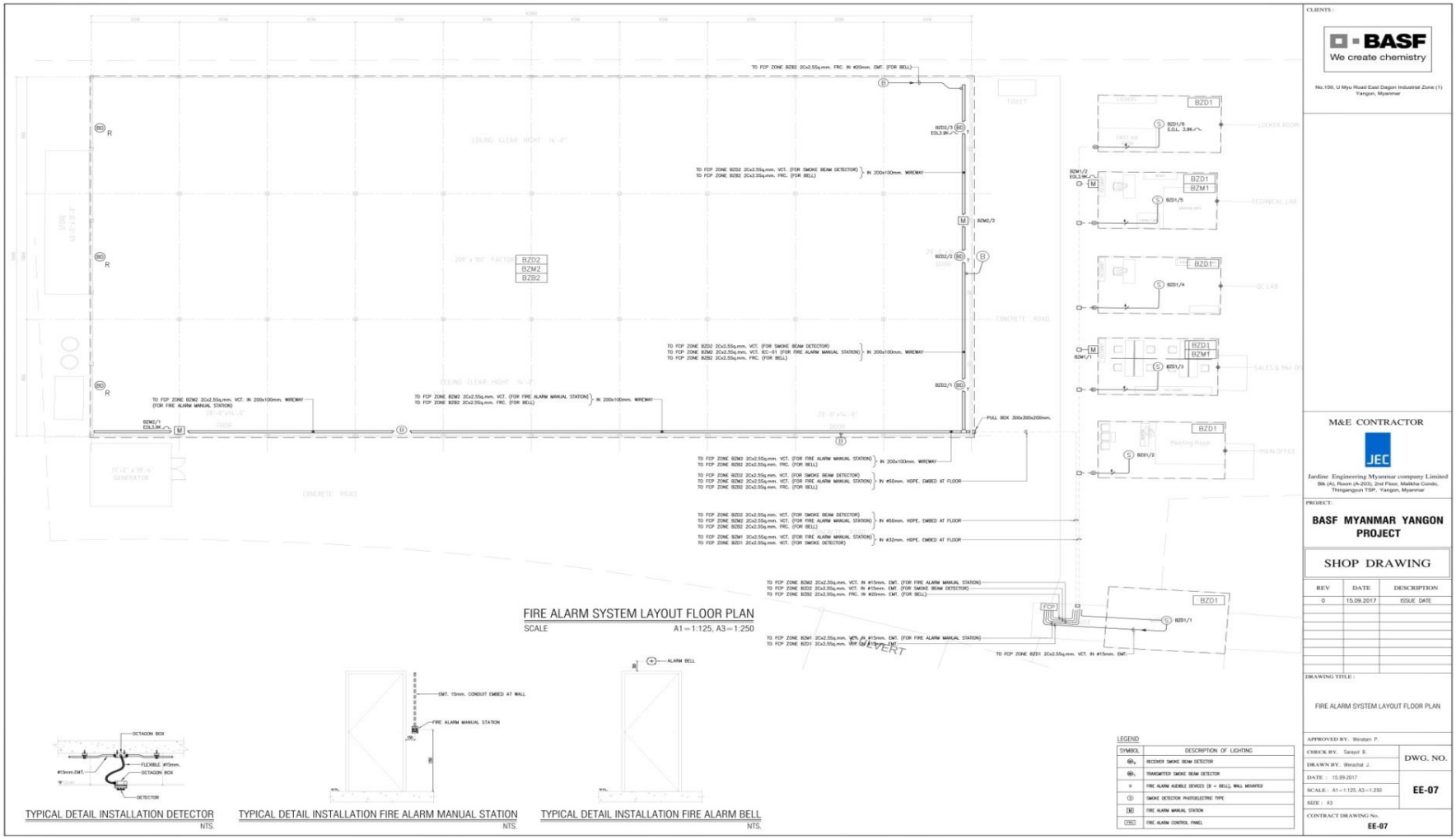
2. **External Walkway**
   Concreted external walkway on two sides of the factory.
   New Foundation at East End for :
   (A) 4.5m X 4.5m X 0.2m - for water storage tank capacity for 30 m3 @ 7 Ton/m2.
   (B) 4.5m X 4.5m X 0.2m for compressor and water pumps.

3. **Roof, Gutter and rain water drain pipe**.

Appendix 4: Project site layout map for Factory Building & Product Ware House

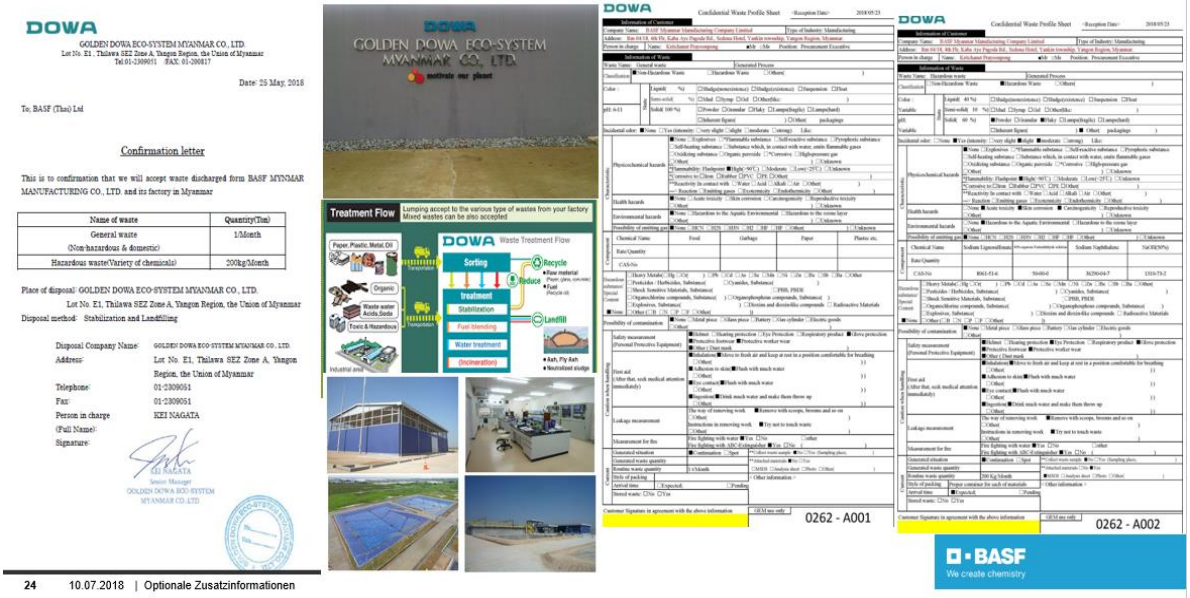


Appendix 5: Fire Alarm System Floor Plan

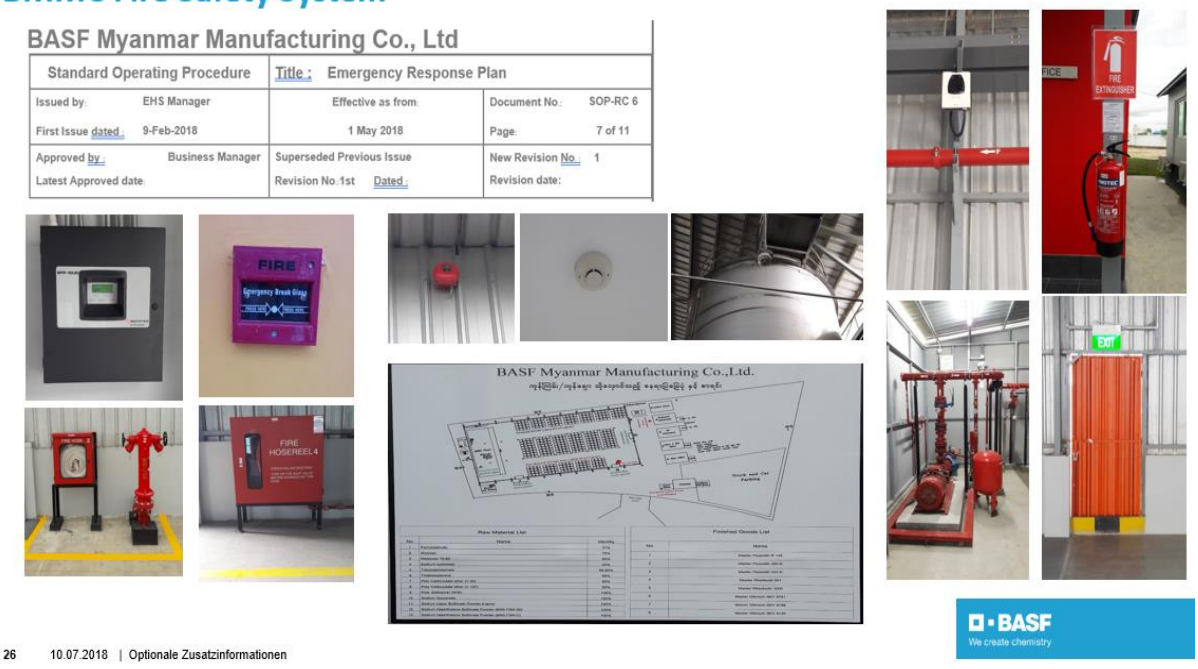


Appendix 6: Engaed Recodrd for Waste Disposal Management and Fire Safety System

External Service Provider Engaged For Waste Disposal Management



BMMC Fire Safety System



Appendix 7: Certificate for project site from Fire Services Department

ပြည်ထောင်စုသမ္မတမြန်မာနိုင်ငံတော်

ပြည်ထဲရေးဝန်ကြီးဌာန

မီးသတ်ဦးစီးဌာန

မီးဘေးလုံခြုံရေးစစ်ဆေးထောက်ခံချက်

အမှတ်စဉ်(၁၉၅၅)

ရက်စွဲ၊ ၂၀၁၈ခုနှစ်၊ ဖေဖော်ဝါရီလ ၂၇ ရက်

၁။ ရန်ကုန်-တိုင်းဒေသကြီး/ပြည်နယ်၊ ဒဂုံမြို့သစ်(အရှေ့ပိုင်း) မြို့နယ်၊ ဒဂုံအရှေ့စက်မှုဇုန် ရပ်ကွက်/ကျေးရွာ၊ -----လမ်း၊အမှတ် (၁၅၉) ရှိပိုင်ရှင်ဦး/ဒေါ်ဦးအုန်းကျော်စိုး(BSAF Myanmar Manufacturing Co.,Ltd)

၂။ သို့လောင်ရုံ+ရုံးခန်း အဆောက်အဦအတွက် ဤဌာနမှ သတ်မှတ်ပေးထားသည့် မီးဘေးလုံခြုံရေးဆိုင်ရာပြဌာန်းချက်များအား(၆-၄-၂၀၁၈)ရက်နေ့တွင် ကွင်းဆင်းစစ်ဆေးသည့်အခါပြည့်စုံစွာဆောင်ရွက်ထားကြောင်းစစ်ဆေး တွေ့ရှိရသည်။

၂။ ဤထောက်ခံချက်သည် စစ်ဆေးသည့်နေ့မှစ၍ (၃)နှစ်အထိသာ အကျုံးဝင်သည်။

၃။ ထို့ပြင် မီးသတ်ဦးစီးဌာနမှ အခါအားလျော်စွာ ထပ်မံစစ်ဆေးချိန်တွင် မီးဘေးလုံခြုံရေးဆိုင်ရာ ပြဌာန်းချက်များကို လိုက်နာဆောင်ရွက်ခြင်းမရှိပါက ဤထောက်ခံချက်ကို ပြန်လည်ရုတ်သိမ်းသွားမည်ဖြစ်ပြီး အဆောက်အဦအား အသုံးပြုသူ(သို့မဟုတ်)ပိုင်ရှင်သည် မြန်မာနိုင်ငံမီးသတ်တပ်ဖွဲ့ ဥပဒေအရ အရေးယူခြင်းခံရမည်။

မှတ်ချက်။ ဤထောက်ခံချက်အား လွဲပြောင်းသုံးစွဲခြင်းမပြုရ။ အဆောက်အဦအား မူလရည်ရွယ်ချက်မှ ပြောင်းလဲအသုံးပြုပါက ထောက်ခံချက်အသစ် ထပ်မံလျှောက်ထားရမည်။

ညွှန်ကြားရေးမှူးချုပ်(ကိုယ်စား)

(ကျော်သူရ၊ ညွှန်ကြားရေးမှူး)

Appendix 8: Internal Safety Training Record for all of employees

BASF Myanmar Manufacturing Co., Ltd

is hereby certifies that

Mr. Myo Myint Aye

has participated in and successfully passed the internal safety training held in BASF Myanmar Manufacturing site in the below modules:

- **Chemical Safety.**
- **Emergency Response for hazardous chemicals.**
- **Use of personal protective equipment (PPE).**
- **Transport and Distribution Safety.**
- **Safe Operation Procedures.**

Completion date: 9 May 2018

Trainer:

- Triphat Prakhenri – Operation Manager
- Nguyen Bui – EHS Manager

This certificate is made in compliance with EHS Policy and the standards described in BASF Responsible Care Management System.

Approved by:

Mr. Triphat Prakhenri
Operation Manager

Mr. Nguyen Bui
EHS Manager

Acknowledged by:

Mr. Myo Myint Aye
Date: 9 May 2018

BASF
We create chemistry

Appendix 9: Ground Water Quality Results

SUPREME GROUP OF COMPANIES

SUPREME WATER DOCTOR COMPANY

No.19-C, Nawaday Garden, Yangon-Pathein Road,
Hlaing Tharyar Township, Yangon, Republic of the Union of Myanmar
Tel : 01-689376, 689377, 689378, 689718, 689719. Fax : 01-685237

WATER ANALYSIS RESULT

Result Form No. 0594/ PED / SWDC / 18
Client BASF Myanmar Manufacturing
Location အရှေ့ဒဂုံစက်မှုဇုန်
Nature of Water Ground Water
Date of Sample Received 10.7.2018
Tested on 10.7.2018

	UNIT	ANALYSIS RESULT	WHO GUIDELINE
Cadmium	mg/L	0.043	0.003
Sulfate	mg/L	11	250

Remark :

Approved By

Tin Moh Moh Hlaing
M.Sc (Chem:), M.S (Biotech:)
Head of R&D Dept;
Supreme Water Doctor Group
Supreme Group of Companies

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2008 Cert. No.688283

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

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WATER QUALITY TEST RESULTS FORM

Client	BASF Myanmar Manufacturing Co.,Ltd.
Nature of Water	Ground Water
Location	East Dagon Industrial Zone(1), East Dagon Township.
Date and Time of collection	10.7.2018
Date and Time of arrival at Laboratory	10.7.2018
Date and Time of commencing examination	11.7.2018
Date and Time of completing	13.7.2018

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH	8.4		6.5 - 8.5
Colour (True)		TCU	15 TCU
Turbidity	8	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness	100	mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron	0.35	mg/l	0.3 mg/l
Chloride (as CL)	64	mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	10	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese	Nil	mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

W0718 193

WATER QUALITY TEST RESULTS FORM

Client	BASF Myanmar Manufacturing Co.,Ltd.
Nature of Water	Ground Water
Location	East Dagon Industrial Zone (1), East Dagon Township.
Date and Time of collection	10.7.2018
Date and Time of arrival at Laboratory	10.7.2018
Date and Time of commencing examination	11.7.2018
Date and Time of completing	16.7.2018

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)	Nil	mg/l	0.01 mg/l
Arsenic (As)	Nil	mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)		mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)		mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)	Nil	mg/l	3 mg/l
Copper (Cu)	Nil	mg/l	2 mg/l
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by

Signature:

Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:

Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)
No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

Appendix 10: Surface Water Quality Results

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2008 Cert. No.688283

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 2 of 2

WW0718 034

WATER QUALITY TEST RESULTS FORM

Client	BASF Myanmar Manufacturing Co.,Ltd.
Nature of Water	Surface Water (Public Drainning)
Location	East Dagon Industrial Zone (1), East Dagon Township.
Date and Time of collection	10.7.2018
Date and Time of arrival at Laboratory	10.7.2018
Date and Time of commencing examination	11.7.2018
Date and Time of completing	16.7.2018

Results of Water Analysis

			WHO Drinking Water Guideline (Geneva - 1993)
Temperature (°C)		°C	
Fluoride (F)		mg/l	1.5 mg/l
Lead (as Pb)		mg/l	0.01 mg/l
Arsenic (As)		mg/l	0.01 mg/l
Nitrate ($N.NO_3$)		mg/l	50 mg/l
Chlorine (Residual)		mg/l	
Ammonia (NH_3)		mg/l	
Ammonium (NH_4)		mg/l	
Dissolved Oxygen (DO)		mg/l	
Chemical Oxygen Demand (COD)	64	mg/l	
Biochemical Oxygen Demand (BOD) (5 days at 20 °C)	18	mg/l	
Cyanide (CN)		mg/l	0.07 mg/l
Zinc (Zn)		mg/l	3 mg/l
Copper (Cu)		mg/l	2 mg/l
Silica (Si)		mg/l	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)
No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
Ph: 01-640955, 09-73225175, 09-73242162, Fax: 01-644506, E-mail: isotechlaboratory@gmail.com, Website: weg-myanmar.com

ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

ISO 9001:2008 Cert. No.688283

WTL-RE-001
Issue Date - 01-12-2012
Effective Date - 01-12-2012
Issue No - 1.0/Page 1 of 2

WW0718 034

WATER QUALITY TEST RESULTS FORM

Client	BASF Myanmar Manufacturing Co.,Ltd.
Nature of Water	Surface Water (Public Drainning)
Location	East Dagon Industrial Zone (1), East Dagon Township.
Date and Time of collection	10.7.2018
Date and Time of arrival at Laboratory	10.7.2018
Date and Time of commencing examination	11.7.2018
Date and Time of completing	16.7.2018

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
pH			6.5 - 8.5
Colour (True)	110	TCU	15 TCU
Turbidity	102	NTU	5 NTU
Conductivity		micro S/cm	
Total Hardness		mg/l as $CaCO_3$	500 mg/l as $CaCO_3$
Calcium Hardness		mg/l as $CaCO_3$	
Magnesium Hardness		mg/l as $CaCO_3$	
Total Alkalinity		mg/l as $CaCO_3$	
Phenolphthalein Alkalinity		mg/l as $CaCO_3$	
Carbonate ($CaCO_3$)		mg/l as $CaCO_3$	
Bicarbonate (HCO_3)		mg/l as $CaCO_3$	
Iron		mg/l	0.3 mg/l
Chloride (as CL)		mg/l	250 mg/l
Sodium Chloride (as NaCL)		mg/l	
Sulphate (as SO_4)		mg/l	200 mg/l
Total Solids		mg/l	1500 mg/l
Suspended Solids	108	mg/l	
Dissolved Solids		mg/l	1000 mg/l
Manganese		mg/l	0.05 mg/l
Phosphate		mg/l	
Phenolphthalein Acidity		mg/l	
Methyl Orange Acidity		mg/l	
Salinity		ppt	

Remark: This certificate is issued only for the receipt of the test sample.

Tested by
Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by
Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

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No.18, Lanthit Road, Nanthargone Quarter, Insein Township, Yangon, Myanmar.
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ISO TECH LABORATORY

Laboratory Technical Consultant: U Saw Christopher Maung
B.Sc Engg: (Civil), Dip S.E (Delft) Lecturer of YIT (Retd), Consultant (Y.C.D.C), LWSE 001.
Former Member (UNICEF, Water quality monitoring & Surveillance Myanmar)

WTL-RE-001
Issue Date - 01-1-2016
Effective Date - 01-1-2016
Issue No - 1.0/Page 1 of 1

M0718 005

WATER QUALITY TEST (MICROBIOLOGY) RESULTS FORM

Client	BASF Myanmar Manufacturing Co.,Ltd.
Nature of Water	Surface Water (Public Drainning)
Location	East Dagon Industrial Zone (1), East Dagon Townshi
Date and Time of collection	10.7.2018
Date and Time of arrival at Laboratory	10.7.2018
Date and Time of commencing examination	10.7.2018
Date and Time of completing	11.7.2018

Results of Water Analysis			WHO Drinking Water Guideline (Geneva - 1993)
Total Coliform Count	32	CFU/100ml	Not detected
Thermotolerant (fecal) Coliform Count	6	CFU/100ml	Not detected
pH	7.5		6.5 - 8.5
Turbidity	102	NTU	5 NTU
Colour (True)	110	TCU	15 TCU
Free Chlorine	Nil	mg/l	
Total Chlorine	Nil	mg/l	

Remark : **Unsatisfactory for drinking purpose.**

: **This certificate is issued only for the receipt of the test sample.**

: **< - Less than**

Tested by

Signature:
Name: Zaw Hein Oo
B.Sc (Chemistry)
Sr. Chemist
ISO TECH Laboratory

Approved by

Signature:
Name: Soe Thit
B.E (Civil) 1980,
Technical Officer
ISO TECH Laboratory

(a division of WEG Co.,Ltd.)

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SUPREME GROUP OF COMPANIES
SUPREME WATER DOCTOR COMPANY
No.19-C, Nawaday Garden, Yangon-Pathein Road,
Hlaing Tharyar Township, Yangon, Republic of the Union of Myanmar
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WATER ANALYSIS RESULT

Result Form No.	0595/ PED / SWDC / 18
Client	BASF Myanmar Manufacturing
Location	အရှေ့ဒဂုံစက်မှုဇုန်
Nature of Water	Surface Water
Date of Sample Received	10.7.2018
Tested on	10.7.2018

	UNIT	ANALYSIS RESULT	WHO GUIDELINE
Phosphorous	mg/L	1.1	-
Sodium	mg/L	52	200
Chloride	mg/L	40	250
Total Nitrogen	mg/L	6.5	-

Remark :

Approved By

Tin Moh Moh Hlaing
M.Sc (Chem:), M.S (Biotech:)
Head of R&D Dept;
Supreme Water Doctor Group
Supreme Group of Companies

Occupational and Environmental Health Laboratory

No. (250), Lower Kyeemyindine Rood, Ahlone Township, Yangon, Myanmar.
Tel: +9567-431139, 431138, +951-221387, 210844,
Fax: +9567-431139, +951-223824

Sample Name:	Waste Water	**Received Date:**	11-7-2018
		Reported Date:	12-7-2018
Site Name:	စက်ရုံရှေ့မြောင်းရေ	**Reg no:**	150/2018
Address:	BASF Myanmar Manufacturing		

Analyses	Ref: Value	Unit	Result	Method
Oil and Grease	10	mg/L	3.4	*Standard method of waste water analysis*

Reference: National Environmental Quality (Emission) Guidelines

Tested by	Checked by	Signed by
OH (Lab)	Laboratory Officer	Dr. Kay Khine Aye
U Zin Min Thu.	Daw Aye Aye Thinn	Deputy Director
M.Sc. (I)		Occupational and Environmental Health Division

OEHD/lab result (2017)/BASF Myanmar (waste water)

Appendix 11: Soil Quality Results

West Yangon University
Chemistry Department

EDX Report

Report No.

Sample Information

Sample Name	BASF
Meas. Date	2018/08/02 12:04:42
Comment	Quick&easy Air-Metal
Group	easy-ppm
Operator	Dr Cherry Ohn

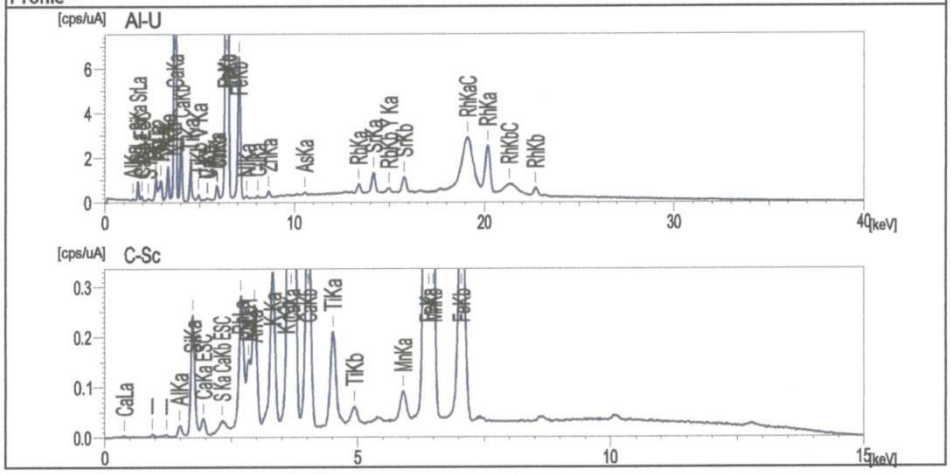
Measurement Condition

Channel	kV	uA	Filter	Acq.	Collimator Analysis	10mm Time	Atmos. DT%	Air
Al-U	50	53-Auto	----	0 - 40	0.00-40.00	Live- 30	30	
C-Sc	15	466-Auto	----	0 - 20	0.00- 4.40	Live- 30	30	

Quantitative Result

Analyte	Result		Std.Dev.	Calc.Proc	Line	Intensity
Ca	356742.8	ppm	[1533.43]	Quan-FP	CaKa	34.792
Si	268193.5	ppm	[4645.02]	Quan-FP	SiKa	2.067
Fe	219885.3	ppm	[969.038]	Quan-FP	FeKa	295.476
Al	75237.69	ppm	[3857.92]	Quan-FP	AlKa	0.182
K	42553.37	ppm	[539.559]	Quan-FP	K Ka	3.215
Ti	22326.28	ppm	[534.856]	Quan-FP	TiKa	8.709
Mn	4489.459	ppm	[128.773]	Quan-FP	MnKa	4.521
S	4137.631	ppm	[523.431]	Quan-FP	S Ka	0.150
Sr	2100.079	ppm	[68.051]	Quan-FP	SrKa	10.2273
Zn	993.064	ppm	[88.032]	Quan-FP	ZnKa	2.0929
Rb	889.382	ppm	[61.283]	Quan-FP	RbKa	3.9926
V	739.434	ppm	[238.430]	Quan-FP	V Ka	0.425
Cr	660.559	ppm	[154.466]	Quan-FP	CrKa	0.535
Ni	483.905	ppm	[103.380]	Quan-FP	NiKa	0.705
Y	288.601	ppm	[53.357]	Quan-FP	Y Ka	1.4632
Cu	278.999	ppm	[84.612]	Quan-FP	CuKa	0.4965

Profile



Appendix 12: Material Safety Data Sheet for all Raw Materials

BASF
We create chemistry

Safety data sheet

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

V157(50%ND)

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Product for construction chemicals

1.3. Details of the supplier of the safety data sheet

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Construction Chemicals

Telephone: +49 621 60-74354
E-mail address: info.construction-chemicals@basf.com

1.4. Emergency telephone number

International emergency number:
Telephone: +49 180 2273-112

SECTION 2: Hazards Identification

2.1. Classification of the substance or mixture

According to Regulation (EC) No 1272/2008 [CLP]

No need for classification according to GHS criteria for this product.

2.2. Label elements

According to Regulation (EC) No 1272/2008 [CLP]

The product does not require a hazard warning label in accordance with GHS criteria.

2.3. Other hazards

According to Regulation (EC) No 1272/2008 [CLP]

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

SECTION 3: Composition/Information on Ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Chemical nature

Aqueous solution based on: polycarboxylate ether

Hazardous ingredients (GHS)
according to Regulation (EC) No. 1272/2008

No particular hazards known.

SECTION 4: First-Aid Measures

4.1. Description of first aid measures

First aid personnel should pay attention to their own safety. Immediately remove contaminated clothing.

If inhaled:
If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact:
After contact with skin, wash immediately with plenty of water and soap. Under no circumstances should organic solvent be used. If irritation develops, seek medical attention.

On contact with eyes:
Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Rinse mouth immediately and then drink plenty of water, seek medical attention. Do not induce vomiting unless told to by a poison control center or doctor.

4.2. Most important symptoms and effects, both acute and delayed
Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11.

4.3. Indication of any immediate medical attention and special treatment needed
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

SECTION 5: Fire-Fighting Measures

5.1. Extinguishing media
Suitable extinguishing media:
foam, water spray, dry powder, carbon dioxide

Unsuitable extinguishing media for safety reasons:
water jet

5.2. Special hazards arising from the substance or mixture
Carbon dioxide, carbon monoxide, harmful vapours, nitrogen oxides, fumes/smoke, carbon black

5.3. Advice for fire-fighters
Special protective equipment:
Wear a self-contained breathing apparatus.

Further information:
The degree of risk is governed by the burning substance and the fire conditions. If exposed to fire, keep containers cool by spraying with water. Collect contaminated extinguishing water separately, do not allow to reach sewage or effluent systems. Contaminated extinguishing water must be disposed of in accordance with official regulations.

SECTION 6: Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures
Do not breathe vapour/aerosol/spray mists. Wear eye/face protection. If exposed to high vapour concentration, leave area immediately. Use personal protective clothing. Handle in accordance with good building materials hygiene and safety practice.

6.2. Environmental precautions
Contain contaminated water/firefighting water. Do not discharge into drains/surface waters/groundwater.

6.3. Methods and material for containment and cleaning up

For small amounts: Pick up with inert absorbent material (e.g. sand, earth etc.). Dispose of contaminated material as prescribed.
For large amounts: Pump off product.

6.4. Reference to other sections
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

SECTION 7: Handling and Storage

7.1. Precautions for safe handling
Avoid aerosol formation. Avoid inhalation of mists/vapours. Avoid skin contact. No special measures necessary provided product is used correctly.

7.2. Conditions for safe storage, including any incompatibilities
Further information on storage conditions: Keep only in the original container in a cool, dry, well-ventilated place away from ignition sources, heat or flame. Protect from direct sunlight.

Storage stability:
Storage temperature: 0 - 50 °C

SECTION 8: Exposure Controls/Personal Protection

8.1. Control parameters

Components with occupational exposure limits

No occupational exposure limits known.

8.2. Exposure controls

Personal protective equipment

Respiratory protection:
Wear respiratory protection if ventilation is inadequate. Combination filter for gases/vapours of organic, inorganic, acid inorganic and alkaline compounds (e.g. EN 14387 Type ABEK).

Hand protection:
impermeable gloves
Synthetic rubber gloves
Manufacturer's directions for use should be observed because of great diversity of types.

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:
light protective clothing

General safety and hygiene measures

Do not inhale gases/vapours/aerosols. Avoid contact with the skin, eyes and clothing. Avoid exposure - obtain special instructions before use. Handle in accordance with good building materials hygiene and safety practice. Wearing of closed work clothing is recommended. When using, do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift. At the end of the shift the skin should be cleaned and skin-care agents applied. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks).

SECTION 9: Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Form:	liquid
Colour:	colourless to yellow
Odour:	acrylic-like
pH value:	5 - 7 (20 °C)
Boiling point:	not applicable
Flash point:	A flash point determination is unnecessary due to the high water content.
Flammability:	not flammable
Vapour pressure:	(20 °C) not applicable
Density:	1.08 - 1.2 g/cm3 (20 °C)
Solubility in water:	soluble
Self ignition:	not self-igniting
Thermal decomposition:	No decomposition if stored and handled as prescribed/indicated.
Viscosity, dynamic:	300 - 550 mPa.s (23 °C)
Explosion hazard:	not explosive
Fire promoting properties:	not fire-propagating

9.2. Other information

Self heating ability:	It is not a substance capable of spontaneous heating.
Bulk density:	(20 °C) not applicable
Miscibility with water:	(20 °C) completely (e.g. >=90%)
Hygroscopy:	Non-hygroscopic

Solids content: 50 %
Other Information:
If necessary, information on other physical and chemical parameters is indicated in this section.

SECTION 10: Stability and Reactivity

10.1. Reactivity
No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals: No corrosive effect on metal.

10.2. Chemical stability
The product is stable if stored and handled as prescribed/indicated.

10.3. Possibility of hazardous reactions
The product is stable if stored and handled as prescribed/indicated.

10.4. Conditions to avoid
See MSDS section 7 - Handling and storage.

10.5. Incompatible materials

Substances to avoid:
strong oxidizing agents, strong acids, strong bases

10.6. Hazardous decomposition products

No hazardous decomposition products if stored and handled as prescribed/indicated.

SECTION 11: Toxicological Information

11.1. Information on toxicological effects

Acute toxicity

Assessment of acute toxicity:
Virtually nontoxic after a single ingestion. Based on available Data, the classification criteria are not met.

Irritation

Assessment of irritating effects:
No irritation is expected under intended use and appropriate handling. Based on available Data, the classification criteria are not met.

Respiratory/Skin sensitization

Assessment of sensitization:
Based on available Data, the classification criteria are not met.

Germ cell mutagenicity

Assessment of mutagenicity:
The chemical structure does not suggest a specific alert for such an effect. Based on available Data, the classification criteria are not met.

Carcinogenicity

Assessment of carcinogenicity:
The chemical structure does not suggest a specific alert for such an effect. Based on available Data, the classification criteria are not met.

Reproductive toxicity

Assessment of reproduction toxicity:
The chemical structure does not suggest a specific alert for such an effect. Based on available Data, the classification criteria are not met.

Developmental toxicity

Assessment of teratogenicity:
The chemical structure does not suggest a specific alert for such an effect. Based on available Data, the classification criteria are not met.

Specific target organ toxicity (single exposure)

No data available.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
No reliable data was available concerning repeated dose toxicity. Based on available Data, the classification criteria are not met.

Aspiration hazard

No aspiration hazard expected.

Other relevant toxicity information

Based on our experience and the information available, no adverse health effects are expected if handled as recommended with suitable precautions for designated uses. The product has not been tested. The statements on toxicology have been derived from the properties of the individual components.

SECTION 12: Ecological Information

12.1. Toxicity

Assessment of aquatic toxicity:
Based on available Data, the classification criteria are not met. There is a high probability that the product is not acutely harmful to aquatic organisms.

12.2. Persistence and degradability

Assessment biodegradation and elimination (H2O):
Inherently biodegradable. The insoluble fraction can be removed by mechanical means in suitable waste water treatment plants.
The polymer component of the product is poorly biodegradable.

12.3. Bioaccumulative potential

Assessment bioaccumulation potential:
No data available.
Discharge into the environment must be avoided.

12.4. Mobility in soil

Assessment transport between environmental compartments:
Volatility: No data available.

12.5. Results of PBT and vPvB assessment

The product does not fulfill the criteria for PBT (Persistent/bioaccumulative/toxic) and vPvB (very persistent/very bioaccumulative).

12.6. Other adverse effects

The product does not contain substances that are listed in Annex I of Regulation (EC) 2037/2000 on substances that deplete the ozone layer.

12.7. Additional information

Other ecotoxicological advice:
Do not discharge product into the environment without control. The product has not been tested. The statements on ecotoxicology have been derived from the properties of the individual components.

SECTION 13: Disposal Considerations

13.1. Waste treatment methods

Observe national and local legal requirements.

Residues should be disposed of in the same manner as the substance/product.

Contaminated packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

SECTION 14: Transport Information

Land transport

ADR

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user	None known

RID

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user	None known

Inland waterway transport
ADN

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user:	None known

Transport in inland waterway vessel
Not evaluated

Sea transport

IMDG

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user	None known

Air transport

IATA/ICAO

	Not classified as a dangerous good under transport regulations
UN number:	Not applicable
UN proper shipping name:	Not applicable
Transport hazard class(es):	Not applicable
Packing group:	Not applicable
Environmental hazards:	Not applicable
Special precautions for user	None known

14.1. UN number
See corresponding entries for "UN number" for the respective regulations in the tables above.

14.2. UN proper shipping name
See corresponding entries for "UN proper shipping name" for the respective regulations in the tables above.

14.3. Transport hazard class(es)
See corresponding entries for "Transport hazard class(es)" for the respective regulations in the tables above.

14.4. Packing group
See corresponding entries for "Packing group" for the respective regulations in the tables above.

14.5. Environmental hazards
See corresponding entries for "Environmental hazards" for the respective regulations in the tables above.

14.6. Special precautions for user

See corresponding entries for "Special precautions for user" for the respective regulations in the tables above.

14.7. Transport in bulk according to Annex II of MARPOL and the IBC Code

Regulation:	Not evaluated
Shipment approved:	Not evaluated
Pollution name:	Not evaluated
Pollution category:	Not evaluated
Ship Type:	Not evaluated

SECTION 15: Regulatory Information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

SECTION 16: Other Information

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. This safety data sheet is neither a Certificate of Analysis (CoA) nor technical data sheet and shall not be mistaken for a specification agreement. Identified uses in this safety data sheet do neither represent an agreement on the corresponding contractual quality of the substance/mixture nor a contractually designated use. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

BASF
The Chemical Company

Safety data sheet

BASF Safety data sheet according to Regulation (EC) No. 1907/2006
Date / Revised: 21.02.2012
Product: **DEFOAMER DF 93**

Version: 1.2

(ID no. 30443686/SDS_GEN_EU/EN)
Date of print 22.02.2012

1. Identification of the substance/mixture and of the company/undertaking

Product identifier

DEFOAMER DF 93

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: additive for cement based and other inorganic suspensions of solids in water

Details of the supplier of the safety data sheet

Company:
BASF SE
67056 Ludwigshafen
GERMANY
Operating Division Construction Chemicals

Telephone: +49 621 60-74354
E-mail address: info.construction-chemicals@basf.com

Emergency telephone number

International emergency number:
Telephone: +49 180 2273-112

2. Hazards Identification

Label elements

According to Directive 67/548/EEC or 1999/45/EC

EEC Directives

S-phrase(s)
S12 Do not keep the container sealed.

The product does not require a hazard warning label in accordance with EC Directives.

Classification of the substance or mixture

According to Directive 67/548/EEC or 1999/45/EC

Possible Hazards:
No specific dangers known, if the regulations/notes for storage and handling are considered.

Other hazards

According to Regulation (EC) No 1272/2008 [CLP]

No specific dangers known, if the regulations/notes for storage and handling are considered.

3. Composition/Information on Ingredients

Mixtures

Chemical nature

Emulsion based on: alkylene glycols, Polymer

modified with: polycarboxylate ether
in water

Hazardous ingredients (GHS)
according to Regulation (EC) No. 1272/2008

No particular hazards known.

Hazardous ingredients
according to Directive 1999/45/EC

The product contains no substances classified as hazardous to health or the environment in concentrations which should be taken into account according to EC directives

4. First-Aid Measures

Description of first aid measures
First aid personnel should pay attention to their own safety. Remove contaminated clothing.

If inhaled:
If difficulties occur after vapour/aerosol has been inhaled, remove to fresh air and seek medical attention.

On skin contact:
After contact with skin, wash immediately with plenty of water and soap. If irritation develops, seek medical attention.

On contact with eyes:

Wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

On ingestion:
Rinse mouth immediately and then drink plenty of water, seek medical attention. Do not induce vomiting unless told to by a poison control center or doctor.

Most important symptoms and effects, both acute and delayed
Symptoms: No significant symptoms are expected due to the non-classification of the product.

Indication of any immediate medical attention and special treatment needed
Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media
Suitable extinguishing media:
foam, water spray, dry powder, carbon dioxide

Unsuitable extinguishing media for safety reasons:
water jet

Special hazards arising from the substance or mixture
carbon monoxide, Carbon dioxide, harmful vapours, nitrogen oxides, fumes/smoke, carbon black

Advice for fire-fighters
Special protective equipment:
Wear a self-contained breathing apparatus.

Further information:
The degree of risk is governed by the burning substance and the fire conditions. Contaminated extinguishing water must be disposed of in accordance with official regulations.

Sealed containers should be protected against heat as this results in pressure build-up. Keep containers cool by spraying with water if exposed to fire.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures
Use personal protective clothing. Do not breathe vapour/aerosol/spray mists. Sources of ignition should be kept well clear. Handle in accordance with good building materials hygiene and safety practice.

Environmental precautions
Contain contaminated water/firefighting water. Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up
For small amounts: Pick up with inert absorbent material (e.g. sand, earth etc.). Dispose of contaminated material as prescribed.

For large amounts: Pump off product.

Reference to other sections
Information regarding exposure controls/personal protection and disposal considerations can be found in section 8 and 13.

7. Handling and Storage

Precautions for safe handling
Avoid aerosol formation. Avoid inhalation of mists/vapours. Avoid skin contact. No special measures necessary provided product is used correctly.

Protection against fire and explosion:
No special precautions necessary.

Conditions for safe storage, including any incompatibilities

Suitable materials for containers: High density polyethylene (HDPE)
Further information on storage conditions: Keep away from heat. Store protected against freezing. Do not keep the container sealed. Formation of CO2 and build up of pressure possible.

Storage class according to TRGS 510 (originally VCI, Germany): (12) Non-combustible liquids.

Protect from temperatures below: 5 °C
The packed product must be protected from temperatures below the indicated one.
Protect from temperatures above: 50 °C
The packed product must be protected against exceeding the indicated temperature.

Specific end use(s)
For the relevant identified use(s) listed in Section 1 the advice mentioned in this section 7 is to be observed.

8. Exposure Controls/Personal Protection

Control parameters

Components with workplace control parameters

The substances without values are not listed in the occupational exposure regulations for the validity area of this safety data sheet.

Exposure controls

Personal protective equipment

Respiratory protection:
Wear respiratory protection if ventilation is inadequate. Combination filter for gases/vapours of organic, inorganic, acid inorganic and alkaline compounds (e.g. EN 14387 Type ABEK).

Hand protection:
impermeable gloves
Synthetic rubber gloves
Manufacturer's directions for use should be observed because of great diversity of types.

Eye protection:
Safety glasses with side-shields (frame goggles) (e.g. EN 166)

Body protection:
light protective clothing

General safety and hygiene measures
In order to prevent contamination while handling, closed working clothes and working gloves should be used. Handle in accordance with good building materials hygiene and safety practice. When using, do not eat, drink or smoke. Hands and/or face should be washed before breaks and at the end of the shift. At the end of the shift the skin should be cleaned and skin-care agents applied. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks).

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Form:	emulsion
Colour:	yellowish to brown
Odour:	characteristic, of styrene
pH value:	approx. 6.5 - 8 (20 °C)
Information on: Water *Melting point:*	*0 °C*
Information on: Water *Boiling point:*	*100 °C*
Flash point:	not applicable
Information on: Water *Vapour pressure:*	*23.4 hPa* *(20 °C)* *Literature data.*
Density:	1.03 - 1.13 g/cm3 (20 °C)
Solubility in water:	miscible
Partitioning coefficient n-octanol/water (log Kow):	not applicable
Thermal decomposition:	No decomposition if stored and handled as prescribed/indicated.

Other information

Bulk density:
not applicable
Other Information:
If necessary, information on other physical and chemical parameters is indicated in this section.

10. Stability and Reactivity

Reactivity

No hazardous reactions if stored and handled as prescribed/indicated.

Chemical stability
The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions
The product is stable if stored and handled as prescribed/indicated.

Conditions to avoid
See MSDS section 7 - Handling and storage.

Incompatible materials

Substances to avoid:
strong acids, strong bases, strong oxidizing agents

Hazardous decomposition products

Possible decomposition products:
Carbon dioxide
Traces of the substances/groups of substances mentioned can be released at elevated temperatures.

11. Toxicological Information

Information on toxicological effects

Acute toxicity

Assessment of acute toxicity:
Virtually nontoxic after a single ingestion.

Irritation

Assessment of irritating effects:
Not irritating to eyes and skin. The product has not been tested. The statement has been derived from products of a similar structure or composition.

Respiratory/Skin sensitization

Assessment of sensitization:
The chemical structure does not suggest a sensitizing effect.

Germ cell mutagenicity

Assessment of mutagenicity:
The chemical structure does not suggest a specific alert for such an effect.

Experimental/calculated data:
Ames-test
Mutagenicity tests revealed no genotoxic potential.

Carcinogenicity

Assessment of carcinogenicity:
The chemical structure does not suggest a specific alert for such an effect.

Reproductive toxicity

Assessment of reproduction toxicity:
The chemical structure does not suggest a specific alert for such an effect.

Developmental toxicity

Assessment of teratogenicity:
The chemical structure does not suggest a specific alert for such an effect.

Repeated dose toxicity and Specific target organ toxicity (repeated exposure)

Assessment of repeated dose toxicity:
The product has not been tested. The statement has been derived from the properties of the individual components.

Other relevant toxicity information

On the basis of the product's composition, no acute general toxic effects are to be expected. The product has not been tested. The statement has been derived from products of a similar structure or composition.

12. Ecological Information

Toxicity

Assessment of aquatic toxicity:
There is a high probability that the product is not acutely harmful to aquatic organisms.

Persistence and degradability

Assessment biodegradation and elimination (H2O):
Not readily biodegradable (by OECD criteria).

Bioaccumulative potential

Bioaccumulation potential:
No data available concerning bioaccumulation.

Mobility in soil (and other compartments if available)

Assessment transport between environmental compartments:
No data available.

Results of PBT and vPvB assessment

The product does not fulfill the criteria for PBT (persistent/bioaccumulative/toxic) or vPvB (very persistent/very bioaccumulative).

Additional information

Other ecotoxicological advice:
There is a high probability that the product is not acutely harmful to aquatic organisms. Do not discharge product into the environment without control. The product has not been tested. The statement has been derived from products of a similar structure or composition.

13. Disposal Considerations

Waste treatment methods

Observe national and local legal requirements.
Residues should be disposed of in the same manner as the substance/product.

Contaminated packaging:
Contaminated packaging should be emptied as far as possible; then it can be passed on for recycling after being thoroughly cleaned.

14. Transport Information

Land transport

ADR

Not classified as a dangerous good under transport regulations

RID

Not classified as a dangerous good under transport regulations

Inland waterway transport
ADN

Not classified as a dangerous good under transport regulations

Sea transport
IMDG

Not classified as a dangerous good under transport regulations

Air transport
IATA/ICAO

Hazard class:	9
Packing group:	III
ID number:	UN 3334
Hazard label:	9
Proper shipping name:	AVIATION REGULATED LIQUID, N.O.S. (contains POLYCARBOXYLATE ETHER)

15. Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture

If other regulatory information applies that is not already provided elsewhere in this safety data sheet, then it is described in this subsection.

16. Other Information

The data contained in this safety data sheet are based on our current knowledge and experience and describe the product only with regard to safety requirements. The data do not describe the product's properties (product specification). Neither should any agreed property nor the suitability of the product for any specific purpose be deduced from the data contained in the safety data sheet. It is the responsibility of the recipient of the product to ensure any proprietary rights and existing laws and legislation are observed.

Vertical lines in the left hand margin indicate an amendment from the previous version.

Siam PVS Chemicals	Safety Data Sheet **Sodium Hydroxide 50%**	

S-205-20.135 Rev.2

1. Identification of the substance or mixer and of the supplier

Identification of the substance

Production Name : SODIUM HYDROXIDE 50%

Other Identification : CAS#: 1310-73-2 EC/EINECS: 215-185-5 RTECS# : 011-002-00-6

UN/#: 1824 EC Annex 1 Index # : 011-002-00-6

Manufacturer Name :

Siam PVS Chemicals Co.,Ltd.

Address: 403 Bangpoo Industrial Estate, Preaksa, Muang, Samutprakarn 10280, Thailand

Tel : +662-323-9980-1

Fax : +66-323-9188

2. Hazards Identification

Classification of Substance:

○ Acute Toxicity (Oral)	Category 4
○ Acute Toxicity (Dermal)	Category 4
○ Skin Corrosion/irritation	Category 1, 1
○ Serious eye damage/eye irritation	Category 1, 1
○ Specific Target Organ Toxicity – Single exposure (Respiratory)	Category 1
○ Hazardous to Aquatic Environment (Acute)	Category 3

Pictograms GHS:

Signal word : **Danger**

Hazard Statements:

○ Harmful if swallowed, contact with skin
○ Causes severe skin burns and eye damage

Siam PVS Chemicals	Safety Data Sheet **Sodium Hydroxide 50%**	RESPONSIBLE CARE

S-205-20.135 Rev.2

○ May cause damage to Gastrointestinal
○ Very toxic to aquatic life

Precautionary Statements

○ protective gloves/clothing and eye/face protection
○ Close the container tightly Store in a well-ventilated and locked up.
○ Avoid release to the environment
○ Separate contaminated clothing and wash thoroughly before reuse
○ If in eyes: flush with water for at least 20 minutes, remove contact lenses out. Do not use collyrium. And doctor / physician
○ Rinsing the mouth if ingested, do not induce vomiting
○ If skin contact. Remove all contaminated clothing immediately. Rinse with plenty of water for at least 20 minutes. Separate contaminated clothing cleaned before reuse.

Other hazards that do not result in classification: No data

3. Composition/Information on Ingredients

Identity of the chemical:

Chemical Name : Sodium Hydroxide

Common Name : Sodium Hydroxide

Synonyms : Caustic soda

Molecular formula : NaOH

Molecular mass : 40 g/mol

Ingredients :

Substance	CAS. No.	Content
Sodium Hydroxide	1310-73-2	50 %
Water	7732-18-5	50 %

Impurities and additives stable : No

Siam PVS Chemicals	Safety Data Sheet **Sodium Hydroxide 50%**	

S-205-20.135 Rev.2

4. First Aid Measures

Inhaled	Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Skin contact	Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower for 20 minutes. Wash contaminated clothing before reuse.
Eyes	Rinse with plenty of water. Eyelid held wide. Allow water to flow through at least 20 minutes (do not use collyrium) led to a doctor immediately
Ingestion	rinse mouth, Do not induce vomiting Then immediately for medical attention.

Symptoms / significant impacts:

- Breathing : shortness of breath, coughing
- Skin: skin irritation, rash, red skin burns.
- Ingestion: Heartburn, stomach pain, nausea, vomiting, shock, loss of consciousness.
- Eyes: Conjunctivitis, eye pain, severe burns.3

Medical considerations must be made immediately, and care should be a major operation: Chest X-Ray Eye and vision, Pulmonary Function Tests.

5. Fire Fighting Measures

Extinguishing media appropriate: Use extinguishing media appropriate to around fire conditions

Extinguishing inappropriate : -

Hazards caused by chemicals :

- This substance is not flammable But when exposed to water or moisture will cause heat. When the heat This substance is evaporated to produce the is alkaline

Special protective equipment and precautions for firefighters:

- FIREFIGHTERS Wear Wear protective clothing and respiratory masks
- Combustible containers should be cooled with water spray to reduce the temperature.

Siam PVS Chemicals.	Safety Data Sheet Sodium Hydroxide 50%	

S-205-20.135 Rev.2

6. Accidental Release Measure

Personal precautions:

- Evacuated from the area where the chemical leak.
- Do not touch this chemical directly.
- Do not inhale mist/vapor

Personal Protective Equipment:

- Wear protective clothing, Respirator and chemical resistant gloves.

Environmental precautions:

- Avoid release to the environment

Procedures and materials for storage and cleaning :

- Wear chemical protection suits
- Plastic storage containers for disposal
- Use appropriate absorbent or sand
- Use water cleaning the area

7. Handling and Storage

Precautions in handling:

- Avoid contact with substance.

Storage conditions :

- Keep container corrosion protection

8. Exposure Controls/Personal Protection

Parameters used to control exposure:

IDLH:	10	mg/m^3	(NIOSH 2012)
REL-C:	2	mg/m^3 (15 min)	(NIOSH 2012)
PEL-TWA:	2	mg/m^3	(OSHA 2012)
TLV- C:	2	mg/m^3	(ACGIH 2012)

Engineering controls:

- Provide adequate ventilation

Siam PVS Chemicals	**Safety Data Sheet** **Sodium Hydroxide 50%**	

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Personal Protective Equipment:

 Chemical-resistant gloves	 Respiratory protection Wear protective masks, chemical vapor When working with Sodium hydroxide, which has a high temperature (This material is evaporated to produce an alkaline)	 Safety Glasses/Goggle
 Chemical protective suit	 face shield	

Rule:

- ○ Change contaminated clothing.
- ○ Wash hands and face after working with substance before eating, smoking or using the toilet
- ○ Do not eat or drink or smoke in the workplace.

9. Physical and Chemical Properties	
1.) Appearance	Colorless, odorless and smooth touch like soap
2.) Odor	odorless
3.) Odor threshold	No data
4.) pH	> 14
5.) melting point/freezing point	9-12 °C
6.) initial boiling point and boiling range	143 °C
7.) flash point	Incombustible

Siam PVS Chemicals.	Safety Data Sheet **Sodium Hydroxide 50%**	

S-205-20.135 Rev.2

8.)	evaporation rate	No data
9.)	flammability	No data
10.)	upper/lower flammability or explosive limits(%, v/v)	
	Lower Explosion Limit: No data	Upper Explosion Limit : No data
11.)	vapor pressure	13 mmHg (0.2 kPa@) @ 20 °C
12.)	vapor density (Air = 1)	1.2
13.)	relative density (water = 1)	1.5 @ 15°C
14.)	solubility(ies)	100 %
15.)	partition coefficient: n-octanol/water (Log Kow)	No data
16.)	auto-ignition temperature	Incombustible
17.)	decomposition temperature	No data
18.)	Viscosity	78.3 cP @ 20°C

10. Stability and Reactivity

Reactivity:

- React with strong acids (Hydrochloric, Sulfuric, Nitric) react with metals (Aluminum, Lead, Tin, Zinc) cause flammable and explosive hydrogen gas. Ammonium salts react with Ammonia which causes the danger of fire. React with sodium hypochlorite, cause chlorine gas, which is toxic.

Chemical stability:

- Stable under recommended storage conditions

Incompatible materials : no data

Decomposition products are hazardous when mixed with water: No data

11. Toxicological Information

Acute Toxicity :

LD_{50} (Dermal, Rabbit):	1,350	**mg/kg**
LD_{50} (i.p., Mouse):	40	**mg/kg**

Siam PVS Chemicals.	Safety Data Sheet **Sodium Hydroxide 50%**	

S-205-20.135 Rev.2

Toxicological Information :

Inhalation	Burning throat, coughing, shortness of breath, trouble breathing
Skin	Severe burns to skin, painful ulcers
Eye	Severe eye burns and blindness
Ingestion	Burning the mouth, throat and chest pain, nausea, vomiting, shock, loss of consciousness
Symptoms	Cough, shortness of breath, headache, edema, muscle spasms. Laryngitis, fatigue
Acute effects	corrosive to the eyes skin and respiratory cause pulmonary edema
Chronic effects	Cause dermatitis ,bronchitis, permanent lung damagee

12. Ecological Information

Toxicity ecological:

Toxicity to fish Oncorhynchus mykiss LC_{50} : 45.4 mg/ l/ 96 hr.

Toxicity to Crustacea Daphnia magna EC_{50}: 40.38 mg/ l/ 48 hr.

Residues and ability to biodegradation:

To normal by neutralizing the acidic process of biodegradation

Potential for bioaccumulation: Not bioaccumulation

Mobility in soil: No data

Other impacts: No data

13. Disposal Considerations

Dispose: To comply with local requirements In order to have minimal environmental impact

Package : Cleaned containers to dispose of the waste.

14. Transport Information

UN number : 1824

Name of Transportation of the United Nations : Sodium Hydroxide Solution

Hazard Class for transport : 8

Siam PVS Chemicals	Safety Data Sheet **Sodium Hydroxide 50%**	

S-205-20.135 Rev.2

Packaging Group (If any): II

Label :

Marine pollution: No data

Transport with a large container: L4BN

Special precautions: No data

15. Regulatory Information

Laws / regulations of Thailand

- Hazardous Substances Act. B.E. 2535

  Ministry of Industry Identify the types of hazardous materials: type 1 (Ministry of Industry Department of Fisheries)

Label :

- **NFPA-704 :**

- **GHS:**

16. Other Information

Date of preparation of safety data sheets: December 3, 2013

Reference:

Siam PVS Chemicals	Safety Data Sheet **Sodium Hydroxide 50%**	

S-205-20.135 Rev.2

1. The National Institute for Occupational Safety and Health(NIOSH):NIOSH Pocket Guide to Chemical Hazards http://www.cdc.gov/niosh/npg/npgdcas.html
2. United Nations Recommendations on the Transport of Dangerous Goods (UNRTDG) http://www.unece.org/trans/danger/publi/unrec/rev14/English/05E_Index.pdf
3. Principles and measures to prevent accidents from chlorine

Domsjö Lignin

Material Safety Data Sheet

According to Regulation (EU) no 453/2010

Domsjö Lignin DS10

Version: 2
Revision: 2012-03-07 Issued: 2011-12-20

1 IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Domsjö Lignin DS10

1.2 Relevant identified uses of the substance or mixture and use advised against

Uses: Concrete additives, binders for feed, minerals and dust.

1.3 Details of the supplier of the safety data sheet

Supplier: Domsjö Fabriker AB
Address: SE-891 86 Örnsköldsvik, Sweden
Telephone: +46 660 756 00
e-mail: eva.selling@domsjoe.com

1.4 Emergency telephone number

Telephone: +46 70 693 59 40 *(open 24/7)*

2 HAZARDS IDENTIFICATION

2.1 classification of the substance

Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]
The product has not been classified as hazardous to health, safety or environment according to regulation 1272/2008/EC.

Classification according to Directive 67/548/EEC
The product has not been classified as hazardous to health, safety or environment according to regulation 67/548/EEC.

2.2 Label elements

Labelling according to directive (EC) No 1272/2008
The product has not been classified as hazardous to health, safety or environment according to regulation 1272/2008/EC

Domsjö Lignin

Domsjö Lignin DS10

Version: 2
Revision: 2012-03-07
Issued: 2011-12-20

6.2 Environmental precautions
Prevent the product from reaching sewers and surface and ground water.

6.3 Methods and material for containment and cleaning up
Containment: Barricade with absorbent, such as sand or soil.Collect.

Cleaning: Collect in appropriate container for disposal. Rinse area with water.

6.4 Reference to other sections
Personal protective equipment, see section 8. Disposal considerations, see section 13.

7 HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of dust.
Avoid dust formation.
Avoid skin and eye contact.
Assume normal precautions when handling chemicals.

7.2 Conditions for safe storage, including any incompatibilities
Store dry

7.3 Specific end use(s)
No information.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
Occupational exposure limits
No exposure limits

8.2 Exposure controls
Personal protective equipment

Eye protection: If there is risk for direct contact or splashing protective glasses should be used.
Hand protection: In case of prolonged or frequently repeated contact with the product rubber gloves should be used.
Body protection: Protective clothing as needed.

Precautions to limit environmental exposure
Assume normal precautions when handling chemicals.

3 (6)

12.2 Persistence and degradability
Mobility: Soluble in water.
BOD_7: 100 mg O_2/g

12.3 Bioaccumulative potential
No information.

12.4 Mobility in soil
No information.

12.5 Results of PBT- and vPvB-assessment
No information.

12.6 Other adverse effects
No other hazardous effects.

13 DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Waste should be handled according to Directive 2008/98/EC.
Consult local authorities about waste disposal or contact Domsjö Fabriker AB, for advice.

14 TRANSPORT INFORMATION

14.1 UN-number
Not classified as dangerous goods.

14.2 UN proper shipping name
Not classified as dangerous goods.

14.3 Transport hazard class(es)
Not classified as dangerous goods.

14. 4 Packing group
Not classified as dangerous goods.

14.5 Environmental hazards
Not classified as dangerous goods.

14.6 Special precautions for user
Not classified as dangerous goods.

14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC-code
Not classified as dangerous goods.

Supplier is THANODOM TRADING CO., LTD.

TECHNICAL DATA

AM-107 B5

ETERNAL RESIN CO.,LTD.

MATERIAL SAFETY DATA SHEET

1. Identification of Product and Company

Name of product	:	AM-107 B5
Type of product	:	40% Aqueous Formaldehyde Solution
Company	:	Eternal Resin Co., Ltd.

2. Hazards Identification

Potential Acute Health Effects

Eye Contact	:	Corrosive to eye. Eye irritant. Causes eye burns. Inflammation of the eye is characterized by redness, itching.
Skin Contact	:	Corrosive, irritant, dryness, may cause eczema.
Ingestion	:	May be corrosive to digestive tract, may cause burns to the digestive tract. May cause liver and kidney damage. May cause central nervous system depression. May be fatal or cause blindness if swallowed.
Inhalation	:	Causes respiratory tract irritation. May cause central nervous system depression, characterized by nausea, headache, unconsciousness and coma. May cause allergic sensitization of the respiratory tract.

Chronic Health Effects

Carcinogenic effects	:	Contains formaldehyde, which is classified A2 (suspected carcinogen for human) by ACGIH
Mutagenic effects		
Formaldehyde	:	Mutagenic for mammalian somatic cells and for bacteria and/or yeast.
Methyl alcohol	:	Mutagenic for mammalian somatic cells and for bacteria and/or yeast.

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Factory

Eternal

AM-107 B5

ETERNAL RESIN CO.,LTD.

3. Information on ingredient

Ingredient	CAS Numbers	% By weight
Formaldehyde	50-00-0	40%
Methyl alcohol	67-56-1	7.0-10.0%
Water		50-53%

4. First Aid Measures

Eye Contact : Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, holding eyelids.

Skin Contact : In case of contact, immediately flush skin with running water for at least 15 minutes. Cover irritated skin with an emollient. Remove contaminated clothing and wash before reuse. Seek medical attention.

Ingestion : Do not induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person. Loosen tight clothing, such as collar, belt, waistband. Seek medical attention immediately.

Inhalation : Remove to fresh air. Loosen tight clothing. If breathing is difficult, give oxygen. If victim is not breathing, give artificial respiration. Seek medical attention immediately.

5. Fire Fighting Measures

Extinguishing media

For small fire : Dry chemical, foam or carbon dioxide, water spray.

For large fire : Water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Fire fighting procedure : Wear completes personal protective equipment and respirator.

ETERNAL RESIN CO.,LTD.

AM-107 B5

6. Accidental Release Measures

Before proceeding with clean up. Use appropriate Personal Protective Equipment during clean up. Wear self-contained breathing apparatus and chemical-proof suit.

Spillage / leakage	:	Soak up small spills with earth, sand or other noncombustible absorbent material and remove in covered metal containers. Dike large spills and neutralize with dilute (5%) solution of ammonia, sodium sulfite, or sodium bisulfite and remove. Flush area with plenty of water.
Waste disposal method	:	Dispose in accordance with federal, state and local regulations.

7. Handling and Storage

Handling	:	Keep away from heat and sources of ignition. Ground all equipment. Do not pressurize, cut, weld, solder, drill, grind or expose empty containers to heat, sparks, or open flame. Do not ingest. Do not breathe vapor or mist. Use only with adequate ventilation. Wash thoroughly after handling. Do not get in eyes, on skin, or on clothing. Remove contaminated clothing and wash before reusing.
Storage	:	Store in a dry, well-ventilated area in tightly closed and sealed containers. Store away from incompatible materials such as oxidizing agents, reducing agents, acids, alkalis

ETERNAL RESIN CO.,LTD.

AM-107 B5

8. Exposure Controls / Personal Protection

Engineering Control	:	Provide exhaust ventilation or other engineering controls to keep vapor concentrations below their respective threshold limit values. Safety showers and eyewash stations must be available in the work area.
Exposure Limits	:	TLV-C 0.3 ppm *(ACGIH)* TLV-TWA 0.75 ppm *(OSHA)* TLV-STEL 2 ppm *(OSHA)*
Personal protective equipment		
Eyes	:	Wear chemical splash goggles and face shield.
Skin	:	Wear appropriate gloves to prevent skin exposure.
Clothing	:	Wear appropriate protective clothing to prevent skin exposure.
Respirators	:	Use a NIOSH/MSHA or European Standard EN149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

9. Physical and Chemical Properties

Appearance	:	Clear liquid, Colorless
Odor	:	Pungent
Molecular Weight	:	30.03
Boiling point	:	96°C
Melting point	:	-92°C
pH	:	2.5 - 4.0
Specific gravity (25°C)	:	1.080 - 1.110
Vapour pressure (20°C)	:	1.52 mm-Hg
Solubility	:	Easily soluble in water, alcohol, ether, acetone
Flash point	:	> 60.5°C
Autoignition Temperature	:	424 °C

10. Stability and Reactivity

Stability	:	Stable.
Conditions to avoid	:	Flame and spark.
Materials to avoid	:	Reactive with oxidizing agents, reducing agents, acids, alkalis. Slightly reactive to reactive with metals.
Hazardous Decomposition Product	:	Carbon monoxide, Carbon dioxide
Hazardous polymerization	:	Will not occur.
Inhibitor	:	Polymerization can be inhibited by the addition of methanol.

11. Toxicological Information

Routes of Entry	:	Absorption through skin, eye contact, inhalation, and ingestion.
Toxicity to Animals		
LD_{50} [Oral,rat]	:	605 mg/kg *(HSDB Non-Human Toxicity Values)*
LD_{50} [Skin,rabbit]	:	270 mg/kg *(HSDB Non-Human Toxicity Values)*
LD_{50} [Inhalation,rat]	:	578 mg/m^3 @ 4 hr *(HSDB Non-Human Toxicity Values)*
Chronic Effects on Humans		
Carcinogenic Effects	:	A2 – Suspected Human Carcinogen *(ACGIH)* Group 1 – Carcinogenic to humans *(IARC)*
Mutagenic Effects	:	Mutagenic for mammalian somatic cells (formaldehyde, methyl alcohol). Mutagenic for bacteria and/or yeast (formaldehyde, methyl alcohol)

ETERNAL RESIN CO.,LTD.

AM-107 B5

12. Ecological Information

Ecotoxicity		
LC_{50}	:	24.1 mg/L @ 96 hr (Fish)
EC_{50}	:	42 mg/L
Log K_{ow}	:	0.35
BCF	:	3
Bioaccumulative potential	:	Bioaccumulation in aquatic organisms is not expected.

13. Disposal Consideration

Waste disposal method	:	In accordance with all local, state, and federal regulations. Contact a licensed professional waste disposal service. Dissolve or mix with combustible solvent and burn in chemical incinerator equipped with after-burner and scrubber.

14. Transport Information

Shipping Name	:	Formaldehyde solution
UN Number	:	2209
UN Class	:	8
UN Packing Group	:	III
Placards	:	Corrosive

15. Regulation Information

Hazardous Substance	:	Type II (Hazardous Substance Act B.E. 2535)
Transport Regulation	:	Land Transport Regulation for Hazardous Substance, Ministry of Industry B.E. 2546

16. Other Information

This information relates only to the specific material designated and may not be valid for such material used in combination with other material or in any process. Such information is to the best of our knowledge and believed accurate and reliable as of the date indicated.

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supplier: Orient International Enterprises
PASTIS 3763437

CNAS

CNAS IB0071

NO.2616010097

SAFETY DATA SHEET

Product Name: Sodium Naphthalene Sulphonate (FDN-C)

Revision Date: 2016-02-22

Compiler: Liu Lindiu

Checker: Fengzhuo

Approver: Zhangxiaoqin

Shanghai Research Institute of Chemical Industry Testing Centre

NO.2616010097

Shandong Wanshan Chemical Co., Ltd.

SAFETY DATA SHEET

Sodium Naphthalene Sulphonate

SECTION1 PRODUCT AND COMPANY IDENTIFICATION

Product name:	Sodium Naphthalene Sulphonate
Company:	Shandong Wanshan Chemical Co., Ltd.
Address:	Wanshan Road, Zhuliu Industrial Park, Changle County, Weifang City, Shandong Province, 262404, P.R.China
Email:	Shen-tao@oic.com.cn
Fax:	86-536-6771798
Emergency Phone:	86-536-6771798
SDS Number:	2616010097
SDS Date:	2016-02-22

SECTION2 HAZARDS IDENTIFICATION

GHS Classification:

Physical Hazards:
Not classified

Health Hazards:
Not classified

Environmental Hazards:
Not classified

The hazards not mentioned are not applicable or no data available.

GHS Labelling:

Pictogram:
None

Signal Word:
No signal word

Hazard Statements:
None

Prevention Precautionary Statements:
None

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NO.2616010097

Response Precautionary Statements:
None

Storage Precautionary Statements:
None

Disposal Precautionary Statements:
Dispose of contents/container in accordance with local / regional / national / international regulation.

SECTION3 INFORMATION ON INGREDIENTS

Product name: Sodium Naphthalene Sulphonate

Ingredient	Concentration	CAS No.	EC No.
Sodium Naphthalene Sulphonate	75%	36290-04-7	/
Sodium sulfate	17%	7757-82-6	231-820-9
Water	8%	7732-18-5	231-791-2

SECTION4 FIRST-AID MEASURES

Skin Exposure:

In case of skin contact, flush with copious amounts of water. If irritation persists, call a physician.

Eye Exposure:

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. If irritation persists, call a physician.

Inhalation Exposure:

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

Oral Exposure:

If swallowed, wash out mouth with water provided person is conscious. Call a physician. Do not induce vomiting.

Most important symptoms and effects, both acute and delayed:

No data available.

Indication of any immediate medical attention and special treatment needed:

No data available.

SECTION5 FIRE FIGHTING MEASURES

Extinguishing Media:
Suitable: Dry chemical, Water spray, Carbon dioxide or appropriate foam.

Special hazards arising from the substance or mixture:
May decompose upon combustion or in high temperatures to generate Carbon oxides, Sulphur oxides, Sodium oxides.

Advice for firefighters:
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Fire-extinguishing work is done from the windward. Uninvolved persons should evacuate to a safe place.

2/5

NO.2616010097

SECTION6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures:
Use personal protective equipment. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Avoid breathing dust. Entry to noninvolved personnel should be controlled around the leakage area by roping off, etc.

Environmental precautions:
Do not let product enter drains.

Methods and materials for containment and cleaning up:
Sweep up with spade and transfer to a dry, clean, lidded container for disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

SECTION7 HANDLING AND STORAGE

Precautions for safe handling:
Wear appropriate protective clothing and gloves. Avoid inhalation. Avoid contact with eyes, skin and clothing. Avoid formation of dust. Mechanical exhaust required. Keep away from ignition sources, heat and flame. Incompatibilities: Strong acids, Aluminum, Magnesium. Wash hands and face thoroughly after handling. No smoking at working site. Normal measures for preventive fire protection.

Conditions for safe storage, including any incompatibilities:
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Keep away from ignition sources, heat and flame. Incompatibilities: Strong acids, Aluminum, Magnesium.

SECTION8 EXPOSURE CONTROL/PPE

Control parameters:
Not set up.

Appropriate engineering controls:
Mechanical exhaust required. Safety shower and eye bath.

Personal Protective Equipment:
Respiratory: Wear government approved respirator if needed.
Eye: Wear chemical safety glasses if needed.
Clothing: Wear appropriate protective clothing.
Hand: Wear compatible protective gloves.

Other Protect:
No smoking, drinking and eating at working site. Wash thoroughly after handling.

SECTION9 PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Brown powder
Odor:	Weak odor
Melting Point/℃:	>350℃
pH Value:	8.4 (25℃, 50.0g/L)
Solubility:	Slightly soluble in water

SECTION10 STABILITY AND REACTIVITY

Reactivity:
No data available.

Chemical stability:
Stable under normal temperatures and pressures.

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NO.2616010097

Possibility of hazardous reactions:
No data available.

Conditions to avoid:
No data available.

Incompatible materials:
Strong acids, Aluminum, Magnesium.

Hazardous Decomposition Products:
Carbon oxides, Sulphur oxides, Sodium oxides.

SECTION11 TOXICOLOGICAL INFORMATION

Acute toxicity:
Sodium sulfate: Mouse Oral LD_{50} 5989mg/kg

Skin corrosion/irritation:
No data available.

Serious eye damage/irritation:
No data available.

Respiratory or skin sensitization:
No data available.

Germ cell mutagenicity:
No data available.

Carcinogenicity:
No data available.

Reproductive toxicity:
No data available.

Specific target organ toxicity - single exposure:
No data available.

Specific target organ toxicity - repeated exposure:
No data available.

Aspiration hazard:
No data available.

SECTION12 ECOLOGICAL INFORMATION

Toxicity:
Sodium sulfate: Toxicity to fish LC_{50} - Gambusia affinis (Mosquito fish) - 120 mg/l - 96 h
LC_{50} - Lepomis macrochirus - 4380 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates EC_{50} - Daphnia magna (Water flea) - 2564 mg/l - 48h

Persistence and degradability:
No data available.

Bioaccumulative potential:
No data available.

Mobility in soil:
No data available.

Other adverse effects:
No data available.

SECTION13 DISPOSAL CONSIDERATION

Appropriate Method of Disposal of Substance:

4/5

Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with and afterburner and scrubber. Observe all federal, state, and local environmental regulations.

SECTION14 TRANSPORT INFORMATION

RID/ADR: Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA: Non-Hazardous for Air Transport: Non-hazardous for air transport.

IMO: Non-Hazardous for Sea Transport: Non-hazardous for sea transport.

SECTION15 REGULATORY INFORMATION

Regulation (EC) No. 1272/2008 and the amendments:

Physical Hazards: Not classified
Health Hazards: Not classified
Environmental Hazards: Not classified

SECTION16 OTHER INFORMATION

Date:

2016-02-22

Department:

Shanghai Research Institute of Chemical Industry Testing Centre
Tel(Fax):8621-52815377/52800971/52807275/52811034/52569800

Revision:

0

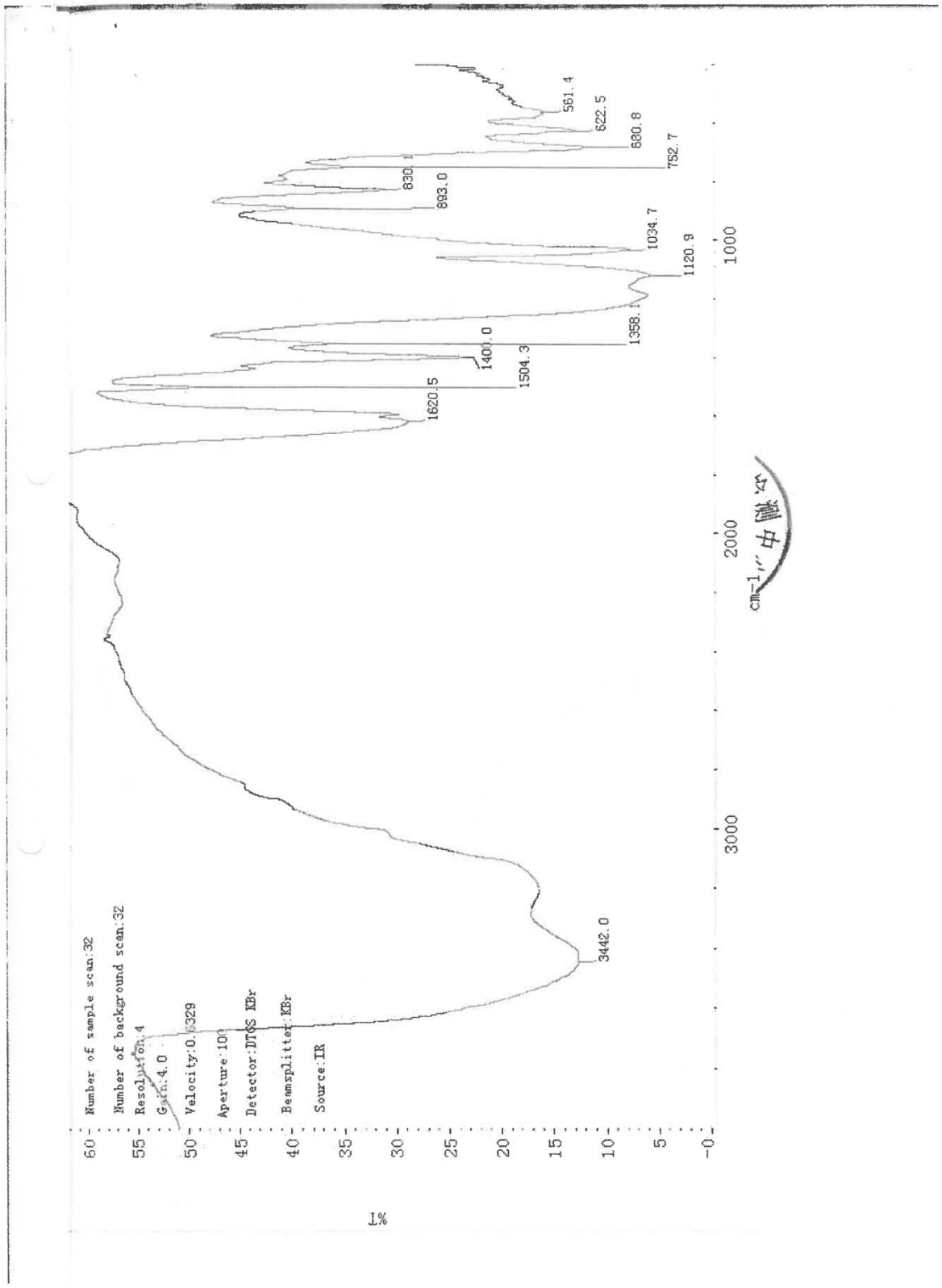
Reference Standard:

GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), 5th edition

Other Information:

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. We make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigation to determine the suitability of the information for their particular purposes. In no way shall we be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising from using the above information.

5/5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Number of background scan:32
Resolution:4
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Aperture:100
Detector:DTGS KBr
Beamsplitter:KBr
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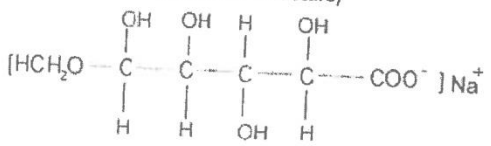
%T
cm-1
3442.0
1620.5
1504.3
1400.0
1358.1
1120.9
1034.7
893.0
830.1
752.7
680.8
622.5
561.4

SHANDONG KAISON BIOCHEMICAL CO., LTD
No 52 Yanhe Road, Wulian County Shandong China
Tel: 86 15954003315 FAX:86 633 6157776

MATERIAL SAFETY DATA SHEET
Of Sodium Gluconate

(Molecular Structure)



1. IDENTIFICATION OF SUBSTANCE AND SUPPLIER

PRODUCT NAME

SODIUM GLUCONATE

Synonym: gluconic acid sodium salt

Supplier

Company name : Shandong Kaison Biochemical Co., Ltd
Address :No 52 Yanhe Road, Wulian County Shandong China
Telephone NO : 86 15954003315
Fax NO : 86 633 6157776
Contact : Weilei Chen

2. COMPOSITION/INFORMATION on INGREDIENTS

Chemical Formula: CH2(OH)(CHOH)4COONa
Chemical Name: Sodium Gluconate
CAS No.: 527-07-1
EC No: 208-407-7
HS Code: 2918 1600

3. HAZARD IDENTIFICATION TLV CARCINOGEN

Nuisance Dust 15 mg/m3 (total) no
(Particulates no otherwise regulated) 5 mg/m3 (respirable)

Empty Containers: No special precautions.

Other Precautions: If substantial dust is in air, take measures to remove sources of ignition to prevent possible dust combustion or explosion. Promptly ventilate the area. Adopt procedures to minimize dust generation.

SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION

Engineering Controls:

Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

CAS# :527-07-1

9. CHEMICAL AND PHYSICAL PROPERTIES

Appearance: White to yellow powder or granules

Boiling Point: n/a

Odor: none

Melting Point: 207°C

PH: 6.2-7.2

Water Solubility: Soluble

Vapor Pressure (mm Hg): n/a; Spec. Gravity (H2O=1): n/a

Bulk Density: free flow = 56 lb/ft3; packed = 66 lb/ft3

10. REACTIVITY INFORMATION

Stability: Stable ; Incompatibility: Strong-oxidizing agents

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide

Hazardous Polymerization: Does Not Occur

11. TOXICOLOGY

May cause eye, skin or respiratory tract irritation

SECTION 12 - ECOLOGICAL INFORMATION

SECTION 13 - DISPOSAL CONSIDERATIONS

Dispose of in a manner consistent with federal, state, and local regulations.

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山东凯翔生物化工有限公司
ShanDong Kaison Biochemical CO.,LTD.

葡萄糖酸钠

一、物理化学性质

英文名称: Sodium Gluconate

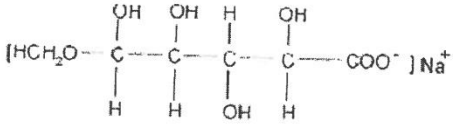
别名: 五羟基已酸钠

性状: 白色结晶颗粒或粉末，极易溶于水，略溶于酒精，不溶于乙醚。

分子量: 218.14

分子式: $C_6H_{11}O_7Na$

结构式:



二、产品执行标准:

项 目	标 准	
	工业级	食品级
鉴别	符合	符合
含量，%	≥98.0	98.0 ~ 102.0
干燥失重，%	≤0.50	≤0.30
还原物，%	≤0.70	≤0.50
PH	6.2 ~ 7.8	6.2 ~ 7.8
硫酸盐，%	≤0.05	≤0.05
氯化物，%	≤0.07	≤0.07
铅，μ g/g	≤2	≤1
砷盐，μ g/g	≤2	≤2
重金属，μ g/g	≤10	≤10
溶状(1.0g,10ml 水)	山东凯翔生物化工有限公司	无色,几乎澄清

Add: No.52 Yanhe Rd., Wulian county, Shandong province, China
Tel:+86-633-6157777 Fax:+86-633-6157776
Http://www.sdkaison.com E-mail:Sales@itaconicacid.com

JiLON 吉龙 Shangyu Jilong Chemicals Building Materials Co.,Ltd.

MATERIAL SAFETY DATA SHEETS

Date Prepared: Jan.30, 2015

1. Product and company identification

Product name Sodium Salt of Poly-naphthalene Sulfonic Acid (FDN-20)
Supplier Shangyu Jilong Chemicals Building Materials Co., Ltd.
Daoxu Town, Shangyu City, Zhejiang Province, China.312368
Tel: 86-575-82519800 Fax: 86-575-82519369
Synonym Sodium salt of naphthalene sulfonate polymerized with formaldehyde.
Sodium Naphthalene Sulphonate
Appearance Light Brown, free-flowing powder

2. Composition/information on ingredients

Name	CAS No.	LD_{50}	LC_{50}	Solid content
Sodium Salt of Poly-naphthalene Sulfonic Acid	36290-04-7	>1800mg/kg (oral-rat)	N.D.	92-94%

3. Physical and Chemicals properties

PH:	7.0-9.0 (2% solution)	**S.G (water=1) :**	0.69
Water solubility:	Completely soluble	**Odor threshold:**	N.A.
Vapor pressure:	N.A.	**Evaporation rate:**	N.A.
Boiling point:	N.A.	**Volatile (by weight):**	6-9%
Freezing point:	N.A.	**Vapor density (air=1) :**	N.A

Partition coef. (n-octane/water) : N.A.

4. Characteristics

The main component: Sodium Salt of Poly-naphthalene Sulfonic Acid
Its high purity makes cement particles with high dispersancy, low foaming, high range water reducing and obvious strengthening so that we can get advantages of accelerating project mould turnover and construction speed, and also saving cement, improving cement mobility and workability. It is the high range concrete admixture of concrete cast-in-place, prefabricating, pumping and curing.
It can increase concrete slump and improve concrete mobility obviously. It is suitable for commercial concrete, pump sending concrete, liquidity concrete, grouting material, etc.

5. Hazards Identification

Eye contact: may cause eye irritation

occur, wear goggles and/or face shield and impervious gloves.

11. Handling and storage

Handling methods: Handle the solution product in containers, piping and pumps made of stainless steel, fiberglass or plastic. Galvanized steel may be used for piping. Avoid prolonged or repeated skin contact.

Storage Requirements: Store the material in a cool, dry place. It should be stored in a dedicated warehouse that is well-ventilated and dry. Keep container tightly closed. It remains effective in one year. After the expiration date, it can be used again if the testing results fall within the established range.

12. Accidental release measures

Spill, leak, and disposal, procedures: Sweep the area and transfer the material into container for disposal. Recycle if possible. Dispose of waste in accordance with Federal, State or local regulations.

13. Regulatory information

Transport information:

Indentification Number	N.A.
Classification	N.A.

USA Regulations: No ingredient of this product is subject to the reporting requirements of section 313 of Title III of the "Superfund Amendment and Reauthorization Act II (SARA) of 1986 and 40CFR part 372 of United States.

14. Applications

Applications: general applications, industrial applications, compounds of dispersing and anti-caking agents, etc.

15. Transport information

Cautions should be taken to prevent from being torn by sharp-ended objects while packages are being transferred or delivered. When being contaminated by high humidity or moisture in case of leakage, it can be prepared in prescribed ways for further use without surrendering any effect.

16. Other information

Although the information in this MSDS was obtained from sources which we believe to be reliable, if cannot be guaranteed, in addition, this information may be used in manner beyond our knowledge or control, the information is therefore provided for advice purposes only, without any representation or warranty express or implied.

Prepared by the Technical Department of Shangyu Jilong Chemicals Building Materials Co., Ltd.

Appendix: 13 Newspaper Announcements

ဖိတ်ကြားလွှာ

BASF Myanmar Manufacturing Co., Ltd. မှ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ အရှေ့ဒဂုံစက်မှုဇုန် (၁)၊ မြေကွက်အမှတ် (၁၅၉) တွင် တည်ဆောက်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံးဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်မည့် စက်ရုံစီမံကိန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာ အချက်လက်များ ရှင်းလင်း တင်ပြခြင်း၊ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း အခမ်းအနား (Public Consultation) သို့ တက်ရောက်ပေးကြပါရန် ဖိတ်ကြားအပ်ပါသည်။

ရက်စွဲ ။ ၂၀၁၉ ခုနှစ်၊ ဧပြီလ (၁၀) ရက်၊ ဗုဒ္ဓဟူးနေ့
အချိန် ။ နံနက် ၉:၃၀ နာရီ မှ ၁၂:၀၀ နာရီအထိ
နေရာ ။ ကနောင် ခန်းမ၊ ဒဂုံအရှေ့ စက်မှုမြို့ စီမံခန့်ခွဲရေးရုံး ကနောင်မင်းသားကြီးလမ်း၊ ဒဂုံအရှေ့စက်မှုဇုန်၊ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး။

ဖိတ်ကြားလွှာ

BASF Myanmar Manufacturing Co., Ltd. မှ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ အရှေ့ဒဂုံစက်မှုဇုန် (၁)၊ မြေကွက်အမှတ် (၁၅၉) တွင် တည်ဆောက်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံးဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်မည့် စက်ရုံစီမံကိန်း နှင့်ပတ်သက်၍ ပတ်ဝန်းကျင် ထိခိုက်မှုဆန်းစစ်ခြင်း (Environmental Impact Assessment-EIA) လုပ်ငန်းစဉ်၏ စီမံကိန်းဆိုင်ရာ အချက်လက်များ ရှင်းလင်း တင်ပြခြင်း၊ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်းနှင့် အများပြည်သူသဘောထားရယူခြင်း အခမ်းအနား (Public Consultation) သို့ တက်ရောက်ပေးကြပါရန် ဖိတ်ကြားအပ်ပါသည်။

Appendix: 14 Invitees list

စဉ်	ဖိတ်ကြားမည့် ပုဂ္ဂိုလ်	မှတ်ချက်	လက်ခံရရှိသူ၏ အမည် နှင့် လက်မှတ်
က	အစိုးရအဖွဲ့		
၁။	ဦးလှဟောင်သိမ်း ညွှန်ကြားရေးမှူးချုပ် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန နေပြည်တော်။	ကုမ္ပဏီ letter Head ဖြင့် ပေးပို့ရန် Office – 067- 431321 Office – 067- 431342	
၂။	ဒေါ်ခင်သီတာထင် ညွှန်ကြားရေးမှူး ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန၊ ရန်ကုန်တိုင်းဒေသကြီး။	ကုမ္ပဏီ letter Head ဖြင့် ပေးပို့ရန် 01-2585456	
၃။	ပြည်ထောင်စုပန်ကြီး ဦးဘောင်းထွန်း ဥက္ကဋ္ဌ မြန်မာနိုင်ငံရင်းနှီးမြှုပ်နှံမှုကော်မရှင် ရန်ကုန်တိုင်းဒေသကြီး။	ကုမ္ပဏီ letter Head ဖြင့် ပေးပို့ရန် Fax no. – 657889 Office -01 - 658121	5-4-2019
၄။	အတွင်းရေးမှူး ရင်းနှီးမြှုပ်နှံမှုနှင့်ကုမ္ပဏီများညွှန်ကြားမှုဦးစီးဌာန ရန်ကုန်တိုင်းဒေသကြီး ဦးစီးမှူးရုံး။	အမှတ်(၁)သစ္စာလမ်း ရန်ကင်းမြို့နယ်၊ရန်ကုန်တိုင်းဒေသကြီး ဖုန်း -၀၁-၆၅၈ ၁၃၄၊ ၀၁-၆၅၈ ၁၀၃	
၅။	ဦးနေဇော် ပ မြည်သူ့လွှတ်တော်ကိုယ်စားလှယ် အရှေ့ဒဂုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး။		
၆။	ဒေါက်တာဥေးကြွယ် ပ အမျိုးသားလွှတ်တော်ကိုယ်စားလှယ် ရန်ကုန်တိုင်းဒေသကြီး။		
၇။	ဦးတင်မြင့် ပ တိုင်းဒေသကြီး လွှတ်တော်မဲဆန္ဒနယ်(၁) အရှေ့ဒဂုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး။		
၈။	ဦးကျော်ကျော်မောင် ပ တိုင်းဒေသကြီး လွှတ်တော်မဲဆန္ဒနယ်(၂) အရှေ့ဒဂုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး။		
၉။	မြို့နယ်အုပ်ချုပ်ရေးမှူး အထွေထွေအုပ်ချုပ်ရေးဦးစီးဌာန ဒဂုံမြို့သစ်(အရှေ့ပိုင်း) မြို့နယ်၊ရန်ကုန်တိုင်းဒေသကြီး။		
၁၀။	ရပ်ကွက်အုပ်ချုပ်ရေးမှူး (အရှေ့ဒဂုံစက်မူဇုန်) အမှတ် ( ) ရပ်ကွက် (၁၁၈) ဒဂုံမြို့သစ်(အရှေ့ပိုင်း) မြို့နယ်၊ရန်ကုန်တိုင်းဒေသကြီး။		

၂၃။	ဦးစီးအရာရှိ မီးသတ်ဦးစီးဌာန ဒဂုံမြို့သစ်(အရှေ့ပိုင်း)မြို့နယ်၊ရန်ကုန်တိုင်းဒေသကြီး။ ~~(east dagon ကွင်းရှိမရှိမေးရမည်)~~	၀၁-၂၅၈၅၄၆၀ ၀၉-၄၅၅၁၂၁၄၆၀ မင်းရဲကျော်စွာလမ်း အင်းဝလမ်းထောင့် ၁၂၂	[illegible]
၂၄။	ဦးစီးအရာရှိ လူမှုဖူလုံရေးအဖွဲ့ [illegible] ဒဂုံမြို့သစ်(အရှေ့ပိုင်း)မြို့နယ်၊ရန်ကုန်တိုင်းဒေသကြီး။		[illegible]
(ခ)	သက်ဆိုင်ရာဒေသခံမိဘပြည်သူများ အရှေ့ဒဂုံစက်မှုဇုန်၊ အရှေ့ဒဂုံမြို့နယ်၊ ရန်ကုန်တိုင်းဒေသကြီး		+
(ဂ)	အနီးပတ်ဝန်းကျင်ရှိ လယ်မြေပိုင်ရှင်များ နှင့် စက်ရုံများမှ တာဝန်ရှိသူများ		[illegible] (Royal [illegible]
(ဃ)	NGO & INGOs		
(င)	သတင်းဌာနအဖွဲ့အစည်းများ		
၂၅။	[illegible]		[illegible]
၂၆။	[illegible]		[illegible]
၂၇။	[illegible]		[illegible]
၂၈။	[illegible]		[illegible]
	[illegible]		[illegible]
၂၉။	[illegible]		[illegible]

([illegible]) - ၀၉ 783525450

Appendix:15 Attendance List

BASF MYANMAR MANUFACTURING COMPANY LIMITED မှ ရန်ကုန်တိုင်းဒေသကြီး ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ အရှေ့ဒဂုံစက်မှုဇုန် (၁)၊ မြေကွက်အမှတ် (၁၅၉) တွင် တည်ဆောက် လည်ပတ်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံးဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်မည့် စက်ရုံနှင့် ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) ဆိုင်ရာ လုပ်ငန်းများရှင်းလင်းတင်ပြခြင်း၊ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အစီးအနား သို့တက်ရောက်သူများစာရင်း

ပုဂ္ဂလိကကုမ္ပဏီများ (Private Company)

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဇူလိုင် (၁၀) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	Ma Thida Zin Hlaing	Technical Executive	Technical	09.43025945	Thida
၂။	Myowaiaung	WHS & QC / QA	WHS	09420216380	
၃။	Ma May Phyo Han	CSO	Office	09-455977000	
၄။	Pyae Phyo	Operator	Production	09-799337351	
၅။	Myo Myint Oo	Technical	Technical	09.786612693	
၆။					
၇။					
၈။					
၉။					
၁၀။					

BASF MYANMAR MANUFACTURING COMPANY LIMITED မှ ရန်ကုန်တိုင်းဒေသကြီး၊ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ အရှေ့ဒဂုံစက်မှုဇုန် (၁)၊ မြေကွက်အမှတ် (၁၅၉) တွင် တည်ဆောက် လည်ပတ်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံးဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်မည့် စက်ရုံနှင့် ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) ဆိုင်ရာ လုပ်ငန်းများရှင်းလင်းတင်ပြခြင်း အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနား သို့ တက်ရောက်သူများစာရင်း

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဧပြီလ (၁၀) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဒေါ်မြမြသိန်း	အတွင်းရေးမှူး	စက်မှုဇုန်	09-453390574	
၂။	ဒေါ်အေးအေးအောင်	ရုံးအဖွဲ့မှူး	〃	09-970425971	
၃။	ဦးကျော်လွင်ဦး	ကြီးကြပ်ရေးမှူး	〃	09-45112515	
၄။					
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					

BASF MYANMAR MANUFACTURING COMPANY LIMITED မှ ရန်ကုန်တိုင်းဒေသကြီး၊ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ အရှေ့ဒဂုံစက်မှုဇုန် (၁)၊ မြေကွက်အမှတ် (၁၅၉) တွင် တည်ဆောက် လည်ပတ်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံးဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်မည့် စက်ရုံနှင့် ပတ်သက်၍ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) ဆိုင်ရာ လုပ်ငန်းများရှင်းလင်းတင်ပြခြင်း၊ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အစီးအနား သို့ တက်ရောက်သူများစာရင်း

အစိုးရဌာနဆိုင်ရာအဖွဲ့အစည်းများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဧပြီလ (၁၀) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	[illegible]	[illegible]	[illegible]	09 509 8374	[illegible]
၂။	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
၃။	[illegible]	[illegible]	[illegible]	09 5413878	[illegible]
၄။	[illegible]	[illegible]	[illegible]	09 448047506	[illegible]
၅။	[illegible]	[illegible]	[illegible]	09 254 300005	[illegible]
၆။	[illegible]	[illegible]	[illegible]	09 797917288	[illegible]
၇။	[illegible]	[illegible]	[illegible]	၀၅	
၈။					
၉။					
၁၀။					

BAST MYANMAR MANUFACTURING COMPANY LIMITED မှ ရန်ကုန်တိုင်းဒေသကြီး၊ ခရုပြိုသစ် (အရှေ့ပိုင်း) မြို့နယ်၊ အရှေ့ခရုစက်မှုဇုန် (၁)၊ မြေကွက်အမှတ် (၁၅၉) တွင် တည်ဆောက် လည်ပတ်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံးဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်မည့် စက်ရုံနှင့် ပတ်သက်၍ ပတ်ဝန်းကျင် ထိခိုက်မှု ဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) ဆိုင်ရာ လုပ်ငန်းများရှင်းလင်းတင်ပြခြင်း၊ အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အစည်းအနား သို့ တက်ရောက်သူများစာရင်း

ရပ်မိ၊ ရပ်ဖဒေသခံပြည်သူများ

ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဧပြီလ (၁၀) ရက်

စဉ်	အမည်	နေရပ်လိပ်စာ	အလုပ်အကိုင်	ဖုန်းနံပါတ်	လက်မှတ်
၁။	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
၂။	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
၃။	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
၄။	[illegible]	[illegible]	mechanical Engineer	09777731143	[illegible]
၅။					
၆။					
၇။					
၈။					
၉။					
၁၀။					

BASF MYANMAR MANUFACTURING COMPANY LIMITED မှ ရန်ကုန်တိုင်းဒေသကြီး၊ ဒဂုံမြို့သစ် (အရှေ့ပိုင်း) မြို့နယ်၊ အရှေ့ဒဂုံစက်မှုဇုန် (၁)၊ မြေကွက်အမှတ် (၁၅၉) တွင် တည်ဆောက် လည်ပတ်မည့် ဆောက်လုပ်ရေးလုပ်ငန်းသုံးဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်မည့် စက်ရုံနှင့် ပတ်သက်၍ ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း (Environmental Impact Assessment- EIA) ဆိုင်ရာ လုပ်ငန်းများရှင်းလင်းတင်ပြခြင်း အများပြည်သူနှင့် တိုင်ပင်ဆွေးနွေးခြင်း အခမ်းအနား သို့ တက်ရောက်သူများစာရင်း

ပုဂ္ဂလိကကုမ္ပဏီများ (Private Company)

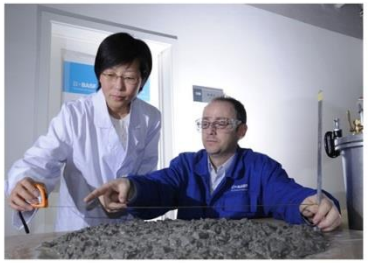
ရက်စွဲ - ၂၀၁၉ ခုနှစ်၊ ဧပြီလ (၁၀) ရက်

စဉ်	အမည်	ရာထူး	ဌာန/အဖွဲ့အစည်း	ဆက်သွယ်ရန်ဖုန်း	လက်မှတ်
၁။	ဦးမျိုးမြင့်ဇော်	Supervisor / EHS	BASF	09-450280469	[illegible]
၂။	မိုးမိုးဝင်း	Engineer	May Modern Steel Const	09.898716903	Mhn-
၃။	[illegible]	Engineer	May Mordem Co:	09-458451125	[illegible]
၄။	[illegible]	Admin	"	09-252175959	[illegible]
၅။	S Tamilarasan	Engineer	May Modern Steel	+91 9789565256	[illegible]
၆။	[illegible]	MD	Shwe Chan Thar	09-5101120	[illegible]
၇။	[illegible]	Director	Shwe Chan Thar	09-5101391	[illegible]
၈။					
၉။					
၁၀။					

Appendix: 16 Presentation Sheet

BASF – We create chemistry

- Our chemistry is used in almost all industries
- We combine economic success, social responsibility and environmental protection
- Sales 2018: €62,675 million
- EBIT 2018: €6,033 million
- Employees (as of December 31, 2018): 122,404
- 6 Verbund sites and 347 other production sites



2 10.04.2019

2018 sales* and EBIT in the regions

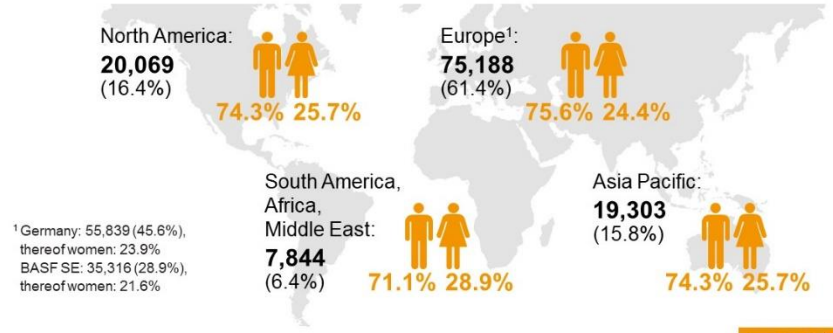
Figures in Million €

* By location of company

3 10.04.2019

Employees by region

BASF Group employees by region
(Total: 122,404, thereof 25.1% women, as of December 31, 2018)



[1] Germany: 55,839 (45.6%), thereof women: 23.9%
BASF SE: 35,316 (28.9%), thereof women: 21.6%

4 10.04.2019

Organization of the BASF Group

- Combined into six **segments**, 12 **divisions** bear operational responsibility and manage our global and regional **business units**
- The **regional divisions** contribute to the local development of BASF's business, help to exploit market potential and are responsible for optimizing the infrastructure for our business
- Seven **functional units** and eight **corporate units** support the BASF Group's business activities.

5 10.04.2019

BASF's segments

* We are considering the possibility of merging our construction chemicals business with a strong partner, as well as the option of divesting this business. The outcome of this review is open. The Construction Chemicals division will be reported under the Surface Technologies segment until signing of a transaction agreement.

6 10.04.2019

Construction Chemicals: Facts and figures

- **Sales 2018:** €2,456 Million
- **Employees 2018:** 7,000*
- **Broad range of solutions**
  Admixtures, Cement Additives, Underground Construction, Concrete Repair & Protection, Grouts, Waterproofing & Sealants, Flooring, Tile Fixing Systems, Expansion Control Systems, Wall Systems, Wood Protection, coatings for wood fibers and mulch
- **Close to local market needs**
  Present in more than 60 countries
- Serving more than 30,000 customers world-wide

* Total employment contracts according to BASF's consolidated financial statement

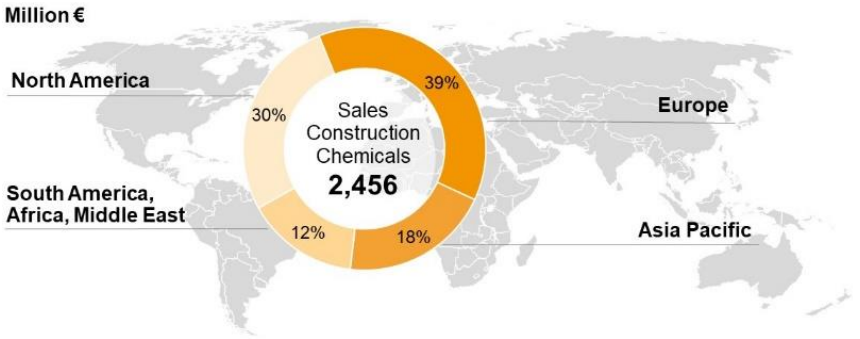
7 10.04.2019

Construction Chemicals Employees worldwide

Employees by regions

13

Construction Chemicals 2018 sales* in the regions



* by location of company

9 10.04.2019

Construction Chemicals is close to end users

10 10.04.2019

BASF Construction Chemical in Myanmar

- BASF Myanmar Manufacturing Co., Ltd
- 100% Foreign Investment Company
  - Myanmar Investment Commission Approved to invest on 17 Oct 2017.
  - Plant Inauguration was done on 18th May 2018.
- Liquid Admixture Plant for Ready Mixed Concrete Industry
  - MasterPozzolith (Plasticizers)
  - MasterRheobuild (SuperPlasticizer)
  - MasterGlenium (Slump Retainers)
- Local Sales & Marketing Team, led by experienced technical sales professionals, will be supporting directly to local infrastructure, commercial and industrial development projects….
- Total Full Time Employee: 13 (As of 5 Apr 2019)

Local Product Portfolio at a Glance

- Non-hazardous Finished Goods (Concrete Admixtures) for Concrete Producers to enhance the quality & performance of the concrete to supply to the Residential, Commercial & Infrastructure Development Projects across the country.
- Retarding & Water Reducing Admixtures – "MasterPozzolith & MasterRheobuilds, MasterGlenium ACE"
- Slump Retainers – "MasterGlenium Sky"
- Viscosity Modifying Admixtures – "MasterEase"
- Bonding Agent for Concrete – "MasterEmaco"
- Curing Agent to protect the moisture inside the concrete, drying out fast - " MasterKure"

Local Technical Service in Myanmar

- Strong QA/AC Team with experienced technicians
- In house lab can provide general requirements for concrete mix design
- After sale tech-support by experienced concrete engineer.

13 10.04.2019 | Optionale Zusatzinformationen

Local Technical Service in Myanmar

Pan Type Lab Concrete Mixer

On-site Technical Supp
& Concrete
Troubleshooting

3000 kN Compressive Machine
with calibration certificate

14 10.04.2019 | Optionale Zusatzinformationen

The Construction Chemicals portfolio

15 10.04.2019

Innovations

16 10.04.2019

Research and innovation enabling sustainable construction

- We innovate to create value throughout the life cycle of buildings
  - Construction phase
    Higher productivity, faster progress, lower overall costs, lower consumption of natural resources, better energy efficiency, improved health protection & safety
  - Use phase
    Extended service life, lower life cycle costs, better performance and functionality, improved safety & comfort

17 10.04.2019

Research and innovation in Construction Chemicals

- Main development hubs shown. Local extensions are: Redditch (Flooring), Oldenburg (Resins)
- Technical Centers for technical support and local formula adaptation not shown. Development Centers for regional segments (e.g. ECS, Wood Protection) also not shown.

18 10.04.2019

Our brand for the construction industry

19 10.04.2019

Master Builders Solutions at a glance

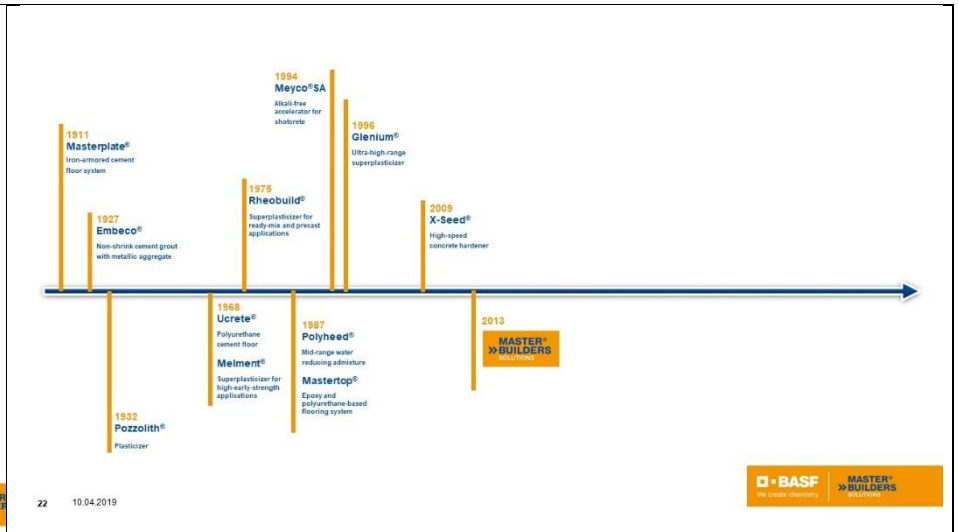
- Global BASF brand of advanced chemical solutions for the construction industry
- Strengths of many existing BASF brands and products
- Solutions for new construction, maintenance, repair and renovation of structures
- Experience from more than a century in construction and countless construction projects worldwide
- Global community of construction experts
- Reflection of BASF's commitment to the construction industry

BASF We create chemistry

MASTER® BUILDERS SOLUTIONS

20 10.04.2019


With the Master Builders Solutions launch,
30 brands become ONE
» Before
» Now
MASTER® BUILDERS SOLUTIONS
21 10.04.2019


1911 Masterplate®
1927 Embeco®
1932 Pozzolith®
1968 Ucrete®
1975 Rheobuild®
1987 Polyheed®
1994 Meyco®SA
1996 Glenium®
2009 X-Seed®
2013
22 10.04.2019


Experience and know-how gained from construction projects worldwide
23 10.04.2019


Master Builders Solutions create value – for construction and people
MASTER® BUILDERS SOLUTIONS
Combined BASF strengths in chemical solutions for construction
more competitiveness
more profitability
more quality of life
less resource consumption
Planners
Producers
Applicators/ Contractors
Owners/Users
Society
24 10.04.2019

Focus on the construction industry

25 10.04.2019

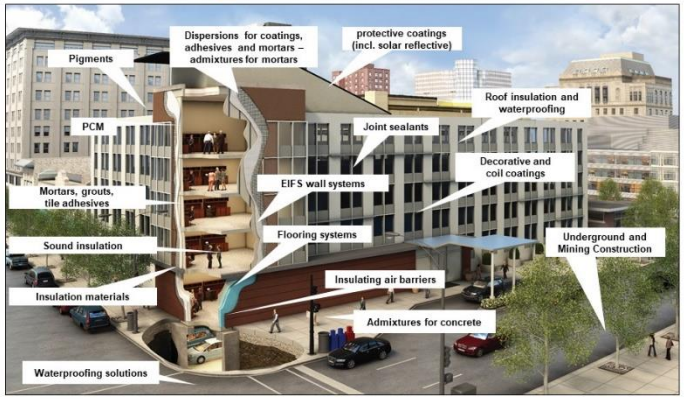
Construction Chemicals and other BASF divisions are serving all construction segments: Infrastructures

26 10.04.2019

Construction Chemicals and other BASF divisions are serving all construction segments: Residential buildings

27 10.04.2019

Construction Chemicals and other BASF divisions are serving all construction segments: Commercial buildings



28 10.04.2019


Connections are at the heart of our new claim “We create chemistry
29
10.04.2019
BASF
We create chemistry

BASF Myanmar ၏ ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ဓာတုပစ္စည်း (Chemical Admixture) စက်ရုံစီမံကိန်း

ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာ သက်ရောက်မှုဆန်းစစ်ခြင်း လုပ်ငန်းစဉ် ၏ အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်း နှင့် အများပြည်သူ ပူးပေါင်းပါဝင်ခြင်းဆိုင်ရာ ဆွေးနွေးပွဲ

၂၀၁၉ ခုနှစ်၊ ဧပြီလ (၁၀) ရက်

မာတိကာ

၁။ စီမံကိန်းဆိုင်ရာအချက်အလက်များ

စီမံကိန်းအကောင်ထည်ဖော်ဆောင်မှု၏ လက်ရှိအခြေအနေ

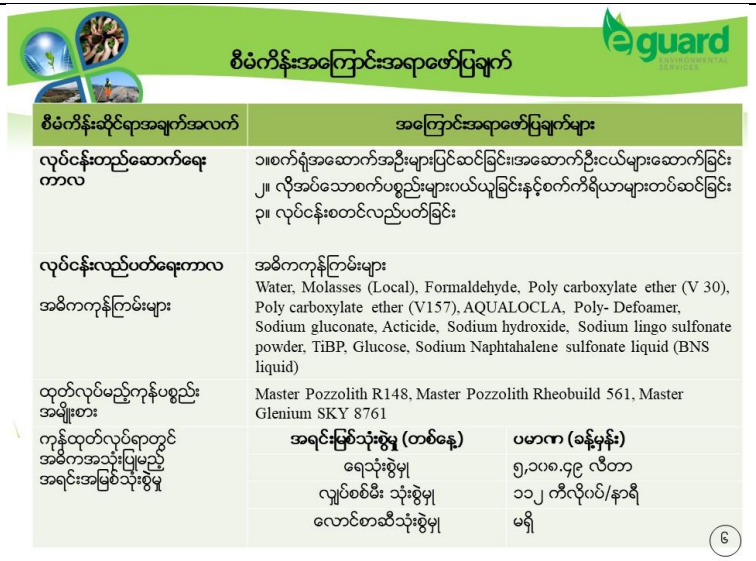

စက်ရုံ မျက်နှာစာ မြင်ကွင်း


အစည်းဝေးခန်း

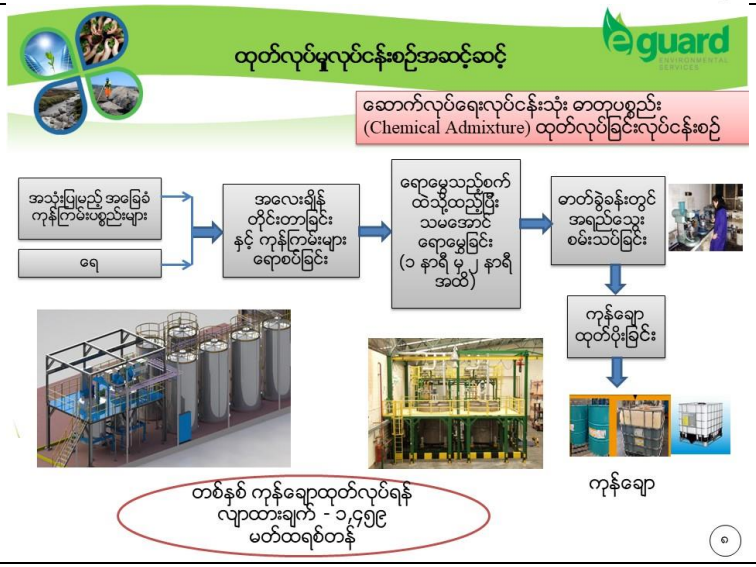

စက်ရုံပင်မဆောင် (ကုန်ထုတ်လုပ်ရာနေရာ)


စက်ရုံဝင်းအတွင်းရှိ အဆောက်အဦငယ်များ


ဘိလပ်မြေအရည်သွေးစမ်းသပ်ဓာတ်ခွဲခန်း
ရုံးခန်း
သန့်စင်ခန်း
စက်ရုံ လုံခြုံရေးကိတ်
၅


စီမံကိန်းအကြောင်းအရာဖော်ပြချက်
စီမံကိန်းဆိုင်ရာအချက်အလက်
အကြောင်းအရာဖော်ပြချက်များ
လုပ်ငန်းတည်ဆောက်ရေးကာလ
၁။စက်ရုံအဆောက်အဦးများပြင်ဆင်ခြင်း၊အဆောက်ဦးငယ်များဆောက်ခြင်း
၂။ လိုအပ်သောစက်ပစ္စည်းများဖယ်ယူခြင်းနှင့်စက်ကိရိယာများတပ်ဆင်ခြင်း
၃။ လုပ်ငန်းစတင်လည်ပတ်ခြင်း
လုပ်ငန်းလည်ပတ်ရေးကာလ
အဓိကကုန်ကြမ်းများ
Water, Molasses (Local), Formaldehyde, Poly carboxylate ether (V 30), Poly carboxylate ether (V157), AQUALOCLA, Poly- Defoamer, Sodium gluconate, Acticide, Sodium hydroxide, Sodium lingo sulfonate powder, TiBP, Glucose, Sodium Naphtahalene sulfonate liquid (BNS liquid)
အဓိကကုန်ကြမ်းများ
ထုတ်လုပ်မည့်ကုန်ပစ္စည်း အမျိုးစား
Master Pozzolith R148, Master Pozzolith Rheobuild 561, Master Glenium SKY 8761
ကုန်ထုတ်လုပ်ရာတွင် အဓိကအသုံးပြုမည့် အရင်းအမြစ်သုံးစွဲမှု
အရင်းမြစ်သုံးစွဲမှု (တစ်နေ့)
ပမာဏ (ခန့်မှန်း)
ရေသုံးစွဲမှု
၅၂၀.၄၉ လီတာ
လျှပ်စစ်မီး သုံးစွဲမှု
၁၁၂ ကီလိုဗပ်/နာရီ
လောင်စာဆီသုံးစွဲမှု
မရှိ
၆


အရင်းအမြစ်ရယူသုံးစွဲမှုအခြေအနေနှင့် စွန့်ပစ်ပစ္စည်းသိမ်းဆည်းမှုပုံစံ
အဝိစိတွင်းရေသုံးစွဲမှု
လျှပ်စစ်ရယူသုံးစွဲမှု (၃၁၅ ကေဗီအေ)
စွန့်ပစ်စွည်း သိမ်းဆည်းမှုအခြေအနေ
၇


ထုတ်လုပ်မှုလုပ်ငန်းစဉ်အဆင့်ဆင့်
ဆောက်လုပ်ရေးလုပ်ငန်းသုံး ဓာတုပစ္စည်း (Chemical Admixture) ထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ်
အသုံးပြုမည့် အခြေခံ ကုန်ကြမ်းပစ္စည်းများ
ရေ
အလေးချိန် တိုင်းတာခြင်း နှင့် ကုန်ကြမ်းများ ရောစပ်ခြင်း
ရောမွှေသည့်စက် ထဲသို့ထည့်ပြီး သမအောင် ရောမွှေခြင်း (၁ နာရီ မှ ၂ နာရီ အထိ)
ဓာတ်ခွဲခန်းတွင် အရည်သွေး စမ်းသပ်ခြင်း
ကုန်ချော ထုတ်ပိုးခြင်း
ကုန်ချော
တစ်နှစ် ကုန်ချောထုတ်လုပ်ရန် လျာထားချက် - ၁,၄၅၉ မက်ထရစ်တန်
၈

၂။ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆောင်ရွက်ရန်လိုအပ်ချက်များနှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းစဉ်များ

ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဆိုင်ရာ ဥပဒေ၊ နည်းဥပဒေနှင့် လုပ်ထုံးလုပ်နည်းများ

- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂ ခုနှစ်) နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး နည်းဥပဒေ (၂၀၁၄ ခုနှစ်) အရ စီမံကိန်းများကို စိစစ်ရာတွင် စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်မည့် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ မလိုလားအပ်သည့် ထိခိုက်မှုများ ရှိ/မရှိ နှင့် ထိခိုက်မှုများရှိခဲ့ပါကလည်း သိသာထင်ရှားမှု ရှိ (သို့) ပြင်းထန်သောထိခိုက်မှု ရှိ/မရှိ စသည်ဖြင့် စနစ်တကျဆန်းစစ်နိုင်ရန်ချည်ရွယ်၍ ပြုလုပ်ရ ခြင်းဖြစ်ပါသည်။
- ၂၀၁၅ ခုနှစ် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာ လုပ်ထုံးလုပ်နည်း၏ အပိုဒ် (၁၂၆) အရ အဆိုပြု စီမံကိန်းသည် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ဆောင်ရွက်ရန် ဖြစ်ပါသော်လည်း လူမှုရေးရာ ထိခိုက်မှုအားထည့်သွင်း၍ ပတ်ဝန်းကျင်နှင့်လူမှုရေးရာ ထိခိုက်မှုဆန်းစစ်ခြင်း (EIA) ကို ဆောင်ရွက် သွားမည်ဖြစ်ပါသည်။

၉

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆောင်ရွက်မည့် တတိယအဖွဲ့အစည်း နှင့် စိစစ်ခွင့်ပြုသည့် အစိုးရအဖွဲ့အစည်း

စိစစ်ခွင့်ပြုသည့် အစိုးရအဖွဲ့အစည်း

သယံဇာတနှင့်သဘာဝပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဝန်ကြီးဌာန (MONREC)

ဆောင်ရွက်သည့် တတိယအဖွဲ့အစည်း

E Guard Environmental Services Co. Ltd

၁၀

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ငန်းစဉ်များ

အစီရင်ခံစာ အပေါ် သုံးသပ် အကဲဖြတ်ခြင်း၊ သဘောထားမှတ်ချက်ပြုနိုင်ခြင်း နှင့် ECC လက်မှတ်ပေးခြင်း (ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန)

ဒေသလူထုဆွေးနွေးပွဲ (နောက်ဆုံး အဆင့်)

ပတ်ဝန်းကျင်ထိခိုက်မှု ဆန်းစစ်ခြင်း အတွက် စစ်တမ်းကောက်ယူခြင်းနှင့်အစီရင်ခံစာပြင်ဆင်ခြင်း

ဒေသလူထုဆွေးနွေးပွဲ (ကနဦး အဆင့်)

နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်း အစီရင်ခံစာရေးသားပြုစုခြင်း (Scoping Report)

စီမံကိန်းအမျိုးစားရွေးချယ်သတ်မှတ်ခြင်း (screening : IEE/EMP/EIA or Non EIA)

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း နှင့် ဒေသလူထုဆွေးနွေးပွဲ (နောက်ဆုံးအဆင့်တွင် ပါဝင်သောလုပ်ငန်းစဉ်များ)

၁။ စီမံကိန်းဆိုင်ရာအချက်အလက်များထုတ်ဖော်တင်ပြခြင်း။
၂။ ပတ်ဝန်းကျင်ဆိုင်ရာနှင့်လူမှုရေးဆိုင်ရာဆန်းစစ်လေ့လာမှုများ၊စုံစမ်းစစ်ဆေးမှုရလဒ်များအားတင်ပြခြင်း။
၃။ စီမံကိန်းကြောင့်ထိခိုက်နိုင်သူများ၊ဒေသဆိုင်ရာလူထုနှင့်အုပ်ချုပ်ရေးအဖွဲ့များ၊ လူမှုအဖွဲ့အစည်းများ၊ ရပ်ရွာအဖြေပြုလူမှုအဖွဲ့အစည်းများနှင့်တွေ့ဆုံဆွေးနွေးညှိနှိုင်းမှုများဆောင်ရွက်ခြင်း။

၁၁

နယ်ပယ်တိုင်းတာသတ်မှတ်ခြင်းအဆင့်မှတ်တမ်းများ

စီမံကိန်းအခြေအနေအား ကွင်းဆင်းလေ့လာခြင်း (စက်ရုံတည်ဆောက်ပြုပြင်ရေးကာလ ၊ (၂၀၁၈ ခုနှစ်၊ ဖေဖော်ဝါရီလ (၂၀) ရက်))

၁၂

နယ်ပယ်အတိုင်းအတာသတ်မှတ်ခြင်းအဆင့် စီမံကိန်းနှင့်ပတ်သက်ပြီး အများပြည်သူတွေ့ဆုံ ဆွေးနွေးပွဲ မှတ်တမ်းများ (၂၀၁၈ ခုနှစ်၊ မေလ (၂၅) ရက်)






၃။အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်းနှင့်အများပြည်သူ ပူပေါင်းပါဝင်ခြင်းဆိုင်ရာဆွေးနွေးပွဲကျင်းပရခြင်း၏ ရည်ရွယ်ချက်

ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းဆိုင်ရာလုပ်ထုံးလုပ်နည်း (၂၀၁၅)၊ အပိုဒ် (၆၃၈) အရ

- နယ်ပယ်အတိုင်းအတာ သတ်မှတ်ခြင်း (Scoping) နှင့် ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အတွက် စုံစမ်းစစ်ဆေးခြင်း (EIA Investigation) များ ဆောင်ရွက်ရာတွင် အများပြည်သူနှင့်တိုင်ပင်ဆွေးနွေးခြင်း နှင့် စီမံကိန်းနှင့်ပတ်သက်သောသတင်းအချက်အလက်များ ထုတ်ဖော်တင်ပြခြင်းစသည့် အများပြည်သူ နှင့်ပူးပေါင်းပါဝင်မှုလုပ်ငန်းစဉ်များ ဆောင်ရွက်ပြီးမှသာ အစီရင်ခံစာများ တင်ပြရန် ဖြစ်ပါသည်။

၁။ စီမံကိန်းဆိုင်ရာ အချက်အလက်များဖြစ်သော စီမံကိန်းဘည်နေရာ၊ အကောင်ထည်ဖော်ဆောင်ပီးစီးမှုအခြေန၊ ထိခိုက်သက်ရောက်နိုင်မှုအခြေအနေများ။ သက်ရောက်မှုအား လျော့ချနိုင်မည့်နည်းလမ်းများနှင့် ဆောင်ရွက်မည့် အစီအစဉ်ဝသည်တို့အား အသိပေးရန်။

၂။ စီမံကိန်းလုပ်ငန်းစဉ်များ အကောင်အထည်ဖော်စဉ်အတွင်း စီမံကိန်းနှင့်သက်ဆိုင်သူများထံမှသဘောထားမှတ်ချက် နှင့် အကြံဉာဏ်ရယူရန်။

၃။ လူထုတွေ့ဆုံပွဲမှရရှိသော အကြံဉာဏ်များနှင့်သဘောထားမှတ်ချက်များအား စီမံကိန်းအကောင်အထည်ဖော်ရာတွင် ထည့်သွင်းစဉ်းစားရန်။

၄။ စီမံကိန်း၏ သဘာဝနှင့်လူမှုဝန်းကျင်သက်ရောက်မှုများအား လူထုအားအသိပေးရန်။

၄။ ဥပဒေ၊နည်းဥပဒေဆိုင်ရာမူဘောင်နှင့်ကန့်သတ်ချက်

- ၂၀၁၈ အခြေခံဖွဲ့စည်းပုံဥပဒေ (EIA / SIA ဆိုင်ရာ ဥပဒေနှင့် လုပ်ထုံးလုပ်နည်းများ)
- ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဥပဒေ (၂၀၁၂) နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးနည်းဥပဒေများ (၂၀၁၄)
- EIA Procedures - ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်းလုပ်ငန်းလုပ်ထုံးလုပ်နည်းများ (၂၀၁၅)
- အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးထုတ်လွှတ်မှု (အခိုးအငွေ့) လမ်းညွှန်ချက်များ (၂၀၁၅)
- စီမံကိန်းနှင့်ပတ်သက်ဆက်နွယ်သော အခြား ဥပဒေ ၊ နည်းဥပဒေနှင့် လုပ်ထုံးလုပ်နည်းများ
- ပုဂ္ဂလိကစက်မှုလုပ်ငန်းဥပဒေ (၁၉၉၀)
- ပုဂ္ဂလိကစက်မှုလုပ်ငန်းဥပဒေဆိုင်ရာလုပ်ထုံးလုပ်နည်းများ (၁၉၉၁)
- မြန်မာနိုင်ငံ ရင်းနှီးမြှုပ်နှံမှုဥပဒေ (၂၀၁၆)
- ဓာတုပစ္စည်းနှင့်ဆက်စပ်ပစ္စည်းများအန္တရာယ်မှတားဆီးကာကွယ်ရေးဥပဒေ (၂၀၁၃)
- လျှပ်စစ်ဥပဒေ (၂၀၁၄)
- ရေအရင်းအမြစ်နှင့်မြစ်ချောင်းများထိန်းသိမ်းရေးဥပဒေ (၂၀၁၆)နှင့် နည်းဥပဒေ (၂၀၁၃)
- မြေအောက်ရေအက်ဥပဒေ (၁၉၃၀)
- ယဉ်ကျေးမှုအမွေအနှစ်ဒေသများကာကွယ်ထိန်းသိမ်းရေးဥပဒေ (၁၉၉၈)
- အလုပ်ရုံဥပဒေ (၂၀၁၅) များစသည့် စီမံကိန်းနှင့် ပတ်သက်ဆက်နွယ်သော ဥပဒေများ

မှတ်ချက် - အခြားသက်ဆိုင်သော ဥပဒေ၊ နည်းဥပဒေ များကိုလည်း EIA အစီရင်ခံစာတွင်ပြည့်စုံစွာ ဖော်ပြထားပါသည်။

၅။စီမံကိန်းအနီးပတ်ဝန်းကျင်ရှိ လက်ရှိသဘာဝပတ်ဝန်းကျင်နှင့် လူမှုပတ်ဝန်းကျင်ဆိုင်ရာတွေ့ရှိချက်များ

လက်ရှိပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးများကိုစက်ကိရိယာများဖြင့်တိုင်းတာစစ်ဆေးခြင်း

- ✓ လေထုထဲတွင်ပါဝင်သော - အမှုန်အမွှားပမာဏ၊ ကာဗွန်ဒိုင်အောက်ဆိုဒ်၊ကာဗွန်မိုနောက်ဆိုဒ်၊ ဆာလဖာဒိုင်အောက်ဆိုဒ် ၊ နိုက်ထရိုဂျင်ဒိုင်အောက်ဆိုဒ်၊ အငွေ့ပျံလွယ်သောအောဂဲနစ်ပြပေါင်းတို့ကို တိုင်းတာခဲ့ပါသည်။
- ✓ ပတ်ဝန်းကျင်ဆူညံသံ - စက်ရုံပြင်ဆင်ဆောက်လုပ်ရေးကာလ လုပ်ငန်းခွင်နေရာနှင့် စက်ရုံပန်းအတွင်း ဆူညံသံတိုင်းတာခဲ့ပါသည်
- ✓ ရေအရည်သွေး တိုင်းတာခြင်း - မြေအောက်ရေ (အပီစိတွင်းရေ) နှင့် စက်ရုံ၏ရေနုတ်မြောင်း မှ ရေနမူနာများကောက်ယူကာ ဓာတ်ခွဲခန်းတွင် စမ်းသပ်တိုင်းတာခဲ့ပါသည်။
- ✓ မြေအရည်သွေး - စီမံကိန်းနေရာရှိမြေနမူနာများကောက်ယူကာ သက်ဆိုင်ရာဓာတ်ခွဲခန်းတွင်း စမ်းသပ်တိုင်း တာခဲ့ပါသည်။

မှတ်ချက် - တိုင်းတာရရှိလာသော မြေအရည်သွေး၊ လေ အရည်သွေး၊ ဆူညံသံအခြေအနေ စသည့်တိုင်းတာမှု ရလဒ်များ သည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ ထုတ်လွှတ်မှုအရည်သွေး (အနိုးငွေ့) လမ်းညွှန်ချက်များ အတွင်းရှိသည်ကိုတွေ့ရပြီး ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ (EIA report) တွင် ပြည့်စုံစွာဖော်ပြထားပါသည်။

(က) ရေ၊ မြေ၊ လေထု၊ ဆူညံသံ စသည့် ပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးလေ့လာဆန်းစစ်နမူနာ ကောက်ယူခြင်း

မြေအောက်ရေနမူနာ ကောက်ယူခြင်း

စက်ရုံတွင်းအသုံးပြုရန် ရေတွင်း

စက်ရုံရေနုတ်ပြောင်းမှ ရေနမူနာကောက်ယူခြင်း

မြေအရည်သွေးတိုင်းတာရန် နမူနာကောက်ယူခြင်း

လေအရည်သွေးတိုင်းတာခြင်း

ဆူညံသံ တိုင်းတာခြင်း

စီမံကိန်းပတ်ဝန်းကျင်ရှိ လေအရည်အသွေးရလဒ်များ

စဉ်	အမည်	တိုင်းတာရရှိသည့် ပျမ်းမျှတန်ဖိုး	လမ်းညွှန်ချက်တ တန်ဖိုးများ	ယူနစ်	လမ်းညွှန်ချက်၏ ပျမ်းမျှကြာချိန် (နာရီ)	အခွဲ အစည်း
၁။	PM_{10}	၂၁.၉၉	၅၀	µg/m3	၂၄	NEQG
၂။	$PM_{2.5}$	၁၃.၅၁	၂၅	µg/m3	၂၄	NEQG
၃။	CO	၀.၀၀၀၆၂	၉	ppm	၈	ACGIH
၄။	CO_2	၄၄၇.၀၂	၅၀၀၀	ppm	၈	ACGIH
၅။	SO_2	၂.၆၃	၂၀		၂၄	NEQG
၆။	NO_2	၅၃.၆၈	၂၀၀		၂၄	NEQG
၇။	VOC	၀.၁၄	၅၀	mgN/m^3	၈	NEQG

NEQ – National Environmental Quality Emission Guideline, ACGIH –American Conference of Governmental Industrial Hygienists , NAAQS – National Ambient Air Quality Standard

စီမံကိန်းပတ်ဝန်းကျင်ရှိ ရေအရည်အသွေး

အဝိစိရေ (မြေအောက်ရေ) ဓာတ်ခွဲတိုင်းတာမှုရလဒ်တန်ဖိုးများ

No.	Parameters	Unit	Ground Water Quality Result	WHO Drinking water Guideline
Ground Water Quality				
On-site Measurement				
1	pH	pH	8.90	6.5 ~ 8.5
2	Temperature	°C	27.07	-
3	Electric Conductivity (EC)	µS/cm	0.641	30
4	Total Dissolved Solids (TDS)	mg/l	410	-
5	Salinity	ppt	0.3	-
6	Dissolved Oxygen (DO)	mg/l	10.21	-
Laboratory Finding				
1	pH	pH	8.4	6.5 ~ 8.5
2	Turbidity	NTU	8	5
3	Total Hardness	mg/l as CaCO3	100	500
4	Suspended Solids	mg/l	10	-
5	Total Hardness	mg/l	100	500
6	Iron	mg/l	0.35	0.3
7	Chloride (as Cl)	mg/l	64	250
8	Manganese	mg/l	Nil	0.05
9	Zinc (Zn)	mg/l	Nil	3
10	Copper (Cu)	mg/l	Nil	2
11	Arsenic (As)	mg/l	Nil	0.01
12	Lead (as Pb)	mg/l	Nil	0.01
13	Cadmium	mg/l	0.043	< 1
14	Sulfate	mg/l	11	250

မှတ်ချက် - တိုင်းတာမှုရလဒ်များတွင် pH, turbidity,iron တို့သည် WHO Drinking Water Guideline ထက် အနည်းငယ်ကျော်လွန်နေသည်ကိုတွေ့ရပါသည်။

စက်ရုံ၏ ရေနုတ်မြောင်းမှ ရေ ဓာတ်ခွဲတိုင်းတာမှုရလဒ်တန်ဖိုးများ

No.	Parameters	Unit	Water quality Result	National Environmental Quality (emission) Guideline
Wastewater Onsite Result				
Laboratory Finding				
1	pH	S.U.a	7.5	6-9
2	Turbidity	NTU	102	-
3	Color (True)	TCU	110	-
4	Suspended Solids (TSS)	mg/l	108	-
5	Free Choline	mg/l	Nil	-
6	Total Chlorine (total residual)	mg/l	Nil	0.2
7	Chemical Oxygen Demand (COD)	mg/l	64	250
8	5 Days Biochemical Oxygen Demand (BOD), at 20°C	mg/l	18	50
9	Total Nitrogen	mg/l	6.5	10
10	Oil & Grease	mg/l	3.4	10
11	Total Coliform Count	CFU/100 ml	32	400
12	Thermo tolerant (fecal) Coliform Count	CFU/100 ml	6	400
13	Chloride	mg/l	40	-
14	Sodium	mg/l	52	-
15	Phosphorous	mg/l	11	-

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စက်ရုံ၏ မြေအရည်အသွေး ဓာတ်ခွဲတိုင်းတာမှုရလဒ်တန်ဖိုးများ

Chemical Compositions of Soil Quality	Laboratory Finding (ppm)
Calcium (Ca)	356742.8
Silicon (Si)	268193.5
Iron (Fe)	219885.3
Aluminum (Al)	75237.69
Potassium (K)	42553.37
Titanium (Ti)	22326.28
Manganese (Mn)	4489.459
Sulfur (S)	4137.613
Strontium (Sr)	2100.079
Zinc (Zn)	993.064
Rubidium (Rb)	889.382
Vanadium (V)	739.434
Chromium (Cr)	660.559
Nickel (Ni)	483.905
Yttrium (Y)	288.601
Copper (Cu)	278.999

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(ခ) စီမံကိန်းအနီးပတ်ဝန်းကျင်ရှိ လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်း

မှတ်ချက် - လူမှုစီးပွားစစ်တမ်းကောက်ယူခြင်းမှ တွေ့ရှိချက်များကိုလည်း ပတ်ဝန်းကျင်ထိခိုက်မှုဆန်းစစ်ခြင်း အစီရင်ခံစာ (EIA report) တွင် ပြည့်စုံစွာဖော်ပြထားပါသည်။

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၆။ စီမံကိန်းကြောင့်ဖြစ်ပေါ်လာနိုင်သည့် ပတ်ဝန်းကျင်နှင့် လူမှုရေးဆိုင်ရာ သက်ရောက်နိုင်မှုတွေ့ရှိချက်များ

စီမံကိန်းလုပ်ငန်းများလုပ်ဆောင်မှုအဆင့်ဆင့်

ပြန်လည်ပြုပြင်မွမ်းမံရေး/တည်ဆောက်ရေးကာလ

- မူလအဆောက်အအုံအား BASF Myanmar Co., Ltd ၏ စက်ရုံဒီဇိုင်းအတိုင်းပြန်လည်ပြင်ဆင်ခြင်း
- အဆောက်အဦးငယ်များဆောက်လုပ်ခြင်းလုပ်ငန်း
- စက်ပစ္စည်းများသယ်ယူပို့ဆောင်ခြင်းနှင့်တပ်ဆင်ခြင်းလုပ်ငန်း

လုပ်ငန်းလည်ပတ်ရေးကာလ

- ဓာတုပစ္စည်း (အရည်၊အမှုန့်) စသည့်ကုန်ကြမ်းများ တင်သွင်းခြင်း နှင့် ယင်းတို့အား MSDS သတ်မှတ်ချက်များနှင့် အညီ စနစ်တကျစစ်ဆေးသိုလှောင်ခြင်း
- ဆောက်လုပ်ရေးလုပ်ငန်း ဓာတုပစ္စည်း (Concrete Chemical Admixture) ထုတ်လုပ်ခြင်းလုပ်ငန်းစဉ်အဆင့်ဆင့်
- ကုန်ချောများယာယီသိုလှောင်ခြင်းနှင့်ပြည်တွင်းဈေးကွက်သို့ဖြန့်ဖြူးရောင်းချခြင်း

စီမံကိန်းပိတ်သိမ်းကာလ

- စက်ပစ္စည်းများဖြုတ်သိမ်းခြင်း
- အဆောက်အဦးများဖျက်သိမ်းခြင်း
- စီမံကိန်းနေရာအားမူလအခြေအနေအတိုင်း ပြင်ဆင်ခြင်း။

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ထိခိုက်သက်ရောက်မှု အဆင့်များ

သိသာထင်ရှားသောသက်ရောက်မှု	သက်ရောက်မှု အဆင့်
၁၅ အောက်	အလွန်နည်း
၁၅-၂၉	နည်း
၃၀-၄၄	အလယ်အလတ်
၄၅-၅၉	မြင့်
၆၀ အထက်	အလွန်မြင့်

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ပတ်ဝန်းကျင်နှင့်လူမှုရေးဆိုင်ရာသက်ရောက်နိုင်မှုများ

စီမံကိန်းဇရိယာနှင့် အနီးပတ်ဝန်းကျင်အား ထိခိုက်နိုင်မှုများ	သက်ရောက်မှုအဆင့် (ကောင်းကျိုး/ဆိုးကျိုး)	
	လုပ်ငန်းလည်ပတ်ရေးကာလ	လုပ်ငန်းပိတ်သိမ်းကာလ
သဘာဝပတ်ဝန်းကျင်နှင့်သယံဇာတအရင်းအမြစ်များ အပေါ် သက်ရောက်နိုင်မှုများ		
ရေသုံးစွဲမှုနှင့် ရေအရည်သွေး (မြေပေါ်ရေ၊ မြေအောက်ရေ)	ဆိုးကျိုးသက်ရောက်မှု အဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်	သိသာသော ဆိုးကျိုး သက်ရောက်မှုအဆင့် **အလွန်နည်း**
မြေဆီလွှာ နှင့် မြေရည်အသွေး	ဆိုးကျိုးသက်ရောက်မှုအဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်	ဆိုးကျိုးသက်ရောက်မှုအဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်
လေထုအရည်သွေး	ဆိုးကျိုးသက်ရောက်မှုအဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်	ဆိုးကျိုးသက်ရောက်အဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်
ဆူညံသံနှင့် တုန်ခါမှု	ဆိုးကျိုးသက်ရောက်မှုအဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်	သိသာသောဆူညံသံနှင့်တုန်ခါမှုအဆင့် **အနည်းငယ်** ရှိပါသည်

၂၆

စီမံကိန်းဇရိယာနှင့် အနီးပတ်ဝန်းကျင်အား ထိခိုက်နိုင်မှုများ	သက်ရောက်မှုအဆင့် (ကောင်းကျိုး/ဆိုးကျိုး)	
	လုပ်ငန်းလည်ပတ်ရေးကာလ	လုပ်ငန်းပိတ်သိမ်းကာလ
ဇီဝမျိုးစုံမျိုးကွဲ နှင့် ပတ်သက်သည့် သက်ရောက်နိုင်မှုများ		
ရေနေသတ္တဝါ	သက်ရောက်မှုအဆင့် **အနည်းငယ်**ရှိနိုင်ပါသည်	ဆိုးကျိုးသက်ရောက်မှုမရှိနိုင်ပါ
သစ်တော	ဆိုးကျိုးသက်ရောက်မှုမရှိပါ	ဆိုးကျိုးသက်ရောက်မှုမရှိနိုင်ပါ
တောရိုင်းတိရိစ္ဆာန်	ဆိုးကျိုးသက်ရောက်မှုမရှိပါ	ဆိုးကျိုးသက်ရောက်မှုမရှိနိုင်ပါ
လူမှုဝန်းကျင်ဆိုင်ရာ သက်ရောက်နိုင်မှုများ		
ဆူညံသံနှင့်တုန်ခါမှု	ဆိုးကျိုးသက်ရောက်မှု အဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်	ဆိုးကျိုးသက်ရောက်မှု **အနည်းငယ်** ရှိနိုင်ပါသည်
ဆိုးရွားသောအနံ့	ဆိုးကျိုးသက်ရောက်မှုအဆင့် **အလွန်နည်း**	ဆိုးကျိုးသက်ရောက်မှုမရှိနိုင်ပါ
ဒေသခံများ၏ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်းရှင်းရေး	ဆိုးကျိုးသက်ရောက်မှု အဆင့် **အသင့်တင့် (အလည်အလတ်)** ရှိနိုင်ပါသည်	ဆိုးကျိုးသက်ရောက်မှု အနည်းငယ် ရှိနိုင်ပါသည်

၂၇

စီမံကိန်းဇရိယာနှင့် အနီးပတ်ဝန်းကျင်အား ထိခိုက်မှုများ	သက်ရောက်မှုအဆင့် (ကောင်းကျိုး/ဆိုးကျိုး)	
	လုပ်ငန်းလည်ပတ်ရေးကာလ	လုပ်ငန်းပိတ်သိမ်းကာလ
လူမှုဝန်းကျင်ဆိုင်ရာ သက်ရောက်နိုင်မှုများ		
မြန်လည်နေရာချထားခြင်း	မြန်လည်နေရာချထားမှု ပြုလုပ်ရန်မလိုအပ်ပါ	မြန်လည်နေရာချထားမှု ပြုလုပ်ရန်မလိုအပ်ပါ
နေထိုင်မှုနှင့် အသက်မွေးမှု	ကောင်းကျိုးသက်ရောက်မှု ရှိနိုင်ပါသည်	ကောင်းကျိုးသက်ရောက်မှုဆင့် **အနည်းငယ်**ရှိပါသည်
ယဉ်ကျေးမှု အမွေအနှစ်	ဆိုးကျိုးသက်ရောက်မှုမရှိပါ	ဆိုးကျိုးသက်ရောက်မှုမရှိပါ
အခြားသော သက်ရောက်နိုင်မှုများ		
မတော်တဆ ဖြစ်ပွားနိုင်မှု၊ မီးဘေးအန္တရာယ်	ဆိုးကျိုးသက်ရောက်မှု **အနည်းငယ်**ရှိနိုင်ပါသည်	သက်ရောက်နိုင်မှုဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်
စွန့်ပစ်ပစ္စည်း (အမှိုက်)	သက်ရောက်မှု **အနည်းငယ်** ရှိနိုင်ပါသည်	ဆိုးကျိုးသက်ရောက်မှုဆင့် **အနည်းငယ်** ရှိနိုင်ပါသည်
လျှပ်စစ်မီး သုံးစွဲမှု	ဆိုးကျိုးသက်ရောက်နိုင်မှု အဆင့် **အလည်အလတ်** ရှိနိုင်ပါသည်	သက်ရောက်မှုဖြစ်နိုင်ခြေအဆင့် **အလွန်နည်း**

၂၈

ဂ၊စီမံကိန်းကြောင့် ပတ်ဝန်းကျင်ထိခိုက်မှု အနှည်းဆုံးဖြစ်စေရန် ဆောင်ရွက်ပေးမည့် လျော့ချရေး အစီအမံများ

- ✓ စီမံကိန်းလုပ်ငန်းများဆောင်ရွက်ရာတွင် မြန်မာနိုင်ငံမှပြဋ္ဌာန်းထားသော အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာ အရည်အသွေး (ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များ နှင့် နိုင်ငံတကာဘဏ္ဍာရေးပူပေါင်းဆောင်ရွက်ရေးအဖွဲ့ (IFC) ၏ ကုန်ထုတ်လုပ်မှုလုပ်ငန်းဆိုင်ရာ လမ်းညွှန်ချက်များ၊ ကမ္ဘာ့ကျန်းမာရေးအဖွဲ့ (WHO) ကျန်းမာရေးဆိုင်ရာ စံချိန်စံညွှန်းများ နှင့် BASF Group ၏ ကမ္ဘာလုံးဆိုင်ရာ HSE သတ်မှတ်ချက်စံချိန်စံညွှန်းများစသည် တို့နှင့် အညီ ဆောင်ရွက် အကောင်အထည်ဖော်ခြင်း။
- ✓ ကုန်ထုတ်လုပ်ငန်းမှ ထွက်ရှိလာမည့် စွန့်ပစ်ရေဆိုးများကို သီးခြားကန်ဖြင့် စုဆောင်းကာ နောက်တစ်ကြိမ် ကုန်ထုတ်ခြင်းလုပ်ငန်းစဉ်အတွက် ပြန်လည်အသုံးပြုခြင်း။ (Zero Discharge System)
- ✓ အန္တရာယ်ရှိစွန့်ပစ်ပစ္စည်းများ (စွန့်ပစ် ဓာတုပစ္စည်းနှင့်အခြားပစ္စည်း) ကိုလည်း ပြည်တွင်းရှိ အသိမှတ်ပြု အမှိုက်သိမ်းအဖွဲ့အစည်းနှင့်ချိတ်ဆက်ကာ စွန့်ပစ်ခြင်း (ဥပမာ- YCDC, Dowa)
- ✓ အခိုးအငွေ့ထွက်ရှိမှုများလျော့နည်းစေရန် ထိန်းချုပ်စက်ကိရိယာ (scrubber system) တပ်ဆင်ခြင်းအသုံးပြုပြီး ဆောင်ရွက်ထားရှိခြင်း။
- ✓ စီမံကိန်းနှင့်ပတ်သက်၍ ဒေသခံများအနေဖြင့် သိလိုသည်များ၊ပြောကြားလိုသည်များ အချိန်မီ သိရှိနိုင်ရန် ဆက်သွယ်မေးမြန်းသည့် Grievance Mechanisms (တိုင်ကြားရန်) စီမံချက်ထားရှိပေးခြင်း။

၈။ပတ်ဝန်းကျင်စီမံခန့်ခွဲမှုအစီအစဉ်

- စက်ရုံလည်ပတ်ခြင်း **(စက်ရုံလည်ပတ်သည့် ကာလ)**
- စက်ရုံပိတ်သိမ်းကာလ **(ဖြိုဖျက်ရေးကာလ)**

ဆိုးကျိုးသက်ရောက်ခြင်းမှ
- ✓ကာကွယ်ရန်
- ✓ရှောင်လွှဲရန်
- ✓လျော့နည်းစေရန်

နည်းလမ်းနှင့် အစီအစဉ်များ ဖော်ပြသည့်စီမံချက်

=

ဆိုးကျိုးလျော့နည်းစေရန် အရေးယူဆောင်ရွက်မှုများနှင့် စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်

စက်ရုံလည်ပတ်သည့်ကာလ

စက်ရုံလည်ပတ်သည့်ကာလ

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၁။	လေထုအရည်အသွေးနှင့်အန္တ	• ကုန်ကြမ်းများ ရောနှောခြင်း နှင့်ကန့်များဆေးကြော သန့်စင်ရာ ကုန်ထုတ်လုပ် သည့် ဇရိယာ မှ အငွေ့ပျံလွှယ်သော ဓာတုပစ္စည်းများ အငွေ့အဖြစ် ထွက်ရှိခြင်း • ကုန်ကြမ်းသိုလှောင်ထားခြင်းမှ အခိုးငွေ့နှင့် အန့်များ ထွက်ခြင်း	• အဆောက်အဦအတွင်းလေထုညစ်ညမ်းမှုကို ကာကွယ်တားဆီးရန် တပ်ဆင်ထားသော ဓာတ်ငွေ့စုပ်စနစ် (gases scrubber system) နှင့် အမှုန်စုပ် ကိရိယာများ (filter) များကို ပုံမှန်စစ်ဆေးပြုပြင်ခြင်း။ • လေအရည်သွေးစောင့်ကြပ်ကြည့်ရှုရန်အစီအစဉ်ပါ သတ်မှတ်ထားသော parameter များကို လမ်းညွှန်ချက်စံချိန်စံညွှန်းများ အတိုင်းတိုင်းတာခြင်း။ • သယ်ယူရလွယ်ကူသော ကိရိယာများ အသုံး ပြုပြီး အငွေ့ပျံလွယ်သော ဓာတုပစ္စည်းများ အခြေနေကို ပုံမှန် တိုင်းတာခြင်း။ • ဓာတုပစ္စည်းများ အငွေ့ပျံလွှယ်ခြင်း လျော့နည်းစေရန် အခန်းအပူချိန်၊ စိုထိုင်းစ စသည့် ပတ်ဝန်းကျင်ဆိုင်ရာ အခြေနေများကို ထိန်းညှိပေးခြင်းနှင့်ပုံမှန်စစ်ဆေးခြင်း။
၂။	ဆူညံသံ	• ကုန်ထုတ်လုပ်သည့် ဇရိယာ မှ စက် ဆူညံသံ နှင့် လုပ်ငန်းသုံး ယာဉ်များ အသုံးပြုခြင်းမှ ဆူညံသံများ	• စက်များကို ပုံမှန်စစ်ဆေး ပြုပြင်ခြင်း • လုပ်ငန်းခွင်ဇရိယာတွင် ဆူညံသံကို အချိုးသာပတ်ဝန်းကျင်ဆိုင်ရာထုတ်လွှတ်မှု အရည်သွေး (အခိုးငွေ့) လမ်းညွှန်ချက် အတိုင်း စောင့်ကြည့်ခြင်း။ • ဆူညံသံလျော့ချနိုင်သော Mufflers ကိရိယာများကို တပ်ဆင်အသုံးပြုခြင်း

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၃။	ဒေသခံများ၏ ကျန်းမာရေးနှင့် ဘေးအန္တရာယ်ကင်း ရှင်းရေး	• လုပ်ငန်းခွင်မှ ထွက်ရှိလာမည့် စွန့်ပစ်ရေဆိုး၊အိုးအိမ်အငွေ့ဆည်သံနှင့် အန္တရာယ်ရှိ စွန့်ပစ်အမှိုက်များ ကို စနစ်တကျ ဖယ်ရှိမခန့် ခွဲခြင်း။	• စီမံကိန်းလည်ပတ်ရေးကာလတွင် ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်များကို အနီး ပတ်ဝန်းကျင်ရှိ လူနေအိမ်များနှင့် စက်ရုံများကို ထိခိုက်မှုအနည်းဆုံးဖြစ်စေရန် စီမံခန့်ခွဲခြင်း။ • လုပ်ငန်းခွင် မတော်တဆမှုများလျော့ချနိုင်ရန် ကျန်းမာရေးနှင့်ဘေးအန္တရာယ်ကင်းရှင်းရေး လုပ်ထုံးလုပ်နည်းများအတိုင် စီမံဆောင် ရွက်ခြင်း။
၉။	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး	• မတော်တဆထိခိုက်နိုင်မှု • အငွေ့ပျံလွယ်သောဓာတုကုန် • ကြမ်းများ နှင့် အန္တရာယ်ရှိ ဓာတုပစ္စည်းများ ကုန်ထုတ် လုပ် သည့် ဓရိယာ တွင် ဝန်ထမ်းများအား ရွှံရွှက်မိ ခြင်းနှင့် ထိတွေ့ နိုင်ခြင်း။	• ကျွမ်းကျင်ဝန်ထမ်းများကိုခန့်ထားခြင်း။ • လိုအပ်သော လုပ်ငန်းခွင်ဆိုင်ရာ သင်တန်းများ ပေးခြင်း။ • လုပ်ငန်းခွင်သုံးကာကွယ်ရေးပစ္စည်း (PPE) ပေးခြင်း • လုံလောက်သော လေ ပေးစနစ် တပ်ဆင်ပေးခြင်း • ဝန်ထမ်းများ အား ကျန်းမာရေ စစ်ဆေးမှုများကို နှစ်စဉ်ဆောင်ရွက်ပေးခြင်း။

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၁။	ရေသုံးစွဲမှု မြေပေါ်မြေအောက် ရေအရည်အသွေး	• ကုန်ထုတ်လုပ်ခြင်းအတွက် ရေသုံးစွဲခြင်း • မိလ္လာရေဆိုး • ကုန်ကြမ်းကုန်ချောများ ၊ထည့်သည့် tanks၊ containers များ ဆေးကြောခြင်းမှ ထုတ်လာမည့် ရေဆိုးများ	• ကုန်ထုတ်လုပ်သည့် ဇရိယာတွင် ရေဓိတာတပ်ဆင်အသုံး ပြုခြင်း။ • ပုံမှန်ရေသုံးစွဲမှုကို သတ်မှတ်နေရာတွင် ပုံမှန်မှိုင်းယှဉ်ပြီး ကျော့ချခြင်းအစီအစဉ်များအကောင်ထည်ဖော်ဆောင်ရွက် ခြင်း။ • စက်ရုံမှ စွန့်ပစ်မည့်ရေဆိုးများကို အမျိုးသားပတ်ဝန်းကျင်ဆိုင် ရာ အရည်သွေးထုတ်လွှတ်မှုလမ်းညွှန်ချက်နှင့်အညီစွန့်ပစ်ခြင်း • ကုန်ထုတ် ဇရိယာမှ ထွက်ရှိလာမည့် စွန့်ပစ်ရေအား သင့်တင့်ကောင်းမွန်သော စနစ်ဖြင့် စနစ်တကျ စုဆောင်း သိုလှောင်ထားကာ ကုန်ထုတ်လုပ်မှု တွင် ပြန်လည်အသုံး ပြုခြင်း • စုဆောင်းထားသော စွန့်ပစ်ရေများထည့်သည့် IBC tank များကို ပုံမှန်စစ်ဆေးမှုပြုလုပ်ခြင်း။ • စက်ရုံအနီးရှိ ရေနတ်မြောင်းကို ပုံမှန်ပြုပြင်ခြင်း • အန္တရာယ်ရှိ ဓာတုပစ္စည်းများ မတော်တဆ ဖိတ်စင်ယိုကျနိုင်မှု များ အတွက် အရေးပေါ်ကာကွယ်တာဆီးနိုင်ရန်ကြိုတင် ပြင်ဆင်ခြင်း။
၄။	ရေနေသတ္တဝါများ အပေါ် သက်ရောက်နိုင်မှု	• ရုံးသုံး ရေဆိုးစွန့်ပစ် ခြင်း • Tank နှင့် container များ ဆေးကြောခြင်းမှ ထွက်လာမည့် စွန့်ပစ်ရေဆိုးထွက်ခြင်း	• စွန့်ပစ်ရေဆိုး (domestic wastewater) ထုတ်လွှတ်မည့် စက်ရုံ ရေနတ်မြောင်း၏ ရေအရည်သွေးကို စစ်ဆေးခြင်း။ • သင့်တင့်ကောင်းမွန်သော ရေဆိုး စွန့်ပစ်စနစ်ကို အသုံးပြုခြင်း။ • အန္တရာယ်ရှိ ကုန်ကြမ်းဓာတုပစ္စည်းများကို ရေနှင့်ဝေးသော နေရာတွင်ထားခြင်း။

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၅။	မြေအရည်အသွေး	• အန္တရာယ်ရှိ ဓာတုပစ္စည်း နှင့် ကုန်ကြမ်းများ မတော်တဆဖိတ်စင်ခြင်း။	• ကုန်ကြမ်း နှင့် ကုန်ချောများကို ၎င်းတို့၏ MSDS (Material Safety Data Sheet) များအတိုင်း စနစ်တကျသိမ်းဆည်း သိုလှောင်ခြင်း။ • မြေအရည်သွေးကို နှစ်စဉ် စောင့် ကြပ်ကြည့် ရှု့ခြင်း။
၆။	လျှပ်စစ်သုံးစွဲမှု	• စက်များလည်ပတ်ရန် နှင့် ရုံးလုပ်ငန်းများအတွက် လျှပ်စစ်သုံးစွဲခြင်း	• လုပ်ငန်းခွင်၏ လျှပ်စစ်သုံးစွဲမှုအခြေနေများကို ပုံမှန် ပြင်ဆင် သုံးသပ်ကာ ချွေတာရေး အစီအစဉ်များပြုလုပ်ခြင်း။ • ကုန်ထုတ်လုပ်မှုမဟာဗျူဟာနှင့် စွမ်းအင်သုံးစွဲမှု အခြေကို ညီတူညီမျှဖြစ်စေရန် ဆောင်ရွက်ခြင်း။
၇။	စွန့်ပစ်ပစ္စည်း (အမှိုက်)	• ရုံးသုံး စွန့်ပစ်အမှိုက်များ • ကုန်ကြမ်းသိုလှောင်ထားသော container မှ အကြွင်းကျန်ဓာတုပစ္စည်းများ ။အရည်သွေးမမှီသောကုန် ၊ကျောများ • ကုန်ထုပ်ပိုးပစ္စည်း အမှိုက်များ	• စက်ရုံးအတွင်းရှိ အမှိုက်များကို စနစ်တကျ သိမ်းဆည်းကာ YCDC ၏ လမ်းညွှန်ချက်များအတိုင်း စွန့်ပစ်ခြင်း။ • ဓာတုကုန်ကြမ်းများကို MSDS (Material Safety Data Sheet) များအတိုင်း စနစ်တကျထားရှိကာ ပုံမှန်စစ်ဆေးခြင်း • သတ်မှတ်ထားသော နေရာတွင်သာ အန္တရာယ်ရှိ ဓာတုပစ္စည်းများကို စနစ်တကျ စွန့်ပစ်ခြင်း။ • 3R စနစ်ကို စက်ရုံတွင်းကျင့်သုံးခြင်း။

ဆိုးကျိုးလျော့နည်းစေသည့် အရေးယူဆောင်ရွက်မှုများနှင့် စောင့်ကြပ်ကြည့်ရှုမည့် အစီအစဉ်

စီမံကိန်းလွန်ဖျက်သိမ်းရေးကာလ

စီမံကိန်းလွန်ဖျက်သိမ်းရေးကာလ

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၁။	လေထုအရည်အသွေး	• လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့်ယာဉ်ယန္တရား များသွားလာခြင်းမှ ဖုန်ထခြင်း နှင့် ထို ယာဉ်များမှ ဓာတ်ငွေ့ များထွက်ခြင်း • စီမံကိန်းဖြိုဖျက်ရေးလုပ်ဆောင်မှု ငါးများ	• ရေဖြန်းခြင်း • ယာယီအုပ်ဆိုင်းခြင်း • လုပ်ငန်းဖျက်သိမ်းရာတွင် ကောင်းမွန်သောယာဉ်ယန္တရားများ အသုံးပြုခြင်းနှင့်ပုံမှန်စစ်ဆေးခြင်း • ဖျက်သိမ်းထားသော ပစ္စည်းများအား စနစ်တကျစွန့်ပစ်ခြင်းနှင့် မီးရှို့ခြင်းကို တားမြစ်ခြင်း
၂။	မြေပေါ်မြေအောက် ရေအရည်အသွေး	• ဖျက်သိမ်းရာမှ ထွက်လာသော အမှိုက်များအား ရေမြောင်းများ အတွင်းသို့စွန့်ပစ်ခြင်း • အလုပ်သမားများ၏ မိလ္လာအညစ်အကြေးစွန့်ပစ်မှု	• ယာယီယင်လုံသန့်စင်ခန်းအသုံးပြုစေ ခြင်း။ • အမှိုက်များကို စည်ပင်သာကော်မတီ၏ လမ်းညွှန်မှုနှင့်အညီ စနစ်တကျ စွန့်ပစ် စေခြင်း
၃။	မြေအရည်အသွေး	• လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့်ယာဉ်ယန္တရား များမှ ဆီများယိုစိမ့်မိခြင်း • စွန့်ပစ်အမှိုက်အခဲအမှိုက်များကိုစန စနစ်တကျမစွန့်ပစ်ခြင်း	• လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့်ယာဉ်ယန္တရားများနှင့် စက်များအားပုံမှန်စစ်ဆေးခြင်း • ဆီစစ်သံကန်များအသုံးပြုခြင်း

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၄။	ဆူညံသံ	• အဆောက်အဦများဖြိုချခြင်းမှ ထွက်ပေါ်လာသော ဆူညံသံများ • လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့် ယာဉ်ယန္တရားများ မောင်းနှင်ခြင်းနှင့် စက်များ လည်ပတ်ခြင်း	• လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့် ယာဉ်ယန္တရားများနှင့်စက်များအားပုံမှန်စစ် ဆေးခြင်း။ • ညအချိန်တွင် ဆူညံသံထွက်နိုင်သည့် ဖျက်သိမ်းသည့်လုပ်ငန်းများလုပ်ဆောင်ခြင် ခြင်းအား တားမြစ်ခြင်း။ • လုပ်ငန်းခွင်ကာကွယ်ရေး ပစ္စည်းများ အသုံးပြုစေခြင်း။
၅။	စွန့်ပစ်ပစ္စည်းများ	• ဖျက်သိမ်းရာမှ ထွက်ပေါ်လာသော စွန့်ပစ်ပစ္စည်းများ • အလုပ်သမားများမှ ထွက်ရှိလာသော မိလ္လာအညစ်အကြေးများနှင့်ရေဆိုးများ • ကုန်ထုတ်လုပ်ငန်းမှကျန်ရှိနေသော စွန့်ပစ်အမှိုက်များ	• ဖျက်သိမ်းရာမှ ထွက်ပေါ်လာသော အမှိုက်များကိုအမျိုးအစားခွဲကာ ရန်ကုန်မြို့ တော်စည်ပင်သာယာရေးကော်မတီနှင့် တိုနှင့်ဆက်သွယ်စွန့်ပစ်ခြင်း။ • စီမံကိန်းဆိုင်တွင်ယာယီယင်လုံသန့်စင်ခန်း အသုံးပြုစေခြင်း။ • အမှိုက်များကိုစနစ်တကျစွန့်ပစ်စေခြင်း။ • ဖြိုဖျက်ရေးလုပ်ငန်းခွင်မှဆောက်လုပ်ရေး ပစ္စည်းများကိုပြန်အသုံးချနိုင်သောနေရာတွင် ပြန်လည်အသုံးပြုစေခြင်း။
၆။	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး	• အဆောက်အဦများဖြိုချရာတွင် မတော်တဆမျက်စိဒဏ်ရာခြင်း • လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့် ယာဉ်ယန္တရားများ သွားလာခြင်း • ဖျက်သိမ်းထားသည့် ပစ္စည်းများအား သယ်ပို့ခြင်း	• လုပ်ငန်းခွင်ကာကွယ်ရေး ပစ္စည်းများ အသုံးပြုစေခြင်း။ • လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့်ယာဉ်ယန္တရားများသွား လာမှုကိုပုံမှန်စစ်ဆေးခြင်း။ • သတိပေးဆိုင်းဘုတ်များတပ်ဆင်ခြင်း • ကျမ်းကျင်သော ဖျက်သိမ်းရေး ဝန်ထမ်းများခန့်အပ်ခြင်း။

စဉ်	သက်ရောက်မှု	စီမံကိန်းဆောင်ရွက်ချက်	လျော့နည်းစေရန်အရေးယူ ဆောင်ရွက်မှု
၆။	လုပ်ငန်းခွင် ကျန်းမာရေးနှင့် ဘေးအန္တရာယ် ကင်းရှင်းရေး	• အဆောက်အဦများဖြိုချရာတွင် မတော်တဆမျက်စိဒဏ်ရာများ • လုပ်ငန်းဖျက်သိမ်းရာတွင် အသုံးပြုသည့် ယာဉ်ယန္တရားများ သွားလာခြင်း • ဖျက်သိမ်းထားသည့် ပစ္စည်းများအား သယ်ပို့ခြင်း	• ကျမ်းကျင်သော ဖျက်သိမ်းရေး ဝန်ထမ်းများခန့်အပ်ခြင်း။ • ဆေးပစ္စည်းအိတ်များလုပ်ငန်းခွင်တွင်ထား ပေးခြင်း။
၇။	မီးဘေးအန္တရာယ်	• ဖျက်သိမ်းထားသော ပစ္စည်းများစုပုံခြင်း	• မီးသတ်ဆေးဘူးများ ထားရှိခြင်း။ • မီးဘေးအန္တရာယ် ကာကွယ်ရေး အစီအစဉ်များရေးဆွဲခြင်း။

ပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေးများကိုစောင့်ကြည့်စစ်ဆေးမည့် အစီအစဉ်

စဉ်	ပတ်ဝန်းကျင်ဆိုင်ရာ အချက်အလက်	တိုင်းတာမည့် အကြိမ်အရေအတွက်	တိုင်းတာမည့်နေရာ
၁။	လေထုအရည်အသွေး	တစ်နှစ် နှစ်ကြိမ်	စက်ရုံဝင်းအတွင်း
၂။	ဆူညံသံ	တစ်နှစ် နှစ်ကြိမ်	စက်ရုံဝင်းအတွင်း (လုပ်ငန်းခွင်နေရာနှင့်စက်ရုံဂင်း တွင်းတစ်နေရာ)
၃။	မြေအောက်ရေ အရည်အသွေး	တစ်နှစ် တစ်ကြိမ်	စက်ရုံရှိ (အဝိစိတွင်း)
၄။	ရေဆိုးစွန့်ပစ်မှု	တစ်နှစ်သုံးကြိမ်	စက်ရုံရှိ ရေနတ်မြောင်း
၅။	မြေအရည်သွေး	တစ်နှစ်တစ်ကြိမ်	စက်ရုံးအတွင်း
၆	အမှိုက်စွန့်ပစ်မှု	အပတ်စဉ်	စက်ရုံအတွင်းအမှိုက်စွန့်ပစ်ရာနေရာ

မှတ်ချက်- တိုင်းတာမှုရလဒ်များသည် အမျိုးသားပတ်ဝန်းကျင်ဆိုင်ရာအရည်အသွေး(ထုတ်လွှတ်မှု) လမ်းညွှန်ချက်များအတွင်းသာ ဖြစ်ရ ပါမည် (သို့) ကျော်လွန်နေပါက လျော့ရဲရေးနည်းလမ်းစဉ်ဆောင်ရွက်ခြင်းမှ ပြုလုပ်ရမှာပင်၊ ခြောက်လတစ်ကြိမ်စောင့်ကြည့် စစ်ဆေးထားသော အစီရင်ခံစာကို ပတ်ဝန်းကျင်ထိန်းသိမ်းရေး ဦးစီးဌာန ရန်ကုန်သို့ တင်ပြရမည်ဖြစ်ပါသည်။

၉။ အရေးပေါ် ကိစ္စများအတွက်စီမံချက်

မီးဘေးအန္တရာယ်-မီးဘေး လျှံခြဲရေးစီမံချက် (ကြိုတင်/ဖြစ်ပွားချိန်/ပြန်လည်ထူထောင်ခြင်းကာလ) ရေးဆွဲခြင်း

ကြိုတင်ကာကွယ်ရာတွင် အသုံးပြုမည့်နည်းလမ်းများ	ဖြစ်ပွားချိန်အတည်ပြုပြီး ဖြေရှင်းမည့်နည်းလမ်း	ပြန်လည်ထူထောင်မည့် ကာလ
▪ မီးဘေးလျှံခြဲရေးစီမံချက်ရေးဆွဲခြင်း။ ▪ အရေးပေါ် မီးဘေးအန္တရာယ်သရုပ်ပြ လေ့ကျင့်ပေးခြင်း။ ▪ မြင်လွယ်ကြားလွယ်သောအချက်ပေးစနစ်များတပ်ဆင်ခြင်းနှင့်မီးသတ်ကိရိယာများကိုပုံမှန်စစ်ဆေးခြင်း။ ▪ မီးဘေးအန္တရာယ်သင်တန်းပေးခြင်း ▪ စက်ရုံအတွင်းမီးဘေးအန္တရာယ်ဖြစ်နိုင်သောဧရိယာများသတ်မှတ်ကာကြိုတင်ပြင်ဆင်မှုများပြုလုပ်ဆောင်ရွက်ထားခြင်းခြင်းကိုအလေးထားဆောင်ရွက်ခြင်း။	▶ အရေးပေါ်အခြေအနေအား အခြားနေရာများသို့ မပြန့်ပွားစေရန် ဆောင်ရွက်ခြင်း။ ▶ လူနှင့်ပစ္စည်းပျက်စီးဆုံးရှုံးမှုအနည်းဆုံးဖြစ်စေခြင်း။ ▶ အရေးပေါ်ထွက်ပေါက်များသတ်မှတ်ပေးထားခြင်း။ ▶ ထိရောက်သောကယ်ဆယ်မှု နှင့် ဆေးဝါးကုသမှုပေးခြင်း။ ▶ ဘေးကင်းရာသို့ ပို့ ဆောင်ပေးခြင်း။	✚ သက်ဆိုင်ရာတာဝန်ရှိသူများ၊ သက်ဆိုင်ရာအဖွဲ့အစည်းများနှင့် ပူးပေါင်းဆောင်ရွက်ခြင်း။

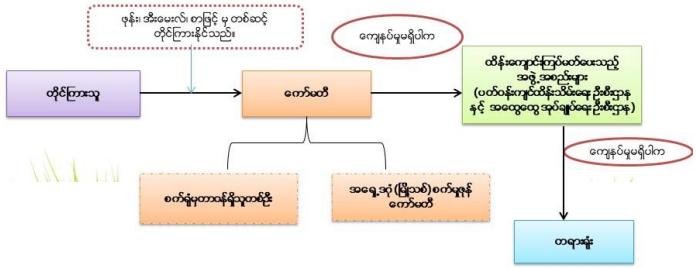
၁၀။ လူမှုစီးပွားတာဝန်ယူမှု (CSR)

✓ အဆိုပါ စီမံကိန်းနှင့် ပတ်သတ်ပြီး လူမှုစီးပွားတာဝန်သိတတ်မှု တာဝန်ယူမှု အတွက် BASF Myanmar မှ အသားတင်အမြတ်ငွေ၏ ၁% ကို ရန်ပုံငွေအဖြစ်ထားရှိပြီး စက်မှုဇုန်ပတ်ဝန်းကျင်ရှိ ဒေသခံများနှင့်ဒေသဖွံ့ဖြိုးတိုးတက်မှုလုပ်ငန်းများ အတွက် အဆိုပါရန်ပုံငွေကို အသုံးပြုသွားမည် ဖြစ်ပါသည်

၁၁။ မကျေလည်မှုများ ဖြေရှင်းပေးမည့် အစီအစဉ်

✓ တိုင်ကြားမှုသည် စာ/နှုတ်ဖြင့် တိုင်ကြားနိုင်ပြီး စာရွက်စာတမ်းဖြင့်တိုင်းကြားနိုင်ခြင်း

✓ ဖြစ်ပေါ်လာသောတိုင်ကြားမှုများကို စက်ရုံမှတာဝန်ခံ၊ စက်မှုဇုံကော်မတီ၊ ရပ်ကွက်အုပ်ချုပ်ရေးမှူး နှင့် ပတ်ဝန်းကျင်ထိန်းသိမ်းရေးဦးစီးဌာန အစရှိသဖြင့် အဆင့်ဆင့်မကျေလည်မှုများ ဖြေရှင်းရေးအစီစဉ်များကိုလဲ အစီရင်ခံစာတွင်ပြည့်စုံစွာဖော် ပြထားပြီး အဆင့်ဆင့် မြန်မာနိုင်ငံရှိတည်ဆဲ ဥပဒေများနှင့်အညီ ဆောင်ရွက်ဖြေရှင်းပေးသွားပါမည်။



၁၂။ နိဂုံးချုပ်နှင့်အကြံပြုချက်

ပတ်ဝန်းကျင်ဆန်းစစ်ခြင်း - သက်ရောက်မှု / ထိခိုက်မှု အနည်းငယ် ရှိ

အဆိုပါစီမံကိန်းကြောင့် ရရှိနိုင်သောအကျိုးကျေးဇူးများ - နိုင်ငံတော်အတွက် အခွန်ငွေရရှိစေခြင်း
- အလုပ်ကိုင်အခွင့်လမ်းနှင့်ဒေသဖွံ့ဖြိုးတိုးတက်စေခြင်း

ပတ်ဝန်းကျင်ထိခိုက်မှု အနည်းဆုံးဖြစ်စေရန်

✓ ကုန်ထုတ်လုပ်မှုလုပ်ငန်းစဉ်များကို သဘာဝပတ်ဝန်းကျင်နှင့်လူမှုပတ်ဝန်းကျင်ကို ထိခိုက်မှုအနည်းဆုံးဖြစ်စေရန် စီစဉ်ဆောင်ရွက်ခြင်း

✓ အဆိုပြုထားသည့်လျှော့ချရေး စီမံချက်များအား အကောင်အထည်ဖော်ဆောင်ရာတွင် ပတ်ဝန်းကျင်ထိခိုက်မှုအား တတ်နိုင်သမျှ အနည်းဆုံးဖြစ်စေမည့် နည်းလမ်းများဖြင့် ဆောင်ရွက်ရန်

✓ ပတ်ဝန်းကျင်ဆိုင်ရာ စီမံခန့်ခွဲမှုအစီစဉ်နှင့် စောင့်ကြပ်ကြည့်ရှုစစ်ဆေးရေး အစီအစဉ်များအတိုင်းလိုက်နာဆောင်ရွက်ခြင်း

✓ လက်တွေ့ လုပ်ငန်းအတွေ့အကြုံများကိုအခြေခံ၍ ပိုမိုကောင်းမွန်သောစီမံချက်များ ဆောင်ရွက်ရန်

✓ ရရှိလာသော တုန်ပြန်မှုနှင့်အတွေ့အကြုံသင်ခန်းစာများအပေါ် အခြေခံ၍စီမံချက်များကိုမွမ်းမံရန်

Appendix: 17 Commitment by Project Proponent

BASF
We create chemistry

Commitment to follow Environmental Conservation Law, Rules and Regulation, Environmental Standards and Mitigation Measures Stated in the Environmental Management Plan (EMP) of EIA Report

With regard to the above matter, we, BASF Myanmar Manufacturing Limited has established for Production and distribution of Construction Chemical Admixture products. Our company strongly commits that all our operations will be performed in an environmentally friendly manner by following Environmental Conservation Law 2012, Environmental Conservation Rules 2014, Environmental Impact Assessment Procedure and National Environmental Quality (emission) Guidelines (2015) and relevant environmental standards through successful implementation of mitigation measures stated in the Environmental Management Plan (EMP) of EIA Report.

BASF Myanmar Manufacturing Company Ltd. No..... Date.15/8/2019

Ms.Roschan Lohakitsongkam

Managing Director
BASF Myanmar Manufacturing Co.,Ltd

BASF Myanmar Manufacturing Company Ltd.
No. 159, Thon Chet Wun U Myu Road,
East Dagon Industrial Zone(1), Yangon,
Myanmar 11451

Appendix: 18 Commitment by Third Party

No. (11), Airport Avenue Road, (စလဆိပ်ရှိသာလမ်း)
Yangon Airport Road, Saw Bwar Gyi Gone Quarter,
Insein Township, Yangon 11011, Myanmar.
Tel: (95) 1 666512 Fax: (95) 19667757
H.P (95) 9 44801676

Commitment to follow and compliance with Environmental Conservation Law, Rules, Environmental Impact Assessment Procedure, National Environmental (Quality) Emission Guidelines, Standards and Mitigation Measures states in the Environment Impact Assessment (EIA) Report

With regard to the above matter, we, E Guard Environmental Services has prepared the Environmental Impact Assessment Report for Manufacturing of Construction Chemical Admixture Project proposed by BASF Myanmar Manufacturing Co., Ltd. Our company strongly commits that this EIA report has been prepared by the following Environmental Conservation Law (2012), Environmental Conservation Rules (2014), National Environmental Quality (Emission) Guideline (2015) and relevant environmental standards through successful implementation of mitigation measures stated in the Environmental Impact Assessment (EIA) of the Proposed Project.

Soe Min
Director
E guard Environmental Services

Email: info@eguardservices.com URL: www.eguardservices.com